

Dedicated Outdoor Air Systems

for high percentage and 100% outside air

Models RV and RVE

• Institutional • Commercial • Industrial

- Up to 18,000 cfm
- 3 in. wg External Static Pressure
- Packaged DX (5-70 tons), Chilled Water, Split DX Cooling with or without Remote Condenser, Air-Source Heat Pump (5-30 tons)
- Indirect Gas, Hot Water, Electric Heating, Air-Source Heat Pump
- Optional Energy Recovery
- Optional Return Air



Greenheck is 100% Dedicated to Outdoor Air Systems!

Models RV and RVE

- 2-inch double-wall with R13 foam insulation construction
- 800 to 18,000 cfm and up to 3 in. wg
- Ideal for 100% outdoor air, variable air volume, and single zone applications
- Direct drive, VFD driven, plenum supply/exhaust fans
- Optional recirculation damper for 20-100% outside air and night setback operation
- Optional total energy wheel
- Optional horizontal duct configurations for side return and supply



Cooling

- Chilled water, packaged direct expansion (5-70 tons), split direct expansion (with or without remote condenser), or air-source heat pump (5-30 tons)
- Low sound condenser fans
- Optional inverter, digital or standard scroll compressor
- Optional modulating hot gas reheat for humidity control
- Optional electronically commutated (EC) motor on lead condenser fan

Heating

- Indirect gas-fired, electric, hot water, or air-source heat pump
- Up to 1,200 mbh heating capacity
- Optional 16:1 high turndown furnace

Remote Condenser

(Paired with Models RV-25, 45 and RVE-40, 85)

- 5 to 30 tons cooling capacity
- 800 to 8,500 cfm
- Hot gas reheat and compressors internally mounted and piped within the RV/RVE unit
- Low sound condenser fans
- Lead EC condenser fan



Product Certifications

Greenheck takes pride in offering a high quality, reliable product. We invest our resources into designing, testing and manufacturing products to ensure customer satisfaction.



ETL Listed for electrical and overall unit safety. Every unit is tested at the factory before it is shipped to the jobsite.



AHRI Certified coils and energy wheels. To guarantee your coil is going to perform as required, check for AHRI Certification.



Energy recovery wheels are certified by the AHRI Air-to-Air Energy Recovery Ventilation Equipment Certification Program in accordance with AHRI Standard 1060. Actual performance in packaged equipment may vary. Certified ratings are available in the Certified Product Directory at www.ahrirectory.org.

Energy Efficiency

Inverter Compressor

An inverter compressor option is available from 5 to 70 tons. The inverter compressor provides many benefits.

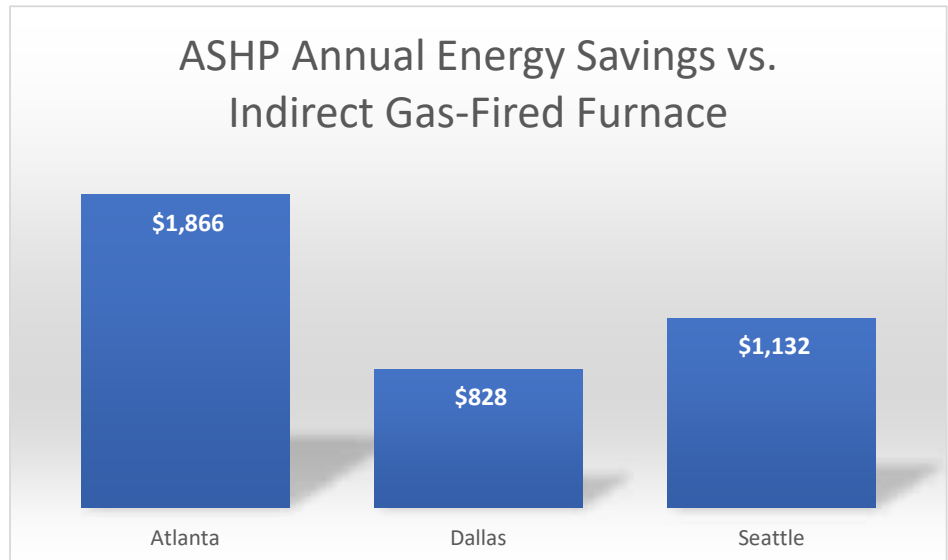
- Improved part load efficiency
- Integrated Energy Efficiency Ratio (IEER) up to 22.1, with an average improvement over a digital scroll compressor of 15 to 20%
- Reduced sound levels
- Precise temperature and humidity control



Air-Source Heat Pump (ASHP)

An air-source heat pump is available from 5-30 tons. This heating and cooling option offers:

- High efficiency with an inverter compressor (standard feature)
- Lead EC outdoor fan motor (standard feature) for modulating head pressure control
- Coefficients of Performance (COP) ranging from 3-4, contributing to lower annual energy costs



The chart illustrates the approximate energy cost savings of an ASHP over an indirect gas-fired furnace.

