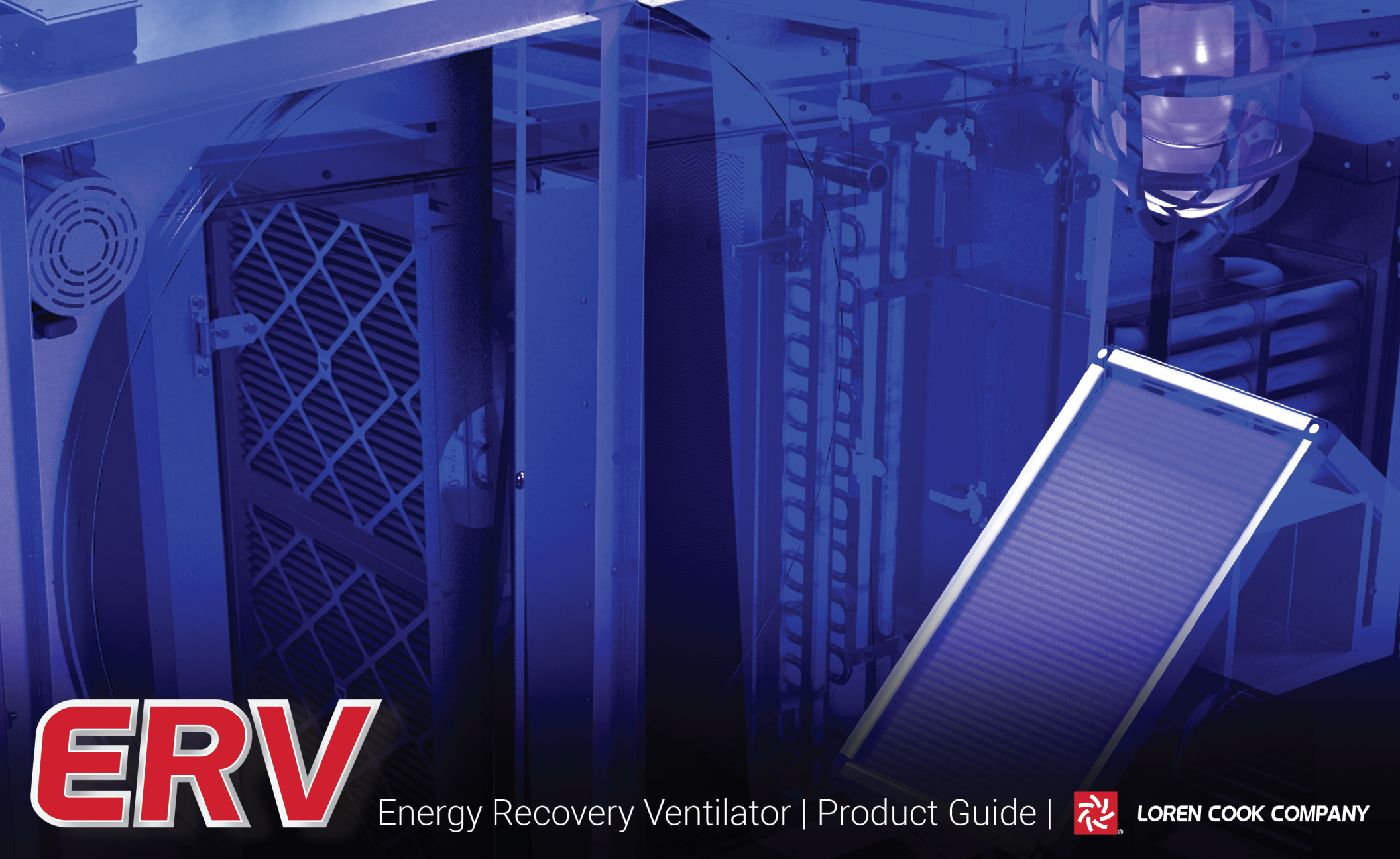


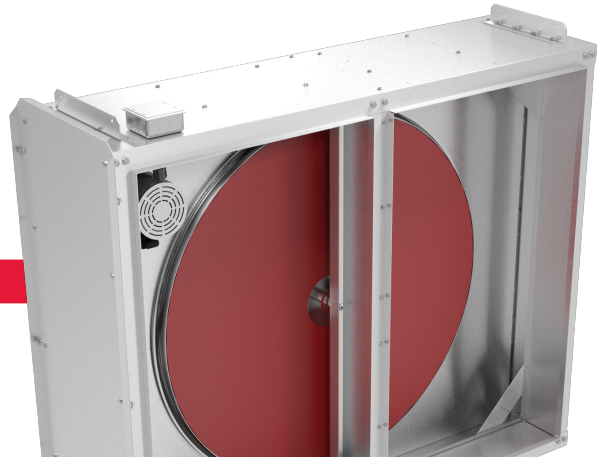
ERV

Energy Recovery Ventilator | Product Guide |

LOREN COOK COMPANY

INTRODUCTION

Cook has developed a complete line of energy recovery products that provide fresh air options to meet ASHRAE Standard 62 Indoor Air Quality Standards



ESSENTIAL ADVANTAGES

SEPARATE AIRSTREAMS
for supply and exhaust

HEATING AND COOLING
available on 8 models

ENERGY RECOVERY
is 70% to 90% effective

VARI-FLOW®
available on 6 models

PERFORMANCE RANGE
40-10,000 CFM

LIFTING LUGS
are provided on all models for ease of handling

MERV 8
filters provided for both air streams

EXTRA BENEFITS

- Core and rotary wheel complete package units, to cassette only for custom built in the field units
- Straight through, vertical, horizontal, and all top are available as duct connections
- 7 year warranty on the rotary wheel. One of the longest warranties on the market today
- Accurate air performance assured through the AMCA Certified Rating Program and performance certified as a complete assembly

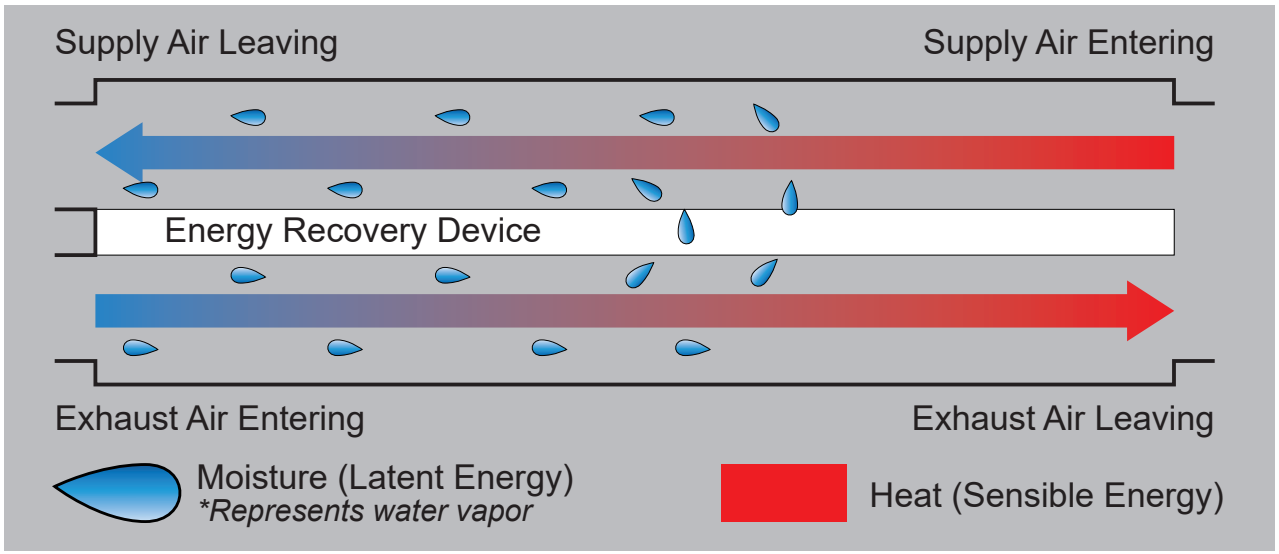
WHAT DOES IT DO?

In today's world, the words 'energy' and 'money' can be interchanged. With Cook's energy recovery products, real world savings happens

ENERGY RECOVERY BASICS

The second law of thermodynamics states that energy always transfers from a region of high sensible energy (temperature) to one of lower sensible energy. This law is extended to the mass transfer of latent energy

Air to air energy recovery devices are used to facilitate this transfer without mixing the two airstreams



Adapted from ASHRAE Handbook HVAC Systems and Equipment Chapter 26

WHY IS IT NEEDED?

Ventilation rates prescribed by ASHRAE Standard 62 have required mechanical designers to significantly increase the amount of outdoor air provided to occupied spaces

ERV IS THE SOLUTION

- The high efficiencies of energy recovery ventilators allow engineers to meet the ASHRAE 62 Standard and continue to design energy efficient structures
- In the winter, heat and moisture recovered from the warm indoor exhaust air is transferred to the cold outdoor air being introduced into the building. With the heat transfer effectiveness as high as 85 percent, heating cost can be drastically reduced while providing a healthy and comfortable indoor environment
- Similar energy savings can be realized in the summer months as warm, humid outdoor air is cooled and dehumidified before it is introduced to the conditioned space, thus; reducing air conditioning load

TYPICAL APPLICATIONS

Cook offers multiple duct arrangements along with several ways to mount the ERV. This makes it ideal for a variety of buildings:

- Libraries
- Museums
- Night Clubs
- Schools
- Offices
- Hotels
- Retail Stores
- Auditoriums
- Gymnasiums
- Convention Centers
- Health Care Facilities
- Manufacturing Plants

ANNUAL ENERGY SAVINGS

In today's world, the words 'energy' and 'money' can be interchanged. With Cook's energy recovery products, real world saving happens

