SELF-CONTAINED COOLING PACKAGE UNITS

FORM NO. S22-943

Featuring Industry Standard R-410A Refrigerant

featuring R-410A

RJNL-B STANDARD EFFICIENCY SERIES

NOMINAL SIZES 15 TON [52.8 kW]

ASHRAE 90.1-2007 COMPLIANT MODEL

Accredited by the RvA

ABS Quality Evaluations, Inc. Management System Certification

ISO 9001:2008

Certificate Number: 30164

C UL US LISTED

AHRI CERTIFIED™

www.ahridirectory.org

Unitary Large AC

AHRI Standard 340/360

Certification applies only when the complete system is listed with AHRI.

TABLE OF CONTENTS

These quality features are included in the Ruud Package Heat Pump Unit

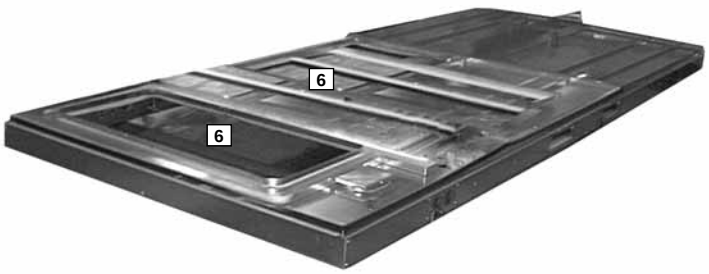
STANDARD FEATURES INCLUDE:

- Unit is assembled, wired, charged with R-410A HFC refrigerant and run tested at the factory.
- Scroll compressors with internal line break overload and high-pressure protection.
- Two independent refrigerant circuits each with a scroll compressor provide two stage cooling/heating operation.
- TXV refrigerant metering system on each circuit.
- High Pressure and Low Pressure/Loss of charge protection standard on all models.
- Solid Core liquid line filter drier on each circuit.
- Each evaporator and condenser coil is constructed as a single slab to facilitate easy cleaning for maintaining high efficiencies.
- Cooling operation up to 125 degree F ambient.
- Foil faced insulation encapsulated throughout entire unit minimizes airborne fibers from the air stream.
- Hinged major access door with heavy-duty gasketing, 1/4 turn latches and door retainers.
- Slide Out Indoor fan assembly for added service convenience.
- Powder Paint Finish meets ASTMB117 G90 galvanized steel coated on each side for maximum protection.
- Base pan with drawn supply and return opening for superior water management.
- Convertible airflow – vertical downflow or horizontal sideflow.
- Forkable base rails for easy handling and lifting.
- Single point electrical connections.
- Internally sloped slide out condensate pan conforms to ASHRAE 62 standards.
- High performance belt drive motor with variable pitch pulleys and quick adjust belt system.
- Permanently lubricated evaporator, and condenser motors.
- Condenser motors are internally protected, totally enclosed with shaft down design.
- 2 inch filter standard with slide out design.
- 24 volt control system with resettable circuit breakers.
- Colored and labeled wiring.
- Copper tube/Aluminum Fin coils.
- Supplemental electric heat provides 100% efficient heating.

UNIT FEATURES & BENEFITS—RJNL-B SERIES

Ruud Package 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 large Ruud *Commercial Series*™ 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 screws. **(**4**)** The outdoor coil is slanted to protect from hail. Every Ruud package 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.

Anything built to last must start with the right foundation. In this case, the foundation is 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 cover and has eliminated the worry of water entering the conditioned space **(**6**)**. The drainpan **(**7**)** is made of material 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 basepan, 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.

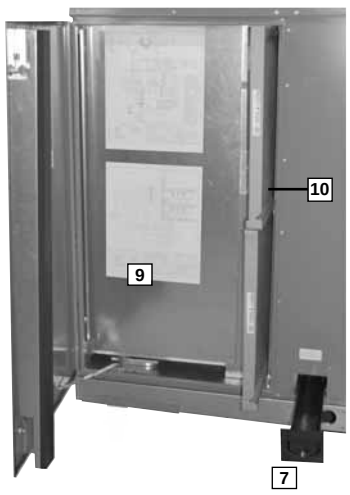


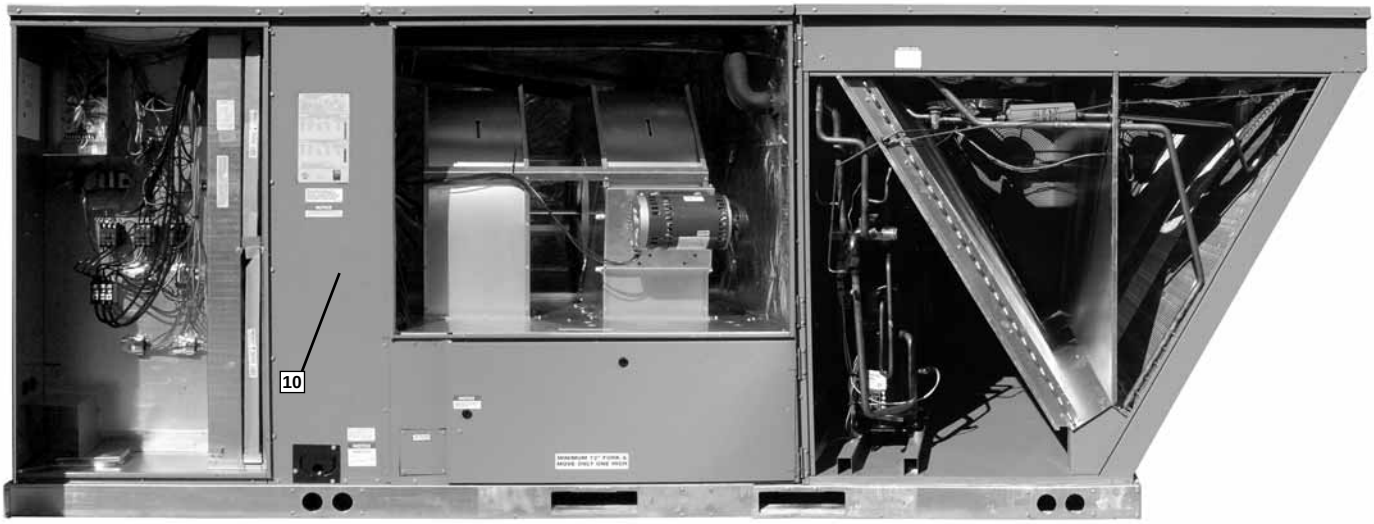
During development, each unit was tested to U.L. 1995, AHRI 340-360 and other Ruud-required reliability tests. Ruud adheres to stringent IS0 9002 quality procedures, and each unit bears the U.L. and AHRI certification labels located on the unit nameplate **(**8**)**. Contractors can rest assured that when a Ruud package unit arrives at the job, it is ready to go with a factory charge and quality checks.

Access to all major compartments is 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.

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



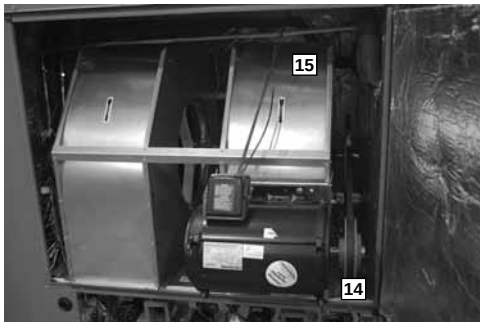


A control box component location legend sticker **(**11**)** is located on the left interior surface of the control section to match the components to the wiring diagram for ease of trouble shooting. Wiring is numbered on each end of the termination and color-coded to match the wiring diagram. The control transformer has a low voltage circuit breaker that trips if a low voltage electrical short occurs. There is a blower contactor and contactor for each compressor.

Enhanced feature demand defrost control has high and low pressure control inputs with unique pressure switch logic built into the microprocessor to provide compressor and system protection without nuisance lock-outs. LED's on the defrost control provide diagnostic information for service personnel **(**12**)**.

For added convenience in the field, a factory-installed convenience outlet **(**13**)** 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.

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 **(**14**)** 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 pulley is removed, the motor sheave can be adjusted to the desired number of turns, ranging from 0 to 6 turns open. Where the demands for the job require high static, Ruud 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 **(**15**)** 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.

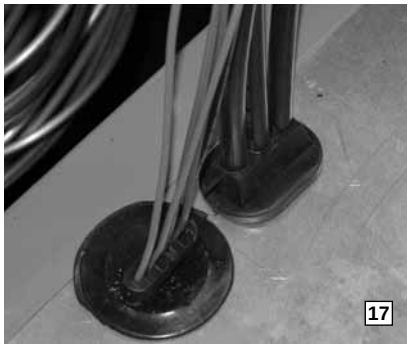


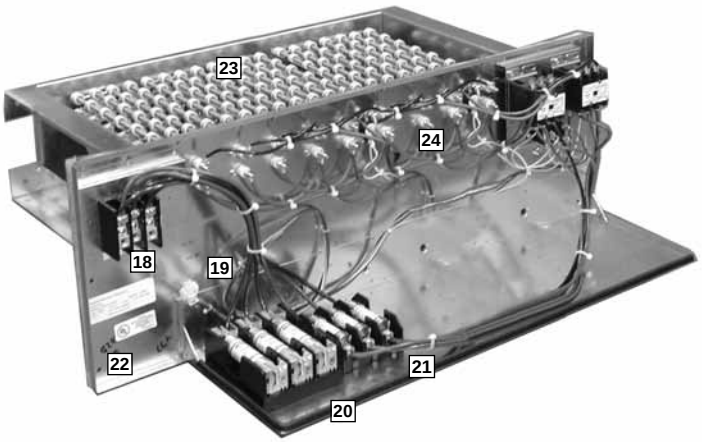
Inside the blower compartment the interlaced evaporator can also be viewed. The evaporator uses enhanced fin technology for maximum heat transfer.

Also in the blower compartment, the optional freezestats **(**16**)** protect the compressors if the evaporator gets too cold (below freezing) due to low airflow. The optional freezestats clip on the suction lines near the indoor coil and connect to the low voltage circuit with the use of polarized plugs and removable jumper for easy field or factory installation.

Wiring throughout the unit is neatly bundled and routed. Where wire harnesses go through the condenser bulkhead or blower deck, a molded wire harness assembly **(**17**)** provides an air-tight and water-tight seal, and provides strain relief. Care is also taken to tuck raw edges of insulation behind sheet metal to improve indoor air quality.

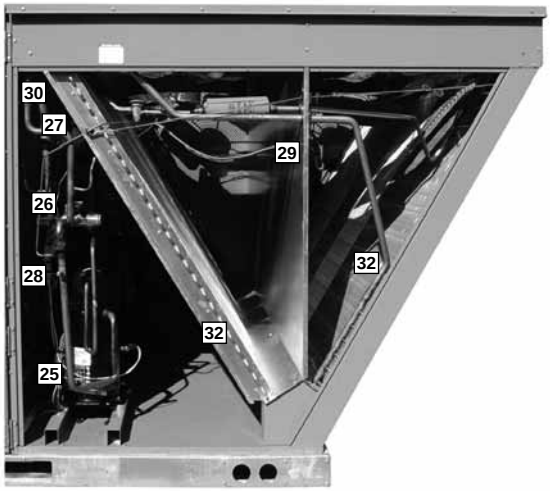
The auxillary heating compartment contains the latest electric furnace technology on the market. The 100% efficient electric furnace can be factory-installed or easily field-installed. Built with ease-of-installation in mind, the electric furnace is completely wired up for slide-in, plug-and-play installation in the field. With choices of up to four kilowatt offerings, the contractor is assured to get the correct amount of heating output to meet the designed heating load.





Power hook-up in the field is easy with single-point wiring to a terminal block **(**18**)** and a polarized plug for the low-voltage connection **(**19**)**. The electric furnace comes with fuses for the unit **(**20**)** and for the electric furnace **(**21**)**, and is UL certified **(**22**)**. The electric heating elements are of a wound-wire construction **(**23**)** and isolated with ceramic bushings. The limit switch **(**24**)** protects the design from over-temperature conditions.

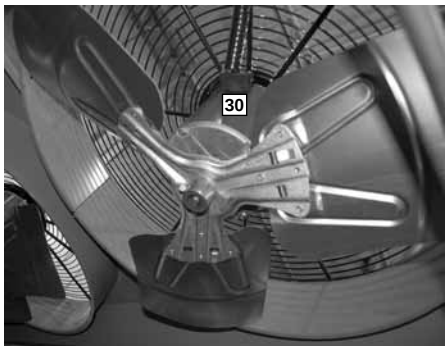
The compressor compartment houses the heartbeat of the unit. The scroll compressor **(**25**)** is known for its long life, and for reliable, quiet, and efficient operation. The suction and discharge lines are designed with shock loops **(**26**)** to absorb the strain and stress that the starting torque, steady state operation, and shut down cycle impose on the refrigerant tubing. Each compressor and circuit is independent for built-in redundancy, and each circuit is clearly marked throughout the system. Each unit has two stages of efficient cooling operation, first stage is approximately 50% of second stage.

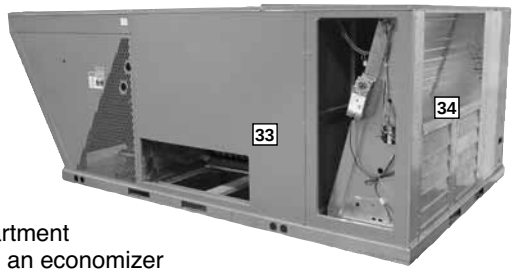


In the outdoor section are the external gauge ports **(**27**)**. With the gauge ports mounted externally, an accurate diagnosis of system operation can be performed quickly and easily. Also located in this area are the refrigerant safety devices: the low-pressure switches **(**28**)**, and the high-pressure switches **(**29**)**. The high-pressure switches 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. The factory-installed high and low pressure switches are screwed into schrader valves on the appropriate high or low side and wired appropriately. The optional low ambient controls **(**30**)** screw to schrader valves on the discharge line. The low-ambient controls allow cooling mode operation of the compressors down to 0 degrees ambient temperature by cycling the outdoor fans on high pressure.

The condenser fan motor **(**31**)** can easily be accessed and maintained by removing the protective fan grille. The polarized plug connection allows the motor to be changed quickly and eliminates the need to snake wires through the unit.

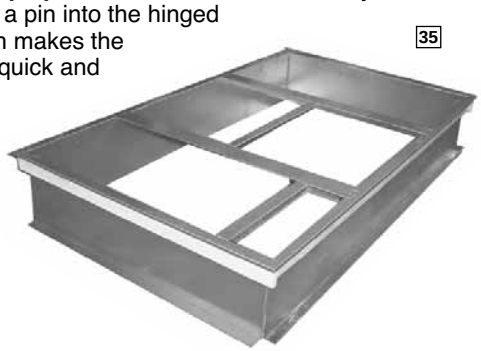
The outdoor coil uses the latest enhanced fin design **(**32**)** for the most effective method of heat transfer. The outdoor coil is slanted to protect the unit from Mother Nature.





Each unit is designed for both downflow or horizontal applications **(**33**)** for job configuration flexibility. The return air compartment can also contain an economizer **(**34**)**. Two models exits, 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, comes 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 setpoint, an outdoor-air setpoint, a mix-air setpoint, and a CO^2 setpoint. 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.

The Ruud roofcurb **(**35**)** is made for toolless assembly at the jobsite by inserting a pin into the hinged corners **(**36**)**, which makes the assembly process quick and easy.



SELECTION PROCEDURE EXAMPLE—RJNL-B SERIES

To select an RJNL-B Heat Pump 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—	230 V — 3 Phase — 60 Hz
Total Cooling Capacity—	175,000 BTUH [51.2 kW]
Sensible Cooling Capacity—	140,000 BTUH [41.0 kW]
Heating Capacity—	175,000 BTUH [51.2 kW]
*Condenser Entering Air—	95°F [35.0 °C] DB
*Evaporator Mixed Air Entering—	65°F [18.3 °C] WB
	78°F [25.6 °C] DB
*Indoor Air Flow (vertical)—	6400 CFM [3020 L/s]
*External Static Pressure—	0.60 in. WG [.15 kPa]

2. SELECT UNIT TO MEET COOLING REQUIREMENTS.

Since total cooling is within the range of a nominal 15 ton [52.7 kW] unit, enter cooling performance table at 95°F [35.0 °C] DB condenser inlet air. Interpolate between 63°F [17.2 °C] WB and 67°F [19.4 °C] WB to determine total and sensible capacity and power input for 65°F [18.3 °C] WB evaporator inlet air at 6025 CFM [2843 L/s] indoor air flow (table basis):

Total Cooling Capacity = 180,250 BTUH [52.78 kW]
Sensible Cooling Capacity = 156,700 BTUH [45.88 kW]
Power Input (Compressor and Cond. Fans) = 14,830 watts

Use formula in note ① to determine sensible capacity at 78°F [26°C] DB evaporator entering air:

Sensible Cooling Capacity = 143,887 BTUH [42.13 kW]

3. CORRECT CAPACITIES OF STEP 2 FOR ACTUAL AIR FLOW.

Select factors from airflow correction table at 6400 CFM [3020 L/s] and apply to data obtained in step 2 to obtain gross capacity:

Total Capacity = 180,250 x 1.02 = 183,855 BTUH [53.83 kW]
Sensible Capacity = 143,887 x 1.06 = 152,520 BTUH [44.66 kW]
Power Input = 14,830 x 1.01 = 14,978 Watts

These are Gross Capacities, not corrected for blower motor heat or power.

4. DETERMINE BLOWER SPEED AND WATTS TO MEET SYSTEM DESIGN.

Enter Indoor Blower performance table at 6400 CFM [3020 L/s]. Total ESP (external static pressure) per the spec of 0.60 in. WG [.15 kPa] includes the system duct and grilles. Add from the table “Component Air Resistance”, 0.1 in. WG [.02 kPa] for wet coil, 0.06 in. WG [.01 kPa] for downflow air flow, for a total selection static pressure of 0.76 (0.8) in. WG [.20 kPa], and determine:

RPM = 697
WATTS = 2,402
DRIVE = L (standard 3 H.P. motor)

5. CALCULATE INDOOR BLOWER BTUH HEAT EFFECT FROM MOTOR WATTS, STEP 4.

2,402 x 3.412 = 8,196 BTUH [2.40 kW]

6. CALCULATE NET COOLING CAPACITIES, EQUAL TO GROSS CAPACITY, STEP 3, MINUS INDOOR BLOWER MOTOR HEAT.

Net Total Capacity = 183,855 – 8,196 = 175,659 BTUH [51.43 kW]

Net Sensible Capacity = 152,520 – 8,196 = 144,324 BTUH [42.26 kW]

7. CALCULATE UNIT INPUT AND JOB EER.

Total Power Input = 14,978 (step 3) + 2,402 (step 4) = 17,380 Watts

$$\text{EER} = \frac{\text{Net Total BTUH [kW] (step 6)}}{\text{Power Input, Watts (above)}} = \frac{175{,}659}{17{,}380} = 10.11$$

8. SELECT UNIT HEATING CAPACITY.

From Heater Kit Table select kW to meet heating capacity requirement; multiply kW x 3412 to convert to BTUH

Use 50 kW Heater Kit
Heater Kit Model: RXJJ-CE50C
Heater Kit Capacity: 170,600 BTUH [50.0 kW]

Add indoor blower heat effect (STEP 5) to Heater Kit Capacity to get total heating capacity:

170,600 + 8,196 = 178,796BTUH [52.4 kW]

9. CHOOSE MODEL RJNL-B180CL040

*NOTE: These operating conditions are typical of a commercial application in a 95°F/79°F [35°C/26°C] design area with indoor design of 76°F [24°C] DB and 50% RH and 10% ventilation air, with the unit roof mounted and centered on the zone it conditions by ducts.

