USER'S INFORMATION MANUAL

FOR YOUR DUAL FUEL PACKAGE UNIT FEATURING EARTH-FRIENDLY R-410A REFRIGERANT

DO NOT DESTROY. PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICEMAN OR USER OF THIS APPLIANCE.

INTRODUCTION

This manual contains the operating instructions for your package dual fuel unit. There are precautions that should be taken to maximize your satisfaction.

IMPORTANT: COMPLETELY READ ALL INSTRUCTIONS PRIOR TO ATTEMPTING TO OPERATE OR MAINTAIN THE PRODUCT.

This unit has been designed to give you many years of efficient, dependable comfort. With regular maintenance, your unit will operate satisfactorily year after year. Please read this manual to familiarize yourself with operation, maintenance and safety procedures.

RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!

⚠WARNING

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

⚠WARNING

— Do not store or use gasoline or other flammable vapors and liquids, or other combustible materials in the vicinity of this or any other appliance.

— WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- Do not return to your home until authorized by the gas supplier or fire department.

— DO NOT RELY ON SMELL ALONE TO DETECT LEAKS. DUE TO VARIOUS FACTORS, YOU MAY NOT BE ABLE TO SMELL FUEL GASES.
- U.L. recognized fuel gas and CO (carbon monoxide) detectors are recommended in all applications, and their installation should be in accordance with the manufacturer's recommendations and/or laws, rules, regulations, or customs.

— Improper installation, adjustment, alteration, service or maintenance can cause injury, property damage or death. Refer to this manual. Installation and service must be performed by a qualified installer, service agency or the gas supplier.

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

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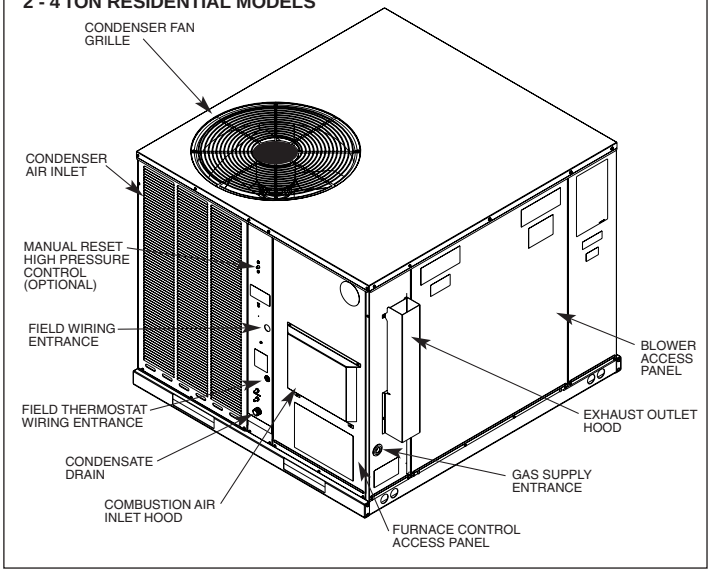
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SAFETY

Carefully follow these safety rules:

1. The area around the unit must be kept clear and free of all combustible materials including gasoline and other flammable vapors and liquids.
2. Do not block the combustion air inlets or the exhaust air outlet openings. See Figure 1.

FIGURE 1
2 - 4 TON RESIDENTIAL MODELS



3. Do not operate the unit without all panels and doors securely in place.

⚠ WARNING

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

4. Any additions, changes or conversions required in order for the unit to satisfactorily meet the application needs should be made by a qualified installer, service agency or the gas supplier, using factory specified or approved parts. Read your WARRANTY. Contact the WARRANTOR for conversion information. The unit was equipped at the factory for use on NATURAL GAS ONLY. Conversion to LP GAS requires a special kit supplied by the WARRANTOR.

⚠ WARNING

OBSTRUCTION OF THE AIR VENT ON AN LP TANK REGULATOR CAN CAUSE EXPLOSION OR FIRE RESULTING IN SERIOUS PERSONAL INJURY, DEATH OR PROPERTY DAMAGE. PERIODICALLY INSPECT AND CLEAN THE AIR VENT SCREEN TO PREVENT ANY OBSTRUCTION. KEEP PROTECTIVE REGULATOR COVER IN PLACE, AS EXPOSURE TO THE ELEMENTS CAN CAUSE ICE BUILDUP AND REGULATOR FAILURE.

