INSTALLATION INSTRUCTIONS

PACKAGE DUAL FUEL FEATURING EARTH-FRIENDLY R-410A REFRIGERANT

RQPW-B 14 SEER SERIES (2-4 TONS)



EFFICIENCY RATING CERTIFIED Gama

ENERGY STAR PARTNER

ARI PERFORMANCE CERTIFIED™

ARI Standard 210/240 UAC

c UL us LISTED

Accredited by the RvA

ABS Quality Evaluations, Inc. Management System Certification

ANAB ACCREDITED

ISO 9001:2000

Certificate Number: 30164

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

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

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

REGULAR MAINTENANCE WILL REDUCE THE BUILDUP OF CONTAMINANTS AND HELP TO PROTECT THE UNIT'S FINISH.

⚠ WARNING

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

⚠ 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 10. 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

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 CAN CAUSE ELECTRICAL SHOCK RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

DO NOT USE THIS UNIT DURING CONSTRUCTION IF AIR LADEN CORROSIVE COMPOUNDS ARE PRESENT SUCH AS CHLORINE AND FLUORINE. OTHERWISE, PROVISIONS MUST BE TAKEN TO PROVIDE CLEAN, UNCONTAMINATED COMBUSTION AND VENTILATION AIR TO THE UNIT. COMBUSTION AND VENTILATION AIR CONTAMINATED WITH THESE COMPOUNDS FORMS ACIDS DURING COMBUSTION WHICH CORRODES THE HEAT EXCHANGER AND COMPONENT PARTS. SOME OF THESE CONTAMINANTS ARE FOUND IN, BUT NOT LIMITED TO, PANELING, DRY WALL, ADHESIVES, PAINTS, STAINS, VARNISHES, SEALERS, AND MASONRY CLEANING MATERIALS.

⚠ 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

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.

II. INTRODUCTION

A Package Dual Fuel Unit is a Package Heat Pump with a gas furnace installed in the heat section instead of electric heat that is in a standard Package Heat Pump. Generally, heating is satisfied by operation of the Heat Pump above an outdoor temperature balance point and below the outdoor temperature balance point the gas furnace is utilized to satisfy the heat requirement. This hybrid package system allows for both comfort and energy savings. It is more cost affective above the balance point to run electricity and the heat pump provides adequate supply air temperature at these outdoor temperatures to assure comfort. Below the balance point it is more economical and provides better comfort to utilize gas heat.

This booklet contains the installation and operating instructions for your dual fuel packaged 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 Package Dual Fuel Unit is available in 60, 80 and 100 BTU/Hr. heating inputs and cooling capacities of 2, 2½, 3, 3½, and 4 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 biflow thermal expansion valve (TXV), 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 and performance tested. Refrigerant amount and type are indicated on rating plate.

C. R-410A REFRIGERANT

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

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

The thermostatic expansion valve is specifically designed to operate with R-410A. DO NOT use an R-22 TXV.

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.

V. UNIT DIMENSIONS
FOR CLEARANCES SEE FIGURE 9.

FIGURE 1

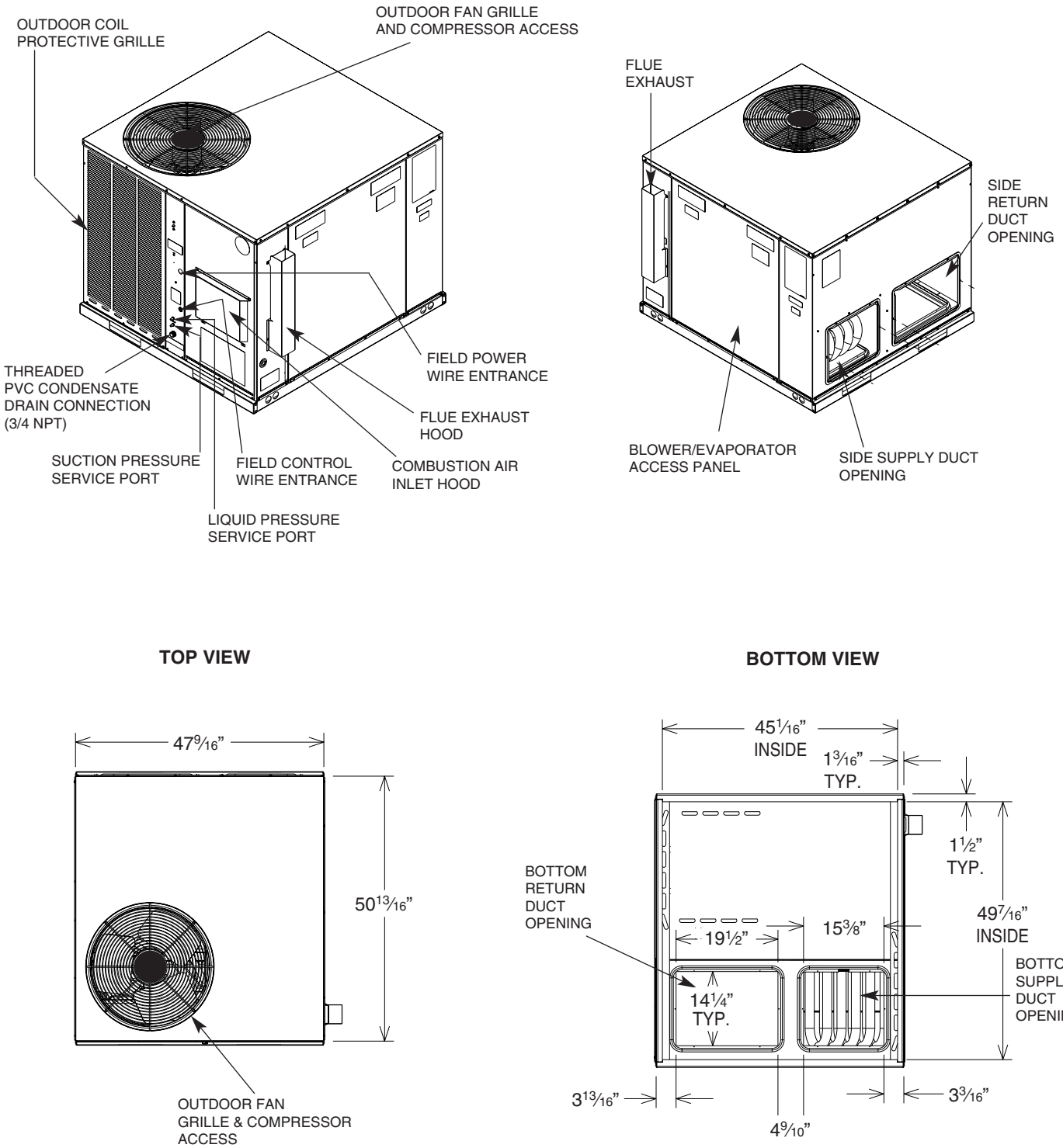
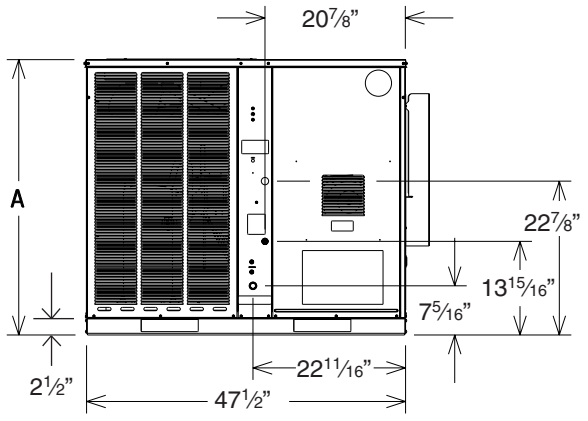
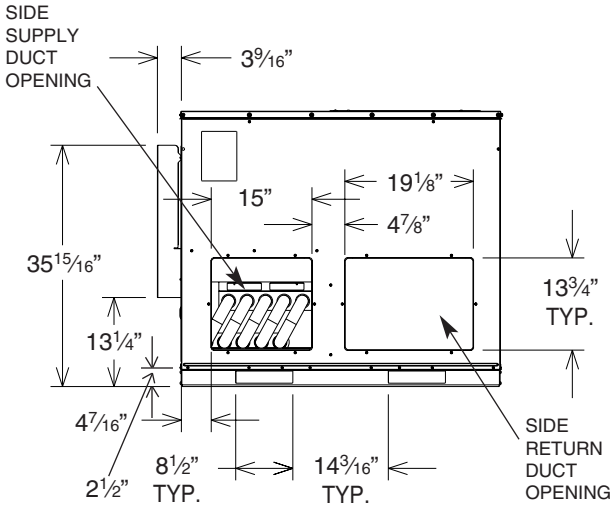


FIGURE 1 (CONTINUED)

FRONT VIEW



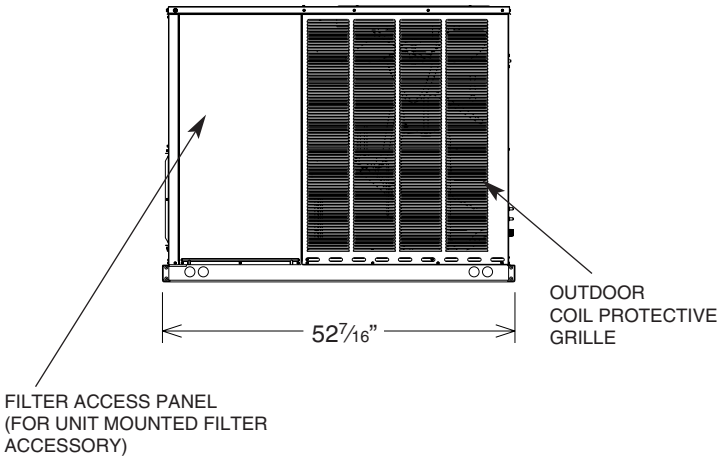
BACK VIEW



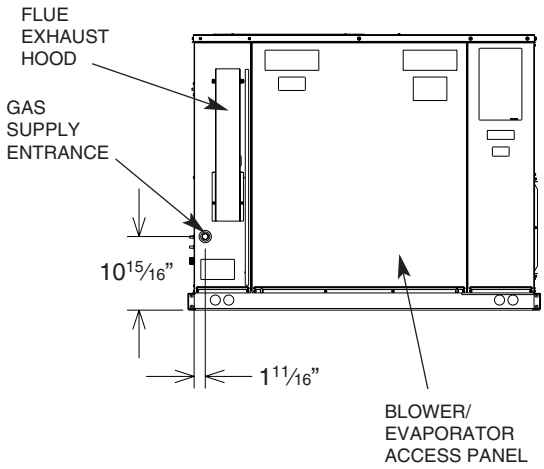
SHOWN WITH DUCT COVERS REMOVED.

MODEL	"A" HEIGHT
B024	35¹⁵⁄₁₆"
B030, B036, B042, B048	41

SIDE VIEW



SIDE VIEW



VI. INSTALLATION

A. GENERAL

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

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

These publications are available from:

National Fire Protection Association, Inc.
1 Batterymarch Park
Quincy, MA 02169-7471
www.nfpa.org

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

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

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

1. Avoid having lawn sprinkler heads spray directly on the unit cabinet.
2. In coastal areas locate the unit on the side of the building away from the waterfront.

⚠ WARNING

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

3. Shielding by a fence or shrubs may give some protection.
4. Elevate the unit off its slab or base enough to allow air circulation and avoid holding water against the basepan.
5. 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.
6. Regular cleaning and waxing of the cabinet with a good automobile polish will provide some protection.
7. 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

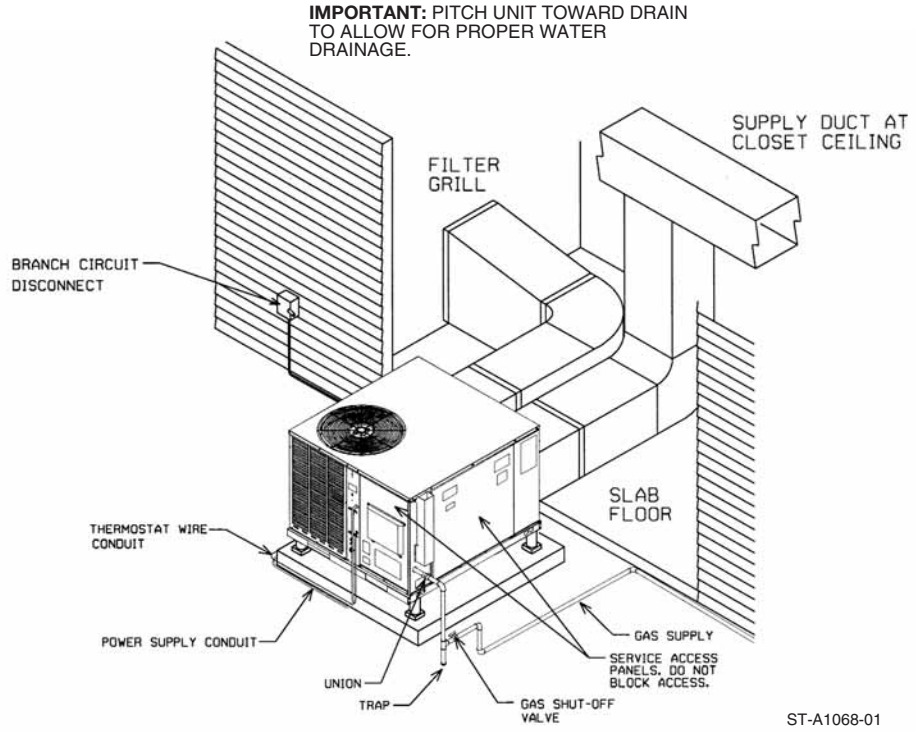
THESE UNITS ARE DESIGNED CERTIFIED FOR OUTDOOR INSTALLATION ONLY. INSTALLATION INSIDE ANY PART OF A STRUCTURE CAN RESULT IN INADEQUATE UNIT PERFORMANCE AS WELL AS PROPERTY DAMAGE. INSTALLATION INSIDE CAN ALSO CAUSE RECIRCULATION OF FLUE PRODUCTS INTO THE CONDITIONED SPACE RESULTING IN PERSONAL INJURY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

(Typical outdoor slab installation is shown in Figure 2.)

1. Select a location where external water drainage cannot collect around unit.
2. Locate unit where operating sounds will not disturb owner or neighbors.
3. The location of the unit should allow proper access for inspection and servicing as shown in Figure 9.
4. Locate unit so roof runoff water does not pour directly on the unit. Provide gutter or other shielding at roof level. Do not locate unit in an area where excessive snow drifting may occur or accumulate.
5. Provide a concrete slab extending 3" beyond all four sides of the unit. The slab should be sufficiently high enough above grade to prevent surface water from entering the unit. The slab should be isolated from the foundation wall.
6. Pitch the slab approximately ½" so that the unit will be pitched toward the drain. See Figure 3.
7. It is essential that the unit be elevated above the base pad to allow for defrost water runoff, condensate drainage, and possible refreezing of condensate. Route condensation off the base pad to an area that will not become slippery and result in personal injury.

   IMPORTANT: Do not interfere with openings in bottom of unit.
8. Where snowfall is anticipated, the height of the unit above the ground level must be considered. Mount unit high enough to be above average area snowfall to prevent snow from blocking the outdoor coil, to allow condensate runoff, and to allow combustion air to enter the combustion air inlet.

FIGURE 2
OUTSIDE SLAB INSTALLATION. CLOSET DISTRIBUTION SYSTEM. SLAB FLOOR CONSTRUCTION.



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 4.

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 1.
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 4. 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 6.

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 5.

FIGURE 3
PITCHING UNIT TO INSURE PROPER CONDENSATE DRAINAGE.

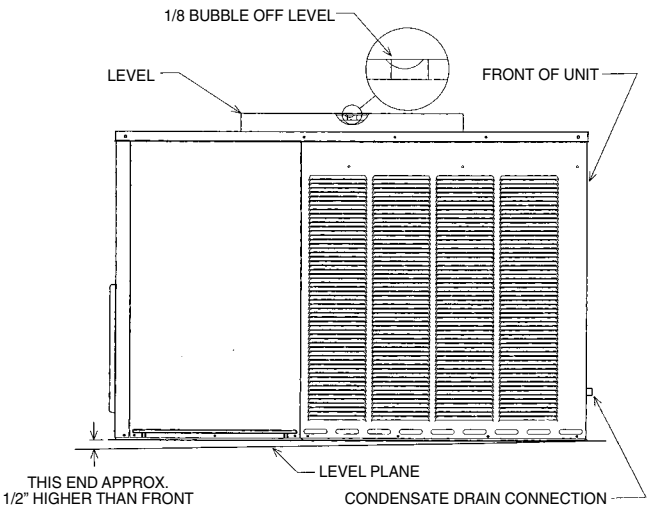


FIGURE 4
COMBUSTION AIR INLET HOOD & EXHAUST HOOD INSTALLATION

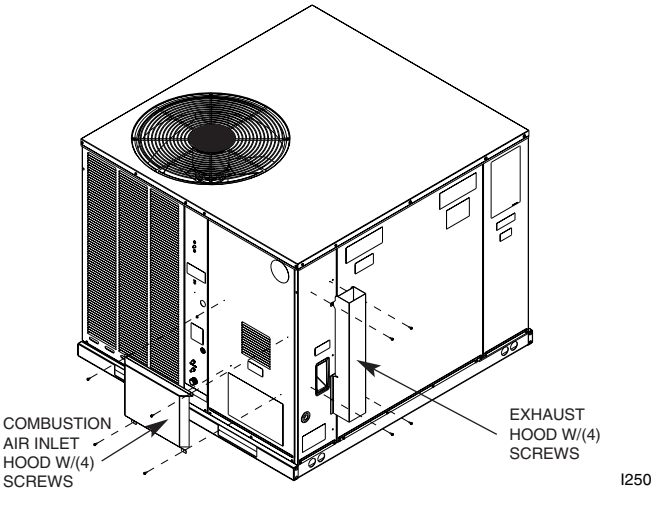
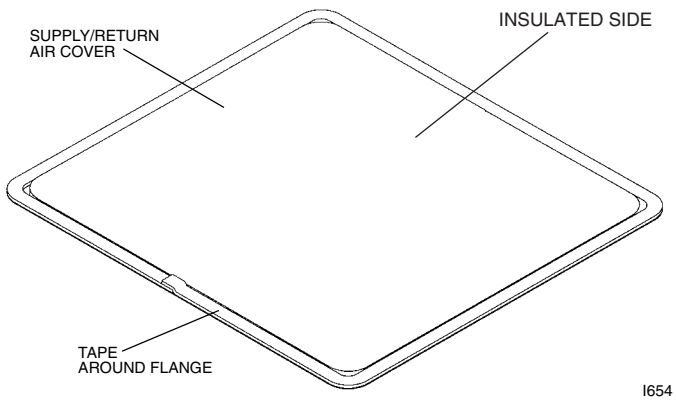