[ ] Designates Metric Conversions

R J N L — B 180 C L 000 X X X

- Economizer Option (See Next Page)
- Factory Installed Options (See Next Page)
- Electric Heat
  - 000 = No Resistance Heat
  - 020 = 20 kW Resistance Heat
  - 040 = 40 kW Resistance Heat
  - 060 = 60 kW Resistance Heat
  - 075 = 75 kW Resistance Heat
- Drive Package
  - L = Belt Drive
  - M = Belt Drive—High Static
- Electrical Designation
  - C = 208-230 V, 3 PH, 60 Hz
  - D = 460 V, 3 PH, 60 Hz
  - Y = 575 V, 3 PH, 60 Hz
- Cooling Capacity (BTUH) [kW]
  - 180 = 180,000 [52.75]
- Future Technical Variations
- Design Series
  - L = R410A Refrigerant
- Efficiency Designation
  - N = ASHRAE 90.1-2007 Compliant
- Product Classification
  - J = Packaged Heat Pump–Commercial
- Tradebrand
  - R = Ruud

[ ] Designates Metric Conversions

FACTORY INSTALLED OPTION CODES FOR RJNL- (B180) (15 TON) [52.8 kW]

Option Code	Non-Powered Convenience Outlet	Low Ambient/ Freeze Stat
AA	NO OPTIONS	
AG	x	
AP		x
JC	x	x

Example: RJNL-B180CL000**XXX** *(where **XX** is factory installed option)*

Example: No Options

RJNL-B180CL000

Example: No Options with factory installed economizer

RJNL-B180CL000AAB

Example: Options with low ambient/freezestat and no factory installed economizer

RJNL-B180CL000APA

Example: Options same as above with factory installed economizer

RJNL-B180CL000APB

ECONOMIZER SELECTION FOR RJNL- (B180)

Option Code	No Economizer	Single Enthalpy Economizer* With Barometric Relief	Single Enthalpy Economizer* With Barometric Relief and Smoke Detector
A	x		
B		x	
C			x

"x" indicates factory installed option.

*Downflow economizer only.

Instructions for Factory Installed Option(s) Selection

Note: Three characters following the model number will be utilized to designate a factory-installed option or combination of options. If no factory option(s) is required, nothing follows the model number.

Step 1. After a basic rooftop model is selected, choose a *two-character* option code from the FACTORY INSTALLED OPTION SELECTION TABLE.

Proceed to Step 2.

Step 2. The last option code character is utilized for factory-installed economizers. Choose a character from the FACTORY INSTALLED ECONOMIZER SELECTION TABLE.

[ ] Designates Metric Conversions

NOM. SIZES 15 TON [52.8 kW] ENERGY STAR® COMPLIANT MODELS

Model RJNL- Series	B180CL	B180CM	B180DL	B180DM
Cooling Performance[1]				CONTINUED →
Gross Cooling Capacity Btu [kW]	182,000 [53.33]	182,000 [53.33]	182,000 [53.33]	182,000 [53.33]
EER/SEER[2]	10.7/NA	10.7/NA	10.7/NA	10.7/NA
Nominal CFM/AHRI Rated CFM [L/s]	6000/6025 [2831/2843]	6000/6025 [2831/2843]	6000/6025 [2831/2843]	6000/6025 [2831/2843]
AHRI Net Cooling Capacity Btu [kW]	176,000 [51.57]	176,000 [51.57]	176,000 [51.57]	176,000 [51.57]
Net Sensible Capacity Btu [kW]	133,600 [39.14]	133,600 [39.14]	133,600 [39.14]	133,600 [39.14]
Net Latent Capacity Btu [kW]	42,400 [12.42]	42,400 [12.42]	42,400 [12.42]	42,400 [12.42]
IEER[3]	11.5	11.5	11.5	11.5
Net System Power [kW]	16.53	16.53	16.53	16.53
Heating Performance (Heat Pumps)				
High Temp. Btuh [kW] Rating	170,000 [49.81]	170,000 [49.81]	170,000 [49.81]	170,000 [49.81]
System Power KW / COP	13.84/3.6	13.84/3.6	13.84/3.6	13.84/3.6
Low Temp. Btuh [kW] Rating	104,000 [30.47]	104,000 [30.47]	104,000 [30.47]	104,000 [30.47]
System Power KW / COP	12.7/2.4	12.7/2.4	12.7/2.4	12.7/2.4
Compressor				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[4]	91	91	91	91
Outdoor Coil—Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	1 / 22 [9]	1 / 22 [9]	1 / 22 [9]	1 / 22 [9]
Refrigerant Control	TXV	TXV	TXV	TXV
Indoor Coil—Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	2 / 18 [7]	2 / 18 [7]	2 / 18 [7]	2 / 18 [7]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan—Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	4/24 [609.6]	4/24 [609.6]	4/24 [609.6]	4/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	16000 [7550]	16000 [7550]	16000 [7550]	16000 [7550]
No. Motors/HP	4 at 1/3 HP	4 at 1/3 HP	4 at 1/3 HP	4 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan—Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	3	5	3	5
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	184	56	184
Filter—Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	200/193.6 [5670/5489]	200/193.6 [5670/5489]	200/193.6 [5670/5489]	200/193.6 [5670/5489]
Weights				
Net Weight lbs. [kg]	1826 [828]	1855 [841]	1958 [888]	1987 [901]
Ship Weight lbs. [kg]	1926 [874]	1955 [887]	2058 [934]	2087 [947]

See Page 13 for Notes.

[ ] Designates Metric Conversions

NOM. SIZES 15 TON [52.8 kW] ENERGY STAR® COMPLIANT MODELS

Model RJNL- Series	B180YL	B180YM
Cooling Performance[1]		
Gross Cooling Capacity Btu [kW]	182,000 [53.33]	182,000 [53.33]
EER/SEER[2]	10.7/NA	10.7/NA
Nominal CFM/AHRI Rated CFM [L/s]	6000/6025 [2831/2843]	6000/6025 [2831/2843]
AHRI Net Cooling Capacity Btu [kW]	176,000 [51.57]	176,000 [51.57]
Net Sensible Capacity Btu [kW]	133,600 [39.14]	133,600 [39.14]
Net Latent Capacity Btu [kW]	42,400 [12.42]	42,400 [12.42]
IEER[3]	11.5	11.5
Net System Power [kW]	16.53	16.53
Heating Performance (Heat Pumps)		
High Temp. Btuh [kW] Rating	170,000 [49.81]	170,000 [49.81]
System Power KW / COP	13.84/3.6	13.84/3.6
Low Temp. Btuh [kW] Rating	104,000 [30.47]	104,000 [30.47]
System Power KW / COP	12.7/2.4	12.7/2.4
Compressor		
No./Type	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[4]	91	91
Outdoor Coil—Fin Type	Louvered	Louvered
Tube Type	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	1 / 22 [9]	1 / 22 [9]
Refrigerant Control	TXV	TXV
Indoor Coil—Fin Type	Louvered	Louvered
Tube Type	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	2 / 18 [7]	2 / 18 [7]
Refrigerant Control	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan—Type	Propeller	Propeller
No. Used/Diameter in. [mm]	4/24 [609.6]	4/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1
CFM [L/s]	16000 [7550]	16000 [7550]
No. Motors/HP	4 at 1/3 HP	4 at 1/3 HP
Motor RPM	1075	1075
Indoor Fan—Type	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable
No. Motors	1	1
Motor HP	3	5
Motor RPM	1725	1725
Motor Frame Size	56	184
Filter—Type	Disposable	Disposable
Furnished	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	200/193.6 [5670/5489]	200/193.6 [5670/5489]
Weights		
Net Weight lbs. [kg]	1826 [828]	1855 [841]
Ship Weight lbs. [kg]	1926 [874]	1955 [887]

See Page 13 for Notes.

[ ] Designates Metric Conversions

NOTES:

1. 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 ±20% of nominal cfm. Units are certified in accordance with the Unitary Air Source Heat Pump Equipment certification program, which is based on AHRI Standard 210/240 or 360.
2. EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
3. IEER is rated in accordance with AHRI Standard 210/240 or 340/360. Units are rated at 80° F ambient, 80° F entering dry bulb, and 67° F entering wet bulb at AHRI rated cfm.
4. Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

COOLING PERFORMANCE DATA—RJNL-B180

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]			7200 [3398]	6025 [2843]	4800 [2265]	7200 [3398]	6025 [2843]	4800 [2265]	7200 [3398]	6025 [2843]	4800 [2265]	
DR ①			.07	.10	.13	.07	.10	.13	.07	.10	.13	
OUTDOOR DRY BULB TEMPERATURE °F [°C]	75 [23.9]	Total BTUH [kW]	217.9 [63.9]	210.4 [61.7]	202.6 [59.4]	206.5 [60.5]	199.4 [58.4]	192.1 [56.3]	199.0 [58.3]	192.2 [56.3]	185.1 [54.2]	
		Sens BTUH [kW]	140.1 [41.1]	120.9 [35.4]	102.4 [30.0]	167.6 [49.1]	146.5 [42.9]	126.0 [36.9]	190.5 [55.8]	167.8 [49.2]	145.5 [42.7]	
		Power	12.5	12.3	12.1	12.3	12.1	11.9	12.2	12.0	11.8	
	80 [26.7]	Total BTUH [kW]	213.9 [62.7]	206.6 [60.5]	199.0 [58.3]	202.6 [59.4]	195.6 [57.3]	188.4 [55.2]	195.0 [57.1]	188.4 [55.2]	181.4 [53.2]	
		Sens BTUH [kW]	138.3 [40.5]	119.5 [35.0]	101.3 [29.7]	165.8 [48.6]	145.0 [42.5]	124.7 [36.6]	188.7 [55.3]	166.4 [48.8]	144.3 [42.3]	
		Power	13.1	12.9	12.7	12.9	12.7	12.5	12.8	12.6	12.3	
	85 [29.4]	Total BTUH [kW]	209.6 [61.4]	202.4 [59.3]	194.9 [57.1]	198.2 [58.1]	191.4 [56.1]	184.4 [54.0]	190.7 [55.9]	184.2 [54.0]	177.4 [52.0]	
		Sens BTUH [kW]	136.5 [40.0]	117.9 [34.6]	99.9 [29.3]	163.9 [48.0]	143.4 [42.0]	123.5 [36.2]	186.8 [54.8]	164.7 [48.3]	142.9 [41.9]	
		Power	13.8	13.5	13.3	13.6	13.4	13.1	13.4	13.2	13.0	
	90 [32.2]	Total BTUH [kW]	204.8 [60.0]	197.8 [58.0]	190.5 [55.8]	193.5 [56.7]	186.8 [54.7]	179.9 [52.7]	185.9 [54.5]	179.6 [52.6]	172.9 [50.7]	
		Sens BTUH [kW]	134.2 [39.3]	116.0 [34.0]	98.4 [28.8]	161.7 [47.4]	141.5 [41.5]	121.8 [35.7]	184.5 [54.1]	162.8 [47.7]	141.3 [41.4]	
		Power	14.5	14.2	14.0	14.3	14.1	13.8	14.1	13.9	13.7	
	95 [35]	Total BTUH [kW]	199.7 [58.5]	192.8 [56.5]	185.7 [54.4]	188.3 [55.2]	181.9 [53.3]	175.1 [51.3]	180.8 [53.0]	174.6 [51.2]	168.1 [49.3]	
		Sens BTUH [kW]	131.8 [38.6]	113.9 [33.4]	96.7 [28.3]	159.2 [46.7]	139.5 [40.9]	120.1 [35.2]	180.8 [53.0]	160.7 [47.1]	139.6 [40.9]	
		Power	15.2	15.0	14.7	15.1	14.8	14.5	14.9	14.7	14.4	
	100 [37.8]	Total BTUH [kW]	194.1 [56.9]	187.4 [54.9]	180.5 [52.9]	182.7 [53.5]	176.5 [51.7]	169.9 [49.8]	175.2 [51.3]	169.2 [49.6]	163.0 [47.8]	
		Sens BTUH [kW]	129.0 [37.8]	111.5 [32.7]	94.7 [27.8]	156.5 [45.9]	137.2 [40.2]	118.2 [34.7]	175.2 [51.4]	158.4 [46.4]	137.8 [40.4]	
		Power	16.1	15.8	15.5	15.9	15.6	15.3	15.7	15.5	15.2	
	105 [40.6]	Total BTUH [kW]	188.1 [55.1]	181.7 [53.3]	175.0 [51.3]	176.7 [51.8]	170.7 [50.0]	164.4 [48.2]	169.2 [49.6]	163.4 [47.9]	157.4 [46.1]	
		Sens BTUH [kW]	126.0 [36.9]	109.1 [32.0]	92.7 [27.2]	153.4 [45.0]	134.6 [39.5]	116.1 [34.0]	169.2 [49.6]	155.8 [45.7]	135.6 [39.8]	
		Power	16.9	16.6	16.3	16.8	16.5	16.2	16.6	16.3	16.0	
	110 [43.3]	Total BTUH [kW]	181.7 [53.3]	175.5 [51.4]	169.0 [49.5]	170.4 [49.9]	164.5 [48.2]	158.4 [46.4]	162.8 [47.7]	157.3 [46.1]	151.4 [44.4]	
		Sens BTUH [kW]	122.7 [36.0]	106.3 [31.2]	90.3 [26.5]	150.2 [44.0]	131.8 [38.6]	113.8 [33.4]	162.8 [47.7]	153.2 [44.9]	133.3 [39.1]	
		Power	17.8	17.5	17.2	17.7	17.4	17.1	17.5	17.2	16.9	
	115 [46.1]	Total BTUH [kW]	174.9 [51.3]	168.9 [49.5]	162.7 [47.7]	163.6 [47.9]	158.0 [46.3]	152.1 [44.6]	156.0 [45.7]	150.7 [44.2]	145.1 [42.5]	
		Sens BTUH [kW]	119.2 [34.9]	103.3 [30.3]	87.9 [25.8]	146.7 [43.0]	128.9 [37.8]	111.3 [32.6]	156.0 [45.7]	150.2 [44.0]	130.9 [38.4]	
		Power	18.8	18.5	18.2	18.7	18.3	18.0	18.5	18.2	17.9	

DR —Depression ratio
dbE —Entering air dry bulb
wbE—Entering air wet bulb
Total —Total capacity x 1000 BTUH
Sens —Sensible capacity x 1000 BTUH
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 x CFM x (1 – DR) x (dbE – 80)].

HEATING PERFORMANCE DATA—RJNL-B180

IDB			60°F [15.5°C]			70°F [21.1°C]			80°F [26.7°C]		
CFM [L/s]			7200 [3398]	6025 [2843]	4800 [2265]	7200 [3398]	6025 [2843]	4800 [2265]	7200 [3398]	6025 [2843]	4800 [2265]
OUTDOOR DRY BULB TEMPERATURE °F [°C]	0 [-17.8]	Total BTUH [kW]	67.5 [19.8]	66.5 [19.5]	65.6 [19.2]	62.7 [18.4]	61.8 [18.1]	60.9 [17.8]	57.9 [17.0]	57.1 [16.7]	56.3 [16.5]
		Power	8.9	9.2	9.4	9.9	10.1	10.4	11.2	11.5	11.8
	5 [-15]	Total BTUH [kW]	78.5 [23.0]	77.4 [22.7]	76.3 [22.4]	73.7 [21.6]	72.7 [21.3]	71.6 [21.0]	68.9 [20.2]	68.0 [19.9]	67.0 [19.6]
		Power	9.2	9.4	9.6	10.1	10.4	10.6	11.4	11.7	12.0
	10 [-12.2]	Total BTUH [kW]	89.5 [26.2]	88.3 [25.9]	87.0 [25.5]	84.8 [24.9]	83.6 [24.5]	82.4 [24.1]	80.0 [23.4]	78.9 [23.1]	77.7 [22.8]
		Power	9.4	9.6	9.8	10.3	10.6	10.8	11.6	11.9	12.2
	15 [-9.4]	Total BTUH [kW]	100.6 [29.5]	99.2 [29.1]	97.8 [28.7]	95.8 [28.1]	94.5 [27.7]	93.1 [27.3]	91.0 [26.7]	89.7 [26.3]	88.4 [25.9]
		Power	9.6	9.8	10.1	10.5	10.8	11.1	11.8	12.1	12.4
	20 [-6.7]	Total BTUH [kW]	111.6 [32.7]	110.1 [32.3]	108.5 [31.8]	106.8 [31.3]	105.4 [30.9]	103.8 [30.4]	102.0 [29.9]	100.6 [29.5]	99.2 [29.1]
		Power	9.8	10.0	10.3	10.7	11.0	11.3	12.0	12.3	12.6
	25 [-3.9]	Total BTUH [kW]	122.7 [36.0]	121.0 [35.5]	119.2 [34.9]	117.9 [34.6]	116.2 [34.1]	114.6 [33.6]	113.1 [33.1]	111.5 [32.7]	109.9 [32.2]
		Power	10.0	10.2	10.5	10.9	11.2	11.5	12.2	12.5	12.8
	30 [-1.1]	Total BTUH [kW]	133.7 [39.2]	131.9 [38.7]	129.9 [38.1]	128.9 [37.8]	127.1 [37.2]	125.3 [36.7]	124.1 [36.4]	122.4 [35.9]	120.6 [35.3]
		Power	10.2	10.4	10.7	11.1	11.4	11.7	12.4	12.7	13.1
	35 [1.7]	Total BTUH [kW]	144.7 [42.4]	142.7 [41.8]	140.7 [41.2]	139.9 [41.0]	138.0 [40.4]	136.0 [39.9]	135.1 [39.6]	133.3 [39.1]	131.4 [38.5]
		Power	10.4	10.6	10.9	11.3	11.6	11.9	12.6	12.9	13.3
	40 [4.4]	Total BTUH [kW]	155.8 [45.7]	153.6 [45.0]	151.4 [44.4]	151.0 [44.3]	148.9 [43.6]	146.7 [43.0]	146.2 [42.8]	144.2 [42.3]	142.1 [41.6]
		Power	10.6	10.9	11.1	11.5	11.8	12.1	12.8	13.2	13.5
	45 [7.2]	Total BTUH [kW]	166.8 [48.9]	164.5 [48.2]	162.1 [47.5]	162.0 [47.5]	159.8 [46.8]	157.5 [46.2]	157.2 [46.1]	155.1 [45.5]	152.8 [44.8]
		Power	10.8	11.1	11.3	11.7	12.0	12.3	13.0	13.4	13.7
	50 [10]	Total BTUH [kW]	177.8 [52.1]	175.4 [51.4]	172.9 [50.7]	173.1 [50.7]	170.7 [50.0]	168.2 [49.3]	168.3 [49.3]	166.0 [48.6]	163.5 [47.9]
		Power	11.0	11.3	11.6	12.0	12.2	12.6	13.2	13.6	13.9

IDB—Indoor air dry bulb

[ ] Designates Metric Conversions

AIRFLOW PERFORMANCE—15 TON [52.8 kW]–SIDEFLOW

Air Flow CFM [L/s]	Model RJNL-B180 Voltage 208/230, 460, 575 — 3 Phase																																			
	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]	
	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W
4800 [2265]	—	—	—	—	—	—	—	—	—	—	583	1393	608	1508	632	1621	656	1732	679	1841	701	1947	723	2052	744	2154	764	2254	785	2326	805	2430	825	2537	844	2647	863	2761	881	2878
5000 [2359]	—	—	—	—	—	—	—	—	—	—	591	1476	616	1593	640	1707	663	1820	686	1930	708	2038	729	2145	750	2248	771	2350	791	2420	811	2528	830	2640	850	2755	868	2873	887	2995
5200 [2454]	—	—	—	—	—	—	—	—	575	1442	600	1562	624	1681	648	1797	671	1911	693	2023	715	2133	736	2241	757	2346	777	2410	797	2520	817	2633	836	2749	855	2869	874	2992	892	3118
5400 [2548]	—	—	—	—	—	—	—	—	583	1530	608	1652	632	1772	655	1890	678	2005	701	2119	722	2231	743	2340	764	2447	784	2512	804	2626	823	2744	842	2865	861	2989	879	3117	897	3248
5600 [2643]	—	—	—	—	—	—	—	—	592	1621	616	1745	640	1866	663	1986	686	2103	708	2218	729	2331	750	2442	770	2551	791	2620	810	2739	830	2861	849	2987	867	3116	885	3248	903	3384
5800 [2737]	—	—	—	—	—	—	576	1588	601	1715	625	1840	649	1964	672	2085	694	2204	716	2321	737	2436	757	2548	778	2614	798	2735	817	2858	836	2985	855	3116	873	3249	891	3386	909	3527
6000 [2831]	—	—	—	—	—	—	585	1683	610	1813	634	1940	657	2065	680	2187	702	2308	724	2426	744	2543	765	2657	785	2731	805	2856	824	2984	843	3116	861	3251	879	3389	897	3531	914	3676
6200 [2926]	—	—	—	—	570	1650	595	1783	619	1913	643	2042	666	2169	688	2293	710	2415	731	2535	752	2653	773	2728	792	2854	812	2984	831	3116	850	3253	868	3392	886	3535	903	3682	920	3832
6400 [3020]	—	—	—	—	579	1750	604	1885	628	2017	652	2148	674	2276	697	2402	718	2526	739	2648	760	2767	780	2852	800	2983	819	3118	838	3255	856	3396	875	3541	892	3688	909	3839	926	3994
6600 [3114]	—	—	—	—	589	1854	614	1991	637	2125	661	2257	683	2386	705	2514	727	2640	748	2763	768	2884	788	2984	808	3119	827	3258	845	3400	863	3546	881	3695	899	3847	916	4003	—	—
6800 [3209]	—	—	574	1822	599	1961	623	2099	647	2235	670	2369	692	2500	714	2629	735	2756	756	2882	776	2984	796	3121	815	3262	834	3405	853	3552	871	3702	888	3856	905	4013	922	4173	—	—
7000 [3303]	—	—	584	1930	609	2072	633	2211	656	2349	679	2484	701	2617	723	2748	744	2877	764	3003	785	3124	804	3265	823	3410	842	3559	860	3710	878	3865	895	4024	912	4185	929	4350	—	—
7200 [3398]	570	1897	595	2042	619	2185	643	2327	666	2466	689	2602	711	2737	732	2870	753	3000	773	3127	793	3270	812	3416	831	3566	849	3719	868	3875	885	4035	902	4198	919	4364	—	—	—	—

NOTE: L-Drive left of bold line, M-Drive right of bold line.

