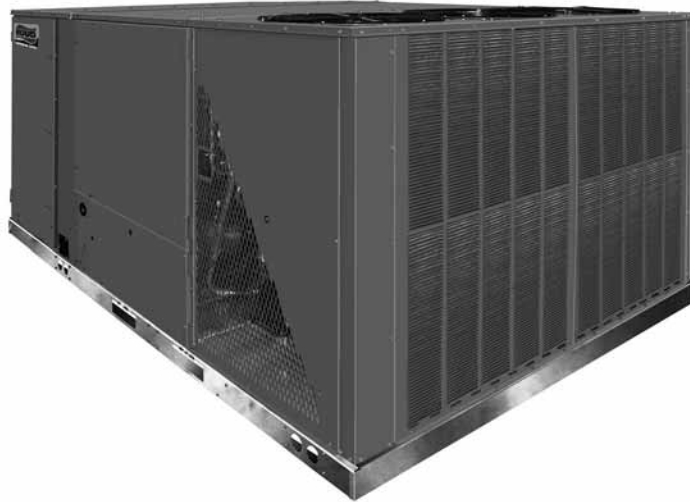




## Ruud Commercial Value Series Package Air Conditioner



### **RLKL-B High Efficiency Series**

Nominal Sizes 7.5, 10 & 12.5 Tons

[26.4, 35.2 & 44.0 kW]

ASHRAE 90.1-2010 Compliant Model



*"Proper sizing and installation of equipment is critical to achieve optimal performance. Ask your Contractor for details or visit [www.energystar.gov](http://www.energystar.gov)."*

# TABLE OF CONTENTS

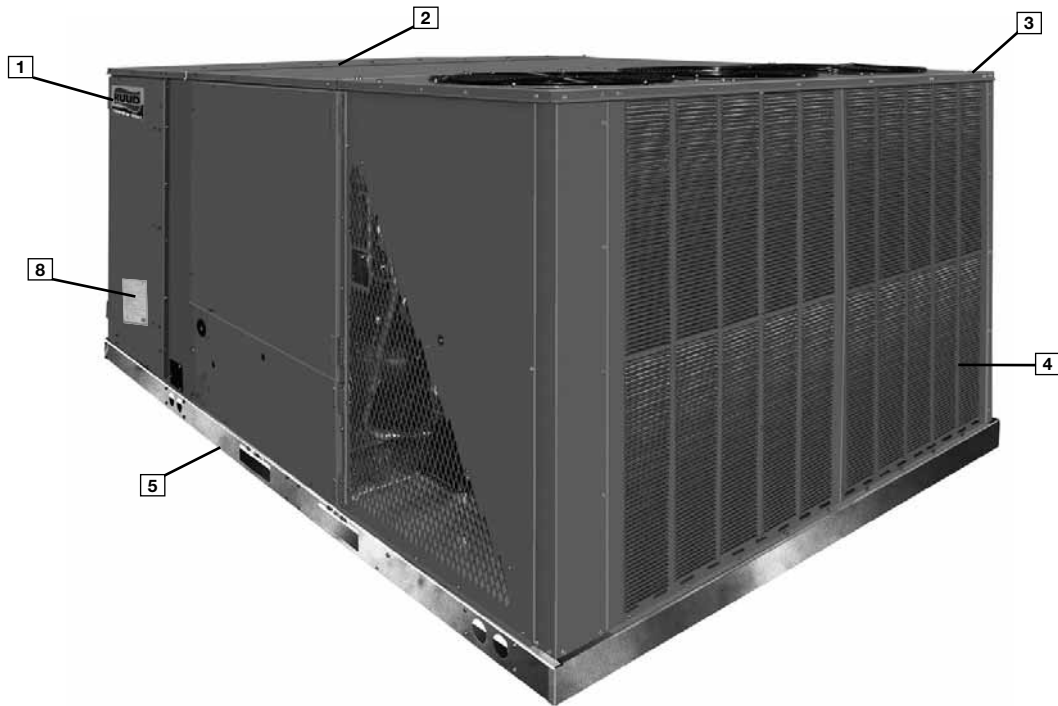
Unit Features & Benefits .....	3-7
Selection Procedure .....	8
Model Number Identification .....	9
Options .....	10
General Data	
RLKL-B Series .....	11-16
General Data Notes .....	17
Gross Systems Performance Data	
RLKL-B Series .....	18-19
Airflow Performance	
RLKL-B Series .....	20-22
Electrical Data	
RLKL-B Series .....	23-25
Electric Heater Kits .....	26-31
Dimensional Data .....	32-35
Accessories .....	36-55
Mechanical Specifications .....	56-57
Wiring Diagrams .....	58-61
Limited Warranty .....	62