5. A gas burner needs an adequate supply of combustion and ventilation air for proper and safe operation. Do not block or obstruct air openings on the unit. Do not place anything around the unit that could block the flow of fresh air to the unit.
6. Do not use this unit if any part has been under water. Immediately call a qualified installer, service agency or the gas supplier to inspect the unit and to replace any part of the control system or any gas control that has been under water.

⚠ WARNING

DO NOT ALLOW DEBRIS SUCH AS LEAVES, GRASS, WEEDS, SHRUBS, VINES OR SNOW ACCUMULATE IN THE AREA SURROUNDING THE UNIT, PARTICULARLY IN THE VICINITY OF THE VENT, AIR INTAKE AND A/C CONDENSER FINS. DOING SO CAN RESULT IN INADEQUATE UNIT PERFORMANCE OR CREATE A FIRE HAZARD RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

7. The combustion air inlet/exhaust outlet hood and surrounding area are very hot when operating in heating mode. **Do not allow children to play on or around the unit.**

⚠ WARNING

DO NOT ALLOW DEBRIS SUCH AS LEAVES, GRASS, WEEDS, SHRUBS, VINES OR SNOW ACCUMULATE IN THE AREA SURROUNDING THE UNIT, PARTICULARLY IN THE VICINITY OF THE VENT, AIR INTAKE AND A/C CONDENSER FINS. DOING SO CAN RESULT IN INADEQUATE UNIT PERFORMANCE OR CREATE A FIRE HAZARD RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

IMPORTANT! BEFORE YOU TURN YOUR PACKAGE DUAL FUEL UNIT ON!

1. Be sure all supply and return grilles are open and not obstructed. Arrange your furniture and drapes to avoid obstructions.
2. Check to see that a clean air filter has been installed either in the package unit with the **OPTIONAL** filter rack, or in the return air filter/grille.
3. Except for the mounting platform, keep all combustible articles three feet from the unit and exhaust system.
4. The return and supply duct connections should be physically sound and sealed where they connect to the unit.

HOW YOUR PACKAGE DUAL FUEL UNIT WORKS

COOLING

During the cooling season, your dual fuel unit works like any other summer air conditioner. It uses an indoor coil (the coil the indoor air flows through in the package unit), a compressor and an outdoor coil to move heat from the inside to the outside. Fans move air across the coils and circulate air in the conditioned space. A thermostat turns the fans and compressor on and off as cooling is needed. Hotter weather means more cooling is required, so your unit will run longer. When the temperature is highest, the unit may run continuously for several hours.

HEATING

In the heating season, the use of the coils is reversed. The outdoor coil picks up heat from the air and the indoor coil releases this heat to warm your home. Colder weather increases heat needed and the unit runs longer. In most areas, the temperature will sometimes drop low enough that the heat pump portion of the dual fuel unit will run continuously. This outdoor temperature at which the heat needed is equal to your dual fuel unit's heat pump capacity is known as the system "Capacity Balance Point". This temperature will vary with each installation, depending on the heat loss of the home and the size of the heat pump selected. Below the Capacity Balance Point, the thermostat will signal the heat pump portion of the unit to stop, and the gas heat portion of the unit will then provide heating.

When gas heat is called by the thermostat, it functions to initiate the ignition sequence and open the gas valve. The spark igniter located on the main burner tray will safely ignite the gas (natural or LP) leaving the main burner ports.

When the thermostat is satisfied, the gas valve will close, the gas heat exchanger will cool and the unit will either return to heat pump heating or turn off depending upon the "balance point" setting and the room temperature setting.

The heat pump portion of the unit will operate with a much lower discharge air temperature than the gas heat portion of the unit. When in the heat pump mode, the air

coming from the supply grilles and registers will be only 15°F to 30°F warmer than the air in your home. It will feel cool if it blows directly on you, but will provide the heat needed to keep your home warm and comfortable.