Drive Package	L						M					
Motor H.P. [W]	3.0 [2237.1]						5.0 [3728.5]					
Blower Sheave	BK105H						BK105H					
Motor Sheave	1VL-44						1VP-56					
Turns Open	**1**	2	3	4	5	6	1	2	3	**4**	5	6
RPM	**733**	701	669	640	605	572	927	903	873	**840**	808	775

NOTES: 1. Factory sheave settings are shown in bold type.
2. Do not set motor sheave below minimum 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.

COMPONENT AIR RESISTANCE—15 TON [52.8 kW]

CFM [L/s]	4800 [2265]	5000 [2360]	5200 [2454]	5400 [2549]	5600 [2643]	5800 [2737]	6000 [2832]	6200 [2926]	6400 [3020]	6600 [3115]	6800 [3209]	7000 [3304]	7200 [3398]
	Resistance — Inches of Water [kPa]												
Wet Coil	0.03 [0.01]	0.04 [0.01]	0.05 [0.01]	0.06 [0.01]	0.06 [0.01]	0.07 [0.02]	0.08 [0.02]	0.09 [0.02]	0.10 [0.02]	0.10 [0.02]	0.11 [0.03]	0.12 [0.03]	0.13 [0.03]
Downflow	0.05 [0.01]	0.05 [0.01]	0.05 [0.01]	0.05 [0.01]	0.05 [0.01]	0.05 [0.01]	0.05 [0.01]	0.06 [0.01]	0.06 [0.01]	0.06 [0.01]	0.07 [0.02]	0.08 [0.02]	0.08 [0.02]
Downflow Economizer R.A. Damper Open	0.09 [0.02]	0.10 [0.02]	0.10 [0.02]	0.11 [0.03]	0.12 [0.03]	0.13 [0.03]	0.13 [0.03]	0.14 [0.03]	0.15 [0.04]	0.16 [0.04]	0.16 [0.04]	0.17 [0.04]	0.18 [0.04]
Horizontal Economizer R.A. Damper Open	0.00 [0.00]	0.01 [0.00]	0.01 [0.00]	0.02 [0.00]	0.02 [0.00]	0.03 [0.01]	0.03 [0.01]	0.04 [0.01]	0.04 [0.01]	0.05 [0.01]	0.05 [0.01]	0.06 [0.01]	0.06 [0.01]
Concentric Grill RXRN-AD80 or RXRN-AD81 & Transition RXMC-CJ07	0.21 [0.05]	0.25 [0.06]	0.28 [0.07]	0.32 [0.08]	0.35 [0.09]	0.39 [0.10]	0.43 [0.11]	0.46 [0.11]	0.50 [0.12]	0.54 [0.13]	0.57 [0.14]	0.61 [0.15]	0.64 [0.16]

NOTE: Add component resistance to duct resistance to determine total external static pressure.

AIRFLOW CORRECTION FACTORS—15 TON [52.8 kW]

ACTUAL—CFM [L/s]	4800 [2265]	5000 [2360]	5200 [2454]	5400 [2549]	5600 [2643]	5800 [2737]	6000 [2832]	6200 [2926]	6400 [3020]	6600 [3115]	6800 [3209]	7000 [3304]	7200 [3398]
TOTAL MBTUH	0.97	0.97	0.98	0.98	0.99	1.00	1.00	1.01	1.02	1.02	1.03	1.03	1.04
SENSIBLE MBTUH	0.87	0.90	0.92	0.94	0.97	0.99	1.02	1.04	1.06	1.09	1.11	1.14	1.16
POWER kW	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02

NOTES: Multiply correction factor times gross performance data–resulting sensible capacity cannot exceed total capacity.

[ ] Designates Metric Conversions

ELECTRICAL DATA – RJNL- SERIES							
		B180CL	**B180CM**	**B180DL**	**B180DM**	**B180YL**	**B180YM**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	518-632	518-632
	Volts	208/230	208/230	460	460	575	575
	Minimum Circuit Ampacity	78/78	81/81	38	40	28	30
	Minimum Overcurrent Protection Device Size	90/90	90/90	45	45	30	35
	Maximum Overcurrent Protection Device Size	100/100	100/100	45	50	35	35
Compressor Motor	No.	2	2	2	2	2	2
	Volts	200/230	200/230	460	460	575	575
	Phase	3	3	3	3	3	3
	RPM	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	7	7	7	7	7	7
	Amps (RLA), Comp. 1	25/25	25/25	12.2	12.2	9	9
	Amps (LRA), Comp. 1	164/164	164/164	100	100	78	78
	HP, Compressor 2	7	7	7	7	7	7
	Amps (RLA), Comp. 2	25/25	25/25	12.2	12.2	9	9
	Amps (LRA), Comp. 2	164/164	164/164	100	100	78	78
Compressor Motor	No.	4	4	4	4	4	4
	Volts	208/230	208/230	460	460	575	575
	Phase	1	1	1	1	1	1
	HP	1/3	1/3	1/3	1/3	1/3	1/3
	Amps (FLA, each)	2.4/2.4	2.4/2.4	1.4	1.4	1	1
	Amps (LRA, each)	4.7/4.7	4.7/4.7	2.4	2.4	1.8	1.8
Evaporator Fan	No.	1	1	1	1	1	1
	Volts	208/230	208/230	460	460	575	575
	Phase	3	3	3	3	3	3
	HP	3	5	3	5	3	5
	Amps (FLA, each)	11.5/11.5	14.9/14.9	4.6	6.6	3.5	5.3
	Amps (LRA, each)	74.5/74.5	82.6/82.6	38.1	46.3	20	39.4

280/240 VOLT, THREE PHASE, 60 HZ, AUXILIARY ELECTRIC HEATER KITS CHARACTERISTICS AND APPLICATION													
Single Power Supply for Both Unit and Heater Kit										Separate Power Supply for Both Unit and Heater Kit			
	Heater Kit					Air Conditioner			Heater Kit		Air Conditioner		
Model No. RJNL-	RXJJ- Heater Kit Nominal kW	No. of Sequence Steps	Rated Heater kW @ 280/240V	Heater kBTU/Hr @ 280/240V	Heater Amps @ 280/240V	Unit Min. Ckt. Ampacity @ 280/240V	Over Current Protective Device Size		Min. Ckt. Ampacity 280/240V	Max. Fuse Size 280/240V	Min. Circuit Ampacity 280/240V	Over Current Protective Device Size	
							Min./Max 280/240V	Min./Max. 280/240V				Min./Max. 280/240V	Min./Max. 280/240V
B180CL	No Heat	—	—	—	—	78/78	90/100	90/100	—	—	78/78	90/100	90/100
	CE20C	1	14.4/19.2	49.13/65.5	40/46.2	128/136	150/150	150/150	50/58	50/60	—	—	—
	CE40C	2	28.8/38.3	98.25/130.66	79.9/92.2	178/194	200/200	225/225	100/116	100/125	—	—	—
	CE60C	2	43.2/57.5	147.38/196.16	119.9/138.3	228/251	250/250	300/300	150/173	150/175	—	—	—
	CE75C	2	54/71.9	184.22/245.29	149.8/172.8	266/295	300/300	350/350	188/217	200/225	—	—	—
B180CM	No Heat	—	—	—	—	81/81	90/100	90/100	—	—	81/81	90/100	90/100
	CE20C	1	14.4/19.2	49.13/65.5	40/46.2	131/139	150/150	175/175	50/58	50/60	—	—	—
	CE40C	2	28.8/38.3	98.25/130.66	79.9/92.2	181/197	200/200	225/225	100/116	100/125	—	—	—
	CE60C	2	43.2/57.5	147.38/196.16	119.9/138.3	231/254	250/250	300/300	150/173	150/175	—	—	—
	CE75C	2	54/71.9	184.22/245.29	149.8/172.8	269/298	300/300	350/350	188/217	200/225	—	—	—

480 VOLT, THREE PHASE, 60 HZ, AUXILIARY ELECTRIC HEATER KITS CHARACTERISTICS AND APPLICATION													
Single Power Supply for Both Unit and Heater Kit										Separate Power Supply for Both Unit and Heater Kit			
	Heater Kit					Air Conditioner			Heater Kit		Air Conditioner		
Model No. RJNL-	RXJJ- Heater Kit Nominal kW	No. of Sequence Steps	Rated Heater kW @ 480V	Heater kBTU/Hr @ 480V	Heater Amps @ 480V	Unit Min. Ckt. Ampacity @ 480V	Over Current Protective Device Size		Min. Ckt. Ampacity 480V	Max. Fuse Size 480V	Min. Circuit Ampacity 480V	Over Current Protective Device Size	
							Min./Max 480V	Min./Max. 480V				Min./Max. 480V	Min./Max. 480V
B180DL	No Heat	—	—	—	—	38	45/45	—	—	—	38	45/45	—
	CE20D	1	19.2	65.5	23.1	67	80/80	—	29	30	—	—	—
	CE40D	2	38.4	131	46.2	96	110/110	—	58	60	—	—	—
	CE60D	2	57.6	196.5	69.3	125	150/150	—	87	90	—	—	—
	CE75D	2	72	245.63	86.6	147	175/175	—	109	110	—	—	—
B180DM	No Heat	—	—	—	—	40	45/50	—	—	—	40	45/50	—
	CE20D	1	19.2	65.5	23.1	69	80/80	—	29	30	—	—	—
	CE40D	2	38.4	131	46.2	98	110/110	—	58	60	—	—	—
	CE60D	2	57.6	196.5	69.3	127	150/150	—	87	90	—	—	—
	CE75D	2	72	245.63	86.6	149	175/175	—	109	110	—	—	

*= For Canadian use only. Uses “P” fuses for inductive circuit.
+ = Field installed only.

600 VOLT, THREE PHASE, 60 HZ, AUXILIARY ELECTRIC HEATER KITS CHARACTERISTICS AND APPLICATION												
Single Power Supply for Both Unit and Heater Kit										Separate Power Supply for Both Unit and Heater Kit		
	Heater Kit					Air Conditioner				Heater Kit		Air Conditioner		
Model No. RJNL-	RXJJ- Heater Kit Nominal kW	No. of Sequence Steps	Rated Heater kW @ 600V	Heater kBTU/Hr @ 600V	Heater Amps @ 600V	Unit Min. Ckt. Ampacity @ 600V	Over Current Protective Device Size			Min. Ckt. Ampacity 600V	Max. Fuse Size 600V	Min. Circuit Ampacity 600V	Over Current Protective Device Size	
							Min./Max 600V	Min./Max. 600V					Min./Max. 600V	Min./Max. 600V
B180YL	No Heat	—	—	—	—	28	30/35	—		—	—	28	30/35	—
	CE20Y	1	19.2	65.5	18.5	52	60/60	—		24	25	—	—	—
	CE40Y	2	38.4	131	37	75	80/80	—		47	50	—	—	—
	CE60Y	2	57.6	196.5	55.4	98	110/110	—		70	70	—	—	—
	CE75Y	2	72	245.63	69.3	115	125/125	—		87	90	—	—	—
B180YM	No Heat	—	—	—	—	30	35/35	—		—	—	30	35/35	—
	CE20Y	1	19.2	65.5	18.5	54	60/60	—		24	25	—	—	—
	CE40Y	2	38.4	131	37	77	90/90	—		47	50	—	—	—
	CE60Y	2	57.6	196.5	55.4	100	110/110	—		70	70	—	—	—
	CE75Y	2	72	245.63	69.3	117	125/125	—		87	90	—	—	—

*= For Canadian use only. Uses “P” fuses for inductive circuit.
+ = Field installed only.

