

**USER'S MANUAL & INSTALLATION INSTRUCTIONS****Single Package Gas Heating / Electric Cooling - 3 Phase**

Premium Model Shown

**⚠ WARNING:****FIRE OR EXPLOSION HAZARD**

- Failure to follow safety warnings exactly could result in serious injury or property damage.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.
- Do not store or use gasoline or other flammable vapors and liquids 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.
- Leave the building immediately.
- Immediately call your gas supplier from a neighbors phone. Follow the gas suppliers instructions.
- If you cannot reach your gas supplier, call the fire department.

**DO NOT DESTROY. PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.****ATTENTION INSTALLERS:**

It is your responsibility to know this product better than your customer. This includes being able to install the product according to strict safety guidelines and instructing the customer on how to operate and maintain the equipment for the life of the product. Safety should always be the deciding factor when installing this product and using common sense plays an important role as well. Pay attention to all safety warnings and any other special notes highlighted in the manual. Improper installation of the unit or failure to follow safety warnings could result in serious injury, death, or property damage. These instructions are primarily intended to assist qualified individuals experienced in the proper installation of this appliance. Some local codes require licensed installation/service personnel for this type of equipment. After completing the installation, return these instructions to the customer's package for future reference.

# USER INFORMATION

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## WARRANTY INFORMATION

A warranty certificate with full details is included with the Air Conditioner. Carefully review these responsibilities with your dealer or service company. The manufacturer will not be responsible for any costs found necessary to correct problems due to improper setup, improper installation, adjustments, improper operating procedure on the part of the user, etc. Some specific examples of service calls which are not included in the limited warranty are:

- Correcting wiring problems in the electrical circuit supplying the Air Conditioner.
- Resetting circuit breakers or other switches.
- Adjusting or calibrating of thermostat.

# INSTALLER INFORMATION

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# USER INFORMATION

## IMPORTANT SAFETY INFORMATION

Safety markings are used frequently throughout this manual to designate a degree or level of seriousness and should not be ignored. **WARNING** indicates a potentially hazardous situation that if not avoided, could result in personal injury or death. **CAUTION** indicates a potentially hazardous situation that if not avoided, may result in minor or moderate injury or property damage.

## OPERATING INSTRUCTIONS

**NOTE:** Thermostat styles vary. Some models may not include the AUTO mode and others will have the AUTO in place of the HEAT and COOL. Others may include all three. Please refer to the thermostat manufacturer's User manual for detailed programming instructions.

**NOTE:** If the temperature level is re-adjusted, or the system mode is reset, the fan and compressor in the outdoor unit may not start immediately. A protective timer circuit holds the compressor and the outdoor fan off for approximately three minutes following a previous operation or the interruption of the main electrical power.

### Cooling Operation

1. Set the thermostat's system mode to COOL or AUTO and change the fan mode to AUTO. See Figure 1.
2. Set the temperature selector to the desired temperature level. The outdoor fan, compressor, and blower motor will all cycle on and off to maintain the indoor temperature at the desired cooling level.

### Heating Operation

1. Set the thermostat's system mode to HEAT or AUTO and change the fan mode to AUTO. See Figure 1.
2. Set the temperature selector to the desired temperature level. The compressor, outdoor fan, and blower motor will cycle on and off to maintain the indoor temperature at the desired heating level.

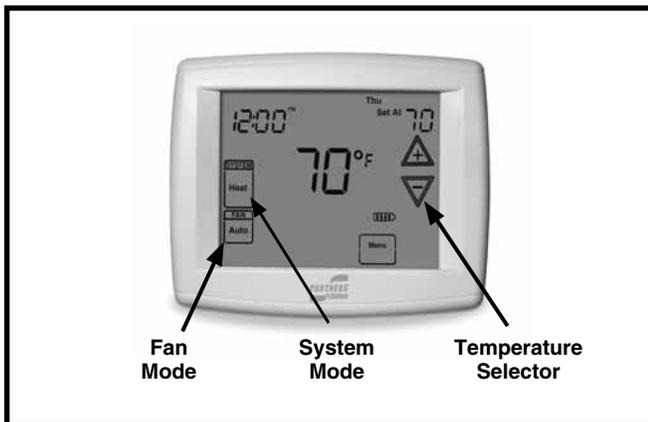


Figure 1. Digital Thermostat

## Turning the Unit OFF

Change the thermostat's system mode to OFF and the fan mode to AUTO (See Figure 1). **NOTE:** The system will not operate, regardless of the temperature selector setting.

## Operating the Indoor Blower Continuously

The continuous indoor blower operation is typically used to circulate the indoor air to equalize a temperature unbalance due to a sun load, cooking, or fireplace operation.

Set the thermostat fan mode to ON (Figure 1). The indoor blower starts immediately, and will run continually until the fan mode is reset to AUTO.

The continuous indoor blower operation can be obtained with the thermostat system mode set in any position, including OFF.

## UNIT MAINTENANCE

Proper maintenance is most important to achieve the best performance from the appliance and should be performed frequently at the beginning of each air conditioning season.

## WARNING:

**Your equipment contains liquid and gaseous refrigerant under pressure. Installation and servicing should only be attempted by qualified, trained personnel thoroughly familiar with the equipment and safe responsible refrigerant handling procedures. Failure to comply with this warning could result in equipment damage, personal injury, or death.**

- Keep the outdoor unit clean. Hose off periodically and keep unit fins clear of leaves and grass clippings.
- Keep the outdoor unit clear of obstructions. DO NOT obstruct airflow with tall plants or shrubs. DO NOT store gasoline or other flammable materials on or near the outdoor unit.
- Never operate the appliance without a filter installed in the return air duct. Inspect filters frequently and replace when necessary with filter of same dimensional size.

## TROUBLESHOOTING

If the unit fails to operate, check the following:

- Check the thermostat setting. Make sure the system mode and temperature settings are correct.
- Check the electrical panel for tripped circuit breakers.
- Check the filters for dust accumulation.
- Check the outdoor unit and make sure it is clean and not covered with grass or leaves.
- If the items above don't resolve your problems, then call your nearest service technician.

# INSTALLER INFORMATION

## IMPORTANT SAFETY INFORMATION

Please read all instructions before servicing this equipment. Pay attention to all safety warnings and any other special notes highlighted in the manual. Safety markings are used frequently throughout this manual to designate a degree or level of seriousness and should not be ignored. **WARNING** indicates a potentially hazardous situation that if not avoided, could result in personal injury or death. **CAUTION** indicates a potentially hazardous situation that if not avoided, may result in minor or moderate injury or property damage.

### **WARNING:**

Improper installation, service, adjustment, or maintenance may cause explosion, fire, electrical shock or other hazardous conditions which may result in personal injury or property damage. Unless otherwise noted in these instructions, only factory authorized kits or accessories may be used with this product.

### **CAUTION:**

This unit uses refrigerant R-410A. DO NOT use any other refrigerant in this unit. Use of another refrigerant will damage the unit.

### **WARNING:**

Shut off all electrical power to the unit before performing any maintenance or service on the system. Failure to comply may result in personal injury or death.

### **WARNING:**

These units are fully charged with R-410A refrigerant and ready for installation. When a system is installed according to these instructions, no refrigerant charging is required. If repairs make it necessary for evacuation and charging, it should only be attempted by qualified, trained personnel thoroughly familiar with this equipment. Some local codes require licensed installation service personnel to service this type of equipment. Under no circumstances should the homeowner attempt to install and/or service this equipment. Failure to comply with this warning could result in equipment damage, personal injury, or death.

### **WARNING:**

Do not place combustible material on or against the unit cabinet. Do not place combustible materials, including gasoline and any other flammable vapors and liquids, in the vicinity of the unit.

### **WARNING:**

**PROPOSITION 65 WARNING:** This product contains fiberglass insulation. Disturbing the insulation of this product during installation, maintenance, or repair may expose you to fiberglass insulation.

- Breathing this material may cause respiratory irritations.
- Fiberglass insulation may also cause eye irritation, skin sensitization, or other allergic responses in susceptible individuals.
- Always wear goggles, disposable gloves, long sleeved shirt, and appropriate breathing protection when working near this insulation. If contact with skin occurs, wash immediately with soap and water. In case of contact with eyes, flush immediately with water for at least 15 minutes. Contact a physician if needed.

### **WARNING:**

The information listed below and on the next page must be followed during the installation, service, and operation of this unit. Unqualified individuals should not attempt to interpret these instructions or install this equipment. Failure to follow safety recommendations could result in possible damage to the equipment, serious personal injury or death.

- The installation must conform with the National Fuel Gas Code (ANSI 2223.1, NFPA-54). Canadian installations must conform with CAN/CGA-B149 installation codes.
- The installer must comply with all local codes and regulations which govern the installation of this type of equipment. Local codes and regulations take precedence over any recommendations contained in these instructions. Consult local building codes and the National Electrical Code (ANSI C1) for special installation requirements.
- This equipment contains liquid and gaseous refrigerant under high pressure. Installation or servicing should only be performed by qualified trained personnel thoroughly familiar with this type equipment.

- All electrical wiring must be completed in accordance with local, state and national codes and regulations and with the National Electric Code (ANSI/NFPA 70) or in Canada the Canadian Electric Code Part 1 CSA C.22.1.
- Air Ducts must be installed in accordance with the standards of the National Fire Protection Association “Standards for Installation of Air Conditioning and Ventilation Systems” (NFPA 90A), “Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems” (NFPA 90B), these instructions, and all applicable local codes.
- Install this unit only in a location and position as specified on page 7. This unit is designed only for outdoor installations and should be located with consideration of minimizing the length of the supply and return ducts. Consideration should also be given to the accessibility of fuel, electric power, service access, noise, and shade.
- Before beginning the installation, verify that the unit model is correct for the job. The unit model number is printed on the data label. Follow all precautions in the literature, on tags, and on labels provided with the equipment. Read and thoroughly understand the instructions provided with the equipment prior to performing the installation and operational checkout of the equipment.
- Use only with the type of gas approved for this unit. Refer to the unit rating plate.
- Provide adequate combustion and ventilation air to the unit. See pages 7 - 9.
- Provide adequate clearances around the air vent intake terminal. See page 8.
- Combustion products must be discharged outdoors. Connect this unit to an approved vent system only, as specified on page 8.
- Never test for gas leaks with an open flame. Use a commercially available soap solution to check all connections (See page 17).
- Consult Table 10 (page 25), and the rating plate for the proper circulating air flow and temperature rise. It is important that the duct system be designed to provide the correct flow rates and external pressure rise. An improperly designed duct system can result in nuisance shutdowns, and comfort or noise issues.
- Installation of equipment may require brazing operations. Installer must comply with safety codes and wear appropriate safety equipment (safety glasses, work gloves, fire extinguisher, etc.) when performing brazing operations.
- This equipment is **NOT** to be used for temporary heating of buildings or structures under construction.

## REQUIREMENTS & CODES

**This unit must be installed in accordance with instructions outlined in this manual, all applicable local building codes, and the current revision of the National Fuel Gas Code (NFPA54/ANSI Z223.1) or the Natural Gas and Propane Installation Code, CAN/CGA B149.1.**

Additional codes listed below are for reference purposes only and do not necessarily have jurisdiction over local or state codes. Local codes and regulations take precedence over any recommendations contained in these instructions. Always consult with local authorities before installing any gas appliance.

### Combustion & Ventilation Air

- US: National Fuel Gas Code (NFGC), Air for Combustion and Ventilation
- CANADA: Natural Gas and Propane Installation Codes (NSCNGPIC), Venting Systems and Air Supply for Appliances

### Duct Systems

- US and CANADA: Air Conditioning Contractors Association (ACCA) Manual D, Sheet Metal and Air Conditioning Contractors National Association (SMACNA), or American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Fundamentals Handbook

### Electrical Connections

- US: National Electrical Code (NEC) ANSI/NFPA 70
- CANADA: Canadian Electrical Code CSA C22.1

### Gas Piping & Gas Pipe Pressure Testing

- US: NFGC and National Plumbing Codes
- CANADA: NSCNGPIC

### General Installation

- US: Current edition of the NFGC and the NFPA 90B. For copies, contact the National Fire Protection Association Inc., Batterymarch Park, Quincy, MA 02269; or American Gas Association, 400 N. Capitol, N.W., Washington DC 20001 or [www.NFPA.org](http://www.NFPA.org)
- CANADA: NSCNGPIC. For a copy, contact Standard Sales, CSA International, 178 Rexdale Boulevard, Etobicoke (Toronto), Ontario, M9W 1R3 Canada

### Safety

- US: (NFGC) NFPA 54–1999/ANSI Z223.1 and the Installation Standards, Warm Air Heating and Air Conditioning Systems ANSI/NFPA 90B.
- CANADA: CAN/CGA-B149.1 and .2–M00 National Standard of Canada. (NSCNGPIC)

## GENERAL INFORMATION

The R6GD Single Package Gas Heating / Electric Cooling Unit is designed only for outdoor rooftop or ground level installations and can be readily connected to the high static duct system of a home. This unit has been tested for capacity and efficiency in accordance with A.R.I. Standards and will provide many years of safe and dependable comfort, providing it is properly installed and maintained. With regular maintenance, this unit will operate satisfactorily year after year. Abuse, improper use, and/or improper maintenance can shorten the life of the appliance and create unsafe hazards.

To achieve optimum performance and minimize equipment failure, it is recommended that periodic maintenance be performed on this unit. The ability to properly perform maintenance on this equipment requires certain tools and mechanical skills.

### Before you install this unit

- √ The cooling load of the area to be conditioned must be calculated and a system of the proper capacity selected. It is recommended that the area to be conditioned be completely insulated and vapor sealed.
- √ Check the electrical supply and verify the power supply is adequate for unit operation. Consideration should be given to availability of electric power, service access, noise, and shade. If there is any question concerning the power supply, contact the local power company.
- √ All units are securely packed at the time of shipment and upon arrival should be carefully inspected for damage prior to installing the equipment at the job site. Verify coil fins are straight. If necessary, comb fins to remove flattened or bent fins. Claims for damage (apparent or concealed) should be filed immediately with the carrier.
- √ Survey the job site to determine the best location for mounting the outdoor unit. Choose an appropriate location that minimizes the length of the supply and return air ducts.
- √ The indoor unit (air handler, furnace, etc) should be installed before routing the refrigerant tubing. Refer to the indoor unit's instruction manual for installation details.
- √ Please consult your dealer for maintenance information and availability of maintenance contracts. Please read all instructions before installing the unit.

### Locating the Equipment

- Select a solid, level position, preferably on a concrete slab, slightly above the grade level, and parallel to the home. **DO NOT PLACE UNIT UNDER THE HOME.**
- Overhead obstructions, poorly ventilated areas, and areas subject to accumulation of debris should be avoided. Do not place the unit in a confined space or recessed area where discharge air from the unit to recirculate into the condenser air inlet, through the coil.
- Sufficient clearance for unobstructed airflow through the louvered control access panel and outdoor coil must be maintained in order to achieve rated performance. See Figure 2 for minimum clearances to obstructions.

- A clearance of at least 36 inches from the blower access panel and from the louvered control access panel is recommended for servicing and maintenance. **Where accessibility to combustibles clearances are greater than minimum clearances, accessibility clearances must take preference.**
- The hot condenser air must be discharged up and away from the home, and if possible, in a direction with the prevailing wind.
- If practical, place the air conditioner and its ducts in an area where they will be shaded from the afternoon sun, when the heat load is greatest.