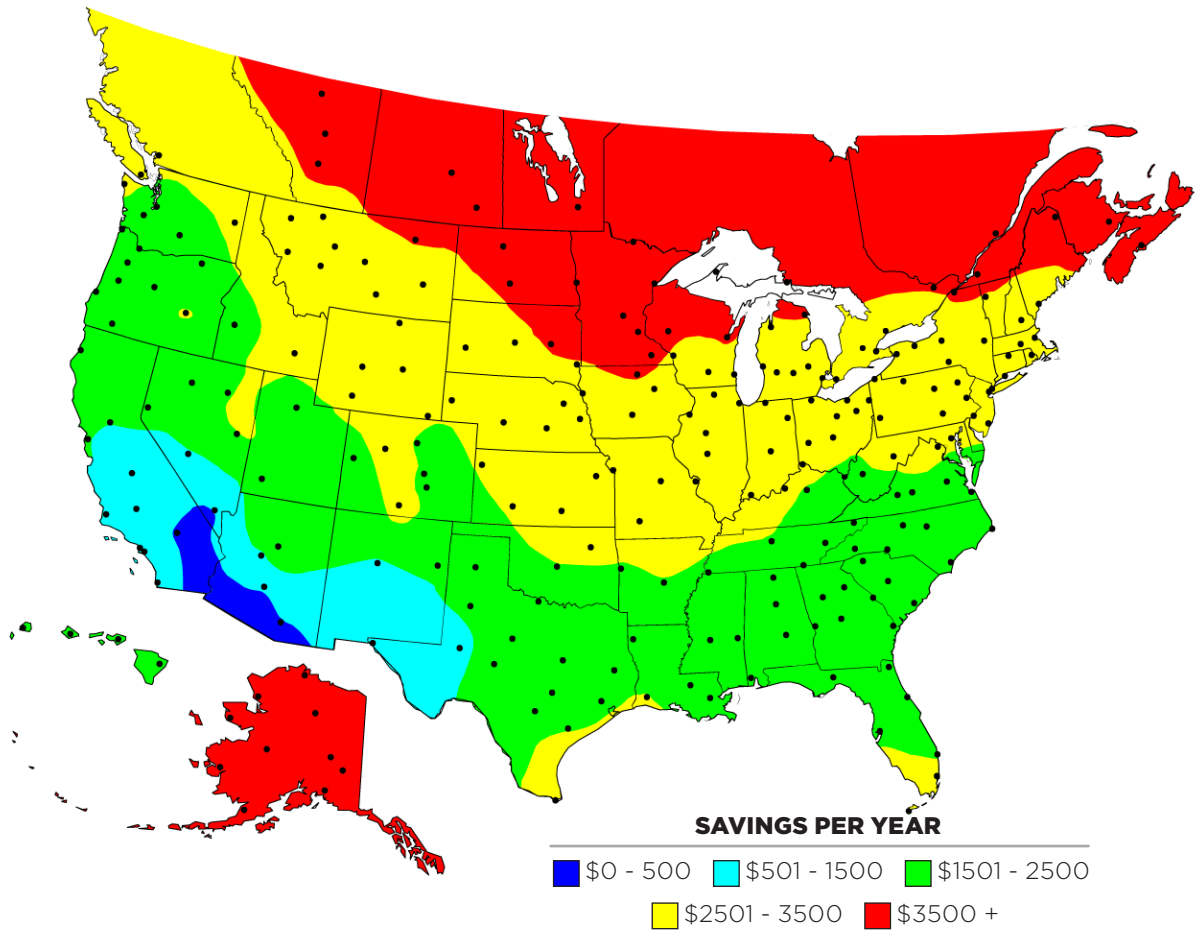
ANNUAL ENERGY SAVINGS

This map illustrates typical annual savings. For in-depth analysis of first cost and annual energy savings, this information can be found using COOK's selection software

OPERATING ASSUMPTIONS

This map illustrates typical annual energy savings (in dollars per 5,000 cfm) by location. The analysis is based on the following assumptions

- Hours of operation: 6 a.m. to 10 p.m., five days per week
- Cooling source EER: 10.0
- Summer indoor design: 75˚Dry Bulb, 50% Relative Humidity
- Electric cost: $.10/kwh
- Winter indoor design: 72˚Dry Bulb, 35% Relative Humidity
- Heating source: Gas, $.95/therm
- Wheel effectiveness: 75% latent and sensible
- Calculations include ERV operating costs

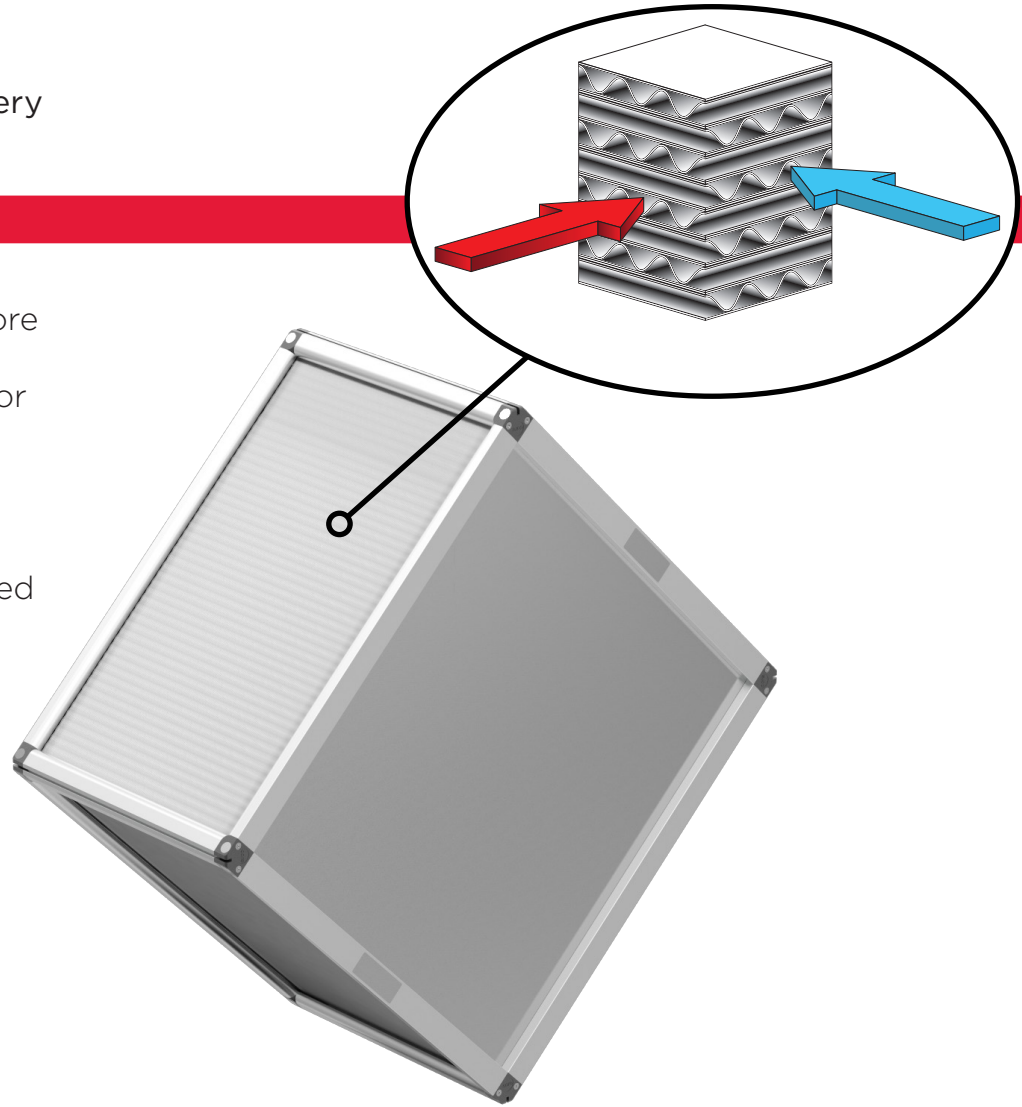


ENERGY RECOVERY OPTIONS

Cook offers two options for effective energy recovery

FIXED CORE

- Two airstreams pass separately through the flutes in the core at 90° angles
- Latent energy transfer occurs via the difference in the vapor pressure on each side of the highly selectivity, durably dimensional stable, antimicrobial polymeric membrane
- Aluminum material is used as a separator facilitating the transfer of sensible energy transfer
- Layers of membrane and aluminum with spacers are stacked together and placed in to a frame to form the core

