Dedicated Outdoor Air Systems

for high percentage and 100% outside air

Models RV, RVE, and RVC

• Institutional • Commercial • Industrial

- Up to 18,000 cfm
- 3 in. wg External Static Pressure
- Packaged DX (3-70 tons), Chilled Water, Air-Source Heat Pump (5-30 tons)
- Indirect Gas, Hot Water, Electric Heating, Air-Source Heat Pump
- Optional Energy Recovery
- Optional Return Air

GREENHECK
Building Value in Air.

August
2024

Greenheck is 100% Dedicated to Outdoor Air Systems!

Models RV, RVE, and RVC

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

Cooling

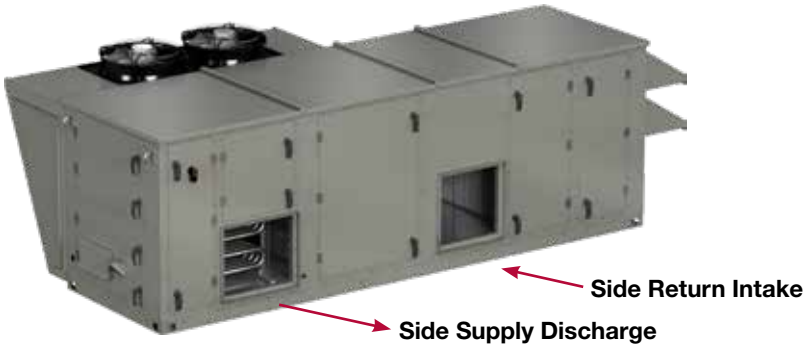
- Chilled water, packaged direct expansion (3-70 tons), or air-source heat pump (5-30 tons)
- Low sound condenser fans
- Lead inverter compressor
- Optional modulating hot gas reheat for humidity control
- Electronically commutated (EC) motor on the lead condenser fan or option for all EC condenser fans

Heating

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

Horizontal Duct Connections

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



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.

Energy recovery wheels are certified by the AHRI Air-to-Air Energy Recovery Ventilation Equipment Certification Program in accordance with AHRI Standard 1060.

Energy Efficiency

Inverter Compressor

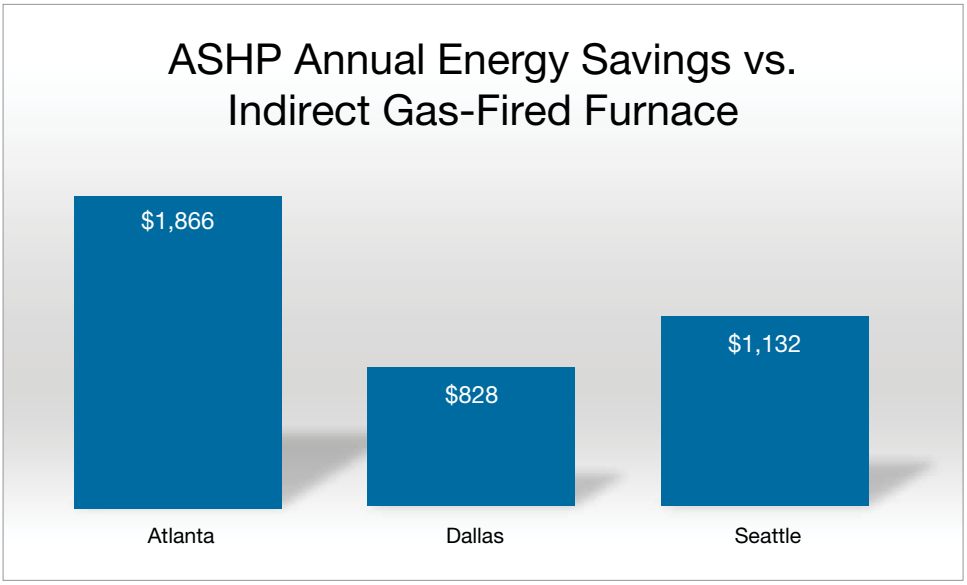
An inverter compressor is standard for the lead compressor from 3 to 70 tons. The inverter compressor provides many benefits:

- Improved part-load efficiency
- Integrated Energy Efficiency Ratio (IEER) up to 23.7, 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, RVE, and RVC. This high turndown is industry-leading technology for the tubular-style heat exchanger market.

