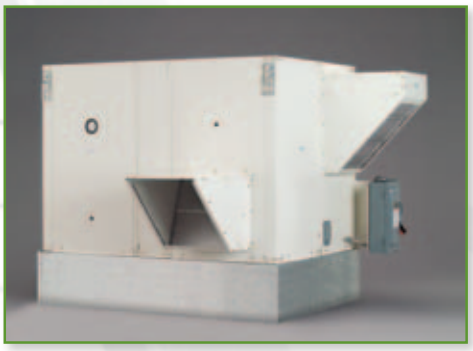
RUSKIN®

GO GREEN GO RUSKIN



ENERVENT™ SERIES

Indoor/Outdoor

Energy Recovery Ventilators

CONTENTS

ENERVENT™ SERIES

Cross Leakage in ERV's (Purge Sectors)

The issue of cross leakage in rotary wheel based ERV'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 rational 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 of concern. Cross leakage in the ERV 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 that that required for a purge sector. Do not use the Ruskin ERV's in applications that have strong concentrations of dangerous or noxious contaminants.

ENGINEERING DATA

Energy recovery wheels certified by the ARI Air-to-Air Energy Recovery Ventilation Equipment Certification Program in accordance with ARI Standard 1060-2005. Actual performance in packaged equipment may vary.

- Reduces cooling load at design temperatures up to 4 tons per 1000 cfm of outside air.
- Reduces heating load up to 12,000 Btuh per 400 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 in the ventilator.
- Units can be used in a rooftop application, a mechanical room application, or ground application.
- Separate fused power supply.
- Filters / mist eliminators are provided on the entering air openings of the outdoor units. Indoor units have pre-filters for both the supply and exhaust air.
- Centrifugal blowers (both intake and exhaust) for high static capability and low sound levels.
- Heavy gauge galvanized steel cabinets.
- Fully insulated cabinet.
- **ARI rated 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. All wheels are segmented into easily removable pie segments.
- All wheels are designed to easily slide in and out of the ERV for servicing.
- Continuous operation down to 10o F (-12o C) without defrost at indoor relative humidity up to 40%. For temperatures below 10o F (-12o C), Optional Low Ambient Control Kit is required. Kit includes temperature sensor to shutoff power to ERV before frost build up can occur on recovery wheel.

ETL Certified per UL 1995 and CSA 22.2

Typical Applications

Mechanical Room ERV Unit

Rooftop Downflow ERV Unit

ERV for Rooftop or Ground Installation

Applications

Energy Recovery Ventilators (ERV) are used to recover exhaust air energy and reintroduce it into the conditioned space. The recovery 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 with high occupancy loads or high ventilation requirements. Areas that have high humidity or very low humidity (recover exhaust air humidity from buildings that have humidifiers) are good applications. ERV's also reduce the design loads due to outside air, which can mean downsizing the air conditioning equipment. Application software is available to calculate the load reductions and provide the energy and dollar savings for all areas of the United States and Canada.

Principle of Operation

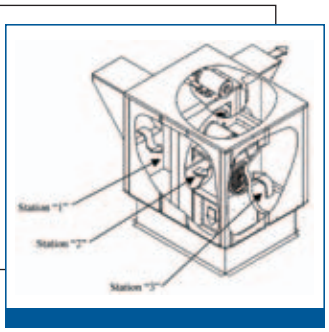
The ERV enthalpy wheel contains parallel layers of a polymeric material that are impregnated with silica gel (desiccant). The wheel is located in the entering (intake) air and exhaust air streams of the ventilation equipment. As the wheel rotates through each air stream, the wheel surface captures sensible 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. For applications that do not need to recover energy during mild outside weather conditions, an option is provided to stop the wheel from rotating, thereby providing cooling with energy recovery.

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 psychometric 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).

AHRI Standard 1060-2005 for Air-to-Air Energy Recovery Ventilation Equipment

The Air-Conditioning and Refrigeration Institute (ARI) 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 ERV. All of the energy recovery units have an ARI certified wheel. The data shown in the specification charts are the ARI certified data for the wheel. Actual performances may vary.



Energy Recovery Wheel

The heart of the Unitary Energy Recovery Ventilator is the Energy Recovery Wheel (defined by ARI 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. All wheels are slide out cassettes, and all wheels have pie segments that are removable for cleaning.

Stand Alone Energy Recovery Ventilators are designed for ease of maintenance.