## ***These quality features are included in the Ruud Package Air Conditioner Unit***



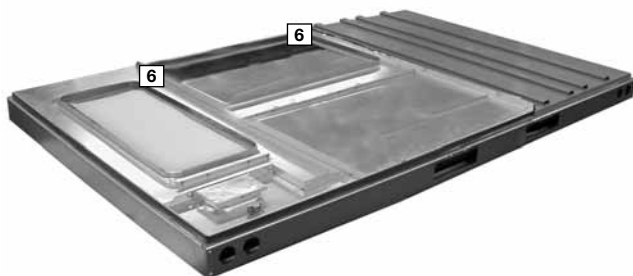
### **STANDARD FEATURES INCLUDE:**

- R-410A HFC refrigerant.
- Complete factory charged, wired and run tested.
- Scroll compressors with internal line break overload and high-pressure protection.
- Single stage compressor.
- Convertible airflow.
- Orifice metering system on 7.5 and 10 ton. TXV metering on 12.5 ton.
- 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.
- MicroChannel outdoor coil.
- Cooling operation up to 125 degree F ambient.
- Foil faced insulation encapsulated throughout entire unit minimizes airborne fibers from the air stream.
- Mechanical fasteners, door with heavy-duty gasketing.
- 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 connections.
- Internally sloped slide out condensate pan conforms to ASHRAE 62 standards.
- High performance belt drive motor with variable pitch pulleys and quick adjust belt system.
- Permanently lubricated evaporator and condenser motors.
- Condenser motors are internally protected, totally enclosed with shaft down design.
- 2 inch filter standard with slide out design.
- 24 volt control system with resettable circuit breakers.
- Colored and labeled wiring.
- Molded compressor plug.
- Supplemental electric heat provides 100% efficient heating.



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 (optional) (4) 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 cover and has eliminated the worry of water entering the conditioned space (6). 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. The drainpan (7) is made of material that resists the growth of harmful bacteria and is sloped for the latest IAQ benefits. Furthermore, the drain pan slides out for easy cleaning.



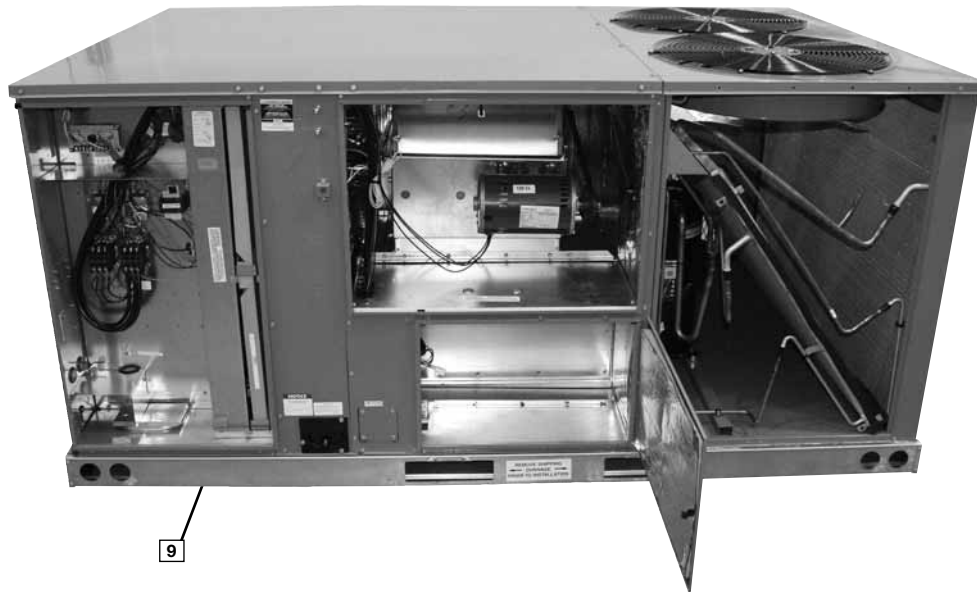
During development, each unit was tested to U.L. 1995, AHRI 340-370 and other Ruud-required reliability tests. Ruud adheres to stringent ISO 9002 quality procedures, and each unit bears the U.L. and AHRI certification labels located on the unit nameplate. Contractors can rest assured that when a Ruud package unit arrives at the job, it is ready to go with a factory charge and quality checks. Each unit also proudly displays the "Made in the USA" designation.

