INSTALLATION INSTRUCTIONS

PACKAGE GAS ELECTRIC FEATURING EARTH-FRIENDLY R-410A REFRIGERANT

R-410A
earth friendly refrigerant

RKNL-B SERIES 15, 20 & 25 TON [52.8, 70.3, 87.9 kW]
COMPLIES WITH ASHRAE 90.1-2007

RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!

⚠ WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED, LICENSED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

ARI PERFORMANCE CERTIFIED ™
ARI Standard 340/360 Unitary Large AC
Certification applies only when the complete system is listed with ARI
www.ariidirectory.org
25 TON IS OUTSIDE THE SCOPE OF ARI STANDARD 340/360

c UL us LISTED

Accredited by the RvA
A&S Quality Evaluations, Inc. Management System Certification
ANAB ACCREDITED
ISO 9001:2000
Certificate Number: 30164

DO NOT DESTROY THIS MANUAL
PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICEMAN

[ ] INDICATES METRIC CONVERSIONS

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⚠ Recognize this symbol as an indication of Important Safety Information!

⚠ WARNING

THE MANUFACTURER'S WARRANTY DOES NOT COVER ANY DAMAGE OR DEFECT TO THE AIR CONDITIONER CAUSED BY THE ATTACHMENT OR USE OF ANY COMPONENTS, ACCESSORIES OR DEVICES (OTHER THAN THOSE AUTHORIZED BY THE MANUFACTURER) INTO, ONTO OR IN CONJUNCTION WITH THE AIR CONDITIONER. YOU SHOULD BE AWARE THAT THE USE OF UNAUTHORIZED COMPONENTS, ACCESSORIES OR DEVICES MAY ADVERSELY AFFECT THE OPERATION OF THE AIR CONDITIONER AND MAY ALSO ENDANGER LIFE AND PROPERTY. THE MANUFACTURER DISCLAIMS ANY RESPONSIBILITY FOR SUCH LOSS OR INJURY RESULTING FROM THE USE OF SUCH UNAUTHORIZED COMPONENTS, ACCESSORIES OR DEVICES.

⚠ WARNING

UNITS ARE NOT DESIGN CERTIFIED TO BE INSTALLED INSIDE THE STRUCTURE. DOING SO CAN CAUSE INADEQUATE UNIT PERFORMANCE AS WELL AS PROPERTY DAMAGE AND CARBON MONOXIDE POISONING RESULTING IN PERSONAL INJURY OR DEATH.

⚠ WARNING

PROVIDE ADEQUATE COMBUSTION AND VENTILATION AIR TO THE UNIT SPACE AS SPECIFIED IN THE COMBUSTION AND VENTILATION AIR SECTION OF THESE INSTRUCTIONS.

CHECKING PRODUCT RECEIVED

This booklet contains the installation and operating instructions for your combination gas heating/electric cooling unit. There are some precautions that should be taken to derive maximum satisfaction from it. Improper installation can result in unsatisfactory operation or dangerous conditions.

Read this booklet and any instructions packaged with separate equipment required to make up the system prior to installation. Give this booklet to the owner and explain its provisions. The owner should retain this booklet for future reference.

EQUIPMENT PROTECTION FROM THE ENVIRONMENT

Upon receiving the unit, inspect it for any damage from shipment. Claims for damage, either shipping or concealed, should be filed immediately with the shipping company. **IMPORTANT:** Check the unit model number, heating size, electrical characteristics, and accessories to determine if they are correct.

I. SPECIFICATIONS

A. GENERAL

The Combination Gas Heating/Electric Cooling Rooftop is available in 250,000 AND 350,000 BTUH heating input with nominal cooling capacity of 15 tons. 300,000 and 400,000 BTUH heating inputs are available in nominal cooling capacity of 20 & 25 tons. Units are convertible from bottom supply and return to side supply and return by relocation of supply and return air cover panels. See cover installation detail and Figures 10 &11.

The units are weatherized for mounting outside of the building.

B. MAJOR COMPONENTS

The unit includes a hermetically-sealed refrigerating system consisting of a scroll compressor, condenser coil, evaporator coil with capillary tube assembly or TXV, a circulation air blower, condenser fans, a heat exchanger assembly, gas burner and control assembly, combustion air motors and fan, and all necessary internal electrical wiring. The cooling system of these units is factory-evacuated, charged and performance tested. Refrigerant amount and type are indicated on rating plate.

C. R410A REFRIGERANT

All units are factory charged with R-410A refrigerant.

1. Specification of R-410A:

Application: <u>R-410A is not a drop-in replacement for R-22;</u> equipment designs must accommodate its higher pressures. It cannot be retrofitted into R-22 units.

<u>Pressure: The pressure of R-410A is approximately 60% (1.6 times) greater than R-22.</u> Recovery and recycle equipment, pumps, hoses, and the like need to have design pressure ratings appropriate for R-410A. *Manifold sets need to range up to 800 psig high-side and 250 psig low-side with a 550 psig low-side retard. Hoses need to have a service pressure rating of 800 psig. Recovery cylinders need to have a 400 psig service pressure rating.* DOT 4BA400 or DOT BW400.

Combustibility: At pressures above 1 atmosphere, mixture of R-410A and air can become combustible. **<u>R-410A and air should never be mixed in tanks or supply lines, or be allowed to accumulate in storage tanks. Leak checking should never be done with a mixture of R-410A and air.</u>** Leak checking can be performed safely with nitrogen or a mixture of R-410A and nitrogen.

2. Quick Reference Guide For R-410A

- R-410A refrigerant operates at approximately 60% higher pressure (1.6 times) than R-22. Ensure that servicing equipment is designed to operate with R-410A.
- R-410A refrigerant cylinders are pink.
- R-410A, as with other HFC's is only compatible with POE oils.
- Vacuum pumps will not remove moisture from POE oil.

- R-410A systems are to be charged with liquid refrigerants. Prior to March 1999, R-410A refrigerant cylinders had a dip tube. These cylinders should be kept upright for equipment charging. Post March 1999 cylinders do not have a dip tube and should be inverted to ensure liquid charging of the equipment.
- Do not install a suction line filter drier in the liquid line.
- A liquid line filter drier is standard on every unit.
- Desiccant (drying agent) must be compatible for POE oils and R-410A.

3. Evaporator Coil/ TXV

The thermostatic expansion valve is specifically designed to operate with R-410A. **DO NOT use an R-22 TXV. The existing evaporator must be replaced with the factory specified TXV evaporator specifically designed for R-410A.**

4. Tools Required For Installing & Servicing R-410A Models

Manifold Sets:
-Up to 800 PSIG High Side
-Up to 250 PSIG Low Side
-550 PSIG Low Side Retard

Manifold Hoses:
-Service Pressure Rating of 800 PSIG

Recovery Cylinders:
-400 PSIG Pressure Rating
-Dept. of Transportation 4BA400 or BW400

⚠ CAUTION

R-410A systems operate at higher pressures than R-22 systems. Do not use R-22 service equipment or components on R-410A equipment.

SAFETY INFORMATION

⚠ WARNING

USE ONLY WITH TYPE OF GAS APPROVED FOR THIS UNIT. REFER TO THE UNIT RATING PLATE.

⚠ WARNING

INSTALL THIS UNIT ONLY IN A LOCATION AND POSITION AS SPECIFIED IN THE LOCATION REQUIREMENTS AND CONSIDERATIONS SECTION OF THESE INSTRUCTIONS. PROVIDE ADEQUATE COMBUSTION AND VENTILATION AIR TO THE UNIT SPACE AS SPECIFIED IN THE VENTING SECTION OF THESE INSTRUCTIONS.

⚠ WARNING

PROVIDE ADEQUATE COMBUSTION AND VENTILATION AIR TO THE UNIT SPACE AS SPECIFIED IN THE COMBUSTION AND VENTILATION AIR SECTION OF THESE INSTRUCTIONS.

⚠ WARNING

COMBUSTION PRODUCTS MUST BE DISCHARGED OUTDOORS. CONNECT THIS UNIT TO AN APPROVED VENT SYSTEM ONLY, AS SPECIFIED IN VENT PIPE INSTALLATION SECTION OF THESE INSTRUCTIONS.

⚠ WARNING

NEVER TEST FOR GAS LEAKS WITH AN OPEN FLAME. USE A COMMERCIALLY AVAILABLE SOAP SOLUTION MADE SPECIFICALLY FOR THE DETECTION OF LEAKS TO CHECK ALL CONNECTIONS, AS SPECIFIED IN GAS SUPPLY AND PIPING SECTION OF THESE INSTRUCTIONS.

⚠ WARNING

ALWAYS INSTALL UNIT TO OPERATE WITHIN THE UNIT'S INTENDED TEMPERATURE-RISE RANGE WITH A DUCT SYSTEM WHICH HAS AN EXTERNAL STATIC PRESSURE WITHIN THE ALLOWABLE RANGE, AS SPECIFIED IN DUCTING SECTION OF THESE INSTRUCTIONS. SEE ALSO UNIT RATING PLATE.

⚠ WARNING

WHEN A UNIT IS INSTALLED SO THAT SUPPLY DUCTS CARRY AIR CIRCULATED BY THE UNIT TO AREAS OUTSIDE THE SPACE CONTAINING THE UNIT, THE RETURN AIR SHALL ALSO BE HANDLED BY DUCT(S) SEALED TO THE UNIT CASING AND TERMINATING OUTSIDE THE SPACE CONTAINING THE UNIT.

⚠ WARNING

THIS UNIT MAY BE USED TO HEAT THE BUILDING OR STRUCTURE DURING CONSTRUCTION IF THE FOLLOWING INSTALLATION REQUIREMENTS ARE MET. INSTALLATION MUST COMPLY WITH ALL INSTALLATION INSTRUCTIONS INCLUDING:

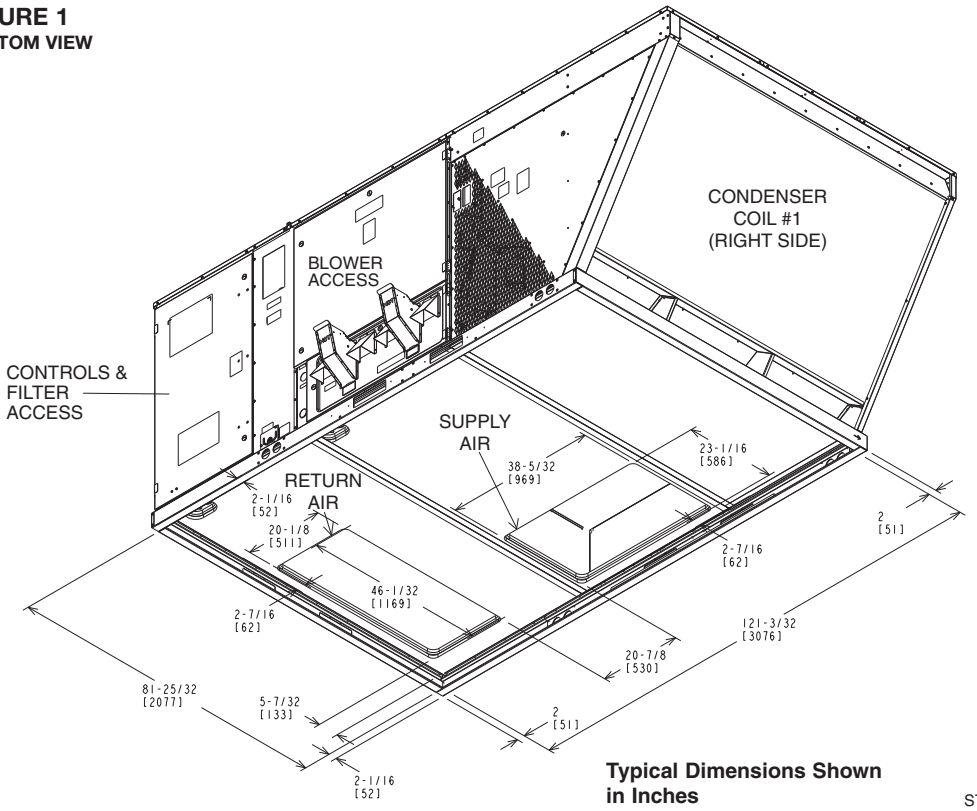
- **PROPER VENT INSTALLATION;**
- **FURNACE OPERATING UNDER THERMOSTATIC CONTROL;**
- **RETURN AIR DUCT SEALED TO THE FURNACE;**
- **AIR FILTERS IN PLACE;**
- **SET FURNACE INPUT RATE AND TEMPERATURE RISE PER RATING PLATE MARKING;**
- **MEANS OF PROVIDING OUTDOOR AIR REQUIRED FOR COMBUSTION;**
- **RETURN AIR TEMPERATURE MAINTAINED BETWEEN 55°F (13°C) AND 80°F (27°C); AND**
- **INSTALLATION OF EXHAUST AND COMBUSTION AIR INLET HOODS COMPLETED;**
- **CLEAN FURNACE, DUCT WORK AND COMPONENTS UPON SUBSTANTIAL COMPLETION OF THE CONSTRUCTION PROCESS, AND VERIFY FURNACE OPERATING CONDITIONS INCLUDING IGNITION, INPUT RATE, TEMPERATURE RISE AND VENTING ACCORDING TO THE INSTRUCTIONS.**

Unit Dimensions

FOR CLEARANCES SEE PAGE 12, FIGURE 12.

IMPORTANT: THIS UNIT MUST BE MOUNTED LEVEL IN BOTH DIRECTIONS TO ALLOW WATER TO DRAIN FROM THE CONDENSER SECTION AND CONDENSATE PAN.

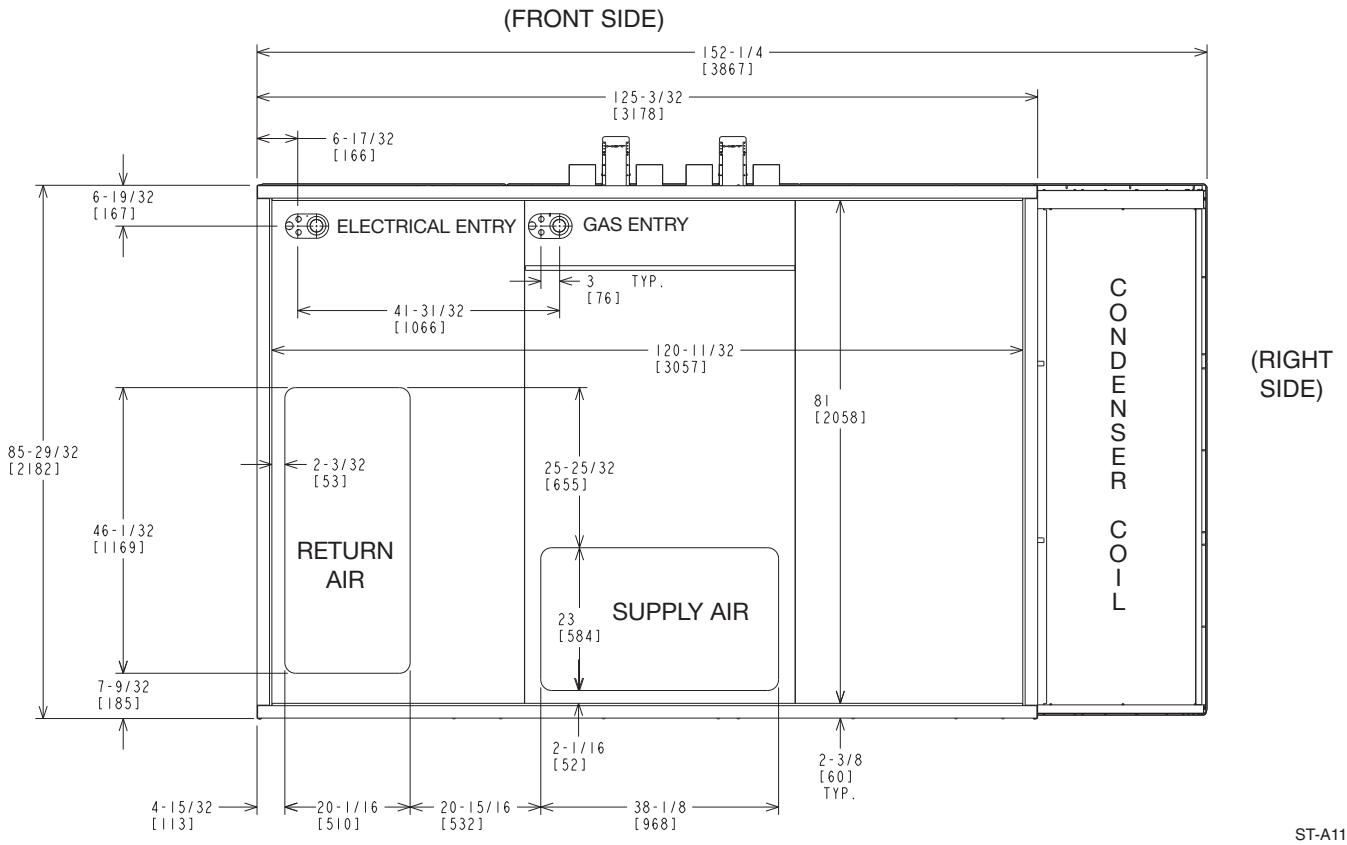
FIGURE 1
BOTTOM VIEW



Typical Dimensions Shown in Inches

ST-A1125-02A

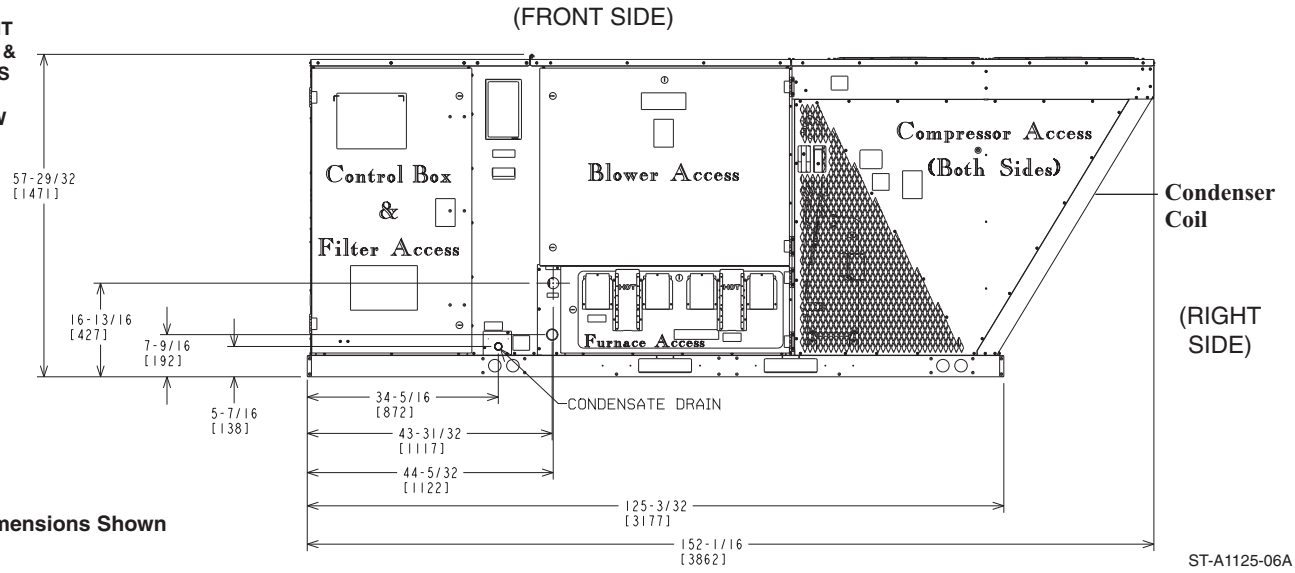
FIGURE 2
SUPPLY AND RETURN DIMENSIONS FOR DOWNFLOW APPLICATIONS – BOTTOM VIEW



ST-A1125-09A

FIGURE 3
COMPONENT LOCATIONS & DIMENSIONS

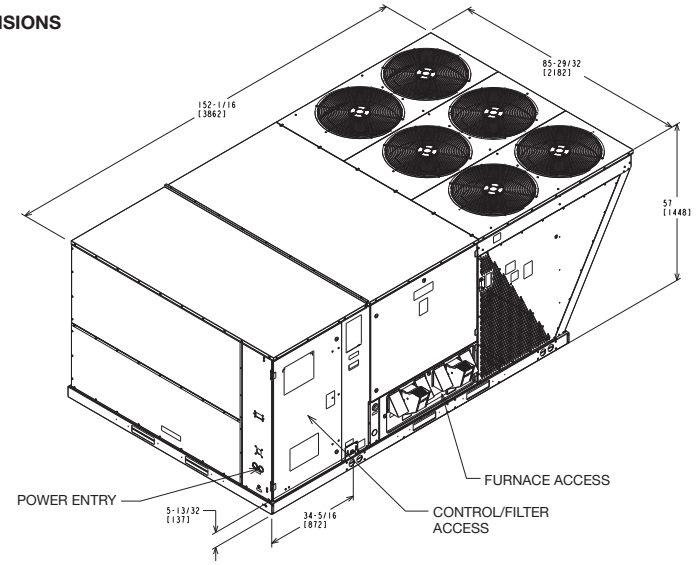
FRONT VIEW



Typical Dimensions Shown in Inches

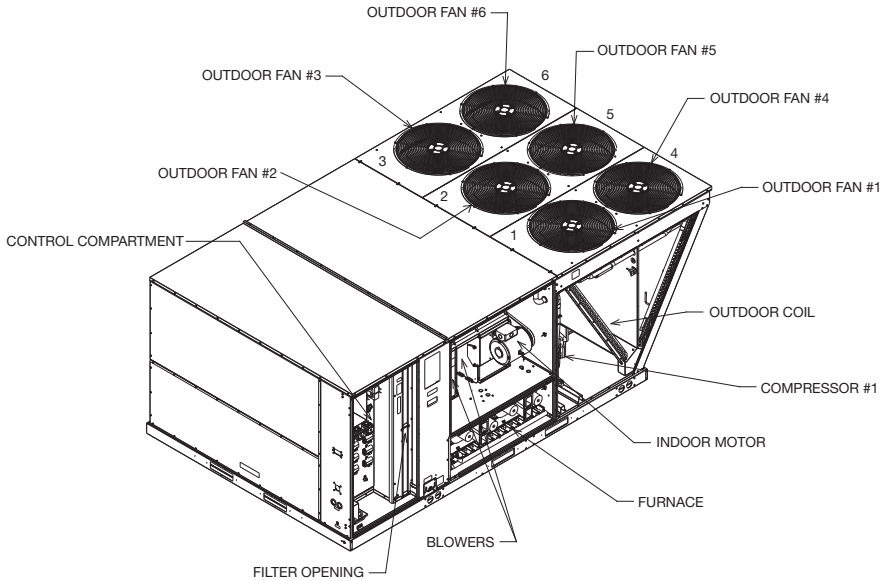
ST-A1125-06A

FIGURE 4
COMPONENT LOCATIONS & DIMENSIONS



ST-A1125-01A

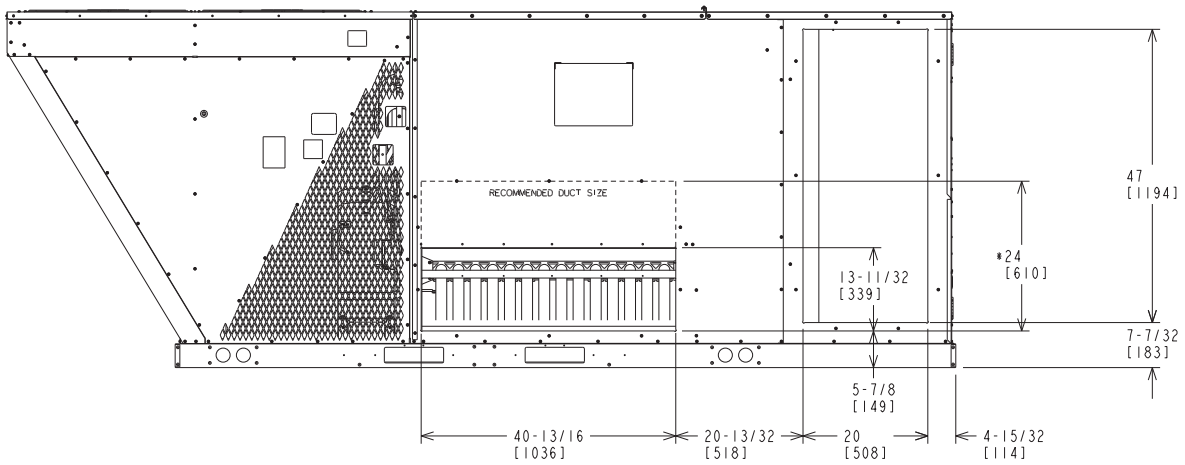
FIGURE 5
COMPONENT LOCATIONS



ST-A1125-04

FIGURE 6
DIMENSIONS

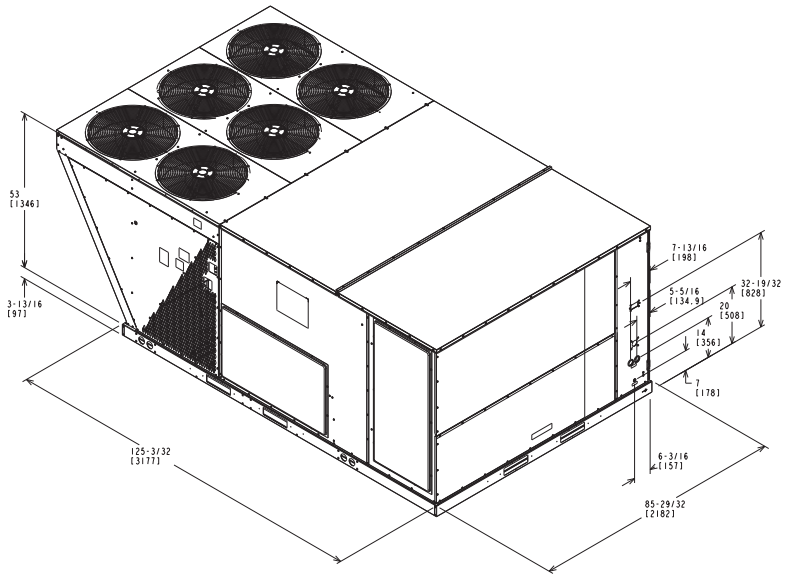
(REAR SIDE)



