

DAKE | WELLS
a r c h i t e c t u r e

Date: July 30, 2025

From: Alex Reeves,
Dake Wells Architecture
2100 Central St, suite 21, Kansas City, MO 64108
417-988-9631

Project: Lawrence Municipal Services and Operations Campus - Phase 1

23 74 16 -2.1 ENERGY RECOVERY VENTILATOR PRODUCT DATA R1

23041-Lawrence Municipal Services and Operations Campus - Phase 1

Comments:

See comments from PKMR MEP engineers within. No other exceptions taken.

DAKE | WELLS architecture, inc.
134 park central square, suite 300
springfield, mo 65806 p.417.831.9904

- REJECTED
- REVISE AND RESUBMIT
- MAKE CORRECTIONS NOTED
- NO EXCEPTIONS TAKEN

This review is for conformance with the design concept and compliance with the information given in the Contract Documents. This review is not for safety precautions, means, methods, procedures, techniques or construction sequences. This review does not warrant or represent that the information on the submittal is either accurate or complete. Contractor is responsible for all dimensions and quantities and for complying with the requirements of the Contract Documents.

REVIEWED BY areeves

DATE 07/30/2025



Submittal Review

Date: June 26, 2025

PKMR# 23.331

Project: Lawrence MSO

We have reviewed the following items: Attached

Returned: Electronic

Courier

Mail/UPS

Copies	Description
1	23 74 16-2.1 - ERVs

PEARSON KENT MCKINLEY RAAF ENGINEERS, LLC ENGINEER'S SUBMITTAL REVIEW STAMP


- REVIEWED – NO EXCEPTIONS TAKEN
- FURNISH AS NOTED OR CORRECTED
- REVISE & RESUBMIT INDICATED ITEMS ONLY
- REVISE & RESUBMIT ENTIRE SUBMITTAL
- REJECTED, RESUBMIT
- SUBMIT THE SPECIFIED ITEM(S)
- REVIEWED FOR INFORMATION ONLY
- REFER / RESPOND TO ATTACHED COMMENTS

Corrections or comments made on these submittals and/or shop drawings during this review do not relieve the contractor from compliance with the requirements of the contract documents, including the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents prepared by Pearson Kent McKinley Raaf Engineers, LLC. The contractor is still responsible for confirming and correlating all quantities and dimensions, selecting all fabrication processes and techniques of construction, coordinating their work with that of all other contractors, and performing their work in a safe and satisfactory manner.

Date 7/30/25 By: Kate M. Dennis

GENERAL COMMENTS: (Fully review submittal for additional specific comments in document)

1. Units shall have vertical inlet connection and horizontal discharge connection.
2. Provide with BACnet controller.
3. Provide field-wired service receptacle.

	SUBMITTAL REVIEW SUMMARY	
	Project Name	MSO Operations Campus - Phase 1
	Project Number	MS1-00023A
	Subject	23-7416 - 23-7416-2.1 ENERGY RECOVERY VENTILATOR (ERV) - Product Data R1
	Approval Status	Approved

Submittal Summary

Spec Section	23-7416	Submittal Item	23-7416-2.1 ENERGY RECOVERY VENTILATOR (ERV) - Product Data R1
Manufacturer	Trane (Temp-Con)	Category	Product Data
Description	Revision to SR-55		

Routing and Approval Summary

Submitted By	Buckley, Grace (McCownGordon Construction)
Reviewed By	
Approval Status	Approved

Comment Summary

Review Info	Review
By: ,	

Submittal #23 74 16-2.1 - ENERGY RECOVERY VENTILATOR (ERV) - Product Data R1

23 74 16 - ROOFTOP HEATING/COOLING UNITS (3-20 TON)

Revision	1	Submittal Manager	Grace Buckley (McCownGordon Construction, LLC)
Status	In Review	Date Created	May 12, 2025
Issue Date	Jun 18, 2025	Spec Section	23 74 16 - ROOFTOP HEATING/COOLING UNITS (3-20 TON)
Responsible Contractor	Temp-Con, LLC	Received From	Dylan Jenkins (Temp-Con, LLC)
Received Date	Jun 18, 2025	Submit By	
Final Due Date	Jul 16, 2025	Lead Time	
Sub Job		Cost Code	
Location		Type	Product Data

Submittal Package

Approvers	Grace Buckley (McCownGordon Construction, LLC), Zach Kremer (Entegrity Partners), Kate Dennis (PKMR Engineers), Alex Reeves (Dake Wells Architecture)
Ball in Court	Grace Buckley (McCownGordon Construction, LLC)
Distribution	Brad Corkrean (McCownGordon Construction, LLC), Dylan Jenkins (Temp-Con, LLC), Grace Buckley (McCownGordon Construction, LLC), Jason Dunlap (McCownGordon Construction, LLC), Kevin Miller (McCownGordon Construction, LLC), Lily Quitno (McCownGordon Construction, LLC), Phillip Garcia (Temp-Con, LLC), Tyler Logsdon (McCownGordon Construction, LLC), Clint Miller (Temp-Con, LLC)
Description	10 week leadtime

Submittal Workflow

Name	Sent Date	Due Date	Returned Date	Response	Attachments
General Information Attachments					
Grace Buckley		Jun 25, 2025		Pending	
Zach Kremer		Jul 2, 2025		Pending	
Kate Dennis		Jul 9, 2025		Pending	
Alex Reeves		Jul 16, 2025		Pending	

Project 07-2206 Submittal No. 237416-2.1

REVIEWED ONLY

Contractor's review is for general compliance with the information provided in the Contract Documents and for general conformance with the design concept of the project. Any action noted herein is subject to the requirements set forth in the Contract Documents. Subcontractor/Supplier is responsible for all dimensions which shall be confirmed at the jobsite; all fabrication processes and techniques of construction; the coordination of Subcontractor's work with that of all other trades, and the performance of Subcontractor's work in accordance with the Contract Documents

McCownGordon Construction

gbuckley 4:46:58 PM 06/18/2025

TEMP-CON

A TRIPLEPOINT COMPANY

15670 S. Keeler
Olathe KS 66062
(913) 768-4888

Submittal

Submittal#: 23.74.16 Rev 1

Submittal Date: 6/18/2025

To: MCCOWN GORDON CONSTRUCTION
850 Main St.
KANSAS CITY MO 64105

Project: 240062
Lawrence Municipal Services Operations
2425 E 15th St
Lawrence KS

Prepared By: Dylan Jenkins

Item	Description	Action Required	Date Required
1	ERV-1	For Approval	7/2/2025
2	ERV-2A	For Approval	7/2/2025
3	ERV-2B	For Approval	7/2/2025

Please sign and date this form as proof that you are in receipt of the above listed items.
Return form to Temp-Con, LLC

Signed: _____ Date: _____



Project Name	Lawrence MSO
Project Location	Lawrence KS
Mechanical Contractor	Temp-Con
SEMCO Representative	

Date	4/24/2025
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Customer Purchase Order Number	
SEMCO Job Number	

Submittal Provided by: SEMCO, LLC
1800 East Pointe Drive
Columbia, Missouri 65201-3508
Phone: (573) 443-1481
Fax: (573) 886-5408

Please Note:

Once this submittal is approved or approved "as noted", a complete copy of this document must be returned to the SEMCO office before the equipment can be released for fabrication. An approval area has been provided for your convenience.

Disapproval or approved "as noted" actions should be indicated on the appropriate individual submittal sheets.

