

Model: RARTU-I Specifications

Description

A Rooftop Packaged Unit (RTU) shall be designed to efficiently condition and move air via indirect heating and direct expansion cooling. Unit(s) shall be designed for horizontal or down discharge, and horizontal, down, or no return. Unit(s) shall be factory assembled, wired, piped, and tested as a complete packaged assembly for outdoor mounting, consisting of the following:

1. G-90 Galvanized steel housing
2. Fully automatic modulating intake assembly
3. Pre-piped and charged cooling system
4. Backward inclined centrifugal supply fan wheel
5. Variable supply motor and controls
6. Fuel burning and safety equipment
7. Temperature control system
8. Gas piping

Application

Dedicated Outdoor Air System (DOAS) RTUs are engineered to condition 100% Outdoor Air (OA) to a comfortable temperature and relative humidity (optional). RTUs allow for automatic modulation of supply air, heating capacity, cooling capacity, and condensing fans. Ideally suited for hospitals, corridors, dining areas, and other applications where a high percentage of OA is required.

Certifications

All models shall be ETL listed and comply with safety standards UL 1995, ANSI Z83.8-2013, CSA Std. C22.2, No. 236-11 and CSA 2.6-2013.

Housing

Unit(s) shall be constructed of minimum 20ga. G-90 galvanized steel riveted together via pop-rivets; eliminating the risk of loose construction over time. All metal shall be automatically machine bent for precise assembly. The lids shall be fabricated by forming a double-standing, self-locking seam that requires no additional support. All exterior walls shall consist of a double wall, G-90 galvanized steel construction insulated with 2in. thick, foil-faced, R13 closed cell foam. The unit shall have a structural base constructed of minimum 14ga. G-90 galvanized steel, and include full sized fork pockets and lifting points on all sides.

All door jambs shall be gasketed around their perimeter, and allow for doors to be mounted via removable, spring actuated, stainless steel hinges, and self-compressing latches. Each compartment shall have removable access panels with recessed handles to allow for ease of service and maintainability.

All gas valves and heating related electrical safety-limits shall be mounted within the burner vestibule; wiring to these components shall be properly secured and away from all high temperature metal surfaces. The burner vestibule shall be an integral part of the unit and not extend outside the exterior casing of the unit, unexposed to the main air stream.

Intake Assembly

Standard

The intake assembly shall consist of integrated louvers and bird screen designed to eliminate the need for an intake hood, reducing the unit's overall footprint, low leakage outside air intake and return dampers capable of 0 to 100% modulation via a motorized, spring-return actuator, and an easily accessible, maintenance-free drive train consisting of fiberglass reinforced polypropylene gears to reduce friction and wear. Intake assemblies shall include standard outside air, metal mesh filters specifically designed to eliminate foreign moisture and contaminants from entering the building.

Optional

- Low leakage economizer with barometric relief (only usable with down return).

Filtration

Standard

Unit(s) shall be factory supplied with two inch metal mesh filters.

Optional

- Single row of two inch MERV 8 filters for a total of two layers of outside air filtration
- Single row of two inch MERV 13 filters for a total of two layers of outside air filtration
- Single row of two inch MERV 8 followed by two inch MERV 13 filters for a total of three layers of outside air filtration
- Single row of four inch MERV 15 high efficiency filters for a total of two layers of outside air filtration
- Single row of four inch HEPA filters for a total of two layers of outside air filtration

