



## owner's manual

### MODEL NOS:

1403612; 1403622  
2203612; 2203622  
3003612; 3003622

**FOR USE WITH  
NATURAL GAS ONLY**

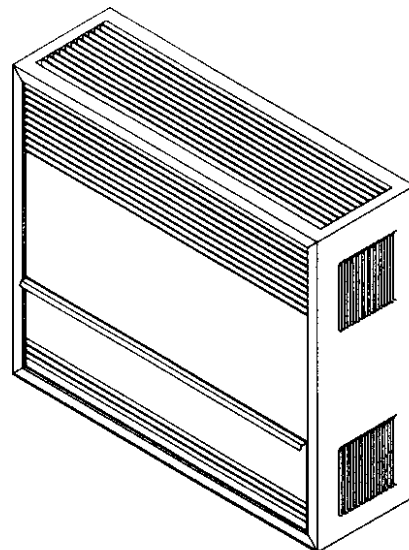
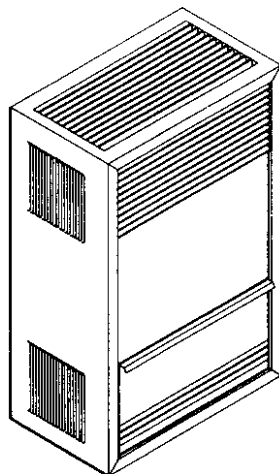


### MODEL NOS.

1403611; 1403621  
2203611; 2203621  
3003611; 3003621

**FOR USE WITH  
LIQUEFIED  
PETROLEUM (L.P.)  
GAS ONLY**

# INSTALLATION & OPERATING INSTRUCTION MANUAL GRAVITY DIRECT VENT WALL FURNACE



## READ THIS OWNERS MANUAL CAREFULLY BEFORE YOU INSTALL YOUR NEW WILLIAMS WALL FURNACE

- Unpacking
- Installation
- Operation
- Repair Parts

### MODEL NUMBER INFORMATION

NOTE: CANADIAN MODEL NUMBERS THIRD DIGIT FROM LEFT TO BE:

- 1 FOR BASIC ALTITUDE
- 2 FOR HIGH ALTITUDE

EXAMPLE:

MODEL: 1403612 BECOMES 1413612  
(0-2000 FT. BASIC ALTITUDE)  
OR BECOMES 1423612  
(2000-4000- FT. HIGH ALTITUDE)

**WARNING: Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or the gas supplier.**

**WARNING: Do not install any of these furnaces (Natural or L.P. Gas) in mobile homes, trailers, or recreational vehicles.**

**WARNING:** If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- 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
  - Open all windows.
  - Do not try to light any appliance.
  - Do not touch any electrical switch; do not use any phone in your building.
  - Extinguish any open flame.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instruction.
  - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

**WILLIAMS Furnace Co., 225 Acacia St., Colton, CA 92324**

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## Your Warranty

The Manufacturer, Williams Furnace Co., warrants this wall furnace or heater to the original purchaser under the following conditions:

### LIMITED ONE-YEAR WARRANTY

1. Any part thereof which proves to be defective in material or workmanship within one year from date of original purchase for use will be repaired or replaced at the Manufacturer's option, FOB its factory.
2. No liability is assumed by the Manufacturer for removal or installation labor costs, nor for freight or delivery charges.

### LIMITED EXTENDED WARRANTY

1. In addition to the above limited one-year warranty on the complete unit, any heat exchanger which burns out or rusts under normal installation, use and service conditions during a period of nine years following expiration of the one-year warranty period will be exchanged for a like or functionally similar part, FOB Manufacturer's factory.
2. No liability is assumed by the Manufacturer for removal or installation labor costs, nor for freight or delivery charges.

### LIMITATIONS

1. THIS LIMITED WARRANTY IS THE ONLY WARRANTY MADE BY THE MANUFACTURER. IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE LIMITED TO THE SAME ONE YEAR TERM AS THIS EXPRESS WARRANTY. UNDER NO CIRCUMSTANCES SHALL THE MANUFACTURER BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL OR CONTINGENT DAMAGES OR EXPENSES ARISING DIRECTLY OR INDIRECTLY FROM ANY DEFECT IN THE PRODUCT OR ANY COMPONENT OR FROM THE USE THEREOF. THE REMEDIES SET FORTH HEREIN ARE THE EXCLUSIVE REMEDIES AVAILABLE TO THE USER AND ARE IN LIEU OF ALL OTHER REMEDIES.

Some states do not allow limitations on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

2. This warranty does not include any charge for labor or installation.
3. This warranty does not extend to painted surfaces nor to damage or defects resulting from accident, alteration, misuse or abuse, or improper installation.
4. This warranty does not cover claims which do not involve defective workmanship or materials.

### DUTIES OF THE CONSUMER

1. The heating equipment must be installed by a qualified installer and operated in accordance with the installation and homeowner's instructions furnished with the equipment.
2. Any travel, diagnostic costs, service labor, and labor to repair the defective unit will be the responsibility of the owner.
3. A bill of sale, cancelled check, payment record or permit should be kept to verify purchase date to establish the warranty period.
4. Have the installer enter the requested information in the space below.

### GENERAL

1. The Manufacturer neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with said equipment.
2. Service under this warranty should be obtained by contacting your dealer. Provide the dealer with the model number, serial number and purchase date verification.
3. If, within a reasonable time after contacting your dealer, satisfactory service has not been received, contact: Customer Service Department, 225 Acacia St., Colton, CA 92324, for assistance.
4. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

### INSTALLATION INFORMATION

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Orig. Purchaser \_\_\_\_\_

Address \_\_\_\_\_

City and State \_\_\_\_\_ Zip \_\_\_\_\_

Dealer \_\_\_\_\_

Address \_\_\_\_\_

City and State \_\_\_\_\_ Zip \_\_\_\_\_

Installation date \_\_\_\_\_ Signed by \_\_\_\_\_ (Dealer or authorized representative who certifies that this appliance has been installed in accordance with Manufacturer's instructions and local codes.)

## Introduction

Please read our instructions before you install and use your furnace. This will help you obtain the full value from this furnace. It could help you avoid needless service costs, if the answer to the problem is found within this instruction manual.

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## Basic Description

Your direct vent wall furnace is shipped ready to install against an exterior wall up to 9 inches thick. For walls greater than 9 inches, and up to 24 inches thick, use an optional VENT EXTENSION KIT listed under OPTIONAL ACCESSORIES.

The furnace may burn either Natural or L.P. Gas, depending on the model you have purchased.

No electric power is required unless furnace is equipped with an optional blower accessory.

Always consult your local heating or plumbing inspector, building department or gas utility company regarding regulations, codes or ordinances which apply to the installation of a direct vent furnace.

The sealed combustion system draws combustion air directly from outdoors into the combustion chamber and combustion gases are discharged directly to the outdoors through tubes mounted to the rear of the furnace.

The furnace heat exchanger is built of heavy gauge steel treated for corrosion resistance.

The furnace cabinet is also constructed of heavy gauge steel and has an enamel paint finish.

The furnace controls are located behind an access door on the lower front of the furnace. All models are equipped with American Gas Association and Canadian Gas Association listed gas valves and pilots.

MODELS 1403611, 1403612, 2203611, 2203612, 3003611 and 3003612 are equipped with a built-in thermostat.

MODELS 1403621, 1403622, 2203621, 2203622, 3003621 and 3003622 are equipped with a wall thermostat.

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## Optional Accessories

**MODELS:** 1403611; 1403612; 1403621; 1403622

For walls greater than 9 inches thick and up to 24 inches thick, use one of the following Vent Extension Kits:

KIT NUMBER	WALL THICKNESS
9304	9 inches to 15 inches
9303	15 inches to 24 inches

**MODELS:** 2203611; 2203612; 2203621; 2203622  
3003611; 3003612; 3003621; 3003622

For walls greater than 9 inches thick and up to 24 inches thick, use one of the following Vent Extension Kits:

KIT NUMBER	WALL THICKNESS
9301	9 inches to 15 inches
9302	15 inches to 24 inches (220 model series only)
9303	15 inches to 24 inches (140 (or) 300 model series)

**MODELS:** 2203611; 2203612; 2203621; 2203622  
3003611; 3003612; 3003621; 3003622

To increase circulation of warmed air within the heated space, you may use Blower Accessory Kit 2302, which is equipped with a two-speed fan and automatic fan switch.

### ALL MODELS

For walls less than 4½ inches thick, a thin Wall Collar Kit 9307 may be used to increase wall thickness if wood strips are undesirable.

**ALL MODELS:** Decorator Face Panel Colors

Various Face Panel colors may be used on all models. All are constructed of heavy gauge steel with your choice of colored enamel paint finish.

**MODELS:** 1403611; 1403612; 1403621; 1403622

4309 (Almond)  
4310 (Black)  
4311 (Red)  
4312 (White)

**MODELS:** 2203611; 2203612; 2203621; 2203622  
3003611; 3003612; 3003621; 3003622

4313 (Almond)  
4314 (Black)  
4315 (Red)  
4316 (White)

### ALL MODELS:

For additional vent cap protection, Vent Cap Guard 9308 may be used. This mounts to the outside of the exterior wall over the vent cap.

### NOTE

Accessories are identified on the carton by their manufacturing number. (For example: 9301; 9302; 9303.) These manufacturing numbers are also listed on the furnace rating plate so you can be sure you have the accessory that fits your furnace.

## Safety Rules

### WARNING

READ THESE RULES AND THE INSTRUCTIONS CAREFULLY. FAILURE TO FOLLOW THESE RULES AND INSTRUCTIONS COULD CAUSE A MALFUNCTION OF THE FURNACE. THIS COULD RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR PROPERTY DAMAGE.

INSTALLATION MUST CONFORM TO LOCAL CODES. IN THE ABSENCE OF LOCAL CODES, INSTALLATION MUST CONFORM WITH THE NATIONAL FUEL GAS CODE, ANSI Z223.1. THE APPLIANCE, WHEN INSTALLED, MUST BE ELECTRICALLY CONNECTED AND GROUNDED IN ACCORDANCE WITH LOCAL CODES OR, IN THE ABSENCE OF LOCAL CODES, WITH THE CURRENT NATIONAL ELECTRICAL CODE ANSI/NFPA NO. 70.

### IN CANADA

1. INSTALLATION MUST CONFORM TO LOCAL CODES OR, IN THE ABSENCE OF LOCAL CODES, THE CURRENT CAN/CGA B149 INSTALLATION CODE.
2. THE APPLIANCE, WHEN INSTALLED, MUST BE ELECTRICALLY CONNECTED AND GROUNDED IN ACCORDANCE WITH LOCAL CODES OR, IN THE ABSENCE OF LOCAL CODES, WITH THE CURRENT CSA C22.1 CANADIAN ELECTRICAL CODE.
3. FIELD CONVERSIONS FOR HIGH ALTITUDE ARE NOT PERMITTED IN CANADA.
4. REFERENCE IS MADE IN THIS MANUAL REGARDING GAS TYPE AS L.P.G. BE ADVISED THAT L.P.G. IS NOT AVAILABLE IN CANADA, REFER TO PROPANE/L.P. GAS.

1. USE ONLY MANUFACTURER'S REPLACEMENT PARTS. USE OF ANY OTHER PARTS COULD CAUSE INJURY OR DEATH.
2. DO NOT install this furnace in an alcove.
3. DO NOT install these furnaces in a travel trailer, recreational vehicle or mobile home.
4. MAINTAIN all clearances specified in section "Locating Wall Furnace and Thermostat" and "Vent Installation."
5. BE SURE furnace is for type of gas to be used. Check the rating plate by the gas valve in the lower cabinet. Do not change it to use other gases. Unsafe operation could result and could cause bodily injury and death.
6. For Natural gas, the minimum inlet gas supply pressure for the purpose of input adjustment is 5" column. The maximum inlet gas supply pressure is 7" water column.

For L.P. gas, the minimum inlet gas supply pressure for the purpose of input adjustment is 11" water column.

umn. The maximum inlet gas supply pressure is 13" water column.