Approved as Submitted Name: _____

Approved as Noted Date: _____

FV Output Section



Project Name	Lawrence MSO
Project Location	Lawrence KS
Mechanical Contractor	Temp-Con
SEMCO Representative	

Unit Designation	ERV-2A	Date	4/24/2025
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Unit Size and Options Selected

Quantity (1) - FV-2000 - Fresh Air Preconditioner

- SEMCO 3 angstrom total energy wheel
- Antimicrobial/anti-corrosion wheel face coating
- Wheel cassette slides in and out for service
- Outdoor Unit
- Outdoor air filter - MERV 8
- Return air filter - MERV 8
- Outdoor Damper - actuator and control
- HS Configuration
- Antimicrobial cleanable foam insulation
- Standard paint finish
- Standard roof curb for unit
- 480V/3Ph
- Stop/Jog Economizer Wheel Control
- Rotation Detector with Alarm Relay
- Unit On/Off Frost Control Thermostat
- Remote Indicating Panel (Run, Filter, Wheel Rotation Status)
- Hinged access door for filter, wheel and fan inspection
- 20 gauge galvanized steel enclosure
- DWDI fans
- 24 volt remote start/stop terminals provided
- Fan VFD - prewired (supply and exhaust)
- Disconnect - (non-fused)
- Spare set of outdoor and return filters
- 5 year limited warranty

Fan and Electrical Data

Fan Data	Airflow (scfm)	External Static Pressure (inwg)	Motor Brake Horsepower*	Fan Speed (RPM)
Supply Air	2,075	0.50	1.81	1,740
Return Air	2,075	0.25	1.86	1,771

* 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	2.00	480V/3Ph	9.1	10.0	15.0
Return Air	2.00				

* maximum overload circuit protection

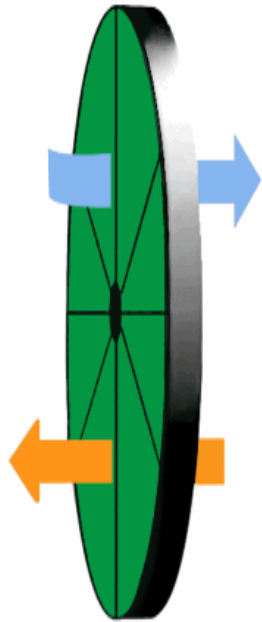
Electrical Data	Recommended Disconnect*
Single Point Connection	30 Amp

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



Recovery Wheel Performance Data: Cooling Season **Model Chosen: FV-2000**

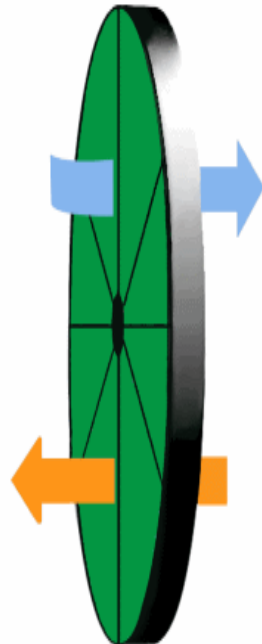
Outdoor Airstream	
Dry bulb (°F)	100.0
Wet bulb (°F)	77.0
Grains	103.4
Enthalpy (BTU/Lb)	40.3
Exhaust Airstream	
Dry bulb (°F)	91.7
Wet bulb (°F)	72.8
Grains	91.3
Enthalpy (BTU/Lb)	36.4
Unit Effectiveness 0.67	
Supply Sensible Efficiency	0.67
Supply Latent Efficiency	0.67



Supply Airstream	
Dry bulb (°F)	83.3
Wet bulb (°F)	68.2
Grains	79.2
Enthalpy (BTU/Lb)	32.4
Airflow (scfm)	2,075
Return Airstream	
Dry bulb (°F)	75.0
Wet bulb (°F)	63.0
Grains	67.1
Enthalpy (BTU/Lb)	28.5
Relative Humidity	52%
Airflow (scfm)	2,075
Supply Air Pressure Loss	0.66
Exhaust Air Pressure Loss	0.65

Recovery Wheel Performance Data: Heating Season

Outdoor Airstream	
Dry bulb (°F)	-10.0
Wet bulb (°F)	-11.0
Grains	1.5
Enthalpy (BTU/Lb)	-2.2
Exhaust Airstream	
Dry bulb (°F)	16.7
Wet bulb (°F)	16.3
Grains	12.0
Enthalpy (BTU/Lb)	5.8
Unit Effectiveness 0.67	
Supply Sensible Efficiency	0.67
Supply Latent Efficiency	0.67
Min Cooling Season RER	184.2



Supply Airstream	
Dry bulb (°F)	43.3
Wet bulb (°F)	37.0
Grains	22.4
Enthalpy (BTU/Lb)	13.9
Airflow (scfm)	2,075
Return Airstream	
Dry bulb (°oF)	70.0
Wet bulb (°F)	53.0
Grains	32.9
Enthalpy (BTU/Lb)	21.9
Relative Humidity	30%
Airflow (scfm)	2,075
Supply Air Pressure Loss	0.57
Exhaust Air Pressure Loss	0.61
Purge Pres Differential (in)	2.00

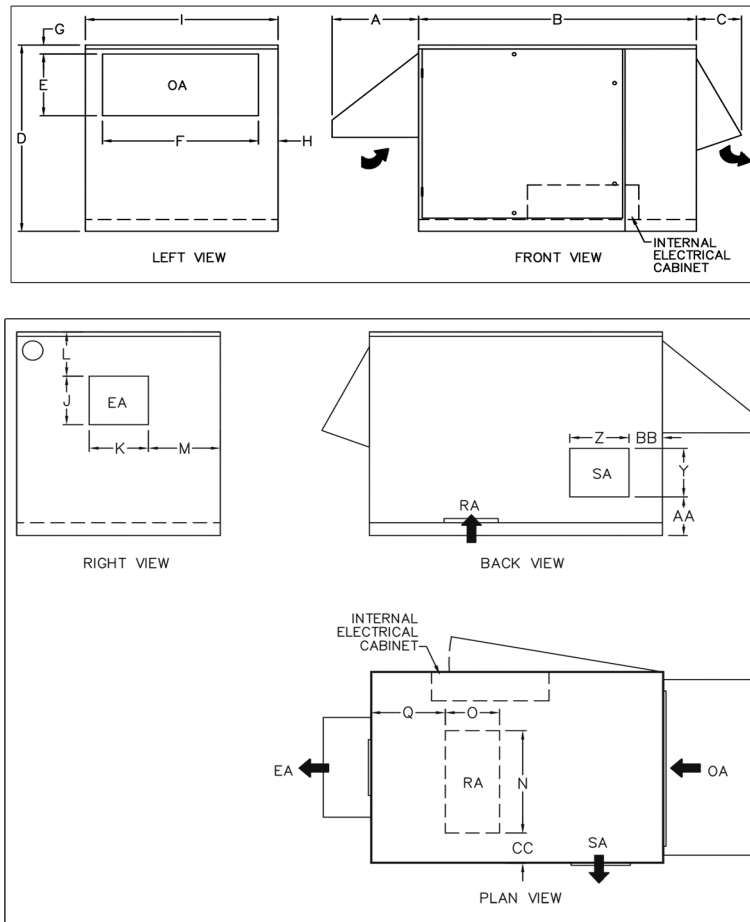
Cooling Season RER total 90.4

Heating Season RER total 184.2

Dimensions and Weight

ERV-2A

FV-2000

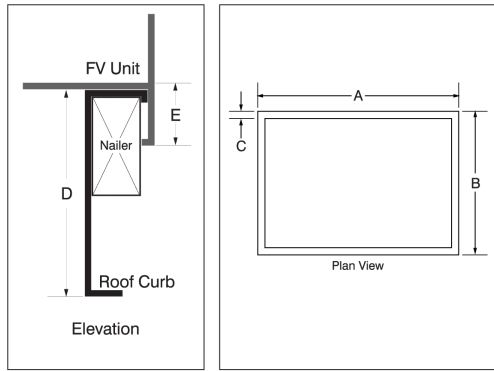


Dimensions and Weights (inches)

