

## Ruud Commercial Ultra™ Series Package Gas Electric Unit



Unit shown with optional  
louwered coil protection.

### **RKRL-C Series**

With ClearControl™

Nominal Sizes 7.5 & 10 Tons [26.4 & 35.2 kW]  
ASHRAE 90.1-2007 Compliant Model

### **RKRL-H Series**

With ClearControl™ and VFD Technology

Nominal Sizes 7.5 & 10 Tons [26.4 & 35.2 kW]  
ASHRAE 90.1-2010 Compliant Model



25 TON MODEL IS OUTSIDE  
THE SCOPE OF AHRI  
STANDARD 340/360

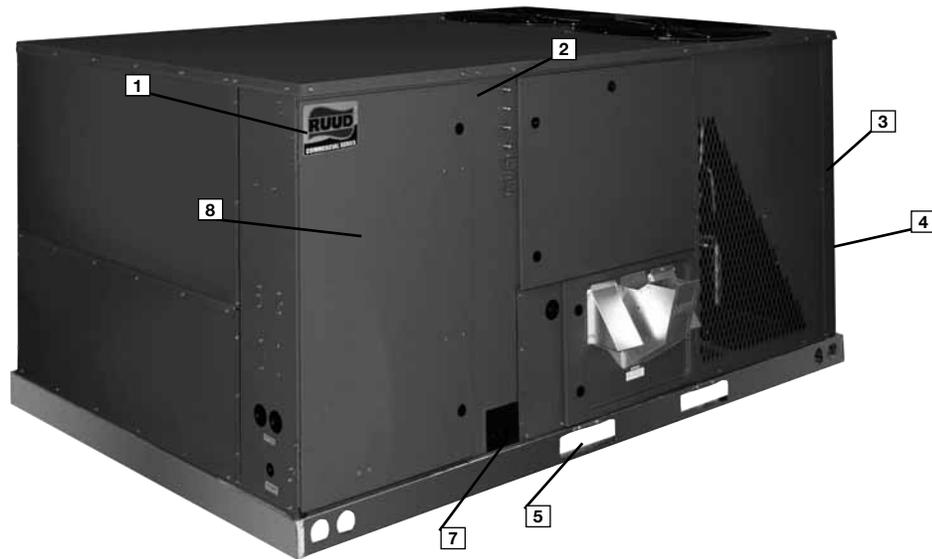
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## RKRL-C/H STANDARD FEATURES INCLUDE:

- R-410A HFC refrigerant.
- Complete factory charged, wired and run tested.
- Scroll compressors with internal line break overload and high-pressure protection.
- Dual stage compressor.
- Convertible airflow – vertical downflow or horizontal sideflow.
- 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.
- Single slab, single pass designed evaporator and condenser coils facilitate easy cleaning for maintained 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 ASTM B117 steel coated on each side for maximum protection. G90 galvanized.
- One piece top cover and one piece base pan with drawn supply and return opening for superior water management.
- Forkable base rails for easy handling and lifting.
- Single point electrical and gas 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, condenser and gas heat inducer motors.
- Condenser motors are internally protected, totally enclosed with shaft down design.
- 2 inch filter standard with slide out design.
- Two stage gas valve, direct spark ignition, and induced draft for efficiency and reliability.
- Tubular heat exchange for long life and induced draft for efficiency and reliability.
- Solid state furnace control with on board diagnostics.
- 24 volt control system with resettable circuit breakers.
- Colored and labeled wiring.
- Copper tube/Aluminum Fin Evaporator coil.
- MicroChannel condenser coil.
- Molded compressor plug.
- Factory Installed ClearControl™, a Direct Digital Control (DDC) and sensors which can connect to LonWorks™ or BACnet® BAS systems for remote monitoring and control.
- -H models with supply fan Variable Frequency Drive (VFD) meets ASHRAE 90.1-2010 and California Title 24.

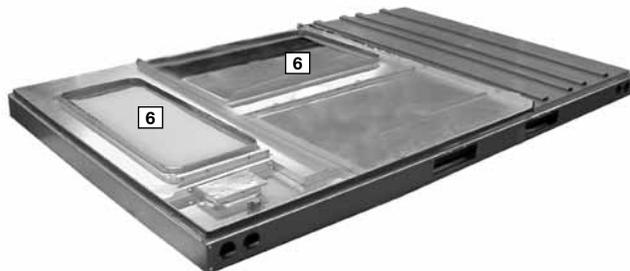


Ruud Package equipment is designed from the ground up with the latest features and benefits required to compete in today's market. The clean design stands alone in the industry and is a testament to the quality, reliability, ease of installation and serviceability that goes into each unit. Outwardly,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

The sheet-metal cabinet (2) uses nothing less than 18-gauge material for structural components with an underlying coat of G90. To ensure the leak-proof integrity of these units, the design utilizes a one-piece top with a 1/8" drip lip (3), gasket-protected

panels and screws. The Ruud hail guard (4) (optional) is its trademark, and sets the standard for coil protection in the industry. 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.

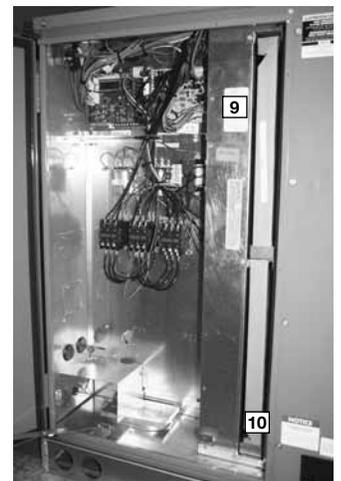
Anything built to last must start with the right foundation. In this case, the foundation is 14-gauge, commercial-grade, full-perimeter base rails (5), which integrate fork slots and rigging holes to save set-up time on the job site. The base pan is stamped, which forms a 1-1/8" flange around the supply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

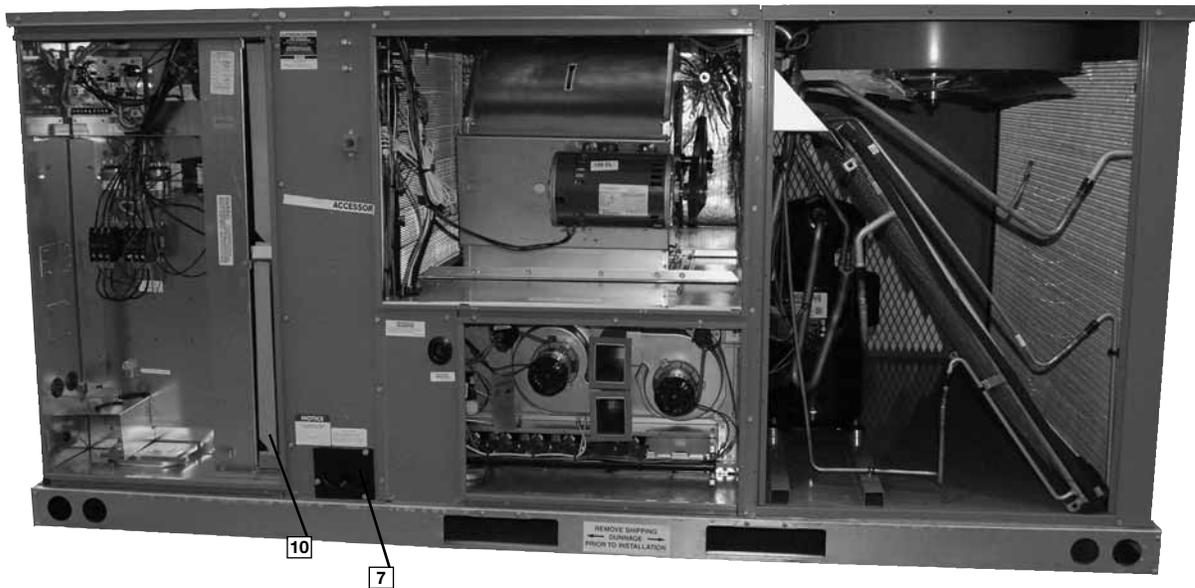


During development, each unit was tested to U.L. 1995, ANSI 21.47, AHRI 340-360 and other Ruud-required reliability tests. Ruud adheres to stringent ISO 9002 quality procedures, and each unit bears the U.L. and AHRI certification labels located on the unit nameplate (8). Contractors can rest assured that when a Ruud package unit arrives at the job, it is ready to go with a factory charge and quality checks.

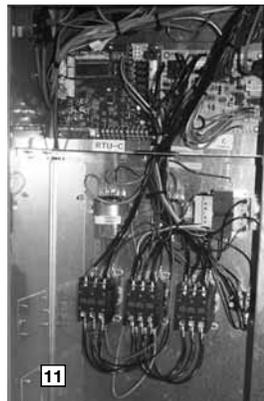
Access is granted with 1/4 turn fasteners and hinged access panels. Access to all major compartments is from the front of the unit, including the filter and electrical compartment, blower compartment, furnace section, and outdoor section. Each panel is permanently embossed with the compartment name (control/filter access, blower access and furnace access).

Electrical and filter compartment access is through a large hinged-access panel. 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.

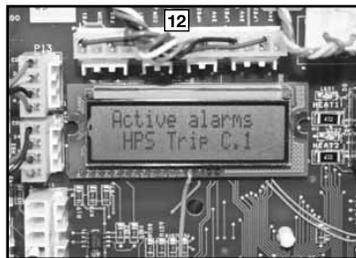




Inside the control box (11), each electrical component is clearly identified with a label that matches the component to the wire diagram for ease of troubleshooting. All wiring is numbered on each end of the termination and color-coded to match the wiring diagram. The integrated furnace control, used 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 a blower contactor and compressor contactor for each compressor.



As part of the ClearControl™ system which allows real time monitoring and communication between rooftop units, the RKRL-C/H Package Gas Electric 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 perform 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 (12). New 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 RKRL-C/H Package Gas/Electric with the RTU-C is specifically designed to be applied in four distinct applications:



The RKRL-C/H 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 onto the unit RTU-C controller and allows communication between the RTU-C and the BACnet MSTP network. A zone sensor, a BACnet network zone sensor, a BACnet thermostat or DDC controller may be used to send the zone temperature 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.

The RKRL-C/H 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 the RTU-C 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 ft. with no repeater. The LonWorks limit of 64 nodes per segment applies to this device.

The RKRL-C/H 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.

The RKRL-C/H is compatible with a zone sensor and 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.

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.

## Unit Features & Benefits RKRL-C/H Series

-H models with factory installed supply fan Variable Frequency Drive (VFD) (13) optimizes energy usage year round by providing a lower speed for first stage cooling operation improving IEEER's over the conventional constant fan system. Furthermore, operating in the constant fan mode at the reduced speed can use as little as 1/5<sup>th</sup> of the energy of a conventional constant fan system. Also, by operating at a lower speed on first stage cooling up to 126% more moisture is removed improving comfort during low load operation. The VFD supply fan factory option meet's California Title 24 and ASHRAE 90.1-2010 requirements for multi blower speed control. VFD also ramps up to the desired speed reducing stress on the supply fan components and reducing the noise from 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.



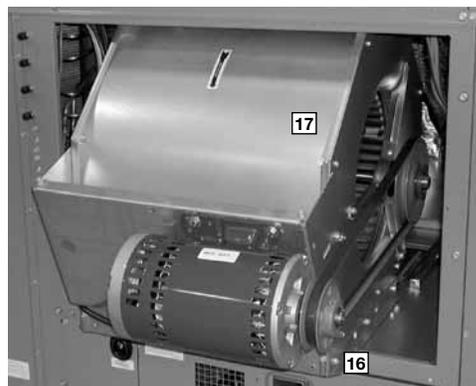
For added convenience in the field, a factory-installed convenience outlet and disconnect (14) are available. Low and High voltage can enter either from the side or through the base. Low-voltage connections are made through the low-voltage terminal strip. For ease of access, the U.L.-required low voltage barrier can be temporarily removed for low-voltage termination and then reinstalled. The high-voltage connection is terminated at the number 1 compressor contactor. The suggested mounting for the field-installed disconnect is on the exterior side of the electrical control box.



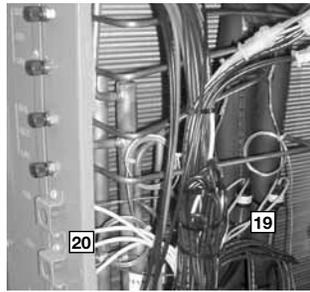
To the right of the electrical and filter compartment are the externally mounted gauge ports, which are permanently identified by embossed wording that clearly identifies the compressor circuit, high pressure connection and low pressure connection (15). With the gauge ports mounted externally, an accurate diagnostic of system operation can be performed quickly and easily. Brass caps on the schrader fitting assure that the gauge parts are leak proof.



The blower compartment is to the right of the gauge ports and can be accessed by 1/4 turn fastener. To allow easy maintenance of the blower assembly, the entire assembly easily slides out by removing two 3/8" screws from the blower retention bracket. The adjustable motor pulley (16) 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 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 (17) 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.

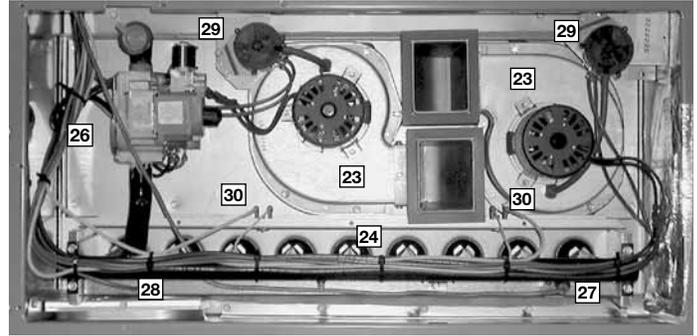
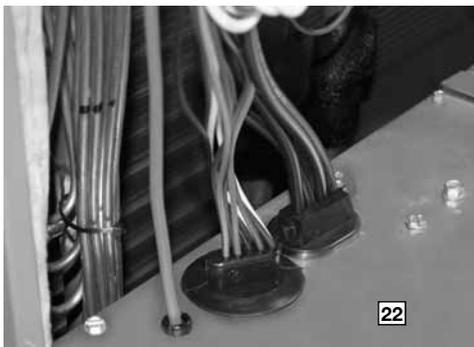


Also inside the blower compartment is the low-ambient control (18), low-pressure switch (19), high-pressure switch (20) and freeze sensor (21). The low-ambient control allows for operation of the compressor down to 0 degrees ambient temperature by cycling the outdoor fans on high pressure. The high-pressure switch will shut off the compressors if pressures in excess of 610 PSIG are detected, as may occur if the outdoor fan motor fails. The low-pressure switch shuts off the compressors if low pressure is detected due to loss of charge. The freeze sensor protects the compressor if the evaporator coil gets too cold (below freezing) due to low airflow and allows monitoring of the suction line temperature on the controller display. Each factory-installed option is brazed into the appropriate high or low side and wired appropriately. Use of polarized plugs and schrader fittings allow for easy field installation.



Inside the blower compartment the interlaced evaporator can also be viewed. The evaporator uses enhanced fin technology for maximum heat transfer. The TXV metering device assures even distribution of refrigerant throughout the evaporator. (Note: the single stage 6 ton utilizes an orifice).

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 (22) 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.

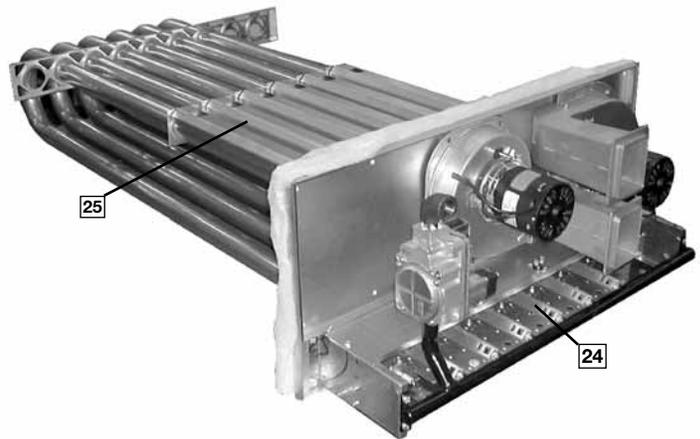


The furnace compartment contains the latest furnace technology on the market. The draft inducers (23) draw the flame from the Ruud exclusive in-shot burners (24) into the aluminized tubular heat exchanger (25) for clean, efficient gas heat. Stainless steel heat exchangers can be factory installed for those applications that have high fresh-air requirements, or applications in corrosive environments. Each furnace is equipped with a two-stage gas valve (26), which provides two stages of gas heat input. The first stage operates at 50% of the second stage (full fire). 81% steady state efficiency is maintained on both first and second stage by staging the multiple inducers to optimize the combustion airflow and maintain a near stoichiometric burn at each stage.

The direct spark igniter (27) assures reliable ignition in the most adverse conditions. This is coupled with remote flame sense (28) to assure that the flame has carried across the entire length of the burner assembly. Gas supply can be routed from the side or up through the base.

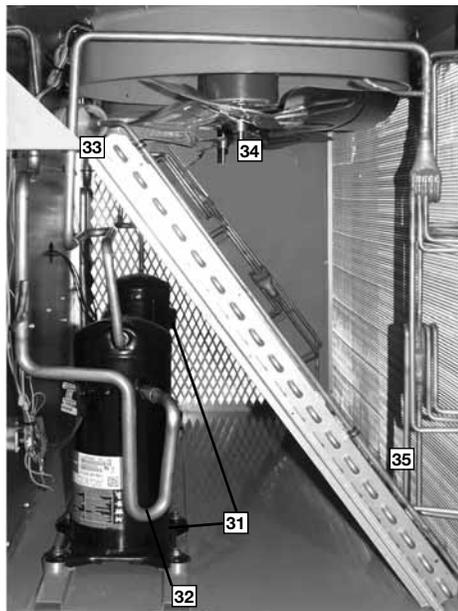
Each furnace has the following safety devices to assure consistent and reliable operation after ignition:

- Pressures switches (29) to assure adequate combustion airflow before ignition.
- Rollout switches (30) to assure no obstruction or cracks in the heat exchanger.
- A limit device that protects the furnace from over-temperature problems.



**Unit Features & Benefits**  
**AKRL-C/H Series**

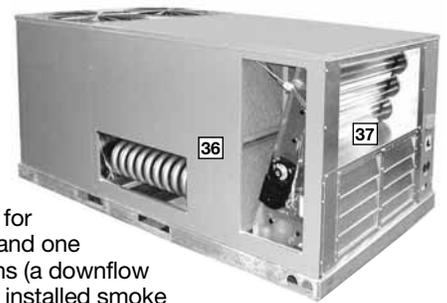
The compressor compartment houses the heart-beat of the unit. The scroll compressor (31) is known for its long life, and for reliable, quiet, and efficient operation. The suction and discharge lines are designed with shock loops (32) to absorb the strain and stress that the starting torque, steady state 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. (072 single stage)



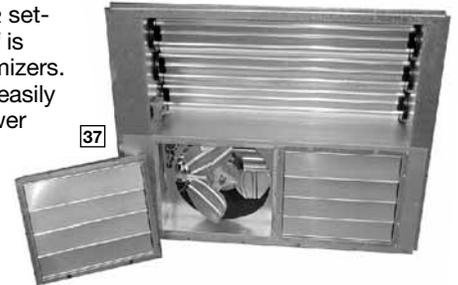
Each unit comes standard with filter dryer (33). The condenser fan motor (34) can easily be accessed and maintained through the top. The polarized plug connection allows the motor to be changed quickly and eliminates the need to snake wires through the unit.

The outdoor coil uses the latest enhanced fin design (35) 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 Mother Nature and vandalism.

Each unit is designed for both downflow or horizontal applications (36) for job configuration flexibility. The return air compartment can also contain an economizer (37).



Three models exist, two for downflow applications, and one for horizontal applications (a downflow economizer with factory installed smoke detector in the return section is available). Each unit is pre-wired for the economizer to allow quick plug-in installation. The economizer is also available as a factory-installed option. 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<sub>2</sub> setpoint. Barometric relief is standard on all economizers. Power Exhaust (37) is easily field-installed. The power exhaust is housed in the barometric relief opening and is easily slipped in with a plug-in assembly. The wire harness to the economizer also has accommodations for a smoke detector.



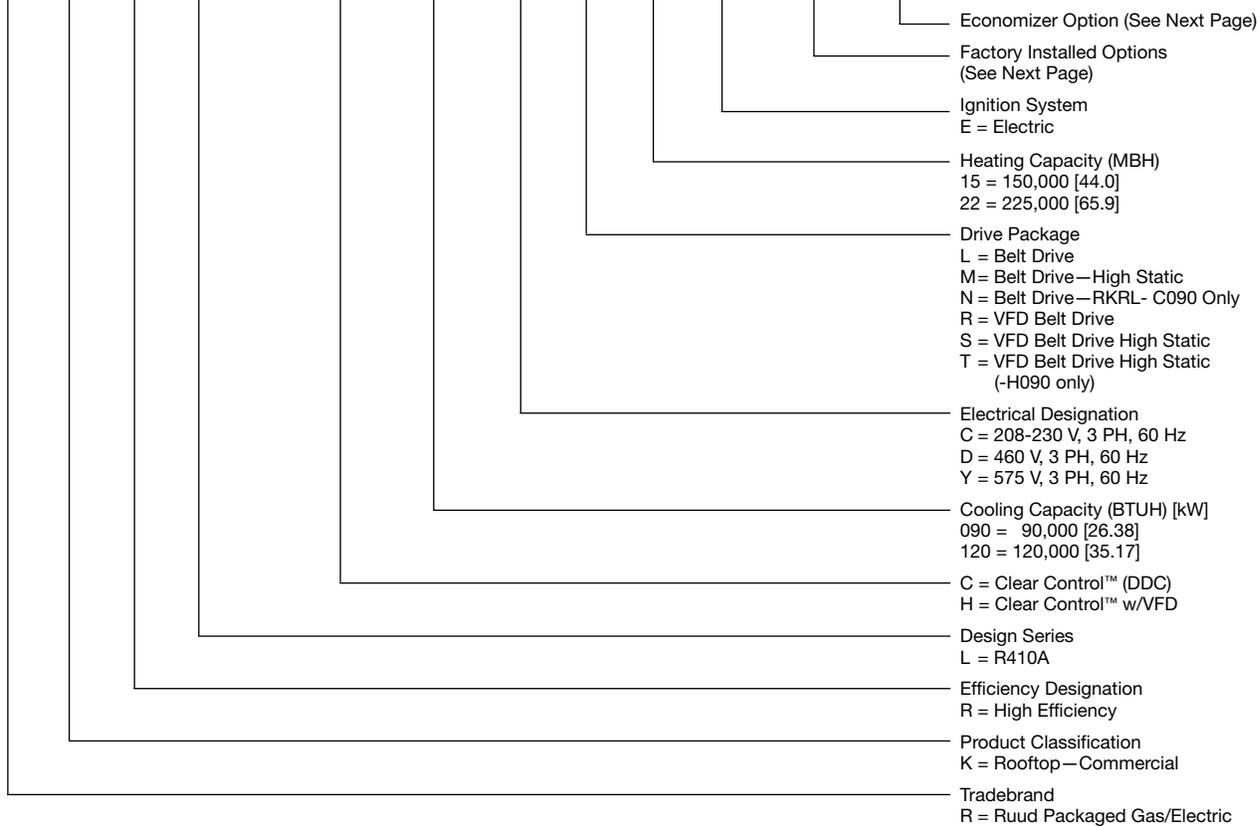
The damper minimum position, actual damper position, power exhaust on/off setpoint, mixed air temperature limit setpoint and Demand Controlled Ventilation (DCV) setpoint can be read and adjusted at the unit controller display or remotely through a network connection.

The Space CO<sub>2</sub> level, mixed air temperature, and Economizer Status (Free Cooling Available, Single or Dual Enthalpy) can be read at the unit controller display or remotely through a network connection. Economizer Faults will trigger a network Alarm and can be read at the unit controller display or remotely through a network connection.

The Ruud roofcurb (38) is made for toolless assembly at the jobsite by engaging a pin into the hinged corners of adjacent curb sides, which makes the assembly process quick and easy.



**R K R L - C 090 C L 15 E X X X**



[ ] Designates Metric Conversions

## FACTORY INSTALLED OPTION CODES FOR KRL-C (7.5 & 10 TON) [21.1 & 44.0 kW]

Option Code	Hail Guard	Stainless Steel Heat Exchanger	Non-Powered Convenience Outlet/Unfused Service Disconnect	Low Ambient/Comfort Alert
AD	x			
AJ		x		
AH			x	
AR				x
BF	x		x	
BG	x	x		
JD	x			x
JB		x	x	
KA	x	x		x
DP	x	x	x	x

NOTES: (1) High and low pressure is standard on all models.  
"x" indicates factory installed option.

## ECONOMIZER SELECTION FOR KRL (7.5 & 10 TON) [26.4 & 35.2 kW]

Option Code	No Economizer	DDC Single Enthalpy Economizer w/Barometric Relief	DDC Single Enthalpy Economizer w/Barometric Relief and Smoke Detector
A	x		
H		x	
J			x

"x" indicates factory installed option.

### 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.

### Examples:

RKRL-C120CL22E .....this unit has no factory installed options.

RKRL-C120CL22EBGA .....this unit is equipped with *hail guard and stainless steel heat exchanger*.

RKRL-C120CL22EAHA.....this unit is equipped with a *non-powered convenience outlet and unfused service disconnect*.

RKRL-C120CL22EAHH .....this unit is equipped as above *and* includes an *Economizer with single enthalpy sensor and with barometric relief*.

RKRL-C120CL22EAAH.....this unit is equipped with an *Economizer with single enthalpy sensor and Barometric Relief*.

[ ] Designates Metric Conversions

To select an RKRL-C/H 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—	208/240V—3 Phase 60 Hz
Total cooling capacity—	106,000 BTUH [31.0 kW]
Sensible Cooling Capacity —	82,000 BTUH [24.0 kW]
Heating Capacity —	150,000 BTUH [43.9 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) —	3600 CFM [1699 L/s]
*External Static Pressure —	0.40 in. WG [.10 kPa]

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

Since total cooling is within the range of a nominal 10 ton [35.1 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 3750 CFM [1770 L/s] indoor air flow (table basis):

Total Cooling Capacity = 118,900 BTUH [34.82 kW]  
Sensible Cooling Capacity = 99,950 BTUH [29.27 kW]  
Power Input (Compressor and Cond. Fans) = 8,950 watts

Use formula in note (1) to determine sensible capacity at 78°F [25.6 °C] DB evaporator entering air:

$$99,950 + (1.10 \times 3,600 \times (1 - 0.03) \times (78 - 80))$$

$$\text{Sensible Cooling Capacity} = 92,268 \text{ BTUH [27.02 kW]}$$

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

Select factors from airflow correction table at 3600 CFM [1699 L/s] and apply to data obtained in step 2 to obtain gross capacity:

Total Capacity = 118,900 x 0.98 = 116,522 BTUH [34.12 kW]  
Sensible Capacity = 92,268 x 0.95 = 87,655 BTUH [25.67 kW]  
Power Input = 8,950 x 0.99 = 8,861 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 3600 CFM [1699 L/s]. Total ESP (external static pressure) per the spec of 0.40 in. WG [.10 kPa] includes the system duct and grilles. Add from the table 'Component Air Resistance', 0.076 in. WG [.02 kPa] for wet coil, 0 in. WG [.00 kPa] for downflow air flow, for a total selection static pressure of 0.476 (0.5) in. WG [.12 kPa], and determine:

$$\text{RPM} = 796$$

$$\text{WATTS} = 1,576$$

$$\text{DRIVE} = \text{L (standard 2 H.P. motor)}$$

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

$$1,576 \times 3.412 = 5,377 \text{ BTUH [1.57 kW]}$$

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

$$\text{Net Total Capacity} = 116,522 - 5,377 = 111,145 \text{ BTUH [32.54 kW]}$$

$$\text{Net Sensible Capacity} = 87,655 - 5,377 = 82,278 \text{ BTUH [24.09 kW]}$$

**7. CALCULATE UNIT INPUT AND JOB EER.**

$$\text{Total Power Input} = 8,861 \text{ (step 3)} + 1,576 \text{ (step 4)} = 10,437 \text{ Watts}$$

$$\text{EER} = \frac{\text{Net Total BTUH [kW] (step 6)}}{\text{Power Input, Watts (above)}} = \frac{111,145}{10,437} = 10.65$$

**8. SELECT UNIT HEATING CAPACITY.**

From Physical Data Table read that gas heating output (input rating x efficiency) is:

$$\text{Heating Capacity} = 182,250 \text{ BTUH [53.4 kW]}$$

**9. CHOOSE MODEL RKRL-C120CL22E**

\*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

## NOM. SIZES 7.5 & 10 TONS [26.4 & 35.2 kW] ASHRAE 90.1-2007 COMPLIANT MODELS

Model RKRL- Series	C090CL15E	C090CL22E	C090CM15E	C090CM22E
Model RKRL- Series (with VFD)	H090CR15E	H090CR22E	H090CS15E	H090CS22E
<b>Cooling Performance<sup>1</sup></b>				<b>CONTINUED</b> →
Gross Cooling Capacity Btu [kW]	95,000 [27.83]	95,000 [27.83]	95,000 [27.83]	95,000 [27.83]
EER/SEER <sup>2</sup>	13/NA	13/NA	13/NA	13/NA
Nominal CFM/AHRI Rated CFM [L/s]	3000/2600 [1416/1227]	3000/2600 [1416/1227]	3000/2600 [1416/1227]	3000/2600 [1416/1227]
AHRI Net Cooling Capacity Btu [kW]	92,000 [26.96]	92,000 [26.96]	92,000 [26.96]	92,000 [26.96]
Net Sensible Capacity Btu [kW]	66,200 [19.4]	66,200 [19.4]	66,200 [19.4]	66,200 [19.4]
Net Latent Capacity Btu [kW]	25,800 [7.56]	25,800 [7.56]	25,800 [7.56]	25,800 [7.56]
IEER <sup>3</sup> (Standard / VFD)	14/15.8	14/15.8	14/15.8	14/15.8
Net System Power kW	7.04	7.04	7.04	7.04
<b>Heating Performance (Gas)<sup>4</sup></b>				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13.9-30.6] / 25-55 [13.9-30.6]	40-70 [22.2-38.9] / 40-70 [22.2-38.9]	25-55 [13.9-30.6] / 25-55 [13.9-30.6]	40-70 [22.2-38.9] / 40-70 [22.2-38.9]
Steady State Efficiency (%)	81	81	81	81
No. Burners	6	9	6	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.75 [19]	0.5 [12.7]	0.75 [19]
<b>Compressor</b>				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
<b>Outdoor Sound Rating (dB)<sup>5</sup></b>				
	88	88	88	88
<b>Outdoor Coil—Fin Type</b>				
Tube Type	Louvered	Louvered	Louvered	Louvered
MicroChannel Depth in. [mm]	MicroChannel	MicroChannel	MicroChannel	MicroChannel
Face Area sq. ft. [sq. m]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Rows / FPI [FPcm]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
<b>Indoor Coil—Fin Type</b>				
Tube Type	Louvered	Louvered	Louvered	Louvered
Tube Size in. [mm]	Rifled	Rifled	Rifled	Rifled
Face Area sq. ft. [sq. m]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Rows / FPI [FPcm]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
Refrigerant Control	3 / 15 [6]	3 / 15 [6]	3 / 15 [6]	3 / 15 [6]
Drain Connection No./Size in. [mm]	TX Valves	TX Valves	TX Valves	TX Valves
	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
<b>Outdoor Fan—Type</b>				
No. Used/Diameter in. [mm]	Propeller	Propeller	Propeller	Propeller
Drive Type/No. Speeds	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
CFM [L/s]	Direct/1	Direct/1	Direct/1	Direct/1
No. Motors/HP	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
Motor RPM	2 at 1/3 HP			
	1075	1075	1075	1075
<b>Indoor Fan—Type</b>				
No. Used/Diameter in. [mm]	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Drive Type	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
No. Speeds (Standard / VFD)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Motors	Single / Multiple	Single / Multiple	Single / Multiple	Single / Multiple
Motor HP	1	1	1	1
Motor RPM	2	2	2	2
Motor Frame Size	1725	1725	1725	1725
	56	56	56	56
<b>Filter—Type</b>				
Furnished	Disposable	Disposable	Disposable	Disposable
(NO.) Size Recommended in. [mm x mm x mm]	Yes	Yes	Yes	Yes
	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
<b>Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]</b>				
	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]
<b>Weights</b>				
Net Weight lbs. [kg]	1056 [479]	1092 [495]	1056 [479]	1092 [495]
Ship Weight lbs. [kg]	1093 [496]	1129 [512]	1093 [496]	1129 [512]

See Page 19 for Notes.