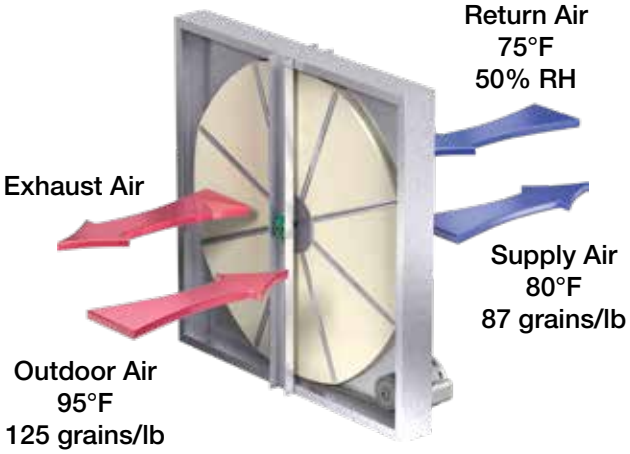
- Up to 16:1 turndown per furnace
- Precise temperature control
- Fully modulating control
- Less cycling during part-load conditions
- Commissioning sequence for easy start-up

Enthalpy Recovery Technologies

	Total Enthalpy Wheel		Total Enthalpy Core	
				
Model	RVE		RVC	
Material	Polymer	Aluminum	Fiber	Polymer
Airflow Range	500-18,000 cfm	1,230-13,320 cfm	500-6,500 cfm	500-6,250 cfm
Effectiveness	70-80%		50-60%	55-65%
Cross Leakage	3-5%		0-1%	
Frost Control	Timed Exhaust Modulating Wheel Electric Preheater		Timed Exhaust Energy Core Bypass Electric Preheater	
Economizer	Stop/Jog Wheel Modulating Wheel Energy Wheel Bypass		Energy Core Bypass	
Maintenance	Removable segments - wash with mild detergent and low pressure tap water	Vacuum off surface, purge with compressed air, or wipe dust/ particles from surface	Vacuum off surfaces	Wash with mild detergent and low pressure tap water

Total Enthalpy Wheel

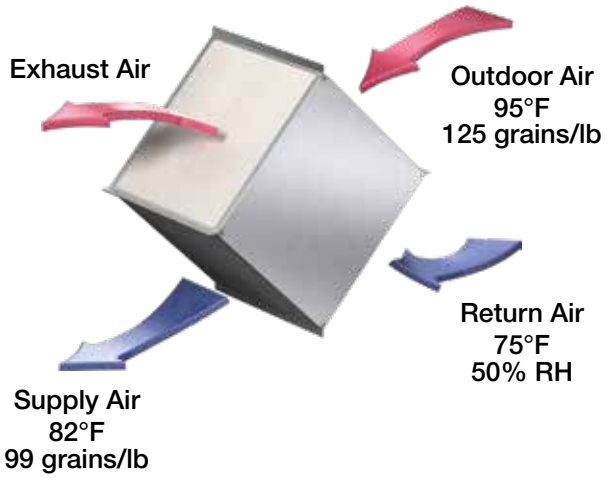
The energy wheel rotates between two airstreams while transferring both sensible (heat) and latent (moisture) energy.



Summer Operation

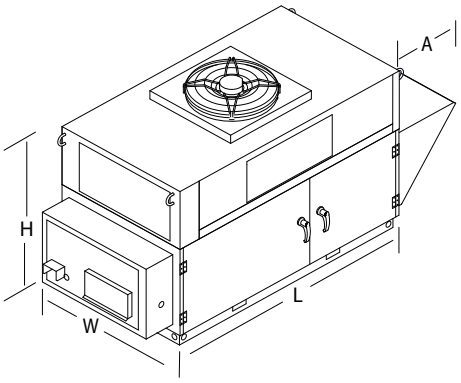
Total Enthalpy Core

The energy core crosses air with the core without direct air-to-air contact while transferring both sensible (heat) and latent (moisture) energy.