### Heating Load

This unit should be sized to provide the design heating load requirement. Heating load estimates can be made using approved methods available from Air Conditioning Contractors of America (Manual J); American Society of Heating, Refrigerating, and Air Conditioning Engineers; or other approved engineering methods. For installations above 2,000 ft., the unit should have a sea level input rating large enough that it will meet the heating load after deration for altitude.

## COMBUSTION AIR REQUIREMENTS

### WARNING:

**Installation methods other than those described in the following sections must comply with the National Fuel Gas Code and all applicable local codes for providing sufficient combustion air to the furnace.**

Provisions must be made during the installation of this unit that provide an adequate supply of air for combustion.

- Instructions for determining the adequacy of an installation can be found in the current revision of the NFGC (ANSI Z223.1 / NFPA54). **Consult local codes for special requirements.** These requirements are for US installations as found in the NFGC.
- The requirements in Canada (B149.1) are structured differently. Consult with B149.1 and local code officials for Canadian installations.

Air openings in the door of the unit, warm air registers, and return air grilles must never be restricted. If the unit does not receive an adequate supply of air for combustion, the flame roll-out control located above the burners will open, turning off the gas supply to the burners. This safety device is a manually reset switch. **IMPORTANT NOTE: DO NOT install jumper wires across this control to defeat its function or reset the control without identifying and correcting the fault condition.**

If this control must be replaced, use only factory authorized replacement parts. See the Replacement Parts List on page 23.

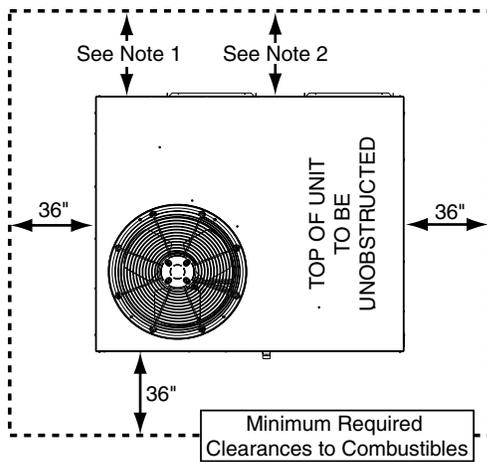


Figure 2. Clearance Requirements

**⚠ WARNING:**

**Combustible air must not be drawn from a contaminated atmosphere. Excessive exposure to contaminated combustion air will result in safety and performance related problems.**

To maximize heat exchanger life, the combustion air must be free of chemicals that can form corrosive acidic compounds in the combustion gases. The recommended source of combustion air is to use clean air from outside. **DO NOT place any chemicals with flammable or caustic vapors or these other corrosive chemicals near the vent termination:**

- Gasoline/Kerosene
- Permanent wave solutions
- Chlorinated waxes and cleaners
- Chlorine based swimming pool chemicals
- Water softening chemicals
- De-icing salts or chemicals
- Carbon tetrachloride
- Halogen type refrigerants
- Cleaning solvents
- Cements, glues, paint removers, varnishes, etc.
- Hydrochloric acid
- Masonry acid washing materials
- Plumbing Stack

**Venting Requirements**

This unit has been equipped with an integral venting system and designed to operate only with this venting system. No additional venting shall be used. This unit must be vented to the outdoors.

**⚠ WARNING:**

**This unit is intended for outdoor installation only. Do not vent the unit through a conventional venting system.**

A vent cover assembly has been supplied with the unit, and can be found secured to the gas controls within the

control area of this unit. **The vent cover assembly must be installed to assure proper operation of the unit.**

The following list summarizes the requirements for the location of the vent system termination:

- The location of the vent termination must be consistent with the National Fuel Gas Code (ANSI Z223.1) or CAN/CGA-B149 Installation Codes.
- The vent termination must be located at least 4 feet horizontally from any electric meters, gas meters, regulators, and relief equipment.
- The vent termination must be located at least 3 feet above any forced air inlet located within 10 feet.
- The vent termination must be located at least 4 feet below, 4 feet horizontally from, or 1 foot above any door, window, or gravity air inlet into any building.
- The vent termination must be located at least 1 foot above grade.
- The unit should be installed in a way that prevents any obstruction of the vent termination during accumulating snow.
- The unit installation shall avoid areas where condensate drainage may cause problems by dropping on planters or patios, etc. Also verify exhaust gases will not impinge on windows or building surfaces, which may be compromised or damaged by condensation.
- Do not install the unit such that exhaust from the vent termination is directed into window wells, stairwells, under decks, or in alcoves or similarly recessed areas. The vent termination must not be located above any public walkways.

Figure 3 shows the proper installation of the vent cover assembly over the vent outlet on the exterior of the corner panel. The fasteners used to secure the vent cover assembly have been included in the owner's package.

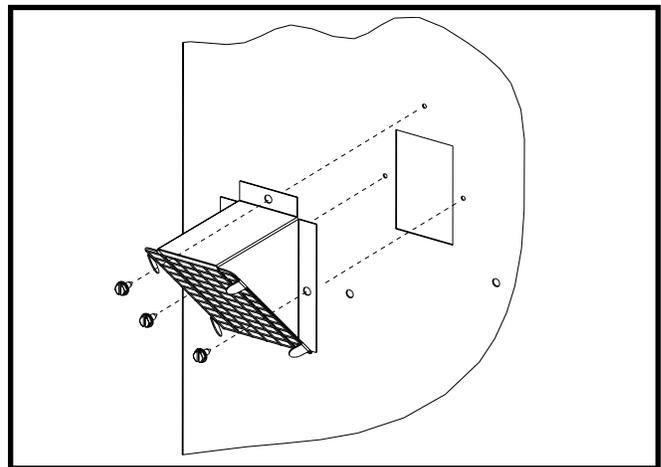


Figure 3. Vent Assembly

**⚠ WARNING:**

**CARBON MONOXIDE POISONING HAZARD**  
Failure to follow the steps outlined below for each appliance connected to the venting system being placed into operation could result in carbon monoxide poisoning or death.

The following steps shall be followed with each individual appliance connected to the venting system being placed in operation, while all other appliances connected to the venting system are not in operation:

1. Seal any unused openings in the venting system.
2. Inspect the venting system for proper size and horizontal pitch, as required in the National Fuel Gas Code, ANSI Z223.1/NFPA 54 or the CSA B149.1, Natural Gas and Propane Installation Codes and these instructions. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. As far as practical, close all building doors and windows and all doors between the space in which the appliance(s) connected to the venting system are located and other spaces of the building.
4. Close fireplace dampers.
5. Turn on clothes dryers and any appliance not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they are operating at maximum speed. Do not operate a summer exhaust fan.
6. Follow the lighting instructions. Place the appliance being inspected into operation. Adjust the thermostat so appliance is operating continuously.
7. Test for spillage from draft hood equipped appliances at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle.
8. If improper venting is observed during any of the above tests, the venting system must be corrected in accordance with the National Fuel Gas Code, ANSI Z223.1/NFPA 54 and/or CSA B149.1, Natural Gas and Propane Installation Codes.
9. After it has been determined that each appliance connected to the venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-fired burning appliance to their previous conditions of use.

**⚠ AVERTISSEMENT:**

**RISQUE D'EMPOISONNEMENT AU MONOXYDE DE CARBONE**

Le non-respect des consignes suivantes portant sur chacun des appareils raccordés au système d'évacuation mis en service pourrait entraîner l'empoisonnement au monoxyde de carbone ou la mort. Les consignes suivantes doivent être observées pour chaque appareil raccordé au système d'évacuation mis en service si les autres appareils raccordés au système ne sont pas en service:

1. Sceller toute ouverture non utilisée de la système d'évacuation;
2. S'assurer que la système d'évacuation présente des dimensions et une pente horizontale conformes à la norme ANSI Z223.1/NFPA 54, intitulée National Fuel Gas Code ou aux codes d'installation CSA-B149.1, ainsi qu'aux présentes instructions. S'assurer que la système d'évacuation n'est pas bloquée, restreinte, corrodée, qu'elle ne fuit pas et qu'elle ne présente aucun autre défaut potentiellement dangereux;
3. Dans la mesure du possible, fermer toutes les portes et fenêtres du bâtiment, et toutes les portes entre la pièce où se trouve l'appareil raccordé à la système d'évacuation et les autres pièces du bâtiment.
4. Fermer les registres des foyers;
5. Mettre en service les sècheuses et tout autre appareil qui n'est pas raccordé à la système d'évacuation. Faire fonctionner à régime maximal tout ventilateur d'évacuation, tel que les hottes de cuisinière et les ventilateurs de salles de bains. Ne pas mettre en service les ventilateurs d'été.
6. Respecter les instructions d'allumage. Mettre en service l'appareil à l'essai. Régler le thermostat de manière à ce que l'appareil fonctionne sans interruption;
7. Vérifier s'il y a débordement à l'orifice d'évacuation du coupe tirage des appareils dotés d'un coupe tirage 5 minutes après l'allumage du brûleur principal. Utiliser la flamme d'une allumette ou d'une chandelle.
8. Si l'on constate, au cours de l'un des essais qui précèdent, que l'évacuation est déficiente, corriger le système d'évacuation conformément à la norm ANSI Z223.1/NFPA 54, National Fuel Gas Code, et (ou) aux codes d'installation CSA B149.1.
9. Après avoir déterminé que tous les appareils raccordés à la système d'évacuation évacuent correctement tel que prescrit ci-dessus, rouvrir les portes et les fenêtres et remettre les ventilateurs d'évacuation, les registres de foyers et tout autre appareil fonctionnant au gaz à leur état de fonctionnement initial.

## CIRCULATING AIR SUPPLY

### **WARNING:**

Products of combustion must not be allowed to enter the return air ductwork or the circulating air supply. 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.

All return ductwork must be adequately sealed, all joints must be taped, and the ductwork must be secured to the unit with sheet metal screws. When return air is provided through the bottom of the unit, the joint between the unit and the return air plenum must be air tight.

The roof curb or cement pad that the unit is mounted must provide sound physical support of the unit with no gaps, cracks, or sagging between the unit and pad.

Return air and circulating air ductwork must not be connected to any other heat producing device such as a fireplace insert, stove, etc. Doing so may result in fire, explosion, carbon monoxide poisoning, personal injury, or property damage.

### Air Ducts

This unit is designed only for use with a supply and return duct. Air ducts should be installed in accordance with the standards of the National Fire Protection Association "Standard for Installation of Air Conditioning Systems" (NFPA 90A), "Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems" (NFPA 90B), and all applicable local codes. NFPA publications are available by writing to: National Fire Protection Association, Batterymarch Park, Quincy, ME 02269 or visit [www.NFPA.org](http://www.NFPA.org) on the web.

- Design the duct work according to Manual D by the Air Conditioning Contractors of America (ACCA).
- The ducts must be properly sized and not exceed 0.2" W.C. pressure drop at 400 scfm per nominal ton of cooling capacity.
- Duct work should be attached directly to the unit flanges for horizontal applications.
- If roof curb is installed, the ducts must be attached to the curb hangers, not the unit.
- It is recommended that the outlet duct be provided with a removable access panel. The opening should be accessible when the unit is installed in service and shall be sized so that smoke or reflected light may be observed inside the casing to indicate the presence of leaks in the heat exchanger. The cover for the opening shall be attached in a way that will prevent leaks.
- If outside air is utilized as return air to the unit for ventilation or to improve indoor air quality, the system must be designed so that the return air to the unit is not

less than 50° F (10° C) during heating operation.

- If a combination of indoor and outdoor air is used, the ducts and damper system must be designed so that the return air supply to the furnace is equal to the return air supply under normal, indoor return air applications.

### Air Filter Requirements

### **WARNING:**

Never operate the unit without a filter in place. Dust and lint could accumulate on internal parts, resulting in loss of efficiency, equipment damage and possible fire.

- A suitable air filter must be installed upstream of the evaporator coil of the return air system. Refer to Table 1 for recommended filter sizes.
- All return air must pass through the filters before entering the evaporator coil. It is important that all filters be kept clean and replaced frequently to ensure proper operation of unit. Dirty or clogged filters will reduce the efficiency of the unit and result in unit shutdowns.
- Air filter pressure drop must not exceed 0.08 inches WC.
- Downflow Installations require an internal filter accessory kit to be installed.
- Horizontal Installations require the air filter system be installed in the return air ductwork.

**NOTE TO INSTALLER:** After installing or replacing the filtration system for this unit, add the following statement on or adjacent to the filter service panel: **"Replace filter(s) installed in your system only with the same dimensional size filters that are being replaced."**

NOMINAL COOLING (TONS)	APPROXIMATE AIR FLOW RANGE (CFM)	APPROXIMATE FILTER AREA (SQ. IN.)*	RECOMMENDED FILTER SIZE (IN. X IN.)
3.0	1,100 - 1,300	625	25 x 25
4.0	1,400 - 1,800	850	18 x 24 (2 required)
5.0	1,800 - 2,200	1,000	20 x 25 (2 required)

\* Based on velocity of 300 ft/min for disposable filters and 500 ft/min for high velocity (cleanable) Filters.

**Table 1. Air Filter Requirements**

### Unconditioned Spaces

All duct work passing through unconditioned space must be properly insulated to minimize duct losses and prevent condensation. Use insulation with an outer vapor barrier. Refer to local codes for insulation material requirements.

### Acoustical Duct Work

Certain installations may require the use of acoustical lining inside the supply duct work.

- Acoustical insulation must be in accordance with the current revision of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) application standard for duct liners.
- Duct lining must be UL classified batts or blankets with a fire hazard classification of FHC-25/50 or less.

- Fiber duct work may be used in place of internal duct liners if the fiber duct work is in accordance with the current revision of the SMACNA construction standard on fibrous glass ducts. Fibrous duct work and internal acoustical lining must be NFPA Class 1 air ducts when tested per UL Standard 181 for Class 1 ducts.

## UNIT INSTALLATION

### Packaging Removal

Remove the shipping carton and User's Manual from the equipment. Take care not to damage the tubing connections when removing the carton. For rooftop installations, remove and discard the two supports attached beneath the unit.

### Rigging & Hoisting

#### **WARNING:**

To avoid the risk of property damage, personal injury, or death, it is the rigger's responsibility to ensure that whatever means are used to hoist the unit are safe and adequate:

- The lifting equipment must be adequate for the load. Refer to Table 9 (page 24) for unit weights.
- The unit must be lifted from the holes in the base rails using cables or chains.
- Spreader bars are required to protect the unit and ensure even loading.
- Keep the unit in an upright position at all times. The rigging must be located outside the units center of gravity. Refer to Figure 10 (page 24) for locating the center of gravity.
- All panels must be securely in place during rigging and hoisting.

### Clearances to Combustible Materials

R6GD units are certified as combination heating and cooling equipment for outdoor rooftop or ground level installations. Units may be installed on combustible flooring or Class A, B, or C roofing material when used with bottom supply and return air ducts as long as the following requirements are met:

- If using horizontal supply and return air ducts, the horizontal roof curb kit and return air kit must be installed prior to unit installation. Horizontal roof curb is required.
- If using bottom discharge with return air ducts a roof curb must be installed prior to unit installation. See Rigging and Hoisting section for setting of the unit.
- Sufficient clearance for unobstructed airflow through the outdoor coil must also be maintained in order to achieve rated performance. See page 7 for information about locating the equipment.