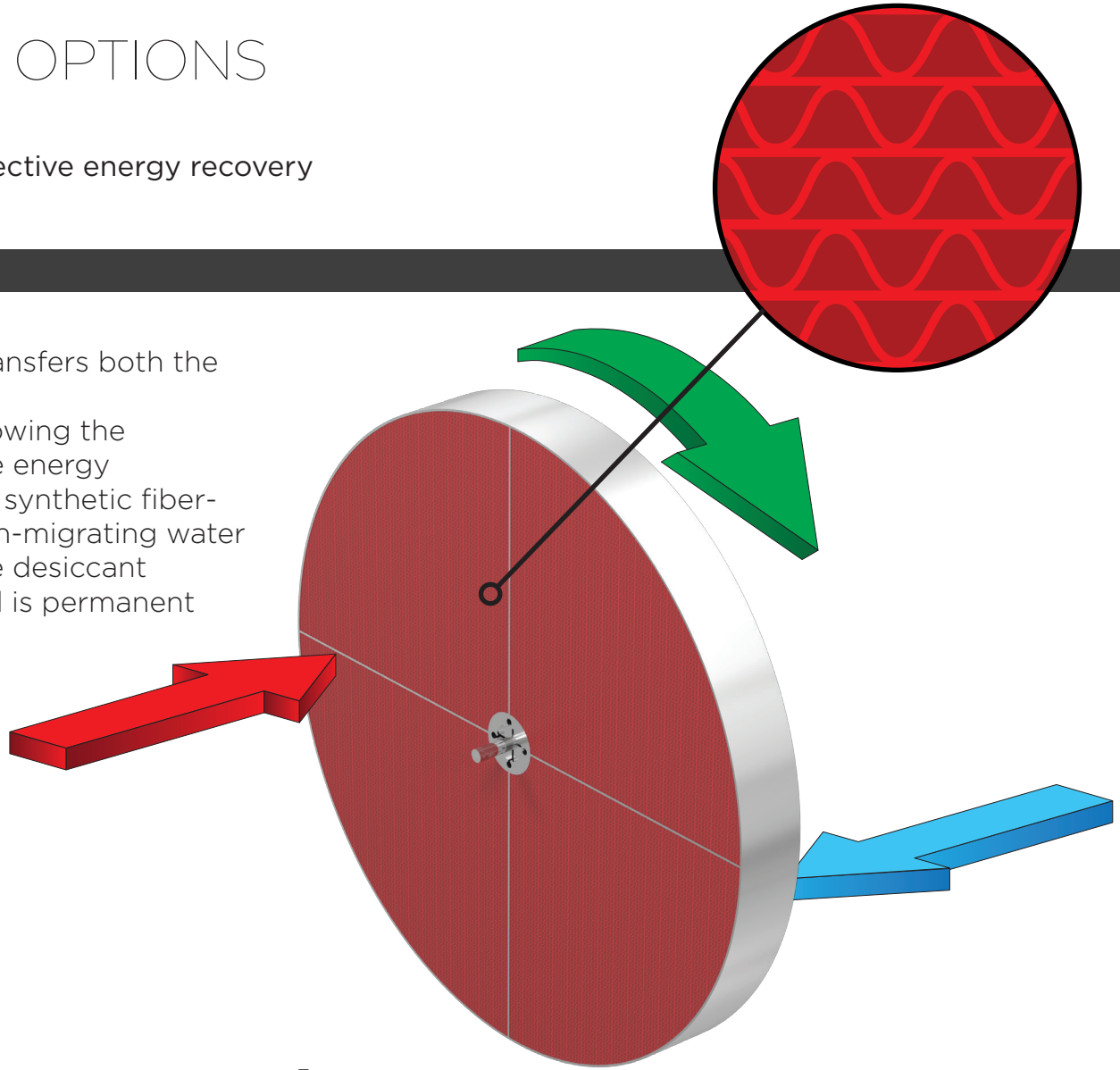


ENERGY RECOVERY OPTIONS

Cook offers two options for effective energy recovery

ROTARY WHEEL

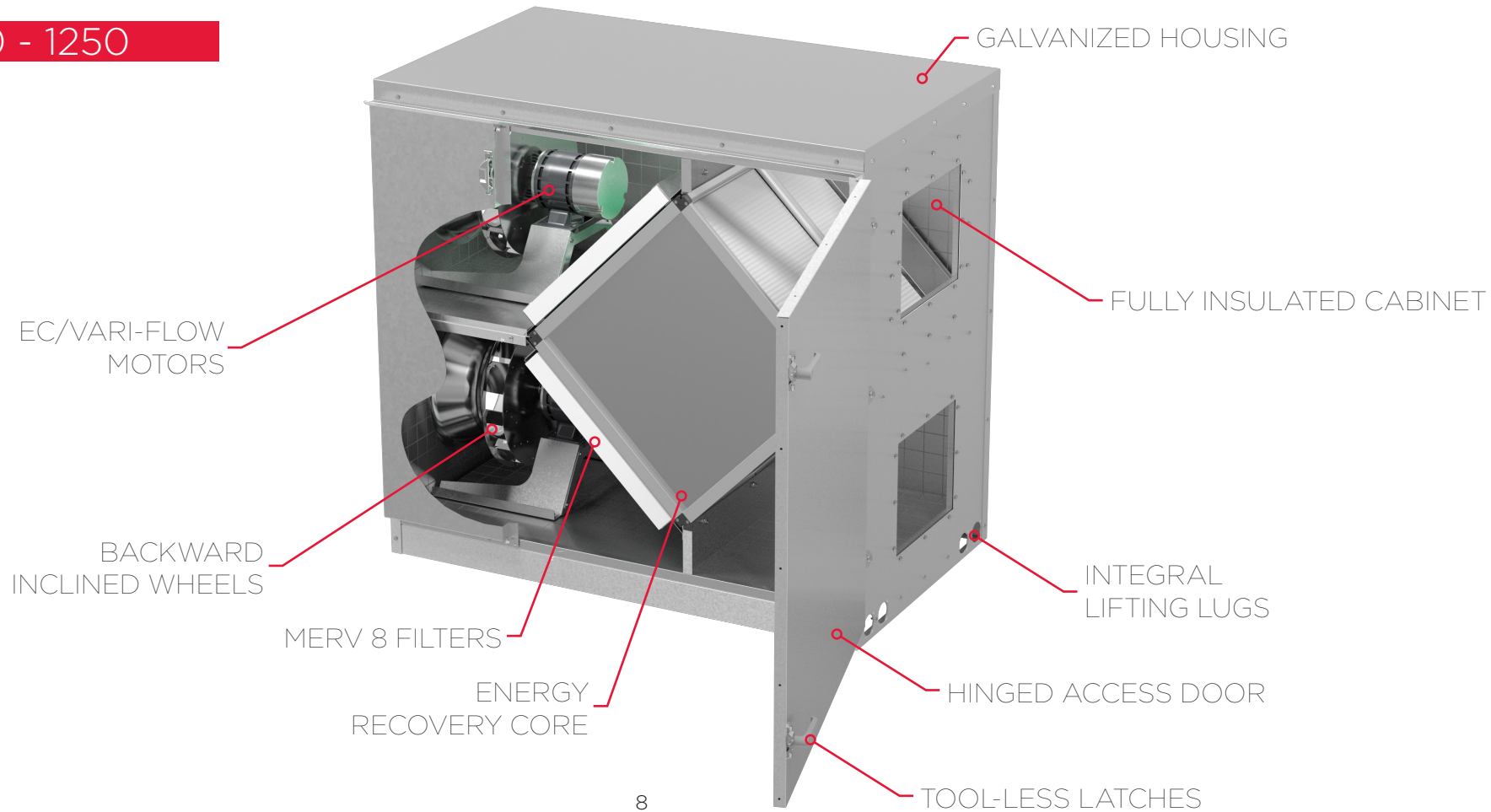
- Air passes through the wheel and transfers both the sensible and latent energy
- Energy wheel continually rotates allowing the opposing airstream to reclaiming the energy
- Wheel material is constructed fluted synthetic fiber-based media impregnated with a non-migrating water selective 4 angstrom molecular sieve desiccant
- Desiccant is uniformly dispersed and is permanent part of the material structure
- Flute design airstream channels provide optimal contact with media to maximize energy transfer



