



# FRIEDRICH

1 8 8 3

## Commercial Resolute™ Line F-Series™ Packaged Air Conditioners



### **RACHYB360 Series (30 Ton Models)**

Cooling Efficiencies up to: 10.0 EER & 13.2 IEER

Nominal Sizes: 30 Tons [105.5 kW]

Cooling Capacity: 348k Btu/h [101.99 kW]

Refrigerant Type: R-454B

ASHRAE 90.1 2022 Compliant Models



TABLE OF CONTENTS

Unit Features and Benefits.....3-9

Model Number Identification .....10

Options .....11

Selection Procedure .....12

General Data and Notes .....13

Cooling Performance Data .....14

Airflow Performance.....15-18

Electrical Data .....19-20

Electric Heater Kits.....21-23

A2L Installation Safety Data .....24

Dimensional Data .....25-27

Field-Installed Accessories .....29-41

Guide Specifications .....43-49

Limited Warranty .....50



## **RACHYB360 STANDARD FEATURES INCLUDE:**

- Factory charged with R-454B refrigerant
- Wired and run tested at the factory
- Powder Paint Finish meets ASTM B117 test requirements. G90 galvanized steel coated on each side for maximum protection
- Foil faced insulation encapsulated throughout entire unit minimizes airborne fibers in the air stream
- Cooling operation up to 125°F ambient
- Scroll compressors with internal line break overload and high-pressure protection
- One single-stage and one two-stage compressor for 5 total stages of cooling
- MicroChannel condenser coil and Tube and Fin evaporator coil
- Blower with variable frequency drive (VFD) control
- Single-zone and multi-zone variable air volume (VAV) capable
- High pressure and low pressure/loss of charge protection
- Permanently lubricated evaporator and condenser motors
- Internally protected condenser motors with totally enclosed shaft down design
- Forkable base rails for easy handling and lifting
- Color-coded and labeled wiring
- Single point electrical connections
- Field convertible airflow – vertical downflow or horizontal sideflow
- Solid-core liquid line filter drier
- Hinged major access doors with heavy-duty gasketing and 1/4 turn latches
- Slide-out indoor fan assembly for added service convenience
- Slide-out, internally sloped condensate drain pan with overflow switch, conforms to ASHRAE 62 standards
- Slide-out filter rack with 2-inch filters
- MERV 8 and MERV 13 filters available as a factory-installed option
- Factory-installed refrigerant leak detection system
- Standard Modbus interface
- Factory-installed Direct Digital Control (DDC) system and sensors, enabling easy connectivity with LonWorks® or BACnet® BAS systems for remote monitoring and control

## **Designing for Sustainability with Low GWP**



For 2025, the Environmental Protection Agency (EPA) has set a global warming potential (GWP) limit of 700 for refrigerant used in most heating and cooling systems. This new requirement will result in a 78%<sup>1</sup> lower GWP than previous-generation refrigerants—with only minimal changes to system installation. For us, this is another step toward our ongoing sustainability goal of reducing greenhouse gas emissions, while still delivering an exceptional level of energy efficient, dependable comfort

<sup>1</sup>When comparing the GWP of R-454B to R-410A refrigerant.

## FACTORY-INSTALLED OPTIONS:

- Louvered panels
- Hinged access doors
- Low-Ambient Control Kit
- Freeze Stat Kit
- Non-powered convenience outlet
- Economizer w/Single Enthalpy (Downflow/Vertical)
- Economizer w/Single Enthalpy (Downflow/Vertical) DDC
- Comfort Alert/Phase monitor

## FIELD-INSTALLED ACCESSORY EQUIPMENT:

Accessory	Model Number	Factory Installation Available?
<b>Economizers</b>		
DDC Economizer with Single Enthalpy (Downflow) <i>Ruskin Rooftop Systems Economizer with Honeywell Controller</i>	AXRD-01RMDCM3	Yes
DDC Economizer with Single Enthalpy (Downflow) <i>Ruskin Rooftop Systems Economizer with Honeywell Controller w/ Smoke Detector</i>	AXRD-01RMDDM3	Yes
DDC Economizer with Single Enthalpy (Horizontal) <i>Ruskin Rooftop Systems Economizer with Honeywell Controller</i>	AXRD-01RMHCM3	No
Non-DDC Economizer with Single Enthalpy (Downflow) <i>Ruskin Rooftop Systems Economizer with Siemens Controller</i>	RXRD-51MHDAM3	Yes
Non-DDC Economizer with Single Enthalpy (Horizontal) <i>Ruskin Rooftop Systems Economizer with Siemens Controller</i>	RXRD-51MHHAM3	No
Economizer Universal DDC Interface Kit	RXRX-DDC02	Yes

Accessory	Model Number	Factory Installation Available?
Comfort Alert® (1 per Compressor)	RXRX-AZ01	Yes
Communication Card, BACnet	RXRX-AY01	No
Communication Card, LonWorks	RXRX-AY02	No
Concentric Adapter/Transition (30 ton)	RXMC-CL09	No
Concentric Step Down Diffuser (30 ton)	RXRN-AD88	No
Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell DDC)	RXRX-AV04	No
Dual Enthalpy, Temperature and Humidity Sensor (for Siemens Non-DDC)	PD555460	No
Electric Heaters (* = C, D or Y Voltage)	RXJJ-CE40*	Yes
	RXJJ-CE60*	Yes
	RXJJ-CE75*	Yes
Fresh Air Damper <sup>1</sup> , Manual	AXRF-KFA1	No
Fresh Air Damper <sup>1</sup> , Motorized (DDC)	RXRX-AW05	No
Hail Guard Louvers	AXRX-AAD01L	Yes

Accessory	Model Number	Factory Installation Available?
Low-Ambient Control Kit (1 Per Compressor)	RXRZ-C02	Yes
MERV 8 Filter	RXMF-M08A22520	Yes
MERV 13 Filter	RXMF-M13A22520	Yes
Power Exhaust (208/230V) Kit, Convertible (RRS)	RXRX-BGF05C	No
Power Exhaust (460V) Kit, Convertible (RRS)	RXRX-BGF05D	No
Roofcurb, 14"	RXKG-CBH14	No
Roofcurb Adapter to RXKG-CAF14	RXRX-CJCF14	No
Roofcurb Adapter to RXRK-E56	RXRX-CJCE56	No
Sensor, Carbon Dioxide (Wall Mount)	RXRX-AR02	No
Sensor, Room Humidity	RHC-ZNS4	No
Sensor, Room Temperature and Relative Humidity	RHC-ZNS5	No

<sup>1</sup>Motorized Kit and Manual Fresh Air Damper must be combined for a complete Motorized Outside Air Damper Selection.

[ ] Designates Metric Conversions





## Cabinet and Foundation

Resolute™ packaged equipment is designed from the ground up with the latest features and benefits required to compete in today's market. The clean design stands alone in the industry and is a testament to the quality, reliability, ease of installation and serviceability that goes into each unit. Outwardly, the Friedrich® label (1) identifies the brand to the customer.

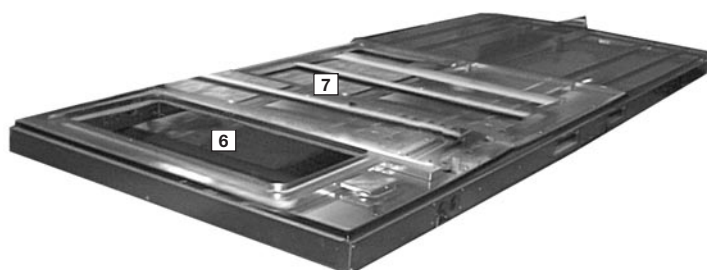
The sheet metal cabinet (2) uses nothing less than 20-gauge material for structural components with an underlying coat of G90. To ensure the leak-proof integrity of these units, the design utilizes a top with a 1/8" drip lip (3), gasket-protected panels and screw. The slanted outdoor coil protects the coil from hail damage (4). Every Friedrich packaged unit uses the toughest finish in the industry, using electro deposition baked-on enamel tested to withstand a rigorous 1000-hour salt spray test, per ASTM B117.

## Base Pan and Foundation

Anything built to last must start with the right foundation. In this case, the foundation is a 14-gauge, commercial-grade, full-perimeter base rails (5), which integrate fork slots and rigging holes to save set-up time on the job site. The base pan is stamped, which forms a 1-1/8" flange around the supply and return opening and has eliminated the worry of water entering the conditioned space (6).

## Drain Pan

The drain pan (7) is made of plastic that resists the growth of harmful bacteria and is sloped for the latest IAQ benefits. Furthermore, the drain pan slides out for easy cleaning. The insulation



has been placed on the underside of the base pan, removing areas that would allow for potential moisture accumulation, which can facilitate growth of harmful bacteria. All insulation is secured with both adhesive and mechanical fasteners, and all edges are hidden.

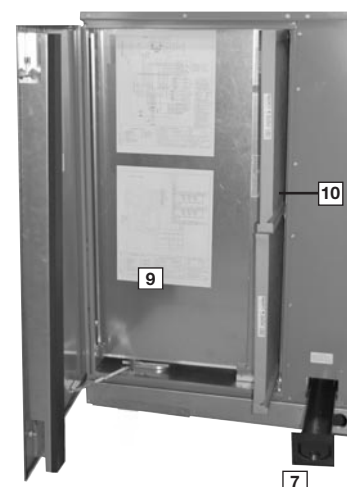
## Test Standards

During development, each unit was tested to UL 60335-2-40, ANSI 21.47, AHRI 340/360 and other Friedrich-required reliability tests. Friedrich adheres to stringent ISO 9001:2015 quality procedures, and each unit bears the U.L. and AHRI certification labels located on the unit nameplate (8). Contractors can rest assured that when a Friedrich packaged unit arrives at the job, it is ready to go with a factory charge and quality checks.

## Easy Access

Access all major compartments from the front of the unit, including the filter and electrical compartment, blower compartment, heating section, and outdoor section. Each panel is permanently embossed with the compartment name (control/filter access, blower access, and furnace access).

Electrical and filter compartment access is through a large, hinged-access panel with 1/4 turn latches. On the outside of the panel is the unit nameplate, which contains the model and serial number, electrical data, and other important unit information.



## Charging Charts, Wiring Diagrams, & Labels

The unit charging chart is located on the inside of the electrical and filter compartment door. Electrical wiring diagrams are found on the control box cover, which allows contractors to move them to more readable locations. To the right of the control box, the model and serial number can be found. Having this information on the inside will assure model identification for the life of the product. The production line quality test assurance label is also placed in this location ([9]).

## Filter Rack

The two-inch throwaway filters ([10]) are easily removed on a slide-out tracked system for easy replacement.



## Blower Assembly

The blower compartment is to the right of the control box and can be accessed by 1/4 turn latches. To allow easy maintenance of the blower assembly, the entire assembly easily slides out by removing four #10 screws from the blower assembly. The adjustable motor pulley ([11]) can easily be adjusted by loosening the bolts on either side of the motor mount. Removing the bolts allows for easy removal of the blower pulley by pushing the blower assembly up to loosen the belt. Once the belt is removed, the motor sheave can be adjusted to the desired number of turns, ranging from 1 to 6 turns open.

Where the demands for the job require high static, Friedrich® has high-static drives available that deliver nominal airflow up to 2" of static. By referring to the airflow performance tables listed in the installation instructions, proper static pressure and CFM requirements can be dialed in. The scroll housing ([12]) and blower scroll provide quiet and efficient airflow. The blower sheave is secured by an "H" bushing which firmly secures the pulley to the blower shaft for years of trouble-free operation. The "H" bushing allows for easy removal of the blower pulley from the shaft, as opposed to the use of a set screw, which can score the shaft, creating burrs that make blower-pulley removal difficult.



## High and Low Pressure Switches & Freeze Stat

The low-pressure switches and high-pressure switches are mounted on the appropriate refrigerant lines in the condenser section. The high-pressure switch will shut off the compressors if pressures exceeding 610 PSIG are detected as may occur if the outdoor fan motor fails. The low-pressure switches shut off the compressors if low pressure is detected due to loss of refrigerant charge. Each factory-installed option is brazed into the appropriate high or low side and wired appropriately. Use of polarized plugs allow for easy field inspection and repair.

## Thermostatic Expansion Valve (TXV)

Inside the blower compartment the interlaced evaporator can also be viewed. The evaporator uses fin technology for maximum heat transfer. The TXV ([13]) metering device assures even distribution of refrigerant throughout the evaporator.



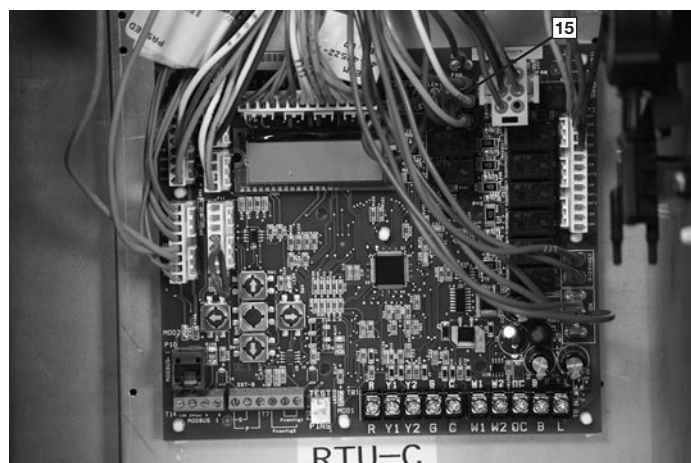
## Control Box

Inside the control box (14), each electrical component is clearly identified with a label that matches the component to the wiring diagram for ease of trouble shooting. Most of the wiring is numbered on each end of the termination and color-coded to match the wiring diagram. The integrated furnace control, used to control furnace operation, incorporates a flashing LED troubleshooting device. Flash codes are clearly outlined on the unit wiring diagram. The control transformer has a low voltage circuit breaker that trips if a low voltage electrical short occurs. There is also a compressor contactor for each compressor.



## ClearControl

As part of the ClearControl system (15) which allows real time monitoring and communication between rooftop units, the RACHYB360 Packaged AC Unit has a Rooftop Unit Controller (RTU-C) factory mounted and wired in the control panel. The RTU-C is a solid-state microprocessor-based control board that provides flexible control and extensive diagnostics for all unit functions. The RTU-C, through proportional/integral control algorithms, performs specific unit functions that govern unit operation in response to zone conditions, system temperatures, system pressures, ambient conditions, and electrical inputs. The RTU-C features a 16 x 2 character LCD display and a five-button keypad for local configuration and direct diagnosis of the system. Features include a clogged filter switch (CFS), fan proving switch (FPS), return air temperature sensor (RAT), discharge air temperature sensor (DAT), and outdoor air temperature sensor (OAT). Freeze sensors (FS) are used in place of freezestats to allow measurement of refrigerant suction line temperatures.



The RACHYB360 with the RTU-C is specifically designed to be applied in four distinct applications:

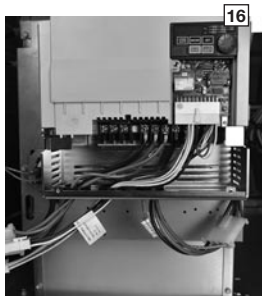
1. **BACnet Communication** — The RACHYB360 is compatible with a third party building management system that supports the BACnet Application Specific Controller device profile, with the use of a field-installed BACnet Communication Module. The BACnet Communication Module plugs into the unit RTU-C controller and allows communication between ClearControl and the BACnet MSTP or IP network. A zone sensor, a BACnet network zone sensor, a BACnet thermostat or DDC controller may be used to send the zone thermostat or thermostat demands to the RTU-C. The BACnet Communication Module is compatible with MSTP EIA-485 daisy chain networks communicating at 38.4 bps. It is compatible with twisted pair, shielded cables.
2. **LonWorks Communication** — The RACHYB360 is compatible with a third party building management system that supports the LonMark Space Comfort Controller (SCC) functional profile or LonMark Discharge Air Controller (DAC) functional profile. This is accomplished with a field-installed LonMark communication module. The LonMark Communication Module plugs onto the RTU-C controller and allows communication between ClearControl and a LonWorks network. A zone sensor, a LonTalk network zone sensor, or a LonTalk thermostat or DDC controller may be used to send the zone temperature or thermostat demands to the RTU-C. The LonMark Communication Module utilizes an FTT-10A free topology transceiver communicating at 78.8 kbps. It is compatible with Echelon qualified, twisted pair cable, Belden 8471, or NEMA Level 4 cables. The module can communicate up to 1640 feet with no repeater. The LonWorks limit of 64 nodes per segment applies to this device.
3. **24V Thermostat Compatibility** — The RACHYB360 is compatible with a programmable 24 volt thermostat. Connections are made via conventional thermostat screw terminals. Extensive unit status and diagnostics are displayed on the LCD screen of the RTU-C.
4. **Zone Sensor Compatibility** — The RACHYB360 is compatible with a zone sensor and a mechanical or solid state time clock connected to the RTU-C. Extensive unit status and diagnostics are displayed on the LCD screen of the RTU-C.

## Comfort Alert

A factory or field-installed Comfort Alert module is available for power phase-monitoring protection and additional compressor diagnostics. The alarms can be displayed on the RTU-C display, through the (BAS) network, or connected to the "L-Terminal" of a thermostat for notification.

## Variable Frequency Drive

The supply fan Variable Frequency Drive (VFD) (16) optimizes energy usage year round by providing a lower speed for first stage cooling operation, improving IEER's over the conventional constant fan system. Operating in the constant fan mode at the reduced speed can use as little as  $\frac{1}{5}$  of the energy of a conventional constant fan system. Also, by operating at a lower speed on first stage cooling, up to 51% more moisture is removed, improving comfort during low load operation. The VFD supply fan meets California Title 24 and ASHRAE 90.1 requirements for multi blower speed control. VFD also ramps up to the desired speed, reducing stress on the supply fan components and noise from a sudden inrush of air. Because the airflow is cut in half during first stage cooling and constant fan operation, noise is much less during these modes of operation.



## Convenience Outlet

For added convenience in the field, a factory-installed convenience outlet (17) is available. Low and High voltage can enter either from the side or through the base. Low-voltage connections are made through the low-voltage terminal strip. For ease of access, the U.L.-required low voltage barrier can be temporarily removed for low-voltage termination and then reinstalled. The high-voltage connection is terminated at the high-voltage terminal block. The suggested mounting for the field-installed disconnect is on the exterior side of the electrical control box.



## External Gauge Ports

The high (18) and low (19) external gauge ports are located in the outdoor section. With gauge ports mounted externally, an accurate diagnostic of system operation can be performed quickly and without removing exterior panels.

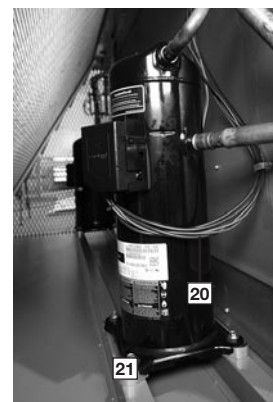


## Variable Air Volume (VAV)

Single and Multi-Zone Variable Air Volume (VAV) allows for enhanced control of airflow and temperature in multiple building zones. Friedrich® VAV technology is compatible with industry standard zoning controls and zone systems. The controls vary the airflow and the cooling capacity to meet the demands of multiple zones. This increases the comfort and air quality of the environment.

## Compressor

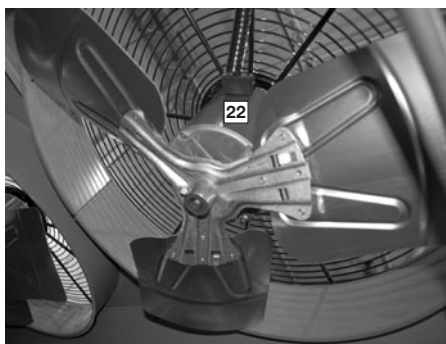
The compressor compartment houses the heartbeat of the unit. The scroll compressors (20) are known for their long life and for reliable, quiet, and efficient operation. Each compressor has four rubber grommets (21) on the bottom for sound and vibration dampening. The suction and discharge lines are designed with shock loops to absorb the strain and stress that the starting torque, steady state operation, and shut down cycle impose on the refrigerant tubing. Each compressor and circuit are independent for built-in redundancy, and each circuit is clearly marked throughout the system. Each unit has 5 stages of cooling for precise supply air control.





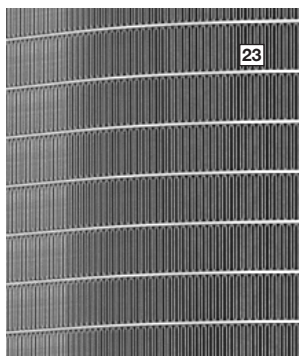
## Condenser Fans

The condenser fan motors (22) can easily be accessed and maintained through the top of the unit. A down-mount fan provides corrosion protection and easy removal. The polarized plug connection allows the motor to be changed quickly and eliminates the need to snake wires through the unit.



## MicroChannel Condenser Technology

The outdoor coil uses the latest MicroChannel technology (23) for the most effective method of heat transfer. The outdoor coil is protected by optional louvered panels, which allow unobstructed airflow while protecting the unit from both the environment and vandalism.



## Economizer and Dampers

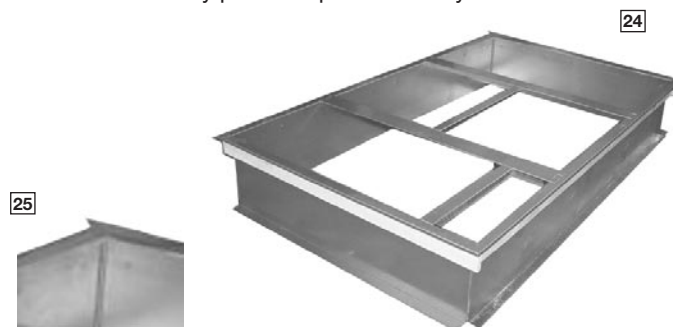
Each unit is designed for both downflow or horizontal applications for job configuration flexibility. The return air compartment can also contain an economizer. Two economizer models exist: one for downflow applications, and one for horizontal applications. Each unit is pre-wired for the economizer to allow quick plug-in installation. The downflow economizer is also available as a factory-installed option. Power Exhaust is easily field-installed.