DEFROST CYCLE

When the outdoor temperature drops below 45°F, frost may start to form on the outdoor coil. Frost buildup will be heaviest on damp days with the temperature at 35°F to 40°F. The dual fuel unit has an automatic control that will reverse the system and stop the outdoor fan to defrost the coil when needed. This electronic control senses coil and air temperatures to determine when a defrost cycle is needed. They may go as long as 6 hours between defrosts. The coil may be almost completely covered with frost at some times. Don't worry unless it continues to build up a thicker layer with areas of hard clear ice. If excessive ice buildup should occur, call your serviceman.

When the package dual fuel unit is defrosting, a cloud of steam may rise from the unit for a short time. This is normal and harmless.

The water that runs from the defrosting coil must be drained away from the unit. Snowdrifts must be kept cleared away to prevent ice buildup in the coil from defrost water.

Important things to remember about the Defrost Cycle:

1. Water must drain away from the coil and unit to prevent damage from ice buildup. Keep snow cleared away.
2. The outdoor fan stops. The unit may make some strange hissing or gurgling noises and a cloud of steam. They are normal.
3. Call your serviceman if you notice excessive frost and clear ice buildup.

HOW TO OPERATE YOUR PACKAGE DUAL FUEL UNIT

The control center for your dual fuel unit is your thermostat. The room thermostat must be specifically designed to control dual fuel package units. It is recommended that the thermostat listed below be used for dual fuel applications.

(-)RHC-TST402DFMS

Your thermostat will have switches to select the following functions:



Red arrow: Raises temperature setting.

Blue arrow: Lowers temperature setting.

SYSTEM: This button selects whether the unit is in the Cooling, Heating, Emergency Heating Mode, Automatic Changeover mode, or Off.

1. **COOL**ing: Turns cooling on when temperature rises above setpoint.
2. **HEAT**ing: Turns Heat Pump heating on when temperature drops below set point if the outdoor temperature is above the "balance point" and the Heat Pump has sufficient capacity, otherwise gas heat is used.
3. **EMER**gency Heat: Turns HeatPump compressor and outdoorfan off. Heat is provided by thegas heat section only. Use thisswitch to change to gas heat incase of Heat Pump problems.
4. **AUTO**matic changeover: Turns on cooling or heating as required to maintain setpoints. The thermostat decides whether Cooling or Heating is required based on the indoor temperature.
5. **OFF:** Turns unit off.

FAN: This button selects fan operation. If **AUTO** is selected, then the indoor fan only runs when a call for cooling or heating is required. If **ON** is selected, then the indoor fan runs continuously. The fan **ON** selection can sometimes improve comfort by minimizing the temperature difference between zones. Note: In the cooling mode, with continuous

air circulation, some condensation on the cooling coil can re-evaporate at the end of each cycle and cause a buildup of humidity prior to the next cooling cycle.

The recommended thermostat includes a multi-color indicator: green for first stage, yellow for second stage, flashing yellow for third stage, red for emergency heat and flashing red for malfunctions in the system.

An internal time clock can be used to program an occupancy schedule. Please review the thermostat guide PROGRAMMED OPERATION – Planning your Program, to use this feature.

This dual fuel thermostat also requires installation of the outdoor air temperature sensor (provided with the recommended thermostat) to accurately measure the “balance point” between when it is preferable to use gas heat instead of operating the heat pump to provide heating.

The “balance point” temperature setting of the recommended thermostat is adjustable from 5° to 50°F, but is factory set at 35°F. Normally the “balance point” temperature is set at installation and not readjusted. The following three factors must be considered when adjusting the “balance point” temperature on the thermostat:

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

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

OPERATING ECONOMICALLY

For the most economical operation of your system, select the highest summer setting and the lowest winter setting at which you are comfortable. Typical temperatures are 78°F on cooling and 70°F on heating. Your operating cost is increased from 3% to 8% for each degree lower setting in cooling and for each degree higher setting in heating. When heating, let the Heat Pump do the work whenever possible. Do not change temperature settings more than necessary: **SET IT AND FORGET IT.** If you quickly turn the temperature setting up 2°F or more when in the heating mode, you will bring on the gas heat. This costs more to operate than the Heat Pump. If the thermostat is adjusted and the unit stops, the thermostat should not be readjusted to start the unit without waiting 5 minutes. If you do not wait 5 minutes, an automatic overload device may cause the compressor to stop, or a fuse may blow to prevent damage to the compressor. Poor incoming electrical service can cause nuisance tripping of overloads or blow fuses.