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

Electrical and filter compartment access is through a large, mechanically fastened panel. On the outside of the panel is the unit nameplate, which contains the model and serial number, electrical data and other important unit information.

The unit charging chart is located on the inside of the electrical and filter compartment door. Electrical wiring diagrams are found on the control box cover, which allows contractors to move them to more readable locations. To the right of the control box the model and serial number can be found. Having this information on the inside will assure model identification for the life of the product. The production line quality test assurance label is also placed in this location (8). The two-inch throwaway filters (9) are easily removed on a tracked system for easy replacement.





Inside the control box (10), each electrical component is clearly identified with a label that matches the component to the wire diagram for ease of trouble shooting. All wiring is numbered on each end of the termination and color-coded to match the wiring diagram. The control transformer has a low voltage circuit breaker that trips if a low voltage electrical short occurs. There is a blower contactor and compressor for each compressor.



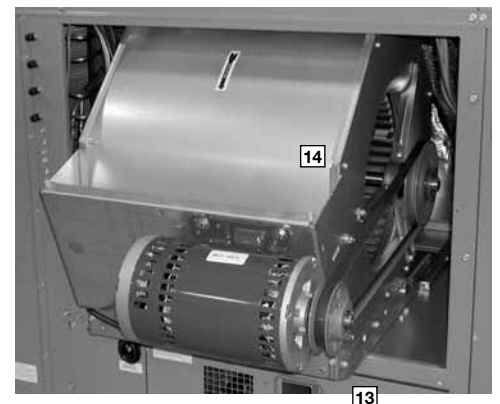
For added convenience in the field, a factory-installed convenience outlet (11) is available. Low and High voltage can enter either from the side or through the base. Low-voltage connections are made integrated cooling control. The high-voltage connection is terminated at the number 1 compressor contactor. The suggested mounting for the field-installed disconnect is on the exterior side of the electrical control box.



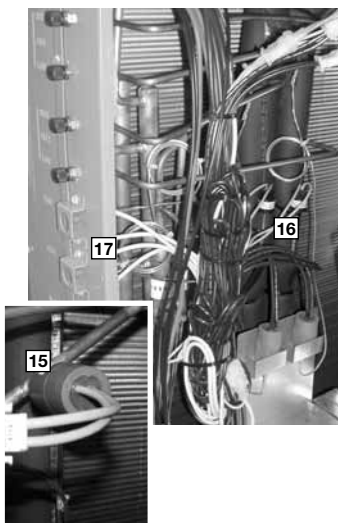
To the right of the electrical and filter compartment are the externally mounted gauge ports, which are permanently identified by embossed wording that clearly identifies the compressor circuit, high pressure connection and low pressure connection (12). With the gauge ports mounted externally, an accurate diagnostic of system operation can be performed quickly and easily. The blower compartment is to the right of the gauge ports and can be



accessed by removing mechanical turn fasteners. To allow easy maintenance of the blower assembly, the entire assembly easily slides out by removing the 3/8" screws from the blower retention bracket. The adjustable motor pulley (13) can easily be adjusted by loosening the bolts on either side of the motor mount. Removing the bolts allows for easy removal of the blower pulley by pushing the blower assembly up to loosen the belt. Once the pulley is removed, the motor sheave can be adjusted to the desired number of turns, ranging from 0 to 6 turns open. Where the demands for the job require high static, Ruud has high-static drives available that deliver nominal airflow up to 2" of static. By referring to the airflow performance tables listed in the installation instructions, proper static pressure and CFM requirements can be dialed in. The scroll housing (14) 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.