*RECOMMENDED DUCT CONNECTION SIZE
SUPPLY: 24 x 40.8 INCHES
RETURN: 47 x 20 INCHES

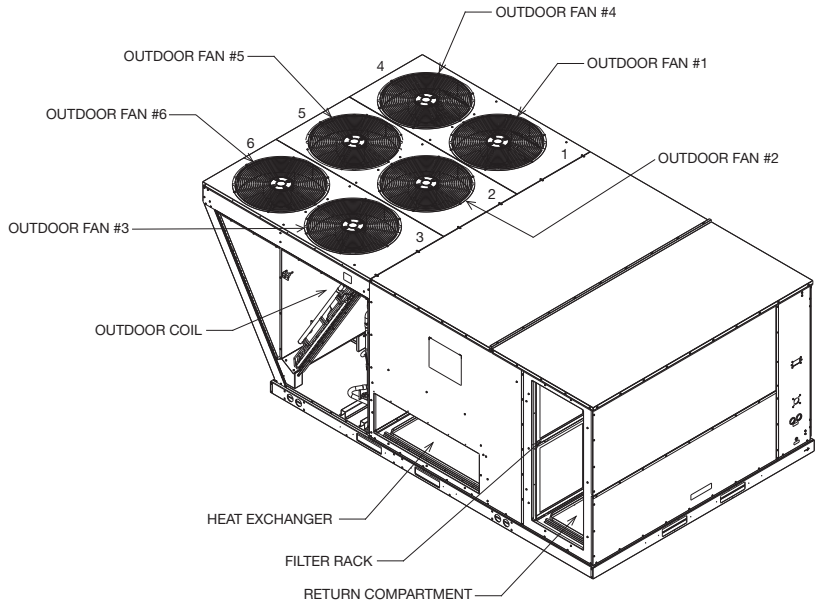
ST-A1125-08A

FIGURE 7
COMPONENT ACCESS
LOCATIONS & DIMENSIONS



ST-A1125-03

FIGURE 8
COMPONENT
LOCATIONS



ST-A1125-05

GENERAL DATA - RKNL

Model RKNL- Series	B180CL25E	B180CL35E	B180CM25E	B180CM35E
Cooling Performance[1]				Continued ->
Gross Cooling Capacity Btu [kW]	188,000 [55.08]	188,000 [55.08]	188,000 [55.08]	188,000 [55.08]
EER/SEER[2]	11.1/NA	11.1/NA	11.1/NA	11.1/NA
Nominal CFM/ARI Rated CFM [L/s]	6000/5900 [2831/2784]	6000/5900 [2831/2784]	6000/5900 [2831/2784]	6000/5900 [2831/2784]
ARI Net Cooling Capacity Btu [kW]	182,000 [53.33]	182,000 [53.33]	182,000 [53.33]	182,000 [53.33]
Net Sensible Capacity Btu [kW]	135,700 [39.76]	135,700 [39.76]	135,700 [39.76]	135,700 [39.76]
Net Latent Capacity Btu [kW]	46,300 [13.57]	46,300 [13.57]	46,300 [13.57]	46,300 [13.57]
Integrated Part Load Value[3]	13.4	13.4	13.4	13.4
Net System Power kW	16.35	16.35	16.35	16.35
Heating Performance (Gas)[4]				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	125,000/250,000 [36.62/73.25]	175,000/350,000 [51.27/102.55]	125,000/250,000 [36.62/73.25]	175,000/350,000 [51.27/102.55]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	101,500/203,000 [29.74/59.48]	142,000/284,000 [41.61/83.21]	101,500/203,000 [29.74/59.48]	142,000/284,000 [41.61/83.21]
Temperature Rise Range ºF [ºC]	15-45 [8.3/25]	30-60 [16.7/33.3]	15-45 [8.3/25]	30-60 [16.7/33.3]
Steady State Efficiency (%)	81	81	81	81
No. Burners	10	14	10	14
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]
Compressor				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[5]	91	91	91	91
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
MicroChannel Depth in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	1 / 22 [9]	1 / 22 [9]	1 / 22 [9]	1 / 22 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	2 / 18 [7]	2 / 18 [7]	2 / 18 [7]	2 / 18 [7]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	4/24 [609.6]	4/24 [609.6]	4/24 [609.6]	4/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	16000 [7550]	16000 [7550]	16000 [7550]	16000 [7550]
No. Motors/HP	4 at 1/3 HP	4 at 1/3 HP	4 at 1/3 HP	4 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	3	3	5	5
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	56	184	184
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	205/211 [5812/5982]	205/211 [5812/5982]	205/211 [5812/5982]	205/211 [5812/5982]
Weights				
Net Weight lbs. [kg]	1958 [888]	1971 [894]	1987 [901]	2000 [907]
Ship Weight lbs. [kg]	2058 [934]	2071 [939]	2087 [947]	2100 [953]

GENERAL DATA - RKNL

Model RKNL- Series	B180DL25E	B180DL35E	B180DM25E	B180DM35E
Cooling Performance[1]				Continued ->
Gross Cooling Capacity Btu [kW]	188,000 [55.08]	188,000 [55.08]	188,000 [55.08]	188,000 [55.08]
EER/SEER[2]	11.1/NA	11.1/NA	11.1/NA	11.1/NA
Nominal CFM/ARI Rated CFM [L/s]	6000/5900 [2831/2784]	6000/5900 [2831/2784]	6000/5900 [2831/2784]	6000/5900 [2831/2784]
ARI Net Cooling Capacity Btu [kW]	182,000 [53.33]	182,000 [53.33]	182,000 [53.33]	182,000 [53.33]
Net Sensible Capacity Btu [kW]	135,700 [39.76]	135,700 [39.76]	135,700 [39.76]	135,700 [39.76]
Net Latent Capacity Btu [kW]	46,300 [13.57]	46,300 [13.57]	46,300 [13.57]	46,300 [13.57]
Integrated Part Load Value[3]	13.4	13.4	13.4	13.4
Net System Power kW	16.35	16.35	16.35	16.35
Heating Performance (Gas)[4]				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	125,000/250,000 [36.62/73.25]	175,000/350,000 [51.27/102.55]	125,000/250,000 [36.62/73.25]	175,000/350,000 [51.27/102.55]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	101,500/203,000 [29.74/59.48]	142,000/284,000 [41.61/83.21]	101,500/203,000 [29.74/59.48]	142,000/284,000 [41.61/83.21]
Temperature Rise Range ºF [ºC]	15-45 [8.3/25]	30-60 [16.7/33.3]	15-45 [8.3/25]	30-60 [16.7/33.3]
Steady State Efficiency (%)	81	81	81	81
No. Burners	10	14	10	14
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]
Compressor				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[5]	91	91	91	91
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	1 / 22 [9]	1 / 22 [9]	1 / 22 [9]	1 / 22 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	2 / 18 [7]	2 / 18 [7]	2 / 18 [7]	2 / 18 [7]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	4/24 [609.6]	4/24 [609.6]	4/24 [609.6]	4/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	16000 [7550]	16000 [7550]	16000 [7550]	16000 [7550]
No. Motors/HP	4 at 1/3 HP	4 at 1/3 HP	4 at 1/3 HP	4 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	3	3	5	5
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	56	184	184
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	205/211 [5812/5982]	205/211 [5812/5982]	205/211 [5812/5982]	205/211 [5812/5982]
Weights				
Net Weight lbs. [kg]	1958 [888]	1971 [894]	1987 [901]	2000 [907]
Ship Weight lbs. [kg]	2058 [934]	2071 [939]	2087 [947]	2100 [953]

GENERAL DATA - RKNL

Model RKNL- Series	B180YL35E	B180YM35E	B240CL30E	B240CL40E
Cooling Performance[1]				Continued ->
Gross Cooling Capacity Btu [kW]	188,000 [55.08]	188,000 [55.08]	244,000 [71.49]	244,000 [71.49]
EER/SEER[2]	11.1/NA	11.1/NA	11.1/NA	11.1/NA
Nominal CFM/ARI Rated CFM [L/s]	6000/5900 [2831/2784]	6000/5900 [2831/2784]	8000/7725 [3775/3645]	8000/7725 [3775/3645]
ARI Net Cooling Capacity Btu [kW]	182,000 [53.33]	182,000 [53.33]	234,000 [68.56]	234,000 [68.56]
Net Sensible Capacity Btu [kW]	135,700 [39.76]	135,700 [39.76]	171,600 [50.28]	171,600 [50.28]
Net Latent Capacity Btu [kW]	46,300 [13.57]	46,300 [13.57]	62,400 [18.28]	62,400 [18.28]
Integrated Part Load Value[3]	13.4	13.4	12.2	12.2
Net System Power kW	16.35	16.35	21.04	21.04
Heating Performance (Gas)[4]				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	175,000/350,000 [51.27/102.55]	175,000/350,000 [51.27/102.55]	150,000/300,000 [43.95/87.9]	200,000/400,000 [58.6/117.2]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	142,000/284,000 [41.61/83.21]	142,000/284,000 [41.61/83.21]	121,500/243,000 [35.6/71.2]	162,000/324,000 [47.47/94.93]
Temperature Rise Range ºF [ºC]	30-60 [16.7/33.3]	30-60 [16.7/33.3]	15-45 [8.3/25]	25-55 [13.9/30.6]
Steady State Efficiency (%)	81	81	81	81
No. Burners	14	14	12	14
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]
Compressor				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[5]	91	91	91	91
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	1 / 22 [9]	1 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	2 / 18 [7]	2 / 18 [7]	3 / 13 [5]	3 / 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]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	4/24 [609.6]	4/24 [609.6]	6/24 [609.6]	6/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	16000 [7550]	16000 [7550]	19800 [9344]	19800 [9344]
No. Motors/HP	4 at 1/3 HP	4 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	3	5	5	5
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	184	184	184
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	205/211 [5812/5982]	205/211 [5812/5982]	402/331 [11397/9384]	402/331 [11397/9384]
Weights				
Net Weight lbs. [kg]	1986 [901]	2015 [914]	2289 [1038]	2303 [1045]
Ship Weight lbs. [kg]	2086 [946]	2115 [959]	2389 [1084]	2403 [1090]

GENERAL DATA - RKNL

Model RKNL- Series	B240CM30E	B240CM40E	B240CN30E	B240CN40E
Cooling Performance[1]				Continued ->
Gross Cooling Capacity Btu [kW]	244,000 [71.49]	244,000 [71.49]	244,000 [71.49]	244,000 [71.49]
EER/SEER[2]	11.1/NA	11.1/NA	11.1/NA	11.1/NA
Nominal CFM/ARI Rated CFM [L/s]	8000/7725 [3775/3645]	8000/7725 [3775/3645]	8000/7725 [3775/3645]	8000/7725 [3775/3645]
ARI Net Cooling Capacity Btu [kW]	234,000 [68.56]	234,000 [68.56]	234,000 [68.56]	234,000 [68.56]
Net Sensible Capacity Btu [kW]	171,600 [50.28]	171,600 [50.28]	171,600 [50.28]	171,600 [50.28]
Net Latent Capacity Btu [kW]	62,400 [18.28]	62,400 [18.28]	62,400 [18.28]	62,400 [18.28]
Integrated Part Load Value[3]	12.2	12.2	12.2	12.2
Net System Power kW	21.04	21.04	21.04	21.04
Heating Performance (Gas)[4]				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	150,000/300,000 [43.95/87.9]	200,000/400,000 [58.6/117.2]	150,000/300,000 [43.95/87.9]	200,000/400,000 [58.6/117.2]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	121,500/243,000 [35.6/71.2]	162,000/324,000 [47.47/94.93]	121,500/243,000 [35.6/71.2]	162,000/324,000 [47.47/94.93]
Temperature Rise Range ºF [ºC]	15-45 [8.3/25]	25-55 [13.9/30.6]	15-45 [8.3/25]	25-55 [13.9/30.6]
Steady State Efficiency (%)	81	81	81	81
No. Burners	12	14	12	14
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]
Compressor				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[5]	91	91	91	91
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	3 / 13 [5]	3 / 13 [5]	3 / 13 [5]	3 / 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]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	19800 [9344]	19800 [9344]	19800 [9344]	19800 [9344]
No. Motors/HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	7 1/2	7 1/2	7 1/2	7 1/2
Motor RPM	1725	1725	1725	1725
Motor Frame Size	213	213	213	213
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	402/331 [11397/9384]	402/331 [11397/9384]	402/331 [11397/9384]	402/331 [11397/9384]
Weights				
Net Weight lbs. [kg]	2327 [1056]	2341 [1062]	2325 [1055]	2340 [1061]
Ship Weight lbs. [kg]	2427 [1101]	2441 [1107]	2425 [1100]	2440 [1107]

GENERAL DATA - RKNL

Model RKNL- Series	B240DL30E	B240DL40E	B240DM30E	B240DM40E
Cooling Performance[1]				Continued ->
Gross Cooling Capacity Btu [kW]	244,000 [71.49]	244,000 [71.49]	244,000 [71.49]	244,000 [71.49]
EER/SEER[2]	11.1/NA	11.1/NA	11.1/NA	11.1/NA
Nominal CFM/ARI Rated CFM [L/s]	8000/7725 [3775/3645]	8000/7725 [3775/3645]	8000/7725 [3775/3645]	8000/7725 [3775/3645]
ARI Net Cooling Capacity Btu [kW]	234,000 [68.56]	234,000 [68.56]	234,000 [68.56]	234,000 [68.56]
Net Sensible Capacity Btu [kW]	171,600 [50.28]	171,600 [50.28]	171,600 [50.28]	171,600 [50.28]
Net Latent Capacity Btu [kW]	62,400 [18.28]	62,400 [18.28]	62,400 [18.28]	62,400 [18.28]
Integrated Part Load Value[3]	12.2	12.2	12.2	12.2
Net System Power kW	21.04	21.04	21.04	21.04
Heating Performance (Gas)[4]				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	150,000/300,000 [43.95/87.9]	200,000/400,000 [58.6/117.2]	150,000/300,000 [43.95/87.9]	200,000/400,000 [58.6/117.2]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	121,500/243,000 [35.6/71.2]	162,000/324,000 [47.47/94.93]	121,500/243,000 [35.6/71.2]	162,000/324,000 [47.47/94.93]
Temperature Rise Range ºF [ºC]	15-45 [8.3/25]	25-55 [13.9/30.6]	15-45 [8.3/25]	25-55 [13.9/30.6]
Steady State Efficiency (%)	81	81	81	81
No. Burners	12	14	12	14
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]
Compressor				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[5]	91	91	91	91
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	3 / 13 [5]	3 / 13 [5]	3 / 13 [5]	3 / 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]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	19800 [9344]	19800 [9344]	19800 [9344]	19800 [9344]
No. Motors/HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	5	5	7 1/2	7 1/2
Motor RPM	1725	1725	1725	1725
Motor Frame Size	184	184	184	213
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	402/331 [11397/9384]	402/331 [11397/9384]	402/331 [11397/9384]	402/331 [11397/9384]
Weights				
Net Weight lbs. [kg]	2289 [1038]	2303 [1045]	2327 [1056]	2341 [1062]
Ship Weight lbs. [kg]	2389 [1084]	2403 [1090]	2427 [1101]	2441 [1107]

GENERAL DATA - RKNL

Model RKNL- Series	B240DN30E	B240DN40E	B240YL40E	B240YM40E
Cooling Performance[1]				Continued ->
Gross Cooling Capacity Btu [kW]	244,000 [71.49]	244,000 [71.49]	244,000 [71.49]	244,000 [71.49]
EER/SEER[2]	11.1/NA	11.1/NA	11.1/NA	11.1/NA
Nominal CFM/ARI Rated CFM [L/s]	8000/7725 [3775/3645]	8000/7725 [3775/3645]	8000/7725 [3775/3645]	8000/7725 [3775/3645]
ARI Net Cooling Capacity Btu [kW]	234,000 [68.56]	234,000 [68.56]	234,000 [68.56]	234,000 [68.56]
Net Sensible Capacity Btu [kW]	171,600 [50.28]	171,600 [50.28]	171,600 [50.28]	171,600 [50.28]
Net Latent Capacity Btu [kW]	62,400 [18.28]	62,400 [18.28]	62,400 [18.28]	62,400 [18.28]
Integrated Part Load Value[3]	12.2	12.2	12.2	12.2
Net System Power kW	21.04	21.04	21.04	21.04
Heating Performance (Gas)[4]				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	150,000/300,000 [43.95/87.9]	200,000/400,000 [58.6/117.2]	200,000/400,000 [58.6/117.2]	200,000/400,000 [58.6/117.2]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	121,500/243,000 [35.6/71.2]	162,000/324,000 [47.47/94.93]	162,000/324,000 [47.47/94.93]	162,000/324,000 [47.47/94.93]
Temperature Rise Range ºF [ºC]	15-45 [8.3/25]	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	12	14	14	14
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]
Compressor				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[5]	91	91	91	91
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	3 / 13 [5]	3 / 13 [5]	3 / 13 [5]	3 / 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]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	19800 [9344]	19800 [9344]	19800 [9344]	19800 [9344]
No. Motors/HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	7 1/2	7 1/2	5	7 1/2
Motor RPM	1725	1725	1725	1725
Motor Frame Size	184	213	184	213
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	402/331 [11397/9384]	402/331 [11397/9384]	402/331 [11397/9384]	402/331 [11397/9384]
Weights				
Net Weight lbs. [kg]	2325 [1055]	2340 [1061]	2323 [1054]	2361 [1071]
Ship Weight lbs. [kg]	2425 [1100]	2440 [1107]	2423 [1099]	2461 [1116]

GENERAL DATA - RKNL

Model RKNL- Series	B240YN40E	B300CL30E	B300CL40E	B300CM30E
Cooling Performance[1]				Continued ->
Gross Cooling Capacity Btu [kW]	244,000 [71.49]	312,000 [91.42]	312,000 [91.42]	312,000 [91.42]
EER/SEER[2]	11.1/NA	10/NA	10/NA	10/NA
Nominal CFM/ARI Rated CFM [L/s]	8000/7725 [3775/3645]	10000/9475 [4719/4471]	10000/9475 [4719/4471]	10000/9475 [4719/4471]
ARI Net Cooling Capacity Btu [kW]	234,000 [68.56]	294,000 [86.14]	294,000 [86.14]	294,000 [86.14]
Net Sensible Capacity Btu [kW]	171,600 [50.28]	214,100 [62.73]	214,100 [62.73]	214,100 [62.73]
Net Latent Capacity Btu [kW]	62,400 [18.28]	79,900 [23.41]	79,900 [23.41]	79,900 [23.41]
Integrated Part Load Value[3]	12.2	11.1	11.1	11.1
Net System Power kW	21.04	29.39	29.39	29.39
Heating Performance (Gas)[4]				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	200,000/400,000 [58.6/117.2]	150,000/300,000 [43.95/87.9]	200,000/400,000 [58.6/117.2]	150,000/300,000 [43.95/87.9]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	162,000/324,000 [47.47/94.93]	121,500/243,000 [35.6/71.2]	162,000/324,000 [47.47/94.93]	121,500/243,000 [35.6/71.2]
Temperature Rise Range ºF [ºC]	25-55 [13.9/30.6]	10-40 [5.6/22.2]	15-45 [8.3/25]	10-40 [5.6/22.2]
Steady State Efficiency (%)	81	81	81	81
No. Burners	14	12	14	12
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]
Compressor				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[5]	91	92	92	92
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	3 / 13 [5]	4 / 15 [6]	4 / 15 [6]	4 / 15 [6]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	19800 [9344]	19800 [9344]	19800 [9344]	19800 [9344]
No. Motors/HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	7 1/2	7 1/2	7 1/2	10
Motor RPM	1725	1725	1725	1725
Motor Frame Size	213	213	213	215
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	402/331 [11397/9384]	339/357 [9611/10121]	339/357 [9611/10121]	339/357 [9611/10121]
Weights				
Net Weight lbs. [kg]	2360 [1070]	2388 [1083]	2402 [1090]	2399 [1088]
Ship Weight lbs. [kg]	2460 [1116]	2488 [1129]	2502 [1135]	2499 [1134]

GENERAL DATA - RKNL

Model RKNL- Series	B300CM40E	B300DL30E	B300DL40E	B300DM30E
Cooling Performance[1]				Continued ->
Gross Cooling Capacity Btu [kW]	312,000 [91.42]	312,000 [91.42]	312,000 [91.42]	312,000 [91.42]
EER/SEER[2]	10/NA	10/NA	10/NA	10/NA
Nominal CFM/ARI Rated CFM [L/s]	10000/9475 [4719/4471]	10000/9475 [4719/4471]	10000/9475 [4719/4471]	10000/9475 [4719/4471]
ARI Net Cooling Capacity Btu [kW]	294,000 [86.14]	294,000 [86.14]	294,000 [86.14]	294,000 [86.14]
Net Sensible Capacity Btu [kW]	214,100 [62.73]	214,100 [62.73]	214,100 [62.73]	214,100 [62.73]
Net Latent Capacity Btu [kW]	79,900 [23.41]	79,900 [23.41]	79,900 [23.41]	79,900 [23.41]
Integrated Part Load Value[3]	11.1	11.1	11.1	11.1
Net System Power kW	29.39	29.39	29.39	29.39
Heating Performance (Gas)[4]				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	200,000/400,000 [58.6/117.2]	150,000/300,000 [43.95/87.9]	200,000/400,000 [58.6/117.2]	150,000/300,000 [43.95/87.9]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	162,000/324,000 [47.47/94.93]	121,500/243,000 [35.6/71.2]	162,000/324,000 [47.47/94.93]	121,500/243,000 [35.6/71.2]
Temperature Rise Range ºF [ºC]	15-45 [8.3/25]	10-40 [5.6/22.2]	15-45 [8.3/25]	10-40 [5.6/22.2]
Steady State Efficiency (%)	81	81	81	81
No. Burners	14	12	14	12
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]
Compressor				
No./Type	2/Scroll	2/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[5]	92	92	92	92
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	4 / 15 [6]	4 / 15 [6]	4 / 15 [6]	4 / 15 [6]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	19800 [9344]	19800 [9344]	19800 [9344]	19800 [9344]
No. Motors/HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	10	7 1/2	7 1/2	10
Motor RPM	1725	1725	1725	1725
Motor Frame Size	215	213	213	215
Filter - Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	339/357 [9611/10121]	339/357 [9611/10121]	339/357 [9611/10121]	339/357 [9611/10121]
Weights				
Net Weight lbs. [kg]	2413 [1095]	2388 [1083]	2402 [1090]	2399 [1088]
Ship Weight lbs. [kg]	2513 [1140]	2488 [1129]	2502 [1135]	2499 [1134]

GENERAL DATA - RKNL

Model RKNL- Series	B300DM40E	B300YL40E	B300YM40E
Cooling Performance[1]			
Gross Cooling Capacity Btu [kW]	312,000 [91.42]	312,000 [91.42]	312,000 [91.42]
EER/SEER[2]	10/NA	10/NA	10/NA
Nominal CFM/ARI Rated CFM [L/s]	10000/9475 [4719/4471]	10000/9475 [4719/4471]	10000/9475 [4719/4471]
ARI Net Cooling Capacity Btu [kW]	294,000 [86.14]	294,000 [86.14]	294,000 [86.14]
Net Sensible Capacity Btu [kW]	214,100 [62.73]	214,100 [62.73]	214,100 [62.73]
Net Latent Capacity Btu [kW]	79,900 [23.41]	79,900 [23.41]	79,900 [23.41]
Integrated Part Load Value[3]	11.1	11.1	11.1
Net System Power kW	29.39	29.39	29.39
Heating Performance (Gas)[4]			
Heating Input Btu [kW] (1st Stage / 2nd Stage)	200,000/400,000 [58.6/117.2]	200,000/400,000 [58.6/117.2]	200,000/400,000 [58.6/117.2]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	162,000/324,000 [47.47/94.93]	162,000/324,000 [47.47/94.93]	162,000/324,000 [47.47/94.93]
Temperature Rise Range ºF [ºC]	15-45 [8.3/25]	15-45 [8.3/25]	15-45 [8.3/25]
Steady State Efficiency (%)	81	81	81
No. Burners	14	14	14
No. Stages	2	2	2
Gas Connection Pipe Size in. [mm]	0.75 [19]	0.75 [19]	0.75 [19]
Compressor			
No./Type	2/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)[5]	92	92	92
Outdoor Coil - Fin Type	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	53.3 [4.95]	53.3 [4.95]	53.3 [4.95]
Rows / FPI [FPcm]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Indoor Coil - Fin Type	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.67 [2.48]	26.67 [2.48]	26.67 [2.48]
Rows / FPI [FPcm]	4 / 15 [6]	4 / 15 [6]	4 / 15 [6]
Refrigerant Control	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan - Type	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	6/24 [609.6]	6/24 [609.6]	6/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
CFM [L/s]	19800 [9344]	19800 [9344]	19800 [9344]
No. Motors/HP	6 at 1/3 HP	6 at 1/3 HP	6 at 1/3 HP
Motor RPM	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]	2/18x9 [457x229]	2/18x9 [457x229]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1
Motor HP	10	7 1/2	10
Motor RPM	1725	1725	1725
Motor Frame Size	215	213	215
Filter - Type	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	339/357 [9611/10121]	339/357 [9611/10121]	339/357 [9611/10121]
Weights			
Net Weight lbs. [kg]	2413 [1095]	2422 [1099]	2433 [1104]
Ship Weight lbs. [kg]	2513 [1140]	2522 [1144]	2533 [1149]

II. INSTALLATION

A. GENERAL

1. INSTALLATION — Install this unit in accordance with The American National Standard Z223.1-latest edition booklet entitled “National Fuel Gas Code,” and the requirements or codes of the local utility or other authority having jurisdiction.

