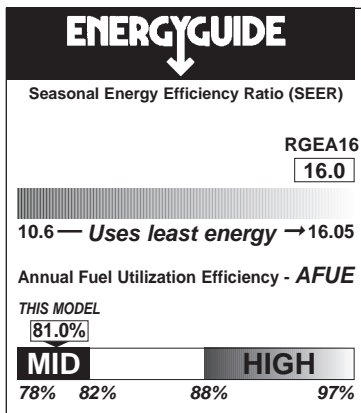


INSTALLATION INSTRUCTIONS

PACKAGE GAS ELECTRIC

FEATURING EARTH-FRIENDLY R-410A REFRIGERANT 

RGEA16 UP TO 16 SEER (2-5 TONS)



⚠️ 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: THIS FURNACE CONTAINS FIBERGLASS INSULATION. RESPIRABLE PARTICLES OF FIBERGLASS ARE KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER. EXHAUST GAS FROM THIS FURNACE CONTAINS CHEMICALS, INCLUDING CARBON MONOXIDE, KNOWN TO THE STATE OF CALIFORNIA TO CAUSE 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 (carbon monoxide) 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.

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



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I. SAFETY INFORMATION

WARNING

PROPOSITION 65: THIS FURNACE CONTAINS FIBERGLASS INSULATION. RESPIRABLE PARTICLES OF FIBERGLASS ARE KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER. EXHAUST GAS FROM THIS FURNACE CONTAINS CHEMICALS, INCLUDING CARBON MONOXIDE, KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

WARNING

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

WARNING

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

WARNING

DISCONNECT ALL POWER TO UNIT BEFORE STARTING MAINTENANCE. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

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.

WARNING

THIS UNIT MUST NOT BE INSTALLED DIRECTLY ON WOOD FLOORING, CLASS A, CLASS B OR CLASS C ROOF COVERING MATERIALS, OR ANY OTHER COMBUSTIBLE STRUCTURE EXCEPT AS SPECIFIED IN FIGURE 15. FAILURE TO ADHERE TO THIS WARNING CAN CAUSE A FIRE OR EXPLOSION RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

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, OR PROPERTY DAMAGE.

⚠ 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.

⚠ 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.

⚠ 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.

⚠ 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.

⚠ 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.

⚠ WARNING

IF YOU DO NOT FOLLOW THESE INSTRUCTIONS EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

⚠ 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.

⚠ 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!

 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.

 WARNING

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

 WARNING

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

 WARNING

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

 WARNING

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.

 WARNING

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

 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.

 CAUTION

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

WARNING

IMPORTANT: ALL MANUFACTURER PRODUCTS MEET CURRENT FEDERAL OSHA GUIDELINES FOR SAFETY. CALIFORNIA PROPOSITION 65 WARNINGS ARE REQUIRED FOR CERTAIN PRODUCTS, WHICH ARE NOT COVERED BY THE OSHA STANDARDS.

CALIFORNIA'S PROPOSITION 65 REQUIRES WARNINGS FOR PRODUCTS SOLD IN CALIFORNIA THAT CONTAIN, OR PRODUCE, ANY OF OVER 600 LISTED CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER OR BIRTH DEFECTS SUCH AS FIBERGLASS INSULATION, LEAD IN BRASS, AND COMBUSTION PRODUCTS FROM NATURAL GAS.

ALL "NEW EQUIPMENT" SHIPPED FOR SALE IN CALIFORNIA WILL HAVE LABELS STATING THAT THE PRODUCT CONTAINS AND/OR PRODUCES PROPOSITION 65 CHEMICALS. ALTHOUGH WE HAVE NOT CHANGED OUR PROCESSES, HAVING THE SAME LABEL ON ALL OUR PRODUCTS FACILITATES MANUFACTURING AND SHIPPING. WE CANNOT ALWAYS KNOW "WHEN, OR IF" PRODUCTS WILL BE SOLD IN THE CALIFORNIA MARKET.

YOU MAY RECEIVE INQUIRIES FROM CUSTOMERS ABOUT CHEMICALS FOUND IN, OR PRODUCED BY, SOME OF OUR HEATING AND AIR-CONDITIONING EQUIPMENT, OR FOUND IN NATURAL GAS USED WITH SOME OF OUR PRODUCTS. LISTED BELOW ARE THOSE CHEMICALS AND SUBSTANCES COMMONLY ASSOCIATED WITH SIMILAR EQUIPMENT IN OUR INDUSTRY AND OTHER MANUFACTURERS.

- GLASS WOOL (FIBERGLASS) INSULATION
- CARBON MONOXIDE (CO)
- FORMALDEHYDE
- BENZENE

MORE DETAILS ARE AVAILABLE AT THE WEBSITES FOR OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION), AT WWW.OSHA.GOV AND THE STATE OF CALIFORNIA'S OEHHA (OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT), AT WWW.OEHHA.ORG. CONSUMER EDUCATION IS IMPORTANT SINCE THE CHEMICALS AND SUBSTANCES ON THE LIST ARE FOUND IN OUR DAILY LIVES. MOST CONSUMERS ARE AWARE THAT PRODUCTS PRESENT SAFETY AND HEALTH RISKS, WHEN IMPROPERLY USED, HANDLED AND MAINTAINED.

II. INTRODUCTION

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.

III. 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.

IV. SPECIFICATIONS

A. GENERAL

The Combination Gas Heating/Electric Cooling Rooftop is available in 60, 80 and 100 BTU/Hr. heating inputs and cooling capacities of 2, 3, 4 and 5 nominal tons of cooling. Units are convertible from end supply and return to bottom supply and return by relocation of supply and return air access 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 9 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 compressor, condenser coil, evaporator coil with thermostatic expansion valve), a circulation air blower, a condenser fan, 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 with R-410A refrigerant and performance tested. Refrigerant amount is indicated on rating plate.

C. R410A REFRIGERANT

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

1. Specification 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 pressures than R-22 systems. Do not use R-22 service equipment or components on R-410A equipment.

D. COMFORT ALERT™ SYSTEM (2-STAGE MODELS ONLY)

1. Comfort Alert™

The Comfort Alert™ diagnostics module is for troubleshooting air conditioning system failures. By monitoring and analyzing data from the compressor and the thermostat demand, the module can accurately detect the cause of electrical and system-related failures without any external sensors. A flashing LED indicator communicates the ALERT code and guides the service technician more quickly and accurately to the root cause of a problem.

POWER LED (Green): indicates voltage is present at the power connection of the module.

ALERT LED (Yellow): communicates an abnormal system condition through a unique flash code. The ALERT LED will flash a number of times consecutively, pause and then repeat the process. The number of consecutive flashes, defined as the Flash Code, correlates to a particular abnormal condition. Detailed descriptions of specific ALERT Flash Codes are shown in the Comfort Alert Diagnosis Chart in this manual.

TRIP LED (Red): indicates there is a demand signal from the thermostat but no current to the compressor is detected by the module. The TRIP LED typically indicates the compressor internal overload protector is open or may indicate missing high voltage supply power to the compressor.

When an abnormal system condition occurs, the Comfort Alert module displays the appropriate ALERT and/or TRIP LED. The yellow ALERT LED will flash a number

FIGURE 1
LED DESCRIPTION



of times consecutively, pause and then repeat the process. To identify a Flash Code number, count the number of consecutive flashes.

IMPORTANT: Every time the module powers up, the last ALERT Flash Code that occurred prior to shut down is displayed for one minute. The module will continue to display the flash code until the condition returns to normal or if 24VAC power is removed from the module.

The control box cover allows access to the Comfort Alert™ status LEDs. An abbreviated Comfort Alert™ diagnostic chart is provided on the control box cover.

2. High Pressure Control (HPC)

The high pressure control (HPC) keeps the compressor from operating in pressure ranges, which can cause damage to the compressor. This is an auto-reset control that opens near 610 PSIG and closes once the system pressure drops below 420 PSIG.

The high pressure control is wired in the 24VAC side of the control circuitry.

3. Low Pressure Control (LPC)

The low pressure control (LPC) keeps the compressor from operating in pressure ranges that can cause damage to the compressor. This is an auto-reset control that opens near 90 PSIG and closes once the system pressure rises above 135 PSIG.

The low pressure control is wired in the common side of the control circuitry.

4. Comfort Alert With Active Protection

A two-stage cooling thermostat is required for proper unit operation.

Manufacturer recommends the use of thermostats that provide active compressor protection via the L terminal when the Comfort-Alert module on the unit is connected to the L terminal on the thermostat.

The Comfort Alert diagnostics module diagnoses system and electrical problems in the air conditioning system. Abnormal conditions are indicated by flashing ALERT codes on the yellow LED on the Comfort Alert module. The flash codes are transmitted to the thermostat when the **L** terminal on the Comfort Alert Module is connected to the **L** terminal on the thermostat. The compatible thermostat displays a CHECK SYSTEM icon that flashes at the same rate as the yellow ALERT LED on the Comfort Alert module.

NOTE: The Comfort Alert™ module does not provide safety protection! It does not disconnect power from the unit.

Comfort Alert™ Flash Codes

- 1 – Long Run Time
- 2 – System Pressure Trip
- 3 – Short Cycling
- 4 – Locked Rotor
- 5 – Open Circuit
- 6 – Open Start Circuit (single phase) – missing phase (3-phase)
- 7 – Open Run Circuit (single phase) – reverse phase (3-phase)
- 8 – Welded Contactor
- 9 – Low Voltage

See Figures 42 and 43 (Comfort Alert Diagnostic Charts) for more troubleshooting information.

FIGURE 2



Active protection occurs under the following conditions:

1) Flash Code 2 - *System Pressure Trip*

Condition: Four consecutive compressor protector trips occur where the average run time until trip is between 1 minute and 15 minutes

Possible causes:

- Low suction pressure
- Low pressure switch is open
- Low system charge
- Blocked condenser coil
- Restricted condenser air flow

Active Thermostat Reaction:

The thermostat will cycle the system ON for 5 minutes and OFF for five minutes to verify system fault. If this ON/OFF cycling repeats for 30 ten-minute cycles, the thermostat concludes there is a system problem and implements a hard lockout.

2) Flash Code 3 - *Short Cycling*

Condition: A pattern of short cycling emerges where the run time for the previous four cycles is less than three minutes each.

Possible causes:

- High head pressure
- High pressure switch is open
- System overcharged
- Non-condensables in system
- Faulty thermostat
- Intermittent contactor

Active Thermostat Reaction:

The thermostat will cycle the system ON for 5 minutes and OFF for five minutes to verify the system fault. If this ON/OFF cycling repeats for 30 ten-minute cycles, the thermostat concludes there is a system problem and implements a hard lockout.

3) Flash Code 4 - *Locked Rotor*

Condition: The compressor internal overload trips where the average run time is less than 15 seconds.

Possible causes:

- Bad run capacitor
- Low line voltage
- Excessive liquid refrigerant in compressor
- Compressor bearings are seized
- Faulty hard start components

Active Thermostat Reaction:

The thermostat implements a hard lockout once this error is sensed.

4) Flash Code 6 - *Open Start Circuit*

Condition: Current is detected in the run circuit but not in the start circuit.

Possible causes:

- Bad run capacitor
- Open circuit in compressor start wiring or connections.
- Compressor start winding is damaged

Active thermostat reaction:

The thermostat implements a hard lockout after 3 hours.

5) Flash Code 7 - *Open Run Circuit*

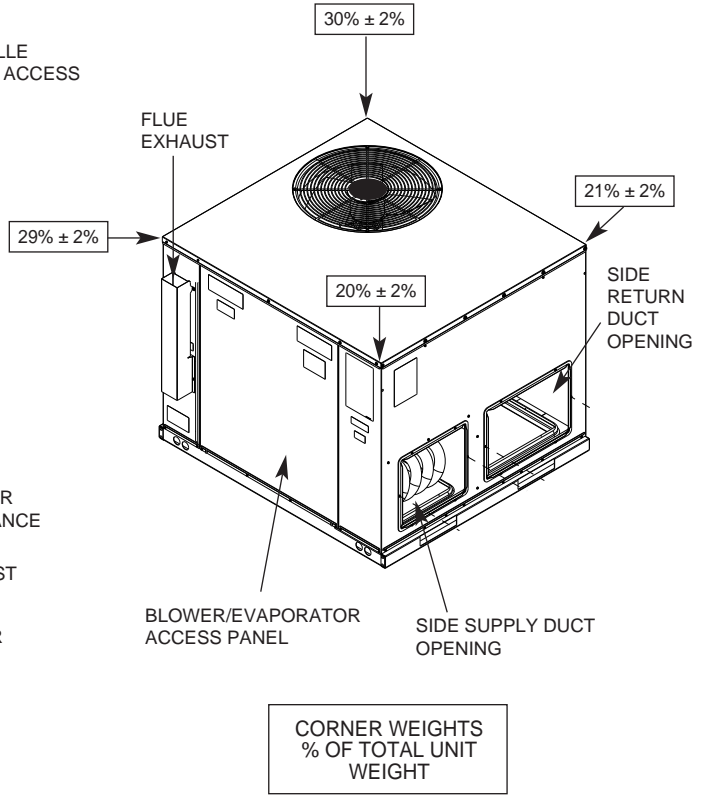
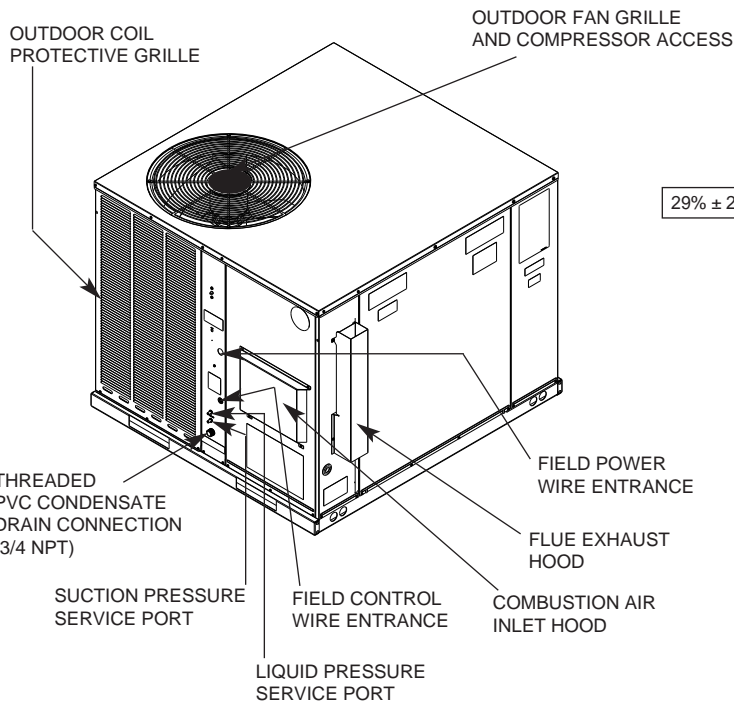
Condition: Open circuit in compressor run wiring or connections. Compressor run winding is damaged.

Active Thermostat Reaction:

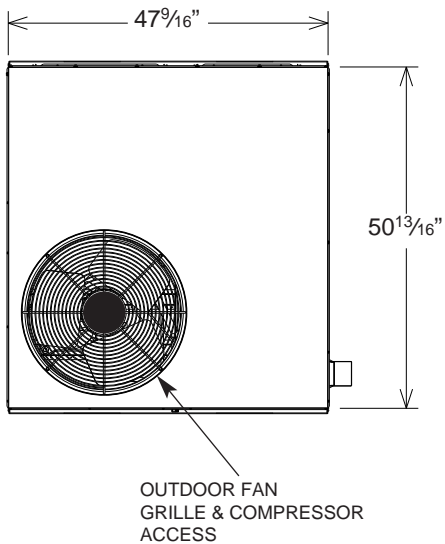
The thermostat implements a hard lockout after 3 hours.

V. UNIT DIMENSIONS FOR CLEARANCES SEE FIGURE 3.

FIGURE 3



TOP VIEW



BOTTOM VIEW

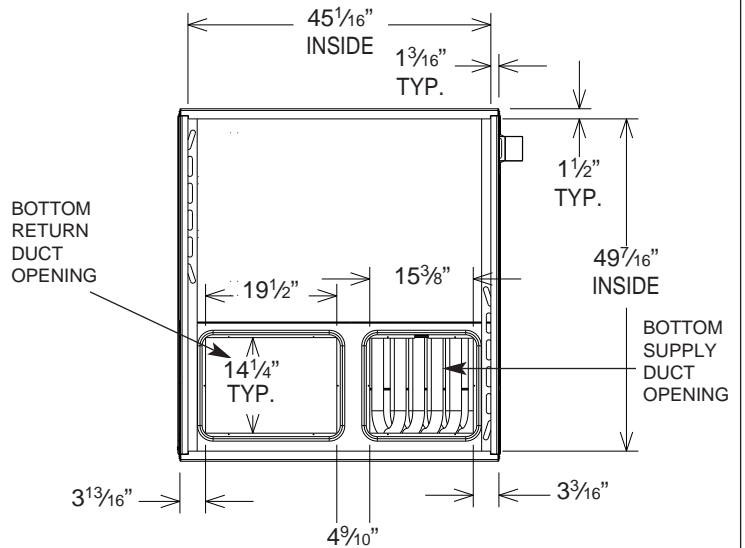
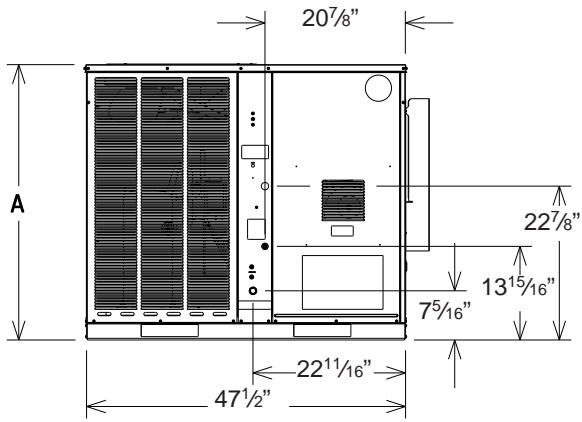
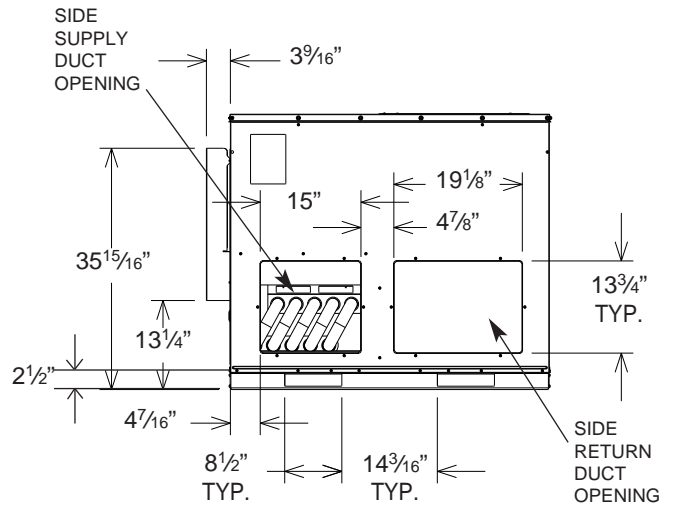


FIGURE 3 (CONTINUED)

FRONT VIEW



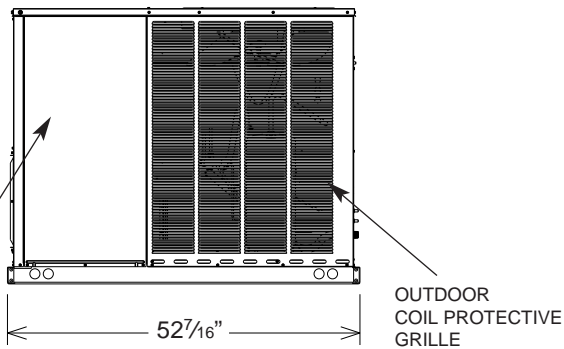
BACK VIEW



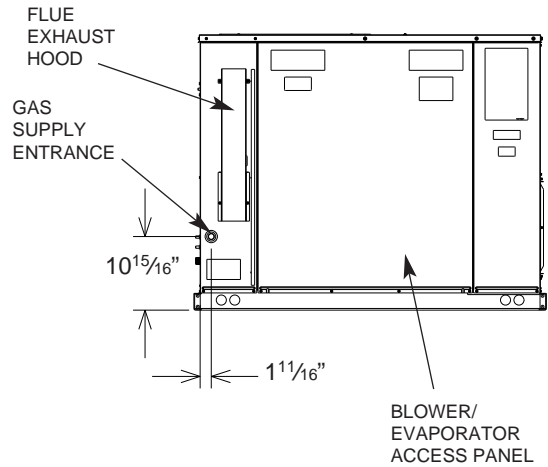
SHOWN WITH DUCT COVERS REMOVED.

MODEL RGEA16	"A" HEIGHT
024	35 15/16"
036, 048, 060	41

SIDE VIEW



SIDE VIEW



VI. INSTALLATION

A. GENERAL

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

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

2. LOCATION CONSIDERATIONS (CORROSIVE ENVIRONMENT)

The metal parts of this unit may be subject to rust or deterioration if exposed to a corrosive environment. This oxidation could shorten the equipment's useful life. Corrosive elements include, but are not limited to, 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.

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.