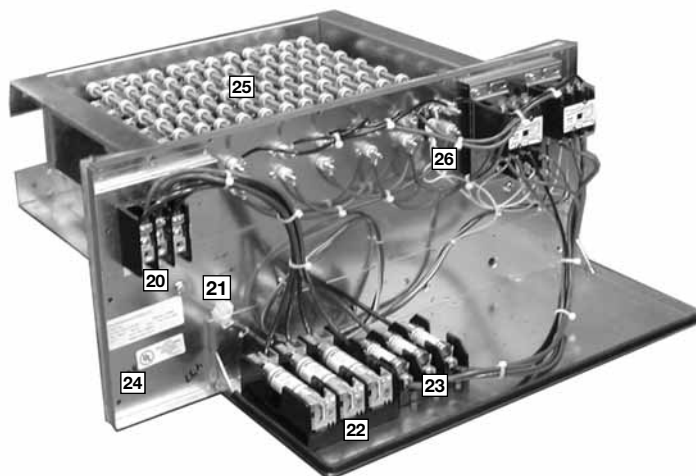
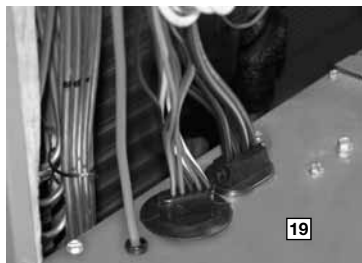


Also inside the blower compartment is the low-ambient control (15), low-pressure switch (16), high-pressure switch (17) and freeze stat refrigerant safety device (18) (optional). The low-ambient control allows for operation of the compressor down to 0 degrees ambient temperature by cycling the outdoor fans on high pressure. The high-pressure switch will shut off the compressors if pressures exceeds, 610 PSIG are detected, this 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 stat protects the compressor if the evaporator coil gets too cold (below freezing) due to low airflow. Each factory-installed option is brazed into the appropriate high or low side and wired appropriately. Use of polarized plugs and sharder 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 fixed orifice metering device (TXV's on 12.5 ton) assures even distribution of refrigerant throughout the evaporator. MicroChannel technology is used on outdoor coil.

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

Power hook-up in the field is easy with single-point wiring to a terminal block (20) and a polarized plug for the low-voltage connection (21). The electric furnace comes with fuses for the unit (22) and for the electric furnace (23), and is UL certified (24). The electric heating elements are of a wound-wire construction (25) and isolated with ceramic bushings. The limit switch (26) protects the design from over-temperature conditions. Each electric furnace has the capability to be converted from single-stage operation to two-stage operation by removing a jumper on the low-voltage terminal strip.

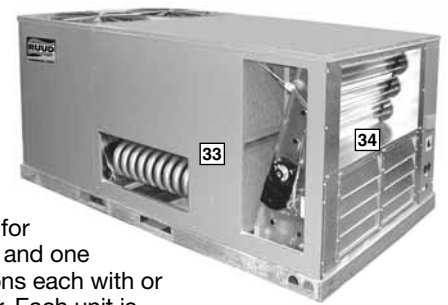
The compressor compartment houses the heart-beat of the unit. The scroll compressor (28) is known for its long life, and for reliable, quiet, and efficient operation. The suction and discharge lines are designed with shock loops (29) to absorb the strain and stress that the starting torque, steady state operation, and shut down cycle impose on the refrigerant tubing.



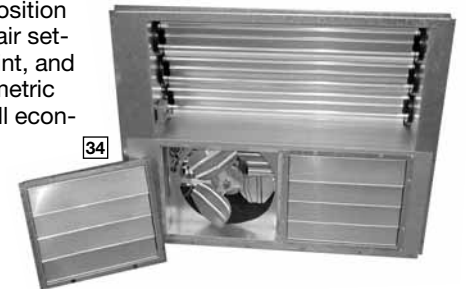
Each unit comes standard with filter dryer (30). The condenser fan motor (31) can easily be accessed and maintained through the compressor compartment. The polarized plug connection allows the motor to be changed quickly and eliminates the need to snake wires through the unit.

The outdoor coil uses the latest MicroChannel technology (32) 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 (33) for job configuration flexibility. The return air compartment can also contain an economizer (34).



Four models exits, one for downflow applications, and one for horizontal applications each with or without smoke detector. Each unit is pre-wired for the economizer to allow quick plug-in installation. The economizer is also available as a factory-installed option. Power Exhaust is easily field-installed. The economizer, which provides free cooling when outdoor conditions are suitable and also provides fresh air to meet local requirements, comes standard with single enthalpy controls. The controls can be upgraded to dual enthalpy easily in the field. The direct drive actuator combined with gear drive dampers has eliminated the need for linkage adjustment in the field. The economizer control has a minimum position setpoint, an outdoor-air setpoint, a mix-air setpoint, and a CO<sub>2</sub> setpoint. Barometric relief is standard on all economizers. The power exhaust is housed in the barometric relief opening and is easily slipped in with a plug-in assembly. The wire harness to the economizer also has accommodations for a smoke detector.