### Ground Level

Ground level installations must be located according to local building codes or ordinances and these requirements:

- Clearances must be in accordance with those shown in Figure 2 (page 7).

- A suitable mounting pad (Figure 4, page 12) must be provided and be separate from the building foundation. The pad must be level to ensure proper condensate disposal and strong enough to support the unit's weight. The slab height must be a minimum of 2" (5cm) above grade and with adequate drainage.
- Units require horizontal roof curb and return air kit for horizontal installations.
- Ductwork should be attached directly to flanges on panels supplied in horizontal duct conversion kits.

### Rooftop

Rooftop installations must be located according to local building codes or ordinances and these requirements:

- The roof must be capable of handling the weight of the unit. For unit weights, see Table 9. Reinforce the roof if necessary.
- The appropriate accessory roof curb (Figure 5, page 12) must be installed prior to unit installation. The roof curb must be square and level to ensure proper condensate drainage. **Please follow all instructions provided with the kit.**
- Secure roof curb or frame to roof using acceptable mechanical methods per local codes. **NOTE:** Make sure the two supports beneath the unit have been removed.

### Condensate Drain

Condensate is removed from the unit through the 3/4" female pipe fitting (Figure 6, page 12) located on the front side of the unit. Install a 2 inch condensate trap in the drain line of the same size and prime with water. When connecting rigid drain line, hold the female fitting with a wrench to prevent twisting. **Do not over tighten!** Refer to local codes and restrictions for proper condensate disposal requirements.

### Horizontal to Downflow Conversion

The unit is shipped ready for horizontal duct connections. If down flow ducts are required, the unit must be converted following the steps below for both the supply and return ducts.

1. Remove the horizontal duct cap.
2. Locate the duct cap inside the duct openings and remove the screw holding it in place.
3. Lift the cap out of the unit. (**Hint:** The cap can be pushed up from the bottom by reaching through the fork slot).
4. Cover the horizontal duct opening with the horizontal duct cap. The insulation will be on the indoor side.
5. Fasten the cover with screws to seal.

### Removal of Internal Filter Rack (3 Phase Only)

1. Remove the return air panel from the unit.
2. Remove the height adjustment screw from the inside of the rack.
3. Remove (1) screw securing the assembly to the coil located on the left leg of the rack. **NOTE:** The assembly can now be easily collapsed and removed from the unit. See Figure 7 for filter rack securing screw locations.

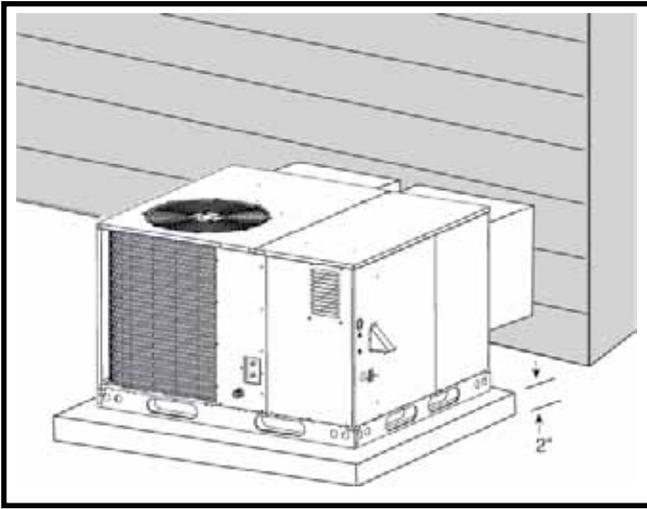


Figure 4. Ground Level Installation

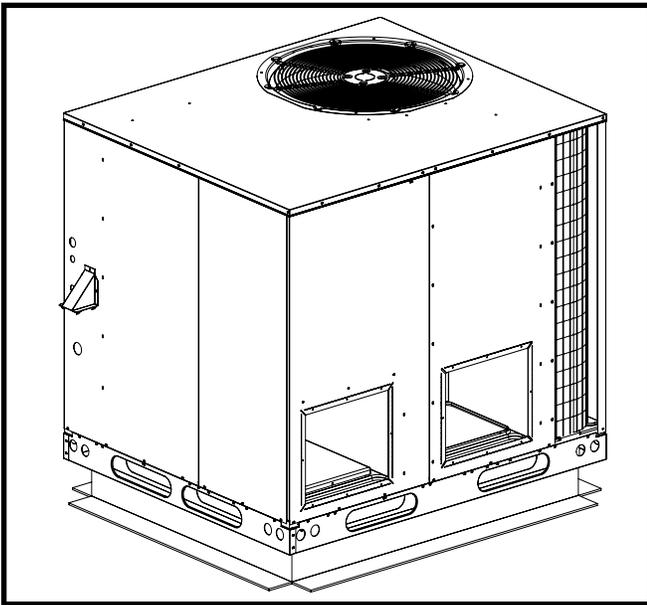


Figure 5. Roof Top Installation

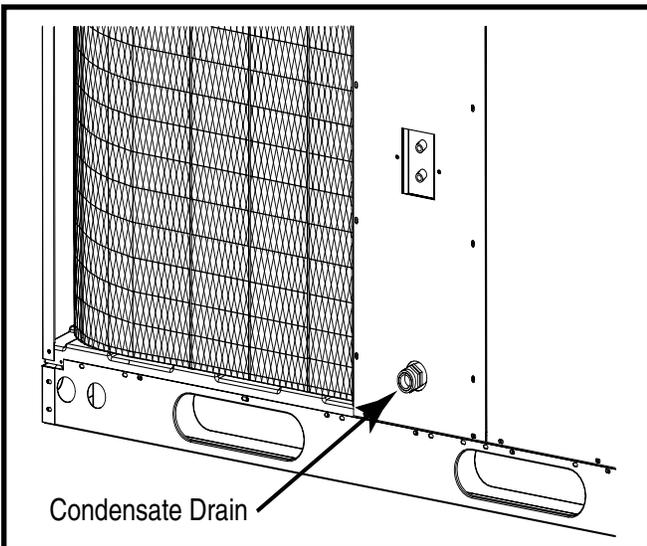


Figure 6. Condensate Drain Location

### Installing Filters in the Filter Rack (3 Phase Only)

1. Remove access panel screws from return air panel. (**HINT:** Loosen the unit's top panel screws near the top edge of the access panel. The access panel was designed to be captured underneath the top panel.)
2. Slide the first filter between both guide channels of filter rack and allow the filter to drop easily into place.
3. Verify the bottom of the filter is within the channels of the rack.
4. Slide the 2nd filter between both guide channels of filter rack.
5. Verify the bottom of the filter is within the channels of the rack.
6. Replace access cover by sliding the top edge of panel under the lip of the unit's top panel. Secure access panel by replacing the screws.

### Removing Filters from Filter Rack (3 Phase Only)

1. Remove access panel screws from return air panel. (**Hint:** Loosen the unit's top panel screws near the top edge of the access panel. The access panel was designed to be captured underneath the top panel.)
2. Remove upper filter by gently pulling filter through the access panel opening.
3. Remove lower filter by lifting media to top of filter rack. Remove in the same manner as described in step 2.
4. Install new filter in the filter rack as described in the previous section.

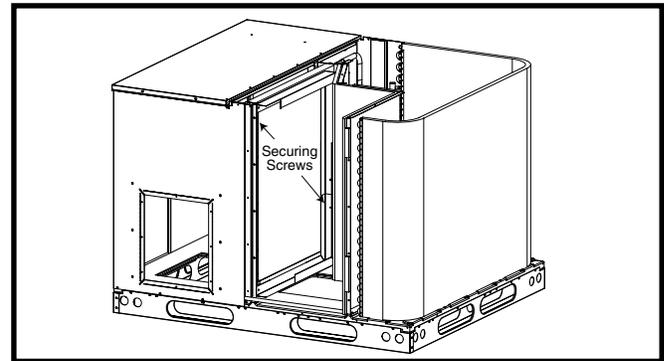


Figure 7. Internal Filter Rack Location

UNIT SIZE	INTERNAL FILTER SIZE
R6GD-X36	(2) 16" x 25" x 1"
	or (2) 16" x 25" x 2"
R6GD-X48 / X60	(2) 18" x 25" x 1"
	or (2) 18" x 25" x 2"

Table 2. Internal Filter Sizes

## ELECTRICAL WIRING

### **WARNING:**

**To avoid risk of electrical shock, personal injury, or death, disconnect all electrical power to the unit before performing any maintenance or service. The unit may have more than one electrical supply.**

**Label all wires prior to disconnection when servicing the unit. Wiring errors can cause improper and dangerous operation**

- All electrical connections must be in compliance with all applicable local codes and ordinances, and with the current revision of the National Electric Code (ANSI/NFPA 70).
- For Canadian installations the electrical connections and grounding shall comply with the current Canadian Electrical Code (CSA C22.1 and/or local codes).

#### **Pre-Electrical Checklist:**

- ✓ Verify the voltage, frequency, and phase of the supply source match the specifications on the unit rating plate.
- ✓ Verify that the service provided by the utility is sufficient to handle the additional load imposed by this equipment. See Table 3 or the unit wiring label for proper high and low voltage wiring.
- ✓ Verify factory wiring is in accordance with the unit wiring diagram (Figures 12 - 13, pages 28 - 29). Verify none of the connections loosened during shipping or installation.

#### **Line Voltage**

- The line voltage to the unit should be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the unit.
- **An electrical disconnect must be located within sight of and readily accessible to the unit.** This switch shall be capable of electrically de-energizing the outdoor unit.

See unit data label for proper incoming field wiring. Any other wiring methods must be acceptable to authority having jurisdiction.

- Use only copper wire for the line voltage power supply to this unit (Table 4, page 14). Use proper code agency listed conduit and a conduit connector for connecting the supply wires to the unit. Use of rain tight conduit is recommended.
- Provide power supply for the unit in accordance with the unit wiring diagram and the unit rating plate.
- Overcurrent protection must be provided at the branch circuit distribution panel and sized as shown on the unit rating label and according to applicable local codes. See the unit rating plate for maximum circuit ampacity and maximum overcurrent protection limits.
- A wiring diagram is located on the inside cover of the control access panel of the outdoor unit. The installer should become familiar with the wiring diagram before making any electrical connections to the outdoor unit. See Figures 12 - 13.
- If any of the original wires supplied with the unit must be replaced, they must be replaced with material of the same gauge and temperature rating.
- Units are shipped from the factory wired for 240 volt transformer operation. For 208V operation, remove the lead from the transformer terminal marked 240V and connect it to the terminal marked 208V. Three phase, 460V units are shipped wired for 460V operation.
- Internally mounted circuit breakers are available as field installed options. These circuit breakers can be used as an electrical disconnect.
- Connect the line-voltage leads to the terminals on the contactor (or the circuit breaker if the field installed circuit breaker kits are used) inside the control compartment.

Model Number	Heating Input (BTUh)	Nominal Electrical Supply	Voltage Range		Compressor		Fan Amps	Blower Motor Amps	Minimum Circuit Ampacity	Maximum Over-current Protection
			Min.	Max.	RLA	LRA				
R6GD-X36C	72,000	208/-230/60/3	187	253	11.6	73.0	1.2	4.1	21.2	30
	96,000	208/-230/60/3	187	253	11.6	73.0	1.2	4.1	21.2	30
R6GD-X48C	96,000	208/-230/60/3	187	253	15.3	83.1	1.2	6	27.7	40
	120,000	208/-230/60/3	187	253	15.3	83.1	1.2	6	27.7	40
R6GD-X60C	96,000	208/-230/60/3	187	253	17.4	110.0	1.2	7.6	31.9	45
	120,000	208/-230/60/3	187	253	17.4	110.0	1.2	7.6	31.9	45

R6GD-X36D	72,000	460/60/3	414	506	6.4	38	0.6	2.1	12.1	15
	96,000	460/60/3	414	506	6.4	38	0.6	2.1	12.1	15
R6GD-X48D	96,000	460/60/3	414	506	6.9	41	0.6	3.2	13.8	20
	120,000	460/60/3	414	506	6.9	41	0.6	3.2	13.8	20
R6GD-X60D	96,000	460/60/3	414	506	8.6	52	0.6	4.0	16.7	25
	120,000	460/60/3	414	506	8.6	52	0.6	4.0	16.7	25

**Note:** FLA = Full Load Amps; LRA = Lock Rotor amps; RLA = Rated Load Amps.

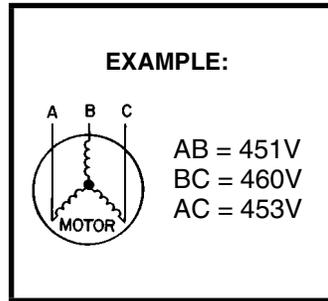
**Table 3. Electrical Data.**

## Unbalanced 3-Phase Supply Voltage

Voltage unbalance occurs when the voltages of all phases of a 3-phase power supply are no longer equal. This unbalance reduces motor efficiency and performance. Some underlying causes of voltage unbalance may include: Lack of symmetry in transmission lines, large single-phase loads, and unbalanced or overloaded transformers. A motor should never be operated when a phase imbalance in supply is greater than 2%.

Perform the following steps to determine the percentage of voltage imbalance:

1. Measure the line voltages of your 3-phase power supply where it enters the building and at a location that will only be dedicated to the unit installation. (at the units circuit protection or disconnect).



2. Determine the average voltage in the power supply.

In this example, the measured line voltages were 451, 460, and 453. The average would be 454 volts (451 + 460 + 453 = 1,364 / 3 = 454).

3. Determine the maximum deviation:

**EXAMPLE**

From the values given in step 1, the BC voltage (460V) is the greatest difference in value from the average:

460 - 454 = 6  
454 - 451 = 3  
454 - 453 = 1

4. Determine percent of voltage imbalance by using the results from steps 2 & 3 in the following equation.

**EXAMPLE**

$$100 \times \frac{6}{454} = 1.32\%$$

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

The amount of phase imbalance (1.32%) is satisfactory since the amount is lower than the maximum allowable 2%. Please contact your local electric utility company if your voltage imbalance is more than 2%.

## Grounding

### **WARNING:**

**The unit cabinet must have an uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur. Do not use gas piping as an electrical ground!**

This 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) or the CSA C22.1 Electrical Code. Use the grounding lug provided in the control box for grounding the unit.