A	20.4	Q	
B	51.4	R	
C	16.7	S	
D	32.6	T	
E	9.1	U	7.8
F	28.5	V	23.0
G	2.5	W	3.2
H	4.5	X	2.7
I	37.0	Y	10.1
J	10.2	Z	11.7
K	11.7	AA	4.9
L	4.3	BB	4.3
M	7.3	CC	
N		DD	17.4
O		EE	24.7
P		Weight	550 Lbs

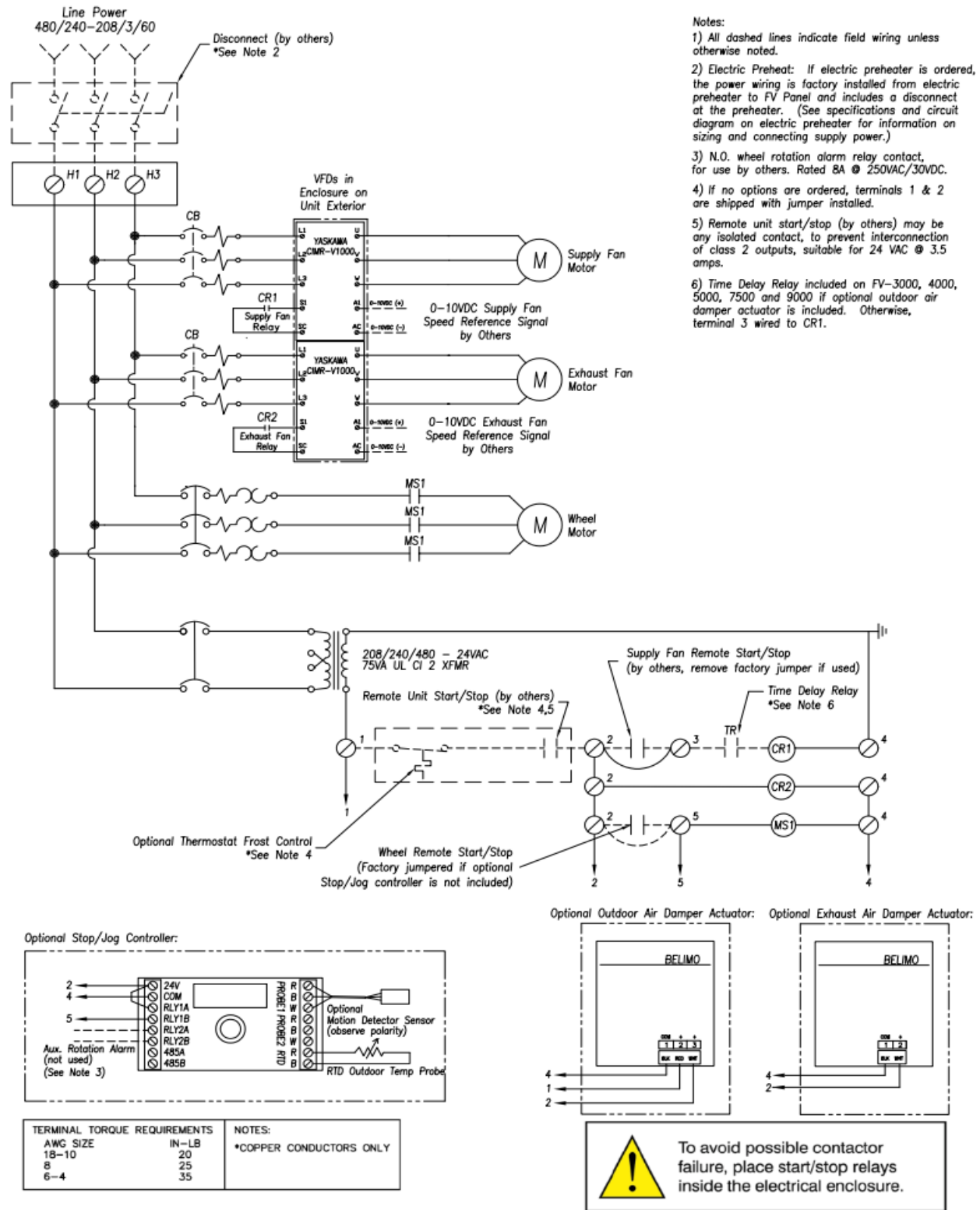
Curb Mounting Details

ERV-2A

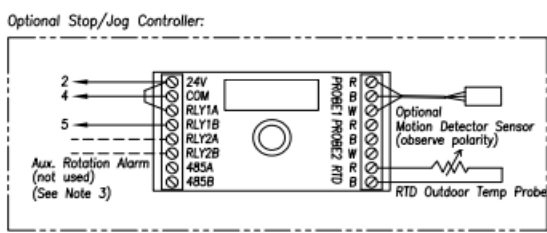


Electrical Diagram

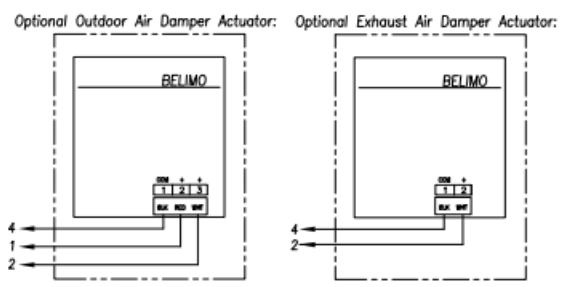
ERV-2A




- Notes:
- 1) All dashed lines indicate field wiring unless otherwise noted.
 - 2) Electric Preheat: If electric preheater is ordered, the power wiring is factory installed from electric preheater to FV Panel and includes a disconnect at the preheater. (See specifications and circuit diagram on electric preheater for information on sizing and connecting supply power.)
 - 3) N.O. wheel rotation alarm relay contact, for use by others. Rated 8A @ 250VAC/30VDC.
 - 4) If no options are ordered, terminals 1 & 2 are shipped with jumper installed.
 - 5) Remote unit start/stop (by others) may be any isolated contact, to prevent interconnection of class 2 outputs, suitable for 24 VAC @ 3.5 amps.
 - 6) Time Delay Relay included on FV-3000, 4000, 5000, 7500 and 9000 if optional outdoor air damper actuator is included. Otherwise, terminal 3 wired to CR1.



TERMINAL TORQUE REQUIREMENTS		NOTES:
AWG SIZE	IN-LB	*COPPER CONDUCTORS ONLY
18-10	20	
8	25	
6-4	35	



 To avoid possible contactor failure, place start/stop relays inside the electrical enclosure.

Total Energy Recovery Wheel

The rotor media will be made of aluminum which is coated to prohibit corrosion. All surfaces will be coated with a non-migrating adsorbent specifically developed for the selective transfer of water vapor. Verification in writing will be presented from the desiccant manufacturer confirming that the internal pore diameter distribution inherent in the desiccant being provided limits adsorption to materials not larger than the critical diameter of a water molecule (2.8 angstroms). In addition, the face of the media will be coated with an acid resistant coating to provide maximum protection against face oxidation. Equal sensible and latent recovery efficiencies will be clearly documented through a certification program conducted in accordance with ASHRAE 84-78P and ARI 1060 standards. The media will be cleanable with low temperature steam, hot water or light detergent, without degrading the latent recovery. Dry particles up to 600 microns will freely pass through the media. Wheel media will be independently tested and shown to conform with the requirements of NFPA-90A, documenting a flame spread of less than 25 and a smoke generation rating of less than 50.