- All of the enthalpy w.heels are designed to “slide” in and out of the ERV. This allows easy access to all parts of the wheel.
- Wheel “Pie” segments can be removed for easy cleaning.
- All wiring is color coded to match the wiring diagram.
- Control boxes provided with internal fuses.
- Blower motors are mounted on “adjustable” bases that allow easy tensioning of the belts.
- All filters are standard sizes.
- All options are easily installed by simply plugging them into the appropriate plug.
- Roof curbs have duct supports.

Outoor (D, S, 0)

"D" Series energy recovery ventilators are utilized in applications that require a rooftop installation. These units may be installed as a stand-alone unit with a separate and distinct duct system from other air conditioning equipment. In many applications the supply (intake) air duct is connected to the return air duct of an air conditioning system (or multiple systems). By doing this the enthalpy wheel is able to provide preconditioned outside air to the air conditioning system(s).

"D" Series

"S" Series energy recovery ventilators are designed for outside use in rooftop or "pad" installations where the application requires a "side-by-side" duct system. One of the benefits of this design is the ability to easily be connected to the horizontal ductwork of an air conditioning system. Field supplied balancing dampers should be utilized to help control the air volumes.

"O" Series energy recovery ventilators are designed for outside use in rooftop or "pad" installations where the application requires a "over and under" duct system. One of the benefits of this design is the ability to be ducted directly to the back of a rooftop air conditioning unit. Another use is for "through the wall" applications. The horizontal return duct connection can be converted to bottom return in the field. Field supplied balancing dampers should be utilized to help control the air volumes.

Indoor (M, N)

"M" Series energy recovery ventilators are designed for use inside a building for applications that require "side-by-side" duct. Typically these units are installed in a mechanical room or mounted above a ceiling. Both the outside air intake and the exhaust air have duct systems to an outside source. The return air and supply air also are ducted. Field provided balancing dampers should be utilized to help control the air volumes.

"M" Series

"N" Series energy recovery ventilators are designed for use inside a building for applications that require "over and under" duct. Typically these units are installed in a mechanical room or mounted above a ceiling. Both the outside air intake and the exhaust air have duct systems to an outside source. The return air and supply air also are ducted. The horizontal return duct connection can be converted to bottom return in the field. Field provided balancing dampers should be utilized to help control the air volumes.

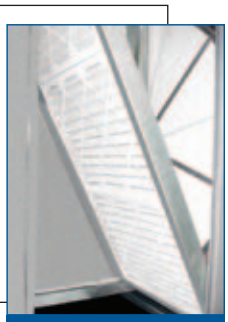
Ruskin Energy Recovery Ventilators are supplied with MERV 8 filters before the Energy Recovery Wheel.

The type(s) of filters are determined by the style of the ERV.

"D" series has an aluminum mist eliminator for the intake air and a 2" pleated filter for the exhaust air.

"O" & "S" series have an aluminum mist eliminator for the intake air and a 2" pleated filter for the exhaust air.

"M" & "N" series have a 2" pleated filter for both the exhaust air and the intake air.



Pleated Filter Shown

Ruskin Energy Recovery Ventilators are supplied with factory tested blower assemblies.

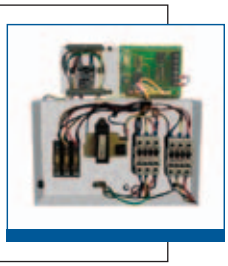
Some of the features are as follows:

1. The blowers are housed within a sheet metal frame to insure reliable performance.
2. The blower motor is mounted on an adjustable motor mount that provides an easy method of adjusting the belts.
3. All blowers are equipped with adjustable sheave pulleys.
4. The blower pulley and the motor pulley are aligned by a state of the art "laser" alignment system.

Ruskin Energy Recovery Ventilators are supplied with factory tested control systems.

Some of the features are as follows:

1. Electronic control board.
2. Factory wired.
3. Independently fused.
4. Color coded wires.
5. Provides own 24 volt circuit.
6. All options are "plug-in" modules.



Optional Accessories

Roof Mounting Curb – A 14 or 24 inch (355 or 610 mm) roof curb is required to match supply and exhaust openings of the ERV with the rooftop ERV units. Ruskin provides a full line of roof curbs to match the specified unit.

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 ERV to determine airflow across the Enthalpy Wheel. The control test ports are on the Intake portion of the ERV, but can easily be moved to the Exhaust portion.