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 a good automobile polish will provide some protection.
3. Use a good liquid cleaner 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

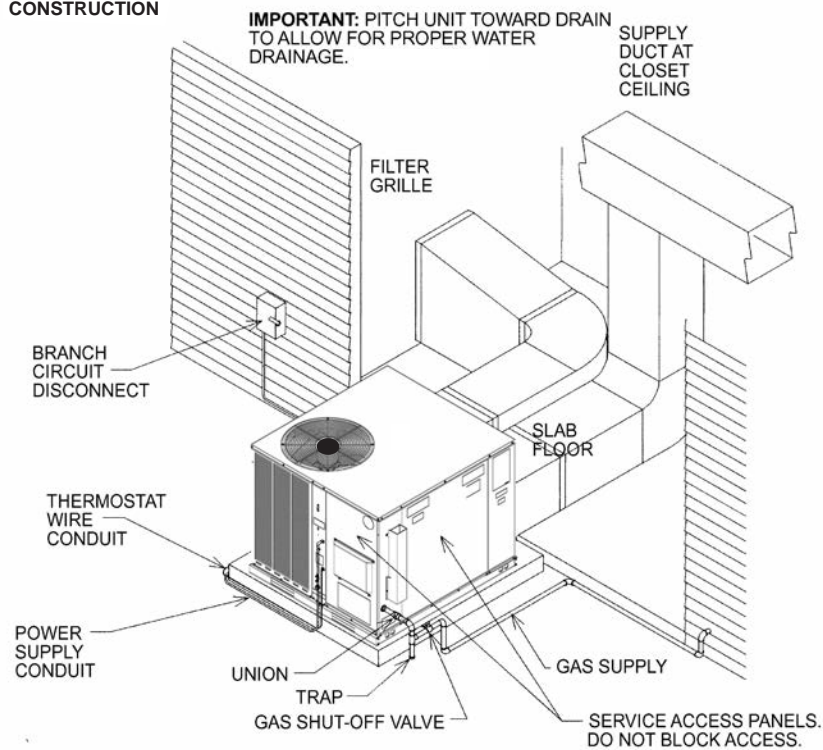
WARNING

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.

(Typical outdoor slab installation is shown in Figure 4.)

1. Select a location where external water drainage cannot collect around unit.

FIGURE 4
OUTSIDE SLAB INSTALLATION. CLOSET DISTRIBUTION SYSTEM. SLAB FLOOR CONSTRUCTION



I251

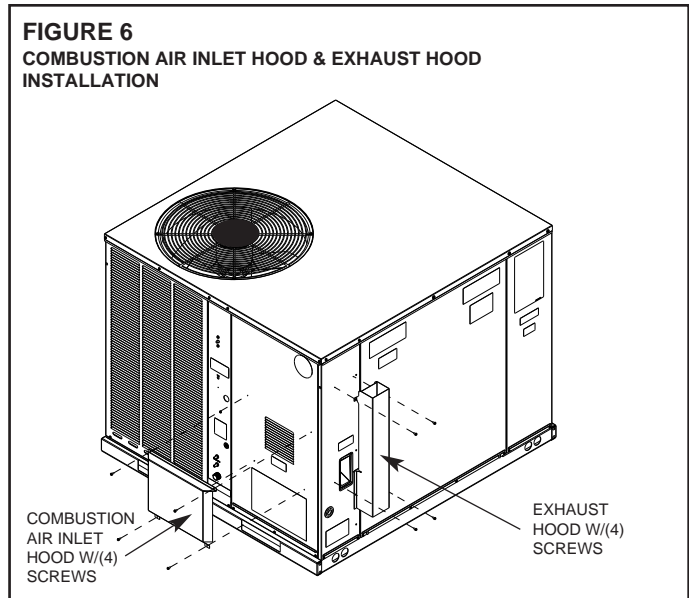
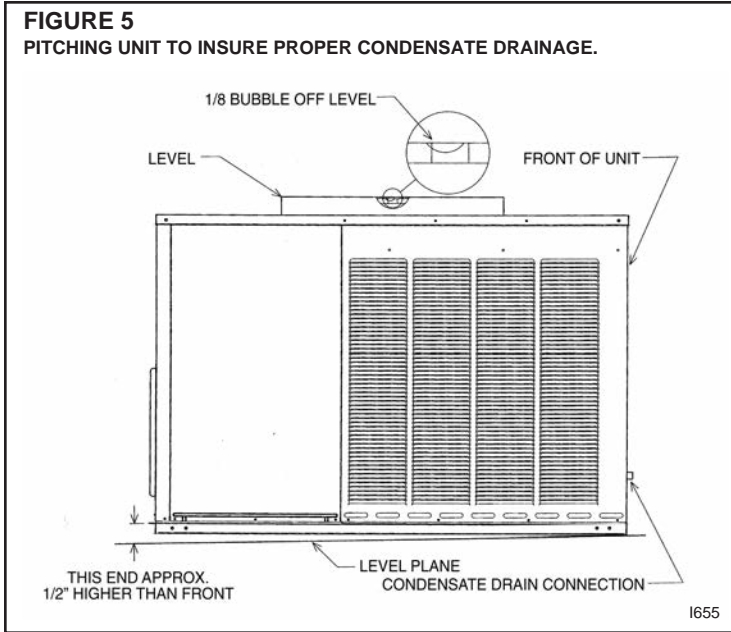
2. Provide a slab sufficiently high enough above grade to prevent surface water from entering the unit. Where snowfall is anticipated, mount the unit above the anticipated maximum snow depth for your area. Do not locate unit in an area where excessive snow drifting may block combustion air inlet.
3. Pitch the slab approximately $\frac{1}{2}$ " so that the unit will be pitched toward the drain. See Figure 5.
4. The location of the unit should be such as to provide proper access for inspection and servicing as shown in Figure 11.
5. Locate unit where operating sounds will not disturb owner or neighbors. The slab should be isolated from the foundation wall.
6. Locate unit so roof runoff water does not pour directly on the unit. Provide gutter or other shielding at roof level.

C. ATTACHING EXHAUST AND COMBUSTION AIR INLET HOODS

IMPORTANT: Do not operate this unit without the exhaust and combustion air inlet hood properly installed. These hoods are shipped in a carton in the return air compartment inside the unit and must be attached when the unit is installed. See Figure 6.

To attach exhaust and combustion air inlet hood:

1. Remove 3 screws securing filter access panel and remove filter access panel. For location of filter access panel, see Figure 3.
2. Remove both exhaust and combustion air inlet hoods from their carton, located inside the return air compartment.
3. Attach filter access panel.
4. Attach the combustion air inlet hood and the exhaust hood each with 4 screws as shown in Figure 6. Screws are in parts bag shipped in the burner compartment.
5. Vent the unit using the flue exhaust hood, as supplied from the factory, without alteration or addition. The only exception is with factory approved additions. Consult your local utility or other authority having jurisdiction for accepted venting techniques.



D. COVER PANEL INSTALLATION/CONVERSION PROCEDURE

1. HORIZONTAL TO DOWNFLOW
 - a. Remove screws and covers from the supply and return bottom sections. NOTE: Rotate the supply cover 90° and remove.
 - b. Install gasket (supplied with parts bag) around perimeter of cover on the insulated side. See Figure 8.
 - c. Secure covers to the side of the unit using existing screws and those supplied in the parts bag.
2. DOWNFLOW TO HORIZONTAL
 - a. Remove screws and covers from the supply and return bottom sections.
 - b. Install gasket (supplied with parts bag) around perimeter of cover as illustrated in Figure 7.
 - c. Install covers in the unit bottom with the insulated side up. NOTE: Supply cover must be inserted through supply opening with narrow side toward unit. Once cover is through opening, rotate 90° and slip back flange of cover under tab at the back of bottom duct opening. See Figure 10.
 - d. Secure supply cover to base of unit with 2 screws, engaging prepunched holes in raised duct opening flange.
 - e. Secure return covers to base of unit with screws engaging prepunched holes in raised duct opening flange.

⚠ WARNING

THIS UNIT MUST NOT BE INSTALLED DIRECTLY ON WOOD FLOORING, CLASS A, CLASS B OR CLASS C ROOF COVERING MATERIALS, OR ANY OTHER COMBUSTIBLE STRUCTURE EXCEPT AS SPECIFIED IN FIGURE 15. FAILURE TO ADHERE TO THIS WARNING CAN CAUSE A FIRE OR EXPLOSION RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

E. CLEARANCES

The following minimum clearances must be observed for proper unit performance and serviceability. See Figure 11.

1. Provide 48" minimum clearance at front of the unit. Provide 24" minimum clearance on right side of unit. If economizer is used, a 24" minimum clearance is required on

FIGURE 7
COVER GASKET DETAIL FOR UNITS SHIPPED FOR DOWNFLOW
APPLICATION BEING CONVERTED TO SIDE DISCHARGE

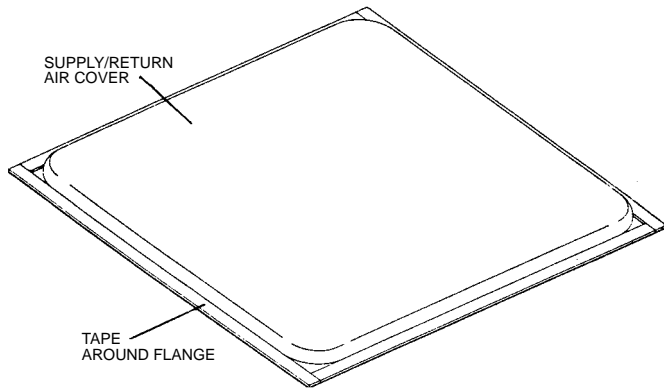
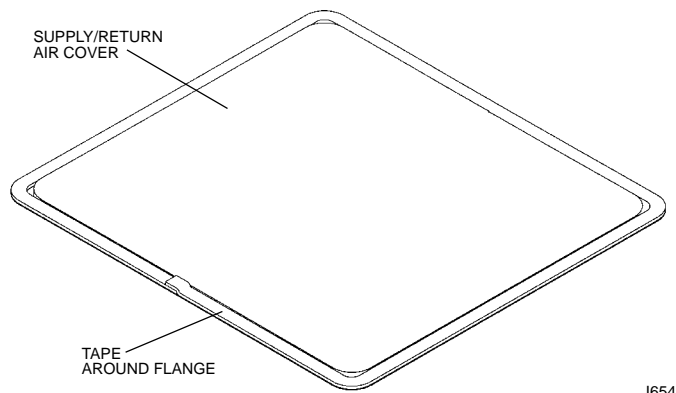
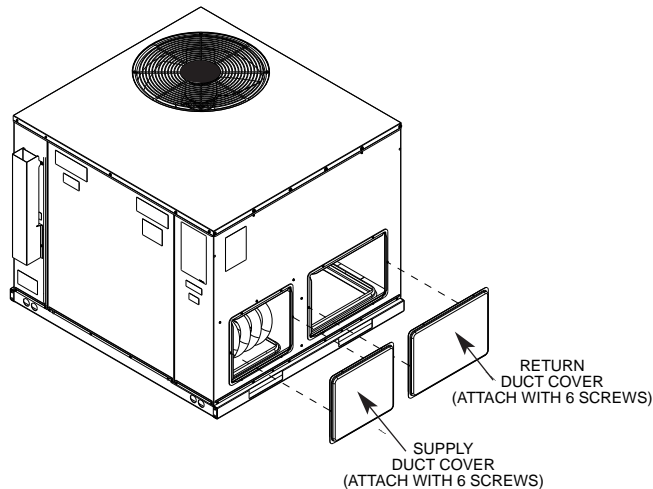


FIGURE 8
COVER GASKET DETAIL FOR UNITS SHIPPED FOR SIDE DISCHARGE
APPLICATION BEING CONVERTED TO DOWNFLOW



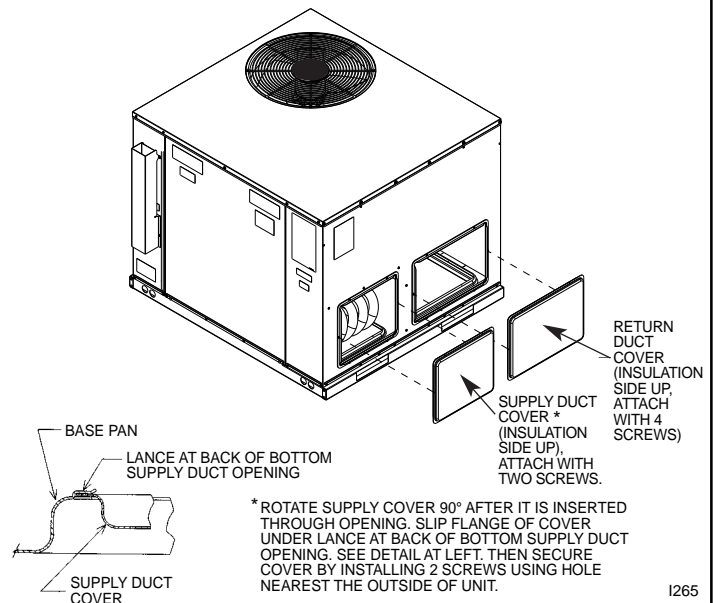
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FIGURE 9
DUCT COVER INSTALLATION SIDE MOUNTING



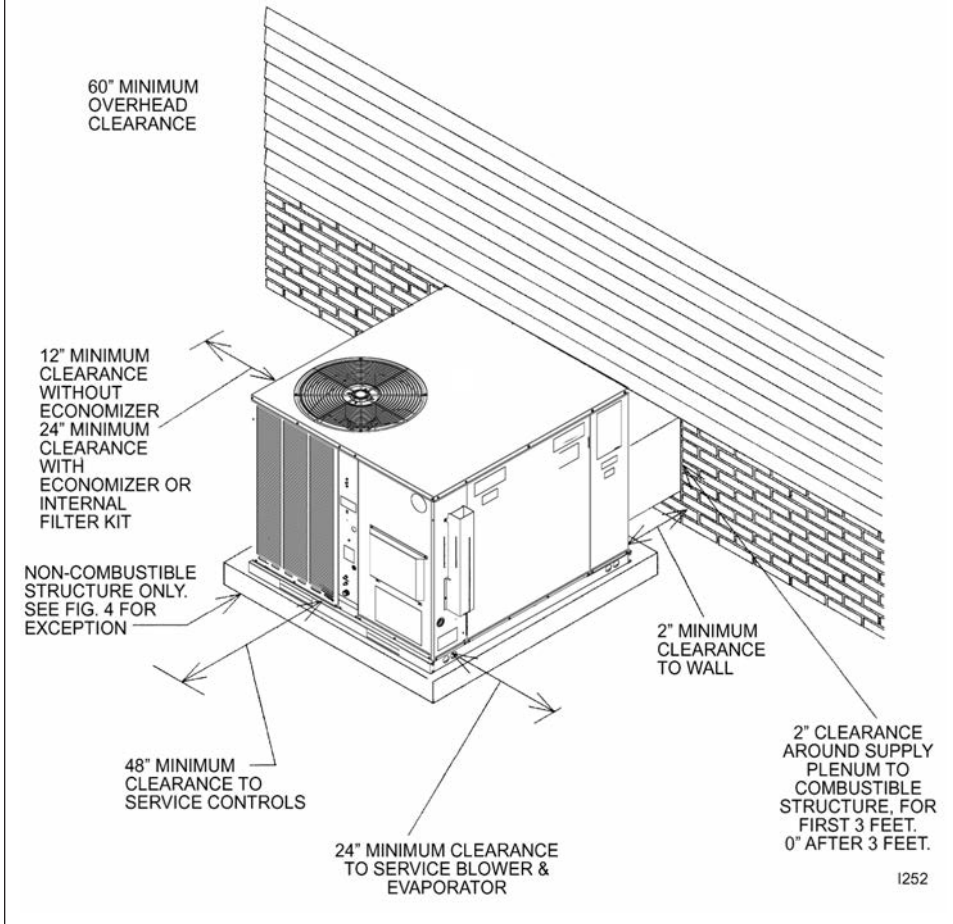
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FIGURE 10
DUCT COVER INSTALLATION BASE PAN MOUNTING



1265

FIGURE 11
CLEARANCES



left side of unit. (See Figure 11.) If no economizer is required, then a 12" clearance is required on left side of unit.

2. Provide 60" minimum clearance between top of unit and maximum 3 foot overhang.
3. Unit is design certified for 2" minimum clearance between supply duct and a combustible structure for the first 3 feet of duct. 0" clearance is allowed after 3 feet.

F. 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 book for weight of unit.) **THIS IS VERY IMPORTANT AND THE INSTALLER'S RESPONSIBILITY.**
2. For rigging and roofcurb details, see Figures 16, 17, and 18.
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.

G. DUCTWORK

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, OR PROPERTY DAMAGE.

FIGURE 12
EXCEPTION TO NON-COMBUSTIBLE FLOORING REQUIREMENT

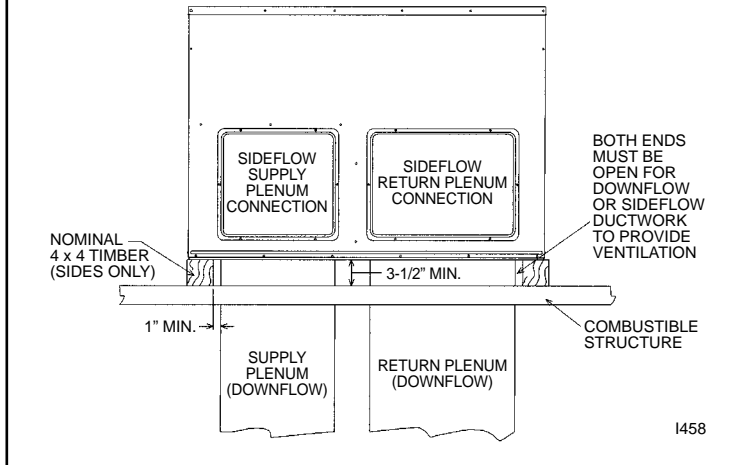


FIGURE 13
FLAT ROOFTOP INSTALLATION, ATTIC OR DROP CEILING DISTRIBUTING SYSTEM. MOUNTED ON ROOFCURB, PITCH UNIT TOWARD DRAIN.

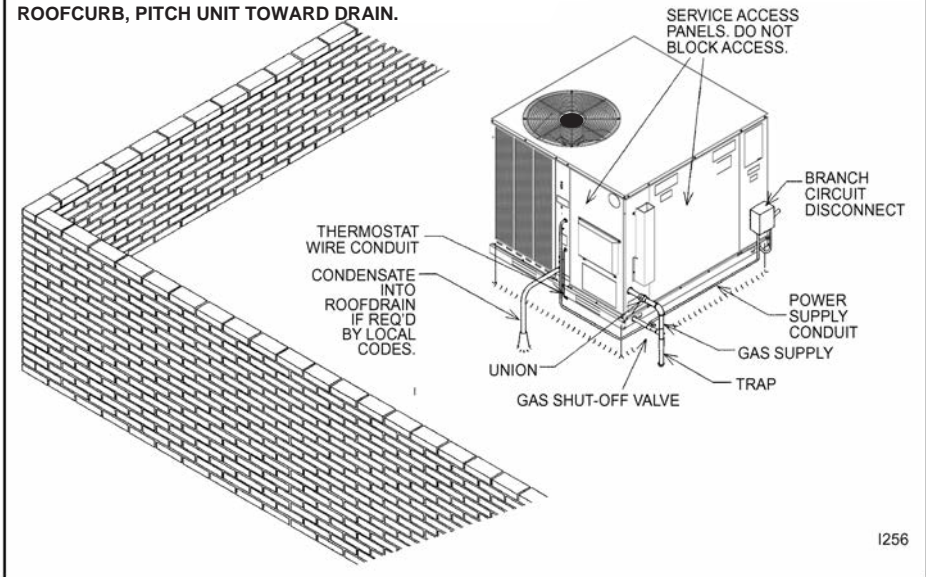


FIGURE 14
PITCHED ROOFTOP INSTALLATION, ON ANGLE-IRON STAND, SIDE FLOW DUCTWORK, ATTIC OR DROP CEILING DISTRIBUTING SYSTEM. PITCH UNIT TOWARD DRAIN.

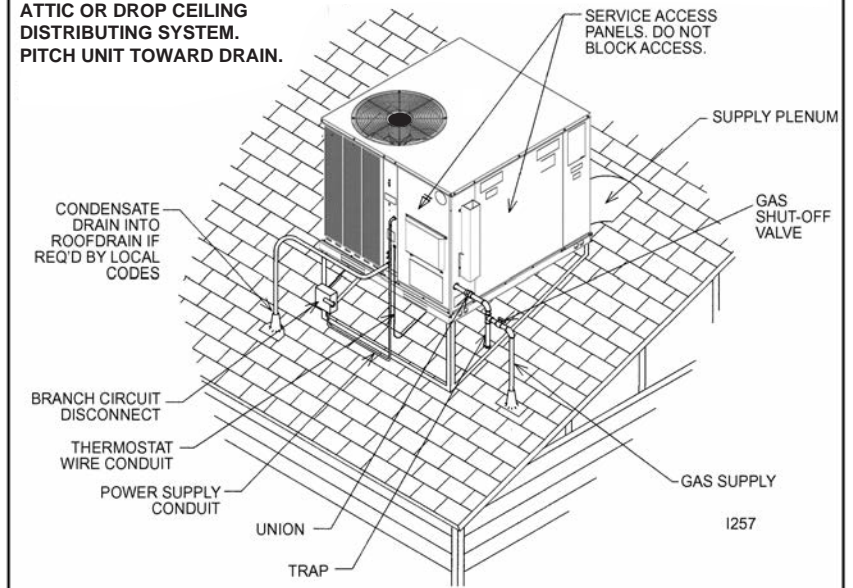
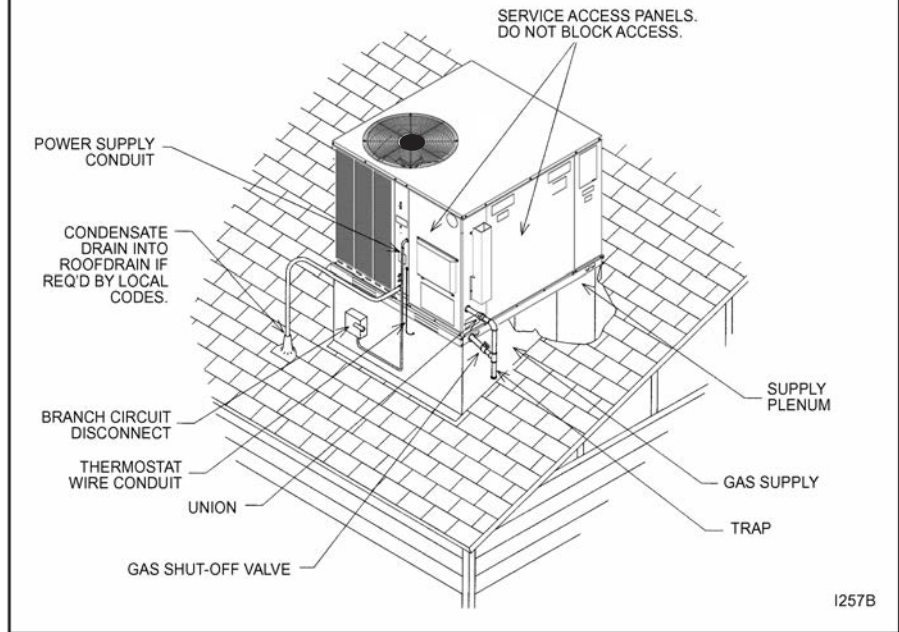


FIGURE 15

PITCHED ROOFTOP INSTALLATION, ON ROOFJACK, DOWNFLOW DUCTWORK, ATTIC OR DROP CEILING DISTRIBUTING SYSTEM. PITCH UNIT TOWARD DRAIN.