[ ] Designates Metric Conversions

## NOM. SIZES 7.5 & 10 TONS [26.4 & 35.2 kW] ASHRAE 90.1-2007 COMPLIANT MODELS

Model RKRL- Series	C090CN15E	C090CN22E	C090DL15E	C090DL22E
Model RKRL- Series (with VFD)	H090CT15E	H090CT22E	H090DR15E	H090DR22E
				<b>CONTINUED</b> →
<b>Cooling Performance<sup>1</sup></b>				
Gross Cooling Capacity Btu [kW]	95,000 [27.83]	95,000 [27.83]	95,000 [27.83]	95,000 [27.83]
EER/SEER <sup>2</sup>	13/NA	13/NA	13/NA	13/NA
Nominal CFM/AHRI Rated CFM [L/s]	3000/2600 [1416/1227]	3000/2600 [1416/1227]	3000/2600 [1416/1227]	3000/2600 [1416/1227]
AHRI Net Cooling Capacity Btu [kW]	92,000 [26.96]	92,000 [26.96]	92,000 [26.96]	92,000 [26.96]
Net Sensible Capacity Btu [kW]	66,200 [19.4]	66,200 [19.4]	66,200 [19.4]	66,200 [19.4]
Net Latent Capacity Btu [kW]	25,800 [7.56]	25,800 [7.56]	25,800 [7.56]	25,800 [7.56]
IEER <sup>3</sup> (Standard / VFD)	14/15.8	14/15.8	14/15.8	14/15.8
Net System Power kW	7.04	7.04	7.04	7.04
<b>Heating Performance (Gas)<sup>4</sup></b>				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13.9-30.6] / 25-55 [13.9-30.6]	40-70 [22.2-38.9] / 40-70 [22.2-38.9]	25-55 [13.9-30.6] / 25-55 [13.9-30.6]	40-70 [22.2-38.9] / 40-70 [22.2-38.9]
Steady State Efficiency (%)	81	81	81	81
No. Burners	6	9	6	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.75 [19]	0.5 [12.7]	0.75 [19]
<b>Compressor</b>				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
<b>Outdoor Sound Rating (dB)<sup>5</sup></b>				
	88	88	88	88
<b>Outdoor Coil—Fin Type</b>				
Tube Type	Louvered	Louvered	Louvered	Louvered
MicroChannel Depth in. [mm]	MicroChannel	MicroChannel	MicroChannel	MicroChannel
Face Area sq. ft. [sq. m]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Rows / FPI [FPcm]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
<b>Indoor Coil—Fin Type</b>				
Tube Type	Louvered	Louvered	Louvered	Louvered
Tube Size in. [mm]	Rifled	Rifled	Rifled	Rifled
Face Area sq. ft. [sq. m]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Rows / FPI [FPcm]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
Refrigerant Control	3 / 15 [6]	3 / 15 [6]	2 / 18 [7]	3 / 15 [6]
Drain Connection No./Size in. [mm]	TX Valves	TX Valves	TX Valves	TX Valves
	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
<b>Outdoor Fan—Type</b>				
No. Used/Diameter in. [mm]	Propeller	Propeller	Propeller	Propeller
Drive Type/No. Speeds	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
CFM [L/s]	Direct/1	Direct/1	Direct/1	Direct/1
No. Motors/HP	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
Motor RPM	2 at 1/3 HP			
	1075	1075	1075	1075
<b>Indoor Fan—Type</b>				
No. Used/Diameter in. [mm]	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Drive Type	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
No. Speeds (Standard / VFD)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Motors	Single / Multiple	Single / Multiple	Single / Multiple	Single / Multiple
Motor HP	1	1	1	1
Motor RPM	3	3	2	2
Motor Frame Size	1725	1725	1725	1725
	56	56	56	56
<b>Filter—Type</b>				
Furnished	Disposable	Disposable	Disposable	Disposable
(NO.) Size Recommended in. [mm x mm x mm]	Yes	Yes	Yes	Yes
	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
<b>Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]</b>				
	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]
<b>Weights</b>				
Net Weight lbs. [kg]	1064 [483]	1100 [499]	1056 [479]	1092 [495]
Ship Weight lbs. [kg]	1101 [499]	1137 [516]	1093 [496]	1129 [512]

See Page 19 for Notes.

[ ] Designates Metric Conversions

## NOM. SIZES 7.5 & 10 TONS [26.4 & 35.2 kW] ASHRAE 90.1-2007 COMPLIANT MODELS

Model RKRL- Series	C090DM15E	C090DM22E	C090DN15E	C090DN22E
Model RKRL- Series (with VFD)	H090DS15E	H090DS22E	H090DT15E	H090DT22E
<b>Cooling Performance<sup>1</sup></b>				<b>CONTINUED →</b>
Gross Cooling Capacity Btu [kW]	95,000 [27.83]	95,000 [27.83]	95,000 [27.83]	95,000 [27.83]
EER/SEER <sup>2</sup>	13/NA	13/NA	13/NA	13/NA
Nominal CFM/AHRI Rated CFM [L/s]	3000/2600 [1416/1227]	3000/2600 [1416/1227]	3000/2600 [1416/1227]	3000/2600 [1416/1227]
AHRI Net Cooling Capacity Btu [kW]	92,000 [26.96]	92,000 [26.96]	92,000 [26.96]	92,000 [26.96]
Net Sensible Capacity Btu [kW]	66,200 [19.4]	66,200 [19.4]	66,200 [19.4]	66,200 [19.4]
Net Latent Capacity Btu [kW]	25,800 [7.56]	25,800 [7.56]	25,800 [7.56]	25,800 [7.56]
IEER <sup>3</sup> (Standard / VFD)	14/15.8	14/15.8	14/15.8	14/15.8
Net System Power kW	7.04	7.04	7.04	7.04
<b>Heating Performance (Gas)<sup>4</sup></b>				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13.9-30.6] / 25-55 [13.9-30.6]	40-70 [22.2-38.9] / 40-70 [22.2-38.9]	25-55 [13.9-30.6] / 25-55 [13.9-30.6]	40-70 [22.2-38.9] / 40-70 [22.2-38.9]
Steady State Efficiency (%)	81	81	81	81
No. Burners	6	9	6	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.75 [19]	0.5 [12.7]	0.75 [19]
<b>Compressor</b>				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
<b>Outdoor Sound Rating (dB)<sup>5</sup></b>				
	88	88	88	88
<b>Outdoor Coil—Fin Type</b>				
Tube Type	Louvered	Louvered	Louvered	Louvered
MicroChannel Depth in. [mm]	MicroChannel	MicroChannel	MicroChannel	MicroChannel
Face Area sq. ft. [sq. m]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Rows / FPI [FPcm]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
<b>Indoor Coil—Fin Type</b>				
Tube Type	Louvered	Louvered	Louvered	Louvered
Tube Size in. [mm]	Rifled	Rifled	Rifled	Rifled
Face Area sq. ft. [sq. m]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Rows / FPI [FPcm]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
Refrigerant Control	3 / 15 [6]	3 / 15 [6]	3 / 15 [6]	3 / 15 [6]
Drain Connection No./Size in. [mm]	TX Valves	TX Valves	TX Valves	TX Valves
	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
<b>Outdoor Fan—Type</b>				
No. Used/Diameter in. [mm]	Propeller	Propeller	Propeller	Propeller
Drive Type/No. Speeds	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
CFM [L/s]	Direct/1	Direct/1	Direct/1	Direct/1
No. Motors/HP	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
Motor RPM	2 at 1/3 HP			
	1075	1075	1075	1075
<b>Indoor Fan—Type</b>				
No. Used/Diameter in. [mm]	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Drive Type	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
No. Speeds (Standard / VFD)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Motors	Single / Multiple	Single / Multiple	Single / Multiple	Single / Multiple
Motor HP	1	1	1	1
Motor RPM	2	2	3	3
Motor Frame Size	1725	1725	1725	1725
	56	56	56	56
<b>Filter—Type</b>				
Furnished	Disposable	Disposable	Disposable	Disposable
(NO.) Size Recommended in. [mm x mm x mm]	Yes	Yes	Yes	Yes
	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
<b>Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]</b>				
	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]
<b>Weights</b>				
Net Weight lbs. [kg]	1056 [479]	1092 [495]	1064 [483]	1100 [499]
Ship Weight lbs. [kg]	1093 [496]	1129 [512]	1101 [499]	1137 [516]

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[ ] Designates Metric Conversions

## NOM. SIZES 7.5 & 10 TONS [26.4 & 35.2 kW] ASHRAE 90.1-2007 COMPLIANT MODELS

Model RKRL- Series	C090YL22E	C090YM22E	C090YN22E	C120CL15E H120CR15E
<b>Model RKRL- Series (with VFD)</b>				<b>CONTINUED</b> →
<b>Cooling Performance<sup>1</sup></b>				
Gross Cooling Capacity Btu [kW]	95,000 [27.83]	95,000 [27.83]	95,000 [27.83]	124,000 [36.33]
EER/SEER <sup>2</sup>	13/NA	13/NA	13/NA	12.5/NA
Nominal CFM/AHRI Rated CFM [L/s]	3000/2600 [1416/1227]	3000/2600 [1416/1227]	3000/2600 [1416/1227]	4000/3575 [1888/1687]
AHRI Net Cooling Capacity Btu [kW]	92,000 [26.96]	92,000 [26.96]	92,000 [26.96]	120,000 [35.16]
Net Sensible Capacity Btu [kW]	66,200 [19.4]	66,200 [19.4]	66,200 [19.4]	87,600 [25.67]
Net Latent Capacity Btu [kW]	25,800 [7.56]	25,800 [7.56]	25,800 [7.56]	32,400 [9.49]
IEER <sup>3</sup> (Standard / VFD)	14	14	14	13.8/15.6
Net System Power kW	7.04	7.04	7.04	9.62
<b>Heating Performance (Gas)<sup>4</sup></b>				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	112,500/225,000 [32.96/65.92]	112,500/225,000 [32.96/65.92]	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	91,125/182,250 [26.7/53.4]	91,125/182,250 [26.7/53.4]	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	40-70 [22.2-38.9] / 40-70 [22.2-38.9]	40-70 [22.2-38.9] / 40-70 [22.2-38.9]	40-70 [22.2-38.9] / 40-70 [22.2-38.9]	15-45 [8.3-25] / 15-45 [8.3-25]
Steady State Efficiency (%)	81	81	81	81
No. Burners	9	9	9	6
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.5 [12.7]
<b>Compressor</b>				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
<b>Outdoor Sound Rating (dB)<sup>5</sup></b>	88	88	88	88
<b>Outdoor Coil—Fin Type</b>	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Face Area sq. ft. [sq. m]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	2 / 23 [9]
<b>Indoor Coil—Fin Type</b>	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]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	15.75 [1.46]
Rows / FPI [FPcm]	3 / 15 [6]	3 / 15 [6]	3 / 15 [6]	4 / 13 [5]
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]
<b>Outdoor Fan—Type</b>	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
No. Motors/HP	2 at 1/3 HP			
Motor RPM	1075	1075	1075	1075
<b>Indoor Fan—Type</b>	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
Drive Type	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Speeds (Standard / VFD)	Single	Single	Single	Single / Multiple
No. Motors	1	1	1	1
Motor HP	2	2	3	2
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	56	56	56
<b>Filter—Type</b>	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(3)2x18x18 [51x457x457] (3)2x18x24 [51x457x610]
<b>Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]</b>	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]	105.6/105.6 [2994/2994]	153.6/156.8 [4355/4445]
<b>Weights</b>				
Net Weight lbs. [kg]	1092 [495]	1092 [495]	1100 [499]	1205 [547]
Ship Weight lbs. [kg]	1129 [512]	1129 [512]	1137 [516]	1242 [563]

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[ ] Designates Metric Conversions

## NOM. SIZES 7.5 & 10 TONS [26.4 & 35.2 kW] ASHRAE 90.1-2007 COMPLIANT MODELS

Model RKRL- Series	C120CL22E	C120CM15E	C120CM22E	C120DL15E
Model RKRL- Series (with VFD)	H120CR22E	H120CS15E	H120CS22E	H120DR15E
<b>Cooling Performance<sup>1</sup></b>				<b>CONTINUED</b> →
Gross Cooling Capacity Btu [kW]	124,000 [36.33]	124,000 [36.33]	124,000 [36.33]	124,000 [36.33]
EER/SEER <sup>2</sup>	12.5/NA	12.5/NA	12.5/NA	12.5/NA
Nominal CFM/AHRI Rated CFM [L/s]	4000/3575 [1888/1687]	4000/3575 [1888/1687]	4000/3575 [1888/1687]	4000/3575 [1888/1687]
AHRI Net Cooling Capacity Btu [kW]	120,000 [35.16]	120,000 [35.16]	120,000 [35.16]	120,000 [35.16]
Net Sensible Capacity Btu [kW]	87,600 [25.67]	87,600 [25.67]	87,600 [25.67]	87,600 [25.67]
Net Latent Capacity Btu [kW]	32,400 [9.49]	32,400 [9.49]	32,400 [9.49]	32,400 [9.49]
IEER <sup>3</sup> (Standard / VFD)	13.8/15.6	13.8/15.6	13.8/15.6	13.8/15.6
Net System Power kW	9.62	9.62	9.62	9.62
<b>Heating Performance (Gas)<sup>4</sup></b>				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13.9-30.6] / 25-55 [13.9-30.6]	15-45 [8.3-25] / 15-45 [8.3-25]	25-55 [13.9-30.6] / 25-55 [13.9-30.6]	15-45 [8.3-25] / 15-45 [8.3-25]
Steady State Efficiency (%)	81	81	81	81
No. Burners	9	6	9	6
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.5 [12.7]	0.75 [19]	0.5 [12.7]
<b>Compressor</b>				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
<b>Outdoor Sound Rating (dB)<sup>5</sup></b>				
	88	88	88	88
<b>Outdoor Coil—Fin Type</b>				
Tube Type	Louvered	Louvered	Louvered	Louvered
MicroChannel Depth in. [mm]	MicroChannel	MicroChannel	MicroChannel	MicroChannel
Face Area sq. ft. [sq. m]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Rows / FPI [FPcm]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
	2 / 22 [9]	2 / 23 [9]	2 / 23 [9]	2 / 23 [9]
<b>Indoor Coil—Fin Type</b>				
Tube Type	Louvered	Louvered	Louvered	Louvered
Tube Size in. [mm]	Rifled	Rifled	Rifled	Rifled
Face Area sq. ft. [sq. m]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Rows / FPI [FPcm]	15.75 [1.46]	15.75 [1.46]	15.75 [1.46]	15.75 [1.46]
Refrigerant Control	4 / 13 [5]	4 / 13 [5]	4 / 13 [5]	4 / 13 [5]
Drain Connection No./Size in. [mm]	TX Valves	TX Valves	TX Valves	TX Valves
	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
<b>Outdoor Fan—Type</b>				
No. Used/Diameter in. [mm]	Propeller	Propeller	Propeller	Propeller
Drive Type/No. Speeds	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
CFM [L/s]	Direct/1	Direct/1	Direct/1	Direct/1
No. Motors/HP	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
Motor RPM	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP
	1075	1075	1075	1075
<b>Indoor Fan—Type</b>				
No. Used/Diameter in. [mm]	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Drive Type	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
No. Speeds (Standard / VFD)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Motors	Single / Multiple	Single / Multiple	Single / Multiple	Single / Multiple
Motor HP	1	1	1	1
Motor RPM	2	3	3	2
Motor Frame Size	1725	1725	1725	1725
	56	56	56	56
<b>Filter—Type</b>				
Furnished	Disposable	Disposable	Disposable	Disposable
(NO.) Size Recommended in. [mm x mm x mm]	Yes	Yes	Yes	Yes
	(6)2x18x18 [51x457x457]	(3)2x18x18 [51x457x457] (3)2x18x24 [51x457x610]	(3)2x18x18 [51x457x457] (3)2x18x24 [51x457x610]	(3)2x18x18 [51x457x457] (3)2x18x24 [51x457x610]
<b>Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]</b>				
	153.6/156.8 [4355/4445]	153.6/156.8 [4355/4445]	153.6/156.8 [4355/4445]	153.6/156.8 [4355/4445]
<b>Weights</b>				
Net Weight lbs. [kg]	1241 [563]	1213 [550]	1249 [567]	1205 [547]
Ship Weight lbs. [kg]	1278 [580]	1250 [567]	1286 [583]	1242 [563]

See Page 19 for Notes.

[ ] Designates Metric Conversions

## NOM. SIZES 7.5 & 10 TONS [26.4 & 35.2 kW] ASHRAE 90.1-2007 COMPLIANT MODELS

Model RKRL- Series Model RKRL- Series (with VFD)	C120DL22E H120DR22E	C120DM15E H120DS15E	C120DM22E H120DS22E	C120YL22E
<b>Cooling Performance<sup>1</sup></b>				<b>CONTINUED</b> →
Gross Cooling Capacity Btu [kW]	124,000 [36.33]	124,000 [36.33]	124,000 [36.33]	124,000 [36.33]
EER/SEER <sup>2</sup>	12.5/NA	12.5/NA	12.5/NA	12.5/NA
Nominal CFM/AHRI Rated CFM [L/s]	4000/3575 [1888/1687]	4000/3575 [1888/1687]	4000/3575 [1888/1687]	4000/3575 [1888/1687]
AHRI Net Cooling Capacity Btu [kW]	120,000 [35.16]	120,000 [35.16]	120,000 [35.16]	120,000 [35.16]
Net Sensible Capacity Btu [kW]	87,600 [25.67]	87,600 [25.67]	87,600 [25.67]	87,600 [25.67]
Net Latent Capacity Btu [kW]	32,400 [9.49]	32,400 [9.49]	32,400 [9.49]	32,400 [9.49]
IEER <sup>3</sup> (Standard / VFD)	13.8/15.6	13.8/15.6	13.8/15.6	13.8
Net System Power kW	9.62	9.62	9.62	9.62
<b>Heating Performance (Gas)<sup>4</sup></b>				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]	112,500/225,000 [32.96/65.92]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]	91,125/182,250 [26.7/53.4]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13.9-30.6] / 25-55 [13.9-30.6]	15-45 [8.3-25] / 15-45 [8.3-25]	25-55 [13.9-30.6] / 25-55 [13.9-30.6]	25-55 [13.9-30.6] / 25-55 [13.9-30.6]
Steady State Efficiency (%)	81	81	81	81
No. Burners	9	6	9	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.5 [12.7]	0.75 [19]	0.75 [19]
<b>Compressor</b>				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
<b>Outdoor Sound Rating (dB)<sup>5</sup></b>				
	88	88	88	88
<b>Outdoor Coil—Fin Type</b>				
Tube Type	Louvered	Louvered	Louvered	Louvered
MicroChannel Depth in. [mm]	MicroChannel	MicroChannel	MicroChannel	MicroChannel
Face Area sq. ft. [sq. m]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Rows / FPI [FPcm]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
	2 / 23 [9]	2 / 23 [9]	2 / 23 [9]	2 / 23 [9]
<b>Indoor Coil—Fin Type</b>				
Tube Type	Louvered	Louvered	Louvered	Louvered
Tube Size in. [mm]	Rifled	Rifled	Rifled	Rifled
Face Area sq. ft. [sq. m]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Rows / FPI [FPcm]	15.75 [1.46]	15.75 [1.46]	15.75 [1.46]	15.75 [1.46]
	4 / 13 [5]	4 / 13 [5]	4 / 13 [5]	4 / 13 [5]
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]
<b>Outdoor Fan—Type</b>				
No. Used/Diameter in. [mm]	Propeller	Propeller	Propeller	Propeller
Drive Type/No. Speeds	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
CFM [L/s]	Direct/1	Direct/1	Direct/1	Direct/1
No. Motors/HP	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
Motor RPM	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP
	1075	1075	1075	1075
<b>Indoor Fan—Type</b>				
No. Used/Diameter in. [mm]	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Drive Type	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
No. Speeds (Standard / VFD)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Motors	Single / Multiple	Single / Multiple	Single / Multiple	Single
Motor HP	1	1	1	1
Motor RPM	2	3	3	2
Motor Frame Size	1725	1725	1725	1725
	56	56	56	56
<b>Filter—Type</b>				
Furnished	Disposable	Disposable	Disposable	Disposable
(NO.) Size Recommended in. [mm x mm x mm]	Yes	Yes	Yes	Yes
	(3)2x18x18 [51x457x457]	(3)2x18x18 [51x457x457]	(3)2x18x18 [51x457x457]	(3)2x18x18 [51x457x457]
	(3)2x18x24 [51x457x610]	(3)2x18x24 [51x457x610]	(3)2x18x24 [51x457x610]	(3)2x18x24 [51x457x610]
<b>Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]</b>				
	153.6/156.8 [4355/4445]	153.6/156.8 [4355/4445]	153.6/156.8 [4355/4445]	153.6/156.8 [4355/4445]
<b>Weights</b>				
Net Weight lbs. [kg]	1241 [563]	1213 [550]	1249 [567]	1241 [563]
Ship Weight lbs. [kg]	1278 [580]	1250 [567]	1286 [583]	1278 [580]

See Page 19 for Notes.

[ ] Designates Metric Conversions

## NOM. SIZES 7.5 & 10 TONS [26.4 & 35.2 kW] ASHRAE 90.1-2007 COMPLIANT MODELS

<b>Model RKRL- Series</b>	<b>C120YM22E</b>
<b>Model RKRL- Series (with VFD)</b>	
<b>Cooling Performance<sup>1</sup></b>	
Gross Cooling Capacity Btu [kW]	124,000 [36.33]
EER/SEER <sup>2</sup>	12.5/NA
Nominal CFM/AHRI Rated CFM [L/s]	4000/3575 [1888/1687]
AHRI Net Cooling Capacity Btu [kW]	120,000 [35.16]
Net Sensible Capacity Btu [kW]	87,600 [25.67]
Net Latent Capacity Btu [kW]	32,400 [9.49]
IEER <sup>3</sup> (Standard / VFD)	13.8
Net System Power kW	9.62
<b>Heating Performance (Gas)<sup>4</sup></b>	
Heating Input Btu [kW] (1st Stage / 2nd Stage)	112,500/225,000 [32.96/65.92]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	91,125/182,250 [26.7/53.4]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13.9-30.6] / 25-55 [13.9-30.6]
Steady State Efficiency (%)	81
No. Burners	9
No. Stages	2
Gas Connection Pipe Size in. [mm]	0.75 [19]
<b>Compressor</b>	
No./Type	2/Scroll
<b>Outdoor Sound Rating (dB)<sup>5</sup></b>	
	88
<b>Outdoor Coil—Fin Type</b>	
Tube Type	Louvered
MicroChannel Depth in. [mm]	MicroChannel
Face Area sq. ft. [sq. m]	1 [25.4]
Rows / FPI [FPcm]	27 [2.51]
	2 / 23 [9]
<b>Indoor Coil—Fin Type</b>	
Tube Type	Louvered
Tube Size in. [mm]	Rifled
Face Area sq. ft. [sq. m]	0.375 [9.5]
Rows / FPI [FPcm]	15.75 [1.46]
Refrigerant Control	4 / 13 [5]
Drain Connection No./Size in. [mm]	TX Valves
	1/1 [25.4]
<b>Outdoor Fan—Type</b>	
No. Used/Diameter in. [mm]	Propeller
Drive Type/No. Speeds	2/24 [609.6]
CFM [L/s]	Direct/1
No. Motors/HP	8000 [3775]
Motor RPM	2 at 1/3 HP
	1075
<b>Indoor Fan—Type</b>	
No. Used/Diameter in. [mm]	FC Centrifugal
Drive Type	1/15x15 [381x381]
No. Speeds (Standard / VFD)	Belt (Adjustable)
No. Motors	Single
Motor HP	1
Motor RPM	3
Motor Frame Size	1725
	56
<b>Filter—Type</b>	
Furnished	Disposable
(NO.) Size Recommended in. [mm x mm x mm]	Yes
	(3)2x18x18 [51x457x457]
	(3)2x18x24 [51x457x610]
<b>Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]</b>	
	153.6/156.8 [4355/4445]
<b>Weights</b>	
Net Weight lbs. [kg]	1249 [567]
Ship Weight lbs. [kg]	1286 [583]

See Page 19 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  $\pm 20\%$  of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
2. EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
3. Integrated Energy Efficiency Ratio (IEER) is rated in accordance with AHRI Standard 340/360.
4. Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standard Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.
5. Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