   Additional helpful publications available from the “National Fire Protection Association” are: NFPA-90A - Installation of Air Conditioning and Ventilating Systems 1985 or latest edition. NFPA-90B - Warm Air Heating and Air Conditioning Systems 1984.

   These publications are available from:

   National Fire Protection
   Association, Inc.
   1 Batterymarch Park
   Quincy, MA 02269-7471
   www.nfpa.org

2. PRE-INSTALLATION CHECK-POINTS — Before attempting any installation, carefully consider the following points:

   Structural strength of supporting members
   (Rooftop Installation)
   Clearances and provision for servicing
   Power supply and wiring
   Gas supply and piping
   Air duct connections and sizing
   Drain facilities and connections
   Location for minimum noise and
   vibration - away from bedroom
   windows

IMPORTANT: Before operating unit, remove compressor shipping supports from the compressor base. Failure to remove supports will cause noise and vibration.

LOCATION CONSIDERATIONS

The metal parts of this unit may be subject to rust or deterioration in adverse environmental conditions. This oxidation could shorten the equipment’s useful life. Salt spray, fog or mist in seacoast areas, sulphur or chlorine from lawn watering systems, and various chemical contaminants from industries such as paper mills and petroleum refineries are especially corrosive.

If the unit is to be installed in an area where contaminants are likely to be a problem, give special attention to the equipment location and exposure.

1. Avoid having lawn sprinkler heads spray directly on the unit cabinet.
2. In coastal areas locate the unit on the side of the building away from the waterfront.
3. Shielding by a fence or shrubs may give some protection.
4. Frequent washing of the cabinet, fan blade and coil with fresh water will remove most of the salt or other contaminants that build up on the unit.
5. Regular cleaning and waxing of the cabinet with an automobile polish will provide some protection.
6. A liquid cleaner may be used several times a year to remove matter that will not wash off with water.

Several different types of protective coatings are offered in some areas. These coatings may provide some benefit, but the effectiveness of such coating materials cannot be verified by the equipment manufacturer.

The best protection is frequent cleaning, maintenance and minimal exposure to contaminants.

⚠ WARNING

DISCONNECT ALL POWER TO UNIT BEFORE STARTING MAINTENANCE. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH. REGULAR MAINTENANCE WILL REDUCE THE BUILDUP OF CONTAMINANTS AND HELP TO PROTECT THE UNIT’S FINISH.

⚠ WARNING

THESE UNITS ARE DESIGNED CERTIFIED FOR OUTDOOR INSTALLATION ONLY. INSTALLATION INSIDE ANY PART OF A STRUCTURE CAN RESULT IN INADEQUATE UNIT PERFORMANCE AS WELL AS PROPERTY DAMAGE. INSTALLATION INSIDE CAN ALSO CAUSE RECIRCULATION OF FLUE PRODUCTS INTO THE CONDITIONED SPACE RESULTING IN PERSONAL INJURY OR DEATH.

B. OUTSIDE INSTALLATION

(Typical outdoor slab installation is shown in Figure 9.)

1. Select a location where external water drainage cannot collect around unit.
2. Provide a level slab sufficiently high enough above grade to prevent surface water from entering the unit
3. Locate the unit to provide proper access for inspection and servicing as shown in Figure 12.
4. Locate unit where operating sounds will not disturb owner or neighbors.
5. Locate unit so roof runoff water does not pour directly on the unit. Provide gutter or other shielding at roof level. Do not locate unit in an area where excessive snow drifting may occur or accumulate.
6. Where snowfall is anticipated, the height of the unit above the ground level must be considered. Mount unit high enough to be above anticipated maximum area snowfall and to allow combustion air to enter the combustion air inlet.
7. Select an area which will keep the areas of the vent, air intake, and A/C condenser fins free and clear of obstructions such as weeds, shrubs, vines, snow, etc. Inform the user accordingly.

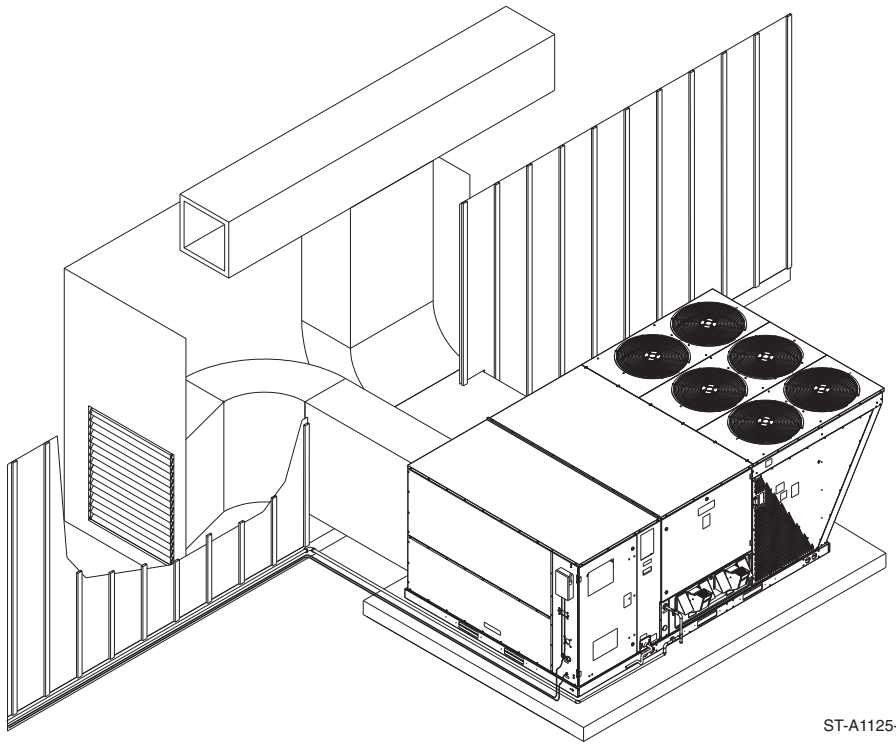
C. ATTACHING EXHAUST AND COMBUSTION AIR INLET HOODS

IMPORTANT: Do not operate this unit without the exhaust/combustion air inlet hood properly installed. These hoods are shipped in cartons in the blower compartment inside the unit and must be attached when the unit is installed. See Figure 4.

To attach exhaust/combustion air inlet hood:

1. Open blower access panel. For location of blower access panel, see Figure 3.
2. Remove exhaust/combustion air inlet hoods from the cartons, located inside the blower compartment.
3. Attach blower access panel.
4. Attach the combustion air inlet/exhaust hoods with screws. Reference Figure 4 for proper location. Screws are in carton with the hood.
5. Vent the unit using the flue exhaust hood, as supplied from the factory, without alteration or addition.

FIGURE 9
OUTSIDE SLAB INSTALLATION. CLOSET DISTRIBUTION SYSTEM. SLAB FLOOR CONSTRUCTION



D. COVER PANEL INSTALLATION / CONVERSION PROCEDURE

DOWNFLOW TO HORIZONTAL

1. Remove the screws and covers from the outside of the supply and return sections. See Figure 7.
2. Install the covers over the bottom supply and return openings, painted side up, inserting the ***leading flange under the bracket provided.*** Place the ***back flange to top of the front bracket provided.*** See Figures 10 and 11.
3. Secure the return and supply cover to front bracket with two (2) screws.

E. FILTER REPLACEMENT

This unit is provided with 8 – 20" X 25" x 2" disposable filters. When replacing filters, ensure they are inserted fully to the back to prevent bypass. See Figure 5.

Recommended supplier of this filter is Glassfloss Industries, Inc. or

AAF International
215 Central Avenue
P.O. Box 35690
Louisville, KY 40232
Phone: 1-800-501-3146
Part #: 54-42541-04 (20" x 25" x 2")

FIGURE 10
HORIZONTAL CONVERSION DETAIL

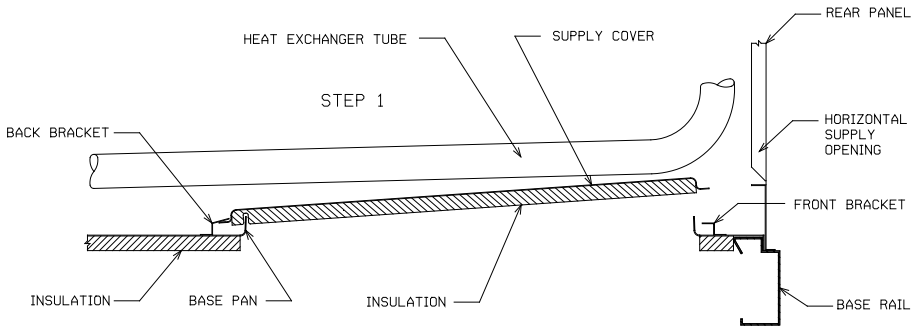
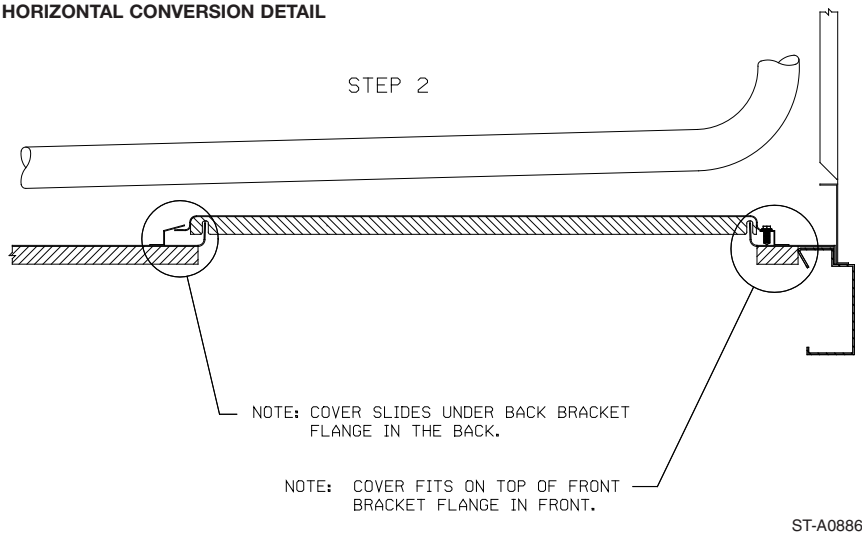


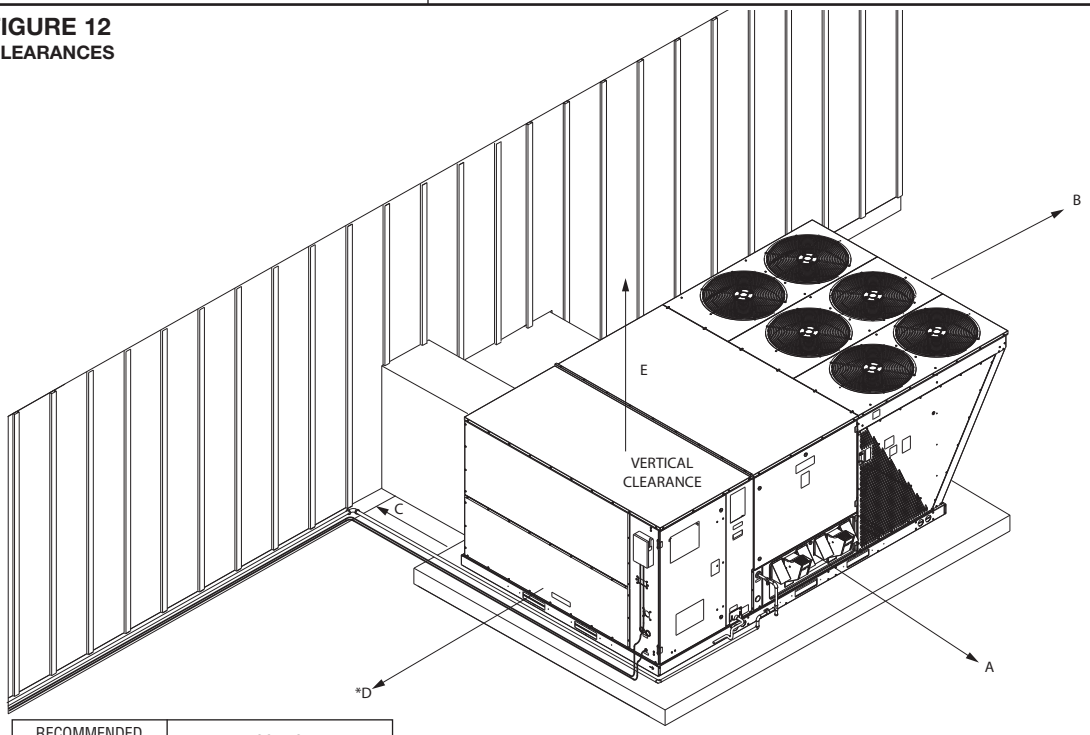
FIGURE 11
HORIZONTAL CONVERSION DETAIL



E. CLEARANCES

The following minimum clearances must be observed for proper unit performance and serviceability. Reference Figure 12.

FIGURE 12
CLEARANCES



RECOMMENDED CLEARANCE	LOCATION
80"	A – FRONT
18"	B – CONDENSER COIL
18"/42"	+C – DUCT SIDE
18"/48"	*D – EVAPORATOR END
18"	E – ABOVE
* WITHOUT ECONOMIZER/48" WITH ECONOMIZER	

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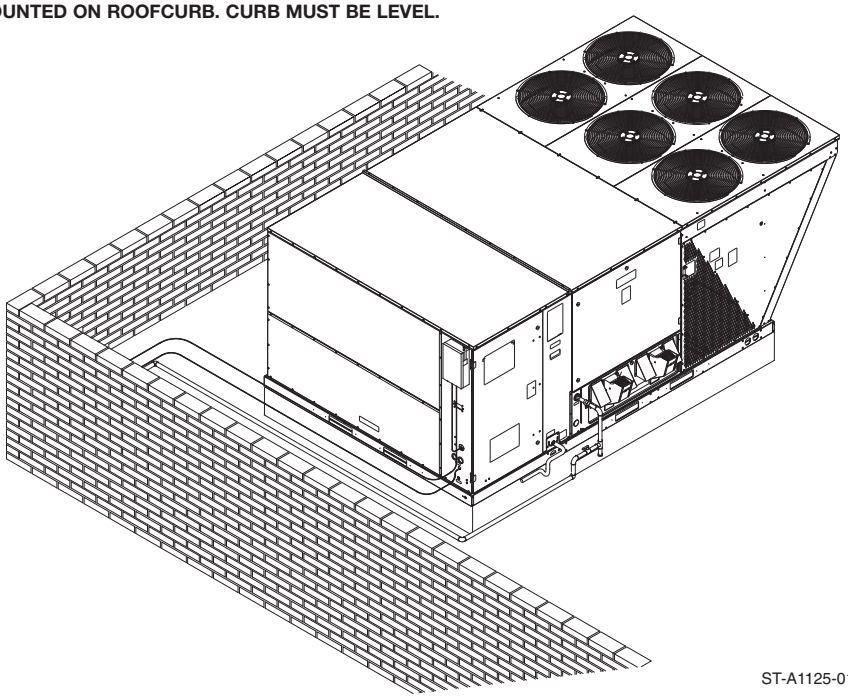
+ WITHOUT HORIZONTAL ECONOMIZER/42" WITH HORIZONTAL ECONOMIZER

FIGURE 13A
FLAT ROOFTOP INSTALLATION, ATTIC OR DROP CEILING DISTRIBUTING SYSTEM. MOUNTED ON ROOFCURB. CURB MUST BE LEVEL.



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G. ROOFTOP INSTALLATION

1. Before locating the unit on the roof, make sure that the roof structure is adequate to support the weight involved. (See Electrical & Physical Tables in this manual.) **THIS IS VERY IMPORTANT AND THE INSTALLER'S RESPONSIBILITY.**
2. For rigging and roofcurb details, see Figures 14, 15 and 16.
3. The location of the unit on the roof should be such as to provide proper access for inspection and servicing.

IMPORTANT: *If unit will not be put into service immediately, block off supply and return air openings to prevent excessive condensation.*

H. DUCTING

The installing contractor should fabricate ductwork in accordance with local codes. Use industry manuals as a guide when sizing and designing the duct system. Contact Air Conditioning Contractors of America, 2800 Shirlington Road, Suite 300, Arlington, VA 22206, http:/www.acca.org.

Place the unit as close to the conditioned space as possible allowing clearances as indicated. Run ducts as directly as possible to supply and return outlets. Use of non-flammable weatherproof flexible connectors on both supply and return connections at unit to reduce noise transmission is recommended.

On ductwork exposed to outside temperature and humidity, use a minimum of 2" of insulation and a vapor barrier. Distribution system in attic, furred space or crawl space should be insulated with at least 2" of insulation. ½" to 1" thick insulation is usually sufficient for ductwork inside the air conditioned space.

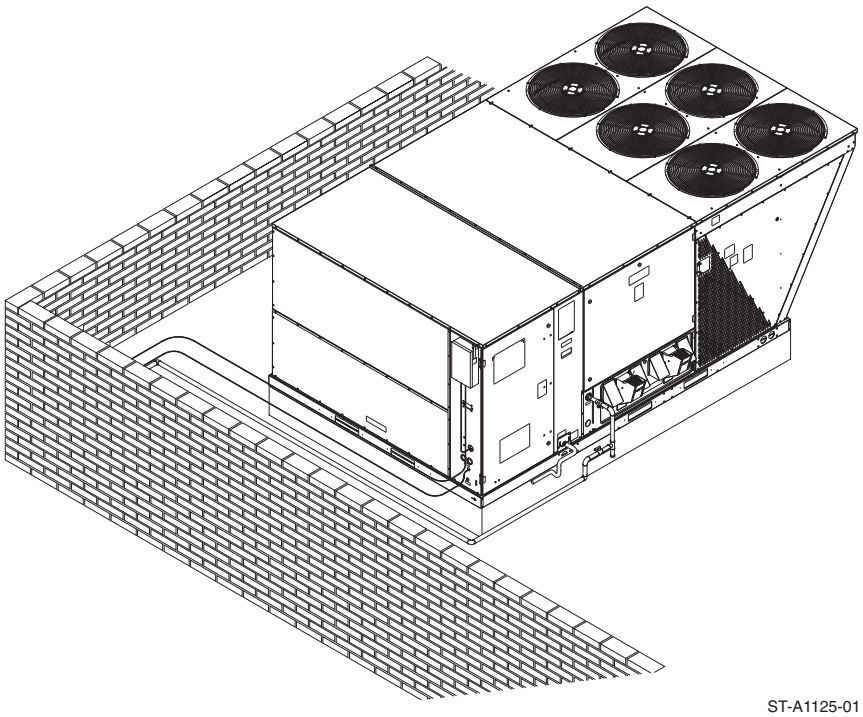
Provide balancing dampers for each branch duct in the supply system. Properly support ductwork from the structure.

IMPORTANT: In the event that the return air ducts must be run through an "unconfined" space containing other fuel burning equipment, it is imperative that the user/building owner must be informed against future changes in construction which might change this to a "confined space." Also, caution the user/building owner against any future installation of additional equipment (such as power ventilators, clothes dryers, etc.), within the existing unconfined and/or confined space which might create a negative pressure within the vicinity of other solid, liquid, or gas fueled appliances.

⚠ WARNING

DO NOT, UNDER ANY CIRCUMSTANCES, CONNECT RETURN DUCTWORK TO ANY OTHER HEAT PRODUCING DEVICE SUCH AS FIREPLACE INSERT, STOVE, ETC. UNAUTHORIZED USE OF SUCH DEVICES MAY RESULT IN FIRE, CARBON MONOXIDE POISONING, EXPLOSION, PERSONAL INJURY, PROPERTY DAMAGE OR DEATH.

FIGURE 13B
FLAT ROOFTOP INSTALLATION, ATTIC OR DROP CEILING DISTRIBUTING SYSTEM. MOUNTED ON ROOFCURB. CURB MUST BE LEVEL.



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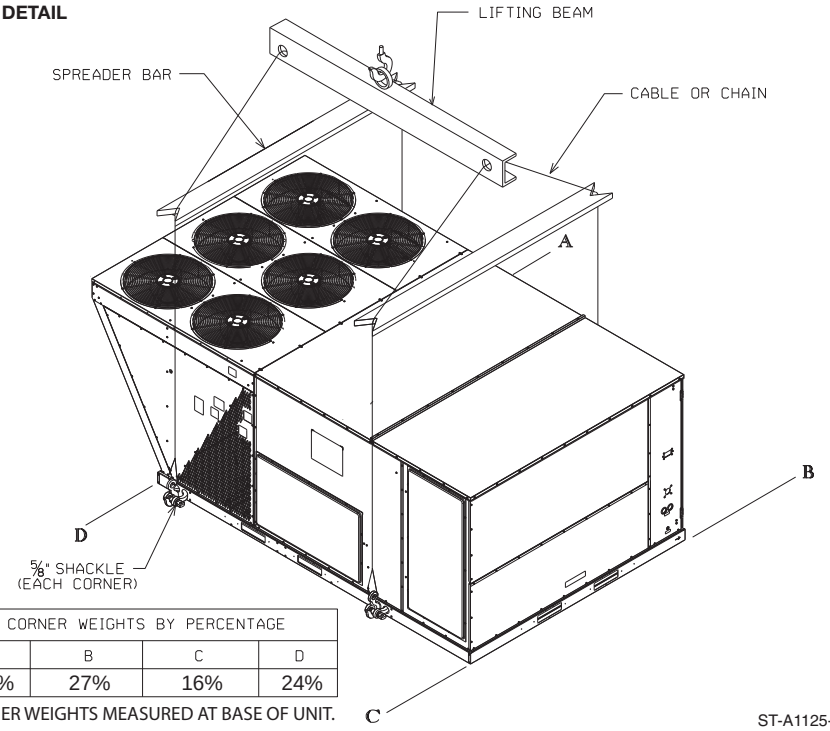
RETURN AIR

⚠ WARNING

NEVER ALLOW PRODUCTS OF COMBUSTION OR THE FLUE PRODUCTS TO ENTER THE RETURN AIR DUCTWORK, OR THE CIRCULATING AIR SUPPLY. ALL RETURN DUCTWORK MUST BE ADEQUATELY SEALED AND SECURED TO THE FURNACE WITH SHEET METAL SCREWS, AND JOINTS TAPED. ALL OTHER DUCT JOINTS MUST BE SECURED WITH APPROVED CONNECTIONS AND SEALED AIRTIGHT.