Rotor Cassette - The rotor cassette will be a sheet metal framework which limits the deflection of the rotor due to air pressure. The cassette will be made of galvanized steel to prevent corrosion. The rotor cassette will be easily removable from the Energy Recovery Unit to facilitate rigging (if necessary) and ease of service. The wheel cassette design will use pillow block bearings for long life. A non-adjustable purge sector will be included in the cassette.

Unit Casing

Panels will be 20 gauge galvanized steel, lined with 1/2 inch thick neoprene insulation where required. The housing will be supported by a formed structural base that forms a pan to ensure weather tight construction. Lifting holes will be provided at the unit base. Units will have a weatherproof sheet metal roof. The outdoor air intake opening will be protected by a galvanized steel sheet metal weather hood(except for indoor construction) and include an automatic shutoff damper with electric operator. The exhaust air discharge will be covered with a gravity backdraft damper and weather hood(except for indoor construction).

Access

Access to components will be provided through a large, hinged, tightly sealed and easily removable access door. Access doors will be constructed of the same materials as the unit casing and use SEMCO's standard hardware. The wheel cassette will be easily removable from the unit. The roof of the unit will also be removable for access.

Unit Configuration

The supply air inlet and exhaust air outlet must be oriented at opposite ends of the Energy Recovery System to maximize the distance between the two airstreams in order to minimize the risk of short circuiting exhaust air into the supply air intake.

Fans

Fans will be double width double inlet design with forward curve type wheels. The blades will be designed for maximum efficiency and quiet operation. Impellers will be statically and dynamically balanced.

Fans will be driven by direct drive motors located at the fan inlet or by motors using belts and sheaves. Motors will be standard NEMA frame with open drip-proof enclosures. V-belt drives will be designed for a minimum 1.2 service factor.

Electric Panel

Units will require a single point 60 cycle power connection at the voltage and phase listed within this submittal. The electrical panel will consist of individual motor contactors, short circuit and overload protection and control power transformer. The electrical panel will be mounted interior to the unit behind the access door. Unit will be ETL listed and labeled.

Filters

The **outdoor air** filters will be 2-inch thick, pleated replaceable MERV 8 filters, listed as Class 2 in accordance with UL 900.

The **return air** filters will be 2-inch thick, pleated replaceable MERV 8 filters, listed as Class 2 in accordance with UL 900.

Exterior Finish

The exterior of the unit will be coated with an alkyd enamel painting system for added protection.

Recovery Wheel Control

Unit is equipped with a stop/jog control option for both economizer operation and frost prevention, and also includes a freeze protection thermostat to shut down the entire recovery system at a predetermined, extreme cold weather condition.

Remote Indicating Panel and Rotation Detector

Panel shall provide remote indication of status of unit power on, wheel rotation alarm, outside air dirty filter and return air dirty filter. Low voltage LED's will be illuminated for power on, wheel stop, filter pressure drop exceeding 0.8" w.c. LED's are factory mounted in a brushed aluminum faceplate with identification label and are factory wired to a terminal strip. Panel includes a junction box and plaster ring for either recessed or surface mounting. FV unit will include factory mounted pressure switches and electrical components wired to a terminal strip located in an exterior weatherproof junction box. Field wiring between the FV unit and the remote panel using Belden 5 conductor 8465 (20-gauge) or equivalent.

Freeze Protection Thermostat

Unit will be equipped with an outdoor air temperature thermostat such that the energy recovery ventilator can be stopped during very low temperature periods. This thermostat will stop the both the fans and the energy recovery wheel until the outdoor air temperature rises above the setpoint, then the unit will restart automatically.

Roof Curb

Units will be provided with a non-insulated roof curb sized to fit just inside of the unit's self flashing base. Curb will be fourteen inches tall and will have a wood nailer on the perimeter for attaching unit.

Disconnect

Unit shall be provided with a non-fused safety disconnect switch sized to provide a suitable disconnecting means for the unit. The disconnect is to be shipped loose for field installation.

Fan Frequency Inverters

Variable speed fan control is accomplished by the use of a 3 Phase frequency inverter. The inverter includes a keypad operator with a status display and is mounted in a enclosure on the exterior of the unit. The drive system will be wired at the factory and loaded with a default program to make it operational.

Sole and Exclusive Warranty

SEMCO warrants to Buyer that for a period of eighteen months from the date of shipment by SEMCO the goods to be delivered to Buyer will in all material respects be free from defects in material and workmanship when used in a proper and normal manner. Should any failure to conform to the above appear within eighteen months after the date of shipment by SEMCO (the "Limited Warranty Period"), SEMCO agrees upon prompt notification thereof during the Limited Warranty Period and confirmation to SEMCO's satisfaction that the goods have been stored, installed,

5 Year Limited Extended Warranty

SEMCO LLC warrants to Buyer for a period of 60 months that the energy recovery unit and components will be free from mechanical defects, defective workmanship and materials when used in a proper and normal manner. SEMCO INCORPORATED's Standard Terms & Conditions of Sale remain in force and applicable. The warranty option covers equipment and components warranted by SEMCO, to be free from mechanical defects, defective workmanship and materials for the "Agreement Term".

5 Year Limited Extended Warranty Details

SEMCO INCORPORATED's Standard Terms & Conditions of Sale remain in force and applicable. The warranty option covers equipment and components warranted by SEMCO, to be free from mechanical defects, defective workmanship and materials for the "Agreement Term". Replacement parts only are included in this additional warranty contract. This Extended Warranty is effective based on the information herein. Claim Coverage under the plan selected will commence upon the date the unit(s) are shipped and upon payment of the required charge. Claim Coverage shall end on the date indicated under "Agreement Term" Expiration. The SEMCO unit(s) must be properly installed, operated and maintained in accordance with the unit owner's manual provided with each SEMCO unit. Failure to provide maintenance per SEMCO instructions will void the warranty. The following components are not covered by this warranty: cabinets, cabinet pieces, paint, air filters, belts, wiring, fuses, refrigerant, driers, DDC controls and open element electric (pre or post) heaters. Coils failing due to freeze up are also excluded. This warranty is void if the covered equipment is removed from the original installation site. This warranty excludes abuse, vandalism, lack of maintenance, shipping damage, theft and natural or other disasters. This warranty excludes labor to install replacement parts. Modification, change or alteration of the SEMCO units will void the warranty, except as directed in writing by SEMCO. SEMCO will provide Replacement Part(s) including standard ground shipment or reimbursement (requires prior SEMCO approval) to the holder of the warranty for said parts for the duration of the warranty. The installation of replacement parts under the terms of this warranty does not extend the original warranty period. SEMCO Incorporated's Standard Terms & Conditions of Sale remain in force and applicable.

FV Output Section



Project Name	Lawrence MSO
Project Location	Lawrence KS
Mechanical Contractor	Temp-Con
SEMCO Representative	

Unit Designation	ERV-1	Date	4/24/2025
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Unit Size and Options Selected

Quantity (1) - **FV-2000** - Fresh Air Preconditioner

- SEMCO 3 angstrom total energy wheel
- Antimicrobial/anti-corrosion wheel face coating
- Wheel cassette slides in and out for service
- Outdoor Unit
- Outdoor air filter - MERV 8
- Return air filter - MERV 8
- Outdoor Damper - actuator and control
- HS Configuration
- Antimicrobial cleanable foam insulation
- Standard paint finish
- Standard roof curb for unit
- 480V/3Ph
- Stop/Jog Economizer Wheel Control
- Rotation Detector with Alarm Relay
- Unit On/Off Frost Control Thermostat
- Remote Indicating Panel (Run, Filter, Wheel Rotation Status)
- Hinged access door for filter, wheel and fan inspection
- 20 gauge galvanized steel enclosure
- DWDI fans
- 24 volt remote start/stop terminals provided
- Fan VFD - prewired (supply and exhaust)
- Disconnect - (non-fused)
- Spare set of outdoor and return filters