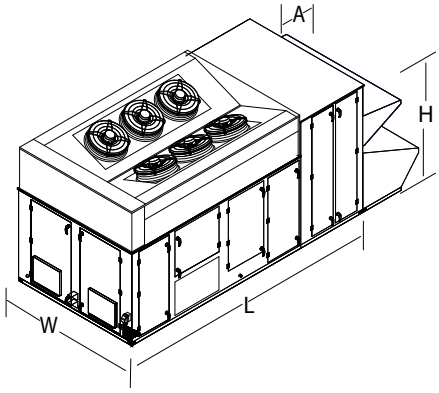


Summer Operation

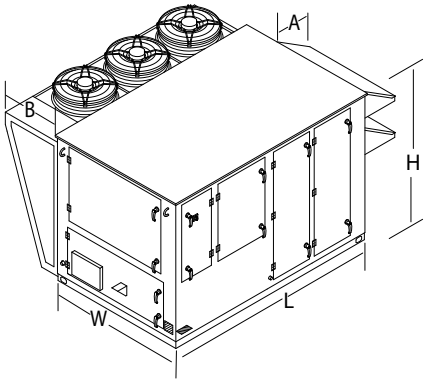
Dimensional Data



Housing size 10/20



Housing size 75/150



Housing size 25/35/40 and 45/65/85

Model	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-10	3-7	58.1	44.0	82.2[9]	22.3	NA	1,180	End	Bottom or Side	Bottom or End[2]	NA
RV-25	5-15	59.3	52.5	98.6[6]/149.5[7]	22.1	30.1	2,700			Bottom, End[11] or Side[1]	End[3] or Side[1]
RV-45	15-30	72.5	68.2	109[6]/163.2[7]	27.1	30.1	4,500				
RV-75	25-70	101.3	98	155.2[6]/184.2[4]	39/48.4[8]	NA	6,500			Bottom, End[11] or Side[1]	End
RVE-20	3-7	58.1	44.0	124.8	28.6	NA	1,688	End	Bottom or Side	Bottom	Side[1]
RVE-40	5-15	59.3	52.5	149.5/180.5[4]	22.1	30.1	3,400			Bottom, or Side[1]	
RVE-85	15-30	72.5	68.2	163.2/197.2[4]	27.1	30.1	5,100				
RVE-150	25-70	101.3	98	199.6[5]/228.5[4]	48.4	NA	8,000			Bottom or Side	End
RVC-35	5-15	59.3	52.5	180.5	40	30.1	3,800	End	Bottom or Side	Bottom	Side
RVC-65	15-30	72.5	68.2	197.2	38	30.1	5,675				

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, and all dampers. Actual weights will vary based on the unit configuration.

[1] Only available with powered exhaust
[2] Only available without barometric relief
[3] Only available with barometric relief
[4] Length with side return
[5] Length with bottom return
[6] Length with bottom or end return
[7] Length with powered exhaust
[8] Length with powered exhaust bumpout
[9] Optional indirect gas-fired furnace bumpout length is additional 13.3 inches
[10] Only available without powered exhaust
[11] Only available without powered exhaust and without barometric relief

Standard and Optional Features

GREENHECK
Building Value in Air.

1 Plenum Supply/Exhaust Fan

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

2 Construction

- 2-inch double-wall cabinet with R13 injected foam insulation
- R13 foam insulation thermally broken
- Exterior Finish Permatector™ (2,500 hr salt spray rating under ASTM B117 testing conditions)

3 Filters

- Outdoor air and exhaust filters (pre-wheel)
  - 2-inch MERV 8
- Supply filters (pre-coil)
  - 2-inch MERV 8 or MERV 13
  - 4-inch MERV 14
  - Combination of MERV 8 and MERV 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 & ASHP)
- Optional exhaust fan only power

5 Outdoor Air and Recirculated Air Dampers

- Low leakage
- Modulating actuator

6 Compressors

- Quiet operating hermetic, scroll-type
- 3 to 70 tons of mechanical cooling
- Inverter scroll compressor for lead circuit

7 Reheat

- Modulating hot gas reheat

8 Cooling Options

- Packaged direct expansion (PDX)
  - – Modulating head pressure control (EC motor on the lead condenser fan or all condenser fan(s))
- Chilled water coil
- R-454B Refrigerant
- Mounted on a stainless steel drain pan
- Air-source heat pump (ASHP)
  - Modulating refrigerant pressure control (EC motor on the lead condenser fan or all condenser fan(s))

9 Total Enthalpy Wheel (RVE)

- Sensible and latent energy recovery
- Stainless steel housing
- Optional polymer or aluminum energy wheel
- Lightweight, segmented wheel for easy cleaning (polymer wheel)
- Permanently bonded, silica gel desiccant for latent transfer — long term durability (polymer wheel)
- Molecular sieve desiccant for latent transfer (aluminum wheel)