## GROSS SYSTEMS PERFORMANCE DATA—C/H090

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]			3600 [1699]	2600 [1227]	2400 [1133]	3600 [1699]	2600 [1227]	2400 [1133]	3600 [1699]	2600 [1227]	2400 [1133]
DR ①			.0	.03	.05	.0	.03	.05	.0	.03	.05
OUTDOOR DRY BULB TEMPERATURE °F [°C]	75 [23.9]	Total BTUH [kW]	121.5 [35.6]	113.6 [33.3]	112.0 [32.8]	115.0 [33.7]	107.5 [31.5]	106.0 [31.1]	109.4 [32.1]	102.3 [30.0]	100.9 [29.6]
		Sens BTUH [kW]	82.0 [24.0]	61.6 [18.0]	57.8 [16.9]	95.3 [27.9]	73.3 [21.5]	69.2 [20.3]	105.8 [31.0]	82.6 [24.2]	78.3 [22.9]
		Power	5.2	5.0	5.0	5.1	5.0	4.9	5.1	4.9	4.9
	80 [26.7]	Total BTUH [kW]	118.2 [34.6]	110.5 [32.4]	108.9 [31.9]	111.6 [32.7]	104.4 [30.6]	102.9 [30.1]	106.1 [31.1]	99.2 [29.1]	97.8 [28.7]
		Sens BTUH [kW]	80.8 [23.7]	60.8 [17.8]	57.1 [16.7]	94.0 [27.5]	72.5 [21.2]	68.5 [20.1]	104.6 [30.6]	81.8 [24.0]	77.5 [22.7]
		Power	5.5	5.3	5.3	5.4	5.3	5.2	5.4	5.2	5.2
	85 [29.4]	Total BTUH [kW]	114.8 [33.6]	107.3 [31.4]	105.8 [31.0]	108.2 [31.7]	101.2 [29.7]	99.7 [29.2]	102.7 [30.1]	96.0 [28.1]	94.7 [27.7]
		Sens BTUH [kW]	79.4 [23.3]	59.8 [17.5]	56.2 [16.5]	92.6 [27.1]	71.5 [20.9]	67.5 [19.8]	102.7 [30.1]	80.8 [23.7]	76.6 [22.4]
		Power	5.8	5.6	5.6	5.8	5.6	5.5	5.7	5.5	5.5
	90 [32.2]	Total BTUH [kW]	111.3 [32.6]	104.0 [30.5]	102.6 [30.1]	104.7 [30.7]	97.9 [28.7]	96.5 [28.3]	99.2 [29.1]	92.7 [27.2]	91.4 [26.8]
Sens BTUH [kW]		77.6 [22.7]	58.5 [17.1]	55.1 [16.1]	90.8 [26.6]	70.2 [20.6]	66.3 [19.4]	99.2 [29.1]	79.5 [23.3]	75.4 [22.1]	
Power		6.2	6.0	5.9	6.1	5.9	5.9	6.1	5.9	5.8	
95 [35]	Total BTUH [kW]	107.7 [31.6]	100.7 [29.5]	99.3 [29.1]	101.2 [29.7]	94.5 [27.7]	93.2 [27.3]	95.6 [28.0]	89.4 [26.2]	88.1 [25.8]	
	Sens BTUH [kW]	75.6 [22.2]	57.1 [16.7]	53.7 [15.7]	88.9 [26.0]	68.7 [20.1]	65.0 [19.0]	95.6 [28.0]	78.1 [22.9]	74.0 [21.7]	
	Power	6.6	6.3	6.3	6.5	6.3	6.3	6.5	6.2	6.2	
100 [37.8]	Total BTUH [kW]	104.0 [30.5]	97.2 [28.5]	95.9 [28.1]	97.5 [28.6]	91.1 [26.7]	89.8 [26.3]	92.0 [27.0]	85.9 [25.2]	84.7 [24.8]	
	Sens BTUH [kW]	73.2 [21.4]	55.3 [16.2]	52.1 [15.3]	86.6 [25.4]	67.0 [19.6]	63.3 [18.5]	92.0 [27.0]	76.3 [22.4]	72.4 [21.2]	
	Power	7.0	6.7	6.7	6.9	6.7	6.7	6.9	6.6	6.6	
105 [40.6]	Total BTUH [kW]	100.3 [29.4]	93.7 [27.5]	92.4 [27.1]	93.7 [27.5]	87.6 [25.7]	86.4 [25.3]	88.2 [25.8]	82.4 [24.1]	81.3 [23.8]	
	Sens BTUH [kW]	70.8 [20.7]	53.4 [15.6]	50.2 [14.7]	84.0 [24.6]	65.1 [19.1]	61.6 [18.0]	88.2 [25.8]	74.4 [21.8]	70.7 [20.7]	
	Power	7.4	7.2	7.1	7.4	7.1	7.1	7.3	7.1	7.0	
110 [43.3]	Total BTUH [kW]	96.5 [28.3]	90.2 [26.4]	88.9 [26.0]	89.9 [26.3]	84.0 [24.6]	82.9 [24.3]	84.4 [24.7]	78.9 [23.1]	77.8 [22.8]	
	Sens BTUH [kW]	67.9 [19.9]	51.3 [15.0]	48.2 [14.1]	81.1 [23.8]	62.9 [18.4]	59.6 [17.5]	84.4 [24.7]	72.3 [21.2]	68.6 [20.1]	
	Power	7.9	7.6	7.6	7.8	7.6	7.5	7.8	7.5	7.5	
115 [46.1]	Total BTUH [kW]	92.5 [27.1]	86.5 [25.3]	85.3 [25.0]	86.0 [25.2]	80.4 [23.6]	79.2 [23.2]	80.5 [23.6]	75.2 [22.0]	74.1 [21.7]	
	Sens BTUH [kW]	64.8 [19.0]	48.9 [14.3]	46.0 [13.5]	78.1 [22.9]	60.6 [17.8]	57.3 [16.8]	80.5 [23.6]	69.9 [20.5]	66.3 [19.4]	
	Power	8.4	8.1	8.1	8.4	8.1	8.0	8.3	8.0	8.0	

## GROSS SYSTEMS PERFORMANCE DATA—C/H120

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]			4800 [2266]	3575 [1687]	3200 [1510]	4800 [2266]	3575 [1687]	3200 [1510]	4800 [2266]	3575 [1687]	3200 [1510]
DR ①			.0	.04	.07	.0	.04	.07	.0	.04	.07
OUTDOOR DRY BULB TEMPERATURE °F [°C]	75 [23.9]	Total BTUH [kW]	156.5 [45.9]	147.3 [43.2]	144.5 [42.3]	148.9 [43.6]	140.2 [41.1]	137.5 [40.3]	142.7 [41.8]	134.4 [39.4]	131.8 [38.6]
		Sens BTUH [kW]	105.2 [30.8]	81.5 [23.9]	74.8 [21.9]	123.2 [36.1]	97.5 [28.6]	90.2 [26.4]	137.2 [40.2]	110.0 [32.2]	102.1 [29.9]
		Power	7.1	6.9	6.8	7.0	6.8	6.7	6.9	6.7	6.6
	80 [26.7]	Total BTUH [kW]	152.4 [44.7]	143.5 [42.0]	140.7 [41.2]	144.9 [42.5]	136.4 [40.0]	133.8 [39.2]	138.7 [40.6]	130.5 [38.2]	128.0 [37.5]
		Sens BTUH [kW]	103.7 [30.4]	80.5 [23.6]	73.9 [21.7]	121.8 [35.7]	96.5 [28.3]	89.3 [26.2]	135.8 [39.8]	108.9 [31.9]	101.2 [29.7]
		Power	7.5	7.2	7.2	7.3	7.1	7.1	7.2	7.0	7.0
	85 [29.4]	Total BTUH [kW]	148.2 [43.4]	139.5 [40.9]	136.8 [40.1]	140.6 [41.2]	132.4 [38.8]	129.9 [38.1]	134.5 [39.4]	126.6 [37.1]	124.2 [36.4]
		Sens BTUH [kW]	101.8 [29.8]	79.1 [23.2]	72.7 [21.3]	119.8 [35.1]	95.1 [27.9]	88.1 [25.8]	134.1 [39.3]	107.7 [31.6]	100.1 [29.3]
		Power	7.9	7.6	7.6	7.8	7.5	7.5	7.7	7.4	7.4
	90 [32.2]	Total BTUH [kW]	143.8 [42.1]	135.4 [39.7]	132.8 [38.9]	136.3 [39.9]	128.3 [37.6]	125.9 [36.9]	130.1 [38.1]	122.5 [35.9]	120.1 [35.2]
Sens BTUH [kW]		99.6 [29.2]	77.5 [22.7]	71.2 [20.9]	117.7 [34.5]	93.5 [27.4]	86.6 [25.4]	130.1 [38.1]	106.1 [31.1]	98.6 [28.9]	
Power		8.3	8.1	8.0	8.2	8.0	7.9	8.1	7.9	7.8	
95 [35]	Total BTUH [kW]	139.3 [40.8]	131.2 [38.4]	128.7 [37.7]	131.8 [38.6]	124.1 [36.4]	121.7 [35.7]	125.6 [36.8]	118.2 [34.6]	116.0 [34.0]	
	Sens BTUH [kW]	97.2 [28.5]	75.7 [22.2]	69.6 [20.4]	115.3 [33.8]	91.7 [26.9]	84.9 [24.9]	125.6 [36.8]	104.2 [30.5]	97.0 [28.4]	
	Power	8.8	8.5	8.5	8.7	8.4	8.3	8.6	8.3	8.2	
100 [37.8]	Total BTUH [kW]	134.7 [39.5]	126.8 [37.2]	124.4 [36.4]	127.2 [37.3]	119.7 [35.1]	117.4 [34.4]	121.0 [35.5]	113.9 [33.4]	111.7 [32.7]	
	Sens BTUH [kW]	94.4 [27.7]	73.5 [21.5]	67.6 [19.8]	112.5 [33.0]	89.5 [26.2]	82.9 [24.3]	121.0 [35.5]	102.1 [29.9]	95.0 [27.8]	
	Power	9.3	9.0	8.9	9.2	8.9	8.8	9.1	8.8	8.7	
105 [40.6]	Total BTUH [kW]	129.9 [38.1]	122.3 [35.8]	120.0 [35.2]	122.4 [35.9]	115.2 [33.8]	113.0 [33.1]	116.2 [34.0]	109.4 [32.1]	107.3 [31.4]	
	Sens BTUH [kW]	91.3 [26.8]	71.1 [20.8]	65.4 [19.2]	109.4 [32.1]	87.1 [25.5]	80.7 [23.6]	116.2 [34.0]	99.7 [29.2]	92.8 [27.2]	
	Power	9.8	9.5	9.4	9.7	9.4	9.3	9.6	9.3	9.2	
110 [43.3]	Total BTUH [kW]	125.0 [36.6]	117.6 [34.5]	115.4 [33.8]	117.4 [34.4]	110.5 [32.4]	108.4 [31.8]	111.2 [32.6]	104.7 [30.7]	102.7 [30.1]	
	Sens BTUH [kW]	87.8 [25.7]	68.3 [20.0]	62.9 [18.4]	105.8 [31.0]	84.3 [24.7]	78.2 [22.9]	111.2 [32.6]	96.9 [28.4]	90.3 [26.5]	
	Power	10.4	10.1	10.0	10.3	10.0	9.9	10.2	9.9	9.8	
115 [46.1]	Total BTUH [kW]	119.9 [35.1]	112.9 [33.1]	110.7 [32.4]	112.3 [32.9]	105.7 [31.0]	103.7 [30.4]	106.1 [31.1]	99.9 [29.3]	98.0 [28.7]	
	Sens BTUH [kW]	84.0 [24.6]	65.4 [19.2]	60.1 [17.6]	102.0 [29.9]	81.3 [23.8]	75.4 [22.1]	106.1 [31.1]	93.9 [27.5]	87.5 [25.6]	
	Power	11.0	10.6	10.5	10.9	10.5	10.4	10.7	10.4	10.3	

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  $[1.10 \times \text{CFM} \times (1 - \text{DR}) \times (\text{dbE} - 80)]$ .

[ ] Designates Metric Conversions

# AIRFLOW PERFORMANCE — 7.5 TON [26.4 kW] — 60 Hz — SIDEFLOW

Air Flow CFM [L/s]	Model RKRL-C090 Voltage 208/230, 460, 575 — 3 Phase 60 Hz																							
	External Static Pressure—Inches of Water [kPa]																							
	0.1 [0.02]	0.2 [0.05]	0.3 [0.07]	0.4 [0.10]	0.5 [0.12]	0.6 [0.15]	0.7 [0.17]	0.8 [0.20]	0.9 [0.22]	1.0 [0.25]	1.1 [0.27]	1.2 [0.30]	1.3 [0.32]	1.4 [0.35]	1.5 [0.37]	1.6 [0.40]	1.7 [0.42]	1.8 [0.45]	1.9 [0.47]	2.0 [0.50]				
2400 [1133]	—	550 [810]	582 [845]	614 [883]	645 [924]	677 [968]	708 [1015]	740 [1066]	771 [1119]	802 [1175]	833 [1234]	864 [1296]	895 [1361]	924 [1435]	955 [1508]	985 [1584]	1016 [1663]	1046 [1744]	1076 [1829]	1104 [1916]				
2500 [1180]	—	559 [839]	590 [876]	622 [916]	653 [959]	684 [1004]	715 [1053]	745 [1105]	776 [1160]	807 [1218]	837 [1279]	867 [1343]	897 [1410]	927 [1490]	957 [1564]	987 [1641]	1017 [1721]	1047 [1804]	1077 [1890]	1105 [1979]				
2600 [1227]	—	569 [872]	600 [910]	630 [952]	661 [997]	691 [1044]	722 [1095]	752 [1149]	782 [1205]	812 [1265]	842 [1328]	871 [1394]	901 [1462]	931 [1546]	961 [1622]	990 [1701]	1019 [1782]	1049 [1866]	1078 [1954]	1106 [2044]				
2700 [1274]	549	870 [579]	908 [610]	948 [640]	992 [670]	1038 [699]	1088 [729]	1140 [759]	1196 [788]	1255 [818]	1316 [847]	1381 [876]	1448 [905]	1519 [935]	1606 [964]	1683 [993]	1763 [1022]	1846 [1050]	1931 [1079]	2020 [1107]	2111			
2800 [1321]	561	909 [591]	948 [620]	990 [650]	1036 [679]	1084 [708]	1135 [737]	1190 [766]	1247 [795]	1308 [824]	1371 [853]	1437 [881]	1507 [910]	1579 [940]	1667 [968]	1746 [996]	1827 [1025]	1911 [1052]	1998 [1080]	2088 [1108]	2181			
2900 [1368]	573	951 [602]	992 [631]	1036 [660]	1083 [689]	1134 [718]	1187 [746]	1243 [775]	1302 [803]	1365 [831]	1430 [860]	1498 [888]	1569 [915]	1644 [945]	1732 [973]	1811 [1000]	1894 [1028]	1980 [1055]	2068 [1082]	2159 [1109]	2253			
3000 [1416]	586	997 [615]	1040 [643]	1086 [672]	1135 [700]	1187 [728]	1242 [756]	1300 [784]	1361 [812]	1425 [839]	1492 [867]	1563 [894]	1636 [923]	1720 [950]	1798 [977]	1879 [1004]	1963 [1031]	2050 [1058]	2140 [1084]	2233 [1111]	2328			
3200 [1510]	615	1101 [642]	1147 [669]	1197 [697]	1250 [724]	1305 [751]	1364 [777]	1426 [804]	1491 [831]	1558 [857]	1629 [884]	1703 [910]	1780 [936]	1857 [962]	1939 [988]	2022 [1013]	2109 [1039]	2199 [1064]	2291 [1090]	2387 [1115]	2485			
3300 [1557]	630	1158 [657]	1207 [683]	1258 [710]	1313 [736]	1370 [763]	1431 [789]	1495 [815]	1561 [841]	1631 [867]	1703 [893]	1779 [919]	1858 [943]	1930 [968]	2012 [993]	2098 [1018]	2186 [1043]	2277 [1068]	2371 [1093]	2468 [1117]	2567			
3400 [1604]	646	1220 [672]	1270 [698]	1324 [724]	1380 [750]	1439 [776]	1502 [801]	1567 [827]	1636 [852]	1707 [878]	1781 [903]	1859 [925]	1924 [950]	2005 [975]	2089 [999]	2175 [1024]	2265 [1048]	2357 [1072]	2453 [1096]	2551 [1120]	2652			
3500 [1652]	662	1285 [688]	1337 [713]	1393 [739]	1451 [764]	1512 [789]	1576 [814]	1644 [839]	1714 [864]	1787 [889]	1863 [914]	1943 [933]	2000 [958]	2082 [982]	2167 [1006]	2255 [1029]	2346 [1053]	2440 [1077]	2537 [1100]	2636 [1124]	2739			
3600 [1699]	679	1355 [704]	1409 [729]	1466 [754]	1526 [779]	1589 [804]	1655 [828]	1724 [853]	1796 [877]	1871 [901]	1949 [918]	1998 [942]	2078 [966]	2162 [989]	2249 [1012]	2338 [1035]	2430 [1058]	2525 [1081]	2623 [1104]	2724 [1127]	2828			

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

Drive Package	L						M						N					
Motor H.P. [W]	2 [1491.4]						2 [1491.4]						3 [2237.1]					
Blower Sheave	BK110H						BK90H						BK65H					
Motor Sheave	1VP-44						1VP-44						1VP-44					
Turns Open	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
RPM	708	676	<b>646</b>	612	580	548	868	830	<b>794</b>	752	713	673	1192	1134	1085	1031	<b>979</b>	919

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.

# COMPONENT AIRFLOW RESISTANCE—7.5 TON [26.4 kW]

Airflow CFM [L/s]	Airflow Correction Factors*			Component Airflow Resistance					
	Total MBH	Sensible MBH	Power kW	Wet Coil	Downflow	Resistance — Inches of Water [kPa]			Concentric Grill RXRN-FA65 or RXRN-FA75 & Transition RXMC-CC04
						Downflow Economizer RA Damper Open	Horizontal Economizer RA Damper Open		
2400 [1133]	0.97	0.87	0.98	0.09 [.02]	0.08 [.02]	0.10 [.02]	0.10 [.02]	0.13 [.03]	
2500 [1180]	0.97	0.90	0.98	0.10 [.02]	0.08 [.02]	0.10 [.02]	0.10 [.02]	0.15 [.04]	
2600 [1227]	0.98	0.92	0.99	0.10 [.02]	0.09 [.02]	0.11 [.03]	0.11 [.03]	0.17 [.04]	
2700 [1274]	0.98	0.94	0.99	0.11 [.03]	0.09 [.02]	0.11 [.03]	0.11 [.03]	0.19 [.05]	
2800 [1321]	0.99	0.97	0.99	0.11 [.03]	0.10 [.02]	0.12 [.03]	0.12 [.03]	0.21 [.05]	
2900 [1368]	1.00	0.99	1.00	0.12 [.03]	0.10 [.02]	0.12 [.03]	0.12 [.03]	0.23 [.06]	
3000 [1416]	1.00	1.02	1.00	0.12 [.03]	0.11 [.03]	0.13 [.03]	0.13 [.03]	0.25 [.06]	
3100 [1463]	1.01	1.04	1.00	0.13 [.03]	0.11 [.03]	0.13 [.03]	0.13 [.03]	0.28 [.07]	
3200 [1510]	1.02	1.06	1.01	0.13 [.03]	0.11 [.03]	0.14 [.03]	0.14 [.03]	0.31 [.08]	
3300 [1557]	1.02	1.06	1.01	0.13 [.03]	0.11 [.03]	0.14 [.03]	0.14 [.03]	0.34 [.08]	
3400 [1604]	1.02	1.06	1.01	0.13 [.03]	0.11 [.03]	0.15 [.04]	0.15 [.04]	0.37 [.09]	
3500 [1652]	1.02	1.06	1.01	0.14 [.03]	0.11 [.03]	0.15 [.04]	0.15 [.04]	0.40 [.10]	
3600 [1699]	1.02	1.06	1.01	0.14 [.03]	0.11 [.03]	0.15 [.04]	0.15 [.04]	0.44 [.11]	

\*Multiply correction factor times gross performance data—resulting sensible capacity cannot exceed total capacity.

[ ] Designates Metric Conversions



**COMPONENT AIRFLOW RESISTANCE — 10 TON [35.1 kW]**

Airflow CFM [L/s]	Airflow Correction Factors*			Component Airflow Resistance						
	Total MBH	Sensible MBH	Power kW	Wet Coil	Downflow	Downflow Economizer RA Damper Open	Horizontal Economizer RA Damper Open	Concentric Grill RXRN-FA665 or RXRN-FA75 & Transition RXMC-CD04	Concentric Grill RXRN-AA61 or RXRN-AA71 & Transition RXMC-CE05	Concentric Grill RXRN-AA66 or RXRN-AA76 & Transition RXMC-CF06
3200 [1510]	0.96	0.87	0.98	0.06 [.01]	0.05 [.01]	0.09 [.02]	0.05 [.01]	0.31 [.08]	—	—
3300 [1557]	0.97	0.88	0.99	0.07 [.02]	0.05 [.01]	0.10 [.02]	0.05 [.01]	0.34 [.08]	—	—
3400 [1604]	0.97	0.90	0.99	0.07 [.02]	0.05 [.01]	0.10 [.02]	0.06 [.01]	0.37 [.09]	—	—
3500 [1652]	0.98	0.92	0.99	0.07 [.02]	0.06 [.01]	0.11 [.03]	0.06 [.01]	—	—	—
3600 [1699]	0.98	0.93	0.99	0.08 [.02]	0.06 [.01]	0.11 [.03]	0.06 [.01]	—	0.16 [.04]	—
3700 [1746]	0.99	0.95	1.00	0.08 [.02]	0.06 [.01]	0.12 [.03]	0.06 [.01]	—	0.18 [.04]	—
3800 [1793]	0.99	0.97	1.00	0.08 [.02]	0.07 [.02]	0.12 [.03]	0.07 [.02]	—	0.19 [.05]	—
3900 [1840]	1.00	0.99	1.00	0.08 [.02]	0.07 [.02]	0.13 [.03]	0.07 [.02]	—	0.20 [.05]	—
4000 [1888]	1.00	1.00	1.01	0.09 [.02]	0.07 [.02]	0.13 [.03]	0.07 [.02]	—	0.21 [.05]	—
4100 [1935]	1.00	1.02	1.01	0.09 [.02]	0.08 [.02]	0.14 [.03]	0.07 [.02]	—	0.23 [.06]	—
4200 [1982]	1.01	1.04	1.01	0.09 [.02]	0.08 [.02]	0.14 [.03]	0.08 [.02]	—	0.24 [.06]	—
4300 [2029]	1.01	1.06	1.01	0.10 [.02]	0.08 [.02]	0.15 [.04]	0.08 [.02]	—	0.25 [.06]	—
4400 [2076]	1.02	1.07	1.02	0.10 [.02]	0.08 [.02]	0.15 [.04]	0.08 [.02]	—	0.27 [.07]	—
4500 [2123]	1.02	1.09	1.02	0.10 [.02]	0.09 [.02]	0.16 [.04]	0.09 [.02]	—	—	—
4600 [2171]	1.03	1.11	1.02	0.10 [.02]	0.09 [.02]	0.16 [.04]	0.09 [.02]	—	—	0.30 [.07]
4700 [2218]	1.03	1.12	1.03	0.11 [.03]	0.09 [.02]	0.17 [.04]	0.09 [.02]	—	—	0.31 [.08]
4800 [2265]	1.04	1.14	1.03	0.11 [.03]	0.10 [.02]	0.17 [.04]	0.10 [.02]	—	—	0.32 [.08]

\*Multiply correction factor times gross performance data—resulting sensible capacity cannot exceed total capacity.

[ ] Designates Metric Conversions

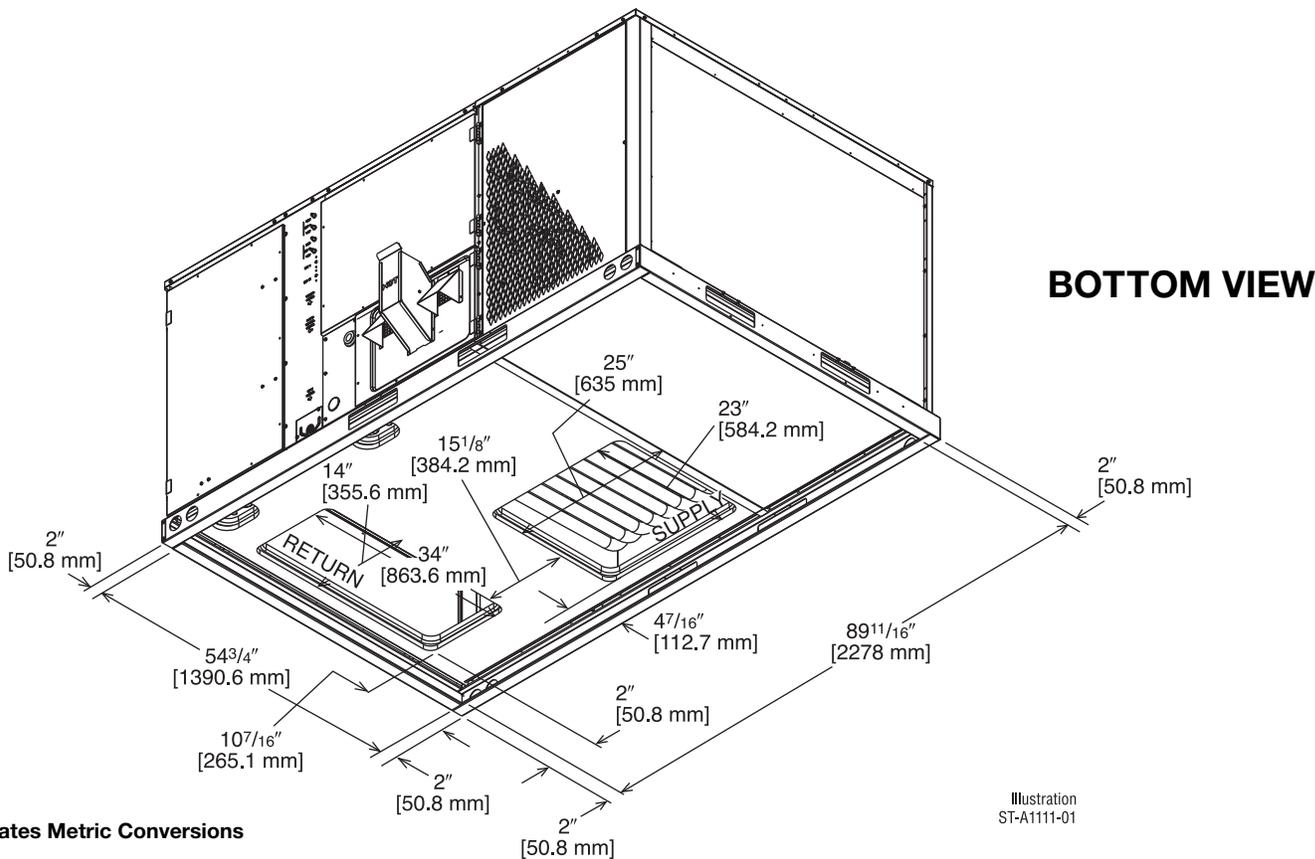
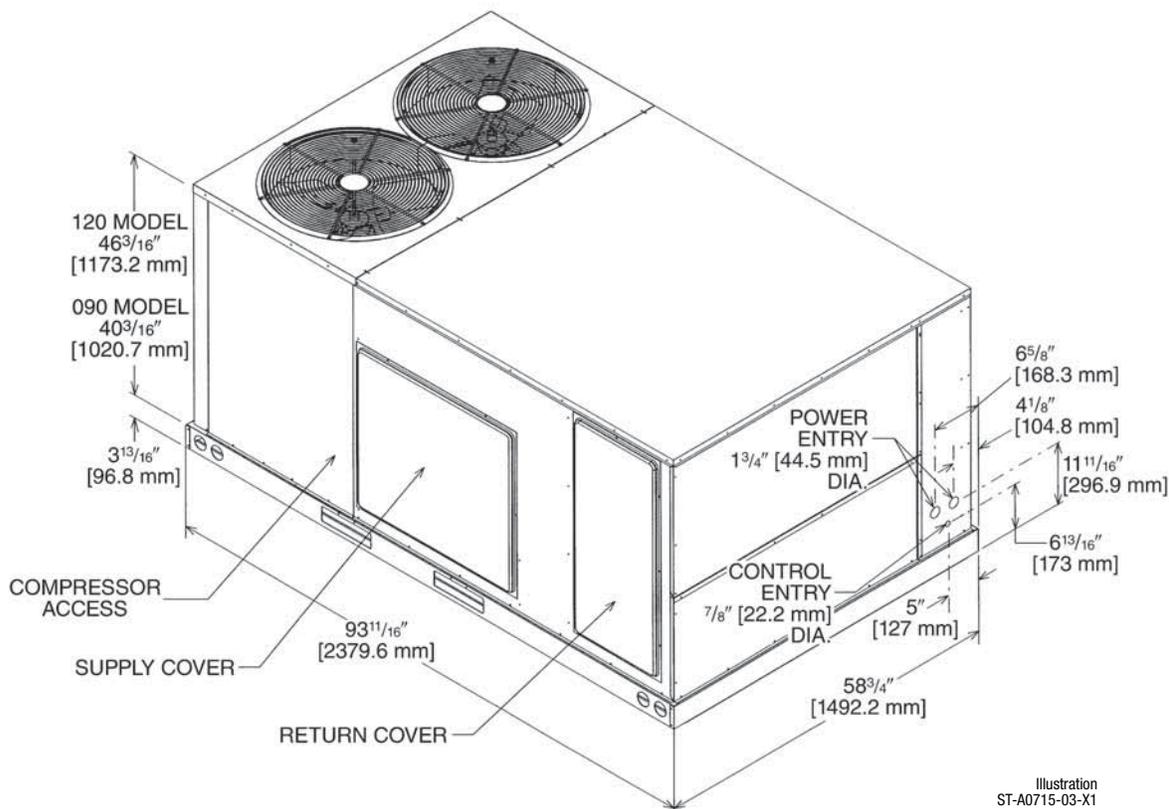
**ELECTRICAL DATA – RKRL- SERIES**