SELF-CONTAINED HEAT PUMP

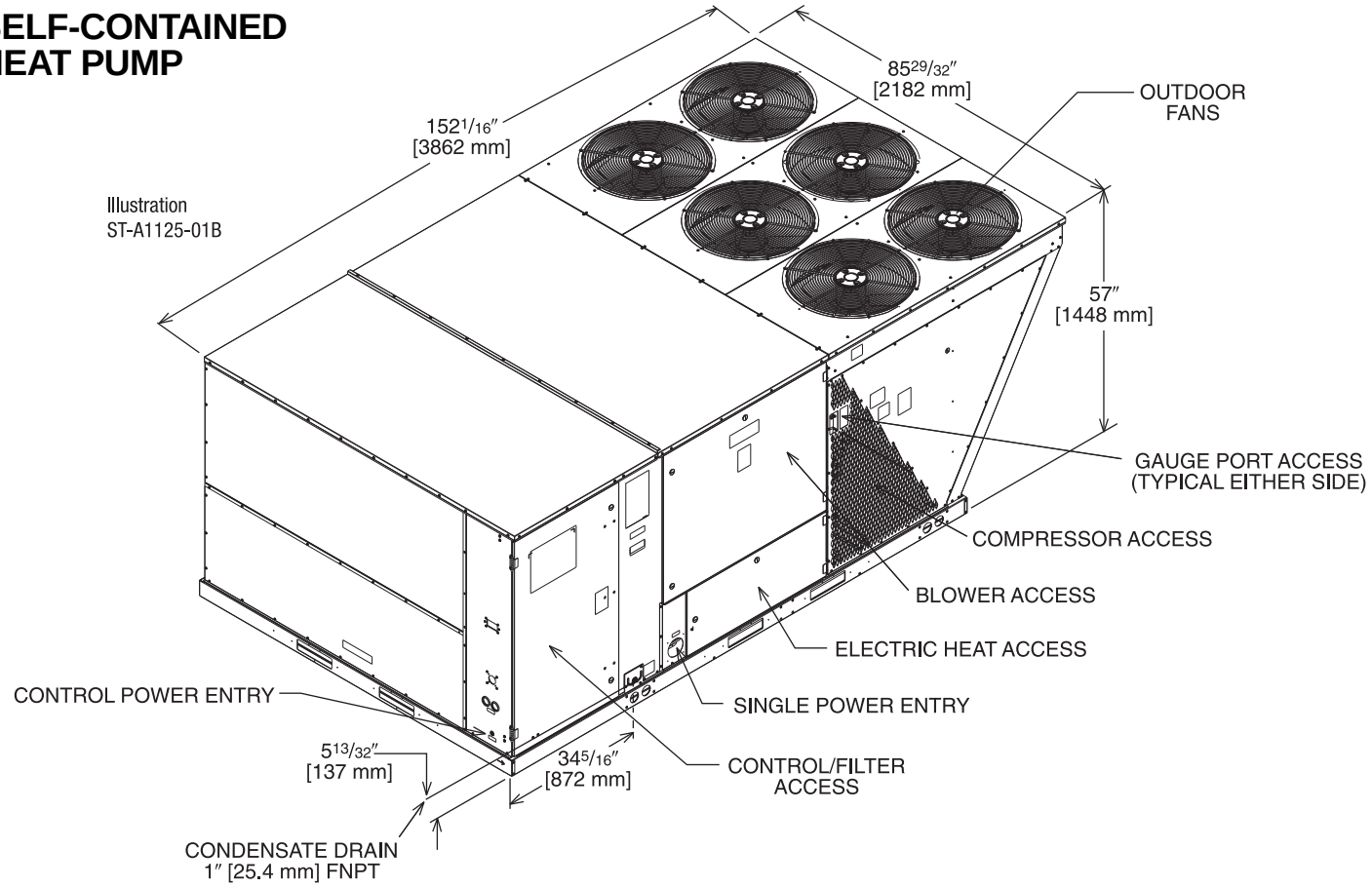


Illustration
ST-A1125-01B

BOTTOM VIEW

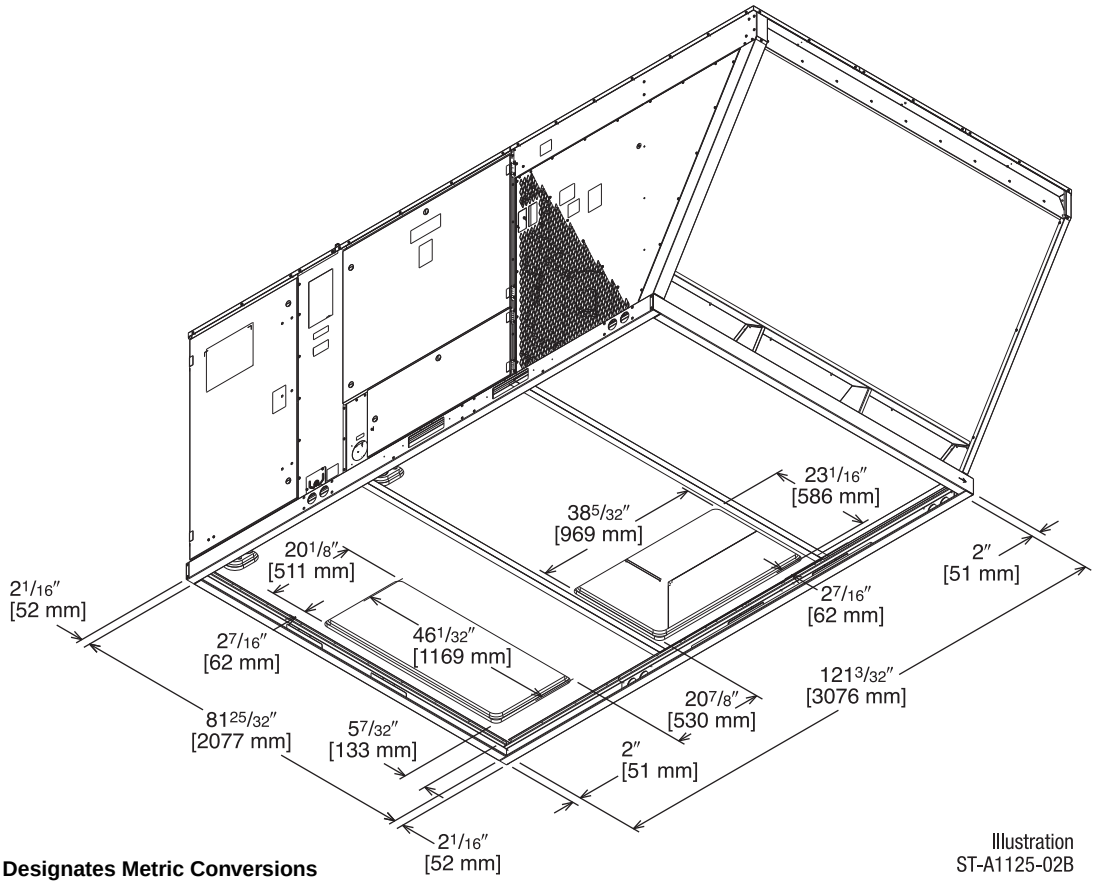


Illustration
ST-A1125-02B

[ ] Designates Metric Conversions

SELF-CONTAINED HEAT PUMP

SUPPLY AND RETURN DIMENSIONS FOR HORIZONTAL APPLICATIONS

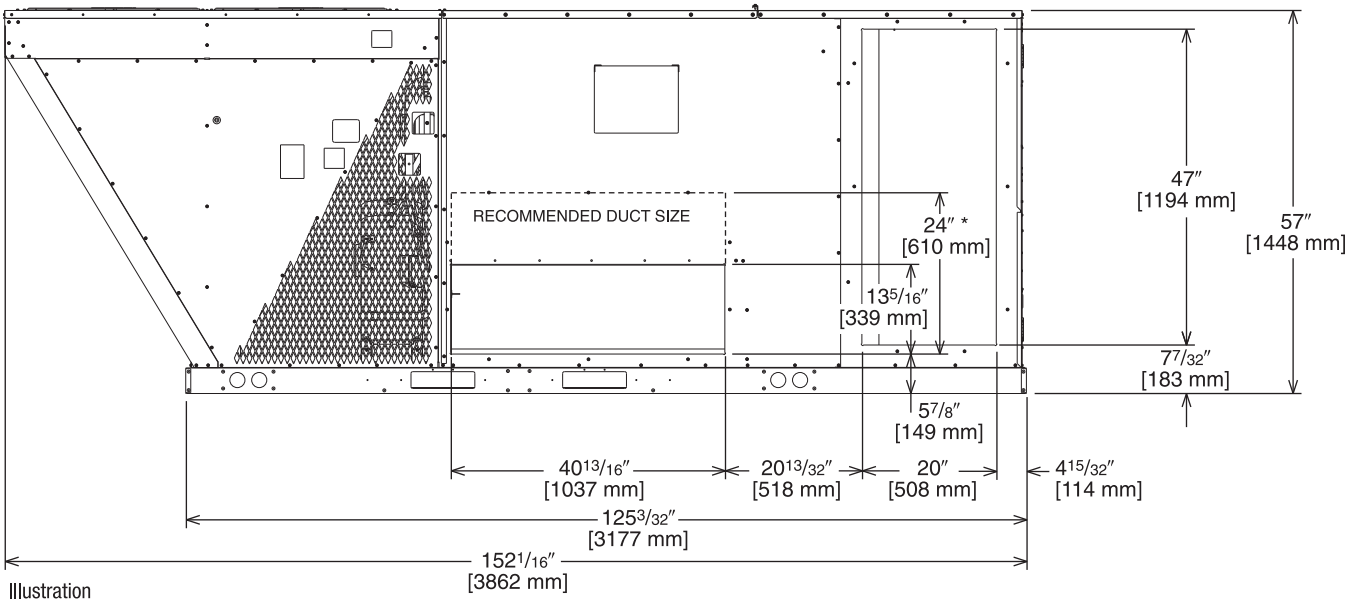


Illustration ST-A1125-08B

* RECOMMENDED DUCT SIZE

DUCT SIDE VIEW (REAR)

SUPPLY AND RETURN DIMENSIONS FOR DOWNFLOW APPLICATIONS

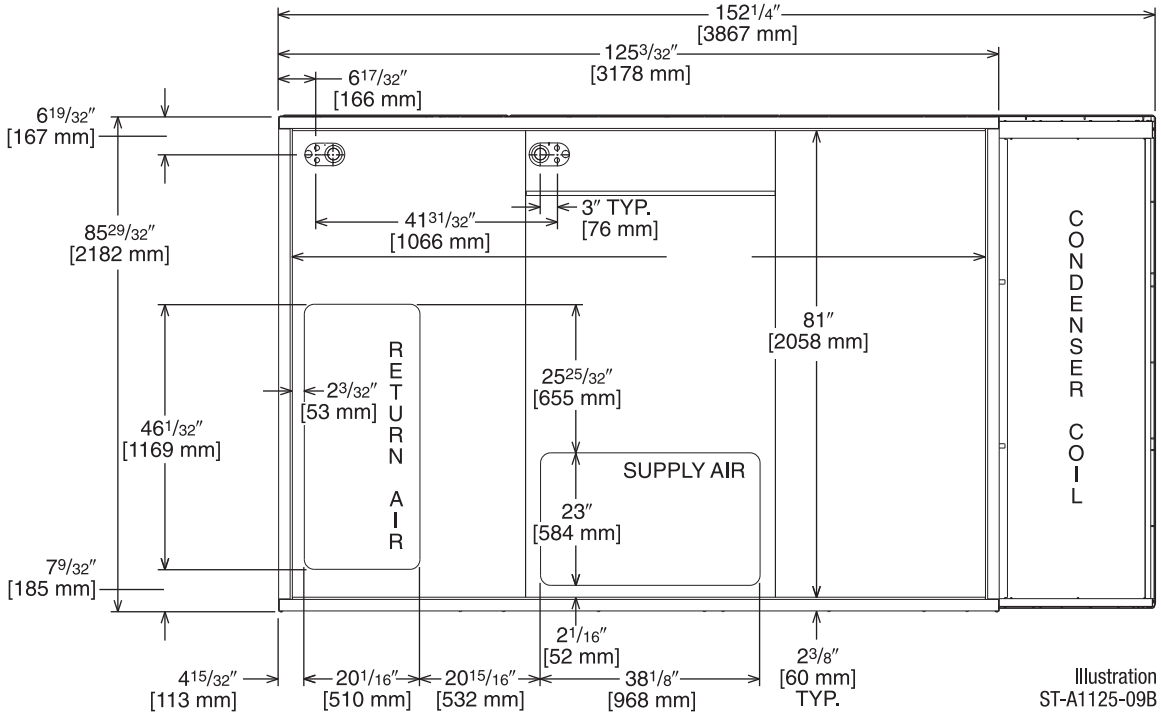


Illustration ST-A1125-09B

BOTTOM VIEW

[ ] Designates Metric Conversions

UNIT DIMENSIONS SELF-CONTAINED HEAT PUMP

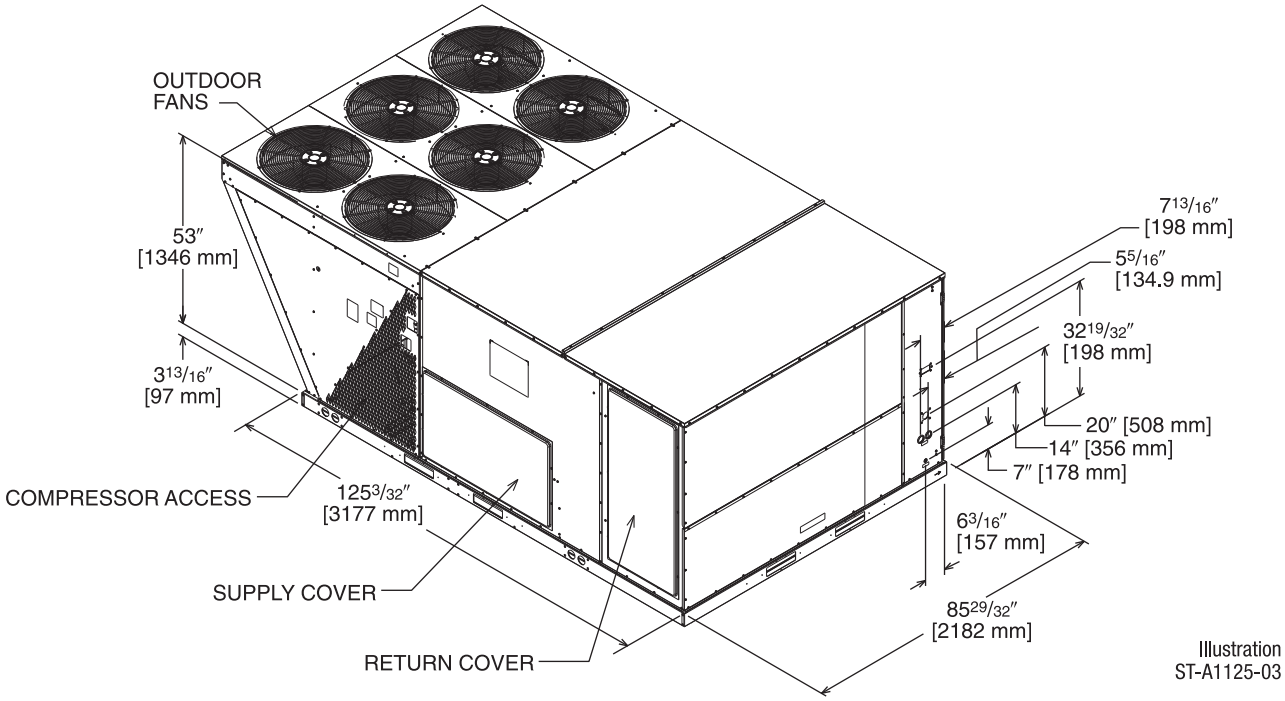
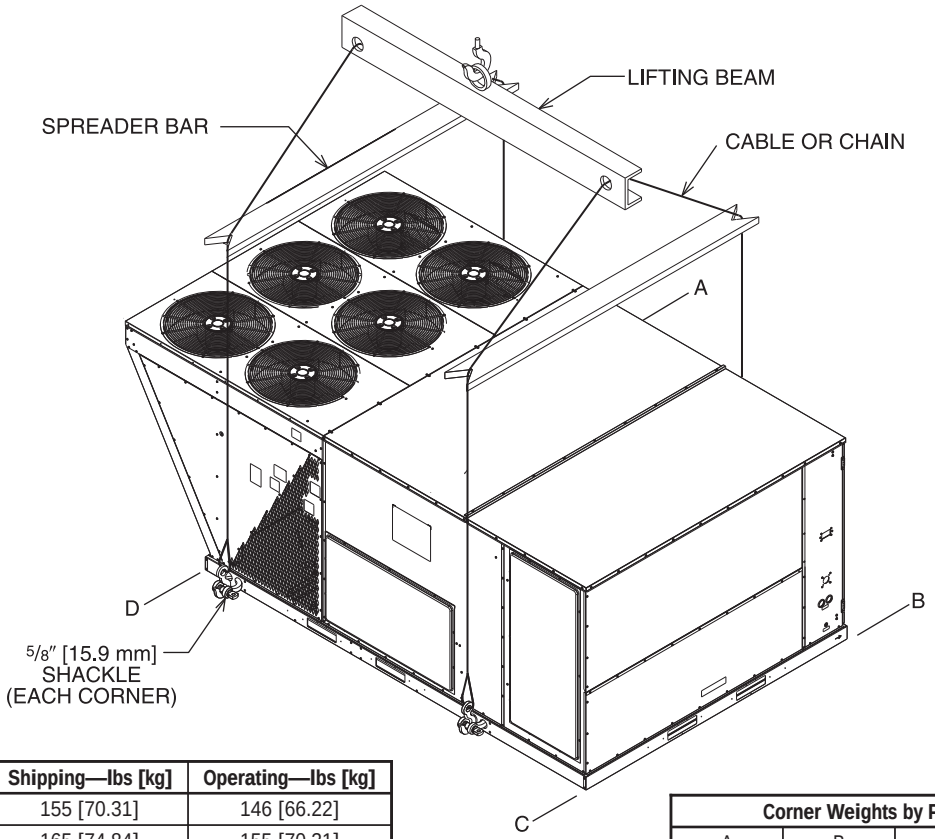


Illustration ST-A1125-03



WEIGHTS

Accessory	Shipping—lbs [kg]	Operating—lbs [kg]
Economizer–Downflow	155 [70.31]	146 [66.22]
Economizer–Horizontal	165 [74.84]	155 [70.31]
Power Exhaust	44 [19.96]	42 [19.05]
Fresh Air Damper (Manual)	51 [23.13]	40 [18.14]
Fresh Air Damper (Motorized)	46 [20.87]	35 [15.88]
Roof Curb 14"	170 [77.11]	164 [74.39]

Corner Weights by Percentage			
A	B	C	D
32%	27%	16%	24%

*Note: Corner weights measured at base of unit.

[ ] Designates Metric Conversions

SLAB INSTALLATION

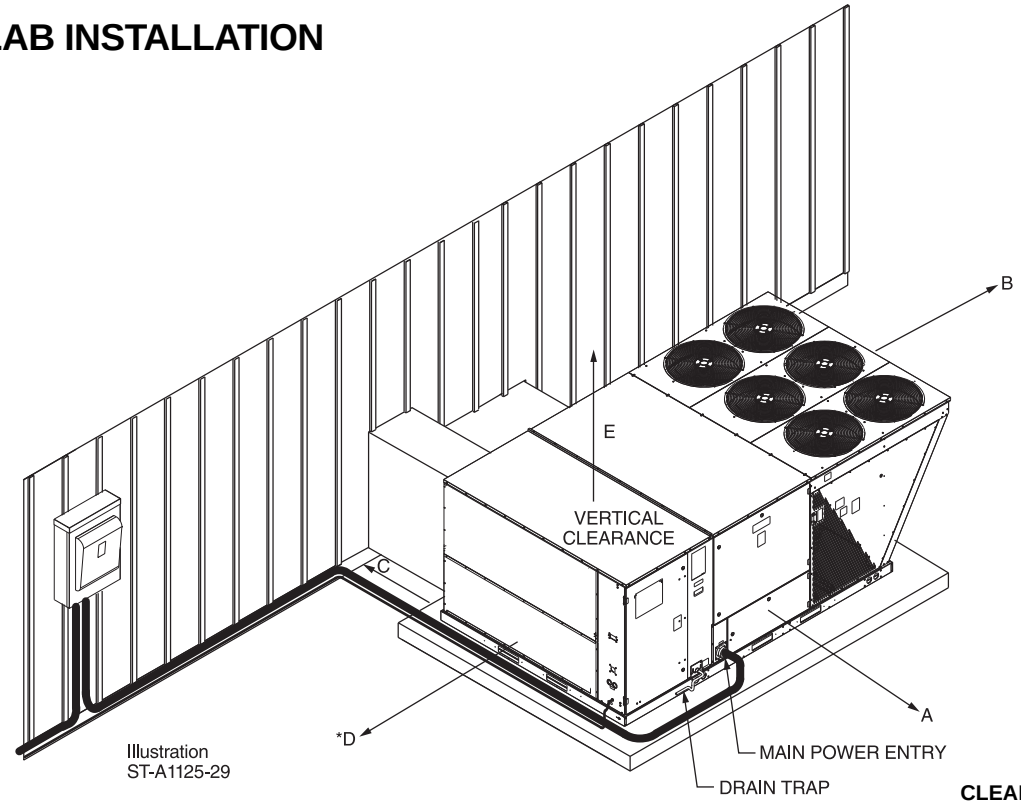


Illustration
ST-A1125-29

CLEARANCES

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

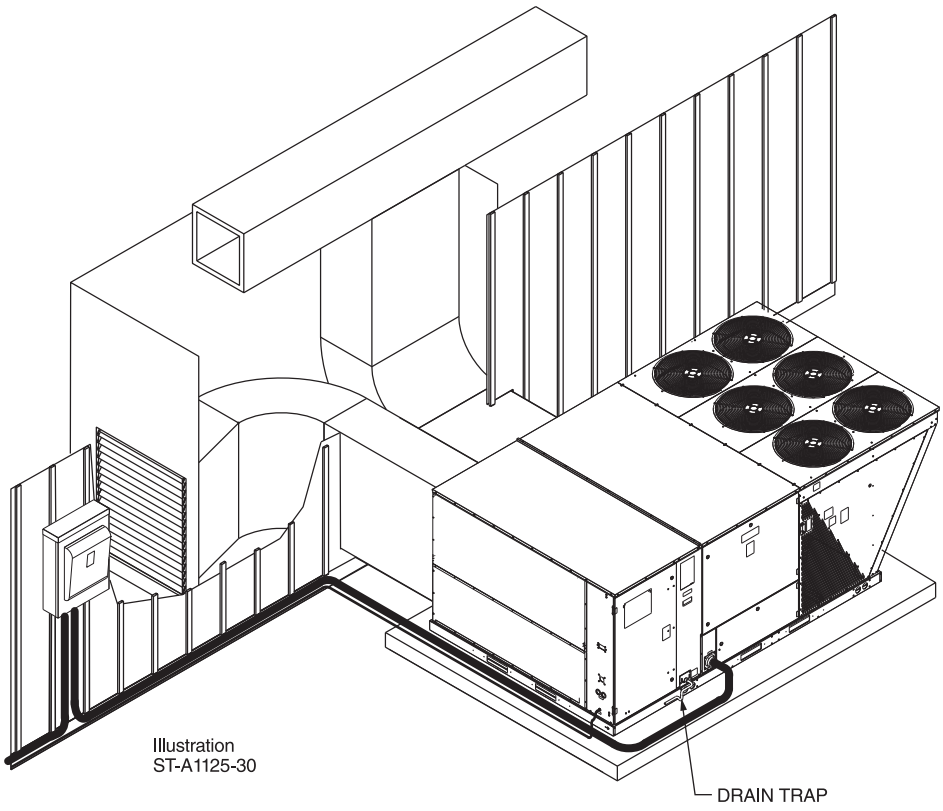


Illustration
ST-A1125-30

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

FIELD INSTALLED ACCESSORY EQUIPMENT–SELF CONTAINED HEAT PUMP

New Descriptions	Model Number RJNL-B180	Shipping Weight Lbs. [kg]	Installed Weight Lbs. [kg]	Factory Installation Available?
Thermostat	See Thermostat Specification Sheet for Details (T22-001)			No
Electric Heaters	RXJJ-CE20 (C,D,Y)	41 [18.6]	31 [14.1]	Yes
	RXJJ-CE40 (C,D,Y)	44 [20.0]	34 [15.4]	Yes
	RXJJ-CE60 (C,D,Y)	45 [20.4]	35 [15.9]	Yes
	RXJJ-CE75 (C,D,Y)	46 [20.8]	36 [16.3]	Yes
Downflow Economizer w/Single Enthalpy	RXRD-PGCM3	155 [70.3]	146 [66.2]	Yes
Downflow Economizer w/Smoke Detector	RXRD-SGCM3	280 [127.0]	171 [77.6]	Yes
Dual Enthalpy Kit	RXRX-AV02	1 [.5]	1 [.5]	No
Horizontal Economizer w/Single Enthalpy	RXRD-RGCM3	333 [151.0]	301 [136.5]	No
Carbon Dioxide Sensor (Wall Mount)	RXRX-AR02	3 [1.4]	2 [1.0]	No
Power Exhaust (208/230V)	RXRX-BGF05C	102 [46.3]	69 [31.3]	No
Power Exhaust (460V)	RXRX-BGF05D	102 [46.3]	69 [31.3]	No
Power Exhaust (575V)	RXRX-BGF05Y	102 [46.3]	69 [31.3]	No
Manual Fresh Air Damper*	RXRF-KFA1	61 [27.7]	52 [23.6]	No
Motorized Kit for Manual Fresh Air Damper*	RXRX-AW03	42 [19.1]	35 [15.9]	No
Roofcurb, 14"	RXKG-CBH14	170 [77.1]	164 [74.4]	No
Roofcurb Adapter to RXRK-E56	RXRX-CJCE56	465 [210.3]	415 [188.2]	No
Roofcurb Adapter to RXKG-CAF14	RXRX-CJCF14	555 [251.7]	505 [229]	No
Concentric Diffuser (Step-Down, 18" x 36")	RXRN-AD81	310 [140.6]	157 [71.2]	No
Concentric Diffuser (Step-Down, 24" x 48")	RXRN-AD86	367 [166.4]	212 [96.1]	No
Concentric Diffuser (Step-Down, 28" x 60")	RXRN-AD88	410 [186.0]	370 [167.8]	No
Concentric Diffuser (Flush, 18" x 36")	RXRN-AD80	213 [96.6]	115 [52.2]	No
Downflow Transition (Rect. to Rect., 18" x 36")	RXMC-CJ07	81 [36.7]	74 [33.6]	No
Downflow Transition (Rect. to Rect., 24" x 48")	RXMC-CK08	81 [36.7]	74 [33.6]	No
Downflow Transition (Rect. to Rect., 28" x 60")	RXMC-CL09	81 [36.7]	74 [33.6]	No
Low-Ambient Control Kit (1 Per Compressor)	RXRZ-C02	3 [1.4]	2 [1.0]	Yes
Freeze-Stat Kit	RXRX-AM05	1 [.5]	.5 [.2]	Yes
Unwired Convenience Outlet	RXRX-AN01	2 [1.0]	1.5 [.7]	Yes

