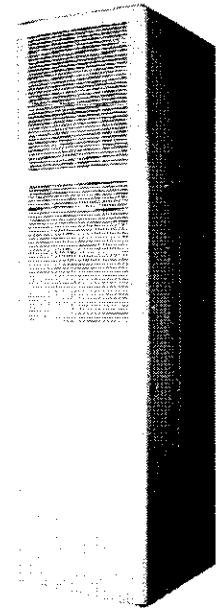


# OWNER'S MANUAL

## SEALED COMBUSTION DOWNFLOW GAS FURNACE



### TABLE OF CONTENTS

<b>INTRODUCTION</b> .....	2
WARRANTY AND RESPONSIBILITIES .....	2
GAS SUPPLY .....	2
SAFETY INFORMATION .....	2
<b>INSTRUCTIONS FOR STANDING PILOT MODELS</b> .....	3
LIGHTING INSTRUCTIONS .....	3
SEQUENCE OF OPERATION .....	3
THE FURNACE CONTROLS AND THEIR FUNCTION .....	4
<b>INSTRUCTIONS FOR AUTOMATIC IGNITION MODELS</b> .....	4
LIGHTING INSTRUCTIONS .....	4
SEQUENCE OF OPERATION .....	4
DIAGNOSTIC LIGHT .....	5
THE FURNACE CONTROLS AND THEIR FUNCTION .....	5
<b>GENERAL INFORMATION FOR ALL MODELS</b> .....	6
GAS SHUTOFF .....	6
OBSERVING BURNER OPERATION .....	6
IF FURNACE FAILS TO OPERATE PROPERLY .....	6
PERIODIC INSPECTION AND MAINTENANCE BY HOMEOWNER .....	6
SEASONAL SERVICE INFORMATION .....	7

### **▲ WARNING**

**FOR YOUR SAFETY - Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**

**Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. 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.**

**Never attempt to modify this furnace. Fire, explosion, or asphyxiation may result. If malfunction occurs, obtain the assistance of a qualified service agent.**

**If not installed, operated, and maintained in accordance with the manufacturer's instructions, this product could expose you to substances in fuel or from fuel combustion which are known to the State of California to cause cancer, birth defects or other reproductive harm. Also, operation, installation and servicing of this product could expose you to airborne particles of glasswool fibers known to the State of California to cause cancer through inhalation.**

**Use of furnace or air conditioning components that are not included in the Intertek Testing Services (ETL) certification of this appliance may create a hazard, will invalidate the certification, and will in many states make installation illegal. UL listed air conditioning components are specified on the furnace label.**

### **▲ CAUTION**

**Before placing furnace in service, it must be checked to make sure it is equipped for the type of gas being used. Failure to observe this caution may result in unsafe operation, explosion, and/or fire or asphyxiation. Use of other components not tested in combination with this furnace may make the equipment in violation of State Codes, may create a hazard, and may ruin the equipment.**

# Congratulations . . .

On your purchase of one of the most versatile furnaces available in the industry today. This compact, energy-efficient furnace has been precision designed, manufactured of high-quality materials and has passed many rigorous inspections and tests to ensure many years of satisfactory service. This booklet is meant to increase your understanding of your unit, tell you how to operate it efficiently and how to obtain the greatest measure of comfort at the lowest operating expense. Please read this booklet thoroughly. We appreciate your interest in our product and your decision to purchase our furnace. Enjoy your comfort.

## INTRODUCTION

### WARRANTY AND RESPONSIBILITIES

It is the sole responsibility of the home owner to make certain that the gas furnace has been correctly set up and converted to the proper fuel (Propane or Natural gas) and adjusted to operate properly.

The manufacturer warrants the furnace to be free from defects in material or workmanship for the stated time in the warranty agreement (see warranty certificate packed with the furnace).

However, the manufacturer will not be responsible for any repair costs to correct problems due to improper set-up, improper installation, furnace adjustments, improper operating procedure by the user, etc.

Some specific examples of service calls which cannot be included in warranty payments are:

1. Converting the furnace to use another type of gas.
2. Correcting faulty duct work in the home.
3. Correcting wiring problems in the electrical circuit to the furnace.
4. Resetting circuit breakers or other switches.
5. Adjusting the burner air shutter or service calls made to correct problems caused by improper air adjustment.
6. Correcting problems caused by improper gas supply pressure to the furnace.
7. Instructional training on how to light and operate furnace.