### Thermostat / Low Voltage Connections

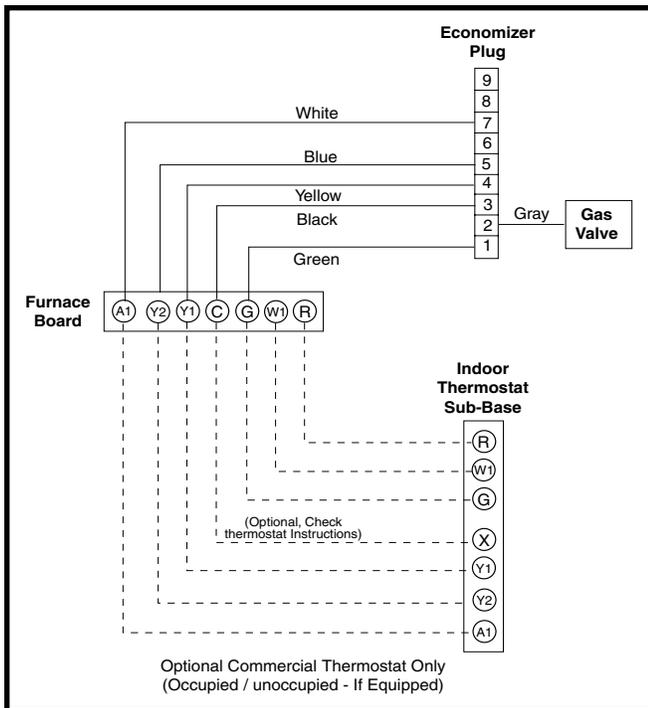
- The R6GD unit is designed to operate from a 24 VAC Class II control circuit. The control circuit wiring must comply with the current provisions of the NEC (ANSI/NFPA 70) and with applicable local codes having jurisdiction. Thermostat connections should be made in accordance with the instructions supplied with the thermostat and the indoor equipment.
- The low voltage wires must be properly connected. Route 24V control wires through the sealing grommet near the power entrance. Recommended wire gauge and wire lengths for typical thermostat connections are listed in Table 5.
- Several thermostat options are available depending on the accessories installed with the unit. Select a thermostat that operates in conjunction with the installed accessories.
- Back-up fossil fuel heat capability is required with the Dual Fuel iHybrid™ heat pump packaged system. This system is capable of providing two stages of cooling, two stages of heating in heat pump mode, and an additional two stages of secondary gas heating.
- The thermostat should be mounted about 5 feet above the floor on an inside wall. **DO NOT** install the thermostat on an outside wall or any other location where its operation may be adversely affected by radiant heat from fireplaces, sunlight, or lighting fixtures, and convective heat from warm air registers or electrical appliances. Refer to the thermostat manufacturer's instruction sheet for detailed mounting information.

### Checking Heat Anticipator Settings

- Add the current draw of the system components.  
OR
- Measure the current flow on the thermostat **R-W** circuit after the circulating blower motor has started. Set the heat anticipator according to the thermostat manufacturer's instructions for heat anticipator settings.

### Optional Outdoor Thermostat

If two stage heating is desired, an outdoor thermostat can be installed in the field with 2-stage electric heat. To install the outdoor thermostat, remove the orange wire from the **E** terminal on the terminal block, and connect to the outdoor thermostat. Connect the other side of the outdoor thermostat to **W2** from the thermostat.



**Figure 8. Typical Thermostat Connection for 1-Stage Cool / 1-Stage Heat**

COPPER WIRE SIZE — AWG (1% VOLTAGE DROP)				
SUPPLY WIRE LENGTH-FEET				SUPPLY CIRCUIT AMPACITY
200	150	100	50	
6	8	10	14	15
4	6	8	12	20
4	6	8	10	25
4	4	6	10	30
3	4	6	8	35
3	4	6	8	40
2	3	4	6	45
2	3	4	6	50
2	3	4	6	55
1	2	3	4	60

Wire Size based on N.E.C. for 60° type copper conductors.

**Table 4. Copper Wire Size**

THERMOSTAT WIRE GAUGE	RECOMMENDED T-STAT WIRE LENGTH (UNIT TO T-STAT)	
	2-WIRE (HEATING)	5-WIRE (HEATING/COOLING)
24	55	25
22	90	45
20	140	70
18	225	110

**Table 5. Thermostat Wire Gauge**

## Blower Speed

The blower speed is preset at the factory for operation at the same speed for heating and cooling. These factory settings are listed in Table 10 (page 25). For optimum system performance and comfort, it may be necessary to change the factory set speed.

## ⚠ CAUTION:

**To avoid personal injury or property damage, make sure the motor leads do not come into contact with any uninsulated metal components of the unit.**

1. Shut off all electrical power to the unit and remove the blower panel. Locate the orange, red and blue wires terminated to the blower motor. **NOTE:** The orange wire controls cooling operation while the red wire controls heating operation. The blue wire controls fan-only operation.
2. Verify the required speed from the airflow data found in Table 10. Place appropriate wire on the correct motor speed tap for the required airflow point.
3. The integrated furnace control can be set to a 2 or 3 speed mode. When a **G** only call is received from the thermostat (indicating a continuous fan mode), the blower will run the heating speed when the **2-SPD** mode is selected using the jumper on the control board (factory setting). When **3-SPD** mode is selected, the fan only speed may be different than the heating or cooling speed. If no jumper is present, the control defaults to the **2-SPD** mode of operation. A call for heating or cooling takes priority over fan only mode

## Optional Humidistat

An optional humidistat may be installed in the return air duct for humidity control (when needed), maximum system capacity and energy efficiency. The humidistat senses when humidity in the return air stream is above a preset level and sends a signal to the motor to reduce airflow. This allows more moisture to be removed until the humidity level drops.

**NOTE:** The packaged heat pump unit is pre-programmed for humidistat operation. Remove the jumper connector between the two terminals marked **HUM** on the variable speed board.

Install the humidistat in the return air duct as directed in the installation instructions included with the kit. Wire the

humidistat through the low-voltage wire entrance in the packaged heat pump unit to the quick-connect terminals (marked **HUM**) Wire the humidistat to open on rise in humidity.

### **⚠ CAUTION:**

To avoid personal injury or property damage, make certain that the motor leads cannot come into contact with any uninsulated metal components of the unit.

Check all factory wiring to the units wiring diagram. Inspect the factory wiring connections to be sure none loosened during shipping or installation.

### **GAS SUPPLY & PIPING**

- All gas piping must be installed in compliance with local codes and utility regulations. In the absence of local codes the gas line installation must comply with the latest edition of the National Fuel Gas Code ANSI Z223.1 or CAN/CGA B149 Installation Codes.
- Some local codes require the installation of a manual main shut-off valve and ground joint union external to the furnace (Figure 9). The shut-off valve should be readily accessible for service and/or emergency use. Consult the local utility or gas supplier for additional requirements regarding placement of the manual main gas shut-off.
- The manifold pressure must be set to the appropriate value for your installation. Refer to the Manifold Pressure Adjustment section (page 20) for adjustment instructions.
- Gas piping must never run in or through air ducts, chimneys, gas vents, or elevator shafts.
- Compounds used to seal joints on gas piping must be resistant to the actions of LP propane gas.
- The main gas valve and main power disconnect to the furnace must be properly labeled by the installer in case emergency shutdown is required.
- An 1/8 inch NPT plugged tap must be installed in the gas line immediately upstream of the gas supply connection to the furnace for use when measuring the gas supply pressure. The plug should be readily accessible for service use.
- A drip leg should be installed in the vertical pipe run to the unit (Figure 9).

This unit only has right side gas entry. When connecting the gas, provide clearance between the gas supply line and the entry hole in the unit's casing to avoid unwanted noise and/or damage to the unit. A typical gas service hookup is shown in Figure 8.

Table 11 (page 26) lists gas pipe capacities for standard pipe sizes as a function of length in typical applications based on nominal pressure drop in the line.

### **Leak Check**

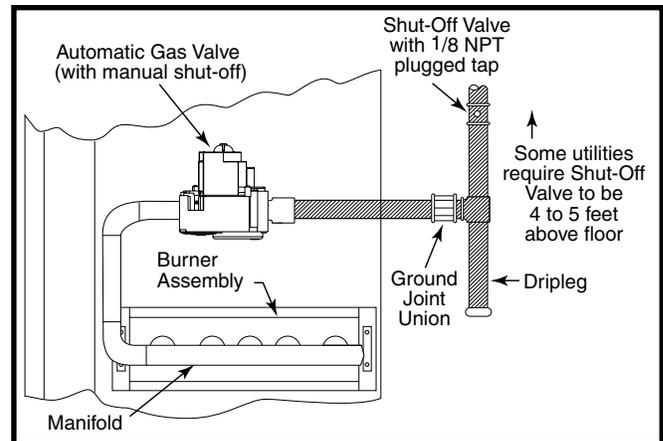
### **⚠ WARNING:**

#### **FIRE OR EXPLOSION HAZARD**

Never test for gas leaks with an open flame. Check all connections using a commercially available soap solution. A fire or explosion may result causing property damage, personal injury or loss of life. Failure to follow the safety warnings exactly could result in serious injury, death or property damage.

After the gas piping to the unit is complete, all connections must be tested for gas leaks. This includes pipe connections at the main gas valve, emergency shutoff valve and other gas connectors. A soap and water solution can be applied on each joint or union using a small paintbrush. If any bubbling is observed, the connection is not sealed adequately and must be retightened. Repeat the tightening and soap check process until bubbling ceases.

- If pressure testing the gas supply lines at pressures greater than 1/2 psig (14 inches WC), the unit must be disconnected from the gas supply piping system to prevent damage to the gas valve.
- If the test pressure is less than or equal to 1/2 psig (14 inches WC), the unit must be isolated from the gas supply line by closing the manual shut-off valve.



**Figure 9. Typical Gas Hookup - Right Side Entry**

## High Altitude Conversion

Conversion of this unit must be performed by qualified service personnel, using only approved parts. All installations must be made in accordance with the National Fuel Gas Code and/or local jurisdiction codes.

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### **WARNING:**

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**The reduction of input rating necessary for high altitude installation may only be accomplished with factory supplied orifices. Do not attempt to drill out orifices in the field. Improperly drilled orifices may cause fire, explosion, carbon monoxide poisoning, personal injury or death.**

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High altitude conversion can be field performed by a simple adjustment of manifold pressure or a change of the orifices (if necessary) as described on page 20. The changes required depend on the installation altitude and the heating value of the gas (based on sea level) which can be obtained from your local gas utility. The heating value of gas at high altitude is always lower than the sea level heating value. The heating values listed in Tables 6 & 7 (page 20) are based on sea level values.

If installing this unit above 2,000 feet, the input rate must be reduced 4% per 1,000 feet of altitude (Example: 12% at 3,000 feet, 16% at 4,000 feet, etc). **NOTE:** Deration is necessary to compensate for low atmospheric pressure at high altitudes.

For altitudes between 5,000 and 10,000 feet above sea level, the unit can be converted by adjusting the furnace manifold pressure. See Tables 6 or 7 for the correct manifold pressure settings.

## LP/Propane Gas Conversion

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### **WARNING:**

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**This unit was equipped at the factory for use with natural gas only. A special kit, supplied by the manufacturer, is required to convert the unit to operate on LP/propane gas. Failure to use the proper conversion kit can cause fire, explosion, property damage, carbon monoxide poisoning, personal injury, or death.**

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Conversion of this equipment to LP/Propane gas must be made by qualified service personnel, using approved factory parts. Conversion to LP can be accomplished by replacing the natural gas orifices with the appropriate LP/Propane orifices and then adjusting the manifold pressure (page 20). Conversion to LP/Propane (sea level and high altitude) is detailed in the installation instructions provided with the conversion kit. **Please follow the instructions provided in each kit.** Approved conversion kits are:

- The United States LP/Propane Gas Sea Level and High Altitude Conversion Kit is for LP/propane conversion in the United States at altitudes between zero and 10,000 ft. above sea level.
- The Canadian LP/Propane Gas Sea Level and High Altitude Conversion Kit is for LP/propane conversions in Canada at altitudes between zero and 4,500 ft. above sea level.

For installations between zero and 4,999 ft. above sea level, a #54 drill size orifice should be used. Installations 5,000 ft. above sea level require a # 55 drill size orifice. Table 7 (page 20) lists the correct orifice size to use at different altitudes.

After changing the orifices, it is required that you measure the gas input rate by clocking the gas meter and using the local gas heating value. See Verifying and Adjusting the Firing Rate section on page 19.

## START UP & ADJUSTMENTS

### Pre-Start Check List

- √ Verify the unit is level and allows condensate to drain.
- √ Verify all clearance requirements are met and there is free airflow to and from the outdoor coil.
- √ Verify that the duct work is sealed to prevent air leakage.
- √ Verify that the line voltage power leads are securely connected and the unit is properly grounded.
- √ Verify that the low voltage wires are securely connected to the correct leads in the low voltage area of the control box.
- √ Verify that the gas line service pressure does not exceed 10.0 inches WC (0.36 psig), and is not less than 4.5 inches WC (0.16 psig) for natural gas. For LP gas the line service pressure must not exceed 14 inches WC (0.51 psig) and must not be less than 11.0 inches WC (0.40 psig).
- √ Verify that the flame roll-out control is closed. If necessary, press the red button to reset the control. **DO NOT** install a jumper wire across the control to defeat its function. If the control reopens upon start-up, **DO NOT** reset the control without identifying and correcting the fault condition which caused the control to trip.
- √ Verify that the gas line has been purged and all connections are leak tight.
- √ Verify that all exterior panels are replaced and securely fastened.
- √ Verify that the outdoor fan turns freely.
- √ Verify that the power supply branch circuit overcurrent protection is sized properly.
- √ Verify that the thermostat is wired correctly. The thermostat function switch should be set to OFF and the thermostat fan switch should be set to AUTO.

### Start-Up Procedure

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#### **WARNING:**

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**If this unit is equipped with crankcase heaters, allow 24 hrs for heating of the refrigerant compressor crankcase prior to start up or anytime the power has been removed for more than 12 hrs. Failure to comply may result in damage or cause premature failure of the system.**

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- Check all electrical wiring for loose connections and tighten as required.
- Check unit for return air filters and condensate trap.
- Close all electrical disconnects to energize the system.

### Air Circulation

Leave the thermostat system mode on OFF, and set the fan mode to ON. Blower should run continuously. Check the air delivery at the supply registers and adjust register openings for balanced air distribution. Examine ductwork for leaks or obstruction if insufficient air is detected. Set the thermostat fan mode to AUTO. The blower should stop running.

### System Cooling

1. Set the thermostat's system mode to COOL and the fan mode to AUTO. Gradually lower the thermostat temperature setpoint below room temperature and verify the compressor, fan and indoor blower energize.
2. Feel the air being circulated by the indoor blower and verify that it is cooler than ambient temperature. Listen for any unusual noises. If unusual sounds occur, determine the source of the noise and correct as necessary.
3. Allow the cooling system to operate for several minutes and then set the temperature selector above room temperature. Verify the fan and compressor cycle off with the thermostat. **NOTE:** The blower will also stop after an 85 - 90 second delay.

### System Heating

1. Set the thermostat to the lowest setting.
2. Follow the procedures given on the operating instruction label, this manual or attached inside the louvered control access panel.
3. Set the thermostat above room temperature and verify the Operating Sequence. See page 20.
4. Verify that the compressor and outdoor fan motor are not energized.
5. After the unit has run for approximately five minutes, set the thermostat below room temperature and verify the shutdown sequence; steps 10 -12 in the Operating Sequence section (page 20).

### **Verifying & Adjusting Temperature Rise**

Verify the temperature rise through the unit is within the range specified on the unit data label. Temperature rises outside the specified range could result in premature heat exchanger failure.

1. Place thermometers in the return and supply air stream as close to the unit as possible. The thermometer on the supply air side must be shielded against direct radiation from the heat exchanger to avoid false readings.
2. Adjust all registers and duct dampers to the desired position. Run the unit for 10 to 15 minutes before taking any temperature readings. The temperature rise is the difference between the supply and return air temperatures.