FAILURE TO PREVENT PRODUCTS OF COMBUSTION FROM BEING CIRCULATED INTO THE LIVING SPACE CAN CREATE POTENTIALLY HAZARDOUS CONDITIONS, INCLUDING CARBON MONOXIDE POISONING THAT COULD RESULT IN PERSONAL INJURY OR DEATH.

FIGURE 14
LIFTING DETAIL



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

CORNER WEIGHTS MEASURED AT BASE OF UNIT.

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FIGURE 15
ROOFCURB

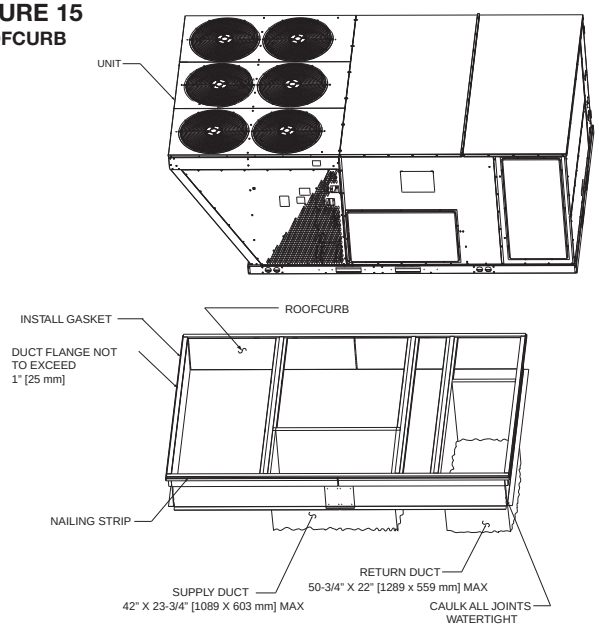

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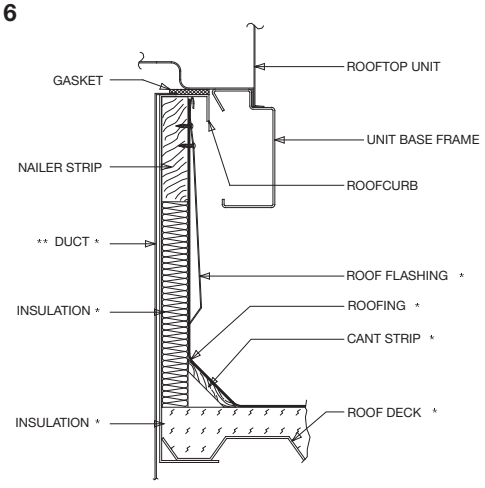
FIGURE 16
ROOFCURB



* 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.

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III. GAS SUPPLY, CONDENSATE DRAIN AND PIPING

A. GAS CONNECTION

IMPORTANT: Connect this unit only to gas supplied by a commercial utility.

1. Install gas piping in accordance with local codes and regulations of the local utility company. In the absence of local codes, the installation must conform to the specifications of the National Fuel Gas Code, ANSI Z223.1 - latest edition.

   NOTE: The use of flexible gas connectors is not permitted.

2. Connect the gas line to the gas valve supplied with unit. Routing can be through the gas pipe opening shown in Figures 9 or through the base as shown in Figure 21.
3. Size the gas line to the furnace adequate enough to prevent undue pressure drop. Do not use less than 1/2" pipes.
4. Install a drip leg or sediment trap in the gas supply line as close to the unit as possible.
5. Install an outside ground joint union to connect the gas supply to the control assembly at the burner tray.
6. Gas valves have been factory installed. Install a manual gas valve where local codes specify a shut-off valve outside the unit casing. (See Figure 17 and Figure 21.)
7. Make sure piping is tight. **A pipe compound resistant to the action of liquefied petroleum gases must be used at all threaded pipe connections.**
8. IMPORTANT: any additions, changes or conversions required for the furnace to satisfactorily meet the application should be made by a qualified installer, service agency or the gas supplier, using factory-specified or approved parts. In the commonwealth of Massachusetts, installation must be performed by a licensed plumber or gas fitter for appropriate fuel.

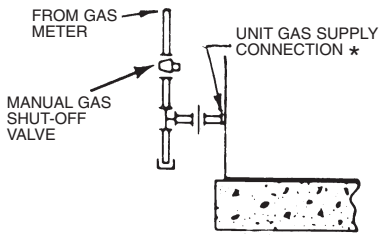
TABLE 1
GAS PIPE CAPACITY TABLE (CU. FT./HR. NATURAL GAS @ 0.30 IWC [INCHES OF WATER COLUMN] PRESSURE DROP)

Nominal Iron Pipe Size, Inches	Equivalent Length of Pipe, Feet							
	10	20	30	40	50	60	70	80
½	132	92	73	63	56	50	46	43
¾	278	190	152	130	115	105	96	90
1	520	350	285	245	215	195	180	170
1¼	1,050	730	590	500	440	400	370	350
1½	1,600	1,100	890	760	670	610	560	530

IMPORTANT: *Disconnect the furnace and its individual shutoff valve from the gas supply piping during any pressure testing of that system at test pressures in excess of 1/2 pound per square inch gauge or isolate the system from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of this gas supply system at pressures equal to or less than 1/2 PSIG.*

FIGURE 17
SUGGESTED GAS PIPING

ROOF OR GROUND LEVEL INSTALLATION



*Factory supplied grommet must be utilized.

⚠ WARNING

DO NOT USE AN OPEN FLAME TO CHECK FOR LEAKS. THE USE OF AN OPEN FLAME CAN RESULT IN FIRE, EXPLOSION, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

TO CHECK FOR GAS LEAKS, USE A SOAP AND WATER SOLUTION OR OTHER APPROVED METHOD. DO NOT USE AN OPEN FLAME.

IMPORTANT: *Check the rating plate to make certain the appliance is equipped to burn the type of gas supplied. Care should be taken after installation of this equipment that the gas control valve not be subjected to high gas supply line pressure.*

In making gas connections, avoid strains as they may damage the gas controls. A backup wrench is required to be used on the valve to avoid damage. Do not overtighten the connection.

The capacities of gas pipe of different diameters and lengths in cu. ft. per hr. with pressure drop of 0.3 in. and specific gravity of 0.60 (natural gas) are shown in Table 1.

After determining the pipe length, select the pipe size which will provide the minimum cubic feet per hour required for the gas input rating of the furnace. By formula:

$$\text{Cu. Ft. Per Hr. Required} = \frac{\text{Gas Input of Furnace (BTU/HR)}}{\text{Heating Value of Gas (BTU/FT}^3\text{)}}$$

The gas input of the furnace is marked on the furnace rating plate. The heating value of the gas (BTU/FT^3) may be determined by consulting the local natural gas utility or the L.P. gas supplier.

B. LP CONVERSION

⚠ WARNING

THIS UNIT IS EQUIPPED AT THE FACTORY FOR USE ON NATURAL GAS ONLY. CONVERSION TO LP GAS REQUIRES A SPECIAL KIT SUPPLIED BY THE DISTRIBUTOR OR MANUFACTURER. MAILING ADDRESSES ARE LISTED ON THE FURNACE RATING PLATE, PARTS LIST AND WARRANTY. FAILURE TO USE THE PROPER CONVERSION KIT CAN CAUSE FIRE, CARBON MONOXIDE POISONING, EXPLOSION, PERSONAL INJURY, PROPERTY DAMAGE OR DEATH.

Convert the unit to use liquefied petroleum (LP) gas by replacing with the stem/spring assembly supplied in the conversion kit. The LP gas valve maintains the proper manifold pressure for LP gas. The correct burner LP orifices are included in the kit.

See Figure 18A for component locations.

NOTE: Order the correct LP conversion kit from the furnace manufacturer. ***See Conversion Kit Index shipped with unit for proper LP kit number. Furnace conversion to LP gas must be performed by a qualified technician.***

FIGURE 18A
HEAT EXCHANGER COMPONENT IDENTIFICATION

BTUH	NO. OF INDUCERS	NO. OF PRESSURE SWTICHES	NO. OF TUBES	NO. OF BURNERS
250,000	2	2	10	10
300,000	3	3	12	12
350,000	3	3	14	14
400,000	4	4	14	14

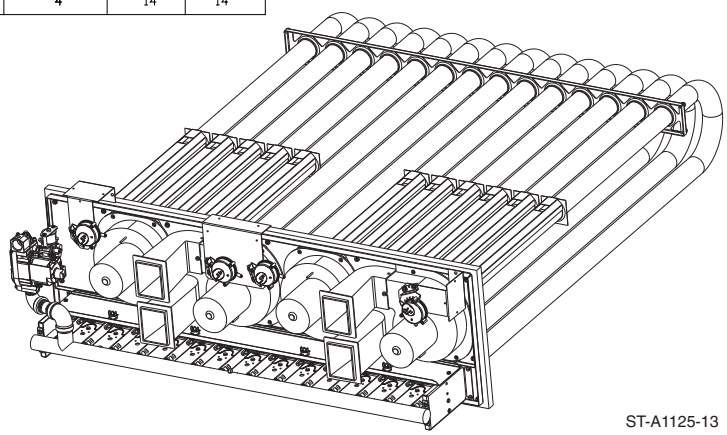


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FIGURE 18B
HONEYWELL VR8305Q4120 TWO STAGE GAS VALVE

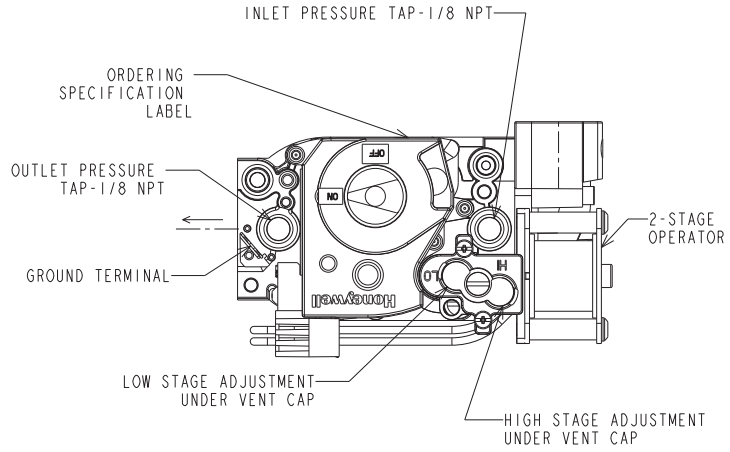


TABLE 2
LP GAS PIPE CAPACITY TABLE (CU. FT./HR.)

Maximum capacity of pipe in thousands of BTU per hour of undiluted liquefied petroleum gases (at 11 inches water column inlet pressure).
(Based on a Pressure Drop of 0.5 Inch Water Column)

Nominal Iron Pipe Size, Inches	Length of Pipe, Feet											
	10	20	30	40	50	60	70	80	90	100	125	150
1/2	275	189	152	129	114	103	96	89	83	78	69	63
3/4	567	393	315	267	237	217	196	182	173	162	146	132
1	1,071	732	590	504	448	409	378	346	322	307	275	252
1-1/4	2,205	1,496	1,212	1,039	913	834	771	724	677	630	567	511
1-1/2	3,307	2,299	1,858	1,559	1,417	1,275	1,181	1,086	1,023	976	866	787
2	6,221	4,331	3,465	2,992	2,646	2,394	2,205	2,047	1,921	1,811	1,606	1,496

Example (LP): Input BTU requirement of unit, 150,000
Equivalent length of pipe, 60 ft. = 3/4" IPS required.

C. ADJUSTING OR CHECKING FURNACE INPUT

– Natural Gas Line Pressure 5" - 10.5" W.C.
– LP Gas Line Pressure 11" - 13" W.C.

– Natural Gas Manifold Pressure 3.5" W.C
– LP Gas Manifold Pressure - 10" W.C.

Supply and manifold pressure taps are located on the gas valve body 1/8" N.P.T. and on the manifold. See Figure 18B.

Use a properly calibrated manometer gauge for accurate gas pressure readings.

Only small variations in the gas flow should be made by means of the pressure regulator adjustment. Furnaces functioning on LP gas must be set by means of the tank or branch supply regulators. The furnace manifold pressure should be set at 10" W.C. at the gas control valve.

To adjust the pressure regulator, remove the regulator vent cover and turn the adjustment screw clockwise to increase pressure or counterclockwise to decrease pressure. See Figure 18B. **Then replace the regulator vent cover securely.**

Any necessary major changes in the gas flow rate should be made by changing the size of the burner orifices. To change orifice spuds, shut off the manual main gas valve and remove the gas manifold.

For elevations up to 2,000 feet, rating plate input ratings apply. For high altitudes (elevations over 2,000 ft.), see conversion kit index 92-21519-XX for derating and orifice spud sizes.

Check of input is important to prevent over-firing of the furnace beyond its design-rated input. NEVER SET INPUT ABOVE THAT SHOWN ON THE RATING PLATE. Use the following table or formula to determine input rate.

$$\text{Cu. Ft. Per Hr. Required} = \frac{\text{Heating Value of Gas (BTU/Cu. Ft.) x 3600}}{\text{Time in Seconds (for 1 Cu. Ft.) of Gas}}$$

Start the furnace and measure the time required to burn one cubic foot of gas. Prior to checking the furnace input, make certain that all other gas appliances are shut off, with the exception of pilot burners. Time the meter with only the furnace in operation.

IMPORTANT NOTE FOR ALTITUDES ABOVE 2,000 FEET (610 METERS): The main burner orifices in your furnace and in these kits are sized for the nameplate input and intended for installations at elevations up to 2,000 feet in the USA or Canada, or for elevations of 2,000 - 4,500 feet (610 -1,373 meters) in Canada if the unit has been derated at the factory. For elevations above 2,000 feet (610 meters) **IN THE USA ONLY** (see ANSI-Z223.1), the burner orifices must be sized to reduce the input 4% for each 1,000 feet (305 meters) above sea level.

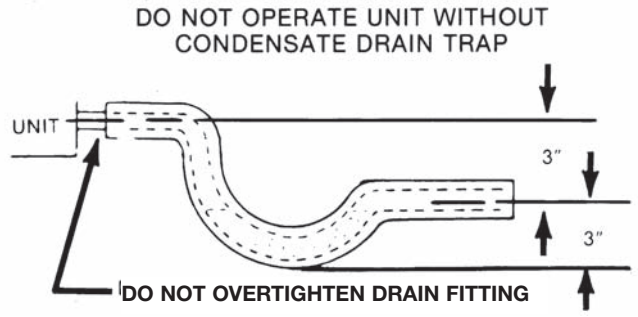
NOTICE: DERATING OF THE HEATING INPUT FOR HIGH ALTITUDE IN THE FIELD IS UNLAWFUL IN CANADA (REFER TO CAN/CGA 2.17). UNITS INSTALLED IN ALTITUDES GREATER THAN 2,000 FEET (610 METERS) MUST BE SHIPPED FROM THE FACTORY OR FROM A FACTORY AUTHORIZED CONVERSION STATION WITH THE HEATING INPUT DERATED BY 10% SO AS TO OPERATE PROPERLY IN ALTITUDES FROM 2,000 - 4,500 FEET (610 - 1,373 METERS).

TABLE 3

METER TIME IN MINUTES AND SECONDS FOR NORMAL INPUT RATING OF FURNACES EQUIPPED FOR NATURAL OR LP GAS

INPUT BTU/HR	METER SIZE CU. FT.	HEATING VALUE OF GAS BTU PER CU. FT.									
		900		1000		1040		1100		2500	
		MIN.	SEC.	MIN.	SEC.	MIN.	SEC.	MIN.	SEC.	MIN.	SEC.
250,000	ONE		13.0		14.4		15.0		15.8		36.0
	TEN	2	10	2	24	2	30	2	38	6	0
300,000	ONE		10.8		12.0		12.5		13.2		30.0
	TEN	1	48	2	0	2	5	2	12	5	0
350,000	ONE		9.3		10.3		10.7		1.3		25.7
	TEN	1	33	1	43	1	47	1	53	4	17
400,000	ONE		8.1		9.0		9.36		9.9		22.5
	TEN	1	21	1	30	1	36	1	39	3	45

FIGURE 19
CONDENSATE DRAIN



D. CONDENSATE DRAIN

The condensate drain connection of the evaporator is threaded 1" -11½" NPT. **IMPORTANT:** Install a condensate trap to ensure proper condensate drainage. See Figure 19.

IV. WIRING

A. POWER SUPPLY

⚠ WARNING

TURN OFF THE MAIN ELECTRICAL POWER AT THE BRANCH CIRCUIT DISCONNECT CLOSEST TO THE UNIT BEFORE ATTEMPTING ANY WIRING. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

1. **All wiring should be made in accordance with the National Electrical Code.** Consult the local power company to determine the availability of sufficient power to operate the unit. Check the voltage at power supply to make sure it corresponds to the unit's RATED VOLTAGE REQUIREMENT. Install a branch circuit disconnect near the rooftop, in accordance with the N.E.C., C.E.C. or local codes.
2. It is important that proper electrical power is available at the unit. Voltage should not vary more than 10% from that stamped on the unit nameplate. On three phase units, phases must be balanced within 3%.
3. For branch circuit wiring (main power supply to unit disconnect), the minimum wire size for the length of run can be determined from Table 3 using the circuit ampacity found on the unit rating plate. Use the smallest wire size allowable from the unit disconnect to unit.
4. For through the base wiring entry reference **Figure 21.** All fittings and conduit are field supplied for this application. Reference the chart with **Figure 21** for proper hole and conduit size.

TABLE 4

AWG Copper Wire Size	AWG Aluminum Wire Size	Connector Type and Size (or equivalent)	
#12	#10	T & B Wire Nut	PT2
#10	# 8	T & B Wire Nut	PT3
# 8	# 6	Sherman Split Bolt	TSP6
# 6	# 4	Sherman Split Bolt	TSP4
# 4	# 2	Sherman Split Bolt	TSP2

NOTES:

1. For branch circuit wiring (main power supply to unit disconnect), the minimum wire size for the length of run can be determined from this table using the circuit ampacity found on the unit rating plate. From the unit disconnect to unit, the smallest wire size allowable in Table 4 may be used, as the disconnect must be in sight of the unit.
2. Wire size based on 75°C rated wire insulation for 1% voltage drop.
3. For more than 3 conductors in a raceway or cable, see the N.E.C. (C.E.C. in Canada) for derating the ampacity of each conductor.

IMPORTANT: THIS UNIT IS APPROVED FOR USE WITH COPPER CONDUCTORS ONLY CONNECTED TO UNIT CONTACTOR.

WARRANTY MAY BE JEOPARDIZED IF ALUMINUM WIRE IS CONNECTED TO UNIT CONTACTOR.

Special instructions apply for power wiring with aluminum conductors: Warranty is void if connections are not made per instructions.

Attach a length (6” or more) of recommended size copper wire to the unit contactor terminals L1, L2 and L3 for three phase.

Select the equivalent aluminum wire size from the tabulation below:

Splice copper wire pigtails to aluminum wire with U.L. recognized connectors for copper-aluminum splices. Please exercise the following instructions very carefully to obtain a positive and lasting connection:

1. Strip insulation from aluminum conductor.
2. Coat the stripped end of the aluminum wire with the recommended inhibitor, and wire brush the aluminum surface through inhibitor. INHIBITORS: Brundy-Pentex “A”; Alcoa-No. 2EJC; T & B-KPOR Shield.
3. Clean and recoat aluminum conductor with inhibitor.
4. Make the splice using the above listed wire nuts or split bolt connectors.
5. Coat the entire connection with inhibitor and wrap with electrical insulating tape.

FIGURE 20
RECOMMENDED BRANCH CIRCUIT DISCONNECT LOCATION

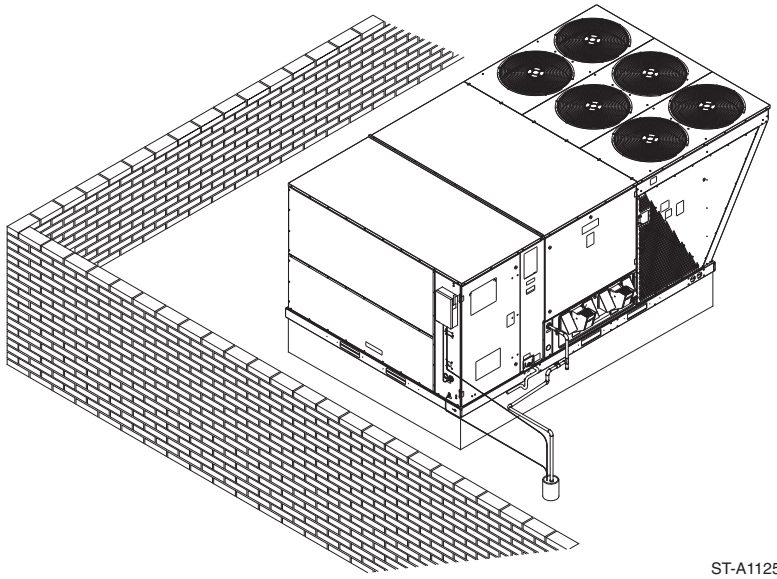


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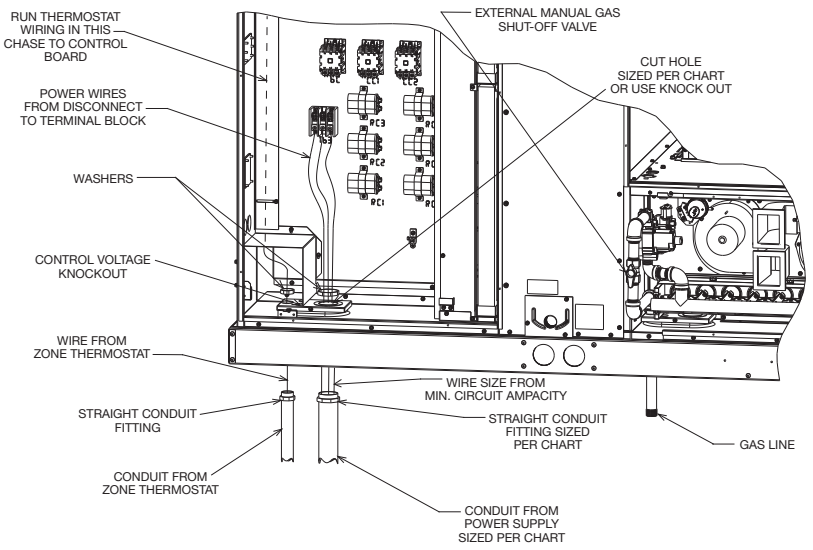
TABLE 5

UNIT MCA	COPPER WIRE SIZE—AWG					
	SUPPLY WIRE LENGTH—FEET					
	50	100	150	200	250	300
20	10	8	6	4	4	4
25	10	8	6	4	4	3
30	8	6	4	4	3	2
35	8	6	4	3	2	1
40	8	6	4	3	2	1
45	8	4	3	2	1	1/0
50	6	4	3	2	1	1/0
60	6	4	2	1	1/0	2/0
70	4	3	2	1/0	2/0	3/0
80	4	3	1	1/0	2/0	3/0
90	3	2	1/0	2/0	3/0	4/0
100	3	2	1/0	2/0	3/0	4/0
110	2	1	2/0	3/0	4/0	250
125	1	1	2/0	3/0	4/0	250
150	1/0	1/0	3/0	4/0	250	300
175	2/0	2/0	4/0	250	300	350

FIGURE 21
BASE ENTRY LOCATIONS



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	WIRE SIZE, AWG											
	14	12	10	8	6	4	3	2	1	0	00	000
CONDUIT SIZE	1/2″	1/2″	1/2″	3/4″	1″	1″	1-1/4″	1-1/4″	1-1/2″	1-1/2″	2″	2″
HOLE SIZE	7/8″	7/8″	7/8″	1-31/32″	1-23/64″	1-23/64″	1-23/32″	1-23/32″	1-31/32″	1-31/32″	2-15/32″	2-15/32″

NOTES: 1. DETERMINE REQUIRED WIRE SIZE FROM MINIMUM CIRCUIT AMPACITY SHOWN IN INSTALLATION & OPERATING INSTRUCTION.
2. BOTTOM POWER ENTRY WILL NOT ACCOMMODATE WIRE LARGER THAN #2 AWG (SHADED AREA).

B. HOOK-UP

To wire unit, refer to the following hook-up diagram.

Refer to Figures 2, 7 and 21 for location of wiring entrances.

