

INSTALLATION INSTRUCTIONS

FOR COMBINATION HEATING AND COOLING ROOFTOP UNITS

RKNL-G SERIES 7.5, 10 & 12.5 TON

[26.4, 35.2 & 44 kW]



⚠️ RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!

⚠️ WARNING

IF THE INFORMATION IN THESE INSTRUCTIONS IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT, CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

⚠️ WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED 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, CARBON MONOXIDE POISONING, EXPLOSION, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

⚠️ WARNING

PROPOSITION 65 WARNING: THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

⚠️ WARNING

- Do not store or use gasoline or other flammable vapors and liquids, or other combustible materials in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
 - Do not return to your home until authorized by the gas supplier or fire department.
- DO NOT RELY ON SMELL ALONE TO DETECT LEAKS. DUE TO VARIOUS FACTORS, YOU MAY NOT BE ABLE TO SMELL FUEL GASES.
 - U.L. recognized fuel gas and CO detectors are recommended in all applications, and their installation should be in accordance with the manufacturer's recommendations and/or local laws, rules, regulations, or customs.
- Improper installation, adjustment, alteration, service or maintenance can cause injury, property damage or death. Refer to this manual. Installation and service must be performed by a qualified installer, service agency or the gas supplier. In the commonwealth of Massachusetts, installation must be performed by a licensed plumber or gas fitter for appropriate fuel.

Featuring New Industry Standard R-410A

R-410A



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



TABLE OF CONTENTS

	Page No.
INTRODUCTION	2
Checking Product Received	2
I. SPECIFICATIONS	2
General	2
Major Components	2
R-410A Refrigerant	2
Safety Information	3
Unit Dimensions	4-6
General Data	7-13
Electrical Data	14-15
II. INSTALLATION	16
General	16
Location Considerations	16
Outside Installation	16
Exhaust & Combustion	
Air Inlet Hoods	17
Cover Panel Installation	17
Filter Replacement	17
Clearances	18
Rooftop Installation	19
Ducting	19
Return Air	20
III. GAS SUPPLY & PIPING	21
Gas Connection	21
LP Conversion	22
Adjusting or Checking	
Furnace Input	22
Condensate Drain	23
IV. WIRING	24
Power Supply	24
Hook-up	25
Internal Wiring	25
Thermostat	25
V. FURNACE CONTROLS	26
Operating Sequence	26
Operating Instructions	26
Burners	27
Manual Reset	27
Pressure Switch	27
Limit Control	27
VI. HUMIDIDRY SYSTEM	27
Humidity Sensor	27
Refrigerant Solenoid Valves	28
Operation	28
VII. VARIABLE FREQUENCY DRIVE	28
VFD Model	28
Replacement	28
Operation	28
VIII. OUTDOOR FAN MOTOR CONTROLLER	28
XIX. OPERATION	29
Cooling Mode	29
XX. SYSTEM OPERATION INFO	29
Advise Customer	29
Furnace Maintenance	29
Lubrication	29
Cooling Maintenance	30
Replacement Parts	30
Troubleshooting	30
Wiring Diagrams	30
Charging	30
AIRFLOW PERFORMANCE	31-33
TROUBLESHOOTING	34-36
WIRING DIAGRAMS	37-38
CHARGE CHARTS	39-41

INTRODUCTION

▲ 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.

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.

CHECKING PRODUCT RECEIVED

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 150,000, 225,000 and 252,000 BTUH heating input. Cooling capacity is 7.5 & 10 nominal 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.

The units are weatherized for mounting outside of the building.

▲ 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.

The information on the rating plate is in compliance with the FTC and DOE rating for single phase units. The following information is for three phase units which **are not** covered under the DOE certification program.

1. The energy consumption of the ignition system used with this unit is 175 watts.
2. The efficiency rating of this unit is a product thermal efficiency rating determined under continuous operating conditions independent of any installed system.

B. MAJOR COMPONENTS

The unit includes a hermetically-sealed refrigerating system (consisting of a scroll compressor, condenser coil, evaporator coil with fixed restrictor assembly or TXV, microchannel reheat coil, solenoid valves), a circulation air blower, condenser fans, variable frequency drive (VFD), outdoor fan motor controller (OFMC), a heat exchanger assembly, gas burner and control assembly, combustion air motor 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. R-410A REFRIGERANT

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

1. Specifications of R-410A:

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

Pressure: The pressure of R-410A is approximately 60% (1.6 times) greater than R-22. 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. **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. 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 PRESSURE 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 THE FACTORY SUPPLIED EXHAUST AND COMBUSTION AIR INLET HOODS ONLY, AS SPECIFIED IN THE EXHAUST AND COMBUSTION AIR INLET HOODS INSTALLATION SECTION OF THESE INSTRUCTIONS.

▲ WARNING

NEVER TEST FOR GAS LEAKS WITH AN OPEN FLAME. USE A COMMERCIALY 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

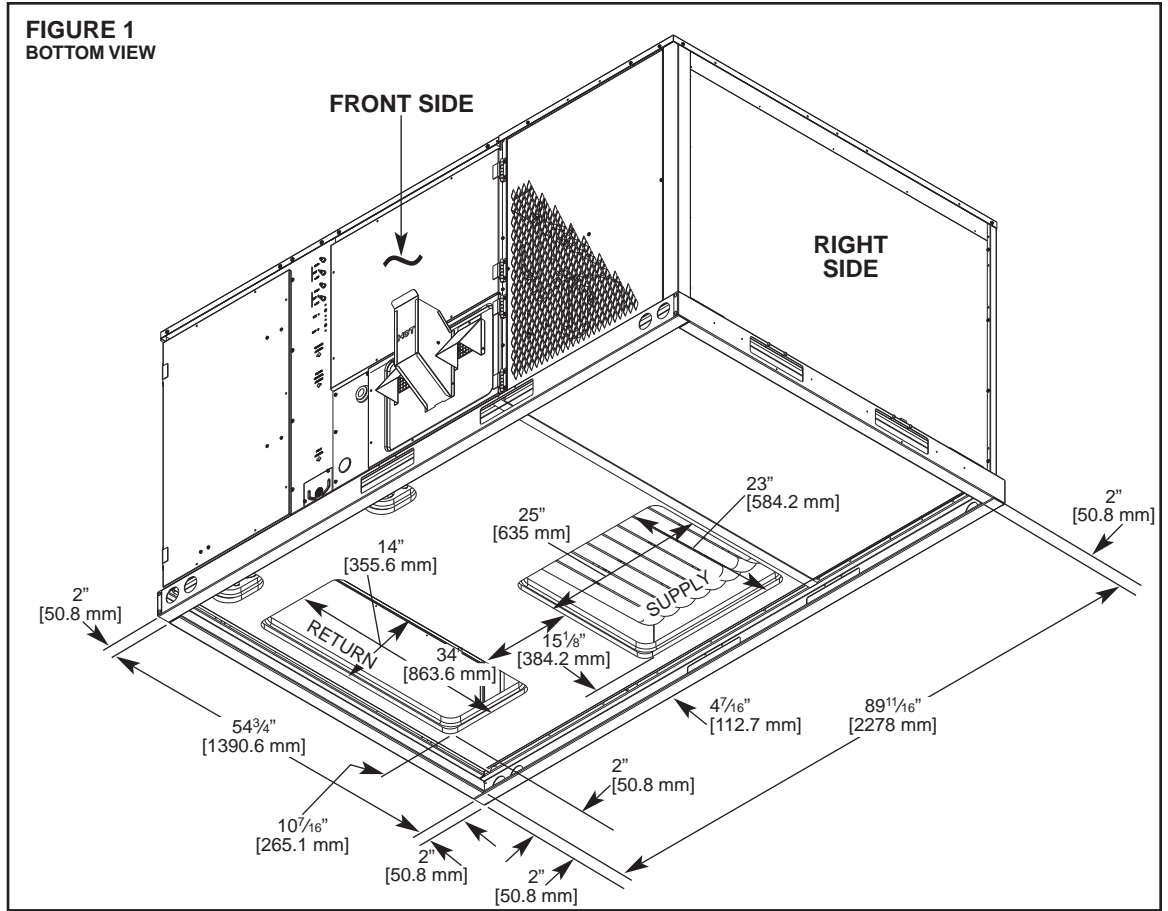
THIS UNIT MAY BE USED TO HEAT THE BUILDING OR STRUCTURE DURING CONSTRUCTION IF THE FOLLOWING INSTALLATION REQUIREMENTS ARE MET. INSTALLATION MUST COMPLY WITH ALL INSTALLATION INSTRUCTIONS INCLUDING:

- 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;
- 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

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**



**FIGURE 2
CABINET DIMENSIONS
AND ACCESS LOCATIONS**

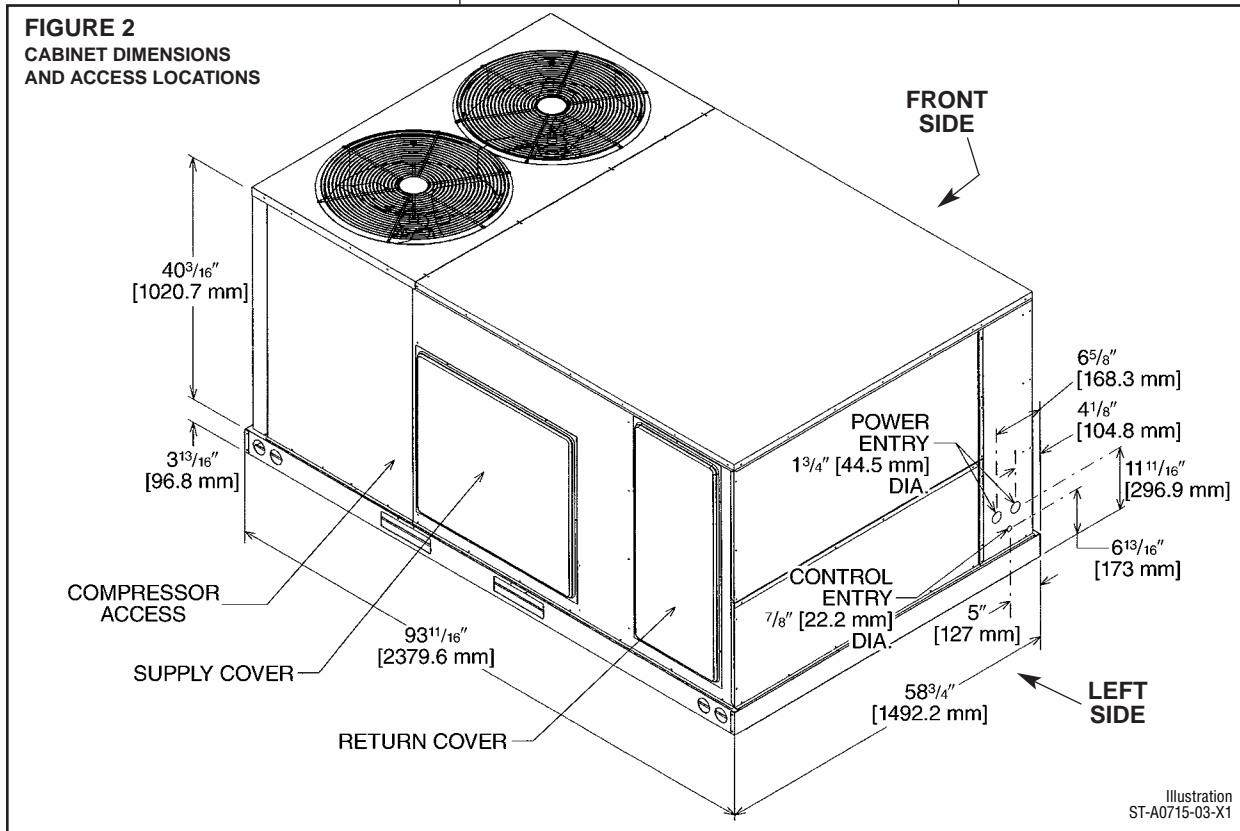


Illustration
ST-A0715-03-X1

FIGURE 3

SUPPLY AND RETURN DIMENSIONS FOR DOWNFLOW APPLICATIONS

(BOTTOM VIEW)

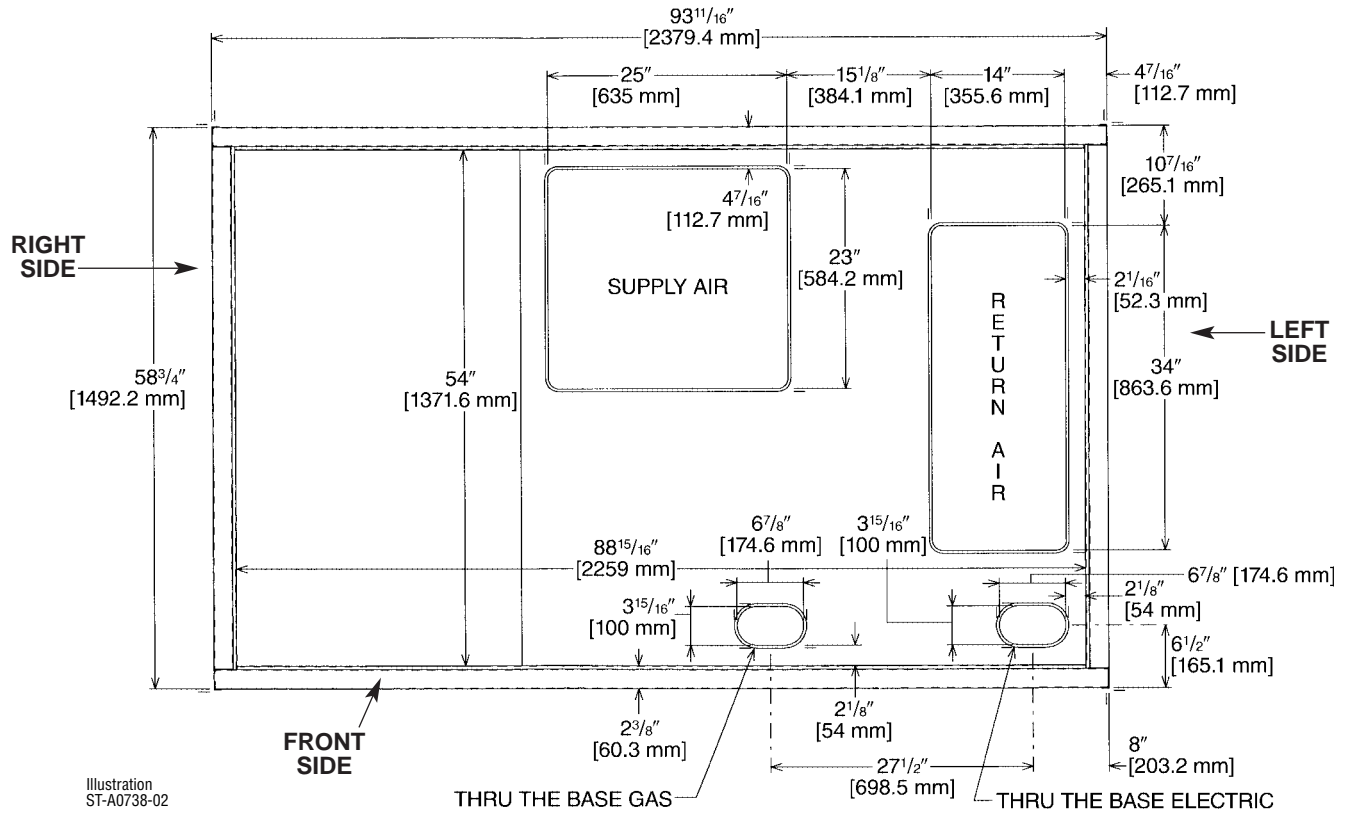
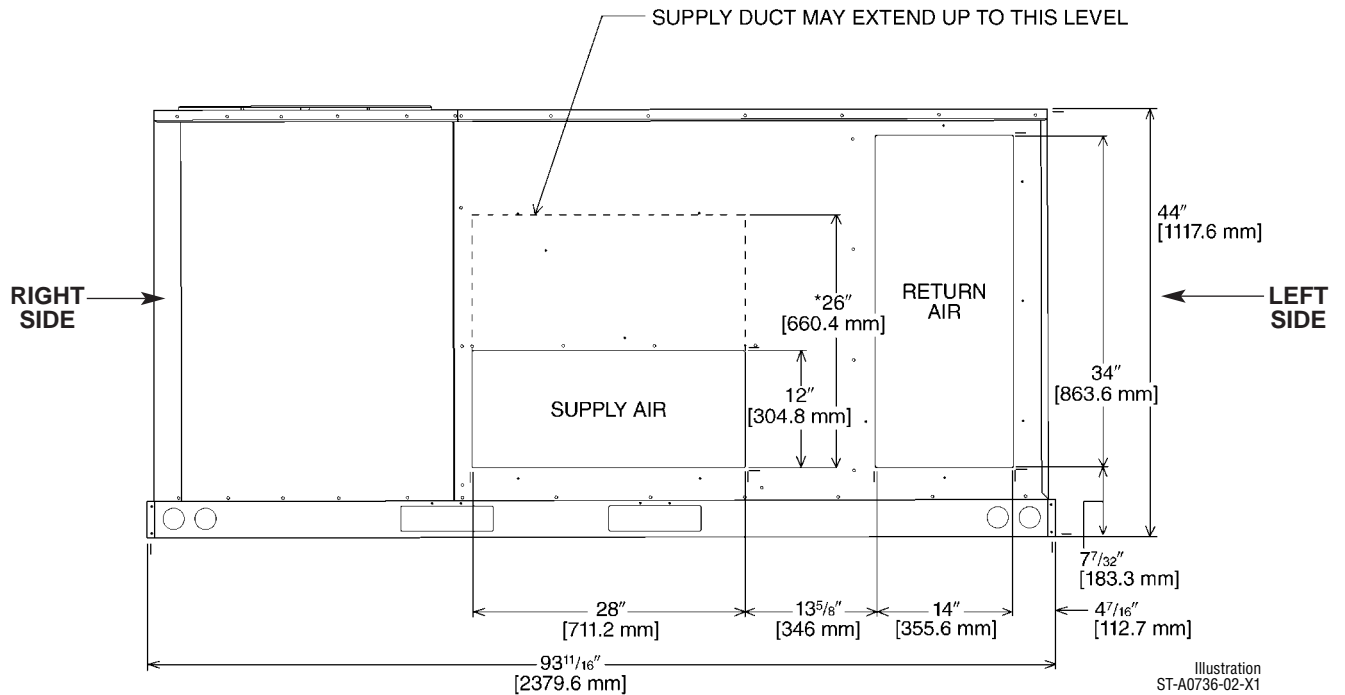