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

Stop-Start-Jog – Function that rotates the Enthalpy on a preset timer to prevent contamination of the wheel during economizer operation.

Rotation Sensor – A Control is used to provide a method of a 24 volt signal for notification should the ERV wheel not rotate during normal operation. This includes bad motors, broken belts, etc.

Disconnect with GFI Plug – The ERV is provided with a factory mounted disconnect switch. The option comes complete with a factory mounted GFI plug. The plug must be field wired.

VFD – Variable Frequency Drives are provided for both the intake and exhaust blowers. This allows the system to be perfectly balanced to the building requirements.

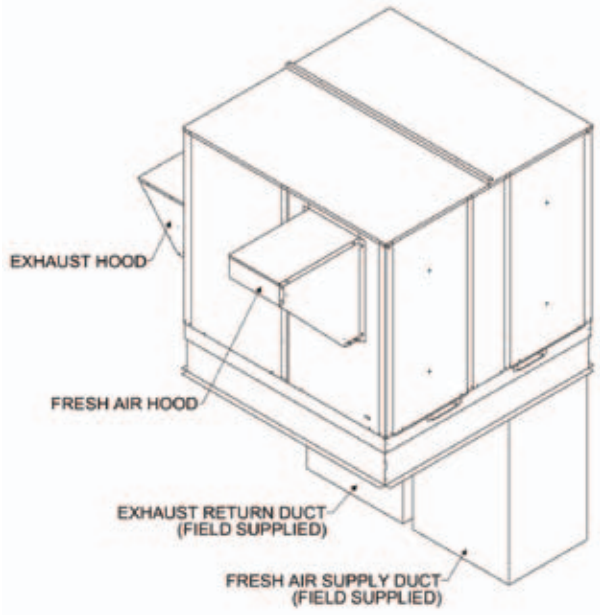
FSK – Fan Speed Kits are available for field change blower speed from low to medium or high.

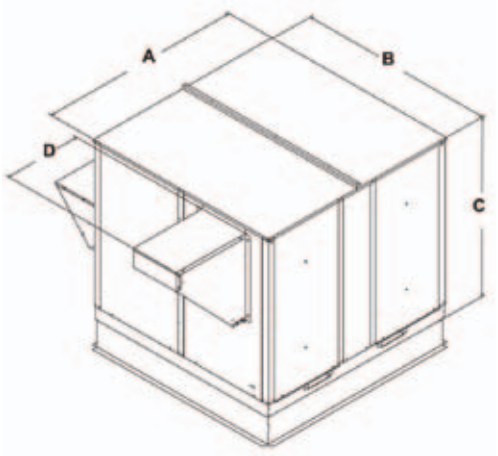
D-02 SERIES STAND ALONE ERV'S OUTDOOR FOR DOWN DISCHARGE DUCT ARRANGEMENTS

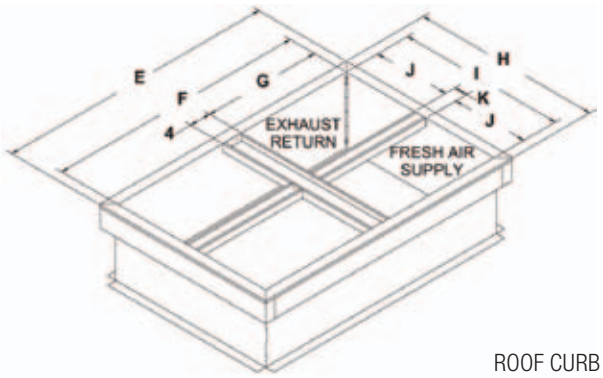
ENERVENT SERIES

Features and Notes

1. Stand alone design allows higher levels of outdoor air to be introduced into the conditioned space.
2. Static test ports provided to verify intake and exhaust CFM.
3. Balancing damper(s) field supplied in duct work when connected to ERV.
4. Roof curbs are available for the ERV's.
5. See blower performance charts for airflow at various E.S.P.
6. Filter rack with 2" pleated filters included.