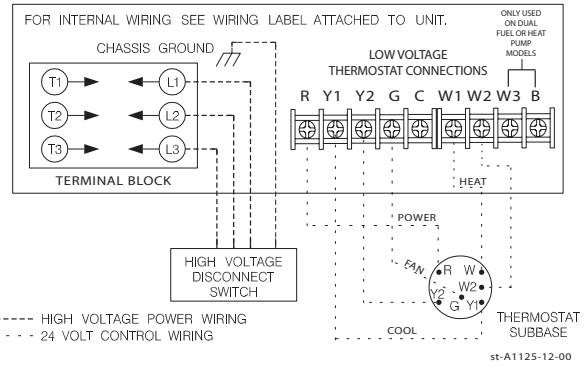
Wiring to be done in the field between the unit and devices not attached to the unit, or between separate devices which are field installed and located, shall conform with the temperature limitation for Type T wire [63°F rise (35°C)] when installed in accordance with the manufacturer's instructions.

C. INTERNAL WIRING

A diagram of the internal wiring of this unit is located on the inside of control access panel and in this manual. If any of the original wire as supplied with the appliance must be replaced, the wire gauge and insulation must be same as original wiring.

Transformer is factory wired for 230 volts on 208/230 volt models and must be changed for 208 volt applications. See unit wiring diagram for 208 volt wiring.

FIGURE 22
TYPICAL THERMOSTAT WIRING



D. THERMOSTAT

The room thermostat must be compatible with the spark ignition control on the unit. Generally, all thermostats that are not of the “current robbing” type are compatible with the integrated furnace control. The low voltage wiring should be sized as shown in Table 6.

Install the room thermostat in accordance with the instruction sheet packed in the box with the thermostat. Run the thermostat lead wires through control entry opening through the thermostat wiring chase on the unit (Figure 2 or Figure 21) and connect to the low voltage thermostat connections (see wiring diagram). Never install the thermostat on an outside wall or where it will be influenced by drafts, concealed hot or cold water pipes or ducts, lighting fixtures, radiation from fireplace, sun rays, lamps, televisions, radios or air streams from registers. Refer to instructions packed with the thermostat for “heater” selection or adjustment.

See Thermostat Specification Sheet for recommended thermostats.

TABLE 6

FIELD WIRE SIZE FOR 24 VOLT THERMOSTAT CIRCUITS							
		SOLID COPPER WIRE - AWG.					
Thermostat Load - Amps	3.0	16	14	12	10	10	10
	2.5	16	14	12	12	12	10
	2.0	18	16	14	12	12	10
		50	100	150	200	250	300
		Length of Run – Feet (1)					

(1) The total wire length is the distance from the unit to the thermostat and back to the unit.

NOTE: DO NOT USE CONTROL WIRING SMALLER THAN NO. 18 AWG.

V. FURNACE SECTION CONTROLS AND IGNITION SYSTEM

NORMAL FURNACE OPERATING SEQUENCE

This unit is equipped with a two stage integrated direct spark ignition control.

NORMAL HEAT MODE

A. Call For First Stage (low fire) Only:

1. Zone thermostat contacts close, a call for first stage (low fire) heat is initiated.
2. Control runs self check.
3. Control checks the high-limit switch for normally closed contacts, each pressure switch for normally open contacts, and all flame rollout switches for continuity.
4. Control energizes each low-fire inducer.
5. Control checks each low-fire pressure switch for closure.
6. If each low-fire pressure switch is closed, the control starts a 30 second prepurge. If either low-fire pressure switch is still open after 180 seconds, the high-fire inducers will be energized until closure.
7. After prepurge timeout, control initiates spark for 2 seconds minimum, 7 second maximum ignition trial, initiates 45 second, second stage (high fire) warm up timing.
8. Control detects flame, de-energizes spark and initiates 45 second delay on blower timing.
9. After a fixed 45 seconds indoor blower delay on, the control energizes the indoor blower.
10. After the 45 second second stage warmup period control checks thermostat input. If only W1 is called for, W2 is de-energized and the control starts a 5 second off delay on the W2 inducer.
11. After fixed 5 seconds the W2 inducer is de-energized.
12. Control enters normal operating loop where all inputs are continuously checked.

B. Call For Second Stage, After First Stage Established; Starting from A.11:

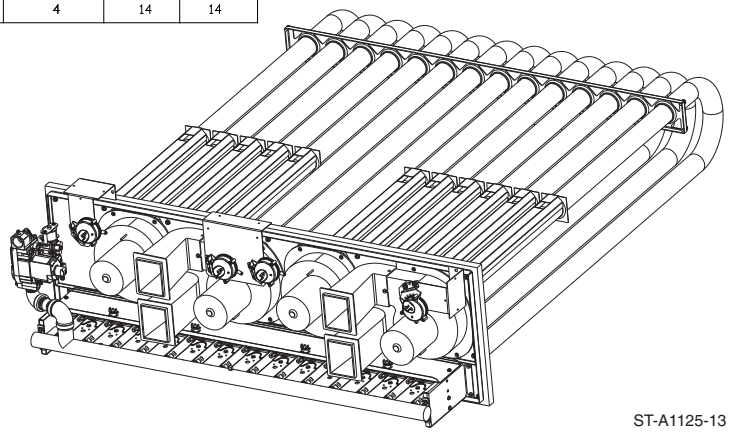
1. If a call for second stage (high fire) is initiated after a call for first stage heat is established, the control energizes the W2 inducer assures the high-fire pressure switch is closed and energizes the second stage of the gas valve.
2. Control enters normal operating loop where all inputs are continuously checked.

C. Second Stage Satisfied; First Stage Still Called For; Starting From B.2:

1. Once the call for second stage is satisfied, the control starts a 30 second off delay on W2 inducer and reduces the gas valve to first stage.
2. Control enters normal operating loop where all inputs are continuously checked.

FIGURE 23

BTUH	NO. OF INDUCERS	NO. OF PRESSURE SWTICHES	NO. OF TUBES	NO. OF BURNERS
250,000	2	2	10	10
300,000	3	3	12	12
350,000	3	3	14	14
400,000	4	4	14	14



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D. First Stage Satisfied:

1. Zone thermostat is satisfied.
2. Control de-energizes gas valve.
3. Control senses loss of flame.
4. Control initiates 5 second inducer postpurge and 90 second indoor blower delay off.
5. Control de-energizes inducer blower.
6. Control de-energizes indoor blower.
7. Control in the stand by mode with solid red LED.

E. First Stage and Second Stage Called Simultaneously:

1. Zone thermostat contacts close, a call for first stage (low fire) and second stage (high fire) heat is initiated.
2. Control runs self check.
3. Control checks the high-limit switch for normally closed contacts, each pressure switch for normally open contacts, and all flame rollout switches for continuity.
4. Control energizes each low-fire inducer.
5. Control checks each pressure switch for closure.
6. If each low-fire pressure switch is closed, the control starts a 30 second prepurge. If either switch is still open after 180 seconds, the high-fire inducers will be energized until closure.
7. After prepurge timeout, control initiates spark for 2 seconds minimum, 7 second maximum ignition trial, and initiates 45 second second stage warm up timing.
8. Control detects flame, de-energizes spark and starts a 45 second indoor blower delay on timing.
9. After a fixed 45 seconds indoor blower delay on, the control energizes the indoor blower.
10. After the 45 seconds second stage warmup period control checks the thermostat input. If W1 and W2 is present control enters normal operating loop where all inputs are continuously checked.

F. First Stage and Second Stage Removed Simultaneously:

1. Upon a loss of W1 and W2 the gas valve is de-energized.
2. Upon a loss of flame, each inducer will complete a 5 second postpurge and the indoor blower will complete a 90 second delay off.
3. Control in the stand by mode with solid red LED.

The integrated control is a four-ignition system.

After a total of four cycles without sensing main burner flame, the system goes into a 100% lockout mode. After one hour, the ignition control repeats the prepurge and ignition cycles for 4 tries and then go into 100% lockout mode again. It continues this sequence of cycles and lockout each hour until ignition is successful or power is interrupted. During the lockout mode, neither the ignitor or gas valve will be energized until the system is reset by turning the thermostat to the “OFF” position or interrupting the electrical power to the unit for 3 seconds or longer. The induced draft blower and main burner will shut off when the thermostat is satisfied.

The circulating air blower will start and run on the heating speed if the thermostat fan switch is in the “ON” position.

The integrated furnace control is equipped with diagnostic LED. The LED is lit continuously when there is power to the control, with or without a call for heat. If the LED is not lit, there is either no power to the control or there is an internal component failure within the control, and the control should be replaced.

If the control detects the following failures, the LED will flash on for approximately 1/4 second, then off for 3/4 second for designated failure detections.

1 Flash: Failed to detect flame within the four tries for ignition.

2 Flash: Pressure switch or induced draft blower problem detected.

3 Flash: High limit or auxiliary limit open.

4 Flash: Flame sensed and gas valve not energized or flame sensed with no “W” signal.

5 Flash: Overtemperature switch open.

OPERATING INSTRUCTIONS

This appliance is equipped with integrated furnace control. This device lights the main burners each time the room thermostat (closes) calls for heat. See operating instructions on the back of the furnace/controls access panel.

⚠ WARNING

DO NOT ATTEMPT TO MANUALLY LIGHT THIS FURNACE WITH A MATCH OR ANY OPEN FLAME. ATTEMPTING TO DO SO CAN CAUSE AN EXPLOSION OR FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

TO START THE FURNACE

1. Set the thermostat to its lowest setting.
2. Turn off all electric power to the appliance.
3. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
4. Remove control door.
5. Move control knob to the “OFF” position. Turn the knob by hand only, do not use any kind of tool.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow B in the safety information on the Operating Instructions located on the back of the controls/access panel. If you don’t smell gas, go to the next step.
7. Move the gas control knob from “OFF” position to “ON” position. Operate this appliance with the gas control knob in the “ON” position only. Do not use the gas control knob as a means for throttling the burner input rate.
8. Replace the control door.
9. Turn on all electric power to the appliance.
10. Set the thermostat to the desired setting.
11. If the appliance will not operate, follow the instructions below on how to shut down the furnace.

⚠ WARNING

THE SPARK IGNITOR AND IGNITION LEAD FROM THE IGNITION CONTROL ARE HIGH VOLTAGE. KEEP HANDS OR TOOLS AWAY TO PREVENT ELECTRICAL SHOCK. SHUT OFF ELECTRICAL POWER BEFORE SERVICING ANY OF THE CONTROLS. FAILURE TO ADHERE TO THIS WARNING CAN RESULT IN PERSONAL INJURY OR DEATH.

The initial start-up on a new installation may require the control system to be energized for some time until air has bled through the system and fuel gas is available at the burners.

TO SHUT DOWN FURNACE

1. Set the thermostat to the lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove control door.
4. Move control knob to the “OFF” position.
5. Replace control door.

⚠ WARNING

SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, SHUT OFF THE MANUAL GAS VALVE TO THE APPLIANCE BEFORE SHUTTING OFF THE ELECTRICAL SUPPLY. FAILURE TO DO SO CAN RESULT IN AN EXPLOSION OR FIRE CAUSING PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH!

BURNERS

Burners for these units have been designed so that field adjustment is not required. Burners are tray-mounted and accessible for easy cleaning when required.

MANUAL RESET OVERTEMPERATURE CONTROL

Four manual reset overtemperature controls are located on the burner shield. These devices senses blockage in the heat exchanger or insufficient combustion air. This shuts off the main burners if excessive temperatures occur in the burner compartment.

Operation of this control indicates an abnormal condition. Therefore, the unit should be examined by a qualified installer, service agency, or the gas supplier before being placed back into operation.

⚠ WARNING

DO NOT JUMPER THIS DEVICE! DO NOT RESET THE OVERTEMPERATURE CONTROL WITHOUT TAKING CORRECTIVE ACTION TO ASSURE THAT AN ADEQUATE SUPPLY OF COMBUSTION AIR IS MAINTAINED UNDER ALL CONDITIONS OF OPERATION. FAILURE TO DO SO CAN RESULT IN CARBON MONOXIDE POISONING OR DEATH. REPLACE THIS CONTROL ONLY WITH THE IDENTICAL REPLACEMENT PART.

PRESSURE SWITCH

This furnace has two sets of pressure switches for sensing a blocked exhaust or a failed induced draft blower. They are normally open and close when the induced draft blower starts, indicating air flow through the combustion chamber.

LIMIT CONTROL

The supply air high temperature limit cut-off is set at the factory and cannot be adjusted. It is calibrated to prevent the air temperature leaving the furnace from exceeding the maximum outlet air temperature.

⚠ WARNING

DO NOT JUMPER THIS DEVICE! DOING SO CAN CAUSE A FIRE OR EXPLOSION RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

IMPORTANT: *Replace this control only with the identical replacement part.*

VI. COOLING SECTION OPERATION

COOLING MODE

A. **Call for first stage cooling**

1. Zone thermostat contacts close and a call for cooling is initiated.
2. Inputs ‘Y1’ and ‘G’ to the control are energized.
3. Control senses ‘Y1’ and ‘G’. After 1 sec. delay, control energizes indoor blower and first stage compressor.
4. Control enters normal operating loop where all inputs are continuously checked.
5. Zone thermostat is satisfied.
6. Control de-energizes indoor blower relay after 80 second indoor blower delay off.
7. Control in the stand by mode with solid red LED.

B. **Call for second stage cooling. After first stage cooling established: starting from A4.**

1. If a call for second stage cooling is initiated after a call for first stage cooling is established, the control energizes Y2 and energizes the second stage compressor.
2. Control enters normal operating loop where all inputs are continuously checked.

C. **Second stage satisfied: first stage still called for: starting from B2.**

1. Y2 is de-energized and second stage compressor is de-energized.

D. **First stage and second stage called simultaneously.**

1. Zone thermostat contacts close, a call for first and second stage cooling is initiated.
2. Inputs Y1, Y2 and G to the control are energized.
3. Control senses Y1, Y2 and G, after 1 second delay, control energizes indoor blower, first and second stage compressor are energized.

E. **First stage and second stage removed simultaneously.**

1. Upon a loss of Y1 and Y2 each compressor is de-energized. Control de-energizes indoor blower relay after 80 second indoor blower delay off.
2. Control in the stand by mode with solid red LED.

CONTINUOUS FAN MODE

A 'G' input only indicates a zone thermostat call for continuous indoor blower operation.

VII. SYSTEM OPERATING INFORMATION

ADVISE THE CUSTOMER

1. Change the air filters regularly. The heating system operates better, more efficiently and more economically.
2. Arrange the furniture and drapes so that the supply air registers and the return air grilles are unobstructed.
3. Close doors and windows. This reduces the heating and cooling load on the system.
4. Avoid excessive use of exhaust fans.
5. Do not permit the heat generated by television, lamps or radios to influence the thermostat operation.
6. Except for the mounting platform, keep all combustible articles three feet from the unit and exhaust system.
7. ***IMPORTANT:*** *Replace all blower doors and compartment cover after servicing the unit. Do not operate the unit without all panels and doors securely in place.*
8. Do not allow snow or other debris to accumulate in the vicinity of the appliance.

FURNACE SECTION MAINTENANCE

The unit's furnace should operate for many years without excessive scale build-up in flue passageways; however, it is recommended that a qualified installer, service agency, or the gas supplier annually inspect the flue passageways, the exhaust system and the burners for continued safe operation, paying particular attention to deterioration from corrosion or other sources.

If during inspection the flue passageways and exhaust system are determined to require cleaning, the following procedures should be followed **(by a qualified installer, service agency, or gas supplier):**

1. **Turn off the electrical power to the unit and set the thermostat to the lowest temperature.**
2. **Shut off the gas supply to the unit either at the meter or at manual valve in the supply piping.**
3. Remove the furnace controls access panel and the control box cover.
4. Disconnect the gas supply piping from the gas valve.
5. Disconnect the wiring to the induced draft blower motors, gas valve, flame sensor, and flame roll-out control, and ignitor cable. **Mark all wires disconnected for proper reconnection**.
6. Remove the screws (4) connecting the burner tray to the heat exchanger mounting panel.
7. Remove the burner tray and the manifold assembly from the unit.
8. Remove the screws (10) connecting the four induced draft blowers to the collector box and screws (12) connecting the inducer mounting plate to the heat exchanger center panel. Remove the induced draft blowers and the collector box from the unit.
9. Remove the turbulators from inside the heat exchangers by inserting the blade of a screwdriver under the locking tabs. Pop the tabs out of the expanded grooves of the heat exchanger. Slide the turbulators out of the heat exchangers.
10. Direct a water hose into the outlet of the heat exchanger top. Flush the inside of each heat exchanger tube with water. Blow out each tube with air to remove excessive moisture.

⚠ WARNING

LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

⚠ WARNING

HOLES IN THE EXHAUST TRANSITION OR HEAT EXCHANGER CAN CAUSE TOXIC FUMES TO ENTER THE HOME. THE EXHAUST TRANSITION OR HEAT EXCHANGER MUST BE REPLACED IF THEY HAVE HOLES OR CRACKS IN THEM. FAILURE TO DO SO CAN CAUSE CARBON MONOXIDE POISONING RESULTING IN PERSONAL INJURY OR DEATH.

⚠ WARNING

DISCONNECT MAIN ELECTRICAL POWER TO THE UNIT BEFORE ATTEMPTING MAINTENANCE. FAILURE TO DO SO MAY RESULT IN ELECTRICAL SHOCK OR SEVERE PERSONAL INJURY OR DEATH.

⚠ WARNING

DISCONNECT MAIN ELECTRICAL POWER TO THE UNIT BEFORE ATTEMPTING MAINTENANCE. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

⚠ WARNING

LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING THE UNIT. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH.

11. Reassemble (steps 1 through 9 in reverse order). **Be careful not to strip out the screw holes used to mount the collector box and inducer blower. Replace inducer blower gasket and collector box gasket with factory replacements if damaged.**

The manufacturer recommends that a qualified installer, service agency or the gas supplier visually inspect the burner flames for the desired flame appearance at the beginning of the heating season and approximately midway in heating season.

The manufacturer also recommends that a qualified installer, service agency or the gas supplier clean the flame sensor with steel wool at the beginning of the heating season.

LUBRICATION

IMPORTANT: DO NOT attempt to lubricate the bearings on the blower motor or the induced draft blower motor. Addition of lubricants can reduce the motor life and void the warranty.

The blower motor and induced draft blower motor are prelubricated by the manufacturer and do not require further attention.

A qualified installer, service agency or the gas supplier must periodically clean the motors to prevent the possibility of overheating due to an accumulation of dust and dirt on the windings or on the motor exterior. And, as suggested elsewhere in these instructions, the air filters should be kept clean because dirty filters can restrict air flow and the motor depends upon sufficient air flowing across and through it to prevent overheating.

COOLING SECTION MAINTENANCE

It is recommended that at the beginning of each cooling season a qualified installer or service agency inspect and clean the cooling section of this unit. The following areas should be addressed: evaporator coil. condenser coil, condenser fan motor and venturi area.

To inspect the evaporator coil:

1. Open the control/filter access panel and remove filters. Also, remove blower access panel. In downflow applications remove the horizontal return to gain access.
2. Shine a flashlight on the evaporator coil (both sides) and inspect for accumulation of lint, insulation, etc.
3. If coil requires cleaning, follow the steps shown below.

Cleaning Evaporator Coil

1. The coil should be cleaned when it is dry. If the coil is coated with dirt or lint, vacuum it with a soft brush attachment. Be careful not to bend the coil fins.
2. If the coil is coated with oil or grease, clean it with a mild detergent-and-water solution. Rinse the coil thoroughly with water. **IMPORTANT: Do not** use excessive water pressure. Excessive water pressure can bend the fins and tubing of the coil and lead to inadequate unit performance. Be careful not to splash water excessively into unit.
3. Inspect the drain pan and condensate drain at the same time the evaporator coil is checked. Clean the drain pan by flushing with water and removing any matters of obstructions which may be present.
4. Go to next section for cleaning the condenser coil.

Cleaning Condenser Coil, Condenser Fan, Circulation Air Blower and Venturi

1. Remove the condenser access end panel and/or compressor access louver panel. Disconnect the wires to the condenser fan motor in the control box (see wiring diagram).
2. The coil should be cleaned when it is dry. If the coil is coated with dirt or lint, vacuum it with a soft brush attachment. Be careful not to bend the coil fins.
3. If the coil is coated with oil or grease, clean it with a mild detergent-and-water solution. Rinse the coil thoroughly with water. **IMPORTANT: Do not** use excessive water pressure. Excessive water pressure can bend the fins and tubing of the coil and lead to inadequate unit performance. Be careful not to splash water excessively into unit.
4. The venturi should also be inspected for items of obstruction such as collections of grass, dirt or spider webs. Remove any that are present.
5. Inspect the circulating air blower wheel and motor for accumulation of lint, dirt or other obstruction and clean it necessary. Inspect the blower motor mounts and the blower housing for loose mounts or other damage. Repair or replace if necessary.

Re-assembly

1. Reconnect fan motor wires per the wiring diagram attached to the back of the control cover.
2. Replace the control box cover.
3. Close the filter/control access panel and replace the blower/evaporator coil access panels.
4. Restore electrical power to the unit and check for proper operation, especially the condenser fan motor.

REPLACEMENT PARTS

Contact your local distributor for a complete parts list.

TROUBLESHOOTING

Refer to Figures 24 and 25 for determining cause of unit problems.

WIRING DIAGRAMS

Figures 26, 27, 28 and 29 are complete wiring diagrams for the unit and its power sources. Also located on back of control access panel.

CHARGING

See Figures 30, 31 and 32 for proper charging information.