*Motorized Kit and Manual Fresh Air Damper must be combined for a complete Motorized Outside Air Damper Selection. **[ ] Designates Metric Conversions**

THERMOSTATS

100-Series *
Non-Programmable

200-Series *
Programmable

300-Series *
Deluxe
Programmable

400-Series *
Special Applications/
Programmable

500-Series *
Communicating/
Programmable

Brand	Unique Model Number Prefix		Descriptor (3 Characters)	Series (3 Characters)	System (2 Characters)	Type (2 Characters)
UHC		-	TST	101	GE	MS
UHC=Ruud			TST=Thermostat	100=Non-Programmable 200=Programmable 300=Deluxe Programmable 400=Special Applications/ Programmable 500=Communicating/ Programmable	GE=Gas/Oil/Electric HP=Heat Pump MD=Modulating Furnace DF=Dual Fuel UN=Universal AC/HP/GE CM=Communicating	SS=Single-Stage MS=Multi-Stage

** Photos are representative. Actual models may vary.*

For detailed thermostat match-up information, see specification sheet form number T22-001.

ECONOMIZERS—DOWNFLOW ONLY

Field Installed

RXRD-PGCM3—Single Enthalpy (Outdoor)
RXRD-SGCM3—Single Enthalpy (Outdoor) w/Smoke Detector
RXRX-AR02—Optional Wall-Mounted CO_2 Sensor
RXRX-AV02—Dual Enthalpy Upgrade Kit

- Features **Honeywell** Controls
- Available Factory Installed or Field Accessory
- Gear Driven Direct Drive Actuator
- Fully Modulating (0-100%)
- Low Leakage Dampers
- Slip-In Design for Easy Installation
- Plug-In Polarized 12-pin Electrical Connections
- Pre-Configured—No Field Adjustments Necessary
- Standard Barometric Relief Damper
- Single Enthalpy with Dual Enthalpy Upgrade Kit Available
- CO_2 Input Sensor Available
- Field Assembled Hood Ships with Economizer
- Economizer Ships Complete for Downflow Duct Application.
- Optional Remote Minimum Position Potentiometer (Honeywell #S963B1128) is Available from Prostock.
- Field Installed Power Exhaust Available

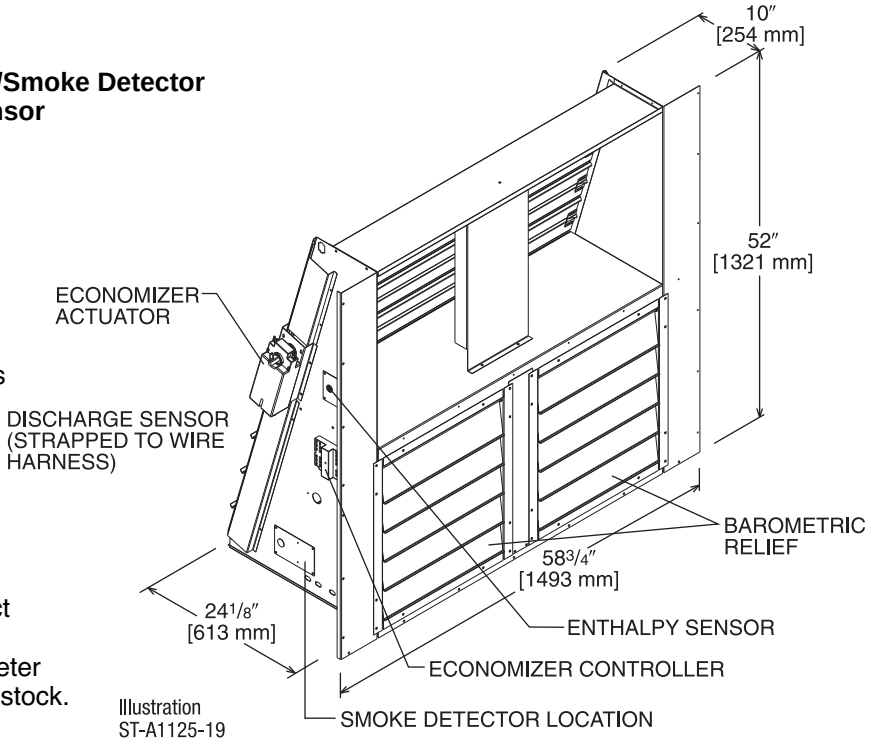


Illustration ST-A1125-19

TOLERANCE ±.125

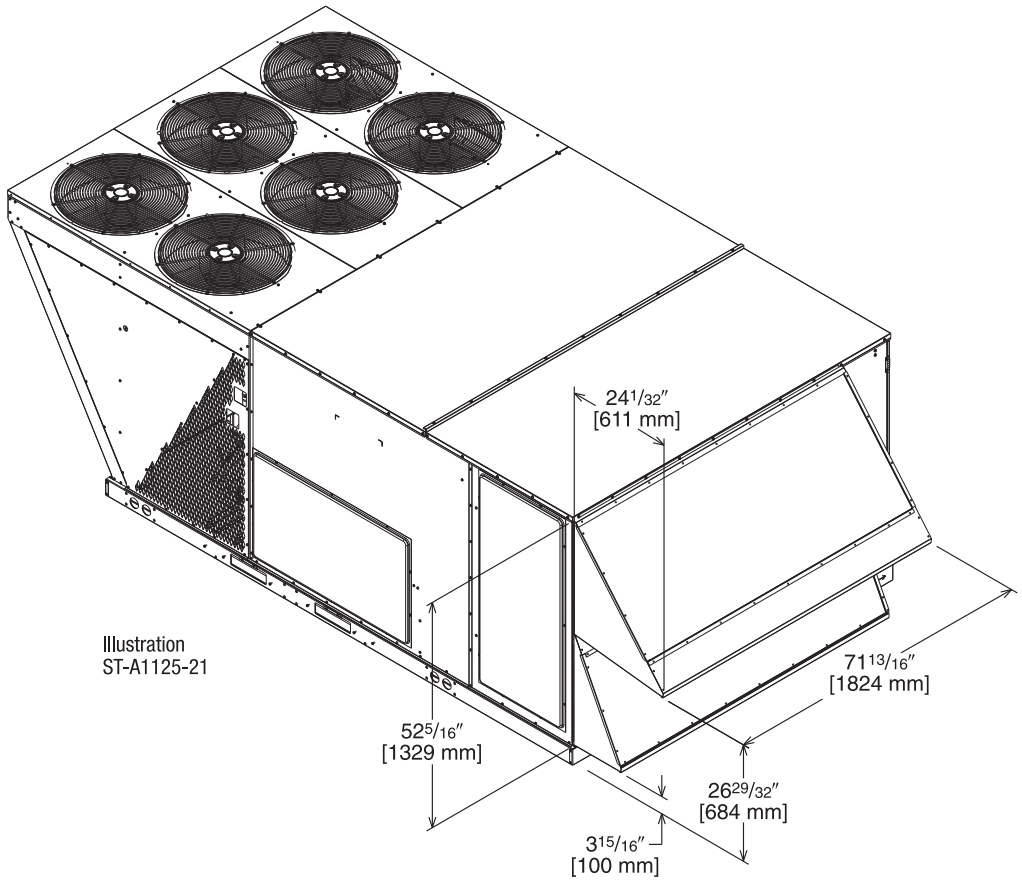


Illustration ST-A1125-21

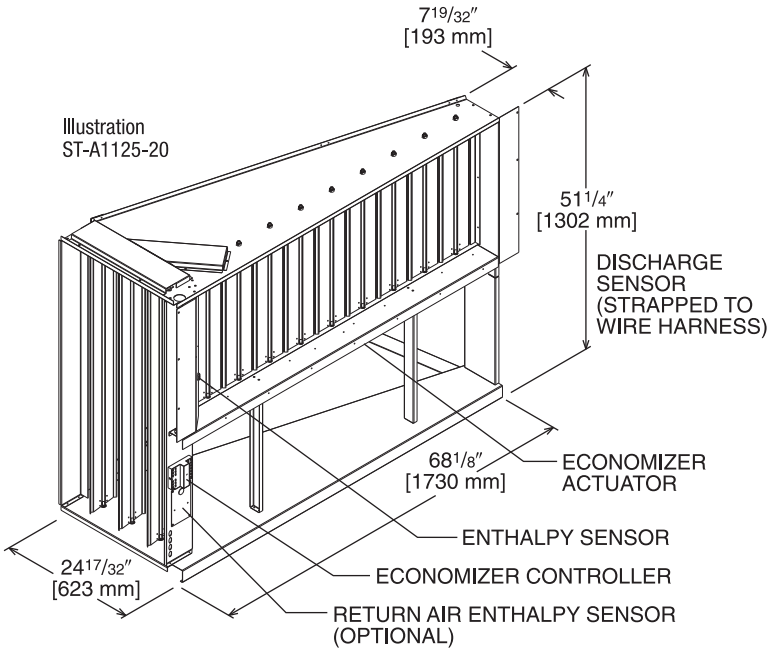
[ ] Designates Metric Conversions

ECONOMIZER FOR HORIZONTAL DUCT INSTALLATION

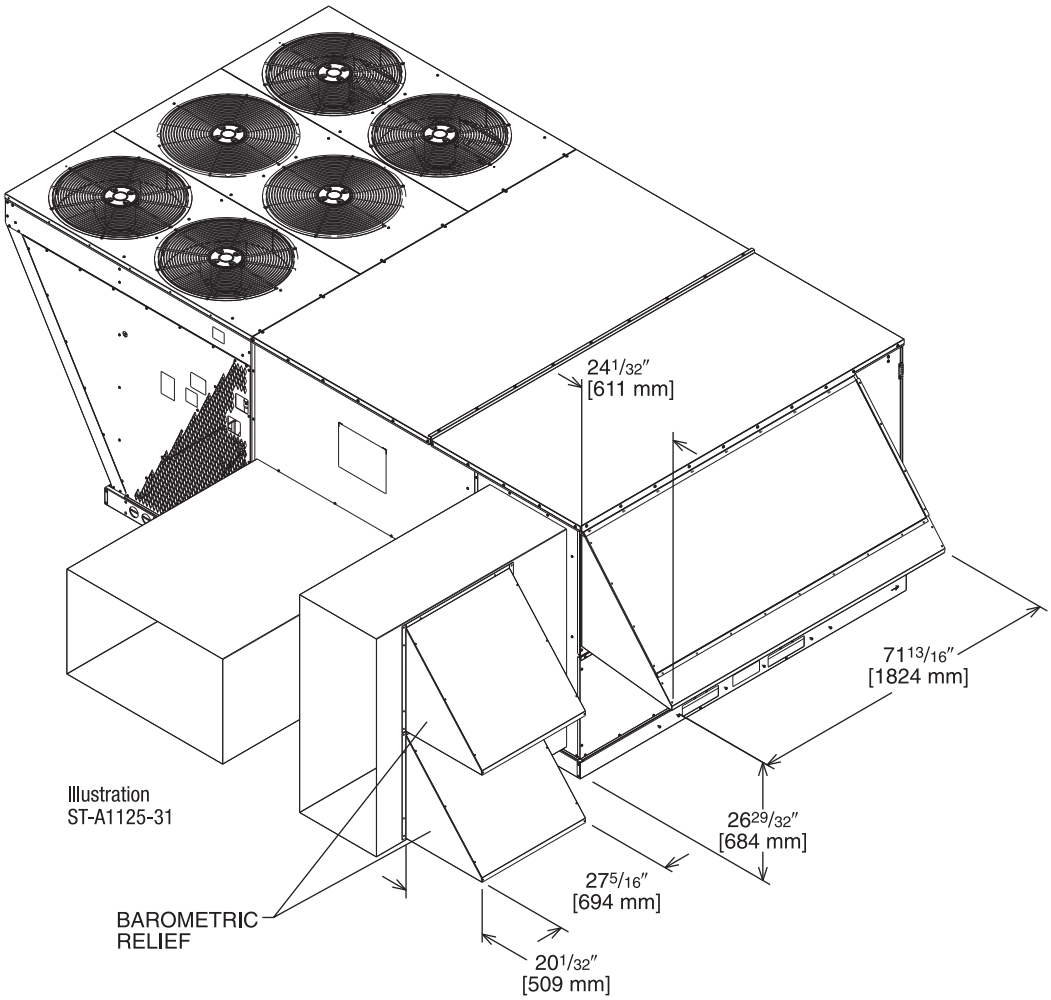
Field Installed Only

RXRD-RGCM3—Single Enthalpy (Outdoor)
RXRX-AV02—Dual Enthalpy Upgrade Kit
RXRX-AR02—Optional Wall-Mounted CO_2 Sensor

- Features **Honeywell** Controls
- Available as a Field Installed Accessory Only
- Gear Driven Direct Drive Actuator
- Fully Modulating (0-100%)
- Low Leakage Dampers
- Slip-In Design for Easy Installation
- Plug-In Polarized 12-pin Electrical Connections
- Pre-Configured—No Field Adjustments Necessary
- Standard Barometric Relief Damper
- Single Enthalpy with Dual Enthalpy Upgrade Kit Available
- CO_2 Input Sensor Available
- Field Assembled Hood Ships with Economizer
- Economizer Ships Complete for Horizontal Duct Application
- Optional Remote Minimum Position Potentiometer (Honeywell #S963B1128) is Available from Prostock
- Field Installed Power Exhaust Available



TOLERANCE ± .125

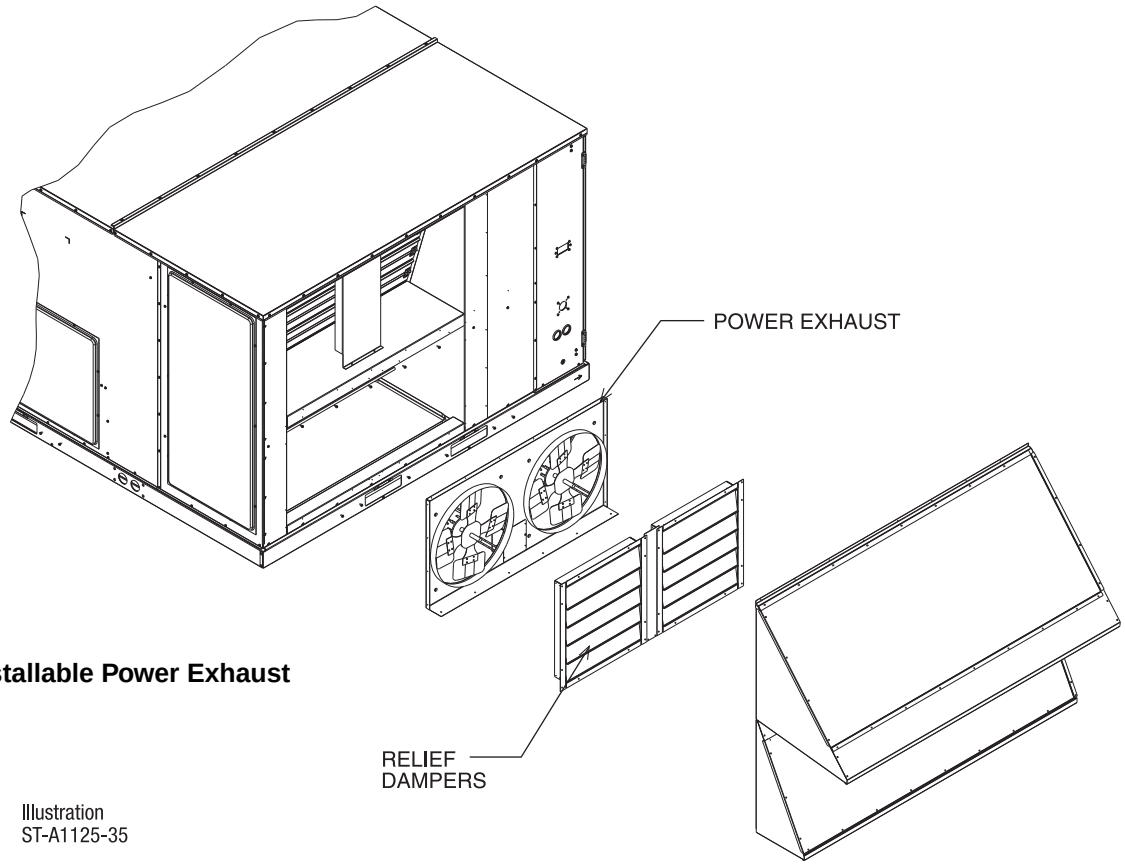


[ ] Designates Metric Conversions

INTEGRAL POWER EXHAUST KIT FOR RXRD-PGCM3 OR SGCM3 ECONOMIZERS

RXRX-BGF05 (C, D, or Y*)

***Voltage Code**



Field Installable Power Exhaust

Illustration
ST-A1125-35

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		
RXRX-BGF05C	2	208-230	1	0.75	4100 [1935]	850	5200 [2454]	1050	5	4.97
RXRX-BGF05D	2	460	1	0.75	4100 [1935]	850	5200 [2454]	1050	2.2	3.4
RXRX-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

FRESH AIR DAMPER

MOTORIZED DAMPER KIT
RXRX-AW03
(Motor Kit for RXRF-KFA1)