FIGURE 4

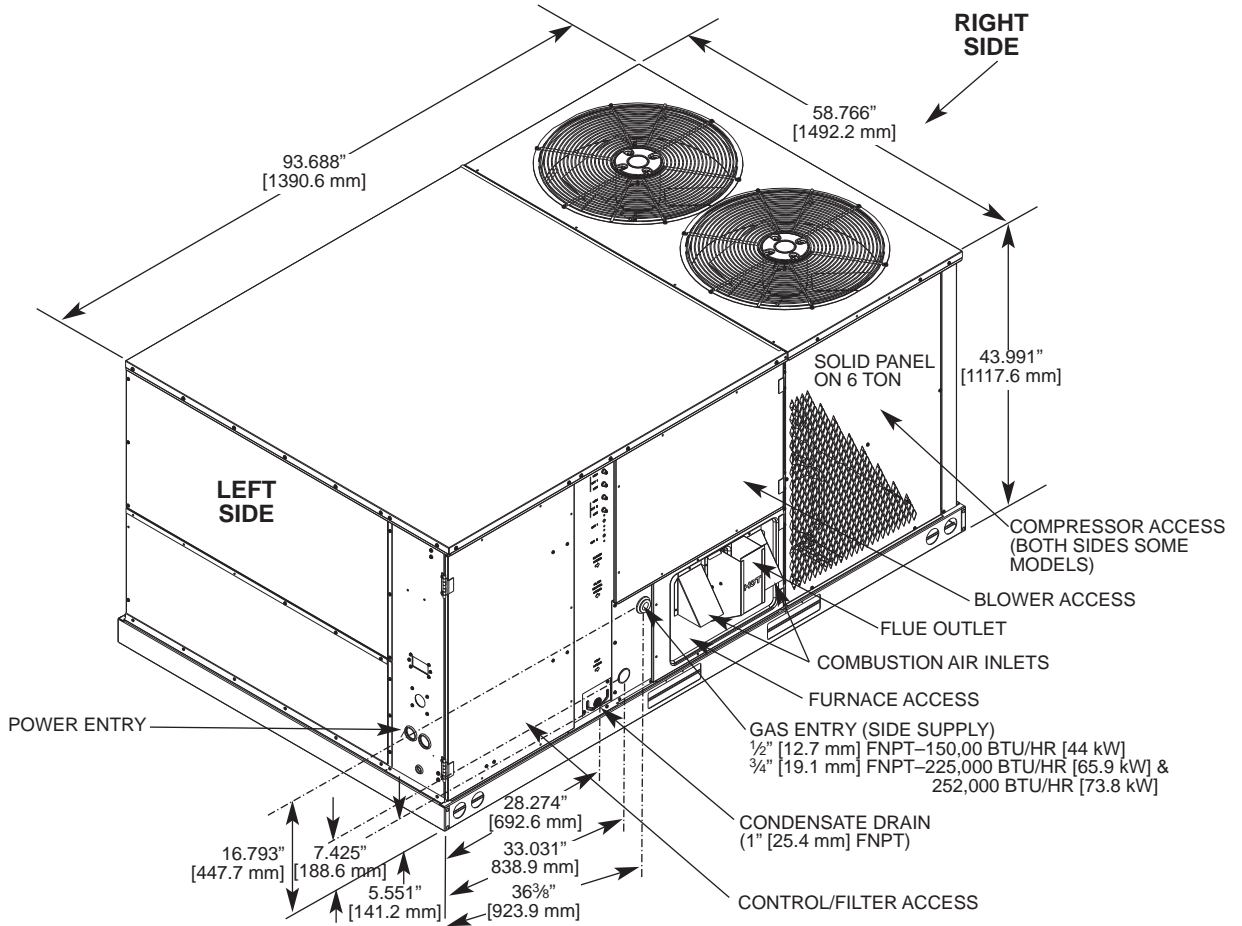
SUPPLY AND RETURN DIMENSIONS FOR HORIZONTAL APPLICATIONS

(SIDE VIEW - REAR)

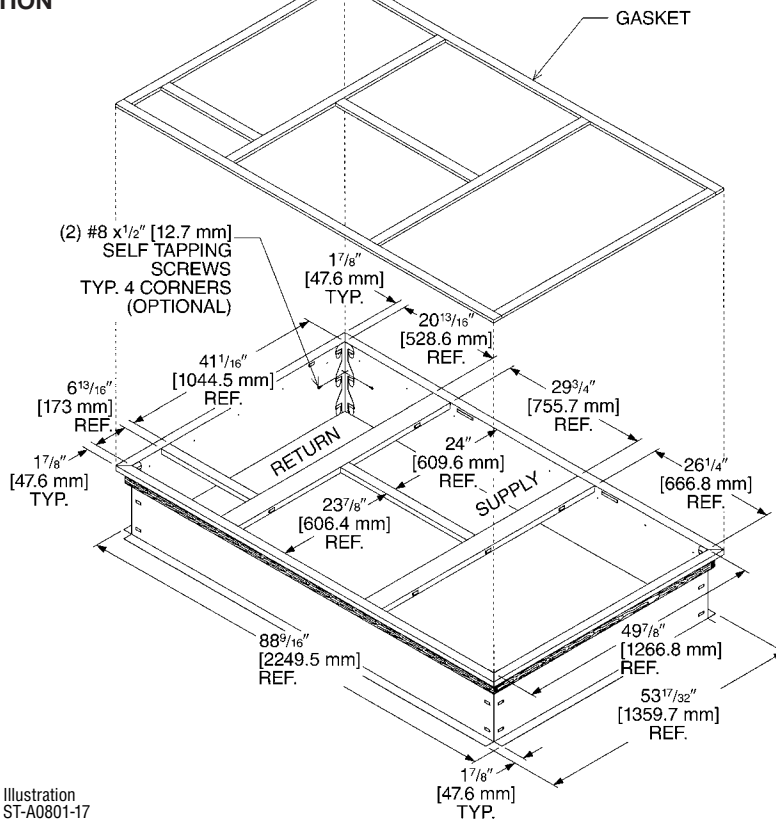


*RECOMMENDED DUCT DIMENSIONS ARE 26"

FIGURE 5



**FIGURE 6
ROOFCURB INSTALLATION**



GENERAL DATA - RKNL MODELS

NOM. SIZES 7.5-12.5 TON [26.4 - 44 kW]

Model RKNL-Series	G090CR15E	G090CR22E	G090CS15E	G090CS22E
Cooling Performance¹				CONTINUED →
Gross Cooling Capacity Btu [kW]	93,000 [27.25]	93,000 [27.25]	93,000 [27.25]	93,000 [27.25]
EER/SEER ²	11.2/NA	11.2/NA	11.2/NA	11.2/NA
Nominal CFM/AHRI Rated CFM [L/s]	3000/2775 [1416/1310]	3000/2775 [1416/1310]	3000/2775 [1416/1310]	3000/2775 [1416/1310]
AHRI Net Cooling Capacity Btu [kW]	90,000 [26.37]	90,000 [26.37]	90,000 [26.37]	90,000 [26.37]
Net Sensible Capacity Btu [kW]	63,100 [18.49]	63,100 [18.49]	63,100 [18.49]	63,100 [18.49]
Net Latent Capacity Btu [kW]	26,900 [7.88]	26,900 [7.88]	26,900 [7.88]	26,900 [7.88]A
IEER ³	14.5	14.5	14.5	14.5
Net System Power kW	7.99	7.99	7.99	7.99
Heating Performance (Gas)⁴				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13.9-30.6]/25-55 [13.9-30.6]	40-70 [22.8-38.9]/40-70 [22.2-38.9]	25-55 [13.9-30.6]/25-55 [13.9-30.6]	40-70 [22.8-38.9]/40-70 [22.2-38.9]
Steady State Efficiency (%)	81	81	81	81
No. Burners	6	9	6	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.75 [19.05]	0.5 [12.7]	0.75 [19.05]
Compressor				
No./Type	1/Scroll	1/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)⁵	88	88	88	88
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]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
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]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
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]
Re-Heat Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.709 [18]	0.709 [18]	0.709 [18]	0.709 [18]
Face Area sq. ft. [sq. m]	5.9 [0.55]	5.9 [0.55]	5.9 [0.55]	5.9 [0.55]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Outdoor Fan—Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
No. Motors/HP	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP	2 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]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
Drive Type	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Speeds	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1
Motor HP	2	2	3	2
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	56	56	56
Filter—Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(No.) Size Recommended in. [mm x mm x mm]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	146/112 [4139/3175]	146/112 [4139/3175]	146/112 [4139/3175]	146/112 [4139/3175]
Weights				
Net Weights lbs. [kg]	1067 [484]	1103 [500]	1075 [488]	1103 [500]
Ship Weights lbs. [kg]	1104 [501]	1140 [517]	1112 [504]	1140 [517]

NOTES:

- Cooling Performance is rated at 95° F ambient, 80° F entering dry bulb, 67° F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to 20% of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
- EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
- IEER is rated in accordance with AHRI Standard 340/360. Units are rated at 80° F ambient, 80° F entering dry bulb, and 67° F entering wet bulb at ARI rated cfm.
- Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standard Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.
- Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

GENERAL DATA - RKNL MODELS

NOM. SIZES 7.5-12.5 TON [26.4 - 44 kW]

Model RKNL-Series	G09OCT15E	G09OCT22E	G09ODR15E	G09ODR22E
Cooling Performance¹				CONTINUED →
Gross Cooling Capacity Btu [kW]	93,000 [27.25]	93,000 [27.25]	93,000 [27.25]	93,000 [27.25]
EER/SEER ²	11.2/NA	11.2/NA	11.2/NA	11.2/NA
Nominal CFM/AHRI Rated CFM [L/s]	3000/2775 [1416/1310]	3000/2775 [1416/1310]	3000/2775 [1416/1310]	3000/2775 [1416/1310]
AHRI Net Cooling Capacity Btu [kW]	90,000 [26.37]	90,000 [26.37]	90,000 [26.37]	90,000 [26.37]
Net Sensible Capacity Btu [kW]	63,100 [18.49]	63,100 [18.49]	63,100 [18.49]	63,100 [18.49]
Net Latent Capacity Btu [kW]	26,900 [7.88]	26,900 [7.88]	26,900 [7.88]	26,900 [7.88]
IEER ³	14.5	14.5	14.5	14.5
Net System Power kW	7.99	7.99	7.99	7.99
Heating Performance (Gas)⁴				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13.9-30.6]/25-55 [13.9-30.6]	40-70 [22.8-38.9]/40-70 [22.2-38.9]	25-55 [13.9-30.6]/25-55 [13.9-30.6]	40-70 [22.8-38.9]/40-70 [22.2-38.9]
Steady State Efficiency (%)	81	81	81	81
No. Burners	6	9	6	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.75 [19.05]	0.5 [12.7]	0.75 [19.05]
Compressor				
No./Type	1/Scroll	1/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)⁵	88	88	88	88
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]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
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]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
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]
Re-Heat Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.709 [18]	0.709 [18]	0.709 [18]	0.709 [18]
Face Area sq. ft. [sq. m]	5.9 [0.55]	5.9 [0.55]	5.9 [0.55]	5.9 [0.55]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Outdoor Fan—Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
No. Motors/HP	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP	2 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]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
Drive Type	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Speeds	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1
Motor HP	3	3	2	2
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	56	56	56
Filter—Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(No.) Size Recommended in. [mm x mm x mm]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	146/112 [4139/3175]	146/112 [4139/3175]	146/112 [4139/3175]	146/112 [4139/3175]
Weights				
Net Weights lbs. [kg]	1075 [488]	1100 [499]	1075 [488]	1103 [500]
Ship Weights lbs. [kg]	1112 [504]	1137 [516]	1112 [504]	1140 [517]

- NOTES:**
- Cooling Performance is rated at 95° F ambient, 80° F entering dry bulb, 67° F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to 20% of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
 - EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
 - IEER is rated in accordance with AHRI Standard 340/360. Units are rated at 80° F ambient, 80° F entering dry bulb, and 67° F entering wet bulb at ARI rated cfm.
 - Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standard Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.
 - Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

GENERAL DATA - RKNL MODELS

NOM. SIZES 7.5-12.5 TON [26.4 - 44 kW]

Model RKNL-Series	G090DS15E	G090DS22E	G090DT15E	G090DT22E
Cooling Performance¹				CONTINUED →
Gross Cooling Capacity Btu [kW]	93,000 [27.25]	93,000 [27.25]	93,000 [27.25]	93,000 [27.25]
EER/SEER ²	11.2/NA	11.2/NA	11.2/NA	11.2/NA
Nominal CFM/AHRI Rated CFM [L/s]	3000/2775 [1416/1310]	3000/2775 [1416/1310]	3000/2775 [1416/1310]	3000/2775 [1416/1310]
AHRI Net Cooling Capacity Btu [kW]	90,000 [26.37]	90,000 [26.37]	90,000 [26.37]	90,000 [26.37]
Net Sensible Capacity Btu [kW]	63,100 [18.49]	63,100 [18.49]	63,100 [18.49]	63,100 [18.49]
Net Latent Capacity Btu [kW]	26,900 [7.88]	26,900 [7.88]	26,900 [7.88]	26,900 [7.88]
IEER ³	14.5	14.5	14.5	14.5
Net System Power kW	7.99	7.99	7.99	7.99
Heating Performance (Gas)⁴				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13.9-30.6]/25-55 [13.9-30.6]	40-70 [22.8-38.9]/40-70 [22.2-38.9]	25-55 [13.9-30.6]/25-55 [13.9-30.6]	40-70 [22.8-38.9]/40-70 [22.2-38.9]
Steady State Efficiency (%)	81	81	81	81
No. Burners	6	9	6	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.75 [19.05]	0.5 [12.7]	0.75 [19.05]
Compressor				
No./Type	1/Scroll	1/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)⁵	88	88	88	88
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]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
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]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
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]
Re-Heat Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.709 [18]	0.709 [18]	0.709 [18]	0.709 [18]
Face Area sq. ft. [sq. m]	5.9 [0.55]	5.9 [0.55]	5.9 [0.55]	5.9 [0.55]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Outdoor Fan—Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
No. Motors/HP	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP	2 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]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
Drive Type	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Speeds	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1
Motor HP	2	2	3	3
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	56	56	56
Filter—Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(No.) Size Recommended in. [mm x mm x mm]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	146/112 [4139/3175]	146/112 [4139/3175]	146/112 [4139/3175]	146/112 [4139/3175]
Weights				
Net Weights lbs. [kg]	1067 [484]	1103 [500]	1075 [488]	1100 [499]
Ship Weights lbs. [kg]	1104 [501]	1140 [517]	1112 [504]	1137 [516]

NOTES:

- Cooling Performance is rated at 95° F ambient, 80° F entering dry bulb, 67° F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to 20% of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
- EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
- IEER is rated in accordance with AHRI Standard 340/360. Units are rated at 80° F ambient, 80° F entering dry bulb, and 67° F entering wet bulb at ARI rated cfm.
- Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standard Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.
- Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

GENERAL DATA - RKNL MODELS

NOM. SIZES 7.5-12.5 TON [26.4 - 44 kW]