AIRFLOW PERFORMANCE — 15 TON [52.7kW] — SIDEFLOW

Air Flow CFM [L/s]	Model RKNL-B180																																			
	Voltage 208/230, 460, 575 — 3 phase																																			
	External Static Pressure — Inches of Water [kPa]																																			
	0,1 [.02]		0,2 [.05]		0,3 [.07]		0,4 [.10]		0,5 [.12]		0,6 [.15]		0,7 [.17]		0,8 [.20]		0,9 [.22]		1,0 [.25]		1,1 [.27]		1,2 [.30]		1,3 [.32]		1,4 [.35]		1,5 [.37]		1,6 [.40]		1,7 [.42]		1,8 [.45]		1,9 [.47]		2,0 [.50]	
	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W
4800 [2265]	—	—	—	—	—	—	—	—	—	—	583	1393	608	1508	632	1621	656	1732	679	1841	701	1947	723	2052	744	2154	764	2254	785	2326	805	2430	825	2537	844	2647	863	2761	881	2878
5000 [2359]	—	—	—	—	—	—	—	—	—	—	591	1476	616	1593	640	1707	663	1820	686	1930	708	2038	729	2145	750	2248	771	2350	791	2420	811	2528	830	2640	850	2755	868	2873	887	2995
5200 [2454]	—	—	—	—	—	—	—	—	575	1442	600	1562	624	1681	648	1797	671	1911	693	2023	715	2133	736	2241	757	2346	777	2410	797	2520	817	2633	836	2749	855	2869	874	2992	892	3118
5400 [2548]	—	—	—	—	—	—	—	—	583	1530	608	1652	632	1772	655	1890	678	2005	701	2119	722	2231	743	2340	764	2447	784	2512	804	2626	823	2744	842	2865	861	2989	879	3117	897	3248
5600 [2643]	—	—	—	—	—	—	—	—	592	1621	616	1745	640	1866	663	1986	686	2103	708	2218	729	2331	750	2442	770	2551	791	2620	810	2739	830	2861	849	2987	867	3116	885	3248	903	3384
5800 [2737]	—	—	—	—	—	—	576	1588	601	1715	625	1840	649	1964	672	2085	694	2204	716	2321	737	2436	757	2548	778	2614	798	2735	817	2858	836	2985	855	3116	873	3249	891	3386	909	3527
6000 [2831]	—	—	—	—	—	—	585	1683	610	1813	634	1940	657	2065	680	2187	702	2308	724	2426	744	2543	765	2657	785	2731	805	2856	824	2984	843	3116	861	3251	879	3389	897	3531	914	3676
6200 [2926]	—	—	—	—	570	1650	595	1783	619	1913	643	2042	666	2169	688	2293	710	2415	731	2535	752	2653	773	2728	792	2854	812	2984	831	3116	850	3253	868	3392	886	3535	903	3682	920	3832
6400 [3020]	—	—	—	—	579	1750	604	1885	628	2017	652	2148	674	2276	697	2402	718	2526	739	2648	760	2767	780	2852	800	2983	819	3118	838	3255	856	3396	875	3541	892	3688	909	3839	926	3994
6600 [3114]	—	—	—	—	589	1854	614	1991	637	2125	661	2257	683	2386	705	2514	727	2640	748	2763	768	2884	788	2984	808	3119	827	3258	845	3400	863	3546	881	3695	899	3847	916	4003	—	—
6800 [3209]	—	—	574	1822	599	1961	623	2099	647	2235	670	2369	692	2500	714	2629	735	2756	756	2882	776	2984	796	3121	815	3262	834	3405	853	3552	871	3702	888	3856	905	4013	922	4173	—	—
7000 [3303]	—	—	584	1930	609	2072	633	2211	656	2349	679	2484	701	2617	723	2748	744	2877	764	3003	785	3124	804	3265	823	3410	842	3559	860	3710	878	3865	895	4024	912	4185	929	4350	—	—
7200 [3398]	570	1897	595	2042	619	2185	643	2327	666	2466	689	2602	711	2737	732	2870	753	3000	773	3127	793	3270	812	3416	831	3566	849	3719	868	3875	885	4035	902	4198	919	4364	—	—	—	—

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

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

NOTES: 1. Factory sheave settings are shown in bold type.
2. Do not set motor sheave below minimum turns open shown.
3. Re-adjustment of sheave required to achieve rated airflow at ARI 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 — 15 TON [52.7kW]

CFM [L/s]	4800 [2265]	5000 [2359]	5200 [2454]	5400 [2548]	5600 [2643]	5800 [2737]	6000 [2831]	6200 [2926]	6400 [3020]	6600 [3114]	6800 [3209]	7000 [3303]	7200 [3398]
	Resistance — Inches of Water [kPa]												
Wet Coil	0.03 [.01]	0.04 [.01]	0.05 [.01]	0.06 [.01]	0.06 [.01]	0.07 [.02]	0.08 [.02]	0.09 [.02]	0.10 [.02]	0.10 [.02]	0.11 [.03]	0.12 [.03]	0.13 [.03]
Downflow	0.05 [.01]	0.05 [.01]	0.05 [.01]	0.05 [.01]	0.05 [.01]	0.05 [.01]	0.05 [.01]	0.06 [.01]	0.06 [.01]	0.06 [.01]	0.07 [.02]	0.08 [.02]	0.08 [.02]
Downflow Economizer RA Damper Open	0.09 [.02]	0.10 [.02]	0.10 [.02]	0.11 [.03]	0.12 [.03]	0.13 [.03]	0.13 [.03]	0.14 [.03]	0.15 [.04]	0.16 [.04]	0.16 [.04]	0.17 [.04]	0.18 [.04]
Horizontal Economizer RA Damper Open	0.00 [.00]	0.01 [.00]	0.01 [.00]	0.02 [.00]	0.02 [.00]	0.03 [.01]	0.03 [.01]	0.04 [.01]	0.04 [.01]	0.05 [.01]	0.05 [.01]	0.06 [.01]	0.06 [.01]
Concentric Grill RXRN-AD80 or RXRN-AD81 & Transition RXMC-CJ07	0.21 [.05]	0.25 [.06]	0.28 [.07]	0.32 [.08]	0.35 [.09]	0.39 [.10]	0.43 [.11]	0.46 [.11]	0.50 [.12]	0.54 [.13]	0.57 [.14]	0.61 [.15]	0.64 [.16]

AIRFLOW CORRECTION FACTORS — 15 TON [52.7kW]

	CFM [L/s]	4800 [2265]	5000 [2359]	5200 [2454]	5400 [2548]	5600 [2643]	5800 [2737]	6000 [2831]	6200 [2926]	6400 [3020]	6600 [3114]	6800 [3209]	7000 [3303]	7200 [3398]
	Total MBH	0.97	0.97	0.98	0.98	0.99	1.00	1.00	1.01	1.02	1.02	1.03	1.03	1.04
	Sensible MBH	0.87	0.90	0.92	0.94	0.97	0.99	1.02	1.04	1.06	1.09	1.11	1.14	1.16
	Power kW	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02

NOTE: Multiply correction factor times gross performance data — resulting sensible capacity cannot exceed total capacity.

[ ] Designates Metric Conversions

AIRFLOW PERFORMANCE — 20 TON [70.3kW] — SIDEFLOW

Air Flow CFM [L/s]	Model RKNL-B240																																					
	Voltage 208/230, 460, 575 — 3 phase																																					
	External Static Pressure — Inches of Water [kPa]																																					
	0.1 [.02]		0.2 [.05]		0.3 [.07]		0.4 [.10]		0.5 [.12]		0.6 [.15]		0.7 [.17]		0.8 [.20]		0.9 [.22]		1.0 [.25]		1.1 [.27]		1.2 [.30]		1.3 [.32]		1.4 [.35]		1.5 [.37]		1.6 [.40]		1.7 [.42]		1.8 [.45]		1.9 [.47]		2.0 [.50]	
	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W
6400 [3020]	—	—	—	—	—	—	—	—	632	2007	654	2111	676	2218	698	2328	719	2439	741	2553	763	2670	785	2789	810	3065	830	3203	850	3342	869	3481	888	3621	906	3761	923	3902	937	4121
6600 [3114]	—	—	—	—	—	—	—	—	642	2106	664	2217	686	2330	707	2446	729	2564	751	2685	773	2808	798	3060	819	3201	838	3342	857	3484	876	3626	894	3769	912	3912	930	4056	944	4271
6800 [3209]	—	—	—	—	—	—	630	2100	652	2215	674	2332	696	2452	718	2574	739	2699	761	2826	783	2955	807	3202	827	3346	846	3490	865	3634	884	3780	901	3926	919	4072	933	4283	950	4432
7000 [3303]	—	—	—	—	—	—	641	2213	663	2334	684	2458	706	2585	728	2713	750	2844	772	2977	796	3207	816	3352	835	3499	854	3646	873	3794	891	3942	909	4091	926	4240	940	4448	957	4603
7200 [3398]	—	—	—	—	630	2211	651	2336	673	2464	695	2594	717	2727	739	2862	761	2999	783	3139	805	3362	825	3511	844	3661	863	3811	881	3961	898	4112	916	4264	932	4417	947	4624	964	4784
7400 [3492]	—	—	—	—	641	2338	663	2470	684	2604	706	2741	728	2880	750	3021	772	3165	795	3375	815	3526	834	3678	853	3831	871	3984	889	4137	906	4292	923	4447	938	4650	954	4810	971	4976
7600 [3586]	—	—	630	2339	652	2475	674	2613	696	2754	718	2897	740	3043	761	3190	783	3341	805	3545	824	3699	843	3854	862	4009	879	4165	897	4322	914	4479	930	4637	945	4841	962	5007	978	5179
7800 [3681]	—	—	642	2480	664	2622	686	2767	707	2914	729	3064	751	3216	773	3370	795	3567	815	3723	834	3880	852	4038	870	4197	888	4356	905	4515	922	4675	936	4878	953	5043	969	5214	986	5392
8000 [3775]	632	2485	654	2631	676	2780	698	2931	719	3085	741	3241	763	3399	785	3559	806	3750	825	3910	844	4070	862	4231	880	4392	897	4554	914	4717	930	4880	944	5084	961	5255	977	5432	993	5616
8200 [3869]	644	2640	666	2793	688	2948	710	3105	732	3265	754	3427	776	3592	797	3780	816	3942	835	4105	854	4268	871	4432	889	4596	906	4761	922	4927	936	5130	952	5300	969	5477	985	5660	1001	5850
8400 [3964]	657	2805	679	2964	701	3126	723	3290	745	3456	767	3625	789	3796	808	3978	827	4143	846	4309	864	4475	881	4642	898	4809	915	4977	931	5146	944	5352	961	5528	977	5710	993	5899	1008	6094
8600 [4058]	670	2980	692	3146	714	3314	736	3484	758	3657	780	3832	800	4017	819	4184	838	4352	856	4521	874	4690	891	4860	907	5030	924	5201	937	5408	953	5584	969	5765	985	5954	1001	6148	—	—
8800 [4153]	683	3166	705	3338	727	3512	749	3689	771	3868	793	4059	812	4229	831	4399	849	4570	867	4742	884	4914	901	5087	917	5260	933	5434	946	5645	962	5826	978	6013	993	6208	1009	6408	—	—
9000 [4247]	697	3361	719	3540	741	3721	763	3904	785	4089	805	4276	824	4449	842	4622	860	4796	877	4971	894	5146	911	5322	927	5498	939	5712	955	5892	971	6079	986	6272	1002	6472	—	—	—	—
9200 [4341]	711	3567	733	3752	755	3939	777	4129	798	4327	817	4502	835	4678	853	4854	871	5031	888	5209	905	5387	921	5565	933	5784	949	5963	964	6149	980	6342	995	6541	1010	6747	—	—	—	—
9400 [4436]	725	3783	747	3975	769	4168	792	4381	811	4558	829	4736	847	4915	865	5094	882	5274	899	5455	915	5636	931	5818	942	6040	958	6225	973	6418	989	6616	1004	6821	—	—	—	—	—	—
9600 [4530]	739	4010	762	4207	784	4407	805	4617	823	4798	842	4979	859	5161	877	5343	894	5526	910	5709	926	5894	937	6122	952	6307	968	6498	983	6696	998	6901	—	—	—	—	—	—	—	—

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

Drive Package	L						M						N (field installed only)					
Motor H.P. [W]	5 [3728.5]						7.5 [5592.7]						7.5 [5592.7]					
Blower Sheave	BK130H						BK130H						BK120H					
Motor Sheave	1VP-56						1VP-71						1VP-71					
Turns Open	**1**	2	3	4	5	6	1	2	3	**4**	5	6	1	2	3	4	5	6
RPM	**756**	734	709	683	658	631	928	902	874	**847**	820	793	1009	981	955	928	899	870

NOTES: 1. Factory sheave settings are shown in bold type.
2. Do not set motor sheave below minimum turns open shown.
3. Re-adjustment of sheave required to achieve rated airflow at ARI 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 — 20 TON [70.3kW]

CFM [L/s]	6400 [3020]	6600 [3114]	6800 [3209]	7000 [3303]	7200 [3398]	7400 [3492]	7600 [3586]	7800 [3681]	8000 [3775]	8200 [3869]	8400 [3964]	8600 [4058]	8800 [4153]	9000 [4247]	9200 [4341]	9400 [4436]	9600 [4530]
	Resistance — Inches of Water [kPa]																
Wet Coil	0.00 [.00]	0.00 [.00]	0.00 [.00]	0.01 [.00]	0.01 [.00]	0.02 [.00]	0.02 [.00]	0.03 [.01]	0.03 [.01]	0.04 [.01]	0.04 [.01]	0.05 [.01]	0.05 [.01]	0.06 [.01]	0.06 [.01]	0.07 [.02]	0.07 [.02]
Downflow	0.06 [.01]	0.06 [.01]	0.07 [.02]	0.08 [.02]	0.08 [.02]	0.09 [.02]	0.10 [.02]	0.11 [.03]	0.12 [.03]	0.13 [.03]	0.14 [.03]	0.15 [.04]	0.16 [.04]	0.18 [.04]	0.19 [.05]	0.20 [.05]	0.22 [.05]
Downflow Economizer RA Damper Open	0.15 [.04]	0.16 [.04]	0.16 [.04]	0.17 [.04]	0.18 [.04]	0.19 [.05]	0.20 [.05]	0.21 [.05]	0.22 [.05]	0.23 [.06]	0.24 [.06]	0.25 [.06]	0.26 [.06]	0.27 [.07]	0.28 [.07]	0.29 [.07]	0.30 [.07]
Horizontal Economizer RA Damper Open	0.04 [.01]	0.05 [.01]	0.05 [.01]	0.06 [.01]	0.06 [.01]	0.07 [.02]	0.07 [.02]	0.08 [.02]	0.09 [.02]	0.09 [.02]	0.10 [.02]	0.10 [.02]	0.11 [.03]	0.11 [.03]	0.12 [.03]	0.12 [.03]	0.13 [.03]
Concentric Grill RXRN-AD86 & Transition RXMC-CK08	0.26 [.06]	0.29 [.07]	0.32 [.08]	0.35 [.09]	0.38 [.09]	0.41 [.10]	0.44 [.11]	0.47 [.12]	0.50 [.12]	0.53 [.13]	0.56 [.14]	0.59 [.15]	0.62 [.15]	0.65 [.16]	0.69 [.17]	0.72 [.18]	0.75 [.19]

AIRFLOW CORRECTION FACTORS — 20 TON [70.3kW]

	CFM [L/s]	6400 [3020]	6600 [3114]	6800 [3209]	7000 [3303]	7200 [3398]	7400 [3492]	7600 [3586]	7800 [3681]	8000 [3775]	8200 [3869]	8400 [3964]	8600 [4058]	8800 [4153]	9000 [4247]	9200 [4341]	9400 [4436]	9600 [4530]
	Total MBH	0.97	0.97	0.98	0.98	0.99	0.99	1.00	1.00	1.01	1.01	1.02	1.02	1.03	1.03	1.03	1.04	1.04
	Sensible MBH	0.88	0.90	0.92	0.94	0.96	0.97	0.99	1.01	1.03	1.05	1.07	1.09	1.10	1.12	1.14	1.16	1.18
	Power kW	0.98	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.01	1.01	1.02	1.02	1.02

NOTE: Multiply correction factor times gross performance data — resulting sensible capacity cannot exceed total capacity.

[ ] Designates Metric Conversions

AIRFLOW PERFORMANCE — 25 TON [87.9kW] — SIDEFLOW

Air Flow CFM [L/s]	Model RKNL-B300 Voltage 208/230, 460, 575 — 3 phase External Static Pressure — Inches of Water [kPa]																																							
	0.1 [.02]		0.2 [.05]		0.3 [.07]		0.4 [.10]		0.5 [.12]		0.6 [.15]		0.7 [.17]		0.8 [.20]		0.9 [.22]		1.0 [.25]		1.1 [.27]		1.2 [.30]		1.3 [.32]		1.4 [.35]		1.5 [.37]		1.6 [.40]		1.7 [.42]		1.8 [.45]		1.9 [.47]		2.0 [.50]	
	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W
8000 [3775]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	794	3720	814	3870	833	4024	851	4182	869	4344	886	4510	903	4680	920	4854	948	5256	963	5410	979	5565	994	5720	1009	5877
8200 [3869]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	807	3908	826	4065	845	4226	863	4392	880	4561	897	4735	914	4912	943	5296	958	5455	973	5614	988	5774	1003	5935	1018	6097
8400 [3964]	—	—	—	—	—	—	—	—	—	—	—	—	801	3947	820	4108	838	4273	856	4442	874	4614	891	4791	908	4972	924	5157	952	5503	967	5667	982	5832	997	5997	1012	6164	1028	6331
8600 [4058]	—	—	—	—	—	—	—	—	—	—	794	3989	813	4153	832	4321	850	4493	868	4670	886	4850	902	5034	919	5223	947	5557	962	5725	977	5894	992	6064	1007	6235	1022	6407	1037	6579
8800 [4153]	—	—	—	—	—	—	—	—	—	—	807	4200	826	4371	845	4547	862	4727	880	4910	897	5098	913	5290	942	5614	957	5787	972	5960	987	6134	1002	6310	1017	6486	1032	6663	1047	6841
9000 [4247]	—	—	—	—	—	—	—	—	801	4249	820	4424	839	4603	857	4786	874	4973	892	5164	908	5359	924	5558	952	5853	967	6031	982	6209	997	6389	1012	6570	1027	6752	1042	6934	1057	7118
9200 [4341]	—	—	—	—	—	—	795	4300	815	4478	833	4660	851	4847	869	5037	886	5232	903	5430	919	5633	947	5923	962	6105	977	6289	992	6473	1007	6658	1022	6844	1037	7031	1052	7219	1068	7408
9400 [4436]	—	—	—	—	790	4352	809	4534	828	4720	846	4910	864	5104	881	5302	898	5504	915	5710	943	5997	958	6184	972	6372	987	6561	1002	6750	1017	6941	1032	7132	1048	7325	1063	7518	—	—
9600 [4530]	—	—	—	—	804	4592	823	4781	841	4975	859	5172	876	5373	893	5579	910	5788	926	6002	953	6267	968	6460	983	6653	998	6847	1013	7042	1028	7238	1043	7434	1058	7632	—	—	—	—
9800 [4624]	—	—	798	4652	817	4845	836	5042	854	5242	872	5447	889	5656	905	5869	922	6085	949	6355	964	6551	979	6749	994	6947	1009	7147	1024	7347	1039	7548	1054	7751	1069	7954	—	—	—	—
10000 [4719]	793	4714	813	4910	831	5110	849	5315	867	5523	884	5735	901	5951	917	6171	945	6446	960	6647	975	6849	990	7052	1005	7256	1019	7461	1034	7667	1050	7873	1065	8081	—	—	—	—	—	—
10200 [4813]	808	4978	827	5181	845	5389	863	5600	880	5816	897	6035	913	6259	941	6542	956	6748	971	6954	986	7162	1001	7370	1016	7579	1031	7789	1046	8000	1061	8212	—	—	—	—	—	—	—	—
10400 [4908]	822	5254	840	5465	858	5680	876	5899	893	6122	909	6349	926	6580	953	6852	967	7063	982	7275	997	7488	1012	7701	1027	7916	1042	8131	1057	8348	1072	8565	—	—	—	—	—	—	—	—
10600 [5002]	836	5543	854	5761	872	5984	889	6210	906	6441	922	6675	949	6961	964	7176	979	7393	993	7610	1008	7828	1023	8047	1038	8267	1053	8488	1068	8710	—	—	—	—	—	—	—	—	—	—
10800 [5096]	850	5845	868	6071	885	6301	902	6534	918	6772	946	7074	961	7294	975	7514	990	7736	1005	7959	1020	8182	1035	8407	1050	8632	1065	8858	—	—	—	—	—	—	—	—	—	—	—	—
11000 [5191]	864	6160	882	6393	899	6630	915	6871	943	7191	958	7415	972	7640	987	7867	1002	8094	1017	8321	1032	8550	1046	8780	1061	9011	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11200 [5285]	878	6487	895	6728	912	6972	940	7313	955	7541	969	7771	984	8001	999	8233	1014	8465	1029	8698	1043	8933	1058	9168	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11400 [5379]	892	6827	909	7075	925	7328	952	7671	967	7905	981	8140	996	8376	1011	8613	1026	8851	1041	9089	1055	9329	1070	9570	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11600 [5474]	906	7180	922	7436	950	7806	964	8044	979	8283	994	8524	1008	8765	1023	9007	1038	9250	1053	9494	1068	9739	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11800 [5568]	920	7546	948	7944	962	8187	977	8431	991	8676	1006	8921	1021	9168	1035	9416	1050	9664	1065	9913	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12000 [5663]	946	8087	960	8334	975	8583	989	8832	1004	9082	1019	9333	1033	9585	1048	9838	1063	10092	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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

Drive Package	L						M					
Motor H.P. [W]	7.5 [5592.7]						10 [7457.0]					
Blower Sheave	BK130H						BK120H					
Motor Sheave	1VP-71						1VP-75					
Turns Open	**1**	2	3	4	5	6	1	2	3	**4**	5	6
RPM	**919**	894	869	844	817	790	1067	1039	1012	**982**	953	925

NOTES: 1. Factory sheave settings are shown in bold type.
2. Do not set motor sheave below minimum turns open shown.
3. Re-adjustment of sheave required to achieve rated airflow at ARI 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 — 25 TON [87.9kW]

CFM [L/s]	8000 [3775]	8400 [3964]	8800 [4153]	9200 [4341]	9600 [4530]	10000 [4719]	10400 [4908]	10800 [5096]	11200 [5285]	11600 [5474]	12000 [5663]
	Resistance — Inches of Water [kPa]										
Wet Coil	0.07 [.02]	0.09 [.02]	0.10 [.02]	0.12 [.03]	0.13 [.03]	0.15 [.04]	0.16 [.04]	0.18 [.04]	0.19 [.05]	0.21 [.05]	0.22 [.05]
Downflow	0.12 [.03]	0.14 [.03]	0.16 [.04]	0.19 [.05]	0.22 [.05]	0.25 [.06]	0.29 [.07]	0.33 [.08]	0.37 [.09]	0.42 [.10]	0.46 [.11]
Downflow Economizer RA Damper Open	0.22 [.05]	0.24 [.06]	0.26 [.06]	0.28 [.07]	0.30 [.07]	0.32 [.08]	0.34 [.08]	0.37 [.09]	0.39 [.10]	0.41 [.10]	0.44 [.11]
Horizontal Economizer RA Damper Open	0.09 [.02]	0.10 [.02]	0.11 [.03]	0.12 [.03]	0.13 [.03]	0.14 [.03]	0.15 [.04]	0.16 [.04]	0.17 [.04]	0.18 [.04]	0.19 [.05]
Concentric Grill RXRN-AD88 & Transition RXMC-CL09	0.17 [.04]	0.23 [.06]	0.30 [.07]	0.36 [.09]	0.43 [.11]	0.50 [.12]	0.56 [.14]	0.63 [.16]	0.69 [.17]	0.76 [.19]	0.82 [.20]

AIRFLOW CORRECTION FACTORS — 25 TON [87.9kW]

	CFM [L/s]	8000 [3775]	8400 [3964]	8800 [4153]	9200 [4341]	9600 [4530]	10000 [4719]	10400 [4908]	10800 [5096]	11200 [5285]	11600 [5474]	12000 [5663]
	Total MBH	0.97	0.98	0.99	0.99	1.00	1.01	1.02	1.03	1.03	1.04	1.05
	Sensible MBH	0.89	0.92	0.95	0.98	1.01	1.04	1.08	1.11	1.14	1.17	1.20
	Power kW	0.99	0.99	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.02

NOTE: Multiply correction factor times gross performance data — resulting sensible capacity cannot exceed total capacity.