Fan and Electrical Data

Fan Data	Airflow (scfm)	External Static Pressure (inwg)	Motor Brake Horsepower*	Fan Speed (RPM)
Supply Air	1,050	0.50	0.41	1,195
Return Air	1,050	0.25	0.35	1,100

* 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	0.75	480V/3Ph	4.7	5.0	15.0
Return Air	0.75				

* maximum overload circuit protection

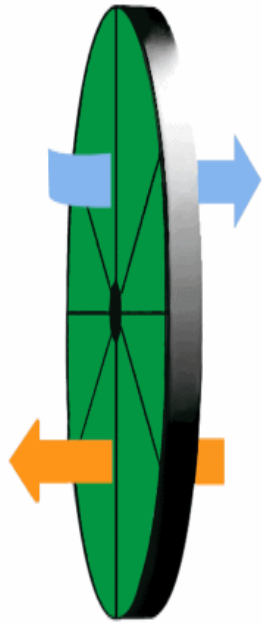
Electrical Data	Recommended Disconnect*
Single Point Connection	30 Amp

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



Recovery Wheel Performance Data: Cooling Season **Model Chosen: FV-2000**

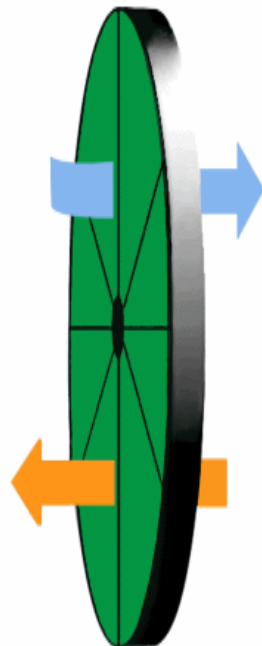
Outdoor Airstream	
Dry bulb (°F)	100.0
Wet bulb (°F)	77.0
Grains	103.4
Enthalpy (BTU/Lb)	40.3
Exhaust Airstream	
Dry bulb (°F)	95.4
Wet bulb (°F)	74.9
Grains	97.7
Enthalpy (BTU/Lb)	38.3
Unit Effectiveness	0.77
Supply Sensible Efficiency	0.77
Supply Latent Efficiency	0.77



Supply Airstream	
Dry bulb (°F)	84.6
Wet bulb (°F)	69.5
Grains	84.3
Enthalpy (BTU/Lb)	33.5
Airflow (scfm)	1,050
Return Airstream	
Dry bulb (°F)	80.0
Wet bulb (°F)	67.0
Grains	78.6
Enthalpy (BTU/Lb)	31.5
Relative Humidity	51%
Airflow (scfm)	1,050
Supply Air Pressure Loss	0.29
Exhaust Air Pressure Loss	0.29

Recovery Wheel Performance Data: Heating Season

Outdoor Airstream	
Dry bulb (°F)	-10.0
Wet bulb (°F)	-11.0
Grains	1.5
Enthalpy (BTU/Lb)	-2.2
Exhaust Airstream	
Dry bulb (°F)	6.0
Wet bulb (°F)	5.6
Grains	6.6
Enthalpy (BTU/Lb)	2.5
Unit Effectiveness	0.77
Supply Sensible Efficiency	0.77
Supply Latent Efficiency	0.77
Min Cooling Season RER	281.4



Supply Airstream	
Dry bulb (°F)	44.0
Wet bulb (°F)	36.1
Grains	18.8
Enthalpy (BTU/Lb)	13.4
Airflow (scfm)	1,050
Return Airstream	
Dry bulb (°oF)	60.0
Wet bulb (°F)	46.0
Grains	23.9
Enthalpy (BTU/Lb)	18.1
Relative Humidity	31%
Airflow (scfm)	1,050
Supply Air Pressure Loss	0.25
Exhaust Air Pressure Loss	0.26
Purge Pres Differential (in)	2.00

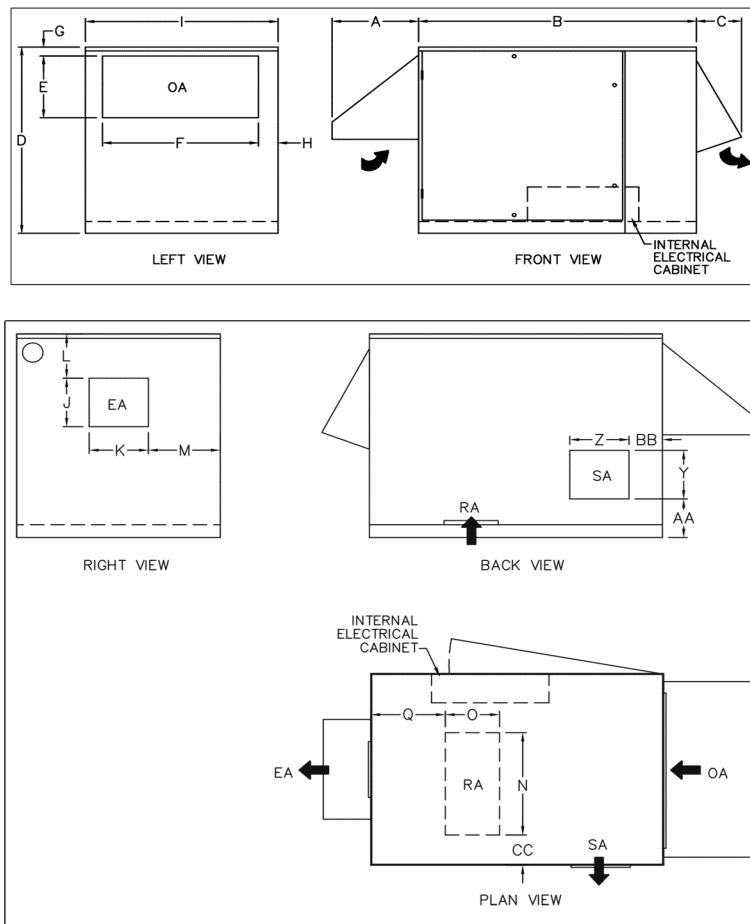
Cooling Season RER total 122.3

Heating Season RER total 281.4

Dimensions and Weight

ERV-1

FV-2000

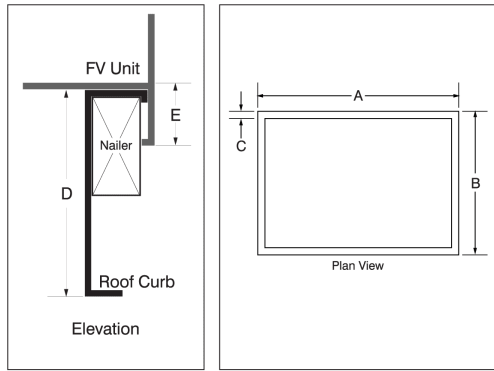


Dimensions and Weights (inches)

A	20.4	Q	
B	51.4	R	
C	16.7	S	
D	32.6	T	
E	9.1	U	7.8
F	28.5	V	23.0
G	2.5	W	3.2
H	4.5	X	2.7
I	37.0	Y	10.1
J	10.2	Z	11.7
K	11.7	AA	4.9
L	4.3	BB	4.3
M	7.3	CC	
N		DD	17.4
O		EE	24.7
P		Weight	550 Lbs