High Turndown Furnace

A high turndown furnace option is available on models RV and RVE. This high turndown is industry-leading technology for the tubular-style heat exchanger market.

- Up to 16:1 turndown per furnace
- Precise temperature control
- Fully modulating control
- Less cycling during part-load conditions
- Commissioning sequence for easy start-up



Simple, Easy Start-Up

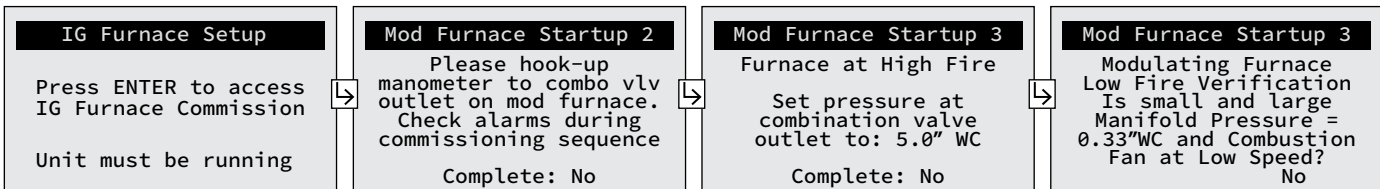
Microprocessor

Models RV and RVE include a microprocessor controller that is factory programmed, wired and tested prior to shipment. The controller can operate stand-alone or integrate with a Building Management System (BMS) using BACnet® MS/TP or IP, LonWorks® or Modbus® RTU protocols. This controller is responsible for operating the unit in a safe and energy efficient manner while controlling temperature and humidity.



Built-in Furnace Commissioning Guide

Controller commissioning menus make for simple and easy start-up, saving time and money. See below for example of furnace start-up menus.



Web User Interface (UI)

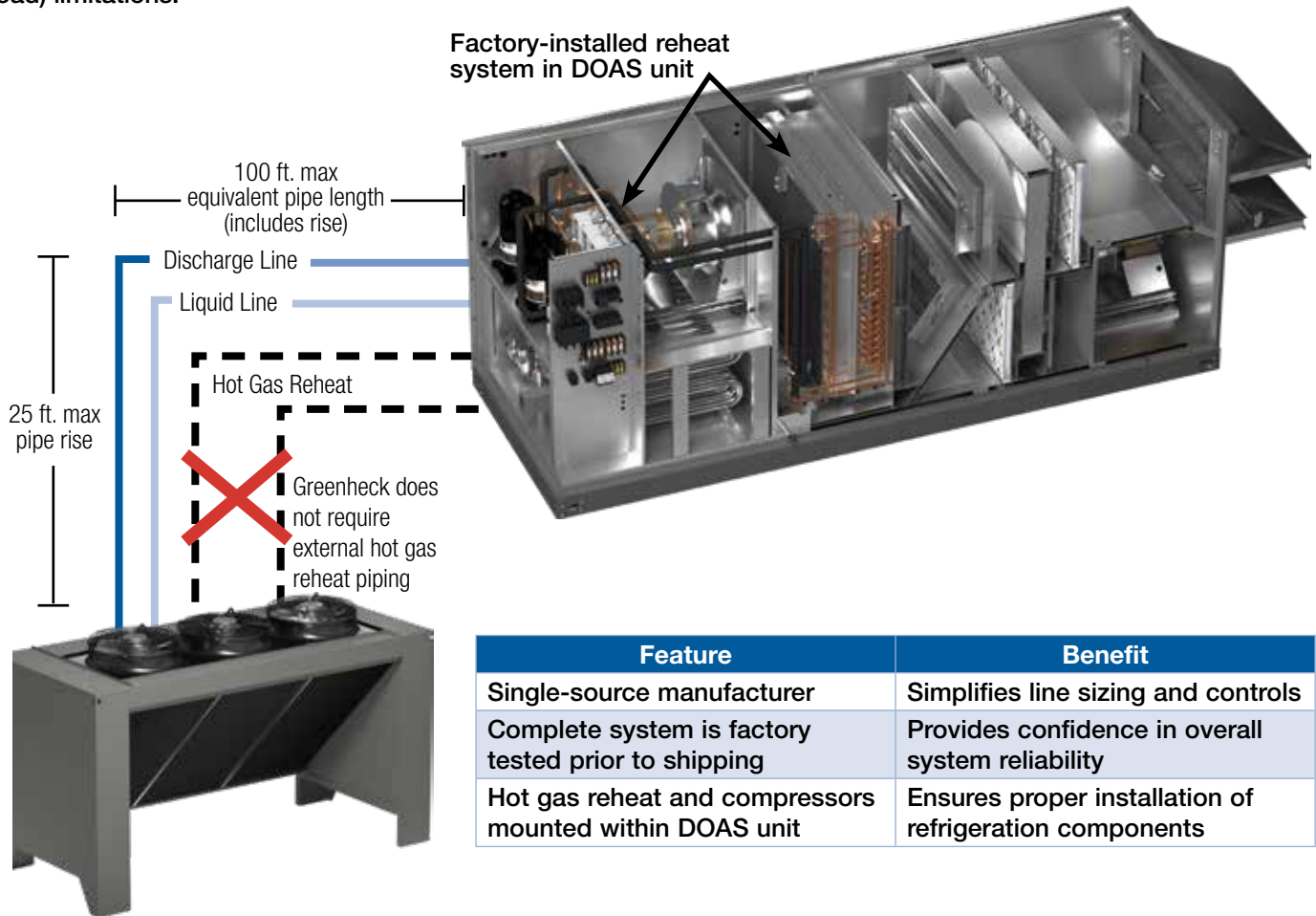
Greenheck's microprocessor controller comes standard with a web user interface allowing the unit to be viewed and controlled from a web browser. With an Ethernet connection from the RV or RVE unit to the facilities network, a full graphic, specific to the unit selected, will allow for monitoring and control of the unit without a Building Management System (BMS). Other features include full control display access, customizable data trending, and service contact information.