7. ANY SAFETY SCREEN, GUARD OR PARTS REMOVED FOR SERVICING AN APPLIANCE MUST BE REPLACED PRIOR TO OPERATING THE APPLIANCE TO AVOID PROPERTY DAMAGE, BODILY INJURY OR DEATH.
8. INSTALL the furnace vent directly to the outdoors, so that harmful gasses will not collect inside the building. Follow the venting instructions for your type installation exactly. Use only the type and size of vent pipe and fittings specified.
9. BE SURE to provide for adequate combustion and ventilation air. See page 7. The flow of this air to the furnace must not be blocked.
10. NEVER vent flue gases into another room, a fireplace or any space inside a building. This could cause property damage, bodily injury or death.
11. NEVER test for gas leaks with an open flame. Use soap suds to check all gas connections. This will avoid the possibility of fire or explosion.
12. ALLOW furnace to cool before servicing. Always shut off electricity and gas to furnace when working on it. This will prevent any electrical shocks or burns.
13. DUE TO HIGH TEMPERATURES, locate the furnace out of traffic and away from furniture and draperies.
14. ALERT children and adults to the hazards of high surface temperature and to keep away to avoid burns or clothing ignition.
15. CAREFULLY supervise young children when they are in the same room with the furnace.
16. DO NOT place clothing or other flammable material on or near furnace.
17. INSTALLATION and REPAIR must be done by a qualified service person. The appliance should be inspected before use and at least annually by a professional service person. More frequent cleaning may be required due to excessive lint from carpeting, bedding material, etc. It is imperative that control compartments, burners and circulating air passages be kept clean.
18. BEFORE INSTALLING: To avoid electrical shock, turn off electrical circuits that pass through the wall where you are going to install the furnace.
19. BE AWARE of good safety practices by wearing personal protective equipment such as gloves and safety glasses to avoid being injured by sharp metal edges in or around furnace and while cutting or drilling holes in wood and or sheet metal.
20. CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

### WARNING

DO NOT USE THIS HEATER IF ANY PART HAS BEEN UNDER WATER. IMMEDIATELY CALL A QUALIFIED SERVICE TECHNICIAN TO INSPECT THE HEATER AND TO REPLACE ANY PART OF THE CONTROL SYSTEM AND ANY GAS CONTROL WHICH HAS BEEN UNDER WATER.

## Unpack Your Furnace

This direct-vent furnace is packaged complete including the vent cap, vent tube and air inlet tube ready for installation on an exterior wall with a total thickness of from 5 inches minimum to a maximum of 9 inches.

Open the carton and remove all parts.

Examine all packing material carefully. Look for loose parts before discarding. Store all parts where they cannot be

lost or damaged before you need them.

### NOTE

Check the burner rating plate, located in burner compartment, to make sure your furnace is equipped to operate on the type of gas available (either Natural or L.P. Gas). Do NOT convert unit from Natural Gas to L.P. Gas or from L.P. Gas to Natural.

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## Basic Tools Needed

Hand drill or properly grounded electric drill  
Expansion bit 1/2" to 1-5/8" or 1/2" or 1-1/2" blade bits  
1/8" and 3/16" drill bit (metal)  
6 ft. folding rule or tape measure  
Screwdriver (Phillips head)  
Pliers (wire cutting)  
Hammer  
Stud locator or small finish nails

Tin snips  
8" adjustable wrench  
12" adjustable wrench  
Key hole saw or Sabre saw  
Hack saw  
2 – 10" or 12" pipe wrenches  
Gloves and safety glasses

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## Basic Materials

Pipe and fittings to make connections to furnace (see page 10).

Caulking compound – silicone rubber with a temperature rating of 500°F.

Do not use types advertised as paintable or for bath tub use as most contain fillers and will not withstand high temperatures.

Pipe joint compound resistant to L.P. Gases.

Electrical wiring supplies as needed for optional blower if equipped (see page 9).

Minimum wire size is #14 gauge copper.

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## Installing Your Wall Furnace

The following steps are needed for proper installation and safe operation of your furnace. If you have any doubts as to any requirements, check with local authorities for local and state codes affecting the installation.

Obtain professional help where needed.

DO NOT install these furnaces in a travel trailer, recreational vehicle, or mobile home.

### IMPORTANT

For satisfactory and trouble-free operation be sure to:

1. Properly locate the furnace within the space to be heated.
2. Provide for adequate combustion air around vent cap on outside, see Fig. 1, page 6 and adequate air circulation around cabinet inside the open room, see Fig. 2, page 6.
3. Maintain all minimum clearances on pages 6 and 7 which apply to your furnace model.

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## Helpful Installation Information

The following booklets will help you in making the installation. Check at the library or they may be purchased from the source listed below.

ANSI/NFPA 70 current edition "National Electrical Code."  
In Canada: C22.1 Canadian Electrical Code.

American National Standard Z223.1 current edition "National Fuel Gas Code."

In Canada: CAN/CGA-B149.1 (.2) Canadian Standard.

Obtain from – American National Standards Institute, Inc.,  
1430 Broadway, New York, NY 10018.

# Locating Wall Furnace

Consider the following points before attempting to install the furnace:

## ALL MODELS

1. This is a direct vent wall furnace. It must be installed on an OUTSIDE WALL for proper venting of flue gases (Fig. 1).
2. Wall furnace can be surface mounted on an outside wall up to 24 inches thick when using an optional VENT EXTENSION KIT.
3. Check the clearances needed from the furnace and vent (Figs. 1 and 2). You must place the furnace where you will have no less than the clearances shown.
4. The outside vent must be at least 18 inches away from any window or other building opening.
5. The furnace will not work if anything stops free entry of fresh air into the vent, or free flow of flue gases from it. Be sure the center of the vent cap is at least 12 inches above ground level or shrubs as shown in Fig. 1. Make sure shrubs are kept trimmed. It must also be at least 18 inches from any wall or other blockage and 30 inches below any overhang.
6. Try to place the furnace near the center of the space to be heated for good air circulation. Do not put it behind a door or draperies. Do not put in a closet, alcove, hallway or other confined space.
7. Be sure that gas piping and electrical wiring (optional blower only) can be brought to the furnace. See sections on gas piping for your type of mounting.
8. To provide adequate clearance and service access, the front of the furnace must face the open room.

## INTERIOR CLEARANCES (Refer to Fig. 2)

### MODELS 1403612, 1403622, 1403611 and 1403621

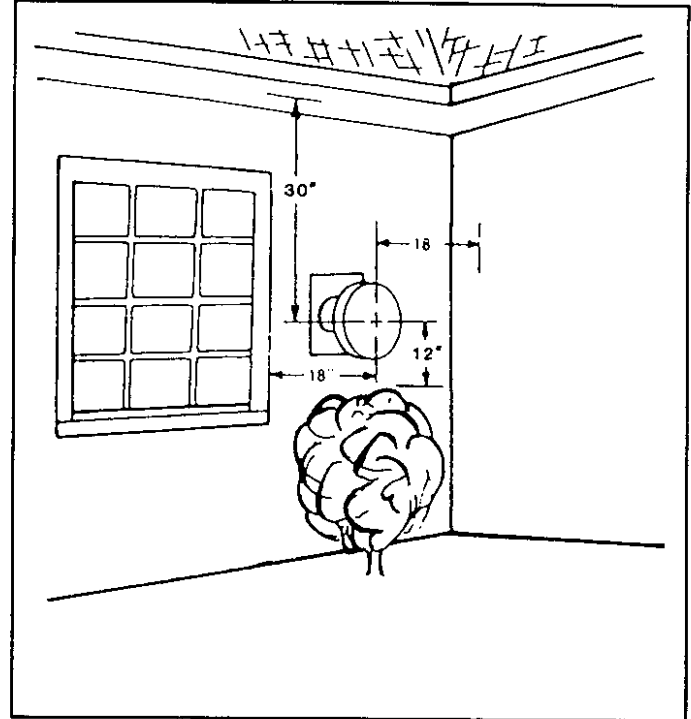
1. There must be at least 1-3/16 inches of space between the floor (top of floor covering) and the bottom of cabinet.
2. The top of the furnace must be at least 18 inches from the ceiling or other projecting overhang.
3. The side of the furnace must not be closer than 2 inches to an adjacent wall.

### MODELS 2203612, 2203611, 2203622, 2203621, 3003612, 3003611, 3003622 and 3003621

1. There must be at least 5-1/2 inches of space between the floor (top of floor covering) and the bottom of cabinet.
2. The top of the furnace must be at least 24 inches from the ceiling or other projecting overhang.
3. The side of the furnace must not be closer than 2 inches to an adjacent wall.

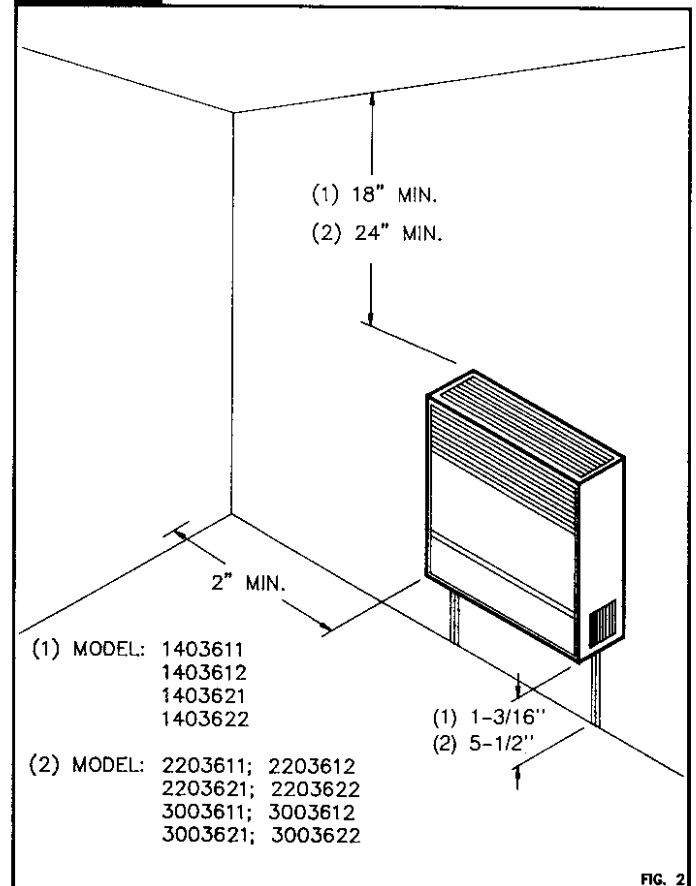
**FIG. 1**

MINIMUM DIMENSIONS FROM VENT



**FIG. 2**

INTERIOR CLEARANCES



**FIG. 2**

## Locating Wall Furnace (cont.)

**MODELS 1403622, 1403621, 2203622, 2203621, 3003622 and 3003621**

**(All other models have a built-in thermostat)**

Choose a location for the thermostat about 5 feet above the floor on an inside wall. The thermostat wire supplied with your furnace is 20 feet long, which should be enough to run up through the attic so the thermostat can be a maximum of 16 feet from furnace measured in a straight line, or approximately 12 feet from the furnace if the wire is run under the floor. The thermostat should be sensing average room temperature, avoid the following:

### HOT SPOTS:

Concealed pipes or ducts  
Fireplaces  
Registers  
TV sets  
Radios  
Lamps  
Direct sunlight  
Kitchen

### COLD SPOTS:

Concealed pipes or ducts  
Stairwells – drafts  
Doors – drafts  
Unheated rooms on other side of wall  
**DEAD SPOTS:**  
Behind doors  
Corners and alcoves

After picking a location that meets the requirements, inspect the wall, floor and outside areas. Make sure there are no pipes, wiring, or anything else that would interfere with furnace or vent or thermostat installation. If required, move them or pick a new location.

## Installation

**BEFORE YOU BEGIN:** To avoid electrical shock turn off electrical circuits that pass through the wall where you are going to install the furnace.

This furnace must be installed using only the vent tube, air inlet tube and vent cap assembly supplied by the manufacturer.

Before the furnace is installed an opening must be cut through the wall for the vent cap.

### FIND THE STUDS

Find the studs where the furnace is to be placed. Use a stud locator or small finishing nails. Repeatedly drive and remove a nail into the wall in the area of the stud until you find it. Then find one side. Leave the nail there. Drive another nail just on the other side of the same stud.

The inside edge of the other stud should be about 14-1/2 inches from the one found. Drive a finishing nail on the inside edge of this stud, then another nail on the outside edge.

Using a level, draw vertical lines that will represent the two stud center lines.

### CUT VENT OPENING

After locating studs, use the cardboard template (Fig. 4, page 8). Line up the CENTER OF STUD lines on the template with the center lines you have drawn on the wall. Use the template to draw the 9-1/4 inch diameter circle on the wall. Then mark the location of the gas supply line.

Using a window, door or wall corner for reference, measure to find where vent will be on outside wall. Check to be sure of proper clearances (Figs. 1 and 2, page 6). If necessary, relocate for proper clearances.