Model RKNL-Series	G120CR15E	G120CR22E	G120CS15E	G120CS22E
Cooling Performance¹				CONTINUED →
Gross Cooling Capacity Btu [kW]	123,000 [36.04]	123,000 [36.04]	123,000 [36.04]	123,000 [36.04]
EER/SEER ²	11.0/NA	11.0/NA	11.0/NA	11.0/NA
Nominal CFM/AHRI Rated CFM [L/s]	4000/3750 [1888/1770]	4000/3750 [1888/1770]	4000/3750 [1888/1770]	4000/3750 [1888/1770]
AHRI Net Cooling Capacity Btu [kW]	118,000 [34.57]	118,000 [34.57]	118,000 [34.57]	118,000 [34.57]
Net Sensible Capacity Btu [kW]	88,800 [26.02]	88,800 [26.02]	88,800 [26.02]	88,800 [26.02]
Net Latent Capacity Btu [kW]	29,200 [8.56]	29,200 [8.56]	29,200 [8.56]	29,200 [8.56]
IEER ³	14.4	14.4	14.4	14.4
Net System Power kW	10.49	10.49	10.49	10.49
Heating Performance (Gas)⁴				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	15-45 [8.3-25]/15-45 [8.3-25]	25-55 [13.9-30.6]/25-55 [13.9-30.6]	15-45 [8.3-25]/15-45 [8.3-25]	25-55 [13.9-30.6]/25-55 [13.9-30.6]
Steady State Efficiency (%)	81	81	81	81
No. Burners	6	9	6	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.75 [19.05]	0.5 [12.7]	0.75 [19.05]
Compressor				
No./Type	1/Scroll	1/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)⁵	88	88	88	88
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]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
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]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
Rows / FPI [FPcm]	2 / 18 [7]	3 / 18 [7]	3 / 18 [7]	3 / 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]
Re-Heat Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.709 [18]	0.709 [18]	0.709 [18]	0.709 [18]
Face Area sq. ft. [sq. m]	5.9 [0.55]	5.9 [0.55]	5.9 [0.55]	5.9 [0.55]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Outdoor Fan—Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
No. Motors/HP	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP	2 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]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
Drive Type	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Speeds	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1
Motor HP	2	2	3	3
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	56	56	56
Filter—Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(No.) Size Recommended in. [mm x mm x mm]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	221/176 [6265/4990]	221/176 [6265/4990]	221/176 [6265/4990]	221/176 [6265/4990]
Weights				
Net Weights lbs. [kg]	1162 [527]	1198 [543]	1170 [531]	1195 [542]
Ship Weights lbs. [kg]	1199 [544]	1235 [560]	1207 [547]	1232 [559]

- NOTES:**
- Cooling Performance is rated at 95° F ambient, 80° F entering dry bulb, 67° F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to 20% of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
 - EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
 - IEER is rated in accordance with AHRI Standard 340/360. Units are rated at 80° F ambient, 80° F entering dry bulb, and 67° F entering wet bulb at ARI rated cfm.
 - Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standard Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.
 - Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

GENERAL DATA - RKNL MODELS

NOM. SIZES 7.5-12.5 TON [26.4 - 44 kW]

Model RKNL-Series	G120DR15E	G120DR22E	G120DS15E	G120DS22E
Cooling Performance¹				CONTINUED →
Gross Cooling Capacity Btu [kW]	123,000 [36.04]	123,000 [36.04]	123,000 [36.04]	123,000 [36.04]
EER/SEER ²	11.0/NA	11.0/NA	11.0/NA	11.0/NA
Nominal CFM/AHRI Rated CFM [L/s]	4000/3750 [1888/1770]	4000/3750 [1888/1770]	4000/3750 [1888/1770]	4000/3750 [1888/1770]
AHRI Net Cooling Capacity Btu [kW]	118,000 [34.57]	118,000 [34.57]	118,000 [34.57]	118,000 [34.57]
Net Sensible Capacity Btu [kW]	88,800 [26.02]	88,800 [26.02]	88,800 [26.02]	88,800 [26.02]
Net Latent Capacity Btu [kW]	29,200 [8.56]	29,200 [8.56]	29,200 [8.56]	29,200 [8.56]
IEER ³	14.4	14.4	14.4	14.4
Net System Power kW	10.49	10.49	10.49	10.49
Heating Performance (Gas)⁴				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]	75,000/150,000 [21.97/43.95]	112,500/225,000 [32.96/65.92]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]	60,750/121,500 [17.8/35.6]	91,125/182,250 [26.7/53.4]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	15-45 [8.3-25]/15-45 [8.3-25]	25-55 [13.9-30.6]/25-55 [13.9-30.6]	15-45 [8.3-25]/15-45 [8.3-25]	25-55 [13.9-30.6]/25-55 [13.9-30.6]
Steady State Efficiency (%)	81	81	81	81
No. Burners	6	9	6	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.75 [19.05]	0.5 [12.7]	0.75 [19.05]
Compressor				
No./Type	1/Scroll	1/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)⁵	88	88	88	88
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]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
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]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
Rows / FPI [FPcm]	3 / 18 [7]	3 / 18 [7]	3 / 18 [7]	3 / 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]
Re-Heat Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.709 [18]	0.709 [18]	0.709 [18]	0.709 [18]
Face Area sq. ft. [sq. m]	5.9 [0.55]	5.9 [0.55]	5.9 [0.55]	5.9 [0.55]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Outdoor Fan—Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
No. Motors/HP	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP	2 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]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
Drive Type	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Speeds	Multiple	Multiple	Multiple	Multiple
No. Motors	1	1	1	1
Motor HP	2	2	3	3
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	56	56	56
Filter—Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(No.) Size Recommended in. [mm x mm x mm]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	221/176 [6265/4990]	221/176 [6265/4990]	221/176 [6265/4990]	221/176 [6265/4990]
Weights				
Net Weights lbs. [kg]	1162 [527]	1198 [543]	1170 [531]	1195 [542]
Ship Weights lbs. [kg]	1199 [544]	1235 [560]	1207 [547]	1232 [559]

NOTES:

- Cooling Performance is rated at 95° F ambient, 80° F entering dry bulb, 67° F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to 20% of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
- EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
- IEER is rated in accordance with AHRI Standard 340/360. Units are rated at 80° F ambient, 80° F entering dry bulb, and 67° F entering wet bulb at ARI rated cfm.
- Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standard Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.
- Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

GENERAL DATA - RKNL MODELS

NOM. SIZES 7.5-12.5 TON [26.4 - 44 kW]

Model RKNL-Series	G151CR15E	G151CR25E	G151CS15E	G151CS25E
Cooling Performance				CONTINUED →
Gross Cooling Capacity Btu [kW]	148,000 [43.36]	148,000 [43.36]	148,000 [43.36]	148,000 [43.36]
EER/SEER ²	11/NA	11/NA	11/NA	11/NA
Nominal CFM/AHRI Rated CFM [L/s]	5000/4250 [2360/2006]	5000/4250 [2360/2006]	5000/4250 [2360/2006]	5000/4250 [2360/2006]
AHRI Net Cooling Capacity Btu [kW]	140,000 [41.02]	140,000 [41.02]	140,000 [41.02]	140,000 [41.02]
Net Sensible Capacity Btu [kW]	99,500 [29.15]	99,500 [29.15]	99,500 [29.15]	99,500 [29.15]
Net Latent Capacity Btu [kW]	40,500 [11.87]	40,500 [11.87]	40,500 [11.87]	40,500 [11.87]
IEER ³	14	14	14	14
Net System Power kW	13.29	13.29	13.29	13.29
Heating Performance (Gas)⁴				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	75,000/150,000 [21.97/43.95]	126,000/252,000 [36.92/73.84]	75,000/150,000 [21.97/43.95]	126,000/252,000 [36.92/73.84]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	60,750/121,500 [17.8/35.6]	102,000/204,000 [29.89/59.77]	60,750/121,500 [17.8/35.6]	102,000/204,000 [29.89/59.77]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	15-45 [8.3-25]/15-45 [8.3-25]	25-55 [13.9-30.6]/25-55 [13.9-30.6]	15-45 [8.3-25]/15-45 [8.3-25]	25-55 [13.9-30.6]/25-55 [13.9-30.6]
Steady State Efficiency (%)	81	81	81	81
No. Burners	6	9	6	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.75 [19.05]	0.5 [12.7]	0.75 [19.05]
Compressor				
No./Type	1/Scroll	1/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)⁵	88	88	88	88
Outdoor Coil—Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Face Area sq. ft. [sq. m]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
Rows / FPI [FPcm]	2 / 23 [9]	2 / 23 [9]	2 / 23 [9]	2 / 23 [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]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
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]
Re-Heat Coil - Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
MicroChannel Depth in. [mm]	0.709 [18]	0.709 [18]	0.709 [18]	0.709 [18]
Face Area sq. ft. [sq. m]	4.5 [0.42]	4.5 [0.42]	4.5 [0.42]	4.5 [0.42]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Outdoor Fan—Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
No. Motors/HP	2 at 1/2 HP	2 at 1/2 HP	2 at 1/2 HP	2 at 1/2 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan—Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
Drive Type	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Speeds	Single	Single	Single	Single
No. Motors	1	1	1	1
Motor HP	5	5	5	5
Motor RPM	1725	1725	1725	1725
Motor Frame Size	184	184	184	184
Filter—Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(No.) Size Recommended in. [mm x mm x mm]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	203/155 [5755/4394]	203/155 [5755/4394]	203/155 [5755/4394]	203/155 [5755/4394]
Weights				
Net Weights lbs. [kg]	1278 [580]	1314 [596]	1283 [582]	1319 [598]
Ship Weights lbs. [kg]	1315 [596]	1351 [613]	1320 [599]	1356 [615]

- NOTES:**
- Cooling Performance is rated at 95° F ambient, 80° F entering dry bulb, 67° F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to 20% of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
 - EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
 - IEER is rated in accordance with AHRI Standard 340/360. Units are rated at 80° F ambient, 80° F entering dry bulb, and 67° F entering wet bulb at ARI rated cfm.
 - Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standard Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.
 - Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

GENERAL DATA - RKNL MODELS

NOM. SIZES 7.5-12.5 TON [26.4 - 44 kW]

Model RKNL-Series	G151DR15E	G151DR25E	G151DS15E	G151DS25E
Cooling Performance				
Gross Cooling Capacity Btu [kW]	148,000 [43.36]	148,000 [43.36]	148,000 [43.36]	148,000 [43.36]
EER/SEER ²	11/NA	11/NA	11/NA	11/NA
Nominal CFM/AHRI Rated CFM [L/s]	5000/4250 [2360/2006]	5000/4250 [2360/2006]	5000/4250 [2360/2006]	5000/4250 [2360/2006]
AHRI Net Cooling Capacity Btu [kW]	140,000 [41.02]	140,000 [41.02]	140,000 [41.02]	140,000 [41.02]
Net Sensible Capacity Btu [kW]	99,500 [29.15]	99,500 [29.15]	99,500 [29.15]	99,500 [29.15]
Net Latent Capacity Btu [kW]	40,500 [11.87]	40,500 [11.87]	40,500 [11.87]	40,500 [11.87]
IEER ³	14	14	14	14
Net System Power kW	13.29	13.29	13.29	13.29
Heating Performance (Gas)⁴				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	75,000/150,000 [21.97/43.95]	126,000/252,000 [36.92/73.84]	75,000/150,000 [21.97/43.95]	126,000/252,000 [36.92/73.84]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	60,750/121,500 [17.8/35.6]	102,000/204,000 [29.89/59.77]	60,750/121,500 [17.8/35.6]	102,000/204,000 [29.89/59.77]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	15-45 [8.3-25]/15-45 [8.3-25]	25-55 [13.9-30.6]/25-55 [13.9-30.6]	15-45 [8.3-25]/15-45 [8.3-25]	25-55 [13.9-30.6]/25-55 [13.9-30.6]
Steady State Efficiency (%)	81	81	81	81
No. Burners	6	9	6	9
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.75 [19.05]	0.5 [12.7]	0.75 [19.05]
Compressor				
No./Type	1/Scroll	1/Scroll	2/Scroll	2/Scroll
Outdoor Sound Rating (dB)⁵				
	88	88	88	88
Outdoor Coil—Fin Type				
Tube Type	Louvered	Louvered	Louvered	Louvered
MicroChannel Depth in. [mm]	MicroChannel	MicroChannel	MicroChannel	MicroChannel
Face Area sq. ft. [sq. m]	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Rows / FPI [FPcm]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
Indoor Coil—Fin Type				
Tube Type	Louvered	Louvered	Louvered	Louvered
Tube Size in. [mm]	Rifled	Rifled	Rifled	Rifled
Face Area sq. ft. [sq. m]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Rows / FPI [FPcm]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
Refrigerant Control	4 / 15 [6]	4 / 15 [6]	4 / 15 [6]	4 / 15 [6]
Drain Connection No./Size in. [mm]	TX Valves	TX Valves	TX Valves	TX Valves
	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Re-Heat Coil - Fin Type				
Tube Type	Louvered	Louvered	Louvered	Louvered
MicroChannel Depth in. [mm]	MicroChannel	MicroChannel	MicroChannel	MicroChannel
Face Area sq. ft. [sq. m]	0.709 [18]	0.709 [18]	0.709 [18]	0.709 [18]
Rows / FPI [FPcm]	4.5 [0.42]	4.5 [0.42]	4.5 [0.42]	4.5 [0.42]
	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Outdoor Fan—Type				
No. Used/Diameter in. [mm]	Propeller	Propeller	Propeller	Propeller
Drive Type/No. Speeds	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
CFM [L/s]	Direct/1	Direct/1	Direct/1	Direct/1
No. Motors/HP	8000 [3775]	8000 [3775]	8000 [3775]	8000 [3775]
Motor RPM	2 at 1/2 HP	2 at 1/2 HP	2 at 1/2 HP	2 at 1/2 HP
	1075	1075	1075	1075
Indoor Fan—Type				
No. Used/Diameter in. [mm]	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Drive Type	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
No. Speeds	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)	Belt (Adjustable)
No. Motors	Single	Single	Single	Single
Motor HP	1	1	1	1
Motor RPM	5	5	5	5
Motor Frame Size	1725	1725	1725	1725
	56	56	184	184
Filter—Type				
Furnished	Disposable	Disposable	Disposable	Disposable
(No.) Size Recommended in. [mm x mm x mm]	Yes	Yes	Yes	Yes
	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]				
	203/155 [5755/4394]	203/155 [5755/4394]	203/155 [5755/4394]	203/155 [5755/4394]
Weights				
Net Weights lbs. [kg]	1278 [580]	1314 [596]	1283 [582]	1319 [598]
Ship Weights lbs. [kg]	1315 [596]	1351 [613]	1320 [599]	1356 [615]

NOTES:

- Cooling Performance is rated at 95° F ambient, 80° F entering dry bulb, 67° F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to 20% of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
- EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
- IEER is rated in accordance with AHRI Standard 340/360. Units are rated at 80° F ambient, 80° F entering dry bulb, and 67° F entering wet bulb at ARI rated cfm.
- Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standard Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.
- Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

ELECTRICAL DATA - RKNL MODELS

ELECTRICAL DATA - RKNL SERIES							
		G090CR	G090CS	G090CT	G090DR	G090DS	G090DT
Unit Information	Unit Operating Voltage Range	187-253	187-253	187-253	414-506	414-506	414-506
	Volts	208/230	208/230	208/230	460	460	460
	Minimum Circuit Ampacity	43/43	43/43	48/48	21	21	24
	Minimum Overcurrent Protection Device Size	45/45	45/45	50/50	25	25	25
	Maximum Overcurrent Protection Device Size	50/50	50/50	60/60	25	25	30
Compressor Motor	No.	2	2	2	2	2	2
	Volts	200/240	200/240	200/240	480	480	480
	Phase	3	3	3	3	3	3
	RPM	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4
	Amps (RLA), Comp. 1	13.1/13.1	13.1/13.1	13.1/13.1	6.1	6.1	6.1
	Amps (LRA), Comp. 1	83.1/83.1	83.1/83.1	83.1/83.1	41	41	41
	HP, Compressor 2	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4
	Amps (RLA), Comp. 2	13.1/13.1	13.1/13.1	13.1/13.1	6.1	6.1	6.1
	Amps (LRA), Comp. 2	83.1/83.1	83.1/83.1	83.1/83.1	41	41	41
Condenser Motor	No.	2	2	2	2	2	2
	Volts	208/230	208/230	208/230	460	460	460
	Phase	1	1	1	1	1	1
	HP	1/3	1/3	1/3	1/3	1/3	1/3
	Amps (FLA, each)	2.4/2.4	2.4/2.4	2.4/2.4	1.4	1.4	1.4
	Amps (LRA, each)	4.7/4.7	4.7/4.7	4.7/4.7	2.4	2.4	2.4
Evaporator Fan	No.	1	1	1	1	1	1
	Volts	208/230	208/230	208/230	460	460	460
	Phase	3	3	3	3	3	3
	HP	2	2	3	2	2	3
	Amps (FLA, each)	8/8	8/8	13/13	4	4	7
	Amps (LRA, each)	56/56	56/56	74.5/74.5	28	28	38.1