		<b>C090CL H090CR</b>	<b>C090CM H090CS</b>	<b>C090CN H090CT</b>	<b>C090DL H090DR</b>	<b>C090DM H090DS</b>	<b>C090DN H090DT</b>	<b>C090YL</b>	<b>C090YM</b>	<b>C090YN</b>
<b>Unit Information</b>	Unit Operating Voltage Range	187-253	187-253	187-253	414-506	414-506	414-506	518-632	518-632	518-632
	Volts	208/230	208/230	208/230	460	460	460	575	575	575
	Minimum Circuit Ampacity	44/44	44/44	49/49	21	21	24	16	16	21
	Minimum Overcurrent Protection Device Size	50/50	50/50	60/60	25	25	30	20	20	25
	Maximum Overcurrent Protection Device Size	50/50	50/50	60/60	25	25	30	20	20	25
<b>Compressor Motor</b>	No.	2	2	2	2	2	2	2	2	2
	Volts	200/240	200/240	200/240	480	480	480	600	600	600
	Phase	3	3	3	3	3	3	3	3	3
	RPM	3450	3450	3450	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4
	Amps (RLA), Comp. 1	13.6/13.6	13.6/13.6	13.6/13.6	6.1	6.1	6.1	4.2	4.2	4.2
	Amps (LRA), Comp. 1	83.1/83.1	83.1/83.1	83.1/83.1	41	41	41	33	33	33
	HP, Compressor 2	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4
	Amps (RLA), Comp. 2	13.6/13.6	13.6/13.6	13.6/13.6	6.1	6.1	6.1	4.2	4.2	4.2
Amps (LRA), Comp. 2	83.1/83.1	83.1/83.1	83.1/83.1	41	41	41	33	33	33	
<b>Compressor Motor</b>	No.	2	2	2	2	2	2	2	2	2
	Volts	208/230	208/230	208/230	460	460	460	575	575	575
	Phase	1	1	1	1	1	1	1	1	1
	HP	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3
	Amps (FLA, each)	2.4/2.4	2.4/2.4	2.4/2.4	1.4	1.4	1.4	1	1	1
	Amps (LRA, each)	4.7/4.7	4.7/4.7	4.7/4.7	2.4	2.4	2.4	1.5	1.5	1.5
<b>Evaporator Fan</b>	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	2	2	3	2	2	3	2	2	3
	Amps (FLA, each)	8/8	8/8	13/13	4	4	7	4	4	8
	Amps (LRA, each)	56/56	74.5/74.5	74.5/74.5	28	28	38.1	19	19	20

**ELECTRICAL DATA – RKRL- SERIES**

		<b>C120CL H120CR</b>	<b>C120CM H120CS</b>	<b>C120DL H120DR</b>	<b>C120DM H120DS</b>	<b>C120YL</b>	<b>C120YM</b>
<b>Unit Information</b>	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	49/49	54/54	23	26	18	23
	Minimum Overcurrent Protection Device Size	60/60	60/60	25	30	20	30
	Maximum Overcurrent Protection Device Size	60/60	60/60	25	30	20	30
<b>Compressor Motor</b>	No.	2	2	2	2	2	2
	Volts	200/240	200/240	480	480	575	575
	Phase	3	3	3	3	3	3
	RPM	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4
	Amps (RLA), Comp. 1	15.9/15.9	15.9/15.9	7.1	7.1	5.1	5.1
	Amps (LRA), Comp. 1	110/110	110/110	52	52	39.5	39.5
	HP, Compressor 2	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4
	Amps (RLA), Comp. 2	15.9/15.9	15.9/15.9	7.1	7.1	5.1	5.1
	Amps (LRA), Comp. 2	110/110	110/110	52	52	39.5	39.5
<b>Compressor Motor</b>	No.	2	2	2	2	2	2
	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	1.5	1.5
<b>Evaporator Fan</b>	No.	1	1	1	1	1	1
	Volts	208/230	208/230	460	460	575	575
	Phase	3	3	3	3	3	3
	HP	2	3	2	3	2	3
	Amps (FLA, each)	8/8	13/13	4	7	4	8
	Amps (LRA, each)	56/56	74.5/74.5	28	38.1	19	20

# GAS HEAT / ELECTRIC COOLING PACKAGE



[ ] Designates Metric Conversions

# GAS HEAT / ELECTRIC COOLING PACKAGE

## SUPPLY AND RETURN DIMENSIONS FOR HORIZONTAL APPLICATIONS

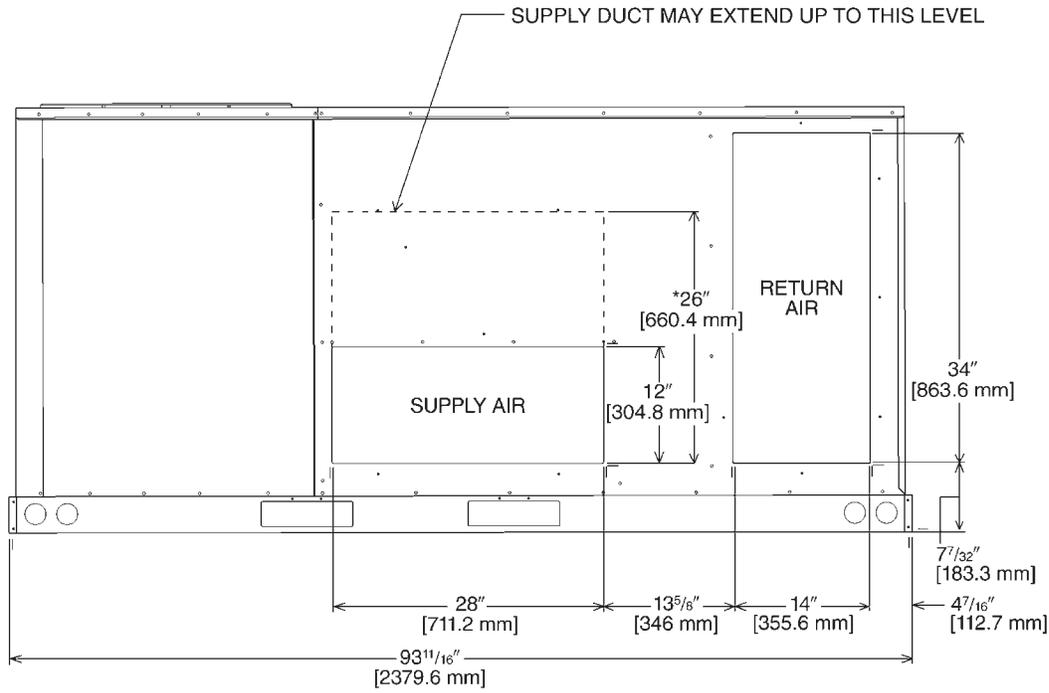


Illustration  
ST-A0736-02-X1

\*RECOMMENDED DUCT DIMENSIONS ARE 26"

## SUPPLY AND RETURN DIMENSIONS FOR DOWNFLOW APPLICATIONS

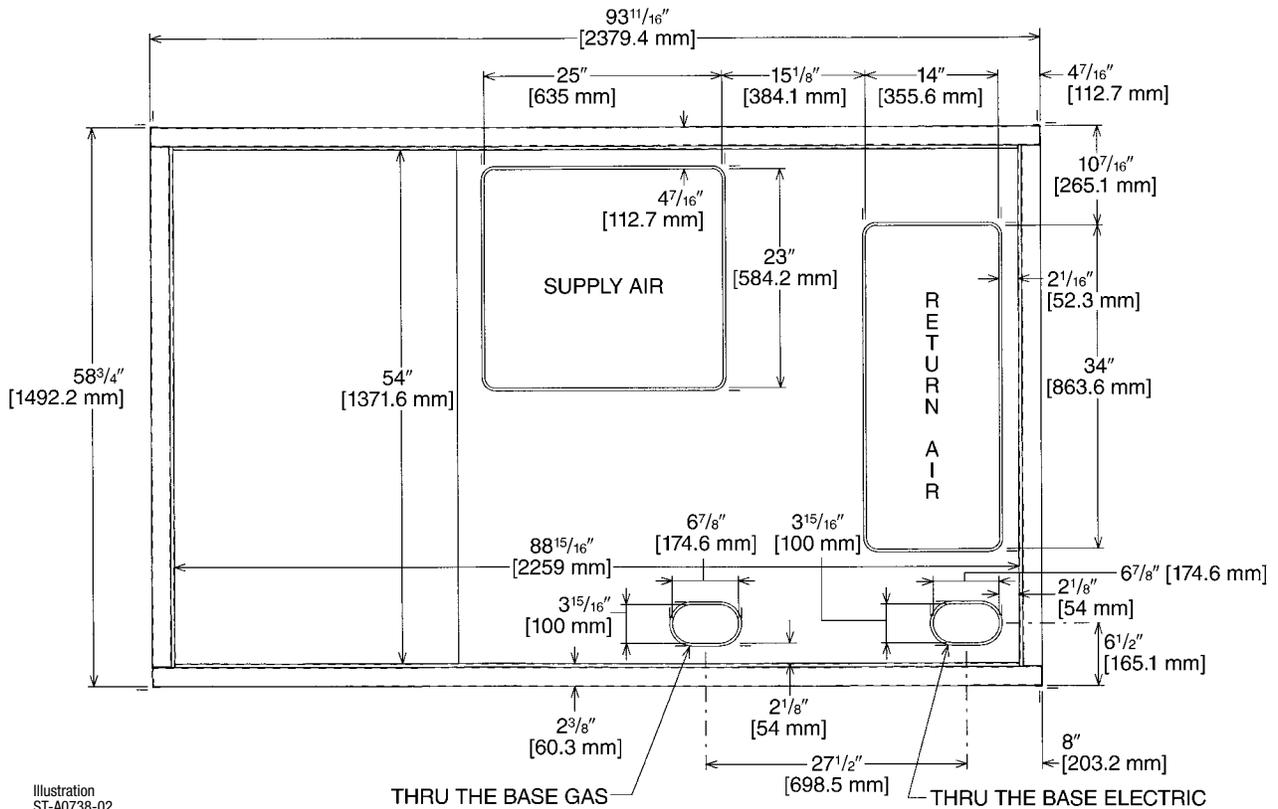


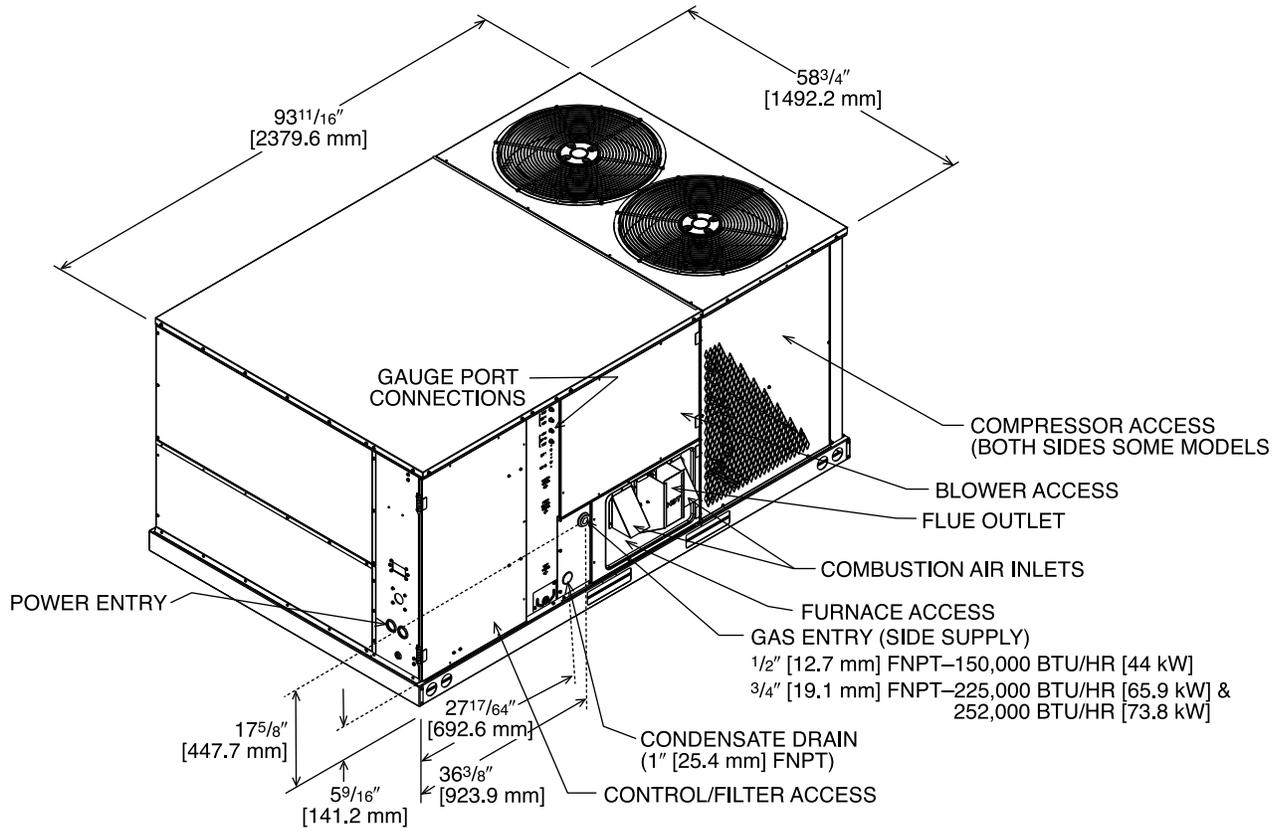
Illustration  
ST-A0738-02

THRU THE BASE GAS

THRU THE BASE ELECTRIC

[ ] Designates Metric Conversions

# GAS HEAT / ELECTRIC COOLING PACKAGE



[ ] Designates Metric Conversions

Illustration  
ST-A1111-03

## WEIGHTS

Accessory	Shipping—lbs [kg]	Operating—lbs [kg]
Economizer	90 [40.82]	81 [36.70]
Power Exhaust	44 [19.96]	42 [19.05]
Fresh Air Damper (Manual)	26 [11.79]	21 [9.53]
Fresh Air Damper (Motorized)	43 [19.50]	38 [17.24]
Roof Curb 14"	90 [40.82]	85 [38.60]
Roof Curb 24"	140 [63.50]	135 [61.23]

Capacity Tons [kW]	Corner Weights by Percentage			
	A	B	C	D
6-12.5 [21.1-44.0]	33%	27%	17%	23%

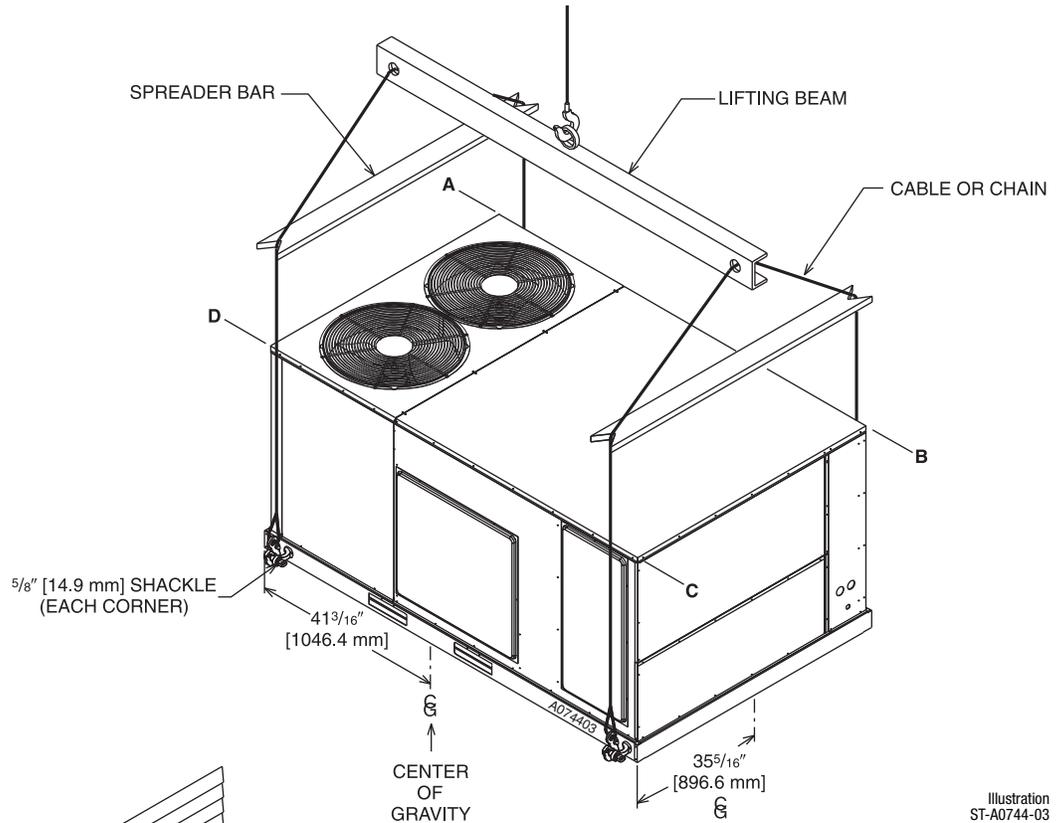
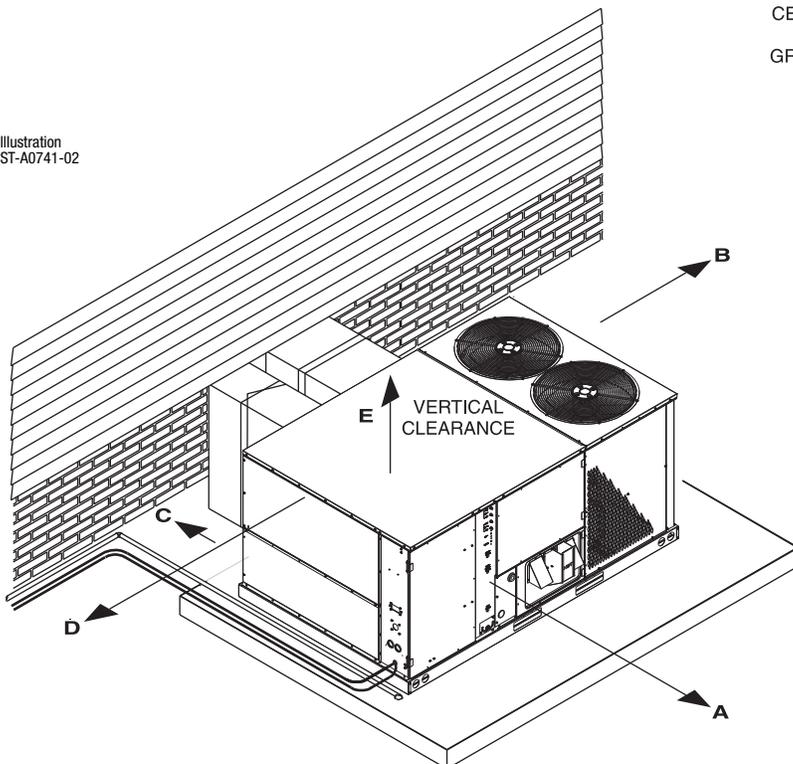


Illustration  
ST-A0744-03

Illustration  
ST-A0741-02



### CLEARANCES

The following minimum clearances must be observed for proper unit performance and serviceability.

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

[ ] Designates Metric Conversions

## FIELD INSTALLED ACCESSORY EQUIPMENT

Accessory	Model Number	Shipping Weight Lbs. [kg]	Installed Weight Lbs. [kg]	Factory Installation Available?
Thermostats	See Thermostat Specification Sheet for Details (T22-001)			No
Economizer w/Single Enthalpy (Downflow)	AXRD-PJCM3	90 [40.8]	81 [36.7]	Yes
Economizer w/Single Enthalpy and Smoke Detector (Downflow)	AXRD-SJCM3	91 [41.3]	82 [37.2]	Yes
Dual Enthalpy Kit	RXXR-AV03	1 [.5]	1 [.5]	No
Horizontal Economizer w/Single Enthalpy	AXRD-RJCM3	94 [42.6]	89 [40.4]	No
Carbon Dioxide Sensor (Wall Mount)	RXXR-AR02	3 [1.4]	2 [1.0]	No
Power Exhaust	RXXR-BFF02 (C,D,Y)	43 [19.5]	38 [17.2]	No
Manual Fresh Air Damper (Horizontal Return Mounted)	AXRF-JDA1	26 [11.8]	21 [9.5]	No
Manual Fresh Air Damper (Left Panel Mounted)	AXRF-KDA1	38 [17.2]	31 [14.1]	No
Motor Kit for RXRF-KDA1 (Left Panel Mounted)	RXXR-AW02	35 [15.9]	27 [12.2]	No
Modulating Motor Kit w/position feedback for RXRF-KDA1	RXXR-AW04	38 [17.2]	30 [13.6]	No
Motorized Fresh Air Damper (Horizontal Return Mounted)	AXRF-JDB1	43 [19.5]	38 [17.2]	No
Roofcurb, 14"	RXKG-CAE14	90 [40.8]	85 [38.5]	No
Roofcurb, 24"	RXKG-CAE24	140 [63.5]	135 [61.2]	No
Roofcurb Adapters	RXXR-CDCE50	300 [136.1]	290 [131.5]	No
	RXXR-CFCE54	325 [147.4]	315 [142.9]	No
	RXXR-CFCE56	350 [158.8]	340 [154.2]	No
	RXXR-CGCC12	450 [204.1]	410 [186.0]	No
Concentric Diffuser (Step-Down, 20" Round)	RXRN-FA65	139 [63.0]	60 [27.2]	No
Concentric Diffuser (Step-Down, 18 x 28)	RXRN-AA61	200 [90.7]	185 [83.9]	No
Concentric Diffuser (Step-Down, 18 x 32)	RXRN-AA66	247 [112.0]	227 [103.0]	No
Concentric Diffuser (Flush, 20" Round)	RXRN-FA75	54 [24.4]	42 [19.0]	No
Concentric Diffuser (Flush, 18 x 28)	RXRN-AA71	170 [77.1]	155 [70.3]	No
Concentric Diffuser (Flush, 18 x 32)	RXRN-AA76	176 [79.8]	161 [73.0]	No
Downflow Transition (Rect. to 20" Round)	RXMC-CD04 ①	15 [6.8]	13 [5.9]	No
Downflow Transition (Rect. to Rect., 18 x 28)	RXMC-CE05 ②	18 [8.2]	16 [7.3]	No
Downflow Transition (Rect. to Rect., 18 x 32)	RXMC-CF06 ③	20 [9.1]	18 [8.2]	No
Low-Ambient Control Kit (1 Per Compressor)	RXRZ-C02	3 [1.4]	2 [1.0]	Yes
Outdoor Coil Louver Kit	AXRX-AAD02A (7.5 Ton)	29 [13.1]	26 [11.8]	Yes
Outdoor Coil Louver Kit	AXRX-AAD03A (10 Ton)	32 [14.5]	28 [12.7]	Yes
Unwired Convenience Outlet	RXXR-AN01	2 [1.0]	1.5 [.7]	Yes
Unfused Service Disconnect	RXXR-AP01	10 [4.5]	9 [4.1]	Yes
Comfort Alert (1 per compressor)	RXXR-AZ01	3 [1.5]	2 [0.9]	Yes
BACnet Communication Card	RXXR-AY01	1 [0.5]	1 [0.5]	No
LonWorks Communication Card	RXXR-AY02	1 [0.5]	1 [0.5]	No

NOTES: ① Used with RXRN-FA65 and RXRN-FA75 concentric diffusers.

② Used with RXRN-AA61 and RXRN-AA71 concentric diffusers.

③ Used with RXRN-AA66 and RXRN-AA76 concentric diffusers.

NOTICE: Please refer to conversion kit index provided with the unit for LP conversion kit.

[ ] Designates Metric Conversions

## THERMOSTATS



**200-Series \***  
 Programmable



**300-Series \***  
 Deluxe  
 Programmable

**400-Series \***  
 Special Applications/  
 Programmable



**500-Series \***  
 Communicating/  
 Programmable

Brand	Descriptor (3 Characters)	Series (3 Characters)	System (2 Characters)	Type (2 Characters)
<b>UHC</b>	<b>- TST</b>	<b>213</b>	<b>UN</b>	<b>MS</b>
UHC=Ruud	TST=Thermostat	200=Programmable 300=Deluxe Programmable 400=Special Applications/ Programmable 500=Communicating/ Programmable	GE=Gas/Electric UN=Universal (AC/HP/GE) MD=Modulating Furnace DF=Dual Fuel CM=Communicating	SS=Single-Stage MS=Multi-Stage

\* Photos are representative. Actual models may vary.

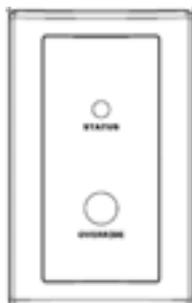
For detailed thermostat match-up information,  
 see specification sheet form number T22-001.

## FLUSH MOUNT ROOM TEMPERATURE SENSORS FOR NETWORKED DDC APPLICATIONS



### ROOM TEMPERATURE SENSOR RHC-ZNS1 with TIMED OVERRIDE BUTTON

10k $\Omega$  room temperature sensor transmits room temperature to DDC system. Timed override button allows tenant to change from unoccupied temperature setpoint to occupied temperature setpoint for a preset time.



### ROOM TEMPERATURE SENSOR RHC-ZNS2 with TIMED OVERRIDE BUTTON and STATUS INDICATOR

10k $\Omega$  room temperature sensor transmits room temperature to DDC system. Timed override button allows tenant to change from unoccupied temperature setpoint to occupied temperature setpoint for a preset time. Status Indicator Light transmits ALARM flash code to occupied space.



### ROOM TEMPERATURE SENSOR RHC-ZNS3 with SETPOINT ADJUSTMENT and TIMED OVERRIDE BUTTON

10k $\Omega$  room temperature sensor with setpoint adjustment transmits room temperature to DDC system along with desired occupied room temperature setpoint. Timed override button allows tenant to change from unoccupied temperature setpoint to occupied temperature setpoint for a preset time.

## 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.

## ECONOMIZER FOR DOWNFLOW DUCT INSTALLATION

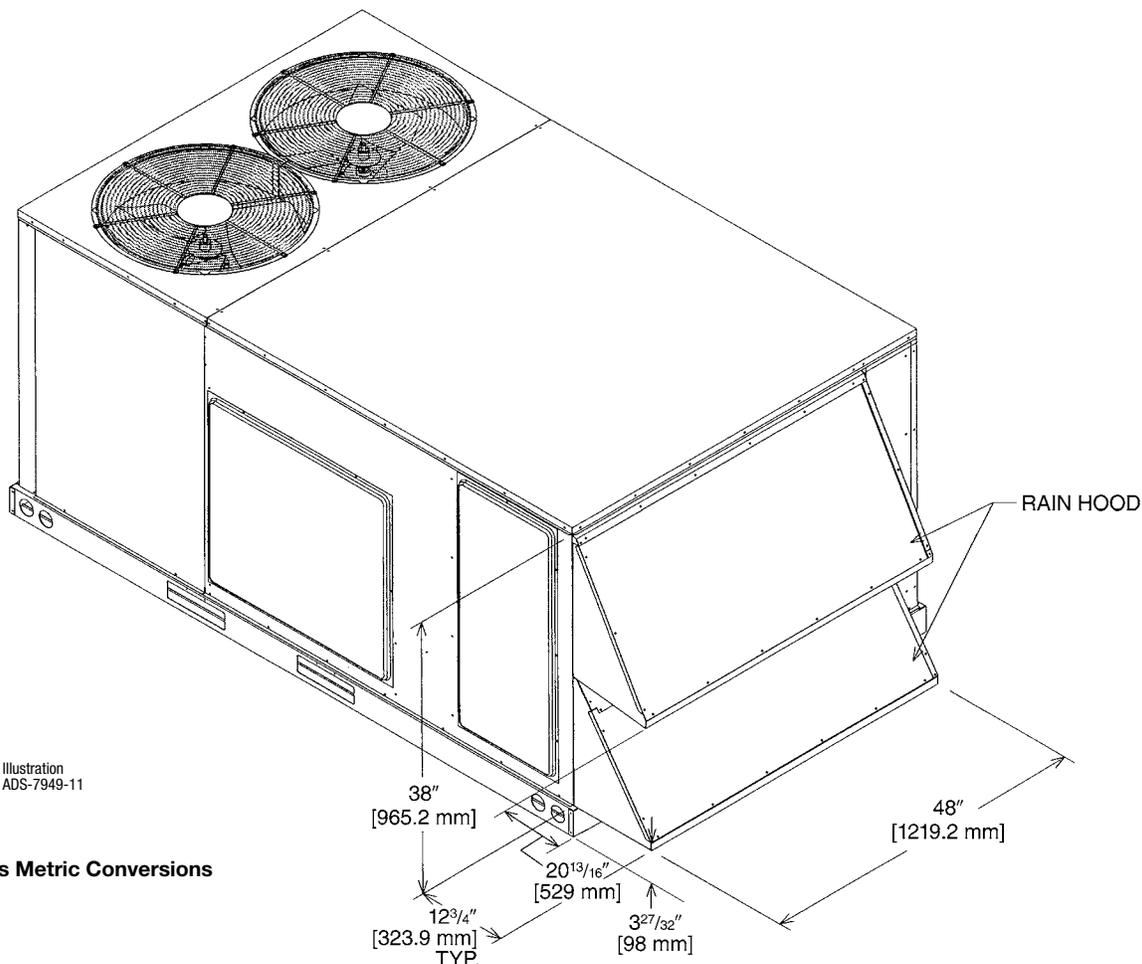
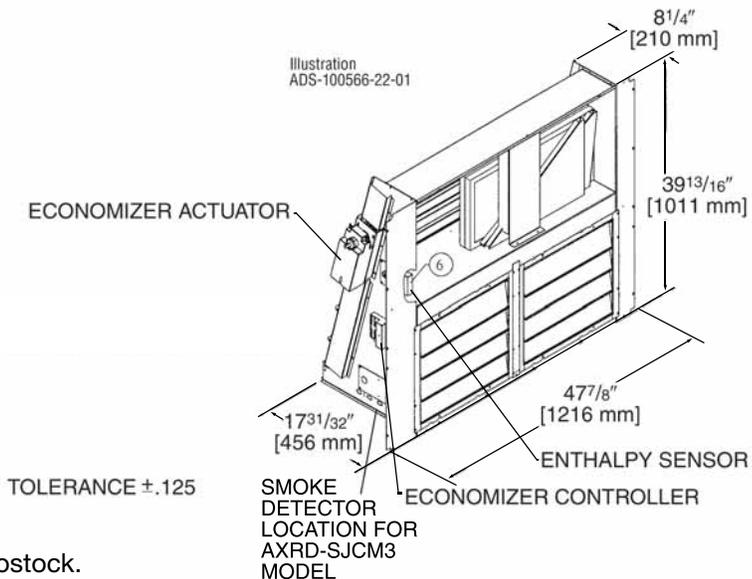
### Use to Select Factory Installed Options Only