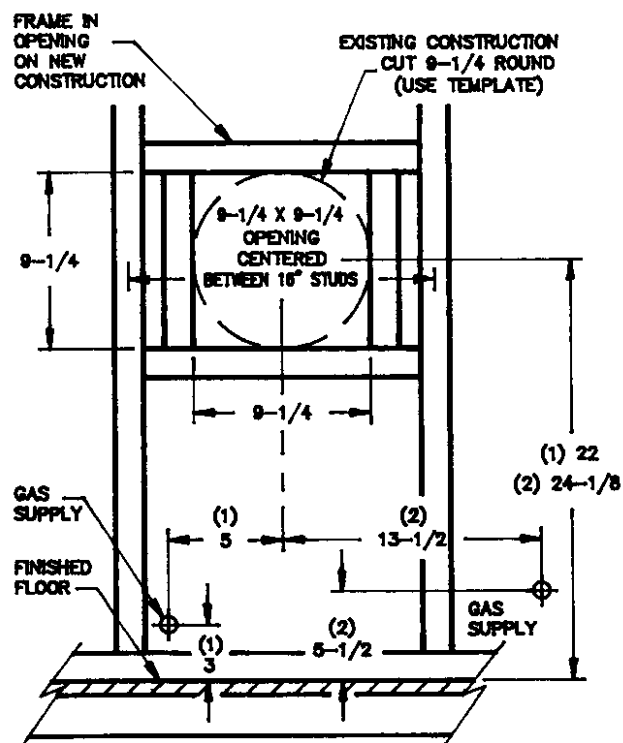
Drill a 1/4 inch hole in the wall at the vent opening center mark all the way through to the outside. Cut the 9-1/4 inch diameter hole through inside wall. Using the 1/4 inch hole as center, cut a matching hole in outside wall. It may be better to work from the outside when breaking through brick, stone or tile.

Make sure the inside and outside wall openings are aligned so tubes and vent will fit properly.

IN NEW CONSTRUCTION frame in 9-1/4 inch x 9-1/4 inch opening centered between studs spaced 16 inches on center, and center point located as noted per Fig. 3.

**FIG. 3**

NOTE: 9-1/4 x 9-1/4 OPENING MAY BE ROUND OR SQUARE CUT.



(1) MODELS: 1403611; 1403612  
1403621; 1403622

(2) MODELS: 2203611; 2203612; 3003611; 3003612  
2203621; 2203622; 3003621; 3003622

FIG. 3

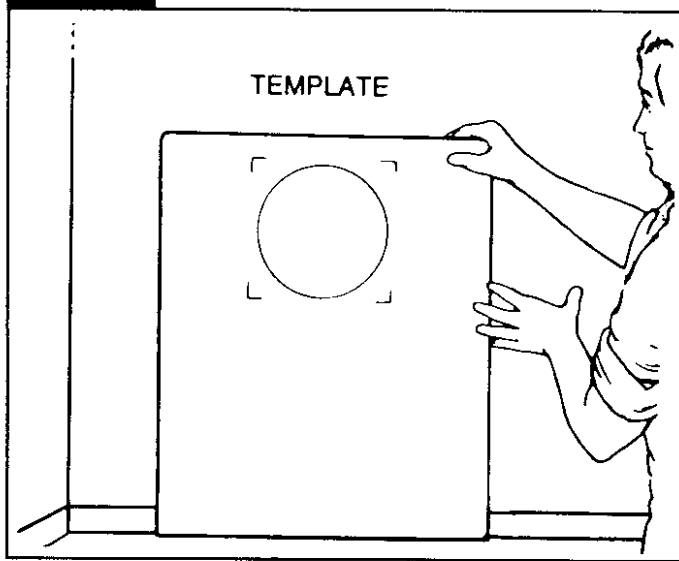
## Installation (cont.)

### GAS AND ELECTRICAL SUPPLY OPENINGS

Holes must be drilled for the gas line (and electrical supply if you use an optional Blower Kit). Drill a 1-1/2 inch hole in wall for gas line where indicated on cardboard template or refer to Fig. 3, page 7. You will have to determine whether the gas line will enter the home through the outside wall or wall floor plate. These instructions can only guide you in where the gas line will enter the furnace.

**FIG. 4**

TEMPLATE



The gas line can be run at this time or done after the furnace is mounted. See section GAS SUPPLY and PIPING, page 10.

No electric power is required unless furnace is equipped with an optional blower kit.

Do not connect 115V service line to the gas valve or wall thermostat.

### MODELS WITH OPTIONAL BLOWER KIT 2302 ONLY

Install an electrical junction box at the location shown in Fig. 7, page 9.

Route the 115V electrical supply wiring to the junction box making sure to leave enough excess wire to make connections later.

### INSTALL SPACER PLATE

Install the mounting spacer plate ("A" Fig. 5) with spacers entering and centered within the 9-1/4 inch vent opening in wall. Level top of spacer plate (embossed top) and fasten to interior wall using six (6) #8 roundhead (long) screws ("B" Fig. 5) provided.

### IMPORTANT

For walls more than 9 inches thick, read note below.

### NOTE

(Refer to Fig. 5.) The vent tube "C" and air inlet tube "D" are factory installed for walls up to 9 inches thick only. For wall thicknesses up to 24 inches, follow the instructions packed with the appropriate factory built VENT EXTENSION KIT. See OPTIONAL ACCESSORIES on page 3.

### FURNACE MOUNTING

Set the furnace body against the wall, legs on the floor, with the vent tubes ("C" and "D" Fig. 5) extending through the spacer plate.

Fasten the furnace to the wall through holes at the top and bottom of the support legs using four (4) #8 roundhead (long) screws ("F" Fig. 5) provided.

Push the air inlet shield "J" on from the exterior side of wall. Rotate the air inlet shield until notches on the end of the tube are straddling the standoff tabs on the mounting spacer plate "A". Trim the air inlet shield "J" flush with the exterior of the wall.

**FIG. 5**

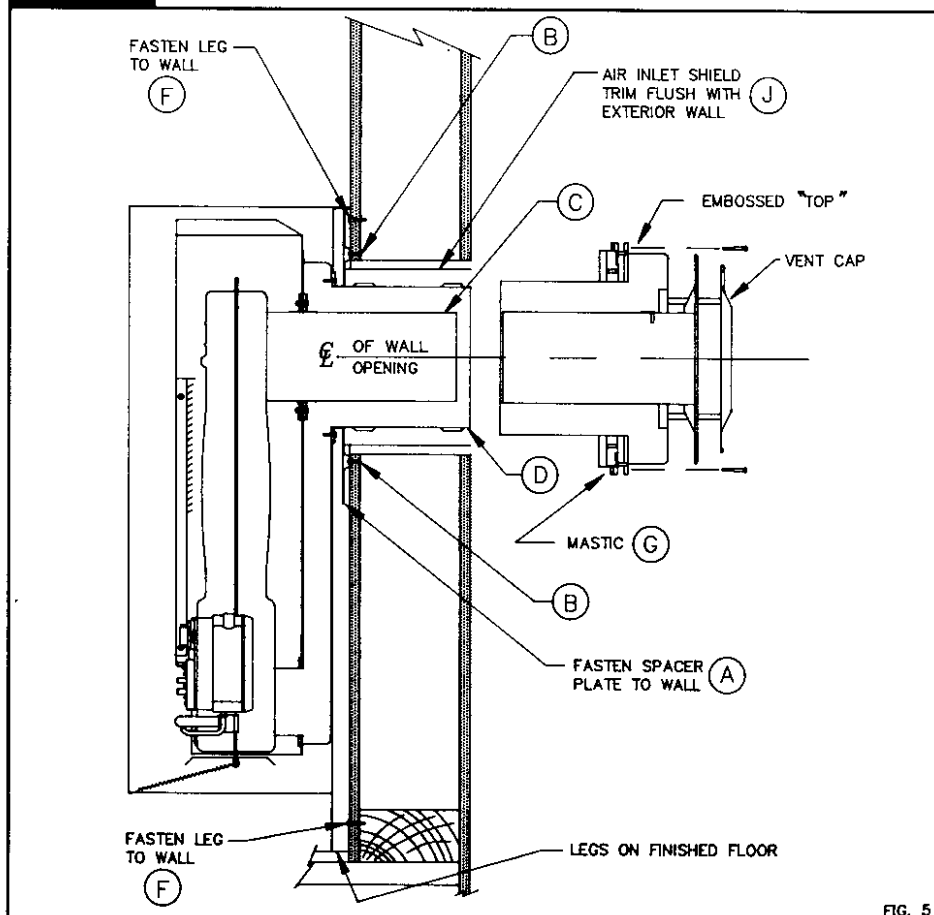


FIG. 5



## Installation (cont.)

### INSTALL VENT CAP

Outside, place a single strip of mastic (provided) around the back flange of the vent cap ("G" Fig. 5, page 8). Install the vent cap by inserting it into the air inlet tube and over the vent tube.

### IMPORTANT

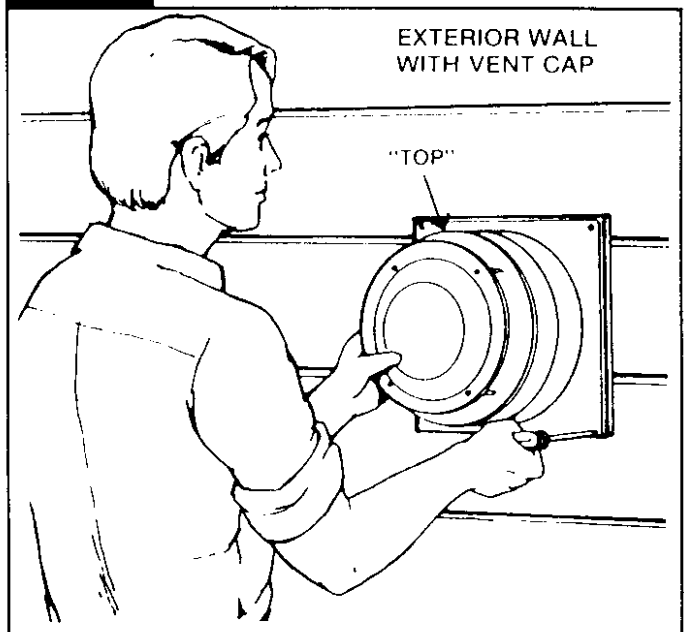
The top of the vent cap is embossed "TOP". Install it in the correct position to prevent water from entering the wall. Level the vent cap and attach it to the outside wall with four (4) #8 roundhead (long) screws (Fig. 6).

If the wall surface is not flat (shiplapped siding, etc.) or less than 5 inches thickness use Thin Wall Collar Kit (9307) or, build up a flat surface with wood strips. Do not tilt or bend cap to fit uneven surfaces. The vent cap flange must be tight against the wall to prevent rain or wind penetration. Use standard caulking compound if required (not provided).

For brick, masonry or plaster walls, it may be necessary to use lag screws or expanding anchor bolts which are not furnished with the furnace.

FIG. 6

POSITION OF VENT CAP



## Optional Blower Installation and Operating Instructions

1. Remove knock-out plates "A" and "B" from right side of furnace inner casing.
2. Remove junction box cover, place blower and junction box assembly in position shown and fasten to inner casing through pre-punched holes with screws "C" and "D" provided.
3. Remove knock-out "G" from bottom of junction box and install 115V line in accordance with local electrical code, connecting as shown on the wiring diagram below.
4. Replace junction box cover.
5. After blower and junction box are installed, rotate bushing "H" if needed to prevent motor wire binding against blower case.

The automatic fan switch "E" turns on the blower after the heater has been operating a few minutes and turns off the blower after the heater is shut off.

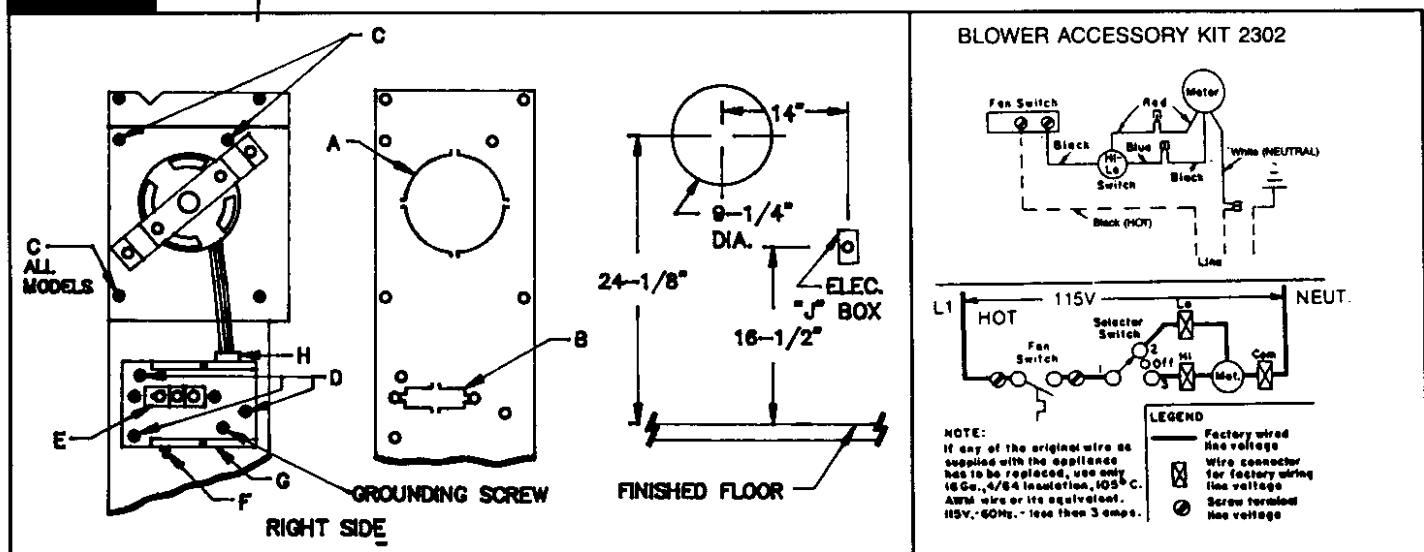
### NOTE

Blower will not operate unless fan switch is pulled to "On" position, either "High" or "Low." To check "On" position, turn automatic fan switch "E" to 70, then pull chain on switch to obtain High, Low or Off position. Set the fan switch dial at 110 and readjust higher or lower as necessary to obtain blower operation within 4 to 5 minutes after the main burner is in operation.