Application Flexibility

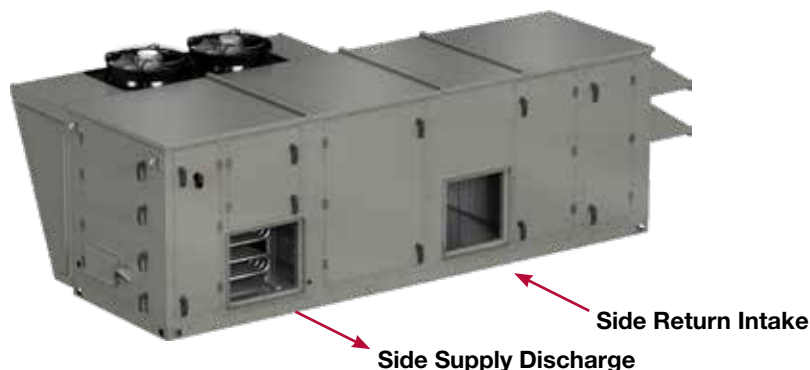
Remote Condenser

Greenheck's optional remote condenser features factory piping and wiring of the hot gas reheat components, providing quicker installation with indoor or outdoor mounting options. Available from 5 to 30 tons. Common applications include standing seam (sloped) roofs, retrofits, restricted roof space, and restricted structural (load) limitations.



Horizontal Duct Connections

An optional side or end return air intake and side discharge is available for installation flexibility. Common applications include indoor mounted, pad mounted, or rooftop mounted reducing ductwork, system effect, and eliminating the need for a tall, costly plenum curb.



1 Plenum Supply/Exhaust Fan

- Direct drive plenum fan
- Neoprene isolation
- Factory provided variable frequency drive

2 Construction

- 2-inch double-wall construction unit housing and base
- R13 foam insulation thermally broken
- Available finishes include:
 - Permator™ (2,500 hr/salt spray rating under ASTM B117 testing conditions)
 - Hi-Pro Polyester (5,000 hr/salt spray rating under ASTM B117 testing conditions)

3 Filters

- Outdoor air and exhaust filters (pre-wheel)
 - 2-inch MERV 8
 - 2-inch aluminum
- Supply filters (pre-coil)
 - 2-inch MERV 8 or MERV 13
 - 4-inch MERV 8 or MERV 14
 - Combination of MERV 8 and MERV 11, 13 or 14

4 Control Center

- 24 VAC control voltage
- Control transformer
- Non-fused disconnect switch
- UL Listed, Recognized, or Classified electrical components
- Factory prewired for single point power connection
- Phase and brownout protection (PDX)
- Optional exhaust fan only power