**NOTE:** For typical duct systems, the temperature rise will fall within the range specified on the data label (with the blower speed at the factory recommended setting) shown in Table 10 (page 25). If the measured temperature rise falls outside the specified range, it may be necessary to change the blower speed. Lowering the blower speed increases the temperature rise and a higher speed decreases the temperature rise.

The unit is equipped with a variable speed motor. Speed selection is made by moving the leads on the blower motor terminal block. The speed taps for adjusting the motor speed are shown in the unit wiring diagram or Figures 12 & 13 (pages 28 - 29). Refer to the Blower Speed Section (page 15) for additional information.

The integrated control starts the circulating air blower 30 seconds after the gas valve is opened. The control is

factory wired to turn the blower motor off 135 seconds after the gas valve is closed. NOTE: The heating blower off delay is factory set at 90 seconds. An additional 45 second off delay is programmed into the X-13 blower motor for a total of 135 seconds.

## Verifying & Adjusting Firing Rate

### CAUTION:

**Do not re-drill the burner orifices. If the orifice size must be changed, use only new orifices.**

The firing rate must be verified for each installation to prevent over-firing of the furnace. **The firing rate must not exceed the rate shown on the unit data label.** To determine the firing rate, follow the steps below:

1. Obtain the gas heating value (HHV) from the gas supplier.
2. Shut off all other gas fired appliances.
3. Start the unit in heating mode and allow it to run for at least 3 minutes.
4. Measure the time (in seconds) required for the gas meter to complete one revolution.
5. Convert the time per revolution to cubic feet of gas per hour using Table 13 (page 27).
6. Multiply the gas flow rate in cubic feet per hour by the heating value of the gas in Btu per cubic foot to obtain the firing rate in Btu per hour. See Example.
7. Adjust the manifold pressure if necessary. See Manifold Pressure Adjustment instructions on page 20. For additional information about elevations above 2,000

#### Example:

- Time for 1 revolution of a gas meter with a 1 cubic foot dial = 40 seconds.
- From Table 13, read 90 cubic feet gas per hour.
- Local heating value of the gas (obtained from gas supplier) = 1,040 Btu per cubic foot.
- Input rate =  $1,040 \times 90 = 93,600$  Btuh.

feet, see page 17.

## Verify Over-Temperature Limit Control Operation

1. Verify the louvered control access panel is in place and that there is power to the unit.
2. Block the return airflow to the unit by installing a close-off plate in place of or upstream of the filter.
3. Set the thermostat above room temperature and verify the units operating sequence (page 20).

**NOTE:** The over-temperature limit control should turn off the gas valve within approximately four minutes (exact time depends on the efficiency of the close-off when blocking the return air). The circulating air and combustion blowers should continue to run when the over-temperature limit control switch opens.

3. Remove the close-off plate immediately after the over-temperature limit control opens. If the unit operates for more than four minutes with no return air, set the

thermostat below room temperature, shut off power to the unit, and replace the over-temperature limit control.

## Verifying Burner Operation

### WARNING:

**Uninsulated live components are exposed when louvered control access panel is removed.**

1. Remove the louvered control access panel and verify there is power to the unit.
2. Set thermostat above room temperature and observe the ignition sequence. **NOTE:** The burner flame should carry over immediately between all burners without lifting off, curling, or floating. The flames should be blue, without yellow tips. Make sure the flame is drawn into the center of the heat exchanger tube. In a properly adjusted burner assembly, the flame bends down and to the right at the end of the heat exchanger tube. The end of the flame will be out of sight around the bend.
3. After validating flame characteristics, set the thermostat below room temperature and verify the burner flame extinguishes completely.

## Refrigerant Charging

### WARNING:

**R6GD units are shipped fully charged with R-410A refrigerant and ready for installation. When a system is installed according to these instructions, no refrigerant charging is required. If repairs make it necessary for evacuation and charging, it should only be done by qualified, trained personnel thoroughly familiar with this equipment. Some local codes require licensed installation/service personnel to service this type of equipment. Under no circumstances should the owner attempt to install and/or service this equipment. Failure to comply with this warning could result in property damage, personal injury, or death.**

### CAUTION:

**This unit uses refrigerant R-410A. DO NOT use any other refrigerant in this unit. Use of another refrigerant will damage the unit.**

The system refrigerant charge can be checked and adjusted through the service ports provided at the front panel. Use only gauge lines which have a "Schrader" depression device present to actuate the valve. Draw a vacuum on gauge lines to remove air before attaching them to the service ports on the unit. Refrigerant charging must be done by qualified personnel familiar with safe and environmentally responsible refrigerant handling procedures.

## Manifold Pressure Adjustment

The manifold pressure must be set to the appropriate value for your installation. To adjust the manifold pressure:

1. Obtain the required manifold pressure setting. Use Table 6 for natural gas or Table 7 for LP/propane gas.
2. Remove the regulator cap. Turn the high fire adjusting screw clockwise to increase the pressure or counterclockwise to reduce the pressure.
3. Replace the regulator cap after adjustments are complete.

MANIFOLD PRESSURE (IN W.C.) FOR NATURAL GAS INSTALLATIONS			
ALTITUDE ABOVE SEA LEVEL	HEATING VALUE BTU/CU. FT.		
	800 TO 899	900 TO 999	1,000 TO 1,100
zero to 1,999 FT	3.5	3.5	3.5
2,000 to 4,999 FT	3.5	3.5	3.5
5,000 to 5,999 FT	3.5	3.5	3.0
6,000 to 7,999 FT	3.5	3.2	2.8
8,000 to 10,000 FT	3.0	2.8	2.5

**Table 6. Manifold Pressure (in W.C.) for Natural Gas**

MANIFOLD PRESSURE (IN W.C.) AND ORIFICE SIZES FOR LP/PROPANE GAS INSTALLATIONS		
ALTITUDE ABOVE SEA LEVEL	MANIFOLD PRESSURE	ORIFICE SIZE
zero to 1,999 FT	10.0	54
2,000 to 4,999 FT	8.5	54
5,000 to 5,999 FT	10.0	55
6,000 to 7,999 FT	9.0	55
8,000 to 10,000 FT	8.5	55

**NOTE:** Manifold pressure based on sea level LP heating value of 2,500 Btu/cu. ft.<sup>3</sup>

**Table 7. Manifold Pressure (in W.C.) for LP Gas**

## OPERATING SEQUENCE

The operating sequences for the heating, cooling, and fan modes are described below. Refer to the field and furnace wiring diagrams (Figures 12 or 13, pages 28 - 29).

### Heating Mode

1. On a call for heat, the thermostat closes and applies 24 VAC to terminal **W** on the control board.
2. The control board checks for continuity on the 24 VAC limit control circuit, over-temperature limit switch, flame rollout switches, and blocked vent switch in series. If an open limit is detected, the control board will energize the inducer blower. All other system functions will be inoperable until the limit circuit closes. While the limit is open, the red LED will pulse at a rate of 1 blink per unit time.
3. The furnace control checks for continuity (24 VAC) across the pressure switch. If the pressure switch is closed, the heat mode sequence will not continue. If it remains closed for 10 seconds, the red LED will flash 3 times repetitively until the fault condition clears.
4. The inducer energizes (if pressure switch is open).
5. The pressure switch will close. If the pressure switch does not close after 10 seconds, the fault LED will flash 2 times and the inducer will continue to run until the switch is closed.
6. The inducer will pre-purge for 30 seconds and then the igniter will start its warm-up as follows:

*Initial Power up:* After 30 seconds of igniter warm-up, the gas valves (24 VAC) will open. The igniter circuit will stay energized for 3 seconds after the gas valve opens.

*After Initial Power up:* The control has a programmed adaptive ignition feature which varies the warm-up period as follows: If ignition is successful the warm-up is reduced by 3 seconds on each subsequent call for heat until ignition failure occurs. Upon ignition failure, the warm-up is increased by 3 seconds on the next try. If successful, the timing remains fixed at this level. In general, whenever ignition failure occurs the warm-up interval is increased by 3 seconds on the next try. And if successful, it remains there. Minimum and maximum warm-up time limits are set at 6 and 54 seconds.

7. The furnace control must prove flame via the flame sensor 5 seconds after the gas valves open. If flame is sensed, burners are on and the igniter cools off. If no flame is sensed, the gas valve closes immediately and the inducer continues to run. A second trial for ignition (step 6) begins. If no flame is sensed on the fifth try for ignition, the furnace control is locked and the red LED will blink 4 times repetitively. The thermostat must be opened for at least ten seconds to reset the furnace control after a lock out. Otherwise, the furnace will attempt another ignition sequence in 1 hour.
8. After the gas valve opens (30 seconds), the blower will ramp to the selected airflow and continues to run.
9. When the thermostat has been satisfied, the **W** terminal on the integrated control is de-energized.

10. The gas valve circuit is de-energized and the gas valve closes.
11. The inducer motor will continue to run for the post purge period of 25 seconds.
12. The main blower will continue to run for the BLOWER OFF delay of 135 seconds.
13. After the BLOWER OFF timer has been satisfied, the integrated control de-energizes the main circulating blower circuit.

### Cooling Mode

1. On a call for cooling, the thermostat closes and applies 24 VAC to the green and yellow leads in the low voltage area.
2. The green lead applies 24VAC to the **G** terminal of the integrated control, energizing the main circulating blower circuit at the cooling speed.
3. The yellow lead applies 24VAC to the contactor.
4. When the thermostat is satisfied, the contactor and integrated control de-energize.
5. The circulating blower motor de-energizes after a 85-90 second delay.

### Fan Mode

1. On a call for fan operation, the thermostat applies 24 VAC to the green lead connected to the **G** terminal of the integrated control.
2. The circulating blower is energized immediately at the heating speed if 2-SPD is selected or fan only speed if 3-SPD is selected on the control. **NOTE:** If a call for heat occurs, the circulating blower de-energizes prior to normal heating cycle.

## EQUIPMENT MAINTENANCE

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### **WARNING:**

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**To avoid risk of electrical shock, personal injury, or death, disconnect all electrical power to the unit before performing any maintenance or service. The unit may have more than one electrical supply.**

**Label all wires prior to disconnection when servicing the unit. Wiring errors can cause improper and dangerous operation**

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### **CAUTION:**

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**Use care when removing parts from this unit. Personal injury can result from sharp metal edges present in all equipment of sheet metal construction.**

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Proper maintenance is important to achieve optimum performance from the system. The ability to properly perform maintenance on this equipment requires certain mechanical skills and tools. If you do not possess these skills, contact your dealer for maintenance. Consult your local dealer about the availability of maintenance contracts. Routine maintenance should include the following:

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### **CAUTION:**

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**The unit should never be operated without a filter in the return air system. Replace disposable filters with the same type and size.**

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- Inspect, clean or replace air filters at the beginning of each heating and cooling season, or more frequently if required.
- Inspect the condensate drain and outdoor coil at the beginning of each cooling season. Remove any debris. Clean the outdoor coil and louvers as necessary using a mild detergent and water. Rinse thoroughly with water.
- Inspect the electrical connections for tightness at the beginning of each heating and cooling season.
- The blower compartment should be cleaned monthly during the heating and cooling seasons to remove any dirt and lint that may have accumulated in the compartment or on the blower and motor. Buildup of dirt and lint on the blower and motor can create excessive loads on the motor resulting in higher than normal operating temperatures and possible shortened service life.
- Maintain heat exchanger and burners. The unit should operate for many years without excessive scale buildup in the heat exchanger, however, the heat exchanger, the vent system, and the burners should be inspected and cleaned (if required) by a qualified serviceman annually to ensure continued safe operation. Particular attention must be given to identify deterioration from corrosion or other sources.

- The motors for the circulating air blower, outdoor fan, and combustion blower are pre-lubricated at the factory. No further oiling is required for the life of this product.
- Inspect and clean the screen of the vent cover assembly at the beginning of each heating and cooling season.

## Cleaning of Heat Exchanger

### **WARNING:**

**Holes in the heat exchanger can cause products of combustion to enter the home. Replace the heat exchanger if leaks are found. 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.**

If the heat exchanger must be cleaned due to soot or scale build up, follow the steps below.

1. Shut off the gas supply to the unit at the meter or at the manual valve in the gas supply piping.
2. Turn off all power to the unit and set the thermostat to the lowest temperature setting.
3. Remove the louvered access panel from the unit.
4. Turn the gas control knob (gas valve) to the OFF position. See Figure 11 (page 27) for gas valve shut off instructions.
5. Disconnect the wires from the gas valve, ignitor, flame sensor, combustion air motor, flame roll-out control, over-temperature limit switch, and pressure switch.
6. Remove the silicone rubber tube from the collector pan to the pressure switch.
7. Remove 4 nuts securing the combustion blower to the collector pan. Remove the combustion blower.
8. Remove all screws securing the collector pan to the unit. Remove the collector pan from the unit.

### **CAUTION:**

**To prevent damage to the unit or internal components, it is recommended that two wrenches be used when loosening or tightening nuts. Do not over tighten!**

9. Using 2 wrenches, separate the ground-joint union in the gas supply piping at the unit.
10. Remove the piping between the gas valve and the ground-joint union, if necessary.
11. Remove the screws that secure the burner assembly in place and the burner assembly. **BE EXTREMELY CAREFUL NOT TO DAMAGE THE IGNITOR WHILE REMOVING THE BURNER ASSEMBLY.**
12. Attach a round wire brush to a length of high grade stainless steel cable, such as drain clean-out cable. Attach the other end of the spring cable to a variable speed reversible drill. Slowly insert and rotate the cable into the top portion of the heat exchanger. Operate the drill alternating between forward and reverse, working

- the cable in and out several times to obtain sufficient cleaning. Repeat this process at each exchanger tube.
13. Remove all loosened debris from the heat exchanger tubes using high pressure air and vacuum cleaner.
14. Using a light, check the condition of the upper and lower sections of the heat exchanger tube.
15. Inspect the burners and if necessary, clean them carefully with a soft wire brush and/or the nozzle of a vacuum cleaner. **DO NOT DAMAGE THE IGNITOR OR FLAME SENSOR WHILE CLEANING THE BURNER.**
16. Replace all the parts in reverse order from which they were removed.
17. Follow the operating instructions found on the right side door and the User's Information Manual to return the unit to operation.

## Cleaning of Burners

If the burners must be cleaned, follow the steps below.

1. Shut off the gas supply to the unit either at the meter or at a manual valve in the supply piping.
2. Turn off all power to the unit and set the thermostat to the lowest temperature setting.
3. Remove the louvered control access panel from the unit.
4. Turn the gas control knob to the OFF position. See Figure 11 for gas valve shut off instructions.
5. Disconnect the wires from the gas valve, ignitor, and flame sensor.

### **CAUTION:**

**To prevent damage to the unit or internal components, it is recommended that two wrenches be used when loosening or tightening nuts. Do not over tighten!**

6. Using two wrenches, separate the ground-joint union in the gas supply piping at the unit.
7. Remove the piping between the gas valve and the ground-joint union (if applicable).
8. Remove all screws securing the burner assembly to the furnace.
9. Carefully remove the burner assembly from the furnace. **DO NOT DAMAGE THE IGNITER WHILE REMOVING THE BURNER ASSEMBLY.**
10. Inspect the burners for accumulated dust or debris. If necessary carefully clean them with a soft wire brush and a vacuum cleaner. **DO NOT DAMAGE THE IGNITER WHILE CLEANING THE BURNER.**
11. Replace all the parts in reverse order from which they were removed.
12. Follow the lighting instructions found on the lower unit door to return the unit to operation.
13. Verify proper operation after servicing.