The unit must be electrically grounded in accordance with ANSI/NFPA 70 current edition of the "National Electrical Code." In Canada: Follow C22.1 Canadian Electrical Code.

**IMPORTANT:** Oil yearly with SAE 20 high temp oil.

FIG. 7



## Gas Supply & Piping

Gas control valve, within the furnace, is shipped with a seal over gas inlet tapping. Do not remove this seal until ready to connect piping.

### WARNING

DANGER OF PROPERTY DAMAGE,  
BODILY INJURY OR DEATH.  
MAKE SURE THE FURNACE IS EQUIPPED TO  
OPERATE ON THE TYPE OF GAS AVAILABLE.  
MODELS DESIGNATED AS NATURAL GAS ARE TO  
BE USED WITH NATURAL GAS ONLY. FURNACE  
DESIGNATED FOR USE WITH LIQUEFIED  
PETROLEUM (L.P.) GAS HAVE ORIFICES SIZED  
FOR COMMERCIALLY PURE PROPANE GAS.  
THEY CANNOT BE USED WITH BUTANE OR A  
MIXTURE OF BUTANE AND PROPANE.

### GAS SUPPLY

For Natural Gas, the minimum inlet gas supply pressure for the purpose of input adjustment is 5" column. The maximum inlet gas supply pressure is 7" water column.

For L.P. Gas, the minimum inlet gas supply pressure for the purpose of input adjustment is 11" water column. The maximum inlet gas supply pressure is 13" water column.

Gas pressures and input to the burners must not exceed the rated input and pressure shown on the rating plate. On Natural Gas the manifold pressure should be 4 inches water column. The manifold pressure should be 11 inches water column for L.P. Gas. See page 13 for operation above 2000 feet altitude. Orifice change may be required to suit gas supplied. Check with your local gas supplier.

### ORIFICE SIZES

Furnace Technical Information, page 13, shows the correct orifice sizes for the different input ratings when using Natural or L.P. Gas.

### GAS PIPING

The gas supply line must be of adequate size to handle the BTU/HR requirements and length of the run for the unit being installed.

Determine the minimum pipe size from Fig. 10, page 11, basing the length of the run from the gas meter or source to the unit.

All piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1 NFPA No. 54), whichever applies.

IN Canada: Follow CAN/CGA-B149.1 (.2) Canadian Standard.

Refer to Fig. 8 for the general layout at the unit. It shows the basic fittings needed.

The following rules apply:

1. Use new, properly reamed pipe free from chips such as steel or black iron pipe and fittings or other approved by local codes.

2. Do not thread pipe too far. Valve distortion or malfunction may result from excess pipe within control.

Apply moderate amount of good quality dope to pipe only, leaving 2 end threads bare. If L.P. Gas installation, use compound resistant to action of liquefied petroleum gases.

3. Use ground joint unions.
4. Install a drip leg to trap dirt and moisture before it can enter the gas valve. Drip leg must be a minimum of 3 inches long.
5. Install a manual shut-off valve.

FIG. 8

GAS SUPPLY PIPING

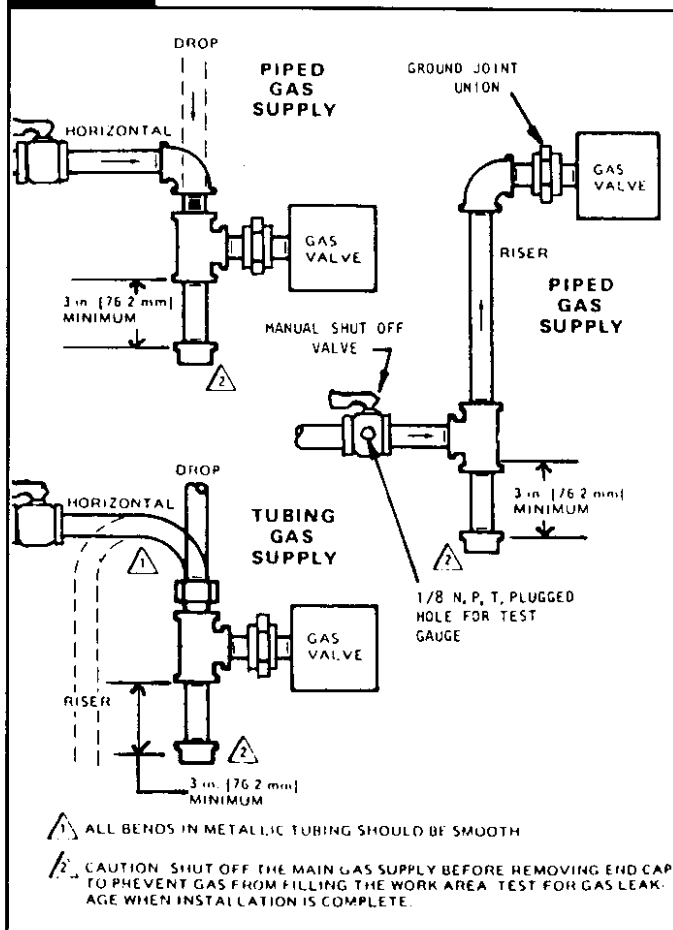
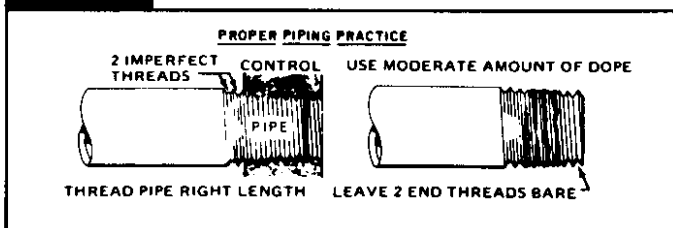


FIG. 9



## Gas Supply & Piping (cont.)

**FIG. 10**

GAS PIPE SIZES

NATURAL GAS PIPE CAPACITY - BTU PER HOUR (INCLUDES FITTINGS) PIPE SIZE			
LENGTH OF PIPE - FEET	1/2 inch	3/4 inch	1 inch
20	92,000	190,000	350,000
40	63,000	130,000	245,000
60	50,000	105,000	195,000
L.P. GAS PIPE CAPACITY - BTU PER HOUR (INCLUDES FITTINGS)			
LENGTH OF PIPE - FEET	1/2 inch	3/4 inch	1 inch
20	189,000	393,000	732,000
40	129,000	267,000	504,000
60	103,000	217,000	409,000

### GAS CONNECTION

If installation is for L.P. Gas have L.P. installer use two-stage regulation and make all connections from storage tank to furnace.

Use two pipe wrenches when making the connection to the valve to prevent turning or damage to gas valve.

Connection between shut off valve and burner control assembly can be made with an A.G.A./C.G.A. design certified flexible connector if allowed by local codes.

Tighten all joints securely.

### CHECKING THE GAS PIPING

Test all piping for leaks. When checking gas piping to the furnace with gas pressure at less than 1/2 PSI, shut off manual gas valve for the furnace. If gas piping is to be checked with the pressure at or above 1/2 PSI, the furnace and manual shut off valve must be disconnected during testing. (SEE WARNING BELOW.) Apply soap suds (or a liquid detergent) to each joint. Bubbles forming indicates a leak. Correct even the slightest leak at once.

### WARNING

**DANGER OF PROPERTY DAMAGE,  
BODILY INJURY OR DEATH.**

**NEVER USE A MATCH OR OPEN FLAME TO TEST FOR LEAKS. NEVER EXCEED SPECIFIED PRESSURES FOR TESTING. HIGH PRESSURES MAY DAMAGE THE GAS VALVE AND CAUSE OVER-FIRING WHICH MAY RESULT IN HEAT EXCHANGER FAILURE. LIQUID PETROLEUM (L.P.) GAS IS HEAVIER THAN AIR AND IT WILL SETTLE IN ANY LOW AREA, INCLUDING OPEN DEPRESSION AND IT WILL REMAIN THERE UNLESS AREA IS VENTILATED.**

**NEVER ATTEMPT START-UP OF UNIT BEFORE THOROUGHLY VENTILATING AREA.**

## Thermostat Installation

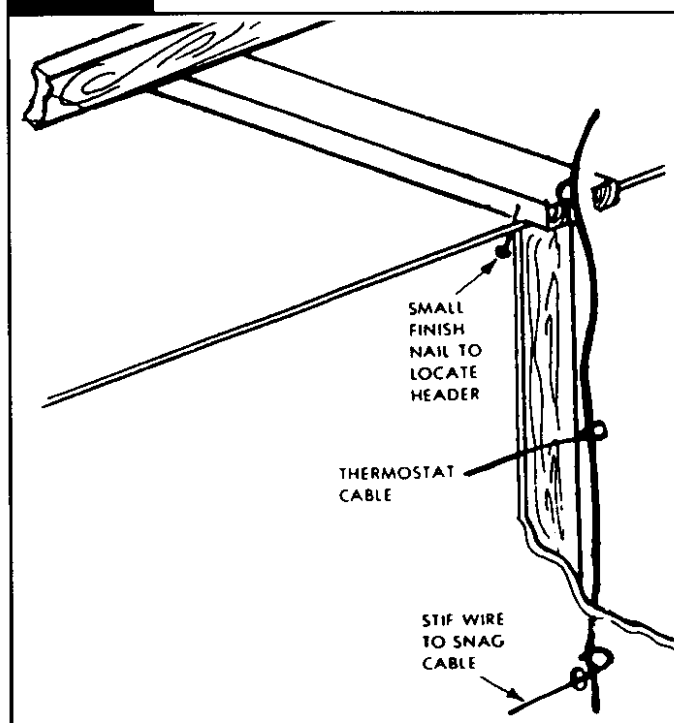
**MODELS 1403622, 1403621, 2203622, 2203621,  
3003622 and 3003621**

**(All other models are equipped with a built-in thermostat)**

1. If an old thermostat is being replaced and is in a satisfactory location and the wiring appears to be in good condition, use existing wiring. If in doubt, use new wire.
2. If a new location is chosen or if this is a new installation, thermostat cable must first be run to the location selected. All wiring must agree with local codes and ordinances. These instructions cover bringing the wire down from the attic but it can be run from a basement or crawl space using similar methods.
3. Before drilling hole in wall at selected location, drive a small finishing nail through the ceiling in the corner of the wall and ceiling above the thermostat location. Pull the nail out and push a small stiff wire through the hole so it can be found in the attic. Drill a 1/2 inch hole through the ceiling wall plate.
4. Probe for obstructions in the partition. Then drill a 1/2 inch hole through wall at selected location for thermostat.
5. From the attic, feed the thermostat cable or a stiff wire through the wall until even with thermostat location.

**FIG. 11**

ROUTE THERMOSTAT CABLE



## Thermostat Installation (cont.)

6. Snag thermostat cable through wall so that 6 inches of cable protrudes.
7. Route cable to wall furnace leaving enough excess cable to make the connections at the gas valve.

### MOUNTING THE THERMOSTAT

1. To remove the thermostat cover, grasp cover and pull straight outward. Carefully remove and discard the packing tab protecting the switch contacts.
2. Connect thermostat wires to the terminal screws on the back of thermostat base.

3. Push any excess wire back through hole in wall and plug hole with insulation to prevent drafts from affecting thermostat operation.
4. Being sure to level thermostat for best appearance, fasten thermostat base to wall through mounting holes with screws provided.
5. Replace the thermostat cover.

### NOTE

Refer to installation instructions packed in the thermostat carton if you have any doubt about the above procedures.