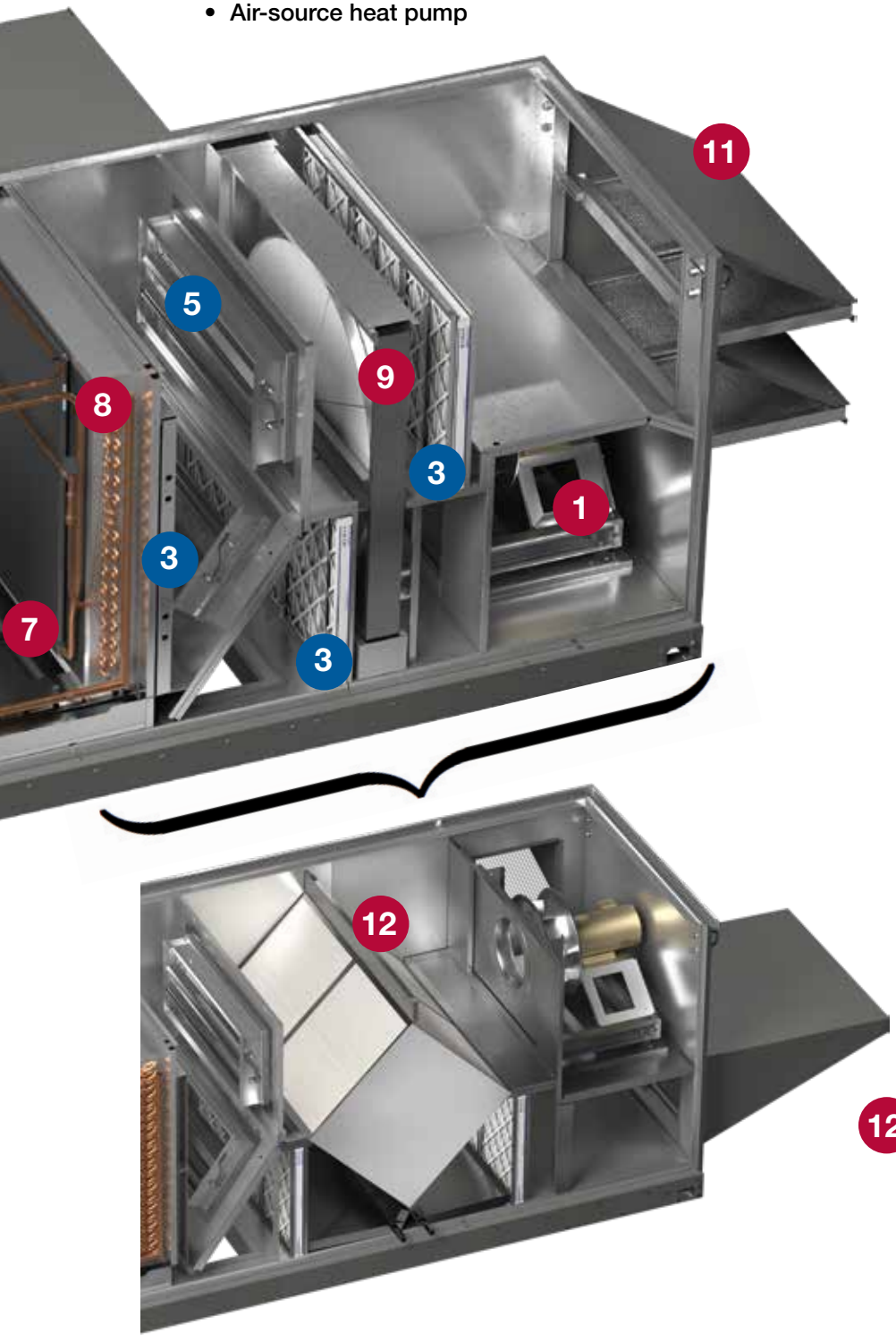
Standard and Optional Features

GREENHECK
Building Value in Air.