The economizer, which provides free cooling when outdoor conditions are suitable and also provides fresh air to meet local requirements, come standard with single enthalpy controls. The controls can be upgraded to dual enthalpy easily in the field. The direct drive actuator combined with gear drive dampers has eliminated the need for linkage adjustment in the field. The economizer control has a minimum position set-point, an outdoor-air set-point, a mix-air set-point, and a CO<sub>2</sub> set-point.

Barometric relief is standard on all economizers. The power exhaust is housed in the barometric relief opening and is easily slipped in with a plug-in assembly.

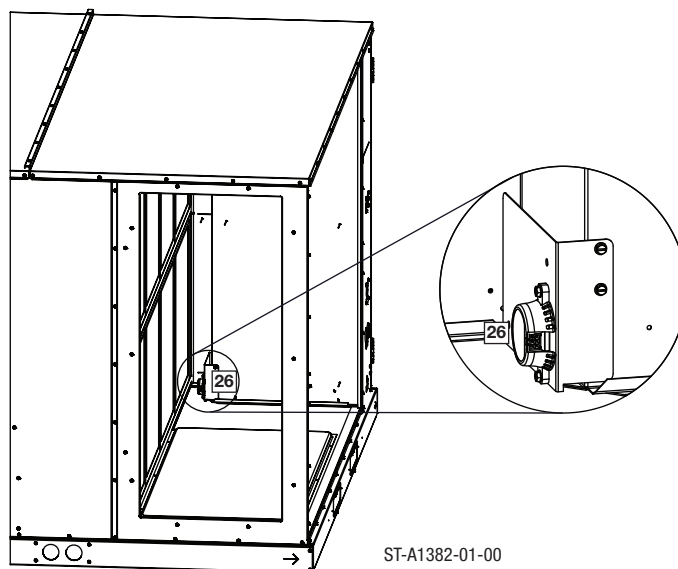
## Roofcurb

The Friedrich® roofcurb (24) is made for toolless assembly at the jobsite by inserting a pin into the hinged corners (25), which makes the assembly process quick and easy.



## Refrigerant Leak Detection

In the event of a detected refrigerant leak, the refrigerant leak detection sensor (26) will trigger the mitigation procedure that shuts off the compressor(s) and turns on the indoor blower motor.



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<u>R</u>	<u>AC</u>	<u>H</u>	<u>Y</u>	<u>B</u>	<u>360</u>	<u>A</u>	<u>C</u>	<u>G</u>	<u>40</u>	<u>0</u>	<u>C</u>	<u>A</u>	<u>****</u>				
<u>1</u>	<u>23</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>789</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>

**1—Brand**

R = Friedrich®

**2, 3—Unit Type**

AC = Packaged AC

**4—Cabinet Type**

H = Large Commercial

**5—Refrigerant**

Y = R-454B

**6—Efficiency Level**

B = Standard Efficiency

**7,8,9—Capacity**

360 = 30 Ton

**10—Major Series**

A = 1st Design

**11—Voltage**

C = 3 PH/208-230 V/60 Hz

D = 3 PH/460 V/60 Hz

Y = 3 PH/575 V/60 Hz

**12—Drive**

F = Belt Drive - VFD Low

G = Belt Drive - VFD Medium

H = Belt Drive - VFD High

**13, 14—Heat Capacity**

00 = No Heat

40 = 40 kW

60 = 60 kW

75 = 75 kW

**15—Heat Configuration**

0 = No Heat

2 = Two-Stage

**16—Control**

C = Clear Control & Phase Monitor

D = Clear Control & Comfort Alert

**17—Minor series**

A = 1st design

**18, 19, 20, 21—Option Code**

See next page

## FACTORY INSTALLED OPTION CODES FOR RACHYB360

18				19			20			21	
LV = Louver protection				NP = Non-Powered Convenience Outlet			EC = DDC Single Enthalpy Economizer with Barometric Relief (Downflow Only)			M8 = MERV 8 Filter	
HA = Hinged Access (Standard)				LF = Low Ambient & Freeze Stat			RS = Return Smoke			M13 = MERV 13 Filter	
CC = Condenser Coil Coating											
OPTION CODE CHARACTER HIGHLIGHTED BELOW											
C	HA			A	None		0	None		A	None
D	LV	HA		B	LF		1	EC		D	M8
F	LV	HA	CC	C	NP		3	EC	RS	G	M13
				D	LF	NP					

### Instructions for Factory Installed Option(s) Selection

Note: Four characters following and the model number will be utilized to designate a factory-installed option or combination of options. If no factory option(s) is required, and “CA0A” follows the model number.

- **Step 1:** In the table above, based on the desired features, choose option code character from highlighted options on the left side under the number 18. For example, the option code character “F” has Louver Protection, Hinged Access, and Condenser Coil Coating
- **Step 2:** In the table above, based on the desired features, choose option code character from highlighted options on the left side under the number 19. For example, the option code character “D” has Low Ambient & Freeze Stat and a Non-Powered Convenience Outlet.
- **Step 3:** In the table above, based on the desired features, choose option code character from highlighted options on the left side under the number 20. For example, the option code character “3” has Economizer and Return Smoke.
- **Step 4:** In the table above, based on the desired features, choose option code character from highlighted options on the left side under the number 21. For example, the option code character “D” has MERV 8 Filters.
- The resulting option code from examples above is: “FD3D”
- **Step 5:** Add your option code selection to the end of the model number.

◦ Example: RACHYB360YB360ACF000CA FD3D = RACHYB360YB360ACF000CAFD3D

Base model                      Option code                      = Model number with option code



To select an RACHYB360 Cooling and Heating unit to meet a job requirement, follow this procedure, with example, using data supplied in this specification sheet.

#### 1. DETERMINE COOLING AND HEATING REQUIREMENTS AND SPECIFIC OPERATING CONDITIONS FROM PLANS AND SPECS.

##### Example:

Voltage—	460V – 3 Phase – 60 Hz
Total Cooling Capacity—	340,000 Btu/h [99.6 kW]
Sensible Cooling Capacity—	230,000 Btu/h [67.4 kW]
Heating Capacity—	136,486 Btu/h [40 kW]
*Condenser Entering Air—	95°F [35.0°C] DB
*Evaporator Mixed Air Entering—	67°F [19.4°C] WB
	78°F [25.6°C] DB
*Indoor Air Flow—	11000 CFM [5191 L/s]
*External Static Pressure—	1.2 in. WG [0.30 kPa]

#### 2. SELECT UNIT TO MEET COOLING REQUIREMENTS.

Since total cooling is within range of a nominal 30 ton unit, use the cooling performance table at 95°F DB condenser inlet air. Interpolate between 9400 CFM [4436 L/s] and 13200 CFM [6230 L/s] to determine total and sensible capacity and Depression Ratio for inlet air at 11000 CFM [5191 L/s] indoor airflow (table basis):

Interpolation Formula:

$$\left[ (\text{CFM} - \text{CFM}_1) \times \left( \frac{\text{kBtu/h}_2 - \text{kBtu/h}_1}{\text{CFM}_2 - \text{CFM}_1} \right) \right] = \text{kBtu/h}$$

Total Cooling Capacity:

$$364.4 + \left[ (11,000 - 13,200) \times \left( \frac{339.5 - 364.4}{9,400 - 13,200} \right) \right] = 350,000 \text{ Btu/h}$$

Total Cooling Capacity = 350,000 Btu/h [102.6 kW]  
Sensible Cooling Capacity = 259,600 Btu/h [76.1 kW]  
DR = 0.105

When the entering dry bulb temperature (dbE) is not 80°F [26.7°C], the sensible capacity needs to be adjusted.

Note: total capacity is unaffected

Sensible Capacity Depression Formula:

$$\text{Cap}_{\text{sensible}} + [1.10 \times \text{CFM} \times (1 - \text{DR}) \times (\text{dbE} - 80)]$$

$$259,600 + [1.10 \times 11,000 \times (1 - 0.105) \times (78 - 80)]$$

$$\text{Sensible Cooling Capacity} = 237,941 \text{ Btu/h}$$

#### 4. DETERMINE BLOWER SPEED AND BHP TO MEET SYSTEM DESIGN.

Total ESP (external static pressure) per the spec of 1.2 in WG [0.30 kPa] includes the system duct and grilles. Add from the table “Component Air Resistance,” 0.19 in. WG [0.05 kPa] for wet coil and 0.35 in. WG [0.09 kPa] for downflow to get an ESP of 1.74 in. WG [0.43 kPa]. Using the “Airflow Performance Table”, at the specified 11,000 CFM and 1.74 in. WG [0.43 kPa] ESP, determine blower BHP.

RPM = 1189  
BHP = 12.98  
DRIVE = H

#### 4. CALCULATE INDOOR BLOWER Btu/h HEAT EFFECT FROM MOTOR BHP IN STEP 3.

Assuming an average of 85% motor efficiency, determine the amount of heat generated by the blower motor at the specified CFM and ESP by dividing the BHP by the motor efficiency and solving for the difference. Convert this value from BTU to Btu/h, multiplying by 2542.8 Btu/h/BHP

$$\text{BHP} = 12.98$$

$$\text{AVG MOTOR EFFICIENCY} = 85\%$$

$$\text{INDOOR BLOWER MOTOR HEAT} =$$

$$\left[ \left( \frac{\text{BHP}}{0.85} - \text{BHP} \right) \right] \times 2542.8$$

$$= [(12.98/0.85) - 12.98] \times 2542.8 = 5825 \text{ Btu/h [1.71 kW]}$$

#### 5. CALCULATE NET COOLING CAPACITIES

Net cooling capacities can be calculated by subtracting the motor heat from the gross cooling capacities.

$$\text{Net Total Capacity} = \text{Gross Total Capacity} - \text{Indoor Blower Motor Heat}$$

$$= 350,000 - 5,825 = 344,175 \text{ Btu/h [100.9 kW]}$$

$$\text{Net Sensible Capacity} = \text{Gross Sensible Capacity} - \text{Indoor Blower Motor Heat}$$

$$= 237,941 - 5,825 = 226,116 \text{ Btu/h [66.3 kW]}$$

#### 6. SELECT UNIT HEATING CAPACITY.

From “Heater Kit” Table, select kW to meet heating capacity requirement; multiply kW by 3412 to convert to Btu/h.

Use 40 kW Heater Kit

Heater Kit Model:	Heater Kit Capacity:
RXJJ-CD40D	131,021 Btu/h [38.4 kW]

Add indoor blower heat effect (step 4) to Heater Kit Capacity to get total heating capacity:

$$131,021 + 5825 = 136,846 \text{ Btu/h [40.1 kW]}$$

#### 7. CHOOSE MODEL RACHYB360ADH40

[ ] Designates Metric Conversions

## GENERAL DATA – RACHYB360 MODELS – 30 TON [105.5 kW]

Model RACHYB Series	360
<b>Cooling Performance<sup>A</sup></b>	
Gross Cooling Capacity Btu/h [kW]	348,000 [101.99]
EER	10.0
IEER <sup>B</sup>	13.2
Nominal CFM/AHRI Rated CFM [L/s]	11,000/9,350 [5191/4413]
AHRI Net Cooling Capacity Btu/h [kW]	330,000 [96.71]
Net Sensible Capacity Btu/h [kW]	231,000 [67.70]
Net Latent Capacity Btu/h [kW]	99,000 [29.01]
Net System Power kW	33.00
<b>Compressor</b>	
No./Type	2/ Scroll
No. Stages	5
<b>Outdoor Sound Rating (dB)<sup>C</sup></b>	
91	
<b>Outdoor Coil - Fin Type</b>	
Louvered	
Tube Type	MicroChannel
MicroChannel Depth in. [mm]	1 [25.4]
Face Area sq. ft. [sq. m]	52.4 [4.87]
Rows / FPI [FPcm]	2 / 23 [9]
<b>Indoor Coil - Fin Type</b>	
Louvered	
Tube Type	Rifled
Tube Size in. [mm]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.7 [2.48]
Rows / FPI [FPcm]	4 / 15 [7]
Refrigerant Control	TX Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]
<b>Outdoor Fan - Type</b>	
Propeller	
No. Used/Diameter in. [mm]	6/24 [609.6]
Drive Type/No. Speeds	Direct/1
CFM [L/s]	19800 [9344]
No. Motors/HP	6 at 3/4 HP
Motor RPM (208-230V / 460V / 575V)	1100 / 1100 / 1130
<b>Indoor Fan - Type</b>	
FC Centrifugal	
No. Used/Diameter in. [mm]	2/18x9 [457x229]
Drive Type	Belt (Adjustable)
No. Speeds	Multiple
No. Motors	1
Motor RPM (F-Drive / G-Drive / H-Drive)	1760 / 1760 / 3535
Motor Frame Size (F-Drive / G-Drive / H-Drive)	213T / 215T / 215T
<b>Filter - Type</b>	
Disposable	
Furnished	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]
<b>Refrigerant Charge Oz. [g] (Circuit 1/Circuit 2)</b>	
230.4 [6532]/223.2 [6328]	
<b>Weights</b>	
Net Weight lbs. [kg]	2403 [1090]
Ship Weight lbs. [kg]	2530 [1148]

**NOTE:** Please look at the rating plates pasted on the side of the unit to understand the model number of your unit.

## NOTES:

A. Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to  $\pm 20\%$  of nominal CFM. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.

B. EER and Integrated Energy Efficiency Ratio (IEER) are rated at AHRI conditions in accordance with AHRI Standard 340/360.

C. Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

[ ] Designates Metric Conversions

## COOLING PERFORMANCE DATA—RACHYB360

ENTERING INDOOR AIR @ 80°F [26.7°C] dbE ①											
wbE			71°F [21.7°C]			67°F [19.4°C]			63°F [17.2°C]		
CFM [L/s]			13200 [6230]	9350 [4413]	8800 [4153]	13200 [6230]	9350 [4413]	8800 [4153]	13200 [6230]	9350 [4413]	8800 [4153]
DR ①			0.05	0.09	0.12	0.05	0.09	0.12	0.05	0.09	0.12
OUTDOOR DRY BULB TEMPERATURE °F [°C]	75 [23.9]	Total kBtu/h [kW]	433.9 [127.2]	403.6 [118.3]	399.3 [117.0]	407.6 [119.5]	379.2 [111.1]	375.1 [109.9]	383.4 [112.4]	356.7 [104.5]	352.9 [103.4]
		Sens kBtu/h [kW]	253.2 [74.2]	212.4 [62.3]	206.5 [60.5]	300.1 [88.0]	251.7 [73.8]	244.8 [71.7]	343.6 [100.7]	288.2 [84.5]	280.3 [82.2]
		Power	29.8	28.8	28.6	29.6	28.6	28.4	29.5	28.5	28.3
	80 [26.7]	Total kBtu/h [kW]	429.5 [125.9]	399.5 [117.1]	395.3 [115.9]	403.2 [118.2]	375.1 [109.9]	371.1 [108.8]	379.0 [111.1]	352.6 [103.3]	348.8 [102.2]
		Sens kBtu/h [kW]	250.8 [73.5]	210.4 [61.7]	204.6 [60.0]	297.7 [87.3]	249.7 [73.2]	242.8 [71.2]	341.3 [100.0]	286.2 [83.9]	278.4 [81.6]
		Power	31.2	30.1	30.0	31.0	29.9	29.8	30.9	29.9	29.7
	85 [29.4]	Total kBtu/h [kW]	423.6 [124.2]	394.1 [115.5]	389.9 [114.3]	397.4 [116.5]	369.7 [108.4]	365.7 [107.2]	373.2 [109.4]	347.2 [101.8]	343.5 [100.7]
		Sens kBtu/h [kW]	247.7 [72.6]	207.8 [60.9]	202.1 [59.2]	294.6 [86.3]	247.1 [72.4]	240.3 [70.4]	338.2 [99.1]	283.7 [83.1]	275.9 [80.9]
		Power	32.7	31.5	31.4	32.4	31.3	31.1	32.4	31.2	31.1
	90 [32.2]	Total kBtu/h [kW]	416.4 [122.0]	387.4 [113.5]	383.3 [112.3]	390.1 [114.3]	363.0 [106.4]	359.1 [105.2]	366.0 [107.3]	340.5 [99.8]	336.8 [98.7]
		Sens kBtu/h [kW]	243.9 [71.5]	204.6 [60.0]	199.0 [58.3]	290.8 [85.2]	244.0 [71.5]	237.3 [69.5]	334.4 [98.0]	280.5 [82.2]	272.8 [80.0]
		Power	34.1	32.9	32.7	33.9	32.7	32.5	33.8	32.6	32.4
95 [35]	Total kBtu/h [kW]	407.8 [119.5]	379.4 [111.2]	375.3 [110.0]	381.5 [111.8]	354.9 [104.0]	351.1 [102.9]	357.3 [104.7]	332.5 [97.5]	328.9 [96.4]	
	Sens kBtu/h [kW]	239.4 [70.2]	200.8 [58.9]	195.3 [57.2]	286.3 [83.9]	240.2 [70.4]	233.6 [68.5]	329.9 [96.7]	276.7 [81.1]	269.1 [78.9]	
	Power	35.5	34.3	34.1	35.3	34.1	33.9	35.2	34.0	33.8	
100 [37.8]	Total kBtu/h [kW]	397.8 [116.6]	370.0 [108.4]	366.1 [107.3]	371.5 [108.9]	345.6 [101.3]	341.9 [100.2]	347.3 [101.8]	323.1 [94.7]	319.7 [93.7]	
	Sens kBtu/h [kW]	234.2 [68.6]	196.5 [57.6]	191.1 [56.0]	281.1 [82.4]	235.8 [69.1]	229.4 [67.2]	324.7 [95.2]	272.4 [79.8]	264.9 [77.6]	
	Power	36.9	35.6	35.4	36.7	35.4	35.2	36.6	35.3	35.2	
105 [40.6]	Total kBtu/h [kW]	386.3 [113.2]	359.4 [105.3]	355.6 [104.2]	360.0 [105.5]	335.0 [98.2]	331.4 [97.1]	335.9 [98.4]	312.5 [91.6]	309.1 [90.6]	
	Sens kBtu/h [kW]	228.3 [66.9]	191.5 [56.1]	186.3 [54.6]	275.3 [80.7]	230.9 [67.7]	224.5 [65.8]	318.8 [93.4]	267.4 [78.4]	260.1 [76.2]	
	Power	38.3	37.0	36.8	38.1	36.8	36.6	38.1	36.7	36.5	
110 [43.3]	Total kBtu/h [kW]	373.5 [109.5]	347.5 [101.8]	343.7 [100.7]	347.2 [101.8]	323.0 [94.7]	319.6 [93.7]	323.0 [94.7]	300.5 [88.1]	297.3 [87.1]	
	Sens kBtu/h [kW]	221.7 [65.0]	186.0 [54.5]	180.9 [53.0]	268.6 [78.7]	225.3 [66.0]	219.2 [64.2]	312.2 [91.5]	261.9 [76.8]	254.7 [74.6]	
	Power	39.8	38.4	38.2	39.6	38.2	38	39.5	38.1	37.9	
115 [46.1]	Total kBtu/h [kW]	359.2 [105.3]	334.2 [97.9]	330.6 [96.9]	333.0 [97.6]	309.8 [90.8]	306.4 [89.8]	308.8 [90.5]	287.3 [84.2]	284.2 [83.3]	
	Sens kBtu/h [kW]	214.4 [62.8]	179.9 [52.7]	174.9 [51.3]	261.3 [76.6]	219.2 [64.2]	213.2 [62.5]	304.9 [89.4]	255.7 [74.9]	248.7 [72.9]	
	Power	41.2	39.7	39.5	41.0	39.5	39.3	40.9	39.5	39.3	
120 [48.9]	Total kBtu/h [kW]	343.6 [100.7]	319.7 [93.7]	316.2 [92.7]	317.3 [93.0]	295.2 [86.5]	292.0 [85.6]	293.1 [85.9]	272.7 [79.9]	269.8 [79.1]	
	Sens kBtu/h [kW]	206.4 [60.5]	173.1 [50.7]	168.4 [49.4]	253.3 [74.2]	212.5 [62.3]	206.7 [60.6]	293.1 [85.9]	249.0 [73.0]	242.2 [71.0]	
	Power	42.6	41.1	40.9	42.4	40.9	40.7	42.3	40.8	40.6	
125 [51.7]	Total kBtu/h [kW]	326.5 [95.7]	303.8 [89.0]	300.5 [88.1]	300.2 [88.0]	279.3 [81.9]	276.3 [81.0]	276.1 [80.9]	256.9 [75.3]	254.1 [74.5]	
	Sens kBtu/h [kW]	197.7 [57.9]	165.8 [48.6]	161.3 [47.3]	244.6 [71.7]	205.2 [60.1]	199.5 [58.5]	276.1 [80.9]	241.7 [70.8]	235.1 [68.9]	
	Power	44.0	42.5	42.3	43.8	42.3	42.1	43.7	42.2	42.0	

DR —Depression ratio  
dbE —Entering air dry bulb  
wbE—Entering air wet bulb

Total —Total capacity x 1000 Btu/h  
Sens —Sensible capacity x 1000 Btu/h  
Power —kW input

NOTES: ① When the entering air dry bulb is other than 80°F [27°C], adjust the sensible capacity from the table by adding  $[1.10 \times \text{CFM} \times (1 - \text{DR}) \times (\text{dbE} - 80)]$ .