ELECTRICAL DATA - RKNL MODELS

ELECTRICAL DATA - RKNL SERIES									
		G120CR	G120CS	G120DR	G120DS	G151CR	G151CS	G151DR	G151DS
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506	187-253	187-253	414-506	414-506
	Volts	208/230	208/230	460	460	208/230	208/230	460	460
	Minimum Circuit Ampacity	49/49	54/54	25	28	68/68	68/68	30	32
	Minimum Overcurrent Protection Device Size	50/50	55/55	25	30	80/80	80/80	35	35
	Maximum Overcurrent Protection Device Size	60/60	60/60	30	35	80/80	80/80	40	40
Compressor Motor	No.	2	2	2	2	2	2	2	2
	Volts	200/240	200/240	480	480	200/240	200/240	480	480
	Phase	3	3	3	3	3	3	3	3
	RPM	3450	3450	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	4 1/4	4 1/4	4 1/4	4 1/4	5	5	5	5
	Amps (RLA), Comp. 1	16/16	16/16	7.8	7.8	19.6/19.6	19.6/19.6	8.2	8.2
	Amps (LRA), Comp. 1	110/110	110/110	52	52	136/136	136/136	66.1	66.1
	HP, Compressor 2	4 1/4	4 1/4	4 1/4	4 1/4	5	5	5	5
	Amps (RLA), Comp. 2	16/16	16/16	7.8	7.8	19.6/19.6	19.6/19.6	8.2	8.2
	Amps (LRA), Comp. 2	110/110	110/110	52	52	136/136	136/136	66.1	66.1
Condenser Motor	No.	2	2	2	2	2	2	2	2
	Volts	208/230	208/230	460	460	208/230	208/230	460	460
	Phase	1	1	1	1	1	1	1	1
	HP	1/3	1/3	1/3	1/3	1/2	1/2	1/2	1/2
	Amps (FLA, each)	2.4/2.4	2.4/2.4	1.4	1.4	2.3/2.3	2.3/2.3	1.5	1.5
	Amps (LRA, each)	4.7/4.7	4.7/4.7	2.4	2.4	5.6/5.6	5.6/5.6	3.1	3.1
Evaporator Fan	No.	1	1	1	1	1	1	1	1
	Volts	208/230	208/230	460	460	208/230	208/230	460	460
	Phase	3	3	3	3	3	3	3	3
	HP	2	3	2	3	5	5	5	5
	Amps (FLA, each)	8/8	13/13	4	7	18.8/18.8	18.8/18.8	10	10
	Amps (LRA, each)	56/56	74.5/74.5	28	38.1	82.6/82.6	82.6/82.6	41.3	41.3

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.
Batterymarch Park
Quincy, MA 02269

2. **PRE-INSTALLATION CHECKPOINTS** — 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

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.

▲ 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.

1. 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.
2. Regular cleaning and waxing of the cabinet with an automobile polish will provide some protection.

3. 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.

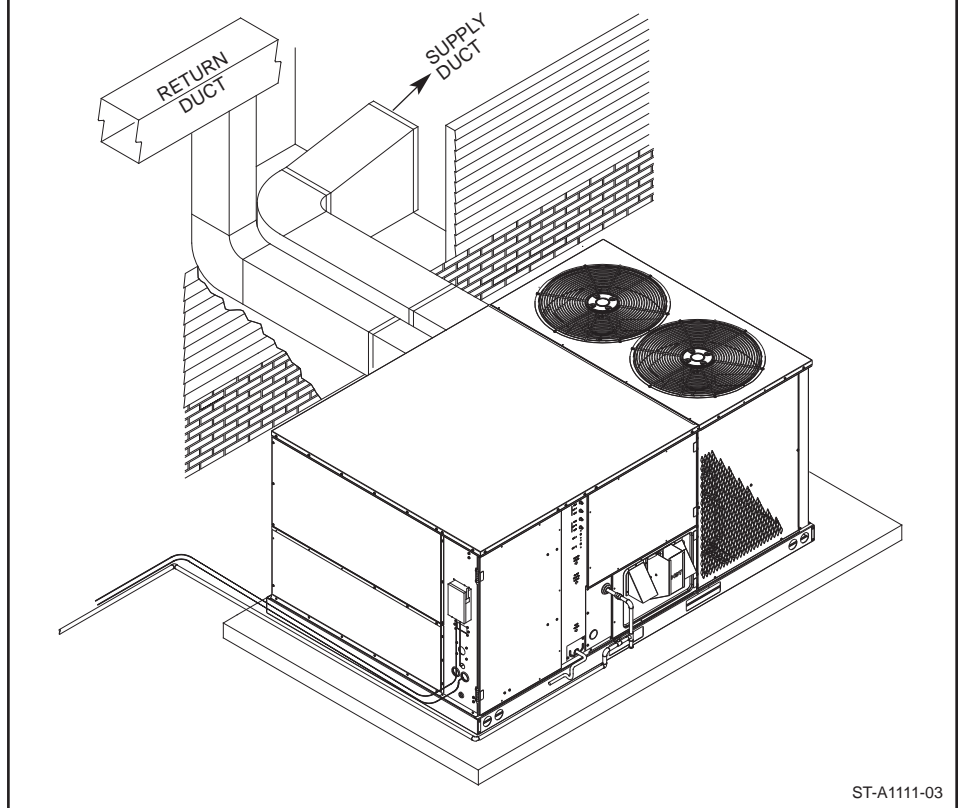
B. OUTSIDE INSTALLATION

▲ 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.

FIGURE 7

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



ST-A1111-03

(Typical outdoor slab installation is shown in Figure 7.)

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 9.
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. This hood is shipped in a carton in the blower compartment inside the unit and must be attached when the unit is installed. See Figure 5.

To attach exhaust/combustion air inlet hood:

1. Remove screws securing blower access panel and remove access panel. For location of blower access panel, see Figure 5.
2. Remove exhaust/combustion air inlet hood from the carton, located inside the blower compartment.
3. Attach blower access panel.
4. Attach the combustion air inlet/exhaust hood with screws. Reference Figure 5 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. Consult your local utility or other authority having jurisdiction for accepted venting techniques.

D. COVER PANEL INSTALLATION/ CONVERSION PROCEDURE

DOWNFLOW TO HORIZONTAL

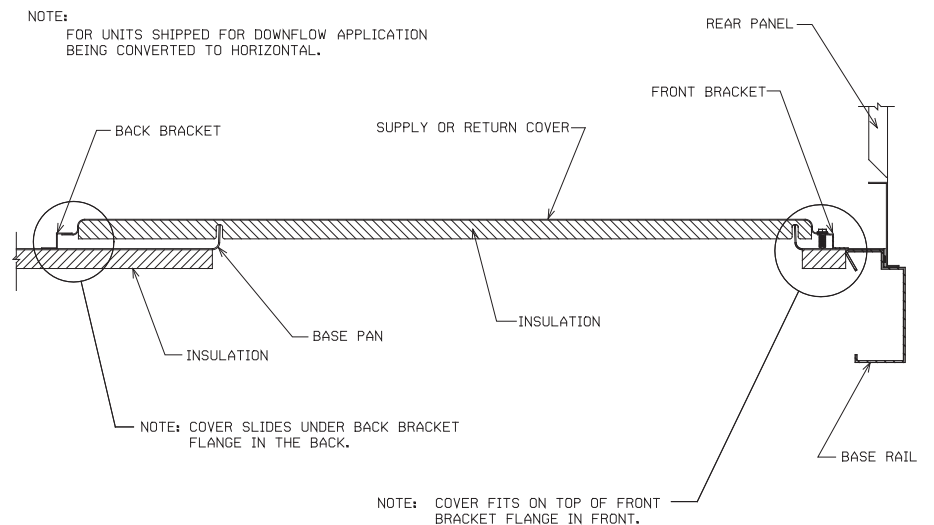
1. Remove the screws and covers from the outside of the supply and return sections. See Figure 2.
2. Install the covers over the bottom supply and return openings, painted side up, inserting the leading flange under the bracket provided. Place the back flange to top of the front bracket provided. See Figure 8.
3. Secure the return and supply cover to front bracket with one (1) screw.

E. FILTER REPLACEMENT

This unit is provided with 6 - 18" X 18" X 2" disposable filters. When replacing filters, ensure they are inserted fully to the back to prevent bypass. See Figure 3.

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

**FIGURE 8
COVER GASKET DETAIL FOR UNITS SHIPPED FOR DOWNFLOW APPLICATION BEING CONVERTED TO HORIZONTAL**



A074001

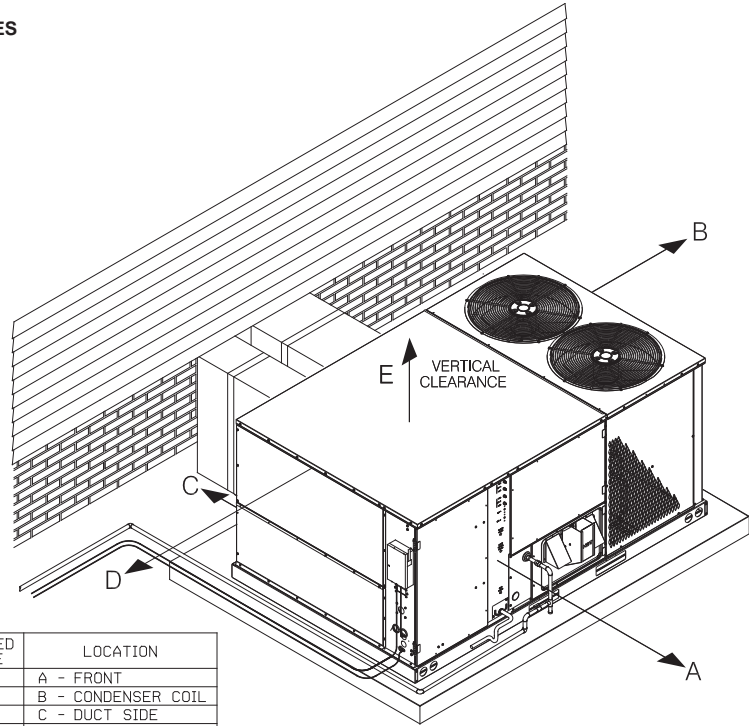
E. CLEARANCES

The following minimum clearances must be observed for proper unit performance and serviceability. Reference Figure 9.

Recommended Clearance	Location
48"	A - Front
18"	B - Condenser Coil
18"	C - Duct Side
18"*	D - Evaporator End
60"	E - Above

*Without Economizer. 48" With Economizer

**FIGURE 9
CLEARANCES**



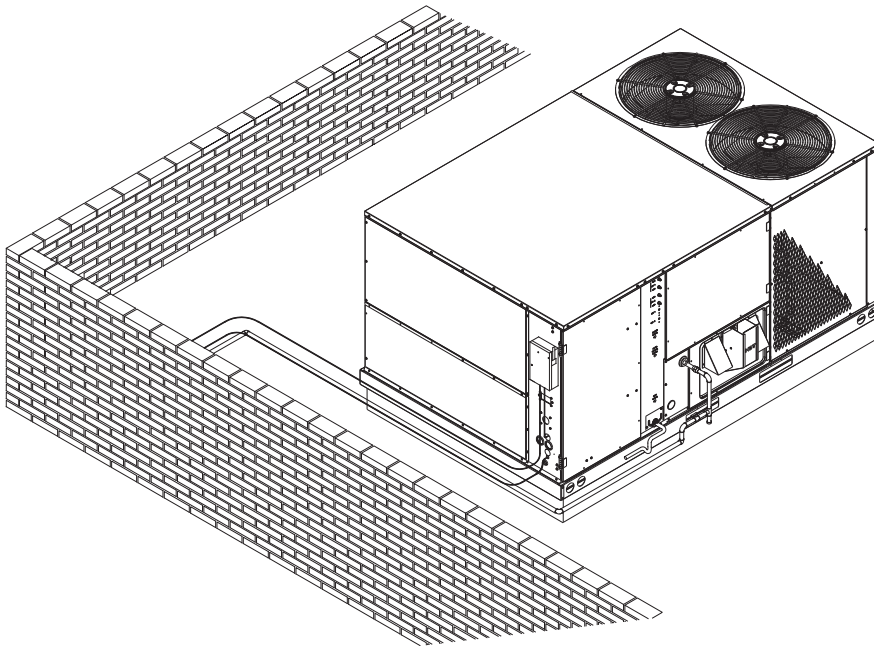
RECOMMENDED CLEARANCE	LOCATION
48"	A - FRONT
18"	B - CONDENSER COIL
18"	C - DUCT SIDE
18"	D - EVAPORATOR END
60"	E - ABOVE

* WITHOUT ECONOMIZER/48" WITH ECONOMIZER

ST-A1111-03

FIGURE 10A

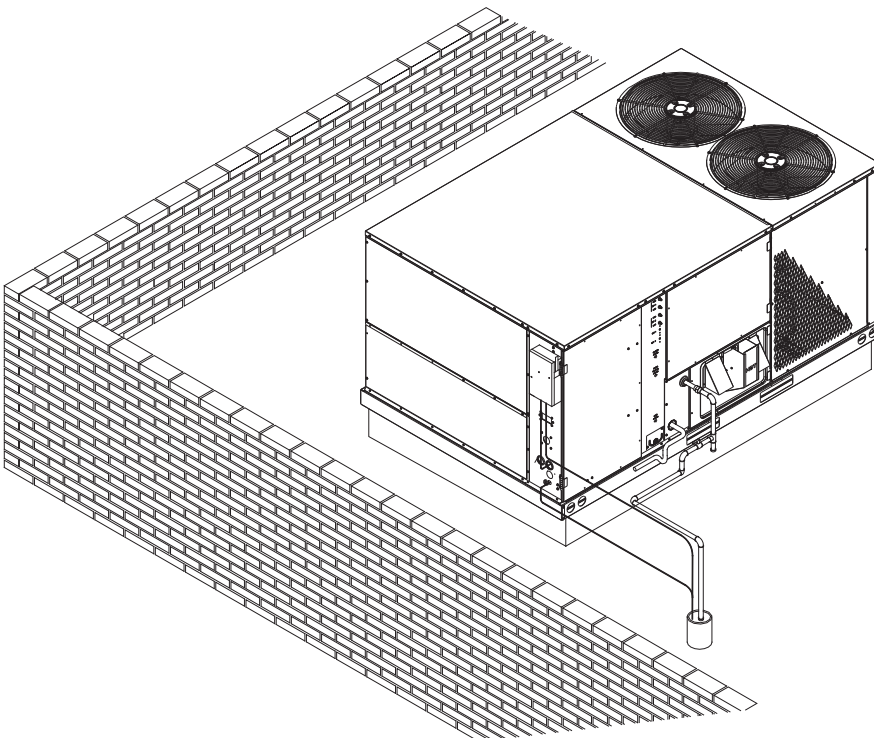
FLAT ROOFTOP INSTALLATION, ATTIC OR DROP CEILING DISTRIBUTING SYSTEM.
MOUNTED ON ROOFCURB. CURB MUST BE LEVEL.



ST-A1111-03

FIGURE 10B

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



ST-A1111-03

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 11, 12 and 13.
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, 1513 16th St. N.W., Washington, D.C. 20036.

▲ 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.

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. Half-inch 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/homeowner must be informed against future changes in construction which might change this to a "confined space." Also, caution the

user/homeowner 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.

RETURN AIR

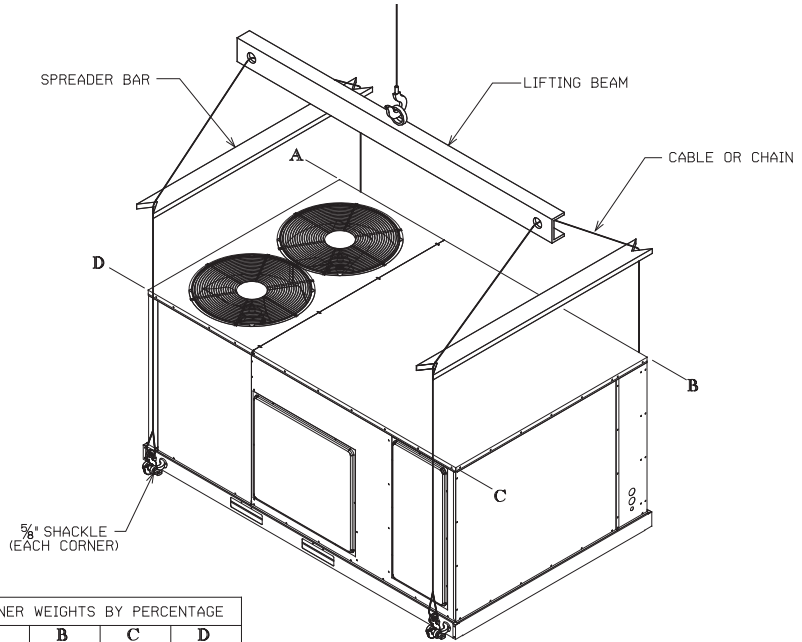
▲ WARNING

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.