The Ruud roofcurb (35) is made for toolless assembly at the jobsite by engaging a pin into the hinged corner brackets into the adjacent curb sides, which makes the assembly process quick and easy.



To select an RLKL- 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:**

Total cooling capacity— 106,000 BTUH [31.26 kW]  
Sensible cooling capacity— 82,000 BTUH [24.03 kW]  
Heating capacity— 150,000 BTUH [43.96 kW]  
\*Condenser Entering Air— 95°F [35°C] DB  
\*Evaporator Mixed Air Entering—65°F [18°C] WB;  
78°F [26°C] DB  
\*Indoor Air Flow (vertical)— 3600 CFM [1699 L/s]  
\*External Static Pressure— .40 in. WG

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

Since total cooling is within the range of a nominal 10 ton [35.2 kW] unit, enter cooling performance table at 95°F [35°C] DB condenser inlet air. Interpolate between 63°F [2°C] and 67°F [19°C] to determine total and sensible capacity and power input for 65°F [18°C] WB evap inlet air at 4000 CFM [1888 L/s] indoor air flow (table basis):

Total Capacity = 118,900 BTUH [34.80 kW]  
Sensible Capacity = 99,950 BTUH [29.29 kW]  
Power Input (Compressor and Cond. Fans) = 8,950 watts

Use formula [1.10 x CFM x (1 - DR) x (dbE - 80)] in note ① to determine sensible capacity at 80°F [26.7°C] DB evaporator entering air:

Sensible Capacity = 92,268 BTUH [27.24 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 .98 = 116,522 BTUH [34.15 kW]  
Sensible Capacity, 92,268 x .95 = 87,655 BTUH [25.67 kW]  
Power Input 11,650 x .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 .40 in. includes the system duct and grilles. Add from the table "Component Air Resistance," .076 for wet coil, .13 for vertical air flow, for a total selection static pressure of .606 (.6) inches of water, and determine:

RPM = 796  
WATTS = 1,650  
DRIVE = L (standard 2 H.P. motor)

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

$$\text{BTUH} = 1,650 \times 3.412 = 5,630$$

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

$$\text{Net Total Capacity} = 116,522 - 5,630 = 110,892 \text{ BTUH [32.5 kW]}$$

$$\text{Net Sensible Capacity} = 87,655 - 5,630 = 82,025 \text{ BTUH [24.04 kW]}$$

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

$$\text{Total Power Input} = 88,610 \text{ (step 3)} + 1,650 \text{ (step 4)} = 10,511 \text{ Watts}$$

$$\text{EER} = \frac{\text{Net Total BTUH [kW] (step 6)}}{\text{Power Input, Watts (above)}} = \frac{110,892}{10,511} = 10.55$$

**8. SELECT UNIT HEATING CAPACITY.**

Units with heater kits section find unit heater kw and convert watts to BTU: add blower BTUH heat effect (step 5).