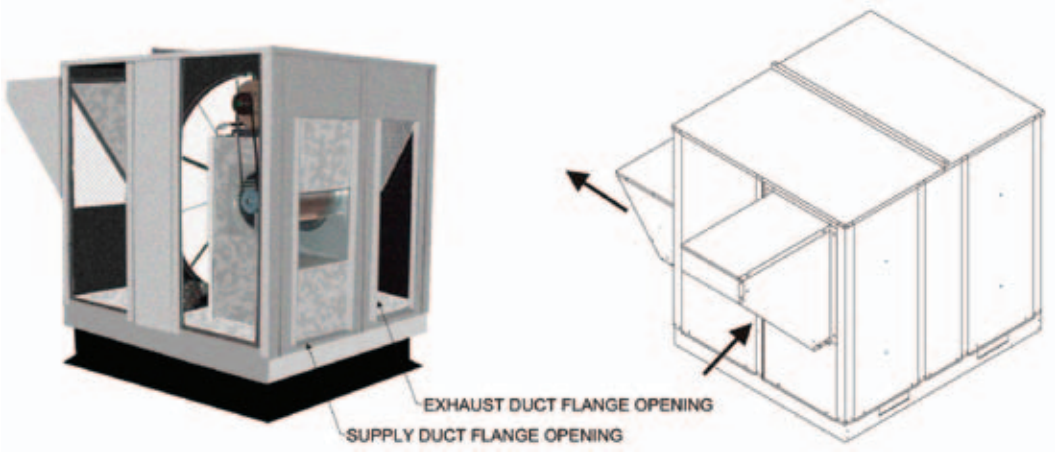




ROOF CURB

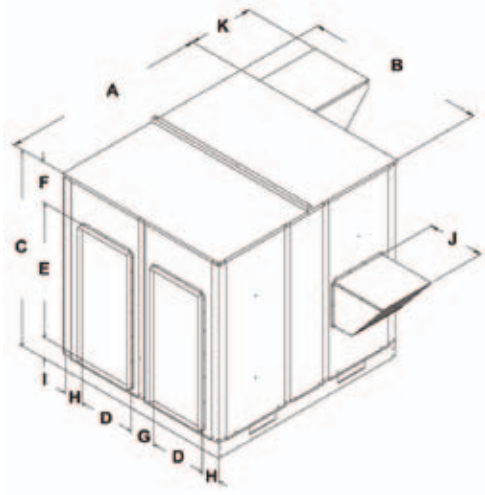
ERV DATA			DIMENSIONAL DATA										
ERV Series	CFM Range	Duct Size (G x J)	ERV				Roof Curb						
			A	B	C	D	E	F	G	H	I	J	K
D11-02	300-1100	17.00 x 11.38	44.75	32.13	33.50	14.38	43.00	39.00	17.50	30.25	26.25	11.88	2.50
D20-02	1200-2000	21.88 x 14.00	54.38	37.25	37.50	17.50	52.75	48.75	22.38	35.50	31.50	14.50	2.50
D28-02	1200-2800	20.25 x 17.00	52.25	42.63	43.56	25.50	49.50	45.50	20.75	41.00	37.00	17.50	2.00
D36-02	2000-3600	23.38 x 17.38	60.00	46.69	57.37	25.50	55.75	51.75	23.88	41.81	37.81	17.91	2.00
D46-02	3000-4600	23.38 x 20.38	60.00	52.69	57.37	28.06	55.75	51.75	23.88	47.81	43.81	20.91	2.00
D62-02	4600-6200	29.38 x 30.00	72.00	70.88	63.63	37.75	67.75	63.75	29.88	66.00	62.00	30.50	2.00
D80-02	6000-8000	38.75 x 35.38	101.38	78.38	71.34	21.75	99.75	95.75	38.75	76.75	72.75	35.38	2.00
D120-02	8000-13000	40.00 x 44.50	120.38	88.38	86.63	28.50	118.50	114.50	44.88	86.50	82.50	40.25	2.00

S-02 SERIES STAND ALONE ERV'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 conditioned space.
2. Static test ports provided to verify intake and exhaust CFM.
3. Balancing damper(s) field supplied in duct work when connected to ERV.
4. Roof curbs are available for the ERV's.
5. See blower performance charts for airflow at various E.S.P.
6. Filter rack with 2" pleated filters included.