5 Weatherhood

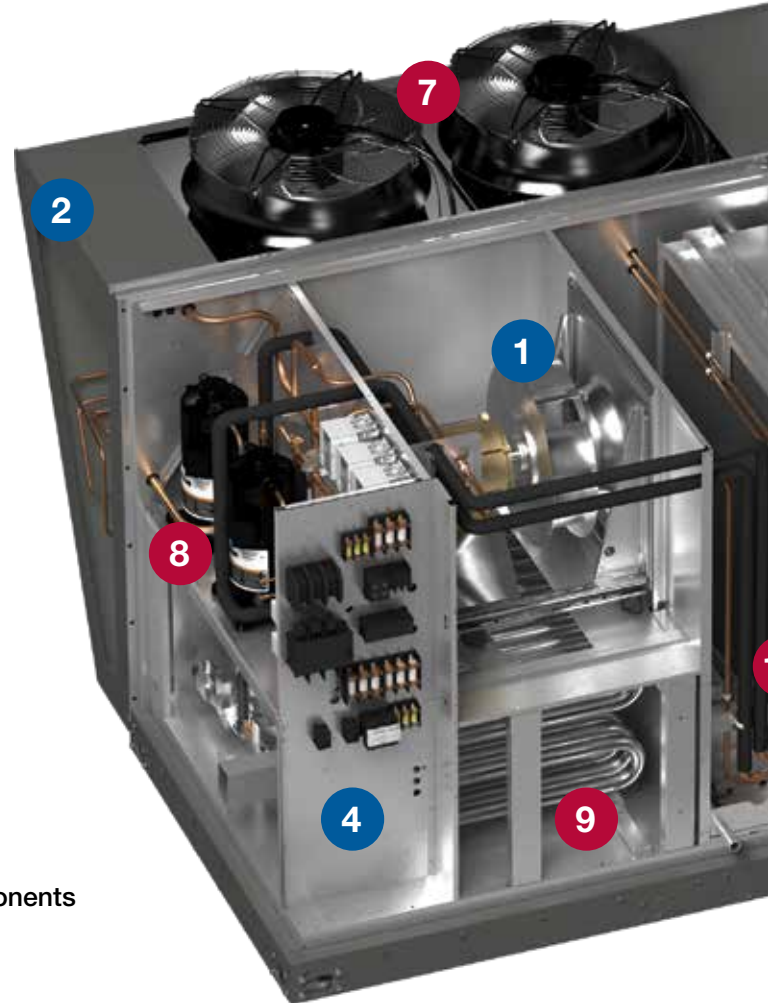
- Aluminum mesh filters
- Wind-driven rain prevention

6 Total Energy Wheel (RVE)

- Sensible and latent energy recovery
- Lightweight, segmented wheel for easy cleaning
- L₁₀ rated bearing life in excess of 400,000 hours
- Permanently bonded, silica gel desiccant for latent transfer – long term durability
- Stainless steel housing