8. Furnace problems caused by installation of air conditioner, heat pump, or other air quality device which is not approved.
9. Problems caused by improper installation of the furnace flue assembly (roof jack).
10. Adding a roof jack extension because of unusual wind conditions or snow conditions.
11. Adjusting or calibrating the thermostat.
12. Problems caused by construction debris which has fallen into the flue or combustion air openings.
13. Replacement of fuses.
14. Problems caused by orifice plugged or restricted by spider webs.

You should establish a firm understanding of these responsibilities with your manufactured housing dealer, service company or gas supplier so there will be no misunderstanding at a later time.

### GAS SUPPLY

The gas supply to your home will either be Natural Gas or Propane gas. Your furnace will be factory equipped to operate on only one of these two different gases.

A small metal tag secured to the furnace next to the gas valve will specify the type of gas your furnace is equipped to use.

If the gas is different from that specified on the metal tag, the furnace can be converted by following the instructions on the furnace safety label inside lower front panel. Parts for conversion are contained in the small bag attached to the gas valve. Be sure the

proper size orifice is used, as specified on the furnace name plate.

### CAUTION

The furnace must be converted by a qualified technician. Improper conversion can cause unsafe operation, explosion, and/or fire or asphyxiation.

### Natural Gas Operation

The furnace is designed for 7" W.C. inlet pressure. Pressure is reduced to 3 1/2" W.C. by the pressure regulator in the gas valve.

### Propane Gas Operation

Inlet pressure to the gas valve must be 11" W.C. When properly converted to Propane gas, the pressure is regulated at 10" W.C.

### SAFETY INFORMATION

For your safety read before lighting.

1. The first lighting of the furnace after any home setup must be performed by a qualified service technician.
2. If this appliance has a pilot that must be lit by hand, follow these instructions exactly.
3. BEFORE LIGHTING smell all around the furnace 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 electric switch and 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.
4. Use only your hand to move the gas control lever or switch. Never use tools. If the lever or switch will not move by hand, don't try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.
  5. Do not use this furnace if any part has been under water. Immediately call a qualified service technician to inspect the furnace and to replace any part of the control system and any gas control which has been under water.

**INSTRUCTIONS FOR STANDING PILOT MODELS****LIGHTING INSTRUCTIONS**

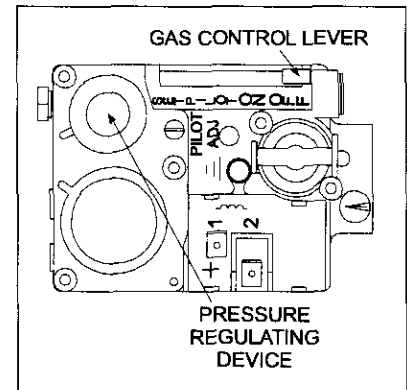
1. **STOP!** Read the **Safety Information**.
2. Set the thermostat to the lowest setting.
3. Turn off all electrical power to the appliance.
4. Remove the furnace doors.
5. Push in the gas control lever slightly and move right to "OFF". **DO NOT FORCE.**

6. Wait ten (10) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow Step 3 in the Safety Information above. If you don't smell gas, go to the next step.
  7. Open hinged observation door, the pilot is found at the end of the pilot shield on the left side of the burner.
  8. Slightly depress the gas control lever and move it to the left to the "ON" position and release; then move it to the "PILOT" position.
  9. Move the control lever to "SET" and hold. Immediately light the pilot with a match (use match holder provided). Continue to hold the control lever for about one (1) minute after the pilot is lit. Release the lever and it will spring back to the "PILOT" position. Pilot should remain lit. If it goes out, repeat steps 5 through 9 above.
- If the lever does not spring back when released, stop and immediately call your service technician or gas supplier.
  - If the pilot will not stay lit after several tries, move the gas control lever to "OFF" and call your service technician or gas supplier.
10. Move the gas control lever to "ON".
  11. Replace the furnace doors.
  12. Turn on all electric power to the furnace. Set the thermostat to "HEAT" and/or the desired temperature setting. Set the ON-OFF-FAN switch to "ON".

**In the event of any flashback or explosion, immediately shut off the furnace and call your service technician.**

**To Turn off Gas to Appliance**

1. Set the thermostat to the lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove the furnace doors.
4. Move gas control switch to "OFF" position. **DO NOT FORCE.**
5. Replace the furnace doors.



**FIGURE 1: STANDING PILOT GAS VALVE**

**SEQUENCE OF OPERATION**

1. On a call for heat, the thermostat contacts close, supplying 24 VAC to the gas valve.
2. When the gas valve is energized it initially opens at a reduced flow and opens fully after approximately 30 seconds.
3. About 1-2 minutes after the burner lights, the furnace air circulation blower will come on.
4. When the call for heat is satisfied the thermostat contacts open, the gas valve shuts off gas flow.
5. After the burner shuts off, the air circulation blower will continue to run for 2-4 minutes, until the furnace has cooled.