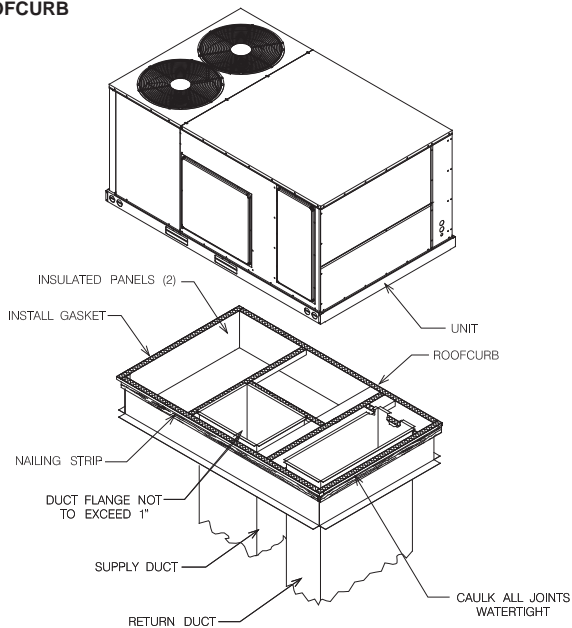
FIGURE 11
LIFTING DETAIL



CORNER WEIGHTS BY PERCENTAGE			
A	B	C	D
33%	27%	17%	23%

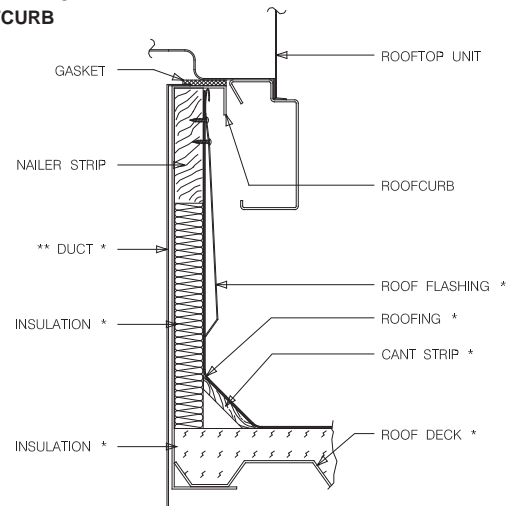
I-744

FIGURE 12
ROOFCURB



A074302

FIGURE 13
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.

A074302

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 7 or 10 or through the base as shown in Figure 17.
3. Size the gas line to the furnace adequate enough to prevent undue pressure drop and never less than 1/2".
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 14.)
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.

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.

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

▲ 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.

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.

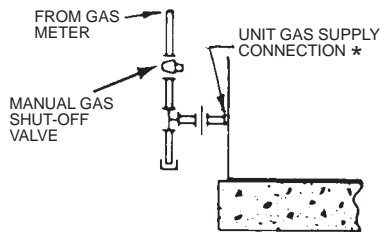
In making gas connections, avoid strains as they may cause noise and damage the controls. A backup wrench is required to be used on the valve to avoid damage.

TABLE 1
GAS PIPE CAPACITY TABLE (CU. FT./HR.)

Nominal Iron Pipe Size, Inches	Equivalent Length of Pipe, Feet							
	10	20	30	40	50	60	70	80
1/2	132	92	73	63	56	50	46	43
3/4	278	190	152	130	115	105	96	90
1	520	350	285	245	215	195	180	170
1 1/4	1,050	730	590	500	440	400	370	350
1 1/2	1,600	1,100	890	760	670	610	560	530

FIGURE 14
SUGGESTED GAS PIPING

ROOF OR GROUND LEVEL INSTALLATION



*Factory supplied grommet must be utilized.

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/FT³) 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 gas valve 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.

IMPORTANT: To remove the natural gas valve, remove the four screws securing the manifold pipe to the burner tray. Remove the manifold pipe with gas valve attached.

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.**

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.

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 cap and turn the adjustment screw clockwise to increase pressure or counterclockwise to decrease pressure.

Then replace the regulator cap 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.

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.
150,000	ONE TEN	3	21.6	4	24.0	4	25.0	4	26.4	1	0.0
			36	0	0	10	4	24	10	0	0
220,000	ONE TEN	2	14.7	2	16.4	2	17.0	3	18.0	6	40.9
			28	44	51	0	6	50			
250,000	ONE TEN	2	13.0	2	14.4	2	15.0	2	15.8	6	36.0
			10	24	30	2	39	6	0		

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

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.

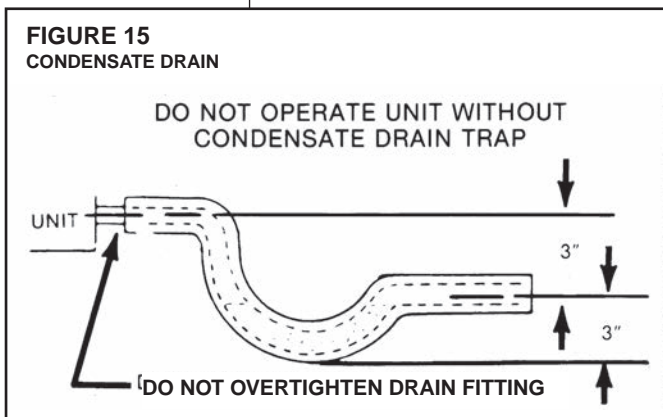
NOTICE: DERATING OF THE HEATING INPUT FOR HIGH ALTITUDE IN THE FIELD IS UNLAWFUL IN CANADA (REFER TO CAN/CGA 2.17). UNITS INSTALLED IN ALTITUDES GREATER THAN 2,000 FEET (610 METERS) MUST BE SHIPPED FROM THE FACTORY OR FROM A FACTORY AUTHORIZED CONVERSION STATION WITH THE HEATING INPUT DERATED BY 10%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

D. CONDENSATE DRAIN

IMPORTANT: Install a condensate trap to ensure proper condensate drainage. See Figure 15.

The condensate drain pan has a threaded female 1 inch NPT (11.5 TPI) connection. Consult local codes or ordinances for specific requirements of condensate drain piping and disposal.

- To use the removable drain pan feature of this unit, some of the condensate line joints should be assembled for easy removal and cleaning.
- Use a thin layer of Teflon tape or paste on drain pan connections and install only hand tight.
- Do not over tighten drain pan connections as damage to the drain pan may occur.
- Drain line **MUST NOT** block service access panels.
- Drain line must be no smaller than drain pan outlet and adequately sized to accommodate the condensate discharge from the unit.
- Drain line should slope away from unit a minimum of 1/8" per foot to ensure proper drainage.
- Drain line must be routed to an acceptable drain or outdoors in accordance with local codes.
- Do not connect condensate drain line to a closed sewer pipe.
- Drain line may need insulation or freeze protection in certain applications.



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 1 using the circuit ampacity found on the unit rating plate. Use the smallest wire size allowable in Table 4 from the unit disconnect to unit.

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

4. For through the base wiring entry reference **Figure 17**. All fittings and conduit are field supplied for this application. Reference the chart with **Figure 17** for proper hole and conduit size.

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 1 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:

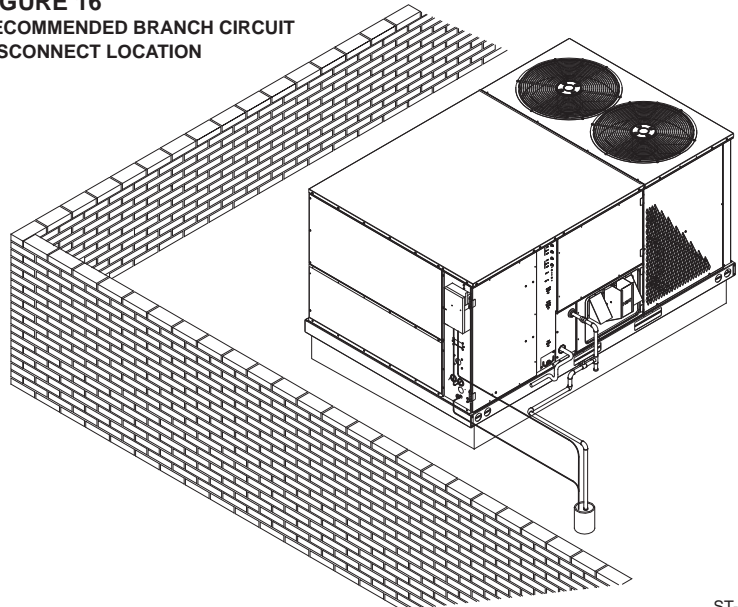
Splice copper wire pigtails to aluminum wire with U.L. recognized connectors for copper-aluminum splices. Please exercise the following instructions very carefully to obtain a positive and lasting connection:

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.

TABLE 5

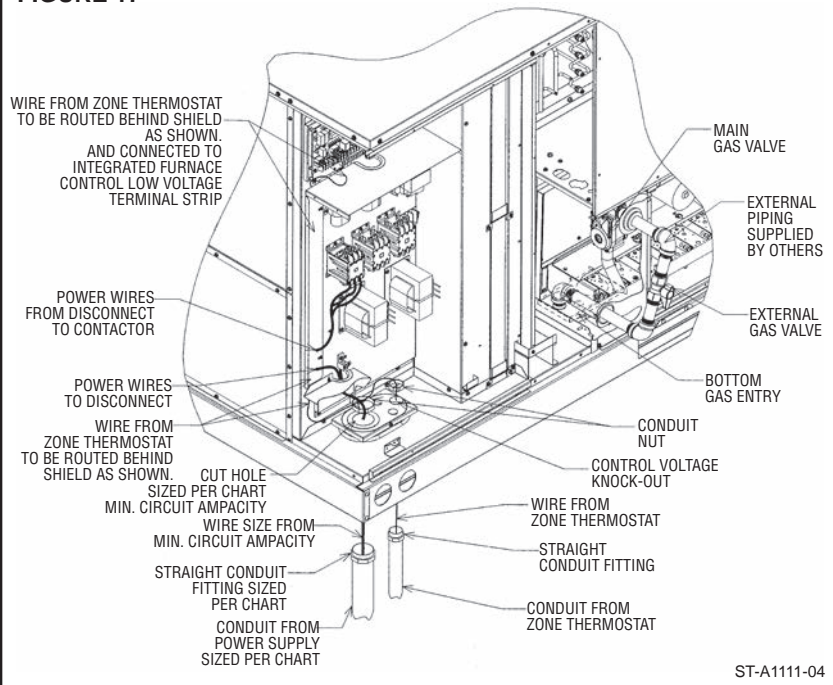
UNIT MCA	COPPER WIRE SIZE—AWG					
	SUPPLY WIRE LENGTH—FEET					
	50	100	150	200	250	300
20	10	8	6	4	4	4
25	10	8	6	4	4	3
30	8	6	4	4	3	2
35	8	6	4	3	2	1
40	8	6	4	3	2	1
45	8	4	3	2	1	1/0
50	6	4	3	2	1	1/0
60	6	4	2	1	1/0	2/0
70	4	3	2	1/0	2/0	3/0
80	4	3	1	1/0	2/0	3/0
90	3	2	1/0	2/0	3/0	4/0
100	3	2	1/0	2/0	3/0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

FIGURE 16
RECOMMENDED BRANCH CIRCUIT DISCONNECT LOCATION



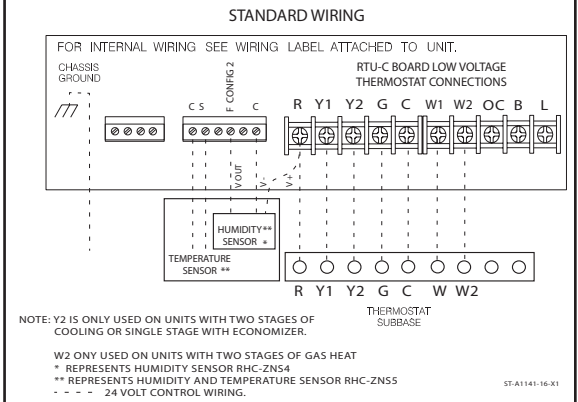
ST-A1111-03

FIGURE 17



ST-A1111-04

FIGURE 18
TYPICAL THERMOSTAT WIRING



ST-A1141-16-01

	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 and 17 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.

D. THERMOSTAT/HUMIDITY SENSOR

The HumidiDry™ System requires both a thermostat (or temperature sensor) and a humidity sensor. 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 and humidity sensor in accordance with the instruction sheet packed in the box with the thermostat. Run the thermostat lead wires through control entry opening (Figure 2 or Figure 17) and connect to the low voltage thermostat connections (see wiring

diagram, Figure 18). 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. See Section VI for humidity sensor information.

TABLE 6

FIELD WIRE SIZE FOR 24 VOLT THERMOSTAT CIRCUITS							
Thermostat Load - Amps		SOLID COPPER WIRE - AWG.					
		3.0	16	14	12	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 furnace to the thermostat and back to the furnace.

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.

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

Two 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 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. HUMIDIDRY™ SYSTEM

The HumidiDry™ system controls both cooling and humidity loads. In addition to two stages of cooling, the unit includes two stages of reheat. A temperature sensor or thermostat relates a low cooling demand (Y1) or high cooling demand (Y2) to the RTU-C. A separate humidity sensor sends the actual indoor relative humidity to the RTU-C via a 0-10 VDC signal. The RTU-C considers a relative humidity level 2%-5% above the humidity setpoint as a "low humidity demand" (H1). The RTU-C considers a relative humidity level greater than 5% above the humidity setpoint as a "high

humidity demand" (H2). The RTU-C determines the unit mode of operation based on the Y1, Y2, H1 and H2 (Table 16). Low reheat is only initiated when there is a humidity call (H1 or H2) and no cooling call (Y1 or Y2). In this mode the unit provides essentially "neutral air" (supply air is within +1°F and -5°F of return air temperature). High reheat is only used when there is a high humidity demand (H2) with a low cooling demand (Y1).

See RTU-C I&O manual for reheat unit setup and for thermostat/sensor combinations.

HUMIDITY SENSOR

An indoor relative humidity sensor (not included with the unit) is required for reheat operation. Available accessory Humidity sensor models are: RHC-ZNS4 (Room Relative Humidity Sensor – for use with a standard thermostat) and RHC-ZNS5 (Room Temperature and Relative Humidity Sensor – for use with a BAS system). Mount sensor per thermostat/humidity sensor section requirements. See wiring diagram (Figure 18).

TABLE 7

Two Stage HumidiDry – Modes of Operation				
Mode	Compressor 1	Compressor 2	Fan	Notes
High Cool	Cool	Cool	High	Operates with (Y2) call, ignores (H1/H2)
High Reheat	Reheat	Cool	High	Operates with (Y1 & Y2)
Low Reheat	Reheat	Off	Low	Operates with (H1 only) or (H2 only)
Low Cool	Cool	Off	Low	Operates with (Y1) or (Y1 & H1), Factory set point
Notes Definitions:				
Y1	Single stage cooling operation			
Y2	Two stage cooling operation			
H1	Space is above humidity set point by more than 2% and less than or equal to 5%.			
H2	Space is above humidity set point by more than 5%.			

REFRIGERANT SOLENOID VALVES

The reheat refrigerant system is part of System 1 only. Three refrigerant solenoid valves (discharge, liquid and reheat) are used to change operation from Cooling Mode to Reheat Mode. The Discharge Solenoid Valve (DSV) is located in the outdoor section (front side of unit) and is a Normally Closed (N.C.) valve. The Liquid Solenoid Valve (LSV) is located in the liquid line in the blower section and is a Normally Open (N.O.) valve. The Reheat Solenoid Valve (RSV)

is near the bottom of the reheat coil (between the evaporator coil and the blower) and is normally open.

OPERATION

During the Cooling mode the RSV is the only valve energized (closed position), LSV is open, DSV is closed. The refrigeration cycle is standard cooling, reheat coil is bypassed.

System 2 operates during High Cooling or High Reheat modes but is not part of the reheat circuit (always operates in standard cooling).

During Low Reheat or High Reheat modes the LSV is energized (closed position), DSV is energized (open position), RHV is open. Some hot gas bypasses the condenser coil and creates a warm two phase mix that enters the reheat coil. See Table A for Modes of Operation including compressor operation, fan speed, thermostat / humidistat calls for each mode. See Blower VFD section (above) for VFD operation.

VII. VARIABLE FREQUENCY DRIVE (VFD)

No adjustments of the VFD are required for installation or operation of this unit.

Location: Control Section (front left) of the unit.

VFD MODEL

Schneider Altivar 212 (factory programmed).