FIGURE 5
COVER GASKET DETAIL FOR UNITS SHIPPED FOR DOWNFLOW APPLICATION BEING CONVERTED TO SIDE DISCHAGE



I654

FIGURE 6
COVER GASKET DETAIL FOR UNITS SHIPPED FOR SIDE DISCHARGE APPLICATION BEING CONVERTED TO DOWNFLOW

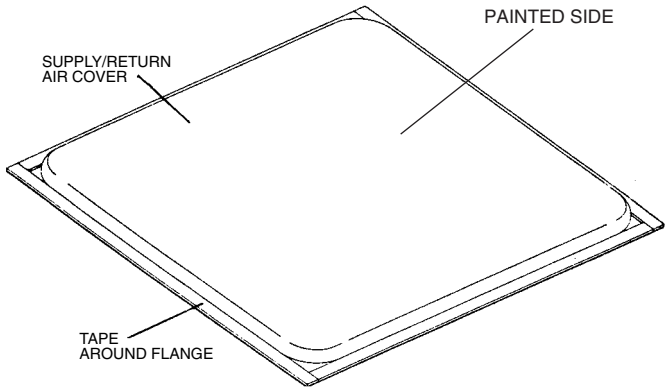
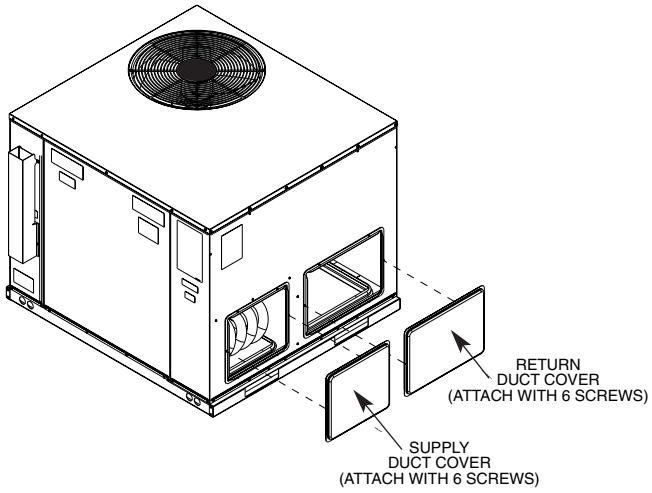
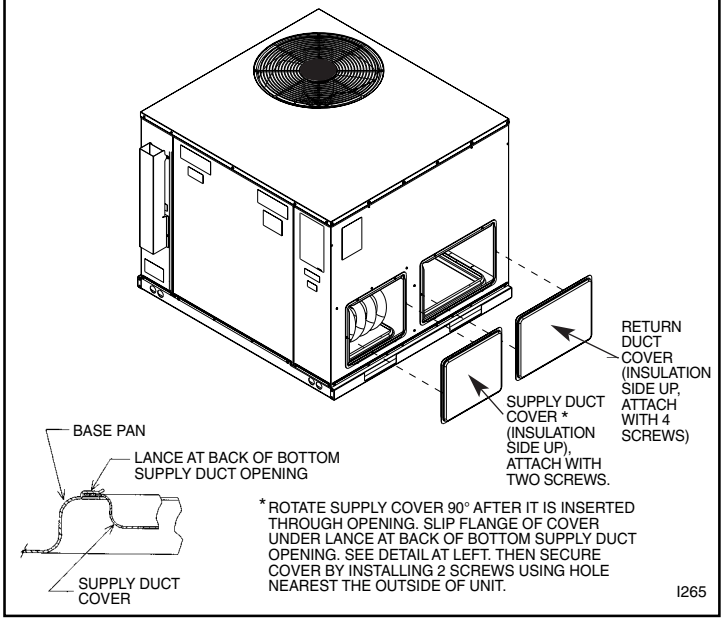


FIGURE 7
DUCT COVER INSTALLATION SIDE MOUNTING



I264

FIGURE 8
DUCT COVER INSTALLATION BASE PAN MOUNTING



* ROTATE SUPPLY COVER 90° AFTER IT IS INSERTED THROUGH OPENING. SLIP FLANGE OF COVER UNDER LANCE AT BACK OF BOTTOM SUPPLY DUCT OPENING. SEE DETAIL AT LEFT. THEN SECURE COVER BY INSTALLING 2 SCREWS USING HOLE NEAREST THE OUTSIDE OF UNIT.

I265

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 8.

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 10. 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 9.

1. Provide 48” minimum clearance at front of the unit. Provide 24” minimum clearance on right side of unit. If economizer (or internal filter kit) is used, a 24” minimum clearance is required on left side of unit. (See Figure 9.) 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.

FIGURE 9
CLEARANCES

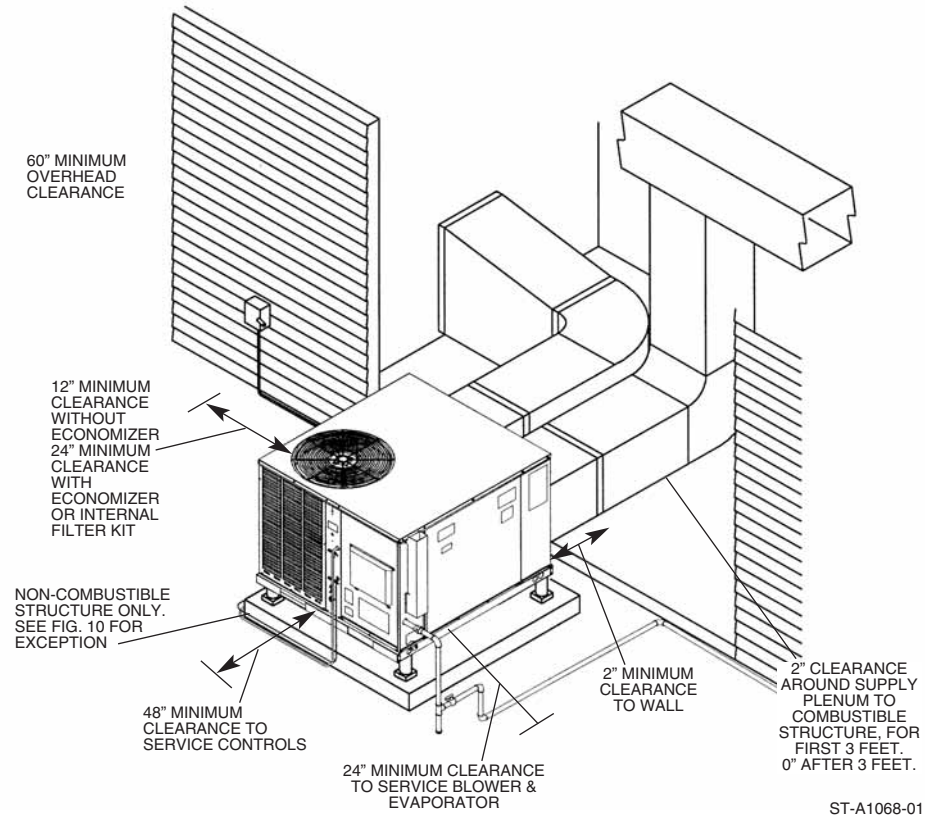


FIGURE 10
EXCEPTION TO NON-COMBUSTIBLE FLOORING REQUIREMENT

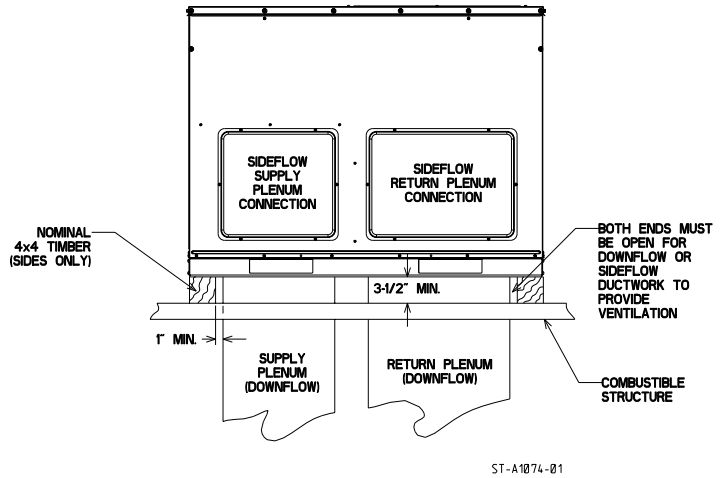


FIGURE 11
FLAT ROOFTOP INSTALLATION, ATTIC OR DROP CEILING DISTRIBUTING SYSTEM. MOUNTED ON ROOFCURB. PITCH UNIT TOWARD DRAIN.

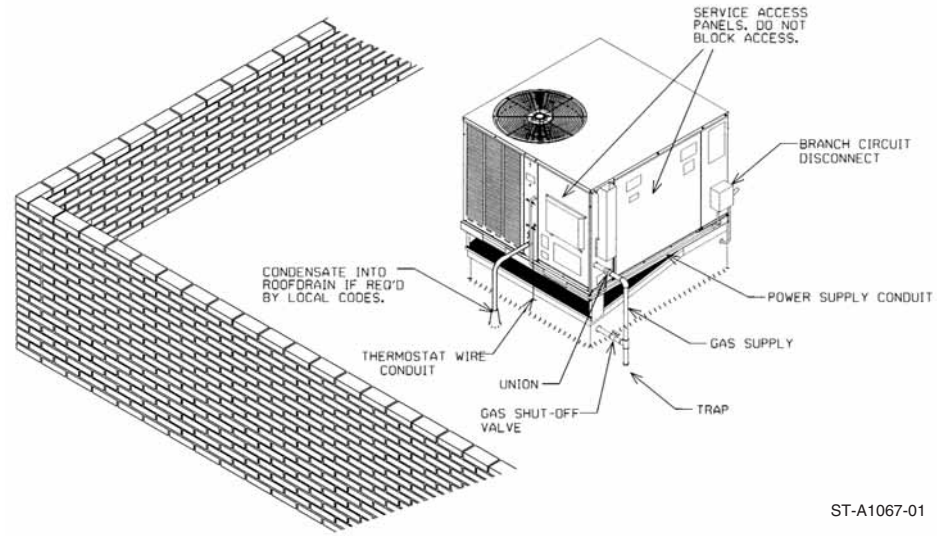
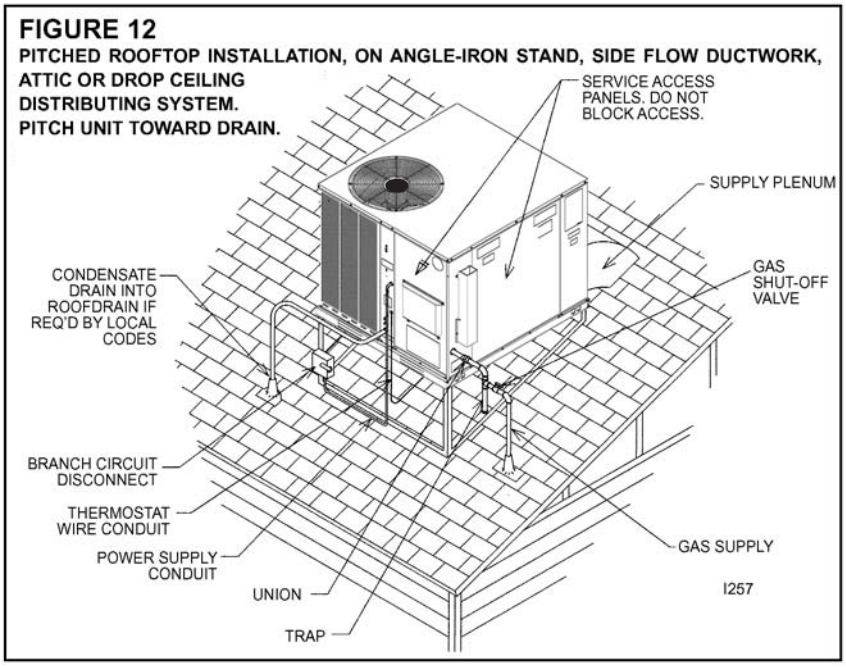


FIGURE 12
PITCHED ROOFTOP INSTALLATION, ON ANGLE-IRON STAND, SIDE FLOW DUCTWORK, ATTIC OR DROP CEILING DISTRIBUTING SYSTEM. PITCH UNIT TOWARD DRAIN.



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 13, 14, and 15.
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, 2800 Shirlington Road, Suite 300, Arlington, VA 22206, www.acca.org.

⚠ 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.

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 CAROBON MONOXIDE POISONING THAT COULD RESULT IN PERSONAL INJURY OR DEATH.

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 13
LIFTING DETAIL
(LIFT KIT MODEL NO. RXML-A01)

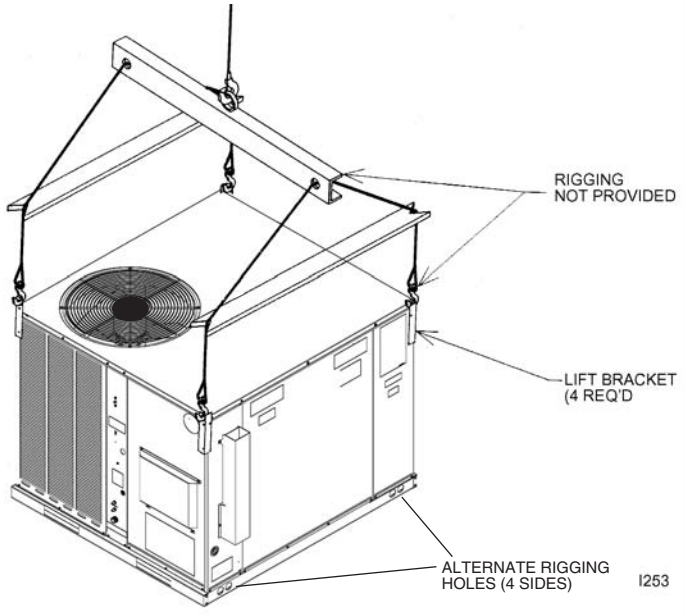
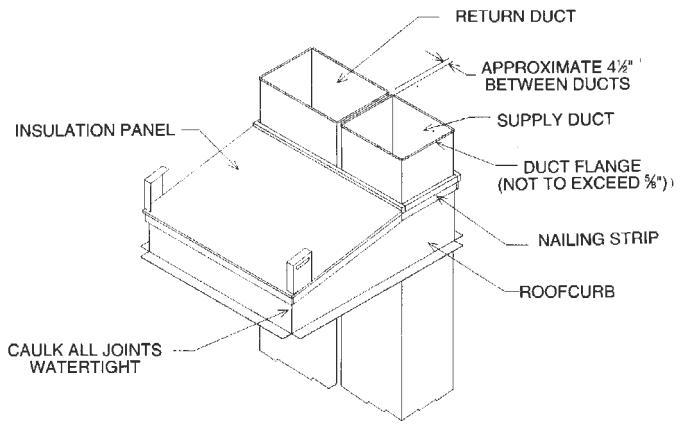


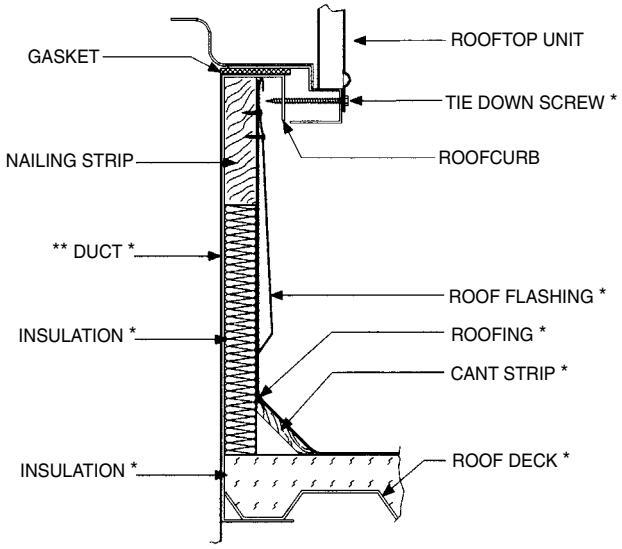
FIGURE 14
ROOFCURB



PACKAGED DUAL FUEL
ROOFCURB INSTALLATION

I270

FIGURE 15
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.

I255

FIGURE 16
DUCTWORK COVER INSTALLATION DETAIL

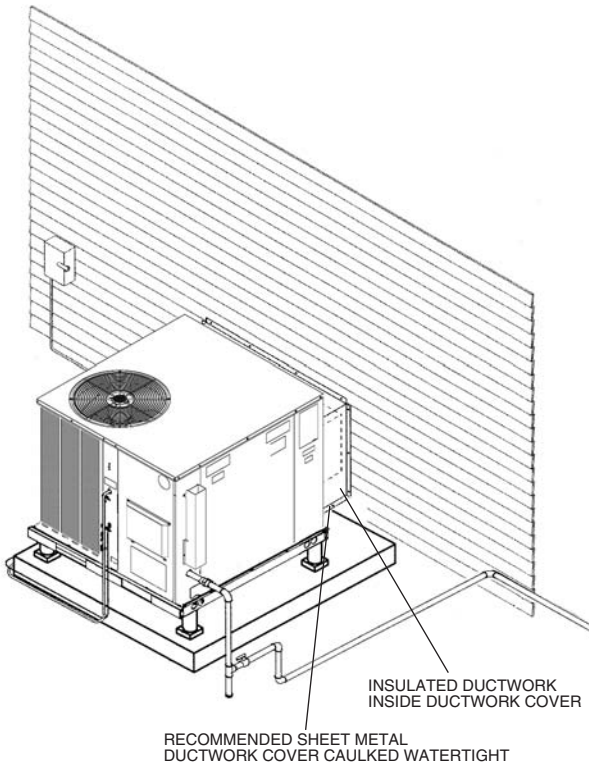
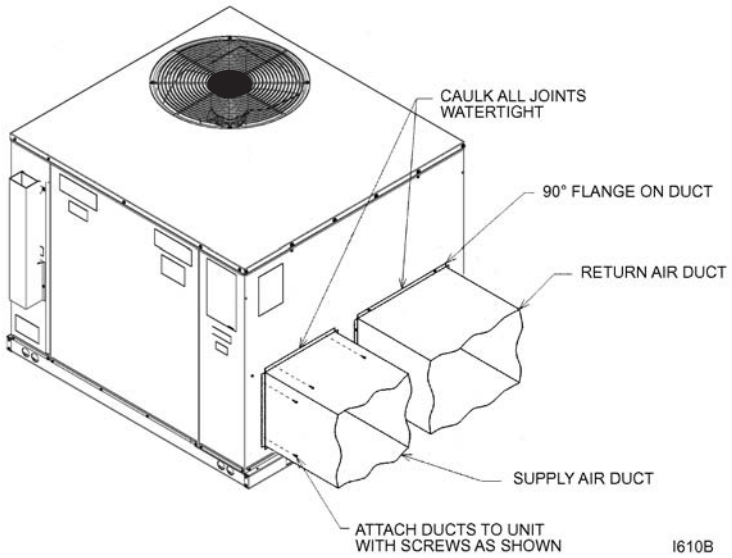


FIGURE 17
RESIDENTIAL ROOFTOP DUCTWORK INSTALLATION DETAIL



I610B

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. If local codes allow the use of a corrugated stainless steel flexible gas appliance connector, always use a new listed connector. Do not use a connector which has previously serviced another gas appliance.

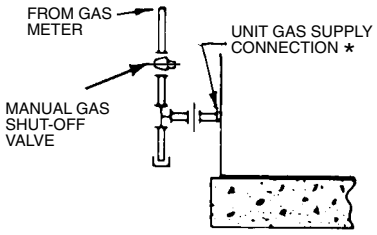
   NOTE: The Commonwealth of Massachusetts requires the gas shut-off valve to be a T-handle gas cock.

2. Connect the gas line to the gas pipe inlet opening provided into the 1/2" inlet valve. See Figure 18 for typical piping.
3. Size the gas line to the furnace adequate enough to prevent undue pressure drop and never less than 1/2" nominal pipe size.
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. Unions may not be installed inside the unit.
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 18.)
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.*

FIGURE 18
SUGGESTED GAS PIPING

ROOF OR GROUND LEVEL INSTALLATION



*Factory supplied grommet must be utilized.

TABLE 1
NATURAL 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

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

⚠ WARNING

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

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

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

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 1.

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

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

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

B. LP CONVERSION

⚠ WARNING

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

Convert the valve to use liquefied petroleum (LP) gas by replacing the pressure regulator spring with the conversion kit spring. This LP kit spring allows the regulator to maintain the proper manifold pressure for LP gas. The correct burner LP orifices are included in the kit. See Figure 19.

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

FIGURE 19



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-XX for derating and orifice spud sizes.

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

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

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. DEFROST RUNOFF

The outdoor coil during heating operation will sweat or run water off. The outdoor coil will also run water off during the defrost cycle. See section VI Installation for mounting precautions.