## THE FURNACE CONTROLS AND THEIR FUNCTION

1. "ON-OFF-FAN" switch turns electrical power to the furnace on and off. The switch must be set in the "ON" position for the furnace to operate. To run the blower continuously without heating, set the switch to "FAN".
2. **Limit Control** - This furnace is protected by two (2) high temperature limit switches. The lower limit switch is an automatic reset type.

**IMPORTANT** - The upper limit switch near left side of blower is a manual reset type limit switch. If burner does not function, turn system switch to "OFF" and push reset button in center of limit switch.

3. **Gas Valve** - The gas valve is 100% shut-off type and will fail safe if for some reason the gas is turned off or the pilot goes out. It is also of the step-open type which means they open to a low fire position and after a few seconds step-open to high fire.
4. **Fan Switch** - This fan switch is a temperature sensing device that turns on the blower when sufficient heat has built up within the furnace. It also turns the blower off when the furnace has cooled down sufficiently after burner shut-off. In warm weather, there is a possibility of the blower coming on periodically or operating continuously due to a heat buildup within the furnace by a combination of

warm weather and heat from the pilot. This is normal operation as long as there is power to the furnace and the ON-OFF-FAN switch is at the "ON" position. IF blower operation is not desired, the ON-OFF-FAN switch may be set in the "OFF" position to cut the electrical power to the furnace.

## INSTRUCTIONS FOR AUTOMATIC IGNITION MODELS

### LIGHTING INSTRUCTIONS

1. **STOP!** Read the safety information
2. Set the thermostat to the lowest setting, or "OFF".
3. Turn off all electric power to the furnace.
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 upper door panel.
6. Move gas valve control switch to "OFF". See Figure 2.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow Step 3, in the Safety Information above. If you don't smell gas, go to the next step.
8. Move gas control switch to "ON".
9. Replace upper door panel.
10. Turn on all electric power to the furnace.

11. Set thermostat to desired setting.

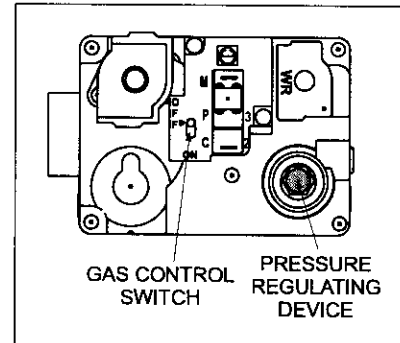


FIGURE 2: AUTO IGNITION GAS VALVE

### SEQUENCE OF OPERATION

This furnace is equipped with an electronic control system which automatically supervises burner and fan operation. A green indicator light displays during normal operation. This indicator light also informs the home owner when certain basic services are needed. In response to a call for heat by the room thermostat, the burner is lighted by a hot glowing ignitor at the beginning of each operation cycle. The burner will continue to operate until the thermostat is satisfied at which time all burner flame is extinguished. During the off cycle no gas is consumed. With the room thermostat set below room temperature, and with the electrical power and gas supply to the furnace on, the normal sequence of operation is as follows:

1. When the room temperature falls below the setting of the room thermostat, the thermostat energizes the furnace control board.

2. When the furnace control board is activated, the combustion air blower is turned on.
3. As the combustion air blower increases in speed, the contacts of the pressure switch will close and complete the electrical circuit to the ignition circuit.
4. During the next 40 to 50 seconds, the combustion air blower will bring fresh air into the heat exchanger and the ignitor will begin to glow. At the end of this period, the gas valve will open and the burner will light.
5. After the burner lights, a separate sensor acts as a flame probe to check for the presence of flame. As long as flame is present, the system will monitor it and hold the gas valve open.
6. If the burner fails to light within 6-8 seconds after the gas valve opens, the gas valve will close and the ignitor will be turned off. After a short pause, the system will recycle and try again for ignition. If the burner fails to light after three tries, the ignition system will lock out. The system will remain in lock-out mode for a period of one hour, then the furnace will try for ignition again.
7. The lapsed time from the moment the room thermostat closes to when the burner lights may be 45-60 seconds. This delay is caused by:
  - a. The time required for the ignitor to heat up and
  - b. The time required for fresh air to be brought into the heat exchanger.
8. Approximately 60-90 seconds after the burner lights, furnace air circulation blower will run.
9. When room thermostat is satisfied, the circuit to the furnace control board is opened. The circuit to the combustion air blower and the gas valve is opened and the burner is extinguished. Then the furnace control board will keep the circulating blower running for a fixed period of time to allow additional heat to be drawn from the heat exchanger.