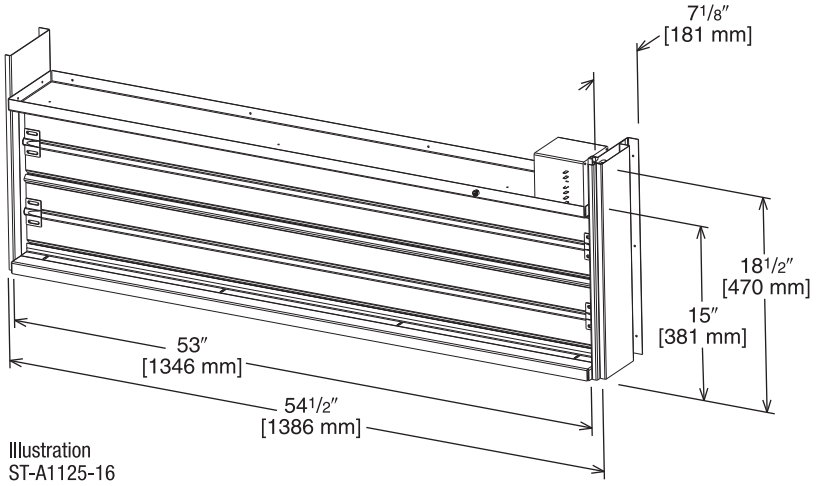


Illustration
ST-A1125-16

RXRF-KFA1 (Manual)
RXRX-AW03 (Motorized damper kit for manual fresh air damper)

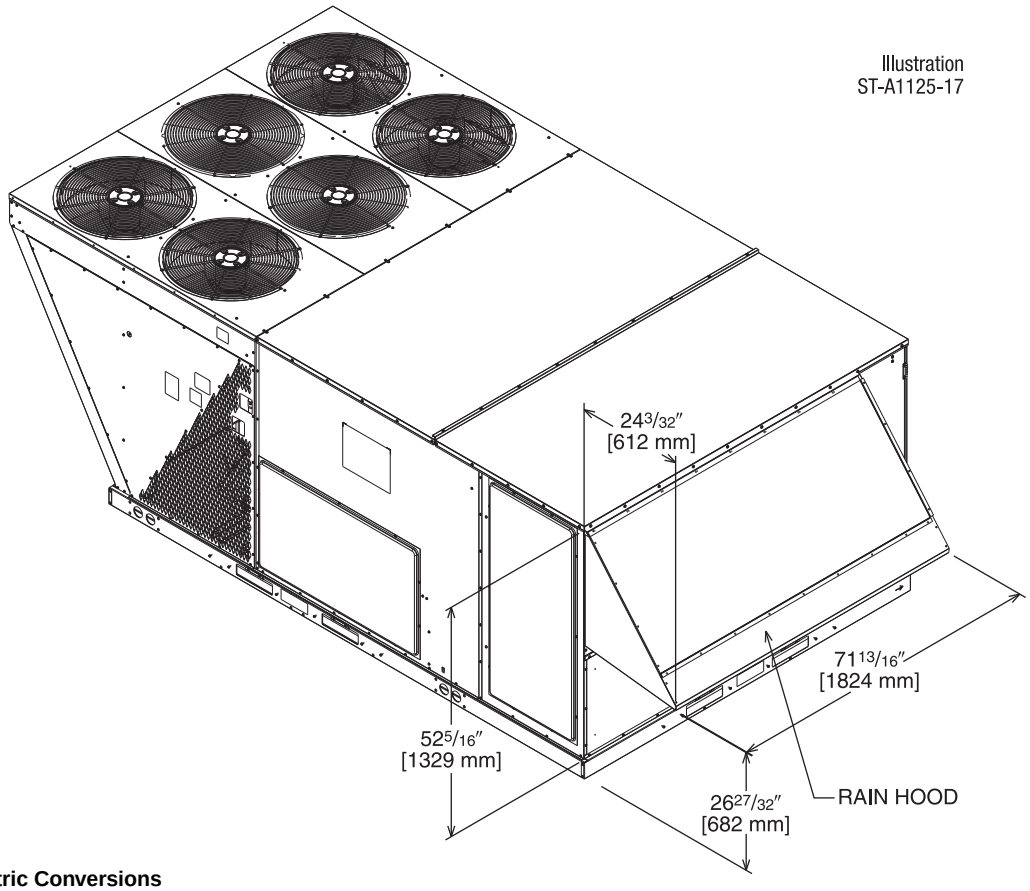


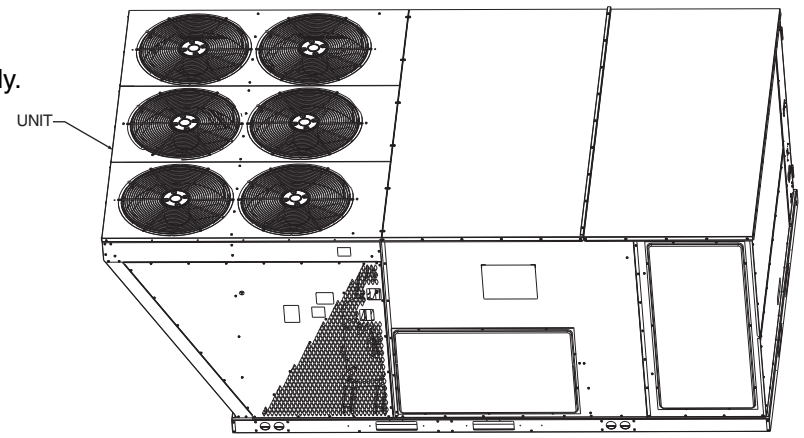
Illustration
ST-A1125-17

[ ] Designates Metric Conversions

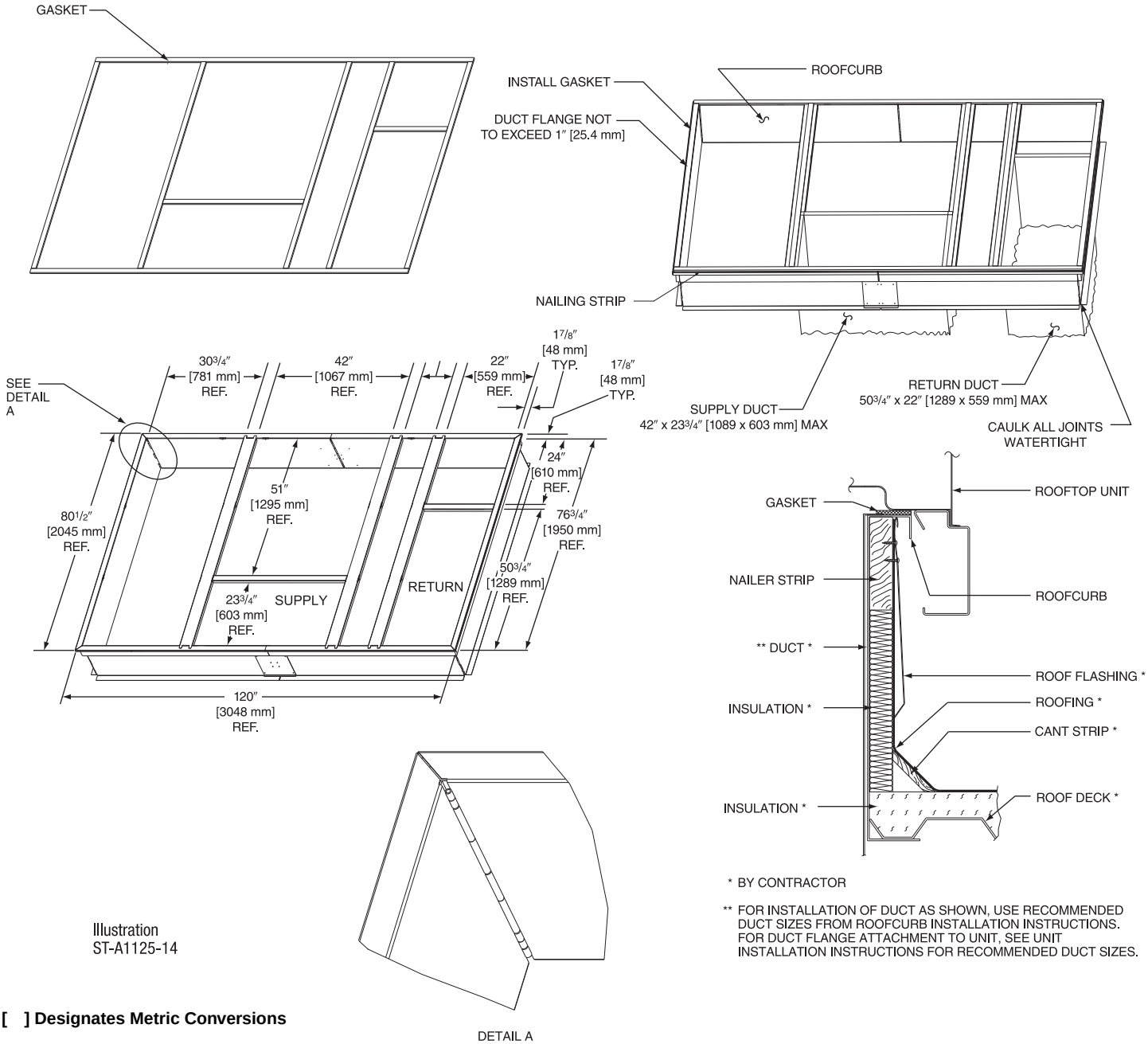
ROOFCURBS (Full Perimeter)

- One available height (14" [356 mm]).
- Quick assembly corners for simple and fast assembly.
- 1" [25.4 mm] x 4" [102 mm] Nailer 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 ASSEMBLY



* BY CONTRACTOR

** FOR INSTALLATION OF DUCT AS SHOWN, USE RECOMMENDED DUCT SIZES FROM ROOFCURB INSTALLATION INSTRUCTIONS. FOR DUCT FLANGE ATTACHMENT TO UNIT, SEE UNIT INSTALLATION INSTRUCTIONS FOR RECOMMENDED DUCT SIZES.

Illustration
ST-A1125-14

[ ] Designates Metric Conversions

ROOFCURB ADAPTERS

OLD MODELS	OLD CURB MODEL	ROOFCURB ADAPTER	NEW MODEL
COMMERCIAL CABINET (12.5, 15 & 20 TON) ([44, 52.8 & 70.3 kW]) (-)RCF, (-)RGF, (-)REF	RXRK-E56	RXRX-CJCE56	(-)JNL (15 TON) ([52.8 kW])

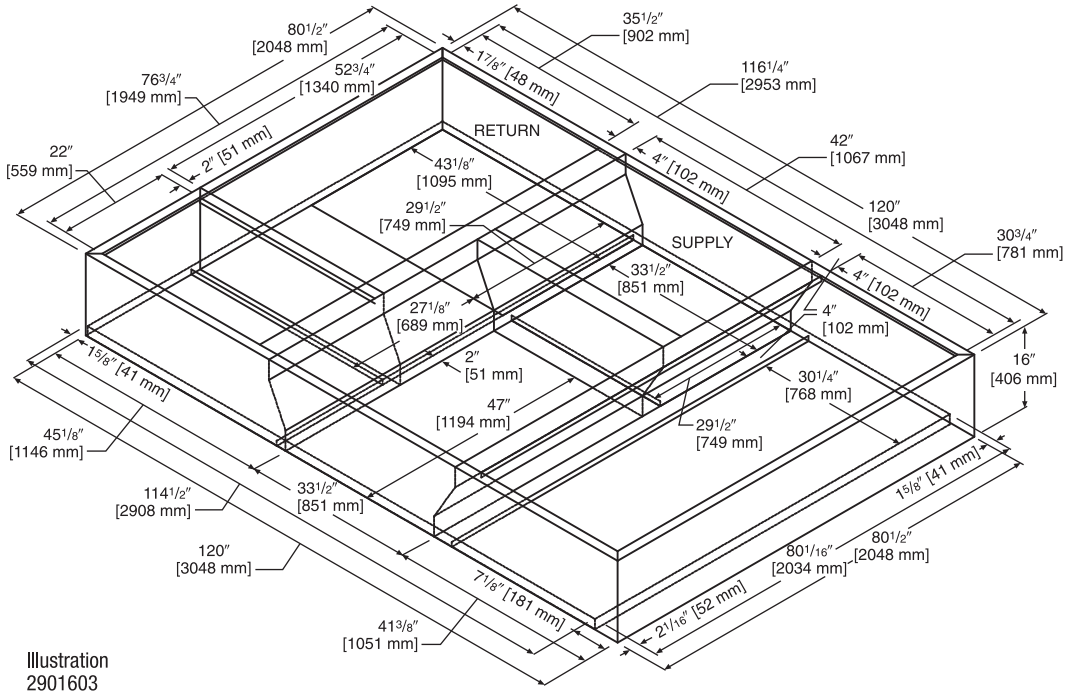


Illustration
2901603

COMMERCIAL CABINET (15, 20 & 25 TON) ([52.8, 70.3 & 87.9 kW]) (-)LKB, LMB, LNB (COOLING ONLY) (-)KKB, KMB, KNB (GAS/ELECTRIC)	RXKG-CAF14	RXRX-CJCF14	(-)JNL (HEAT PUMP) (15 TON) ([52.8 kW])

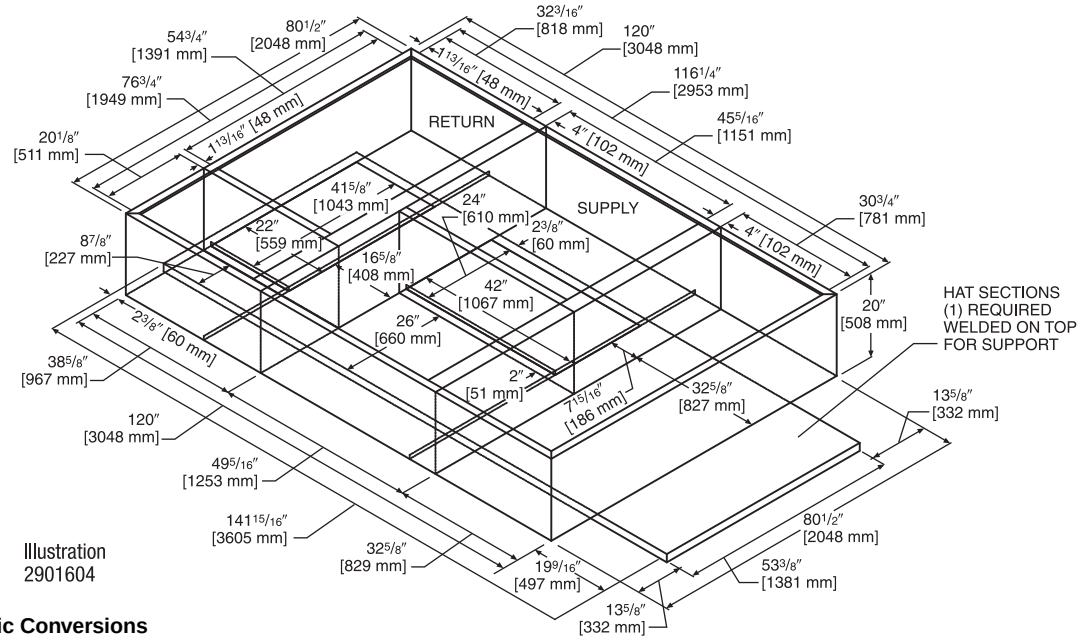


Illustration
2901604

[ ] Designates Metric Conversions

CONCENTRIC DIFFUSER APPLICATION

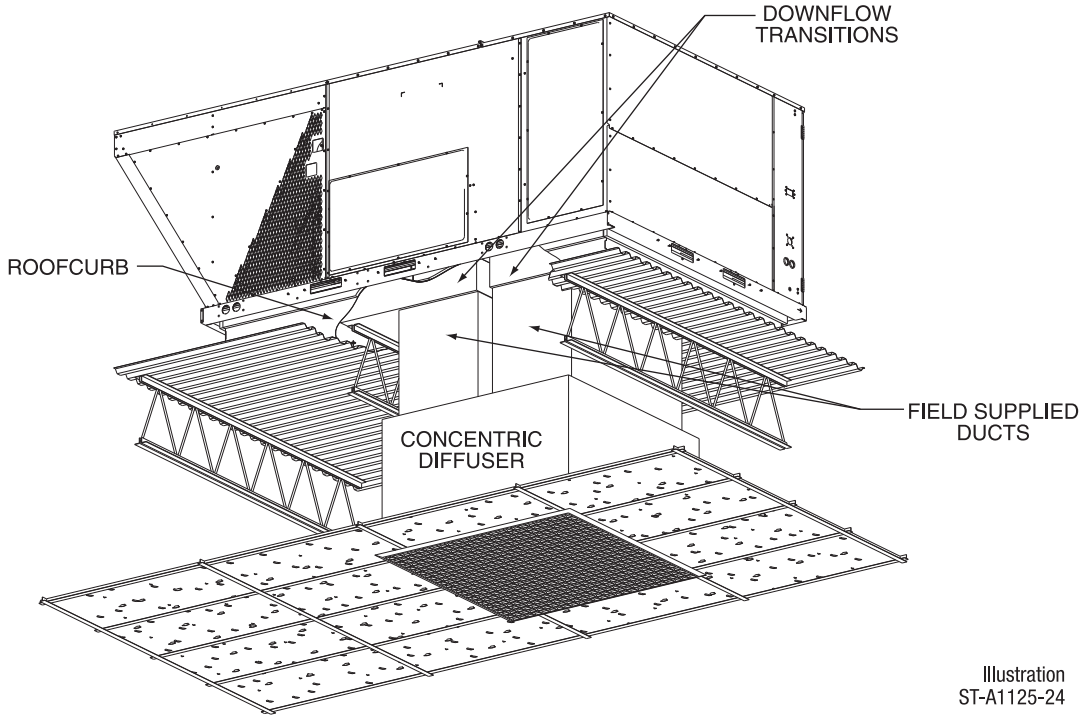


Illustration
ST-A1125-24

DOWNFLOW TRANSITION DRAWINGS

RXMC-CJ07 (15 Ton) [52.8 kW]

- Used with RXRN-AD80 and RXRN-AD81 Concentric Diffusers.