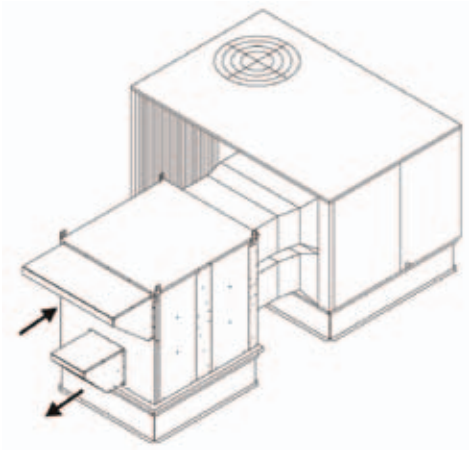
ERV DATA		DIMENSIONAL DATA										
ERV Series	CFM Range	A	B	C	D	E	F	G	H	I	J	K
S11-02	300-1100	44.75	32.13	33.50	11.00	27.00	4.00	4.25	2.88	2.50	20.75	14.38
S20-02	1200-2000	54.38	37.25	37.50	12.00	30.00	5.87	5.13	4.06	1.63	20.75	17.50
S28-02	1200-2800	52.25	42.63	43.56	14.00	32.00	8.69	5.25	4.25	2.88	20.75	25.50
S36-02	2000-3600	60.00	46.69	57.37	16.50	39.50	12.00	5.50	4.05	5.88	20.75	25.50
S46-02	3000-4600	60.00	52.69	57.37	16.50	39.50	12.00	8.69	5.50	5.88	20.75	28.06
S62-02	4600-6200	72.00	70.88	63.63	19.50	39.50	17.53	14.50	8.70	6.60	20.75	37.75

0-02 SERIES STAND ALONE ERV'S
FOR OVER AND UNDER DUCT ARRANGEMENTS

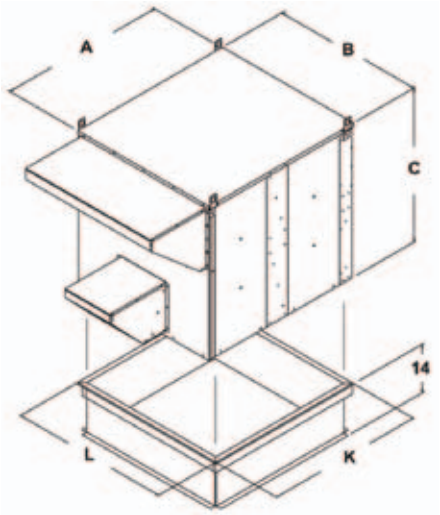
ENERVENT SERIES

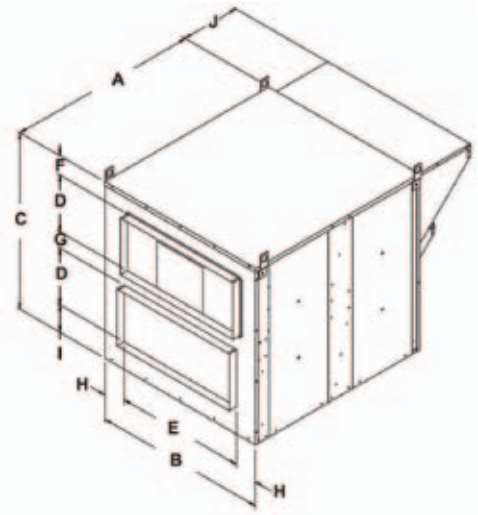
Features and Notes

1. Stand alone design allows higher levels of outdoor air to be introduced into the conditioned space.
2. Static test ports provided to verify intake and exhaust CFM.
3. Balancing damper(s) is field provided when connected to ductwork. System may not operate properly without balancing damper.
4. Roof curbs are available for the ERV's.
5. See blower performance charts for airflow at various E.S.P.
6. Filter rack with 2" pleated filters included.



ERV with Horizontal Ductwork
(balancing damper(s) field supplied)