[ ] Designates Metric Conversions

# AIRFLOW PERFORMANCE—30 TON [105.5 kW] – 60 Hz – DOWNFLOW (NO HEAT EXCHANGER)

Model RACHYB360		Voltage 208/230, 460, 575 — 3 phase 60 Hz																																										
Air Flow CFM [L/s]	RPM	External Static Pressure—Inches of Water [kPa]																																										
		0.1 [ .02]	0.2 [ .05]	0.3 [ .07]	0.4 [ .10]	0.5 [ .12]	0.6 [ .15]	0.7 [ .17]	0.8 [ .20]	0.9 [ .22]	1.0 [ .25]	1.1 [ .27]	1.2 [ .30]	1.3 [ .32]	1.4 [ .35]	1.5 [ .37]	1.6 [ .40]	1.7 [ .42]	1.8 [ .45]	1.9 [ .47]	2.0 [ .50]																							
		W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W																							
8800 [4153]	—	—	—	—	—	—	811	4330	834	4685	886	4836	877	5082	898	5323	918	5559	936	5791	973	6422	994	6714	1014	6988	1032	7242	1048	7477	1063	7692	1076	7888	1113	8297								
9000 [4247]	—	—	—	—	—	—	821	4553	844	4809	886	5080	887	5306	907	5548	926	5785	961	6405	983	6715	1004	7006	1023	7278	1040	7530	1056	7763	1070	7977	1107	8390	1120	8583								
9200 [4341]	—	—	—	—	—	—	809	4521	832	4783	854	5039	875	5291	896	5538	915	5781	934	6018	972	6707	994	7015	1014	7304	1032	7574	1048	7824	1063	8056	1077	8267	1114	8676	1128	8883						
9400 [4436]	—	—	—	—	—	—	820	4758	843	5020	864	5277	885	5529	905	5777	924	6020	942	6258	983	7015	1004	7321	1023	7608	1040	7876	1056	8125	1071	8354	1108	8764	1122	8976	1136	9197						
9600 [4530]	—	—	—	—	—	—	809	4734	832	5001	853	5264	874	5521	895	5774	914	6023	932	6266	972	7005	994	7329	1014	7633	1032	7919	1049	8185	1064	8432	1078	8659	1116	9063	1130	9269	1144	9524				
9800 [4624]	—	—	—	—	—	—	820	4984	843	5252	864	5515	885	5773	904	6027	923	6276	941	6520	983	7327	1004	7649	1023	7952	1041	8235	1057	8499	1071	8763	1110	9144	1124	9375	1138	9615	1152	9864				
10000 [4719]	—	—	—	—	—	—	810	4967	832	5241	854	5509	875	5773	895	6032	914	6286	932	6535	973	7315	994	7655	1014	7975	1033	8276	1059	8558	8820	1079	9063	1117	9456	1132	9701	1146	9955	1161	10218			
10200 [4813]	—	—	—	—	—	—	822	5231	844	5505	865	5774	885	6038	905	6297	923	6552	941	6802	964	7652	1005	7990	1024	8308	1042	8607	1058	8887	1073	9147	1111	9532	1125	9762	1140	10041	1155	10309	1170	10586		
10400 [4908]	—	—	—	—	—	—	811	5222	834	5501	855	5775	876	6045	896	6310	915	6570	933	6826	973	7639	995	7994	1015	8330	1034	8647	1051	8844	1066	9222	1104	9603	1119	9857	1134	10121	1149	10394	1164	10676	1178	10967
10600 [5002]	801	5214	824	5499	845	5778	866	6053	887	6324	906	6589	924	6850	942	7106	985	7990	1006	8343	1025	8677	1043	8992	1059	9287	1074	9563	1113	9927	1127	10196	1142	10473	1157	10760	1173	11056	1188	11362				
10800 [5096]	814	5497	836	5782	857	6063	878	6338	897	6609	916	6875	934	7137	974	7975	996	8346	1016	8698	1035	9030	1052	9343	1068	9637	1106	9992	1121	10265	1136	10548	1151	10840	1166	11140	1182	11451	1197	11770				
11000 [5191]	827	5788	848	6073	869	6354	889	6630	908	6902	927	7168	963	7562	986	8340	1007	8709	1027	9059	1045	9389	1061	9700	1076	9992	1114	10329	1129	10617	1145	10913	1160	1219	1176	11534	1191	11858	1207	12192				
11200 [5285]	840	6085	861	6371	881	6653	900	6929	919	7201	937	7469	975	8325	997	8711	1018	9078	1037	9426	1054	9755	1070	10064	1107	10388	1132	10690	1138	10982	1154	11293	1169	12612	1185	11941	1201	12280	1217	12627				
11400 [5379]	852	6389	873	6676	893	6958	912	7235	930	7508	964	8300	987	8704	1009	9088	1028	9454	1047	9800	1063	10126	1078	10434	1116	10739	1123	11045	1147	11361	1163	11665	1179	12519	1195	12362	1211	12714	—	—				
11600 [5474]	865	6700	885	6988	904	7270	923	7548	941	7822	977	8687	999	9089	1020	9472	1039	9835	1066	10179	1072	10504	1109	10792	1125	11103	1141	11423	1157	11753	1173	12092	1189	12439	1205	12797	—	—						
11800 [5568]	878	7019	897	7307	916	7590	934	7868	966	8661	989	9080	1011	9480	1031	9861	1049	10223	1066	10565	1102	10839	1118	11155	1134	11480	1150	11815	1166	12159	1182	12511	1199	12873	1215	13244	—	—						
12000 [5663]	890	7344	909	7633	928	7916	955	8625	979	9062	1001	9480	1022	9878	1041	10257	1059	10617	1075	10957	1111	11202	1127	11532	1143	11872	1159	12220	1176	12578	1192	12945	1209	13321	—	—								
12200 [5757]	903	7676	922	7965	939	8250	968	9034	991	9469	1013	9885	1033	10282	1052	10659	1068	11017	1104	11244	1120	11579	1136	11923	1153	12276	1169	12639	1186	13011	1202	13392	1219	13782	—	—								
12400 [5851]	916	8016	934	8305	957	8897	981	9450	1004	9883	1025	10297	1044	10692	1062	11067	1078	11423	1113	11620	1129	11969	1146	12327	1162	12695	1179	13071	1196	13457	1213	13852	—	—										
12600 [5946]	928	8362	946	8590	971	9421	994	9871	1016	10303	1036	10715	1054	11108	1071	11481	1106	11656	1122	12010	1139	12373	1156	12745	1172	13127	1189	13517	1206	13917	—	—												
12800 [6040]	940	8715	960	9382	984	9850	1006	10299	1027	10729	1047	11139	1065	11530	1088	11686	1115	12045	1132	12413	1149	12790	1166	13176	1183	13572	1193	13977	1217	14390	—	—												
13000 [6134]	948	9334	973	9820	997	10286	1019	10733	1039	11161	1058	11570	1075	11959	1108	12075	1125	12448	1142	12830	1159	13221	1176	13621	1193	14031	1210	14450	—	—	—	—												
9830	987	10264	1010	10728	1031	11174	1050	11600	1068	12006	1100	12099	1117	12477	1134	12864	1152	13260	1169	13665	1186	14080	1204	14503	—	—	—	—	—	—	—	—												

NOTE: F-Drive left of first bold line, G-Drive in between bold lines, H-Drive right of second bold line.

Drive Package	F										G										H									
Motor H.P. [W]	7.5 [5592.7]										10 [7457.0]										15 [1185.5]									
Blower Sheave	BK130H										BK120H										BK190H									
Motor Sheave	1VP71										1VP75										1VP71									
Turns Open	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
RPM	935	909	882	857	831	804	1067	1038	1009	968	947	926	1210	1183	1154	1125	1096	1067	1038	1009	968	947	926	1210	1183	1154	1125	1096	1038	1009

- NOTES: 1. Factory sheave settings are shown in bold type.  
2. Do not set motor sheave below minimum or maximum turns open shown.  
3. Re-adjustment of sheave required to achieve rated airflow at AHRI minimum External Static Pressure.  
4. Drive data shown is for horizontal airflow with dry coil. Add component resistance (below) to duct resistance to determine total External Static Pressure.

[ ] Designates Metric Conversions

AIRFLOW PERFORMANCE—30 TON [105.5 kW] – 60 Hz – DOWNFLOW (NO HEAT EXCHANGER) (CON'T.)

Airflow CFM [L/s]	AIRFLOW CORRECTION FACTORS*			COMPONENT AIRFLOW RESISTANCE					
	Total kBtu/h	Sensible kBtu/h	Power kW	Wet Coil	Downflow Economizer RA Damper Open	Horizontal Economizer RA Damper Open	Concentric Grill RXRN-AD88 & Transition RXMC-CL09	MERV 8 Filter	MERV 13 Filter
					Resistance — Inches of Water [kPa]				
8800 [4153]	0.99	0.97	0.99	0.10 [.02]	0.26 [.06]	0.11 [.03]	0.30 [.07]	0.15 [.04]	0.13 [.03]
9200 [4341]	1	0.99	1	0.12 [.03]	0.28 [.07]	0.12 [.03]	0.36 [.09]	0.16 [.04]	0.15 [.04]
9600 [4530]	1	1.01	1	0.13 [.03]	0.30 [.07]	0.13 [.03]	0.43 [.11]	0.16 [.04]	0.16 [.04]
10000 [4719]	1.01	1.03	1.01	0.15 [.04]	0.32 [.07]	0.14 [.03]	0.50 [.12]	0.17 [.04]	0.17 [.04]
10400 [4908]	1.02	1.05	1.01	0.16 [.04]	0.34 [.08]	0.15 [.04]	0.56 [.14]	0.18 [.04]	0.18 [.05]
10800 [5096]	1.03	1.07	1.01	0.18 [.04]	0.37 [.09]	0.16 [.04]	0.63 [.16]	0.19 [.05]	0.19 [.05]
11200 [5285]	1.03	1.09	1.02	0.19 [.05]	0.39 [.10]	0.17 [.04]	0.69 [.17]	0.20 [.05]	0.21 [.05]
11600 [5474]	1.04	1.11	1.02	0.21 [.05]	0.41 [.10]	0.18 [.04]	0.76 [.19]	0.20 [.05]	0.22 [.05]
12000 [5663]	1.05	1.13	1.02	0.22 [.05]	0.44 [.11]	0.19 [.05]	0.82 [.20]	0.21 [.05]	0.23 [.06]
12400 [5851]	1.06	1.15	1.03	0.24 [.06]	0.46 [.11]	0.20 [.05]	0.89 [.22]	0.22 [.05]	0.24 [.06]
12800 [6040]	1.07	1.17	1.03	0.25 [.06]	0.49 [.12]	0.21 [.05]	0.96 [.24]	0.23 [.06]	0.26 [.06]
13200 [6229]	1.07	1.19	1.04	0.27 [.07]	0.52 [.13]	0.22 [.05]	1.02 [.25]	0.24 [.06]	0.27 [.07]

[ ] Designates Metric Conversions

## AIRFLOW PERFORMANCE—30 TON [105.5 kW] – 60 Hz – SIDEFLOW (NO HEAT EXCHANGER)

Model RACHYB360		Voltage 208/230, 460, 575 — 3 phase 60 Hz																							
Air Flow CFM [L/s]		External Static Pressure—Inches of Water [kPa]																							
		0.1 [0.02]												0.2 [0.05]											
		RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W
8800 [4153]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9000 [4247]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9200 [4341]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9400 [4436]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9600 [4530]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9800 [4624]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10000 [4719]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10200 [4813]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10400 [4908]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10600 [5002]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10800 [5096]	80.4	5369	829	5675	853	5983	876	6292	899	6602	920	6913	941	7226	955	7373	975	7702	994	8019	1012	8324	1029	8615	1044
11000 [5191]	81.8	5674	843	5987	867	6302	890	6618	912	6935	933	7253	947	7404	968	7746	987	8074	1006	8391	1023	8694	1039	8985	1054
11200 [5285]	83.3	5991	857	6312	880	6633	903	6956	925	7281	939	7435	960	7788	980	8129	1000	8457	1017	8773	1034	9076	1050	9366	1064
11400 [5379]	84.7	6321	871	6649	894	6977	917	7308	938	7639	953	7831	974	8183	993	8524	1012	8851	1029	9166	1045	9468	1060	9758	1074
11600 [5474]	86.2	6664	885	6998	908	7334	931	7671	945	7872	987	8237	987	8590	1006	8929	1024	9256	1041	9570	1056	9871	1071	10160	1138
11800 [5568]	87.7	7019	900	7361	923	7704	938	7914	998	8291	981	8655	1000	9007	1019	9345	1036	9672	1052	9985	1067	10286	1133	11515	1149
12000 [5663]	89.1	7387	915	7735	937	8086	953	8344	974	8720	995	9084	1014	9435	1032	9773	1049	10098	1064	10411	1129	11614	1144	11964	1160
12200 [5757]	90.7	7767	930	8123	946	8397	968	8785	989	9161	1009	9523	1027	9873	1045	10211	1061	10536	1124	11715	1140	12069	1156	12427	1171
12400 [5851]	92.2	8160	939	8449	961	8850	983	9237	1003	9612	1023	9974	1041	10323	1057	10660	1073	10984	1136	12175	1152	12538	1167	12905	1183
12600 [5946]	93.7	8565	955	8914	977	9313	998	9700	1018	10074	1037	10435	1054	10784	1070	11120	1132	12284	1148	12650	1164	13021	1179	13397	1195
12800 [6040]	94.8	8977	971	9389	993	9787	1013	10174	1032	10647	1050	10907	1067	11255	1128	12394	1144	12764	1160	13139	1175	13519	1191	13903	1206
13000 [6134]	96.5	9464	988	9875	1009	10273	1028	10658	1047	11031	1064	11391	1125	12507	1141	12881	1156	13259	1172	13642	1187	14031	1203	14424	1218
13200 [6229]	98.2	9962	1004	10372	1024	10769	1043	11154	1061	11526	1121	12621	1137	12999	1153	13381	1169	13768	1184	14160	1199	14557	1215	14959	1230

NOTE: F-Drive left of first bold line, G-Drive in between bold lines, H-Drive right of second bold line.

Drive Package	F												G										H											
Motor H.P. [W]	7.5 [5592.7]												10 [7457.0]										15 [11185.5]											
Blower Sheave	BK130H												BK120H										BK190H											
Motor Sheave	1VP71												1VP75										1VP71											
Turns Open	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	6
RPM	936	910	884	857	831	805	1065	1038	1010	970	949	929	1250	1215	1180	1145	1109	1074	1250	1215	1180	1145	1250	1215	1180	1145	1109	1074	1250	1215	1180	1145	1109	1074

NOTES: 1. Factory sheave settings are shown in bold type.  
2. Do not set motor sheave below minimum or maximum turns open shown.  
3. Re-adjustment of sheave required to achieve rated airflow at AHRI minimum External Static Pressure.  
4. Drive data shown is for horizontal airflow with dry coil. Add component resistance (below) to duct resistance to determine total External Static Pressure.

[ ] Designates Metric Conversions

AIRFLOW PERFORMANCE—30 TON [105.5 kW] – 60 Hz – SIDEFLOW (NO HEAT EXCHANGER) (CON'T.)

Airflow CFM [L/s]	AIRFLOW CORRECTION FACTORS *				COMPONENT AIRFLOW RESISTANCE				
	Total kBtu/h	Sensible kBtu/h	Power kW	Wet Coil	Downflow Economizer RA Damper Open	Horizontal Economizer RA Damper Open	Concentric Grill RXRN-AD88 & Transition RXMC-CL09	MERV 8 Filter	MERV 13 Filter
					Resistance — Inches of Water [kPa]				
8800 [4153]	0.99	0.97	0.99	0.10 [.02]	0.26 [.06]	0.11 [.03]	0.30 [.07]	0.15 [.04]	0.13 [.03]
9200 [4341]	1	0.99	1	0.12 [.03]	0.28 [.07]	0.12 [.03]	0.36 [.09]	0.16 [.04]	0.15 [.04]
9600 [4530]	1	1.01	1	0.13 [.03]	0.30 [.07]	0.13 [.03]	0.43 [.11]	0.16 [.04]	0.16 [.04]
10000 [4719]	1.01	1.03	1.01	0.15 [.04]	0.32 [.08]	0.14 [.03]	0.50 [.12]	0.17 [.04]	0.17 [.04]
10400 [4908]	1.02	1.05	1.01	0.16 [.04]	0.34 [.08]	0.15 [.04]	0.56 [.14]	0.18 [.04]	0.18 [.05]
10800 [5096]	1.03	1.07	1.01	0.18 [.04]	0.37 [.09]	0.16 [.04]	0.63 [.16]	0.19 [.05]	0.19 [.05]
11200 [5285]	1.03	1.09	1.02	0.19 [.05]	0.39 [.10]	0.17 [.04]	0.69 [.17]	0.20 [.05]	0.21 [.05]
11600 [5474]	1.04	1.11	1.02	0.21 [.05]	0.41 [.10]	0.18 [.04]	0.76 [.19]	0.20 [.05]	0.22 [.05]
12000 [5663]	1.05	1.13	1.02	0.22 [.05]	0.44 [.11]	0.19 [.05]	0.82 [.20]	0.21 [.05]	0.23 [.06]
12400 [5851]	1.06	1.15	1.03	0.24 [.06]	0.46 [.11]	0.20 [.05]	0.89 [.22]	0.22 [.05]	0.24 [.06]
12800 [6040]	1.07	1.17	1.03	0.25 [.06]	0.49 [.12]	0.21 [.05]	0.96 [.24]	0.23 [.06]	0.26 [.06]
13200 [6229]	1.07	1.19	1.04	0.27 [.07]	0.52 [.13]	0.22 [.05]	1.02 [.25]	0.24 [.06]	0.27 [.07]

[ ] Designates Metric Conversions



ELECTRICAL DATA—RACHYB SERIES										
		360ACF	360ACG	360ACH	360ADF	360ADG	360ADH	360AYF	360AYG	360AYH
Unit Information	Unit Operating Voltage Range	187-253	187-253	187-253	414-506	414-506	414-506	518-633	518-634	518-635
	Volts	208/230	208/230	208/230	460	460	460	575	575	575
	Phase	3	3	3	3	3	3	3	3	3
	Hz	60	60	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	147/147	153/153	166/166	69	72	78	52	54	58
	Minimum Circuit Ampacity with Power Exhaust	157/157	163/163	176/176	74	77	82	55	57	61
	Minimum Overcurrent Protection Device Size	175/175	175/175	200/200	80	80	90	60	60	70
	Minimum Overcurrent Protection Device Size with Power Exhaust	175/175	200/200	200/200	80	90	90	60	70	70
	Maximum Overcurrent Protection Device Size	200/200	200/200	200/200	90	90	100	70	70	70
	Maximum Overcurrent Protection Device Size with Power Exhaust	200/200	200/200	225/225	90	100	100	70	70	70
Compressor Motor	No.	2	2	2	2	2	2	2	2	2
	Volts	208/230	208/230	208/230	460	460	460	575	575	575
	Phase	3	3	3	3	3	3	3	3	3
	Amps (RLA), Comp. 1	54.7	54.7	54.7	24.0	24.0	24.0	19.2	19.2	19.2
	Amps (LRA), Comp. 1	386.3	386.3	386.3	182.0	182.0	182.0	131.0	131.0	131.0
	Amps (RLA), Comp. 2	31.8	31.8	31.8	15.6	15.6	15.6	12.4	12.4	12.4
	Amps (LRA), Comp. 2	255.0	255.0	255.0	140.0	140.0	140.0	107.6	107.6	107.6
Condenser Motor	No.	6	6	6	6	6	6	6	6	6
	Volts	208/230	208/230	208/230	460	460	460	575	575	575
	Phase	1	1	1	1	1	1	1	1	1
	HP	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	Amps (FLA, each)	4.2	4.2	4.2	2.3	2.3	2.3	1.2	1.2	1.2
	Amps (LRA, each)	11.5	11.5	11.5	5.9	5.9	5.9	4.2	4.2	4.2
Evaporator Fan	No.	1	1	1	1	1	1	1	1	1
	Volts	208/230	208/230	208/230	460	460	460	575	575	575
	Phase	3	3	3	3	3	3	3	3	3
	HP	7.5	10	15	7.5	10	15	7.5	10	15
	Amps (FLA, each)	21.0	27.0	40.5	9.6	12.5	18.0	7.7	10.0	13.8
	Amps (LRA, each)	127.0	152.0	210.0	63.5	76.0	105.0	50.8	60.8	93.6

## MANUAL MOTOR STARTER AMP SETPOINT

	Motor Part No.	51-102826-10	51-102826-11	51-107478-01	51-107478-02
	Motor HP	10	10	15	15
Motor Nameplate Amps	208V	27.0	—	39.5	—
	230V	25.0	—	36.0	—
	460V	12.5	—	18.0	—
	575V	—	10.0	—	14.4
Motor SF amps	208V	31.1	—	45.4	—
	230V	28.8	—	41.4	—
	460V	14.4	—	20.7	—
	575V	—	11.5	—	16.6
Manual Motor Starter Amp Range	208/230V	25.0-32.0	—	40.0-54.0	—
	460V	10.0-16.0	—	20.0-25.0	—
	575V	—	8.0-12.0	—	16.0-20.0
Motor Starter Part No.	208/230V	42-107877-05	—	42-107877-06	—
	460V	42-107877-02	—	42-107877-04	—
	575V	—	42-107877-01	—	42-107877-03
Manual Motor Starter Amp Setpoint	208V	32.0*	—	47.0*	—
	230V	30.0	—	43.0	—
	460V	15.0	—	22.0	—
	575V	—	12.0	—	17.0
Friedrich® Model No.	208/230V	RACHYB360ACG	—	RACHYB360ACH	—
	460V	RACHYB360ADG	—	RACHYB360ADH	—
	575V	—	RACHYB360AYG	—	RACHYB360AYH