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

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

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

IMPORTANT: In the event that the return air ducts must be run through an "unconfined" space containing other fuel burning equipment, it is imperative that the user/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.

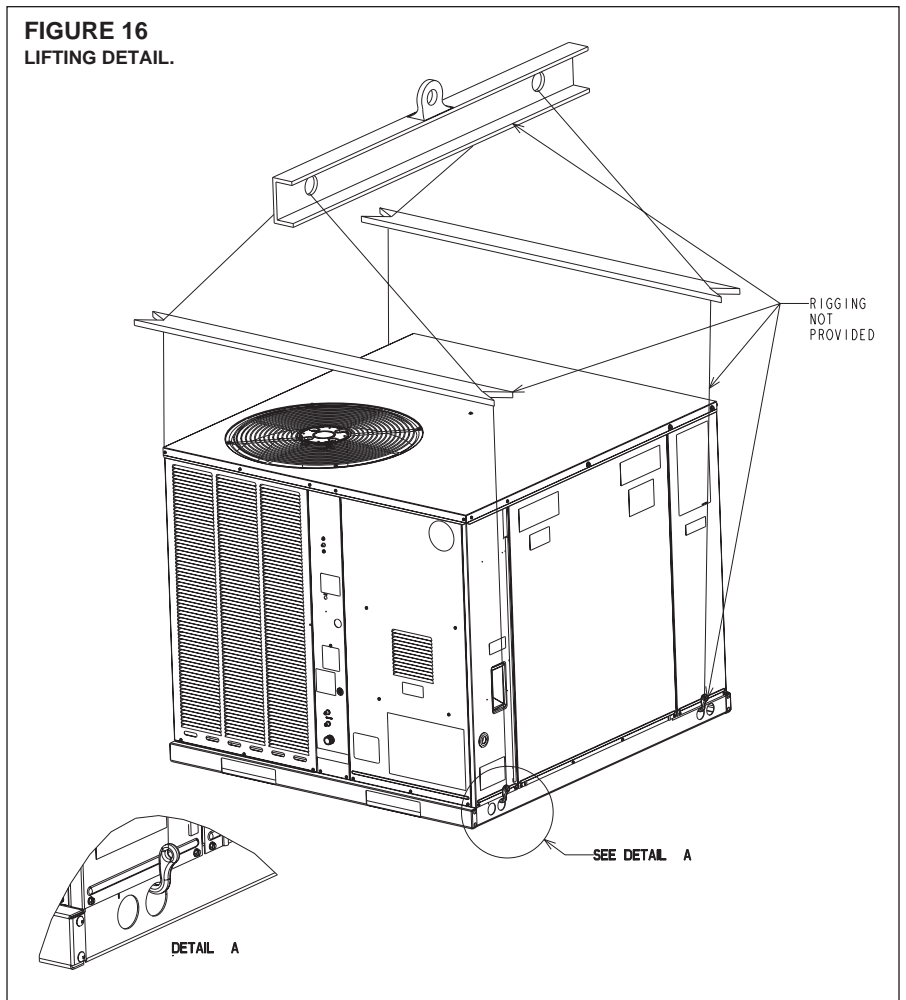
H. RETURN AIR

⚠ 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.

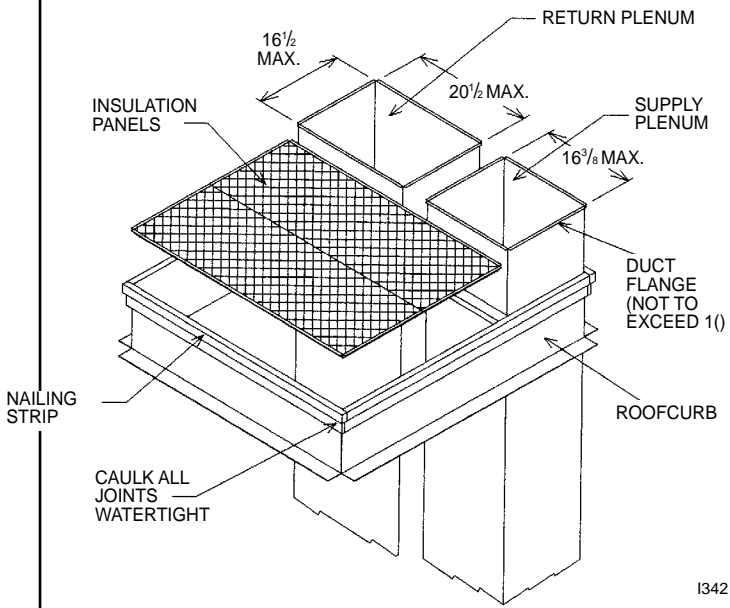
FIGURE 16
LIFTING DETAIL.



I. FILTERS

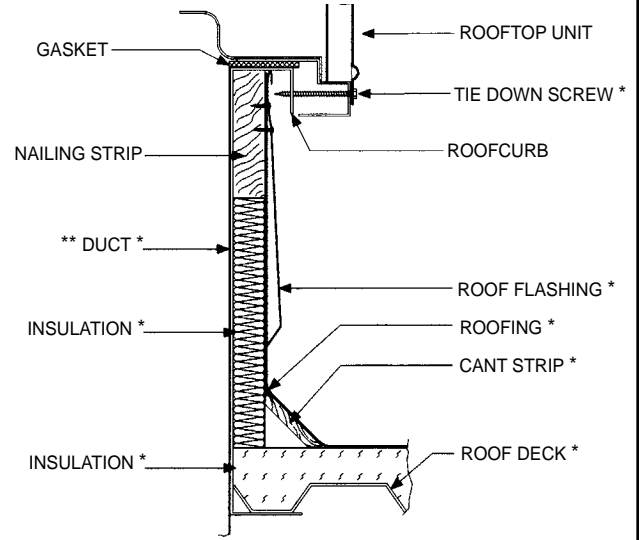
The installer must install field supplied filters in the return air duct. A field installed filter grille is recommended for easy and convenient access to the filters for periodic inspection and cleaning. Filters must have adequate face area for the rated air quantity of the unit. See air delivery tables for recommended filter size. A field installed internal filter kit RXRY-B01 is available.

FIGURE 17
ROOFCURB



1342

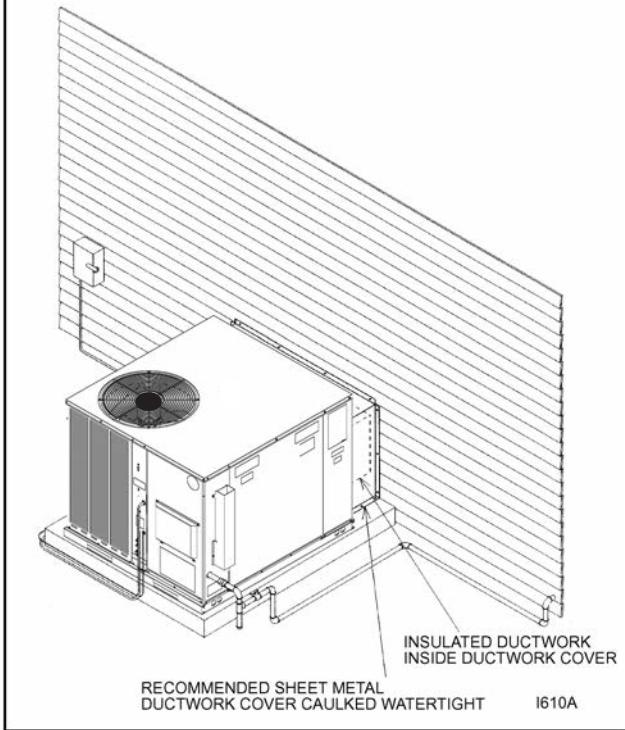
FIGURE 18
ROOFCURB



*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 (FIGURE 1) FOR SIZE OF DUCT OPENINGS.

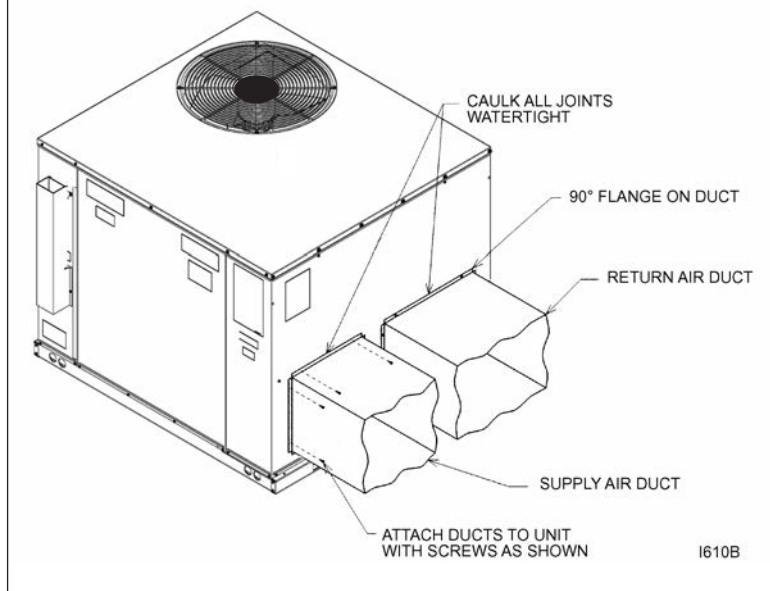
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FIGURE 19
DUCTWORK COVER INSTALLATION DETAIL



1610A

FIGURE 20
RESIDENTIAL ROOFTOP DUCTWORK INSTALLATION DETAIL.



1610B

VII. 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.

NOTE: The Commonwealth of Massachusetts requires the gas shut-off valve to be a T-handle gas cock.

2. Connect the gas line to the gas pipe inlet opening provided into the 1/2" inlet valve. See Figure 4 for typical piping.
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 21.)
7. Make sure piping is tight. **A pipe compound resistant to the action of liquefied petroleum gases must be used at all threaded pipe connections.**
8. **IMPORTANT:** Any additions, changes or conversions required for the furnace to satisfactorily meet the application should be made by a qualified installer, service agency or the gas supplier, using factory-specified or approved parts. In the commonwealth of Massachusetts, installation must be performed by a licensed plumber or gas fitter for appropriate fuel.

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 psig 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.

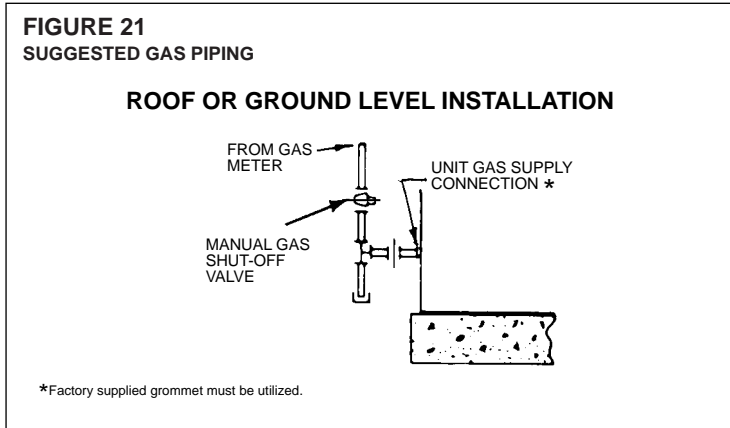


TABLE 1
GAS PIPE CAPACITY TABLE (CU. FT./HR.)

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

WARNING

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

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

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

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

The capacities of gas pipe of different diameters and lengths in cu. ft. per hr. with pressure drop of 0.5 in. and specific gravity of 0.60 (natural gas) are shown in Table 2.

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 TWO STAGE GAS HEAT

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 valve 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.**

C. NOx MODELS

When converting units equipped with NOx inserts to LP gas, the stainless steel mesh inserts in the entrance of the tubular exchangers are not required to meet SCAQMD NOx emission levels. Carefully remove these inserts before firing this furnace on LP gas. This furnace is not designed to operate on LP gas with the NOx inserts in place.

Step by step instructions on removing the NOx inserts and retaining rod are included in the Conversion Kit Installation Instructions.

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.

D. 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.

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 92-21519-47 for derating and orifice spud sizes.

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

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

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.
40,000	ONE	1	21	1	30	1	34	1	39	3	45
	TEN	13	30	15	0	15	36	16	30	37	30
60,000	ONE	0	54	1	0	1	3	1	6	2	30
	TEN	9	0	10	0	10	24	11	0	25	0
80,000	ONE	0	41	0	45	0	47	0	50	1	53
	TEN	6	45	7	30	7	48	8	15	18	45
100,000	ONE	0	33	0	36	0	38	0	40	1	30
	TEN	5	24	6	0	6	15	6	36	15	0

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).

E. CONDENSATE DRAIN

The evaporator coil condensate drain ends with a threaded 3/4" nominal PVC stub. A trap is built in for proper condensate drainage and to prevent debris from being drawn into the unit. Do not connect the drain to a closed sewer line. Connection to a vented sewer line is allowed. It is recommended that a PVC cement not be used so that the drain line can be easily cleaned in the future.

IMPORTANT: DO NOT INSTALL AN EXTERNAL TRAP. DOING SO CAN CAUSE IMPROPER DRAINAGE OF THE CONDENSATE AND RESULT IN FLOODING WITHIN THE UNIT.

VIII. 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 4 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. The disconnect must be in sight and readily accessible of the unit.

TABLE 4
BRANCH CIRCUIT COPPER WIRE SIZE
(BASED ON 1% VOLTAGE DROP)*

	200	6	4	4	4	3	3	2	2
SUPPLY WIRE	150	8	6	6	4	4	4	3	3
LENGTH-FEET	100	10	8	8	6	6	6	4	4
	50	14	12	10	10	8	8	6	6
		15	20	25	30	35	40	45	50

BRANCH CIRCUIT AMPACITY

***Taken from National Electric Code**

NOTES:

1. Wire size based on 60°C rated wire insulation and 30°C Ambient Temp. (86°F).
2. For more than 3 conductors in a raceway or cable, see the N.E.C. for derating the ampacity of each conductor.

When installed, the unit must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, **ANSI/NFPA 70**, if an external electrical source is utilized.

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 and L3 for single phase, 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

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

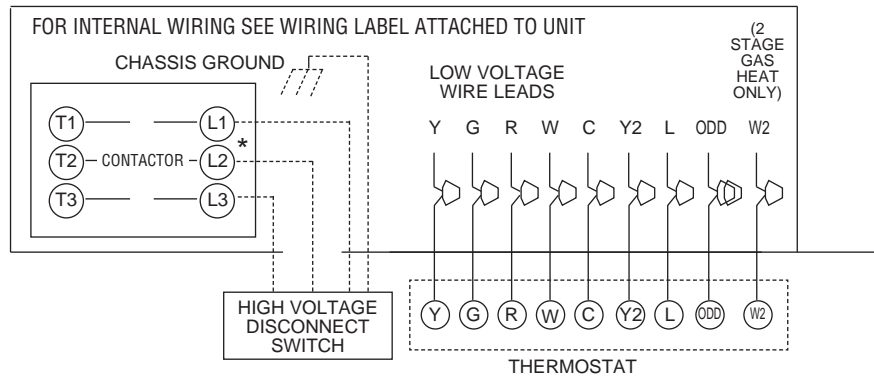
B. HOOK-UP

To wire unit, refer to the following hook-up diagram (see Figure 22).

Refer to Figure 3 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.

FIGURE 22
WIRE HOOK-UP DIAGRAM



C. INTERNAL WIRING

IMPORTANT: Some single phase units are equipped with a single pole contactor. Caution must be exercised when servicing as only one leg of the power supply is broken with the contactor.

A diagram of the internal wiring of this unit is located under the electrical box cover 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

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. Two stage units (5 ton) require use of a thermostat capable of 2 stages of cooling. (See Section IV.) See chart below for recommendations. The low voltage wiring should be sized as shown in Table 6.

Install the room thermostat in accordance with the instruction sheet packed in the box with the thermostat. 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.

Refer to the RGEA16 Specification Sheets for a list of recommended thermostats.

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.

IX. FURNACE SECTION CONTROLS AND IGNITION SYSTEM

A. NORMAL FURNACE OPERATING SEQUENCE (TWO STAGE GAS HEAT FOR RGEA16)

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 high inducer speed.
5. Control checks pressure switches for closure.
6. If pressure switches are closed, the control starts a 30 second prepurge.
7. After prepurge timeout, control initiates spark for 2 seconds minimum, 7 second maximum ignition trial, initiates 30 second, second stage (high fire) warm up timing.
8. Control detects flame, de-energizes spark and initiates 30 second delay on blower timing.
9. After a fixed 30 seconds indoor blower delay on, the control energizes the indoor blower.
10. After the 30 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 speed.
11. After fixed 5 seconds the gas valve shifts to low and the W2 inducer speed 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 speed 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

Removed Simultaneously:

1. Upon a loss of W1 and W2 the gas valve is de-energized.
2. Upon a loss of flame, the 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.

B. OPERATING INSTRUCTIONS

This appliance is equipped with a direct spark intermittent ignition device. 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. STOP! Read the safety information on the Operating Instructions Label located on this appliance.

WARNING

IF YOU DO NOT FOLLOW THESE INSTRUCTIONS EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

2. Set the thermostat to its lowest setting.
3. Turn off all electric power to the appliance.
4. 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.
5. Remove control door/access panel.
6. Move switch to the "OFF" position.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP!
 - Do not try to light any appliance.
 - Do not touch any electric 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.If you don't smell gas, go to the next step.
8. Move the switch from "OFF" position to "ON" position.
9. Replace the control door.
10. Turn on all electric power to the appliance.
11. Set the thermostat to the desired setting.
12. 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 any 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 switch 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!

C. 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.

D. MANUAL RESET OVERTEMPERATURE CONTROL

A manual reset overtemperature control is located on the burner shield. This device 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.

E. PRESSURE SWITCH(S)

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

F. 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! Replace this control only with the identical replacement part.**

X. SYSTEM OPERATING INFORMATION

A. ADVISE THE CUSTOMER

1. Keep the air filters clean. 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 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.

B. 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 (4) connecting the induced draft blower to the collector box and screws (16) connecting the collector box to the heat exchanger mounting 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 10 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.

C. 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.

D. COOLING SECTION MAINTENANCE

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.

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. Remove the filter access panel and the blower/evaporator coil access panel.

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. Unplug the wires from the circulating air blower and the limit control. Remove the two screws and slide the blower out of the unit sideways.
3. Shine a flashlight on the evaporator coil (both sides) and inspect for accumulation of lint, insulation, etc.
4. If coil requires cleaning, follow the steps shown below.

Cleaning Evaporator Coil

1. Remove screws from condenser fan grille assembly and lay grille over on the unit top panel.
2. Remove the controls access panel and the control box cover.
3. Disconnect the outdoor fan motor wiring from the compressor contactor and capacitor. Remove the strain relief in the bulkhead and pull the fan motor wires through. Set grille assembly to the side.
4. Remove the screws that secure the unit top to the unit. Remove the top and set the unit top to the side.
5. 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.
6. 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.
7. Go to next section for cleaning the condenser coil.

Cleaning Condenser Coil, Drain Pan, Condensate Drain, Condenser Fan, Circulation Air Blower and Venturi

1. Remove the screws from the condenser coil protective grille and remove the grille from the unit. Ensure the filter access panel is still removed to access all of the screws securing the grille.
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. Inspect the drain pan and condensate drain at the same time the condenser coil is checked. Clean the drain pan by flushing with water and removing any matters of obstructions which may be present.
5. Flush the drain tube with water. If the drain tube is blocked, it can usually be cleared with high pressure water.
6. Inspect the circulating air blower wheel and motor for accumulation of lint, dirt or other obstruction and clean if necessary. Inspect the blower motor mounts and the blower housing for loose mounts or other damage. Repair or replace if necessary.

Re-assembly

1. Place the condenser coil protective grille back on unit and replace all screws.
2. Place top panel back on unit and replace all screws.
3. Set condenser fan grille assembly on top of the unit with the fan on top and the motor wires on the venturi side. Run the fan motor wires through the bulkhead and pull wires through the hole on the bottom of the control box on the left side and into the control box. Reconnect fan motor wires per the wiring diagram attached to the back of the control box cover.
4. Replace wire strain relief in bulkhead after the slack is pulled out of the wires on the fan side. This will assure wires will not be damaged by the fan during unit operation.
5. Turn the condenser fan grille assembly over and into the recess in the unit top. Secure the grille to the unit with the four screws removed earlier.
6. Replace the circulating air blower, making sure that all wires are properly reconnected per the unit wiring diagram.
7. Replace the filter and blower/evaporator coil access panels.
8. Replace the control box cover and controls access panel.
9. Restore electrical power to the unit and check for proper operation, especially the condenser fan motor.

E. REPLACEMENT PARTS

Contact your local distributor for a complete parts list.

F. CHARGING

Refer to the appropriate charge chart included in this manual.

XI. UNITS WITH ECM BLOWER MOTORS (RGEA16 MODELS ONLY)

The ECM (Brushless permanent magnet) motor used on the blower in this product is programmed to operate over a wide range of external static pressures (0.0" - 1.0" W.C.) with essentially constant air flow (CFM). Motor efficiency on ECM type motors is higher than that of P.S.C. type motors normally used on this type product. See air flow performance data tables.