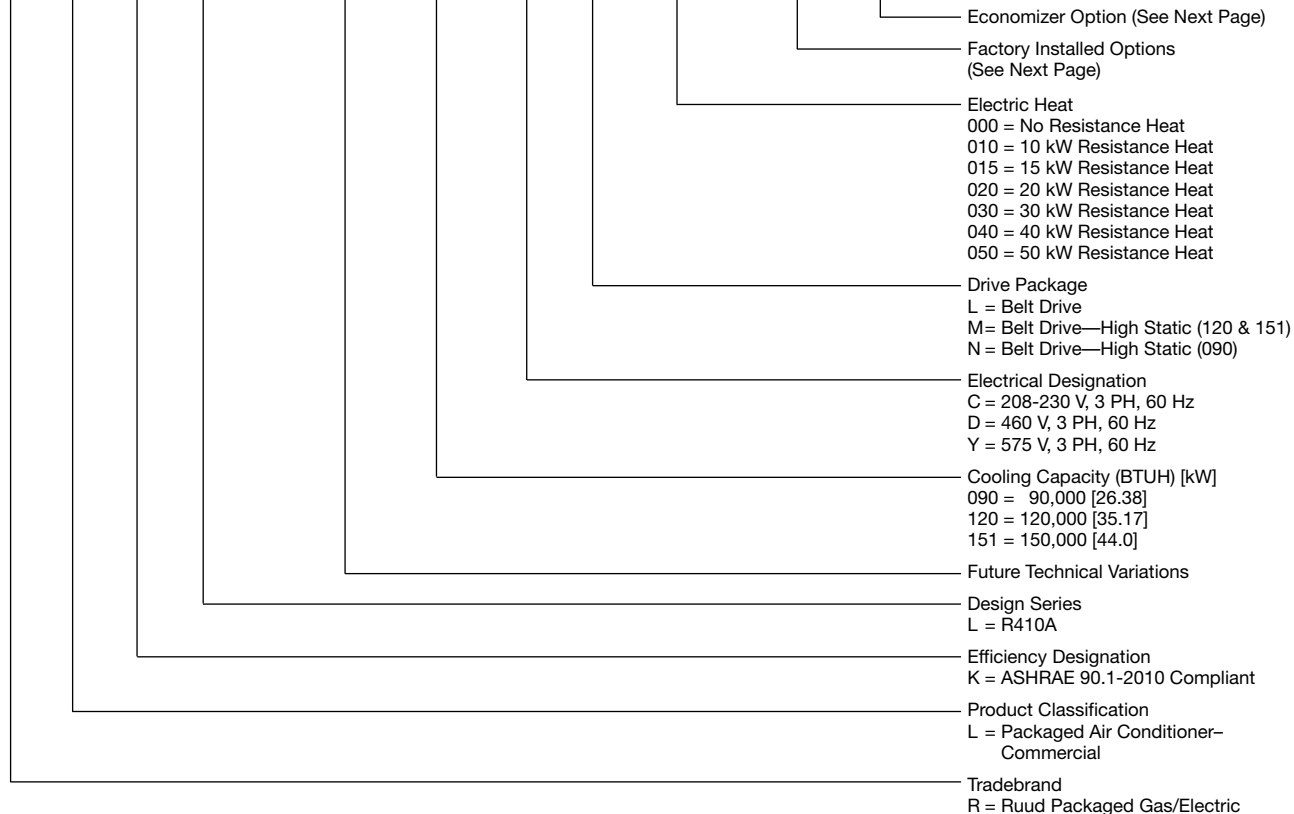
<u>CC51C</u>	<u>Heater Kit</u>
kW x 3412	= 163,776 BTUH [48.00 kW]
	+ 5,630 BTUH [1.65 kW]
Heating Capacity=	169,406 BTUH [49.65 kW]

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

[ ] Designates Metric Conversions



**R L K L — B 120 C L 000 X X X**



[ ] Designates Metric Conversions

## 7.5, 10, & 12.5 TON [26.4, 35.2 & 44.0 kW]

Option Code	Hail Guard	Non-Powered Convenience Outlet	Low Ambient/ Freeze Stat
AD	x		
AG		x	
AP			x
BY	x		x
BJ	x	x	
CX	x	x	x
JC		x	x

"x" indicates factory installed option.

## ECONOMIZER SELECTION FOR LKL 7.5, 10, & 12.5 TON [26.4, 35.2 & 44.0 kW]

Option Code	No Economizer	Single Enthalpy Economizer with Barometric Relief	Single Enthalpy Economizer with Barometric Relief and Smoke Detector
A	x		
F		x	
G			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:

RLKL-B120CL000 .....this unit has no factory installed options.

RLKL-B120CL000**ADA** .....this unit is equipped with *hail guards*.

RLKL-B120CL000**BYA** .....this unit is equipped with *hail guards, low ambient and unit freeze stat*.

RLKL-B120CL000**BYF** .....this unit is equipped as above *and* includes an *Economizer with single enthalpy sensor and with barometric relief*.

RLKL-B120CL000**AAG** .....this unit is equipped with an *Economizer with single enthalpy sensor and barometric relief with smoke detector*.