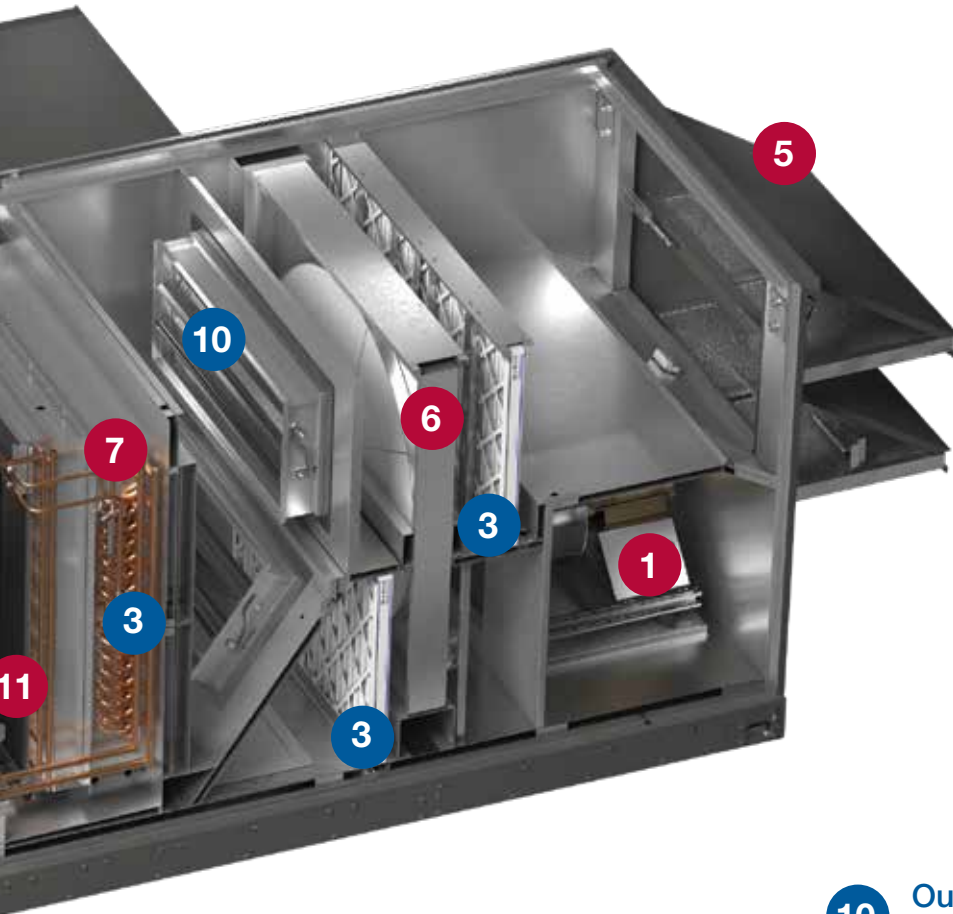
7 Cooling Options

- Packaged direct expansion (PDX)
 - Optional modulating head pressure control (EC motor or VFD on lead condenser fan)
- Chilled water coil
- Split DX coil with or without remote condenser
- All coils with copper tubes and permanently expanded aluminum fins
- Mounted on a stainless steel drain pan
- Air source heat pump
 - Standard features include inverter compressor and modulating head pressure control



S Standard Feature **O** Optional Feature

- 8 Compressors**
- Quiet operating hermetic, scroll-type
 - 5 to 70 tons of mechanical cooling
 - Optional compressor for lead circuit:
 - Standard scroll
 - Digital scroll
 - Inverter scroll



Optional Accessories

- Building Pressure Sensor
- CO₂ Sensor
- Condensate Overflow Switch
- Condenser Hail Guards
- Dirty Filter Sensor
- Duct Pressure Sensor
- Economizer Control
- Electrofin Coated Coils
- Energy Wheel Bypass Damper
- Microprocessor Remote Interface
- Outdoor/Exhaust Airflow Monitor
- Roof Curbs
- Room Temperature Sensor
- Combination Room Temperature and Humidity Sensor
- Room Thermostat
- Rotation Sensor
- Service Lights
- Service Receptacle
- Smoke Detectors
- Wheel Frost Controls

- 9 Heating Options**
- Indirect gas-fired furnace
 - Optional high turndown furnace (up to 16:1) - *patent pending*
 - Stainless steel heat exchanger with optional 5 or 10 year extended warranty
 - Electric heater
 - Silicon controlled rectifier (SCR) control
 - Hot water coil
 - Air-source heat pump

- 10 Outdoor Air and Recirculated Air Dampers**
- Low leakage or insulated low leakage
 - Modulating actuator

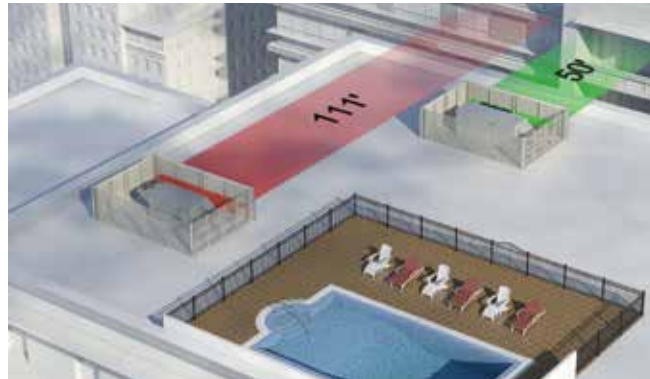
- 11 Reheat**
- Modulating hot gas reheat
 - 6 in. separation between DX and reheat coil components to prevent evaporation of condensate

Quietly Making an Impact

Greenheck offers a variety of solutions for sound-critical applications allowing for unprecedented design flexibility.

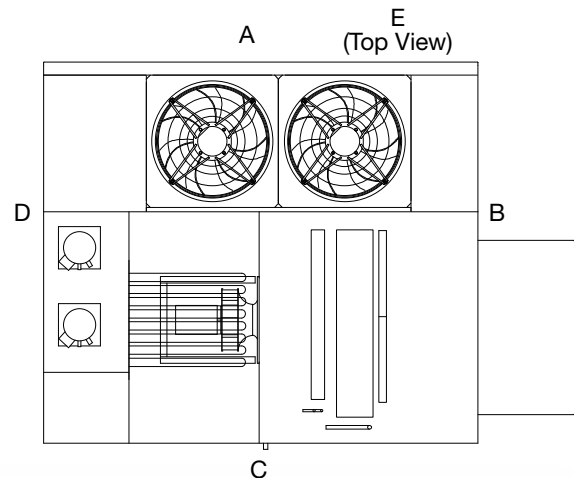
- Low sound swept blade condenser fans
- 2-inch R13 foam unit and base
- Compressor isolation
- Tested radiated sound data

Greenheck's actual radiated sound data is tested in accordance with AMCA 320-07 in our state-of-the-art testing facility, the Robert C. Greenheck Innovation Center.