REPLACEMENT

The VFD is horsepower and voltage specific therefore; replacement must be the same model as the existing. A preprogrammed VFD is recommended and available from ProStock. A non-programmed Schneider Altivar 212 may be used but must be programmed

exactly per the included VFD programming guide for safe and proper function.

OPERATION

The purpose of the VFD is to allow low airflow in Fan Only (G), Low Reheat and First Stage Cooling (Y1) operation of a two stage unit. Unit air balancing should be performed at High Airflow (100% at RTU-C, 60Hz at VFD) by adjusting the blower motor sheave. High Airflow always occurs during a W1, W2, or Y2 call. For air balancing, without heating or cooling, the fan only speed can be temporarily increased to 100% by adjustment through the RTU-C keypad. To meet ASHRAE 90.1-2010 and for best performance, First Stage Cool and Fan Only speeds are

factory set at 50% airflow (30 Hz at VFD). Both of these speeds are independently adjustable at the RTU-C. The VFD display will indicate an equivalent value in Hz (i.e. Low Cool adjusted to 60% at RTU-C will display as 36Hz at the VFD). A 20 second (adjustable at the VFD) ramp-up or ramp-down is used whenever the blower speed is increased or decreased. Low speed blower operation first ramps to 75%, to close fan proving switch, before ramping to the desired speed. Since the VFD operates on 24VDC control voltage, a blower relay (with 24VAC across the coil) is used to turn the VFD on. Blower speeds are changed via Modbus communication from the RTU-C.

VIII. OUTDOOR FAN MOTOR CONTROLLER (OFMC)

XIX. OUTDOOR FAN MOTOR CONTROLLER (OFMC)

Location: Control Section (front left) of the unit.

During Low Reheat Mode the OFMC slows the outdoor fans to increase the discharge pressure/temperature to maintain an optimized amount of reheat required to provide neutral air to the occupied space. The OFMC is located in the control box section. On 15-25 ton units the OFMC slows fans during both Low and High Reheat Modes (circuit 1 fans only). The factory setting for the

outdoor fan motor controller is unit specific (Table 8). The setpoint temperature will provide neutral air +1 to-5°F from the entering air temperature (example if the entering or return air temperature is 75° F the leaving or supply air temperature will be 76° to 70°F during the reheat mode. If field adjustment is required to raise or lower the leaving air temperature, this may be accomplished by turning the temperature control dial on the OFMC (Figure 19).

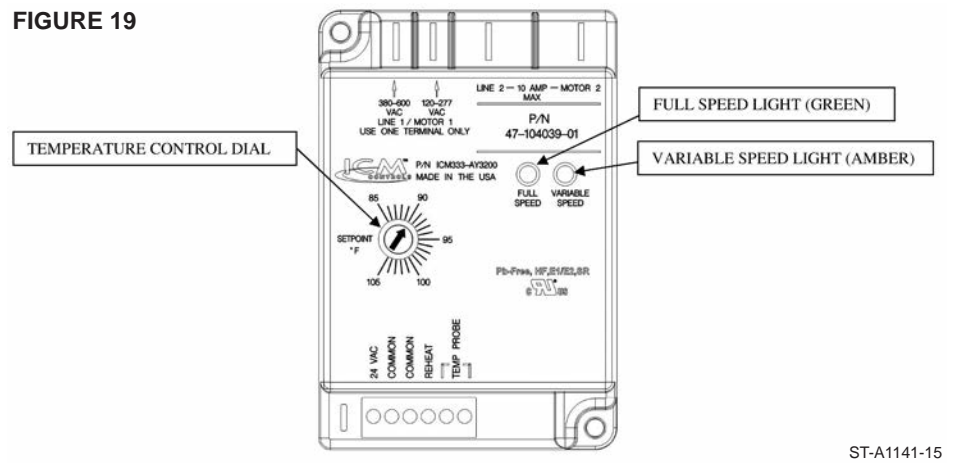
Turning the dial to a higher temperature setting will increase the leaving or supply air temperature and turning the dial to a

lower setting will reduce the leaving or supply temperature. During cooling modes the OFMC will operate at full speed (green light - Figure 19). During reheat modes the OFMC will typically operate at variable speed (amber light - Figure 19) but can change to full speed or off (no lights) depending on the reheat capacity required. During high reheat, the 7½ and 10 ton models must operate the OFMC at full speed to prevent excessive head pressure on system 2.

TABLE 8

OFMC	
Factory Settings	
Unit	Setpoint
090	95°F
120	90°F
151	90°F
180	100°F
240	95°F
300	90°F

FIGURE 19



ST-A1141-15

VIX. OPERATION

COOLING MODE

With thermostat in the cool mode, fan auto and the room temperature higher than the thermostat setting:

- A. Indoor blower relay is energized through thermostat contact (G).

- B. Compressor contactors are energized through thermostat contacts (Y1) & (Y2) and pressure controls.
- C. Economizer enthalpy control (if installed) controls operation of first-stage cooling and positions fresh air damper to maintain mixed air

temperature. Second-stage cooling operates normally as required by second stage of thermostats.

- D. The system will continue in cooling operation as long as all safety controls are closed until the thermostat is satisfied.

XX. 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.

▲ 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.

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 motor, 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 two 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 blower 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.
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.**

▲ 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.

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.

▲ 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.

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

▲ 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.

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.

▲ 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.

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 compressor access 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 cover.
2. Close the filter control and replace the blower/evaporator coil access panels.
3. Replace the control box cover.
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 20 and 21 for determining cause of unit problems.

WIRING DIAGRAMS

Figures 22 and 23 are complete wiring diagrams for the unit and its power sources. Also located on back of compressor access panel.

CHARGING

See Figures 24 and 25 for proper charging information.

TABLE 10 - AIRFLOW PERFORMANCE - 10 TON [35.1kW] - 60 HZ - SIDEFLOW RKNL B120/C120 MODELS

Air Flow CFM [L/s]	Capacity 10 tons [35.1 kW]																			
	External Static Pressure - Inches of Water [kPa]																			
	0.1 [0.2]	0.2 [0.5]	0.3 [0.7]	0.4 [1.0]	0.5 [1.2]	0.6 [1.5]	0.7 [1.7]	0.8 [2.0]	0.9 [2.2]	1.0 [2.5]	1.1 [2.7]	1.2 [3.0]	1.3 [3.2]	1.4 [3.5]	1.5 [3.7]	1.6 [4.0]	1.7 [4.2]	1.8 [4.5]	1.9 [4.7]	
3200 [151.0]	—	676	1090	1153	1219	1286	1360	1436	1514	1596	1681	1769	1861	1955	2053	2164	2258	2365	2476	2590
3300 [155.7]	—	689	1144	1210	1280	1353	1429	1508	1590	1675	1764	1856	1951	2049	2151	2255	2363	2474	2588	2705
3400 [160.4]	670	1137	1204	1274	1347	1423	1503	1585	1671	1760	1853	1948	2047	2149	2254	2362	2473	2588	2706	—
3500 [165.2]	683	1198	1268	1342	1419	1500	1582	1668	1758	1851	1947	2046	2148	2253	2363	2474	2589	2707	2829	—
3600 [170.0]	697	1265	1339	1416	1496	1580	1667	1757	1850	1946	2046	2149	2255	2364	2476	2592	2710	2832	2957	—
3700 [174.6]	711	1337	1415	1495	1580	1667	1757	1851	1950	2048	2151	2257	2367	2480	2596	2715	2837	2962	3091	—
3800 [179.3]	725	1415	1496	1576	1668	1757	1853	1954	2055	2154	2261	2371	2484	2601	2720	2843	2969	3100	3235	—
3900 [184.0]	740	1498	1583	1667	1762	1858	1954	2055	2154	2261	2371	2484	2601	2720	2843	2969	3100	3235	3375	—
4000 [188.8]	754	1586	1671	1761	1858	1954	2055	2154	2261	2371	2484	2601	2720	2843	2969	3100	3235	3375	3520	—
4100 [193.5]	768	1680	1768	1858	1954	2055	2154	2261	2371	2484	2601	2720	2843	2969	3100	3235	3375	3520	3675	—
4200 [198.2]	783	1780	1875	1967	2062	2154	2261	2371	2484	2601	2720	2843	2969	3100	3235	3375	3520	3675	3830	—
4300 [202.9]	798	1884	1981	2074	2168	2261	2371	2484	2601	2720	2843	2969	3100	3235	3375	3520	3675	3830	3990	—
4400 [207.6]	813	1995	2093	2187	2280	2371	2484	2601	2720	2843	2969	3100	3235	3375	3520	3675	3830	3990	4155	—
4500 [212.3]	828	2111	2211	2306	2398	2489	2580	2671	2761	2851	2941	3031	3121	3211	3301	3391	3481	3571	3661	—
4600 [217.1]	844	2232	2332	2427	2520	2611	2701	2791	2881	2971	3061	3151	3241	3331	3421	3511	3601	3691	3781	—
4700 [221.8]	859	2359	2459	2554	2647	2738	2829	2919	3009	3099	3189	3279	3369	3459	3549	3639	3729	3819	3909	—
4800 [226.5]	875	2491	2591	2686	2779	2870	2961	3051	3141	3231	3321	3411	3501	3591	3681	3771	3861	3951	4041	—

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

Drive Package	R	S
Motor H.P. [kW]	2 [1491.4]	3 [2237.1]
Blower Sheave	BK90	BK65
Motor Sheave	1VP-44	1VP-44
Turns Open	1	2
RPM	860	909

NOTES: 1. Factory sheave settings are shown in bold print.
 2. Re-adjustment of sheave required to achieve rated airflow at ARI minimum E.S.P.
 3. Do not operate above blower RPM shown as motor overloading will occur.
 4. Do not set motor sheave below one turn open.

COMPONENT AIR RESISTANCE, IWC 10 TON [35.2 kW]

Component	Standard Indoor Airflow—CFM [L/s]											
	3200 [1510]	3400 [1604]	3600 [1699]	3800 [1793]	4000 [1888]	4200 [1982]	4400 [2076]	4600 [2171]	4800 [2265]	Resistance—Inches Water [kPa]		
	0.065 [0.016]	0.071 [0.018]	0.076 [0.019]	0.082 [0.020]	0.087 [0.022]	0.093 [0.023]	0.099 [0.025]	0.105 [0.026]	0.110 [0.027]	0.076 [0.019]	0.082 [0.020]	0.087 [0.022]
Wet Coil	0.065 [0.016]	0.071 [0.018]	0.076 [0.019]	0.082 [0.020]	0.087 [0.022]	0.093 [0.023]	0.099 [0.025]	0.105 [0.026]	0.110 [0.027]	DNA	DNA	DNA
Concentric Diffuser RXRM-FA65 or FA75 & Transition RXMC-CD04	0.31 [0.077]	0.37 [0.092]	DNA	DNA	0.17 [0.042]	0.21 [0.052]	0.24 [0.060]	DNA	DNA	DNA	DNA	DNA
Concentric Diffuser RXRM-AA61 or AA71 & Transition RXMC-CE05	DNA	DNA	DNA	DNA	0.17 [0.042]	0.21 [0.052]	0.24 [0.060]	DNA	DNA	DNA	DNA	DNA
Concentric Diffuser RXRM-AA66 or AA76 & Transition RXMC-CF06	DNA	DNA	DNA	DNA	0.17 [0.042]	0.21 [0.052]	0.24 [0.060]	DNA	DNA	DNA	DNA	DNA
Economizer 100% R.A. Damper Open	0.09 [0.022]	0.10 [0.025]	0.11 [0.027]	0.12 [0.030]	0.13 [0.032]	0.14 [0.035]	0.15 [0.037]	0.16 [0.040]	0.17 [0.042]	0.09 [0.022]	0.10 [0.025]	0.11 [0.027]
Horizontal Economizer 100% R.A. Damper Open	0.05 [0.012]	0.06 [0.014]	0.06 [0.015]	0.07 [0.017]	0.08 [0.020]	0.09 [0.022]	0.10 [0.025]	0.11 [0.027]	0.12 [0.029]	0.05 [0.012]	0.06 [0.014]	0.06 [0.015]
Horizontal Economizer 100% O.A. Damper Open	0.11 [0.027]	0.12 [0.030]	0.13 [0.032]	0.15 [0.036]	0.16 [0.040]	0.18 [0.044]	0.19 [0.047]	0.20 [0.50]	0.21 [0.052]	0.11 [0.027]	0.12 [0.030]	0.13 [0.032]

NOTE: Add component resistance to duct resistance to determine total external static pressure.
 DNA = Data not Available.

AIRFLOW CORRECTION FACTORS 10 TON [35.2 kW]

ACTUAL—CFM [L/s]	3200 [1510]	3400 [1605]	3600 [1699]	3800 [1793]	4000 [1888]	4200 [1982]	4400 [2077]	4600 [2171]	4800 [2265]
TOTAL MBH	0.96	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04
SENSIBLE MBH	0.91	0.93	0.95	0.97	1.00	1.02	1.05	1.07	1.09
POWER kW	0.98	0.98	0.99	0.99	1.00	1.00	1.01	1.01	1.01

NOTES: 1. Multiply correction factor times gross performance data.
 2. Resulting sensible capacity cannot exceed total capacity.

[] Designates Metric Conversions

FIGURE 20 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	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 450 PSIG • Replace thermostat wiring
Condenser fan runs, compressor doesn't	<ul style="list-style-type: none"> • Loose connection • Compressor stuck, grounded or open motor winding open internal overload. • Low voltage condition • Low voltage condition 	<ul style="list-style-type: none"> • 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. • Add start kit components
Insufficient cooling	<ul style="list-style-type: none"> • Improperly sized unit • Improper airflow • Incorrect refrigerant charge • Air, non-condensibles or moisture in system • Incorrect voltage 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Incorrect voltage • Defective overload protector • Refrigerant undercharge 	<ul style="list-style-type: none"> • At compressor terminals, voltage must be \pm 10% of nameplate marking when unit is operating. • Replace - check for correct voltage • Add refrigerant
Registers sweat	<ul style="list-style-type: none"> • Low evaporator airflow 	<ul style="list-style-type: none"> • Increase speed of blower or reduce restriction - replace air filter
High head-low vapor pressures	<ul style="list-style-type: none"> • Restriction in liquid line, expansion device or filter drier • Flow check piston size too small • Incorrect capillary tubes • TXV does not open 	<ul style="list-style-type: none"> • Remove or replace defective component • Change to correct size piston • Change coil assembly • Replace TXV
High head-high or normal vapor pressure - Cooling mode	<ul style="list-style-type: none"> • Dirty condenser coil • Refrigerant overcharge • Condenser fan not running • Air or non-condensibles in system 	<ul style="list-style-type: none"> • Clean coil • Correct system charge • Repair or replace • Recover refrigerant, evacuate & recharge
Low head-high vapor pressures	<ul style="list-style-type: none"> • Defective Compressor valves • Incorrect capillary tubes 	<ul style="list-style-type: none"> • Replace compressor • Replace coil assembly
Low vapor - cool compressor - iced evaporator coil	<ul style="list-style-type: none"> • Low evaporator airflow • Operating below 65°F outdoors • Moisture in system 	<ul style="list-style-type: none"> • Increase speed of blower or reduce restriction - replace air filter • Add Low Ambient Kit • Recover refrigerant - evacuate & recharge - add filter drier
High vapor pressure	<ul style="list-style-type: none"> • Excessive load • Defective compressor 	<ul style="list-style-type: none"> • Recheck load calculation • Replace
Fluctuating head & vapor pressures	<ul style="list-style-type: none"> • TXV hunting • Air or non-condensibles in system 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Air or non-condensibles in system 	<ul style="list-style-type: none"> • Recover refrigerant, evacuate & recharge