The ECM motor is programmed to provide a "soft" start and stop. On a call for heat or cool, the motor will gradually ramp up to the field selected CFM speed. This eliminates the sudden rush of air and noise normally associated with a P.S.C. type motor. Once the thermostat and blower delay are satisfied, the motor will gradually ramp down as well.

IMPORTANT: Units equipped with ECM motors cannot be used in by-pass zoning applications.

IMPORTANT: The A.C. power plug to the blower motor has locking tabs. It has been shown that by applying excessive force to the A.C. cable half of the connector it is possible to force the connector in backwards. It will not seat and "click" properly but will make connection. If A.C. power is applied with the connector reversed the motor will be immediately destroyed. Do not force power plug into motor connector backwards.

NOTE: Because of the harmonic content of the A.C. Line current to the ECM motor a conventional ammeter will not read correct motor amps. Only a true RMS meter will give accurate AMP readings.

IMPORTANT: The flexibility of ECM motors and the fact that this flexibility is contained in programmed memory, not hardware, emphasizes the need for exact motor numbers for replacement motors. Because they all look the same, ECM MOTORS FROM DIFFERENT PRODUCTS OR DIFFERENT MODELS OF THE SAME PRODUCT MUST NOT BE INTERCHANGED.

IMPORTANT: If an ECM motor is replaced, it is important that the motor be mounted as the original, as far into the blower wheel as practical for proper motor cooling.

IMPORTANT: The ECM motor is controlled directly from the room thermostat (in all modes except heating). In cooling, the motor is controlled from the thermostat "Y" terminal. When the "Y" or "R" thermostat circuit is opened a 30 second delay will occur before the blower motor will cycle. In the heating mode the furnace control board controls the ECM through the blower relay. When the "W" thermostat circuits are opened, a 90 second delay will occur before the blower will cycle off. When the "G" to "R" thermostat circuit is opened for low speed blower, there is no "off" delay. All thermostat sub-base combinations as recommended and provided through the Parts Department have been tested and are compatible with the ECM motor used in this equipment. Some thermostats may not be compatible with the ECM motor provided in this unit. With thermostat in off state, the voltage on control lines "G", "Y", or W with respect to 24 vac common should be less than 3.5 VAC. If the measured voltage is too high, thermostat is incompatible with the ECM motor and will cause the motor to run when it should be off.

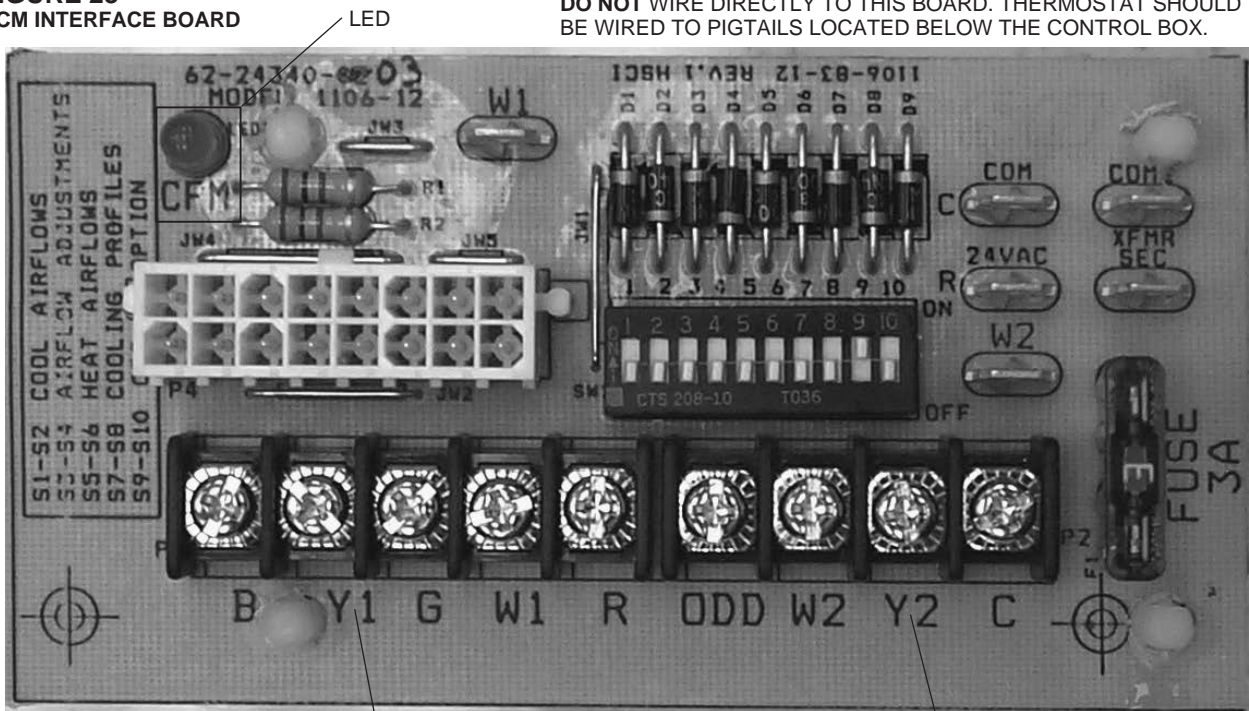
A. ECM MOTOR INTERFACE CONTROL AND SETTINGS (RGEA16 UNITS ONLY)

The RGEA16 series units use ECM blower motors to deliver a constant level of airflow over a wide range of external static pressures (up to 1.0" W.C.). The interface board provides the required communications between the thermostat/IFC and the ECM blower motor. The interface board features:

- An automotive-style ATC blade fuse for transformer protection (3 amp).
- An on-board LED to indicate blower CFM.
- Inputs for two-stages of cooling: Y1 (first stage) and Y2 (second stage)
- Four (4) cooling delay profiles

The DIP switches on the interface board are used to define the operation of the ECM motor (see Table 7).

FIGURE 23
ECM INTERFACE BOARD



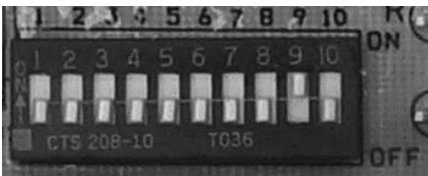
DO NOT WIRE DIRECTLY TO THIS BOARD. THERMOSTAT SHOULD BE WIRED TO PIGTAILS LOCATED BELOW THE CONTROL BOX.

FIRST-STAGE COOLING INPUT

SECOND-STAGE COOLING INPUT

(THIS BOARD IS LOCATED IN THE BLOWER SECTION)

FIGURE 24
ECM MOTOR SETTINGS



(This board is located in the blower section)

TABLE 7
SWITCH FUNCTIONS

Switch	Function
1 & 2	Not Used
3 & 4	Cooling Airflow Adjustment
5 & 6	Heating Airflow Settings
7 & 8	Cooling Delay Profiles
9 & 10	On-Demand Dehumidification

Refer to Figure 24 for switch identification and factory default settings.

IMPORTANT: Disconnect power to unit when changing DIP switch positions. Even if blower is not operating, the motor will not recognize changes in DIP switch positions until unit power is removed and then restored.

B. TRANSFORMER PROTECTION

The ECM interface board is equipped with an automotive-style 3 amp ATC blade fuse for transformer protection. (See Figure 23.) If a short circuit occurs on the secondary side of the transformer, the fuse will open.

C. USING THE ON-BOARD LED TO DETERMINE BLOWER CFM

The ECM interface board LED, which is located in the blower section (see Figure 23), indicates blower output by flashing one (1) second for every 100 CFM of airflow. The LED will pause 1/10 second between each flash. After the blower CFM has been displayed, the LED will illuminate dimly for 10 seconds before repeating the sequence. (See Table 8.)

NOTE: If airflow is not a multiple of 100 CFM, the last LED flash is a fraction of a second of 100 CFM.

**TABLE 8
LED FLASH CODES**

Interface board DIP switch settings	LED Output
1200 CFM	<ul style="list-style-type: none"> Flashes 12 times Illuminate dimly 10 seconds, repeat sequence
600 CFM	<ul style="list-style-type: none"> Flashes 6 times Illuminate dimly 10 seconds, repeat sequence
950 CFM	<ul style="list-style-type: none"> Flashes 9 times, flash once for 1/2 second Illuminate dimly 10 seconds, repeat sequence

D. UNIT OPERATION WITH TWO-STAGE COOLING

The RGEA16 unit provides distinct airflows for two-stage cooling. (See Figure 23.) Unit operation is defined as:

- Y1 – First Stage Cooling
- Y2 – Second Stage Cooling

A 24VAC signal provides input for the cooling stages.

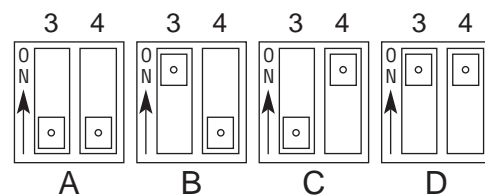
NOTE: A 24VAC input to the Y2 terminal overrides the input to the Y1 terminal. (Both must be energized to enable 2nd stage cooling.)

**TABLE 9
TWO-STAGE OPERATION**

Y1 INPUT	Y2 INPUT	COOLING OPERATION
NONE	NONE	OFF
24 VAC	NONE	1 ST STAGE
24 VAC	24 VAC	2 ND STAGE
NONE	24 VAC	OFF

E. COOLING AIRFLOW ADJUSTMENTS

**FIGURE 25
COOLING AIRFLOW ADJUSTMENTS**



SELECTION	SWITCH 3 POSITION	SWITCH 4 POSITION	COOLING AIRFLOW ADJUSTMENT
A	OFF	OFF	NONE
B	ON	OFF	+10%
C	OFF	ON	-10%
D	ON	ON	NONE

Cooling airflow may be adjusted +10% or -10% from nominal airflow using switches 3 & 4. Refer to Figure 28 for switch positions to achieve the desired adjustments in airflow.

NOTE: Continuous fan speed is NOT affected by switches 3 & 4.

IMPORTANT: The use of On Demand Dehumidification overrides the cooling airflow adjustments when high humidity is detected by a dehumidifying thermostat or humidistat when connected to the ODD terminal as shown in Figure 23. Refer to the Cooling Mode Dehumidification section for more information.

FIGURE 26
COOLING "ON" DELAY PROFILES

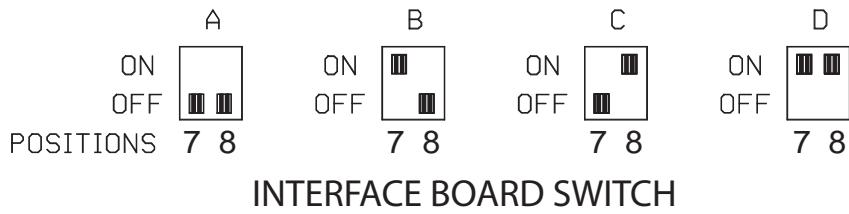
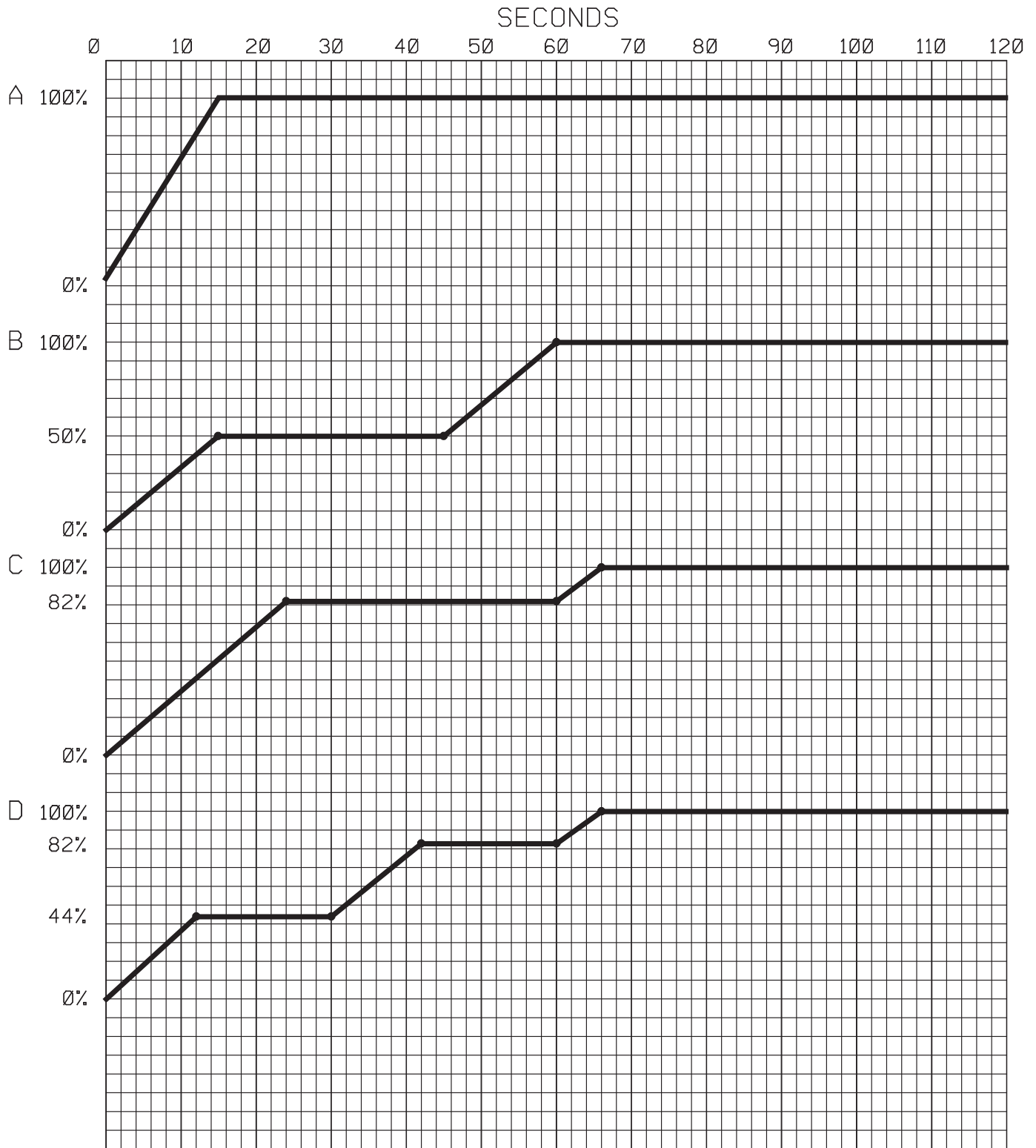
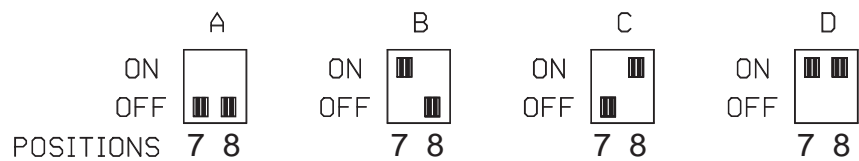
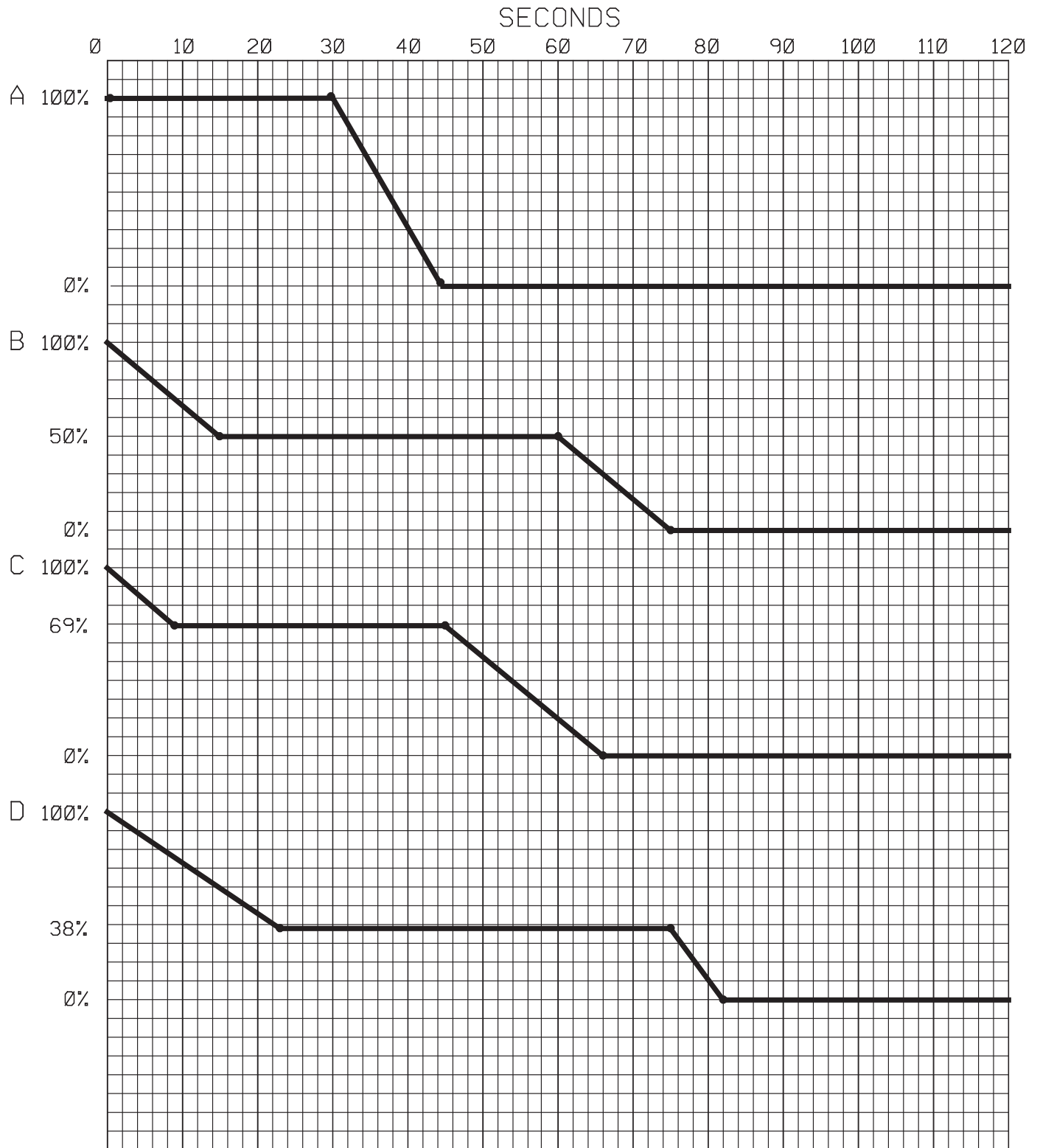


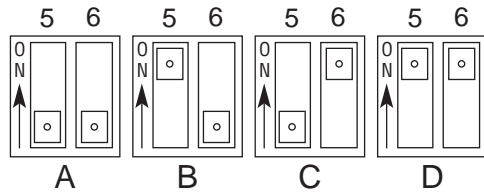
FIGURE 27
 BLOWER "OFF" DELAY PROFILES



INTERFACE BOARD SWITCH

F. HEATING AIRFLOW ADJUSTMENTS

FIGURE 28
HEATING AIRFLOW ADJUSTMENTS



SELECTION	SWITCH 5 POSITION	SWITCH 6 POSITION	HEATING AIRFLOW ADJUSTMENT
A	OFF	OFF	NONE
B	ON	OFF	10%
C	OFF	ON	-10%
D	ON	ON	NONE

Heating airflow may be adjusted +10% or -10% from nominal airflow using switches 5 & 6.

Refer to Figure 28 for switch positions to achieve the desired adjustments in airflow.

NOTE: Continuous fan speed is NOT affected by switches 5 & 6.

G. COOLING DELAY PROFILES

The unit is shipped with a default ON/OFF delay profile for maximum efficiency. This default may be overridden to maximize comfort by using one of the alternate profiles. ON delay profiles are shown in Figure 26.

OFF delay profiles are shown in Figure 27.

IMPORTANT: Blower ON delay profiles are not used in heating mode.

H. COOLING MODE DEHUMIDIFICATION

An Explanation of On Demand Dehumidification Use

“On-Demand Dehumidification” (ODD) is an optional feature of the ECM interface board. The ODD allows the user to have automatic dehumidification in the cooling mode that is controlled by the user’s dehumidifying thermostat or humidistat setting. The humidistat should be wired between the ODD (grey) pigtail and the R (red) pigtail. (Note: no field wiring should be connected directly to the ECM interface board.) When the humidity exceeds the humidistat setting, the airflow is decreased by a preprogrammed amount. This results in higher latent capacity and increases the level of comfort.

Use of the ODD feature is important if maximum latent removal is desired. These systems typically have a latent capacity between 24% to 28% of total system capacity. ODD drops cooling airflow to boost latent capacity without significantly reducing total system capacity.

Refer to the thermostat wiring section of this manual for recommended dehumidifying thermostats.

IMPORTANT: Typical dehumidistats apply a 24V signal when humidity is high. This board requires 24V when humidity is low. (See Table 10.)

I. ON DEMAND DEHUMIDIFICATION AIRFLOW ADJUSTMENT

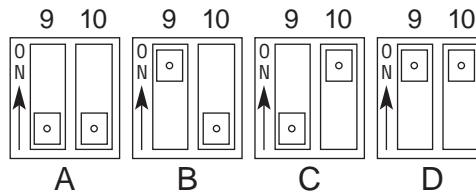
Use switches 9 & 10 to lower cooling airflow as defined in the following table:

IMPORTANT: Selection A turns off the input of the ODD terminal. DO NOT USE SELECTION A WITH A DEHUMIDIFYING THERMOSTAT OR HUMIDISTAT (refer to Figure 29).