**\*NOTE:** Units ship from factory set for 230 volt operation. Setpoint must be adjusted for 208 volt operation.

208/230V THREE PHASE, 60 Hz, AUXILIARY ELECTRIC HEATER KIT CHARACTERISTICS AND APPLICATION													
Single Power Supply For Both Unit and Heater Kit							Separate Power Supply For Both Unit and Heater Kit						
Unit Model No. RACHYB	Heater Kit			Air Conditioner			Heater Kit		Air Conditioner				
	Model No. RXJJ-	Rated Heater kW @ 208/230V	Heater Kit FLA	Unit Min. Ckt. Ampacity	Unit Min. Ckt. Ampacity with Optional Powered Exhaust	Max. Fuse or Ckt. Bkr. Size	Max. Fuse or Ckt. Bkr. Size With Optional Powered Exhaust	Heater Kit Min. Ckt. Ampacity	Heater Kit Max Fuse or Ckt. Bkr. Size	Air Cond. Min. Ckt. Ampacity	Air Cond. Min. Ckt. Ampacity with Optional Powered Exhaust	Air Cond. Max Fuse or Ckt. Bkr. Size	Air Cond. Max Fuse or Ckt. Bkr. Size with Optional Powered Exhaust
360ACF	NONE*	—/—	—/—	147/147	157/157	200/200	200/200	—	—	147/147	157/157	200/200	200/200
	CE40C	28.8/38.4	79.9/92.4	147/147	157/157	200/200	200/200	100/116	100/125	147/147	157/157	200/200	200/200
	CE60C	43.2/57.6	119.9/138.6	177/200	199/212	200/200	200/225	150/174	150/175	147/147	157/157	200/200	200/200
360ACG	CE75C	54.0/72.0	149.9/173.2	214/243	227/256	225/250	250/300	188/217	200/225	147/147	157/157	200/200	200/200
	NONE*	—/—	—/—	153/153	163/163	200/200	200/200	—	—	153/153	163/163	200/200	200/200
	CE40C	28.8/38.4	79.9/92.4	153/153	163/163	200/200	200/200	100/116	100/125	153/153	163/163	200/200	200/200
360ACH	CE60C	43.2/57.6	119.9/138.6	184/207	197/220	200/225	200/225	150/174	150/175	153/153	163/163	200/200	200/200
	CE75C	54.0/72.0	149.9/173.2	222/251	234/263	225/300	250/300	188/217	200/225	153/153	163/163	200/200	200/200
	NONE*	—/—	—/—	166/166	176/176	200/200	225/225	—	—	166/166	176/176	200/200	225/225
360ACH	CE40C	28.8/38.4	79.9/92.4	166/167	176/179	200/200	225/225	100/116	100/125	166/166	176/176	200/200	225/225
	CE60C	43.2/57.6	119.9/138.6	201/224	213/237	225/225	225/250	150/174	150/175	166/166	176/176	200/200	225/225
	CE75C	54.0/72.0	149.9/173.2	238/268	251/280	250/300	300/300	188/217	200/225	166/166	176/176	200/200	225/225

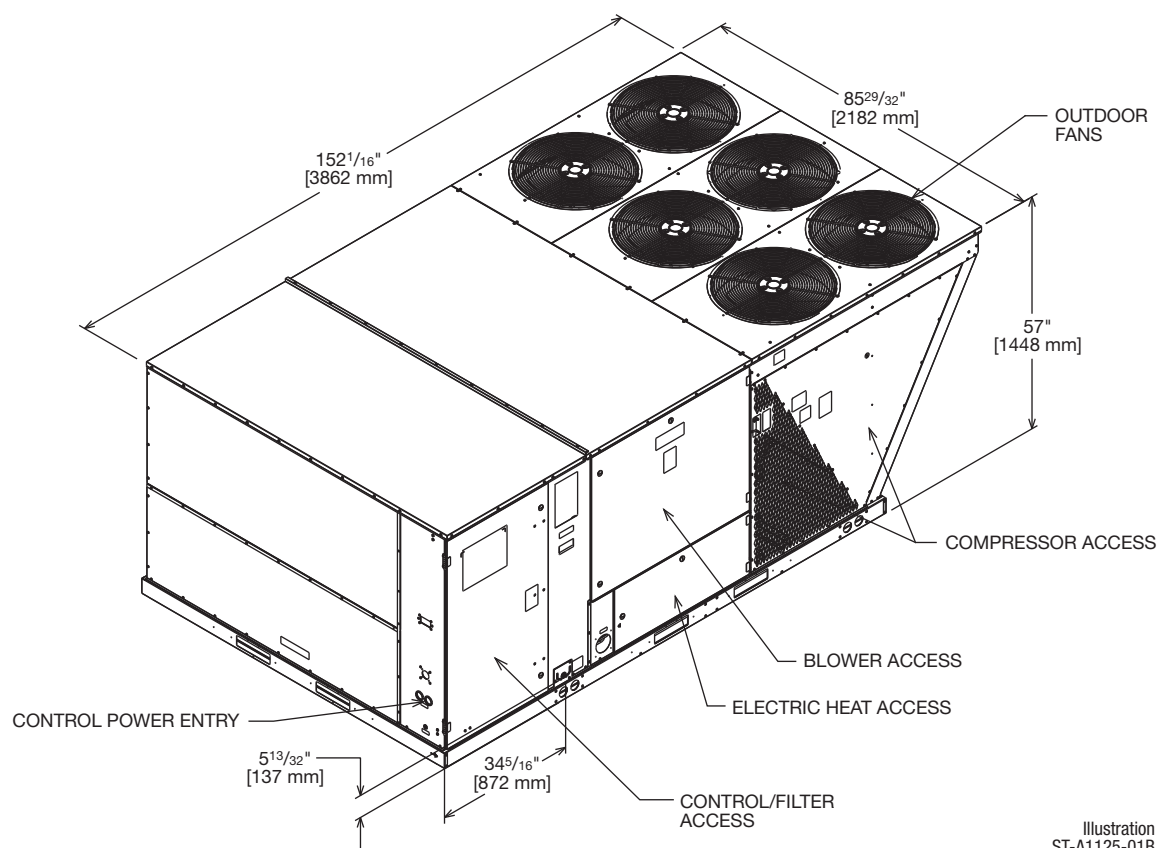
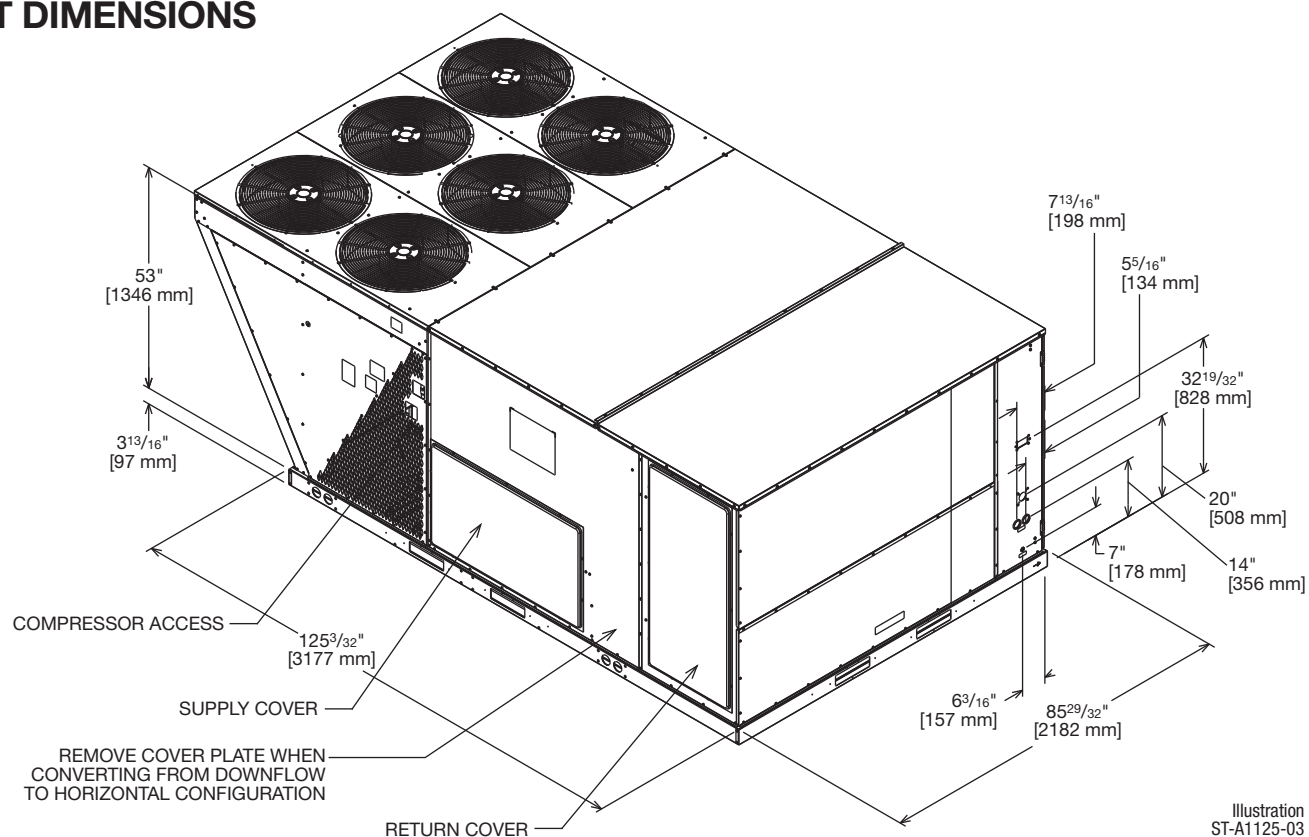
460V THREE PHASE, 60 Hz, AUXILIARY ELECTRIC HEATER KIT CHARACTERISTICS AND APPLICATION													
Single Power Supply For Both Unit and Heater Kit							Separate Power Supply For Both Unit and Heater Kit						
Unit Model No. RACHYB	Heater Kit			Air Conditioner				Heater Kit		Air Conditioner			
	Model No. RXJJ-	Rated kW Heater @ 460V	FLA	Unit Min. Ckt. Ampacity	Unit Min. Ckt. Ampacity with Optional Powered Exhaust	Max. Fuse or Ckt. Bkr. Size	Max. Fuse or Ckt. Bkr. Size With Optional Powered Exhaust	Heater Kit Min. Ckt. Ampacity	Heater Kit Max Fuse or Ckt. Bkr. Size	Air Cond. Min. Ckt. Ampacity	Air Cond. Min. Ckt. Ampacity with Optional Powered Exhaust	Air Cond. Max Fuse or Ckt. Bkr. Size	Air Cond. Max Fuse or Ckt. Bkr. Size with Optional Powered Exhaust
360ADF	NONE*	—	—	69	74	90	90	—	—	69	74	90	90
	CE40D	38.4	46.2	70	76	90	90	58	60	69	74	90	90
	CE60D	57.6	69.3	99	105	100	110	87	90	69	74	90	90
360ADG	CE75D	72	86.6	121	126	125	150	109	110	69	74	90	90
	NONE*	—	—	72	77	90	100	—	—	72	77	90	100
	CE40D	38.4	46.2	74	79	90	100	58	60	72	77	90	100
360ADH	CE60D	57.6	69.3	103	108	110	110	87	90	72	77	90	100
	CE75D	72	86.6	124	130	125	150	109	110	72	77	90	100
	NONE*	—	—	78	82	100	100	—	—	78	82	100	100
360ADH	CE40D	38.4	46.2	81	86	100	100	58	60	78	82	100	100
	CE60D	57.6	69.3	110	115	110	125	87	90	78	82	100	100
	CE75D	72	86.6	131	137	150	150	109	110	78	82	100	100

575V THREE PHASE, 60 Hz, AUXILIARY ELECTRIC HEATER KIT CHARACTERISTICS AND APPLICATION													
Separate Power Supply For Both Unit and Heater Kit													
Single Power Supply For Both Unit and Heater Kit													
Unit Model No. RACHYB	Heater Kit			Air Conditioner				Heater Kit		Air Conditioner			
	Model No. RXJJ-	Rated kW @ 575V	FLA	Unit Min. Ckt. Ampacity	Unit Min. Ckt. Ampacity with Optional Powered Exhaust	Max. Fuse or Ckt. Bkr. Size	Max. Fuse or Ckt. Bkr. Size With Optional Powered Exhaust	Heater Kit Min. Ckt. Ampacity	Heater Kit Max Fuse or Ckt. Bkr. Size	Air Cond. Min. Ckt. Ampacity	Air Cond. Min. Ckt. Ampacity with Optional Powered Exhaust	Air Cond. Max Fuse or Ckt. Bkr. Size	Air Cond. Max Fuse or Ckt. Bkr. Size with Optional Powered Exhaust
360AYF	NONE*	—	—	52	55	70	70	—	—	52	55	70	70
	CE40Y	38.4	37	56	60	70	70	47	50	52	55	70	70
	CE60Y	57.6	55.4	79	83	80	90	70	70	52	55	70	70
360AYG	CE75Y	72	69.3	97	100	100	100	87	90	52	55	70	70
	NONE*	—	—	54	57	70	70	—	—	54	57	70	70
	CE40Y	38.4	37	59	63	70	70	47	50	54	57	70	70
360AYH	CE60Y	57.6	55.4	82	86	90	90	70	70	54	57	70	70
	CE75Y	72	69.3	100	103	100	110	87	90	54	57	70	70
	NONE*	—	—	58	61	70	70	—	—	58	61	70	70
360AYH	CE40Y	38.4	37	64	68	70	70	47	50	58	61	70	70
	CE60Y	57.6	55.4	87	91	90	100	70	70	58	61	70	70
	CE75Y	72	69.3	104	108	110	110	87	90	58	61	70	70

## A2L INSTALLATION REFRIGERATION SAFETY DATA

Model		RACHYB360
Refrigerant Charge Weight (oz) Circuit 1/Circuit 2		230.4/223.2
Minimum circulation airflow, Qmin (CFM)		766
Altitude above Sea Level (Ft.)	Altitude Adjustment Factor	Minimum Total Space Area, TAmin (Sq. Ft.)
0	1.000	425
1000	1.025	435
2000	1.051	446
3000	1.078	458
4000	1.107	470
5000	1.138	483
6000	1.170	497
6500	1.187	504

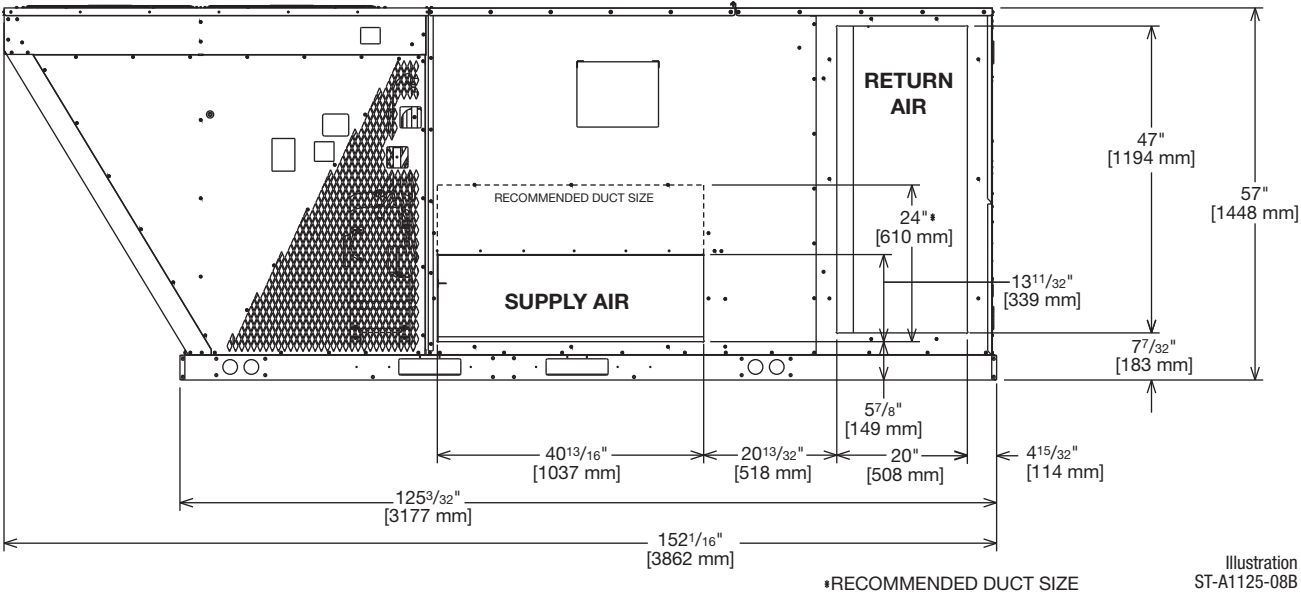
## UNIT DIMENSIONS



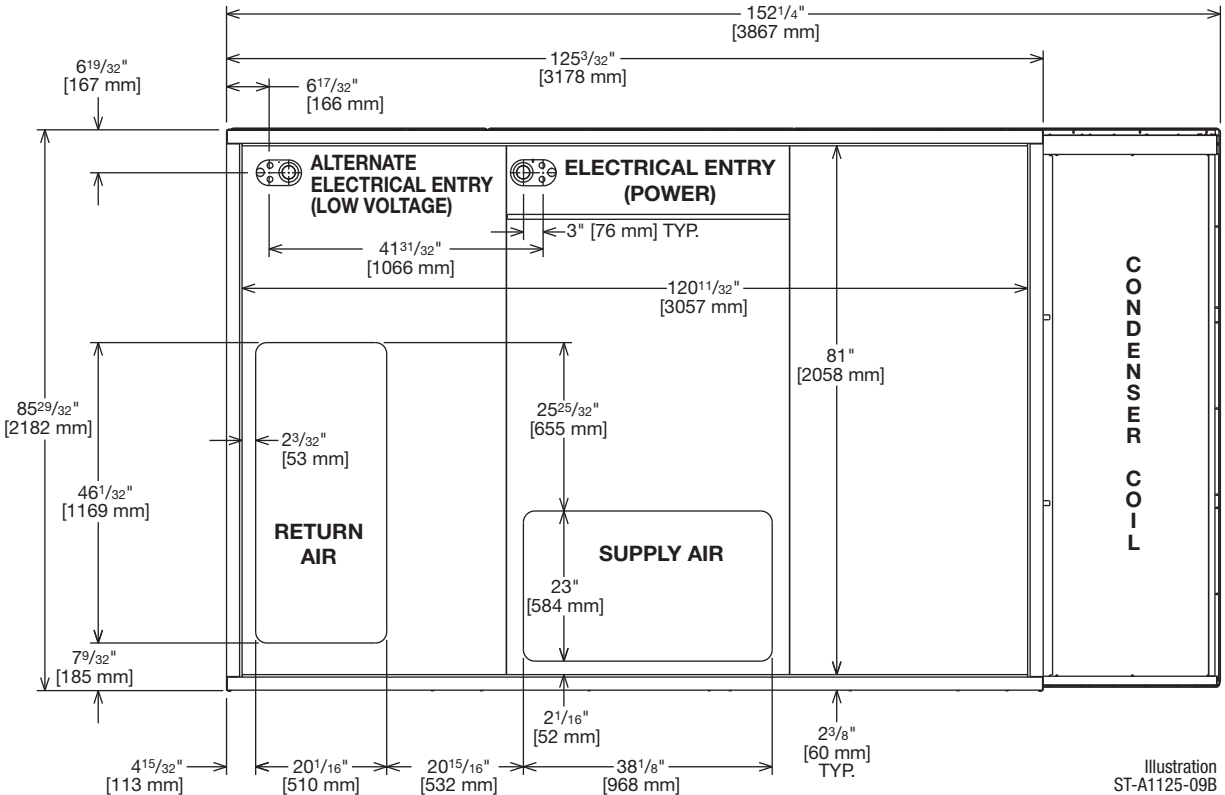
[ ] Designates Metric Conversions



SUPPLY AND RETURN DIMENSIONS FOR HORIZONTAL APPLICATIONS  
(VIEW FROM REAR DUCT SIDE)

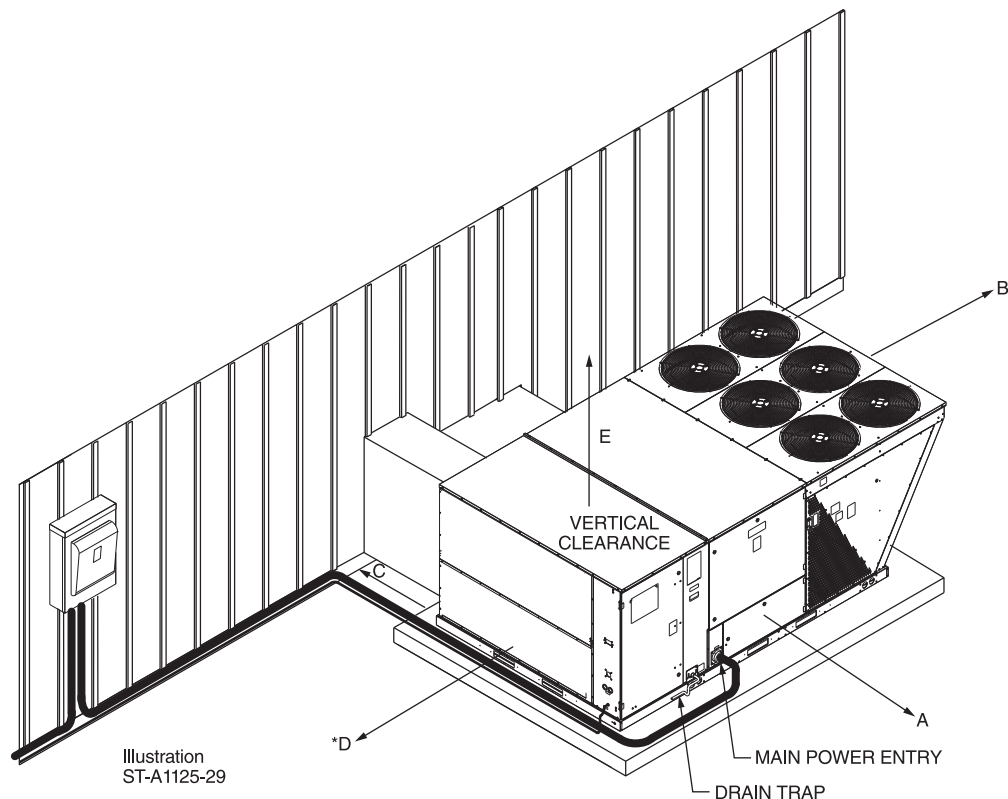


SUPPLY AND RETURN DIMENSIONS FOR DOWNFLOW APPLICATIONS  
(VIEW FROM BOTTOM UP)



[ ] Designates Metric Conversions

## REQUIRED UNIT CLEARANCES

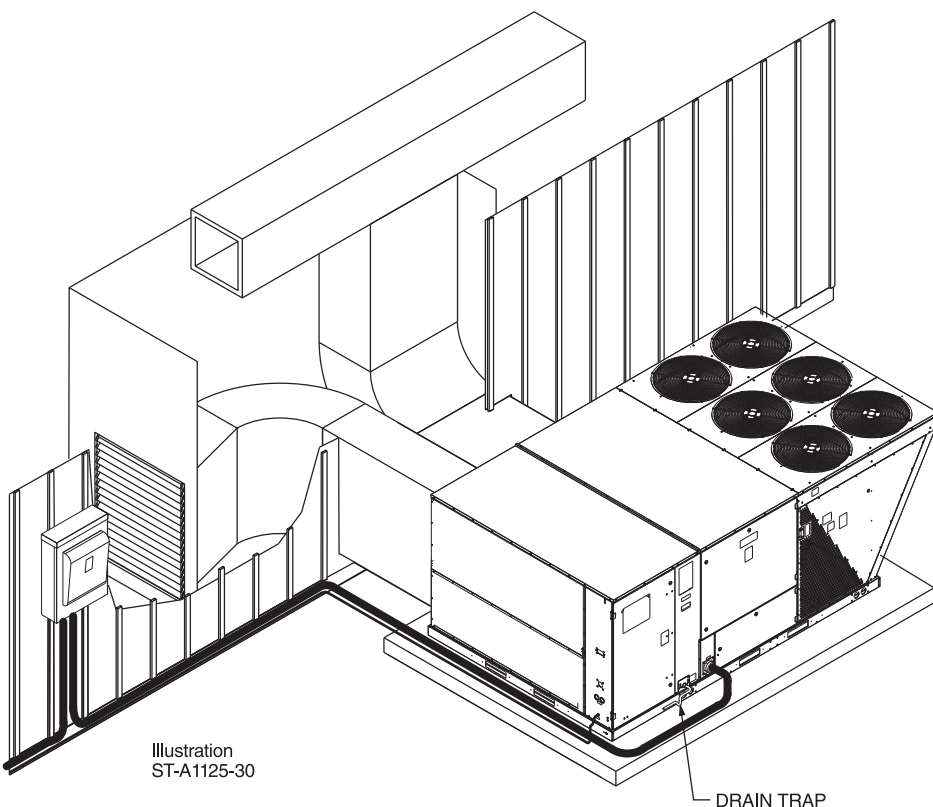


### CLEARANCES

The following minimum clearances are recommended for proper unit performance and serviceability.