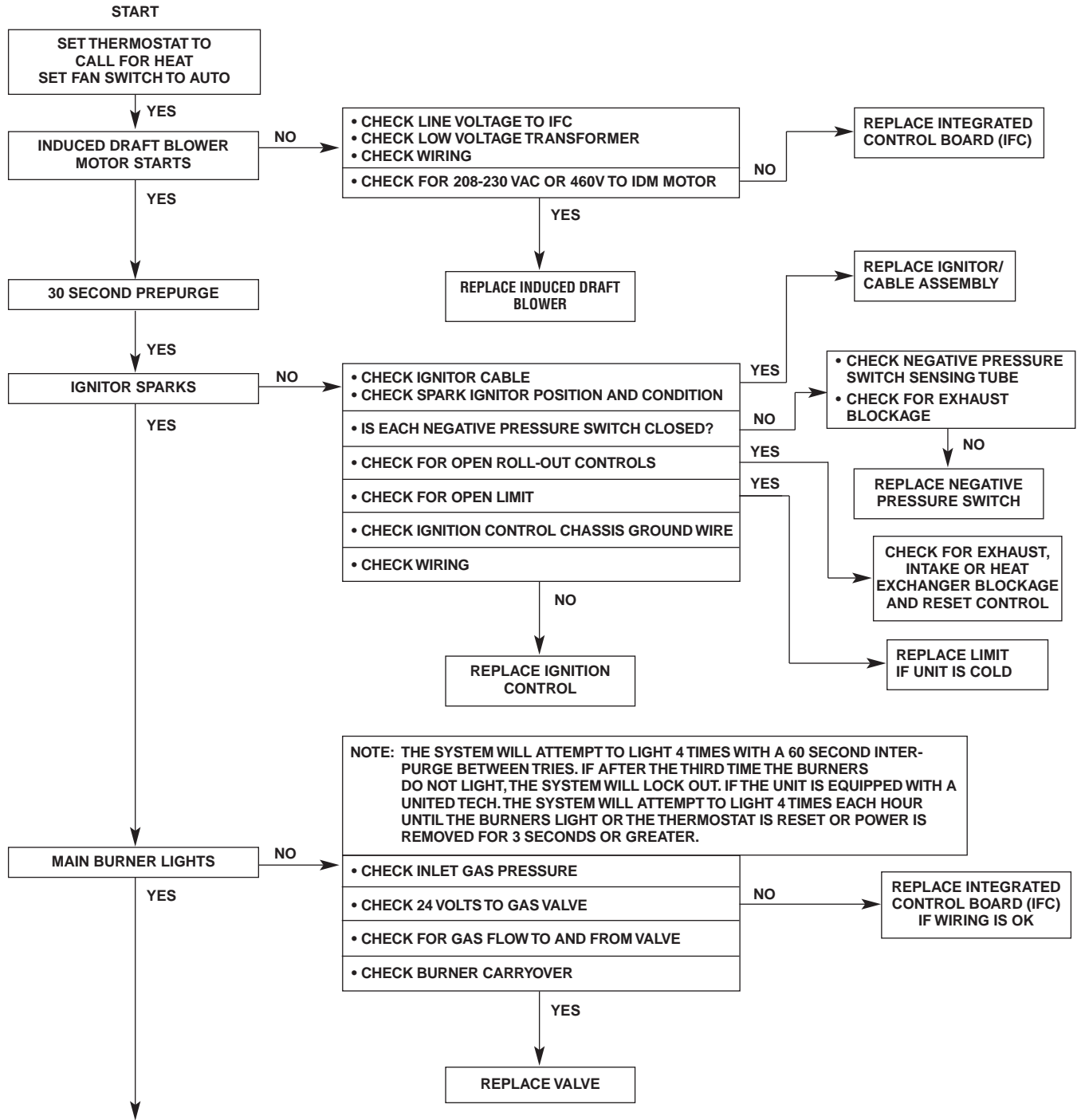
FIGURE 21
FURNACE TROUBLESHOOTING GUIDE
 (COMBINATION HEATING AND COOLING UNITS WITH DIRECT SPARK IGNITION)

⚠ WARNING

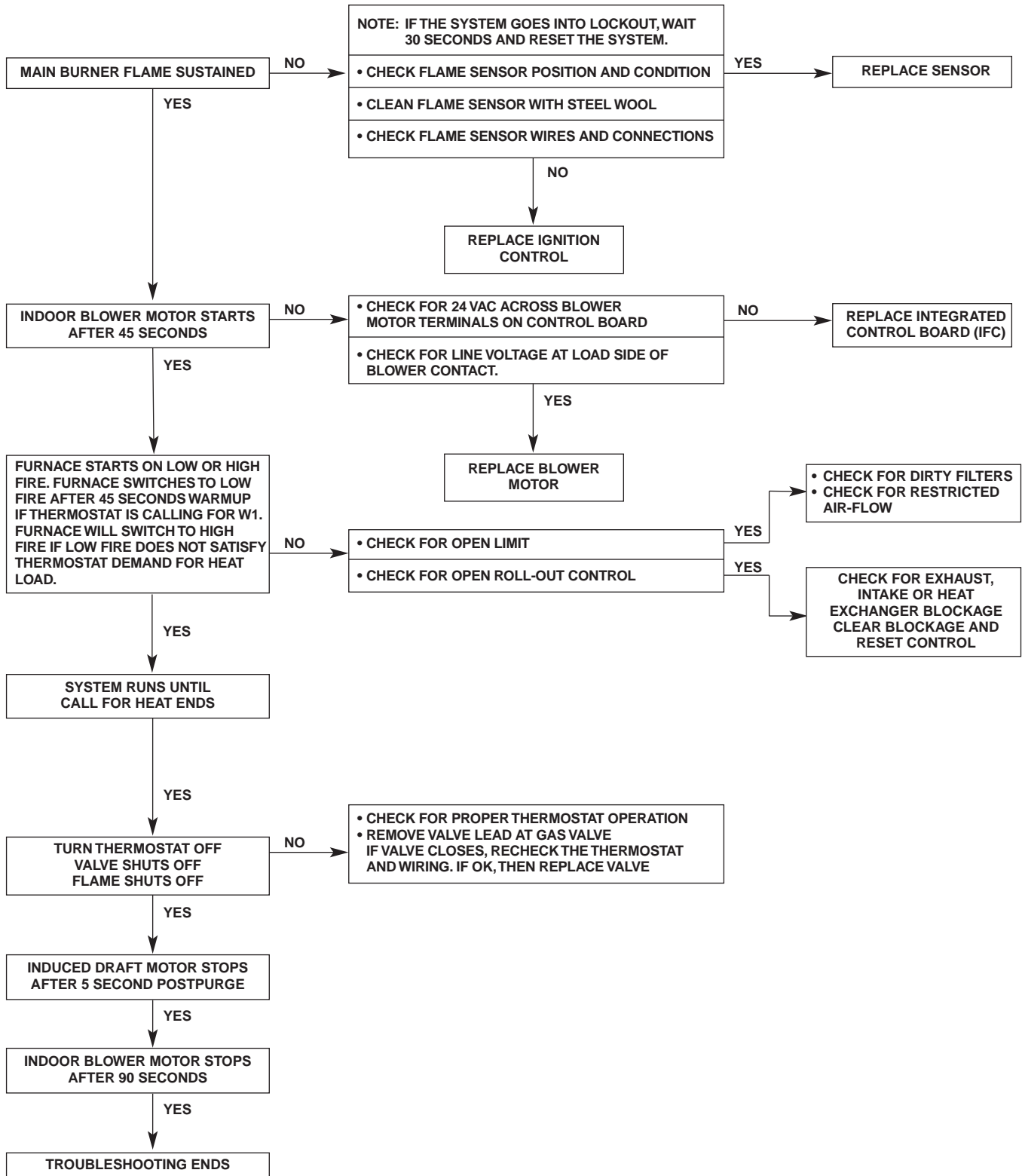


HAZARDOUS VOLTAGE
LINE VOLTAGE CONNECTIONS

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

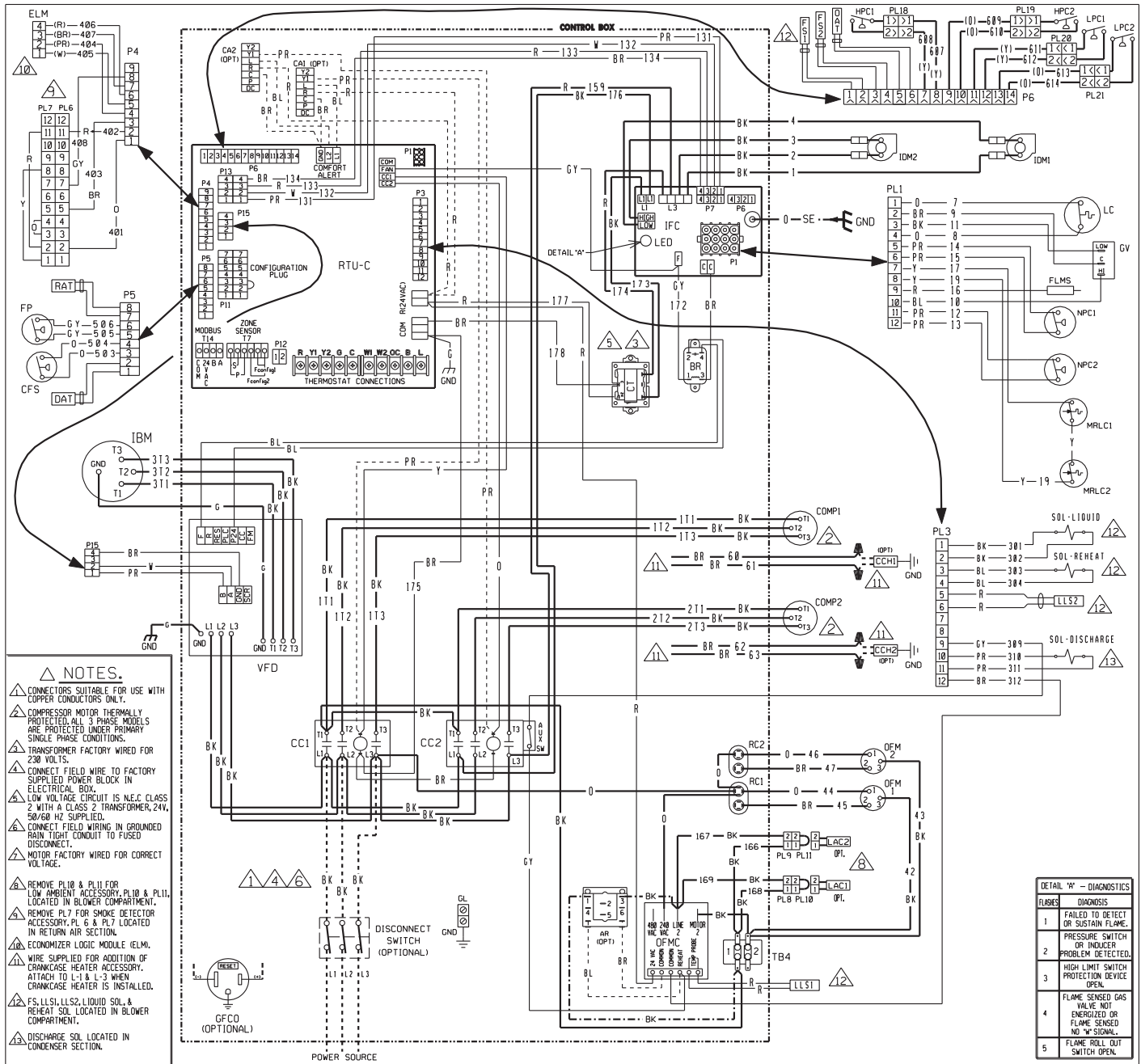


FLOW CHART CONTINUED ON NEXT PAGE



REPEAT PROCEDURE UNTIL TROUBLE FREE OPERATION IS OBTAINED.

FIGURE 22



- NOTES.**
- ▲ CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
 - ▲ COMPRESSOR MOTOR THERMALLY PROTECTED. ALL 3 PHASES ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
 - ▲ TRANSFORMER FACTORY WIRED FOR 230 VOLTS.
 - ▲ CONNECT FIELD WIRE TO FACTORY SUPPLIED POWER BLOCK IN ELECTRICAL BOX.
 - ▲ LOW VOLTAGE CIRCUIT IS N.E.C. CLASS 2 WITH A CLASS 2 TRANSFORMER, 24V, 50/60 HZ SUPPLIED.
 - ▲ CONNECT FIELD WIRING IN GROUNDED RAIN TIGHT CONDUIT TO FUSED DISCONNECT.
 - ▲ MOTOR FACTORY WIRED FOR CORRECT VOLTAGE.
 - ▲ REMOVE PL10 & PL11 FOR LOW AMBIENT ACCESSORY. PL10 & PL11 LOCATED IN BLOWER COMPARTMENT.
 - ▲ REMOVE PL7 FOR SMOKE DETECTOR ACCESSORY. PL 6 & PL7 LOCATED IN RETURN AIR SECTION.
 - ▲ ECONOMIZER LOGIC MODULE (ELM). WIRE SUPPLIED FOR ADDITION OF CRANKCASE HEATER ACCESSORY. ATTACH TO L-1 & L-3 WHEN CRANKCASE HEATER IS INSTALLED.
 - ▲ FS, LLS1, LLS2, LIQUID SOL., & REHEAT SOL. LOCATED IN BLOWER COMPARTMENT.
 - ▲ DISCHARGE SOL. LOCATED IN CONDENSER SECTION.

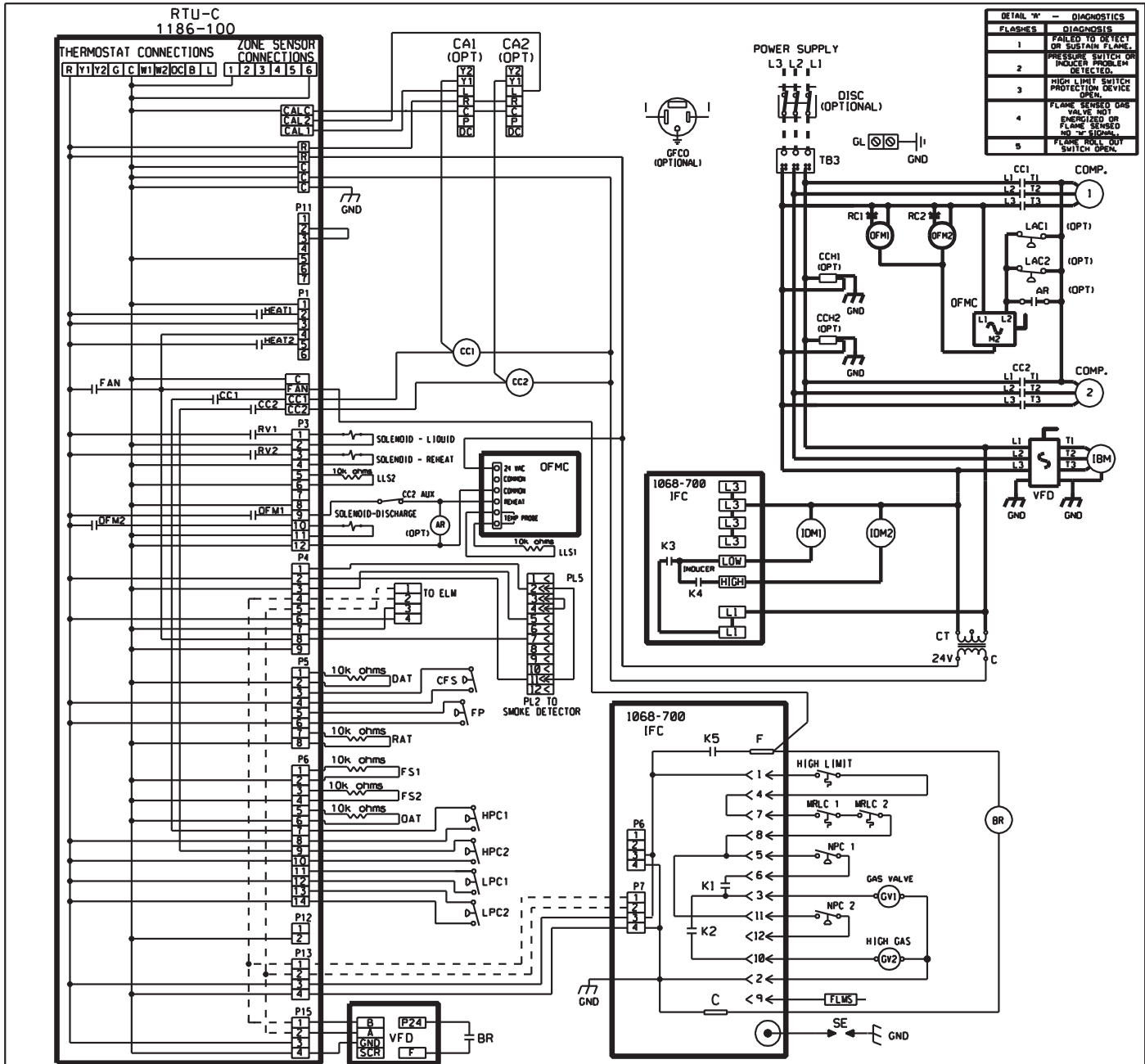
DETAIL 'A' - DIAGNOSTICS	
FLAGES	DIAGNOSIS
1	FAILED TO DETECT OR SUSTAIN FLAME.
2	PRESSURE SWITCH OR INDOOR PROBLEM DETECTED.
3	HIGH LIMIT SWITCH PROTECTION DEVICE OPEN.
4	FLAME SENSED GAS VALVE NOT ENERGIZED OR FLAME SENSED NO "S" SIGNAL.
5	FLAME ROLL OUT SWITCH OPEN.