TABLE 10
ODD TERMINAL

INDOOR AMBIENT CONDITION	INPUT TO “ODD” TERMINAL (FROM HUMIDISTAT)
HIGH HUMIDITY	Ø VAC
LOW HUMIDITY	24 VAC

FIGURE 29



SELECTION	SWITCH 9 POSITION	SWITCH 10 POSITION	COOLING AIRFLOW ADJUSTMENT
A	OFF	OFF	MAXIMUM LATENT REMOVAL (WITHOUT ODD INPUT)
B	ON	OFF	NONE (FACTORY SETTING)
C	OFF	ON	ON DEMAND DEHUMIDIFICATION (WITH ODD INPUT)
D	ON	ON	NONE

EXPLANATION OF ABOVE SELECTIONS:

Selection A: Maximum Latent Removal

This selection lowers cooling airflow to maximize latent removal anytime there is a call for cooling. This selection can be used in environments where there is always a high latent load as in coastal and southern regions of the USA (see Table 11).

NOTE: Use of selection A in arid environments is not necessary and may cause unnecessary power consumption.

TABLE 11

MODEL	SWITCH 9 POSITION	SWITCH 10 POSITION	Y1 CFM	Y2 CFM
RGEA16024	OFF	OFF	468	680
RGEA16036	OFF	OFF	680	1020
RGEA16048	OFF	OFF	893	1360
RGEA16060	OFF	OFF	1063	1573

Selection B: Factory Setting

This is the factory setting and provides cooling airflows as defined in the COOLING AIR-FLOWS section (no reduction in airflow).

Selection C: On Demand Dehumidification

This selection allows On Demand Dehumidification when using a dehumidifying thermostat or humidistat connected to the ODD and "R" pigtails. Nominal airflow is reduced by a preprogrammed amount to maximize latent removal. When high humidity is detected, the cooling airflow as shown in Table 12.

TABLE 12

RGEA16	SWITCH 9 POSITION	SWITCH 10 POSITION	ODD INPUT	Y1 CFM	Y2 CFM
024	OFF	ON	NONE	468	680
			24VAC	550	800
036	OFF	ON	NONE	680	1020
			24VAC	800	1200
048	OFF	ON	NONE	893	1360
			24VAC	1050	1600
060	OFF	ON	NONE	1063	1573
			24VAC	1250	1850

IMPORTANT: A humidistat or dehumidifying thermostat MUST be connected to the "ODD" and "R" pigtails when using this setting. Refer to the explanation of On Demand Dehumidification use for more information.

Selection D: No Adjustment

This selection is the same as the factory setting and provides cooling airflows as defined in the NOMINAL AIRFLOW ADJUSTMENT section.

ON DEMAND DEHUMIDIFICATION INTERACTIONS WITH AIRFLOW ADJUSTMENT SETTINGS

On Demand Dehumidification switch settings (9 & 10) override the cooling airflow adjustment switch settings (3 & 4). The +/-10% adjustments are turned OFF when Selection A (switch 9 & 10 are OFF) or Selection C (switch 9 OFF; switch 10 ON and no signal to ODD terminal) is used.

GENERAL DATA - RGEA16 MODELS

NOMINAL SIZES 2-5 TONS [7-15.8 kW]

Model RGEA16 Series	024AJV06(2,T)	036ACV062	036ACV082	036ACV102
Cooling Performance¹				Continued ->
Gross Cooling Capacity (2nd Stage) Btu [kW]	24,200 [7.09]	36,800 [10.78]	36,800 [10.78]	36,800 [10.78]
SEER ²	16.1	16.3	16.3	16.3
EER (1st stage / 2nd stage)	13.5/12.4	13.4/12.3	13.4/12.3	13.4/12.3
AHRI Rated CFM (1st / 2nd stage) [L/s]	550/800 [260/378]	800/1200 [378/566]	800/1200 [378/566]	800/1200 [378/566]
AHRI Net Cooling Capacity (1st / 2nd stage) Btu [kW]	18,500/23,800 [5.42/6.97]	25,000/36,000 [7.32/10.55]	25,000/36,000 [7.32/10.55]	25,000/36,000 [7.32/10.55]
Net Sensible Capacity (1st / 2nd stage) Btu [kW]	13,380/17,410 [3.92/5.1]	18,470/27,280 [5.41/7.99]	18,470/27,280 [5.41/7.99]	18,470/27,280 [5.41/7.99]
Net Latent Capacity (1st / 2nd stage) Btu [kW]	5,120/6,390 [1.51/1.87]	6,530/8,720 [1.91/2.55]	6,530/8,720 [1.91/2.55]	6,530/8,720 [1.91/2.55]
Net System Power (1st / 2nd stage) kW	1.37/1.92	1.87/2.94	1.87/2.94	1.87/2.94
Heating Performance (Gas)⁴				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	46,000/60,000 [13.48/17.58]	46,000/60,000 [13.48/17.58]	61,000/80,000 [17.88/23.45]	76,000/100,000 [22.27/29.30]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	37,000/49,000 [10.84/14.36]	37,000/49,000 [10.84/14.36]	50,000/65,000 [14.65/19.05]	62,000/81,000 [18.17/23.74]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	10-40 [5-22] / 20-50 [11-27]	10-40 [5-22] / 20-50 [11-27]	15-45 [8-25] / 25-55 [13-30]	25-55 [13-30] / 35-65 [19-36]
AFUE %	81	81	81	81
Steady State Efficiency (%)	82	82	82	82
No. Burners	3	3	4	5
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.5 [12.7]	0.5 [12.7]	0.5 [12.7]
Compressor				
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Sound Rating (dB)⁵	76	76	76	76
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]	10.56 [0.98]	16.23 [1.51]	16.23 [1.51]	16.23 [1.51]
Rows / FPI [FPcm]	1 / 18 [7]	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]	5.54 [0.51]	7.39 [0.69]	7.39 [0.69]	7.39 [0.69]
Rows / FPI [FPcm]	2 / 15 [6]	2 / 15 [6]	2 / 15 [6]	2 / 15 [6]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/22 [558.8]	1/22 [558.8]	1/22 [558.8]	1/22 [558.8]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	2500 [1180]	2700 [1274]	2700 [1274]	2700 [1274]
No. Motors/HP	1 at 1/6 HP	1 at 1/6 HP	1 at 1/6 HP	1 at 1/6 HP
Motor RPM	850	850	850	850
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/10x9 [254x229]	1/10x9 [254x229]	1/10x9 [254x229]	1/10x9 [254x229]
Drive Type/No. Speeds	Direct/11	Direct/11	Direct/11	Direct/11
No. Motors	1	1	1	1
Motor HP	1/2	1/2	3/4	3/4
Motor RPM	1050	1050	1050	1050
Motor Frame Size	48	48	48	48
Filter - Type	Field Supplied	Field Supplied	Field Supplied	Field Supplied
Furnished	No	No	No	No
(NO.) Size Recommended in. [mm x mm x mm]	(1)1x20x20 [25x508x508]	(1)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]
Refrigerant Charge Oz. [g]	97.6 [2767]	155.2 [4400]	155.2 [4400]	155.2 [4400]
Weights				
Net Weight lbs. [kg]	454 [206]	544 [247]	549 [249]	554 [251]
Ship Weight lbs. [kg]	467 [212]	558 [253]	558 [253]	558 [253]

GENERAL DATA - RGEA16 MODELS

NOMINAL SIZES 2-5 TONS [7-15.8 kW]

Model RGEA16 Series	036AJV06(2,T)	036AJV08(2,T)	036AJV10(2,T)	048ACV082
Cooling Performance¹				Continued ->
Gross Cooling Capacity (2nd Stage) Btu [kW]	36,800 [10.78]	36,800 [10.78]	36,800 [10.78]	48,500 [14.21]
SEER ²	16.3	16.3	16.3	15
EER (1st stage / 2nd stage)	13.4/12.3	13.4/12.3	13.4/12.3	12.7/11.5
AHRI Rated CFM (1st / 2nd stage) [L/s]	800/1200 [378/566]	800/1200 [378/566]	800/1200 [378/566]	1050/1600 [495/755]
AHRI Net Cooling Capacity (1st / 2nd stage) Btu [kW]	25,000/36,000 [7.32/10.55]	25,000/36,000 [7.32/10.55]	25,000/36,000 [7.32/10.55]	34,800/47,000 [10.2/13.77]
Net Sensible Capacity (1st / 2nd stage) Btu [kW]	18,470/27,280 [5.41/7.99]	18,470/27,280 [5.41/7.99]	18,470/27,280 [5.41/7.99]	24,820/34,480 [7.27/10.1]
Net Latent Capacity (1st / 2nd stage) Btu [kW]	6,530/8,720 [1.91/2.55]	6,530/8,720 [1.91/2.55]	6,530/8,720 [1.91/2.55]	9,980/12,520 [2.92/3.67]
Net System Power (1st / 2nd stage) kW	1.87/2.94	1.87/2.94	1.87/2.94	2.73/4.1
Heating Performance (Gas)⁴				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	46,000/60,000 [13.48/17.58]	61,000/80,000 [17.88/23.45]	76,000/100,000 [22.27/29.30]	61,000/80,000 [17.88/23.45]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	37,000/49,000 [10.84/14.36]	50,000/65,000 [14.65/19.05]	62,000/81,000 [18.17/23.74]	50,000/65,000 [14.65/19.05]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	10-40 [5-22] / 20-50 [11-27]	15-45 [8-25] / 25-55 [13-30]	25-55 [13-30] / 35-65 [19-36]	15-45 [8-25] / 25-55 [13-30]
AFUE %	81	81	81	81
Steady State Efficiency (%)	82	82	82	82
No. Burners	3	4	5	4
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.5 [12.7]	0.5 [12.7]	0.5 [12.7]
Compressor				
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Sound Rating (dB)⁵	76	76	76	78
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]	16.23 [1.51]	16.23 [1.51]	16.23 [1.51]	16.23 [1.51]
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]	7.39 [0.69]	7.39 [0.69]	7.39 [0.69]	7.39 [0.69]
Rows / FPI [FPcm]	2 / 15 [6]	2 / 15 [6]	2 / 15 [6]	2 / 15 [6]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/22 [558.8]	1/22 [558.8]	1/22 [558.8]	1/22 [558.8]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	2700 [1274]	2700 [1274]	2700 [1274]	3300 [1557]
No. Motors/HP	1 at 1/6 HP	1 at 1/6 HP	1 at 1/6 HP	1 at 1/3 HP
Motor RPM	850	850	850	850
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/10x9 [254x229]	1/10x9 [254x229]	1/10x9 [254x229]	1/10x9 [254x229]
Drive Type/No. Speeds	Direct/11	Direct/11	Direct/11	Direct/11
No. Motors	1	1	1	1
Motor HP	1/2	3/4	3/4	3/4
Motor RPM	1050	1050	1050	1050
Motor Frame Size	48	48	48	48
Filter - Type	Field Supplied	Field Supplied	Field Supplied	Field Supplied
Furnished	No	No	No	No
(NO.) Size Recommended in. [mm x mm x mm]	(1)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]
Refrigerant Charge Oz. [g]	155.2 [4400]	155.2 [4400]	155.2 [4400]	169.6 [4808]
Weights				
Net Weight lbs. [kg]	552 [250]	557 [253]	557 [253]	549 [249]
Ship Weight lbs. [kg]	558 [253]	558 [253]	558 [253]	562 [255]

GENERAL DATA - RGEA16 MODELS

NOMINAL SIZES 2-5 TONS [7-15.8 kW]

Model RGEA16 Series	048ACV102	048AJV08(2,T)	048AJV10(2,T)	060ACV102
Cooling Performance¹				Continued ->
Gross Cooling Capacity (2nd Stage) Btu [kW]	48,500 [14.21]	48,500 [14.21]	48,500 [14.21]	60,500 [17.73]
SEER ²	15	15	15	14.1999981
EER (1st stage / 2nd stage)	12.7/11.5	12.7/11.5	12.7/11.5	12/10.7
AHRI Rated CFM (1st / 2nd stage) [L/s]	1050/1600 [495/755]	1050/1600 [495/755]	1050/1600 [495/755]	1250/1850 [590/873]
AHRI Net Cooling Capacity (1st / 2nd stage) Btu [kW]	34,800/47,000 [10.2/13.77]	34,800/47,000 [10.2/13.77]	34,800/47,000 [10.2/13.77]	41,800/58,000 [12.25/16.99]
Net Sensible Capacity (1st / 2nd stage) Btu [kW]	24,820/34,480 [7.27/10.1]	24,820/34,480 [7.27/10.1]	24,820/34,480 [7.27/10.1]	30,000/42,280 [8.79/12.39]
Net Latent Capacity (1st / 2nd stage) Btu [kW]	9,980/12,520 [2.92/3.67]	9,980/12,520 [2.92/3.67]	9,980/12,520 [2.92/3.67]	11,800/15,720 [3.46/4.61]
Net System Power (1st / 2nd stage) kW	2.73/4.1	2.73/4.1	2.73/4.1	3.48/5.4
Heating Performance (Gas)⁴				
Heating Input Btu [kW] (1st Stage / 2nd Stage)	76,000/100,000 [22.27/29.30]	61,000/80,000 [17.88/23.45]	76,000/100,000 [22.27/29.30]	76,000/100,000 [22.27/29.30]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	62,000/81,000 [18.17/23.74]	50,000/65,000 [14.65/19.05]	62,000/81,000 [18.17/23.74]	62,000/81,000 [18.17/23.74]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13-30] / 35-65 [19-36]	15-45 [8-25] / 25-55 [13-30]	25-55 [13-30] / 35-65 [19-36]	25-55 [13-30] / 35-65 [19-36]
AFUE %	81	81	81	81
Steady State Efficiency (%)	82	82	82	82
No. Burners	5	4	5	5
No. Stages	2	2	2	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.5 [12.7]	0.5 [12.7]	0.5 [12.7]
Compressor				
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Sound Rating (dB)⁵	78	78	78	78
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]	16.23 [1.51]	16.23 [1.51]	16.23 [1.51]	16.23 [1.51]
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]	7.39 [0.69]	7.39 [0.69]	7.39 [0.69]	7.39 [0.69]
Rows / FPI [FPcm]	2 / 15 [6]	2 / 15 [6]	2 / 15 [6]	2 / 15 [6]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]	1/0.75 [19.05]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	1/22 [558.8]	1/22 [558.8]	1/22 [558.8]	1/22 [558.8]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	3300 [1557]	3300 [1557]	3300 [1557]	3300 [1557]
No. Motors/HP	1 at 1/3 HP	1 at 1/3 HP	1 at 1/3 HP	1 at 1/3 HP
Motor RPM	850	850	850	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/10x9 [254x229]	1/10x9 [254x229]	1/10x9 [254x229]	1/12x9 [305x229]
Drive Type/No. Speeds	Direct/11	Direct/11	Direct/11	Direct/11
No. Motors	1	1	1	1
Motor HP	3/4	3/4	3/4	1
Motor RPM	1050	1050	1050	1050
Motor Frame Size	48	48	48	48
Filter - Type	Field Supplied	Field Supplied	Field Supplied	Field Supplied
Furnished	No	No	No	No
(NO.) Size Recommended in. [mm x mm x mm]	(1)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]	(1)1x24x30 [25x610x762]
Refrigerant Charge Oz. [g]	169.6 [4808]	169.6 [4808]	169.6 [4808]	165.8 [4700]
Weights				
Net Weight lbs. [kg]	554 [251]	557 [253]	562 [255]	571 [259]
Ship Weight lbs. [kg]	562 [255]	562 [255]	562 [255]	594 [269]

GENERAL DATA - RGEA16 MODELS

NOMINAL SIZES 2-5 TONS [7-15.8 kW]

Model RGEA16 Series	060AJV10(2,T)
Cooling Performance¹	
Gross Cooling Capacity (2nd Stage) Btu [kW]	60,500 [17.73]
SEER ²	14.2
EER (1st stage / 2nd stage)	12.7/10.7
AHRI Rated CFM (1st / 2nd stage) [L/s]	1250/1850 [590/873]
AHRI Net Cooling Capacity (1st / 2nd stage) Btu [kW]	41,800/58,000 [12.25/16.99]
Net Sensible Capacity (1st / 2nd stage) Btu [kW]	30,000/42,280 [8.79/12.39]
Net Latent Capacity (1st / 2nd stage) Btu [kW]	11,800/15,720 [3.46/4.61]
Net System Power (1st / 2nd stage) kW	3.48/5.4
Heating Performance (Gas)⁴	
Heating Input Btu [kW] (1st Stage / 2nd Stage)	76,000/100,000 [22.27/29.30]
Heating Output Btu [kW] (1st Stage / 2nd Stage)	62,000/81,000 [18.17/23.74]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	25-55 [13-30] / 35-65 [19-36]
AFUE %	81
Steady State Efficiency (%)	82
No. Burners	5
No. Stages	2
Gas Connection Pipe Size in. [mm]	0.5 [12.7]
Compressor	
No./Type	1/Scroll
Outdoor Sound Rating (dB)⁵	
78	
Outdoor Coil - Fin Type	
Louvered	
Tube Type	
Rifled	
Tube Size in. [mm] OD	0.375 [9.5]
Face Area sq. ft. [sq. m]	16.23 [1.51]
Rows / FPI [FPcm]	2 / 22 [9]
Indoor Coil - Fin Type	
Louvered	
Tube Type	
Rifled	
Tube Size in. [mm]	0.375 [9.5]
Face Area sq. ft. [sq. m]	7.39 [0.69]
Rows / FPI [FPcm]	2 / 15 [6]
Refrigerant Control	TX Valves
Drain Connection No./Size in. [mm]	1/0.75 [19.05]
Outdoor Fan - Type	
Propeller	
No. Used/Diameter in. [mm]	1/22 [558.8]
Drive Type/No. Speeds	Direct/1
CFM [L/s]	3300 [1557]
No. Motors/HP	1 at 1/3 HP
Motor RPM	1075
Indoor Fan - Type	
FC Centrifugal	
No. Used/Diameter in. [mm]	1/12x9 [305x229]
Drive Type/No. Speeds	Direct/11
No. Motors	1
Motor HP	1
Motor RPM	1050
Motor Frame Size	48
Filter - Type	
Field Supplied	
Furnished	No
(NO.) Size Recommended in. [mm x mm x mm]	(1)1x24x30 [25x610x762]
Refrigerant Charge Oz. [g]	
165.8 [4700]	
Weights	
Net Weight lbs. [kg]	583 [264]
Ship Weight lbs. [kg]	594 [269]

XIII. MISCELLANEOUS

ELECTRICAL DATA – RGEA16 SERIES								
		024AJV	036ACV	036AJV	048ACV	048AJV	060ACV	060AJV
Unit Information	Unit Operating Voltage Range	197-253	197-253	197-253	197-253	197-253	197-253	197-253
	Volts	208/230	208/230	208/230	208/230	208/230	208/230	208/230
	Minimum Circuit Ampacity	18/18	19/19	25/25	22/22	31/31	28/28	40/40
	Minimum Overcurrent Protection Device Size	20/20	20/20	30/30	25/25	40/40	35/35	45/45
	Maximum Overcurrent Protection Device Size	25/25	25/25	40/40	35/35	50/50	45/45	60/60
Compressor Motor	No.	1	1	1	1	1	1	1
	Volts	208/230	208/230	208/230	208/230	208/230	208/230	208/230
	Phase	1	3	1	3	1	3	1
	RPM	3450	3450	3450	3450	3450	3450	3450
	HP, Compressor 1	2 5/6	4	4	5 1/4	5 1/4	7	6 2/3
	Amps (RLA), Comp. 1	11.7/11.7	11.6/11.6	16.7/16.7	14/14	21.2/21.2	17.6/17.6	27.1/27.1
	Amps (LRA), Comp. 1	58.3/58.3	73/73	83/83	88/88	104/104	135/135	153/153
Condenser Motor	No.	1	1	1	1	1	1	1
	Volts	208/230	208/230	208/230	208/230	208/230	208/230	208/230
	Phase	1	1	1	1	1	1	1
	HP	1/6	1/6	1/6	1/3	1/3	1/3	1/3
	Amps (FLA, each)	0.6/0.6	0.6/0.6	0.6/0.6	1.5/1.5	1.5/1.5	2/2	2/2
	Amps (LRA, each)	1.5/1.5	1.5/1.5	1.5/1.5	3/3	3/3	3.9/3.9	3.9/3.9
Evaporator Fan	No.	1	1	1	1	1	1	1
	Volts	208/230	208/230	208/230	208/230	208/230	208/230	208/230
	Phase	1	1	1	1	1	1	1
	HP	1/2	1/2	1/2	3/4	3/4	1	1
	Amps (FLA, each)	2/2	2/2	2/2	3/3	3/3	4/4	4/4
	Amps (LRA, each)	0/0	0/0	0/0	0/0	0/0	0/0	0/0