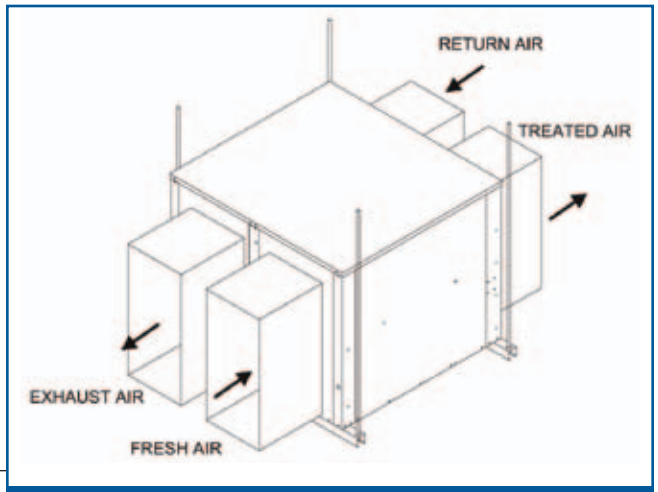
ERV DATA		DIMENSIONAL DATA											
ERV Series	CFM Range	A	B	C	D	E	F	G	H	I	J	K	L
011-02	300-1100	56.75	32.13	39.50	11.00	27.00	6.50	10.00	2.56	1.00	11.00	55.00	30.25
020-02	1200-2000	54.38	37.25	37.50	12.00	30.00	8.00	4.00	3.63	1.50	20.32	52.75	35.50
028-02	1200-2800	60.00	42.63	43.56	14.00	32.00	9.56	4.50	5.31	1.50	18.32	49.50	41.00
036-02	2000-3600	60.00	46.69	57.37	16.50	39.50	12.13	6.38	3.59	5.88	18.32	55.75	41.81
046-02	3000-4600	60.00	52.69	57.37	16.50	39.50	12.13	6.38	6.59	5.88	18.32	55.75	47.81
062-02	4600-6200	72.00	70.88	63.63	19.50	39.50	12.13	6.50	15.69	5.88	18.32	67.75	66.00

M-02 SERIES STAND ALONE ERV'S FOR SIDE BY SIDE INDOOR APPLICATION

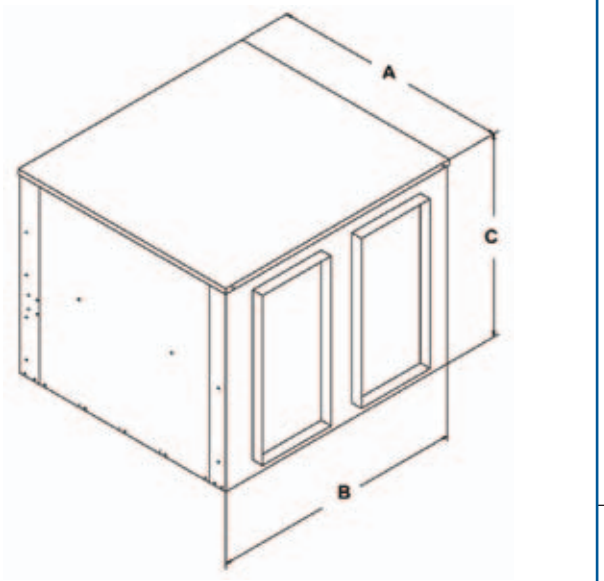
ENERVENT SERIES

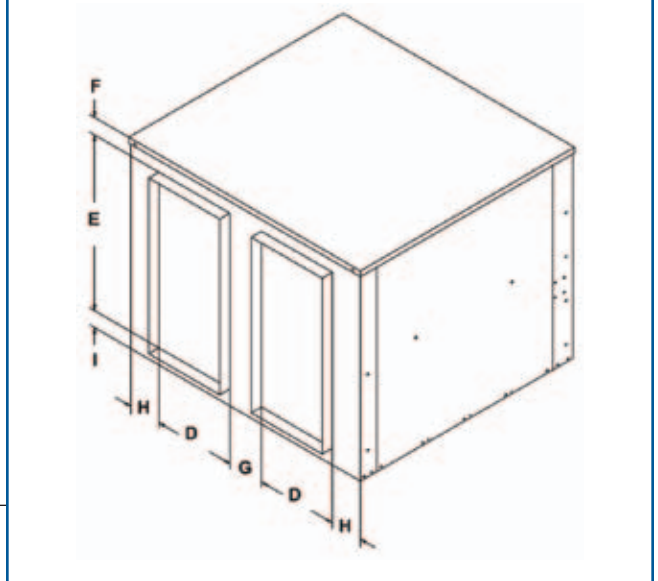
Features and Notes

1. Stand alone design allows higher levels of outdoor air to be introduced into the conditioned space.
2. Static test ports provided to verify intake and exhaust CFM.
3. Balancing damper(s) is field provided when connected to ductwork. System may not operate properly without balancing damper.
4. See blower performance charts for airflow at various E.S.P.
5. Filter rack with 2" pleated filters included.