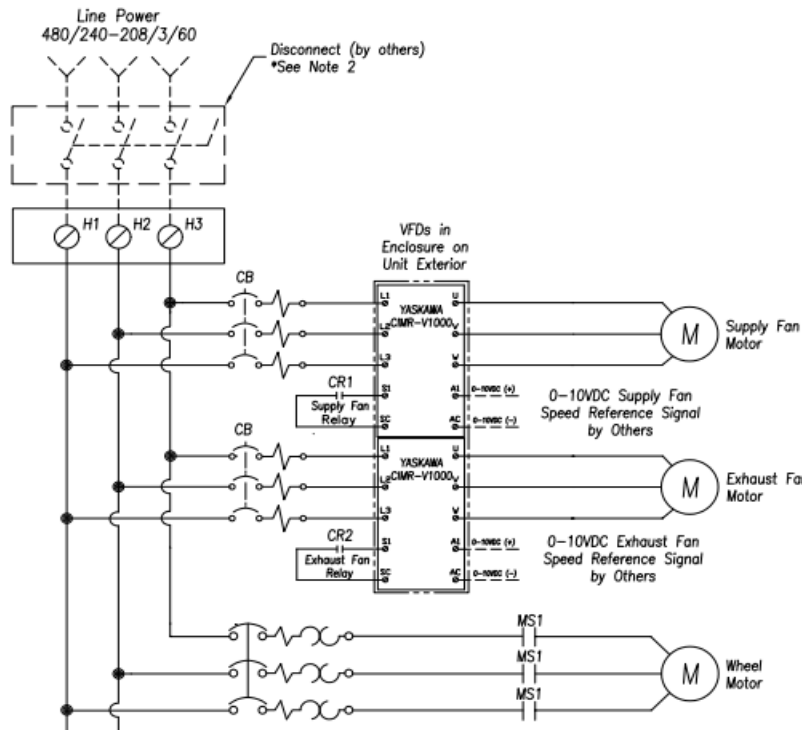
Curb Mounting Details

ERV-1

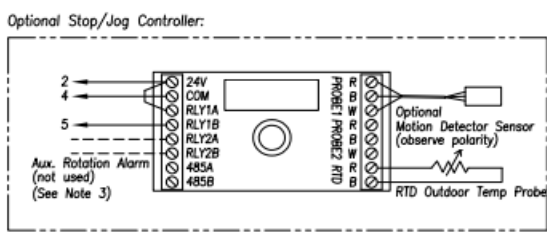
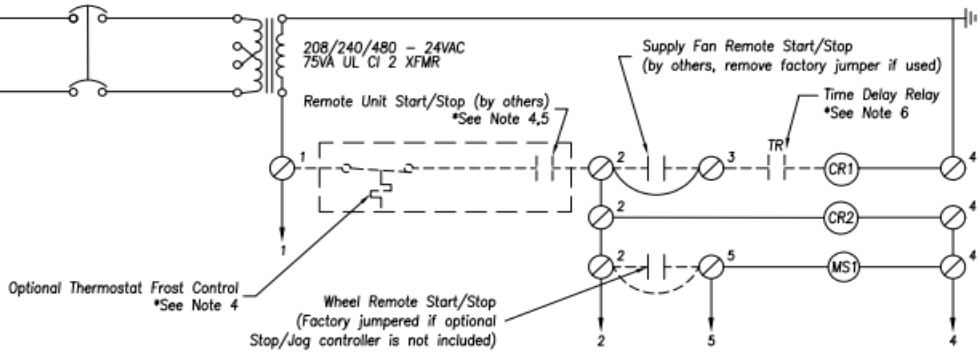


Electrical Diagram

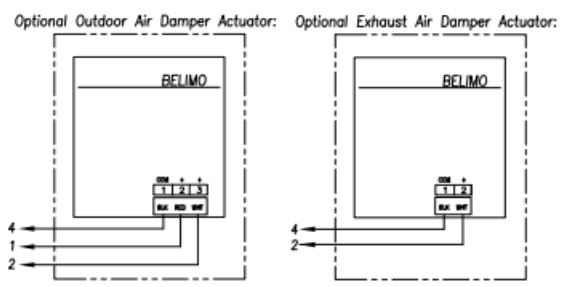
ERV-1



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 - 2) Electric Preheat: If electric preheater is ordered, the power wiring is factory installed from electric preheater to FV Panel and includes a disconnect at the preheater. (See specifications and circuit diagram on electric preheater for information on sizing and connecting supply power.)
 - 3) N.O. wheel rotation alarm relay contact, for use by others. Rated 8A @ 250VAC/30VDC.
 - 4) If no options are ordered, terminals 1 & 2 are shipped with jumper installed.
 - 5) Remote unit start/stop (by others) may be any isolated contact, to prevent interconnection of class 2 outputs, suitable for 24 VAC @ 3.5 amps.
 - 6) Time Delay Relay included on FV-3000, 4000, 5000, 7500 and 9000 if optional outdoor air damper actuator is included. Otherwise, terminal 3 wired to CR1.



TERMINAL TORQUE REQUIREMENTS		NOTES:
AWG SIZE	IN-LB	*COPPER CONDUCTORS ONLY
18-10	20	
8	25	
6-4	35	



To avoid possible contactor failure, place start/stop relays inside the electrical enclosure.

Total Energy Recovery Wheel

The rotor media will be made of aluminum which is coated to prohibit corrosion. All surfaces will be coated with a non-migrating adsorbent specifically developed for the selective transfer of water vapor. Verification in writing will be presented from the desiccant manufacturer confirming that the internal pore diameter distribution inherent in the desiccant being provided limits adsorption to materials not larger than the critical diameter of a water molecule (2.8 angstroms). In addition, the face of the media will be coated with an acid resistant coating to provide maximum protection against face oxidation. Equal sensible and latent recovery efficiencies will be clearly documented through a certification program conducted in accordance with ASHRAE 84-78P and ARI 1060 standards. The media will be cleanable with low temperature steam, hot water or light detergent, without degrading the latent recovery. Dry particles up to 600 microns will freely pass through the media. Wheel media will be independently tested and shown to conform with the requirements of NFPA-90A, documenting a flame spread of less than 25 and a smoke generation rating of less than 50.

Rotor Cassette - The rotor cassette will be a sheet metal framework which limits the deflection of the rotor due to air pressure. The cassette will be made of galvanized steel to prevent corrosion. The rotor cassette will be easily removable from the Energy Recovery Unit to facilitate rigging (if necessary) and ease of service. The wheel cassette design will use pillow block bearings for long life. A non-adjustable purge sector will be included in the cassette.

Unit Casing

Panels will be 20 gauge galvanized steel, lined with 1/2 inch thick neoprene insulation where required. The housing will be supported by a formed structural base that forms a pan to ensure weather tight construction. Lifting holes will be provided at the unit base. Units will have a weatherproof sheet metal roof. The outdoor air intake opening will be protected by a galvanized steel sheet metal weather hood(except for indoor construction) and include an automatic shutoff damper with electric operator. The exhaust air discharge will be covered with a gravity backdraft damper and weather hood(except for indoor construction).

Access

Access to components will be provided through a large, hinged, tightly sealed and easily removable access door. Access doors will be constructed of the same materials as the unit casing and use SEMCO's standard hardware. The wheel cassette will be easily removable from the unit. The roof of the unit will also be removable for access.

Unit Configuration

The supply air inlet and exhaust air outlet must be oriented at opposite ends of the Energy Recovery System to maximize the distance between the two airstreams in order to minimize the risk of short circuiting exhaust air into the supply air intake.

Fans

Fans will be double width double inlet design with forward curve type wheels. The blades will be designed for maximum efficiency and quiet operation. Impellers will be statically and dynamically balanced.

Fans will be driven by direct drive motors located at the fan inlet or by motors using belts and sheaves. Motors will be standard NEMA frame with open drip-proof enclosures. V-belt drives will be designed for a minimum 1.2 service factor.