STANDARD CONSTRUCTION FEATURES

ERVX standard construction features

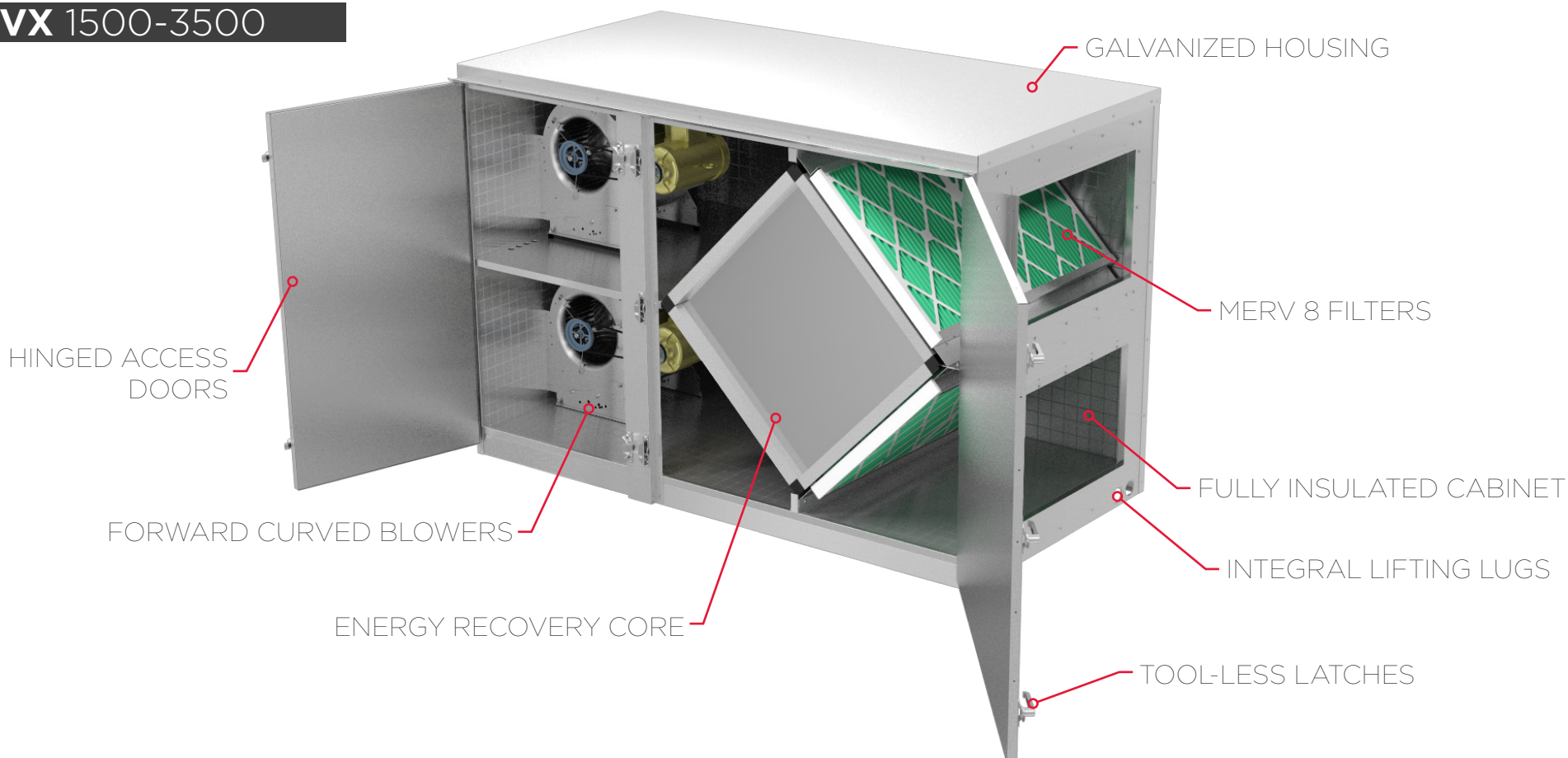
ERVX 500 - 1250



STANDARD CONSTRUCTION FEATURES

ERVX standard construction features

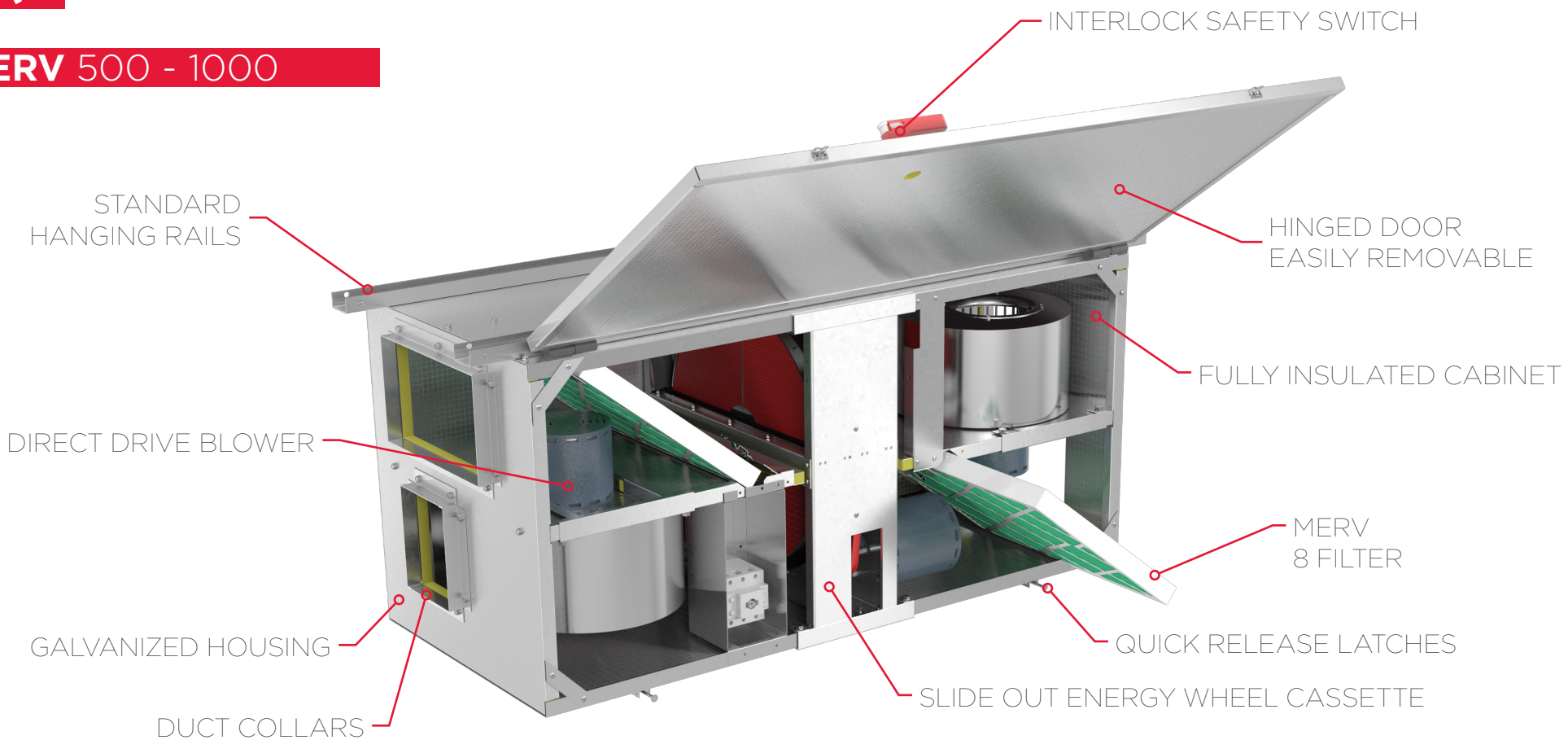
ERVX 1500-3500



STANDARD CONSTRUCTION FEATURES

ERV standard construction features

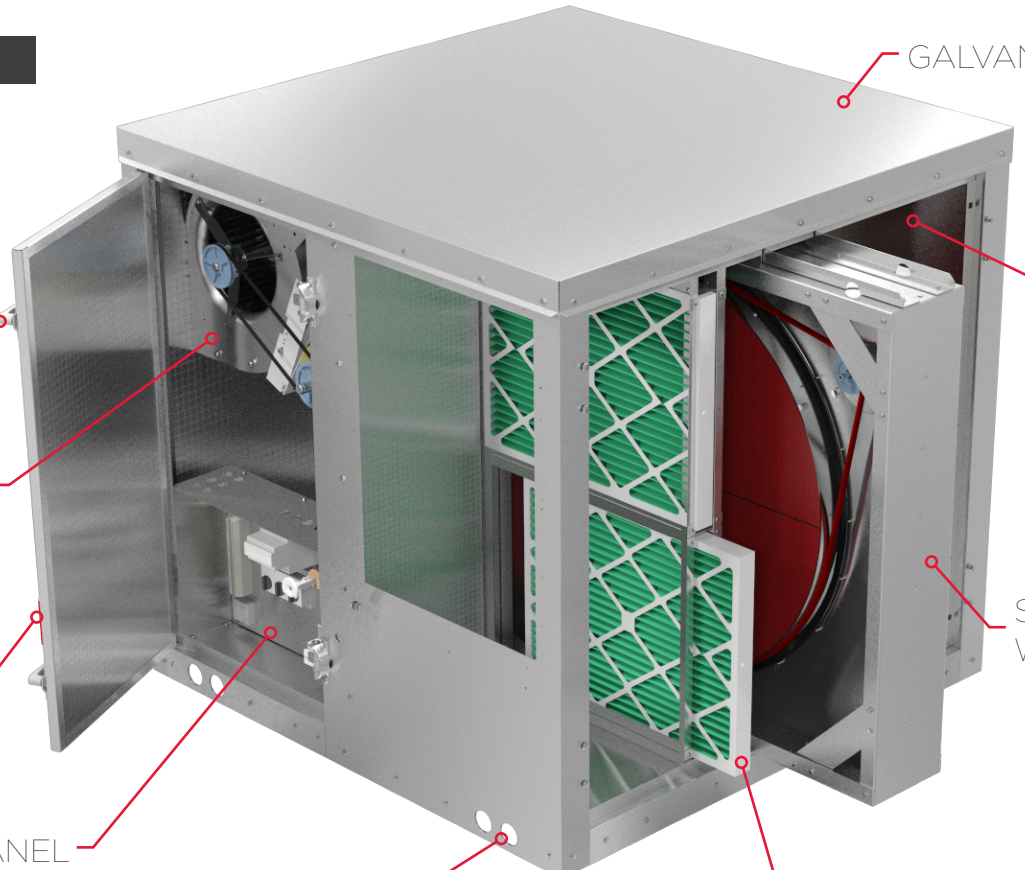
ERV 500 - 1000



STANDARD CONSTRUCTION FEATURES

ERV standard construction features

ERV 1500-10000



GALVANIZED HOUSING

FULLY INSULATED CABINET

TOOL-LESS LATCHES ON CONTROL PANEL

FORWARD CURVE BLOWER

SLIDE OUT ENERGY WHEEL CASSETTE

INTERLOCK SAFETY SWITCH

CONTROL PANEL

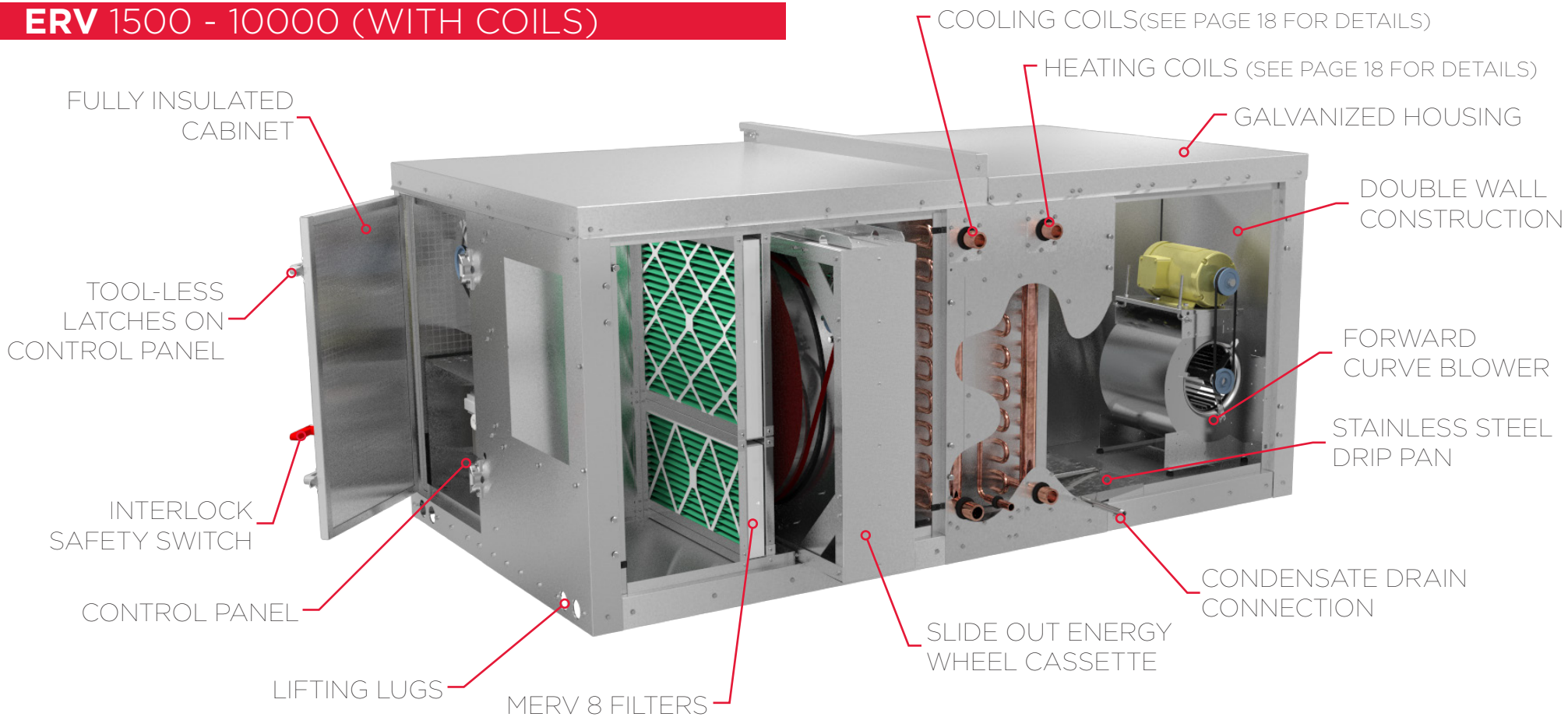
INTEGRAL LIFTING LUGS

MERV 8 FILTER

STANDARD CONSTRUCTION FEATURES

ERV standard construction features

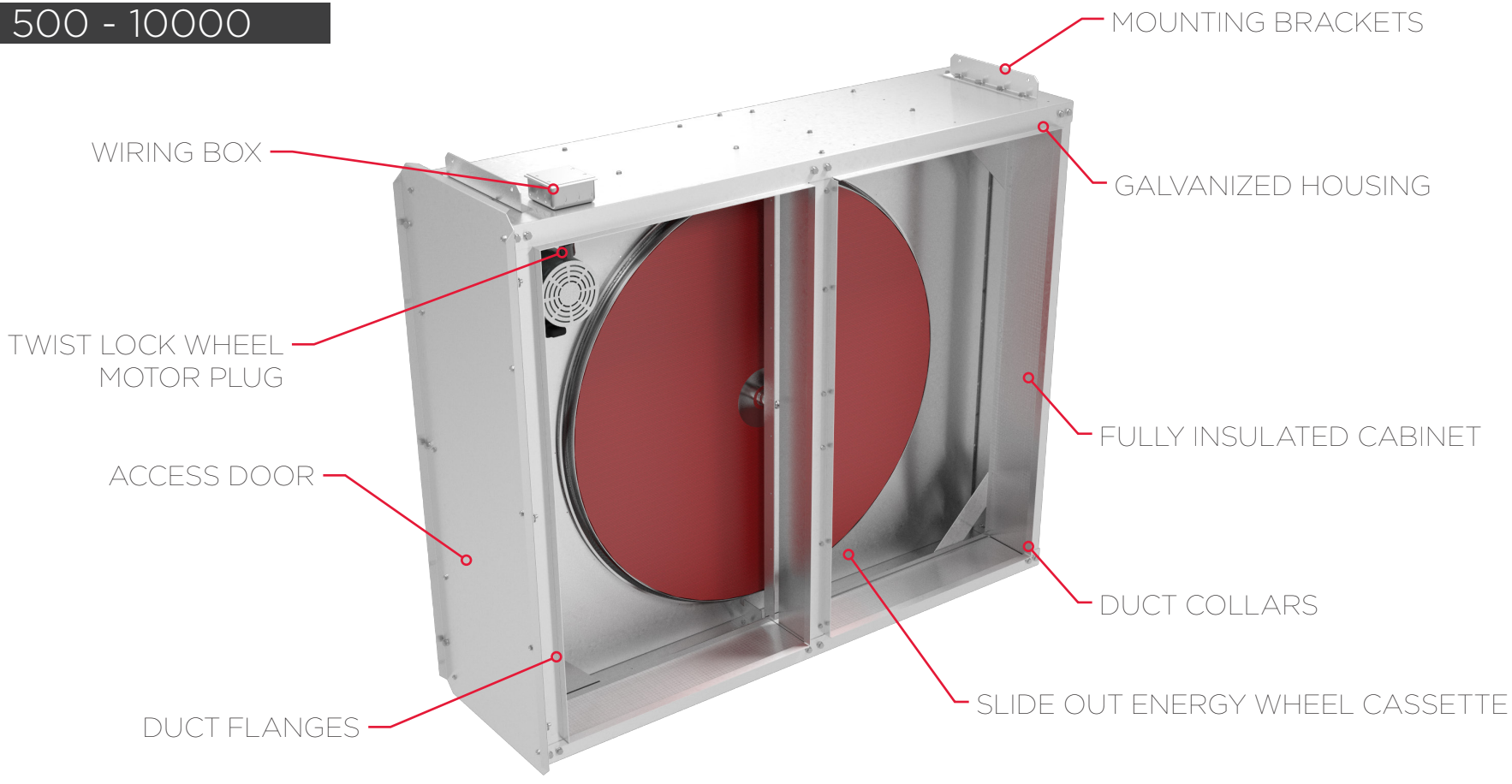
ERV 1500 - 10000 (WITH COILS)