Recommended Clearance In. [mm]	Location
80 [2032]	A - Front
18 [457]	B - Condenser Coil
18 [457]	+C - Duct Side
18 [457]	*D - Evaporator End
60 [1524]	E - Above
*Without Economizer 18" [457 mm]. With Economizer 48" [1219 mm]. +Without Horizontal Economizer 18" [457 mm]. With Horizontal Economizer 42" [1067 mm].	

[ \* ] Designates Metric Conversions



WEIGHTS

CORNER WEIGHTS BY PERCENTAGE			
A	B	C	D
32%	27%	16%	24%

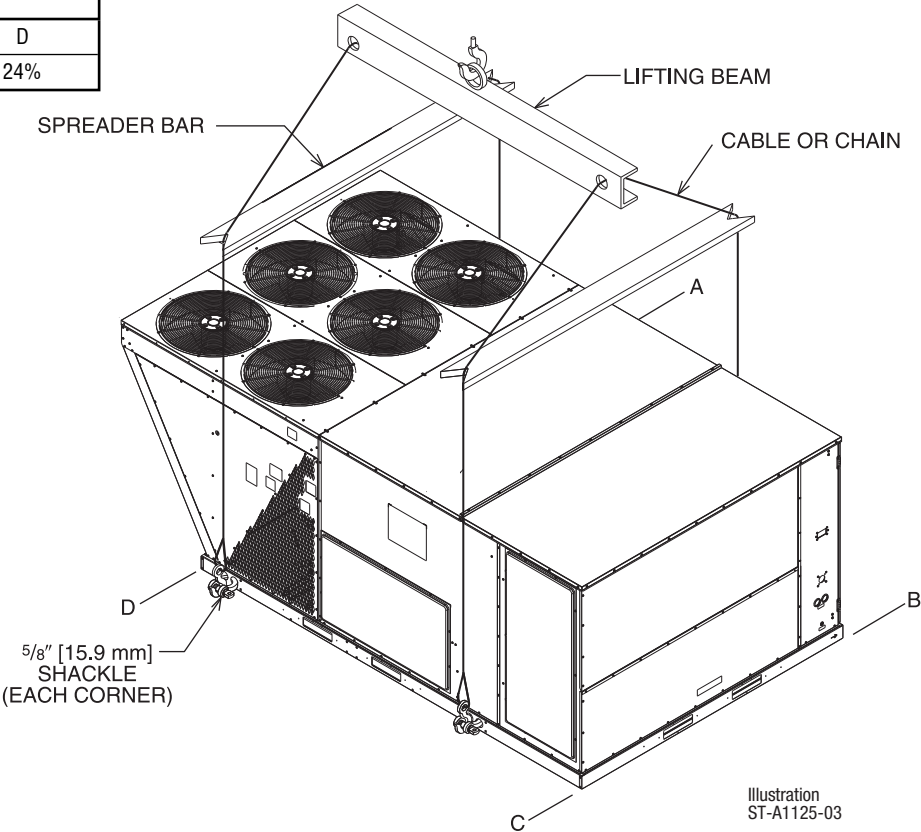


Illustration  
ST-A1125-03

## FIELD-INSTALLED ACCESSORY EQUIPMENT

Accessory	Model Number	Shipping Weight Lbs. [kg]	Installed Weight Lbs. [kg]	Factory Installation Available?
<b>Economizers</b>				
DDC Economizer with Single Enthalpy (Downflow) <i>Ruskin Rooftop Systems Economizer with Honeywell Controller</i>	AXRD-01RMDCM3	277 [125.6]	168 [76.2]	Yes
DDC Economizer with Single Enthalpy (Downflow) <i>Ruskin Rooftop Systems Economizer with Honeywell Controller w/ Smoke Detector</i>	AXRD-01RMDDM3	277 [125.6]	168 [76.2]	Yes
DDC Economizer with Single Enthalpy (Horizontal) <i>Ruskin Rooftop Systems Economizer with Honeywell Controller</i>	AXRD-01RMHCM3	333 [151.0]	301 [36.5]	No
Non-DDC Economizer with Single Enthalpy (Downflow) <i>Ruskin Rooftop Systems Economizer with Siemens Controller</i>	RXRD-51MHDAM3	277 [125.6]	168 [76.2]	Yes
Non-DDC Economizer with Single Enthalpy (Horizontal) <i>Ruskin Rooftop Systems Economizer with Siemens Controller</i>	RXRD-51MHHAM3	333 [151.0]	301 [36.5]	No
Economizer Universal DDC Interface Kit	RXRX-DDC02	40 [18.1]	34 [15.4]	Yes

Accessory	Model Number	Shipping Weight Lbs. [kg]	Installed Weight Lbs. [kg]	Factory Installation Available?
Comfort Alert® (1 per Compressor)	RXRX-AZ01	3 [1.4]	2 [0.9]	Yes
Communication Card, BACnet	RXRX-AY01	1 [0.5]	1 [0.5]	No
Communication Card, LonWorks	RXRX-AY02	1 [0.5]	1 [0.5]	No
Concentric Adapter/Transition (30 ton)	RXMC-CL09	81 [36.7]	74 [33.6]	No
Concentric Step Down Diffuser (30 ton)	RXRN-AD88	410 [186.0]	370 [67.8]	No
Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell DDC)	RXRX-AV04	1 [0.5]	1 [0.5]	No
Dual Enthalpy, Temperature and Humidity Sensor (for Siemens Non-DDC)	PD555460	1 [0.5]	1 [0.5]	No
Electric Heaters (* = C, D or Y voltage)	RXJJ-CE40*	44 [20.0]	34 [15.4]	Yes
	RXJJ-CE60*	45 [20.4]	35 [15.9]	Yes
	RXJJ-CE75*	46 [20.8]	36 [16.3]	Yes
Fresh Air Damper <sup>1</sup> , Manual	AXRF-KFA1	61 [27.7]	52 [23.6]	No
Fresh Air Damper <sup>1</sup> , Motorized (DDC)	RXRX-AW05	45 [20.4]	38 [17.2]	No
Hail Guard Louvers	AXRX-AAD01L	55 [24.8]	45 [20.3]	Yes
Low-Ambient Control Kit (1 Per Compressor)	RXRZ-C02	3 [1.4]	2 [0.9]	Yes
MERV 8 Filter	RXMF-M08A22520	2 [0.9]	1 [0.45]	Yes
MERV 13 Filter	RXMF-M13A22520	2 [0.9]	1 [0.45]	Yes
Power Exhaust (208/230V) Kit, Convertible (RRS)	RXRX-BGF05C	119 [54.0]	59 [26.8]	No
Power Exhaust (460V) Kit, Convertible (RRS)	RXRX-BGF05D	119 [54.0]	59 [26.8]	No
Roofcurb, 14"	RXKG-CBH14	184 [83.5]	176 [79.8]	No
Roofcurb Adapter to RXKG-CAF14	RXRX-CJCF14	555 [251.7]	505 [29.1]	No
Roofcurb Adapter to RXRK-E56	RXRX-CJCE56	465 [210.9]	415 [88.2]	No
Sensor, Carbon Dioxide (Wall Mount)	RXRX-AR02	3 [1.4]	2 [1.0]	No
Sensor, Room Humidity	RHC-ZNS4	1 [0.5]	1 [0.5]	No
Sensor, Room Temperature and Relative Humidity	RHC-ZNS5	1 [0.5]	1 [0.5]	No

<sup>1</sup>Motorized Kit and Manual Fresh Air Damper must be combined for a complete Motorized Outside Air Damper Selection.

[ ] Designates Metric Conversions

## COMMUNICATION CARDS

### Field-Installed



#### **BACnet COMMUNICATION CARD      RXRX-AY01**

The field-installed BACnet Communication Card allows the RTU-C unit controller to communicate with a third party building management system that supports the BACnet Application Specific Controller device profile. The BACnet Communication Module plugs onto the unit RTU-C controller and allows communication between the RTU-C and the BACnet MSTP network.



#### **LonWorks COMMUNICATION CARD      RXRX-AY02**

The field-installed LonWorks Communication Card allows the RTU-C unit controller to communicate with a third party building management system that supports the LonMark Space Comfort Controller (SCC) functional profile or LonMark Discharge Air Controller (DAC) functional profile. The LonMark Communication Module plugs onto the RTU-C controller and allows communication between the RTU-C and a LonWorks Network.

## CONCENTRIC DIFFUSER APPLICATION

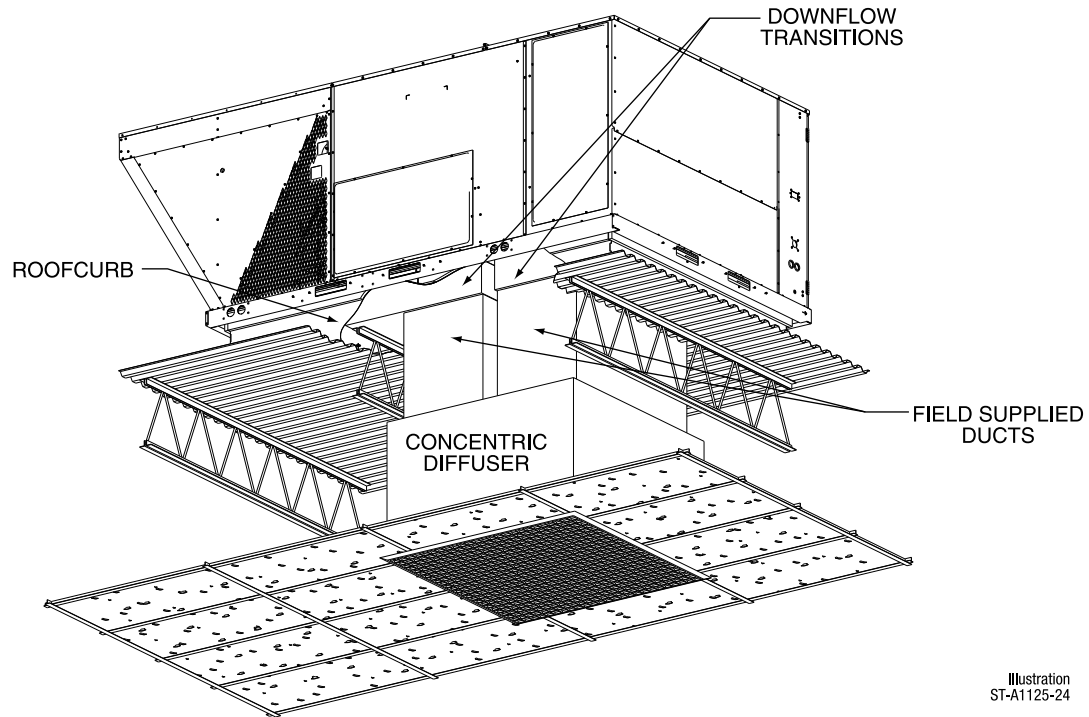


Illustration  
ST-A1125-24

### RXMC-CL09 - Concentric Adapter/Transition (30 Ton)

- Used with RXRN-AD88 Concentric Diffusers

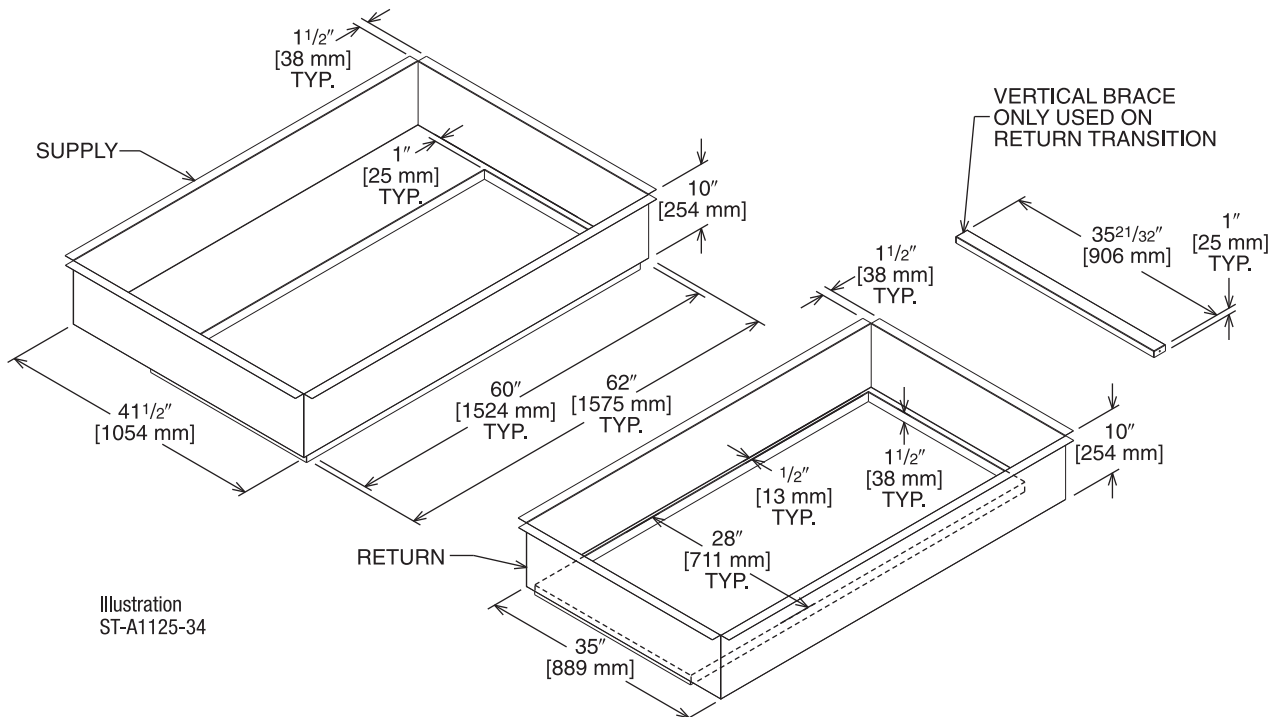


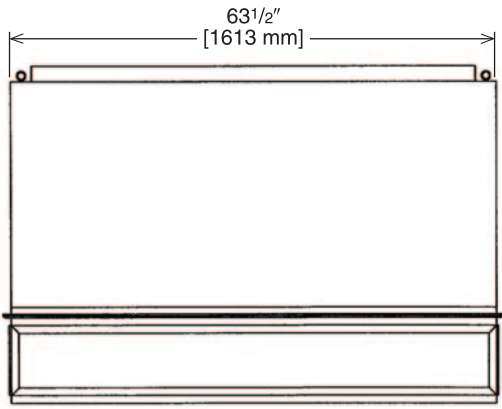
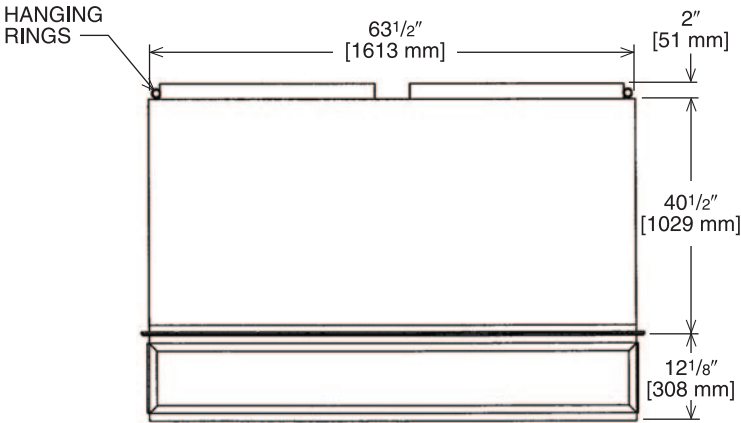
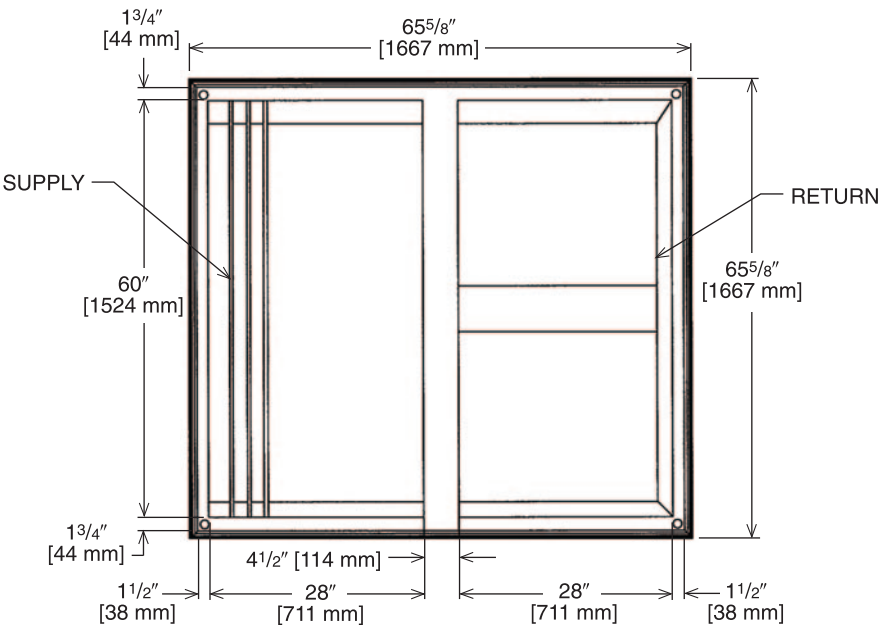
Illustration  
ST-A1125-34

[ ] Designates Metric Conversions

CONCENTRIC STEP DOWN DIFFUSER (30 TON)

RXRN-AD88

- All aluminum diffuser with aluminum return air eggcrate
- Built-in anti-sweat gasket
- Molded fiberglass supports
- Built-in hanging supports
- Diffuser box constructed of sheet metal insulated with 1" [25.4 mm] 1.5 lbs. [.7 kg] duct liner
- Double deflection diffuser with the blades secured by spring steel



CONCENTRIC DIFFUSER SPECIFICATIONS

PART NUMBER	CFM [L/s]	STATIC PRESSURE	THROW FEET	NECK VELOCITY	JET VELOCITY
RXRN-AD88	10000 [4719]	0.51	46-54	907	907
	10500 [4955]	0.58	50-58	953	953
	11000 [5191]	0.65	53-61	998	998
	11500 [5427]	0.73	55-64	1043	1043
	12000 [5663]	0.82	58-67	1089	1089
	12500 [5898]	0.91	61-71	1134	1134
	13000 [6134]	1.00	64-74	1179	1179