Electric Panel

Units will require a single point 60 cycle power connection at the voltage and phase listed within this submittal. The electrical panel will consist of individual motor contactors, short circuit and overload protection and control power transformer. The electrical panel will be mounted interior to the unit behind the access door. Unit will be ETL listed and labeled.

Filters

The **outdoor air** filters will be 2-inch thick, pleated replaceable MERV 8 filters, listed as Class 2 in accordance with UL 900.

The **return air** filters will be 2-inch thick, pleated replaceable MERV 8 filters, listed as Class 2 in accordance with UL 900.

Exterior Finish

The exterior of the unit will be coated with an alkyd enamel painting system for added protection.

Recovery Wheel Control

Unit is equipped with a stop/jog control option for both economizer operation and frost prevention, and also includes a freeze protection thermostat to shut down the entire recovery system at a predetermined, extreme cold weather condition.

Remote Indicating Panel and Rotation Detector

Panel shall provide remote indication of status of unit power on, wheel rotation alarm, outside air dirty filter and return air dirty filter. Low voltage LED's will be illuminated for power on, wheel stop, filter pressure drop exceeding 0.8" w.c. LED's are factory mounted in a brushed aluminum faceplate with identification label and are factory wired to a terminal strip. Panel includes a junction box and plaster ring for either recessed or surface mounting. FV unit will include factory mounted pressure switches and electrical components wired to a terminal strip located in an exterior weatherproof junction box. Field wiring between the FV unit and the remote panel using Belden 5 conductor 8465 (20-gauge) or equivalent.

Freeze Protection Thermostat

Unit will be equipped with an outdoor air temperature thermostat such that the energy recovery ventilator can be stopped during very low temperature periods. This thermostat will stop the both the fans and the energy recovery wheel until the outdoor air temperature rises above the setpoint, then the unit will restart automatically.

Roof Curb

Units will be provided with a non-insulated roof curb sized to fit just inside of the unit's self flashing base. Curb will be fourteen inches tall and will have a wood nailer on the perimeter for attaching unit.

Disconnect

Unit shall be provided with a non-fused safety disconnect switch sized to provide a suitable disconnecting means for the unit. The disconnect is to be shipped loose for field installation.

Fan Frequency Inverters

Variable speed fan control is accomplished by the use of a 3 Phase frequency inverter. The inverter includes a keypad operator with a status display and is mounted in a enclosure on the exterior of the unit. The drive system will be wired at the factory and loaded with a default program to make it operational.

Sole and Exclusive Warranty

SEMCO warrants to Buyer that for a period of eighteen months from the date of shipment by SEMCO the goods to be delivered to Buyer will in all material respects be free from defects in material and workmanship when used in a proper and normal manner. Should any failure to conform to the above appear within eighteen months after the date of shipment by SEMCO (the "Limited Warranty Period"), SEMCO agrees upon prompt notification thereof during the Limited Warranty Period and confirmation to SEMCO's satisfaction that the goods have been stored, installed,

FV Output Section



Project Name	Lawrence MSO
Project Location	Lawrence KS
Mechanical Contractor	Temp-Con
SEMCO Representative	

Unit Designation	ERV-2B	Date	4/24/2025
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Unit Size and Options Selected

Quantity (1) - FV-2000 - Fresh Air Preconditioner

- SEMCO 3 angstrom total energy wheel
- Antimicrobial/anti-corrosion wheel face coating
- Wheel cassette slides in and out for service
- Outdoor Unit
- Outdoor air filter - MERV 8
- Return air filter - MERV 8
- Outdoor Damper - actuator and control
- HS Configuration
- Antimicrobial cleanable foam insulation
- Standard paint finish
- Standard roof curb for unit
- 480V/3Ph
- Stop/Jog Economizer Wheel Control
- Rotation Detector with Alarm Relay
- Unit On/Off Frost Control Thermostat
- Remote Indicating Panel (Run, Filter, Wheel Rotation Status)
- Hinged access door for filter, wheel and fan inspection
- 20 gauge galvanized steel enclosure
- DWDI fans
- 24 volt remote start/stop terminals provided
- Fan VFD - prewired (supply and exhaust)
- Disconnect - (non-fused)
- Spare set of outdoor and return filters
- 5 year limited warranty

Fan and Electrical Data

Fan Data	Airflow (scfm)	External Static Pressure (inwg)	Motor Brake Horsepower*	Fan Speed (RPM)
Supply Air	2,075	0.50	1.81	1,740
Return Air	2,075	0.25	1.86	1,771

* 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	2.00	480V/3Ph	9.1	10.0	15.0
Return Air	2.00				

* maximum overload circuit protection

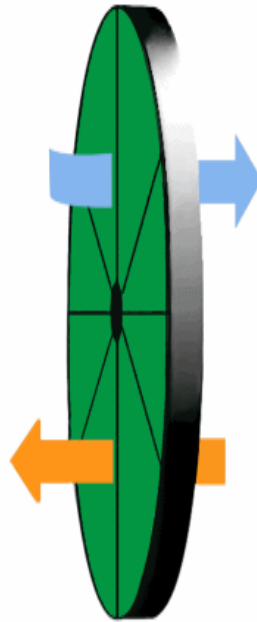
Electrical Data	Recommended Disconnect*
Single Point Connection	30 Amp

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



Recovery Wheel Performance Data: Cooling Season **Model Chosen: FV-2000**

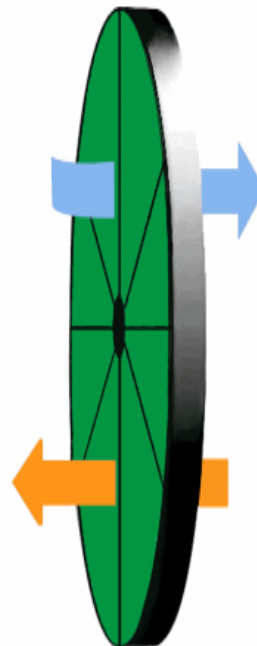
Outdoor Airstream	
Dry bulb (°F)	100.0
Wet bulb (°F)	77.0
Grains	103.4
Enthalpy (BTU/Lb)	40.3
Exhaust Airstream	
Dry bulb (°F)	91.7
Wet bulb (°F)	72.8
Grains	91.3
Enthalpy (BTU/Lb)	36.4
Unit Effectiveness	0.67
Supply Sensible Efficiency	0.67
Supply Latent Efficiency	0.67



Supply Airstream	
Dry bulb (°F)	83.3
Wet bulb (°F)	68.2
Grains	79.2
Enthalpy (BTU/Lb)	32.4
Airflow (scfm)	2,075
Return Airstream	
Dry bulb (°F)	75.0
Wet bulb (°F)	63.0
Grains	67.1
Enthalpy (BTU/Lb)	28.5
Relative Humidity	52%
Airflow (scfm)	2,075
Supply Air Pressure Loss	0.66
Exhaust Air Pressure Loss	0.65

Recovery Wheel Performance Data: Heating Season

Outdoor Airstream	
Dry bulb (°F)	-10.0
Wet bulb (°F)	-11.0
Grains	1.5
Enthalpy (BTU/Lb)	-2.2
Exhaust Airstream	
Dry bulb (°F)	16.7
Wet bulb (°F)	16.3
Grains	12.0
Enthalpy (BTU/Lb)	5.8
Unit Effectiveness	0.67
Supply Sensible Efficiency	0.67
Supply Latent Efficiency	0.67
Min Cooling Season RER	184.2



Supply Airstream	
Dry bulb (°F)	43.3
Wet bulb (°F)	37.0
Grains	22.4
Enthalpy (BTU/Lb)	13.9
Airflow (scfm)	2,075
Return Airstream	
Dry bulb (°oF)	70.0
Wet bulb (°F)	53.0
Grains	32.9
Enthalpy (BTU/Lb)	21.9
Relative Humidity	30%
Airflow (scfm)	2,075
Supply Air Pressure Loss	0.57
Exhaust Air Pressure Loss	0.61
Purge Pres Differential (in)	2.00