If the temperature selection procedure is new to you, ask your installing contractor to familiarize you with the operation of the thermostat.

Here are other ways to save electricity and improve your system’s performance:

1. Keep all grilles and registers open and clear of obstructions such as drapes or furniture.
2. Keep doors and windows closed.
3. Be sure all air ducts are well insulated and sealed with a vapor barrier.

4. Let the sun in during the winter.Keep it out during the summer.
5. Be sure clothes dryers are vented to the outside away from your outdoor unit.
6. Fireplaces are pleasant, but most fireplaces bring in more cold outside air for combustion and flue draft than they heat. Your dual fuel unit may actually run more!
7. Use kitchen and bathroomexhaust fans only whennecessary.
8. Add insulation, storm windows and insulated outside doors. Seal cracks to prevent air leakage.
9. Keep your filters clean. Reduced airflow in your unit reduces efficiency.
10. Operating your indoor fan on AUTO will cost less and provide better humidity control in the summer.
11. Keep lamps, TV's and other heat sources away from your thermostat.
12. Protect the outdoor unit from roof runoff to prevent excess ice buildup.

MAINTAINING YOUR PACKAGE DUAL FUEL UNIT

DANGER: SHUT OFF ELECTRICAL POWER BEFORE PERFORMING ANY MAINTENANCE TO PREVENT SERIOUS INJURY FROM SHOCK.

FILTERS

Have your qualified installer, service agency or the gas supplier instruct you on how to access your filters for regular maintenance.

Keep your air filters clean. You may have any one of these types:

1. Glass Fiber (Throwaway) – Replace these when dirty. Do not clean.
2. Plastic Fiber or Foam – Vacuum clean and reinstall these.
3. Aluminum Mesh – Wash with detergent and water. Always air dry thoroughly and recoat these per the manufacturer's instructions. They will not filter out the dust and dirt without the adhesive coating.

Filters should be checked at least once a month and cleaned or replaced when needed. Replace throwaway filters at least twice a year.

IMPORTANT: Do not operate your system for extended periods without filters, as the dust entrained in the air may pack into the fin area of the evaporator coil creating a condition which could require extensive repairs.

⚠ WARNING

ANY RECIRCULATED DUST PARTICLES WILL BE HEATED AND CHARRED BY CONTACT WITH THE GAS FURNACE HEAT EXCHANGER. THIS RESIDUE WILL SOIL CEILINGS, WALLS, DRAPES, CARPETS, AND OTHER HOUSEHOLD ARTICLES.

LUBRICATION

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

The compressor requires no oiling or other maintenance. The fan motors and induced draft motors are pre-lubricated by the manufacturer and do not require further attention.

CLEANLINESS

The combustion air inlets and combustion air outlets must be clear and free of obstructions.

The indoor air blower motor and the induced draft blower motor must be cleaned periodically by a qualified installer, service agency, or the gas supplier to prevent overheating due to an accumulation of dust and dirt on the motor windings or exterior.

The air filters should be kept clean as mentioned previously because dirty filters can restrict airflow. The indoor air blower motor depends upon sufficient air flowing across and through it to keep from overheating.

Keep the outdoor coil clean and free of restrictions such as grass clippings, weeds, leaves, etc.

TURN ELECTRICITY OFF BEFORE CLEANING!

Free airflow is essential. Keep fences, shrubs, snowdrifts or other obstructions at least two feet from all coil air inlets. If the outdoor coil is allowed to become restricted, the system efficiency will suffer and abnormally high refrigerant operating pressures will result.

Check condensate drain pan and lines annually and clean if necessary. In winter, keep condensate drain and trap dry, or protect against freeze-up. See Figure 1 for location.

Cleaning and waxing the cabinet of the outdoor unit with automotive polish will improve its appearance and extend the life of the finish.

Never use a weather cover over the outdoor unit, even if it is turned off for long periods. A cover will hold moisture in the unit and cause rust buildup and damage to electrical parts.