F. 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)*

SUPPLY WIRE LENGTH-FEET	BRANCH CIRCUIT AMPACITY								
200	6	4	4	4	3	3	2	2
150	8	6	6	4	4	4	3	3
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

***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.

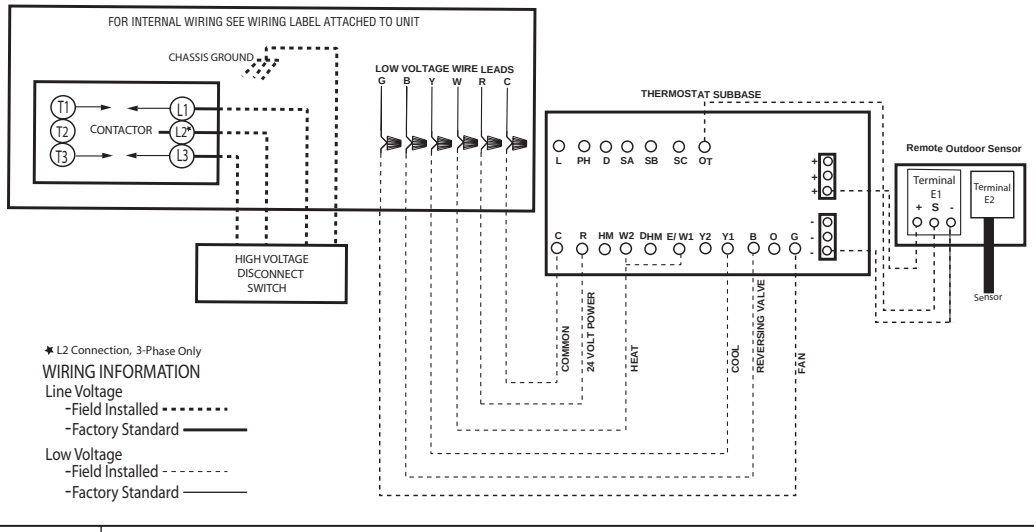
TABLE 5

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.

FIGURE 20



Refer to Figure 1 for location of wiring entrances.

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

C. INTERNAL WIRING

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.

Some models are equipped with an electronically commutated blower motor which is constantly energized unless the main unit disconnect is in the off position.

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 the same as the original wiring.

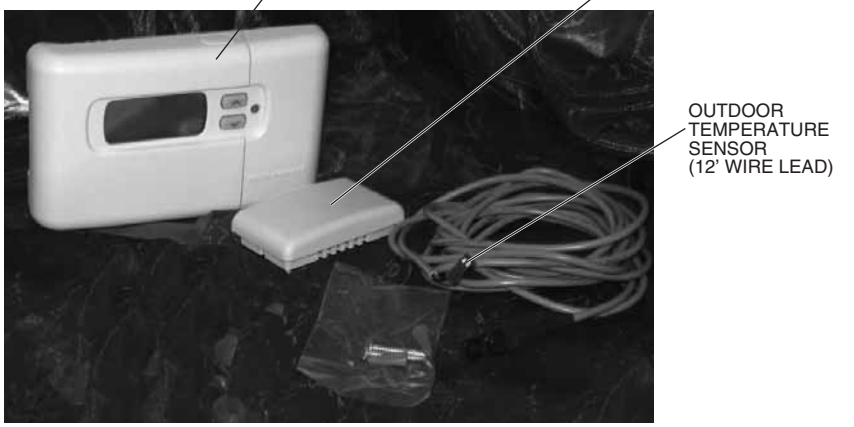
Transformer is factory wired for 230 volts on 208/230 volt models and must be changed for 208 volt applications. See unit wiring diagram for 208 volt wiring.

D. THERMOSTAT

The room thermostat must be specifically designed to control package dual fuel units. It is recommended that the thermostat(s) listed below be used for dual fuel applications with or without an economizer:

Dual Fuel Thermostat
(-)HC-TST402DFMS

FIGURE 21



This thermostat requires six (6) wires between the outdoor unit and the thermostat, and another three (3) wires between the thermostat and the outdoor air temperature sensor.

Install the room thermostat in accordance with the instruction sheet packed in the box with the thermostat. The low voltage wiring should be sized as shown in Table 7. Run the thermostat lead wires through the "FIELD CONTROL WIRE ENTRANCE" as shown on Figure 1 and connect as shown on the wiring diagram above.

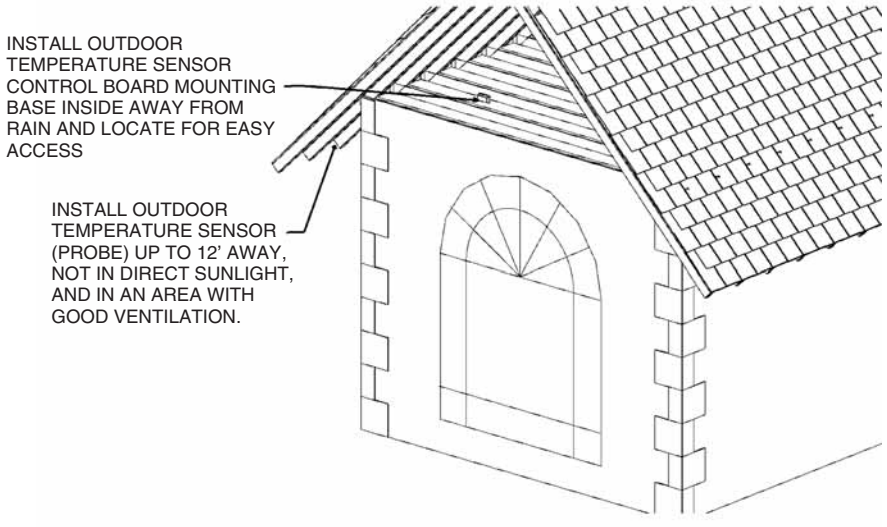
Never install the thermostat on an outside wall or where it will be influenced by drafts, concealed hot or cold water pipes or ducts, lighting fixtures, radiation from fireplace, sun rays, lamps, televisions, radios or air streams from registers.

This dual fuel thermostat also requires installation of the outdoor air temperature sensor (provided with the recommended thermostat) to accurately measure the "balance point" between when it is preferable to use gas heat instead of operating the heat pump to provide heating. Connect wiring to the outdoor air temperature sensor as shown in the thermostat instructions or this diagram.

Please note that the outdoor temperature sensor consists of two basic parts. The outdoor temperature sensor has a module where the wiring connections are made (which should be installed indoors) and an outdoor temperature probe which plugs into the module with an included 12' extension cord. When installing the outdoor temperature probe, please use the following guidelines.

1. Never install the outdoor probe where it will be exposed to direct light from lamps, sun, or any temperature radiating equipment, such as the outdoor fan of the dual fuel unit.
2. Outdoor temperature measurement requires installing the probe outdoors. Good probe locations would be under a bay window or overhang, out of direct sunlight. Direct sun exposure will affect sensed temperature. Install probe with a spacer to obtain a more accurate temperature. (See Figure 22.)

FIGURE 22
OUTDOOR TEMPERATURE SENSOR INSTALLATION LOCATION.



The “balance point” temperature setting of the recommended thermostat is adjustable from 5 to 50 F, but is factory set at 35F. The following three factors must be considered when adjusting the “balance point” temperature on the thermostat:

1. Capacity Balance Temperature: As the outdoor temperature decreases, the heat pump will reach a point where it cannot provide sufficient capacity to maintain the indoor temperature setting. At this outdoor temperature or below, the heat pump is “locked out” by the thermostat and the gas furnace is used to maintain proper indoor temperature. Note: If the outdoor temperature sensor is not installed, then this operating mode will be the only one available.
2. Economic Balance Temperature: As the outdoor temperature decreases, the heat pump will gradually decrease in efficiency and capacity. At some outdoor temperature, it will be less expensive to use the gas furnace instead of the heat pump. This is generally in areas where the cost of electricity is substantially more than the cost of fossil fuel. To calculate this “balance point” temperature one must know the local cost of gas and electricity, the efficiency of the furnace, and the efficiency of the heat pump at various outdoor temperatures. After the “balance point” temperature is set on the thermostat, the heat pump will operate above this temperature (assuming it has sufficient capacity). If the outdoor air temperature drops below this “balance point” temperature, the heat pump will be “locked out” by the thermostat and only the gas furnace will operate.
3. Comfort Balance Temperature: As the outdoor temperature decreases, the discharge air temperature of the heat pump will decrease. At some point, the discharge air temperature may feel uncomfortable to the homeowner. In general, when the discharge air temperature is below the human body temperature, the room may feel cool even though the heat pump is maintaining the thermostat setting. The “balance point” temperature should be set so that the gas furnace operates to improve indoor comfort.

Note: To minimize cycling between heat pump and gas heat operation, the recommended thermostat will allow heat pump operation below the balance point, and will allow gas heat operation above the balance point for short periods.



The recommended thermostat is preprogrammed for dual fuel operation with the outdoor temperature sensor. The following instructions are for verifying and/or changing the default settings for dual fuel operation and adjusting the balance point temperature. Refer to the thermostat instructions for all other modes of operation.

1. To enter the User Configuration Table press the FWD and BACK buttons at the same time.



2. Once in the Configuration Table press the FWD button until TEMP OUT is displayed on the screen. It is a rolling screen so it will alternate between OUT and TEMP for this setting. Press the red UP arrow key until the display says ON. This step enables the outdoor temperature sensor.



3. To enter the Installer table, first enter the User Configuration Table by pressing FWD and BACK as shown above. Once in the User Configuration Table, press and hold the TIME and DAY buttons for 3 seconds. Once in the Installer table, the following steps must be performed to set up the thermostat for dual fuel operation.
4. Press the FWD and BACK buttons at the same time to enter the Configuration menu.
5. The first setting that comes up is “MLTI STG”. Press the red up arrow key until HEAT PUMP is displayed.
6. Press the FWD button until HEAT PUMP is displayed. Press the red up arrow key until HEAT PUMP1 is displayed.
7. Press the FWD button until Set Cycle Aux is displayed. This is a selectable number that is used to determine how quickly the gas furnace will energize if the thermostat is not satisfied. The smaller the number, the quicker the thermostat will cycle to gas heat. The larger the number, the longer it will take to switch to gas heat. It is recommended that the Set Cycle Aux be set high. This will reduce the thermostat from cycling to the furnace as quickly during thermostat setback conditions
8. Press the FWD button until PUMP is displayed. Press the red arrow key until OFF is selected. This selection turns the compressor OFF when the gas heat is energized for one minute. This selection must be made or the gas heat feature of the unit will be locked out.



9. Press the FWD button until COMP OFF DELAY is selected. This setting will allow a time delay in restarting the heat pump after the furnace has been running. It is selectable from 0 to 99.

10. The bPT (balance point) setting is used to determine at what point the thermostat will switch from heat pump to furnace. This is selectable based upon the users needs. Use red or black arrows to select desired balance point. Please see the “balance point” section of these instructions for guidelines.



Press the Run button to exit the programming mode and return to system operation.

The charts of all of the settings for dual fuel operation are listed below.

The remote sensor must be activated as shown in the table below.

USER TABLE			
Step	Displayed Options	Description	Factory Setting
15	OUT TEMP (ON)	Activates the outdoor remote sensor.	ON
	OUT TEMP (OFF)		

The following is a chart listing the features above:

INSTALLER TABLE			
Step	Displayed Options	Description	Factory Setting
1	HEAT PUMP	Used to select Heat Pump	***HEAT PUMP**
	MLTI STG		
2	HEAT PUMP(1)	Selects the type of heat pump.	***HEAT PUMP(1)**
	HEAT PUMP(2)		
	HEAT PUMP(3)		
3	ELEC HEAT FAN (ON)	Fan cycles with call for heat if ON. Fan always cycles with pump stages	ON
	ELEC HEAT FAN (OFF)		
4	SET CYCL (13)	Selects HEAT anticipation adjustment. Increasing the number increases the heat pump run time when heating. Range is 9 to 40.	(13)
5	SET CYCL (13)	Selects COOL anticipation adjustment. Increasing the number increases the heat pump run time when cooling. Range is 9 to 40.	(13)
6	SET CYCL AUX (25)	Selects Auxiliary stage anticipation adjustment. Increasing the number increases the gas heat run time. Range is 1 to 40	(25)
7	COOL FAN DELA OFF (00)	Selects time delay for COOL fan off. The range is 0 to 127 seconds.	(00)
8	FAN DELA ON (01)	Selects time delay for fan ON. Allows a fan-on delay when compressor is activated. The range is 1 to 30 seconds.	(01)

9	HEAT FAN DELA OFF (00)	Allows the fan to continue running after the thermostat has satisfied the call for heat if (step 3) is selected (ON). The range is 0 to 127 seconds.	(00)
10	PUMP (ON) PUMP (OFF)	This selection turns the compressor OFF when auxiliary heat is on for one minute.	***OFF**
11	COMP OFF DELAY (0)	Selects the delay between turning off the furnace and restarting the heat pump. The range is 0 to 99 seconds.	(0)
12	(bPT) (35°F)	(Balance Point Temp) is used to select the temperature at which the thermostat will switch from heat pump to gas heat. The range is 5°F to 50°F	(35°F)
13	bP (05)	(Balance Point) is available if (step 10) is (OFF) and OUTDOOR sensor (OFF). Used to simulate an outdoor sensor for the Balance Point determination. A higher number energizes the gas heat sooner. The range is 0 to 09.	
14	bbP (OFF) bbP (10) ON	(Programmable Blower Balance Point) lowers the Blower speed if the heat pump duty cycle is above the selected value in percentage. The range is 10 to 99%	***OFF**
15	COMP LOCK (OFF) COMP LOCK (ON)	If ON, locks compressor off for at least 5 minutes after each run cycle.	OFF
16	CA (OFF) CA (ON)	If Comfort Alert Module is installed, it allows communication of diagnostic information to the Thermostat.	OFF
17	HEAT-EMER-OFF-COOL-AUTO HEAT-EMER-OFF-COOL	Allows Automatic changeover capability on Thermostat.	HEAT-EMER-OFF-COOL-AUTO
* Settings preceded by an asterisk (*) **must be chosen** or the unit will not operate properly.			

The dual fuel thermostat can operate without an outdoor temperature sensor. Turn the outdoor temperature sensor OFF as in Step 2 (see USER Table). Then, enter the Installer Table as described on previous pages and set the following options below:

INSTALLER TABLE			
Step	Displayed Options	Description	Factory Setting
1	HEAT PUMP MLTI STG	Used to select Heat Pump	***HEAT PUMP**
2	HEAT PUMP(1) HEAT PUMP(2) HEAT PUMP(3)	Selects the type of heat pump.	***HEAT PUMP(1)**
6	SET CYCL AUX (25)	Selects Auxiliary stage anticipation adjustment. Increasing the number increases the gas heat run time. Range is 1 to 40	(25)
10	PUMP (ON) PUMP (OFF)	This selection turns the compressor OFF when auxiliary heat is on for one minute.	***OFF**
11	COMP OFF DELAY (0)	Selects the delay between turning off the furnace and restarting the heat pump. The range is 0 to 99 seconds.	(0)
13	bP (05)	(Balance Point) Used to simulate an outdoor sensor for the Balance Point determination. A higher number energizes the gas heat sooner. The range is 0 to 09.	
* Settings preceded by an asterisk (*) **must be chosen** or the unit will not operate properly.			

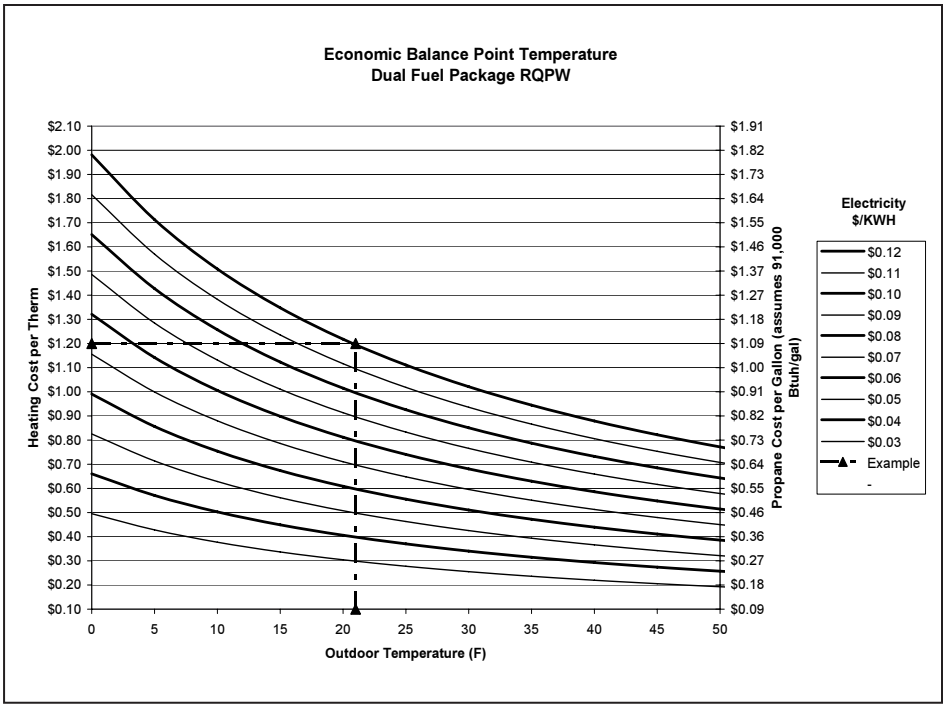
The chart on the next page can be used for determining the Economic Balance Point Temperature for the Package Dual Fuel Unit. If natural gas is the fuel for the gas furnace, look up your price for natural gas in Therms (1 Therm = 100,000 BTUH) on the left side of the chart. If your natural gas bill is in units of CCF (100 Cubic Feet), then your utility must provide you with the heating value of your fuel to convert to units of heating value (Therms).

$$\frac{\text{Monthly Charge on Your Bill (\$)}}{\text{Monthly CCF Usage on Your Bill (ft}^3\text{)}} \times \frac{1000}{\text{Heating Value (Btu/ft}^3\text{)}} = \text{\$/Therm}$$

If propane is the fuel for the gas furnace, look up your price for propane in dollars per gallon on the right side of the chart. The chart assumes a typical heating value of 91,000 Btuh per gallon of Propane. If your heating value is different, then multiply the dollars per gallon by 91,000, and divide by your heating value and use the resulting number on the right side of the chart.

After selection of the fuel heating value, select the Electric Utility Rate ($/KWH where KWH = Kilowatt hours) on the curved lines. Where the Electric Utility Rate and the Heating Value line intersect, go to the bottom of the chart to determine the Economic Balance Point Temperature.

For example, the local price of natural gas is $1.20/therm and the electricity rate is $0.12/KWH. Select $1.20/therm straight line on the left side of the chart. Then select the utility rate curved line (the top one). The two lines intersect at about 21F. Set the balance point at 21F using the instructions above.



IX. FURNACE SECTION CONTROLS AND IGNITION SYSTEM

NORMAL FURNACE OPERATING SEQUENCE

This unit is equipped with an integrated direct spark ignition control.

1. The thermostat calls for gas heat.
2. The control board will run a self check to verify that the limit control and manual reset overtemperature control are closed and that the pressure switch is open. If so, the induced draft blower (inducer) begins a prepurge cycle.

TABLE 6

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

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

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

3. The air proving negative pressure switch closes.
4. **15 seconds after the pressure switch closes**, the gas valve opens and the spark is initiated for a 7 second trial for ignition.
5. Burners ignite and flame sensor proves all burners have lit.
6. The circulating air blower is energized after 30 seconds.
7. The control board enters a normal operation loop in which all safety controls are monitored continuously.
8. Thermostat is satisfied and opens.
9. The gas valve is de-energized and closes, shutting down the burner flame.
10. The control board will de-energize the inducer after a five second post purge.
11. The circulating air blower is de-energized after 90 seconds.