STANDARD CONSTRUCTION FEATURES

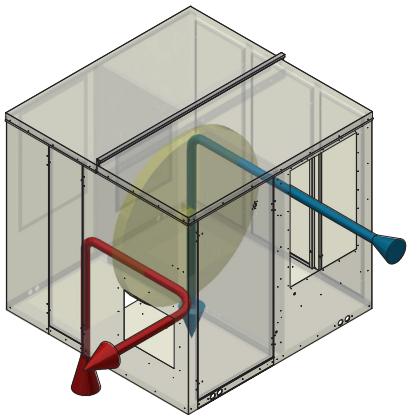
ERC standard construction features

ERC 500 - 10000

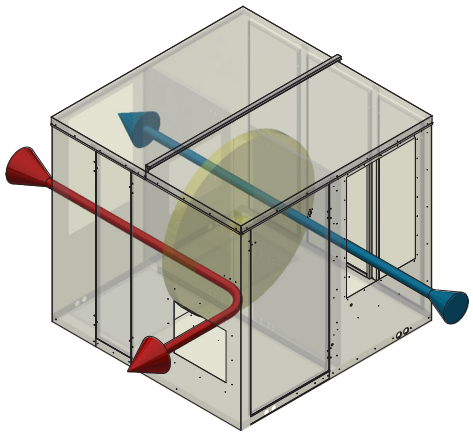


INSTALLATION OPTIONS

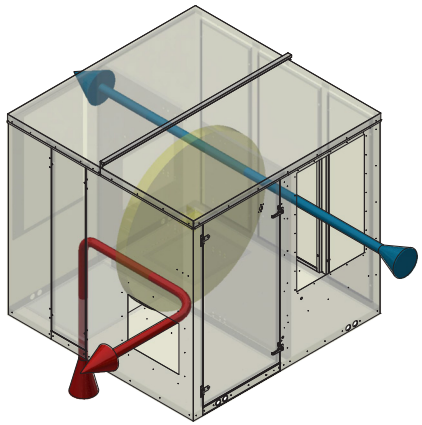
A variety of duct connection and installation options are available



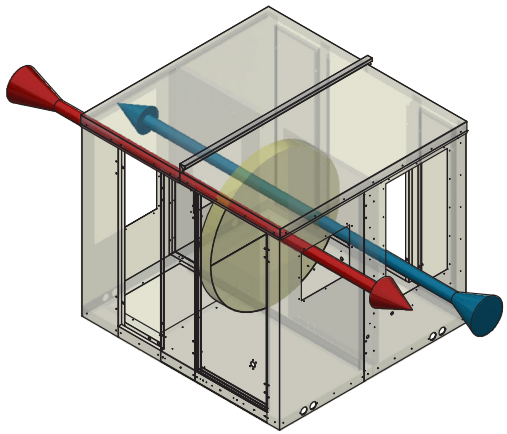
ARRANGEMENT V
Provides vertical supply and return duct connections for belt drive units



ARRANGEMENT H
Provides horizontal supply and return duct connections for belt drive units



ARRANGEMENT C
Provides combination supply and vertical return duct connections for belt drive units



STRAIGHT THROUGH
Provides straight horizontal supply and return ducts for belt and direct drive units

ERV ACCESSORIES

Beyond the ERV Standard Construction Features, Cook offers accessories to fit your custom air-movement requirements and/or preferences

ACCESSORY DESCRIPTIONS

ROOF CURB
- Provides supporting structures for fans and ventilators
- Available for flat, pitched and peaked roofs with or without insulation

DUCT ADAPTER
- Installed on curb prior to fan installation
- Adapter provides convenient and accurate placement of ductwork

DUCT FLANGES
- For ducted connections
- Factory installed flanges attached to the fan aid in the connection of ductwork

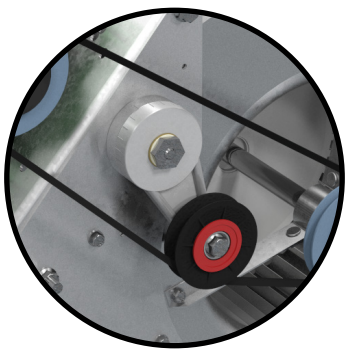
FLEX DUCT CONNECTION
- Flexible connection between the fan and the attached ductwork
- Reinforced neoprene fabric and aluminum bands

TIERED INTAKE WEATHER HOOD
- Architectural tiered style
- Provides a degree of protection against weather and debris
- Standard with 2" washable aluminum filters

DAMPER EXTENSION
- Provide location for the installation of motorized dampers
- Extension selection based on associated accessories at the duct connection

HINGED ACCESS DOORS
- Quarter turn latches
- Heavy duty air handler hit style hinges
- Hinge pins are removable for additional access
- Large easy to grab handle
- Standard on ERVX and ERV 500-1000

SENSIBLE ONLY WHEEL
- When latent energy recovery is not desired
- Replaces standard total energy rotary wheel



BELT TENSIONER
- Maintains constant drive belt tension
- Reduces maintenance costs
- Increases belt life

DOUBLE WALL CONSTRUCTION
- Covers standard foil back insulation with additional layer of galvanized material
- Standard on the coil side of ERV units

ERV ACCESSORIES

Beyond the ERV Standard Construction Features, Cook offers accessories to fit your custom air-movement requirements and/or preferences

ACCESSORY DESCRIPTIONS

VAPOR TIGHT LIGHTS

- Factory mounted, one in each blower compartments
- Fixture seals out dust and other contaminants
- Available for 1500 and larger ERV units

EXHAUST WEATHER HOOD

- Provided with birdscreen
- Provides location and protection for factory installed discharge dampers on outdoor units

DAMPERS

- Optional dampers can be located at intake and discharge locations
- Dampers can be gravity or motorized
- Available in standard and low leakage
- Galvanized and aluminum material options are available
- See Damper & Shutter Accessories Product guide for more details

LOW PROFILE BRACKET (ERV 500 - 1000 ONLY)

- Brackets location allows fan to be turn for a lower profile
- Allows for bottom access to fan

INTAKE WEATHER HOOD

- Provides a degree of protection against weather and debris
- Galvanized construction 45° slope
- Standard with 2" washable aluminum filters

PURGE SECTION

- Uses small amount of fresh outdoor air to purge wheel of any carryover air
- Available for rotary wheel

GFCI SERVICE OUTLET

- NEMA 3R convenience outlet
- Requires field wiring

FILTERS UPGRADE

- Upgrade from standard MERV 8 filters to MERV 11 or 13 filter for supply, exhaust or both

6" WHEEL

- Wheel depth is increased for added effectiveness
- Fits in standard cassette housing without increasing the size
- Available in both total energy and sensible only

ERV MOTOR OPTIONS

Beyond the ERV standard construction features, Cook offers accessories to fit your custom air-movement requirements and/or preferences

EC MOTORS

- EC motors are available for all direct drive sizes of ERVX and ERV 500 in 115/208-230 volt

PSC MOTORS

- PSC motors are available for all sizes of direct drive ERVX and ERV for 115-volt

PM MOTORS

- PM motor are available for all sizes of direct drive ERVX 208-230/460

NEMA PE MOTORS

- NEMA Premium Efficiency motors are available for all ERVX sizes and all belt drive ERV sizes

ACCESSORIES CONTINUED

Beyond the ERV standard construction features, Cook offers accessories to fit your custom air-movement requirements

HEATING & COOLING

Fluid and refrigerant coils available in ERV 1500-1000 and is shipped factory installed.

COOLING

Available in 2, 4, or 6 rows with 8, 10, or 12 fins per inch.

- DX-Direct Expansion
- Chilled water

HEATING

Hot water with 1 or 2 rows with 8, 10, or 12 fins per inch.

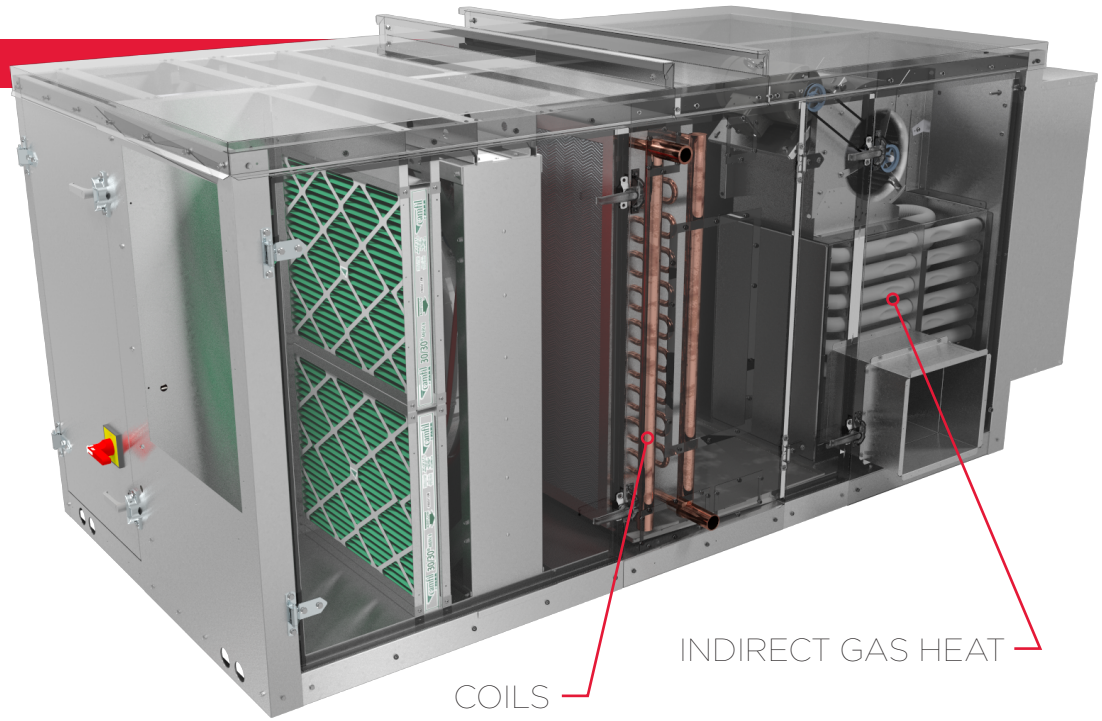
- ERV 1500 - 10000 ship factory installed

Electric Post up to 65 kW depending on unit size

- ERV 1500 - 10000 Shipped factory installed
- ERV is shipped loose for field installation

Indirect Gas up to 4,000,000 BTU

- Available in ERV 2500 - 10000



SENSORS AND CONTROLS

Cook extensive offering of optional sensors and controls allows customized monitoring

AVAILABLE OPTIONS

DIRTY FILTER SENSOR
- Sensor in both supply and return filters
- Registers increase in pressure across filter bank
- Provides signal to either BAS or status indicator that filter requires service

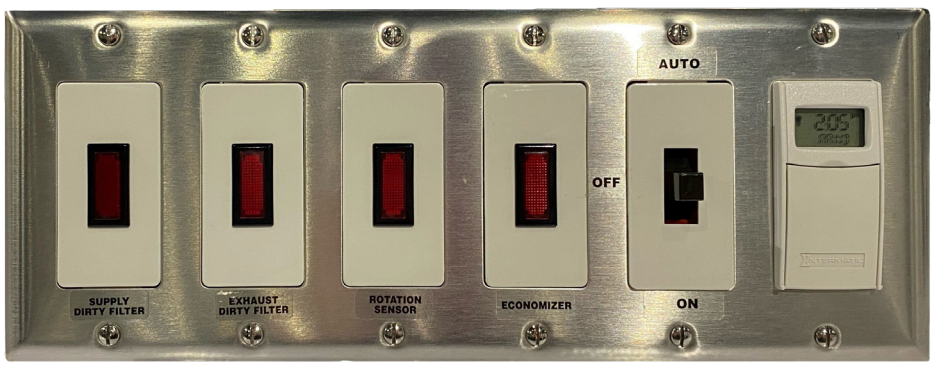
ROTATION SENSOR
- Available for rotary energy wheel units (ERV & ERC)
- Send signal that energy wheel is not turning
- Standard with adjustable time delay for field calibration to reduce false errors

ECONOMIZER MODE
Know as "free cooling" and is useful when outdoor temperature and/or humidity are within desirable range.