### DIAGNOSTIC LIGHT

If furnace does not maintain home temperature as set, check the light indicator, visible through a small window in the right side of the furnace control box.

The electronic furnace control is equipped with a diagnostic light which flashes when there is a service problem. The diagnostic codes are:

**Steady on:** Normal operation.

**ONE flash:** Ignition failure.

**TWO flashes:** Pressure switch failed closed.

**THREE flashes:** Pressure switch failed open.

**FOUR flashes:** Limit switch open.

**FIVE flashes:** Gas valve energized with no call for heat

**SIX flashes or rapid flash:** Reversed polarity

If a problem is indicated, contact your authorized service person.

### THE FURNACE CONTROLS AND THEIR FUNCTION

1. **System Switch** - This system switch turns "ON" or "OFF" the 120 volt electrical circuit that powers the furnace controls and the blower motor. The system switch must be turned "ON" for the furnace to operate. Turn the switch to "OFF" when cleaning the blower, etc.
2. **Limit Control** - This furnace is protected by two (2) high temperature limit switches. The lower limit switch is an automatic reset type.
3. **Gas Valve** - The gas valve for the gas furnaces are a 100% shut-off type and will fail safe if for some reason the gas is turned off.

## GENERAL INFORMATION FOR ALL MODELS

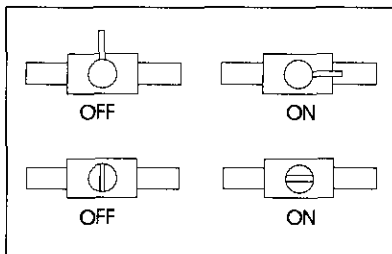
### GAS SHUTOFF

#### ▲ WARNING

*Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the furnace and allow blower to run until furnace cools down and blower shuts off before shutting off the electrical supply.*

The furnace gas valve is equipped with a manual gas shutoff. To turn off gas to the furnace, move the lever on the gas valve to the "OFF" position.

The furnace installation should also have a manual shutoff valve in the gas piping to the furnace, similar to what is shown in Figure 3. To turn off the gas to the furnace, use a wrench and turn the knob or lever so that it is pointing 90 degrees from the gas pipe, as shown in Figure 3.



**FIGURE 3: MANUAL GAS SHUTOFF VALVE**

Set the room thermostat at the desired room temperature. Greatest comfort will be achieved when the setting is not changed frequently.

For energy conservation and economy it is recommended that the thermostat be set at 68° for heating and 80° for cooling.

**For Heating with Air Conditioning Applications** - Set heat/cool switch to "HEAT" position and set fan switch to "AUTO" position.

### OBSERVING BURNER OPERATION

1. Observe burner to make sure it ignites. Observe color of flame. On natural gas the flame will burn blue with appreciably yellow tips. On Propane gas a yellow flame may be expected. If flame is not the proper color call a qualified serviceman for service.
2. Let furnace heat until blower cycles on.
3. Turn thermostat down.
4. Observe burner to make sure it shuts off.
5. Let the furnace cool and blower cycle off.

If any abnormalities are observed when checking for correct operation, such as burner failing to ignite or to turn off, sooty flame, etc., call your nearest authorized service technician as shown in the Service Center List included in the homeowner envelope.

### IF FURNACE FAILS TO OPERATE PROPERLY

1. Check setting of thermostat - and position of heat/cool switch if air conditioning is installed. If a set-back type thermostat is employed be sure that the thermostat is in the correct operating mode.
2. Check to see that electrical power is "ON".

3. Check to see that the lever or switch on the gas control valve is in the full "ON" position.
4. Make sure filters are clean, return grilles are not obstructed, and supply registers are open.
5. Be sure that furnace flue piping is open and unobstructed.

**If the cause for the failure to operate is not obvious, do not attempt to service the furnace yourself. Call a qualified service agency or your gas supplier.**

### PERIODIC INSPECTION AND MAINTENANCE BY HOMEOWNER

It is recommended that the homeowner or user make an inspection of the furnace at least every 90 days, or more often if desired. It is also recommended that a qualified service agency inspect the furnace before each operating season the furnace is used, both heating and air conditioning, and at any time that there is an indication of malfunction. The owner/user should not attempt to disassemble the furnace unless experienced and qualified to do so.