**AXRD-PJCM3—Single Enthalpy (Outdoor) and AXRD-SJCM3 Single Enthalpy with Smoke Detector**

**RXXR-AV03—Dual Enthalpy Upgrade Kit**

**RXXR-AR02—Optional Wall-Mounted CO<sub>2</sub> Sensor**

- 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 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 Downflow Duct Application.
- Optional Remote Minimum Position Potentiometer (270 ohm) (Honeywell #S963B1136) is Available from Prostock.
- Field Installed Power Exhaust Available
- Prewired for Smoke Detector
- If connected to a Building Automation System (BAS), all economizer functions can be viewed on the (BAS), or 16 x 2 LCD screen
- If connected to thermostat, all economizer functions can be viewed on 16 x 2 LCD screen



[ ] Designates Metric Conversions

## ECONOMIZER FOR HORIZONTAL DUCT INSTALLATION

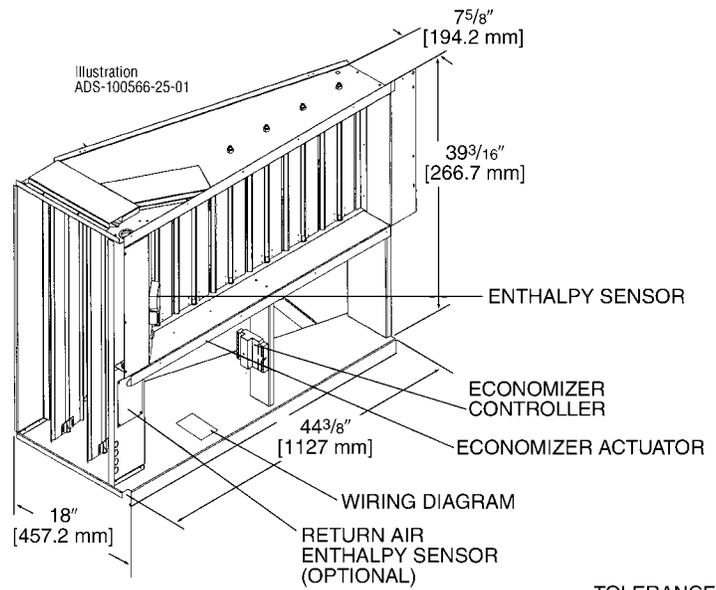
### Field Installed Only

**AXRD-RJCM3—Single Enthalpy (Outdoor)**

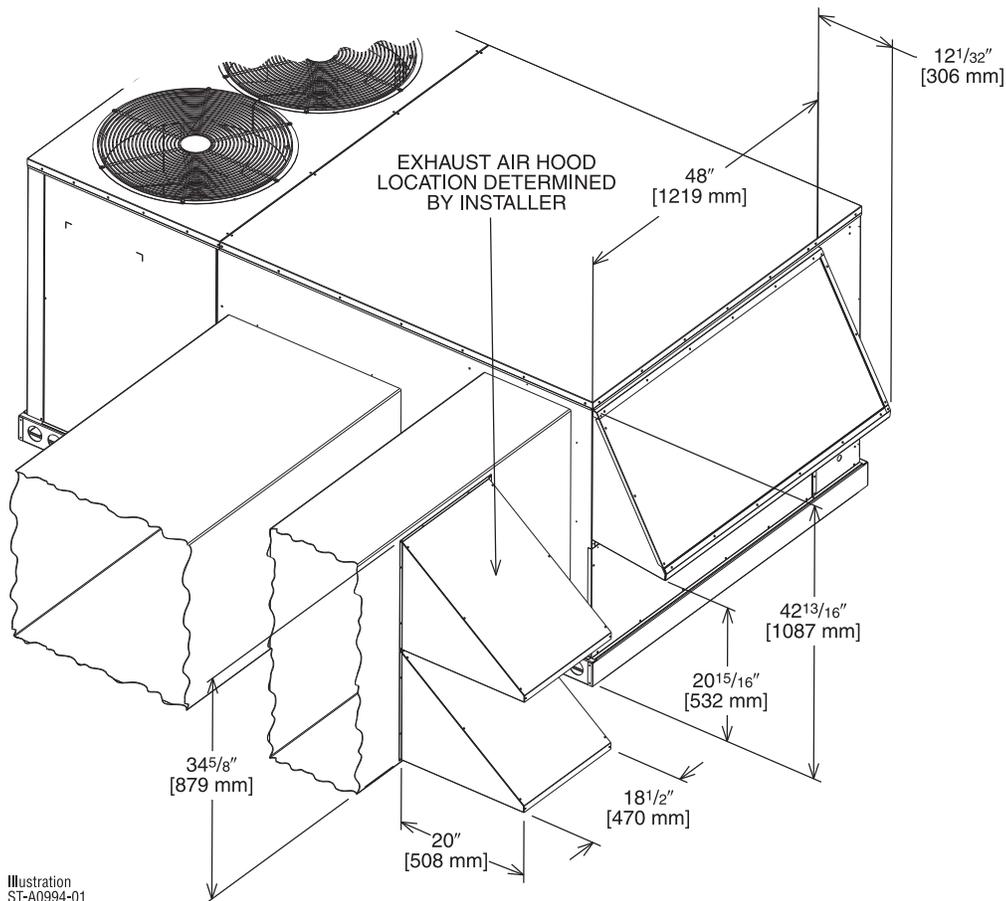
**RXXR-AV03—Dual Enthalpy Upgrade Kit**

**RXXR-AR02—Wall-mounted CO<sub>2</sub> 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 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 x 2 LCD screen
- If connected to thermostat, all economizer functions can be viewed on 16 x 2 LCD screen



TOLERANCE ± .125



[ ] Designates Metric Conversions

# POWER EXHAUST KIT FOR AXRD-PJCM3(-), AXRD-SJCM3(-) ECONOMIZERS

RXRX-BFF02 (C, D, or Y\*)

\*Voltage Code

## VERTICAL AIRFLOW

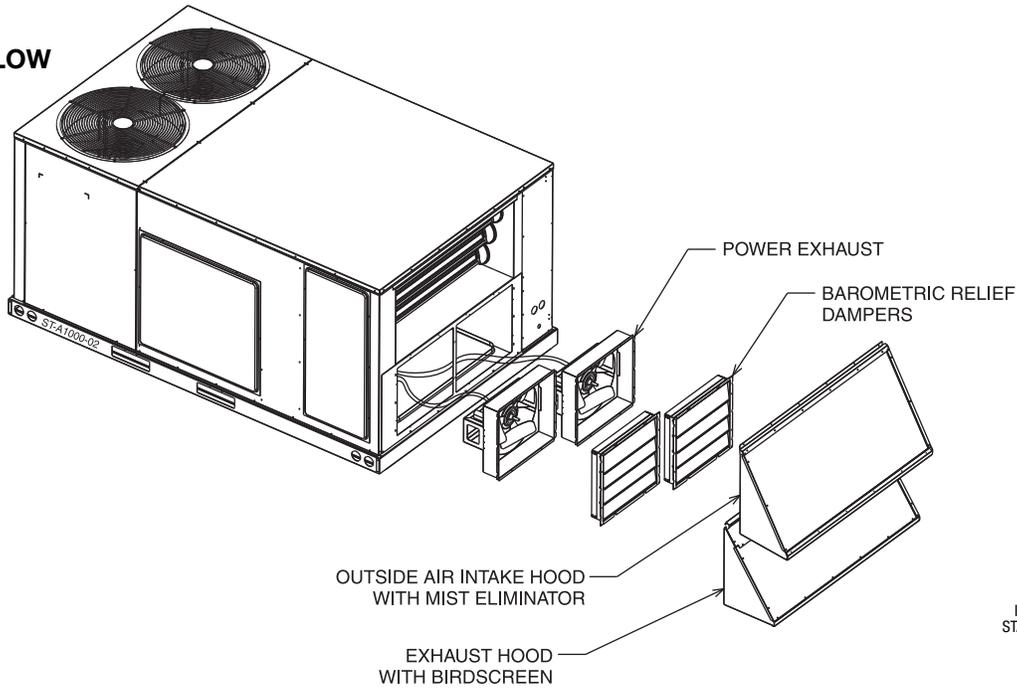


Illustration  
STA1000-02

## HORIZONTAL AIRFLOW

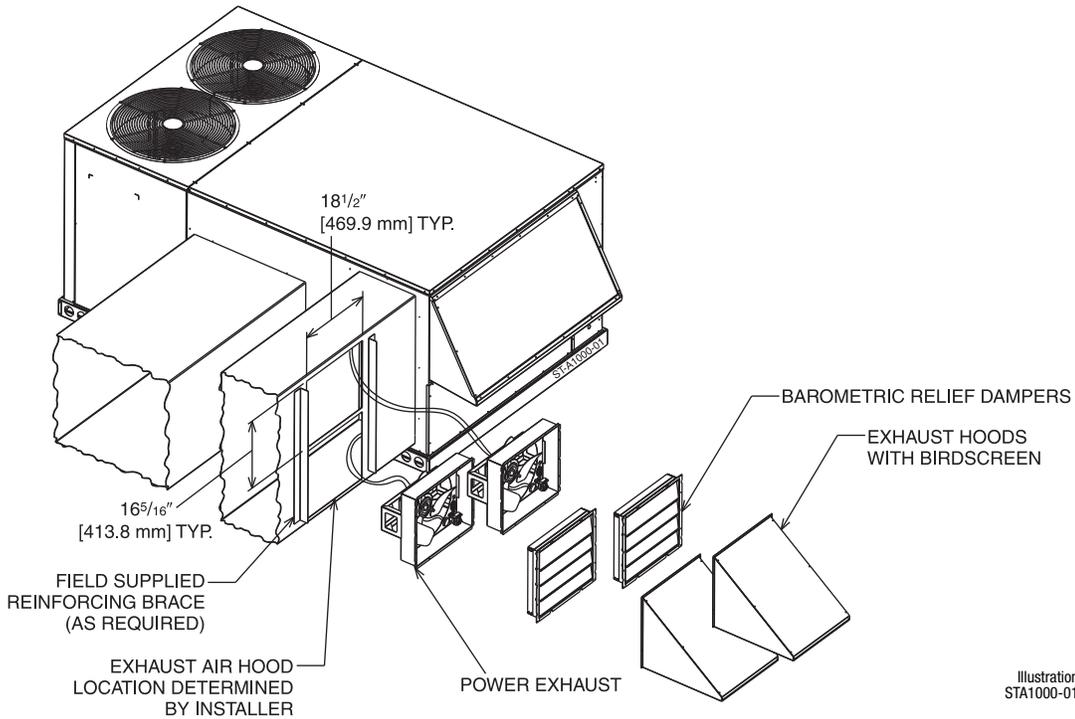


Illustration  
STA1000-01

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-BFF02C	2	208-230	1	0.33	2200 [1038]	1518	2500 [1179]	1670	1.48	3.6
RXRX-BFF02D	2	460	1	0.33	2200 [1038]	1518	2500 [1179]	1670	0.75	1.8
RXRX-BFF02Y	2	575	1	0.33	2200 [1038]	1518	2500 [1179]	1670	0.81	1.5

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

RXXR-AW02

(Motor Kit for AXRF-KDA1)

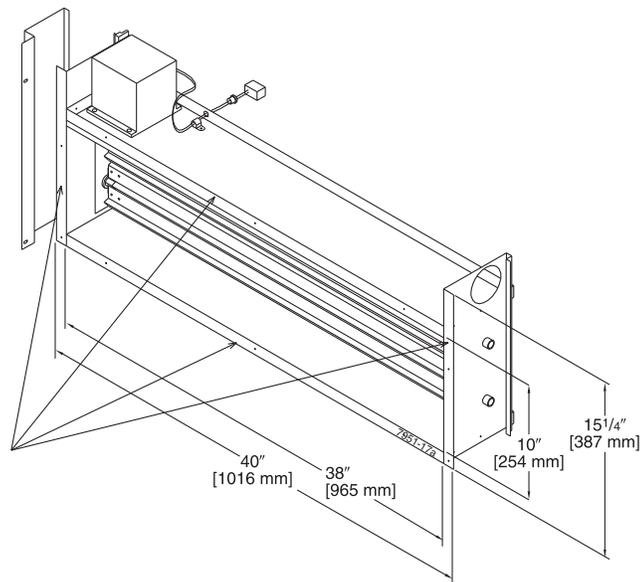


Illustration  
ST-7951-17

[ ] Designates Metric Conversions

### MOTORIZED DAMPER KIT

RXXR-AW04 (Modulating Motor Kit with position feedback for AXRF-KDA1)

- 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), or 16 x 2 LCD screen
- If connected to thermostat, all fresh air damper functions can be viewed on 16 x 2 LCD screen

AXRF-KDA1 (Manual)

DOWNFLOW OR  
HORIZONTAL APPLICATION

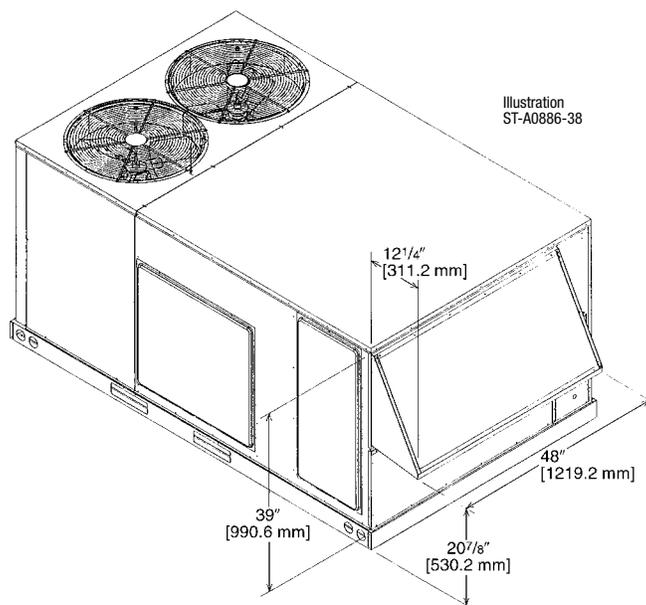


Illustration  
ST-A0886-38

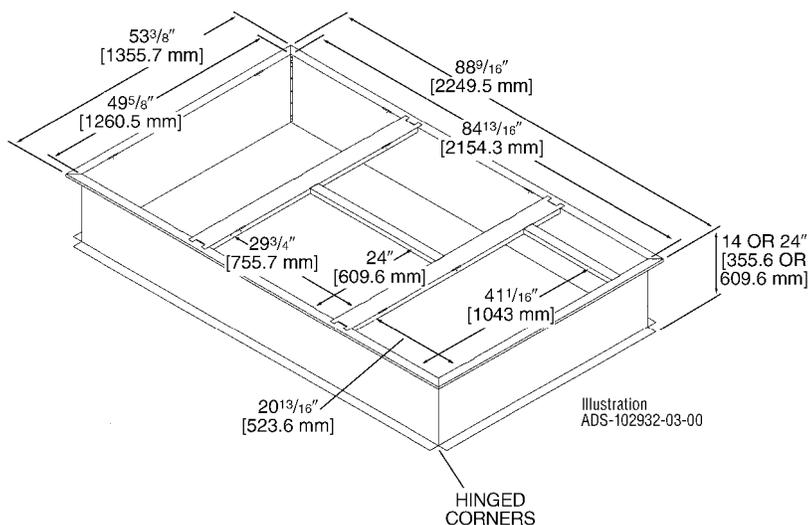


## ROOFCURBS (Full Perimeter)

- Ruud's roofcurb design can be utilized on all 7.5-10 ton [26.4-35.2 kW] RKRL- models.
- Two available heights (14" [356 mm] and 24" [610 mm]) for ALL models.
- Quick assembly corners for simple and fast assembly.
- Opening provided in bottom pan to match the "Thru the Curb" electrical connection opening provided on the unit base pan.
- 1" [25 mm] x 4" [102 mm] Nailer provided.
- Insulating panels not required because of insulated outdoor base pan.
- Sealing gasket (40' [12.2 m]) provided with Roofcurb.
- Packaged for easy field assembly.

Roofcurb Model	Height of Curb
RXKG-CAE14	14" [356 mm]
RXKG-CAE24	24" [610 mm]

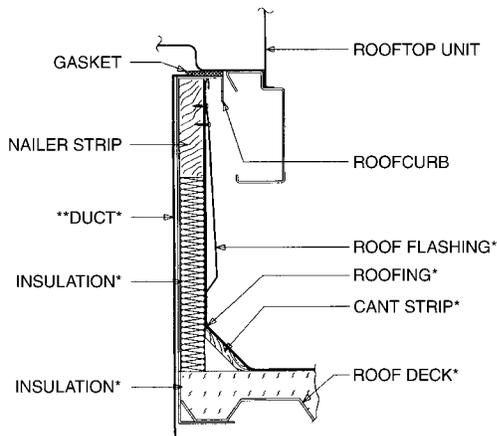
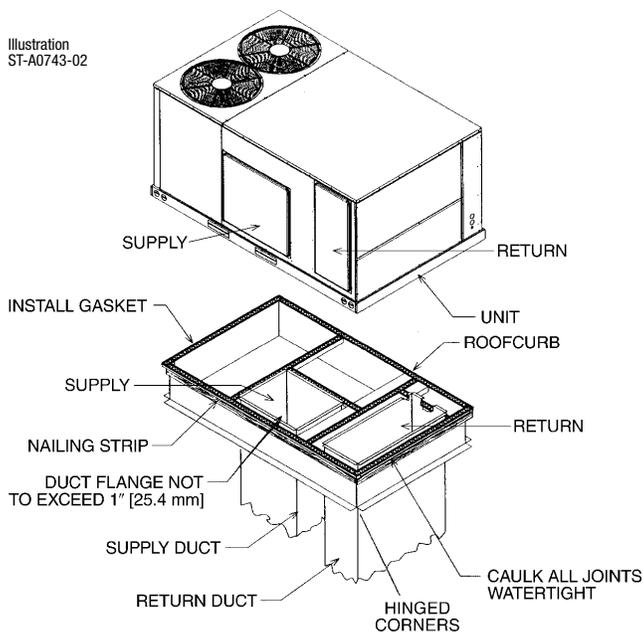
## ROOFCURB INSTALLATION



[ ] Designates Metric Conversions

## TYPICAL INSTALLATION

Illustration ST-A0743-02



\*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-A0743-02

## ROOFCURB ADAPTERS

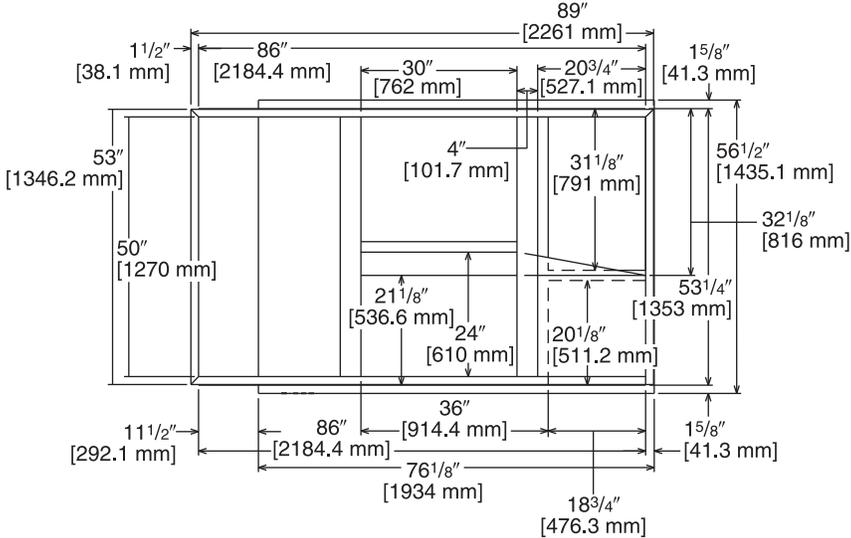
OLD MODELS	OLD ROOFCURB	ROOFCURB ADAPTER	NEW MODELS (All Share Common Cabinet)
(-)RCF, (-)REF-075/076 (-)RGF-150075, (-)RGF-131076 (-)RGF-201076	RXRK-E50	RXRX-CDCE50	RKRL- C090 & C120
(-)RGF-200075 (-)RGG, (-)REG, (-)RCG-075 (-)RGF, (-)REF, (-)RCF-085 (-)RGF, (-)REF, (-)RCF-100 (-)RGG, (-)REG, (-)RCG-100	RXRK-E54	RXRX-CFCE54	
(-)RGF, (-)REF, (-)RCF-125	RXRK-E56	RXRX-CFCE56	
(-)PDC-075 (-)PDC-100/101	RXPK-C12	RXRX-CGCC12	

NOTE: Ductwork modifications may be necessary if the capacity and/or indoor airflow rate of replacement unit is not equivalent to that of the unit being replaced.  
RKRL- C090, C120 fit on the same curb as the RKKB-A090, A120, A150, A181, RKMB- A090 & A120, RKNB- A090 & A120