[ ] Designates Metric Conversions

IX. ELECTRICAL DATA - RKNL

ELECTRICAL DATA - RKNL SERIES										
		B180CL	**B180CM**	**B180DL**	**B180DM**	**B180YL**	**B180YM**	**B240CL**	**B240CM**	**B240CN**
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	518-632	518-632	187-253	187-253	187-253
	Volts	208/230	208/230	460	460	575	575	208/230	208/230	208/230
	Minimum Circuit Ampacity	78/78	81/81	38	40	28	30	101/101	109/109	109/109
	Minimum Overcurrent Protection Device Size	90/90	90/90	45	45	30	35	110/110	125/125	125/125
	Maximum Overcurrent Protection Device Size	100/100	100/100	45	50	35	35	125/125	125/125	125/125
Compressor Motor	No.	2	2	2	2	2	2	2	2	2
	Volts	200/230	200/230	460	460	575	575	200/230	200/230	200/230
	Phase	3	3	3	3	3	3	3	3	3
	RPM	3450	3450	3450	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	7	7	7	7	7	7	10	10	10
	Amps (RLA), Comp. 1	25/25	25/25	12.2	12.2	9	9	33.3/33.3	33.3/33.3	33.3/33.3
	Amps (LRA), Comp. 1	164/164	164/164	100	100	78	78	239/239	239/239	239/239
	HP, Compressor 2	7	7	7	7	7	7	7 1/2	7 1/2	7 1/2
	Amps (RLA), Comp. 2	25/25	25/25	12.2	12.2	9	9	29.5/29.5	29.5/29.5	29.5/29.5
	Amps (LRA), Comp. 2	164/164	164/164	100	100	78	78	195/195	195/195	195/195
Condenser Motor	No.	4	4	4	4	4	4	6	6	6
	Volts	208/230	208/230	460	460	575	575	208/230	208/230	208/230
	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	1.4	1.4	1	1	2.4/2.4	2.4/2.4	2.4/2.4
	Amps (LRA, each)	4.7/4.7	4.7/4.7	2.4	2.4	1.8	1.8	4.7/4.7	4.7/4.7	4.7/4.7
Evaporator Fan	No.	1	1	1	1	1	1	1	1	1
	Volts	208/230	208/230	460	460	575	575	208/230	208/230	208/230
	Phase	3	3	3	3	3	3	3	3	3
	HP	3	5	3	5	3	5	5	7 1/2	7 1/2
	Amps (FLA, each)	11.5/11.5	14.9/14.9	4.6	6.6	3.5	5.3	14.7/14.7	23.1/23.1	23.1/23.1
	Amps (LRA, each)	74.5/74.5	82.6/82.6	38.1	46.3	20	39.4	82.6/82.6	136/136	136/136

ELECTRICAL DATA - RKNL (continued)

ELECTRICAL DATA - RKNL SERIES										
		B240DL	**B240DM**	**B240DN**	**B240YL**	**B240YM**	**B240YN**	**B300CL**	**B300CM**	**B300DL**
Unit Information	Unit Operating Voltage Range	414-506	414-506	414-506	518-632	518-632	518-632	187-253	187-253	414-506
	Volts	460	460	460	575	575	575	208/230	208/230	460
	Minimum Circuit Ampacity	52	56	56	40	42	42	147/147	149/149	60
	Minimum Overcurrent Protection Device Size	60	60	60	45	50	50	175/175	175/175	70
	Maximum Overcurrent Protection Device Size	60	70	70	50	50	50	175/175	175/175	70
Compressor Motor	No.	2	2	2	2	2	2	2	2	2
	Volts	460	460	460	575	575	575	200/240	200/240	460
	Phase	3	3	3	3	3	3	3	3	3
	RPM	3450	3450	3450	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	10	10	10	10	10	10	11 1/2	11 1/2	11 1/2
	Amps (RLA), Comp. 1	17.9	17.9	17.9	12.8	12.8	12.8	48.1/48.1	48.1/48.1	18.6
	Amps (LRA), Comp. 1	125	125	125	80	80	80	245/245	245/245	125
	HP, Compressor 2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	11 1/2	11 1/2	11 1/2
	Amps (RLA), Comp. 2	14.7	14.7	14.7	12.2	12.2	12.2	48.1/48.1	48.1/48.1	18.6
	Amps (LRA), Comp. 2	95	95	95	80	80	80	245/245	245/245	125
Condenser Motor	No.	6	6	6	6	6	6	6	6	6
	Volts	460	460	460	575	575	575	208/230	208/230	460
	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)	1.4	1.4	1.4	1	1	1	2.4/2.4	2/2	1.4
	Amps (LRA, each)	2.4	2.4	2.4	1.8	1.8	1.8	4.7/4.7	3.9/3.9	2.4
Evaporator Fan	No.	1	1	1	1	1	1	1	1	1
	Volts	460	460	460	575	575	575	208/230	208/230	460
	Phase	3	3	3	3	3	3	3	3	3
	HP	5	7 1/2	7 1/2	5	7 1/2	7 1/2	7 1/2	10	7 1/2
	Amps (FLA, each)	6.6	9.6	9.6	5.3	7.8	7.8	24.2/24.2	28.5/28.5	9.6
	Amps (LRA, each)	46.3	67	67	39.4	53.8	53.8	136/136	178/178	67

ELECTRICAL DATA - RKNL (continued)

ELECTRICAL DATA - RKNL SERIES				
		B300DM	**B300YL**	**B300YM**
Unit Information	Unit Operating Voltage Range	414-506	518-632	518-632
	Volts	460	575	575
	Minimum Circuit Ampacity	63	47	50
	Minimum Overcurrent Protection Device Size	70	60	60
	Maximum Overcurrent Protection Device Size	80	60	60
Compressor Motor	No.	2	2	2
	Volts	460	575	575
	Phase	3	3	3
	RPM	3450	3450	3450
	HP, Compressor 1	11 1/2	11 1/2	11 1/2
	Amps (RLA), Comp. 1	18.6	14.7	14.7
	Amps (LRA), Comp. 1	125	100	100
	HP, Compressor 2	11 1/2	11 1/2	11 1/2
	Amps (RLA), Comp. 2	18.6	14.7	14.7
	Amps (LRA), Comp. 2	125	100	100
Condenser Motor	No.	6	6	6
	Volts	460	575	575
	Phase	1	1	1
	HP	1/3	1/3	1/3
	Amps (FLA, each)	1.4	1	1
	Amps (LRA, each)	2.4	1.8	1.8
Evaporator Fan	No.	1	1	1
	Volts	460	575	575
	Phase	3	3	3
	HP	10	7 1/2	10
	Amps (FLA, each)	12.5	7.8	10
	Amps (LRA, each)	74.6	53.8	59.2

X. TROUBLESHOOTING

FIGURE 24
COOLING TROUBLE SHOOTING CHART

⚠ WARNING

DISCONNECT ALL POWER TO UNIT BEFORE SERVICING. CONTACTOR MAY BREAK ONLY ONE SIDE. FAILURE TO SHUT OFF POWER CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

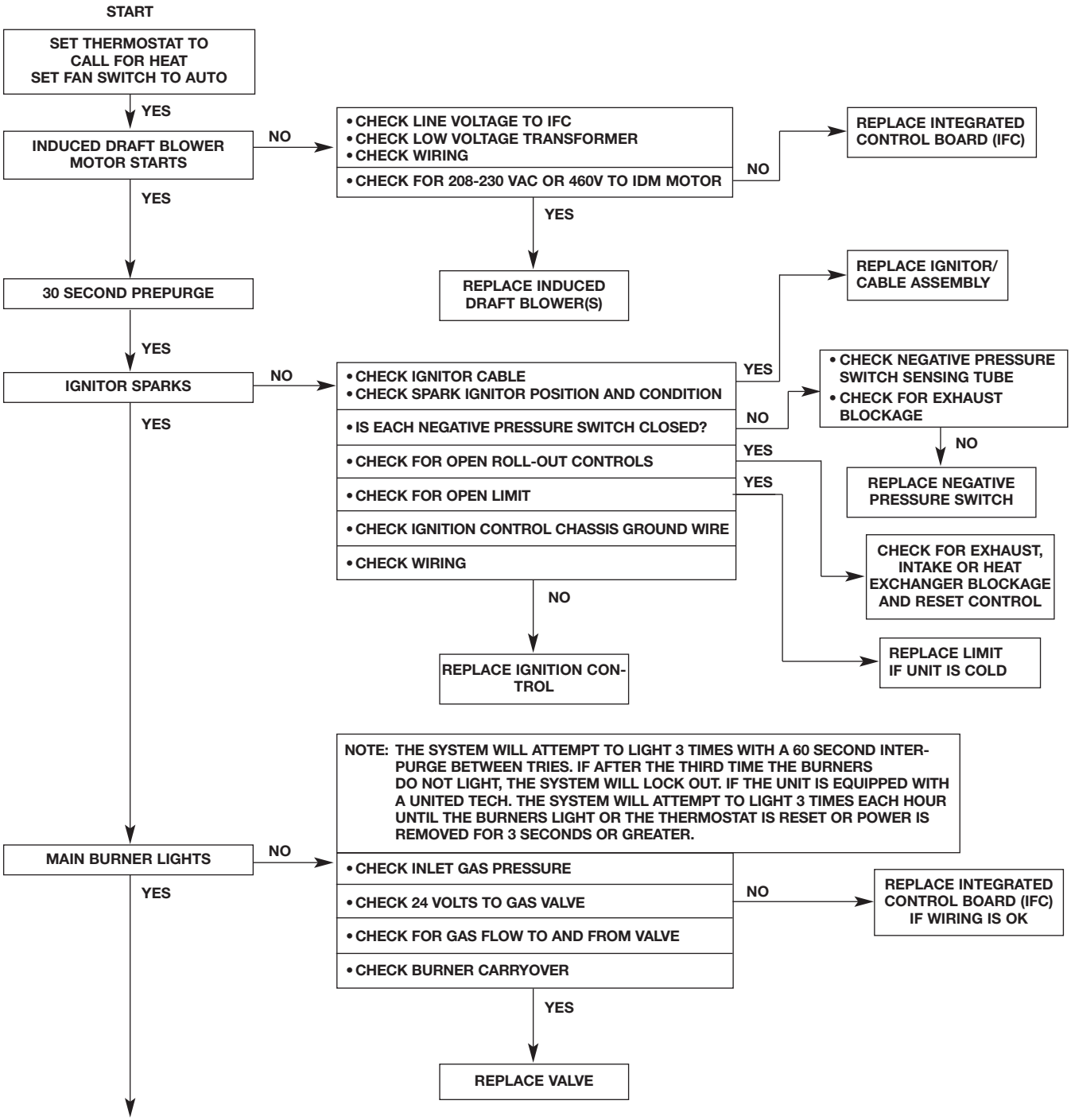
SYMPTOM	POSSIBLE CAUSE	REMEDY
Unit will not run	• Power off or loose electrical connection • Thermostat out of calibration-set too high • Failed contactor • Blown fuses • Transformer defective • High pressure control open (if provided) • Interconnecting low voltage wiring damaged	• Check for correct voltage at compressor contactor in control box • Reset • Check for 24 volts at contactor coil - replace if contacts are open • Replace fuses • Check wiring-replace transformer • Reset-also see high head pressure remedy-The high pressure control opens at 610 PSIG • Replace thermostat wiring
Condenser fan runs, compressor doesn't	• Loose connection • Compressor stuck, grounded or open motor winding open internal overload. • Low voltage condition • Low voltage condition	• Check for correct voltage at compressor - check & tighten all connections • Wait at least 2 hours for overload to reset. If still open, replace the compressor. • At compressor terminals, voltage must be within 10% of rating plate volts when unit is operating. • Increase voltage
Insufficient cooling	• Improperly sized unit • Improper airflow • Incorrect refrigerant charge • Air, non-condensibles or moisture in system • Incorrect voltage	• Recalculate load • Check - should be approximately 400 CFM per ton. • Charge per procedure attached to unit service panel. • Recover refrigerant, evacuate & recharge, add filter drier • At compressor terminals, voltage must be within 10% of rating plate volts when unit is operating.
Compressor short cycles	• Incorrect voltage • Defective overload protector • Refrigerant undercharge	• At compressor terminals, voltage must be ± 10% of nameplate marking when unit is operating. • Replace - check for correct voltage • Add refrigerant
Registers sweat	• Low evaporator airflow	• Increase speed of blower or reduce restriction - replace air filter
High head pressure-low vapor pressures	• Restriction in liquid line, expansion device or filter drier • TXV does not open	• Remove or replace defective component • Replace TXV
High head pressure-high or normal vapor pressure - Cooling mode	• Dirty condenser coil • Refrigerant overcharge • Condenser fan not running • Air or non-condensibles in system	• Clean coil • Correct system charge • Repair or replace • Recover refrigerant, evacuate & recharge
Low head pressure-high vapor pressures	• Defective Compressor valves	• Replace compressor
Low vapor pressure - cool compressor - iced evaporator coil	• Low evaporator airflow • Operating below 65°F outdoors • Moisture in system	• Increase speed of blower or reduce restriction - replace air filter • Add Low Ambient Kit • Recover refrigerant - evacuate & recharge - add filter drier
High vapor pressure	• Excessive load • Defective compressor	• Recheck load calculation • Replace
Fluctuating head & vapor pressures	• TXV hunting • Air or non-condensibles in system	• Check TXV bulb clamp - check air distribution on coil - replace TXV • Recover refrigerant, evacuate & recharge
Gurgle or pulsing noise at expansion device or liquid line	• Air or non-condensibles in system	• Recover refrigerant, evacuate & recharge

FIGURE 25
FURNACE TROUBLESHOOTING GUIDE
(COMBINATION HEATING AND COOLING UNITS WITH DIRECT SPARK IGNITION)

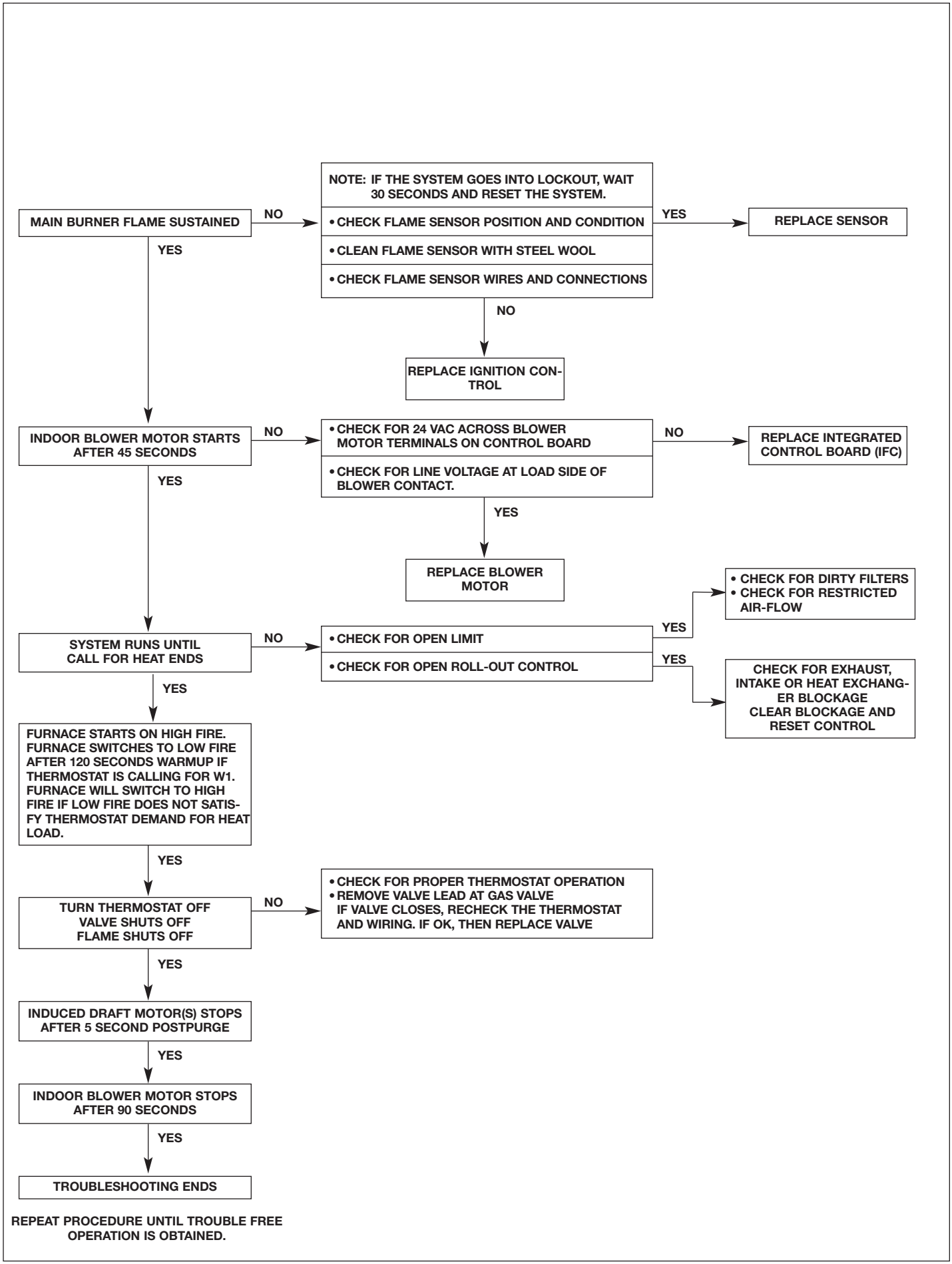
⚠ WARNING

HAZARDOUS VOLTAGE LINE VOLTAGE CONNECTIONS

DISCONNECT POWER BEFORE SERVICING.
SERVICE MUST BE BY A TRAINED, QUALIFIED SERVICE TECHNICIAN.



FLOW CHART CONTINUED ON NEXT PAGE


NOTE: IF THE SYSTEM GOES INTO LOCKOUT, WAIT 30 SECONDS AND RESET THE SYSTEM.
MAIN BURNER FLAME SUSTAINED
NO
YES
• CHECK FLAME SENSOR POSITION AND CONDITION
• CLEAN FLAME SENSOR WITH STEEL WOOL
• CHECK FLAME SENSOR WIRES AND CONNECTIONS
YES
REPLACE SENSOR
NO
REPLACE IGNITION CONTROL
INDOOR BLOWER MOTOR STARTS AFTER 45 SECONDS
NO
YES
• CHECK FOR 24 VAC ACROSS BLOWER MOTOR TERMINALS ON CONTROL BOARD
• CHECK FOR LINE VOLTAGE AT LOAD SIDE OF BLOWER CONTACT.
NO
REPLACE INTEGRATED CONTROL BOARD (IFC)
YES
REPLACE BLOWER MOTOR
SYSTEM RUNS UNTIL CALL FOR HEAT ENDS
NO
YES
• CHECK FOR OPEN LIMIT
• CHECK FOR OPEN ROLL-OUT CONTROL
YES
• CHECK FOR DIRTY FILTERS
• CHECK FOR RESTRICTED AIR-FLOW
YES
CHECK FOR EXHAUST, INTAKE OR HEAT EXCHANGER BLOCKAGE
CLEAR BLOCKAGE AND RESET CONTROL
FURNACE STARTS ON HIGH FIRE. FURNACE SWITCHES TO LOW FIRE AFTER 120 SECONDS WARMUP IF THERMOSTAT IS CALLING FOR W1. FURNACE WILL SWITCH TO HIGH FIRE IF LOW FIRE DOES NOT SATISFY THERMOSTAT DEMAND FOR HEAT LOAD.
YES
TURN THERMOSTAT OFF
VALVE SHUTS OFF
FLAME SHUTS OFF
NO
• CHECK FOR PROPER THERMOSTAT OPERATION
• REMOVE VALVE LEAD AT GAS VALVE
IF VALVE CLOSES, RECHECK THE THERMOSTAT AND WIRING. IF OK, THEN REPLACE VALVE
YES
INDUCED DRAFT MOTOR(S) STOPS AFTER 5 SECOND POSTPURGE
YES
INDOOR BLOWER MOTOR STOPS AFTER 90 SECONDS
YES
TROUBLESHOOTING ENDS
REPEAT PROCEDURE UNTIL TROUBLE FREE OPERATION IS OBTAINED.

XI. WIRING DIAGRAMS

FIGURE 26
RKNL SERIES

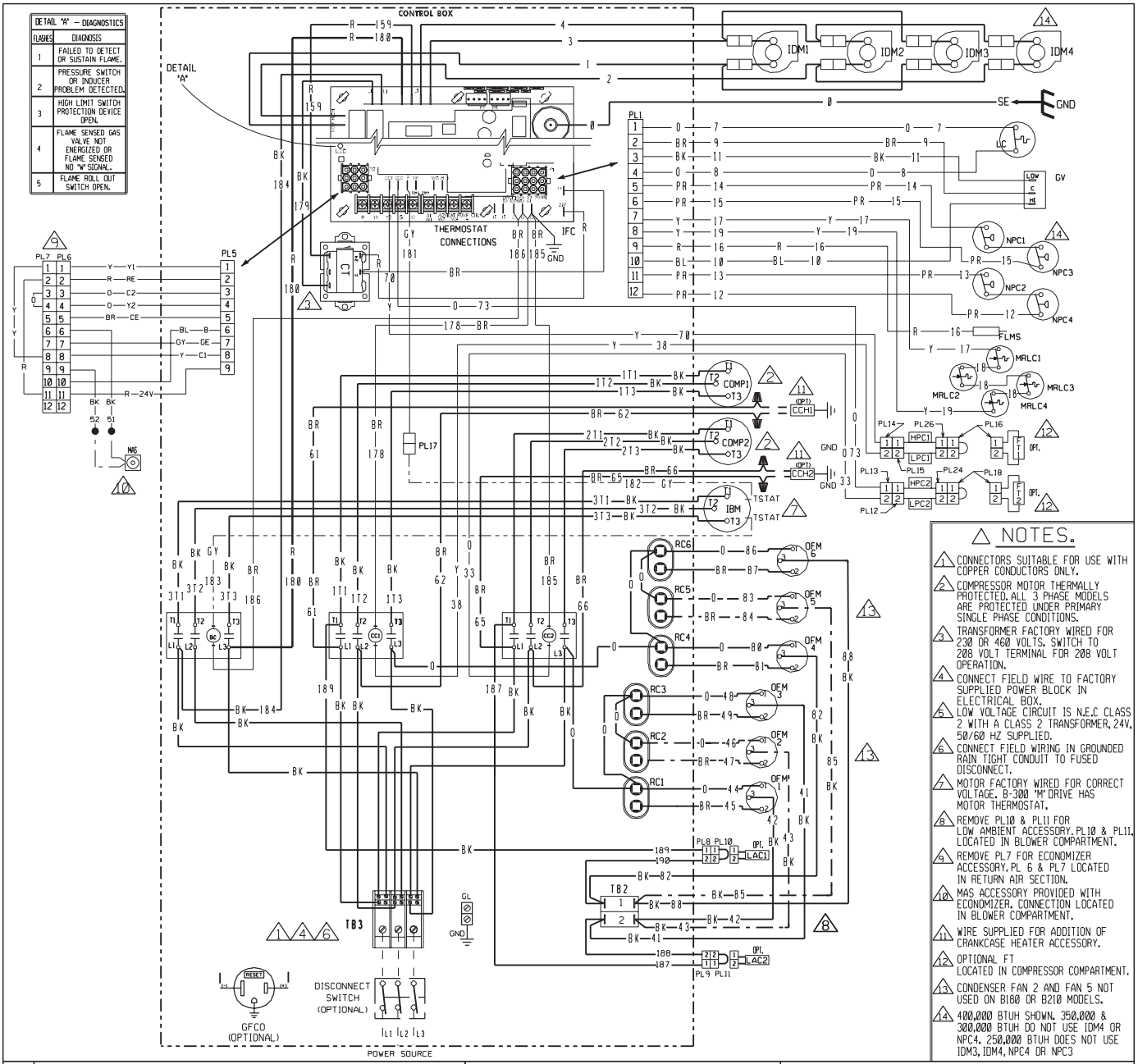
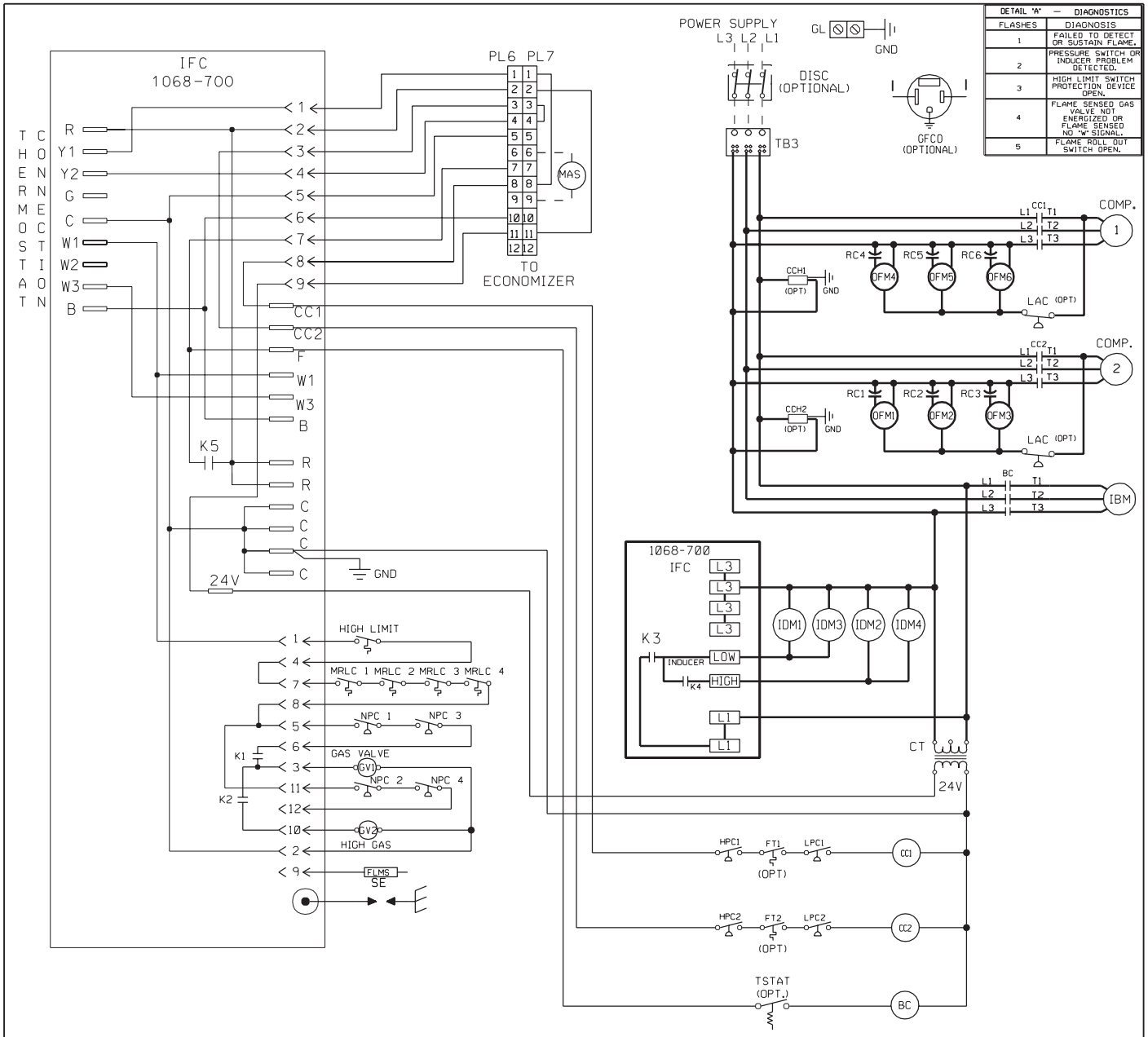