#### ▲ CAUTION

*FOR SAFETY - Turn off electrical power to furnace before performing service such as cleaning filters.*

#### Filters

It is very important that filters in your furnace or air conditioning system be replaced frequently. Clean filters not only provide added comfort and a more healthful environment, but also allow the system to operate more efficiently. Check filters every two or three weeks.

### Motor Lubrication

The circulating air blower motor and combustion air blower are permanently lubricated and do not require periodic lubrication.

### Heat Exchanger Cleaning

Under normal conditions, the heat exchanger should not require periodic cleaning. However, should cleaning of the interior of the heat exchanger become necessary, access to the interior of the heat exchanger may be gained by removing the burner. Do not attempt to disassemble any part of the heat exchanger for cleaning. Do not use any chemical for cleaning the heat exchanger. Such use may cause a fire or explosion or may result in corrosion of the heat exchanger.

**IMPORTANT** - This furnace must be serviced only by qualified individuals specially trained in servicing of this type of equipment. Installation and service personnel are required to be licensed in some areas. Persons not qualified should not attempt to service this furnace.

### Return Air

On some closet installations, the return air opening to the furnace may be on the floor, and/or on the door and/or on the side wall of the closet. The upper grille on the front of the furnace admits return air to the blower. Return air must be provided back to the circulating blower in order to provide air distribution.

**IMPORTANT** - Do not obstruct these openings including the grille on the furnace. To do so will cause the furnace to activate the high limit and shut down or it may cause asphyxiation.

### While you are away

Your furnace is equipped with a safety device which will shut off the supply of gas to the burner in case of malfunction. For this reason it is never practical to assume that the furnace will operate unattended for a long period of time, especially if there is a possibility of damage to your property because of freezing. So, if you plan to be away from home, arrange for someone to check your house every day.

### SEASONAL SERVICE INFORMATION

During extreme cold weather, ice may form on the furnace roof jack crown. Small amounts of ice forming on the roof jack will present no problem to proper furnace operation. However, excessive ice formation could restrict the combustion air supply to the burner causing inefficient burner operation.

When the temperature is very cold, near zero or below, it is recommended that the roof jack be inspected every day or more frequently if required. If ice has started to collect on the roof jack crown, it should be carefully broken off.

### Your Service Technician

Your furnace's best friend is your qualified service technician. If the unit gives any indication of improper operation, call your service technician. If the service technician is allowed to perform the normal routine care of your furnace, he can many times detect potential difficulties and make corrections before trouble develops. Preventative maintenance of this type will allow you to operate the unit with a minimum of concern, and at the same time will pay for itself in added years of comfort.

### When You Call For Service Assistance

Very often time can be saved if you will give the service agency the MODEL and SERIAL NUMBER of your furnace. This will enable him to determine the specific components used, and perhaps to better identify the possible problem and be better prepared if a service call is required.

### To Contact Your Serviceman (fill in)

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

All appliances need maintenance by serviceman at the beginning of each heating season. Call your nearest authorized service technician to:

1. Replace filters. Clean all lint and dust from around furnace.
2. Remove fan and clean all dust and lint from unit with stiff bristle brush.
3. Inspect combustion chamber, the transition into the blower compartment, flue collar, and roof jack.
4. Check the gas valve and line connections for leaks.
5. Make any adjustments necessary for good operation.

**NOTE:** The coil panel provides a good removable access for inspecting inside the furnace casing. Smoke or reflected light inside the casing indicates the presence of leaks in the heat exchanger.

## IMPORTANT

☛ **As an owner of a new furnace you need to know the following information:**

If your home is located at an elevation above 2,000 feet, the burner orifice in your furnace will need to be derated. Please contact the nearest authorized Service Center to have this procedure performed properly.

Your dealer or gas company may have already applied the proper deration for your unit. If so, they should be able to advise you as such. If not, you need to have the deration made to insure continued use of your furnace. Not having the unit derated properly will eventually render the furnace inoperable.

Deration of the orifice for furnaces installed in homes at elevations above 2,000 feet is not covered by the warranty. This procedure is considered a part of the installation process and is required to make the furnace operate properly.

These furnaces are shipped from the factory with a natural gas orifice. If you will be operating this furnace on LP (liquid propane gas), it will also be necessary to have the furnace converted. The correct LP orifice is supplied with the furnace to allow operation at elevations below 2,000 feet. If the furnace will be operating on LP gas at elevations above 2,000 feet, the orifice supplied will be too large to allow proper operation. You should contact your LP supplier for assistance in getting the derated orifice installed.

We hope you follow these instructions and enjoy many years of trouble free service. If you have any questions, please feel free to contact the technical assistance hot line at 1-800-231-4822.