- The integrated control board has a three ignition system.
- After a total of three trials for ignition 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 3 tries and then goes 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 spark ignition control 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 three tries for ignition.

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

3 Flash: High limit or auxiliary limit open.

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

5 Flash: Overtemperature switch open.

OPERATING INSTRUCTIONS

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

⚠ WARNING

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

TO START THE FURNACE

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

⚠ WARNING

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

The initial start-up on a new installation may require the control system to be energized for some time until 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 gas valve to the “OFF” position.
5. Replace control door.

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

BURNERS

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

MANUAL RESET OVERTEMPERATURE CONTROL

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.**

PRESSURE SWITCH

This furnace has a negative pressure switch for sensing a blocked exhaust or a failed induced draft blower. It is normally open and closes when the induced draft blower starts, indicating air flow through the combustion chamber.

LIMIT CONTROL

The supply air high temperature limit cut-off is set at the factory and cannot be adjusted. It is calibrated to prevent the air temperature leaving the furnace from exceeding the maximum outlet air temperature. **WARNING: DO NOT JUMPER THIS DEVICE! Replace this control only with the identical replacement part.**

X. SYSTEM OPERATING INFORMATION

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.

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.

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.

⚠ WARNING

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

COOLING SECTION MAINTENANCE

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

To inspect the evaporator coil:

1. 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: <u>Do not</u>** 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 wth high pressure water.
6. The venturi should also be inspected for items of obstruction such as collections of grass, dirt or spider webs. Remove any that are present.
7. 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 long #8 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.

REPLACEMENT PARTS

Contact your local distributor for a complete parts list.

TROUBLESHOOTING

Refer to Troubleshooting Chart included in this manual.

WIRING DIAGRAMS

Refer to the appropriate wiring diagram included in this manual.

CHARGING

Refer to the appropriate charge chart included in this manual.

BLOWER MOTOR SPEED TAPS

After determining necessary CFM and speed tap data, follow the steps below to change speeds.

1. Remove the blower access panel.
2. Reference Figure 22 for the proper location of the blue wire on the speed tap block of the indoor blower motor to obtain the speed you have chosen.
3. After adjusting the wires accordingly, attach the blower access panel to the unit.

FIGURE 22
LOCATION OF BLUE WIRE ON SPEED TAP BLOCK

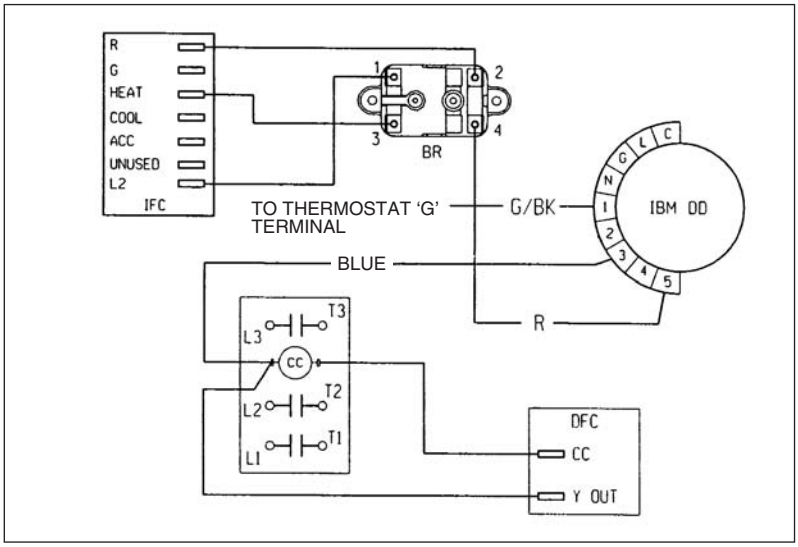
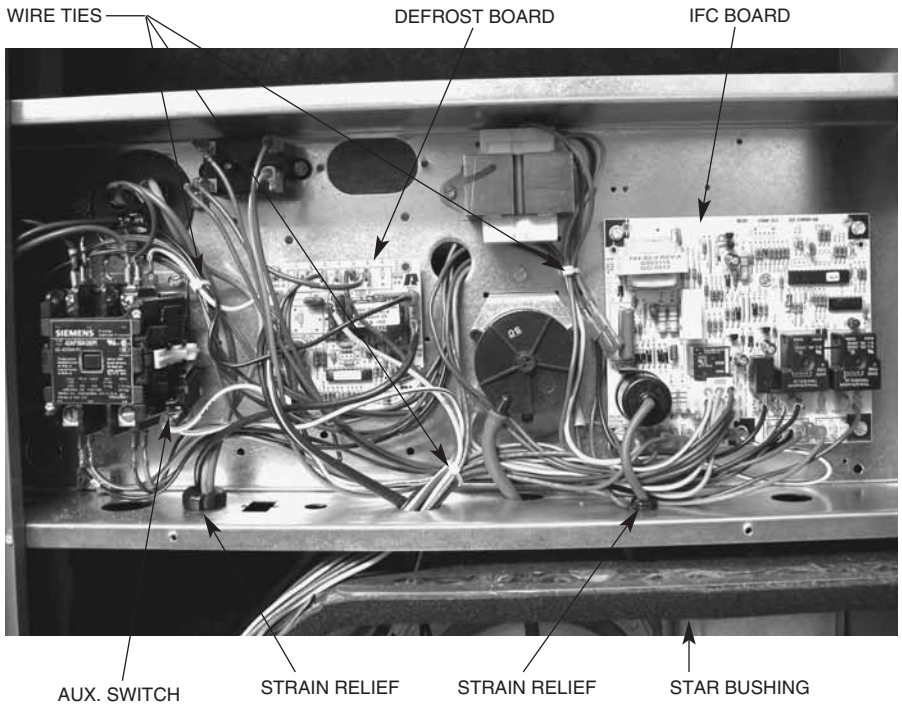


FIGURE 23
RQPW FACTORY SET BLOWER SPEEDS

Nominal Cooling Capacity Tons [kW]	Motor Speed from Factory		Available Motor Speeds
	HP (Cool/Heat)	Gas Heat	
2.0 [7.03]	High HP (Tap 3)	Gas Heat (Tap 5)	Cont. Fan Dedicated (Tap 1)
			Low HP (Cool/Heat) (Tap 2)
			High HP (Cool/Heat) (Tap 3)
			Gas Heat Dedicated (Tap 5)
2.5 [8.79]	Med HP (Tap 3)	Gas Heat (Tap 5)	Cont. Fan Dedicated (Tap 1)
			Low HP (Cool/Heat) (Tap 2)
			Med HP (Cool/Heat) (Tap 3)
			High HP (Cool/Heat) (Tap 4)
			Gas Heat Dedicated (Tap 5)
3.0 [10.55]	Med HP (Tap 3)	Gas Heat (Tap 5)	Cont. Fan Dedicated (Tap 1)
			Low HP (Cool/Heat) (Tap 2)
			Med HP (Cool/Heat) (Tap 3)
			High HP (Cool/Heat) (Tap 4)
			Gas Heat Dedicated (Tap 5)
3.5 [12.31]	High HP (Tap 3)	Gas Heat (Tap 5)	Cont. Fan Dedicated (Tap 1)
			Low HP (Cool/Heat) (Tap 2)
			High HP (Cool/Heat) (Tap 3)
			Gas Heat Dedicated (Tap 5)
4.0 [14.07]	High HP (Tap 3)	Gas Heat (Tap 5)	Cont. Fan Dedicated (Tap 1)
			Low HP (Cool/Heat) (Tap 2)
			High HP (Cool/Heat) (Tap 3)
			Gas Heat Dedicated (Tap 5)

Notes:
Do not connect wiring to unspecified speed taps.
Heat Pump speed must be changed to Low to achieve ARI performance.

FIGURE 24
DUAL FUEL CONTROL BOX



XI. DEMAND DEFROST CONTROL

The demand defrost control is a printed circuit board assembly consisting of solid state control devices with electro-mechanical outputs. The demand defrost control monitors the outdoor ambient temperature, outdoor coil temperature, and the compressor run-time to determine when a defrost cycle is required.

DEFROST INITIATION

A defrost will be initiated when the three conditions below are satisfied:

1) The outdoor coil temperature is below 35°F.
2) The compressor has operated for at least 34 minutes with the outdoor coil temperature below 35°F.
3) The measured difference between the ambient temperature and the outdoor coil temperature is greater than the expected delta T, as determined by the defrost board.

Additionally, a defrost will be initiated if six hours of accumulated compressor run-time has elapsed without a defrost with the outdoor coil temperature below 35°F.

DEFROST TERMINATION

Once a defrost is initiated, the defrost will continue until fourteen minutes has elapsed or the coil temperature has reached the terminate temperature. The terminate temperature is factory set at 70°F, although the temperature can be changed to 50°F, 60°F, 70°F or 80°F by relocating a jumper on the board. See Figure 24.

TEMPERATURE SENSORS

The coil sensor is clipped to a tube on the outdoor coil at the point fed by the distribution tubes from the expansion device (short 3/8″ dia. tube). The air sensor is located behind a cover on the control access side of the unit.

If the ambient sensor fails the defrost control will initiate a defrost every 34 minutes with the coil temperature below 35°F.

If the coil sensor fails the defrost control will not initiate a defrost.

TEST MODE

The test mode is initiated by shorting the TEST pins. In this mode of operation, the enable temperature is ignored and all timers are sped up by a factor of 240. To initiate a manual defrost, short the TEST pins. Remove the short when the system switches to defrost mode. The defrost will terminate on time (14 minutes) or when the termination temperature has been achieved. *Short TEST pins again to terminate the defrost immediately.*

TROUBLE SHOOTING DEMAND DEFROST

Set the indoor thermostat select switch to heat and slowly adjust the temperature to call for heat. If the temperature is adjusted several degrees above the call for heat, then the gas heat will switch on (thermostat calls for second stage heat).

XII. OPERATION

Most single phase units are equipped with Permanent Split Capacitor (PSC) motors (no start relay or start capacitor). It is important that such systems be off for a minimum of 5 minutes before restarting to allow equalization of pressures. Do not move the thermostat to cycle unit without waiting five minutes. To do so may cause the compressor to stop on an automatic open overload device or blow a fuse. Poor electrical service can cause nuisance tripping in overloads or blow fuses.

IMPORTANT: *The compressor has an internal overload protector. Under some conditions, it can take up to 2 hours for this overload to reset. Make sure overload has had time to reset before condemning the compressor.*

Some models may be factory equipped with a start relay and start capacitor.

Most single phase 208/240 volt units are equipped with a time delay control (TDC1). The control allows the blower to operate for up to 90 seconds after the thermostat is satisfied.

A. CONTROL SYSTEM OPERATION

1. In the cooling mode, the thermostat will, on a call for cooling, energize the compressor contactor and the indoor blower relay. The indoor blower can be operated continuously by setting the thermostat fan switch at the “ON” position. The reversing valve coil is de-energized.
2. If the thermostat is switched to the heating mode, the reversing valve will energize, and will remain energized except in defrost.
   a. The first heat stage of the thermostat will energize the compressor contactor and the indoor blower relay if the outside temperature is above the “balance point” (see thermostat section for detail on determining and settling the “balance point”).
   b. If the outside temperature is below the “balance point”, or if the second heat stage of the thermostat is called, then the gas heat will turn on, the compressor contactor is de-energized, and the indoor blower speed is switched.
   c. During defrost, the defrost control (DFC) will de-energize the compressor contactor, de-energize the reversing valve, and re-energize the compressor contactor after 5 seconds. A relay on the defrost control (DFC) will simultaneously de-energize the outdoor fan motor to assist in thawing out the outdoor coil. The defrost control (DFC) will also energize the gas heat to temper the indoor air. During this period, up to three speed taps on the indoor blower motor may be energized simultaneously. The indoor blower motor will run at the highest numerical tap energized regardless of blower speed. If gas heat operation is not desired during defrost, the purple wire (PR 139) may be disconnected from the defrost control (DFC) and the integrated furnace control (IFC). See the gas heat section for specifics on the gas furnace operation.

XIII. GENERAL DATA - RQPW-B MODELS
NOMINAL SIZES 2-4 TONS [7-14.6 kW]

Model RQPW - Series	B024JK06E	B024JK06X	B024JK08E	B024JK08X
Cooling performance[1]				**Continued ->**
Gross Cooling Capacity Btu [kW]	25,000 [7.32]	25,000 [7.32]	25,000 [7.32]	25,000 [7.32]
EER, SEER[2]	11.8/14	11.8/14	11.8/14	11.8/14
Nominal CFM/ARI Rated CFM [L/s]	800/850 [378/401]	800/850 [378/401]	800/850 [378/401]	800/850 [378/401]
ARI Net Cooling Capacity Btu [kW]	24,400 [7.15]	24,400 [7.15]	24,400 [7.15]	24,400 [7.15]
Net Sensible Capacity Btu [kW]	18,900 [5.54]	18,900 [5.54]	18,900 [5.54]	18,900 [5.54]
Net Latent Capacity Btu [kW]	5,500 [1.61]	5,500 [1.61]	5,500 [1.61]	5,500 [1.61]
Net System Power kW	2.06	2.06	2.06	2.06
Heating Performance (Heat Pumps)				
High Temp. Btuh [kW] Rating	23,800 [6.97]	23,800 [6.97]	23,800 [6.97]	23,800 [6.97]
System Power KW / COP	1.94/3.5	1.94/3.5	1.94/3.5	1.94/3.5
Low Temp. Btuh [kW] Rating	13,800 [4.04]	13,800 [4.04]	13,800 [4.04]	13,800 [4.04]
System Power KW / COP	1.78/2.2	1/78/2.2	1/78/2.2	1/78/2.2
HSPF (Btu/Watts-hr)	8	8	8	8
Heating Performance (Gas)[3]				
Heatiing Input Btu [kW]	60,000 [17.58]	60,000 [17.58]	80,000 [23.44]	80,000 [23.44]
Heating Output Btu [kW]	47,000 [13.77]	47,000 [13.77]	62,000 [18.17]	62,000 [18.17]
Temperature Rise Range °F [°C]	40-70 [22.2/38.9]	40-70 [22.2/38.9]	55-85 [30.6/47.2]	55-85 [30.6/47.2]
AFUE %[4]	80	80	80	80
Steady State Efficiency (%)	81	81	81	81
No. Burners	3	3	4	4
No. Stages	1	1	1	1
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/Copeland Scroll	1/Copeland Scroll	1/Copeland Scroll	1/Copeland 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]	14.51 [1.35]	14.51 [1.35]	14.51 [1.35]	14.51 [1.35]
Rows / FPI [FPcm]	1 / 22 [9]	1 / 22 [9]	1 / 22 [9]	1 / 22 [9]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
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]	5.54 [0.51]	5.54 [0.51]	5.54 [0.51]
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]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	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]	2700 [1274]
No. Motors/HP	1 at 1/5 HP	1 at 1/5 HP	1 at 1/5 HP	1 at 1/5 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/9x7 [228.6x177.8]	1/9x7 [228.6x177.8]	1/9x7 [228.6x177.8]	1/9x7 [228.6x177.8]
Drive Type/No. Speeds	Direct/4	Direct/4	Direct/4	Direct/4
No. Motors	1	1	1	1
Motor HP	1/3	1/3	1/3	1/3
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)1x20x20 [25x508x508]	(1)1x20x20 [25x508x508]	(1)1x20x20 [25x508x508]
Refrigerant Charge Oz. [g]	98 [2778]	98 [2778]	98 [2778]	98 [2778]
Weights				
Net Weight lbs. [kg]	440 [200]	440 [200]	445 [202]	445 [202]
Ship Weight lbs. [kg]	450 [204]	450 [204]	455 [206]	455 [206]

GENERAL DATA - RQPW-B MODELS
NOMINAL SIZES 2-4 TONS [7-14.6 kW]

Model RQPW - Series	B030JK08E	B030JK08X	B036JK08E	B036JK08X
Cooling performance[1]				**Continued ->**
Gross Cooling Capacity Btu [kW]	29,800 [8.73]	29,800 [8.73]	36,800 [10.78]	36,800 [10.78]
EER, SEER[2]	12/14	12/14	12/14	12/14
Nominal CFM/ARI Rated CFM [L/s]	1000/1050 [472/495]	1000/1050 [472/495]	1200/1250 [566/590]	1200/1250 [566/590]
ARI Net Cooling Capacity Btu [kW]	29,200 [8.56]	29,200 [8.56]	36,000 [10.55]	36,000 [10.55]
Net Sensible Capacity Btu [kW]	23,000 [6.74]	63,000 [6.74]	27,000 [7.91]	27,000 [7.91]
Net Latent Capacity Btu [kW]	6,200 [1.82]	6,200 [1.82]	9,000 [2.64]	9,000 [2.64]
Net System Power kW	2.43	2.43	3	3
Heating Performance (Heat Pumps)				
High Temp. Btuh [kW] Rating	27,800 [8.15]	27,800 [8.15]	33,200 [9.73]	33,200 [9.73]
System Power KW / COP	2.27/3.6	2.27/3.6	2.73/3.6	2.73/3.6
Low Temp. Btuh [kW] Rating	15,500 [4.54]	15,500 [4.54]	18,000 [5.27]	18,000 [5.27]
System Power KW / COP	2.07/2.2	2.07/2.2	2.5/2.2	2.5/2.2
HSPF (Btu/Watts-hr)	8	8	8	8
Heating Performance (Gas)[3]				
Heatiing Input Btu [kW]	80,000 [23.44]	80,000 [23.44]	80,000 [23.44]	80,000 [23.44]
Heating Output Btu [kW]	62,000 [18.17]	62,000 [18.17]	62,000 [18.17]	62,000 [18.17]
Temperature Rise Range °F [°C]	40-70 [22.2/38.9]	40-70 [22.2/38.9]	40-70 [22.2/38.9]	40-70 [22.2/38.9]
AFUE %[4]	80	80	80	80
Steady State Efficiency (%)	81	81	81	81
No. Burners	4	4	4	4
No. Stages	1	1	1	1
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/Copeland Scroll	1/Copeland Scroll	1/Copeland Scroll	1/Copeland 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]	16.32 [1.52]	16.32 [1.52]	11.2 [1.04]	11.2 [1.04]
Rows / FPI [FPcm]	1 / 22 [9]	1 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
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]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	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]	2700 [1274]
No. Motors/HP	1 at 1/5 HP	1 at 1/5 HP	1 at 1/5 HP	1 at 1/5 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/10x9 [254x228.6]	1/10x9 [254x228.6]	1/10x9 [254x228.6]	1/10x9 [254x228.6]
Drive Type/No. Speeds	Direct/5	Direct/5	Direct/5	Direct/5
No. Motors	1	1	1	1
Motor HP	1/2	1/2	1/2	1/2
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]	108 [3062]	108 [3062]	146 [4139]	146 [4139]
Weights				
Net Weight lbs. [kg]	485 [220]	485 [220]	506 [230]	506 [230]
Ship Weight lbs. [kg]	496 [225]	496 [225]	517 [235]	517 [235]

GENERAL DATA - RQPW-B MODELS
NOMINAL SIZES 2-4 TONS [7-14.6 kW]