Refrigeration System

Standard

- **Coils**
Standard coils shall be of copper tube and aluminum fin design. Every coil circuit shall be pressure and leak tested by the manufacturer to ensure proper operation.
- **Components**
Each refrigeration system shall come standard with an Electronic Expansion Valve (EEV) used to precisely maintain a desired superheat value, a filter drier, discharge line check valve to eliminate backflow to the compressor and multiple service access ports.
- **Compressor**
Compressor shall have modulating variable speed scroll technology capable of a minimum 4:1 capacity turndown (7:1 on size 2 units). Compressor shall have multiple fail-safes to protect itself under all operating conditions and modes of operation. Each compressor shall be controlled via a variable frequency drive sized for the compressor specified. Compressor shall have a standard crankcase heater installed used to reduce the amount of liquid refrigerant within the crankcase during start-up.
- **Outdoor Fan Assembly**
Outdoor fans shall have a high efficiency axial fan mounted directly to a totally enclosed, thermally protected, Electronically Commutated Motor (ECM) capable of modulating from 10 to 100%. Outdoor fans shall be mounted so that air is pulled through the outdoor coil and discharged vertically at the top of the unit.
- **Construction**
Unit(s) shall have a removable, stainless steel, sloped drain pan accessible via removable panel to allow for ease of cleaning and maintainability. Drain pan shall have a standard overflow switch used to prevent condensate overflow within the unit. The indoor coil compartment shall have drip catches on both sides of the coil used to redirect condensate into the sloped drain pan. The outdoor coil compartment shall have a vertical wall and base comprised of a single piece of metal, eliminating seams and any chance of water from entering the building. The outdoor coil compartment base shall be sloped, and the outdoor coil shall be elevated from its base to allow water to properly drain to the exterior of the unit. The outdoor coil compartment shall be accessible on both sides of the unit via removable access panels to allow for ease of service and maintainability. System shall be designed for R410A refrigerant.
- **Sensors**
Every unit shall come standard with the following: a high pressure, manual reset, discharge switch used to protect the compressor at high operating conditions or blockage of flow, a high temperature, bi-metal

discharge switch used to protect the compressor when operating at dangerously high temperatures that are still within the pressure range of the high pressure switch, a pressure transducer located on the discharge line of the compressor used to control the speed of the outdoor fans, a low pressure switch located on the suction line of the compressor used to protect the compressor at low operating conditions or blockage of flow, a pressure transducer located on the suction line of the compressor used to modulate the EEV, and a temperature sensor on the suction line of the compressor used to determine superheat.

Optional

- Modulating hot gas reheat capable of 0 to 100% capacity via two modulating valves for precise humidity control
- Electronic oil level sensor
- Heat pump option with bi-flow EEV, bi-flow filter drier, specifically sized reversing valve and suction line accumulator

Indoor Supply Fan Assembly

The standard indoor supply fan assembly shall consist of a centrifugal backward inclined, non-overloading wheel secured directly to a heavy duty, ball bearing type motor via two set screws. The motor and wheel assembly shall be mounted to a heavy gauge galvanized steel frame via specifically sized rubber vibration isolators. The motor shall be controlled by a variable frequency drive, allowing for variable airflow without the need of belts and pulleys. Wheels shall be robotically welded, and balanced in two planes in accordance with AMCA standard 204-96, Balance Quality and Vibration Levels for Fans. The wheel blades shall be aerodynamically designed to minimize turbulence, increase efficiency and reduce noise. The wheel shall be heavy gauge welded aluminum. In the event that balancing weights are required, they shall be riveted or welded to the blades or wheel. The wheel inlet shall overlap the fan inlet for maximum performance and efficiency. Unit(s) shall be capable of housing multiple horsepower/wheel combinations designed to best fit a wide range of operating conditions, and be equipped with a fan compartment safety interlock switch designed to stop the wheel from spinning when the door is opened.

Burner & Heat Exchanger

Standard

The gas burner shall be an indirect-fired, push-through type, sized to provide an output of _____ BTU/hr using (natural) (LP) gas at an inlet-supply pressure to the unit of _____ inches water column (7" w.c. minimum Nat. Gas, 11"w.c. minimum LP Gas).

The burner shall be capable of heating the entire air supply from _____F° to _____F° (_____ degrees F temperature rise). Burner shall be a tubular in-shot fired design capable of using natural or LP type gas. Each burner ignition shall be of the direct-spark design with remote flame sensing at inlet of the last firing tube of the gas manifold.