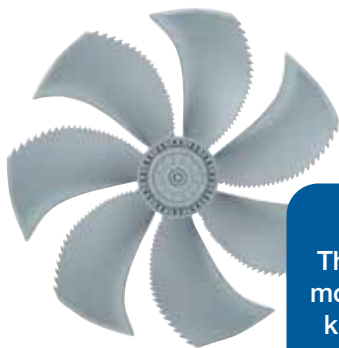
The low sound condenser fans paired with the radiated sound data of the unit operating at full load allows proper design with actual tested data. For example, if equipment is too loud or placed too closely to other buildings, corrective actions can be time consuming and costly. Greenheck provides low sound condenser fans as standard, offering an average sound power reduction of 5 to 8 decibels when compared to typical condenser fans.

RADIATED SOUND LEVELS										
Plane	Octave Bands (Lw)								Plane Lw	Plane LwA
	1	2	3	4	5	6	7	8		
A	73	85	78	80	81	73	67	62	88	83
B	71	79	69	78	73	68	64	57	83	78
C	79	77	69	76	75	70	60	59	83	78
D	74	77	72	74	74	67	61	58	82	77
E	77	84	78	79	77	72	65	61	87	81
Total	83	89	82	85	84	78	71	67	93	87



Tests conducted in accordance with AMCA 320-07 - Laboratory Methods of Sound Testing of Fans Using Sound Intensity.

Free field measurement plane created one foot from unit on all sides and top tested at max capacity.



Did you know?

The blade shape of the low sound condenser fan was modeled from one of the best - nature! The barn owl is known for its quietness during flight to fly just above their prey, without being detected. That quietness is attributed to their specialized feathers featuring a serrated edge, very similar to the profile of the fan blades in our low sound condenser fans.







Web-Based Outdoor Air Selections

Greenheck's free, online eCAPS® Engineer Application Suite provides fast and easy selection of HVAC products including RV and RVE products. Go to ecaps.greenheck.com and see how this comprehensive specifying tool can save you time.

- Online and always up-to-date
- Fast and efficient selection
- Simplified Dedicated Outdoor Air System (DOAS) selection providing:
 - Weights
 - Capacities
 - Dimensional data
 - Revit content
 - Electrical data
 - Unit cut sheets
- Quick comparison of unit options with or without energy recovery
- Scheduling capabilities within minutes



Energy Recovery Model Comparison					
	Without Energy Recovery	With Energy Recovery			
					
	RV-45-25	RVE-40-15	RVE-85-15	RVE-85-15	
	Add	Add	Add	Add	
Enthalpy Recovery Ratio (%)	-	52.6	58.4	64.0	
Relative Price	1.00	0.92	0.97	1.00	
Weight (lbs)	3,742	3,603	4,637	4,699	
Dimensions (LxWxH) (in)	109 x 68 x 76	150 x 53 x 66	163 x 68 x 76	163 x 68 x 76	
MCA/MCP (Amps)	129.0 / 175	86.9 / 110	81.8 / 100	81.8 / 100	
Cooling LAT (F)	55.3 / 55.2	55.5 / 55.2	54.4 / 54.1	53.3 / 53.1	
Cooling Dewpoint (F)	55.1	55.0	54.0	52.9	
Total Cooling Capacity (MBH)	327	203	200	197	
Heating LAT (F)	84	81	104	107	
Heating Capacity (MBH)	320	160	240	240	
Supply Volume (CFM)	4,000	4,000	4,000	4,000	
Outdoor Volume (CFM)	4,000	4,000	4,000	4,000	
Exhaust Volume (CFM)	-	3,000	3,000	3,000	
				Close	