[ ] Designates Metric Conversions



# DDC ECONOMIZER WITH SINGLE ENTHALPY (DOWNFLOW) RUSKIN ROOFTOP SYSTEMS ECONOMIZER WITH HONEYWELL JADE CONTROLLER

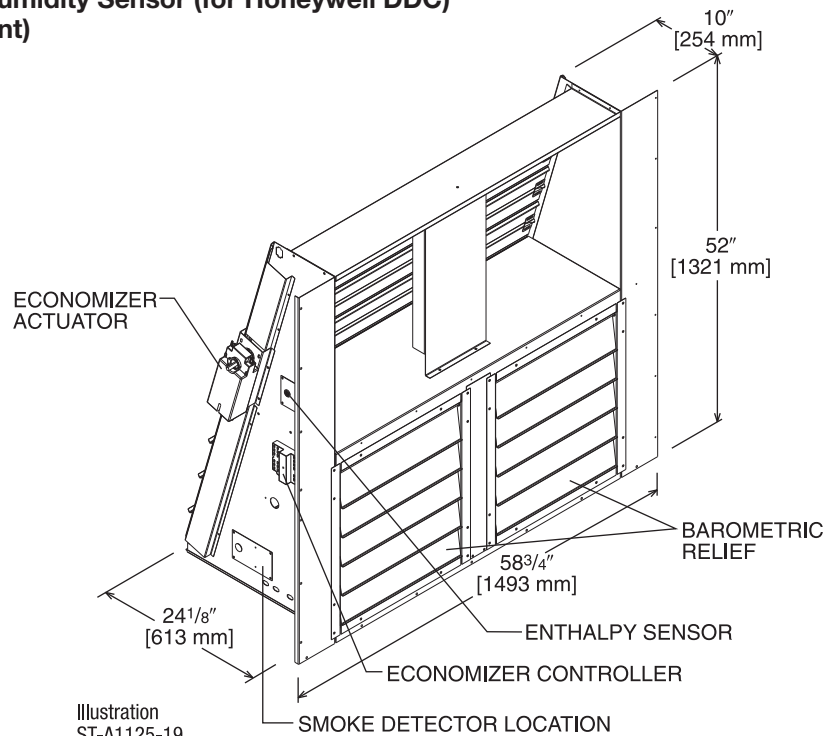
Factory or Field-Installed

AXRD-01RMDCM3

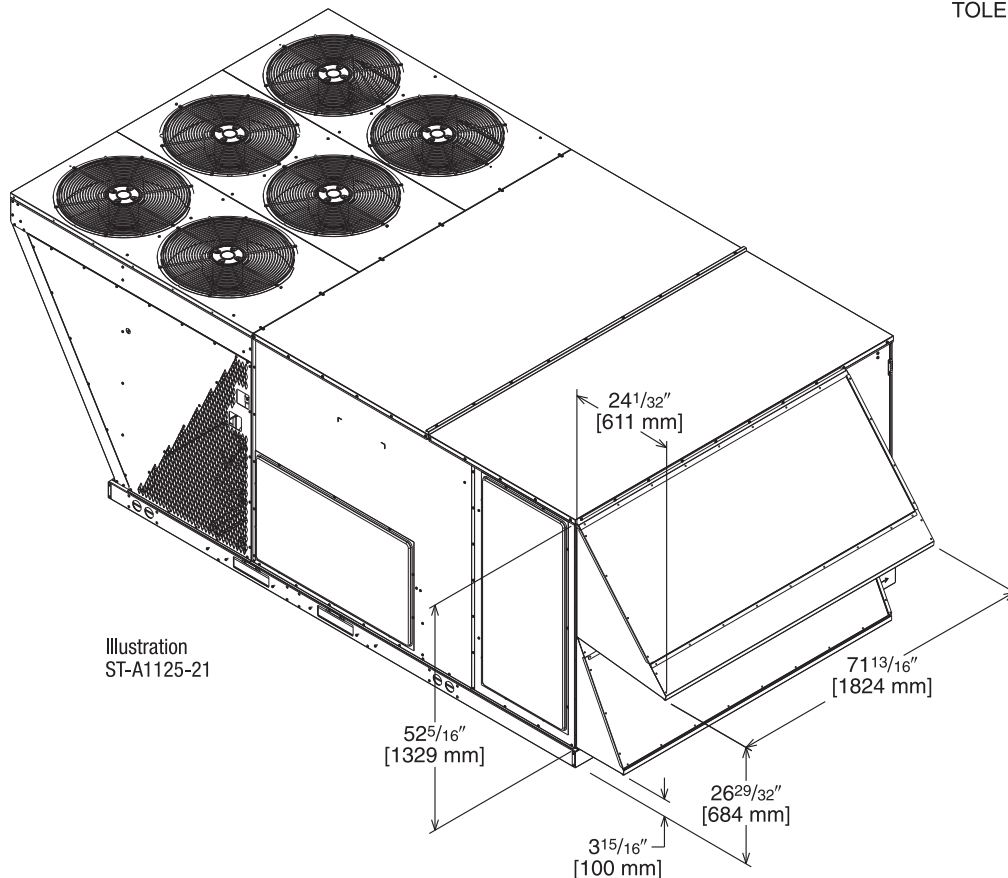
RXXR-AV04—Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell DDC)

RXXR-AR02—Sensor, Carbon Dioxide (Wall Mount)

- Features **Honeywell** controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Standard barometric relief damper
- Single enthalpy with dual enthalpy upgrade kit available
- CO<sub>2</sub> input sensor available
- Field-assembled hood ships with economizer
- Economizer ships complete for downflow duct application
- Optional remote minimum position potentiometer (270 ohm) (Honeywell #S963b1136) is available from Prostock
- Field-installed power exhaust available



TOLERANCE ± .125



[ ] Designates Metric Conversions

## DDC ECONOMIZER WITH SINGLE ENTHALPY (DOWNFLOW) RUSKIN ROOFTOP SYSTEMS ECONOMIZER WITH HONEYWELL CONTROLLER & SMOKE DETECTOR

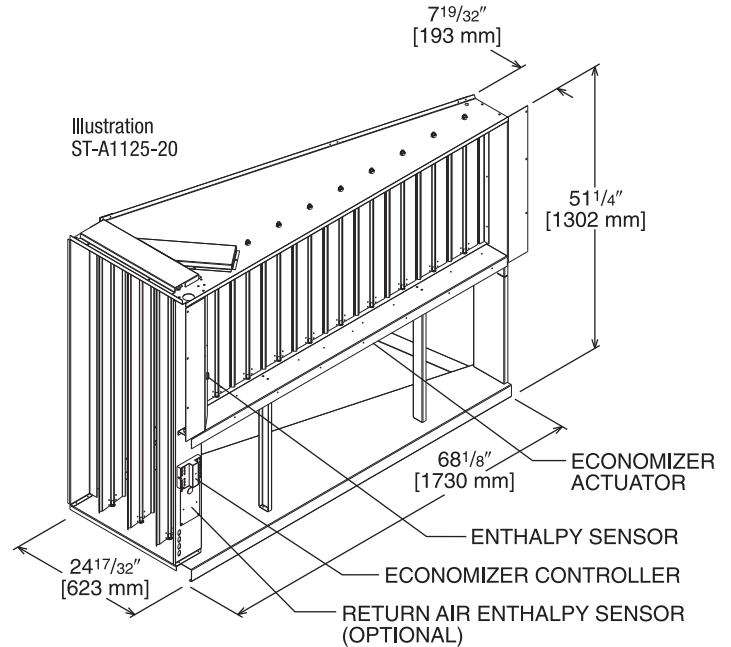
### Factory or Field-Installed

#### AXRD-01RMDDM3

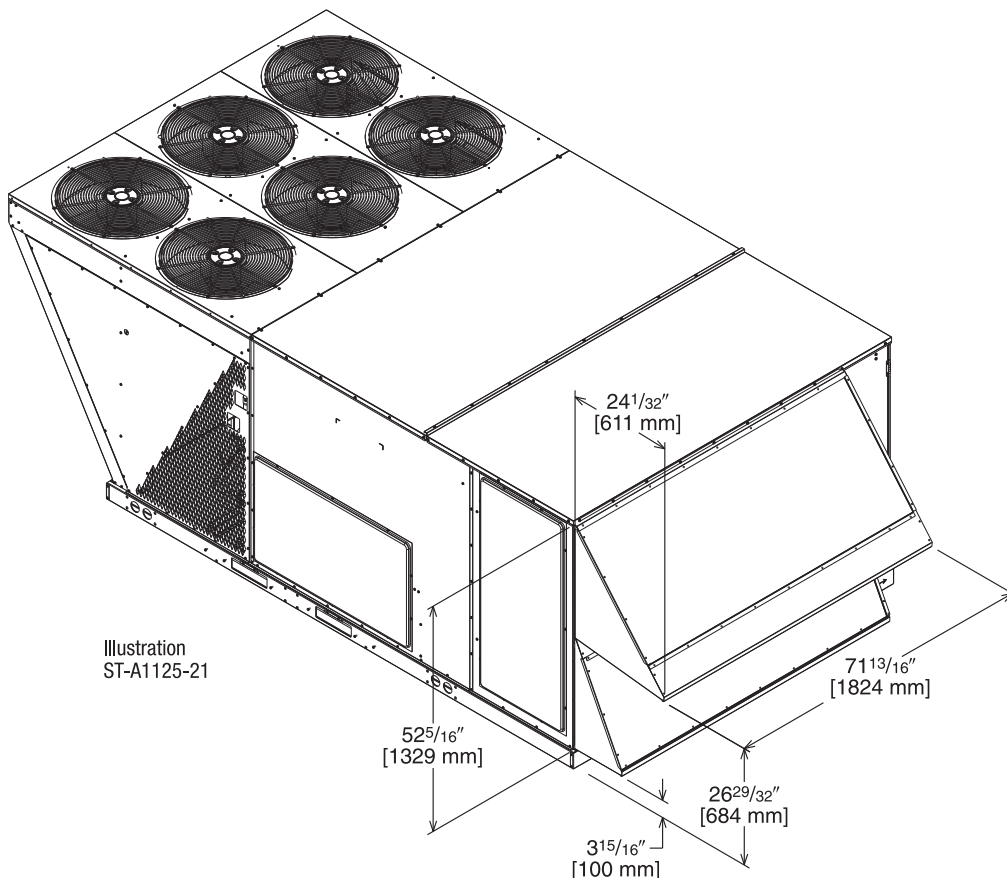
RXR-04—Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell DDC)

RXR-02—Sensor, Carbon Dioxide (Wall Mount)

- Features **Honeywell** controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Plug-in polarized 12-pin and 4-pin electrical connections
- Pre-configured—no field adjustments necessary
- Standard barometric relief damper
- Single enthalpy with dual enthalpy upgrade kit available
- CO<sub>2</sub> input sensor available
- Field-assembled hood ships with economizer
- Economizer ships complete for horizontal duct application
- Optional remote minimum position potentiometer (270 ohm) Honeywell #S963b1136) is available from Prostock
- Field-installed power exhaust available
- If connected to a building automation system (BAS), all economizer functions can be viewed on the (BAS) or 16 characters x 2 rows of text screen
- If connected to thermostat, all economizer functions can be viewed on 16 characters x 2 rows of text character LCD screen



TOLERANCE  $\pm .125$



[ ] Designates Metric Conversions

## DDC ECONOMIZER (HORIZONTAL) RUSKIN ROOFTOP SYSTEMS ECONOMIZER WITH HONEYWELL CONTROLLER

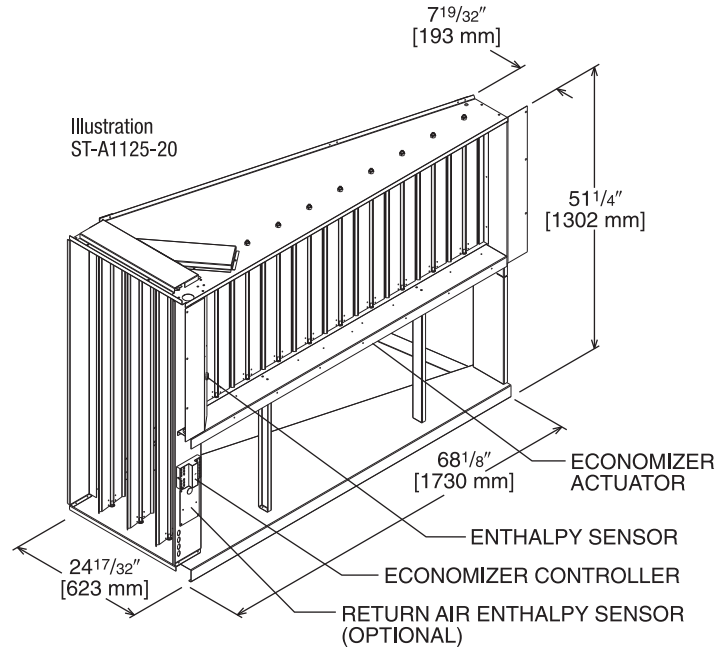
### Field-Installed Only

AXRD-01RMHCM3

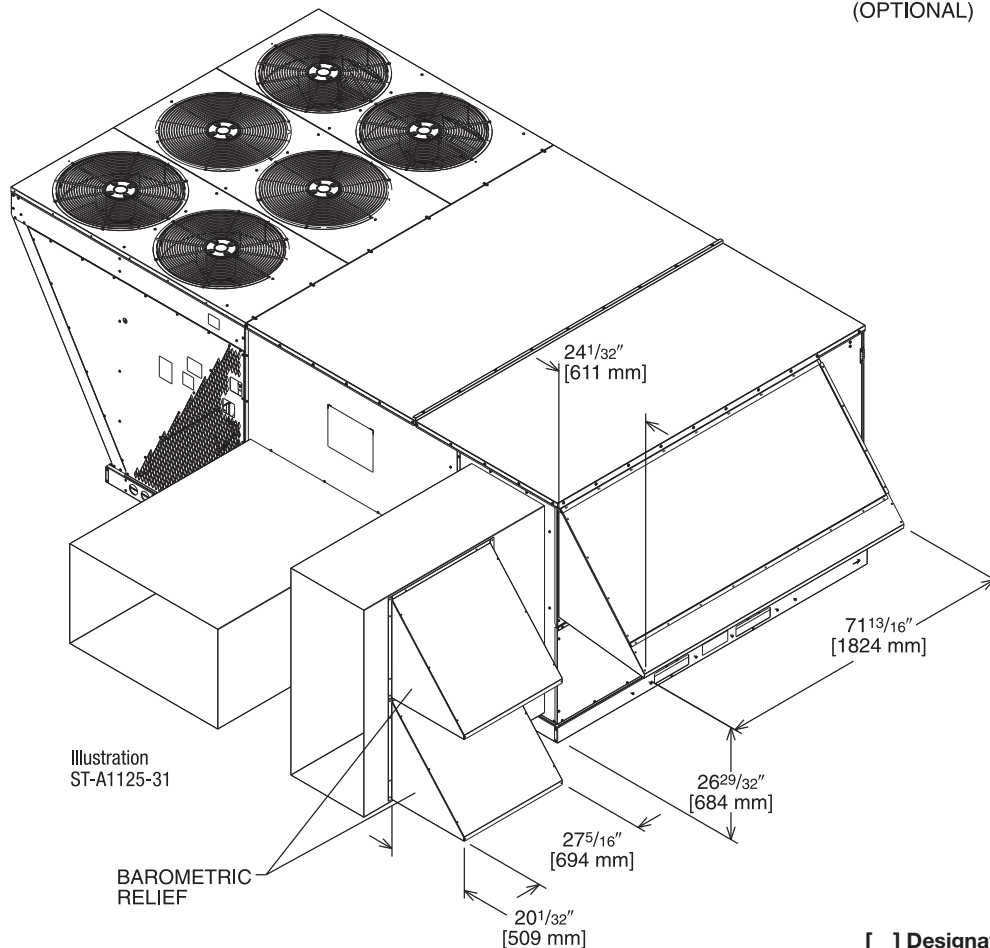
RXXR-AV04—Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell DDC)

RXXR-AR02—Sensor, Carbon Dioxide (Wall Mount)

- Features **Honeywell** controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Plug-in polarized 12-pin and 4-pin electrical connections
- Pre-configured—no field adjustments necessary
- Standard barometric relief damper
- Single enthalpy with dual enthalpy upgrade kit available
- CO<sub>2</sub> input sensor available
- Field-assembled hood ships with economizer
- Economizer ships complete for horizontal duct application
- Optional remote minimum position potentiometer (270 ohm) (Honeywell #S963b1136) is available from Prostock
- Field-installed power exhaust available



TOLERANCE ± .125



[ ] Designates Metric Conversions

## NON-DDC ECONOMIZER WITH SINGLE ENTHALPY (DOWNFLOW) RUSKIN ROOFTOP SYSTEMS ECONOMIZER WITH SIEMENS CONTROLLER

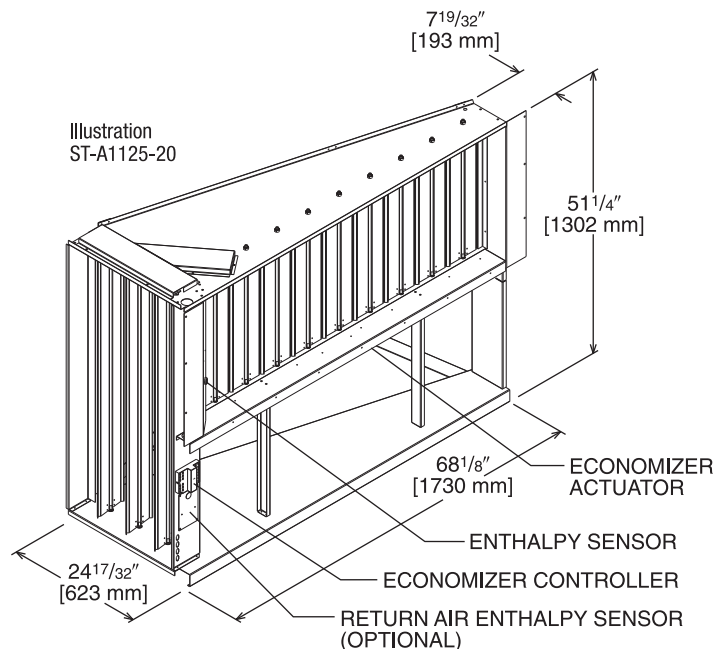
### Factory or Field-Installed

**RXRD-51MHDAM3**

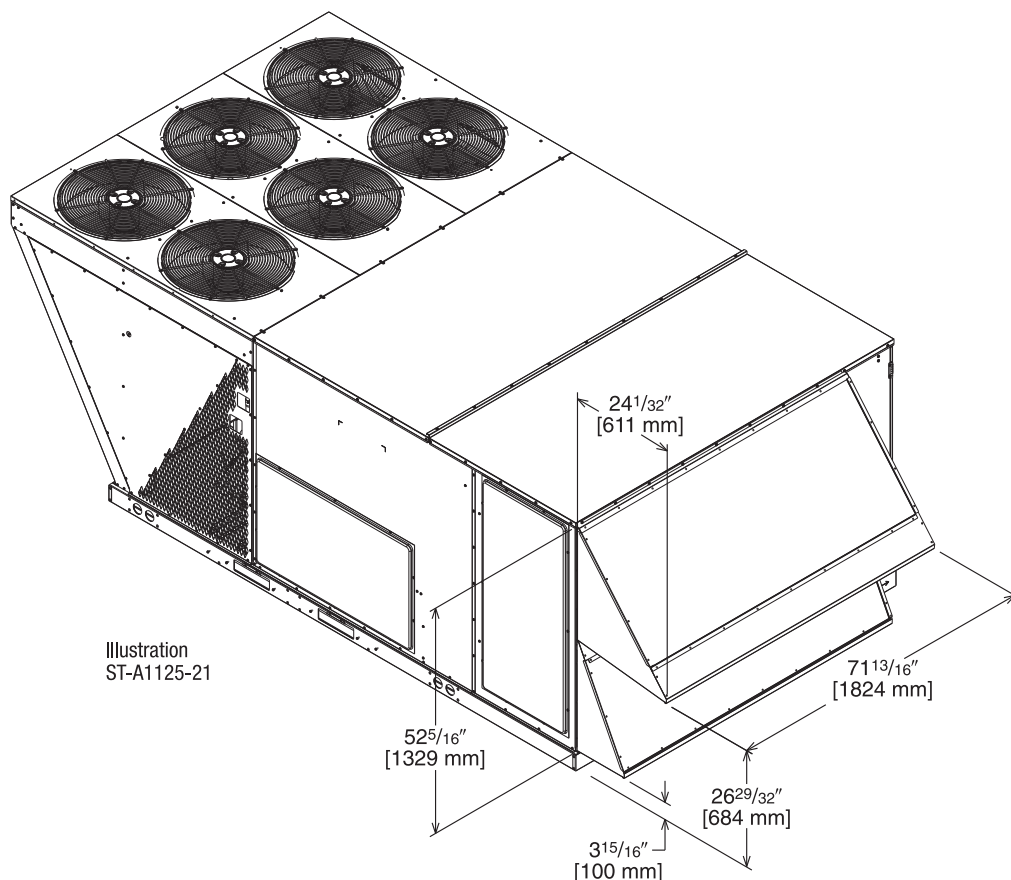
**PD555460-Dual Enthalpy, Temperature and Humidity Sensor (for Siemens Non-DDC)**

**RXR-AR02—Sensor, Carbon Dioxide (Wall Mount)**

- Features **Siemens** controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Plug-in polarized 12-pin and 4-pin electrical connections
- Pre-configured—no field adjustments necessary
- Standard barometric relief damper
- Single enthalpy with dual enthalpy upgrade kit available
- CO<sub>2</sub> input sensor available
- Economizer ships complete for downflow duct application
- Field-assembled hood ships with economizer
- Ultra low leak dampers meet California Title 24 requirements and ASHRAE 90.1
- Field-installed power exhaust available
- Can be converted to DDC operation with the economizer universal DDC interface kit (RXRX-DDC02)