1. Horsepower per Compressor
2. Amp Draw Per Motor. Multiply Value by Number of Motors to Determine Total Amps.

XIV. AIRFLOW PERFORMANCE DATA

INDOOR AIRFLOW PERFORMANCE FOR 2-5 TON PACKAGE GAS ELECTRIC UNITS—RGEA16 DIRECT DRIVE

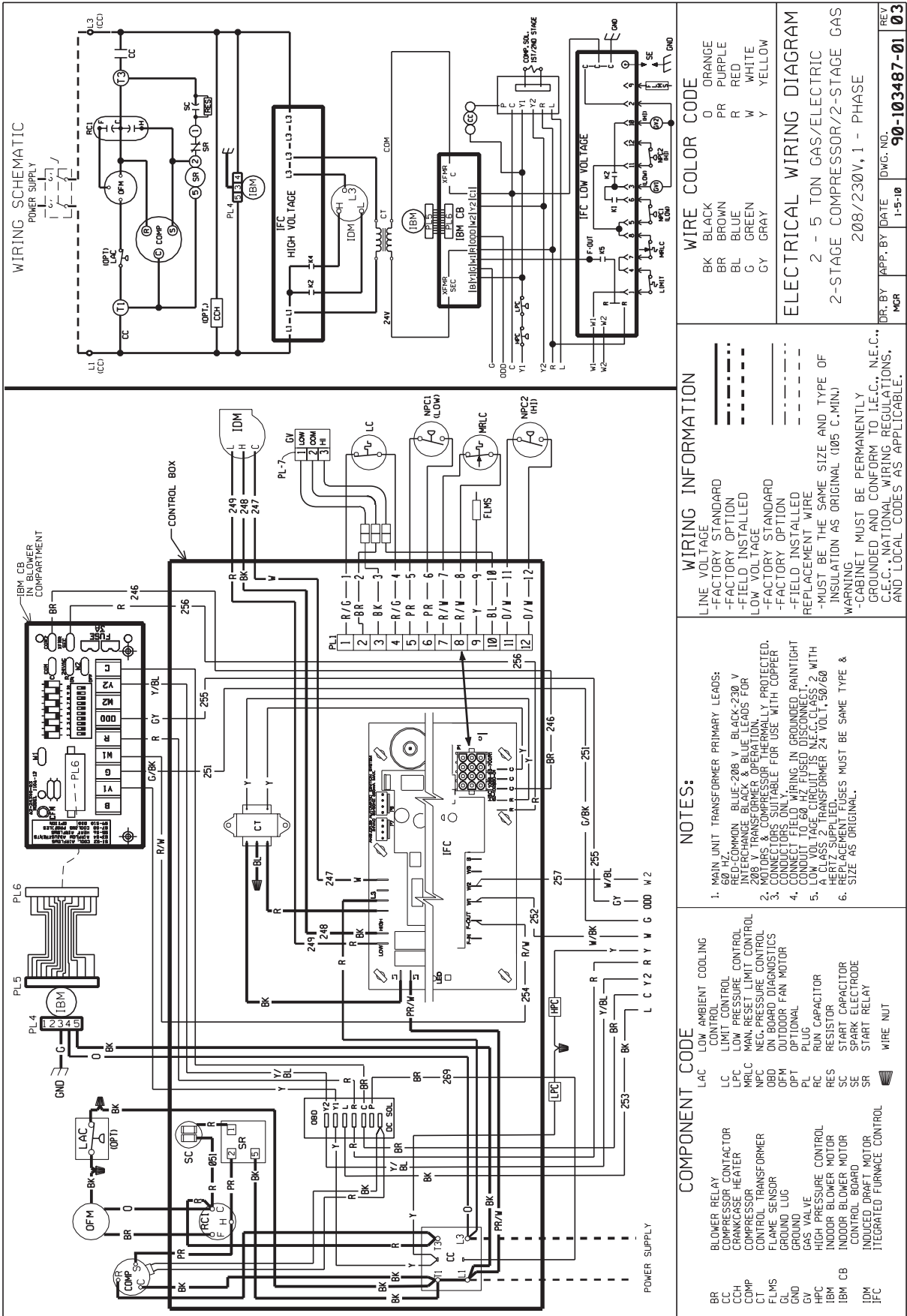
RGEA16 INDOOR AIRFLOW PERFORMANCE — 208 & 230 VOLTS		External Static Pressure — Inches W.C. [kPa] (Side Discharge — Dry Coil)													
		0.1 [0.02]	0.2 [0.05]	0.3 [0.07]	0.4 [0.10]	0.5 [0.12]	0.6 [0.15]	0.7 [0.17]	0.8 [0.20]	0.9 [0.22]	1.0 [0.25]				
2.0 [7.03]	10 x 9 Blower 1/2 HP [372 W] ECM	60,000 [17.58]	Heat	CFM [L/s]	1137 [537]	1156 [546]	1173 [554]	1181 [557]	1192 [563]	1200 [566]	1192 [563]	1140 [514]	1212 [569]	1206 [569]	1197 [565]
				RPM	755	868	929	994	1040	1098	1140	1237	1278		
				Watts	177	236	270	307	336	376	404	456	477	508	
				CFM [L/s]	548 [259]	561 [265]	561 [265]	551 [260]	556 [262]	541 [255]	530 [250]	514 [243]	492 [232]	477 [225]	
				RPM	488	596	685	762	835	891	955	1010	1051	1101	
				Watts	38	56	72	88	105	123	139	155	168	184	
				CFM [L/s]	786 [371]	805 [380]	811 [383]	820 [387]	825 [389]	822 [388]	826 [390]	824 [389]	816 [385]	809 [382]	
				RPM	573	695	751	838	908	969	1010	1082	1119	1171	
				Watts	72	103	120	148	175	199	218	248	265	290	
				CFM [L/s]	1109 [523]	1131 [534]	1150 [543]	1169 [552]	1175 [555]	1187 [560]	1190 [562]	1201 [567]	1205 [569]	1203 [568]	
				RPM	687	706	855	912	961	1009	1057	1135	1152	1212	
				Watts	147	157	226	254	287	317	347	397	413	456	
3.0 [10.55]	10 x 9 Blower 1/2 HP [372 W] ECM	60,000 [17.58]	Low Cool (1st Stage)	CFM [L/s]	784 [370]	801 [378]	813 [384]	820 [387]	827 [390]	830 [392]	809 [382]	806 [380]	799 [377]	791 [373]	
				RPM	514	627	704	775	845	916	1014	1046	1097	1138	
				Watts	58	84	107	127	151	178	217	229	257	276	
				CFM [L/s]	1124 [530]	1144 [540]	1167 [551]	1183 [558]	1197 [565]	1204 [568]	1205 [569]	1237 [584]	1231 [581]	1230 [580]	
				RPM	697	766	866	923	975	997	1085	1110	1165	1211	
				Watts	152	185	234	268	298	314	372	391	428	463	
				CFM [L/s]	1295 [611]	1309 [618]	1331 [628]	1362 [643]	1353 [639]	1359 [641]	1365 [644]	1358 [641]	1365 [644]	1360 [642]	
				RPM	757	869	908	940	1014	1071	1105	1151	1199	1234	
				Watts	209	269	294	316	365	401	417	457	495	518	
				CFM [L/s]	797 [376]	804 [379]	809 [382]	810 [382]	812 [383]	785 [370]	778 [367]	766 [362]	755 [356]	737 [348]	
				RPM	572	650	724	791	856	938	995	1049	1091	1138	
				Watts	77	94	116	133	155	184	203	226	243	264	
4.0 [14.07]	10 x 9 Blower 3/4 HP [559 W] ECM	80,000 [23.44] & 100,000 [29.3]	High Cool (2nd Stage)	CFM [L/s]	1185 [559]	1199 [566]	1211 [572]	1229 [580]	1241 [586]	1242 [586]	1254 [592]	1241 [586]	1238 [584]	1236 [583]	
				RPM	730	798	857	930	995	1032	1099	1141	1173	1202	
				Watts	175	206	237	274	311	336	377	405	422	441	
				CFM [L/s]	1295 [611]	1309 [618]	1331 [628]	1362 [643]	1353 [639]	1359 [641]	1365 [644]	1358 [641]	1365 [644]	1360 [642]	
				RPM	757	869	908	940	1014	1071	1105	1151	1199	1234	
				Watts	209	269	294	316	365	401	417	457	495	518	
				CFM [L/s]	1032 [487]	1045 [493]	1053 [497]	1058 [499]	1058 [499]	1066 [503]	1068 [504]	1056 [498]	1046 [494]	1037 [489]	
				RPM	714	775	837	900	946	1006	1059	1087	1135	1187	
				Watts	137	160	186	214	235	267	293	309	335	362	
				CFM [L/s]	1594 [752]	1609 [759]	1609 [759]	1610 [760]	1612 [761]	1611 [760]	1614 [762]	1613 [761]	1583 [747]	1525 [720]	
				RPM	980	1044	1083	1130	1167	1202	1247	1281	1317	1326	
				Watts	396	445	477	516	549	580	618	652	665	652	
5.0 [17.59]	12 x 9 Blower 1 HP [746 W] ECM	100,000 [29.3]	Heat	CFM [L/s]	1295 [611]	1300 [614]	1322 [624]	1325 [625]	1344 [634]	1343 [634]	1343 [634]	1351 [638]	1349 [637]	1349 [637]	
				RPM	640	751	814	846	890	935	971	1014	1046	1086	
				Watts	189	254	299	326	356	393	423	460	484	525	
				CFM [L/s]	1258 [594]	1280 [604]	1279 [604]	1297 [612]	1306 [616]	1310 [618]	1312 [619]	1312 [619]	1313 [620]	1320 [623]	
				RPM	649	674	795	846	883	939	956	999	1038	1069	
				Watts	190	209	275	314	340	388	399	435	465	494	
				CFM [L/s]	1871 [883]	1871 [883]	1866 [881]	1866 [890]	1908 [900]	1875 [885]	1921 [907]	1907 [900]	1906 [900]	1909 [901]	
				RPM	907	956	1016	1048	1084	1106	1151	1197	1209	1241	
				Watts	563	626	709	750	795	831	897	962	979	1030	

Notes: All airflows listed (except the 5 ton high cool) can be adjusted by +/-10% using the dip switches on the ECM interface board located in the blower section. See ECM Motor Interface Control and Settings Section of the i&O before making adjustments. The +100% setting of the 5 ton high cool is not available to prevent water blow-off.

Down Discharge Pressure Drop (Add to External Static Pressure)		
CFM [L/s]	600 [283]	800 [378]
Pressure Drop - Inches W.C. [kPa]	0	.02 [0.05]
	1000 [472]	1200 [566]
	.05 [0.12]	.07 [0.17]
	1440 [661]	1600 [755]
	.1 [0.25]	.12 [0.30]
	1800 [849]	2000 [944]
	.15 [0.37]	.17 [0.42]

XV. WIRING DIAGRAMS

FIGURE 30
WIRING DIAGRAM



WIRING SCHEMATIC
POWER SUPPLY

WIRE COLOR CODE

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

ELECTRICAL WIRING DIAGRAM
2 - 5 TON GAS/ELECTRIC
2-STAGE COMPRESSOR/2-STAGE GAS
208/230V, 1 - PHASE

DR. BY: MCR
APP. BY: DATE: 1-5-10
DWG. NO.: 90-103487-01
REV: 03

WIRING INFORMATION

- LINE VOLTAGE STANDARD
- FACTORY OPTION
- FIELD INSTALLED
- LOW VOLTAGE
- FACTORY STANDARD
- FIELD INSTALLED
- REPLACEMENT WIRE
- MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105 C.MIN.)
- CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., NATIONAL WIRING REGULATIONS, AND LOCAL CODES AS APPLICABLE.

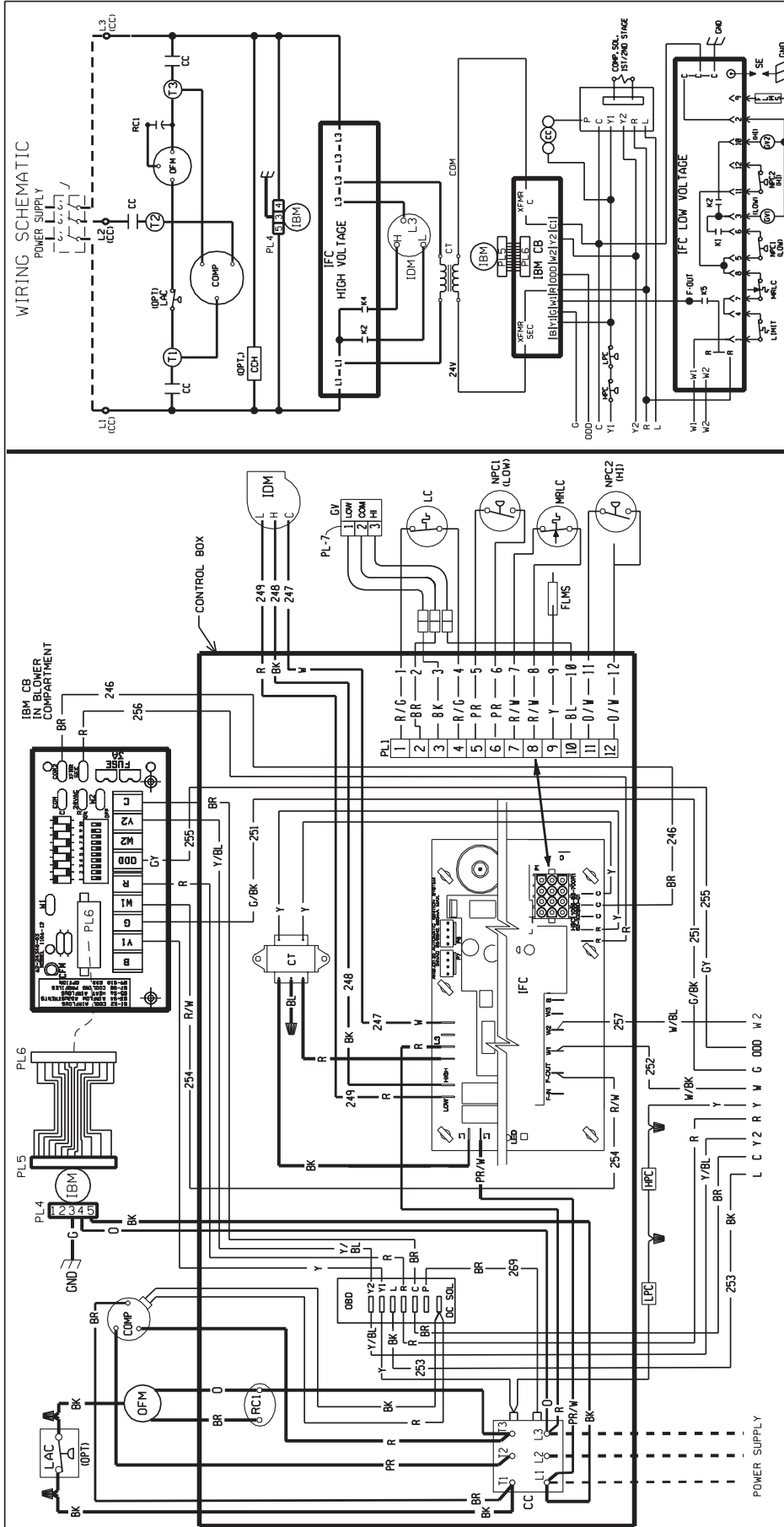
NOTES:

1. MAIN UNIT TRANSFORMER PRIMARY LEADS: 60 HZ. RED-COMMON, BLUE-208 V., BLACK-230 V. INTERCHANGE BLACK & BLUE LEADS FOR 208 V. TRANSFORMER. TERMINALS PROTECTED. MOUNTED COMPRESSOR OPERATIONAL WITH COPPER CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. CONNECT FLD WIRING IN GROUNDED RAIN TIGHT CONDUIT TO 60 HZ. FUSED DISCONNECT, 2 WITH A CLASS 2 TRANSFORMER 24-VOL, 50/60.
3. REPLACEMENT FUSES MUST BE SAME TYPE & SIZE AS ORIGINAL.

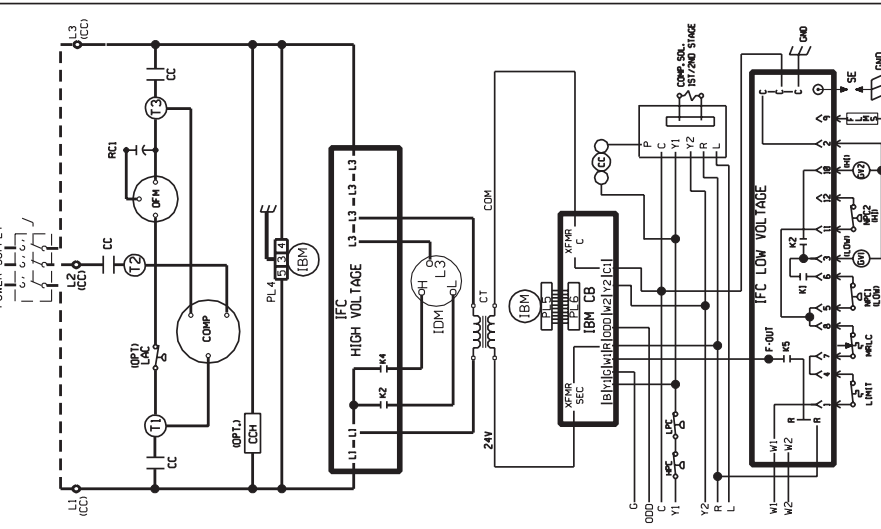
COMPONENT CODE

BR	BLOWER RELAY
CC	CONTROL
CCH	LOW AMBIENT COOLING
COMP	COMPRESSOR CONTACTOR
CRK	CRANKCASE HEATER
CT	CONTROL TRANSFORMER
FLMS	FLAME SENSOR
GL	GROUND LUG
GND	GROUND
GV	GAS VALVE
HPC	HIGH PRESSURE CONTROL
IBM	INDOOR BLOWER MOTOR
IBM CB	INDOOR BLOWER MOTOR CONTROL BOARD
IDM	INDUCED DRAFT MOTOR
IFC	INTEGRATED FURNACE CONTROL
LAC	LOW PRESSURE CONTROL
LPC	LIMIT CONTROL
LC	LOW PRESSURE CONTROL
MRLC	MAN. RESET LIMIT CONTROL
NPC	NEG. PRESSURE CONTROL
OBD	ON BOARD DIAGNOSTICS
OFM	OUTDOOR FAN MOTOR
OPT	OPTIONAL
PL	PLUG
PLUG	RUN CAPACITOR
RES	RESISTOR
SC	START CAPACITOR
SE	START ELECTRODE
SR	START RELAY
WIRE NUT	WIRE NUT

FIGURE 31
WIRING DIAGRAM



WIRING SCHEMATIC



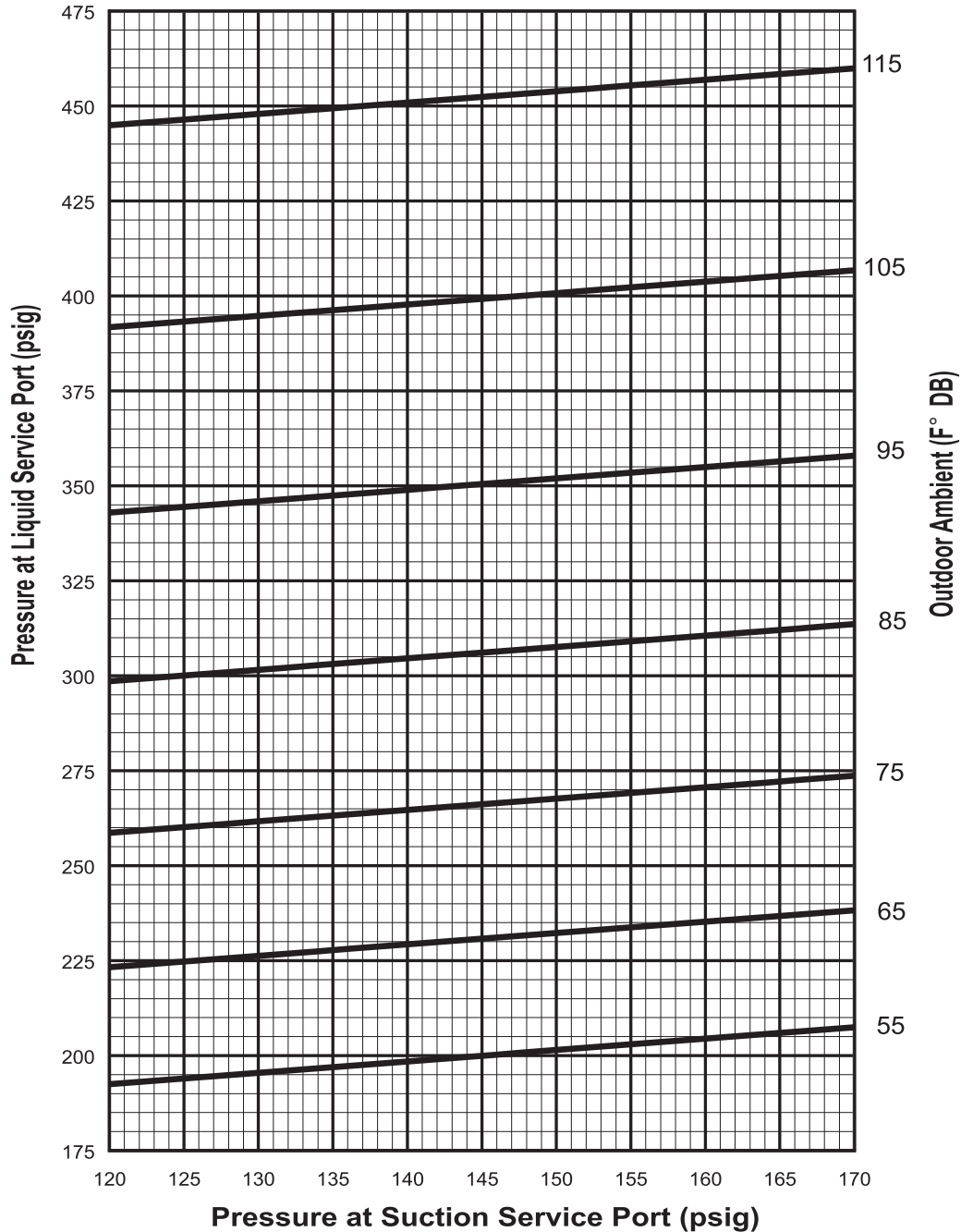
<p>COMPONENT CODE</p> <p>LAC LOW AMBIENT COOLING CONTROL</p> <p>LPC LIMIT CONTROL</p> <p>LPC LOW PRESSURE CONTROL</p> <p>MAN. RESET LIMIT CONTROL</p> <p>MPC NEG. PRESSURE CONTROL</p> <p>OBD ON BOARD DIAGNOSTICS</p> <p>OFM OUTDOOR FAN MOTOR</p> <p>OPT OPTIONAL</p> <p>PL PLUG</p> <p>RES RUN CAPACITOR</p> <p>RC HIGH PRESSURE CONTROL</p> <p>IBM INDOOR BLOWER MOTOR</p> <p>IBM CB INDOOR BLOWER CONTROL BOARD</p> <p>IDM INDUCED DRAFT MOTOR</p> <p>IFC INTEGRATED FURNACE CONTROL</p>	<p>NOTES:</p> <ol style="list-style-type: none"> MAIN UNIT TRANSFORMER PRIMARY LEADS: 60 HZ. RED-COMMON. BLUE-208 V. BLACK-230 V. INTERCHANGE BLACK & BLUE LEADS FOR 208 V. RANGE. COMPRESSOR THERMALLY PROTECTED. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY. CONNECT FIELD WIRING IN GROUND RAINLIGHT CONDUIT TO 60 HZ. FUSED DISCONNECT² WITH LOW VOLTAGE TRANSFORMER N.E.C. CLASS 2, WITH HERTZ SUPPLIED. FUSES MUST BE SAME TYPE & SIZE AS ORIGINAL. 	<p>WIRING INFORMATION</p> <p>LINE VOLTAGE</p> <ul style="list-style-type: none"> -FACTORY STANDARD -FACTORY OPTION -FIELD INSTALLED LOW VOLTAGE -FACTORY STANDARD -FIELD INSTALLED REPLACEMENT WIRE <p>MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105 C.MIN.)</p> <p>WARNING</p> <ul style="list-style-type: none"> -CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., NATIONAL WIRING REGULATIONS, AND LOCAL CODES AS APPLICABLE. 	<p>WIRE COLOR CODE</p> <p>BK BLACK</p> <p>BR BROWN</p> <p>BL BLUE</p> <p>G GREEN</p> <p>GY GRAY</p> <p>O ORANGE</p> <p>PR PURPLE</p> <p>R RED</p> <p>W WHITE</p> <p>Y YELLOW</p>
<p>DR. BY MGR APP. BY DATE 1-5-10 DWG. NO. 90-103487-02 REV 03</p>			