# ROOFCURB ADAPTERS (Cont.)

RXRX-CDCE50

Illustration  
ADS-7952-02  
Sheet 2



TOP VIEW

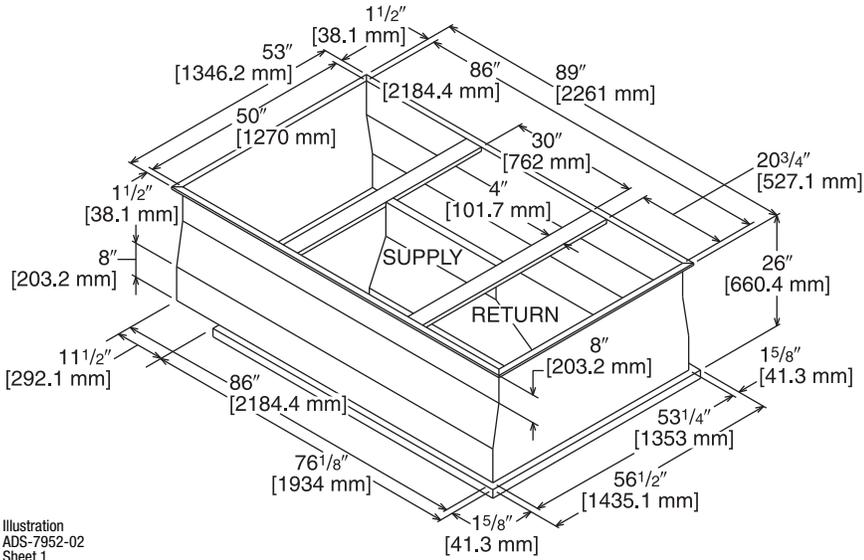


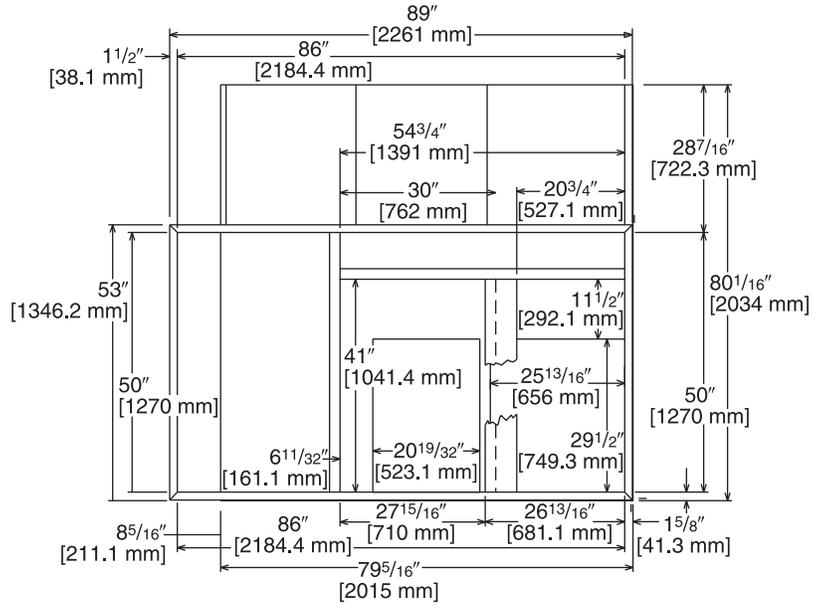
Illustration  
ADS-7952-02  
Sheet 1

[ ] Designates Metric Conversions

# ROOFCURB ADAPTERS (Cont.)

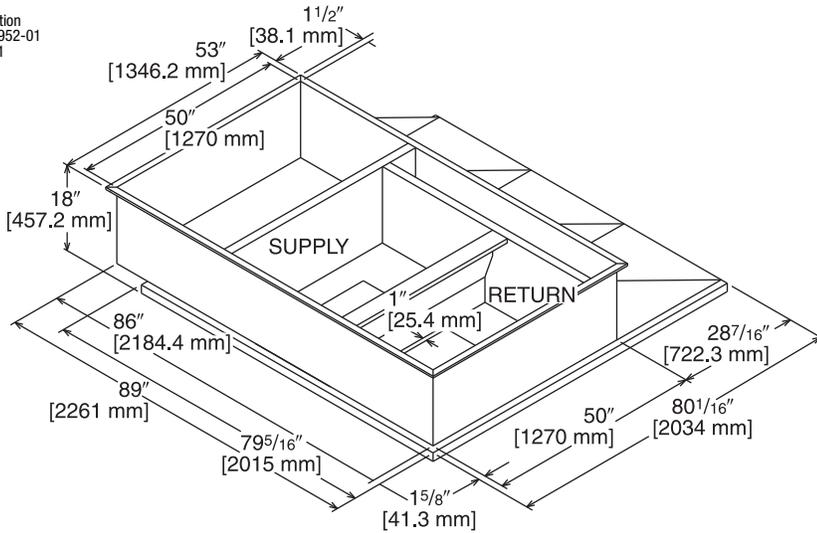
RXRX-CFCE54

Illustration  
ADS-7952-01  
Sheet 2



**TOP VIEW**

Illustration  
ADS-7952-01  
Sheet 1

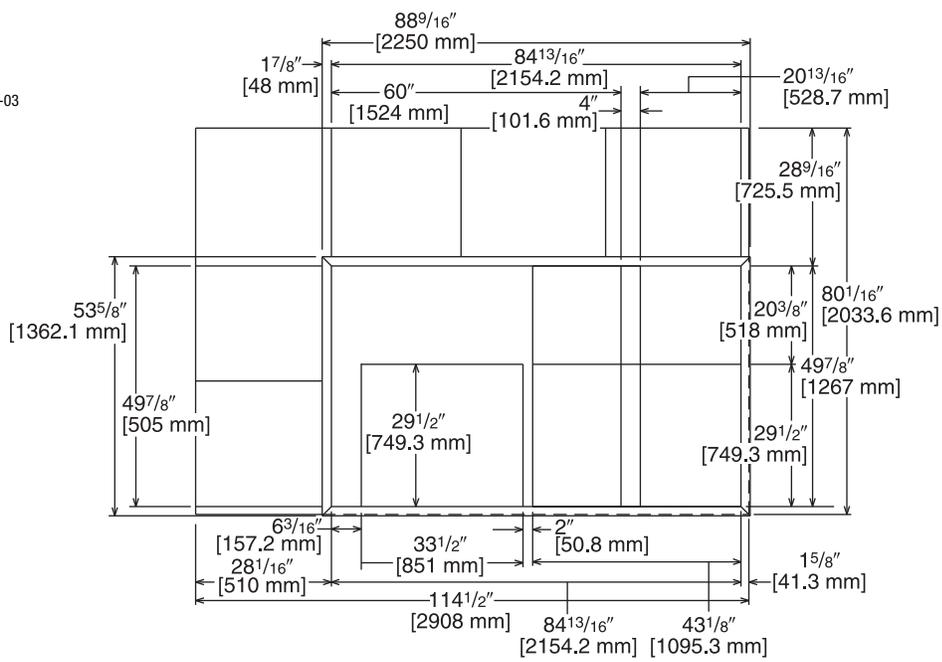


[ ] Designates Metric Conversions

# ROOFCURB ADAPTERS (Cont.)

RXRX-CFCE56

Illustration  
ADS-7952-03  
Sheet 2



TOP VIEW

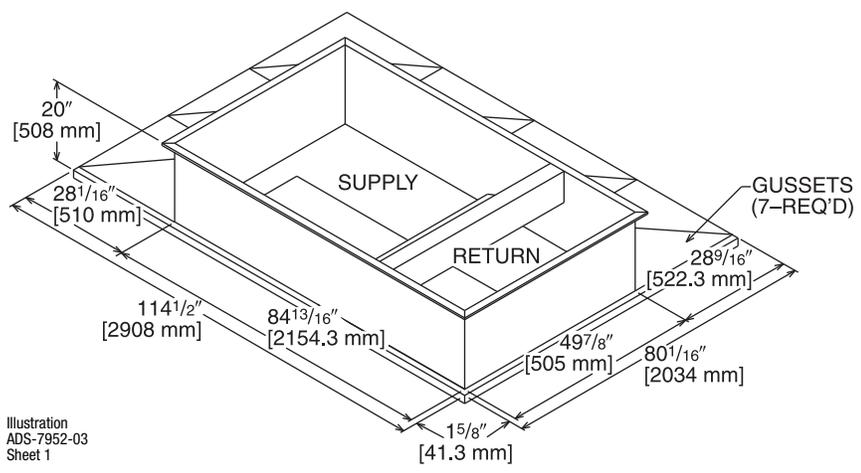


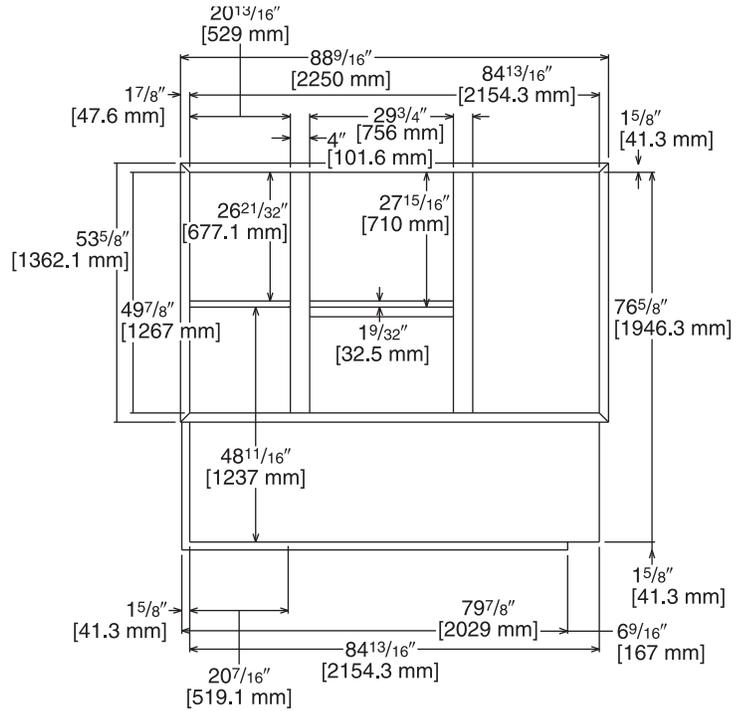
Illustration  
ADS-7952-03  
Sheet 1

[ ] Designates Metric Conversions

# ROOFCURB ADAPTERS (Cont.)

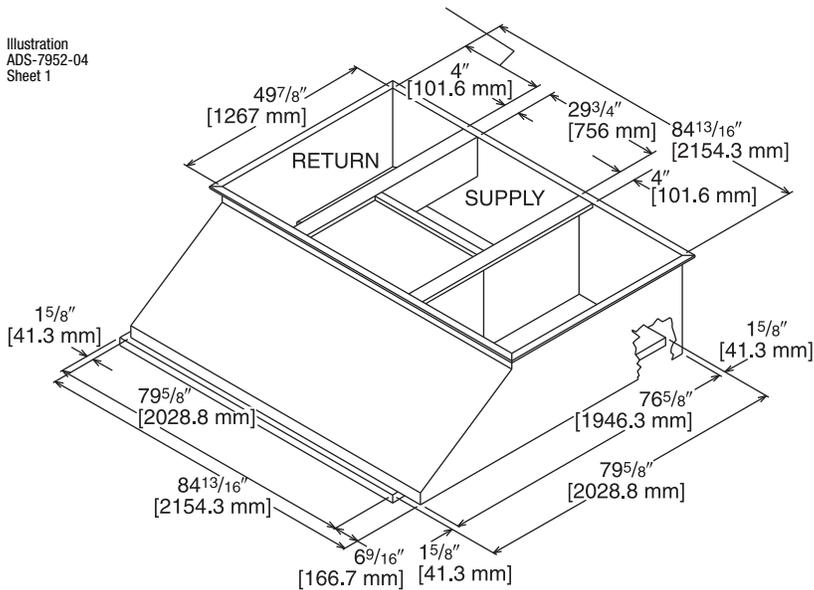
RXRX-CGCC12

Illustration  
ADS-7952-04  
Sheet 2



TOP VIEW

Illustration  
ADS-7952-04  
Sheet 1



[ ] Designates Metric Conversions

# CONCENTRIC DIFFUSER APPLICATION

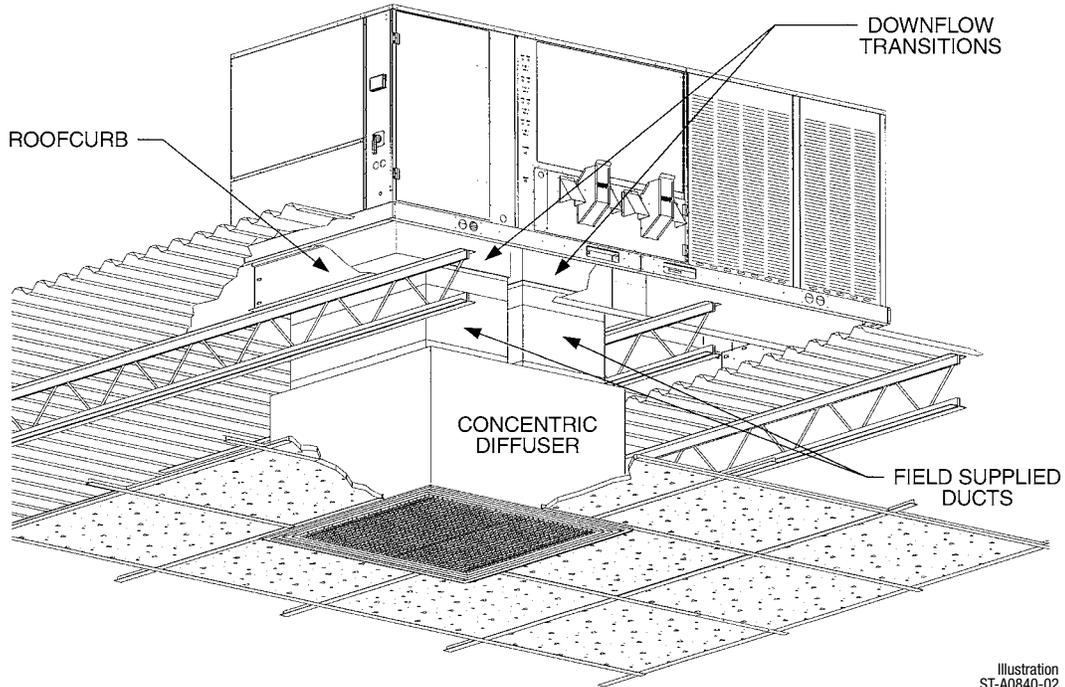


Illustration  
ST-A0840-02

## DOWNFLOW TRANSITION DRAWINGS

### RXMC-CE05

- Used with RXRN-AA61 or RXRN-AA71 Concentric Diffusers.

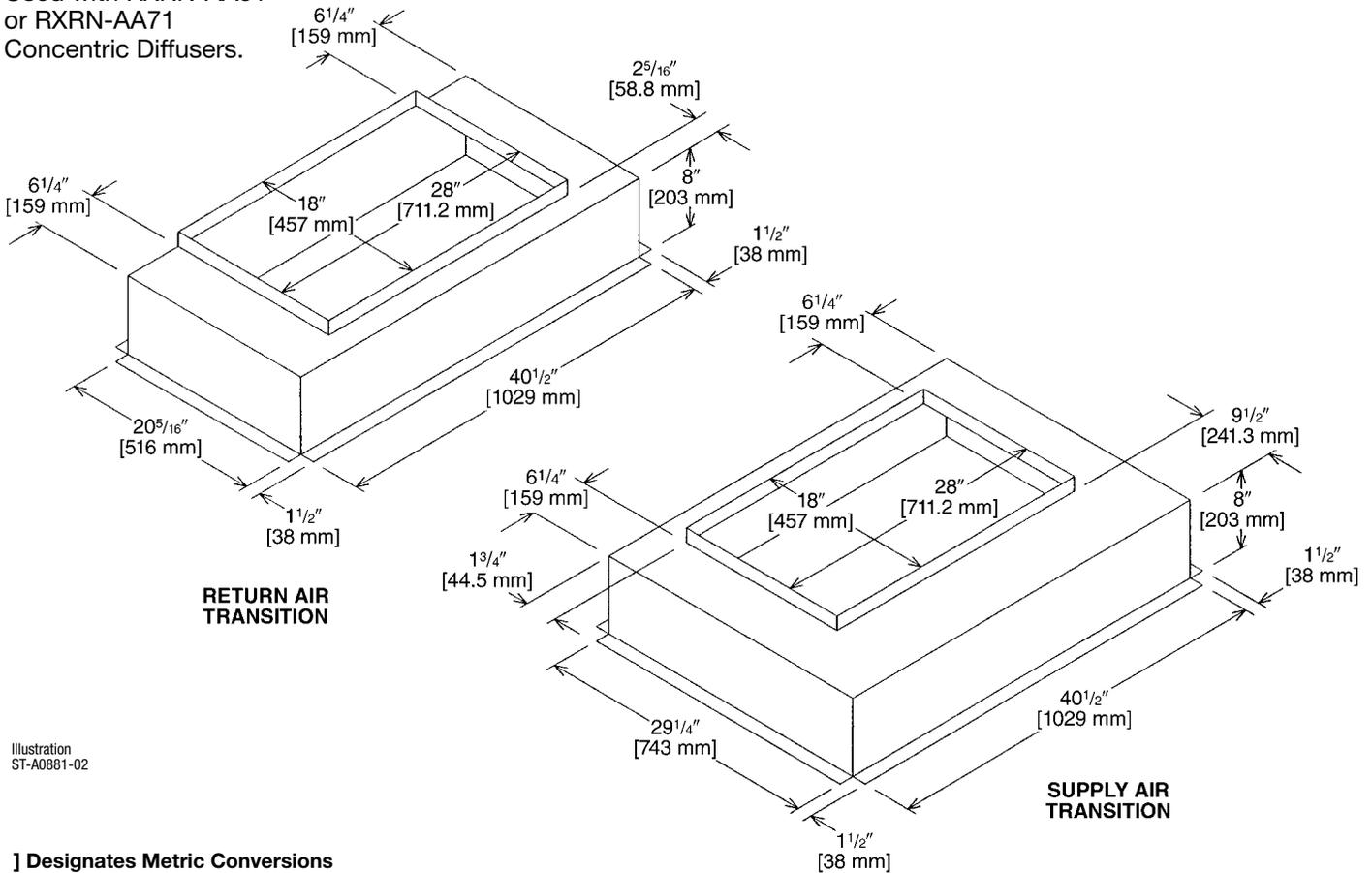


Illustration  
ST-A0881-02

[ ] Designates Metric Conversions

# DOWNFLOW TRANSITION DRAWINGS

## RXMC-CF06

- Used with RXRN-AA66  
or RXRN-AA76  
Concentric Diffusers.

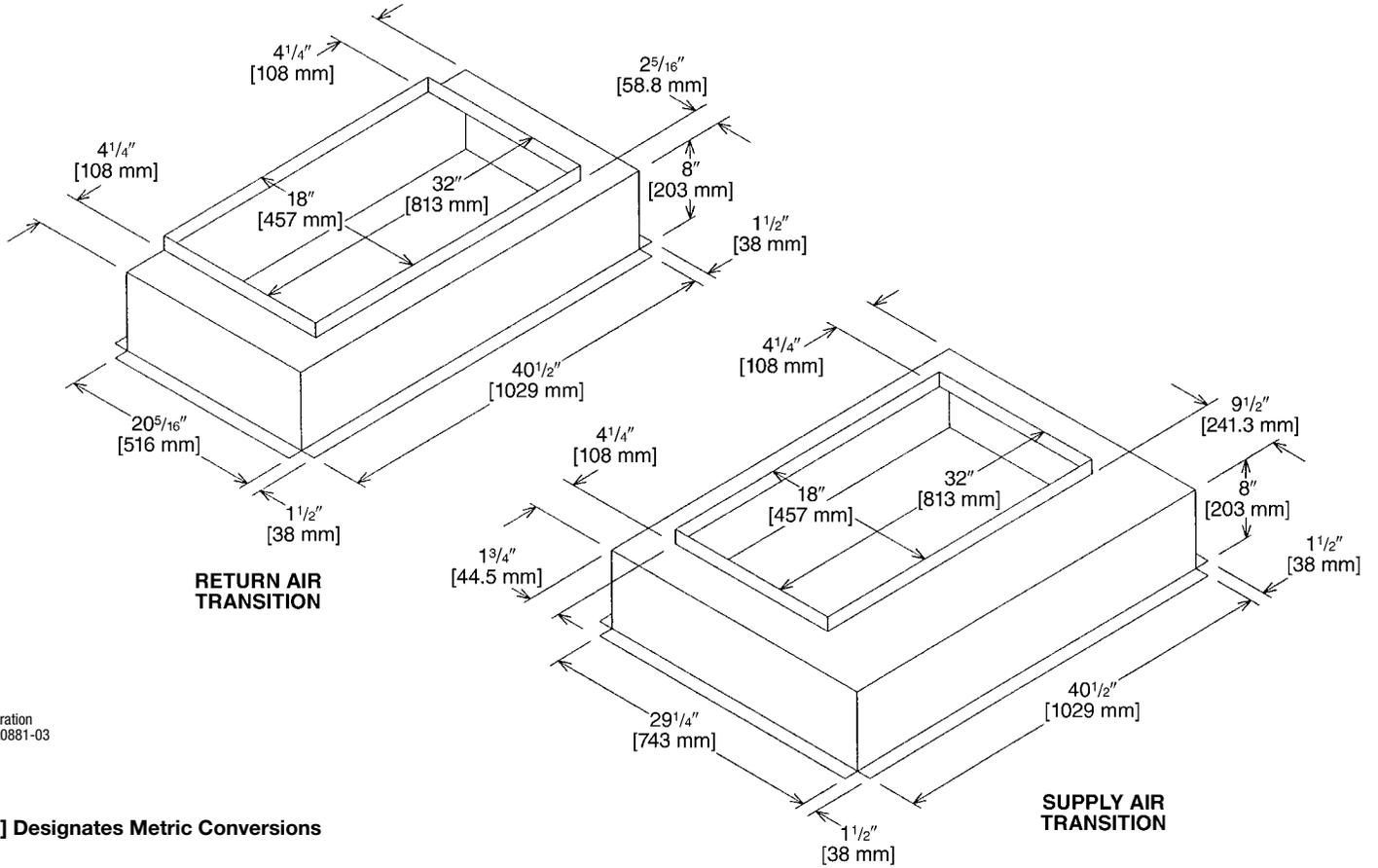


Illustration  
ST-A0881-03

[ ] Designates Metric Conversions

## DOWNFLOW TRANSITION DRAWINGS

### RXMC-CD04

- Used with RXRN-FA65  
or RXRN-FA75  
Concentric Diffusers.

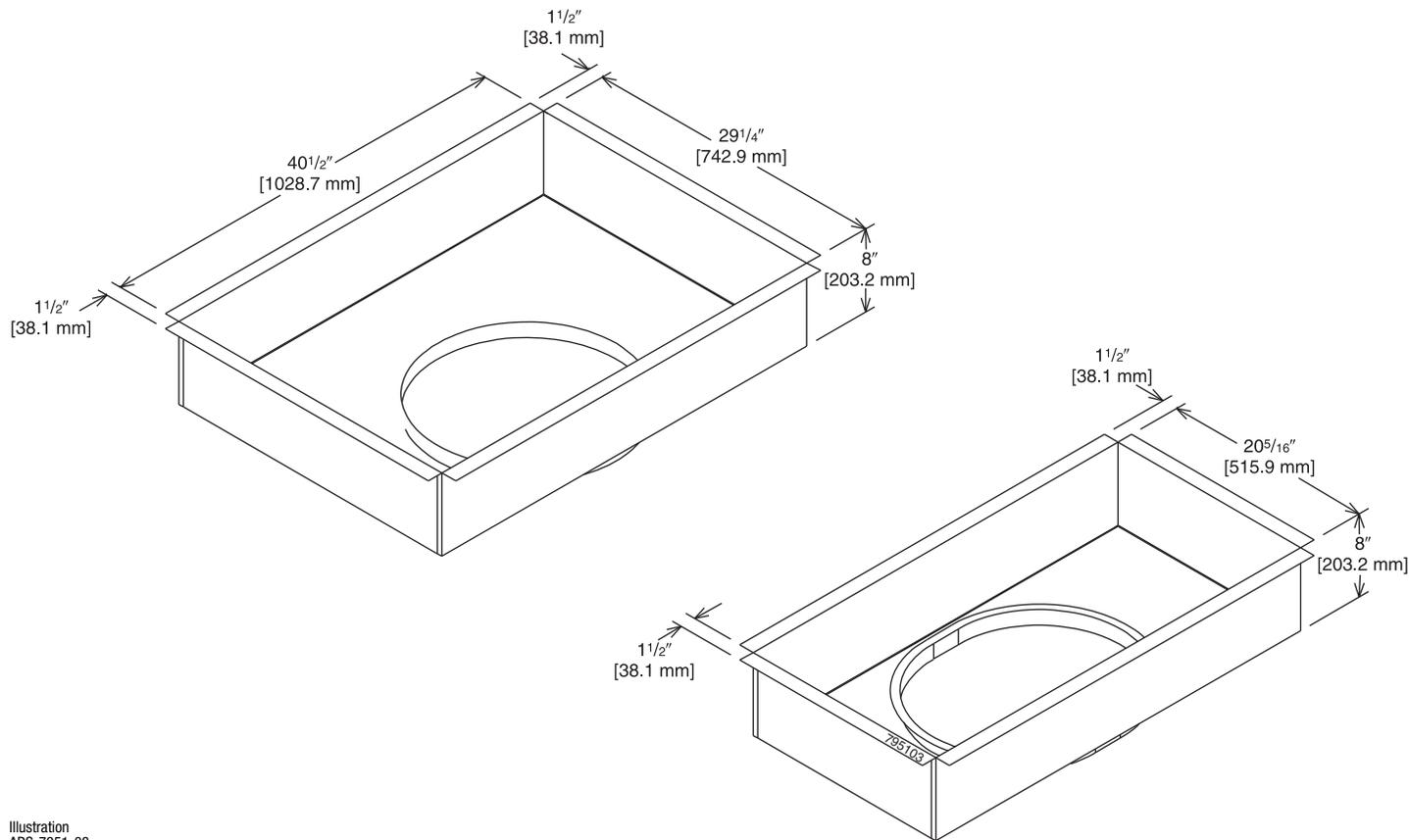


Illustration  
ADS-7951-03

[ ] Designates Metric Conversions



## CONCENTRIC DIFFUSER – STEP DOWN 18" x 28" [457.2 x 711.2 mm]

AXRN-AA61 (8.5 & 10 Ton [29.9 kW & 35.2] Models)

For Use With Downflow Transition (RXMC-CE05)  
and 18" x 28" [457.2 x 711.2 mm]  
Supply and Return Ducts

- 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. [0.7 kg] duct liner.
- Double deflection diffuser with the blades secured by spring steel.

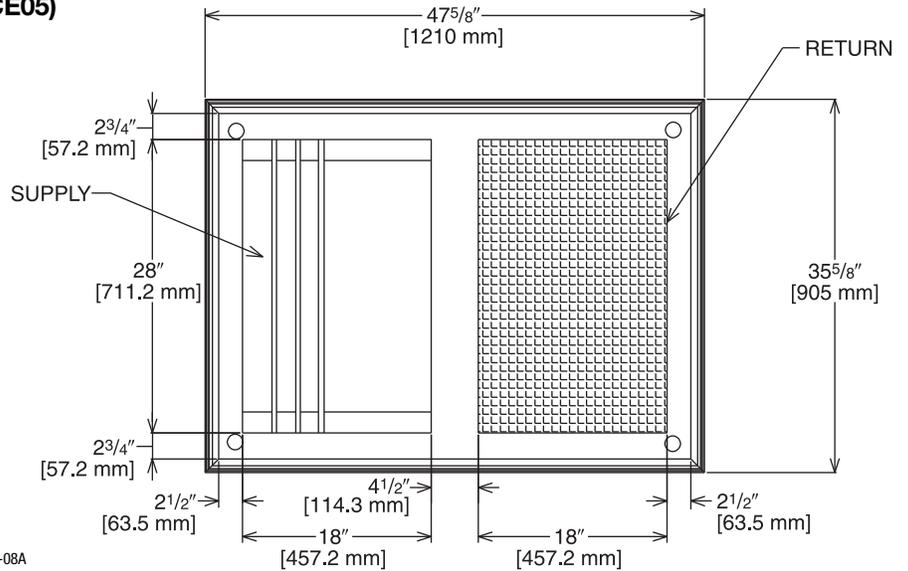


Illustration  
ADS-7951-08A

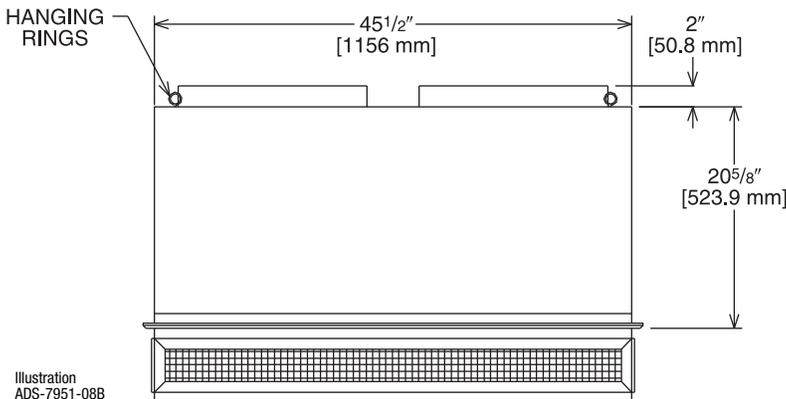


Illustration  
ADS-7951-08B

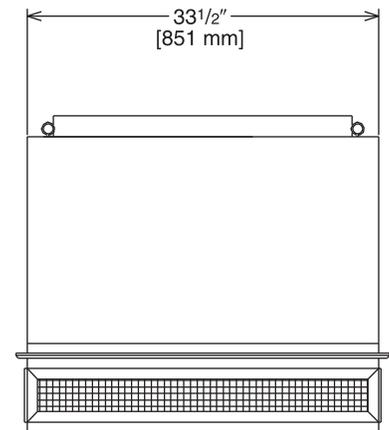


Illustration  
ADS-7951-08C

## ENGINEERING DATA<sup>①</sup>

Model No.	Flow Rate CFM [L/s]	Static Pressure in w.c. [kPa]	Throw <sup>②③</sup> Feet [m]	Neck Velocity fpm [m/s]	Noise Level <sup>④</sup> (dba)
RXRN-AA61	3600 [1699]	0.17 [0.042]	25-33 [7.6-10.1]	851 [4.3]	30
	3800 [1793]	0.18 [0.045]	27-35 [8.2-10.7]	898 [4.6]	30
	4000 [1888]	0.21 [0.052]	29-37 [8.8-11.3]	946 [4.8]	30
	4200 [1982]	0.24 [0.060]	32-40 [9.8-12.2]	993 [5.0]	30
	4400 [2076]	0.27 [0.067]	34-42 [10.4-12.8]	1040 [5.3]	30

NOTES: ① All data is based on the air diffusion council guidelines.

② Throw data is based on 75 FPM Terminal Velocities using isothermal air.

③ Throw is based on diffuser blades being directed in a straight pattern.

④ Actual noise levels may vary due to duct design and do not include transmitted unit noise.

Adequate duct attenuation must be provided to reduce sound output from the unit.

[ ] Designates Metric Conversions

# CONCENTRIC DIFFUSER—STEP DOWN 18" x 32" [457.2 x 813 mm]

RXRN-AA66 (12.5 & 15 Ton [44.0 & 52.8 kW] Models)

For Use With Downflow Transition (RXMC-CF06)  
and 18" x 32" [457.2 x 813 mm]  
Supply and Return Ducts

- 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.

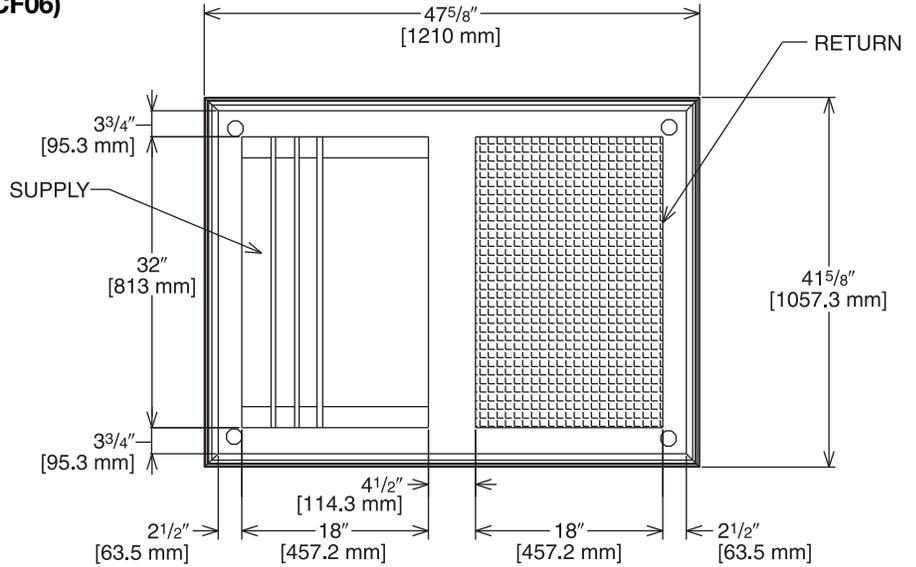


Illustration  
ADS-7951-09A

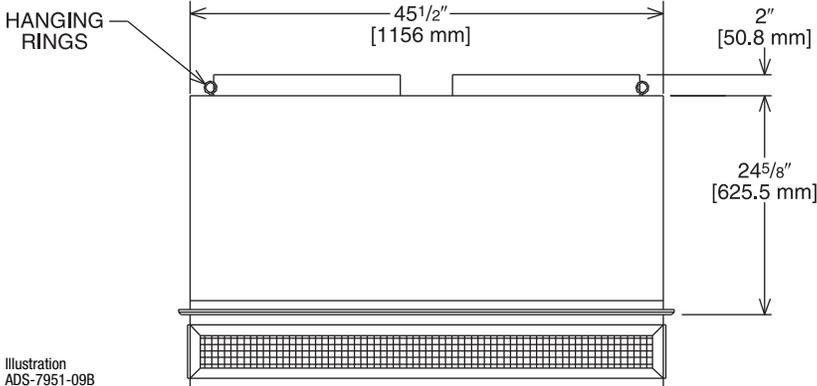


Illustration  
ADS-7951-09B

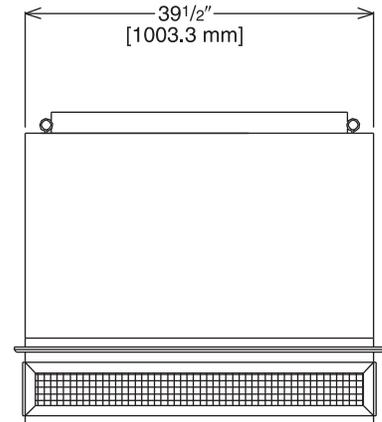


Illustration  
ADS-7951-09C

## ENGINEERING DATA<sup>①</sup>

Model No.	Flow Rate CFM [L/s]	Static Pressure in w.c. [kPa]	Throw <sup>② ③</sup> Feet [m]	Neck Velocity fpm [m/s]	Noise Level <sup>④</sup> (dba)
RXRN-AA66	4600 [2171]	0.31 [0.077]	26-31 [7.9-9.4]	841 [4.3]	30
	4800 [2265]	0.32 [0.080]	27-32 [8.2-9.8]	878 [4.5]	30
	5000 [2359]	0.34 [0.085]	28-33 [8.5-10.1]	915 [4.6]	30
	5200 [2454]	0.36 [0.090]	28-34 [8.5-10.4]	951 [4.8]	30
	5400 [2548]	0.39 [0.097]	29-35 [8.8-10.7]	988 [6.0]	30

- NOTES: ① All data is based on the air diffusion council guidelines.  
② Throw data is based on 75 FPM Terminal Velocities using isothermal air.  
③ Throw is based on diffuser blades being directed in a straight pattern.  
④ Actual noise levels may vary due to duct design and do not include transmitted unit noise.  
Adequate duct attenuation must be provided to reduce sound output from the unit.

[ ] Designates Metric Conversions

## FLUSH MOUNT CONCENTRIC DIFFUSER—FLUSH

RXRN-FA75 (7.5 & 8.5 Ton [26.4 & 29.9 kW] Models)

For Use With Downflow Transition (RXMC-CD04)  
and 20" [508 mm] Round Supply and Return Ducts

- 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.