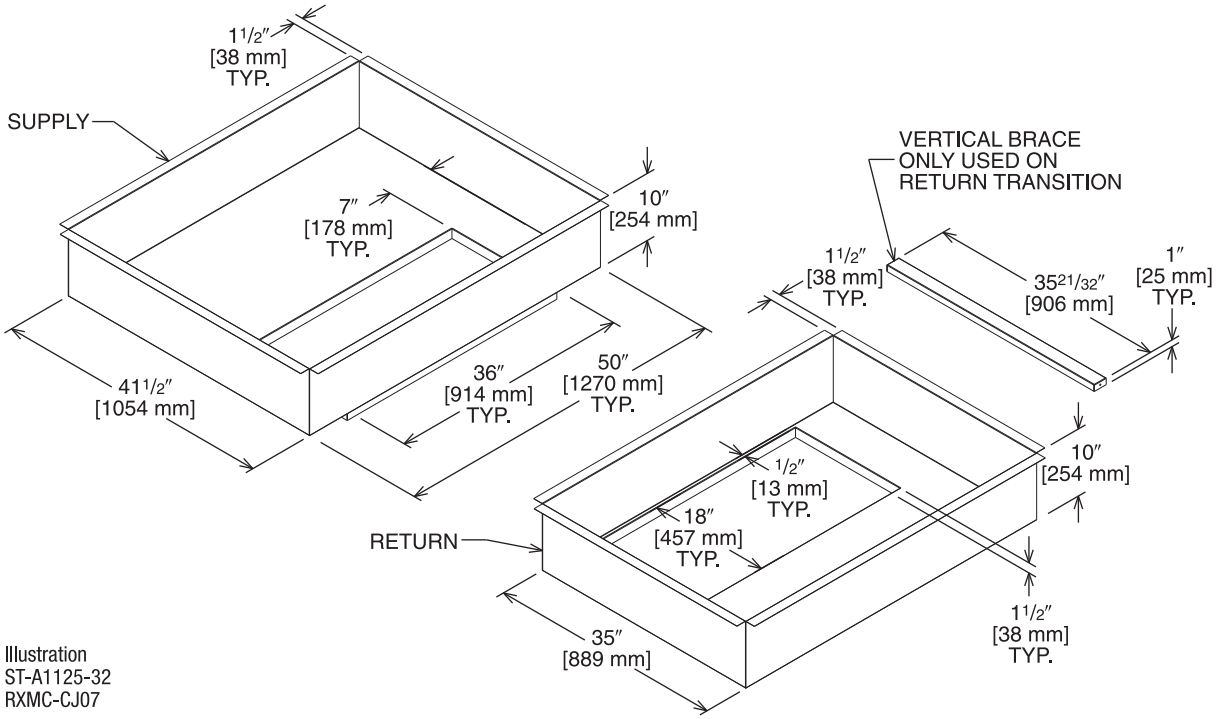
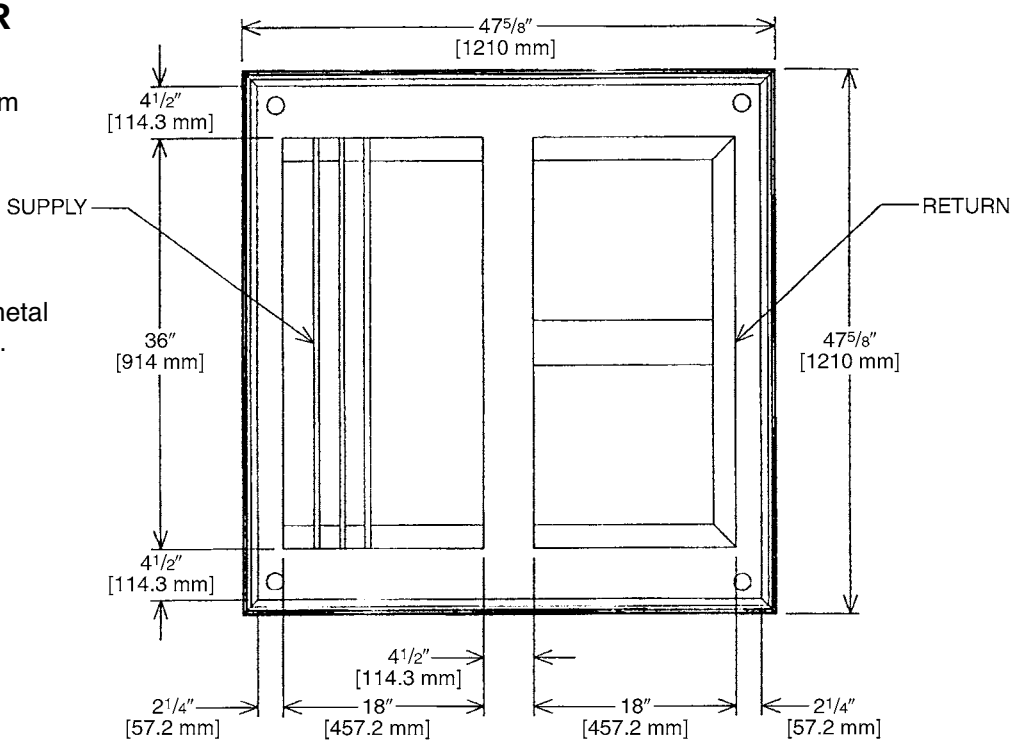


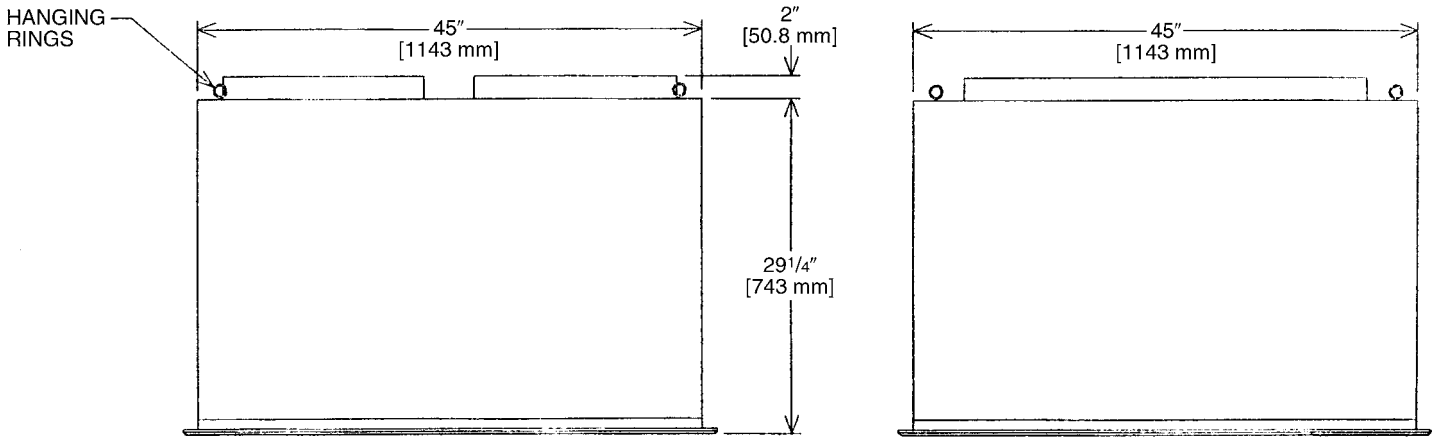
Illustration
ST-A1125-32
RXMC-CJ07

[ ] Designates Metric Conversions

CONCENTRIC DIFFUSER 15 TON [52.8 kW] FLUSH

- All aluminum diffuser with aluminum return air eggcrate.
- Built-in anti-sweat gasket.
- Molded fiberglass supports.
- Built-in hanging supports.
- Diffuser box constructed of sheetmetal insulated with 1" [25.4 mm] 1.5 lbs. [.7 kg] duct liner.





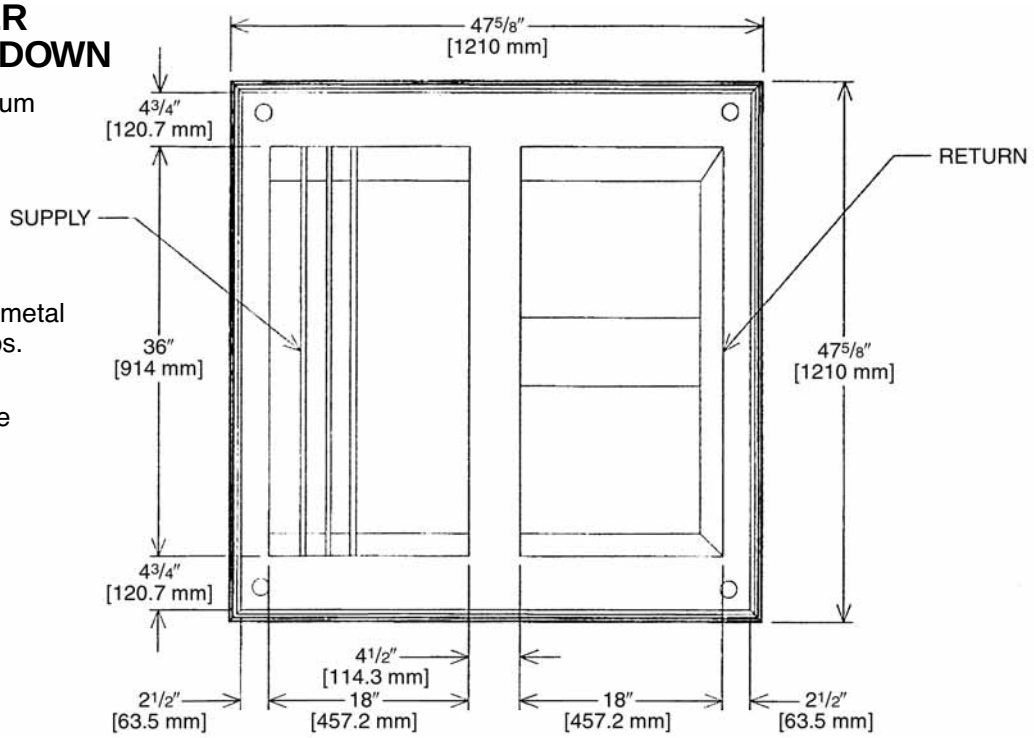
CONCENTRIC DIFFUSER SPECIFICATIONS

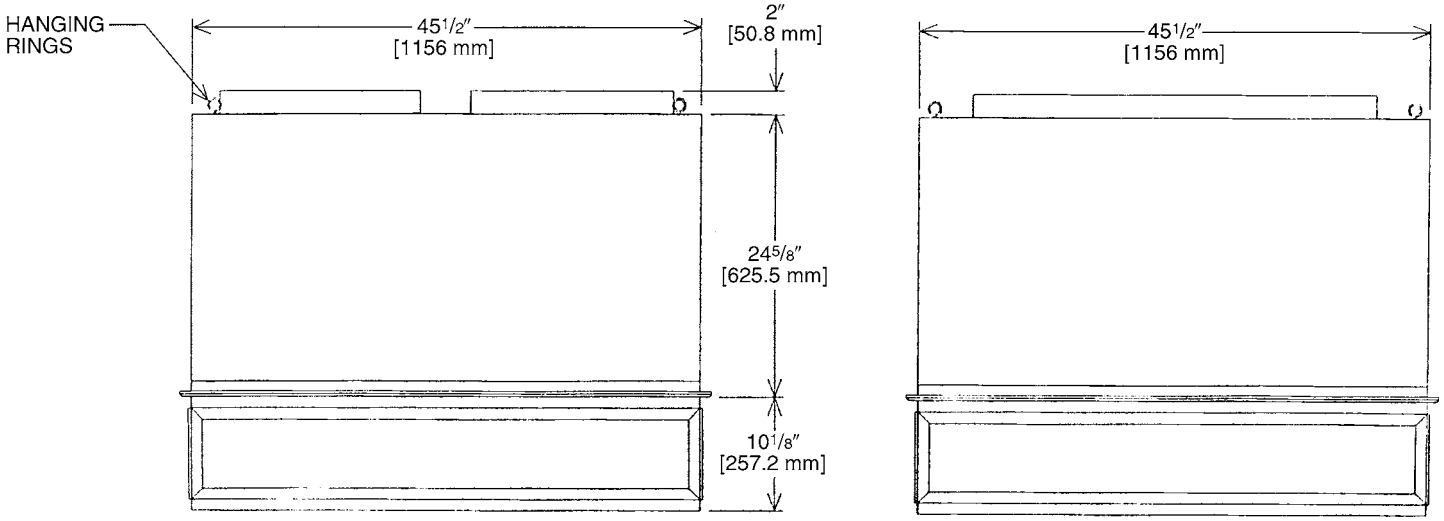
PART NUMBER	CFM [L/s]	STATIC PRESSURE	THROW FEET	NECK VELOCITY	JET VELOCITY
RXRN-AD80	5600 [2643]	0.36	28-37	1000	2082
	5800 [2737]	0.39	29-38	1036	2156
	6000 [2832]	0.42	40-50	1071	2230
	6200 [2926]	0.46	42-51	1107	2308
	6400 [3020]	0.50	43-52	1143	2379
	6600 [3115]	0.54	45-56	1179	2454

[ ] Designates Metric Conversions

CONCENTRIC DIFFUSER 15 TON [52.8 kW] STEP DOWN

- All aluminum diffuser with aluminum return air eggcrate.
- Built-in anti-sweat gasket.
- Molded fiberglass supports.
- Built-in hanging supports.
- Diffuser box constructed of sheetmetal 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-AD81	5600 [2643]	0.36	39-49	920	920
	5800 [2737]	0.39	42-51	954	954
	6000 [2832]	0.42	44-54	1022	1022
	6200 [2926]	0.46	45-55	1056	1056
	6400 [3020]	0.50	46-55	1090	1090
	6600 [3115]	0.54	47-56	1124	1124

[ ] Designates Metric Conversions

Guide Specifications RJNL-B180

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ROOFTOP PACKAGED HEAT PUMP

HVAC Guide Specifications

Size Range: 15 Nominal Tons

Section Description

23 06 80 Schedules for Decentralized HVAC Equipment

23 06 80.13 Decentralized Unitary HVAC Equipment Schedule

23 06 80.13.A. Rooftop unit schedule

1. Schedule is per the project specification requirements.

23 07 16 HVAC Equipment Insulation

23 07 16.13 Decentralized, Rooftop Units:

1. Interior cabinet surfaces shall be insulated with a minimum 3/4-in. thick, minimum 1-1/2 lb density, flexible fiberglass insulation bonded with a phenolic binder, with aluminum foil facing on the air side.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 09 13 Instrumentation and Control Devices for HVAC

23 09 13.23 Sensors and Transmitters:

23 09 13.23.A. Thermostats

1. Thermostat must
   a. have capability to energize 2 different stages of cooling, and 2 different stages of heating and a reversing valve output.
   b. must include capability for occupancy scheduling.

23 09 33 Electric and Electronic Control System for HVAC

23 09 33.13 Decentralized, Rooftop Units:

23 09 33.13.A. General:

1. Shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-v transformer side. Transformer shall have 100VA capabilities.
2. Shall utilize color-coded wiring.
3. Shall include a central control terminal board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, economizer, thermostat, loss of charge, high pressure switches.
4. Unit shall include a minimum of one 10-pin screw terminal connection board for connection of control wiring.
5. Shall include integrated defrost system to prevent excessive frost accumulation during heating duty, and shall be controlled as follows:
   a. Defrost shall be initiated on the basis of Demand Defrost.
   b. The need for a defrost cycle is determined by one of two factors: Time or Frost Detection.
   c. Should six hours of compressor run time elapse without a defrost cycle and the coil temperature is below the frost accumulation temperature, a defrost cycle will be initiated.
   d. The control shall be capable of detecting frost accumulation on the outdoor coil and initiate a defrost cycle when necessary.

23 09 33.23.B. Safeties:

1. Compressor over-temperature, over current.
2. Loss of charge switch.
   a. Units with 2 compressors shall have different colored wires for the circuit 1 and circuit 2 low and high pressure switches.
   b. Loss of charge switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
   c. Loss of charge switch shall have a different sized connector than the high pressure switch. They shall physically prevent the cross-wiring of the safety switches between the high and low pressure side of the system.
3. High-pressure switch.
   a. Units with 2 compressors shall have different colored wires for the circuit 1 and circuit 2 low and high pressure switches.
   b. High pressure switch shall use different color wire than the low pressure switch. The purpose is to assist the installer and service person to correctly wire and or troubleshoot the rooftop unit.
   c. High pressure switch shall have a different sized connector than the loss of charge switch. They shall physically prevent the cross-wiring of the safety switches between the high and low pressure side of the system.
4. Freeze protection sensor, evaporator coil (optional).
5. Automatic reset, motor thermal overload protector.

23 09 93 Sequence of Operations for HVAC Controls

23 09 93.13 Decentralized, Rooftop Units:

23 09 93.13 INSERT SEQUENCE OF OPERATION

23 40 13 Panel Air Filters

23 40 13.13 Decentralized, Rooftop Units:

23 40 13.13.A. Standard filter section shall

1. Shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
2. Filters shall be accessible through an access panel as described in the unit cabinet section of this specification (23 81 19.13.H).

23 81 19 Self-Contained Air Conditioners

23 81 19.13 Small-Capacity Self-Contained Air Conditioners

23 81 19.13.A. General

1. 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.
2. 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.
3. Unit shall use environmentally sound R-410a refrigerant.
4. Unit shall be installed in accordance with the manufacturer's instructions.
5. Unit must be selected and installed in compliance with local, state, and federal codes.

23 81 19.13.B. Quality Assurance

1. Unit meets ASHRAE 90.1-2007 minimum efficiency requirements.
2. 3 phase units are Energy Star qualified.
3. Unit shall be rated in accordance with AHRI Standards 210/240 and 340/360.
4. Unit shall be designed to conform to ASHRAE 15, 2001.
5. Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.
6. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
7. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
8. Unit casing shall be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 5000-hour salt spray.
9. Unit shall be designed in accordance with ISO 9001:2000, and shall be manufactured in a facility registered by ISO 9001:2000.
10. Roof curb shall be designed to conform to NRCA Standards.
11. 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.
12. Unit shall be designed in accordance with UL Standard 1995, including tested to withstand rain.
13. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.

23 81 19.13.C. Delivery, Storage, and Handling

1. Unit shall be stored and handled per manufacturer's recommendations.
2. Lifted by crane requires either shipping top panel or spreader bars.
3. Unit shall only be stored or positioned in the upright position.

23 81 19.13.E. Project Conditions

1. As specified in the contract.

23 81 19.13.F. Operating Characteristics

1. Unit shall be capable of starting and running at 115ºF (46ºC) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 210/240 or 340/360 at ± 10% voltage.
2. Compressor with standard controls shall be capable of operation from 40ºF (4ºC) , ambient outdoor temperatures. Accessory low ambient kit is necessary if mechanically cooling at ambient temperatures below 40ºF (4ºC).
3. Unit shall be capable of simultaneous heating duty and defrost cycle operation when using accessory electric heaters.
4. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
5. Unit shall be factory configured for vertical supply & return configurations.
6. Unit shall be field convertible from vertical to horizontal configuration.

23 81 19.13.G. Electrical Requirements

1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.

23 81 19.13.H. Unit Cabinet

1. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a baked enamel finish on all externally exposed surfaces.
2. Unit cabinet exterior paint shall be: film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60ºF): 60, Hardness: H-2H Pencil hardness.
3. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 210/240 or 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 3/4-in. thick, 1 lb density, flexible fiberglass insulation, aluminum foil-faced on the air side.
4. Base of unit shall have locations for thru-the-base electrical connections (factory installed or field installed), standard.
5. Base Rail
   a. Unit shall have base rails on all sides.
   b. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
   c. Holes shall be provided in the base rail for moving the rooftop by fork truck.
   d. Base rail shall be a minimum of 14 gauge thickness.
6. Condensate pan and connections:
   a. Shall be a sloped condensate drain pan made of a non-corrosive material.
   b. Shall comply with ASHRAE Standard 62.
   c. Shall use a 1" -11 1/2 NPT drain connection, through the side of the drain pan. Connection shall be made per manufacturer's recommendations.
7. Electrical Connections
   a. All unit power wiring shall enter unit cabinet at a single, factory-prepared, knockout location.
   b. Thru-the-base capability
      (1) Standard unit shall have a thru-the-base electrical location(s) using a raised, embossed portion of the unit basepan.
      (2) No basepan penetration, other than those authorized by the manufacturer, is permitted.
8. Component access panels (standard)
   a. Cabinet panels shall be easily removable for servicing.
   b. Stainless steel metal hinges are standard on all doors.
   c. Panels covering control box, indoor fan, indoor fan motor, and electric or gas heater components (where applicable), shall have ¼ turn latches.

23 81 19.13.J. Coils

1. Standard Aluminum/Copper Coils: on all models.
   a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
   b. Evaporator and Condenser coils shall be leak tested to 150 psig, pressure tested to 550 psig, and qualified to UL 1995 burst test at 2,200 psig.