S Standard Feature O Optional Feature

10 Heating Options

- Indirect gas-fired furnace
  - Optional high turndown furnace (up to 16:1)
  - Stainless steel heat exchanger with standard 25-year extended warranty
- Electric heater
  - Silicon controlled rectifier (SCR) control
- Hot water coil
- Air-source heat pump



11 Weatherhood

- Aluminum mesh filters
- Wind-driven rain prevention

Optional Accessories

- Building Pressure Sensor
- CO_2 Sensor
- Combination Room Temperature and Humidity Thermostat
- Condensate Overflow Switch
- Condenser Hail Guards
- Dirty Filter Sensor
- Duct Pressure Sensor
- Economizer Control
- Economizer Fault Detection Diagnostics
- Coated Coils
- Energy Recovery Frost Controls
- Energy Wheel Bypass Damper
- Microprocessor Remote Interface
- Needlepoint Bipolar Ionization (NPBI®)
- Outdoor, Supply, and Exhaust Airflow Monitor
- Rotation Sensor
- Roof Curbs
- Service Lights
- Service Receptacle
- Smoke Detectors
- Ultraviolet Germicidal Irradiation (UVGI)

12 Total Enthalpy Core (RVC)

- Sensible and latent energy recovery
- Optional fiber or polymer energy core
- Utilize for applications requiring low cross leakage
- Integral bypass damper option for economizer and frost control

Simple, Easy Start-Up

Microprocessor

Models RV, RVE, and RVC 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, or Modbus® RTU or IP 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.

IG Furnace Setup	Mod Furnace Startup 2	Mod Furnace Startup 3	Mod Furnace Startup 3
Press ENTER to access IG Furnace Commission Unit must be running	Please hook-up manometer to combo vlv outlet on mod furnace. Check alarms during commissioning sequence Complete: No	Furnace at High Fire Set pressure at combination valve outlet to: 5.0" WC Complete: No	Modulating Furnace Low Fire Verification Is small and large Manifold Pressure = 0.33"WC and Combustion Fan at Low Speed? No

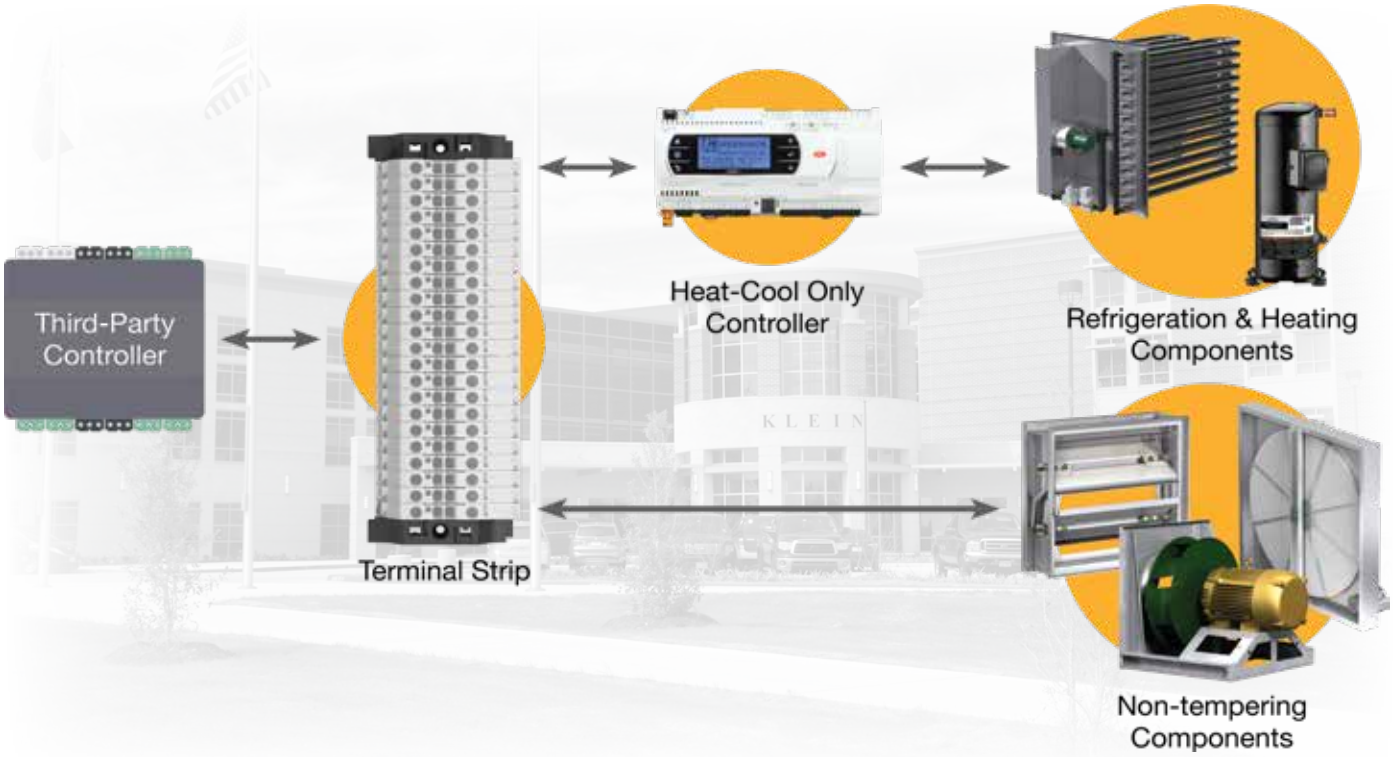
Web User Interface (UI)