## Thermostat Connection at Gas Valve

**MODELS 1403622, 1403621, 2203622, 2203621, 3003622 and 3003621**

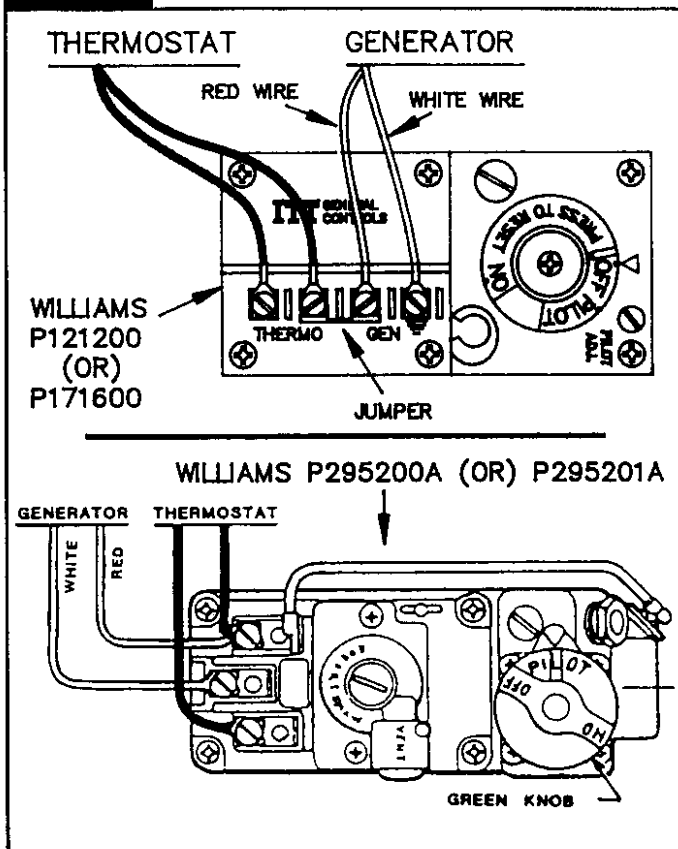
(All other models are equipped with a built-in thermostat)

1. If an old thermostat is being replaced and is in a satisfactory location and the wiring appears to be in good condition, use existing wiring. If in doubt, use new wire.
2. If a new location is chosen or if this is a new installation, thermostat cable must first be run to the location selected. All wiring must agree with local codes and ordinances. These instructions cover bringing the wire

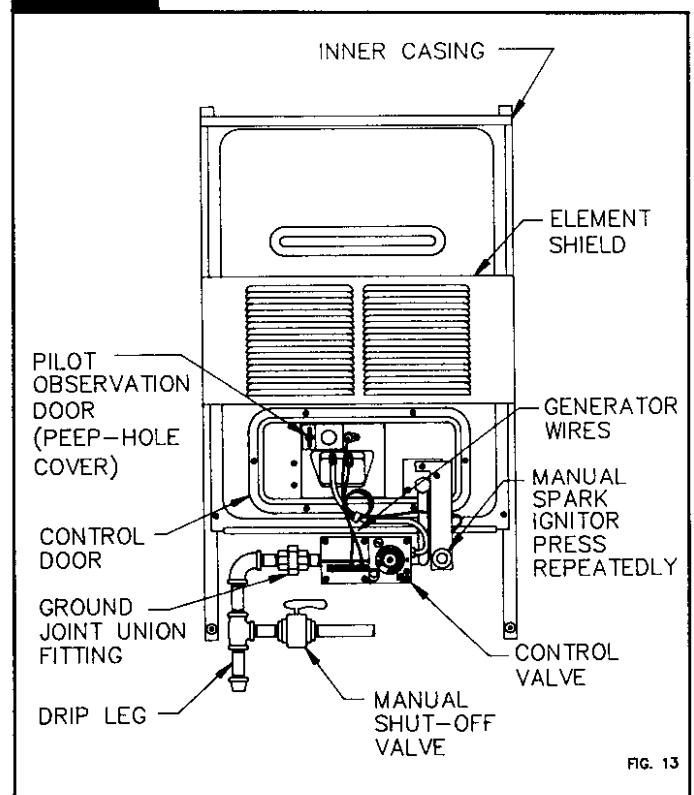
down from the attic but it can be run from a basement or crawl space using similar methods.

3. Before drilling hole in wall at selected location, drive a small finishing nail through the ceiling in the corner of the wall and ceiling above the thermostat location. Pull the nail out and push a small stiff wire through the hole so it can be found in the attic. Drill a 1/2 inch hole through the ceiling wall plate.
4. Probe for obstructions in the partition. Then drill a 1/2 inch hole through wall at selected location for thermostat.

**FIG. 12**



**FIG. 13**



**FIG. 13**

## Furnace Technical Information

MODEL NUMBER	TYPE GAS	INPUT ★ RATING BTU/HR	HTG. CAPAC. RATING BTU/HR	MAIN BURNER ORIFICE		
				DRILL	DEC.	QTY.
1403612	NAT.	14,000	10,039	#51	.0670	
1403611	L.P.G.	14,000	10,039	#58	.0420	
1403622	NAT.	14,000	10,039	#51	.0670	
1403621	L.P.G.	14,000	10,039	#58	.0420	
2203612	NAT.	22,000	16,462	#45	.0820	
2203611	L.P.G.	22,000	16,462	#55	.0520	
2203622	NAT.	22,000	16,462	#45	.0820	
2203621	L.P.G.	22,000	16,462	#55	.0520	
3003612	NAT.	30,000	21,849	#42	.0935	
3003611	L.P.G.	30,000	21,849	#53	.0595	
3003622	NAT.	30,000	21,849	#42	.0935	
3003621	L.P.G.	30,000	21,849	#53	.0595	

\*For elevations above 2000 feet reduce ratings 4% for each 1000 feet above sea level.

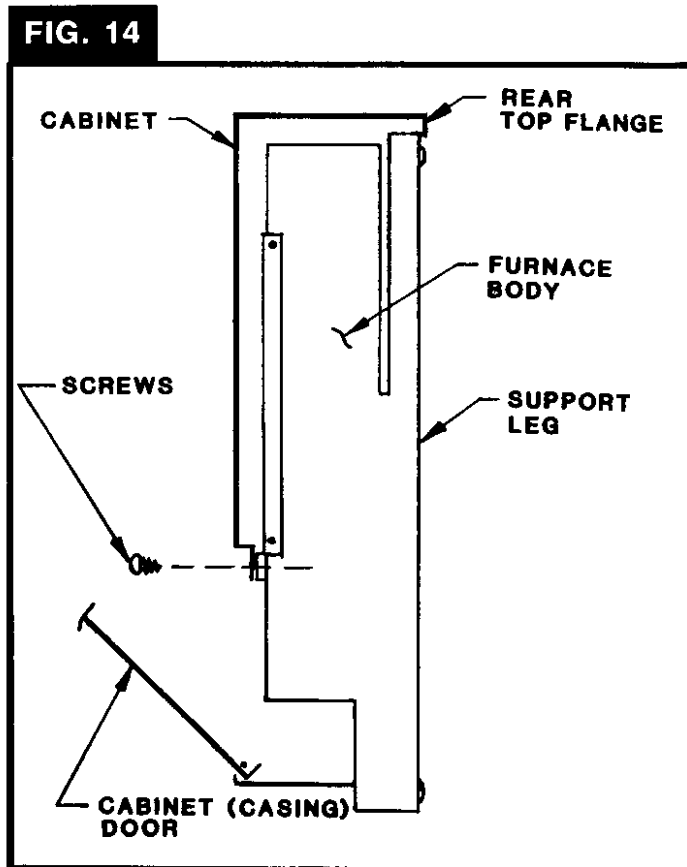
Btuh = British Thermal Units per hour.

The efficiency rating of these appliances is a product thermal efficiency rating system determined under continuous operating conditions and was determined independently of any installed system.

### Cabinet Installation

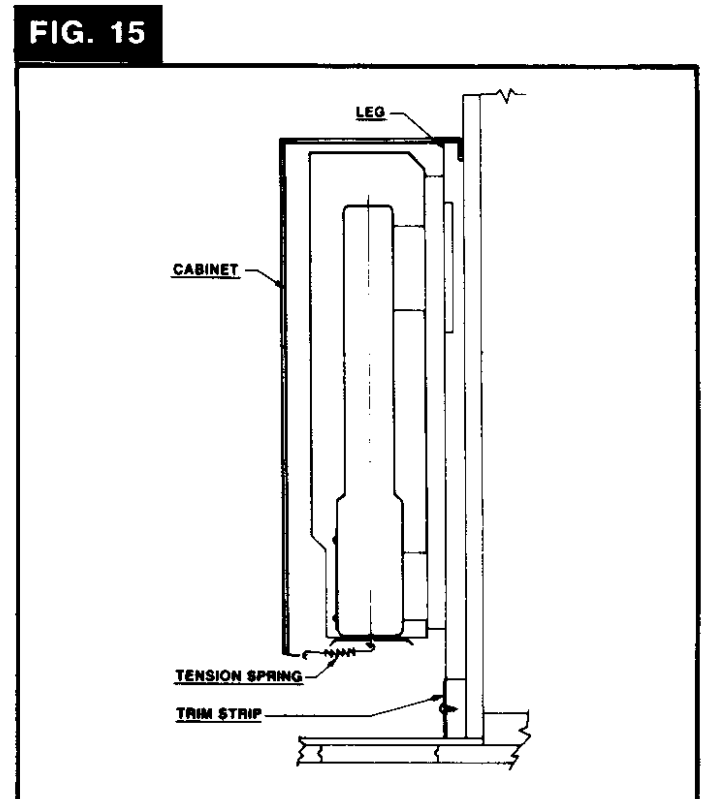
#### MODELS 1403612, 1403622, 1403611 and 1403621

Set cabinet over furnace body, dropping rear top flange between support legs and wall. Open cabinet door and attach cabinet to inner casing with two (2) sheet metal (short) screws (Fig. 14).



#### MODELS 2203612, 2203611, 2203622, 2203621, 3003612, 3003611, 3003622 and 3003621

Set cabinet over furnace body, dropping rear top flange into slot in top of Spacer Plate and into slots between support legs and wall. When correctly positioned side to side, a dimple on the rear top flange will slide against the inside of each support leg. Attach two (2) tension springs through bottom flange of heat exchanger and bottom of cabinet (Fig. 15). Fasten trim strip to bottom of support legs using two (2) sheet metal (short) screws (Fig. 15).



## Start-Up Procedure

Start the furnace using the procedures in section Operating Your Furnace on pages 15 through 19.

### WARNING

#### DANGER OF BODILY INJURY OR DEATH

LIQUEFIED PETROLEUM (L.P.) GAS IS HEAVIER THAN AIR AND IT WILL SETTLE IN ANY LOW AREA, INCLUDING OPEN DEPRESSIONS AND IT WILL REMAIN THERE UNLESS AREA IS VENTILATED.

NEVER ATTEMPT START-UP OF UNIT BEFORE THOROUGHLY VENTILATING AREA.

Check the furnace operation as outlined in the following instructions. If any sparking, odors or unusual noises are encountered, shut off electrical power immediately. Recheck for wiring errors, or obstructions in or near optional blower motor.

### NOTICE:

During the initial firing of this unit some smoke and odor may occur. We recommend ventilating the area during this initial "break in period."

### CHECK GAS INPUT AND PRESSURES

For furnace located at altitudes between sea level and 2000 feet, the measured input must not be greater than the input shown on the rating plate of the furnace. For elevations above 2000 feet, the measured input must not exceed the input of the rating plate reduced by 4 percent for each 1000 feet that the furnace is above sea level.

Gas supply pressure and manifold pressure with the burners operating must also be as specified on the rating plate.

TYPE OF GAS	MANIFOLD PRESSURE, IN. W.C.
Natural	4
L.P.	11

Rated input will be obtained on 2500 BTU propane at 11 inches manifold pressure with factory-sized orifices. If L.P. Gas having a different heating value is supplied, orifices must be changed by a qualified installer before the furnace is operated.

### CHECK THE MANIFOLD GAS PRESSURE

A tapped opening is provided in the gas valve to facilitate measuring the manifold gas pressure. A "U Tube" manometer having a scale range from 0 to 12 inches of water should be used for this measurement. The manifold pressure must be measured with the burner and pilot operating. Any major changes in the flow must be made by changing the size of the burner orifice. Check with local gas company for proper orifice size.

### CHECK THE GAS INPUT (NATURAL GAS ONLY)

### WARNING

NATURAL GAS HEATING VALUE (BTU PER CUBIC FOOT) CAN VARY SIGNIFICANTLY, THEREFORE, IT IS THE INSTALLER'S RESPONSIBILITY TO SEE THAT BTU INPUT TO THE FURNACE IS ADJUSTED PROPERLY. FAILURE TO DO SO COULD CAUSE HEAT EXCHANGER FAILURE, ASPHYXIATION, FIRE OR EXPLOSION, RESULTING IN DAMAGE, BODILY INJURY OR DEATH. REFER TO THE NATURAL FUEL GAS CODE (NFPA-54) TO BE SURE THE FURNACE IS BURNING FUEL AT THE PROPER RATE.

Underfiring could cause inadequate heat, excessive condensation or ignition problems. Overfiring could cause soot-ing flame impingement or overheating of heat exchanger.

Before starting natural gas input check, obtain heating value of gas (BTU per cubic foot) at standard conditions from your local supplier. This factor is used in "Check the Gas Input" section and procedure.