TOLERANCE ± .125



[ ] Designates Metric Conversions

## NON-DDC ECONOMIZER WITH SINGLE ENTHALPY (HORIZONTAL) RUSKIN ROOFTOP SYSTEMS ECONOMIZER WITH SIEMENS CONTROLLER

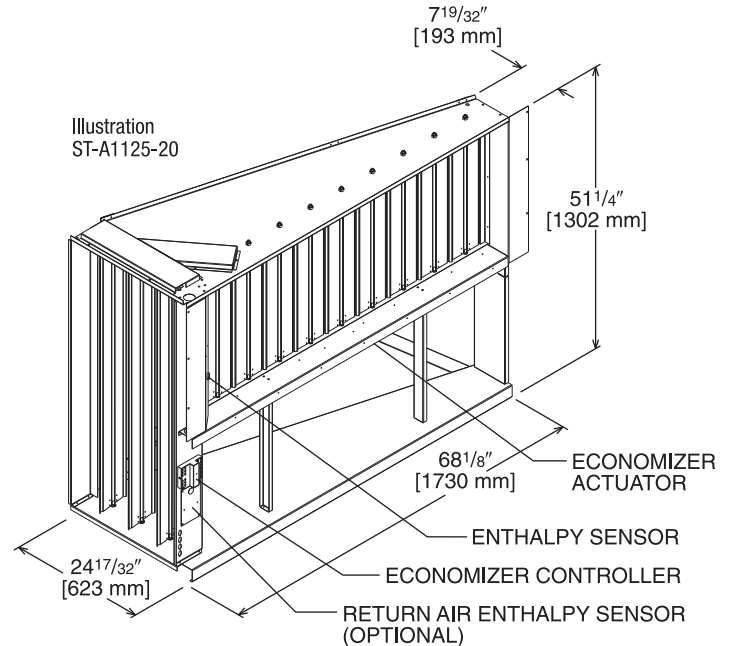
Field-Installed Only

RXRD-51MHHAM3

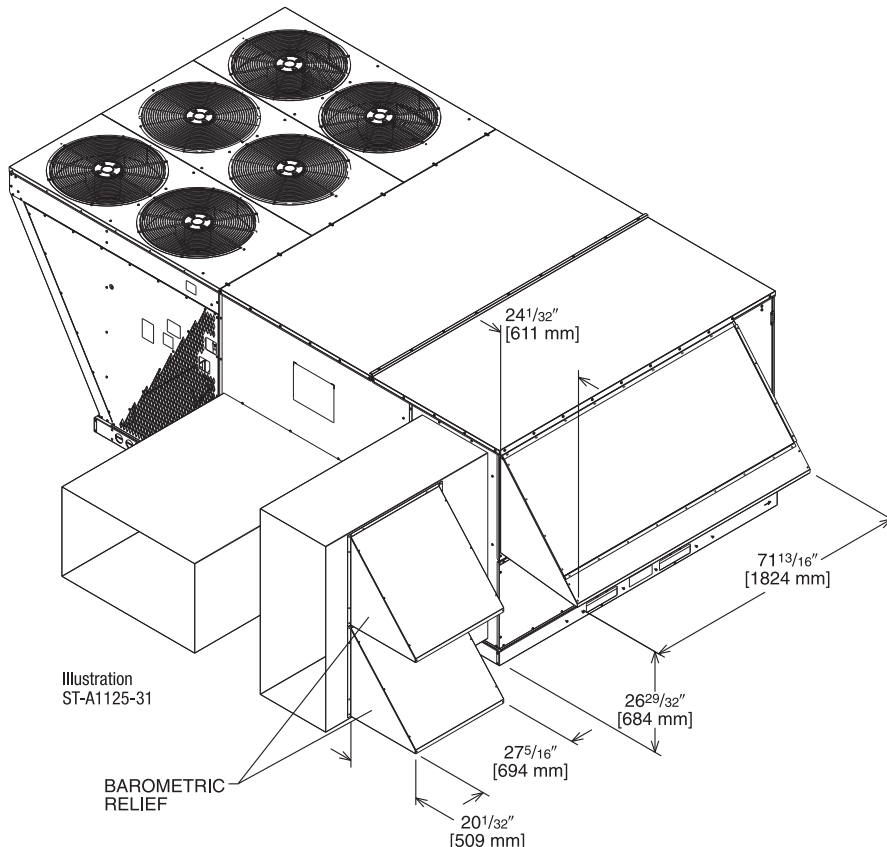
PD555460-Dual Enthalpy, Temperature and Humidity Sensor (for Siemens Non-DDC)

RXXRX-AR02—Sensor, Carbon Dioxide (Wall Mount)

- Features **Siemens** controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Plug-in polarized 12-pin and 4-pin electrical connections
- Pre-configured—no field adjustments necessary
- Standard barometric relief damper
- Single enthalpy with dual enthalpy upgrade kit available
- CO<sub>2</sub> input sensor available
- Field-assembled hood ships with economizer
- Economizer ships complete for horizontal duct application
- Ultra low leak dampers meet California Title 24 requirements and ASHRAE 90.1
- Field-installed power exhaust available
- Can be converted to DDC operation with the economizer universal DDC interface kit (RXXRX-DDC02)



TOLERANCE ± .125



[ ] Designates Metric Conversions

## **ECONOMIZER UNIVERSAL DDC INTERFACE KIT**

**Available Factory or Field-Installed**

### **RXXRX-DDC02**

- Allows any non-DDC economizer to be used with a ClearControl DDC model
- Mounts on the economizer
- Provides mounting location for Economizer Controller
- Provides wire management for excess wire

**NOTE:** Older DDC Models, prior to A2L, may require a field update to the ClearControl Software. The minimum version required is 3.15. Models with R-454B refrigerant will come with software version 4.0 or higher.

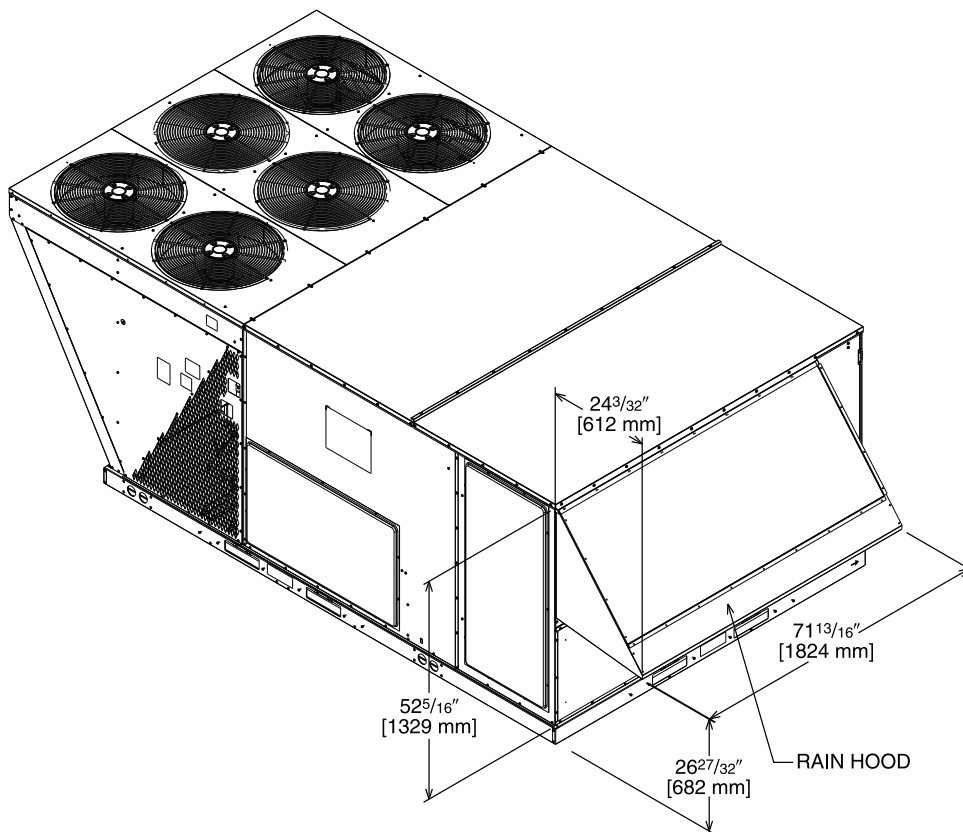
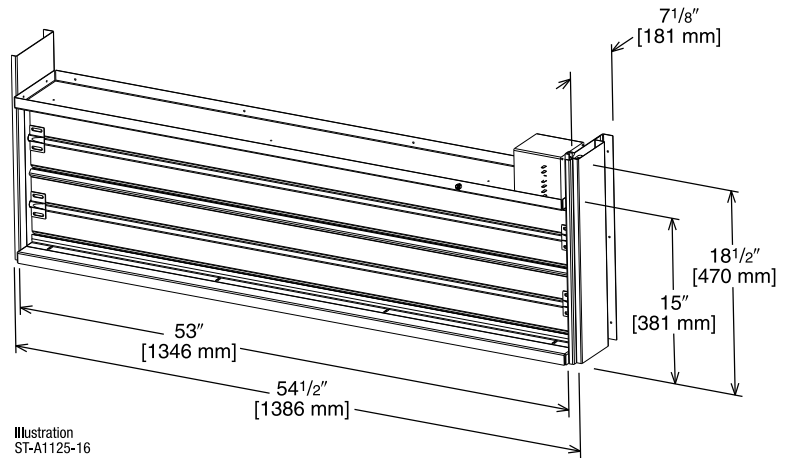


## FRESH AIR DAMPER

AXRF-KFA1 — Fresh Air Damper, Manual

RXRX-AW05 — Fresh Air Damper, Motorized (DDC)

- Features **Honeywell** controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Plug-in polarized 12-pin and 4-pin electrical connections
- Pre-configured—no field adjustments necessary
- Addition of dual enthalpy upgrade kit allows limited economizer function
- CO<sub>2</sub> sensor input available for demand control ventilation (DCV)
- Optional remote minimum position potentiometer (270 ohm) (Honeywell #S963b1136) is available from Prostock
- All fresh air damper functions can be viewed at the RTU-C unit controller display
- If connected to a building automation system (BAS), all fresh air damper functions can be viewed on the (BAS), on 16 characters x 2 rows of text LCD screen
- If connected to thermostat, all fresh air damper functions can be viewed on 16 characters x 2 rows of text LCD screen



[ ] Designates Metric Conversions



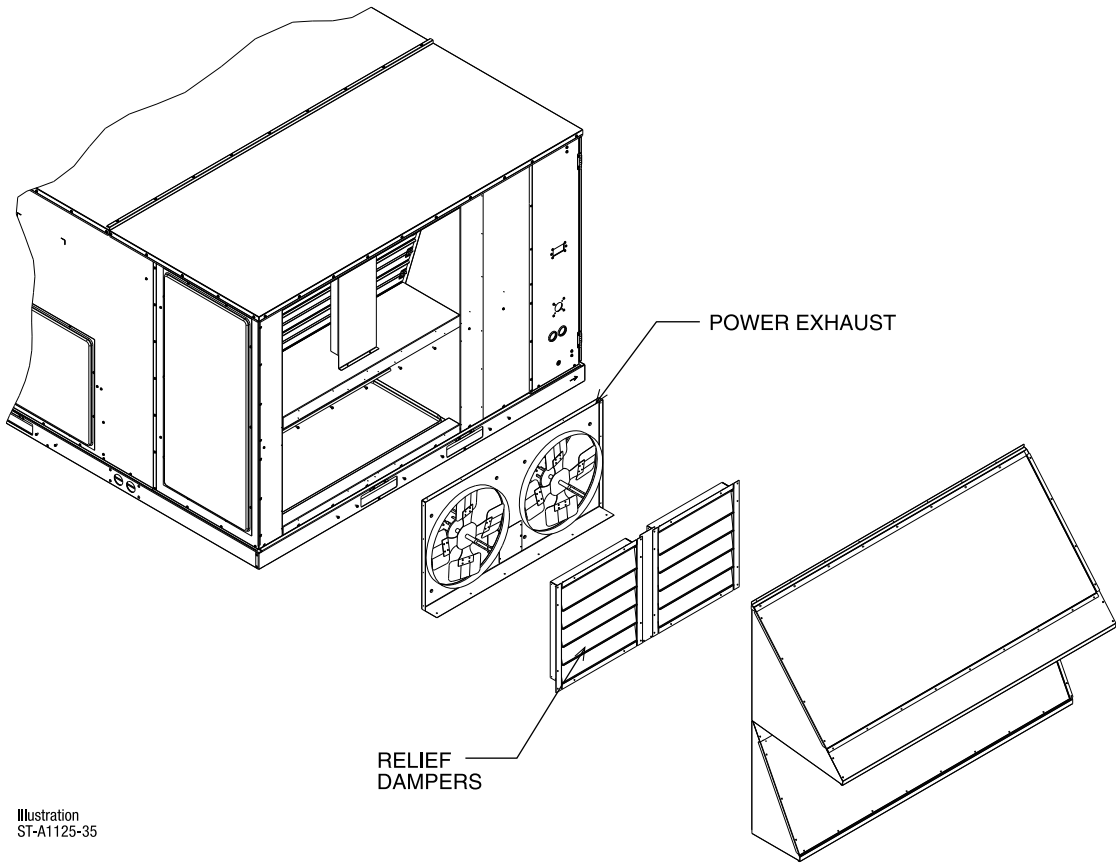
POWER EXHAUST KIT, CONVERTIBLE

RXXRX-BGF05\*

\*Voltage Code: C, D, or Y

- Convertible between vertical airflow and horizontal airflow
- Compatible with all H-cabinet economizers
- Economizer sold separately

Vertical Airflow Installation shown here



Model No.	No. of Fans	Volts	Phase	HP (ea.)	Low Speed		High Speed ①		FLA (ea.)	LRA (ea.)
					CFM [L/s] ②	RPM	CFM [L/s] ②	RPM		
RXXRX-BGF05C	2	208-230	1	0.75	4100 [1935]	850	5200 [2454]	1050	5	4.97
RXXRX-BGF05D	2	460	1	0.75	4100 [1935]	850	5200 [2454]	1050	2.2	3.4
RXXRX-BGF05Y	2	575	1	0.75	4100 [1935]	850	5200 [2454]	1050	1.5	2.84

NOTES: ① Power exhaust is factory set on high speed motor tap.  
② CFM is per fan at 0" w.c. external static pressure.

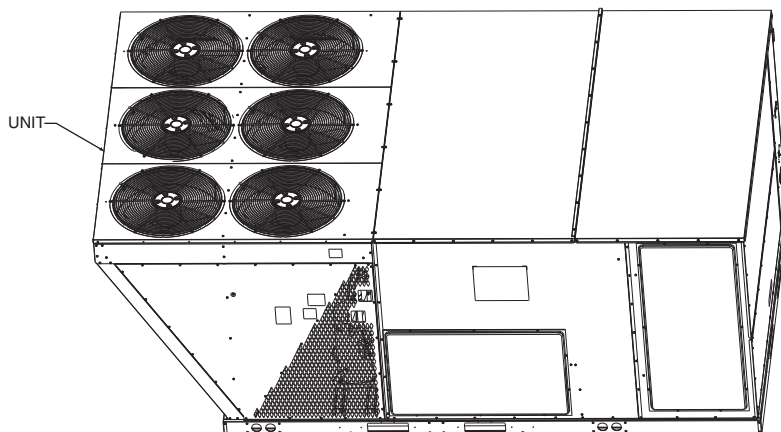
[ ] Designates Metric Conversions

## ROOFCURBS (Full Perimeter)

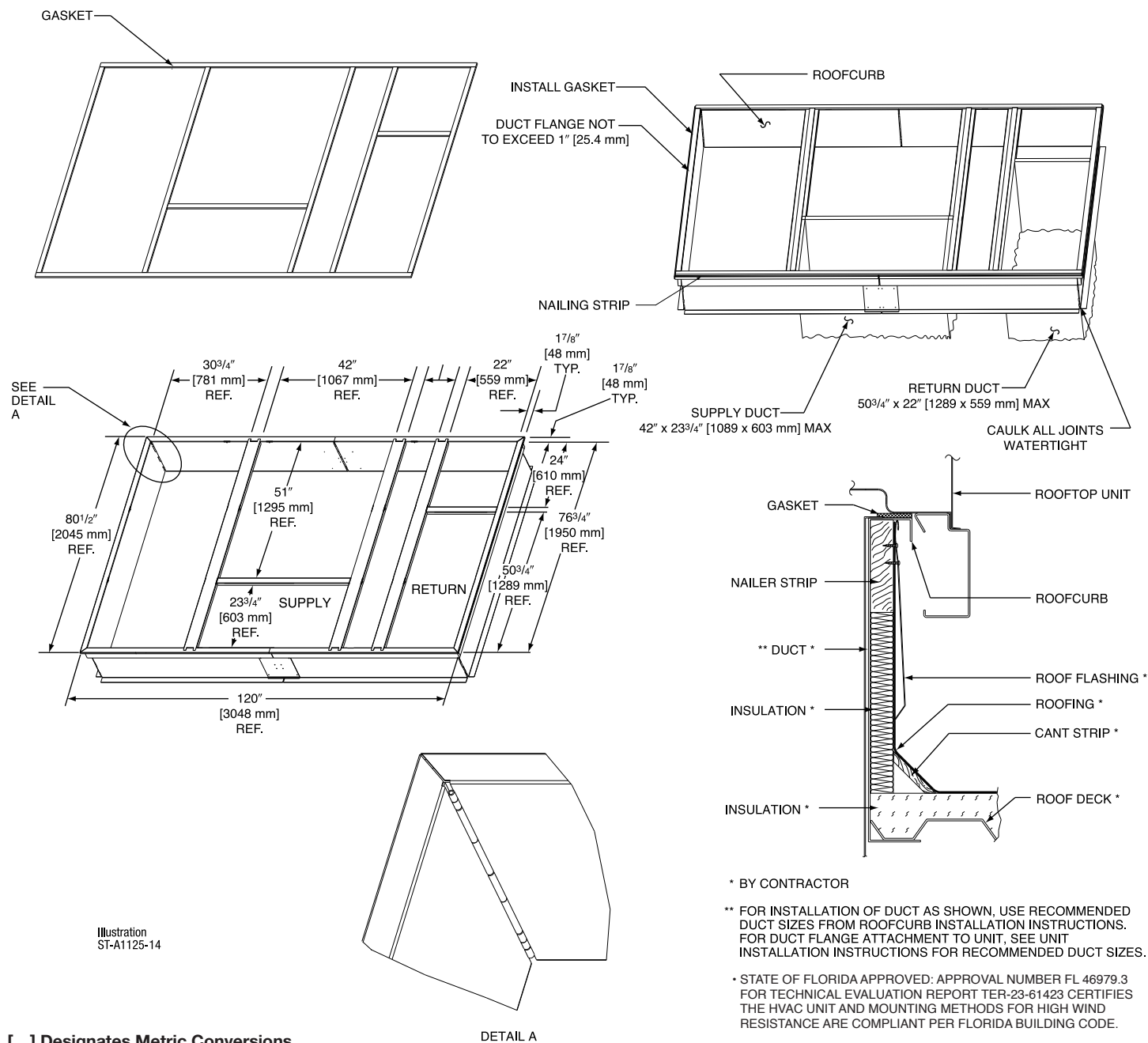
### RXKG-CBH14

- One available height (14" [356 mm])
- Quick assembly corners for simple and fast assembly
- 1" [25.4 mm] x 4" [102 mm] Nailers provided
- Insulating panels not required because of insulated outdoor base pan
- Sealing gasket (28" [711 mm]) provided with Roofcurb
- Packaged for easy field assembly

### TYPICAL INSTALLATION

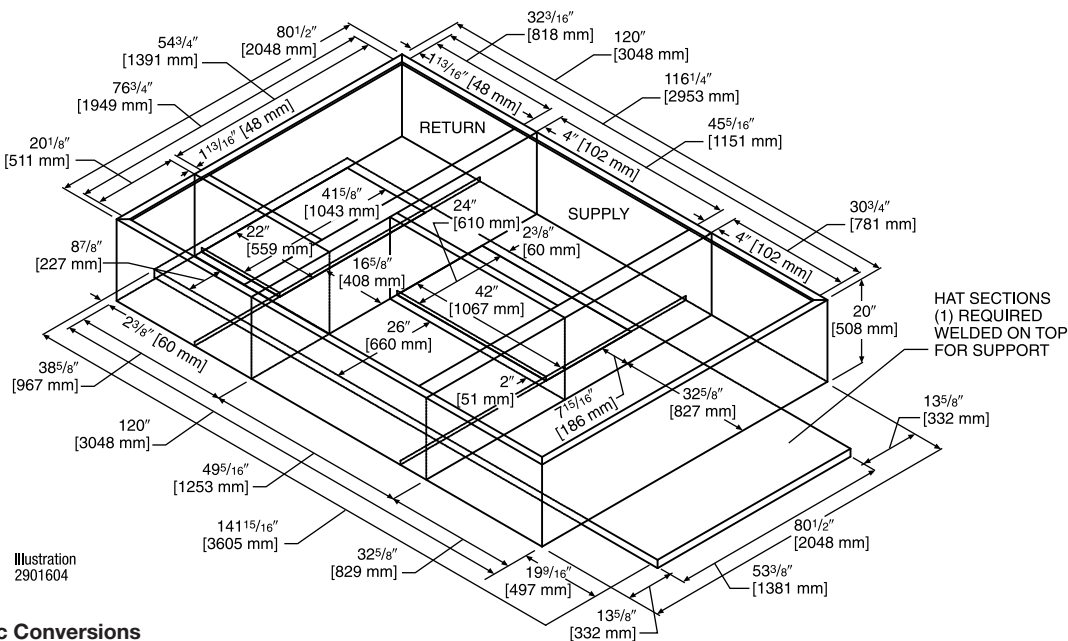
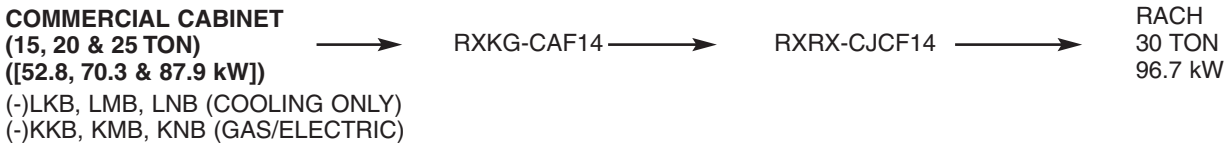
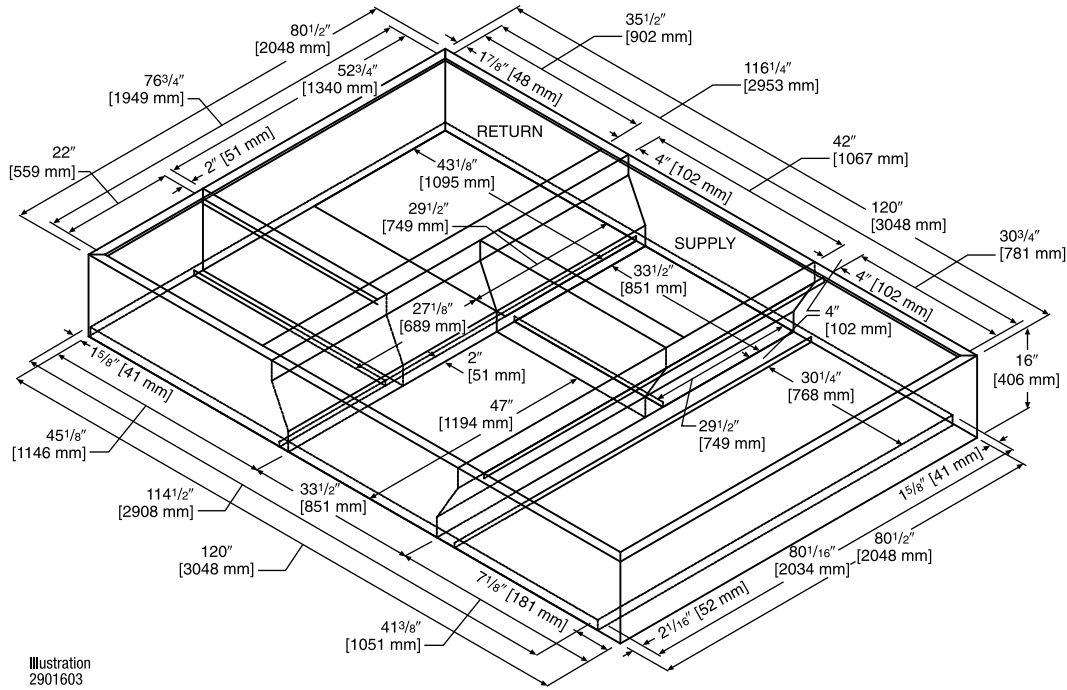
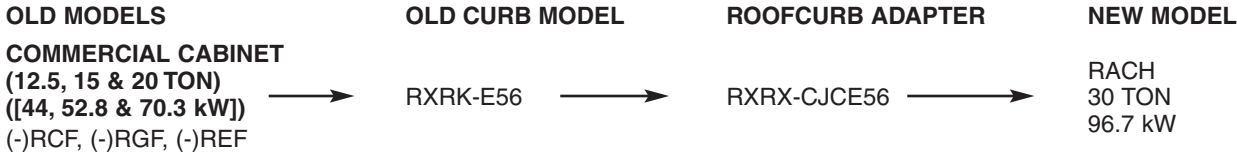