Model RQPW - Series	B036JK10E	B036JK10X	B042JK10E	B042JK10X
Cooling performance[1]				**Continued ->**
Gross Cooling Capacity Btu [kW]	36,800 [10.78]	36,800 [10.78]	43,500 [12.75]	43,500 [12.75]
EER, SEER[2]	12/14	12/14	11.3/14	11.3/14
Nominal CFM/ARI Rated CFM [L/s]	1200/1250 [566/590]	1200/1250 [566/590]	1400/1400 [661/661]	1400/1400 [661/661]
ARI Net Cooling Capacity Btu [kW]	36,000 [10.55]	36,000 [10.55]	42,500 [12.45]	42,500 [12.45]
Net Sensible Capacity Btu [kW]	27,000 [7.91]	27,000 [7.91]	31,500 [9.23]	31,500 [9.23]
Net Latent Capacity Btu [kW]	9,000 [2.64]	9,000 [2.64]	11,000 [3.22]	11,000 [3.22]
Net System Power kW	3	3	3.76	3.76
Heating Performance (Heat Pumps)				
High Temp. Btuh [kW] Rating	33,200 [9.73]	33,200 [9.73]	41,500 [12.16]	41,500 [12.16]
System Power KW / COP	2.73/3.6	2.73/3.6	3.65/3.4	3.65/3.4
Low Temp. Btuh [kW] Rating	18,000 [5.27]	18,000 [5.27]	24,200 [7.09]	24,200 [7.09]
System Power KW / COP	2.5/2.2	2.5/2.2	3.43/2.08	3.43/2.08
HSPF (Btu/Watts-hr)	8	8	8	8
Heating Performance (Gas)[3]				
Heatiing Input Btu [kW]	100,000 [29.3]	100,000 [29.3]	100,000 [29.3]	100,000 [29.3]
Heating Output Btu [kW]	77,000 [22.56]	77,000 [22.56]	77,000 [22.56]	77,000 [22.56]
Temperature Rise Range °F [°C]	45-85 [25/47.2]	45-85 [25/47.2]	45-85 [25/47.2]	45-85 [25/47.2]
AFUE %[4]	80	80	80	80
Steady State Efficiency (%)	81	81	81	81
No. Burners	5	5	5	5
No. Stages	1	1	1	1
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/Copeland Scroll	1/Copeland Scroll	1/Copeland Scroll	1/Copeland 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]	11.2 [1.04]	11.2 [1.04]	16.32 [1.52]	16.32 [1.52]
Rows / FPI [FPcm]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Refrigerant Control	TX Valves	TX Valves	TX Valves	TX Valves
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]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	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]	3300 [1557]	3300 [1557]
No. Motors/HP	1 at 1/5 HP	1 at 1/5 HP	1 at 1/3 HP	1 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/10x9 [254x228.6]	1/10x9 [254x228.6]	1/10x9 [254x228.6]	1/10x9 [254x228.6]
Drive Type/No. Speeds	Direct/5	Direct/5	Direct/4	Direct/4
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)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]
Refrigerant Charge Oz. [g]	146 [4139]	146 [4139]	176 [4990]	176 [4990]
Weights				
Net Weight lbs. [kg]	510 [231]	510 [231]	572 [259]	572 [259]
Ship Weight lbs. [kg]	521 [236]	521 [236]	583 [264]	583 [264]

GENERAL DATA - RQPW-B MODELS
NOMINAL SIZES 2-4 TONS [7-14.6 kW]

Model RQPW - Series	B048JK10E	B048JK10X
Cooling performance[1]		
Gross Cooling Capacity Btu [kW]	49,000 [14.36]	49,000 [14.36]
EER, SEER[2]	11.5/14	11.5/14
Nominal CFM/ARI Rated CFM [L/s]	16000/16000 [755/755]	16000/16000 [755/755]
ARI Net Cooling Capacity Btu [kW]	47,500 [13.92]	47,500 [13.92]
Net Sensible Capacity Btu [kW]	36,000 [10.55]	36,000 [10.55]
Net Latent Capacity Btu [kW]	11,500 [3.37]	11,500 [3.37]
Net System Power kW	4.13	4.13
Heating Performance (Heat Pumps)		
High Temp. Btuh [kW] Rating	46,000 [13.48]	46,000 [13.48]
System Power KW / COP	3.89/3.45	3.89/3.45
Low Temp. Btuh [kW] Rating	26,600 [7.79]	26,600 [7.79]
System Power KW / COP	3.57/2.2	
HSPF (Btu/Watts-hr)	8	8
Heating Performance (Gas)[3]		
Heatiing Input Btu [kW]	100,000 [29.3]	100,000 [29.3]
Heating Output Btu [kW]	77,000 [22.56]	77,000 [22.56]
Temperature Rise Range °F [°C]	45-85 [25/47.2]	45-85 [25/47.2]
AFUE %[4]	80	80
Steady State Efficiency (%)	81	81
No. Burners	5	5
No. Stages	1	1
Gas Connection Pipe Size in. [mm]	0.5 [12.7]	0.5 [12.7]
Compressor		
No/Type	1/Copeland Scroll	1/Copeland Scroll
Outdoor Sound Rating (dB)[5]	76	76
Outdoor Coil - Fin Type	Louvered	Louvered
Tube Type	Rifled	Rifled
Tube Size in. [mm] OD	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	16.32 [1.52]	16.32 [1.52]
Rows / FPI [FPcm]	2 / 22 [9]	2 / 22 [9]
Refrigerant Control	TX Valves	TX Valves
Indoor Coil - Fin Type	Louvered	Louvered
Tube Type	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	7.39 [0.69]	7.39 [0.69]
Rows / FPI [FPcm]	2 / 15 [6]	2 / 15 [6]
Refrigerant Control	TX Valves	TX Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan - Type	Propeller	Propeller
No. Used/Diameter in. [mm]	1/22 [558.8]	1/22 [558.8]
Drive Type/No. Speeds	Direct/1	Direct/1
CFM [L/s]	3000 [1416]	3000 [1416]
No. Motors/HP	1 at 1/3 HP	1 at 1/3 HP
Motor RPM	1075	1075
Indoor Fan - Type	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/10x9 [254x228.6]	1/10x9 [254x228.6]
Drive Type/No. Speeds	Direct/4	Direct/4
No. Motors	1	1
Motor HP	3/4	3/4
Motor RPM	1050	1050
Motor Frame Size	48	48
Filter - Type	Field Supplied	Field Supplied
Furnished	No	No
(NO.) Size Recommended in. [mm x mm x mm]	(1)1x24x24 [25x610x610]	(1)1x24x24 [25x610x610]
Refrigerant Charge Oz. [g]	183 [5188]	183 [5188]
Weights		
Net Weight lbs. [kg]	604 [274]	604 [274]
Ship Weight lbs. [kg]	615 [279]	615 [279]

NOTES:

1 Cooling Performance is rated at 95° F ambient, 80° F entering dry bulb, 67° F entering wet bulb. Gross capacity does not include the effect of fan motor heat. ARI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on ARI Standard 210/240 or 360.

2. EER and/or SEER are rated at ARI conditions and in accordance with DOE test procedures.

3. Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standard Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

4. AFUE is rated in accordance with DOE test procedures.

5. Outdoor Sound Rating shown is tested in accordance with ARI Standard 270.

XIV. MISCELLANEOUS

ELECTRICAL DATA – RQPW SERIES						
		-B024JK	-B030JK	-B036JK	-B042JK	-B048JK
Unit Information	Unit Operating Voltage Range	187-253	187-253	187-253	187-253	187-253
	Minimum Circuit Ampacity	21/21	24/24	27/27	33/33	37/37
	Minimum Overcurrent Protection Device Size	25/25	25/25	30/30	35/35	40/40
	Maximum Overcurrent Protection Device Size	30/30	35/35	40/40	50/50	50/50
Compressor Motor	No.	1	1	1	1	1
	Volts	208/230	208/230	208/230	208/230	208/230
	Phase	1	1	1	1	1
	HP	2	2 1/2	3	3 1/2	4
	RPM	3450	3450	3450	3450	3450
	Amps (RLA)	12.8/12.8	14.1/14.1	16.7/16.7	19.9/19.9	23.8/23.8
	Amps (LRA)	58.3/58.3	73/73	79/79	109/109	117/117
Condenser Motor	No.	1	1	1	1	1
	Volts	208/230	208/230	208/230	208/230	208/230
	Phase	1	1	1	1	1
	HP	1/5	1/5	1/5	1/3	1/3
	Amps (FLA)	1.3	1.3	1.3	2	2
	Amps (LRA)	2.2	2.2	2.2	3.9	3.9
Evaporator Fan	No.	1	1	1	1	1
	Volts	208/230	208/230	208/230	208/230	208/230
	Phase	1	1	1	1	1
	HP	1/3	1/2	1/2	3/4	3/4
	Amps (FLA)	2.8	4.1	4.1	6	6
	Amps (LRA)	0	0	0	0	0

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

RQPW Indoor Airflow Performance - 208 Volts

Nominal Cooling Capacity Tons [kW]	Motor Speed from Factory		Heat Pump Recommended Airflow (Min/Max)	Blower Size/ Motor HP [W] & # of Speeds	Motor Speed		External Static Pressure - Inches W.C. [kPa] (Side Discharge-Wet Coil)							
	HP (Cool/Heat)	Gas Heat					0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.20]
2.0 [7.03]	High HP (Tap 3)	Gas Heat (Tap 5)	700 CFM / 900 CFM	9 x 7 Blower 1/3 HP [249W] 4 Speed X13 Motor	Cont. Fan Dedicated (Tap 1)	CFM [l/s]	821 [387]	799 [377]	775 [366]	742 [350]	706 [333]	681 [321]	641 [303]	611 [288]
						RPM	878	903	953	996	1032	1075	1119	1176
						Watts	131	134	142	145	147	154	156	161
					Low HP (Cool/Heat) (Tap 2)	CFM [l/s]	847 [400]	818 [386]	788 [372]	765 [361]	737 [348]	695 [328]	659 [311]	581 [274]
						RPM	892	818	788	765	737	695	659	581
						Watts	145	147	156	157	164	167	167	155
					High HP (Cool/Heat) (Tap 3)	CFM [l/s]	914 [431]	887 [419]	853 [403]	824 [389]	793 [374]	762 [360]	717 [338]	602 [284]
						RPM	934	971	1024	1053	1083	1121	1135	1155
						Watts	173	177	185	186	188	192	185	164
					Gas Heat Dedicated (Tap 5)	CFM [l/s]	821 [387]	799 [377]	775 [366]	742 [350]	706 [333]	681 [321]	641 [303]	611 [288]
						RPM	878	903	953	996	1032	1075	1119	1176
						Watts	131	134	142	145	147	154	156	161
2.5 [8.79]	Med HP (Tap 3)	Gas Heat (Tap 5)	875 CFM / 1125 CFM	10 x 9 Blower 1/2 HP [373W] 5 Speed X13 Motor	Cont. Fan Dedicated (Tap 1)	CFM [l/s]	1067 [504]	1034 [488]	992 [468]	957 [452]	912 [430]	820 [387]	778 [367]	729 [344]
						RPM	719	749	791	819	876	952	983	1024
						Watts	143	145	155	159	169	182	185	192
					Low HP (Cool/Heat) (Tap 2)	CFM [l/s]	1067 [504]	1034 [488]	992 [468]	957 [452]	912 [430]	820 [387]	778 [367]	729 [344]
						RPM	719	749	791	819	876	952	983	1024
						Watts	143	145	155	159	169	182	185	192
					Med HP (Cool/Heat) (Tap 3)	CFM [l/s]	1165 [550]	1132 [534]	1091 [515]	1051 [496]	1009 [476]	959 [453]	855 [404]	819 [387]
						RPM	744	785	833	864	905	951	1020	1053
						Watts	167	177	188	191	202	206	217	351
					High HP (Cool/Heat) (Tap 4)	CFM [l/s]	1252 [591]	1213 [572]	1166 [550]	1137 [537]	1099 [519]	1046 [494]	986 [465]	892 [421]
						RPM	796	826	868	893	934	982	1026	1086
						Watts	206	210	219	225	234	245	248	256
					Gas Heat Dedicated (Tap 5)	CFM [l/s]	1228 [580]	1187 [560]	1140 [538]	1105 [522]	1062 [501]	1008 [476]	959 [453]	911 [430]
						RPM	761	808	841	884	920	960	999	1038
						Watts	150	170	180	183	185	190	195	215
3.0 [10.55]	Med HP (Tap 3)	Gas Heat (Tap 5)	1050 CFM / 1350 CFM	10 x 9 Blower 1/2 HP [373W] 5 Speed X13 Motor	Cont. Fan Dedicated (Tap 1)	CFM [l/s]	1228 [580]	1187 [560]	1140 [538]	1105 [522]	1062 [501]	1008 [476]	959 [453]	911 [430]
						RPM	761	808	841	884	920	960	999	1038
						Watts	150	170	180	183	185	190	195	215
					Low HP (Cool/Heat) (Tap 2)	CFM [l/s]	1247 [589]	1220 [576]	1178 [556]	1143 [539]	1099 [519]	1064 [502]	998 [471]	904 [427]
						RPM	784	819	863	890	932	957	1012	1075
						Watts	200	208	219	224	233	236	246	256
					Med HP (Cool/Heat) (Tap 3)	CFM [l/s]	1307 [617]	1292 [610]	1238 [584]	1214 [573]	1170 [552]	1135 [536]	1087 [513]	989 [467]
						RPM	820	850	889	918	944	981	1028	1087
						Watts	233	242	248	255	262	268	277	284
					High HP (Cool/Heat) (Tap 4)	CFM [l/s]	1396 [659]	1357 [640]	1334 [630]	1286 [607]	1253 [591]	1207 [570]	1163 [549]	1103 [521]
						RPM	864	898	920	942	976	1010	1043	1089
						Watts	268	280	288	292	299	304	310	316
					Gas Heat Dedicated (Tap 5)	CFM [l/s]	1228 [580]	1187 [560]	1140 [538]	1105 [522]	1062 [501]	1008 [476]	959 [453]	911 [430]
						RPM	761	808	841	884	920	960	999	1038
						Watts	150	170	180	183	185	190	195	215

Notes:
Italic type indicates airflow outside of manufacturers recommendation.
Do not connect wiring to unspecified speed taps.
Heat Pump speed must be changed to Low to achieve ARI performance.

Down Discharge Pressure Drop (Add to External Static Pressure)								
CFM [L/s]	600 [283]	800 [378]	1000 [472]	1200 [566]	1400 [661]	1600 [755]	1800 [849]	2000 [944]
Pressure Drop - Inches W.C. [kPa]	0	.02 [.005]	.05 [.012]	.07 [.017]	.1 [.025]	.12 [.030]	.15 [.037]	.17 [.042]

RQPW Indoor Airflow Performance - 208 Volts (Continued)

Nominal Cooling Capacity Tons [kW]	Motor Speed from Factory		Heat Pump Recommended Airflow (Min/Max)	Blower Size/ Motor HP [W] & # of Speeds	Motor Speed		External Static Pressure - Inches W.C. [kPa] (Side Discharge-Wet Coil)							
	HP (Cool/Heat)	Gas Heat					0.1 [.02]	0.2 [.06]	0.3 [.07]	0.4 [.10]	0.6 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.20]
3.5 [12.31]	High HP (Tap 3)	Gas Heat (Tap 5)	1225 CFM / 1575 CFM	10 x 9 Blower 3/4 HP [559W] 4 Speed X13 Motor	Cont. Fan Dedicated (Tap 1)	CFM [l/s]	1454 [686]	1433 [676]	1392 [657]	1354 [639]	1322 [624]	1283 [606]	1238 [584]	1192 [563]
						RPM	923	946	976	1015	1044	1085	1126	1146
						Watts	301	309	316	327	337	348	356	363
					Low HP (Cool/Heat) (Tap 2)	CFM [l/s]	1455 [687]	1431 [675]	1396 [659]	1360 [642]	1315 [621]	1285 [606]	1241 [586]	
						RPM	824	856	889	931	968	1009	1041	
						Watts	268	280	288	303	311	325	331	
					High HP (Cool/Heat) (Tap 3)	CFM [l/s]	1559 [736]	1530 [722]	1488 [702]	1454 [686]	1417 [669]	1375 [649]	1336 [631]	
						RPM	870	893	932	968	1007	1036	1072	
						Watts	321	327	338	351	364	371	381	
					Gas Heat Dedicated (Tap 5)	CFM [l/s]	1454 [686]	1433 [676]	1392 [657]	1354 [639]	1322 [624]	1283 [606]	1238 [584]	1192 [563]
						RPM	923	946	976	1015	1044	1085	1126	1146
						Watts	301	309	316	327	337	348	356	363
4.0 [14.07]	High HP (Tap 3)	Gas Heat (Tap 5)	1350 CFM / 1700 CFM	10 x 9 Blower 3/4 HP [559W] 4 Speed X13 Motor	Cont. Fan Dedicated (Tap 1)	CFM [l/s]	1454 [686]	1433 [676]	1392 [657]	1354 [639]	1322 [624]	1283 [606]	1238 [584]	1192 [563]
						RPM	923	946	976	1015	1044	1085	1126	1146
						Watts	301	309	316	327	337	348	356	363
					Low HP (Cool/Heat) (Tap 2)	CFM [l/s]	1675 [791]	1658 [782]	1610 [760]	1580 [746]	1535 [724]	1491 [704]	1422 [671]	
						RPM	923	944	979	1013	1045	1077	1098	
						Watts	390	401	412	425	433	440	432	
					High HP (Cool/Heat) (Tap 3)	CFM [l/s]	1770 [835]	1751 [826]	1706 [805]	1672 [789]	1624 [766]	1555 [734]	1463 [690]	
						RPM	966	989	1018	1050	1078	1100	1115	
						Watts	454	466	473	486	490	481	460	
					Gas Heat Dedicated (Tap 5)	CFM [l/s]	1454 [686]	1433 [676]	1392 [657]	1354 [639]	1322 [624]	1283 [606]	1238 [584]	1192 [563]
						RPM	923	946	976	1015	1044	1085	1126	1146
						Watts	301	309	316	327	337	348	356	363

Notes:
Italic type indicates airflow outside of manufacturers recommendation.
Do not connect wiring to unspecified speed taps.
Heat Pump speed must be changed to Low to achieve ARI performance.