Never use your dual fuel unit as a stand for garden hoses or tools. Do not permit children to play near its moving parts or electrical components. Use caution with lawn mower and trimmer to avoid damaging refrigerant piping or electrical wiring.

PROTECTING EQUIPMENT FROM THE ENVIRONMENT

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

⚠ WARNING

DISCONNECT ALL POWER TO THE UNIT BEFORE STARTING MAINTENANCE!

1. Frequent washing of the cabinet, fan blade and coil with fresh water will remove most of the salt or other contaminants that build up on the unit.
2. Regular cleaning and waxing ofthe cabinet with a goodautomobile polish will providesome protection.
3. A good liquid cleaner may be used several times a year to remove matter that will not wash off with water.
4. Avoid having lawn sprinklerheads spray directly on the unitcabinet.

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

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

IN CASE OF PACKAGE DUAL FUEL UNIT PROBLEMS

Please do not attempt any servicing operation with which you are not familiar or experienced unless you are advised by your servicing contractor of the proper procedures.

1. Check to see that electrical power is on. Check breakers or fuses for the unit.
2. Check to see that airflow is not restricted. Indoors - check grilles, registers and filter. Outdoors -check outdoor coils and see that the fan is running (remember it stops for a short time during defrost cycles).
3. Check to be sure that your thermostat is set properly. System switch should be on HEAT, COOL or AUTO as appropriate. Temperature set point must be above room temperature on heating or below room temperature on cooling for system to start.
4. If your unit is equipped with an OPTIONAL external manual high pressure switch reset button, have your servicing contractor familiarize you with its location. Many models have compressors equipped with internal pressure relief valves using an automatic reset feature eliminating the need for an external control. This high-pressure switch or the relief valve will open under excessive high pressures to protect the compressor. Some models with internal relief valves will require power interruption prior to resetting itself. The high refrigerant pressure may be due to a temporary condition, so if your unit is equipped with a reset button, you may reset it as required. However, if the problem persists, refer the problem to your servicing contractor.
5. If you know or suspect that the compressor is not working, you should move the SYSTEM switch on the thermostat to the OFF position. This will stop the operation of the unit until a serviceman can be called.

CALL YOUR SERVICEMAN IF:

1. You observe excess ice buildup.
2. You hear new, unusual noises.
3. The unit is short-cycling (turning on and off rapidly) and not heating or cooling properly.

Annual inspection by your professional serviceman will help to keep your dual fuel unit operating at peak efficiency and reduce the chance of major repairs.

HEAT PUMP OPERATION
SEQUENCE OF OPERATION

1. When the thermostat is set to the “COOL” mode, the thermostat will on a call for cooling, energize the compressor contactor and the indoor blower relay. The indoor blower can be operated continuously by setting the thermostat “FAN” switch to the “ON” position. The reversing valve coil is de-energized.
2. If the thermostat is set to the “HEAT” mode, the reversing valve will energize, and will remain energized except in defrost.
   a. The first heat stage of the thermostat will energize the compressor contactor and the indoor blower relay if the outside temperature is above the “balance point” (see thermostat section for detail on determining and setting the “balance point”).
   b. If the outside temperature is below the “balance point”, or if the second heat stage of the thermostat is called, then the gas heat will turn on, the compressor contactor is de-energized, and the indoor blower speed is switched.
   c. During defrost, the defrost control (DFC) will de-energize the compressor contactor, de-energize the reversing valve, and re-energize the compressor contactor after 5 seconds. A relay on the defrost control (DFC) will simultaneously de-energize the outdoor fan motor to assist in thawing out the outdoor coil. The defrost control (DFC) will also energize the gas heat to temper the indoor air. During this period, up to three speed taps on the indoor blower motor may be energized simultaneously. The indoor blower motor will run at the highest numerical tap energized regardless of blower speed. See the gas heat section for specifics on the gas furnace operation.

GAS HEATING OPERATION
FOR YOUR SAFETY,READ BEFORE OPERATING

⚠ WARNING

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

A. This appliance is equipped with an ignition device which automatically lights the burners. Do **not** try to light the burners by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the ground because some gas is heavier than air and will settle on the ground.