XVI. CHARGE CHARTS

FIGURE 32
SYSTEM CHARGE CHARTS

RGEA16 – 2 TON COOLING
1st (LOW) STAGE CHARGE CHART
R-410A REFRIGERANT

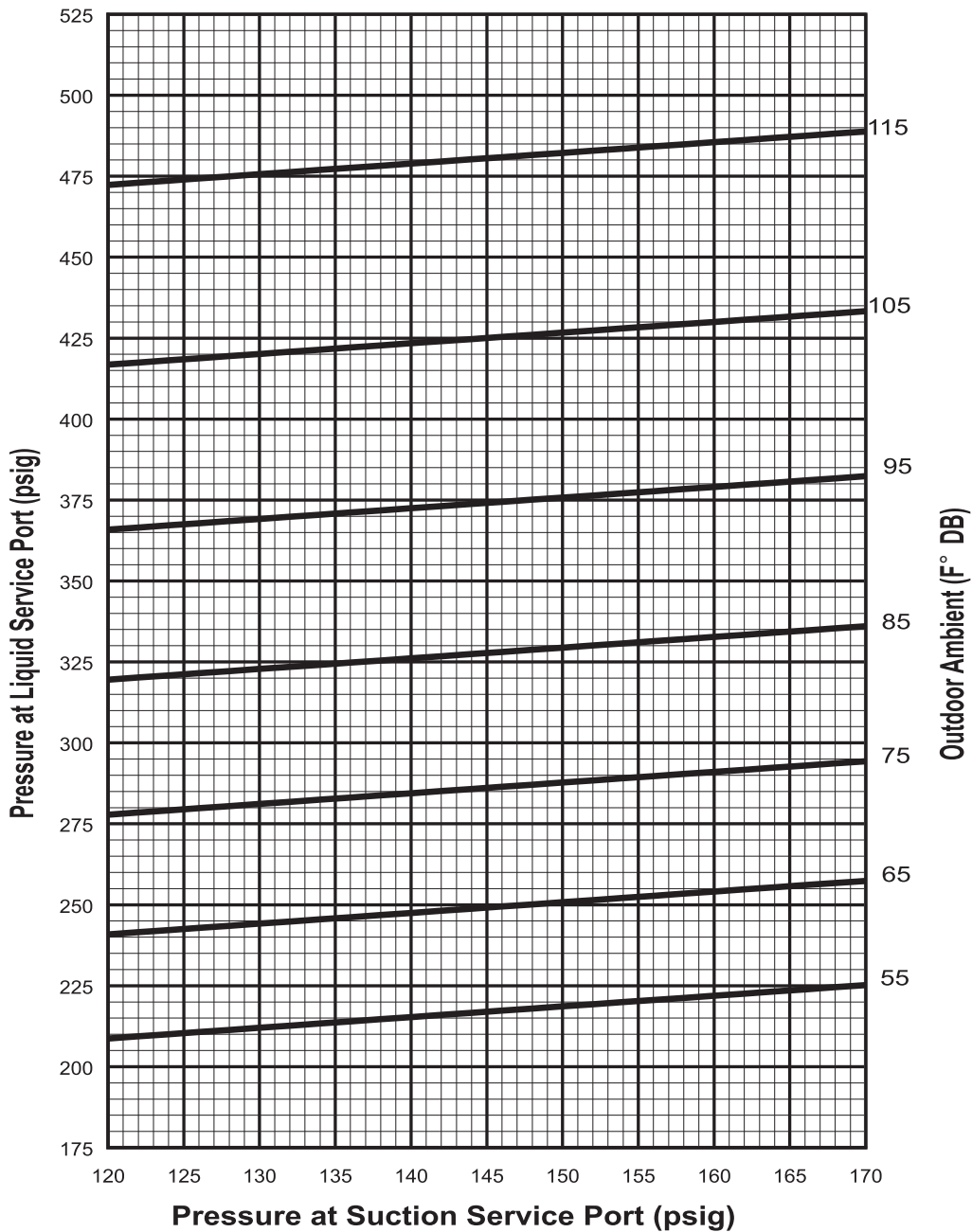
THE CHART BELOW IS FOR REFERENCE ONLY
CHARGE ADJUSTMENT SHOULD BE MADE DURING 2nd (HIGH) STAGE OPERATION ONLY



92-22904-48-00

FIGURE 33
SYSTEM CHARGE CHARTS

**RGEA16 – 2 TON COOLING
2nd (HIGH) STAGE CHARGE CHART
R-410A REFRIGERANT**



CAUTION: BEFORE FINAL REFRIGERANT CHECK, INDOOR AIR TEMPERATURE SHOULD BE AT A COMFORT CONDITIONS FOR MOST ACCURATE RESULTS.

INSTRUCTIONS:

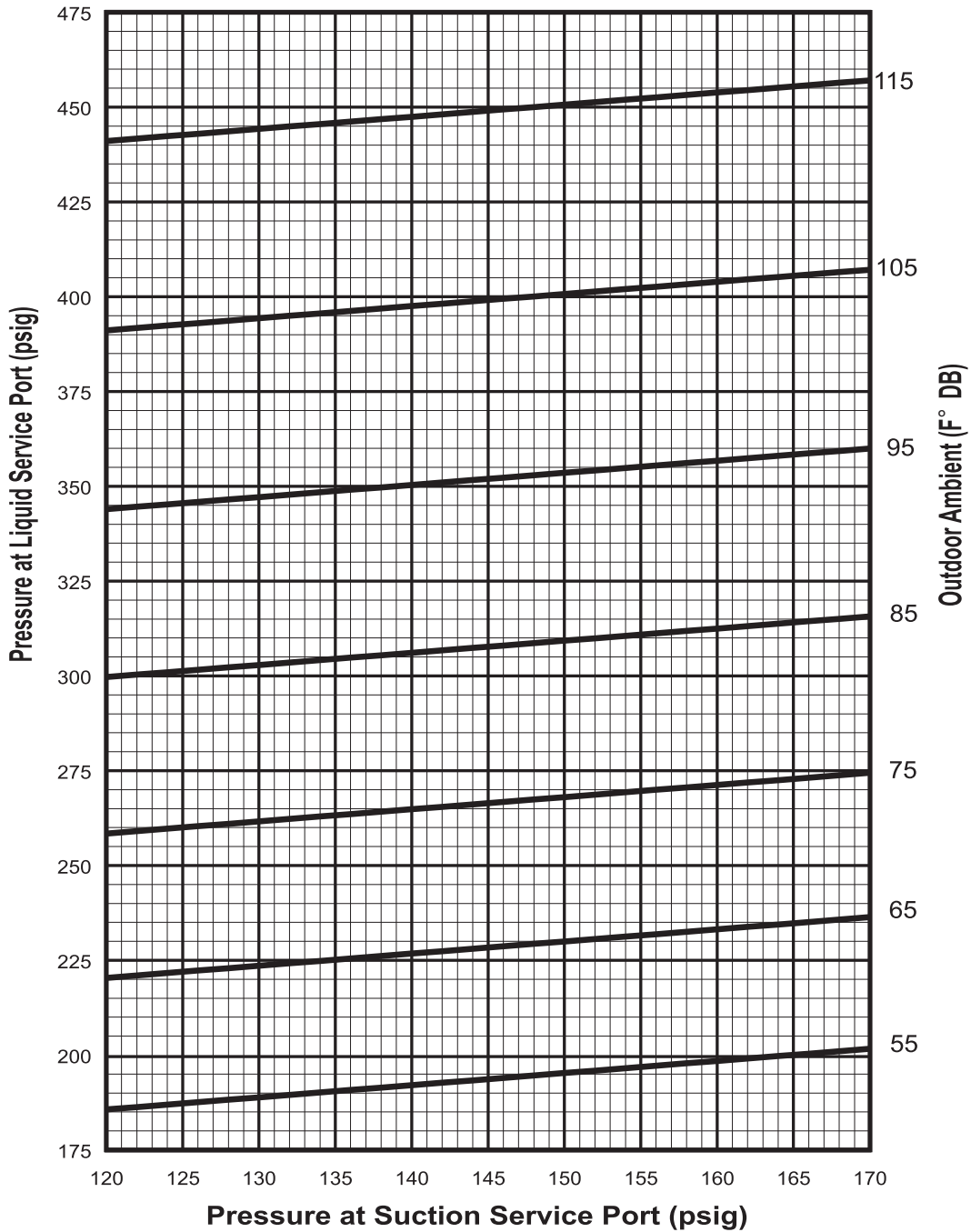
1. CONNECT PRESSURE GAUGES TO SUCTION AND LIQUID PORTS ON UNIT.
2. MEASURE AIR TEMPERATURE TO OUTDOOR COIL.
3. PLACE AN "X" ON THE APPROPRIATE CHART WHERE THE SUCTION AND LIQUID PRESSURES CROSS.
4. IF "X" IS BELOW AMBIENT TEMPERATURE LINE, ADD CHARGE AND REPEAT STEP 3.
5. IF "X" IS ABOVE AMBIENT TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT STEP 3.

92-22904-49-00

FIGURE 34
SYSTEM CHARGE CHARTS

RGEA16 – 3 TON COOLING
1st (LOW) STAGE CHARGE CHART
R-410A REFRIGERANT

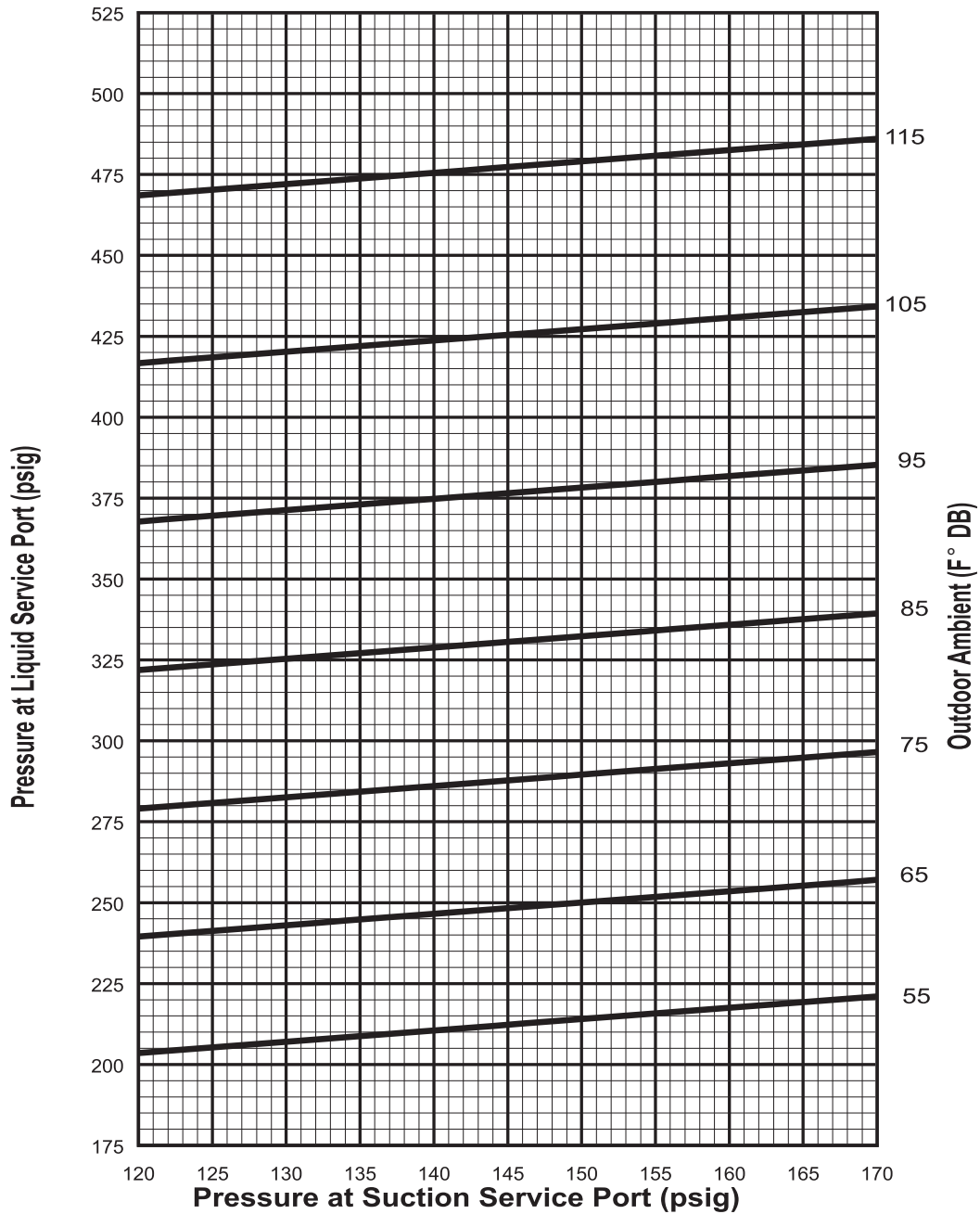
THE CHART BELOW IS FOR REFERENCE ONLY
CHARGE ADJUSTMENT SHOULD BE MADE DURING 2nd (HIGH) STAGE OPERATION



92-22904-50-00

FIGURE 35
SYSTEM CHARGE CHARTS

RGEA16 – 3 TON COOLING
2nd (HIGH) STAGE CHARGE CHART
R-410A REFRIGERANT



CAUTION: BEFORE FINAL REFRIGERANT CHECK, INDOOR AIR TEMPERATURE SHOULD BE AT A COMFORT CONDITIONS FOR MOST ACCURATE RESULTS.

INSTRUCTIONS:

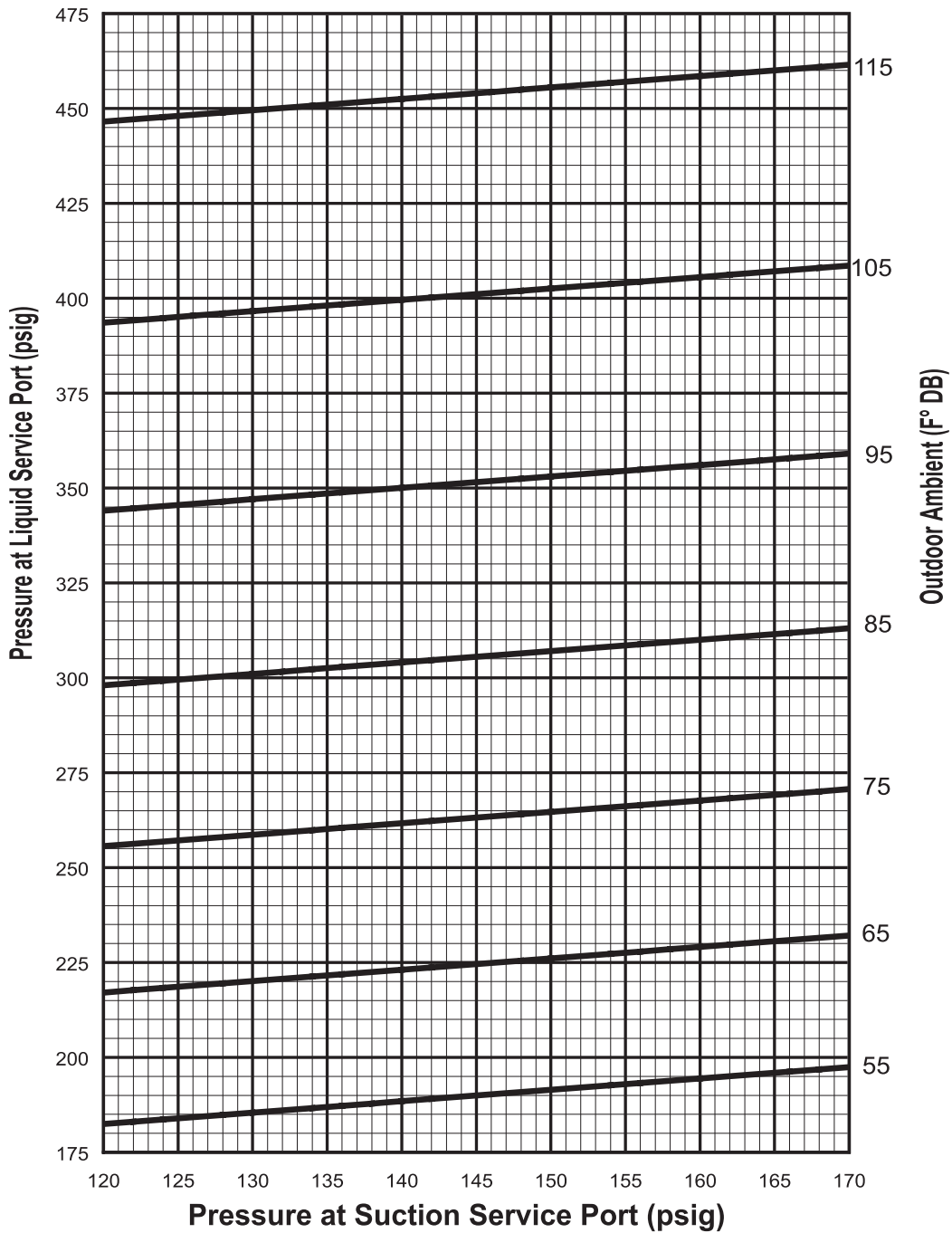
1. CONNECT PRESSURE GAUGES TO SUCTION AND LIQUID PORTS ON UNIT.
2. MEASURE AIR TEMPERATURE TO OUTDOOR COIL.
3. PLACE AN "X" ON THE APPROPRIATE CHART WHERE THE SUCTION AND LIQUID PRESSURES CROSS.
4. IF "X" IS BELOW AMBIENT TEMPERATURE LINE, ADD CHARGE AND REPEAT STEP 3.
5. IF "X" IS ABOVE AMBIENT TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT STEP 3.

92-22904-51-00

FIGURE 36
SYSTEM CHARGE CHARTS

RGEA16 – 4 TON COOLING
1st (LOW) STAGE CHARGE CHART
R-410A REFRIGERANT

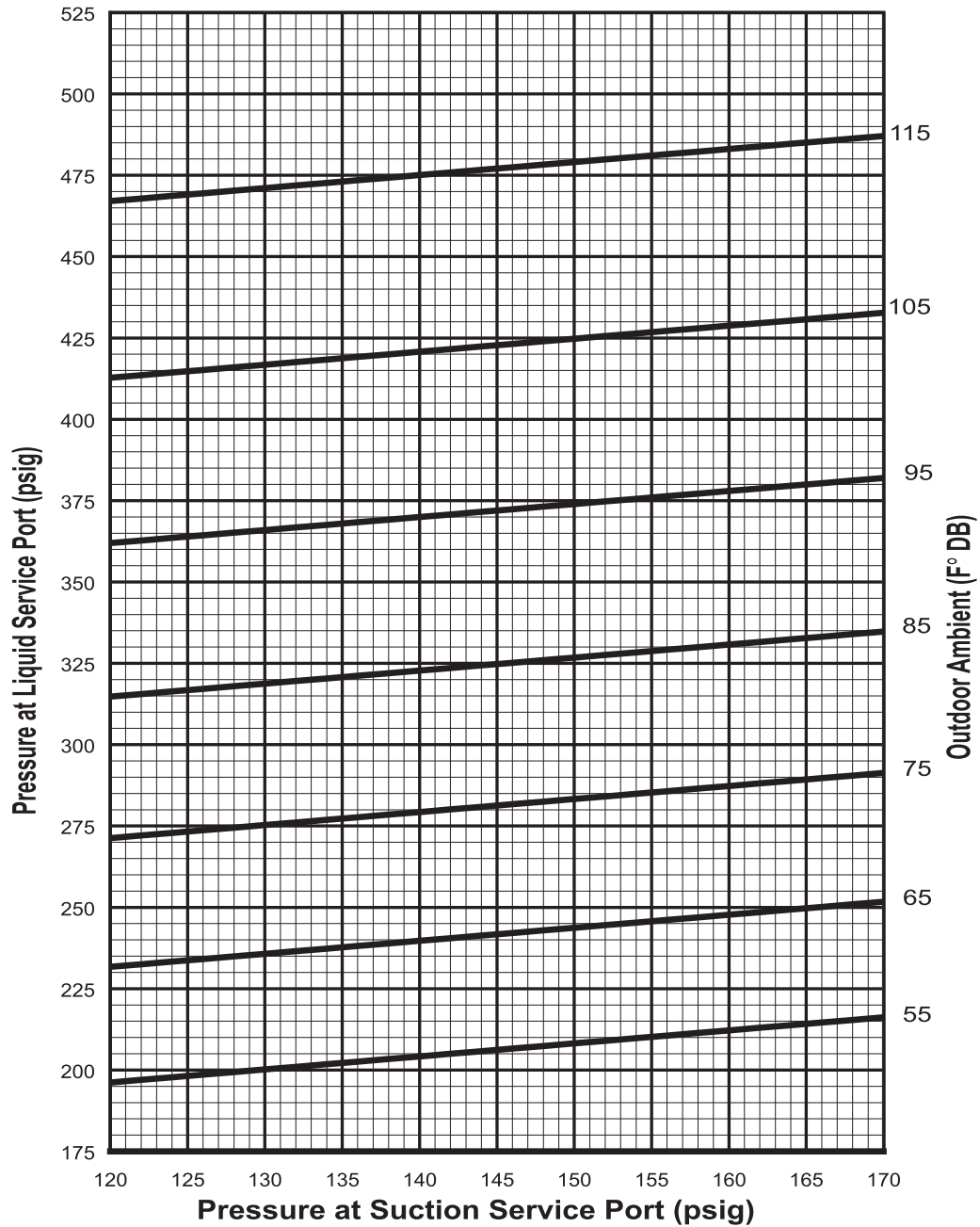
THE CHART BELOW IS FOR REFERENCE ONLY
CHARGE ADJUSTMENT SHOULD BE MADE DURING 2nd (HIGH) STAGE OPERATION ONLY



92-22904-52-00

FIGURE 37
SYSTEM CHARGE CHARTS

RGEA16 – 4 TON COOLING
2nd (HIGH) STAGE CHARGE CHART
R-410A REFRIGERANT



CAUTION: BEFORE FINAL REFRIGERANT CHECK, INDOOR AIR TEMPERATURE SHOULD BE AT A COMFORT CONDITIONS FOR MOST ACCURATE RESULTS.