Direct-sparking sequence shall last through the complete during of the trial for ignition period for guaranteed light-off. Burner shall always be lit at maximum gas flow and combustion airflow for guaranteed light-off. Each burner ignition module shall have LED indicators for troubleshooting and a set of exposed prongs for testing flame indication signal.

All furnaces shall be controlled by an electronic Vernier-type fully modulating control system capable of achieving 80% combustion efficiency over the entire gas firing range of the unit.

Each furnace shall have:

- A minimum turndown ratio of 6:1 for natural gas and 5:1 for LP gas while maintaining a constant 80% efficiency (90% for high efficiency furnace option).
- Each furnace heat exchanger shall be a bent-tube style design made entirely of type 409 stainless steel.
- A blocked vent safety airflow switch with high temperature silicone tubing operating off of absolute pressure measured inside of the power-vent blower housing.
- A high temperature auto-recycling limit with a maximum non-adjustable set point of 250F.
- A manual reset high temperature flame roll out switch with a non-adjustable set point of 325F.

- Each furnace compartment shall have a removable post and panel that allows the furnace to be easily removed for service and maintainability.
- A power-vent assembly for exhausting flue gases with a PSC type motor that is securely mounted with rubber vibration isolators and easily accessible/removable for service.
- A manufacturer-backed 10-year pro-rated warranty.
- A power-vent blower motor and housing with a standard 1-year manufacturer-backed warranty.
- A 0-10" w.c. gas pressure gauge installed on the gas manifold.

Optional

- High efficiency indirect fired heat exchanger capable of achieving 90% combustion efficiency over the entire gas firing range of the unit.
- Heated condensation drain

Gas Train

Standard

All gas equipment shall conform to local-Code requirements

Components:

1. Stainless Steel Quick Seal Gas Connection
2. 0-35" w.c. gas pressure gauge.
3. On/off redundant gas valve
4. Modulating-gas valve
5. Main gas shut-off valve
6. Main gas pressure regulator
7. Burner
8. 0-10" w.c. gas pressure gauge

Optional

- High Gas Pressure Switch
- Low Gas Pressure Switch

All gas manifold components shall be piped and wired at the factory.

Electrical Controls

Standard

Unit(s) shall be factory wired to a pre-installed, single point disconnect switch. All controls shall be housed in an insulated electrical cabinet illuminated by an LED strip activated when either electrical doors open. All sensors shall be wired back to the main control board that continuously monitors all critical components and makes decisions based on pre-determined logic to accurately control all heating modulation, compressor and outdoor fan modulation, EEV position and modulating reheat valve position (if applicable). Unit(s) shall have standard local scheduling without the use of a Building Management System (BMS) or external thermostat.

Optional

- Cabinet heater with thermostat
- Clogged filter airflow switch
- Factory mounted convenience outlet
- Freeze-stat shall be provided with adjustable set points for time and temperature to shut down the main fan in case of burner failure
- Blower-on delay timer to pre-heat the heat-exchanger prior to energizing the main blower

Miscellaneous Options

- Insulated curb welded together from minimum 20ga. aluminized steel
- Floor mounted vibration isolators specifically designed for each size unit
- Miami Dade rated up to ± 150 psf per TAS 201, 202 & 203

Factory Tested

Unit(s) shall be operated, tested and set at the factory using job-site conditions for electrical and gas input. All operating and safety controls shall be tested and set at the factory. Supply motor shall be set for proper RPM at specified conditions. Gas-pressure regulator shall be set for specified burning rate at specified inlet pressure.

Service and Parts

The supplier shall furnish gas piping schematics, as built wiring connection and control-circuit diagrams, dimension sheets and a full description of the unit(s). Service manuals, showing service and maintenance requirements, shall be provided with each unit. Unit(s) shall have the capability to display all real-time refrigeration line and saturation pressures/temperatures, eliminating the need for gauge sets in most troubleshooting scenarios. Unit(s) will also be capable of displaying all supply air temperatures and relative humidity percentages (if applicable).

Fan shall be model RARTU as manufactured by RuppAir Management Systems.

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