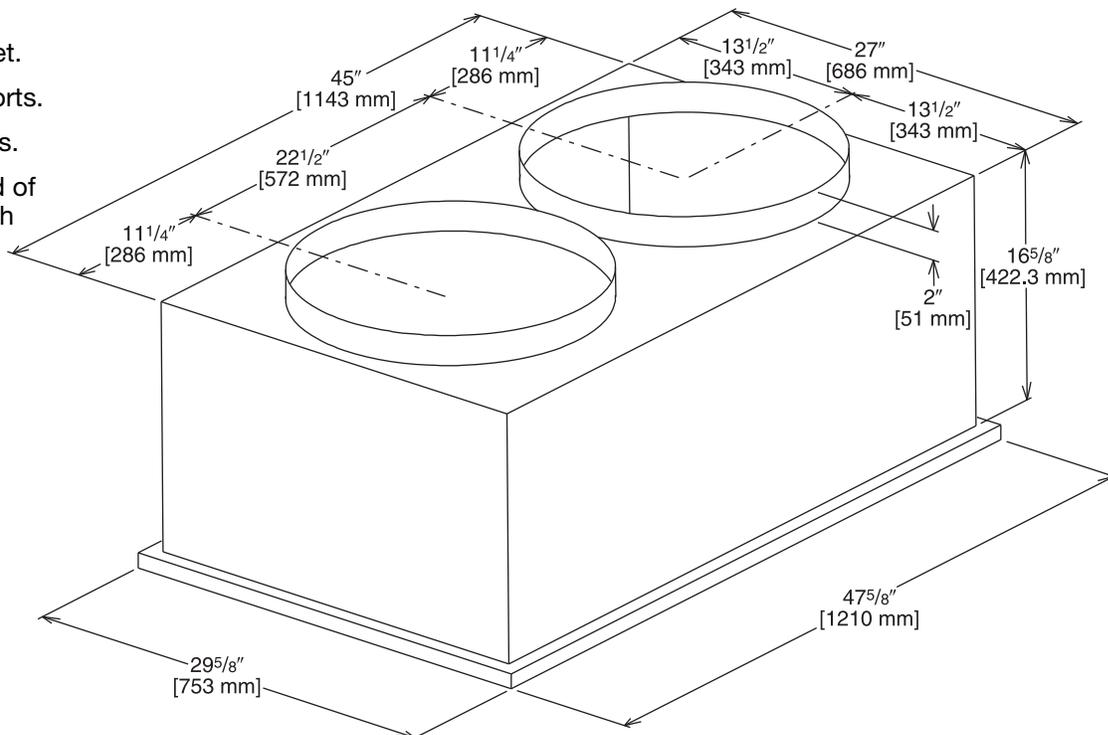


Illustration  
ADS-5348-04

### ENGINEERING DATA<sup>①</sup>

Model No.	Flow Rate CFM [L/s]	Static Pressure in. w.c. [kPa]	Throw <sup>② ③</sup> Feet [m]	Neck Velocity fpm [m/s]	Noise Level <sup>④</sup> (dbA)
RXRN-FA75	2600 [1227]	.17 [0.042]	19-24 [5.8-7.3]	663 [3.4]	30
	2800 [1321]	.20 [0.050]	20-28 [6.1-8.5]	714 [3.6]	35
	3000 [1416]	.25 [0.062]	21-29 [6.4-8.8]	765 [3.9]	35
	3200 [1510]	.31 [0.077]	22-29 [6.7-8.8]	816 [4.1]	40
	3400 [1604]	.37 [0.092]	22-30 [6.7-9.1]	867 [4.4]	40

NOTES: ① All data is based on the air diffusion council guidelines.

② Throw data is based on 75 FPM Terminal Velocities using isothermal air.

③ Throw is based on diffuser blades being directed in a straight pattern.

④ Actual noise levels may vary due to duct design and do not include transmitted unit noise.  
Adequate duct attenuation must be provided to reduce sound output from the unit.

[ ] Designates Metric Conversions

# CONCENTRIC DIFFUSER—FLUSH and 18" x 28" [457.2 x 711.2 mm]

RXRN-AA71 (8.5 & 10 Ton [29.9 & 35.2] Models)

For Use With Downflow Transition (RXMC-CE05)  
and 18" x 28" [457.2 x 711.2 mm]  
Supply and Return Ducts

- 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.

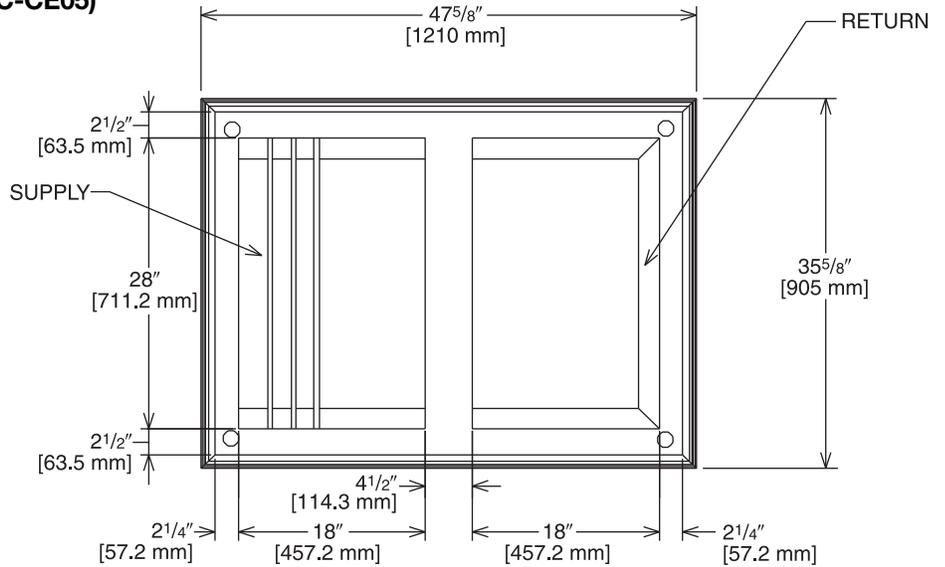


Illustration  
ADS-7951-06A

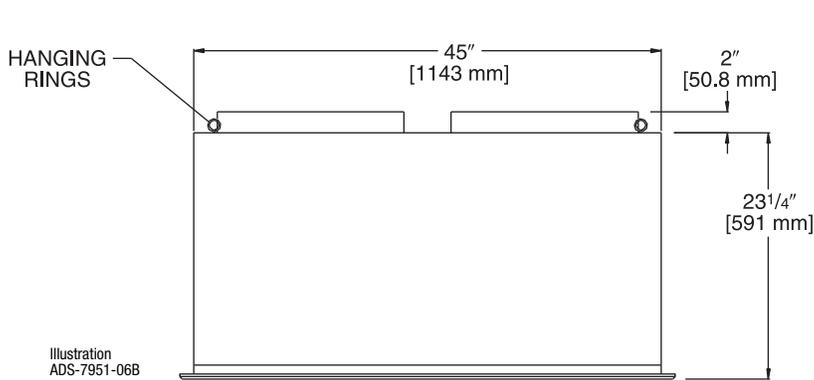


Illustration  
ADS-7951-06B

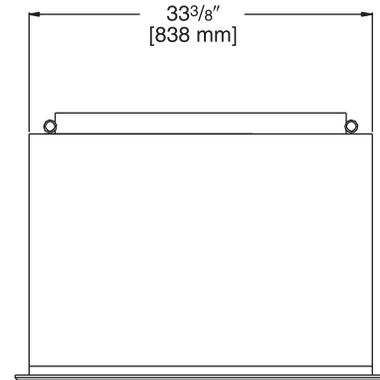


Illustration  
ADS-7951-06C

## ENGINEERING DATA<sup>①</sup>

Model No.	Flow Rate CFM [L/s]	Static Pressure in w.c. [kPa]	Throw <sup>② ③</sup> Feet [m]	Neck Velocity fpm [m/s]	Noise Level <sup>④</sup> (dbA)
RXRN-AA71	3600 [1699]	0.17 [0.042]	22-29 [6.7-8.8]	844 [4.3]	35
	3800 [1793]	0.18 [0.045]	22-30 [6.7-9.1]	891 [4.5]	40
	4000 [1888]	0.21 [0.052]	24-33 [7.3-10.1]	938 [4.8]	40
	4200 [1982]	0.24 [0.060]	26-35 [7.9-10.7]	985 [5.0]	40
	4400 [2076]	0.27 [0.067]	28-37 [8.5-11.3]	1032 [5.2]	40

- NOTES: ① All data is based on the air diffusion council guidelines.  
 ② Throw data is based on 75 FPM Terminal Velocities using isothermal air.  
 ③ Throw is based on diffuser blades being directed in a straight pattern.  
 ④ Actual noise levels may vary due to duct design and do not include transmitted unit noise.  
 Adequate duct attenuation must be provided to reduce sound output from the unit.

[ ] Designates Metric Conversions



## Guide Specifications RKRL-C/H 090 thru 120

You may copy this document directly into your building specification. This specification is written to comply with the 2004 version of the "master format" as published by the Construction Specification institute. [www.csinet.org](http://www.csinet.org).

### GAS HEAT PACKAGED ROOFTOP

#### HVAC Guide Specifications

#### Size Range: 7.5 to 10 Nominal Tons

Section	Description
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<b>23 06 80</b>	<b>Schedules for Decentralized HVAC Equipment</b>
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<b>23 06 80.13</b>	<b>Decentralized Unitary HVAC Equipment Schedule</b>
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23 06 80.13.A.	Rooftop unit schedule
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1. Schedule is per the project specification requirements.

<b>23 07 16</b>	<b>HVAC Equipment Insulation</b>
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<b>23 07 16.13</b>	<b>Decentralized, Rooftop Units:</b>
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23 07 16.13.A.	Evaporator fan compartment:
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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 foil face on the air side.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
3. Insulation shall also be mechanically fastened with welded pin and retainer washer.

23 07 16.13.B.	Gas heat compartment:
----------------	-----------------------

1. Aluminum foil-faced fiberglass insulation shall be used.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
3. Insulation shall also be mechanically fastened with welded pin and retainer washer.

<b>23 09 13</b>	<b>Instrumentation and Control Devices for HVAC</b>
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<b>23 09 13.23</b>	<b>Sensors and Transmitters:</b>
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23 09 13.23.A.	Thermostats
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1. Thermostat must
  - a. have capability to energize 2 different stages of cooling, and 2 different stages of heating.
  - b. must include capability for occupancy scheduling.

<b>23 09 23</b>	<b>Direct-digital Control system for HVAC</b>
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23 09 23.13	Decentralized, Rooftop Units:
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23 09 23.13.A.	RTU-C controller
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1. Shall be ASHRAE 62-2001 compliant.
2. Shall accept 18-32VAC input power.
3. Shall have an operating temperature range from -40°F (-40°C) to 158°F (70°C), 10% - 95% RH (non-condensing).
4. 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.
5. Shall accept a CO<sub>2</sub> sensor in the conditioned space, and be Demand Control Ventilation (DCV) ready.
6. Shall provide the following outputs: Economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2/exhaust/occupied.
7. Unit shall provide surge protection for the controller through a circuit breaker.
8. Shall have a field installed communication card allowing the unit to be Internet capable, and communicate at a Baud rate of 19.2K or faster
9. Shall have an LED display independently showing the status of activity on the communication bus, and processor operation.
10. 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.
11. Software upgrades will be accomplished by local download. Software upgrades through chip replacements are not allowed.
12. Shall be shock resistant in all planes to 5G peak, 11ms during operation, and 100G peak, 11ms during storage.
13. Shall be vibration resistant in all planes to 1.5G @ 20-300 Hz.
14. Shall support a bus length of 4000 ft max, 60 devices per 1000 ft section, and 1 RS-485 repeater per 1000 ft sections.

23 09 23.13.B. Open protocol, direct digital controller:

1. Shall be ASHRAE 62-2001 compliant.
2. Shall accept 18-30VAC, 50-60Hz, and consumer 15VA or less power.
3. Shall have an operating temperature range from -40°F (-40°C) to 130°F (54°C), 10% - 90% RH (non-condensing).
4. 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.
5. The BACnet® plug in communication card shall include built-in protocol for BACNET (MS/TP and PTP modes)
6. The LonWorks™ plug in communication card shall include the Echelon processor required for all Lon applications.
7. Shall allow access of up to 62 network variables (SNVT). Shall be compatible with all open controllers
8. Baud rate Controller shall be selectable through the EIA-485 protocol communication port.
9. Shall have an LED display independently showing the status of serial communication, running, errors, power, all digital outputs, and all analog inputs.
10. 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.
11. Shall provide the following outputs: economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, exhaust.
12. Software upgrades will be accomplished by either local or remote download. No software upgrades through chip replacements are allowed.

**23 09 33 Electric and Electronic Control System for HVAC**

**23 09 33.13 Decentralized, Rooftop Units:**

23 09 13.13.A. General:

1. Shall be complete with self-contained low-voltage control circuit protected by a fuse on the 24-V transformer side (C072-C151 units have a resettable circuit breaker).
2. Shall utilize color-coded wiring.
3. Unit shall include self-contained low-voltage control circuit protected by a fuse on the 24-V transformer side with a resettable circuit breaker.
4. Shall include a central control terminal board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, economizer, thermostat, DDC control options, loss of charge, freeze sensor, high pressure switches.
5. The heat exchanger shall be controlled by an integrated furnace controller (IFC) microprocessor. See heat exchanger section of this specification.
6. Unit shall include a minimum of one 10-pin screw terminal connection board for connection of control wiring.

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.
5. Automatic reset, motor thermal overload protector.
6. Heating section shall be provided with the following minimum protections:
  - a. High-temperature limit switches.
  - b. Induced draft motor pressure switch.
  - c. Flame rollout switch.
  - d. Flame proving controls.

**23 09 33 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. Unit shall use only one filter size. Multiple sizes are not acceptable.
3. Filter face velocity shall not exceed 365 fpm at nominal airflows.
4. Filters shall be accessible through an access panel with “no-tool” removal as described in the unit cabinet section of the specification (23 81 19.13.H).

**23 81 19 Self-Contained Air Conditioners**

**23 81 19.13 (6-12.5 Ton) 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 gas combustion 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 safe, R410A 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 90.1-2010 minimum efficiency requirements.
2. 3 phase units are Energy Star qualified.
3. Unit shall be rated in accordance with AHRI Standards 210 and 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 1000-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 115°F (46°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 210/240 or 360 at ± 10% voltage.
2. Compressor with standard controls shall be capable of operation down to 50°F (10°C), ambient outdoor temperatures. Low ambient accessory kit is necessary if mechanically cooling at ambient temperatures to 0°F (-17.7°C).
3. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
4. Unit shall be factory configured for vertical supply & return configurations.
5. 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.
2. Unit cabinet exterior paint shall be: powder coat paint.
3. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 210 or 360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 3/4-in. thick, 1-1/2 lb density, flexible fiberglass insulation, foil faced on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
4. Base of unit shall have a location for thru-the-base gas and electrical connections standard.
5. Base Rail
  - a. Unit shall have base rails on a minimum of 4 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 for 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 and be removable for cleaning.
  - b. Shall comply with ASHRAE Standard 62.
  - c. Shall use a 1" x 11-1/2 NPT drain connection, through the side of the drain pan. Connection shall be made per manufacturer's recommendations.
  - d. Shall be able to be easily removed.
7. Top panel:
  - a. Shall be a single piece top panel over indoor section.
8. Gas Connections:
  - a. All gas piping connecting to unit gas valve shall enter the unit cabinet at a single location on side of unit (horizontal plane).
  - b. Thru-the-base capability
    - i. Standard unit shall have a thru-the-base gas-line location using a continuous raised, flange around opening in the basepan.
    - ii. No basepan penetration, other than those authorized by the manufacturer, is permitted.
9. Electrical Connections
  - a. All unit power wiring shall enter unit cabinet at a single, factory-prepared, continuous raised flange opening in the basepan.
  - b. Thru-the-base capability
    - i. Standard unit shall have a thru-the-base electrical location(s) using a raised, continuous raised flange opening in the basepan.
    - ii. No basepan penetration, other than those authorized by the manufacturer, is permitted.
10. Component access panels (standard)
  - a. Cabinet panels shall be easily opened for servicing.
  - b. Panels covering control box, indoor fan, indoor fan motor, gas components (where applicable), and filters shall have hinges with 1/4 turn fasteners.
  - c. 1/4 fasteners shall be permanently attached.

23 81 19.13.I. Gas Heat

1. General
  - a. Heat exchanger shall be an induced draft design. Positive pressure heat exchanger designs shall not be allowed.
  - b. Shall incorporate a direct-spark ignition system and redundant main gas valve.
  - c. Heat exchanger design shall allow combustion process condensate to gravity drain; maintenance to drain the gas heat exchanger shall not be required.
  - d. Gas supply pressure at the inlet to the rooftop unit gas valve must match that required by the manufacturer.
2. The heat exchanger shall be controlled by an integrated furnace controller (IFC) microcompressor.
  - a. IFC board shall notify users of fault using a LED (light-emitting diode).
3. Standard Heat Exchanger construction
  - a. Heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gauge steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
  - b. Burners shall be of the in-shot type constructed of aluminum-coated steel.
  - c. Burners shall incorporate orifices for rated heat output up to 2000 ft (610m) elevation. Additional accessory kits may be required for applications above 2000 ft (610m) elevation, depending on local gas supply conditions.
  - d. Each heat exchanger tube shall contain tubulators for increased heating effectiveness.

4. Optional Stainless Steel Heat Exchanger construction
  - a. Use energy saving, direct-spark ignition system.
  - b. Use a redundant main gas valve.
  - c. Burners shall be of the in-shot type constructed of aluminum-coated steel.
  - d. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
  - e. The optional stainless steel heat exchanger shall be of the tubular-section type, constructed of a minimum of 20-gauge type 409 stainless steel.
  - f. Type 409 stainless steel shall be used in heat exchanger tubes.
  - g. Complete stainless steel heat exchanger allows for greater application flexibility.
5. Induced draft combustion motor and blower
  - a. Shall be a direct-drive, single inlet, forward-curved centrifugal type.
  - b. Shall be made from steel with a corrosion-resistant finish.
  - c. Shall be permanently lubricated sealed bearings.
  - d. Shall have inherent thermal overload protection.
  - e. Shall have an automatic reset feature.

23 81 19.13.J. Coils

1. Standard Aluminum/Copper Coils:
  - a. Standard evaporator and condenser coils shall be aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed. (Note: 12-1/2 ton utilizes MicroChannel condensing coil).
  - b. Evaporator and condenser coils shall be leak tested to 150 psig, pressure tested to 400 psig, and qualified to UL 1995 burst test at 2,200 psi.

23 81 19.13.K. Refrigerant Components

1. Refrigerant circuit shall include the following control, safety, and maintenance features:
  - a. TXV metering system shall prevent mal-distribution of two-phase refrigerant. C072 shall use orifice refrigerant control.
  - b. Refrigerant filter drier.
  - c. Service gauge connections on suction and discharge lines.
  - d. External pressure gauge ports access shall be located in front exterior of cabinet.
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.
  - c. Compressors shall be internally protected from high discharge temperature conditions.
  - d. Compressors shall be protected from an over-temperature and over-ampereage conditions by an internal, motor overload device.
  - e. Compressor shall be factory mounted on rubber grommets.
  - f. Compressor motors shall have internal line break thermal and current overload protection.
  - g. Crankcase heaters shall not be required for normal operating range.
  - h. Compressor shall have molded electrical plug.

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 filter tray, facilitating easy removal and installation.
3. Shall consist of factory-installed, low velocity, throw-away 2-in. thick fiberglass filters.
4. Filter face velocity shall not exceed 320 fpm at nominal airflows.
5. Filters shall be standard, commercially available sizes.
6. Only one size filter per unit is allowed.

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.
  - 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 shall:

- 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

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. Enthalpy sensor shall be provided as standard. Outdoor air sensor set point shall be adjustable and shall range from 40 to 100°F / 4 to 38°C. 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 set point.
- l. Dampers shall be completely closed when the unit is in the unoccupied mode.
- m. 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.
- n. 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.
- o. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
- p. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.
- q. Economizer wire harness will have provision for smoke detector.

2. 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.

3. Liquid Propane (LP) Conversion Kit

- a. Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane, up to 2000 ft (610m) elevation.

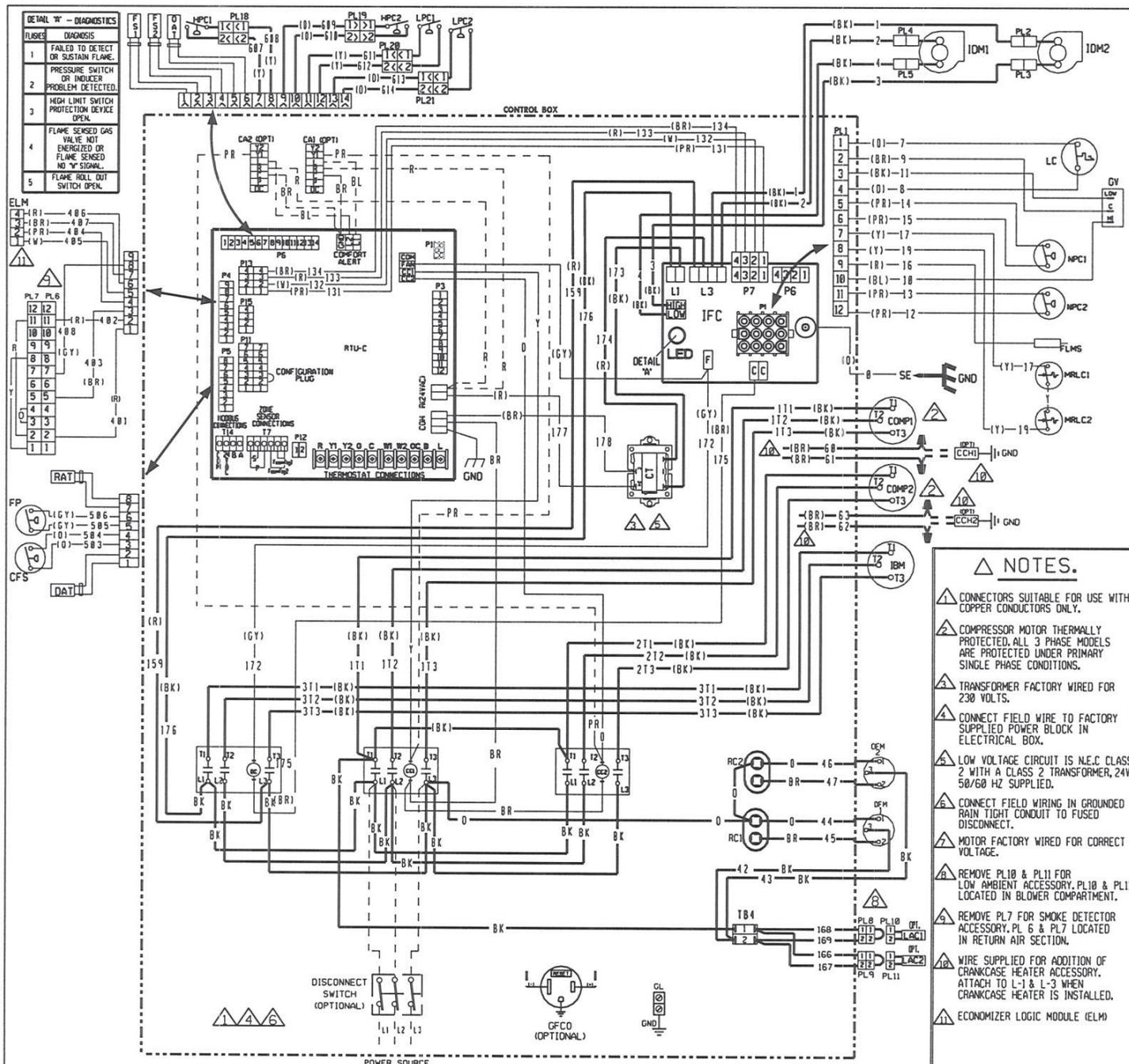
4. Flue Shield

- a. Flue shield shall provide protection from the hot sides of the gas flue hood.

5. Condenser Coil Hail Guard Assembly

- a. Shall protect against damage from hail.
- b. Shall be louvered style.

6. Unit-Mounted, Non-Fused Disconnect Switch:
  - a. Switch shall be factory-installed, internally mounted.
  - b. National Electric Code (NEC) and UL approved non-fused switch shall provide unit power shutoff.
  - c. Shall be accessible from outside the unit.
  - d. Shall provide local shutdown and lockout capability.
7. Convenience Outlet:
  - a. Non-Powered convenience outlet.
  - b. Outlet shall be powered from a separate 115-120v power source.
  - c. A transformer shall not be included.
  - d. Outlet shall be field-installed and internally mounted with easily accessible 115-v female receptacle.
  - e. Outlet shall include 15 amp GFI receptacle with independent fuse protection.
  - f. Outlet shall be accessible from outside the unit.
8. Flue Discharge Deflector:
  - a. Flue discharge deflector shall direct unit exhaust vertically instead of horizontally.
  - b. Deflector shall be defined as a "natural draft" device by the National Fuel and Gas (NFG) code.
9. 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 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.
10. Roof Curbs (Vertical):
  - a. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
  - b. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
11. Universal Gas Conversion Kit:
  - a. Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit to operate from 2000-7000 ft (610 to 2134m) elevation with natural gas or from 0-7000 ft (90-2134m) elevation with liquefied propane.
12. 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.
13. 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 duct mount, wall mount, or wall mount with LED display. The set point shall have adjustment capability.
14. 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 tool-less connection terminal access.
  - e. Shall have a recessed momentary switch for testing and resetting the detector.
  - f. Controller shall include:
    - i. One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel
    - ii. Two Form-C auxiliary alarm relays for interface with rooftop unit or other equipment
    - iii. One Form-C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station
    - iv. Capable of direct connection to two individual detector modules.
    - v. Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications.
15. Barometric relief
  - a. Shall include damper, seals, hard-ware, and hoods to relieve excess building pressure.
  - b. Damper shall gravity-close upon shutdown.



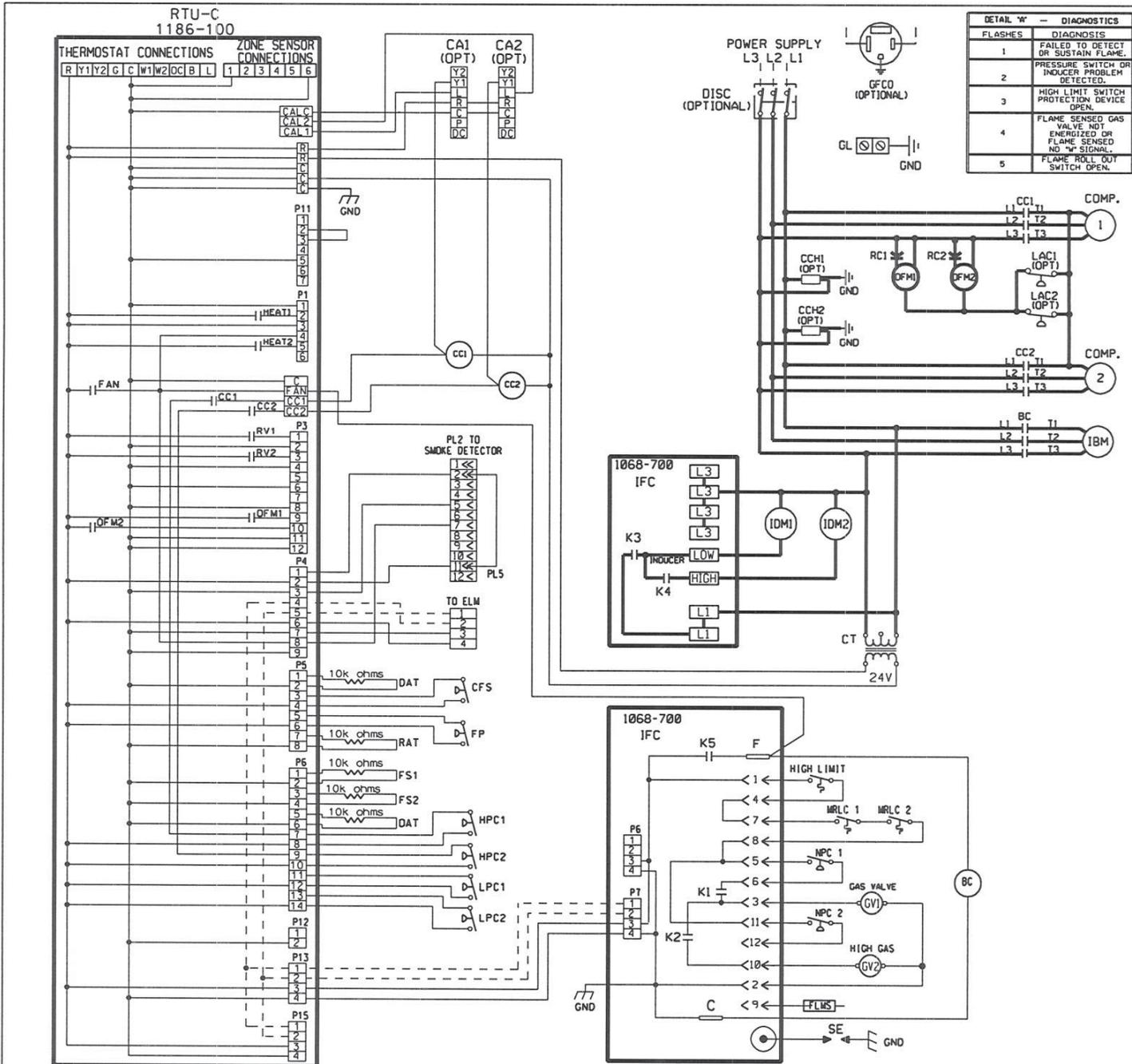
**COMPONENT CODE**

**WIRING INFORMATION**

**WIRE COLOR CODE**

**WIRING DIAGRAM**  
 (-)K?L-C090/102/120/150/151  
 208-230/460V 3 PH, 60 HZ.  
 ROOFTOP W/RTU-C

DR. BY MGR APP. BY DATE 4-14-09 DWG. NO. 90-103089-02 REV 03



DETAIL 'W' - DIAGNOSTICS	
FLASHES	DIAGNOSIS
1	FAILED TO DETECT OR SUSTAIN FLAME.
2	PRESSURE SWITCH OR INDUCER PROBLEM DETECTED.
3	HIGH LIMIT SWITCH PROTECTION DEVICE OPEN.
4	FLAME SENSED GAS VALVE NOT ENERGIZED OR FLAME SENSED NO "F" SIGNAL.
5	FLAME ROLL OUT SWITCH OPEN.