INSTRUCTIONS:

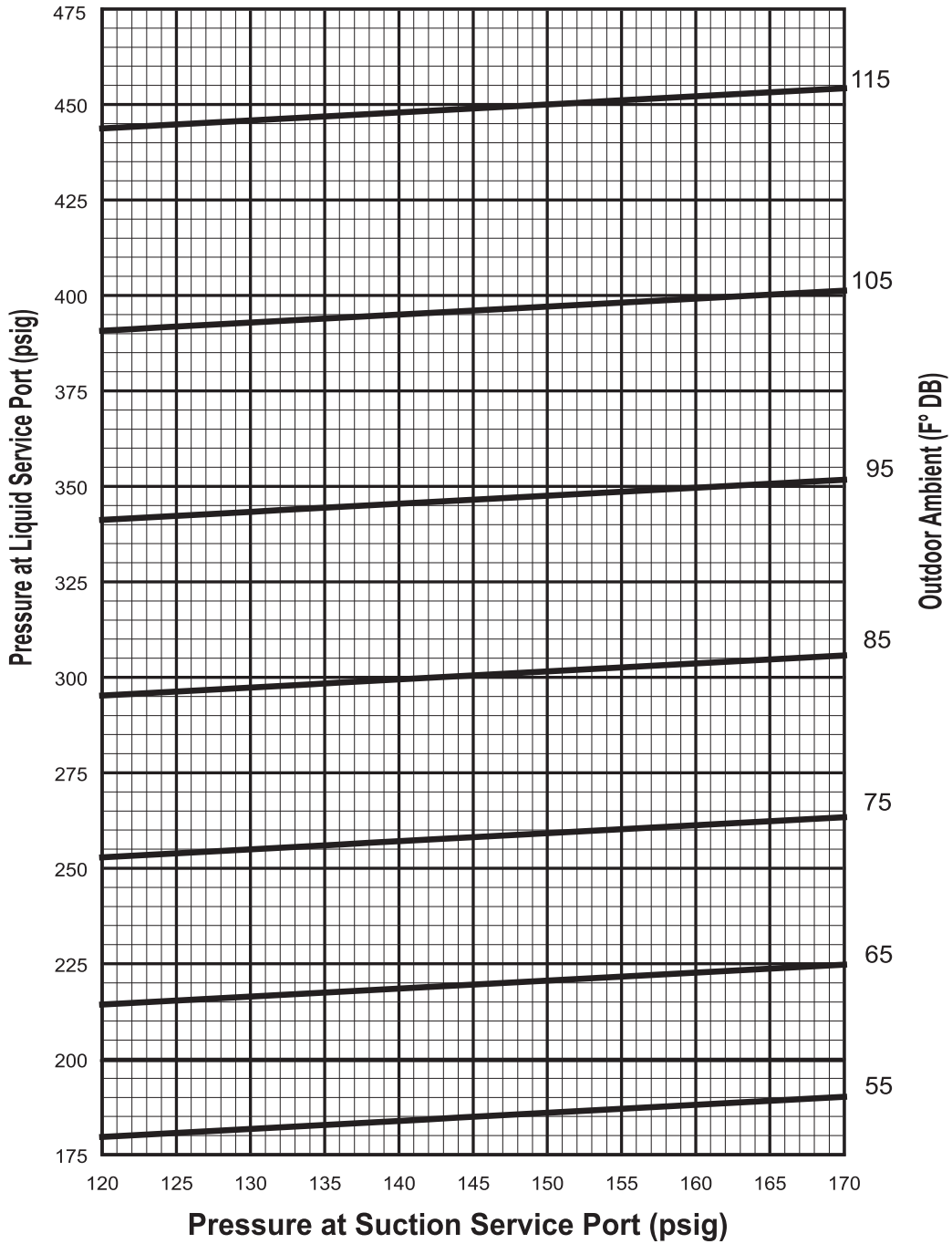
1. CONNECT PRESSURE GAUGES TO SUCTION AND LIQUID PORTS ON UNIT.
2. MEASURE AIR TEMPERATURE TO OUTDOOR COIL.
3. PLACE AN "X" ON THE APPROPRIATE CHART WHERE THE SUCTION AND LIQUID PRESSURES CROSS.
4. IF "X" IS BELOW AMBIENT TEMPERATURE LINE, ADD CHARGE AND REPEAT STEP 3.
5. IF "X" IS ABOVE AMBIENT TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT STEP 3.

92-22904-53-00

FIGURE 38
SYSTEM CHARGE CHARTS

**RGEA16 – 5 TON COOLING
1st (LOW) STAGE CHARGE CHART
R-410A REFRIGERANT**

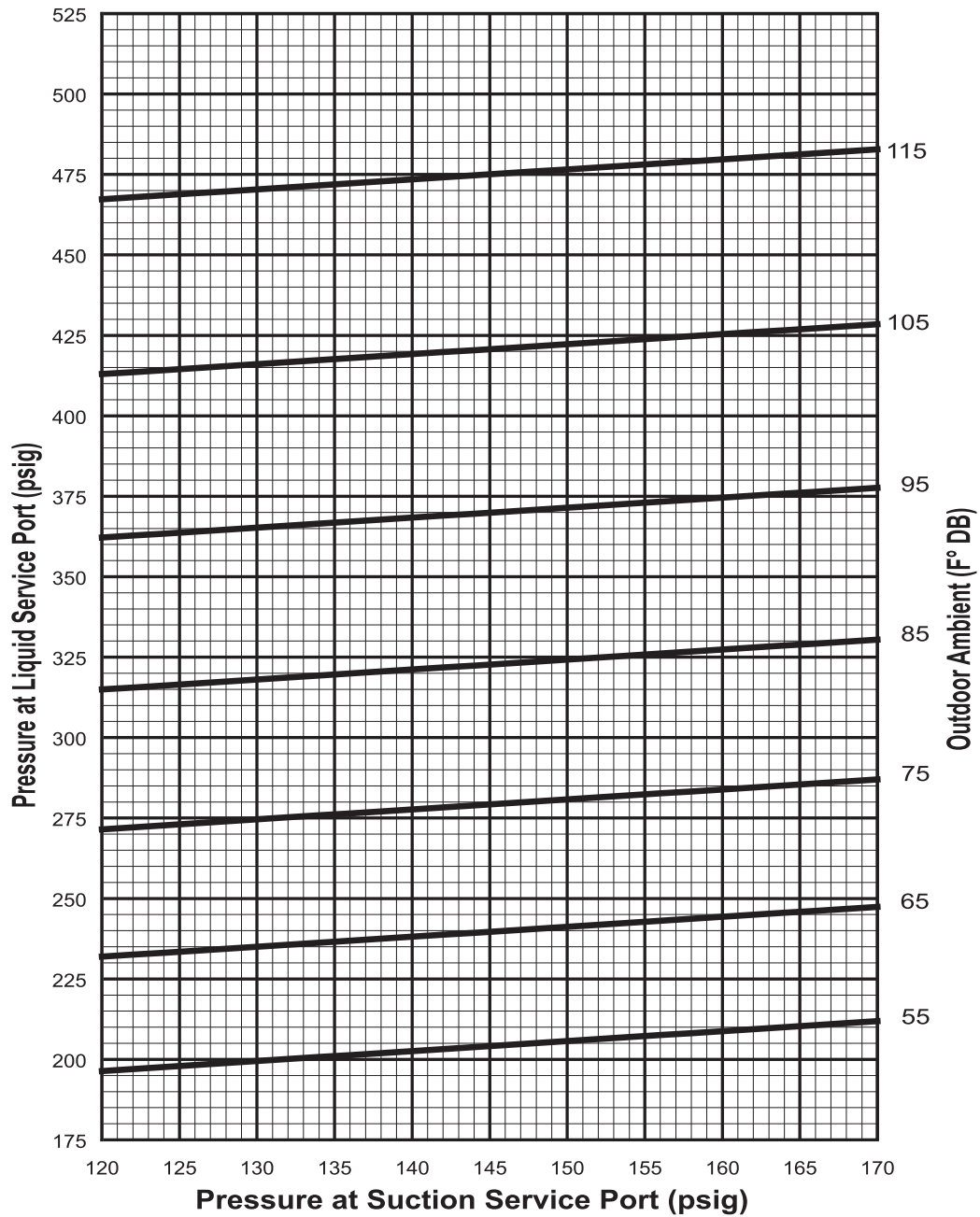
THE CHART BELOW IS FOR REFERENCE ONLY
CHARGE ADJUSTMENT SHOULD BE MADE DURING 2nd (HIGH) STAGE OPERATION ONLY



92-22904-54-00

FIGURE 39
SYSTEM CHARGE CHARTS

RGEA16 – 5 TON COOLING
2nd (HIGH) STAGE CHARGE CHART
R-410A REFRIGERANT



CAUTION: BEFORE FINAL REFRIGERANT CHECK, INDOOR AIR TEMPERATURE SHOULD BE AT A COMFORT CONDITIONS FOR MOST ACCURATE RESULTS.

INSTRUCTIONS:

1. CONNECT PRESSURE GAUGES TO SUCTION AND LIQUID PORTS ON UNIT.
2. MEASURE AIR TEMPERATURE TO OUTDOOR COIL.
3. PLACE AN "X" ON THE APPROPRIATE CHART WHERE THE SUCTION AND LIQUID PRESSURES CROSS.
4. IF "X" IS BELOW AMBIENT TEMPERATURE LINE, ADD CHARGE AND REPEAT STEP 3.
5. IF "X" IS ABOVE AMBIENT TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT STEP 3.

92-22904-55-00

XVII. TROUBLESHOOTING

FIGURE 40

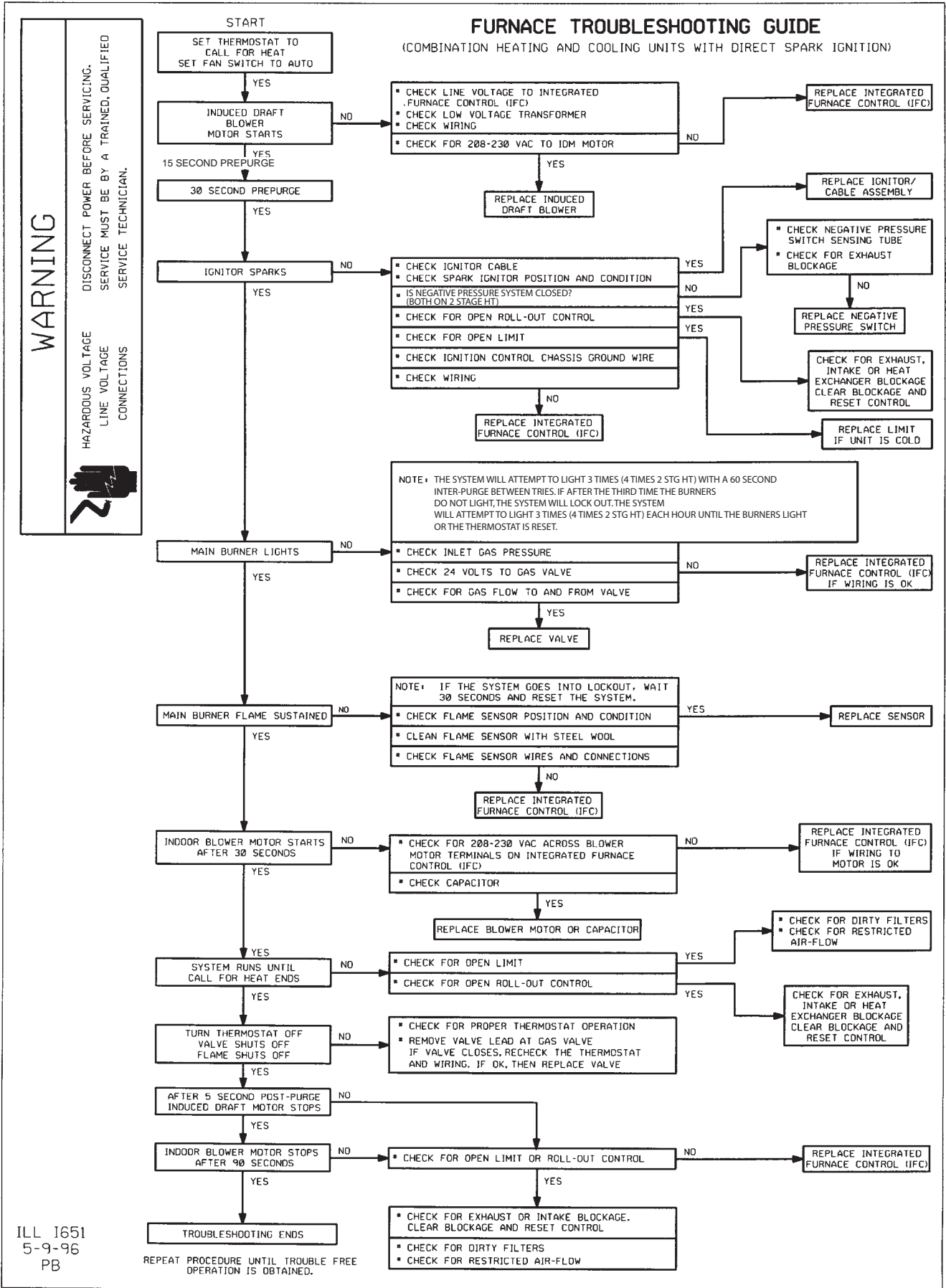
COOLING TROUBLE SHOOTING CHART

▲ 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 610 PSIG Replace thermostat wiring
Condenser fan runs, compressor doesn't	<ul style="list-style-type: none"> Run or start capacitor failed (single phase only) Start relay defective (single phase only) Loose connection Compressor stuck, grounded or open motor winding open internal overload. Low voltage condition Low voltage condition 	<ul style="list-style-type: none"> Replace Replace 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
Circulating air blower & inducer run continuously, compressor will not start	<ul style="list-style-type: none"> Manual reset overtemperature control tripped Wire loose in limit circuit 	<ul style="list-style-type: none"> Reset or replace Check wiring

FIGURE 41



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XVIII. COMFORT ALERT DIAGNOSTIC CHART

FIGURE 42

SINGLE PHASE UNIT

Status LED	Status LED Description	Status LED Troubleshooting Information
Green "POWER"	Module has power	Supply voltage is present at module terminals
Red "TRIP"	Thermostat demand signal Y1 is present, but the compressor is not running	<ol style="list-style-type: none"> 1. Compressor internal overload is open 2. Broken wire or connector is not making contact 3. Low pressure switch open, if present 4. Compressor contactor has failed open
Yellow "ALERT" Flash Code 1	Long Run Time Compressor is running extremely long run cycles	<ol style="list-style-type: none"> 1. Low refrigerant charge 2. Evaporator blower is not running 3. Evaporator coil is frozen 4. Faulty TXV 5. Condenser coil is dirty 6. Liquid line restriction (filter drier blocked if present in system) 7. Thermostat is malfunctioning
Yellow "ALERT" Flash Code 2	System Pressure Trip Discharge or suction pressure out of limits or compressor overloaded	<ol style="list-style-type: none"> 1. Condenser coil poor air circulation (dirty, blocked, damaged) 2. Condenser fan is not running 3. Return air duct has substantial leakage 4. If low pressure switch is present, check flash code (1) information
Yellow "ALERT" Flash Code 3	Short Cycling Compressor is running only briefly	<ol style="list-style-type: none"> 1. High head pressure 2. Thermostat demand signal is intermittent 3. Time delay relay defective, if present 4. Hot gas sensor defective, if present
Yellow "ALERT" Flash Code 4	Locked Rotor	<ol style="list-style-type: none"> 1. Run capacitor has failed 2. Low line voltage (contact utility if voltage at disconnect is low) 3. Excessive liquid refrigerant in compressor 4. Compressor bearings are seized
Yellow "ALERT" Flash Code 5	Open Circuit	<ol style="list-style-type: none"> 1. Compressor contactor has failed open 2. High pressure switch is open, If present 3. Open circuit in compressor supply wiring or connections 4. Unusually long compressor protector reset time due to extreme ambient temperature 5. Compressor windings are damaged
Yellow "ALERT" Flash Code 6	Open Start Circuit Current only in run circuit	<ol style="list-style-type: none"> 1. Run capacitor has failed 2. Open circuit in compressor start wiring or connections 3. Compressor start winding is damaged
Yellow "ALERT" Flash Code 7	Open Run Circuit Current only in start circuit	<ol style="list-style-type: none"> 1. Open circuit in compressor run wiring or connections 2. Compressor run winding is damaged
Yellow "ALERT" Flash Code 8	Welded Contactor Compressor always runs	<ol style="list-style-type: none"> 1. Compressor contactor has failed closed 2. Thermostat demand signal not connected to module
Yellow "ALERT" Flash Code 9	Low Voltage Control circuit < 17VAC	<ol style="list-style-type: none"> 1. Control circuit transformer is overloaded 2. Low line voltage (contact utility if voltage at disconnect is low)

- Flash Code number corresponds to a number of LED flashes, followed by a pause and then repeated.
 TRIP and ALERT LEDs flashing at same time means control circuit voltage is too low for operation.
 Reset ALERT Flash code by removing 24VAC power from module.
 Last ALERT Flash code is displayed for 1 minute after module is powered on.

FIGURE 43

3 PHASE UNIT

Status LED	Status LED Description	Status LED Troubleshooting Information
Green "POWER"	Module has power	Supply voltage is present at module terminals
Red "TRIP"	Thermostat demand signal Y1 is present, but the compressor is not running	<ol style="list-style-type: none"> 1. Compressor internal overload is open 2. Broken wire or connector is not making contact 3. Low pressure switch open, if present 4. Compressor contactor has failed
Yellow "ALERT" LED on Solid	A short circuit or over-current condition exists on "P" terminal	<ol style="list-style-type: none"> A. Low refrigerant charge B. Evaportaor blower is not running C. Evaporator coil is frozen D. Faulty TXV E. Condenser coil is dirty F. Liquid line restriction (filter drier blocked, if present in system) G. Thermostat is malfunctioning
Yellow "ALERT" Flash Code 2	System Pressure Trip Discharge or suction pressure out of limits or compressor overloaded "Lockout"	<ol style="list-style-type: none"> 1. Condenser coil poor air circulation (dirty, blocked, damaged) 2. Condenser fan is not running 3. Return air duct has substantial leakage 4. If low pressure switch is present: <ol style="list-style-type: none"> A. Low refrigerant charge B. Evaportaor blower is not running C. Evaporator coil is frozen D. Faulty TXV E. Condenser coil is dirty F. Liquid line restriction (filter drier blocked, if present in system) G. Thermostat is malfunctioning
Yellow "ALERT" Flash Code 3	Short Cycling Compressor is running only briefly "Lockout"	<ol style="list-style-type: none"> 1. High head pressure 2. Thermostat demand signal is intermittent 3. Time delay relay defective, if present 4. Hot gas sensor defective, if present
Yellow "ALERT" Flash Code 4	Locked Rotor "Lockout"	<ol style="list-style-type: none"> 1. Low line voltage (contact utility if voltage at disconnect is low) 2. Excessive liquid refrigerant in compressor 3. Compressor bearings are seized
Yellow "ALERT" Flash Code 5	Open Circuit	<ol style="list-style-type: none"> 1. Compressor contactor has failed open 2. High pressure switch is open, if present 3. Open circuit in compressor supply wiring or connections 4. Unusually long compressor protector reset time due to extreme ambient temperature 5. Compressor windings are damaged
Yellow "ALERT" Flash Code 6	Missing Phase "Lockout"	<ol style="list-style-type: none"> 1. Broken wire or connector on one phase 2. Compressor motor winding is damaged 3. Utility supply has dropped one phase
Yellow "ALERT" Flash Code 7	Reverse Phase "Lockout"	<ol style="list-style-type: none"> 1. Compressor running backwards due to supply phase reversal
Yellow "ALERT" Flash Code 8	Welded Contactor Compressor always runs	<ol style="list-style-type: none"> 1. Compressor contactor has failed closed 2. Thermostat demand signal not connected to module
Yellow "ALERT" Flash Code 9	Low Voltage Control circuit < 18VAC	<ol style="list-style-type: none"> 1. Control circuit transformer is overloaded 2. Low line voltage (contact utility if voltage at disconnect is low)

- Flash Code number corresponds to a number of LED flashes, followed by a pause and then repeated.
- TRIP and ALERT LEDs flashing at same time means control circuit voltage is too low for operation.
- Reset ALERT Flash code by removing 24VAC power from module.
- Last ALERT Flash code is displayed for 1 minute after module is powered on.

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