   WHAT TO DO IF YOU SMELL GAS

   - Do not try to light any appliance.
   - Do not touch any electric switch, do not use any phone in your building.
   - Immediately call your gas supplier from a neighbor’s phone. Follow the gas supplier’s instructions.
   - If you cannot reach your gassupplier, call the fire department.
   - Do not return to your home until authorized by the gas supplier for 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 turn by hand, don’t try to repair it, call a qualified installer, service agency or the gas supplier. 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 installer, service agency or the gas supplier to inspect the appliance and to replace any part of the control system and any gas control valve, electrical components, motors or burners which have been under water.

SEQUENCE OF OPERATION

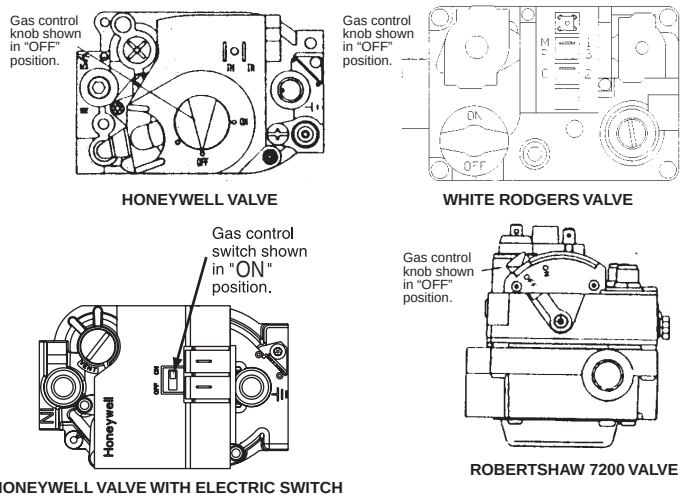
This unit is equipped with an integrated circulating air blower/induced draft blower control board that works in conjunction with a remote sense direct spark ignition control.

1. Each time thermostat contacts close, the induced draft blower operates a prepurge cycle.
2. The air proving negative pressure switch closes.
3. The main gas burner cycle starts.
4. **Thirty seconds after the pressure switch closes, the gas valve opens and the ignitor sparks for approximately 7 seconds** or until the remote flame is sensed at the remote flame sensor. The induced draft blower continues to run for the complete heating cycle.
5. If the flame is not sensed during this 7 second trial for ignition, the control will repeat the prepurge cycle and ignition cycle **two (2) additional times if needed.**
6. After a **total of three (3)** cycles without sensing main burner flame, the system will then go into a 100% lockout mode.
7. After one hour, the ignition control will repeat the prepurge and ignition cycles for **3 tries** and then go into 100% lockout mode again.
8. It will continue this sequence of cycles and lockout each hour until ignition is successful or power is interrupted.
9. During the lockout mode, neither the ignitor or the gas valve will be energized until the system is reset by turning the thermostat to the “OFF” position or interrupting the electrical power to the unit for 10 seconds or longer.
10. The induced draft blower and main burner will shut off when the thermostat is satisfied.
11. The fixed time blower control will start the circulating air blower on the heat speed **approximately twenty to thirty (20 to 30) seconds after the main burners are ignited.**
12. The circulating air blower will continue to run during the burner operation and then shut down at **approximately ninety (90) seconds after the thermostat is satisfied and the burners are shut off.**
13. The circulating air blower will start and run on the heat speed if the thermostat fan switch is in the “ON” position.

SUMMARY OF NORMAL FURNACE OPERATING SEQUENCE

1. Thermostat calls for heat
2. Induced draft blower is energized.
3. Air proving pressure switch closes.
4. 30 second prepurge is initiated.
5. Gas valve opens and ignitor is energized for 7 second trial for ignition period.
6. Burners ignite and flame sensor proves all burners have lit (maximum of 3 trials for ignition each hour).
7. The circulating blower is energized after 20-30 seconds.
8. Thermostat is satisfied and opens.
9. The gas valve is de-energized and closes, shutting down the burner flame.
10. The circulating air blower is de-energized after 90 seconds.

FIGURE 2
TYPICAL GAS VALVES



LIGHTING INSTRUCTIONS

This appliance is equipped with a direct spark intermittent ignition device. This device lights the main burners each time the room thermostat (closes) calls for heat. See lighting instruction on the furnace.