ERVX
- The core is bypassed via factory installed motorized damper
- No field duct work is required
- Available in two sensing options:
  - Temperature only, via a factory installed and field adjustable dry bulb thermostat
  - Enthalpy sensor, factory installed with 4 adjustable set points

ERV
- Stops wheel rotation when the economizer mode is desired
- Available in Temperature or Enthalpy sensor options

ECONOMIZER AUTOMATIC OVERRIDE
- Factory installed thermostat senses when to restart energy recovery
- Selectable with either Economizer Temperature or Economizer Enthalpy



▶ REMOTE PANEL
Designed for occupied space and provides status indication lights for:

- Rotation
- Filter
- Economizer Mode
- Frost Control Mode

Available with Hand-Off-Auto switch for manual operation control. Optional 7 day programmable time clock or manual timed override.

SENSORS AND CONTROLS

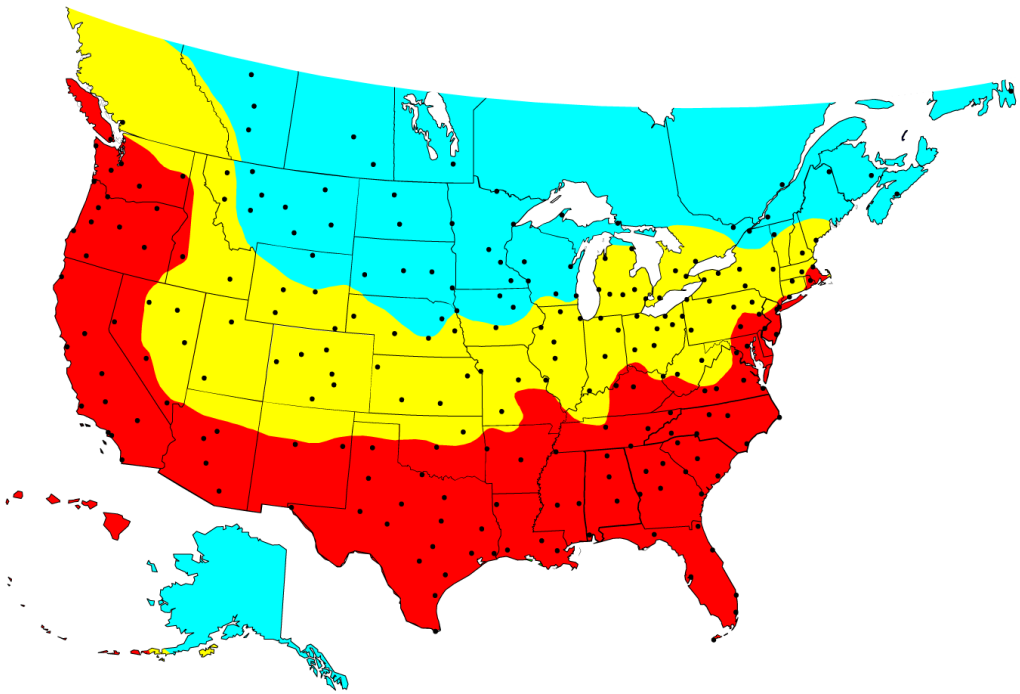
Cook extensive offering of optional sensors and controls allows customized monitoring

CONTINUED

FROST CONTROL

When the outside air temperature drops below the frost threshold point, Cook has several options for prevention.

- On/Off-
  - Automatically turns the unit on or off based on the outside temperature
  - Factory installed thermostat is field adjustable
- Exhaust Only
  - Automatically turns the supply airstream off based on the outside temperature
  - Exhaust/return airstream continue operate, providing thermal load to the energy recovery wheel or core
  - Factory installed thermostat is field adjustable
- Timed
  - Automatically cycles the supply airstream on or off based on a field adjustable time delay and the outside temperature
  - Exhaust/return airstream continue to operate, providing thermal load to the energy recovery wheel or core
- Electric Pre-Heat
  - Two stage electric heater
  - Selection based on the required temperature rise (ΔT°) to be above the frost threshold
  - ERC, ERVX, ERV 500 and ERC 1000 ship loose
  - ERV 1500 thru 10000 ship factory installed and wired to a single point connection



RECOMMENDED

- Preheat Frost Control
- On/Off or Exhaust only Frost Control
- No Frost Control Required

Note: Use map as an informational guideline and a quick estimating tool. For exact information on frost control, refer to ERV selection.

SENSORS AND CONTROLS

Cook extensive offering of optional sensors and controls allows customized monitoring

FAN SPEED CONTROL

FAN SPEED CONTROLLER (FSC)

- Utilized when less than 100% fan capacity is desired
- Available in 115V
  - Available on the ERV 500 & 1000
- Available in optional factory pre-wired installation or shipped loose for field installation

VFD

VFD

- Factory installed
- Available for supply, exhaust and energy wheel
- Compatible with all Vari-Flow® controls

DIRECT DIGITAL CONTROL

DIRECT DIGITAL CONTROL

- Stand-alone microprocessor controller
- LCD display with keypad
- Programmed to monitor
  - 6 Temperature points: outside air, supply air, outside air after wheel, return air, and/or outside air after coils
  - Indoor and outdoor humidity
  - Supply and exhaust motor current
  - Energy wheel rotation
  - Dirty filter
  - CO_2
- Interface with cooling and heating values
- Programmable calendar
- Additional BACnet communication available

VARI-FLOW® CONTROLS

Cook has a variety of EC controls available for ERV products

AIR BALANCE KIT

The Air Balance Kit (VFABK) integrates and simplifies the installation and enhances the function of Vari-Flow motors and controls.

2 SPEED CONTROLLER

The 2-Speed Controller (VF2SC) allows the setting of two separate motor speeds and switching between these speeds by an external control device.

PRESSURE CONTROLLER

The Pressure Controller (VFPC) addresses a wide variety of pressure-based applications. This controller is compact and easy to set up.

REMOTE SPEED CONTROL

The Remote Speed Controller (VFRSC) allows the speed of a Vari-Flow motor to be manually adjusted and set from a location away from the fan.

TEMPERATURE

The Temperature Controller (VFTC/VFTC-N) is used to modulate fan speed based on temperature set point.

HUMIDITY

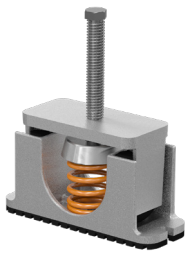
The Humidity Controller (VFHC/VFHC-N) is used to modulate fan speed based on the relative humidity set point.

ERV ISOLATORS

Cook offers six types of isolators which reduce vibration transmission from equipment to building structure

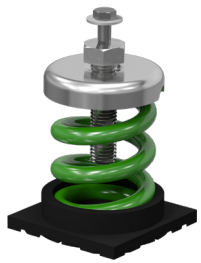
HOUSED SPRING

Floor Mounted



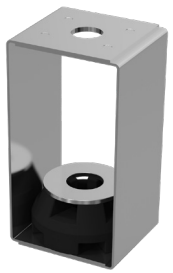
FREE STANDING SPRING

Floor Mounted



RUBBER-IN-SHEAR

Ceiling Mounted



RESTRAINED SPRING

Floor Mounted

SPRING

Floor Mounted

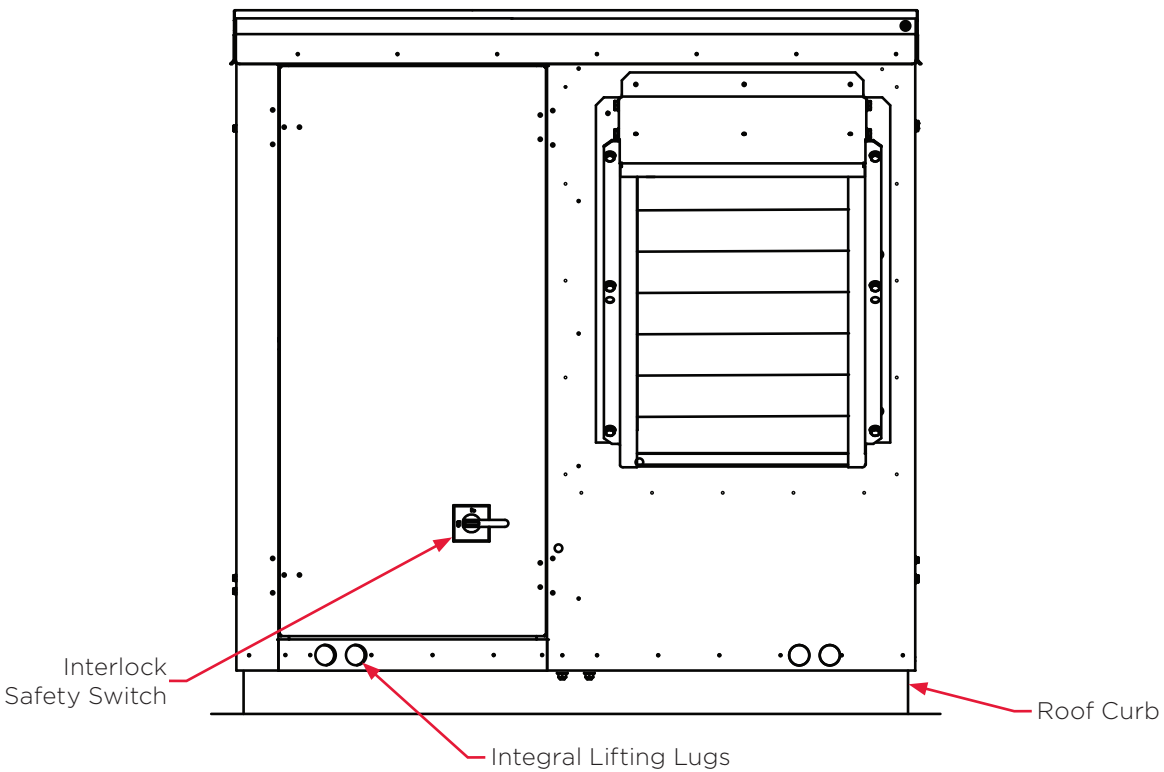
RUBBER-IN-SHEAR

Ceiling Mounted

INSTALLATION & MOUNTING

ERV's can be provided curb-mounted as an option

CURB MOUNTED



ERV DESIGN BENEFITS

The galvanized housing is highly weather resistant

Lifting lugs assist in product installation

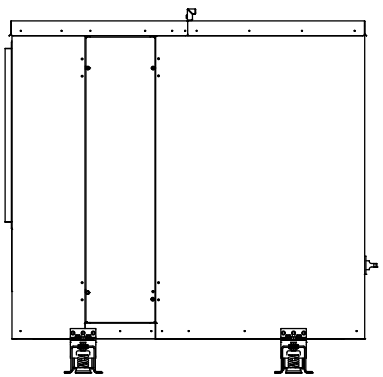
Allows for easy connection to other roof top units