To measure the input using the gas meter, proceed as follows:

- Step 1: Turn off gas supply to all other appliances except the furnace.
- Step 2: With the furnace operating, time the smallest dial on the meter for one complete revolution. If this is a 2 cubic foot dial, divide the seconds by 2; if it is a 1 cubic foot dial, use the time in seconds as is. (3,600 = Sec. Per Hr.) This gives the seconds per cubic foot of gas being delivered to the furnace.
- Step 3: Assuming natural gas with a heating value of 1000 Btu per cubic foot and 34 seconds per cubic foot as determined by step (2), then:  
Input:  $1,000 \times 3,600 \div 34 = 106,000$  Btu Per Hour  
This measured input must not be greater than the input indicated on the rating plate of the furnace.
- Step 4: Relight all other appliances turned off in step 1 above. Be sure all pilot burners are operating.

### ADJUST PILOT BURNER

**NOTE:** Pilot gas may need adjustment depending on inlet pressure, increase or decrease to obtain proper setting.

Pilot flame should surround 3/8 inch to 1/2 inch of the thermocouple tip. To adjust, if needed, remove pilot adjustment cap (do not lose gasket).

1. Remove screw cover over pilot adjusting screw.
2. Insert small screwdriver. Adjust flame as needed. Turn screw counterclockwise (↺) to increase flame, clockwise (↻) to decrease.
3. Turn thermostat to highest setting. Main burners should light quickly and smoothly. Turn thermostat to lowest setting. Main burners should go out. Pilot should remain lighted.
4. Replace screw cover over pilot adjusting screw.

# Operating Your Furnace

## BUILT-IN THERMOSTAT MODELS 1403611, 1403612, 2203611, 2203612, 3003611 and 3003612

Refer to this sheet and sheet 16 (or) 17 for "Safety, Operating Instructions" and "Turn Gas Off To Appliance." These furnaces are equipped with a manually operated piezo spark ignition device to ignite the pilot gas. Follow the steps under "Operating Instructions" and use the manual spark ignitor (shown in Fig. 13) to light the pilot in place of a match. Press spark ignitor button repeatedly.

### WARNING

THE SURFACE OF THE FURNACE IS HOT DURING OPERATION. KEEP CHILDREN, CLOTHING, FURNITURE, AND FLAMMABLE MATERIAL AWAY FROM IT.

## LIGHTING THE FURNACE WITH A MATCH

If the spark ignitor fails to provide spark to light the pilot, loosen the wing nut holding the peep hole cover. This will open the peep hole into the heat exchanger and the pilot can be ignited with a match.

1. Follow the instructions under "LIGHTING AND OPERATING INSTRUCTIONS" and use a match to light the pilot as instructed.

### WARNING

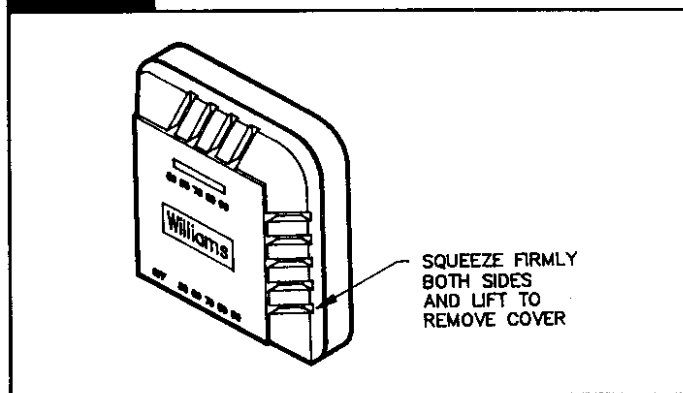
DANGER OF IGNITION FLASH  
AND EYE INJURY OR BLINDNESS

PROTECT YOUR EYES. NEVER ATTEMPT TO LIGHT PILOT WITH GAS CONTROL VALVE KNOB IN "ON" POSITION. FLASHBACK COULD OCCUR.

2. After lighting the pilot, carefully replace the pilot observation door (peep hole cover) and tighten wing nut down.

FIG. 16

THERMOSTAT (TYPICAL)



## WALL THERMOSTAT MODELS 1403622, 1403621, 2203622, 2203621, 3003622 and 3003621

Refer to this sheet and sheet 18 (or) 19 for "Safety, Operating Instructions" and "Turn Gas Off To Appliance." These furnaces are equipped with a manually operated piezo spark ignition device to ignite the pilot gas. Follow the steps under "Operating Instructions" and use the manual spark ignitor (shown in Fig. 13) to light the pilot in place of a match. Press spark ignitor button repeatedly.

### WARNING

DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE LIQUIDS OR VAPORS NEAR THE FURNACE.

On new installations the gas lines will be filled with air and it may take several tries to establish the pilot flame.

Check the manual shut-off valve in the gas line. It must be in the open position (handle parallel to gas line) before you can light your furnace.

Your furnace is equipped with a 100% safety pilot which will shut off the gas valve in case the pilot is not burning or functioning properly. Make sure the pilot is adjusted properly and that the thermocouple or generator connection at the control valve is tight. If furnace will not stay lit, call your local gas utility company.

Your furnace is equipped with a built-in pressure regulator. L.P. Gas models also have a regulator at the supply tank. If you have a question regarding the amount of fuel consumed, call your local gas utility or gas supplier. DO NOT TAMPER WITH THE REGULATORS OR BURNER ORIFICES, AS PROBLEMS RESULTING THEREFROM MAY CAUSE PRODUCT FAILURE NOT COVERED BY WARRANTY. Input and Output shown on the Rating Plate, located in burner compartment, must not be exceeded.

### IMPORTANT

KEEP BURNER AND CONTROL COMPARTMENT CLEAN.

### WARNING

DANGER OF BODILY INJURY OR DEATH  
DO NOT OPERATE THE FURNACE WITH A BROKEN OR MISSING PILOT OBSERVATION DOOR.

## FOR YOUR SAFETY, READ BEFORE LIGHTING

### WILLIAMS GAS CONTROL VALVE P322053 & P322054

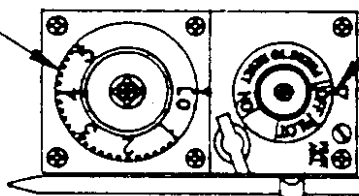
**WARNING:** If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.
- B. **BEFORE LIGHTING** smell 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 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.
- 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 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.

## OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information on front label.
2. Turn off all electric power to the appliance (if applicable).
3. Open control access panel.
4. Turn temperature dial clockwise to "LO".
5. Push in gas control knob slightly and turn clockwise to "OFF".

TEMPERATURE  
DIAL



GAS CONTROL  
KNOB SHOWN  
IN "OFF"  
POSITION

**NOTE:** Knob cannot be turned from "PILOT" to "OFF" unless knob is pushed in slightly. Do not force.

6. Wait five (5) minutes to clear out any gas, then smell for gas, including near the floor. If you then smell gas, **STOP!** Follow "B" in the safety information above. If you don't smell gas, go to the next step.
7. Loosen wingnut and open pilot observation door (if equipped).
8. Find pilot—follow metal tube from gas control. The pilot is mounted on side of burner.

9. Push in gas control knob slightly and turn counterclockwise to "PILOT."
10. Push in control knob all the way and hold in. Immediately light the pilot.



THERMO- PILOT  
COUPLE BURNER

Continue to hold the control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 5 through 10.

- If knob does not pop up when released, stop and immediately call your service technician or gas supplier.
  - If the pilot will not stay lit after several tries, turn the gas control knob to "OFF" and call your service technician or gas supplier.
11. Close pilot observation door, tighten wingnut (if equipped).
  12. Turn gas control knob counterclockwise to "ON". Sensing bulb is now activated. Set temperature dial to desired temperature (1 - 5).
  13. Close control access panel.
  14. Turn on all electric power to the appliance (if applicable).

## TO TURN OFF GAS TO APPLIANCE

1. Turn off all electric power to the appliance if service is to be performed (if applicable).
2. Open control access panel.
3. Push in gas control knob slightly and turn clockwise to "OFF." Do not force.
4. Close control access panel.

**WARNING:** DUE TO HIGH SURFACE TEMPERATURES — KEEP CHILDREN, CLOTHING, FURNITURE OR ANY COMBUSTIBLE MATERIAL AWAY FROM FURNACE.

**IMPORTANT:** KEEP BURNER AND CONTROL COMPARTMENT CLEAN, SEE INSTALLATION AND OPERATING INSTRUCTIONS ACCOMPANYING APPLIANCE.

## LIGHTING PILOT

If furnace is equipped with a manual spark igniter follow next steps:

1. Review all operating instructions.
2. When lighting pilot, depress red button located to the lower right side of burner compartment. (view pilot through observation door, repeat several times if necessary)
3. If pilot fails to light or spark is not present while actuating, follow steps 5 through 10.




## FOR YOUR SAFETY, READ BEFORE LIGHTING

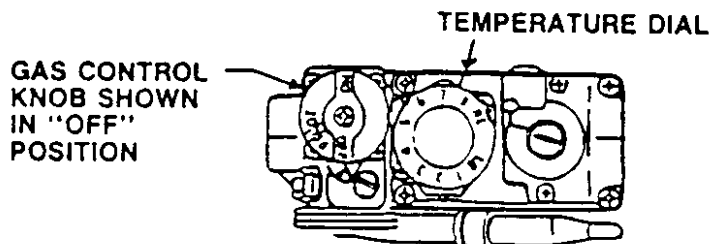
### WILLIAMS GAS CONTROL VALVE P295300A & P295301A

**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 has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.
- B. **BEFORE LIGHTING** smell 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 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.
- 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 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.


## OPERATING INSTRUCTIONS

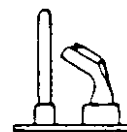
1. **STOP!** Read the safety information above.
2. Turn off all electric power to the appliance (if applicable).
3. Open control access panel.
4. Push in gas control knob slightly and turn clockwise  to "OFF."



**NOTE:** Knob cannot be turned from "PILOT" to "OFF" unless knob is pushed in slightly. Do not force.



5. Wait five (5) minutes to clear out any gas, then smell for gas, including near the floor. If you then smell gas, **STOP!** Follow "B" in the safety information above. If you don't smell gas, go to the next step.
6. Loosen wingnut and open the pilot observation door (if equipped).
7. Find pilot—follow metal tube from gas control. The pilot is mounted on side of burner.

8. Turn knob on gas control counterclockwise  to "PILOT."
9. Push in control knob all the way and hold in. Immediately light the pilot.



**THERMO-PILOT  
COUPLE BURNER**

Continue to hold the control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 5 through 10.

- If knob does not pop up when released, stop and immediately call your service technician or gas supplier.
  - If the pilot will not stay lit after several tries, turn the gas control knob to "OFF" and call your service technician or gas supplier.
10. Close pilot observation door, tighten wingnut (if equipped).
  11. Turn gas control knob counterclockwise  to "ON". Burner is now under control of the thermostatic sensing element. Turn temperature dial (numbered 1 through 8) counterclockwise  toward 8 to obtain desired temperature.
  12. Close control access panel.
  13. Turn on all electric power to the appliance (if applicable).

## TO TURN OFF GAS TO APPLIANCE

1. Turn off all electric power to the appliance if service is to be performed (if applicable).
2. Open control access panel.
3. Push in gas control knob slightly and turn clockwise  to "OFF." Do not force.
4. Close control access panel.

**WARNING: DUE TO HIGH SURFACE TEMPERATURES — KEEP CHILDREN, CLOTHING, FURNITURE OR ANY COMBUSTIBLE MATERIAL AWAY FROM FURNACE.**  
**IMPORTANT: KEEP BURNER AND CONTROL COMPARTMENT CLEAN, SEE INSTALLATION AND OPERATING INSTRUCTIONS ACCOMPANYING APPLIANCE.**


## FOR YOUR SAFETY, READ BEFORE LIGHTING

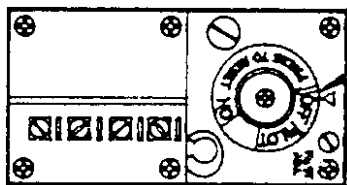
### WILLIAMS GAS CONTROL VALVE P121200 & P171600

**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 has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.
  - B. **BEFORE LIGHTING** smell 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 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.
- C. If you cannot reach your gas supplier, call the fire department.
  - D. 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 service technician. Force or attempted repair may result in a fire or explosion.
  - E. 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.

## OPERATING INSTRUCTIONS


1. **STOP!** Read the safety information above.
2. Turn off all electric power to the appliance (if applicable).
3. Set the thermostat to lowest setting.
4. Open control access panel.
5. Push in gas control knob slightly and turn clockwise  to "OFF."