TO START THE FURNACE

1. STOP! Read the safety information on the Operating Instructions Label located on this appliance.

⚠ WARNING

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

2. Set the room thermostat to its lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do NOT try to light the burner by hand.
5. Remove control door/access panel.
6. Move the switch to the "OFF" position.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP!
   - Do not try to light any appliance.
   - Do not touch any electric switch; do not use any phone in your building.
   - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
   - If you cannot reach your gas supplier, call the fire department.

   If you don't smell gas, go to the next step.
8. Move "OFF" position to "ON" position.
9. Replace the control door.
10. Turn on all electrical power to appliance.
11. Set the thermostat to the desired setting.
12. If the appliance will not operate, follow the instructions below on how to shut down the furnace.

⚠ WARNING

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

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

TO SHUT DOWN FURNACE

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

⚠ WARNING

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

MANUAL RESET OVERTEMPERATURE CONTROL

A manual reset limit control is located on the burner shield. This device senses blockage in the heat exchanger or insufficient combustion air. This will shut off the main burners if excessive temperatures occur in the burner compartment.

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

⚠ WARNING

DO NOT ATTEMPT TO DEFEAT THIS IMPORTANT SAFETY DEVICE. DO NOT RESET THE OVERTEMPERATURE CONTROL WITHOUT TAKING CORRECTIVE ACTION TO ASSURE THAT AN ADEQUATE SUPPLY OF COMBUSTION AIR IS MAINTAINED UNDER ALL CONDITIONS OF OPERATION AND THAT NO HEAT EXCHANGER TUBES ARE BLOCKED OR PERFORATED. REPLACE THIS CONTROL ONLY WITH THE IDENTICAL REPLACEMENT PART. FAILURE TO ADHERE TO THIS WARNING CAN RESULT IN PERSONAL INJURY OR DEATH.

TROUBLESHOOTING - HEATING

PROBLEM

Insufficient heating —

REMEDY

a. Increase temperature setting on thermostat.
b. Check return air filters and change, if necessary.
c. Recheck to assure that all supply registers and diffusers are open.
d. Check closing of all doors and windows.
e. Check that blower compartment doors are in place.
f. Call your servicing contractor.

ROUTINE MAINTENANCE

⚠ WARNING

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

Routine maintenance to be provided by a qualified installer, service agency or the gas supplier ONLY.

COMBUSTION AREA AND EXHAUST SYSTEM

1. It is recommended that an annual inspection of your furnace be done by a qualified installer, service agency or the gas supplier.
2. Turn OFF the electrical supply to the furnace and remove the access doors.
3. Inspect the gas burners and burner compartment for dirt, rust, or scale.

⚠ WARNING

IF DIRT, RUST, SOOT OR SCALE ACCUMULATIONS ARE PRESENT, DO NOT OPERATE THIS FURNACE. INSPECT THE HEAT EXCHANGERS FOR LEAKS. LEAKS CAN CAUSE TOXIC FUMES TO ENTER THE HOME AND CAUSE INJURY OR DEATH.

4. Inspect the exhaust area inside and outside the appliance including the exhaust transition piece and the exhaust hood. Be sure that the exhaust transition piece (inside the appliance) and the hood are in place and are physically sound, without holes or excessive corrosion. If these components have deteriorated, have a qualified service professional replace them using factory specified or approved replacement parts only.
5. Be sure that the return air duct connections are physically sound and are sealed to the unit.
6. Look for obvious signs of deterioration of the unit.
7. If the unit is free of the above conditions, replace all access doors, except furnace access panel, and restore electrical power to the unit.
8. Make sure control box cover is in place. Start the furnace and observe its operation. Watch the burner flames to see if they are bright blue. If a suspected malfunction is observed, or the burner flames are not bright blue, apply appropriate service.

CALCULATING THE ECONOMIC BALANCE POINT

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

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

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

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

For example, the local price of natural gas is $1.20/therm and the electricity rate is $0.12/KW. Select $1.20/therm straight line on the left side of the chart. Then select the utility rate curved line (the top one). The two lines intersect at about 21°F. The balance point should be set at 21°F by referring to the unit installation instructions or contacting your installer.

TABLE 1

Economic Balance Point Temperature
Dual Fuel Package RQPW