23 81 19.13.K. Refrigerant Components

1. Refrigerant circuit shall include the following control, safety, and maintenance features:
   a. Thermal Expansion Valve (TXV) with venturi type distributor.
   b. Refrigerant filter drier.
   c. External service gauge connections to unit suction and discharge lines.
2. Compressors
   a. Unit shall use one fully hermetic, scroll compressor for each independent refrigeration circuit.
   b. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
   d. Compressors shall be internally protected from high discharge temperature conditions.
   e. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
   f. Compressor shall be factory mounted on rubber grommets.
   g. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.
   h. Crankcase heaters shall be utilized on all models to protect compressor with specific refrigerant charge.

23 81 19.13.L. Filter Section

1. Filters access is specified in the unit cabinet section of this specification.
2. Filters shall be held in place by a sliding filter tray, facilitating easy removal and installation.
3. Shall consist of factory-installed, low velocity, throw-away 2-in. thick fiberglass filters.
4. Filters shall be standard, commercially available sizes.
5. Filter face velocity shall not exceed 365 fpm at nominal airflows.

23 81 19.13.M. Evaporator Fan and Motor

1. Evaporator fan motor:
   a. Shall have permanently lubricated bearings.
   b. Shall have inherent automatic-reset thermal overload protection or circuit breaker.
   c. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating shall be required.
2. Belt-driven Evaporator Fan:
   a. Belt drive shall include an adjustable-pitch motor pulley.
   b. Shall use sealed, permanently lubricated ball-bearing type.
   c. Blower fan shall be double-inlet type with forward-curved blades.
   d. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.

23 81 19.13.N. Condenser Fans and Motors

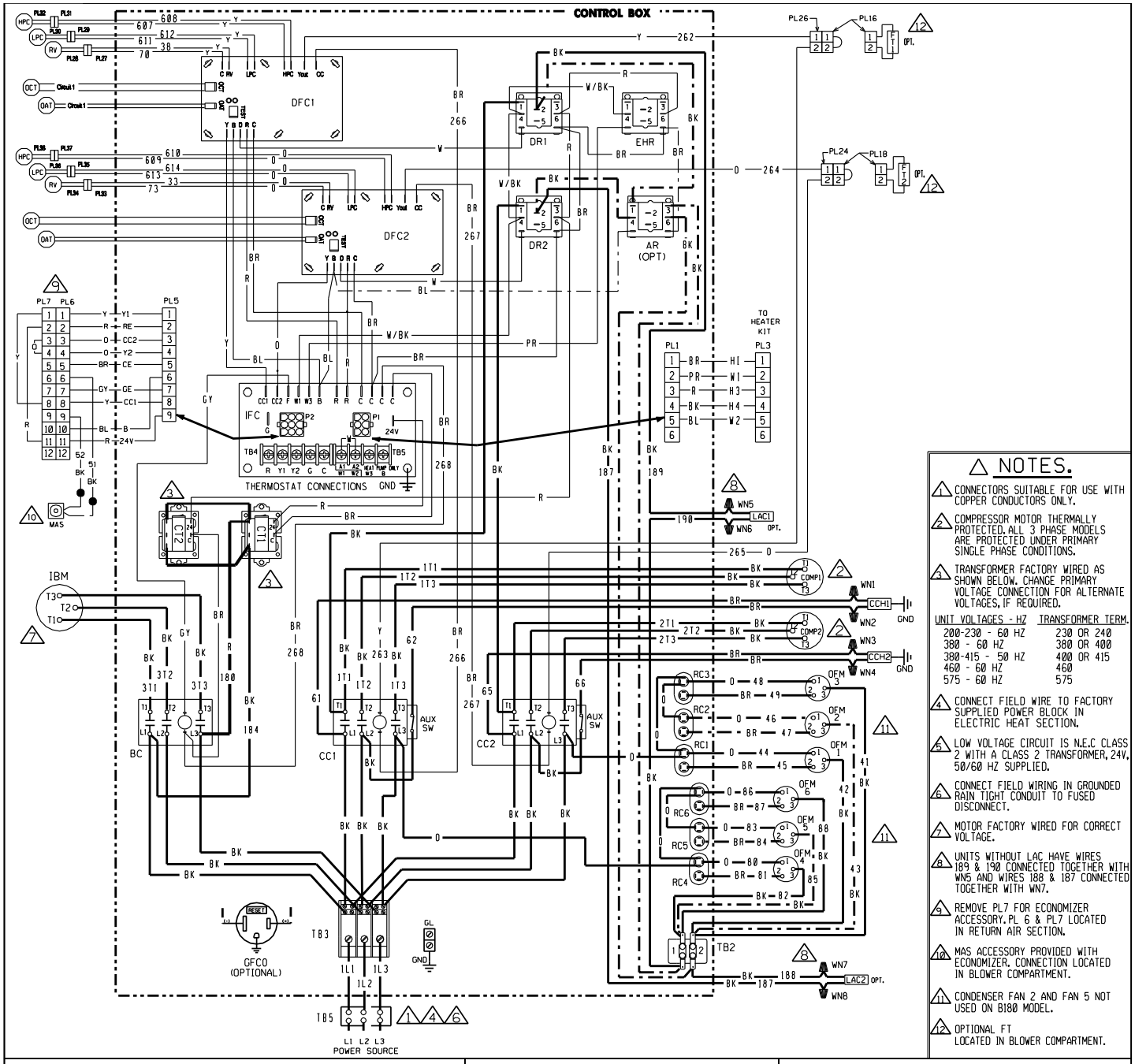
1. Condenser fan motors:
   a. Shall be a totally enclosed motor.
   b. Shall use permanently lubricated bearings.
   c. Shall have inherent thermal overload protection with an automatic reset feature.
   d. Shall use a shaft-down design. Shaft-up designs including those with “rain-slinger devices” shall not be allowed.
2. Condenser Fans:
   a. Shall be a direct-driven propeller type fan.
   b. Shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.

23 81 19.13.O. Special Features, Options and Accessories

1. Integrated Economizers:
   a. Integrated, gear-driven parallel modulating blade design type capable of simultaneous economizer and compressor operation.
   b. Independent modules for vertical or horizontal return configurations shall be available. Vertical return modules shall be available as a factory installed option.
   c. Damper blades shall be galvanized steel with metal gears. Plastic or composite blades on intake or return shall not be acceptable.
   d. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below setpoints.
   e. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
   f. Shall be capable of introducing up to 100% outdoor air.
   g. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air.
   h. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
   i. An outdoor single enthalpy sensor shall be provided as standard. Outdoor air sensor setpoint shall be adjustable and shall range from the enthalpy equivalent of 63°F @ 50% rh to 73°F @ 50% rh. Additional sensor options shall be available as accessories.
   j. 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%.
   k. 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 setpoint.
   l. Economizer controller shall accept a 2-10Vdc CO2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor-air damper to provide ventilation based on the sensor input.
   m. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
   n. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.
   o. Economizer wire harness will have provision for smoke detector.
2. Two-Position Motorized Damper
   a. Damper shall be a Two-Position Motorized Damper. Damper travel shall be from the full closed position to the field adjustable %-open setpoint.
   b. Damper shall include adjustable damper travel from 25% to 100% (full open).
   c. Damper shall include single or dual blade, gear driven dampers and actuator motor.
   d. Actuator shall be direct coupled to damper gear. No linkage arms or control rods shall be acceptable.
   e. Damper will admit up to 100% outdoor air for applicable rooftop units.

f. Damper shall close upon indoor (evaporator) fan shutoff and/or loss of power.
g. The damper actuator shall plug into the rooftop unit's wiring harness plug. No hard wiring shall be required.
h. Outside air hood shall include aluminum water entrainment filter

3. Manual damper
   a. 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.
4. Head Pressure Control Package
   a. Controller shall control coil head pressure by condenser-fan cycling.
5. Convenience Outlet:
   a. Non-Powered convenience outlet.
      (1.) Outlet shall be powered from a separate 115-120v power source.
      (2.) A transformer shall not be included.
      (3.) Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle.
      (4.) Outlet shall include 15 amp GFI receptacles.
      (5.) Outlet shall be accessible from outside the unit.
6. Propeller Power Exhaust:
   a. Power exhaust shall be used in conjunction with an integrated economizer.
   b. Independent modules for vertical or horizontal return configurations shall be available.
   c. Horizontal power exhaust is shall be mounted in return ductwork.
   d. 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.
7. Roof Curbs (Vertical):
   a. Full perimeter roof curb with exhaust capability providing separate air streams for energy recovery from the exhaust air without supply air contamination.
   b. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
   c. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
8. High-Static Indoor Fan Motor(s) and Drive(s):
   a. High-static motor(s) and drive(s) shall be factory-installed to provide additional performance range.
9. Outdoor Air Enthalpy Sensor:
   a. 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.
10. Return Air Enthalpy Sensor:
    a. The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy control.
11. Indoor Air Quality (CO2) Sensor:
    a. Shall be able to provide demand ventilation indoor air quality (IAQ) control.
    b. The IAQ sensor shall be available in wall mount with LED display. The setpoint shall have adjustment capability.
12. Smoke detectors:
    a. Shall be a Four-Wire Controller and Detector.
    b. Shall be environmental compensated with differential sensing for reliable, stable, and drift-free sensitivity.
    c. Shall use magnet-activated test/reset sensor switches.
    d. Shall have a recessed momentary switch for testing and resetting the detector.
    e. Controller shall include:
       (1.) One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel.
       (2.) Two Form-C auxiliary alarm relays for interface with rooftop unit or other equipment.
       (3.) One Form-C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station.
       (4.) Capable of direct connection to two individual detector modules.
       (5.) Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications.
13. Electric Heat:
    a. Heating Section
       (1.) 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.
       (2.) Heater assemblies are provided with integral fusing for protection of internal heater circuits not exceeding 48 amps each. Auto reset thermo limit controls, magnetic heater contactors (24 v coil) and terminal block all mounted in electric heater control box (minimum 18 ga galvanized steel) attached to end of heater assembly.



NOTES.

1. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. COMPRESSOR MOTOR THERMALLY PROTECTED. ALL 3 PHASE MODELS ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
3. TRANSFORMER FACTORY WIRED AS SHOWN BELOW. CHANGE PRIMARY VOLTAGE CONNECTION FOR ALTERNATE VOLTAGES, IF REQUIRED.

UNIT VOLTAGES - HZ	TRANSFORMER TERM.
200-230 - 60 HZ	230 OR 240
380 - 60 HZ	380 OR 400
380-415 - 50 HZ	400 OR 415
460 - 60 HZ	460
575 - 60 HZ	575

4. CONNECT FIELD WIRE TO FACTORY SUPPLIED POWER BLOCK IN ELECTRIC HEAT SECTION.
5. LOW VOLTAGE CIRCUIT IS N.E.C CLASS 2 WITH A CLASS 2 TRANSFORMER, 24V, 50/60 HZ SUPPLIED.
6. CONNECT FIELD WIRING IN GROUNDED RAIN TIGHT CONDUIT TO FUSED DISCONNECT.
7. MOTOR FACTORY WIRED FOR CORRECT VOLTAGE.
8. UNITS WITHOUT LAC HAVE WIRES 189 & 190 CONNECTED TOGETHER WITH WN5 AND WIRES 188 & 187 CONNECTED TOGETHER WITH WN7.
9. REMOVE PL7 FOR ECONOMIZER ACCESSORY. PL 6 & PL7 LOCATED IN RETURN AIR SECTION.
10. MAS ACCESSORY PROVIDED WITH ECONOMIZER. CONNECTION LOCATED IN BLOWER COMPARTMENT.
11. CONDENSER FAN 2 AND FAN 5 NOT USED ON B180 MODEL.
12. OPTIONAL FT LOCATED IN BLOWER COMPARTMENT.

COMPONENT CODE

AR	AUXILIARY RELAY
BC	BLOWER CONTACTOR
CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
COMP	COMPRESSOR
CT	CONTROL TRANSFORMER
DFC	DEFROST CONTROL
DR	DEFROST RELAY
EHR	ELECTRIC HEAT RELAY
FT	FREEZE STAT
GFCO	GROUND FAULT CONVENIENCE OUTLET
GL	GROUND LUG
GND	GROUND
HPC	HIGH PRESSURE CONTROL
IBM	INDOOR BLOWER MOTOR BELT DRIVE
IFC	INTEGRATED FURNACE CONTROL
LAC	LOW AMBIENT COOLING CONTROL
LPC	LOW PRESSURE CONTROL
MAS	MIX AIR SENSOR
OFM	OUTDOOR FAN MOTOR
RC	RUN CAPACITOR
PL	PLUG
	WIRE NUT

WIRING INFORMATION

LINE VOLTAGE
- -FACTORY STANDARD
- -FACTORY OPTION
- -FIELD INSTALLED

LOW VOLTAGE
- -FACTORY STANDARD
- -FACTORY OPTION
- -FIELD INSTALLED

REPLACEMENT WIRE
- -MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105° C MIN.)

WARNING
- -CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., AND LOCAL CODES AS APPLICABLE.

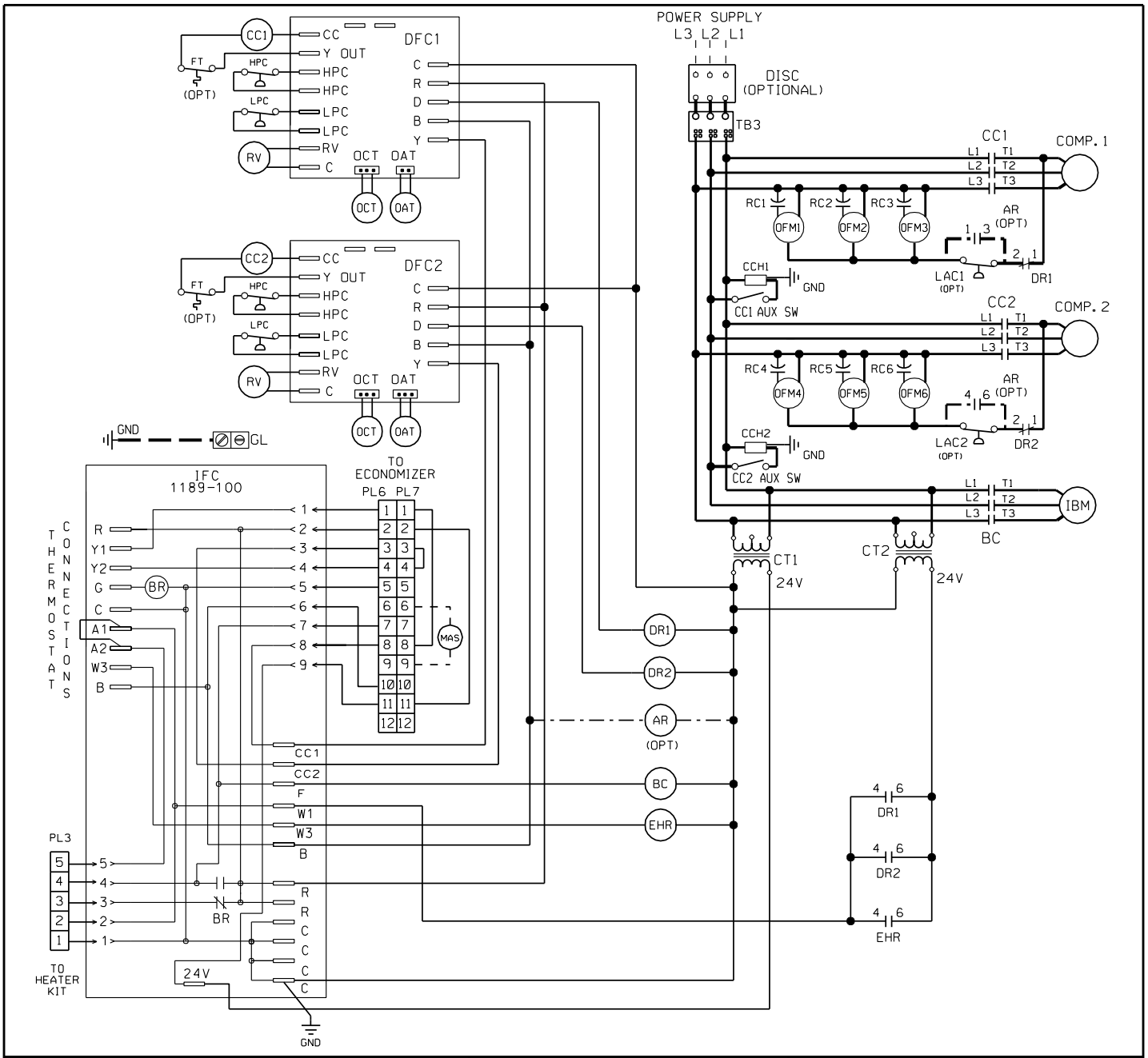
WIRE COLOR CODE

BK	BLACK	O	ORANGE
BR	BROWN	PR	PURPLE
BL	BLUE	R	RED
G	GREEN	W	WHITE
GY	GRAY	Y	YELLOW

WIRING DIAGRAM

15 & 20 TON PACKAGED HEAT PUMP
208-230/460/575V 3 PH, 60 HZ.
200-220/380-415 3PH, 50 HZ.
PACKAGED HEAT PUMP

DR. BY	APP. BY	DATE	DWG. NO.	REV
JRJ		5-25-10	90-42517-34	02



COMPONENT CODE

AUX SW	AUXILLIARY SWITCH	MAS	MIXED AIR SENSOR
BC	BLOWER MOTOR CONTACTOR	OFM	OUTDOOR FAN MOTOR
BR	BLOWER RELAY	OPT	OPTIONAL
CC	COMPRESSOR CONTACTOR	PL	PLUG
CCH	CRANKCASE HEATER	RC	RUN CAPACITOR
COMP	COMPRESSOR	TB	TERMINAL BLOCK
CT	CONTROL TRANSFORMER		
FT	FREEZE STAT		
GL	GROUND LUG		
GND	GROUND		
HPC	HIGH PRESSURE CONTROL		
IBM	INDOOR BLOWER MOTOR		
IFC	INTEGRATED FURNACE CONTROL		
LAC	LOW AMBIENT CONTROL		
LPC	LOW PRESSURE CONTROL		

WIRING INFORMATION

LINE VOLTAGE
- -FACTORY STANDARD
- -FACTORY OPTION
- -FIELD INSTALLED

LOW VOLTAGE
- -FACTORY STANDARD
- -FACTORY OPTION
- -FIELD INSTALLED

REPLACEMENT WIRE
- -MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105° C MIN.)

WARNING
- -CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., AND LOCAL CODES AS APPLICABLE.

WIRE COLOR CODE

BK	BLACK	O	ORANGE
BR	BROWN	PR	PURPLE
BL	BLUE	R	RED
G	GREEN	W	WHITE
GY	GRAY	Y	YELLOW

WIRING SCHEMATIC

15 & 20 TON PACKAGED HEAT PUMP
208-230/460/575V 3 PH, 60 HZ
200-220/380-415V 3 PH, 50 HZ.

DR. BY	APP. BY	DATE	DWG. NO.	REV
JRJ		06-01-10	90-42517-35	00

BEFORE PURCHASING THIS APPLIANCE, READ IMPORTANT ENERGY COST AND EFFICIENCY INFORMATION AVAILABLE FROM YOUR RETAILER.

GENERAL TERMS OF LIMITED WARRANTY

Ruud 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.

For Complete Details of the Limited Warranty, Including Applicable Terms and Conditions, See Your Local Installer or Contact the Manufacturer for a Copy.

Compressor .....Five (5) Years
Electric Resistance Heater Elements .....Five (5) Years
Any Other Part.....One (1) Year

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.

Ruud Heating,
Cooling and
Water Heating

P.O. Box 17010, Fort Smith, AR 72917

"In keeping with its policy of continuous progress and product improvement, Ruud reserves the right to make changes without notice."

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