GAS CONTROL KNOB SHOWN IN "OFF" POSITION


**NOTE:** Knob cannot be turned from "PILOT" to "OFF" unless knob is pushed in slightly. Do not force.

6. Wait five (5) minutes to clear out any gas, then smell for gas, including near the floor. If you then smell gas, **STOP!** Follow "B" in the safety information above. If you don't smell gas, go to the next step.
7. Loosen wingnut and open the pilot observation door (if equipped).
8. Find pilot—follow metal tube from gas control. The pilot is mounted on side of burner.


9. Push in gas control knob slightly and turn counterclockwise  to "PILOT."

GENERATOR



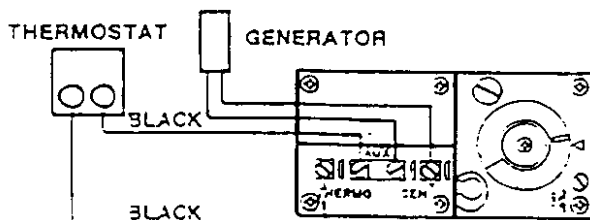
10. Push in control knob all the way and hold in. Immediately light the pilot. Continue to hold the control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 5 through 10.
  - If knob does not pop up when released, stop and immediately call your service technician or gas supplier.
  - If the pilot will not stay lit after several tries, turn the gas control knob to "OFF" and call your service technician or gas supplier.
11. Close pilot observation door, tighten wingnut (if equipped).
12. Turn gas control knob counterclockwise  to "ON".
13. Close control access panel.
14. Turn on all electric power to the appliance (if applicable).
15. Set thermostat to desired setting.

## TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed (if applicable).
3. Open control access panel.
4. From "ON" position, depress and turn gas control knob clockwise  to "OFF" position. Do not force.
5. Close control access panel.

**WARNING: DUE TO HIGH SURFACE TEMPERATURES — KEEP CHILDREN, CLOTHING, FURNITURE OR ANY COMBUSTIBLE MATERIAL AWAY FROM FURNACE.**  
**IMPORTANT: KEEP BURNER AND CONTROL COMPARTMENT CLEAN.**

## CONNECTION WIRING DIAGRAM FOR WALL THERMOSTAT MODELS



### LEGEND

- FACTORY WIRED LOW VOLTAGE
  - ⊗ SCREW TERMINAL LOW VOLTAGE
- NOTE:** if any of the original wire as supplied with the appliance has to be replaced, use only 18 Ga., 4/64 insulation, 105° C. AWM copper wire or its equivalent.


## FOR YOUR SAFETY, READ BEFORE LIGHTING

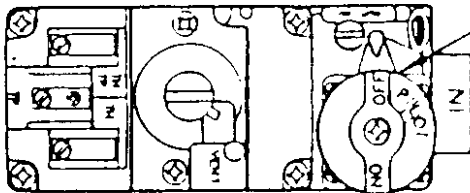
### WILLIAMS GAS CONTROL VALVE P295200A & P295201A

**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 has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.
- B. **BEFORE LIGHTING** smell 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 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.
- C. If you cannot reach your gas supplier, call the fire department.
- D. 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 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.

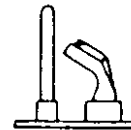
## OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance. (If applicable).
4. Remove control access panel.
5. Push in gas control knob slightly and turn clockwise  to "OFF."



GAS CONTROL KNOB SHOWN IN "OFF" POSITION


8. Find pilot—follow metal tube from gas control. The pilot is mounted on side of burner.
9. Turn knob on gas control counterclockwise  to "PILOT."




GENERATOR

PILOT BURNER

**NOTE:** Knob cannot be turned from "PILOT" to "OFF" unless knob is pushed in slightly. Do not force.

6. Wait five (5) minutes to clear out any gas, then smell for gas, including near the floor. If you then smell gas, **STOP!** Follow "B" in the safety information above. If you don't smell gas, go to the next step.
7. Loosen wingnut and open the pilot observation door (if equipped).
10. Push in control knob all the way and hold in. Immediately light the pilot. Continue to hold the control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 5 through 10.
  - If knob does not pop up when released, stop and immediately call your service technician or gas supplier.
  - If the pilot will not stay lit after several tries, turn the gas control knob to "OFF" and call your service technician or gas supplier.
11. Close pilot observation door, tighten wingnut (if equipped).
12. Turn gas control knob counterclockwise  to "ON".
13. Close control access panel.
14. Turn on all electric power to the appliance (if applicable).
15. Set thermostat to desired setting.

## TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed (if applicable).
3. Open control access panel.
4. From "ON" position, depress and turn gas control knob clockwise  to "OFF" position. Do not force.
5. Close control access panel.

**WARNING: DUE TO HIGH SURFACE TEMPERATURES — KEEP CHILDREN, CLOTHING, FURNITURE OR ANY COMBUSTIBLE MATERIAL AWAY FROM FURNACE.**  
**IMPORTANT: KEEP BURNER AND CONTROL COMPARTMENT CLEAN.**

# How To Care For Your Furnace

## MAINTENANCE

It is recommended that a competent serviceman perform these checks at the beginning of each heating season:

### a. Burner and Control Compartments

Keep clean at all times. Clean all foreign materials from top of burner. For access to burner:

- (1) Remove cabinet. (Reverse procedure outlined in "Cabinet Installation".)
- (2) Shut off gas supply to furnace.
- (3) Remove six (6) #10-24 screws securing control door assembly to heating element.
- (4) Carefully remove control door and burner assembly from heating element. Be careful not to damage the control door gasket.
- (5) After cleaning, replace control door and burner assembly by reversing above procedure. Replace the control door gasket if its condition is in doubt.

### b. Motor and Blower

For maximum motor life of optional blower, the manufacturer recommends the motor be inspected yearly, dust blown out of the ventilating holes. Oil yearly with SAE 20 high temp oil.

### c. Vent System

Check vent cap and tube to be sure birds or children have not blocked inlet air or flue openings. The flow of combustion and ventilation air must not be obstructed. Clean or replace before using furnace.

### d. Pilot Flame

See paragraph "ADJUST PILOT BURNER" under Start-Up Procedure, page 14, and Fig. 28.

### e. Appliance Area

For better circulation and more effective heating, do not place obstructive furniture closer than 4 feet to the front of the cabinet or 2 feet to the side of the cabinet.

The appliance area must be kept clear and free from combustible material, gasoline and other flammable vapor and liquids.

## WARNING

DANGER OF BODILY INJURY OR DEATH. TURN OFF ELECTRIC POWER SUPPLY AT DISCONNECT SWITCH, FUSE BOX OR SERVICE PANEL BEFORE REMOVING ANY DOORS OR ACCESS OR SERVICE PANELS FROM UNIT, IF EQUIPPED WITH ACCESSORY BLOWER.

### f. Cabinet Finish

Clean cabinet with damp rag. Never use abrasive cleaners. Cabinets are finished in heat resistant baked enamel – DO NOT refinish with wall paint.

## BURNER FLAME

Start the furnace and let it operate about 10 minutes then look at the burner flame. Flames should be soft and blue, see Fig. 27. If flames appear abnormal, contact your gas company.

FIG. 27

MAIN BURNER FLAME PATTERN

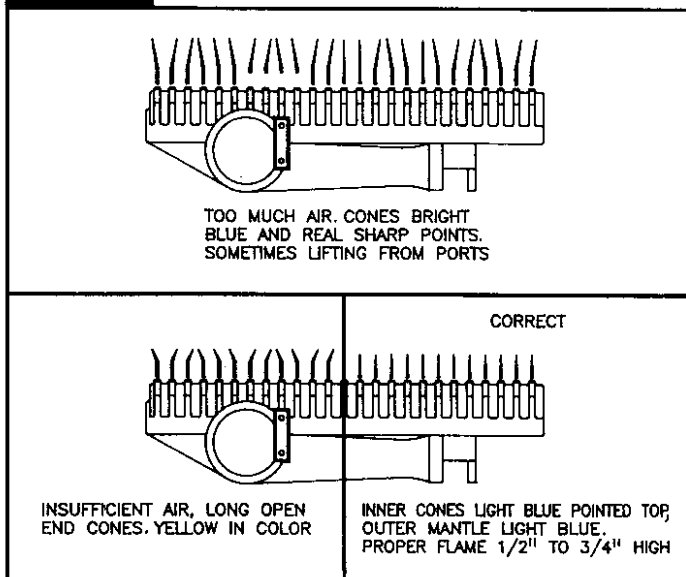
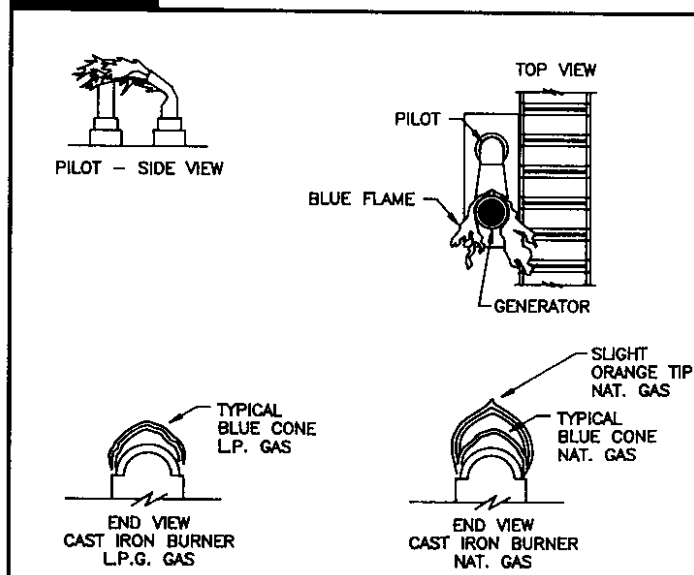


FIG. 28



## Troubleshooting Gravity Direct Vent Wall Furnace

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Pilot will not stay lit after carefully following lighting instructions.	A. Thermocouple or generator producing insufficient millivoltage.	Check pilot flame – must impinge on thermocouple or generator. Be sure thermocouple or generator is fully inserted in bracket. Make sure pilot lighting door is tightly closed.
	B. Loose or dirty thermocouple or generator connections at gas valve.	Clean and/or tighten thermocouple or generator connections at valve.
	C. Thermocouple or generator defective.	Check thermocouple with millivolt meter. Should generate approximately 30 millivolts when not connected to load. When connected to load, should generate approximately 14 millivolts; if below 7 millivolts, replace.  Check generator with millivolt meter. Take reading at generator terminals of valve with pilot burning and thermostat contacts closed. Should be 140 millivolts or more.
	D. Grounded thermostat lead wire (Wall thermostat model).	Remove thermostat lead wires from valve terminals. If pilot now stays lit, trace thermostat wiring circuit for a ground. May be grounded to furnace or gas supply.
	E. Thermomagnet pilot safety defective.	Replace gas valve after above is checked out.
2. Pilot burning – no gas to main burner.	A. Manual valve not turned to "On" position after lighting pilot.	Turn gas valve knob to "On" position.
	B. Temperature dial or thermostat not turned to a position calling for heat.	Set temperature dial or thermostat to a position calling for heat.
	C. Plugged burner orifice.	Check – clean or replace.
	D. Temperature dial out of calibration. (Bulb control model.)	See valve manufacturer's instructions.
	E. Mis-wired or broken thermostat wires. Defective thermostat. (Wall thermostat model.)	Check connections at valve terminals. Jumper across thermostat terminals on valve – if valve operates check thermostat wires.
	F. Pilot generator may not be generating sufficient millivoltage to open valve.	See 1A above.
	G. Defective valve.	Replace.
3. Burner comes "On" but goes "Off" after operating for no apparent reason.	A. Tubes not properly installed.	Check vent tube and air inlet tube. Follow installation instructions. Be sure joints are tight and both tubes are in place. Use only tubes furnished. Do not extend tubes beyond original length.
	B. Furnace may be overrated.	Check for high pressure at valve – see rating plate for specified min/max supply pressure. Check burner orifice.