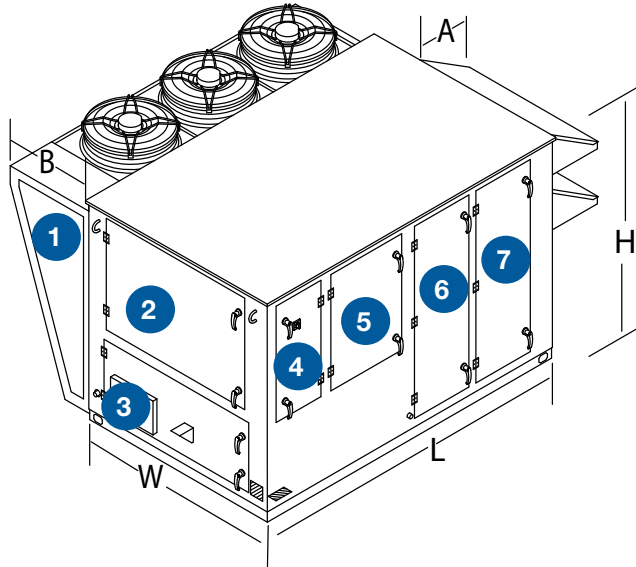
Cost reduction with energy wheel! \$\$\$

10 ton reduction with energy wheel!

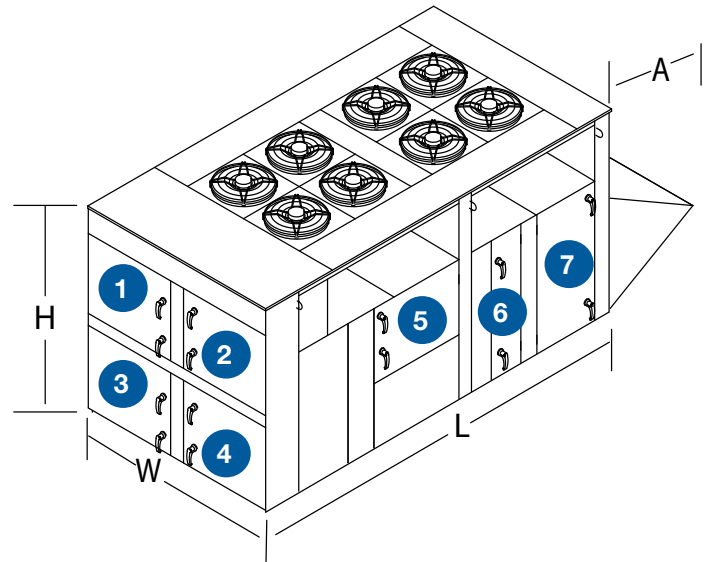
Allows you to choose your exhaust air volume.



Models RV-25, 45, 70 and Models RVE-40, 85, 120



Models RV-110 and RVE-180



Component Access

1	Optional Inverter Drive	6	Coil
2	Optional Compressor/Electrical	7	Filters
3	Optional Gas Furnace/Optional Electric Heater	8	Wheel Access <i>(not shown)</i> <i>When RVE is selected, door 8 will be to the right of door 7.</i>
4	Electrical	9	Exhaust Blower/Optional Electric Preheat <i>(not shown)</i> <i>When a powered exhaust RV is selected, door 9 will be located to the right of door 7.</i>
5	Supply Blower		

Unit Size	Nominal tonnage (tons)	Height (H)	Width (W)	Length (L)	Intake (A)	Condensing Section (B)	Nominal weight (lbs)	Outdoor Intake	Supply Discharge	Return Intake	Exhaust Discharge
RV-25	5-15	59.3	52.5	98.6 ⁷ / 149.5 ¹	22.1	30.1	2,700	End	Bottom or Side	Bottom, End ² or Side ¹	End ³ or Side ¹
RV-45	15-30	72.5	68.2	109 ⁷ / 163.2 ¹	27.7	30.1	4,500				
RV-70	25-45	90	68	156 ⁷ / 224 ¹	22/27 ⁴	30	6,400				
RV-110	30-70	99.5	96	185	52.5	Not Applicable	7,950			Bottom or End	Side ¹
RVE-40	5-15	59.3	52.5	149.5 ⁶ / 180.5 ⁵	22.1	30.1	3,400	End	Bottom or Side	Bottom or Side	Side
RVE-85	15-30	72.5	68.2	163.2 ⁶ / 197.2 ⁵	27.1	30.1	5,100				
RVE-120	25-45	90	68	224 ⁶	22/27 ⁴	30	8,300			Bottom	
RVE-180	30-70	99.5	96	263 ⁶ / 307 ⁵	47	Not Applicable	10,450			Bottom or Side	

All dimensions are shown in inches. Weight is shown in pounds and includes largest supply and exhaust fans, PDX with reheat, largest indirect-gas fired furnace, all dampers and largest energy wheel. Actual weights will vary based on the unit configuration.