FIGURE 27
RKNL SERIES



DWG. NO. 90-42517-31
REV. 02

COMPONENT CODE

BC	BLOWER CONTACTOR	LPC	LOW PRESSURE CONTROL
CC	COMPRESSOR CONTACTOR	MAS	MIX AIR SENSOR
CCH	CRANKCASE HEATER	MRLC	MANUAL RESET LIMIT CONTROL
COMP	COMPRESSOR	NPC	NEGATIVE PRESSURE CONTROL
CT	CONTROL TRANSFORMER	OFM	OUTDOOR FAN MOTOR
DISC	DISCONNECT SWITCH	PL	PLUG
FLMS	FLAME SENSOR	RC	RUN CAPACITOR
FT	FREEZE STAT	SE	SPARK ELECTRODE
GFCO	GROUND FAULT CONVENIENCE OUTLET	TB	TERMINAL BLOCK
		TSTAT	MOTOR THERMOSTAT
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		
LC	LIMIT CONTROL		

WIRING INFORMATION

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

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

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

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

WIRE COLOR CODE

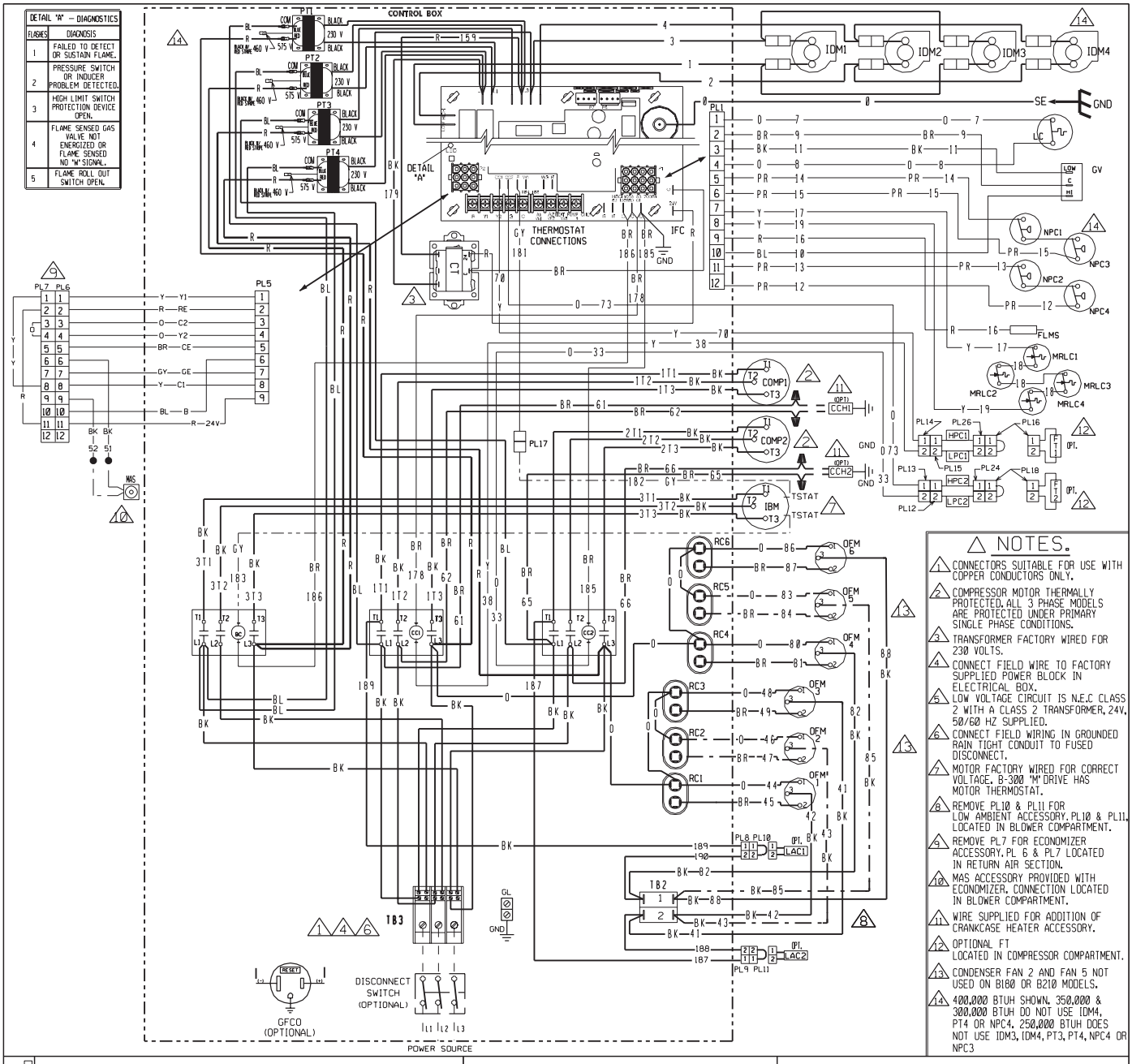
BK	BLACK	O	ORANGE
BR	BROWN	PR	PURPLE
BL	BLUE	R	RED
G	GREEN	W	WHITE
GY	GRAY	Y	YELLOW

WIRING SCHEMATIC
RKNL-B180/210/240/300

208-230/460V, 3 PH, 60 HZ.
ROOFTOP

DR. BY	APP. BY	DATE	DWG. NO.	REV
JRJ		12-29-03	90-42517-31	02

FIGURE 28
RKNL SERIES



NOTES.

1. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. COMPRESSOR MOTOR THERMALLY PROTECTED. ALL 3 PHASE MODELS ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
3. TRANSFORMER FACTORY WIRED FOR 230 VOLTS.
4. CONNECT FIELD WIRE TO FACTORY SUPPLIED POWER BLOCK IN ELECTRICAL BOX.
5. LOW VOLTAGE CIRCUIT IS N.E.C CLASS 2 WITH A CLASS 2 TRANSFORMER, 24V, 50/60 HZ SUPPLIED.
6. CONNECT FIELD WIRING IN GROUNDED RAIN TIGHT CONDUIT TO FUSED DISCONNECT.
7. MOTOR FACTORY WIRED FOR CORRECT VOLTAGE. B-300 "M" DRIVE HAS MOTOR THERMOSTAT.
8. REMOVE PL10 & PL11 FOR LOW AMBIENT ACCESSORY. PL10 & PL11, LOCATED IN BLOWER COMPARTMENT.
9. REMOVE PL7 FOR ECONOMIZER ACCESSORY. PL 6 & PL7 LOCATED IN RETURN AIR SECTION.
10. MAS ACCESSORY PROVIDED WITH ECONOMIZER. CONNECTION LOCATED IN BLOWER COMPARTMENT.
11. WIRE SUPPLIED FOR ADDITION OF CRANKCASE HEATER ACCESSORY.
12. OPTIONAL FT LOCATED IN COMPRESSOR COMPARTMENT.
13. CONDENSER FAN 2 AND FAN 5 NOT USED ON B180 OR B210 MODELS.
14. 400,000 BTUH SHOWN. 350,000 & 300,000 BTUH DO NOT USE IDM4, PT4 OR NPC4. 250,000 BTUH DOES NOT USE IDM3, IDM4, PT3, PT4, NPC4 OR NPC3

COMPONENT CODE

BC	BLOWER CONTACTOR
CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
COMP	COMPRESSOR
CT	CONTROL TRANSFORMER
DISC	DISCONNECT SWITCH
FLMS	FLAME SENSOR
FT	FREEZE STAT
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
OFM	OUTDOOR FAN MOTOR
RC	RUN CAPACITOR
SE	SPARK ELECTRODE
TB	TERMINAL BLOCK
TSTAT	MOTOR THERMOSTAT
PL	PLUG
PT	POWER TRANSFORMER
⚠	WIRE NUT

WIRING INFORMATION

LINE VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED

LOW VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED

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

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

WIRE COLOR CODE

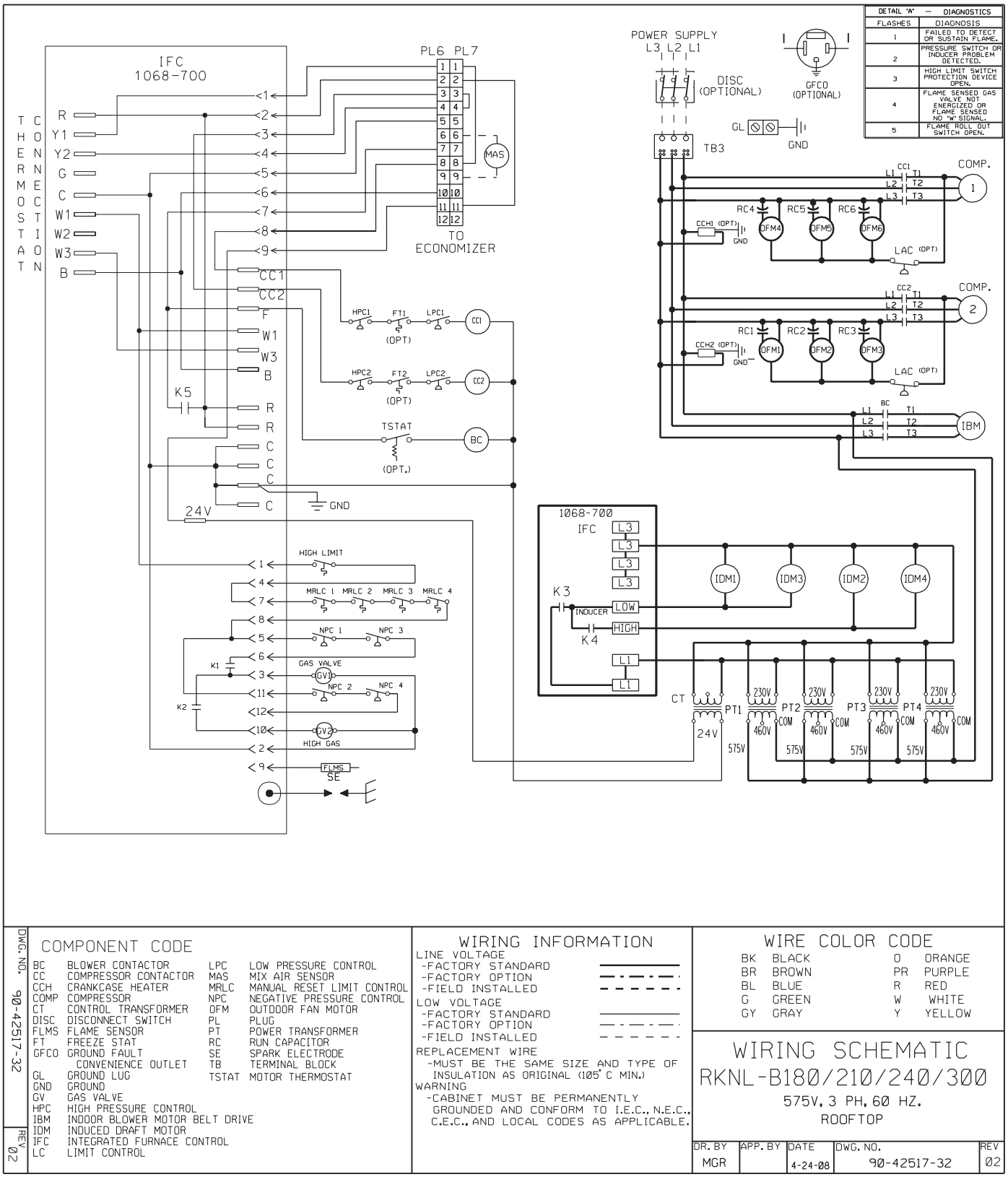
BK	BLACK	O	ORANGE
BR	BROWN	PR	PURPLE
BL	BLUE	R	RED
G	GREEN	W	WHITE
GY	GRAY	Y	YELLOW

WIRING DIAGRAM
RKNL-B180/210/240/300
575V 3 PH, 60 HZ.
ROOFTOP

DR. BY	APP. BY	DATE	DWG. NO.	REV
MGR		7-9-07	90-42517-29	04

DWG. NO. 90-42517-29 REV 04

FIGURE 29
RKNL SERIES



COMPONENT CODE

BC	BLOWER CONTACTOR	LPC	LOW PRESSURE CONTROL
CC	COMPRESSOR CONTACTOR	MAS	MIX AIR SENSOR
CCH	CRANKCASE HEATER	MRLC	MANUAL RESET LIMIT CONTROL
COMP	COMPRESSOR	NPC	NEGATIVE PRESSURE CONTROL
CT	CONTROL TRANSFORMER	OFM	OUTDOOR FAN MOTOR
DISC	DISCONNECT SWITCH	PL	PLUG
FLMS	FLAME SENSOR	PT	POWER TRANSFORMER
FT	FREEZE STAT	RC	RUN CAPACITOR
GFCO	GROUND FAULT CONVENIENCE OUTLET	SE	SPARK ELECTRODE
GL	GROUND LUG	TB	TERMINAL BLOCK
GND	GROUND	TSTAT	MOTOR THERMOSTAT
GV	GAS VALVE		
HPC	HIGH PRESSURE CONTROL		
IBM	INDOOR BLOWER MOTOR BELT DRIVE		
IDM	INDUCED DRAFT MOTOR		
IFC	INTEGRATED FURNACE CONTROL		
LC	LIMIT CONTROL		

WIRING INFORMATION

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

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

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

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

WIRE COLOR CODE

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

WIRING SCHEMATIC
RKNL-B180/210/240/300
575V, 3 PH, 60 HZ.
ROOFTOP

DR. BY	APP. BY	DATE	DWG. NO.	REV
MGR		4-24-08	90-42517-32	02

DWG. NO. 90-42517-32 REV. 02

XII. CHARGE CHARTS

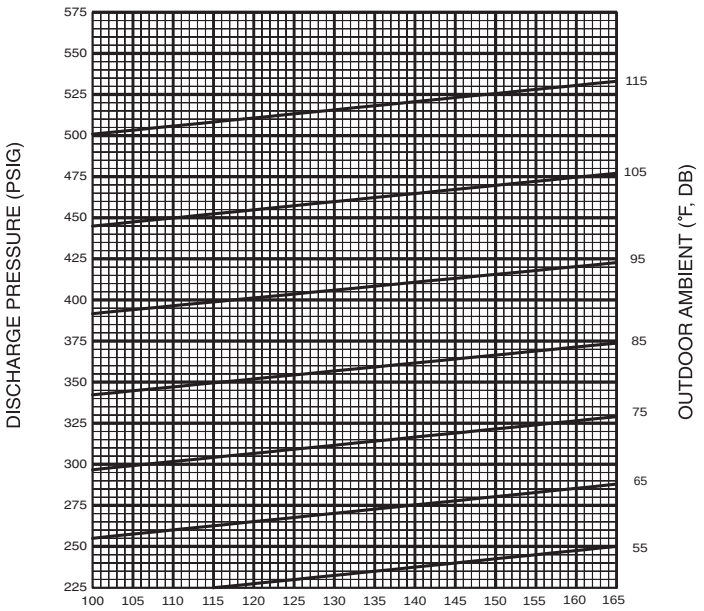
FIGURE 30

RKNL SYSTEM CHARGE CHARTS

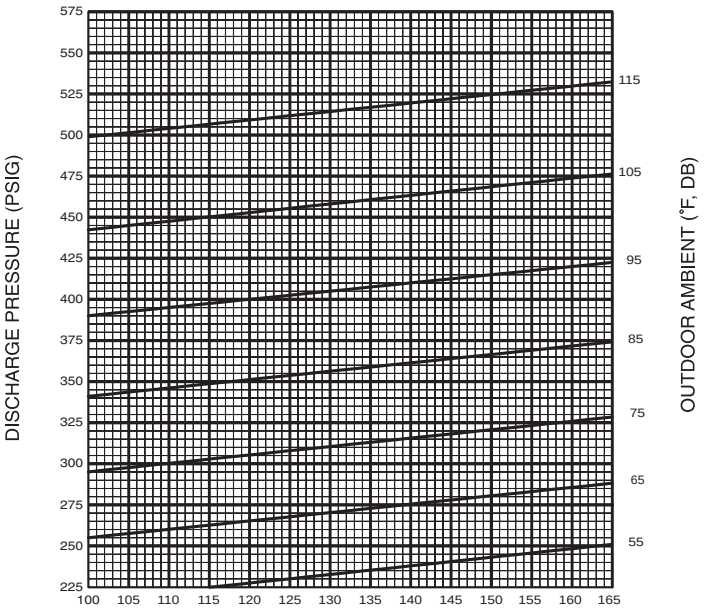
SYSTEM CHARGE CHART - REFRIGERANT 410A
-B180, CIRCUITS 1 & 2

CAUTION:
1. BOTH COMPRESSORS MUST BE OPERATING BEFORE CHECKING REFRIGERANT CHARGE.
2. RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!

INSTRUCTIONS:
1. MEASURE PRESSURE AT COMPRESSOR SUCTION AND DISCHARGE.
2. MEASURE OUTDOOR AMBIENT TO UNIT.
3. PLACE (X) ON CHART WHERE SUCTION AND DISCHARGE INTERSECT.
4. IF (X) IS BELOW OUTDOOR AMBIENT LINE, ADD CHARGE AND REPEAT STEPS 1-3.
5. IF (X) IS ABOVE OUTDOOR AMBIENT LINE, RECOVER EXCESS CHARGE AND REPEAT STEPS 1-3.



-B180, CIRCUIT 1



-B180, CIRCUIT 2

92-102778-01-00

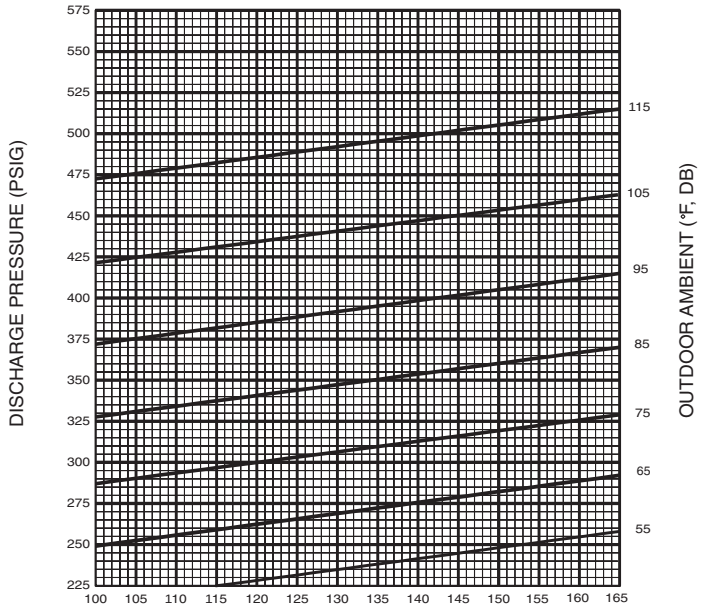
FIGURE 31

RKNL SYSTEM CHARGE CHARTS

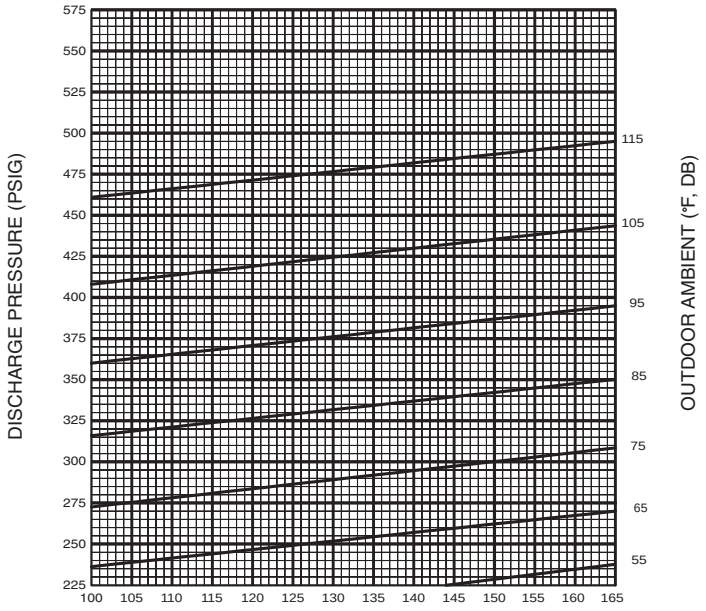
SYSTEM CHARGE CHART - REFRIGERANT 410A
-B240, CIRCUITS 1 & 2

CAUTION:
1. BOTH COMPRESSORS MUST BE OPERATING BEFORE CHECKING REFRIGERANT CHARGE.
2. RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!

INSTRUCTIONS:
1. MEASURE PRESSURE AT COMPRESSOR SUCTION AND DISCHARGE.
2. MEASURE OUTDOOR AMBIENT TO UNIT.
3. PLACE (X) ON CHART WHERE SUCTION AND DISCHARGE INTERSECT.
4. IF (X) IS BELOW OUTDOOR AMBIENT LINE, ADD CHARGE AND REPEAT STEPS 1-3.
5. IF (X) IS ABOVE OUTDOOR AMBIENT LINE, RECOVER EXCESS CHARGE AND REPEAT STEPS 1-3.



-B240, CIRCUIT 1



-B240, CIRCUIT 2

92-102778-03-00

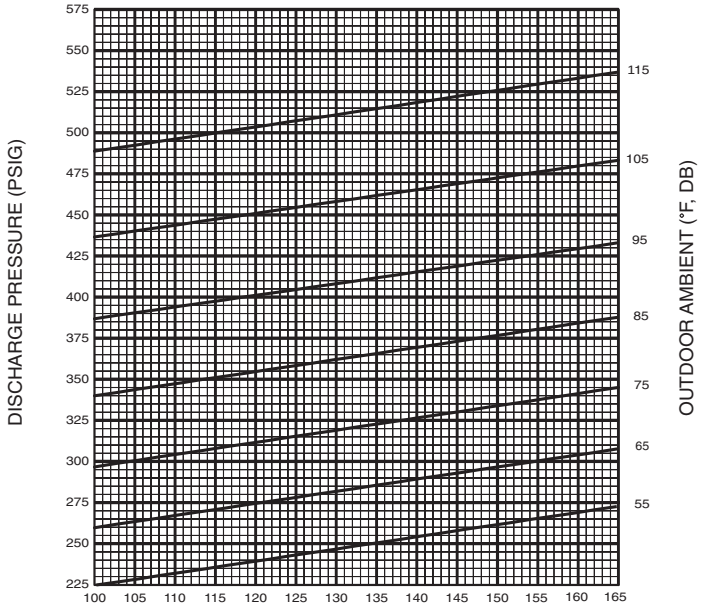
FIGURE 32

RKNL SYSTEM CHARGE CHARTS

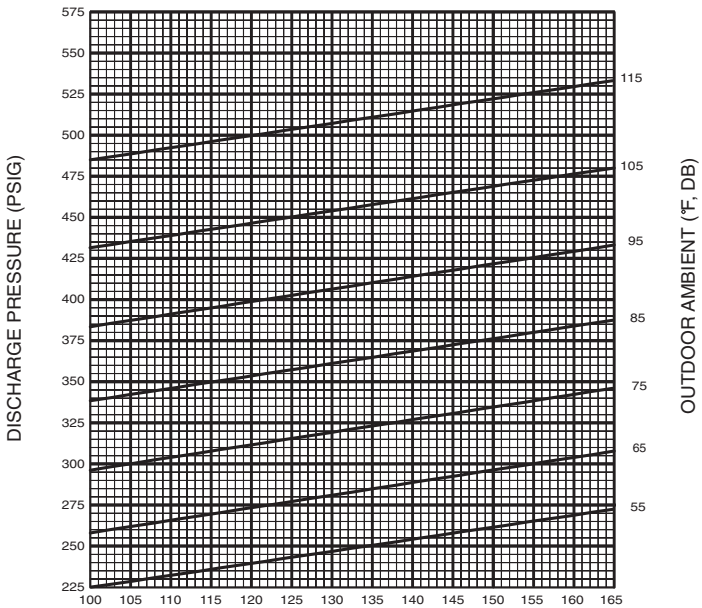
SYSTEM CHARGE CHART - REFRIGERANT 410A
-B300, CIRCUITS 1 & 2

CAUTION:
1. BOTH COMPRESSORS MUST BE OPERATING BEFORE CHECKING REFRIGERANT CHARGE.
2. RETURN AIR TEMPERATURE MUST BE WITHIN COMFORT CONDITIONS BEFORE FINAL REFRIGERANT CHECK!

INSTRUCTIONS:
1. MEASURE PRESSURE AT COMPRESSOR SUCTION AND DISCHARGE.
2. MEASURE OUTDOOR AMBIENT TO UNIT.
3. PLACE (X) ON CHART WHERE SUCTION AND DISCHARGE INTERSECT.
4. IF (X) IS BELOW OUTDOOR AMBIENT LINE, ADD CHARGE AND REPEAT STEPS 1-3.
5. IF (X) IS ABOVE OUTDOOR AMBIENT LINE, RECOVER EXCESS CHARGE AND REPEAT STEPS 1-3.



-B300, CIRCUIT 1



-B300, CIRCUIT 2

92-102778-04-00