ERV with Horizontal Ductwork
(balancing damper(s) field supplied)



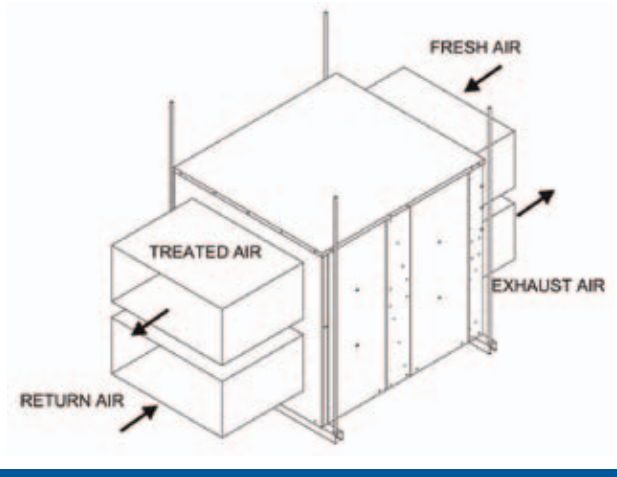


ERV DATA		DIMENSIONAL DATA								
ERV Series	CFM Range	A	B	C	D	E	F	G	H	I
M11-02	300-1100	44.75	32.13	33.50	11.00	27.00	4.00	4.25	2.88	2.50
M20-02	1200-2000	54.38	37.25	37.50	12.00	30.00	5.87	5.13	4.06	1.63
M28-02	1200-2800	52.25	42.63	43.56	14.00	32.00	8.69	5.25	4.25	2.88
M36-02	2000-3600	60.00	46.69	57.37	16.50	39.50	12.00	5.50	4.05	5.88
M46-02	3000-4600	60.00	52.69	57.37	16.50	39.50	12.00	8.69	5.50	5.88
M62-02	4600-6200	72.00	70.88	63.63	19.50	39.50	17.53	14.50	8.70	6.60