Down Discharge Pressure Drop (Add to External Static Pressure)								
CFM [L/s]	600 [283]	800 [378]	1000 [472]	1200 [566]	1400 [661]	1600 [755]	1800 [849]	2000 [944]
Pressure Drop - Inches W.C. [kPa]	0	.02 [.005]	.05 [.012]	.07 [.017]	.1 [.025]	.12 [.030]	.15 [.037]	.17 [.042]

RQPW Indoor Airflow Performance - 230 Volts

Nominal Cooling Capacity Tons [kW]	Motor Speed from Factory		Heat Pump Recommended Airflow (Min/Max)	Blower Size/ Motor HP [W] & # of Speeds	Motor Speed		External Static Pressure - Inches W.C. [kPa] (Side Discharge-Wet Coil)							
	HP (Cool/Heat)	Gas Heat					0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.6 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.20]
2.0 [7.03]	High HP (Tap 3)	Gas Heat (Tap 5)	700 CFM / 900 CFM	9 x 7 Blower 1/3 HP [249W] 4 Speed X13 Motor	Cont. Fan Dedicated (Tap 1)	CFM [l/s]	829 [391]	808 [381]	789 [372]	756 [357]	737 [348]	697 [329]	668 [315]	615 [290]
						RPM	890	915	961	1000	1046	1089	1121	1173
						Watts	137	139	148	151	160	163	166	167
					Low HP (Cool/Heat) (Tap 2)	CFM [l/s]	862 [407]	834 [394]	819 [387]	781 [369]	761 [359]	729 [344]	*695 [328]*	*606 [286]*
						RPM	889	953	974	1018	1065	1101	*1133*	*1156*
						Watts	151	159	162	166	173	176	*180*	*165*
					High HP (Cool/Heat) (Tap 3)	CFM [l/s]	*918 [433]*	888 [419]	874 [412]	838 [395]	819 [387]	781 [369]	711 [336]	*616 [291]*
						RPM	*953*	988	1032	1060	1091	1126	1146	*1157*
						Watts	*181*	184	194	198	200	204	189	*168*
					Gas Heat Dedicated (Tap 5)	CFM [l/s]	829 [391]	808 [381]	789 [372]	756 [357]	737 [348]	697 [329]	668 [315]	615 [290]
						RPM	890	915	961	1000	1046	1089	1121	1173
						Watts	137	139	148	151	160	163	166	167
2.5 [8.79]	Med HP (Tap 3)	Gas Heat (Tap 5)	875 CFM / 1125 CFM	10 x 9 Blower 1/2 HP [373W] 5 Speed X13 Motor	Cont. Fan Dedicated (Tap 1)	CFM [l/s]	1076 [508]	1041 [491]	1017 [480]	970 [458]	928 [438]	852 [402]	785 [370]	745 [352]
						RPM	715	753	787	825	877	946	1005	1032
						Watts	144	148	157	169	175	187	198	202
					Low HP (Cool/Heat) (Tap 2)	CFM [l/s]	1076 [508]	1041 [491]	1017 [480]	970 [458]	928 [438]	*852 [402]*	*785 [370]*	*745 [352]*
						RPM	715	753	787	825	877	*946*	*1005*	*1032*
						Watts	144	148	157	169	175	*187*	*198*	*202*
					Med HP (Cool/Heat) (Tap 3)	CFM [l/s]	*1187 [560]*	1124 [530]	1096 [517]	1071 [505]	1024 [483]	987 [466]	896 [423]	*852 [402]*
						RPM	*762*	799	832	859	914	940	1021	*1059*
						Watts	*176*	182	191	196	209	212	227	*235*
					High HP (Cool/Heat) (Tap 4)	CFM [l/s]	*1271 [600]*	*1223 [577]*	*1169 [552]*	*1137 [537]*	1104 [521]	1071 [505]	1015 [479]	934 [441]
						RPM	*797*	*836*	*878*	*905*	939	974	1026	1089
						Watts	*212*	*217*	*227*	*231*	241	247	257	270
					Gas Heat Dedicated (Tap 5)	CFM [l/s]	1241 [586]	1203 [568]	1155 [545]	1119 [528]	1082 [511]	1032 [487]	994 [469]	950 [448]
						RPM	771	815	848	886	932	965	1004	1044
						Watts	155	162	170	182	193	200	210	220
3.0 [10.55]	Med HP (Tap 3)	Gas Heat (Tap 5)	1050 CFM / 1350 CFM	10 x 9 Blower 1/2 HP [373W] 5 Speed X13 Motor	Cont. Fan Dedicated (Tap 1)	CFM [l/s]	1241 [586]	1203 [568]	1155 [545]	1119 [528]	1082 [511]	1032 [487]	994 [469]	950 [448]
						RPM	771	815	848	886	932	965	1004	1044
						Watts	155	162	170	182	193	200	210	220
					Low HP (Cool/Heat) (Tap 2)	CFM [l/s]	1258 [594]	1215 [573]	1200 [566]	1160 [547]	1130 [533]	1082 [511]	*1026 [484]*	*954 [450]*
						RPM	802	829	861	894	933	971	*1020*	*1077*
						Watts	210	217	225	230	239	245	*259*	*268*
					Med HP (Cool/Heat) (Tap 3)	CFM [l/s]	1336 [631]	1298 [613]	1259 [594]	1229 [580]	1198 [565]	1160 [547]	1116 [527]	1071 [505]
						RPM	821	867	903	920	957	993	1038	1071
						Watts	239	249	259	262	275	279	290	299
					High HP (Cool/Heat) (Tap 4)	CFM [l/s]	*1416 [668]*	*1379 [651]*	1342 [633]	1292 [610]	1275 [602]	1240 [585]	1200 [566]	1168 [551]
						RPM	*874*	*898*	933	952	993	1011	1060	1091
						Watts	*285*	*290*	299	304	314	322	328	337
					Gas Heat Dedicated (Tap 5)	CFM [l/s]	1241 [586]	1203 [568]	1155 [545]	1119 [528]	1082 [511]	1032 [487]	994 [469]	950 [448]
						RPM	771	815	848	886	932	965	1004	1044
						Watts	155	162	170	182	193	200	210	220

Notes:
Italic type indicates airflow outside of manufacturers recommendation.
Do not connect wiring to unspecified speed taps.
Heat Pump speed must be changed to Low to achieve ARI performance.

Down Discharge Pressure Drop (Add to External Static Pressure)								
CFM [L/s]	600 [283]	800 [378]	1000 [472]	1200 [566]	1400 [661]	1600 [755]	1800 [849]	2000 [944]
Pressure Drop - Inches W.C. [kPa]	0	.02 [.005]	.05 [.012]	.07 [.017]	.1 [.025]	.12 [.030]	.15 [.037]	.17 [.042]

RQPW Indoor Airflow Performance - 230 Volts (Continued)

Nominal Cooling Capacity Tons [kW]	Motor Speed from Factory		Heat Pump Recommended Airflow (Min/Max)	Blower Size/ Motor HP [W] & # of Speeds	Motor Speed		External Static Pressure - Inches W.C. [kPa] (Side Discharge-Wet Coil)							
	HP (Cool/Heat)	Gas Heat					0.1 [.02]	0.2 [.05]	0.3 [.07]	0.4 [.10]	0.5 [.12]	0.6 [.15]	0.7 [.17]	0.8 [.20]
3.5 [12.31]	High HP (Tap 3)	Gas Heat (Tap 5)	1225 CFM / 1575 CFM	10 x 9 Blower 3/4 HP [559W] 4 Speed X13 Motor	Cont. Fan Dedicated (Tap 1)	CFM [l/s]	1459 [689]	1438 [679]	1409 [665]	1371 [647]	1337 [631]	1296 [612]	1258 [594]	1223 [577]
						RPM	931	958	993	1031	1058	1097	1133	1158
						Watts	308	319	331	339	349	362	373	381
					Low HP (Cool/Heat) (Tap 2)	CFM [l/s]	1467 [692]	1439 [679]	1408 [665]	1360 [642]	1331 [628]	1287 [607]	1259 [594]	
						RPM	831	854	894	932	972	1005	1042	
						Watts	276	282	297	307	319	326	341	
					High HP (Cool/Heat) (Tap 3)	CFM [l/s]	1550 [732]	1520 [717]	1486 [701]	1449 [684]	1407 [664]	1382 [652]	1337 [631]	
						RPM	867	890	930	974	1003	1039	1073	
						Watts	317	323	339	355	362	377	385	
					Gas Heat Dedicated (Tap 5)	CFM [l/s]	1459 [689]	1438 [679]	1409 [665]	1371 [647]	1337 [631]	1296 [612]	1258 [594]	1223 [577]
						RPM	931	958	993	1031	1058	1097	1133	1158
						Watts	308	319	331	339	349	362	373	381
4.0 [14.07]	High HP (Tap 3)	Gas Heat (Tap 5)	1350 CFM / 1700 CFM	10 x 9 Blower 3/4 HP [559W] 4 Speed X13 Motor	Cont. Fan Dedicated (Tap 1)	CFM [l/s]	1459 [689]	1438 [679]	1409 [665]	1371 [647]	1337 [631]	1296 [612]	1258 [594]	1223 [577]
						RPM	931	958	993	1031	1058	1097	1133	1158
						Watts	308	319	331	339	349	362	373	381
					Low HP (Cool/Heat) (Tap 2)	CFM [l/s]	1692 [799]	1661 [784]	1633 [771]	1589 [750]	1560 [736]	1512 [714]	1442 [681]	
						RPM	931	950	982	1018	1054	1082	1103	
						Watts	404	409	424	434	450	453	443	
					High HP (Cool/Heat) (Tap 3)	CFM [l/s]	*1748 [825]*	*1718 [811]*	1686 [796]	1647 [777]	1616 [763]	1543 [728]	1472 [695]	
						RPM	*955*	*978*	1010	1043	1073	1096	1111	
						Watts	*440*	*446*	462	475	484	473	459	
					Gas Heat Dedicated (Tap 5)	CFM [l/s]	1459 [689]	1438 [679]	1409 [665]	1371 [647]	1337 [631]	1296 [612]	1258 [594]	1223 [577]
						RPM	931	958	993	1031	1058	1097	1133	1158
						Watts	308	319	331	339	349	362	373	381

Notes:
Italic type indicates airflow outside of manufacturers recommendation.
Do not connect wiring to unspecified speed taps.
Heat Pump speed must be changed to Low to achieve ARI performance.

Down Discharge Pressure Drop (Add to External Static Pressure)								
CFM [L/s]	600 [283]	800 [378]	1000 [472]	1200 [566]	1400 [661]	1600 [755]	1800 [849]	2000 [944]
Pressure Drop - Inches W.C. [kPa]	0	.02 [.005]	.05 [.012]	.07 [.017]	.1 [.025]	.12 [.030]	.15 [.037]	.17 [.042]

FIGURE 25
WIRING DIAGRAM

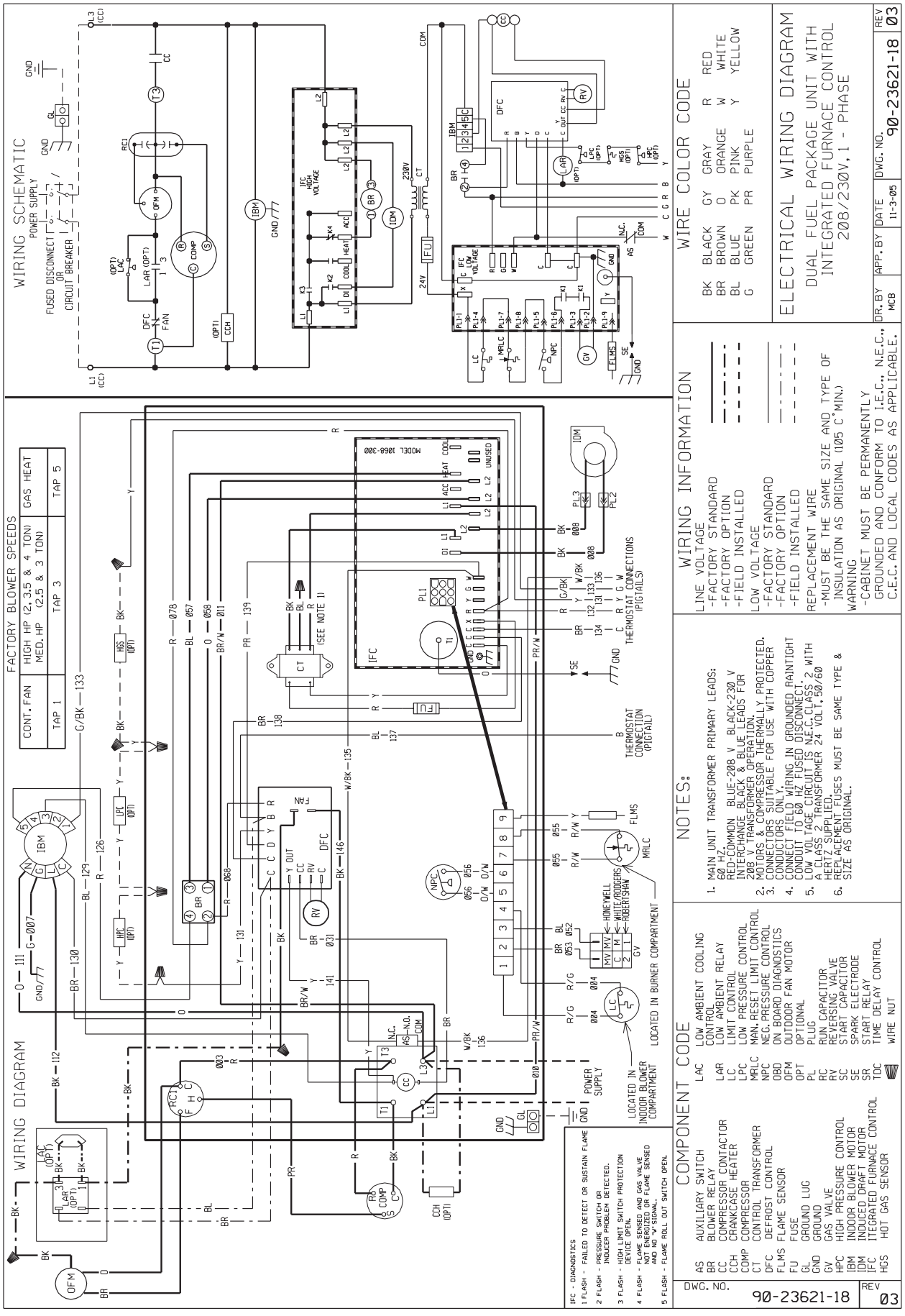
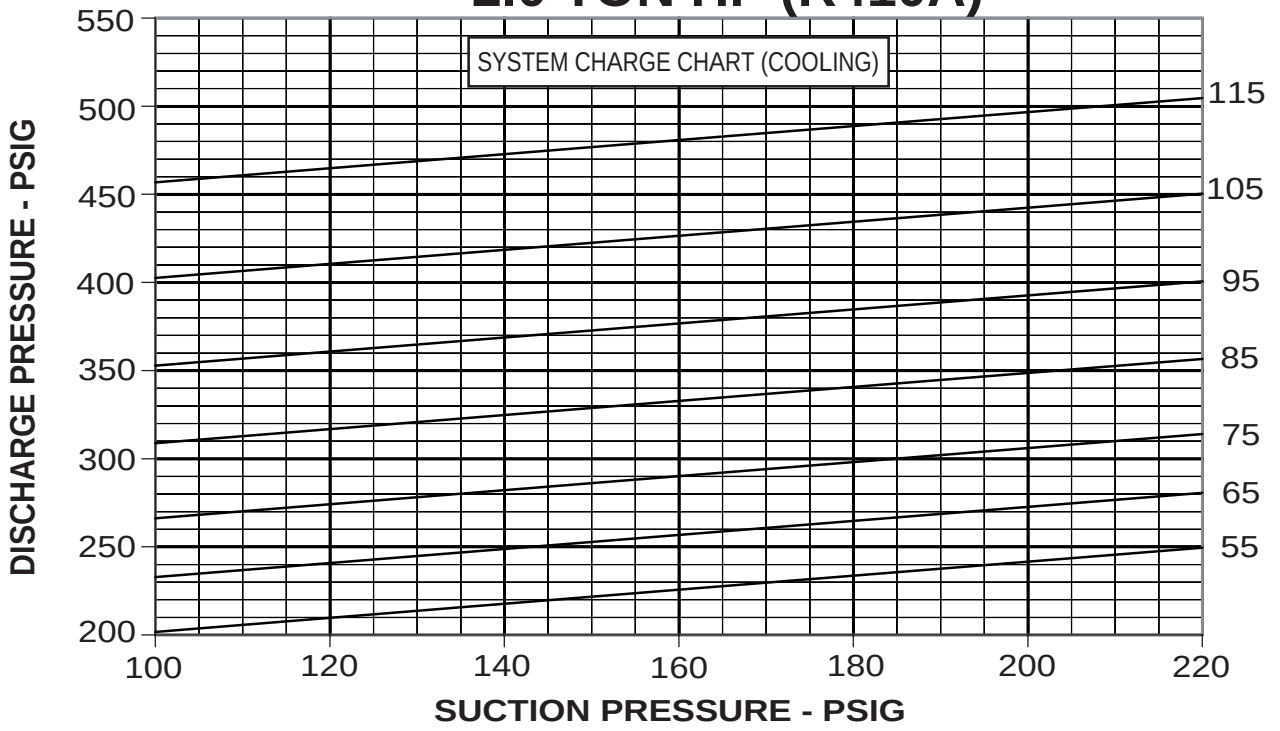
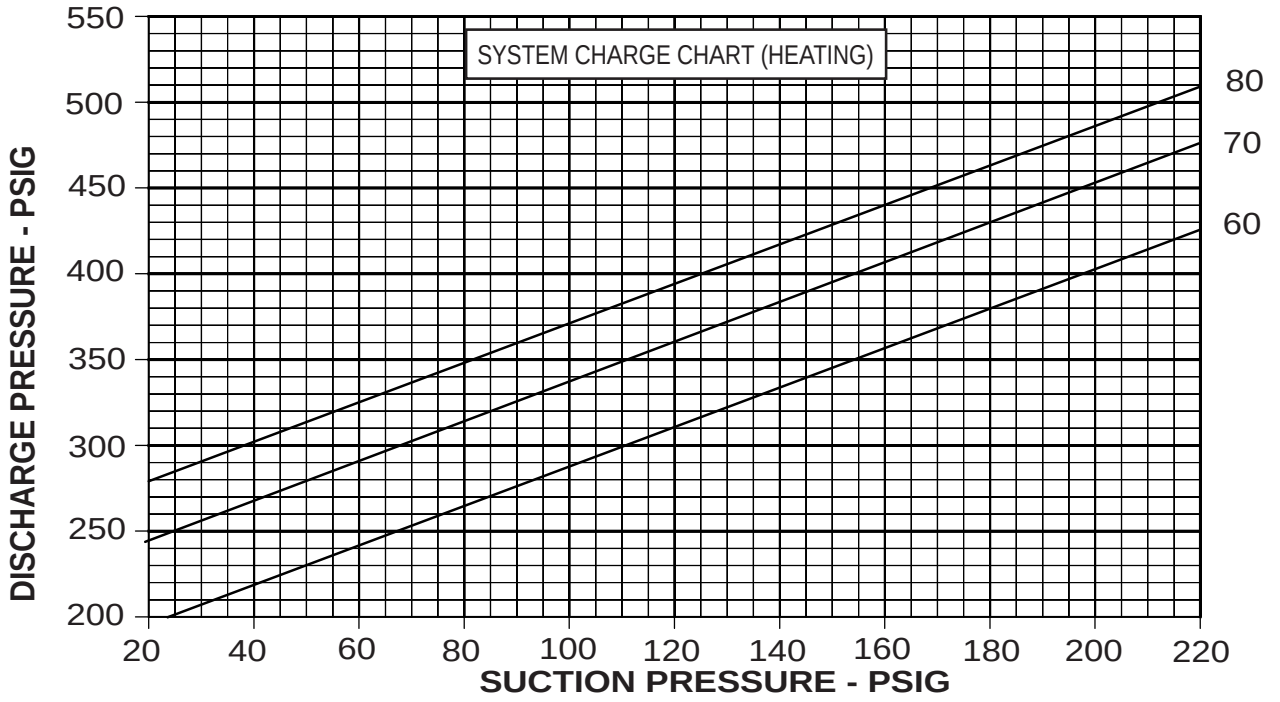


FIGURE 26
SYSTEM CHARGE CHARTS

2 TON DUAL FUEL

2.0 TON HP (R410A)





CAUTION: BEFORE FINAL REFRIGERANT CHECK, INDOOR RETURN AIR TEMPERATURE MUST BE BETWEEN 72°F & 76°F DB AT 50% R.H. (HEATING AND COOLING), AND NO ICE ON OUTDOOR COILS (HEATING).