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, RVE, or RVC 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.

Third-Party Controls Flexibility

Heat-Cool Only Controls

The Heat-Cool Only Control offering is designed to allow third-party control of a packaged direct expansion (DX), heat pump, or indirect gas heat on models RV, RVE, and RVC, while maintaining the safeties of the refrigeration system and heating devices.



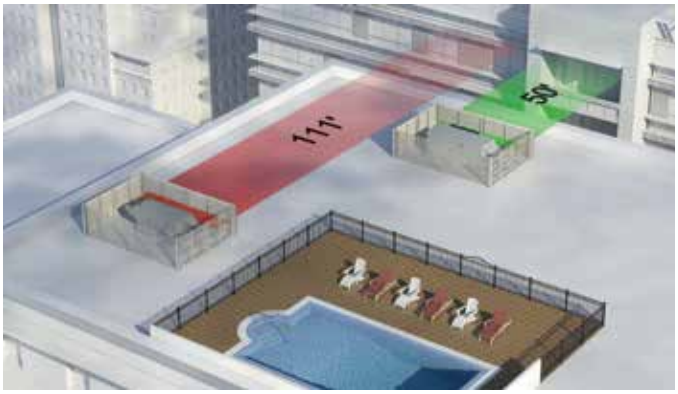
Listed below are the options available for a third party to control and monitor through either digital or analog signals. The signals would need to be field wired from the third-party controller to the terminal strip provided in the RV/RVE/RVC unit.

Description/Device	Terminal Type	Third Party IO Type
Fan Speed Input	0.0-10.0 VDC	Analog Command
Energy Recovery Capacity Input	0.0-10.0 VDC	Analog Command
Cooling Coil Temperature Set Point Input	2.0-10.0 VDC	Analog Command
Supply Air Temperature Set Point Input	2.0-10.0 VDC	Analog Command
OA/RA Modulating Damper Signal	2.0-10.0 VDC	Analog Command
Damper Actuator Power	24 VAC	Digital Command
Fan Start	24 VAC	Digital Command
Energy Recovery-Wheel Start	24 VAC	Digital Command
Remote Start / Shutdown Input	24 VAC	Digital Command
Cooling/Heating/Dehumidification Control Mode	24 VAC	Digital Command
Global Alarm Output (Heat/Cool Alarms Only)	Contact	Digital Status
OA Damper End Switch (100% OA Units)	Contact	Digital Status
Condensate Overflow Switch	Contact	Digital Status
Energy Recovery Status	Contact	Digital Status
Filter Pressure Switch	Contact	Digital Status
Airflow Measuring Station	0.0-10.0 VDC	Analog Feedback

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 double-wall cabinet with R13 injected foam insulation
- Compressor isolation
- Tested radiated sound data



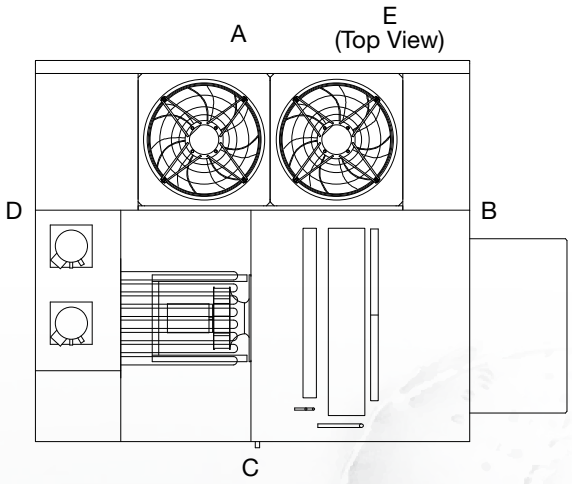
Greenheck's actual radiated sound data is tested in accordance with AMCA 320-08 in our state-of-the-art testing facility, the Robert C. Greenheck Innovation Center.