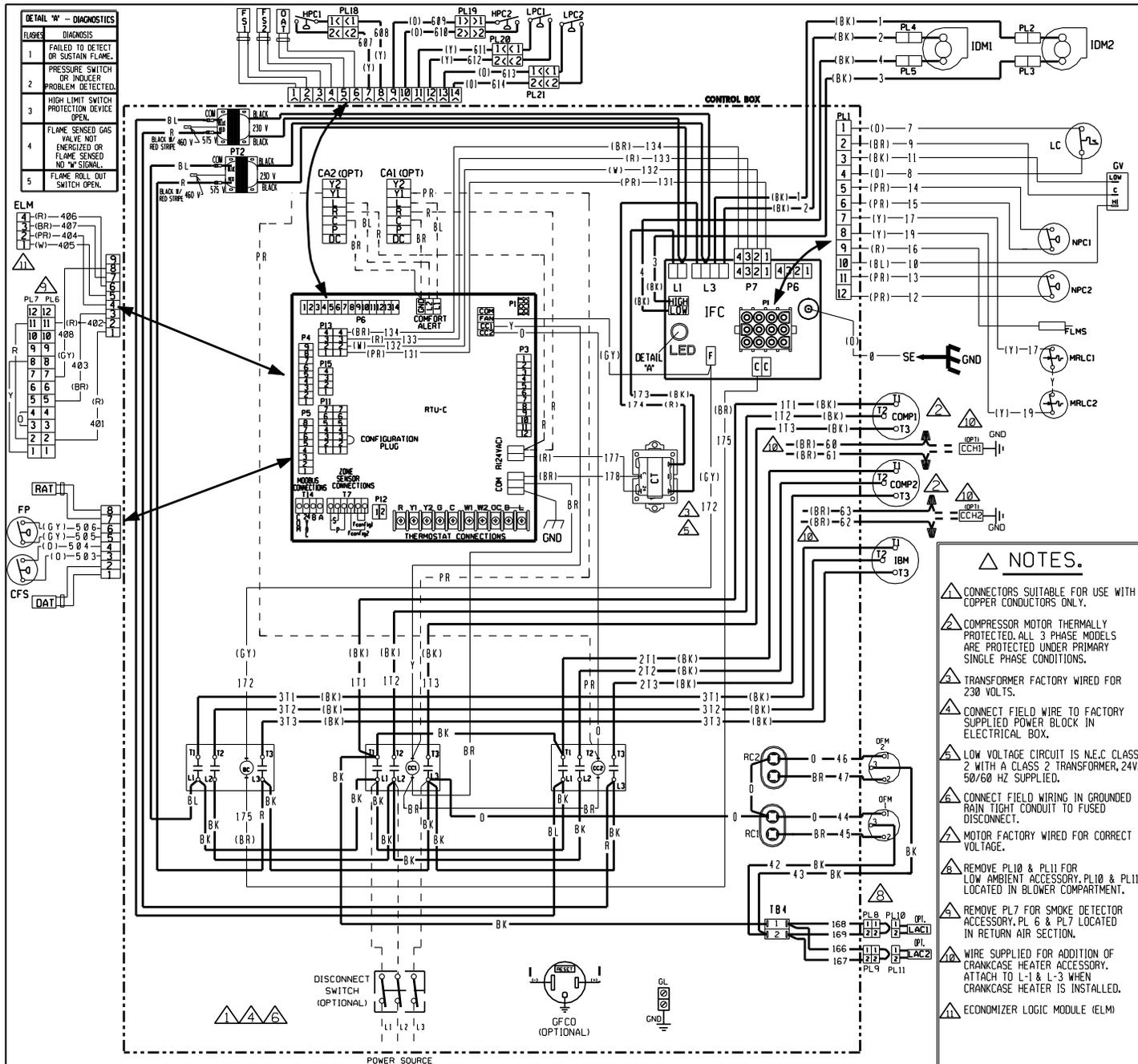
COMPONENT CODE	
BC	BLOWER CONTACTOR
CA	COMFORT ALERT MODULE
CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
CFS	CLOGGED FILTER SWITCH
COMP	COMPRESSOR
CT	CONTROL TRANSFORMER
DISC	DISCONNECT SWITCH
FLMS	FLAME SENSOR
FP	FAN PROVING
FS	FREEZE SENSOR
GFCO	GROUND FAULT CONVENIENCE OUTLET
GL	GROUND LUG
GND	GROUND
GV	GAS VALVE
HPC	HIGH PRESSURE CONTROL
IBM	INDOOR BLOWER MOTOR BELT DRIVE
IDM	INDUCED DRAFT MOTOR
IFC	INTEGRATED FURNACE CONTROL
LAC	LOW AMBIENT COOLING CONTROL
LC	LIMIT CONTROL
LPC	LOW PRESSURE CONTROL
MAS	MIX AIR SENSOR
MRLC	MANUAL RESET LIMIT CONTROL
NPC	NEGATIVE PRESSURE CONTROL
OAS	OUTSIDE AIR SENSOR
OFM	OUTDOOR FAN MOTOR
PL	PLUG
PL	PLUG
RAT	RETURN AIR SENSOR
RC	RUN CAPACITOR
SCC	SPACE COMFORT CONTROL
SE	SPARK ELECTRODE
TB	TERMINAL BLOCK
W	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 SCHEMATIC	
(-)K?L-C090/102/120/150/151	
208-230/460V 3 PH, 60 HZ.	
ROOFTOP W/RTU-C	
DR. BY	APP. BY DATE
MGR	7-16-09
DWG. NO.	REV
90-103246-02	02



- NOTES.**
- △ CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
  - △ COMPRESSOR MOTOR THERMALLY PROTECTED. ALL 3 PHASE MODELS ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
  - △ TRANSFORMER FACTORY WIRED FOR 230 VOLTS.
  - △ CONNECT FIELD WIRE TO FACTORY SUPPLIED POWER BLOCK IN ELECTRICAL BOX.
  - △ LOW VOLTAGE CIRCUIT IS N.E.C. CLASS 2 WITH A CLASS 2 TRANSFORMER, 24V, 50/60 HZ SUPPLIED.
  - △ CONNECT FIELD WIRING IN GROUNDED RAIN TIGHT CONDUIT TO FUSED DISCONNECT.
  - △ MOTOR FACTORY WIRED FOR CORRECT VOLTAGE.
  - △ REMOVE PL10 & PL11 FOR LOW AMBIENT ACCESSORY. PL10 & PL11 LOCATED IN BLOWER COMPARTMENT.
  - △ REMOVE PL7 FOR SMOKE DETECTOR ACCESSORY. PL 6 & PL7 LOCATED IN RETURN AIR SECTION.
  - △ WIRE SUPPLIED FOR ADDITION OF CRANKCASE HEATER ACCESSORY. ATTACH TO L-1 & L-3 WHEN CRANKCASE HEATER IS INSTALLED.
  - △ ECONOMIZER LOGIC MODULE (ELM)

**COMPONENT CODE**

BC	BLOWER CONTACTOR	IDM	INDUCED DRAFT MOTOR
CA	COMFORT ALERT MODULE	IFC	INTEGRATED FURNACE CONTROL
CC	COMPRESSOR CONTACTOR	LAC	LOW AMBIENT COOLING CONTROL
CH	CRANKCASE HEATER	LC	LIMIT CONTROL
CFS	CLOGGED FILTER SWITCH	LPC	LOW PRESSURE CONTROL
COMP	COMPRESSOR	MRLC	MANUAL RESET LIMIT CONTROL
CT	CONTROL TRANSFORMER	NPC	NEGATIVE PRESSURE CONTROL
DAT	DISCHARGE AIR SENSOR	OAT	OUTSIDE AIR SENSOR
DISC	DISCONNECT SWITCH	OFM	OUTDOOR FAN MOTOR
FLMS	FLAME SENSOR	PL	PLUG
FP	FAN FROVING	PT	POWER TRANSFORMER
FS	FREEZE SENSOR	RAT	RETURN AIR SENSOR
GFCO	GROUND FAULT CONVENIENCE OUTLET	RC	RUN CAPACITOR
GL	GROUND LUG	RTU-C	ROOFTOP UNIT CONTROL
GND	GROUND	SE	SPARK ELECTRODE
GV	GAS VALVE	TB	TERMINAL BLOCK
HPC	HIGH PRESSURE CONTROL	W	WIRE NUT
IDM	INDOOR BLOWER MOTOR BELT DRIVE		

**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.)

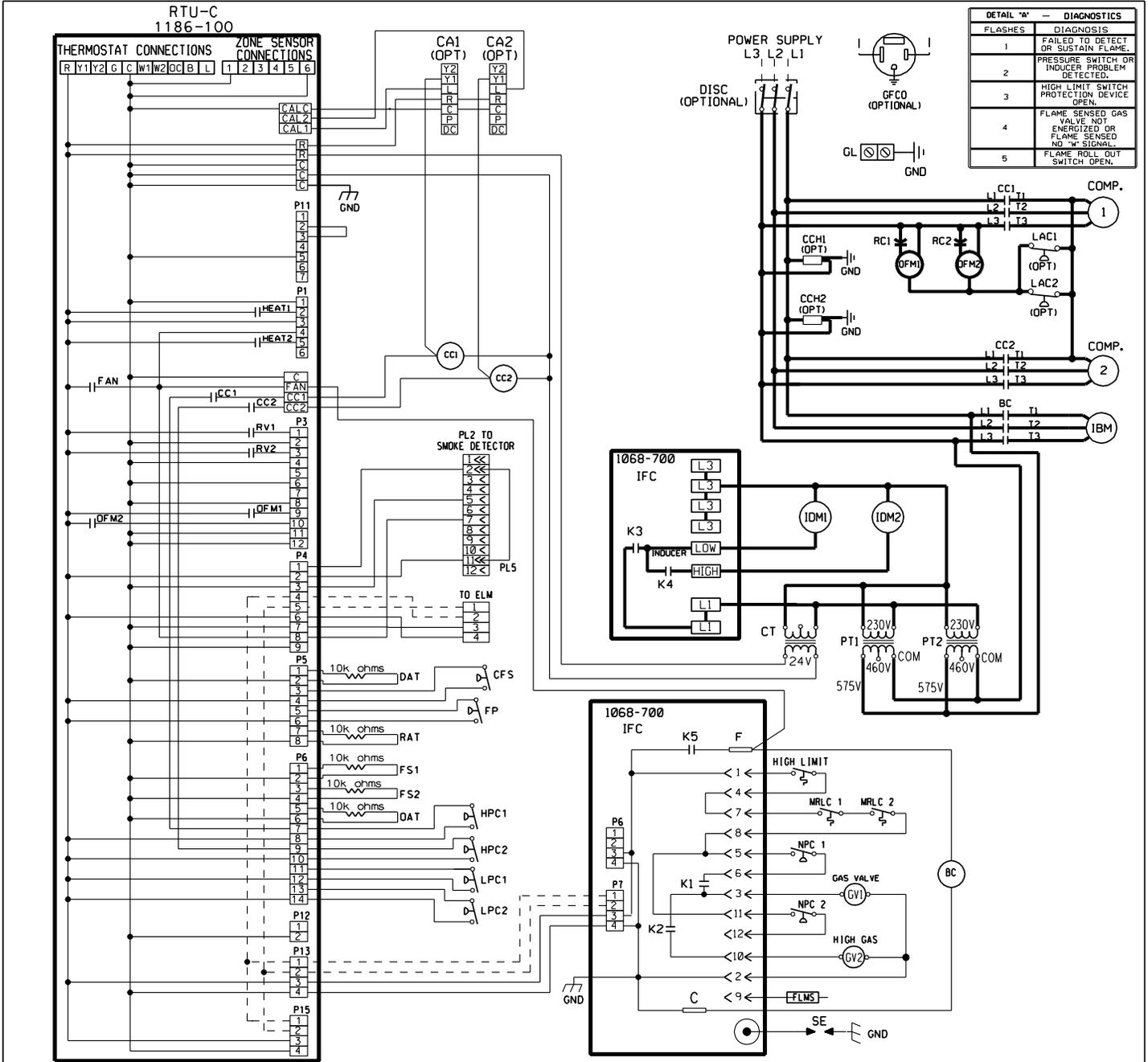
WARNING  
 -CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., AND LOCAL CODES AS APPLICABLE.

**WIRE COLOR CODE**

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

**WIRING DIAGRAM**  
 (-)K?L-C090/102/120/150/151  
 575V 3 PH, 60 HZ.  
 ROOFTOP W/RTU-C

DR. BY	APP. BY	DATE	DWG. NO.	REV
MGR		4-14-09	90-103089-06	03



DETAIL "A" - DIAGNOSTICS	
FLASHES	DIAGNOSIS
1	FAILED TO DETECT OR SUSTAIN FLAME.
2	PRESSURE SWITCH OR INDUCER PROBLEM DETECTED.
3	HIGH LIMIT SWITCH PROTECTION DEVICE OPEN.
4	FLAME SENSED GAS VALVE NOT ENERGIZED OR FLAME SENSED NO "W" SIGNAL.
5	FLAME TROLL OUT SWITCH OPEN.

**COMPONENT CODE**

BC	BLOWER CONTACTOR	IDM	INDUCED DRAFT MOTOR
CA	COMFORT ALERT MODULE	IFC	INTEGRATED FURNACE CONTROL
CC	COMPRESSOR CONTACTOR	LAC	LOW AMBIENT COOLING CONTROL
CCH	CRANKCASE HEATER	LC	LIMIT CONTROL
CFS	CLOGGED FILTER SWITCH	LPC	LOW PRESSURE CONTROL
COMP	COMPRESSOR	MAS	MIX AIR SENSOR
CT	CONTROL TRANSFORMER	MRLC	MANUAL RESET LIMIT CONTROL
DISC	DISCONNECT SWITCH	NPC	NEGATIVE PRESSURE CONTROL
FLMS	FLAME SENSOR	NPC 1	NEGATIVE PRESSURE CONTROL
FP	FAN PROVING	OFM	OUTSIDE AIR SENSOR
FS	FREEZE SENSOR	OFM 1	OUTDOOR FAN MOTOR
GFCO	GROUND FAULT CONVENIENCE OUTLET	PL	PLUG
GL	GROUND LUG	RAT	RETURN AIR SENSOR
GND	GROUND	RC	RUN CAPACITOR
GV	GAS VALVE	SCC	SPACE COMFORT CONTROL
HPC	HIGH PRESSURE CONTROL	SE	SPARK ELECTRODE
IBM	INDOOR BLOWER MOTOR BELT DRIVE	TB	TERMINAL BLOCK
		W	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.)

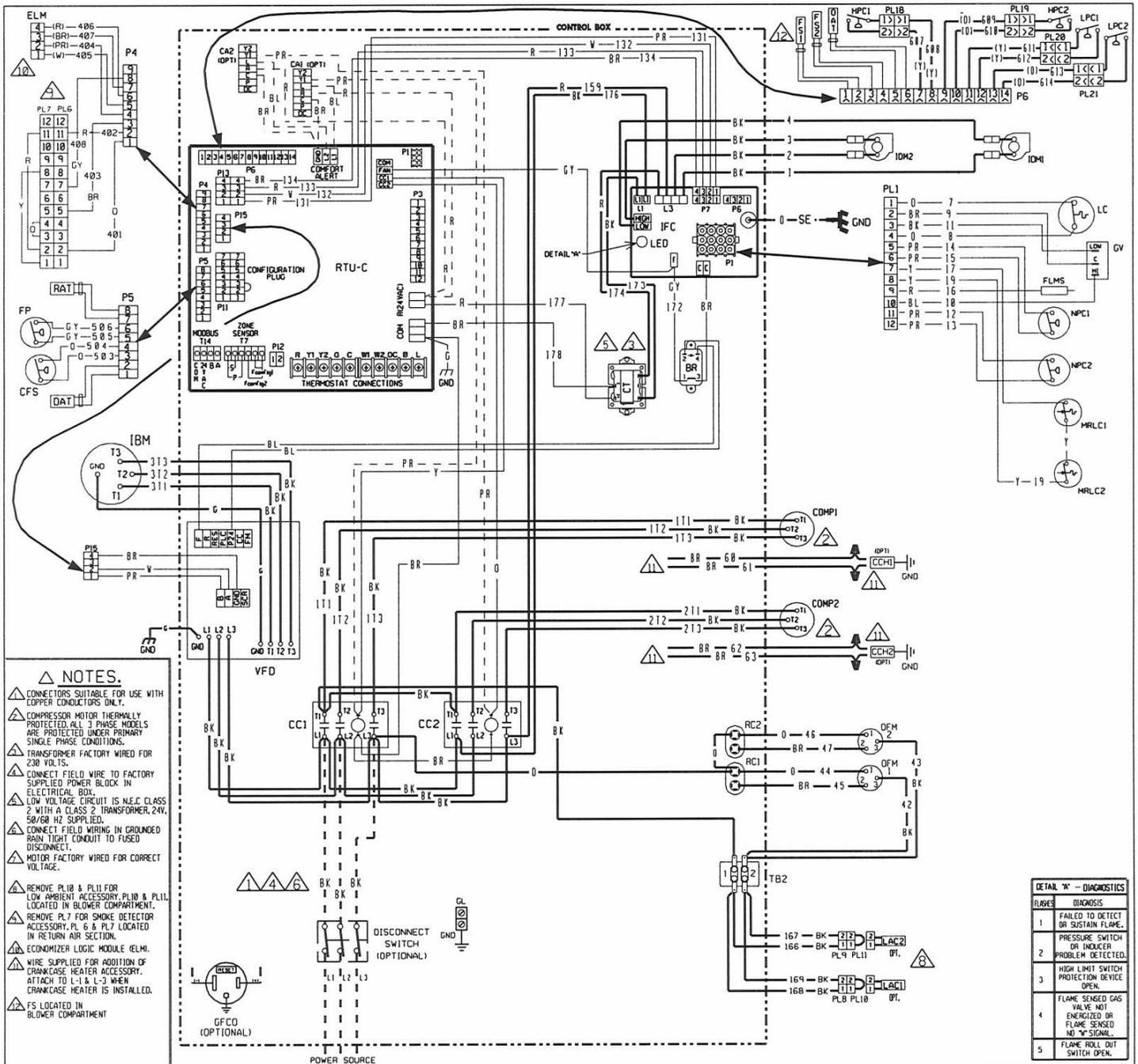
WARNING  
 -CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., AND LOCAL CODES AS APPLICABLE.

**WIRE COLOR CODE**

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

**WIRING SCHEMATIC**  
 (-)K?L-C090/102/120/150/151  
 575V 3 PH, 60 HZ.  
 ROOFTOP W/RTU-C

DR. BY	APP. BY	DATE	DWG. NO.	REV
MGR		7-13-09	90-103246-06	02



- △ NOTES.**
- △ CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
  - △ COMPRESSOR MOTOR THERMALLY PROTECTED. ALL 3 PHASE MODELS ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
  - △ TRANSFORMER FACTORY WIRED FOR 230 VOLTS.
  - △ CONNECT FIELD WIRE TO FACTORY SUPPLIED POWER BLOCK IN ELECTRICAL BOX.
  - △ LOW VOLTAGE CIRCUIT IS N.E.C. CLASS 2 WITH A CLASS 2 TRANSFORMER, 24V, 50/60 HZ SUPPLIED.
  - △ CONNECT FIELD WIRING IN GROUNDED RAIN TIGHT CONDUIT TO FUSED DISCONNECT.
  - △ MOTOR FACTORY WIRED FOR CORRECT VOLTAGE.
  - △ REMOVE PL10 & PL11 FOR LOW AMBIENT ACCESSORY. PL10 & PL11 LOCATED IN BLOWER COMPARTMENT.
  - △ REMOVE PL7 FOR SMOKE DETECTOR ACCESSORY. PL6 & PL7 LOCATED IN RETURN AIR SECTION.
  - △ ECONOMIZER LOGIC MODULE (ELM).
  - △ WIRE SUPPLIED FOR ADDITION OF CRANKCASE HEATER ACCESSORY. ATTACH TO L-1 & L-3 WHEN CRANKCASE HEATER IS INSTALLED.
  - △ FS LOCATED IN BLOWER COMPARTMENT

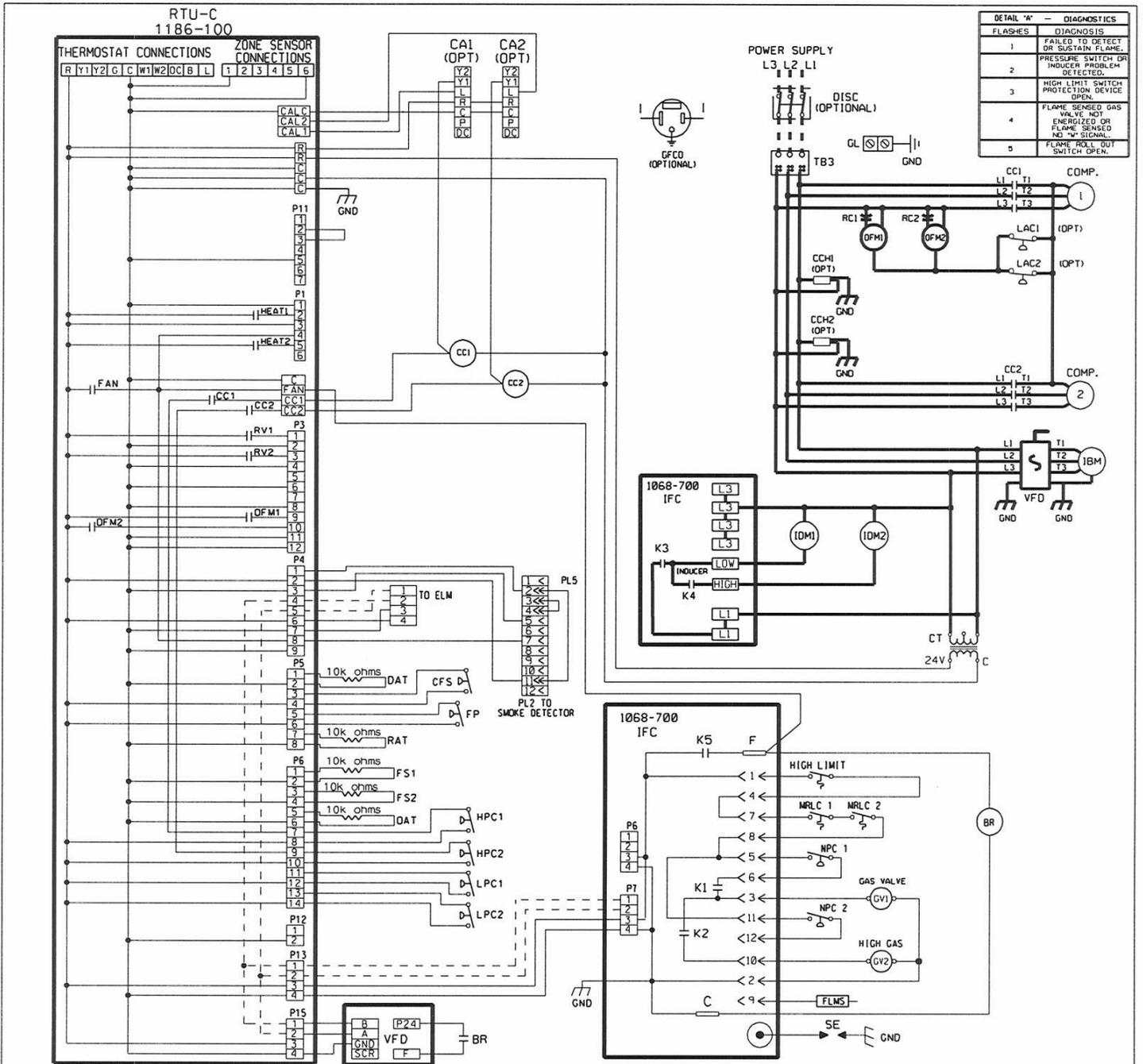
**DETAIL "X" - DIAGNOSTICS**

FLASHES	DIAGNOSIS
1	FAILED TO DETECT OR SUSTAIN FLAME.
2	PRESSURE SWITCH OR INDUCER PROBLEM DETECTED.
3	HIGH LIMIT SWITCH PROTECTION DEVICE OPEN.
4	FLAME SENSED GAS VALVE NOT ENERGIZED OR FLAME SENSED NO "R" SIGNAL.
5	FLAME ROLL OUT SWITCH OPEN.

COMPONENT CODE	WIRING INFORMATION	WIRE COLOR CODE
BR BLOWER RELAY	LINE VOLTAGE	BK BLACK O ORANGE
CA COMFORT ALERT MODULE	-FACTORY STANDARD	BR BROWN PR PURPLE
CC COMPRESSOR CONTACTOR	-FACTORY OPTION	BL BLUE R RED
CCH CRANKCASE HEATER	-FIELD INSTALLED	G GREEN W WHITE
CFS CLOGGED FILTER SWITCH	LOW VOLTAGE	GY GRAY Y YELLOW
COMP COMPRESSOR CONTROL TRANSFORMER	-FACTORY STANDARD	
CT CONTROL TRANSFORMER	-FACTORY OPTION	
DAT DISCHARGE AIR SENSOR	-FIELD INSTALLED	
DISC DISCONNECT SWITCH	REPLACEMENT WIRE	
FLMS FLAME SENSING	-MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105° C MIN.)	
FP FAN PROVDING	WARNING	
FS FREEZE SENSOR	-CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., AND LOCAL CODES AS APPLICABLE.	
GFCO GROUND FAULT CONVENIENCE OUTLET		
GL GROUND LUG		
GND GROUND		
GV GAS VALVE		
HPC HIGH PRESSURE CONTROL		
IBM INDOOR BLOWER MOTOR BELT DRIVE		
IDM INDUCED DRAFT MOTOR		
IFC INTEGRATED FURNACE CONTROL		
LAC LOW AMBIENT COOLING CONTROL		
LC LIMIT CONTROL		
LPC LOW PRESSURE CONTROL		
MRLC MANUAL RESET LIMIT CONTROL		
NPC NEGATIVE PRESSURE CONTROL		
OAT OUTSIDE AIR SENSOR		
OFM OUTDOOR FAN MOTOR		
PL PLUG		
RAT RETURN AIR SENSOR		
RC RUN CAPACITOR		
RTU-C ROOFTOP UNIT CONTROL		
SE SPARK ELECTRODE		
TB TERMINAL BLOCK		
VFD VARIABLE FREQUENCY DRIVE		
WIRE NUT		

**WIRING DIAGRAM**  
090/102/120/151 W/VFD  
208-230/460V 3 PH, 60 HZ.  
ROOFTOP W/RTU-C

DR. BY APP. BY DATE DWG. NO. REV  
JRJ KST 01-03-12 90-103089-29 00



DETAIL 'A' - DIAGNOSTICS	
FLASHES	DIAGNOSIS
1	FAILED TO DETECT OR SUSTAIN FLAME.
2	PRESSURE SWITCH OR INDUCER PROBLEM DETECTED.
3	HIGH LIMIT SWITCH PROTECTION DEVICE OPEN.
4	FLAME SENSED GAS VALVE NOT ENERGIZED OR FLAME SENSED NO "V" SIGNAL.
5	FLAME ROLL OUT SWITCH OPEN.

**COMPONENT CODE**

BR	BLOWER RELAY	IBM	INDOOR BLOWER MOTOR BELT DRIVE
CA	COMFORT ALERT MODULE	IDM	INDUCED DRAFT MOTOR
CC	COMPRESSOR CONTACTOR	IFC	INTEGRATED FURNACE CONTROL
CCH	CRANKCASE HEATER	LAC	LOW AMBIENT COOLING CONTROL
CFS	CLOGGED FILTER SWITCH	LC	LIMIT CONTROL
COMP	COMPRESSOR	LPC	LOW PRESSURE CONTROL
CT	CONTROL TRANSFORMER	MRLC	MANUAL RESET LIMIT CONTROL
DAT	DISCHARGE AIR SENSOR	NPC	NEGATIVE PRESSURE CONTROL
DISC	DISCONNECT SWITCH	OAT	OUTSIDE AIR SENSOR
FLMS	FLAME SENSOR	PL	PLUG
FP	FAN PROVING	RAT	RETURN AIR SENSOR
FS	FREEZE SENSOR	RC	RUN CAPACITOR
GFCO	GROUND FAULT CONVENIENCE OUTLET	RTU-C	ROOFTOP UNIT CONTROL
GL	GROUND LUG	SE	SPARK ELECTRODE
GND	GROUND	TB	TERMINAL BLOCK
GV	GAS VALVE	VFD	VARIABLE FREQUENCY DRIVE
HPC	HIGH PRESSURE CONTROL	▲	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 SCHEMATIC**  
 090/102/120/151 W/VFD  
 208-230/460V 3 PH, 60 HZ.  
 ROOFTOP W/RTU-C

DR. BY	APP. BY	DATE	DWG. NO.	REV
JRJ	KST	01-03-12	90-103246-26	01

**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 and Conditional Warranties, including applicable terms and conditions, contact your local contractor or the Manufacturer for a copy of the product warranty certificate.**

#### **Compressor**

3 Phase, Commercial Applications .....Five (5) Years

#### **Stainless Steel Heat Exchanger**

3 Phase, Commercial Applications .....Twenty (20) Years

#### **Parts**

3 Phase, Commercial Applications .....One (1) Year



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

Ruud Heating, Cooling & Water Heating • P.O. Box 17010  
Fort Smith, Arkansas 72917 • [www.ruud.com](http://www.ruud.com)

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