INSTRUCTIONS:

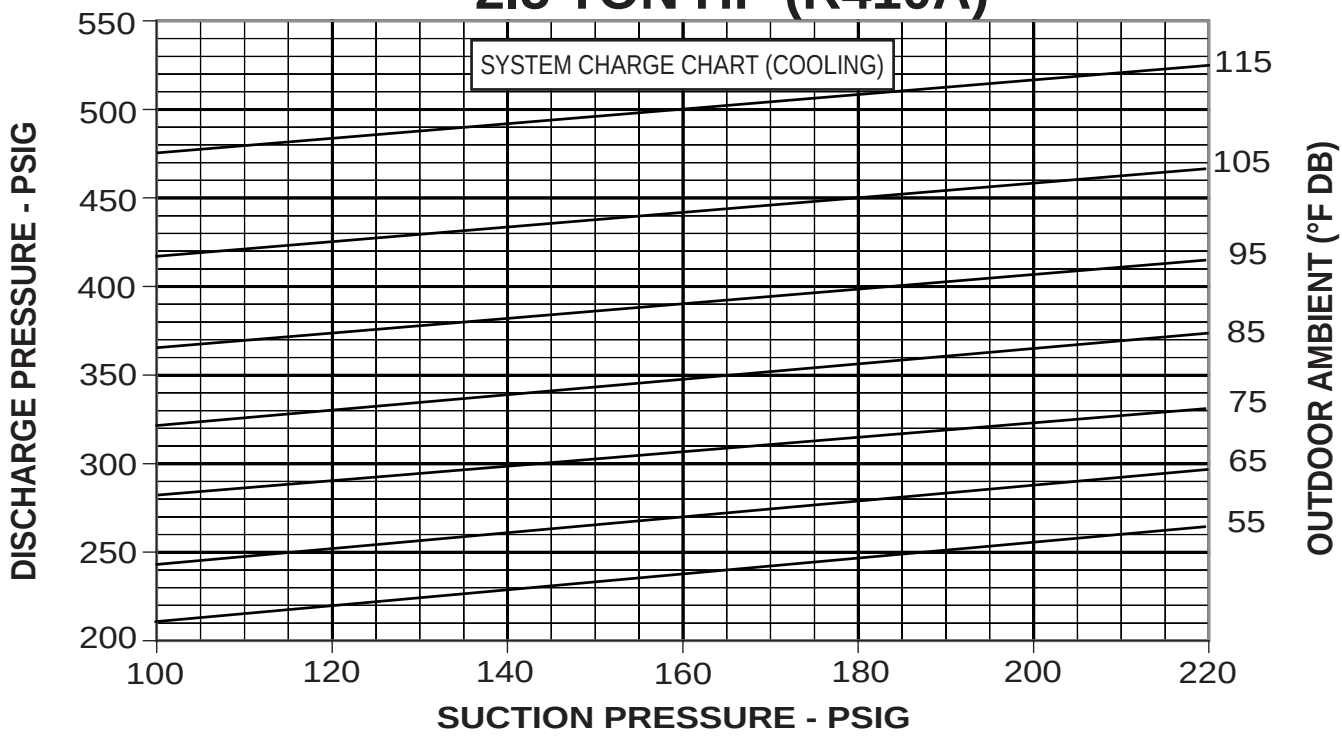
1. CONNECT PRESSURE GAUGES TO SUCTION AND DISCHARGE PORTS ON UNIT.
2. MEASURE AIR TEMPERATURE TO: (a) OUTDOOR COIL FOR COOLING, (b) INDOOR COIL FOR HEATING.
3. PLACE AN "X" ON THE APPROPRIATE CHART WHERE THE SUCTION AND DISCHARGE PRESSURES CROSS.
4. IF "X" IS BELOW AMBIENT TEMPERATURE LINE, ADD CHARGE AND REPEAT STEP 3.
5. IF "X" IS ABOVE AMBIENT TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT STEP 3.

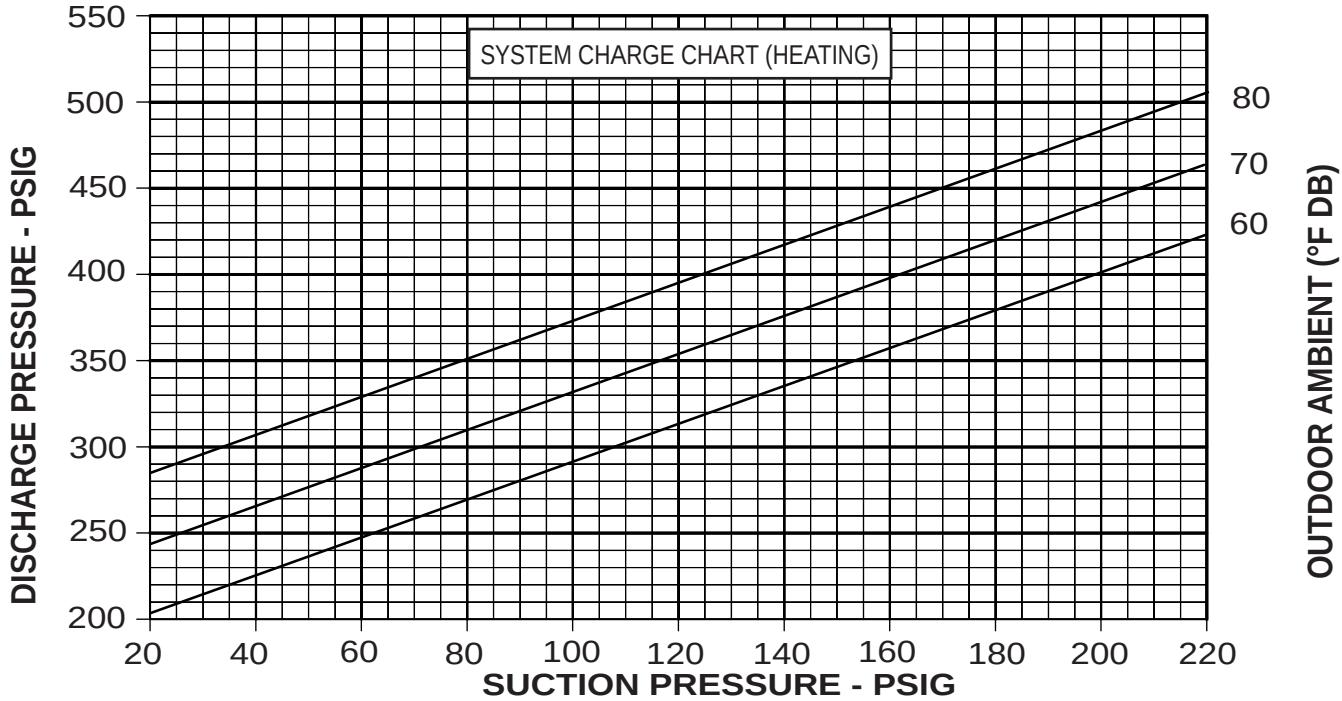
92-102223-01-01

FIGURE 27
SYSTEM CHARGE CHARTS

2.5 TON DUAL FUEL

2.5 TON HP (R410A)





CAUTION: BEFORE FINAL REFRIGERANT CHECK, INDOOR RETURN AIR TEMPERATURE MUST BE BETWEEN 72°F & 76°F DB AT 50% R.H. (HEATING AND COOLING), AND NO ICE ON OUTDOOR COILS (HEATING).

INSTRUCTIONS:

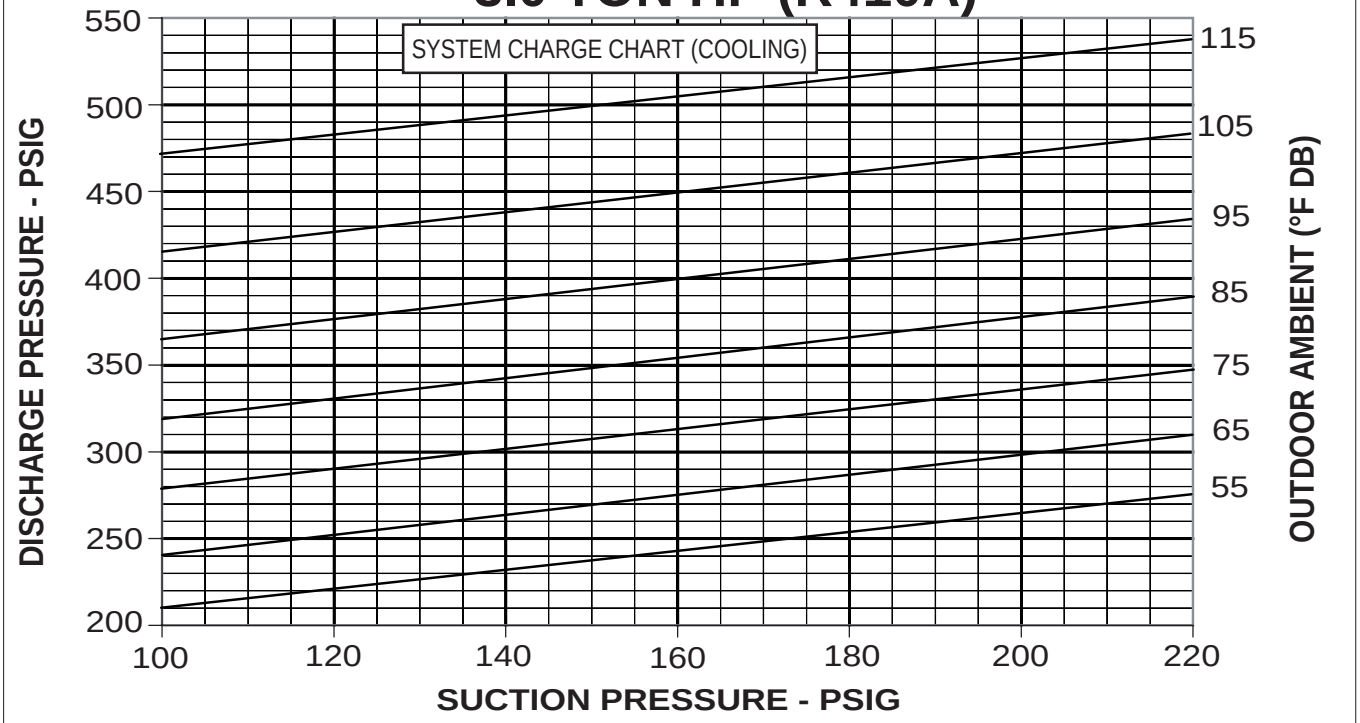
1. CONNECT PRESSURE GAUGES TO SUCTION AND DISCHARGE PORTS ON UNIT.
2. MEASURE AIR TEMPERATURE TO: (a) OUTDOOR COIL FOR COOLING, (b) INDOOR COIL FOR HEATING.
3. PLACE AN "X" ON THE APPROPRIATE CHART WHERE THE SUCTION AND DISCHARGE PRESSURES CROSS.
4. IF "X" IS BELOW AMBIENT TEMPERATURE LINE, ADD CHARGE AND REPEAT STEP 3.
5. IF "X" IS ABOVE AMBIENT TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT STEP 3.

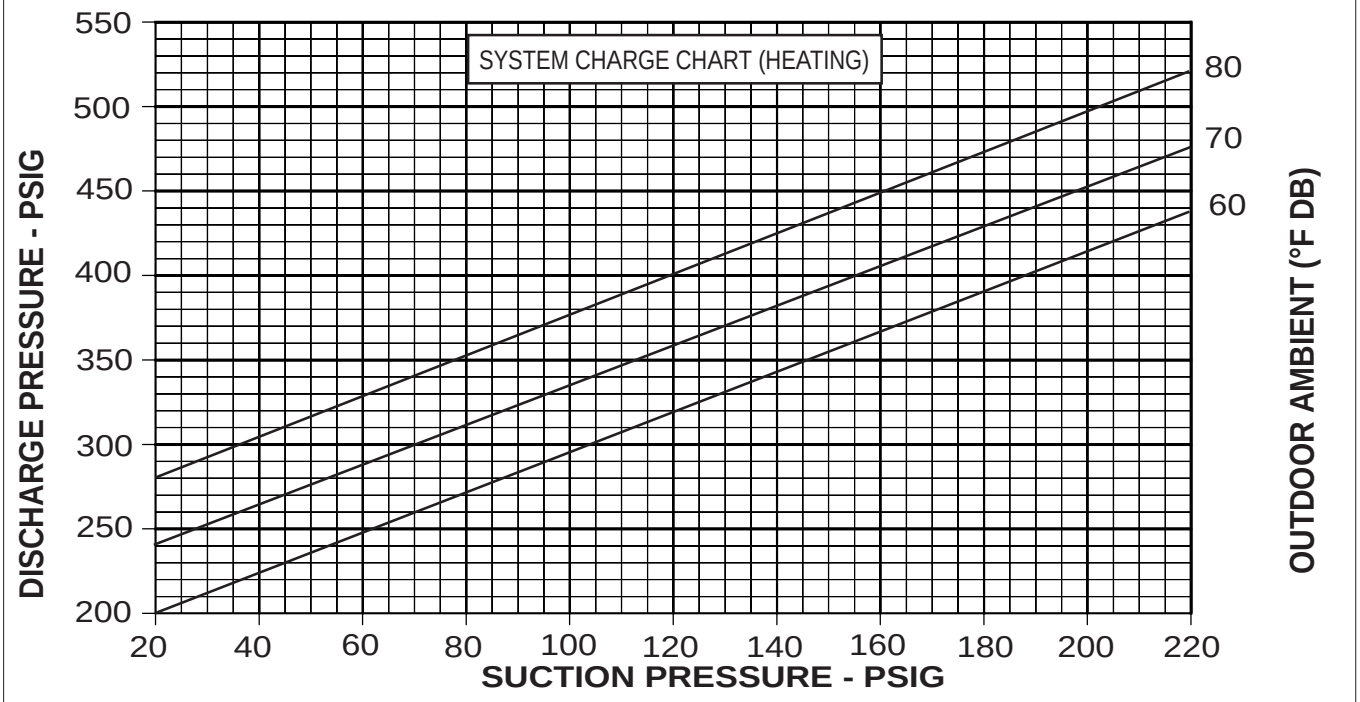
92-102223-02-01

FIGURE 28
SYSTEM CHARGE CHARTS

3 TON DUAL FUEL

3.0 TON HP (R410A)





CAUTION: BEFORE FINAL REFRIGERANT CHECK, INDOOR RETURN AIR TEMPERATURE MUST BE BETWEEN 72°F & 76°F DB AT 50% R.H. (HEATING AND COOLING), AND NO ICE ON OUTDOOR COILS (HEATING).

INSTRUCTIONS:

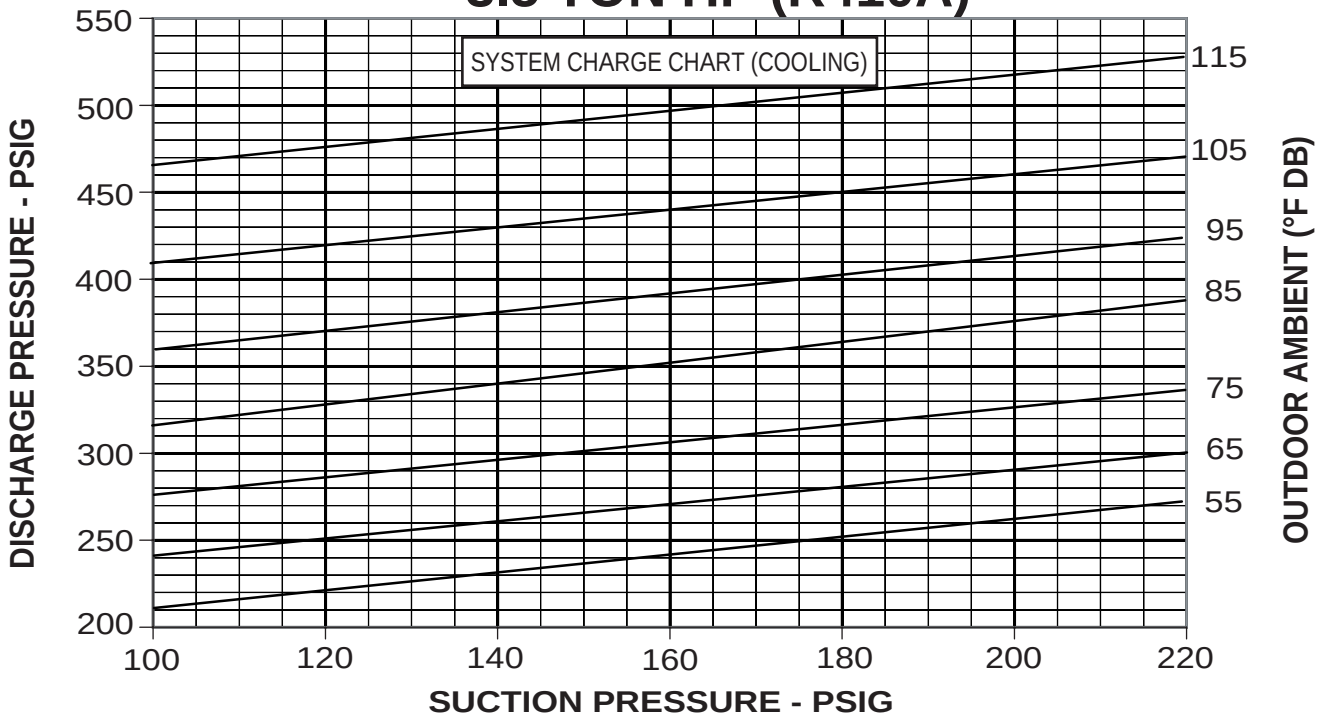
1. CONNECT PRESSURE GAUGES TO SUCTION AND DISCHARGE PORTS ON UNIT.
2. MEASURE AIR TEMPERATURE TO: (a) OUTDOOR COIL FOR COOLING, (b) INDOOR COIL FOR HEATING.
3. PLACE AN "X" ON THE APPROPRIATE CHART WHERE THE SUCTION AND DISCHARGE PRESSURES CROSS.
4. IF "X" IS BELOW AMBIENT TEMPERATURE LINE, ADD CHARGE AND REPEAT STEP 3.
5. IF "X" IS ABOVE AMBIENT TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT STEP 3.

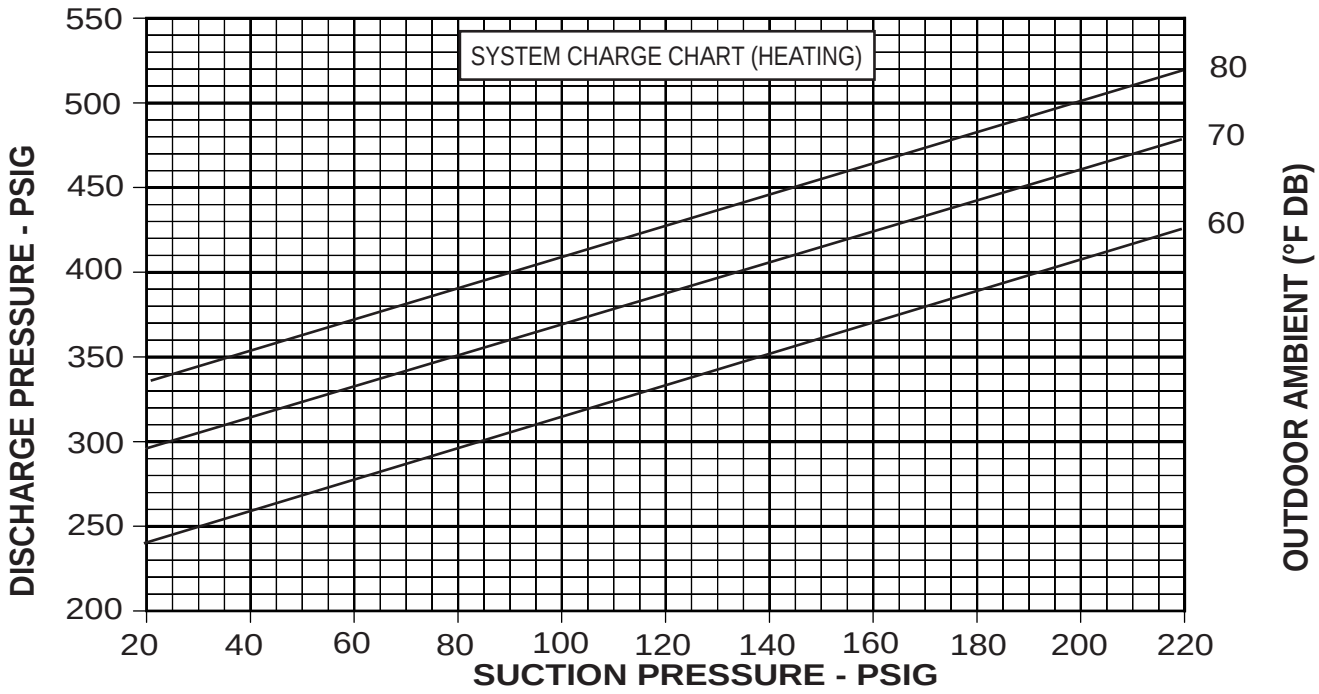
92-102223-03-01

FIGURE 29
SYSTEM CHARGE CHARTS

3.5 TON DUAL FUEL

3.5 TON HP (R410A)





CAUTION: BEFORE FINAL REFRIGERANT CHECK, INDOOR RETURN AIR TEMPERATURE MUST BE BETWEEN 72°F & 76°F DB AT 50% R.H. (HEATING AND COOLING), AND NO ICE ON OUTDOOR COILS (HEATING).