## COMPONENT FUNCTIONS

**Flame Roll-Out Control** - Verifies that the burner flame is being drawn into the heat exchanger tubes. If the burner flame is not being drawn into the heat exchanger tubes, the roll-out control will open within several seconds and the integrated control diagnostic light will flash one time. The circulating air blower and combustion blower will continue to operate if the flame roll-out control opens.

**Flame Sensor** - Proves that flame has carried over from the ignitor to the right-most burner. If no flame is sensed, the unit will be shut down automatically.

**Gas Valve** - controls the flow of gas to the burners in both low and high fire. When the gas valve is energized it automatically opens and regulates the gas pressure in the manifold.

**Pressure Switch** - Verifies that the inducer motor is drawing the combustion gases through the heat exchanger tubes and venting the gases through the vent system.

**Over-Temperature Limit Control** - Prevents the air temperature leaving the unit from exceeding the maximum outlet air temperature. If the limit opens, the integrated control diagnostic will flash one time. The circulating air blower and combustion blower will continue to operate if the over-temperature limit control opens.

## REPLACEMENT PARTS

Replacement parts are available through all Nordyne distributors. Please have the complete model and serial number of the unit when ordering replacement parts.

### ELECTRICAL:

Capacitors	Pressure Switches
Compressors	Relays
Contactors	Temperature Limit Switches
Gas Valves	Thermostats
Ignition Controls	Time Delay Relays
Ignitors/Flame Sensors	Transformers

### MOTORS:

Blower Motor
Fan Motor
Inducer Blower Motor

### COMPONENTS:

Blower Assembly	Fan Grille
Burner Manifold	Filter/Driers
Burners/Orifices	Gaskets
Cabinet Panels	Heat Exchanger
Expansion Valves	

## TROUBLESHOOTING

If the unit does not operate in the cooling mode, check the following:

- The thermostat is operating properly
- Electrical power to the unit is turned on
- The filters are not dirty
- The service doors are in place
- The 3 amp fuse is operational

If the unit does not operate in the heating mode, check the following:

- The thermostat is operating properly
- Electrical power to the unit is turned on
- The filters are not dirty
- The gas is turned on and the manual shut-off valve is open
- The service doors are in place
- The flame roll-out control is closed
- The diagnostic codes listed in Table 7 or on the wiring diagrams (Figures 12 or 13, pages 28 - 29).
- The 5 amp fuse is operational

STATUS LIGHT (RED LED)	FAULT CONDITION
On	Power On
1 Flash	Limit Circuit Open
2 Flashes	Pressure Switch Stuck Open
3 Flashes	Pressure Switch Stuck Closed
4 Flashes	Ignition Failure (Check Ground)
5 Flashes	230 VAC & Neutral Reversed or no ground
Continuous Flash	False Flame or Gas Relay Shorted
Off	Power Off

STATUS LIGHT (YELLOW LED)	FAULT CONDITION
Continuous Flash	Low Flame Sensor Signal
On	Flame Present

**Table 8. Diagnostic Codes**

## FIGURES & TABLES

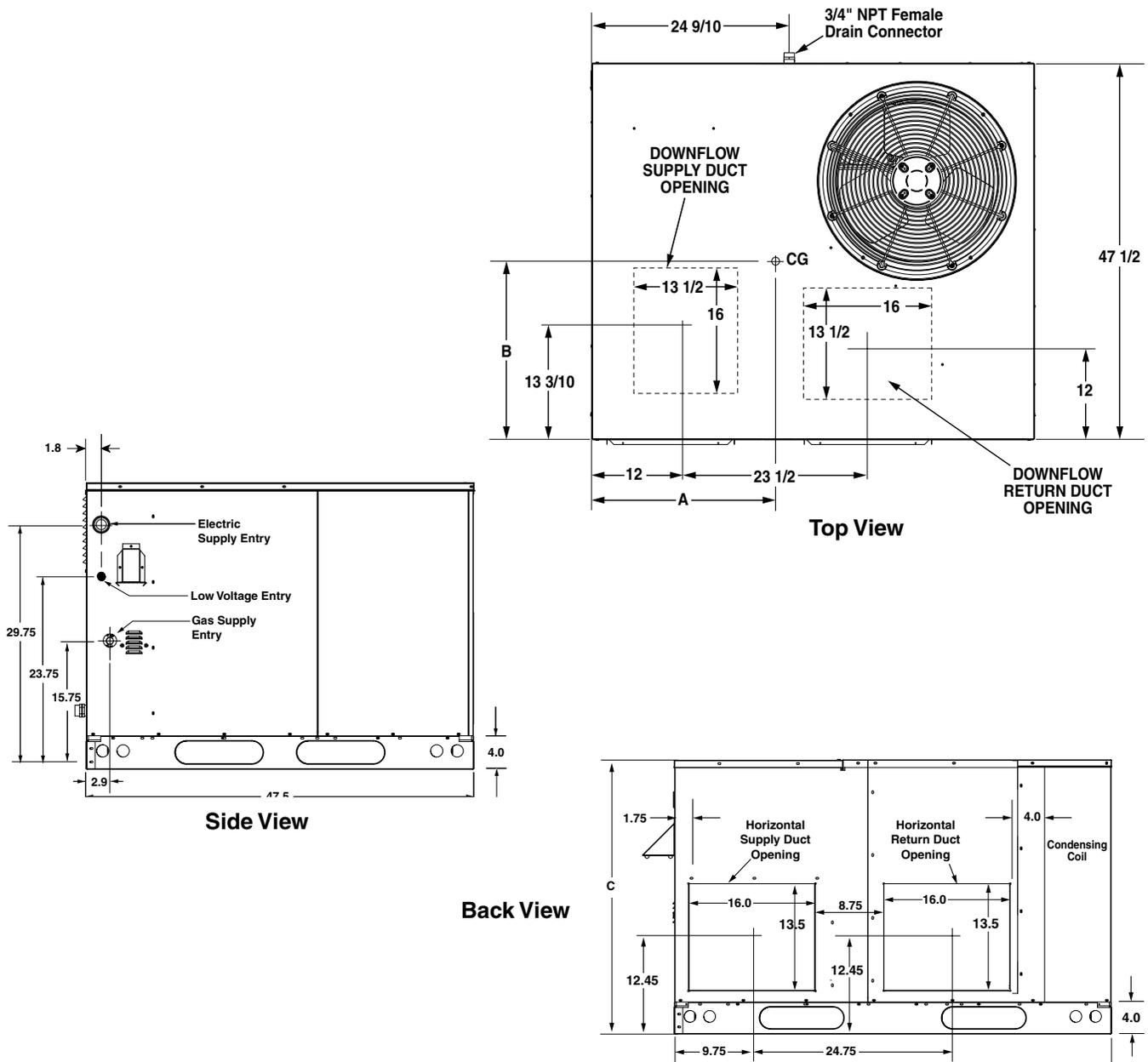


Figure 10. R6GD Dimensions

Model Number R6GD-	Unit Weight	Shipping Weight	Center of Gravity		Height (in inches) C		D
			A	B	with base rails	without base rails	
X36*072†	470	480	26.5	26.5	39.0	35.3	
X36*072†	485	495	26.5	26.5	39.0	35.3	
X36*072†	540	550	27.5	26.5	43.0	39.3	
X36*072†	555	565	27.5	26.5	43.0	39.3	
X36*072†	560	570	27.5	26.5	43.0	39.3	
X36*072†	575	585	27.5	26.5	43.0	39.3	

\* Denotes "C" or "X"  
 † Denotes "C" or "D"

Table 9. Center of Gravity & Unit Shipping Weights

## Airflow Information

Model Number R6GD-	Heating Input (Btu/h)	Heating Output (Btu/h)	Heating Rise Range (° F)	Cooling Output (Btu/h)	Blower Size	Motor HP	Motor Tap	External Static Pressure Drop - inches water column																							
								0.1			0.2			0.3			0.4			0.5			0.6			0.7			0.8		
								CFM	(° F) Rise	(cfm)	(° F) Rise																				
X36(†)072	72,000	57,600	40-70	36,000	10 x 10	1/2	T1	1124	47.45	1049	50.84	956	55.79	883	60.40	831	64.18	784	68.03	714	-	654	-								
							**T2	1323	40.31	1261	42.29	1189	44.86	1117	47.75	1040	51.28	980	54.42	926	57.60	896	59.52								
							*T3	1471	-	1413	-	1366	-	1303	40.93	1253	42.56	1199	44.48	1142	46.70	1090	48.93								
							T4	1461	-	1407	-	1334	-	1259	42.36	1183	45.08	1112	47.96	1072	49.75	1028	51.88								
							T5	1592	-	1526	-	1475	-	1403	-	1326	40.22	1261	42.29	1200	44.44	1129	47.24								
X36(†)096	96,000	76,800	45-75	36,000	10 x 10	1/2	T1	1124	63.27	1049	67.79	956	74.38	883	-	831	-	784	-	714	-	654	-								
							T2	1323	53.75	1261	56.39	1189	59.81	1117	63.66	1040	68.38	980	72.56	926	-	896	-								
							*T3	1471	48.34	1413	50.33	1366	52.06	1303	54.57	1253	56.75	1199	59.31	1142	62.27	1090	65.24								
							**T4	1461	48.67	1407	50.54	1334	53.31	1259	56.48	1183	60.11	1112	63.95	1072	66.33	1028	69.17								
							T5	1592	-	1526	46.60	1475	48.21	1403	50.69	1326	53.63	1261	56.39	1200	59.26	1129	62.99								
X48(†)096	96,000	76,800	45-75	47,800	10 x 10	3/4	T1	1185	60.01	1110	64.06	1035	68.71	980	72.56	925	-	875	-	820	-	785	-								
							**T2	1410	50.43	1330	53.47	1250	56.89	1195	59.51	1140	62.38	1085	65.54	1030	69.04	975	72.93								
							T3	1525	46.63	1450	49.04	1370	51.91	1320	53.87	1270	55.99	1210	58.77	1150	61.84	1100	64.65								
							T4	1650	-	1585	-	1520	46.78	1465	48.54	1405	50.61	1340	53.07	1280	55.56	1235	57.58								
							*T5	1775	-	1715	-	1650	-	1600	-	1540	46.18	1460	48.71	1375	51.72	1330	53.47								
X48(†)120	120,000	96,000	45-75	47,800	10 x 10	3/4	T1	1185	75.00	1110	-	1035	-	980	-	925	-	875	-	820	-	785	-								
							**T2	1410	63.04	1330	66.83	1250	71.11	1195	74.38	1140	-	1085	-	1030	-	975	-								
							T3	1525	58.29	1450	61.30	1370	64.88	1320	67.34	1270	69.99	1210	73.46	1150	-	1100	-								
							T4	1650	53.87	1585	56.08	1520	58.48	1465	60.68	1405	63.27	1340	66.33	1280	69.44	1235	71.97								
							*T5	1775	50.08	1715	51.83	1650	53.87	1600	55.56	1540	57.72	1460	60.88	1375	64.65	1330	66.83								
X60(†)096	96,000	76,800	45-75	56,500	11 x 10	1	T1	1259	56.48	1187	59.91	1130	62.93	1069	66.52	1015	70.06	955	74.46	923	-	869	-								
							**T2	1583	-	1521	46.75	1467	48.47	1416	50.22	1360	52.29	1306	54.45	1265	56.21	1212	58.67								
							*T3	1827	-	1771	-	1703	-	1656	-	1565	45.44	1461	48.67	1363	52.17	1237	57.49								
							T4	2009	-	1931	-	1834	-	1761	-	1639	-	1525	46.63	1441	49.35	1293	55.00								
							T5	2076	-	1967	-	1870	-	1758	-	1662	-	1556	45.70	1450	49.04	1331	53.43								
X60(†)120	120,000	96,000	45-75	56,500	11 x 10	1	T1	1259	70.60	1187	74.89	1130	-	1069	-	1015	-	955	-	923	-	869	-								
							**T2	1583	56.15	1521	58.44	1467	60.59	1416	62.77	1360	65.36	1306	68.06	1265	70.27	1212	73.34								
							*T3	1827	48.65	1771	50.19	1703	52.20	1656	53.68	1565	56.80	1461	60.84	1363	65.22	1237	71.86								
							T4	2009	-	1931	46.03	1834	48.47	1761	50.48	1639	54.23	1525	58.29	1441	61.69	1293	68.75								
							T5	2076	-	1967	45.19	1870	47.53	1758	50.56	1662	53.48	1556	57.13	1450	61.30	1331	66.78								

**NOTE:** Factory set fan only speed (always set on T1).

\* = Factory set cooling speed

\*\* = Factory set heating speed

(†) C = 208/230 Volt Units, D = 460 Volt Units

**Table 10. Nominal Airflow Rates and Temperature Rises (° F)**

## Gas Information

CAPACITY OF BLACK IRON GAS PIPE (CU. FT. PER HOUR) FOR NATURAL GAS (SPECIFIC GRAVITY - 0.60)								
NOMINAL PIPE DIAMETER (IN.)	LENGTH OF PIPE RUN (FEET)							
	10	20	30	40	50	60	70	80
1/2	130	90	75	65	55	50	45	40
3/4	280	190	150	130	115	105	95	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		

Cubic Feet Per Hour Required =  $\frac{\text{Input To Furnace (Btu/hr)}}{\text{Heating Value of Gas (Btu/Cu. Ft.)}}$

**NOTE:** The cubic feet per hour listed in the table above must be greater than the cubic feet per hour of gas flow required by the furnace. To determine the cubic feet per hour of gas flow required by the furnace, divide the input rate of the furnace by the heating value (from gas supplier) of the gas.

**Table 11. Gas Pipe Capacities**

GAS FLOW RATES (CUBIC FEET PER HOUR)			
TIME FOR ONE REVOLUTION (SECONDS)	CUBIC FEET PER REVOLUTION OF GAS METER		
	1	5	10
10	360	1,800	3,600
12	300	1,500	3,000
14	257	1,286	2,571
16	225	1,125	2,250
18	200	1,000	2,000
20	180	900	1,800
22	164	818	1,636
24	150	750	1,500
26	138	692	1,385
28	129	643	1,286
30	120	600	1,200
32	113	563	1,125
34	106	529	1,059
36	100	500	1,000
38	95	474	947
40	90	450	900
42	86	429	857
44	82	409	818
46	78	391	783
48	75	375	750
50	72	360	720
52	69	346	692
54	67	333	667
56	64	321	643
58	62	310	621
60	60	300	600
62	58	290	581
64	56	281	563

GAS FLOW RATES (CUBIC FEET PER HOUR)			
TIME FOR ONE REVOLUTION (SECONDS)	CUBIC FEET PER REVOLUTION OF GAS METER		
	1	5	10
66	55	273	545
68	53	265	529
70	51	257	514
72	50	250	500
74	49	243	486
76	47	237	474
78	46	231	462
80	45	225	450
82	44	220	439
84	43	214	429
86	42	209	419
88	41	205	409
90	40	200	400
92	39	196	391
94	38	191	383
96	38	188	375
98	37	184	367
100	36	180	360
102	35	176	353
104	35	173	346
106	34	170	340
108	33	167	333
110	33	164	327
112	32	161	321
114	32	158	316
116	31	155	310
118	31	153	305
120	30	150	300

**Table 12. Gas Flow Rates**

**FOR YOUR SAFETY READ BEFORE OPERATING****POUR VOTRE SÉCURITÉ. À LIRE AVANT L'EMPLOI**

**WARNING:** If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury, or loss of life.

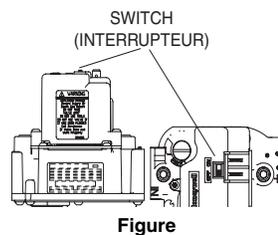
**ATTENTION!** L'inobservation de ces instructions peut entraîner un incendie ou une explosion pouvant causer des dommages à votre propriété à votre personne, ou la mort.