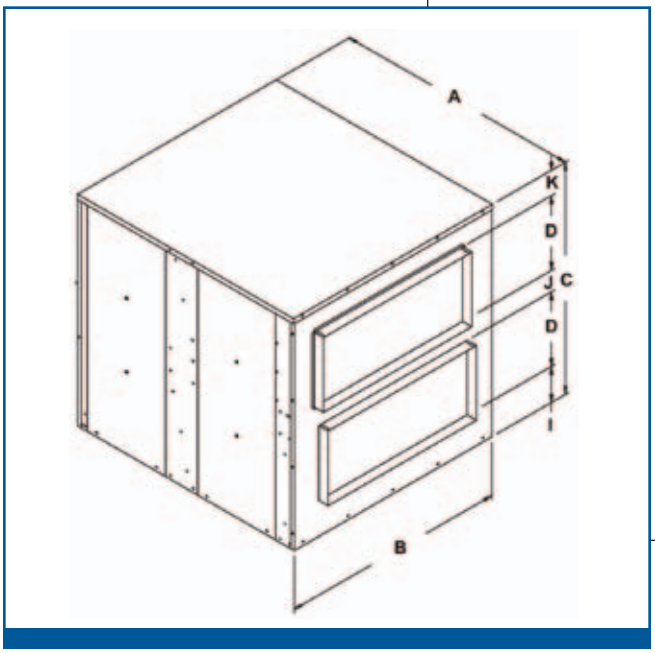
N-02 SERIES STAND ALONE ERV'S FOR OVER AND UNDER INDOOR APPLICATION

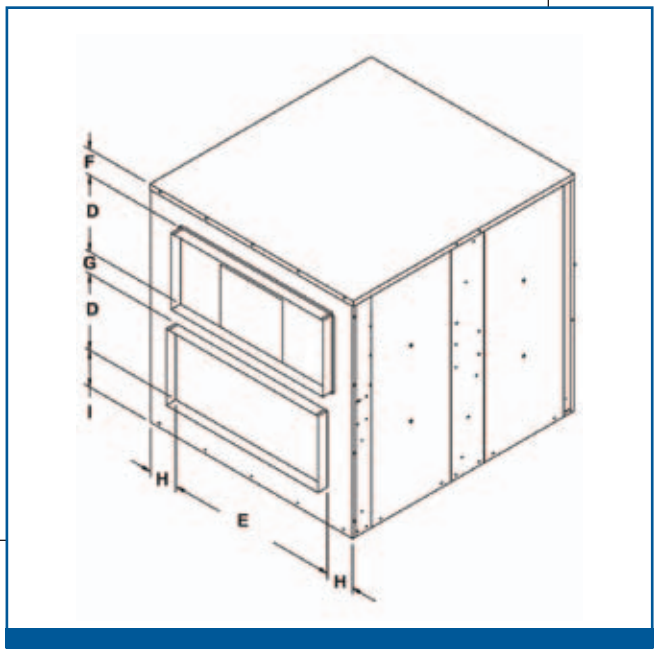
Features and Notes

1. Stand alone design allows higher levels of outdoor air to be introduced into the conditioned space.
2. Static test ports provided to verify intake and exhaust CFM.
3. Balancing damper(s) is field provided when connected to ductwork. System may not operate properly without balancing damper.
4. See blower performance charts for airflow at various E.S.P.
5. Filter rack with 2" pleated filters included.



ERV with Horizontal Ductwork
(balancing damper(s) field supplied)





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N11-02	300-1100	56.75	32.13	39.50	11.00	27.00	6.50	10.00	2.56	1.00	10.00	6.50
N20-02	1200-2000	54.38	37.25	37.50	12.00	30.00	8.00	4.00	3.63	1.50	7.00	5.00
N28-02	1200-2800	60.00	42.63	43.56	14.00	32.00	9.56	4.50	5.31	1.50	8.81	5.25
N36-02	2000-3600	60.00	46.69	57.37	16.50	39.50	12.13	6.38	3.59	5.88	11.75	6.75
N46-02	3000-4600	60.00	52.69	57.37	16.50	39.50	12.13	6.38	6.59	5.88	11.75	6.75
N62-02	4600-6200	72.00	70.88	63.63	19.50	39.50	12.13	6.50	15.69	5.88	12.00	6.75

SUGGESTED SPECIFICATION

Furnish and install, at locations shown on plans or in accordance with schedule, mechanical cooling and/or heating system complete with a stand alone Energy Recovery Ventilator (ERV). The Energy Recovery Ventilator will contain an energy recovery component rated in accordance with ARI Standard 1060 with ratings certified by ARI. ERV shall be designed for ducting to the A/C (rooftop, upflow, horizontal) unit into the duct system of an air conditioning unit or as a stand alone unit with its own duct system. The cabinet shall be galvanized material with a powder coated paint finish electrostatically bonded to the metal. Cabinet panels where conditioned air is handled shall be fully insulated to prevent condensation and minimize sound. Openings shall be provided for duct connections. Lifting devices shall be provided for rigging. Test ports shall be provided so airflow can be measured across the energy recovery wheel. The intake and exhaust air blowers of the ERV shall contain a centrifugal forward curved blower. They shall have ball bearings with adjustable belt drive and motor mount base shall permit ease of motor changeover and belt tension adjustment.

The energy recovery device shall be a rotary heat exchanger per ARI 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 water and/or alkaline based coil cleaning solution. In all size units the wheel shall be provided with removable segments for cleaning and maintenance. All diameter and perimeter seals shall be provided. The energy recovery cassette shall be an Underwriters Laboratories Recognized Component for electrical and fire safety.

Barometric relief dampers will be provided in the exhaust air hood to prevent air infiltration if the ERV is de-energized. All ERV units to have 2" pleated filters on the return air side and indoor units to have 2" pleated filters on the intake side. All outdoor units will be provided with mist eliminator type filters in the intake air hood. All ERV units shall be provided with a single point power connection for high voltage. Energy Recovery Ventilators shall be Ruskin Model (specifier select) “D”, “S”, “M”, “N” or “O”.

Options (specifier select as required)

Roof Curb – Furnish and install the manufacturers’ roof mounting curb to maintain the proper height above the roof.

Low Ambient Kit – Furnish and install a low ambient kit to prevent frost formation on the energy recovery wheel.

Motorized Intake Air Damper – Furnish and install motorized intake air damper.

Stop-Start-Jog – Furnish and install stop-start-jog controls to stop wheel rotation during economizer cycle operation.

Motorized Exhaust Air Damper – Furnish and install motorized exhaust air damper.

Disconnect – Furnish disconnect box for field installation.

Dirty Filter Switch – Furnish and install dirty filter switch.

Rotation Sensor – Furnish and install rotation sensor to verify wheel rotation.

Pressure Sensor – Furnish and install pressure sensor to confirm airflow performance.

Ruskin continually strives to improve our products, and reserves the right to change product design and specification without notice.

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