[ ] Designates Metric Conversions

## NOM. SIZES 7.5, 10, & 12.5 TON [26.4, 35.2 & 44.0 kW] ASHRAE 90.1-2010 COMPLIANT MODELS

Model RLKL- Series	B090YN	B120CL	B120CM	B120DL
<b>Cooling Performance<sup>1</sup></b>				<b>CONTINUED</b> →
Gross Cooling Capacity Btu [kW]	87,000 [25.49]	123,000 [36.04]	123,000 [36.04]	123,000 [36.04]
EER/SEER <sup>2</sup>	11.2/NA	11.2/NA	11.2/NA	11.2/NA
Nominal CFM/AHRI Rated CFM [L/s]	2800/2925 [1321/1380]	4000/3600 [1888/1699]	4000/3600 [1888/1699]	4000/3600 [1888/1699]
AHRI Net Cooling Capacity Btu [kW]	84,000 [24.61]	119,000 [34.87]	119,000 [34.87]	119,000 [34.87]
Net Sensible Capacity Btu [kW]	64,800 [18.99]	87,200 [25.55]	87,200 [25.55]	87,200 [25.55]
Net Latent Capacity Btu [kW]	19,200 [5.63]	31,800 [9.32]	31,800 [9.32]	31,800 [9.32]
IEER <sup>3</sup>	12.1	12.2	12.2	12.2
Net System Power kW	7.5	10.62	10.62	10.62
<b>Compressor</b>				
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll
<b>Outdoor Sound Rating (dB)<sup>4</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]	13.5 [1.25]	27 [2.51]	27 [2.51]	27 [2.51]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 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]	13.5 [1.25]
Rows / FPI [FPcm]	2 / 18 [7]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Refrigerant Control	Orifices	Orifices	Orifices	Orifices
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]	1/24 [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]	4500 [2124]	8400 [3964]	8400 [3964]	8400 [3964]
No. Motors/HP	1 at 1/2 HP	2 at 1/3 HP	2 at 1/3 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/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	3	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]	(6)2x18x18 [51x457x457]
<b>Refrigerant Charge Oz. [g]</b>	117.6 [3334]	204.8 [5806]	204.8 [5806]	204.8 [5806]
<b>Weights</b>				
Net Weight lbs. [kg]	890 [404]	984 [446]	992 [450]	984 [446]
Ship Weight lbs. [kg]	927 [420]	1021 [463]	1029 [467]	1021 [463]

See Page 17 for Notes.

[ ] Designates Metric Conversions

**ELECTRICAL DATA – RLKL SERIES**

		<b>B090YM</b>	<b>B090YN</b>	<b>B120CL</b>	<b>B120CM</b>	<b>B120DL</b>	<b>B120DM</b>	<b>B120YL</b>
<b>Unit Information</b>	Unit Operating Voltage Range	518-632	518-632	187-253	187-253	414-506	414-506	518-632
	Volts	575	575	208/230	208/230	460	460	575
	Minimum Circuit Ampacity	15	19	51/51	56/56	28	31	22
	Minimum Overcurrent Protection Device Size	20	25	60/60	70/70	35	35	25
	Maximum Overcurrent Protection Device Size	20	25	80/80	80/80	40	45	30
<b>Compressor Motor</b>	No.	1	1	1	1	1	1	1
	Volts	600	600	200/240	200/240	480	480	600
	Phase	3	3	3	3	3	3	3
	RPM	3450	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	6	6	10	10	10	10	10
	Amps (RLA), Comp. 1	7.9	7.9	30.1/30.1	30.1/30.1	16.7	16.7	12.2
	Amps (LRA), Comp. 1	54	54	225/225	225/225	114	114	80
	HP, Compressor 2	—	—	—	—	—	—	—
	Amps (RLA), Comp 2	—	—	—	—	—	—	—
Amps (LLA), Comp 2	—	—	—	—	—	—	—	
<b>Condenser Motor</b>	No.	1	1	2	2	2	2	2
	Volts	575	575	208/230	208/230	460	460	575
	Phase	1	1	1	1	1	1	1
	HP	1/2	1/2	1/3	1/3	1/3	1/3	1/3
	Amps (FLA, each)	1	1	2.4/2.4	2.4/2.4	1.4	1.4	1
	Amps (LRA, each)	2.2	2.2	4.7/4.7	4.7/4.7	2.4	2.4	1.5
<b>Evaporator Fan</b>	No.	1	1	1	1	1	1	1
	Volts	575	575	208/230	208/230	460	460	575
	Phase	3	3	3	3	3	3	3
	HP	2	3	2	3	2	3	2
	Amps (FLA, each)	4	8	8/8	13/13	4	7	4
	Amps (LRA, each)	19	20	56/56	74.5/74.5	28	38.1	19