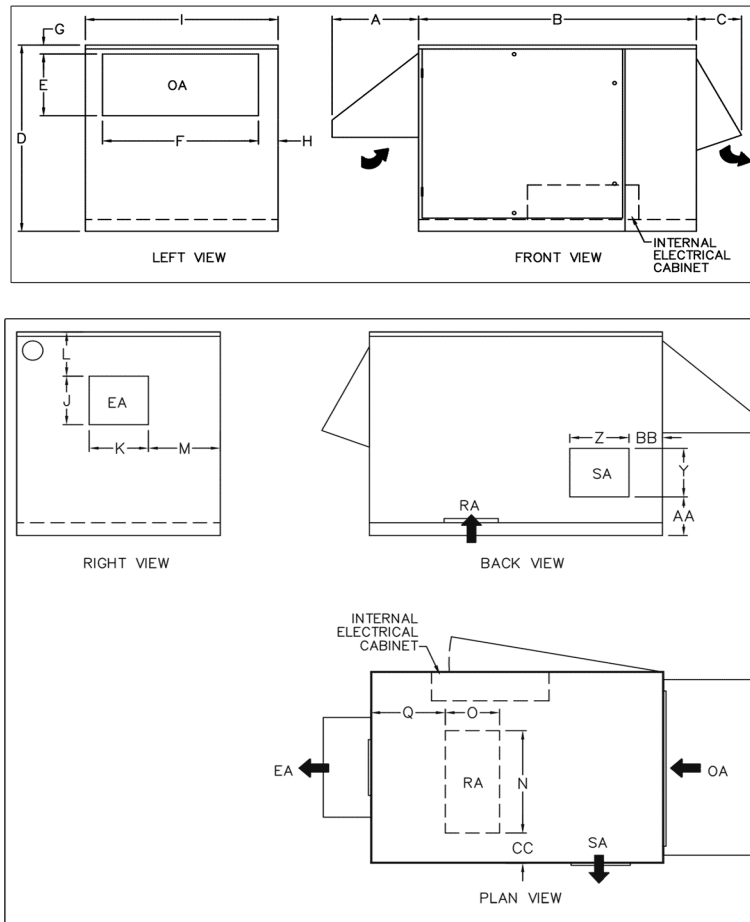
Cooling Season RER
total 90.4

Heating Season RER
total 184.2

Dimensions and Weight

ERV-2B

FV-2000

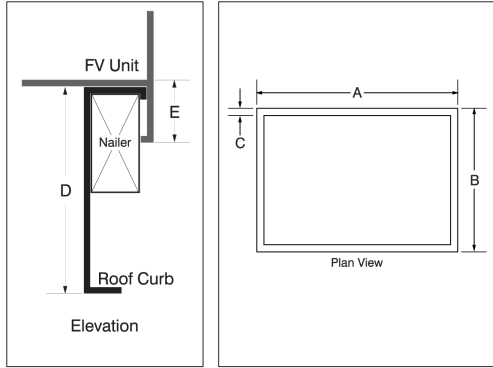


Dimensions and Weights (inches)

A	20.4	Q	
B	51.4	R	
C	16.7	S	
D	32.6	T	
E	9.1	U	7.8
F	28.5	V	23.0
G	2.5	W	3.2
H	4.5	X	2.7
I	37.0	Y	10.1
J	10.2	Z	11.7
K	11.7	AA	4.9
L	4.3	BB	4.3
M	7.3	CC	
N		DD	17.4
O		EE	24.7
P		Weight	550 Lbs

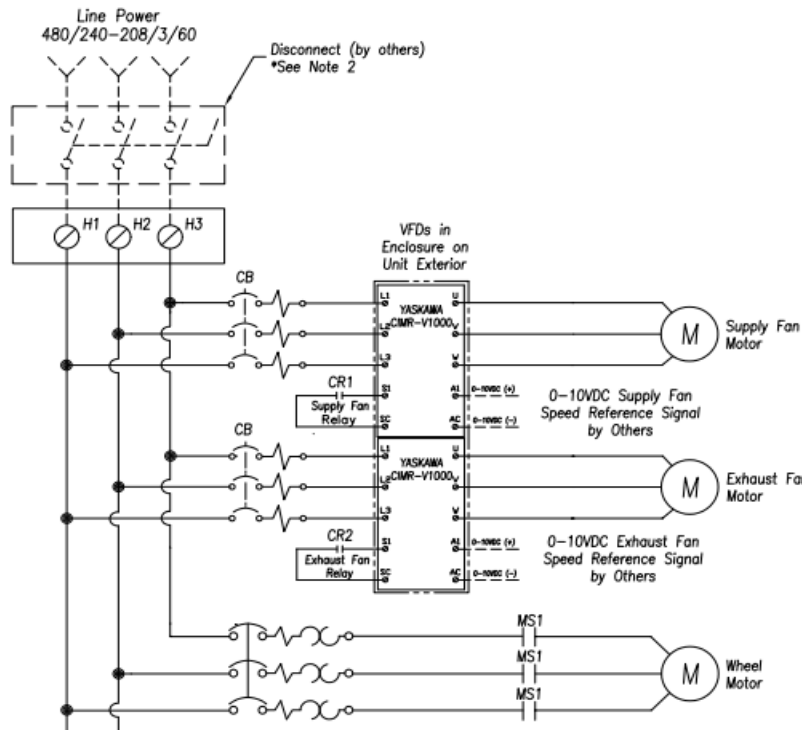
Curb Mounting Details

ERV-2B

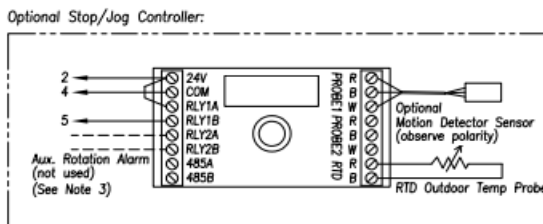
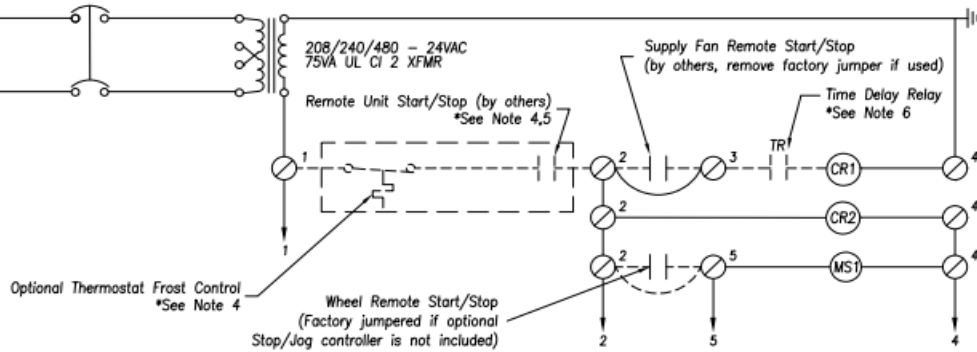


Electrical Diagram

ERV-2B

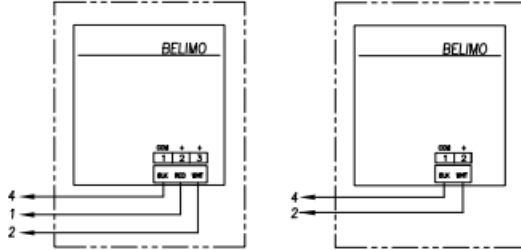


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5 Year Limited Extended Warranty

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5 Year Limited Extended Warranty Details

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