### ROOFCURB INSTALLATION



[ ] Designates Metric Conversions

ROOFCURB ADAPTERS



[ ] Designates Metric Conversions

**Guide Specifications RACHYB360**  
**ELECTRIC HEAT PACKAGED ROOFTOP**  
**HVAC Guide Specifications**  
**Size Range: 30 Nominal Tons**

- 1.00 General:
  - A. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a(n) hermetic scroll compressor(s) for cooling duty and heat pump for heating duty.
  - B. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.
  - C. Unit shall use environmentally safe, R-454B refrigerant.
  - D. Unit shall be installed in accordance with the manufacturer's instructions.
  - E. Unit must be selected and installed in compliance with local, state, and federal codes.
  - F. Model and serial data shall be printed inside the control box.
- 1.01 Quality Assurance:
  - A. Unit meets ASHRAE 90.1 2022 minimum efficiency requirements.
  - B. Unit shall be rated in accordance with AHRI Standards 340/360.
  - C. Unit shall be designed to conform to ASHRAE 15.
  - D. Unit shall be UL-tested and certified in accordance with Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.
  - E. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
  - F. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
  - G. Roof curb shall be designed to conform to NRCA Standards.
  - H. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory and must be available upon request.
  - I. Unit shall be designed in accordance with UL Standard 60335-2-40 4th Edition. including tested to withstand rain.
  - J. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.
- 1.02 Manufacturer Qualifications:
  - A. Unit shall be designed in accordance with ISO 9001:2015 and shall be manufactured in a facility registered by ISO 9001:2015.
- 1.03 Installer Qualifications:
  - A. The installer shall be trained to install and service equipment with A2L refrigerants.
- 1.04 Delivery, Storage, and Handling:
  - A. Unit shall be stored and handled per manufacturer's recommendations.
  - B. Lifted by crane requires either shipping top panel or spreader bars.
  - C. Unit shall only be stored or positioned in the upright position.
- 1.05 Unit Cabinet:
  - A. Unit cabinet shall be constructed of galvanized steel and shall be coated with a baked enamel finish on all externally exposed surfaces.
  - B. Unit cabinet exterior paint shall be: pre-painted steel with film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60°F): 60, Hardness: H-2H Pencil hardness.
  - C. The sheet-metal cabinet shall be constructed of 18-gauge material for structural components with an underlying coat of G90.
  - D. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 3/4-in. thick, 1 lb density, flexible fiberglass insulation, foil faced on the air side.
  - E. Shall utilize uniform screw sizing.
  - F. Base of unit shall have a location for thru-the-base electrical connections standard.
  - G. Base Rail:
    - i. Unit shall have base rails on all sides.
    - ii. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
    - iii. Holes shall be provided in the base rail for moving the rooftop for fork truck.
    - iv. Base rail shall be a minimum of 14 gauge thickness.
  - H. Condensate pan and connections:
    - i. Shall be a sloped condensate drain pan made of a non-corrosive material and be removable for cleaning.
    - ii. Shall comply with ASHRAE Standard 62.
    - iii. Shall use a 1" – 11 1/2 NPT drain connection through either side of the drain pan. Connection shall be made per manufacturer's recommendations.

- iv. Shall be able to be easily removed.
  - v. Shall be separate from the coil.
- I. Top panel:
  - i. Shall be a two piece top panel over indoor section; with one covering the blower, and the other covering the controls and supply/return duct openings.
- J. Electrical Connections:
  - i. All unit power wiring shall enter unit cabinet at a single, factory-prepared, knockout location.
  - ii. Thru-the-base capability:
    - a. Standard unit shall have a thru-the-base electrical location(s) using a raised, embossed portion of the unit base pan.
    - b. No base pan penetration, other than those authorized by the manufacturer, is permitted.
- K. Component access panels (standard):
  - i. Cabinet panels shall be easily opened for servicing.
  - ii. Stainless steel metal hinges are standard on all doors.
  - iii. Panels covering control box, indoor fan, indoor fan motor, and electric or gas heater components (where applicable), shall have 1/4 turn latches.
  - iv. 1/4 fasteners shall be permanently attached.
- 1.06 Operating Characteristics:
  - A. Unit shall be capable of starting and running at 115°F (46°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 340/360 at  $\pm 10\%$  voltage.
  - B. Compressor with standard controls shall be capable of operation down to 40°F (4°C), ambient outdoor temperatures. Low ambient accessory kit is necessary if mechanically cooling at ambient temperatures to 40°F (4°C).
  - C. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
  - D. Unit shall be factory configured for vertical supply & return configurations.
  - E. Unit shall be field convertible from vertical to horizontal configuration.
  - F. Unit shall be capable of mixed operation: vertical supply with horizontal return or horizontal supply with vertical return.
- 1.07 Electrical Requirements
  - A. Main power supply voltage, phase, and frequency must match those required by the manufacturer.
- 1.08 Evaporator fan compartment:
  - A. Interior cabinet surfaces shall be insulated with a minimum 3/4-in. thick, minimum 1 LB density, flexible fiberglass insulation bonded with foil face on the air side.
  - B. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
  - C. Insulation shall also be mechanically fastened with welded pin and retainer washer.
- 1.09 Thermostats
  - A. Thermostat must:
    - i. Energize "G" when calling for heat.
    - ii. Have capability to energize 2 different stages of cooling, and 2 different stages of heating.
    - iii. Must include capability for occupancy scheduling.
- 1.10 Electronic Control System for HVAC:
  - A. Shall be complete with self-contained low-voltage control circuit protected by a fuse on the 24-V transformer side (180-300 units have a resettable circuit breaker).
  - B. Shall utilize color-coded wiring.
  - C. Unit shall include a minimum of one 8-pin screw terminal connection board for connection of control wiring.
  - D. Unit control board shall be provided with 7 segment readout via LCD display for status and diagnostics.
- 1.10.01 Safeties:
  - A. Compressor over-temperature, over current.
  - B. Standard Low-pressure switch:
    - i. Units shall have low pressure, loss of charge automatic reset device that will shut off compressor when tripped.
    - ii. Low pressure control:
      - a. Provides active protection in cooling mode at all outdoor ambient temperatures. The low pressure control is an automatic reset type and opens at approximately 95 psig and closes at approximately 50 psig.
  - C. Standard High-pressure switch:
    - i. Unit shall be equipped with high pressure switch device that will shut off compressor when tripped.

- ii. High pressure control
      - a. The high pressure control is an automatic reset type and opens at approximately 610 psig and closes at approximately 420 psig. The compressor and fan motor will stop when the high pressure control opens and will start again if the high side pressure drops to approximately 420 psig where the automatic reset high pressure control resets. If the high pressure control opens 3 times within a particular call for heating or cooling operation, the defrost control will lock out compressor and outdoor fan operation.
  - D. Automatic reset, motor thermal overload protector.
  - E. The unit must be permanently grounded.
  - F. Components are not compatible between different refrigerants. Do not use R-410A service equipment or components on R-454B equipment. System or part failure could occur.
- 1.11 Standard Filter Section:
- A. Shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
  - B. Unit will accept only 2 inch filters.
  - C. Filter face velocity shall not exceed 365 fpm at nominal airflows.
  - D. Filters shall be accessible through an access panel with “no-tool” removal as described in the unit cabinet section of the specification.
  - E. Filters shall be held in place by a sliding filter tray, facilitating easy removal and installation.
  - F. Filters access is specified in the unit cabinet section of this specification.
- 1.12 Coils:
- A. Standard Aluminum/MicroChannel Condenser Coils:
    - i. Standard condenser coils shall be aluminum.
    - ii. Condenser coils shall be leak tested to 150 psig, pressure tested to 400 psig, and qualified to burst test at 2,200 psi.
  - B. Standard Aluminum/Copper Evaporator Coils.
    - i. Standard evaporator coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
    - ii. Evaporator coils shall be leak tested to 150 psig, pressure tested to 550 psig and qualified to UL 1995 burst test at 2,200 psig.
- 1.13 Refrigerant Components:
- A. Refrigerant circuit shall include the following control, safety, and maintenance features:
    - i. Thermal Expansion Valve (TXV) with orifice type distributor.
    - ii. Refrigerant filter drier.
    - iii. External service gauge connections to unit suction and discharge lines.
    - iv. Pressure gauge access through an access port in the front and rear panel of the unit.
    - v. External gauge ports shall be lockable.
  - B. Compressors:
    - i. Unit shall use one fully hermetic, scroll compressor for each independent refrigeration circuit.
    - ii. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
    - iii. Compressors shall be internally protected from high discharge temperature conditions. Advanced Scroll Temperature Protection on 240-300 sizes.
    - iv. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
    - v. Compressor shall be factory mounted on rubber grommets.
    - vi. Compressor motors shall have internal line break thermal and current overload protection.
    - vii. Crankcase heaters shall not be required for normal operating range.
    - viii. Compressor shall have molded electrical plug
- 1.14 Evaporator Fan and Motor:
- A. Evaporator fan motor:
    - i. Shall have permanently lubricated bearings
    - ii. Shall have inherent automatic-reset thermal overload protection.
    - iii. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating shall be required.



- B. Direct Drive Evaporator Fan:
    - i. Belt drive shall include an adjustable-pitch motor pulley.
    - ii. Shall use sealed, permanently lubricated ball-bearing type.
    - iii. Blower fan shall be double-inlet type with forward-curved blades.
    - iv. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.
  - C. Blower Assembly:
    - i. Entire assembly shall be able to slide out completely.
    - ii. Shall be able to slide-out without the removal of the roof and condenser fan motors.
- 1.15 Condenser Fans and Motors:
- A. Condenser fan motors:
    - i. Shall be a totally enclosed motor.
    - ii. Shall use permanently lubricated bearings.
    - iii. Shall have inherent thermal overload protection with an automatic reset feature.
    - iv. Shall use a shaft-down design. Shaft-up designs including those with “rain-slinger devices” shall not be allowed.
  - B. Condenser Fans shall:
    - i. Shall be a direct-driven propeller type fan
    - ii. Shall have blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.
- 1.16 RTU-C Controller:
- A. Shall be ASHRAE 62-2001 compliant.
  - B. Shall accept 18-32VAC input power.
  - C. Shall have an operating temperature range from -40°F (-40°C) to 158°F (70°C), 10%– 95% RH (non-condensing).
  - D. Controller shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air enthalpy, fire shutdown, return air enthalpy, fan status, remote time clock/door switch.
  - E. Shall accept a CO2 sensor in the conditioned space and be Demand Control Ventilation (DCV) ready.
  - F. Shall provide the following outputs: Economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, exhaust, occupied.
  - G. Unit shall provide surge protection for the controller through a circuit breaker.
  - H. Shall have a field-installed communication card allowing the unit to be able to communicate at a Baud rate of 19.2K or faster.
  - I. Shall have an LED display independently showing the status of activity on the communication bus, and processor operation.
  - J. Optional field-installed BACnet® plug-in communication card which includes an EIA-485 protocol communication port, or an optional field-installed LonWorks® plug-in communications card.
  - K. Software upgrades will be accomplished by local download. Software upgrades through chip replacements are not allowed.
  - L. Shall be shock resistant in all planes to 5G peak, 11ms during operation, and 100G peak, 11ms during storage.
  - M. Shall be vibration resistant in all planes to 1.5G @ 20-300 Hz.
  - N. Shall support a bus length of 4000 ft max, 60 devices per 1000 ft section, and 1 RS-485 repeater per 1000 ft sections.
- 1.17 Open Protocol, Direct Digital Controller:
- A. Shall be ASHRAE 62-2001 compliant.
  - B. Shall accept 18-30VAC, 50-60Hz, and consumer 15VA or less power.
  - C. Shall have an operating temperature range from -40°F (-40°C) to 130°F (54°C), 10% - 90% RH (non-condensing).
  - D. Shall have either a field-installed BACnet plug-in communication card which includes an EIA-485 protocol communication port, or a field-installed LonWorks plug-in communications card.
  - E. The BACnet® plug in communication card shall include built-in protocol for BACNET (MS/TP and PTP modes)
  - F. The LonWorks™ plug in communication card shall include the Echelon processor required for all Lon applications.
  - G. Shall allow access of up to 62 network variables (SNVT). Shall be compatible with all open controllers
  - H. Baud rate Controller shall be selectable through the EIA-485 protocol communication port.
  - I. Shall have an LED display independently showing the status of serial communication, running, errors, power, all digital outputs, and all analog inputs.
  - J. Shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air enthalpy, compressor lock-out, fire shutdown, enthalpy switch, and fan status/filter status/humidity/remote occupancy.
  - K. Shall provide the following outputs: economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, exhaust.
  - L. Software upgrades will be accomplished by either local or remote download. No software upgrades through chip replacements are allowed.
  - M. Shall be natively equipped with Modbus communication protocol.



1.18 Adjustable Frequency Drive:

- A. Unit shall be supplied with an electronic variable frequency drive for the supply air fan.
- B. Drive shall be factory-installed in an enclosed cabinet.
- C. Drive shall meet UL Standard 60335-2-40 4th Edition.
- D. The completed unit assembly shall be UL listed.
- E. Drives are to be accessible through a tooled access hinged door assembly.
- F. The unit manufacturer shall install all power and control wiring.
- G. The supply air fan drive output shall be controlled by the factory-installed main unit control system and drive status and operating speed shall be monitored and displayed at the main unit control panel.
- H. Drive shall be programmed, and factory run tested in the unit.

1.19 Special Features:

A. Integrated Economizers:

- i. Integrated, gear-driven parallel modulating blade design type capable of simultaneous economizer and compressor operation.
- ii. Independent modules for vertical or horizontal return configurations shall be available. Vertical return modules shall be available as a factory-installed option.
- iii. Damper blades shall be galvanized steel with metal gears. Plastic or composite blades on intake or return shall not be acceptable.
- iv. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below setpoints.
- v. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
- vi. Shall be equipped with low-leakage dampers, not to exceed 2% leakage at 1 in. wg pressure differential.
- vii. Shall be capable of introducing up to 100% outdoor air.
- viii. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air.
- ix. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
- x. Enthalpy sensor shall be provided as standard. Outdoor air sensor set point shall be adjustable and shall range enthalpy equivalent of 63°F @ 50% RH to 73°F @ 50% RH. Additional sensor options shall be available as accessories.
- xi. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 70%, with a range of 0% to 100%.
- xii. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy. A remote potentiometer may be used to override the damper set point.
- xiii. Dampers shall be completely closed when the unit is in the unoccupied mode.
- xiv. Economizer controller shall accept a 2-10Vdc CO<sub>2</sub> sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor-air damper to provide ventilation based on the sensor input.
- xv. Compressor lockout sensor on the unit controller is factory set at 35°F and is adjustable from 30°F (-1°C) to 50°F (10°C) and resets the cooling lockout at 5°F (+2.7°C) above the set point.
- xvi. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
- xvii. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.
- xviii. Economizer wire harness will have provision for smoke detector.
- xix. Shall provide fault detection and diagnostics (FDD) system in accordance with local code. Faults shall be communicated out on an alarm signal.

B. Two-Position Motorized Damper:

- i. Damper shall be a Two-Position Motorized Damper. Damper travel shall be from the full closed position to the field adjustable %-open setpoint.
- ii. Damper shall include adjustable damper travel from 25% to 100% (full open).
- iii. Damper shall include single or dual blade, gear driven dampers and actuator motor.
- iv. Actuator shall be direct coupled to damper gear. No linkage arms or control rods shall be acceptable.
- v. Damper will admit up to 100% outdoor air for applicable rooftop units.
- vi. Damper shall close upon indoor (evaporator) fan shutoff and/or loss of power.
- vii. The damper actuator shall plug into the rooftop unit's wiring harness plug. No hard wiring shall be required.
- viii. Outside air hood shall include aluminum water entrainment filter

- C. Manual damper
  - i. Manual damper package shall consist of damper, air inlet screen, and rain hood which can be preset to admit up to 50% outdoor air for year-round ventilation.
- D. Head Pressure Control Package
  - i. Controller shall control coil head pressure by condenser-fan cycling.
- E. Condenser Coil Hail Guard Assembly:
  - i. Shall protect against damage from hail.
  - ii. Shall be louvered style.
- F. Fan/Filter Status Switch:
  - i. Switch shall provide status of indoor evaporator fan (ON/OFF) or filter (CLEAN/DIRTY).
  - ii. Status shall be displayed either over communication bus (when used with direct digital controls) or through the controller LCD display inside the unit control box.
- G. Propeller Power Exhaust:
  - i. Power exhaust shall be used in conjunction with an integrated economizer.
  - ii. Independent modules for vertical or horizontal return configurations shall be available.
  - iii. Horizontal power exhaust shall be mounted in return ductwork.
  - iv. Power exhaust shall be controlled by economizer controller operation. Exhaust fans shall be energized when dampers open past the 0-100% adjustable setpoint on the economizer control.
  - v. Capable of adjustable but constant volume.
- H. Roof Curbs (Vertical):
  - i. Full perimeter roof curb with exhaust capability providing separate air streams for energy recovery from the exhaust air without supply air contamination.
  - ii. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
  - iii. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
- I. High-Static Indoor Fan Motor(s) and Drive(s):
  - i. High-static motor(s) and drive(s) shall be factory-installed to provide additional performance range.
- J. Outdoor Air Enthalpy Sensor
  - i. The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.
- K. Return Air Enthalpy Sensor
  - i. The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy control.
- L. Indoor Air Quality (CO<sub>2</sub>) Sensor:
  - i. Shall be able to provide demand ventilation indoor air quality (IAQ) control.
  - ii. The IAQ sensor shall be available in duct mount, wall mount, or wall mount with LED display. The set point shall have adjustment capability.
- M. Smoke detectors:
  - i. Shall be a Four-Wire Controller and Detector.
  - ii. Shall be environmentally compensated with differential sensing for reliable, stable, and drift-free sensitivity.
  - iii. Shall use magnet-activated test/reset sensor switches.
  - iv. Shall have a recessed momentary switch for testing and resetting the detector.
  - v. Controller shall include:
    - a. One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel
    - b. Two Form-C auxiliary alarm relays for interface with rooftop unit or other equipment
    - c. One Form-C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station
    - d. Capable of direct connection to two individual detector modules.
    - e. Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications.

- N. Barometric relief:
  - i. Shall include damper, seals, hard-ware, and hoods to relieve excess building pressure.
  - ii. Damper shall gravity-close upon shutdown.
  - iii. Only available with an economizer. Barometric relief is not available as a stand-alone accessory.
- O. Time Guard:
  - i. Shall prevent compressor short cycling by providing a 5-minute delay ( $\pm 2$  minutes) before restarting a compressor after shutdown for any reason.
  - ii. One device shall be required per compressor.
- P. Standard Factory Installed Overflow Switch:
  - i. Switch shall monitor the condensate level in drain pan and stops compression operation when overflow conditions occur
- Q. Access Panels:
  - i. Hinges with  $\frac{1}{4}$  turn fasteners shall be permanently attached.
  - ii. Hinges shall be powder coated and made from stainless steel.
- R. Electric Heat:
  - i. Heating Section:
    - a. Heater element open coil resistance wire, nickel-chrome alloy, strung through ceramic insulators mounted on metal frame. Coil ends are staked and welded to terminal screw slots.
    - b. Heater assemblies are provided with integral fusing for protection of internal heater circuits not exceeding 48 amps each. Auto reset thermostat limit controls, magnetic heater contactors (24V coil) and terminal block all mounted in electric heater control box (minimum 18 gauge galvanized steel) attached to end of heater assembly.
- S. Refrigerant Detection System:
  - i. In the event of a detected refrigerant leak, the refrigerant leak detection sensor will trigger the mitigation procedure that shuts off the compressor(s) and turns on the indoor blower motor.
  - ii. In the event of a detected refrigerant leak, the system will display a fault code on the unitary controller. For DDC systems, 'A2L Event' will appear on the LCD module.



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## GENERAL TERMS OF LIMITED WARRANTY\*

Friedrich® will furnish a replacement for any part of this product which fails in normal use and service within the applicable periods stated, in accordance with the terms of the limited warranty.

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**Before proceeding with installation, refer to installation instructions packaged with each model, as well as complying with all Federal, State, Provincial, and Local codes, regulations, and practices.**

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