- A. 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.
- B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- 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.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or move by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

- A. Cet appareil ménager n'a pas de veilleuse. Il est doté d'un système d'allumage automatique. Ne pas essayer d'allumer le brûleur manuellement.
- B. AVANT L'USAGE. Attention à une possible odeur de gaz surtout au niveau du plancher où les gaz les plus lourds ont la tendance de se concentrer.
- EN CAS D'ODEUR DE GAZ.**
- Ne mettre en marche aucun appareil électrique.
  - Ne toucher à aucun commutateur électrique, ne pas employer le téléphone.
  - Quitter le bâtiment immédiatement et avvertir la compagnie du gaz en utilisant le téléphone d'un voisin.
  - A défaut de la compagnie du gaz, avvertir le service des pompiers.
- C. Enfoncer ou faire tourner le robinet à gaz à la main seulement. Ne jamais utiliser d'outils. S'il n'est pas possible de faire tourner ou d'enfoncer le robinet à la main, ne pas essayer de le réparer. Faire appel à un spécialiste. Forcer ou tenter de réparer le robinet pourrait être à l'origine d'une explosion ou d'un incendie.
- D. Il est déconseillé d'utiliser cet appareil en contact prolongé avec l'eau. Faire inspecter ou remplacer toute commande par un technicien qualifié si un des systèmes de contrôle du gaz s'est trouvé sous l'eau.

**OPERATING INSTRUCTIONS****MODE D'EMPLOI**

1. **STOP!** Read the safety information above on this label.
2. Set the thermostat to the lowest setting.
3. Turn off all electrical power to the appliance.
4. The appliance's ignition device automatically lights the burner. Do not try to light burner by hand.
5. Remove the control access door/panel (upper door if two-door model).
6. Move the gas control switch to the "OFF" position. (See Figure 1)
7. 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 above information. If you don't smell gas, go to the next step.
8. Move the gas control switch to the "ON" position. (See Figure)
9. Replace the control access door/panel (upper door if two-door model).
10. Turn on all electrical power to the appliance.
11. Turn the thermostat to a desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.



1. **ATTENTION!** Lire d'abord la liste des mesures de sécurité ci-dessus.
2. Mettre le thermostat à la position minimale.
3. Couper le courant électrique qui mène à l'appareil.
4. Cet appareil ménager étant doté d'un système d'allumage automatique, ne pas essayer d'allumer le brûleur manuellement.
5. Retirer le panneau/volet d'accès de commande (panneau supérieur s'il s'agit d'un modèle à deux panneaux).
6. Régler l'interrupteur de commande du gaz à la position "OFF" (Arrêt) (Voir Figure).
7. Attendre cinq (5) minutes pour s'assurer de la dissipation du gaz.  
En cas d'odeur, **ARRÊTER LE PROCÉDÉ.** Suivre les instructions ci-dessus (Section B). En l'absence de toute odeur de gaz, avancer à l'étape suivante.
8. Régler l'interrupteur de commande du gaz à la position "OFF" (Arrêt) (Voir Figure).
9. Remettre le panneau/volet d'accès de commande en place (panneau supérieur s'il s'agit d'un modèle à deux panneaux).
10. Rebrancher l'appareil sur le réseau électrique.
11. Ajuster le thermostat à la position désirée.
12. Si l'appareil ne fonctionne pas, suivre les "Directives d'arrêt" ci-dessous et appeler le technicien de service.

**TURNING GAS OFF TO THE APPLIANCE****DIRECTIVES D'ARRÊT**

1. Set the thermostat to the lowest setting.
2. Turn off all electrical power to the appliance if service is to be performed.
3. Remove the control access door/panel (upper door if two-door model).
4. Move the gas control knob switch to the "OFF" position. Do not use force. (See Figure)
5. Replace the control access door/panel (upper door if two-door model).

1. Mettre le thermostat à la position minimale.
2. Débrancher l'appareil en prévision de la réparation.
3. Retirer le panneau/volet d'accès de commande (panneau supérieur s'il s'agit d'un modèle à deux panneaux).
4. Régler l'interrupteur de commande du gaz à la position "OFF". Ne forcez pas. (Voir Figure).
5. Remettre le panneau/volet d'accès de commande en place (panneau supérieur s'il s'agit d'un modèle à deux panneaux).

Figure 11. R6GD Gas Valve Label

# WIRING DIAGRAM

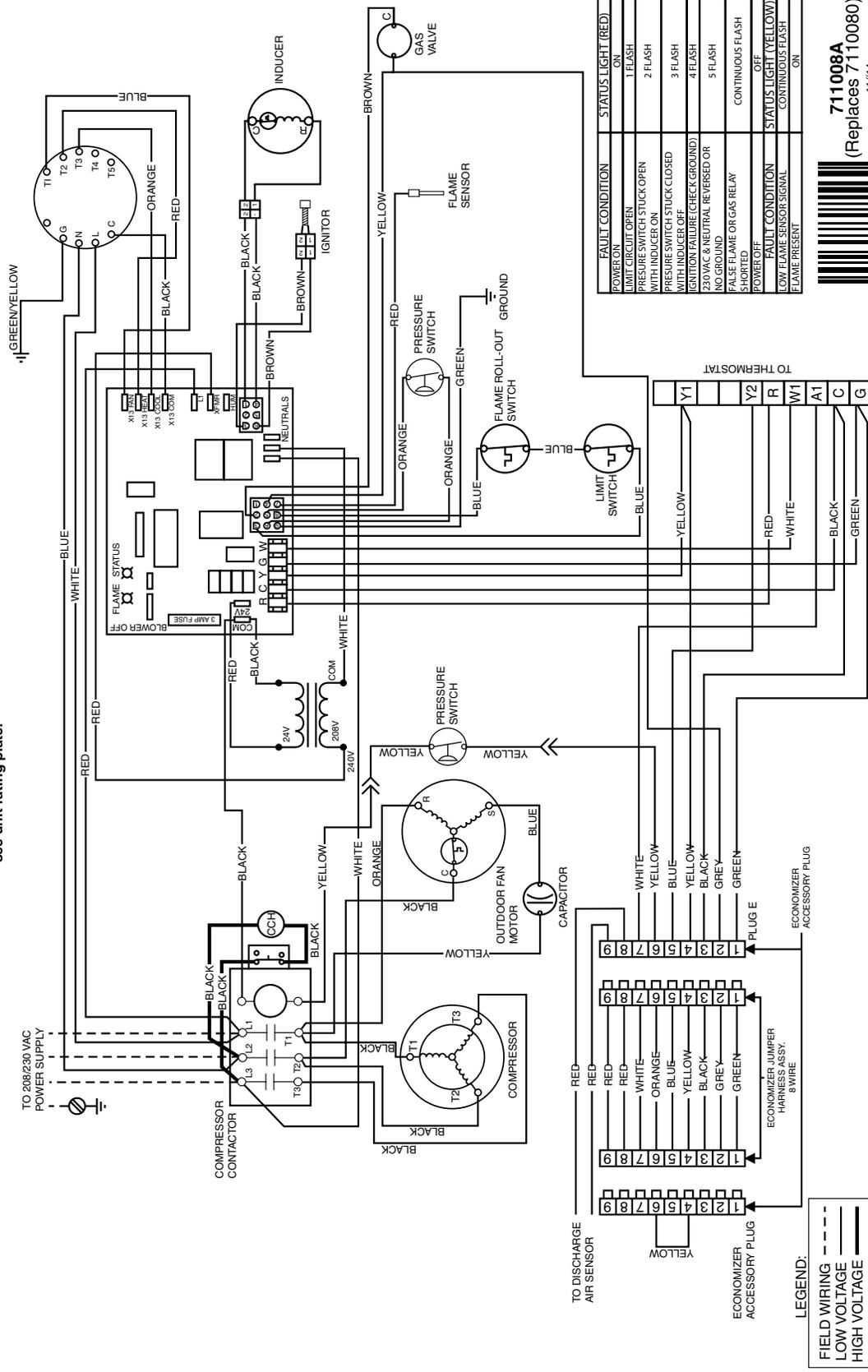
## Packaged Single Stage Gas Heat/Electric Air Conditioner

208/230 Volt

Three Phase 60HZ

### NOTES:

1. Disconnect all power before servicing.
2. For supply connections use copper conductors only.
3. Not suitable on systems that exceed 150v to ground.
4. If any of the original wire as supplied with the furnace must be replaced, it must be replaced with wiring material having a temperature rating of at least 105C.
5. For supply wire ampacities and overcurrent protection, see unit rating plate.
1. Couper le courant avant de faire l'entretien.
2. Employez uniquement des conducteurs en cuivre.
9. Ne convient pas aux installations des plus de 150V a la terre.



711008A  
(Replaces 7110080)  
11/14

Figure 12. Wiring Diagram for 208/230V / 3 Phase / 60 Hz Unit

# WIRING DIAGRAM

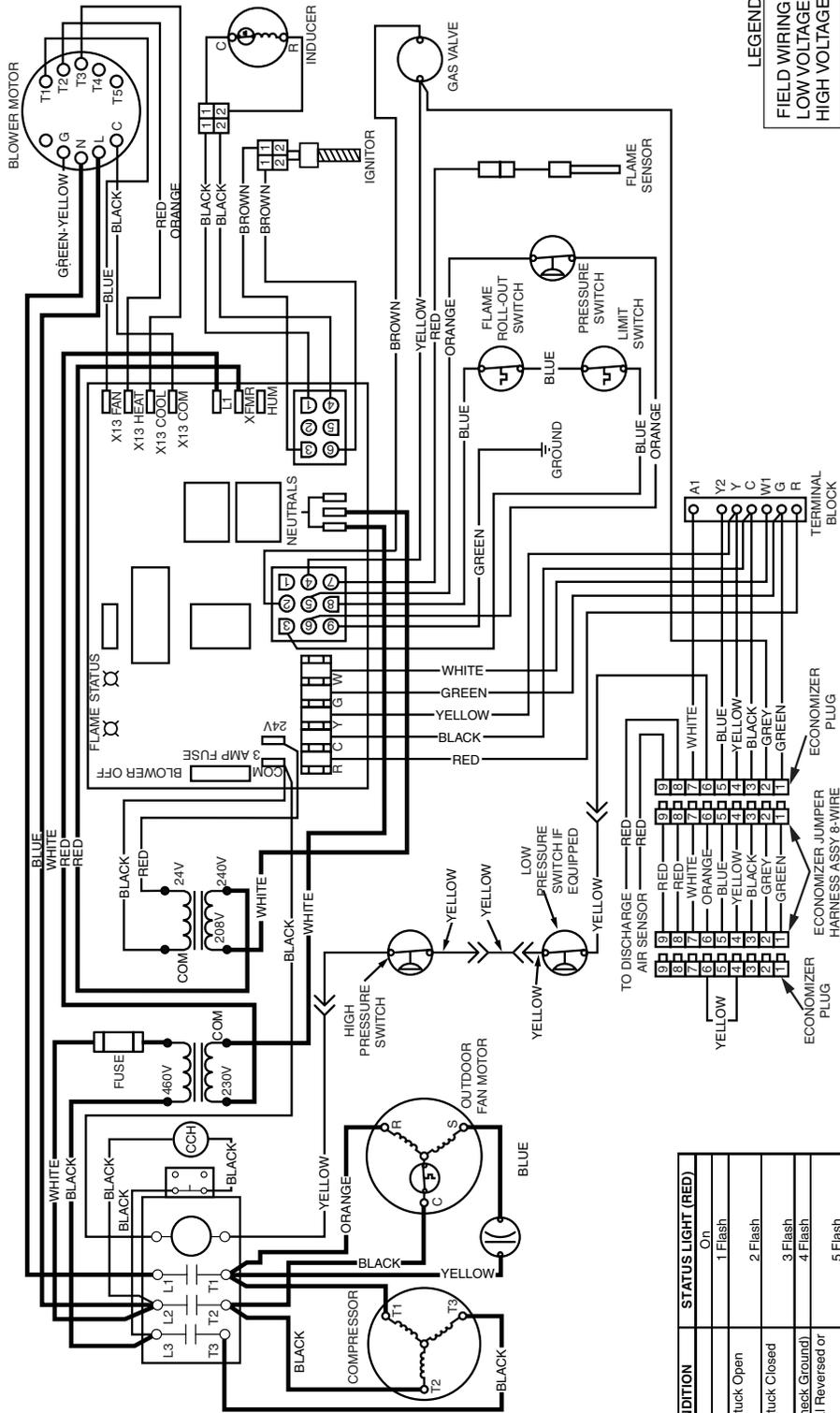
## Packaged Single Stage Gas Heat/Electric Air Conditioner

460 Volt

Three Phase 60Hz

### NOTES:

1. Disconnect all power before servicing.
2. For supply connections use copper conductors only.
3. If any of the original wire as supplied with the furnace must be replaced, it must be replaced with wiring material having a temperature rating of at least 105 C.
4. For supply wire ampacities and overcurrent protection, see unit rating plate.
1. Couper le courant avantaire letretien.
2. Employez uniquement des conducteurs en cuivre.