INSTRUCTIONS:

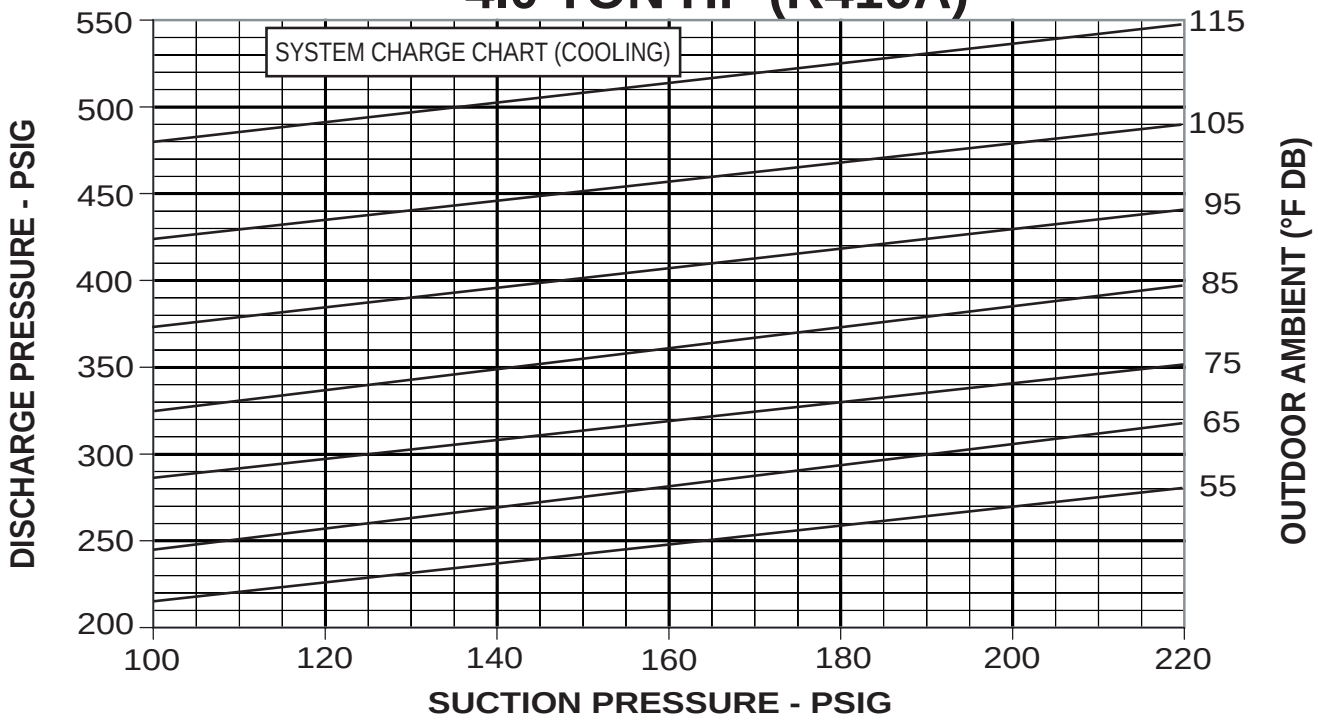
1. CONNECT PRESSURE GAUGES TO SUCTION AND DISCHARGE PORTS ON UNIT.
2. MEASURE AIR TEMPERATURE TO: (a) OUTDOOR COIL FOR COOLING, (b) INDOOR COIL FOR HEATING.
3. PLACE AN "X" ON THE APPROPRIATE CHART WHERE THE SUCTION AND DISCHARGE PRESSURES CROSS.
4. IF "X" IS BELOW AMBIENT TEMPERATURE LINE, ADD CHARGE AND REPEAT STEP 3.
5. IF "X" IS ABOVE AMBIENT TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT STEP 3.

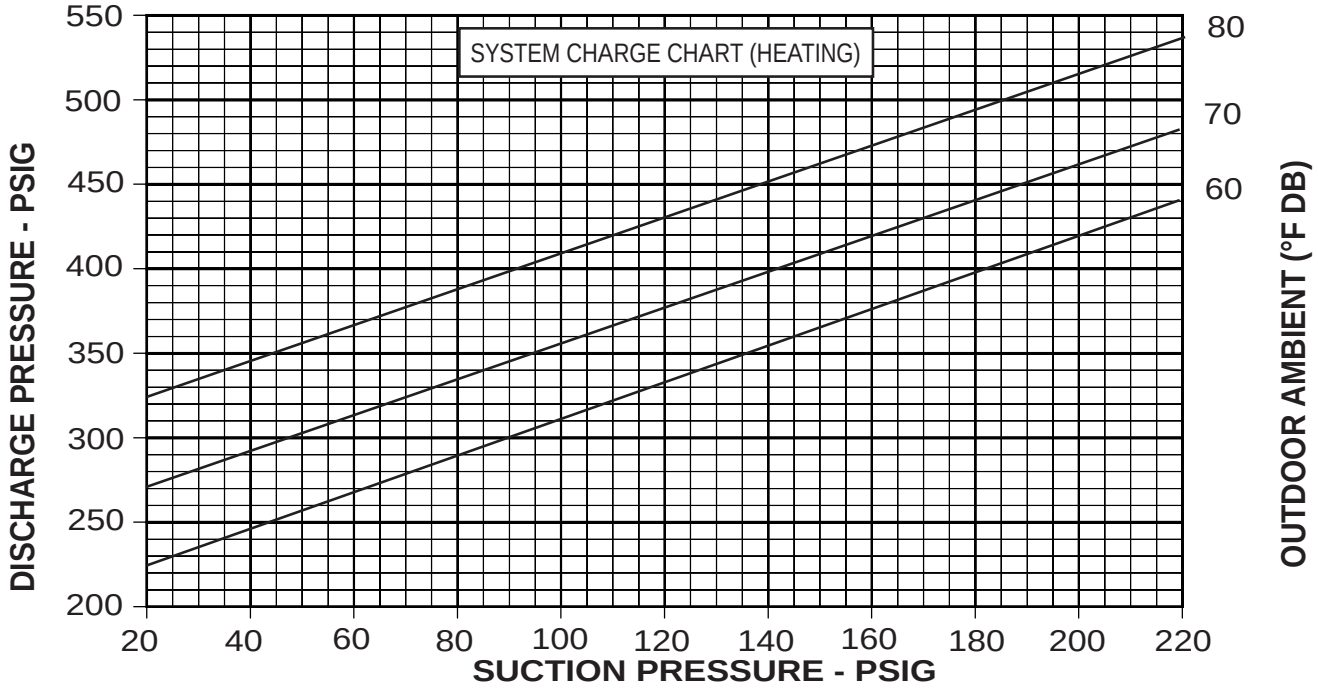
92-102223-04-01

FIGURE 30
SYSTEM CHARGE CHARTS

4 TON DUAL FUEL

4.0 TON HP (R410A)





CAUTION: BEFORE FINAL REFRIGERANT CHECK, INDOOR RETURN AIR TEMPERATURE MUST BE BETWEEN 72°F & 76°F DB AT 50% R.H. (HEATING AND COOLING), AND NO ICE ON OUTDOOR COILS (HEATING).

INSTRUCTIONS:

1. CONNECT PRESSURE GAUGES TO SUCTION AND DISCHARGE PORTS ON UNIT.
2. MEASURE AIR TEMPERATURE TO: (a) OUTDOOR COIL FOR COOLING, (b) INDOOR COIL FOR HEATING.
3. PLACE AN "X" ON THE APPROPRIATE CHART WHERE THE SUCTION AND DISCHARGE 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.

92-102223-05-01

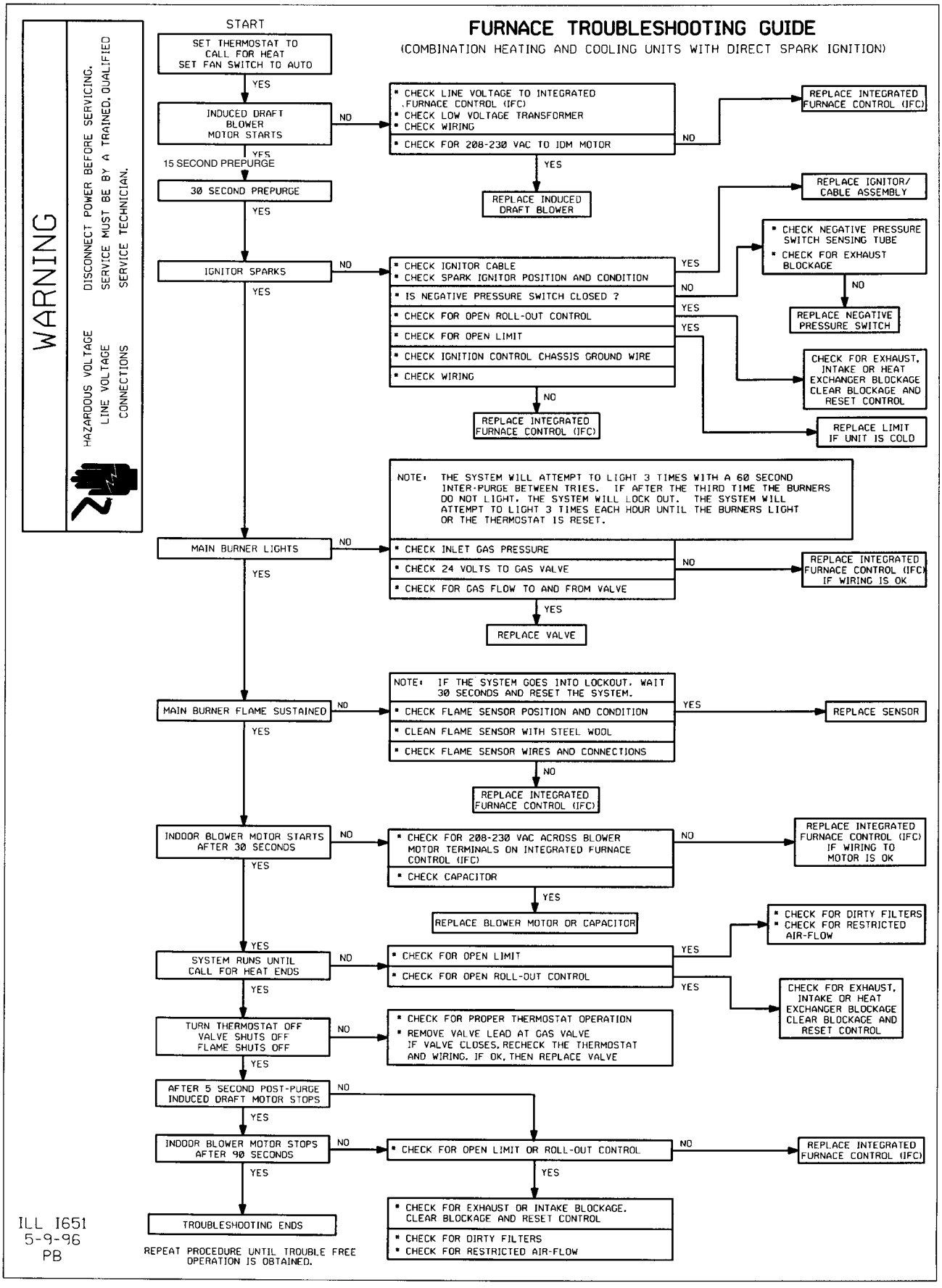
TROUBLE SHOOTING CHART

⚠ WARNING

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

SYMPTOM	POSSIBLE CAUSE	REMEDY
Unit will not run	• Power off or loose electrical connection • Thermostat out of calibration-set too high • Failed contactor • Blown fuses • Transformer defective • High pressure control open (if provided) • Interconnecting low voltage wiring damaged	• Check for correct voltage at compressor contactor in control box • Reset • Check for 24 volts at contactor coil - replace if contacts are open • Replace fuses • Check wiring-replace transformer • Reset-also see high head pressure remedy-The high pressure control opens at 450 PSIG • Replace thermostat wiring
Condenser fan runs, compressor doesn't	• Run or start capacitor failed (single phase only) • Start relay defective 9single phase only) • Loose connection • Compressor stuck, grounded or open motor winding open internal overload. • Low voltage condition • Low voltage condition	• 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	• Improperly sized unit • Improper airflow • Incorrect refrigerant charge • Air, non-condensibles or moisture in system • Incorrect voltage	• Recalculate load • Check - should be approximately 400 CFM per ton. • Charge per procedure attached to unit service panel. • Recover refrigerant, evacuate & recharge, add filter drier • At compressor terminals, voltage must be within 10% of rating plate volts when unit is operating.
Compressor short cycles	• Incorrect voltage • Defective overload protector • Refrigerant undercharge	• At compressor terminals, voltage must be ± 10% of nameplate marking when unit is operating. • Replace - check for correct voltage • Add refrigerant
Registers sweat	• Low evaporator airflow	• Increase speed of blower or reduce restriction - replace air filter
High head-low vapor pressures	• Restriction in liquid line, expansion device or filter drier • Flow check piston size too small • Incorrect capillary tubes • TXV does not open	• Remove or replace defective component • Change to correct size piston • Change coil assembly • Replace TXV
High head-high or normal vapor pressure - Cooling mode	• Dirty condenser coil • Refrigerant overcharge • Condenser fan not running • Air or non-condensibles in system	• Clean coil • Correct system charge • Repair or replace • Recover refrigerant, evacuate & recharge
Low head-high vapor pressures	• Defective Compressor valves • Incorrect capillary tubes	• Replace compressor • Replace coil assembly
Low vapor - cool compressor - iced evaporator coil	• Low evaporator airflow • Operating below 65°F outdoors • Moisture in system	• Increase speed of blower or reduce restriction - replace air filter • Add Low Ambient Kit • Recover refrigerant - evacuate & recharge - add filter drier
High vapor pressure	• Excessive load • Defective compressor	• Recheck load calculation • Replace
Fluctuating head & vapor pressures	• TXV hunting • Air or non-condensibles in system	• Check TXV bulb clamp - check air distribution on coil - replace TXV • Recover refrigerant, evacuate & recharge
Gurgle or pulsing noise at expansion device or liquid line	• Air or non-condensibles in system	• Recover refrigerant, evacuate & recharge
Circulating air blower & inducer run continuously, compressor will not start	• Manual reset overtemperature control • tripped • Wire loose in limit circuit	• Reset or replace • Check wiring

FIGURE 31


WARNING
HAZARDOUS VOLTAGE
LINE VOLTAGE
CONNECTIONS
DISCONNECT POWER BEFORE SERVICING.
SERVICE MUST BE BY A TRAINED, QUALIFIED
SERVICE TECHNICIAN.
START
FURNACE TROUBLESHOOTING GUIDE
(COMBINATION HEATING AND COOLING UNITS WITH DIRECT SPARK IGNITION)
SET THERMOSTAT TO CALL FOR HEAT SET FAN SWITCH TO AUTO
INDUCED DRAFT BLOWER MOTOR STARTS
15 SECOND PREPURGE
30 SECOND PREPURGE
IGNITOR SPARKS
MAIN BURNER LIGHTS
MAIN BURNER FLAME SUSTAINED
INDOOR BLOWER MOTOR STARTS AFTER 30 SECONDS
SYSTEM RUNS UNTIL CALL FOR HEAT ENDS
TURN THERMOSTAT OFF VALVE SHUTS OFF FLAME SHUTS OFF
AFTER 5 SECOND POST-PURGE INDUCED DRAFT MOTOR STOPS
INDOOR BLOWER MOTOR STOPS AFTER 90 SECONDS
TROUBLESHOOTING ENDS
REPEAT PROCEDURE UNTIL TROUBLE FREE OPERATION IS OBTAINED.
YES
NO
* CHECK LINE VOLTAGE TO INTEGRATED FURNACE CONTROL (IFC)
* CHECK LOW VOLTAGE TRANSFORMER
* CHECK WIRING
* CHECK FOR 208-230 VAC TO IDM MOTOR
REPLACE INTEGRATED FURNACE CONTROL (IFC)
REPLACE INDUCED DRAFT BLOWER
REPLACE IGNITOR/ CABLE ASSEMBLY
* CHECK IGNITOR CABLE
* CHECK SPARK IGNITOR POSITION AND CONDITION
* IS NEGATIVE PRESSURE SWITCH CLOSED ?
* CHECK NEGATIVE PRESSURE SWITCH SENSING TUBE
* CHECK FOR EXHAUST BLOCKAGE
REPLACE NEGATIVE PRESSURE SWITCH
* CHECK FOR OPEN ROLL-OUT CONTROL
* CHECK FOR OPEN LIMIT
* CHECK IGNITION CONTROL CHASSIS GROUND WIRE
* CHECK WIRING
CHECK FOR EXHAUST, INTAKE OR HEAT EXCHANGER BLOCKAGE CLEAR BLOCKAGE AND RESET CONTROL
REPLACE LIMIT IF UNIT IS COLD
REPLACE INTEGRATED FURNACE CONTROL (IFC)
NOTE: THE SYSTEM WILL ATTEMPT TO LIGHT 3 TIMES WITH A 60 SECOND INTER-PURGE BETWEEN TRIES. IF AFTER THE THIRD TIME THE BURNERS DO NOT LIGHT, THE SYSTEM WILL LOCK OUT. THE SYSTEM WILL ATTEMPT TO LIGHT 3 TIMES EACH HOUR UNTIL THE BURNERS LIGHT OR THE THERMOSTAT IS RESET.
* CHECK INLET GAS PRESSURE
* CHECK 24 VOLTS TO GAS VALVE
* CHECK FOR GAS FLOW TO AND FROM VALVE
REPLACE INTEGRATED FURNACE CONTROL (IFC) IF WIRING IS OK
REPLACE VALVE
NOTE: IF THE SYSTEM GOES INTO LOCKOUT, WAIT 30 SECONDS AND RESET THE SYSTEM.
* CHECK FLAME SENSOR POSITION AND CONDITION
* CLEAN FLAME SENSOR WITH STEEL WOOL
* CHECK FLAME SENSOR WIRES AND CONNECTIONS
REPLACE SENSOR
REPLACE INTEGRATED FURNACE CONTROL (IFC)
* CHECK FOR 208-230 VAC ACROSS BLOWER MOTOR TERMINALS ON INTEGRATED FURNACE CONTROL (IFC)
* CHECK CAPACITOR
REPLACE INTEGRATED FURNACE CONTROL (IFC) IF WIRING TO MOTOR IS OK
REPLACE BLOWER MOTOR OR CAPACITOR
* CHECK FOR DIRTY FILTERS
* CHECK FOR RESTRICTED AIR-FLOW
* CHECK FOR OPEN LIMIT
* CHECK FOR OPEN ROLL-OUT CONTROL
CHECK FOR EXHAUST, INTAKE OR HEAT EXCHANGER BLOCKAGE CLEAR BLOCKAGE AND RESET CONTROL
* CHECK FOR PROPER THERMOSTAT OPERATION
* REMOVE VALVE LEAD AT GAS VALVE IF VALVE CLOSES, RECHECK THE THERMOSTAT AND WIRING. IF OK, THEN REPLACE VALVE
* CHECK FOR OPEN LIMIT OR ROLL-OUT CONTROL
REPLACE INTEGRATED FURNACE CONTROL (IFC)
* CHECK FOR EXHAUST OR INTAKE BLOCKAGE. CLEAR BLOCKAGE AND RESET CONTROL
* CHECK FOR DIRTY FILTERS
* CHECK FOR RESTRICTED AIR-FLOW
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