¹ Only available with powered exhaust

⁴ Above 12,000 cfm

⁷ Length with bottom or end return

² Only available without barometric relief

⁵ Length with side return

³ Only available with barometric relief

⁶ Length with bottom return

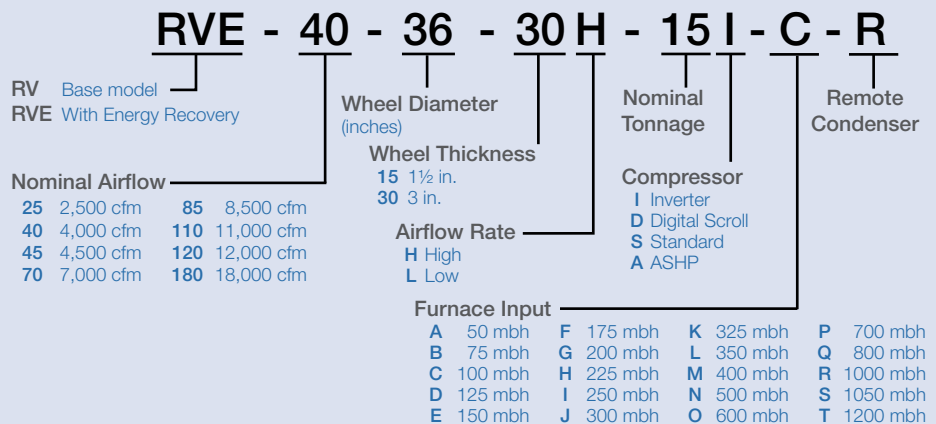
Model	Airflow (SCFM)
RV-25-5I	2325
RV-25-5D	2325
RV-25-5S	2325
RV-25-5A	3400
RV-25-7.5I	2300
RV-25-7.5D	2300
RV-25-7.5S	2300
RV-25-7.5A	3000
RV-25-10I	2700
RV-25-10D	2800
RV-25-10S	2800
RV-25-10A	4400
RV-25-12.5I	3400
RV-25-12.5D	3550
RV-25-12.5S	3550
RV-25-12.5A	4400
RV-25-15I	3775
RV-25-15D	3775
RV-25-15S	3775
RV-25-15A	4300
RV-45-15I	4100
RV-45-15D	4100
RV-45-15S	4100
RV-45-15A	4800
RV-45-17.5I	4650
RV-45-17.5D	4650
RV-45-17.5S	4650
RV-45-17.5A	5500

Model	Airflow (SCFM)
RV-45-20I	4900
RV-45-20D	5100
RV-45-20S	5100
RV-45-20A	6400
RV-45-25I	5750
RV-45-25D	5600
RV-45-25S	5600
RV-45-25A	7200
RV-45-30I	6000
RV-45-30D	6000
RV-45-30S	5750
RV-45-30A	7000
RV-70-25D	6500
RV-70-25S	6500
RV-70-30D	7000
RV-70-30S	7000
RV-70-35D	7000
RV-70-35S	7000
RV-70-43D	8100
RV-70-43S	8100
RV-110-30I	9000
RV-110-30D	9000
RV-110-40I	10500
RV-110-40D	10500
RV-110-50I	10500
RV-110-50D	10500

Full load rating airflow per AHRI 340/360

Model Number Code

The Model Number Code is designed to completely identify the unit. The correct code letters must be specified to designate the configurations and size.



Challenge: Conditioning High Percentage Outdoor Air with Minimal Energy Usage

Solution



- High capacity (6-row) cooling coil
- 2-inch double-wall R13 foam construction
- Energy recovery wheel to precondition the outdoor air *(optional)*
- Modulating hot gas reheat coil *(optional)*
- Inverter compressor *(optional)*
- High turndown indirect gas-fired furnace *(optional)*
- Modulating head pressure control *(optional)*
- Air Source Heat Pump *(optional)*

Challenge: Controlling Outdoor Air Volume

Solution



- Low leakage dampers with modulating actuator
- Factory mounted and wired microprocessor controller
- Energy efficient control sequences
- Direct drive plenum fan with factory mounted VFD
- Remote monitor and control from web-user interface

Challenge: Critical Sound Applications

Solution



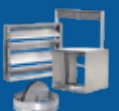
- Low sound condenser fans
- Radiated sound data off five planes of unit tested at full load
- 2-inch R-13 foam insulated unit base
- Compressor isolation
- Inverter scroll at part load *(optional)*
- Electronically commutated (EC) motor *(optional)*

Challenge: Finding a Manufacturer Dedicated to Outdoor Air

Solution



Models RV and RVE
 5 to 70 tons
 800 to 18,000 cfm



Our Commitment

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Product warranties can be found online at Greenheck.com, either on the specific product page or in the literature section of the website at Greenheck.com/Resources/Library/Literature.