FAULT CONDITION	STATUS LIGHT (RED)
Power On	On
Limit Circuit Open	1 Flash
Pressure Switch Stuck Open	2 Flash
Pressure Switch Stuck Closed	3 Flash
Ignition Failure (Check Ground)	4 Flash
230 VAC & Neutral Reversed or No Ground	5 Flash
False Flame or Gas Relay Shorted	Continuous Flash
Power Off	Off
FAULT CONDITION	STATUS LIGHT (YELLOW)
Low Flame Sensor Signal	Continuous Flash
Flame Present	On



**710860A**  
(Replaces 7108600)  
11/14

Figure 13. Wiring Diagram for 460V / 3 Phase / 60 Hz Unit

## Charging Charts

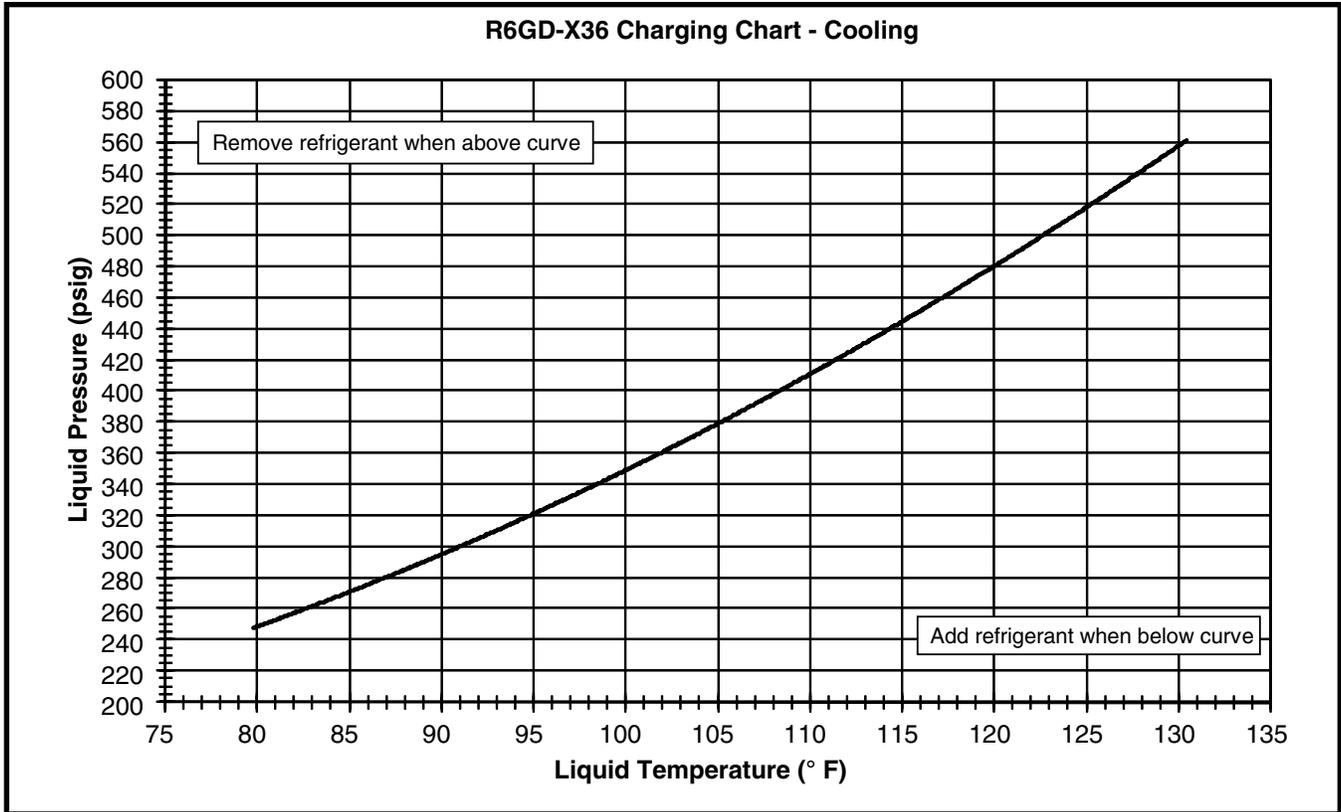


Figure 14. Charging Chart for 3 Ton Units

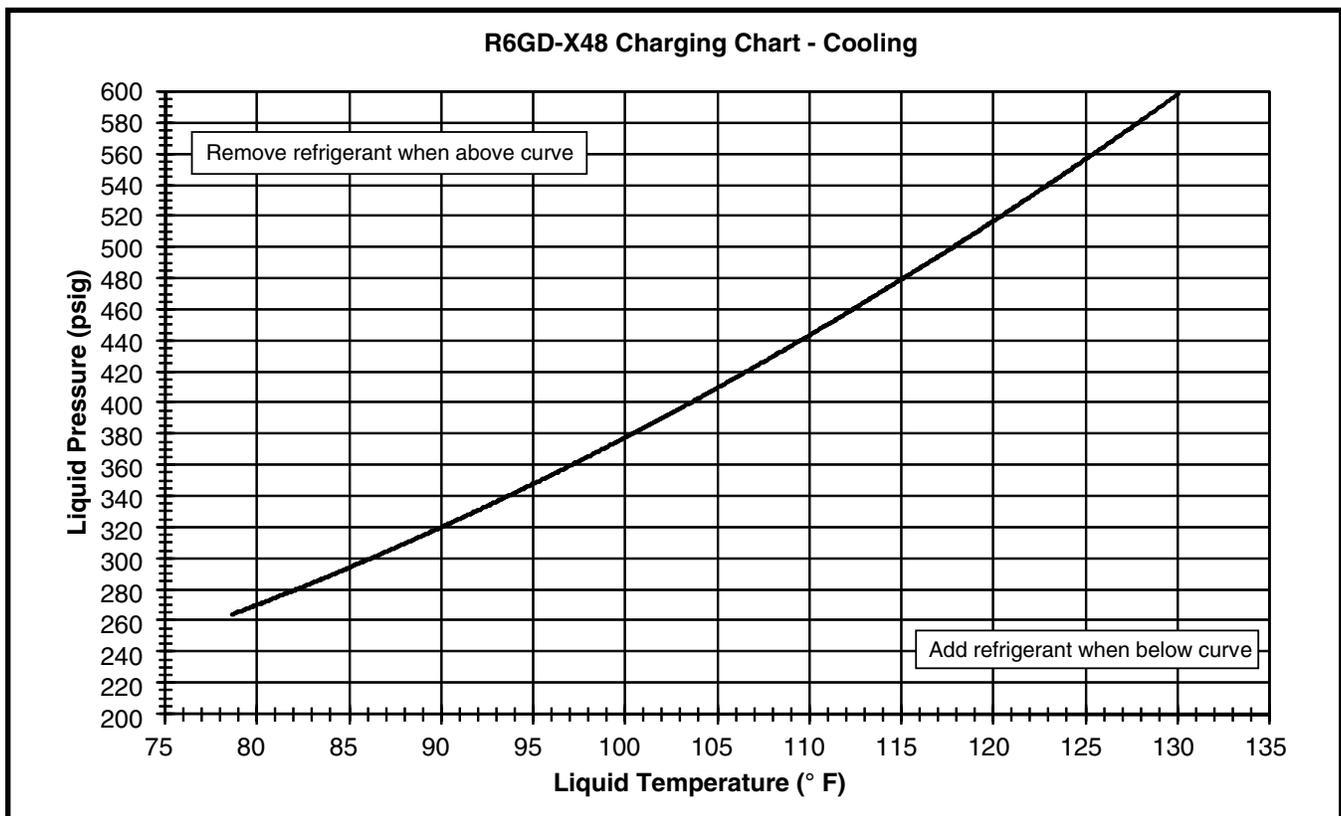
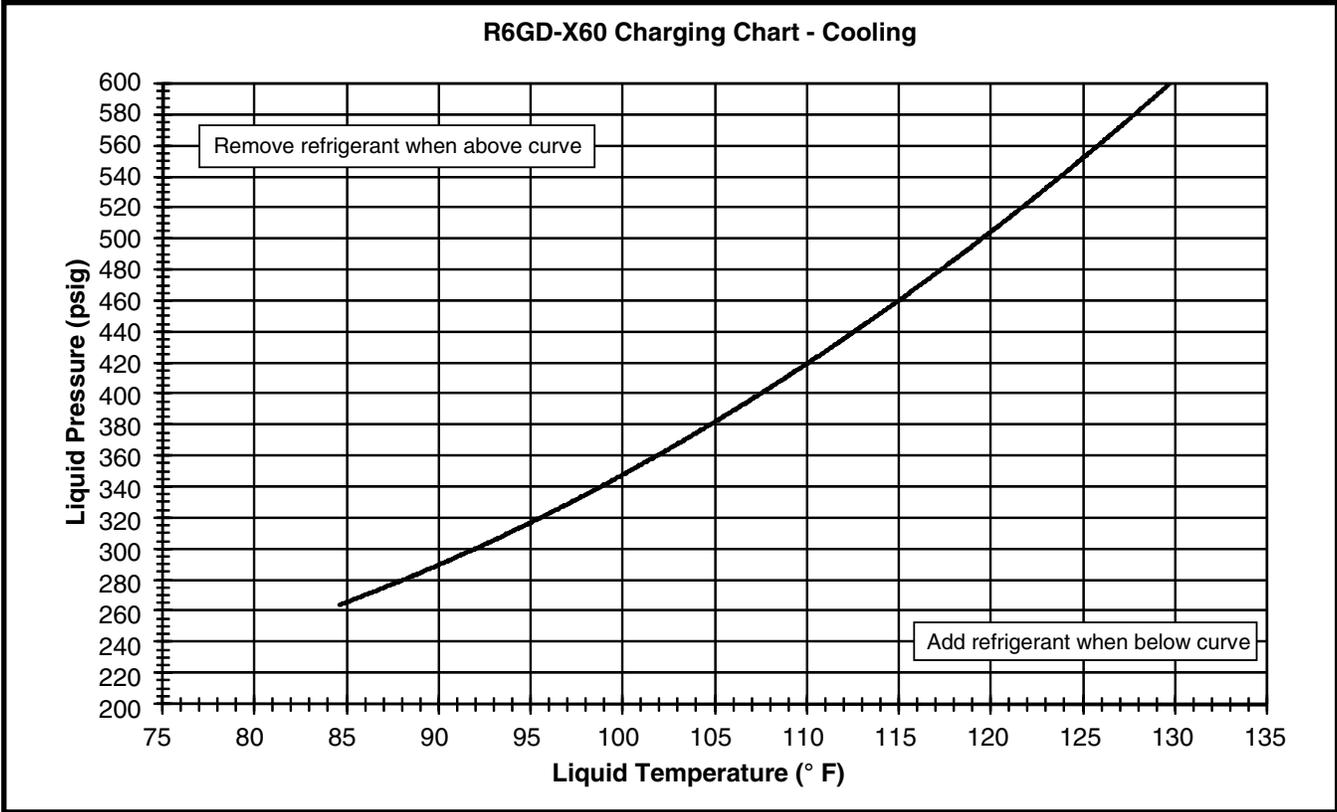


Figure 15. Charging Chart for 4 Ton Units



**Figure 16. Charging Chart for 5 Ton Units**

## FRENCH TRANSLATIONS

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### **AVERTISSEMENT:**

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#### **RISQUE D'INCENDIE OU D'EXPLOSION**

- Le non-respect des avertissements de sécurité pourrait entraîner des blessures graves, la mort ou des dommages matériels.
- L'installation et l'entretien doivent être effectués par un installateur qualifié, un organisme de service ou le fournisseur de gazstaller, service agency or the gas supplier.
- Ne pas entreposer ni utiliser de l'essence ni d'autres vapeurs ou liquides inflammables dans le voisinage de cet appareil, ni de tout autre appareil.

#### **QUE FAIRE S'IL Y A UNE ODEUR DE GAZ**

- Ne pas tenter d'allumer aucun appareil.
  - Ne toucher à aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
  - Évacuer l'immeuble immédiatement.
  - Appeler immédiatement le fournisseur de gaz en employant le téléphone d'un voisin. Respecter à la lettre les instructions du fournisseur de gaz.
  - Si personne ne répond, appeler le service des incendies.
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### **AVERTISSEMENT:**

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#### **RISQUE D'INCENDIE ET D'EXPLOSION**

Risque de blessures graves ou de mort.

Ne pas entreposer ni utiliser de l'essence ni d'autres vapeurs ou liquides inflammables dans le voisinage de cet appareil, ni de tout autre appareil. Le fait d'entreposer ou d'utiliser de l'essence ou d'autres liquides ou vapeurs inflammables à proximité de cet appareil ou de tout autre appareil peut causer des blessures graves ou la mort.

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### **AVERTISSEMENT:**

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#### **RISQUE DE CHOC ÉLECTRIQUE, D'INCENDIE OU D'EXPLOSION**

Le non-respect des avertissements de sécurité pourrait entraîner un fonctionnement dangereux de l'appareil, des blessures graves, la mort ou des dommages matériels.

Un entreteïn incorrect pourrait entraîner un fonctionnement dangereux de l'appareil, des blessures graves, la mort ou des dommages matériels.

- Couper toute alimentation électrique au générateur d'air chaud avant de prodéder aux travaux d'entretein.
  - Au moment de l'entretien des commandes, étiquetez tous les fils avant de les débrancher. S'assurer de les raccorder correctement.
  - S'assurer que l'appareil fonctionne adéquatement après l'entretien.
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### **AVERTISSEMENT:**

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Le non-respect des avertissements de sécurité pourrait d'entraîner des blessures graves, la mort ou des dommages matériels

Ne jamais utiliser une flamme nue por vérifier la présence des fuites de gaz. Pour la vérification de tous les joints, utiliser plutôt une solution savonneuse commerciale fabriquée spécifiquement pur la détection des fuites de gaz. Un incendie ou une explosion peut entraîner des dommages matériels, des blessures ou la mort.

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## INSTALLATION / PERFORMANCE CHECK LIST

<b>INSTALLATION ADDRESS:</b>		
CITY:	STATE:	
UNIT MODEL #		
UNIT SERIAL #		
Unit Installed Minimum clearances per Figure 1 (page 5)?	YES	NO
<b>INSTALLER NAME:</b>		
CITY:	STATE:	
Has the owner's information been reviewed with the customer?	YES	NO
Has the Literature Package been left with the unit?	YES	NO

ELECTRICAL SYSTEM		
Electrical connections tight?	YES	NO
Line voltage polarity correct?	YES	NO
Has the thermostat been calibrated?	YES	NO
Is the thermostat level?	YES	NO
Is the heat anticipator setting correct?	YES	NO

SINGLE PHASE UNITS	
Rated Voltage: .....	VOLTS
L1-L2 Volts: .....	VOLTS

3-PHASE UNITS	
Rated Voltage: .....	VOLTS
L1-L2 Volts: .....	VOLTS
L1-L3 Volts: .....	VOLTS
L2-L3 Volts: .....	VOLTS
Avg. Volts: .....	VOLTS
Max. deviation of voltage from avg. volts: .....	VOLTS
% Volt Imbalance: .....	VOLTS

GAS SYSTEM		
Gas Type: (circle one)	Natural Gas	Propane
Gas pipe connections leak-tested?	YES	NO
Gas Line Pressure: ..... (in - W.C.)		
Is there adequate fresh air supply for combustion and ventilation?	YES	NO
Installation Altitude: ..... (FT.)		
Deration Percentage: ..... (%)		
Heating Input: ..... (Btuh)		
Supply Air Temperature: ..... (° F)		
Return Air Temperature: ..... (° F)		
Temperature Rise: ..... (° F)		
During Unit Operation:		
High Fire Manifold pressure: ..... (in - W.C.)		
Low Fire Manifold pressure: ..... (in - W.C.)		

REFRIGERATION SYSTEM		
Was unit given 24 hr warm up period for crankcase heaters (if equipped)?	YES	NO
Stage-1 Liquid Pressure (high side)		
Stage-1 Suction Pressure (low side)		
Stage-2 Liquid Pressure (high side)		
Stage-2 Suction Pressure (low side)		

VENTING SYSTEM		
Is the vent hood installed?	YES	NO
Is vent hood free from restrictions	YES	NO
Filter(s) secured in place?	YES	NO
Filter(s) clean?	YES	NO



**IMPORTANT** - This product has been designed and manufactured to meet ENERGY STAR criteria for energy efficiency. However, proper refrigerant charge and proper air flow are critical to achieve rated capacity and efficiency. Installation of this product should follow the manufacturer's refrigerant charging and air flow instructions. Failure to confirm proper charge and airflow may reduce energy efficiency and shorten equipment life.