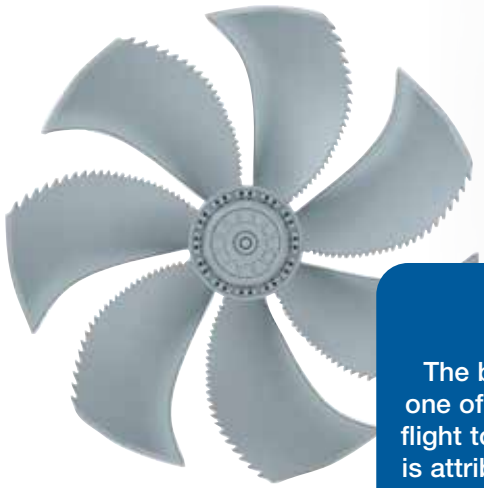
The low sound condenser fans paired with the radiated sound data of the unit operating at full load allows proper design with actual tested data. For example, if equipment is too loud or placed too closely to other buildings, corrective actions can be time consuming and costly. Greenheck provides low 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 320-08 - 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, RVE and RVC 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
  - Dimensional data
  - Electrical data
  - Capacities
  - Revit® content
  - Unit cut sheets
- Quick comparison of unit options with or without energy recovery
- Scheduling capabilities within minutes

Energy Recovery Model Comparison

X

	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

Cost reduction with energy wheel! $$$

10 ton reduction with energy wheel!

Allows you to choose your exhaust air volume.

Close

Rated Airflow Data

Packaged Direct Expansion			
Model	Airflow (SCFM)	Model	Airflow (SCFM)
RV-10-3	1,100	RV-45-17.5	3,800
RV-10-4	1,450	RV-45-20	4,600
RV-10-5	1700	RV-45-25	4,800
RV-10-6	1,600	RV-45-30	5,200
RV-10-7	1,700	RV-75-25	8,300
RV-25-5	1,900	RV-75-30	9,400
RV-25-7	1,900	RV-75-40	10,000
RV-25-10	2,600	RV-75-50	10,800
RV-25-12.5	2,300	RV-75-60	11,000
RV-25-15	3,100	RV-75-70	11,500
RV-45-15	3,800		

Air-Source Heat Pump	
Model	Airflow (SCFM)
RV-25-5	2,600
RV-25-7	2,700
RV-25-10	3,700
RV-25-12.5	4,300
RV-25-15	3,900
RV-45-15	4,300
RV-45-17.5	4,400
RV-45-20	6,300
RV-45-25	7,200
RV-45-30	7,100

Full load rating airflow per AHRI 210/240 or AHRI 340/360
PDX configured with ECM condenser fan and indirect gas heat
ASHP configured with ECM condenser fan and electric heat

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.

RVE - 40 - 36D - 15I - C - A1

- RV Base model
- RVE with Enthalpy Wheel
- Nominal Airflow: 10 1,000 cfm; 20 2,000 cfm; 25 2,500 cfm; 40 4,000 cfm; 45 4,500 cfm; 75 7,500 cfm; 85 8,500 cfm; 150 18,000 cfm
- Wheel Diameter (inches)
- Wheel Specification: A 1.5" thick, low cfm; B 1.5" thick, high cfm; C 3.0" thick, low cfm; D 3.0" thick, high cfm; E 4.0" thick, high cfm
- Nominal Tonnage
- Cooling Option: A-B ASHP Option; D-K Package DX option; CW Chilled Water; 0 None
- Heating Option: A-T IG Furnace Option; 0 None; 1 Electric; 2 Hot Water
- Supply and Return Air Position
- Unit Revision

RVC - 35 - PL - 17.5A - 0 - A1

- RVC with Enthalpy Core
- Nominal Airflow: 35 3,500 cfm; 65 6,500 cfm
- Core Material: P Polymer; F Fiber
- Core Airflow: H High cfm (no bypass); L Low cfm (with bypass)
- Nominal Tonnage
- Cooling Option: A-D ASHP Option; I-L Package DX option; CW Chilled Water; 0 None
- Heating Option: A-T IG Furnace Option; 0 None; 1 Electric; 2 Hot Water
- Supply and Return Air Position
- Unit Revision

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.

00.TAP.1040 R16 8-2024