COMPONENT CODE	WIRING INFORMATION	WIRE COLOR CODE
BR BLOWER RELAY	LINE VOLTAGE	BK BLACK
CA COMFORT ALERT MODULE	-FACTORY STANDARD	BR BROWN
CC COMPRESSOR CONTACTOR	-FACTORY OPTION	BL BLUE
CCH CRANKCASE HEATER	-FIELD INSTALLED	G GREEN
CFS CLOGGED FILTER SWITCH	LOW VOLTAGE	GY GRAY
COMP COMPRESSOR	-FACTORY STANDARD	O ORANGE
COMP2 CONTROL TRANSFORMER	-FACTORY OPTION	PR PURPLE
DAT DISCHARGE AIR SENSOR	-FIELD INSTALLED	R RED
DSR DISCHARGE SOLENOID RELAY	REPLACEMENT WIRE	W WHITE
DISC DISCONNECT SWITCH	-MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105° C MIN.)	Y YELLOW
FLMS FLAME SENSOR	WARNING	
FP FAN PROVING	-CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., AND LOCAL CODES AS APPLICABLE.	
FS FREEZE SENSOR		
GFCO GROUND FAULT CONVENIENCE OUTLET		
GND GROUND		
GV GAS VALVE		
HPC HIGH PRESSURE CONTROL		
IBM INDOOR BLOWER MOTOR BELT DRIVE		
IDM INDUCED DRAFT MOTOR		
IFC INTEGRATED FURNACE CONTROL		
LAC LOW AMBIENT COOLING CONTROL		
LC LIMIT CONTROL		
LPC LOW PRESSURE CONTROL		
MRLC MANUAL RESET LIMIT CONTROL		
NPC NEGATIVE PRESSURE CONTROL		
OAT OUTSIDE AIR SENSOR		
OFM OUTDOOR FAN MOTOR		
OFMC OUTDOOR FAN MOTOR CONTROLLER		
PL PLUG		
PL2 POWER TRANSFORMER		
RAT RETURN AIR SENSOR		
RC RUN CAPACITOR		
RTU-C ROOFTOP UNIT CONTROL		
SE SPARK ELECTRODE		
TB TERMINAL BLOCK		
VFD VARIABLE FREQUENCY DRIVE		
WIRE NUT		

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

DR. BY	APP. BY	DATE	DWG. NO.	REV
JRJ		10-24-11	90-103089-21	03

FIGURE 23



COMPONENT CODE

AR	ACCESSORY RELAY	IBM	INDOOR BLOWER MOTOR BELT DRIVE
BR	BLOWER RELAY	IDM	INDUCED DRAFT MOTOR
CA	COMFORT ALERT MODULE	IFC	INTEGRATED FURNACE CONTROL
CC	COMPRESSOR CONTACTOR	LAC	LOW AMBIENT COOLING CONTROL
CCH	CRANKCASE HEATER	LC	LIMIT CONTROL
CFS	CLOGGED FILTER SWITCH	LLS	LIQUID LINE SENSOR
COMP	COMPRESSOR	LPC	LOW PRESSURE CONTROL
CT	CONTROL TRANSFORMER	MRLC	MANUAL RESET LIMIT CONTROL
DSR	DISCHARGE AIR SENSOR	NPC	NEGATIVE PRESSURE CONTROL
DISC	DISCONNECT SWITCH	OAS	OUTSIDE AIR SENSOR
FLMS	FLAME SENSOR	OFM	OUTDOOR FAN MOTOR
FP	FAN PROVING	OFMC	OUTDOOR FAN MOTOR CONTROLLER
FS	FREEZE SENSOR	PL	PLUG
GFCO	GROUND FAULT CONVENIENCE OUTLET	PL5	RETURN AIR SENSOR
GL	GROUND LUG	RC	RUN CAPACITOR
GND	GROUND	RTU-C	ROOFTOP UNIT CONTROL
GV	GAS VALVE	SE	SPARK ELECTRODE
HPC	HIGH PRESSURE CONTROL	TB	TERMINAL BLOCK
		VFD	VARIABLE FREQUENCY DRIVE
		▲	WIRE NUT

WIRING INFORMATION

LINE VOLTAGE
 -FACTORY STANDARD
 -FACTORY OPTION
 -FIELD INSTALLED

LOW VOLTAGE
 -FACTORY STANDARD
 -FACTORY OPTION
 -FIELD INSTALLED

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

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

WIRE COLOR CODE

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

WIRING SCHEMATIC
 REHEAT 090/120/151
 208-230/460V 3 PH, 60 HZ.
 ROOFTOP W/RTU-C

DR. BY	APP. BY	DATE	DWG. NO.	REV
JRJ		10-24-11	90-103246-18	03

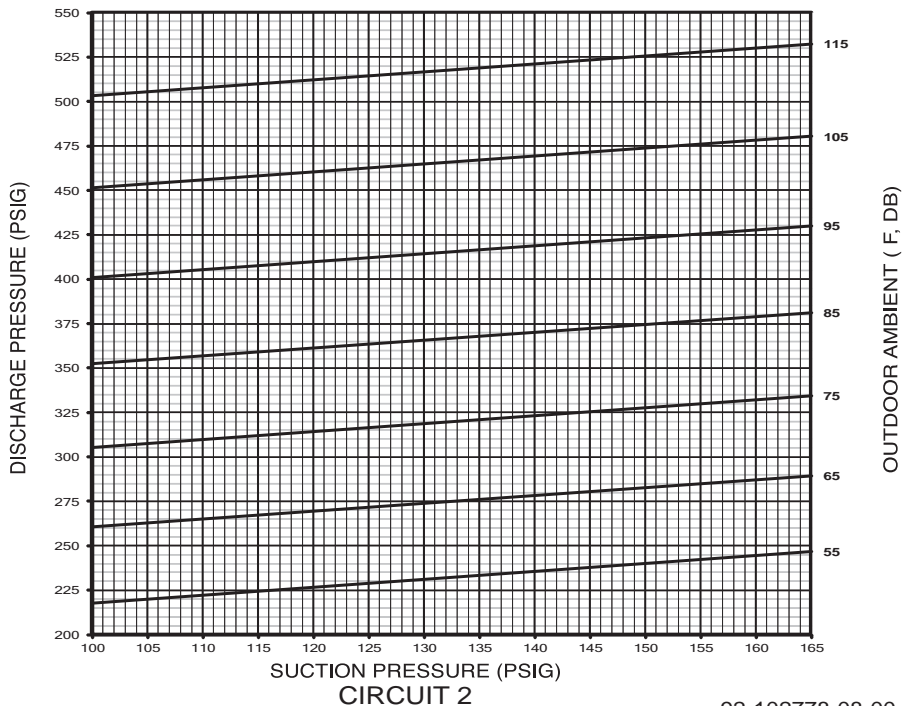
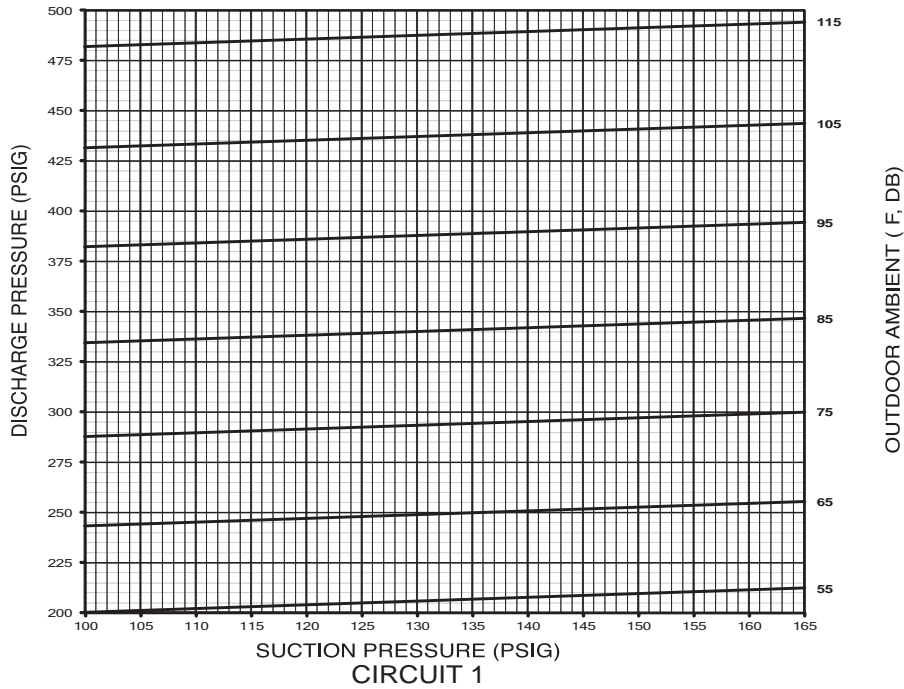
FIGURE 24

RKNL SYSTEM CHARGE CHARTS

SYSTEM CHARGE CHART - REFRIGERANT 410A 7.5 TON, 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.



92-102778-08-00

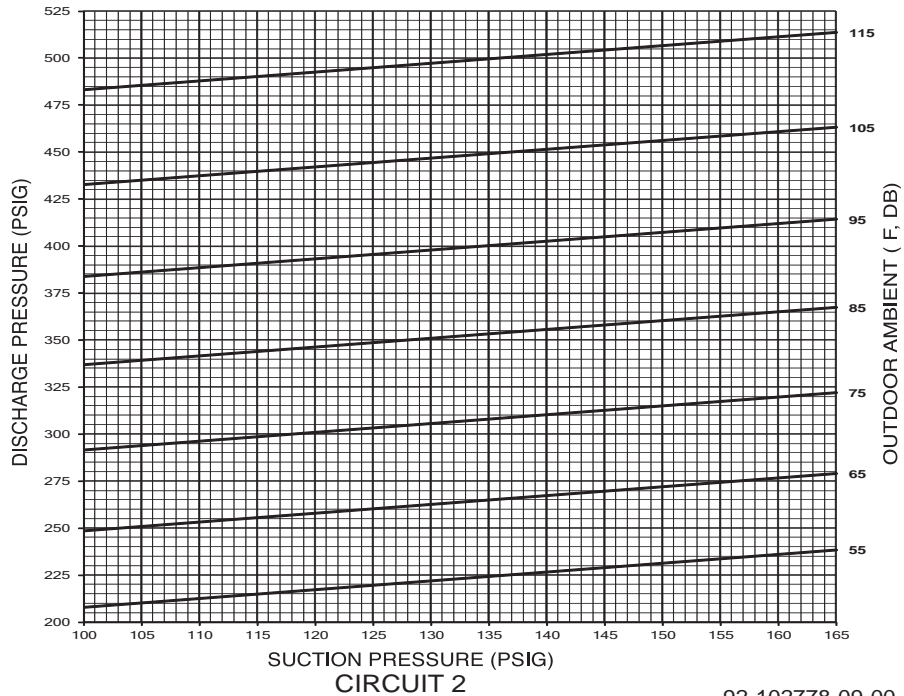
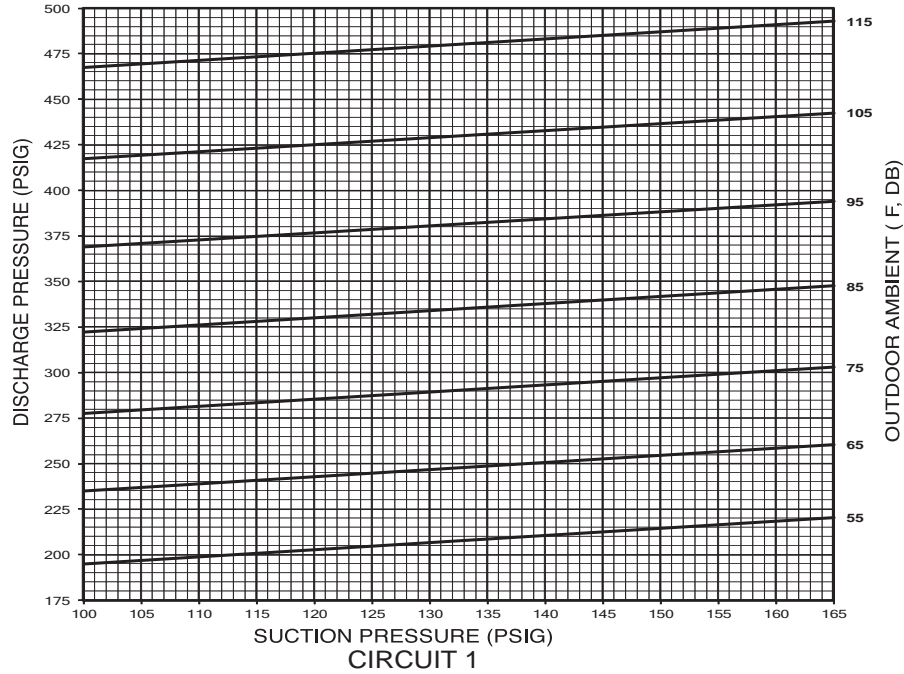
FIGURE 25

RKNL SYSTEM CHARGE CHARTS

SYSTEM CHARGE CHART - REFRIGERANT 410A 10 TON, 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.



92-102778-09-00

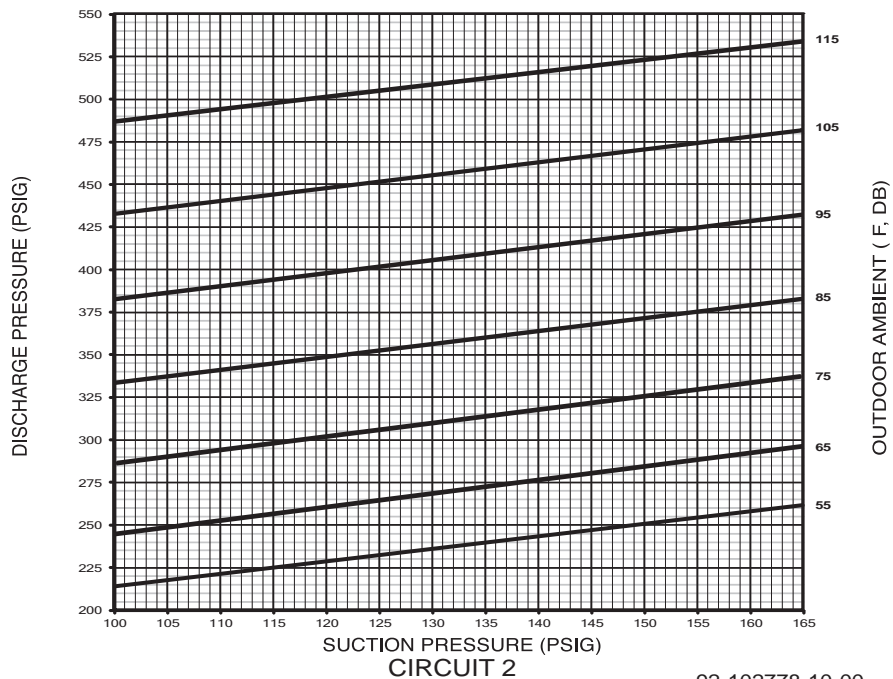
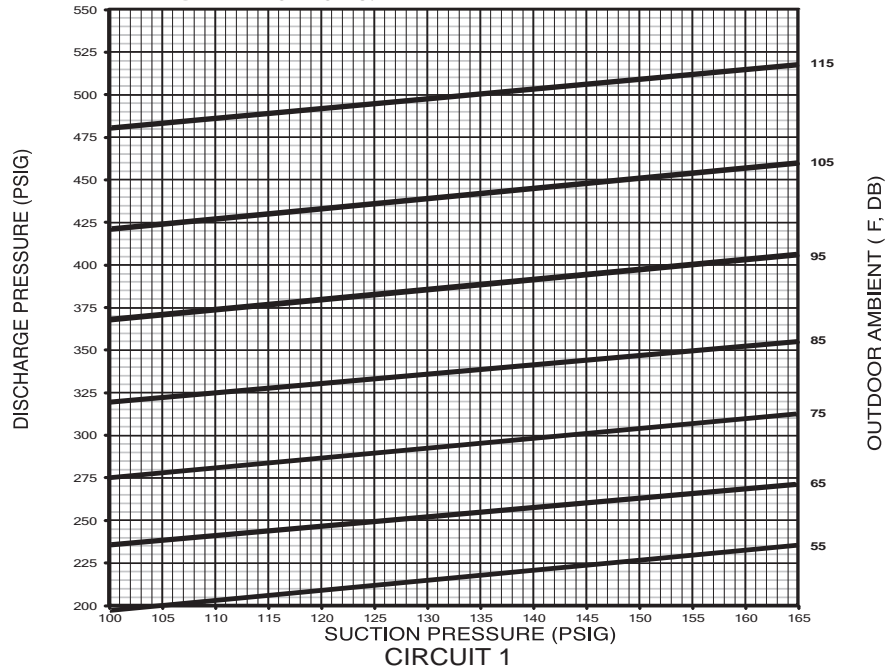
FIGURE 26

RKNL SYSTEM CHARGE CHARTS

SYSTEM CHARGE CHART - REFRIGERANT 410A 12.5 TON, 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.



92-102778-10-00