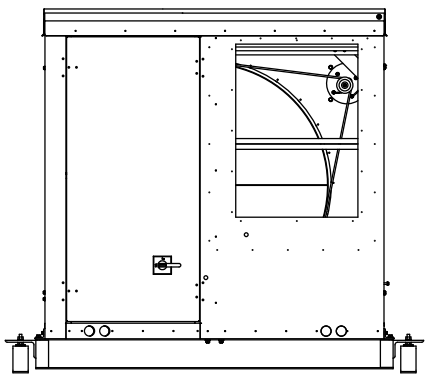
Filters in supply and exhaust air streams to keep contaminants out of your system

INSTALLATION & MOUNTING

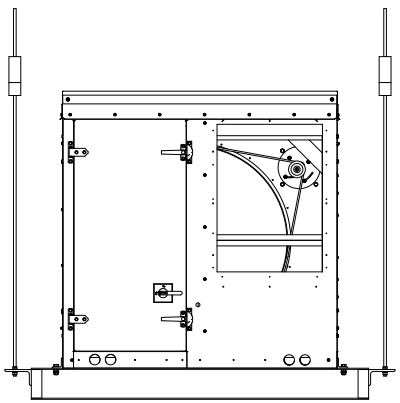
ERV's can be installed with isolation either on the floor of mechanical space or hanging above a mezzanine

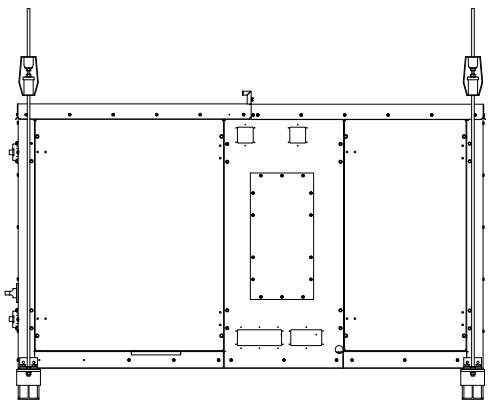
FLOOR MOUNTED





HANGING CEILING





BENIFITS

- When roof space is limited, Cook ERV's can be installed with rails and either free standing spring isolators or ceiling hangers to reduce vibration transmission in the space

OPTIONAL COATING

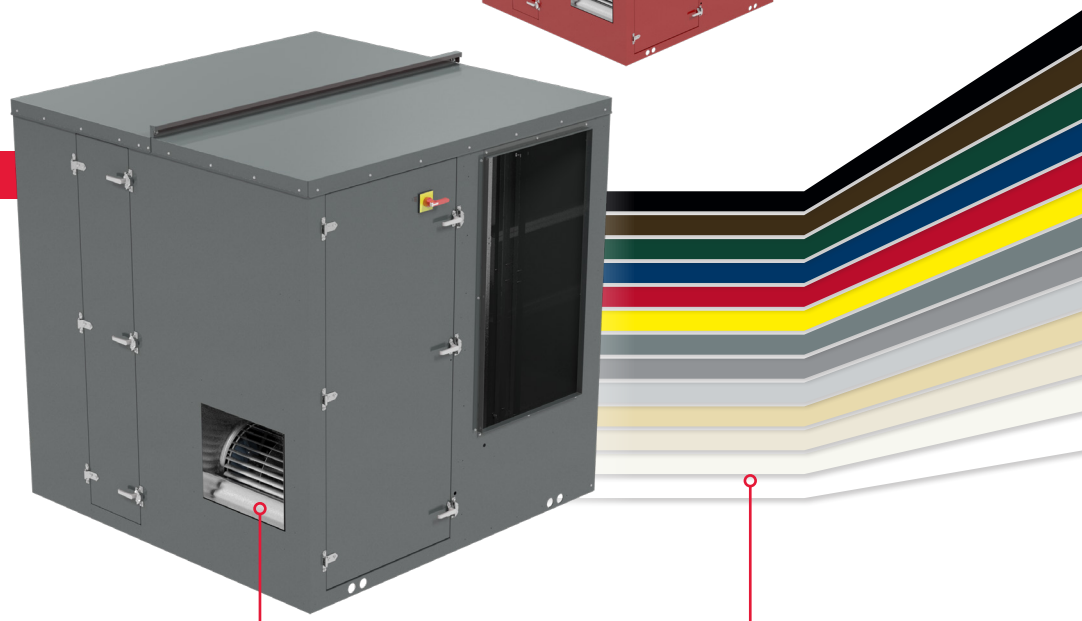
Energy recovery ventilators are available with Lorenized coating

Shown in Lorenized Cook Red

LORENIZED™ COATING

- Electrostatically applied, baked polyester powder coating
- Undergoes a five-stage environmentally friendly pretreatment/wash process before coating
- Baked and cured at 400°F; final coating thickness of 1.5–2.5 mil
- Coating is required to exceed 1,000 hour salt spray under ASTM B117 test method
- Offers strong chemical resistance, durable mechanical performance and tough protection from outdoor elements

The Lorenized™ coating in gray is standard. Lorenized™ is also available in 12 other colors shown



Lorenized™ standard color on ERV

all 13 available Lorenized™ colors

ERV CERTIFICATIONS

We use third party verification agencies for certification, qualification and listing of fan performance

AMCA AIR

AMCA Certified Ratings Seal

Loren Cook products that bear the AMCA Certified Ratings Seal are licensed by AMCA International. These products meet the AMCA Standard and are within the product scope of AMCA International

All Models

ETL

Ducted Heat Recovery Ventilators with supplemental gas heat have been tested to meet the safety requirements for gas heaters specified by ANSI Z83.8/CSA 2.6

Gas heat Models

UL 1812 LISTED

Ducted Heat Recovery Ventilators

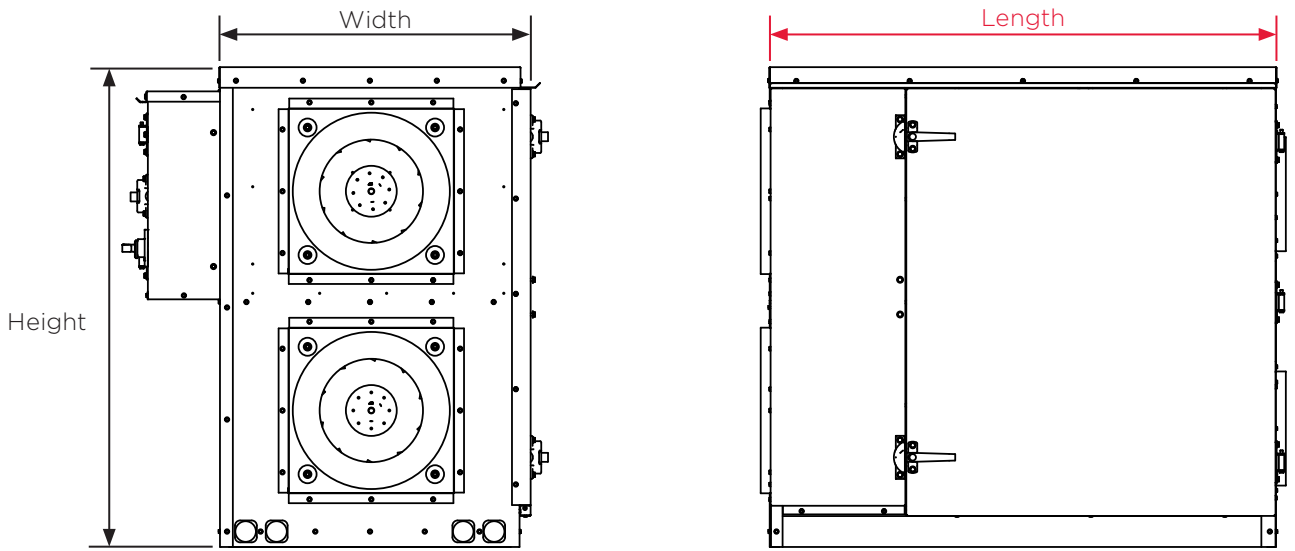
The UL 1812 Listing is the standard for ducted heat recovery models

All Models

OVERALL DIMENSIONS

The following overall dimensions are for ERVX units, and are in inches. For more detailed dimensions, see product submittals

ERVX 500 - 1250 (DIRECT DRIVE)

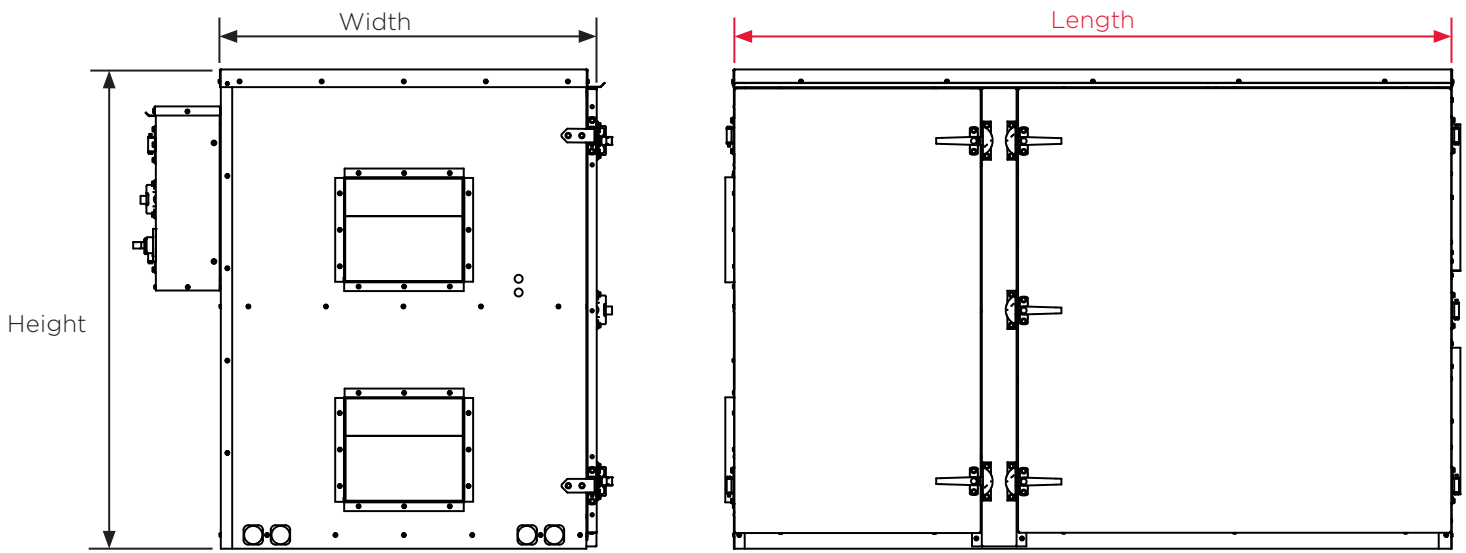


Unit Size	500	550	700	750	1000	1050	1200	1250
Height	42 ½	42 ½	42 ½	42 ½	46 ½	46 ½	46 ½	46 ½
Length	47	47	47	47	49	49	49	49
Width	23	23	23	23	29	29	29	29

OVERALL DIMENSIONS

The following overall dimensions are for ERVX units, and are in inches. For more detailed dimensions, see product submittals

ERVX 1500 - 3500 (BELT DRIVE)

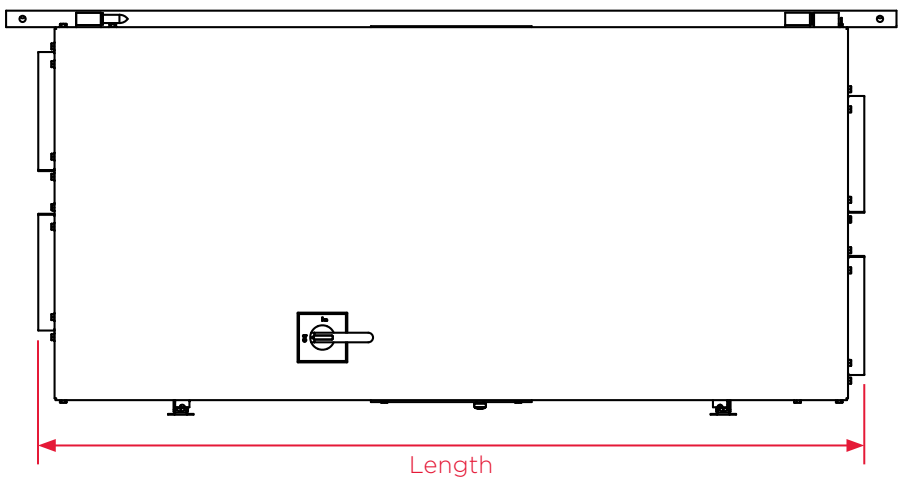


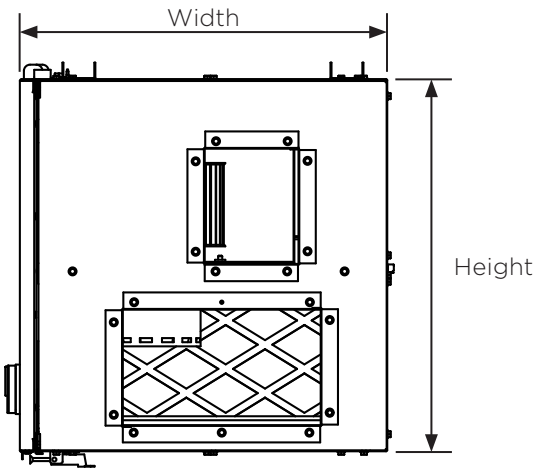
Unit Size	1500	2500	3500
Height	43 ½	52 ½	54 ½
Length	68	78 ½	78 ½
Width	44	41	50

OVERALL DIMENSIONS

The following overall dimensions are for ERVD units, and are in inches. For more detailed dimensions, see product submittals

ERV 500 - 1000 (DIRECT DRIVE)



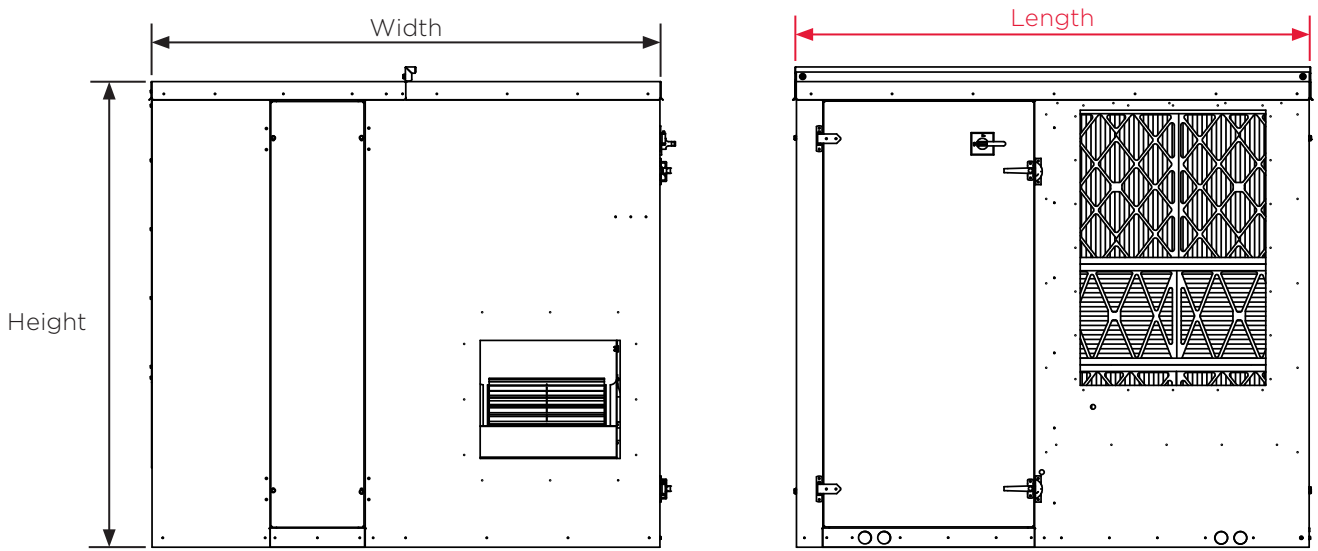


Unit Size	500	1000
Height	23 $^{16}/_{16}$	28 $^{13}/_{16}$
Length	50 ⅛	50 ⅛
Width	22	28 ¼

OVERALL DIMENSIONS

The following overall dimensions are for ERV units, and are in inches. For more detailed dimensions, see product submittals

ERV 1500 - 10000 (BELT DRIVE)

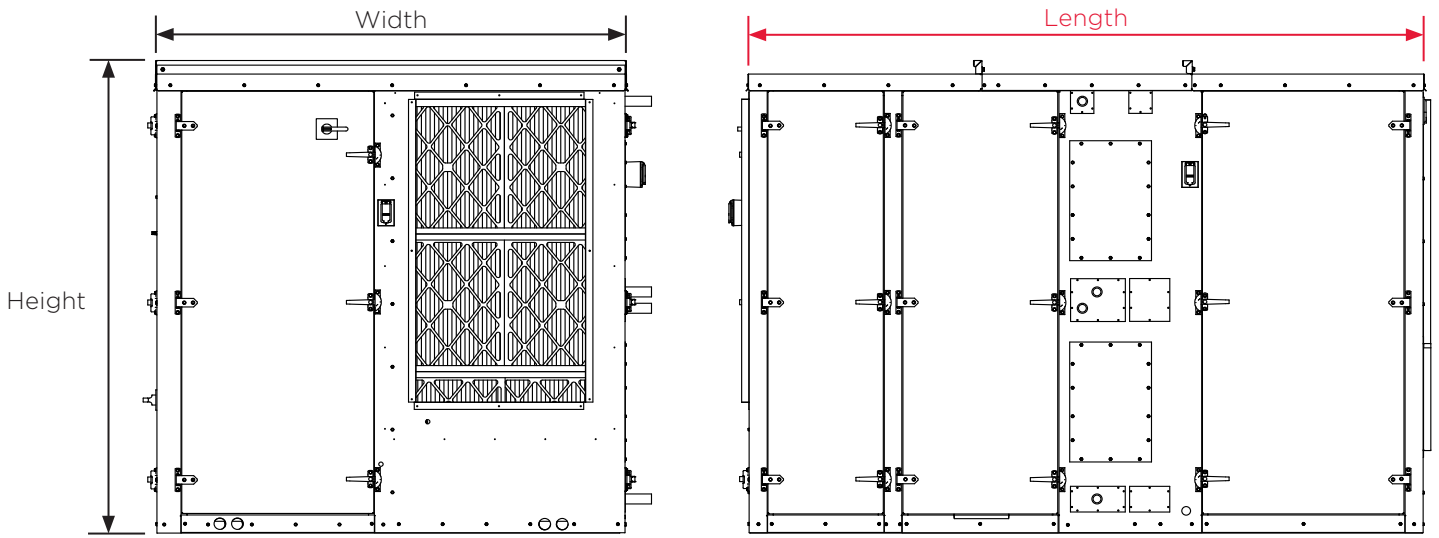


Unit Size	1500	2500	3500	4500	5500	7000	8500	10000
Height	40 ½	50	59	64 ½	71	76 ½	83	90
Length	54 ¼	52	64 ½	69 ½	69 ½	79 ½	79 ½	100
Width	49 ¼	52	60 ½	66 ½	66 ½	80	80	84 ½

OVERALL DIMENSIONS

The following overall dimensions are for ERV units with heating/cooling coils, and are in inches. For more detailed dimensions, see product submittals

ERV WITH COILS 1500 - 10000 (BELT DRIVE)



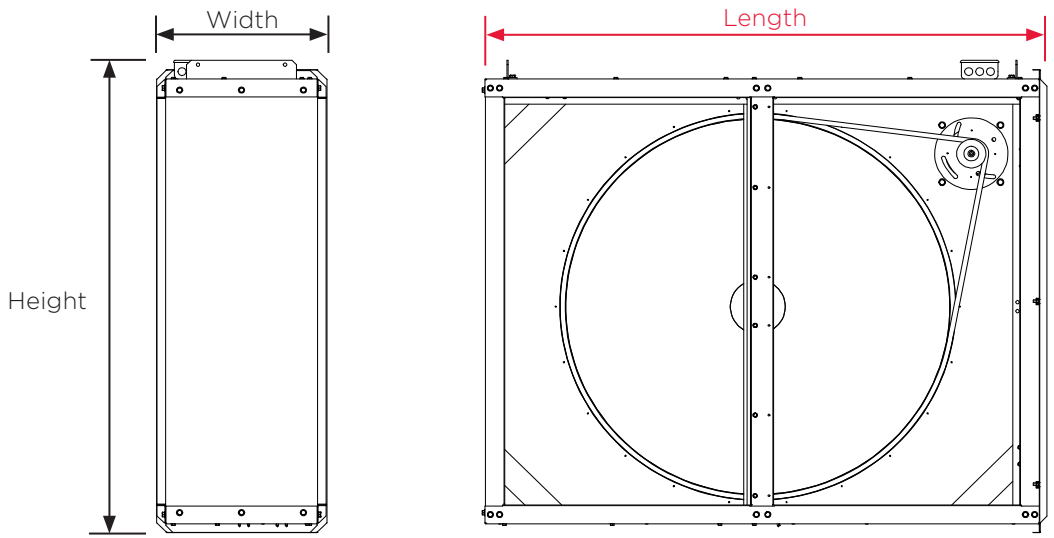
Unit Size	1500	2500	3500	4500	5500	7000	8500	10000
Height	40 ½	50	59	64 ½	71	76 ½	83	90
Length*	90 ¼	88	100 ½	105 ½	105 ½	115 ½	115 ½	136
Width	49 ¼	52	60 ½	66 ½	66 ½	80	80	84 ½

*For indirect heat add 11"

OVERALL DIMENSIONS

The following overall dimensions are for ERV units with heating/cooling coils, and are in inches. For more detailed dimensions, see product submittals

ERC 1500 - 10000 (BELT DRIVE)



Unit Size	500	1000	1500	2500	3500	4500	5500	7000	8500	10000
Height	22 5/8	28 5/8	35 5/8	45 5/8	51 5/8	57 5/8	63 5/8	69 5/8	75 5/8	81 5/8
Length	27 5/16	32 5/16	52 3/16	54 11/16	63 1/2	69 11/16	69 11/16	82 11/16	82 11/1	87 1/4
Width	16 5/8	16 5/8	18 9/16	18 9/16	18 9/16	18 9/16	18 9/16	21 1/8	21 1/8	27 7/8

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