(continued next page)

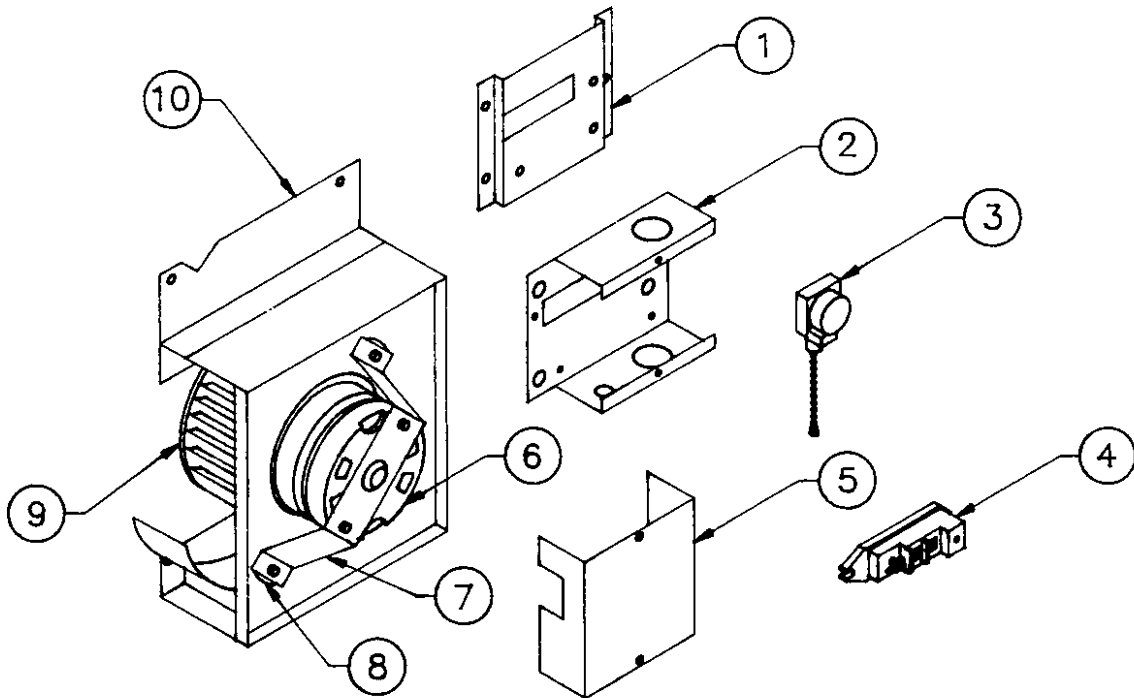
## Troubleshooting ... (cont.)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
4. Furnace operates but turns "Off" before room temperature is attained.	A. Sensing bulb not located properly. (Bulb control model.)	Check location of sensing bulb – should be attached to back of control valve.
	B. Temperature dial out of calibration. (Bulb control model.)	See valve manufacturer's instructions.
	C. Thermostat location. (Wall thermostat model.)	Check thermostat location – should not be in the path of warm air discharge from furnace, near a lamp, or above a TV. or stereo set.
	D. Defective thermostat. (Wall thermostat model.)	Check thermostat calibration or replace.
5. Furnace not producing sufficient heat.	A. Furnace may be too small for space being heated.	Check heat loss calculations.
	B. Furnace not burning at full rate.	Check for low gas pressure (see 3B page 21). Check burner orifice.
6. Furnace operates but will not shut "Off" when room temperature is attained.	A. Sensing bulb not located properly. (Bulb control model.)	Check location of sensing bulb – should be attached to back of control valve.
	B. Temperature dial out of calibration. (Bulb control model.)	See valve manufacturer's instruction.
	C. Bulb or capillary broken. (Bulb control model.)	Replace valve.
	D. Thermostat wiring defective. (Wall thermostat model.)	Thermostat lead wires may be shorted together caused by a nail or staple – check by removing thermostat leads from valve terminals.
	E. Thermostat location. (Wall thermostat model.)	Check thermostat location – if on an outside wall or a hole in wall behind thermostat is causing cold air to contact thermostat – relocate.
	F. Defective thermostat. (Wall thermostat model.)	Check thermostat calibration or replace.
	G. Dirt under valve seat or valve stuck open.	Replace valve.
7. Pilot outage problem.	A. Pilot flame may be low or blowing (high) causing safety to drop out.	Adjust pilot flame. Check vent tube and air inlet tube (see 3A page 21). Be sure pilot lighting door is closed. Pilot orifice or aerating hole may be plugged (check for spiders, webs or other organic material).
8. Abnormal operation.	A. Delayed ignition – pilot flame may be too low.	Adjust pilot flame.
	B. Expansion noise ticking.	Check installation – casing may be distorted by being fastened to an uneven wall. Vent tube and air inlet tube may be in a bind with vent cap assembly – be sure hole through wall is correct and parts fit without binding.

## Williams Direct Vent Gas-Fired Wall Furnace

### REPLACEMENT PARTS FOR OPTIONAL BLOWER ACCESSORY 2302

MODELS: 2203611; 2203612; 2203621; 2203622  
3003611; 3003612; 3003621; 3003622



USE ONLY MANUFACTURE'S AUTHORIZED PARTS

REF. NO.	PART NO.	DESCRIPTION
1	6A24	SWITCH BRACKET
2	6B33	SWITCH BOX
3	P321017	SWITCH-PULL CHAIN
4	P129700	SWITCH-AUTOMATIC
5	6A23	SWITCH BOX COVER
6	P130600	MOTOR
7	6A93	MOTOR SUPPORT
8	P128400	VIBRATION ISOLATOR (2 REQ'D)
9	P130700	BLOWER WHEEL
10	6B64	BLOWER FRAME

NOTE: SCREWS AND BOLTS ARE STANDARD HARDWARE ITEMS, AVAILABLE LOCALLY.

## Williams Direct Vent Gas-Fired Wall Furnace

### REPLACEMENT PARTS FOR MODELS: 1403611; 1403612; 1403621; 1403622

REF. NO.	PART NO.	DESCRIPTION
1	8C28	CASING WRAPPER
2	8A72	ELEMENT SHIELD
3	8B61	COMBUSTION CHAMBER
4	P147001	FLUE TUBE GASKET
5	6B62	INNER CASING
6	P147001	FLUE TUBE GASKET
7	P147000	AIR PAN GASKET
8	6C54-1	AIR INLET SHIELD (MAX. 9" THICK WALL)
9	9306	VENT CAP
10	6C51	AIR INLET COLLAR (MAX. 9" THICK WALL)
11	8A85	FLUE EXTENSION (MAX. 9" THICK WALL)
12	8B64	MOUNTING SPACER PLATE
13	P121800	AIR INLET GASKET
☆ ☆ ☆	VENT EXTENSION KIT 9304	★ FLUE EXTENSION — 15 INCH WITH (1) P147001 GASKET ★ AIR INLET COLLAR — 15 INCH WITH (1) P147000 GASKET ★ AIR INLET SHIELD — 15 INCH
☆ ☆ ☆	VENT EXTENSION KIT 9303	★ FLUE EXTENSION — 24 INCH WITH (1) P147001 GASKET ★ AIR INLET COLLAR — 24 INCH WITH (1) P147000 GASKET ★ AIR INLET SHIELD — 24 INCH

☆NOT SHOWN

★NOT AVAILABLE SEPARATELY (KIT FORM ONLY)

FOR PARTS ILLUSTRATION SEE PAGE 25

USE ONLY MANUFACTURE'S AUTHORIZED PARTS.

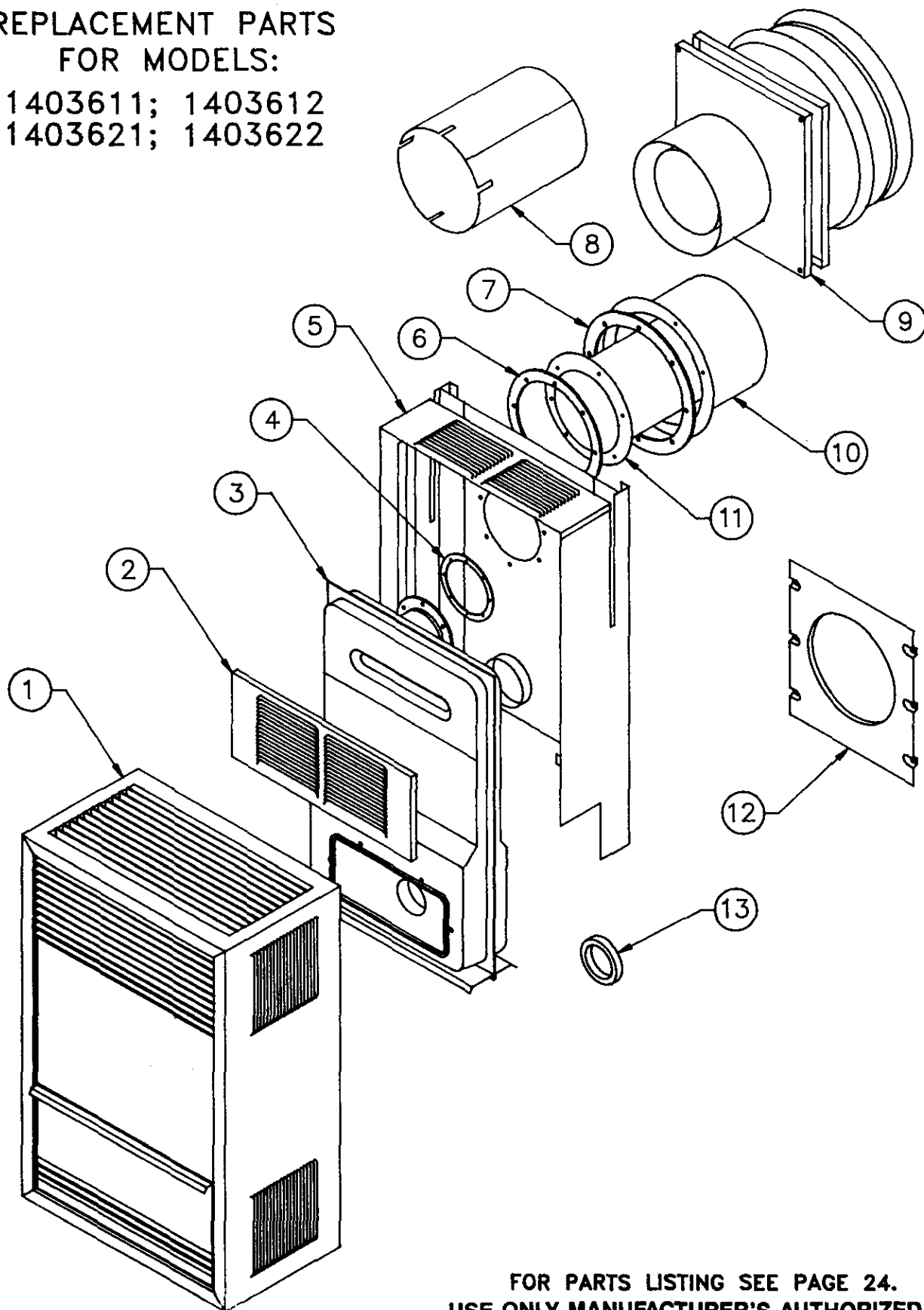
NOTE: SCREWS AND BOLTS ARE STANDARD HARDWARE ITEMS, AVAILABLE LOCALLY.



## Williams Direct Vent Gas-Fired Wall Furnace

### REPLACEMENT PARTS FOR MODELS:

1403611; 1403612  
1403621; 1403622



FOR PARTS LISTING SEE PAGE 24.  
USE ONLY MANUFACTURER'S AUTHORIZED PARTS



## owner's manual

### SERVICE

#### MODEL NOS.

**1403612 NAT**

**1403622 NAT**

**2203612 NAT**

**2203622 NAT**

**3003612 NAT**

**3003622 NAT**

**1403611 LPG**

**1403621 LPG**

**2203611 LPG**

**2203621 LPG**

**3003611 LPG**

**3003621 LPG**

NOTE: CANADIAN MODEL NUMBERS THIRD  
DIGIT FROM LEFT TO BE:

1 FOR BASIC ALTITUDE  
2 FOR HIGH ALTITUDE

EXAMPLE:

MODEL 1403612 BECOMES 1413612  
(0-2000 FT. BASIC ALTITUDE)  
OR BECOMES 1423612  
(2000-4000 FT. HIGH ALTITUDE)

### Service Hints

If your furnace fails to work right, you may avoid inconvenience and the cost of a service call by checking the following points before you call for service.

FOR YOUR SAFETY	FOR YOUR SAFETY
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance	If you smell gas: 1. Open windows. 2. Don't touch electrical. 3. Extinguish any open flame. 4. Immediately call your gas supplier.

#### POSSIBLE CAUSE

#### WHAT TO DO

##### If your furnace is not heating or not giving enough heat —

Thermostat is not set correctly.  
Pilot is out.

Reset thermostat to desired setting.  
Check pilot. Relight if necessary following instructions for "Operating Your Furnace".

Pilot is on but burner won't come on.

If gas valve is set at other than "On" furnace will not operate. Shut furnace down and following instructions for relighting in "Operating Your Furnace" section.

Burner is not operating properly.

Check flame. If it is yellow, the burner is not getting enough air. Or if flame is blue and noisy and seems to lift off the burner, the burner is getting too much air. See "Checks and Adjustments", page 14.

Air flow restricted

Check that doors, drapes or furniture are not blocking louvers.

##### Pilot goes out time after time —

Furnace flue blocked.  
Pilot and burner access door not closed properly.

Locate vent outlet blockage and clean. Check the door. See section on "Operating Your Furnace" beginning on page 15.

##### If burner is noisy —

Gas input amount is incorrect.  
Too much primary air.

Contact Williams Service Department.  
Contact Williams Service Department.

##### If blower does not run —

Fuse is blown.  
Blower not connected to electric power.

Replace fuse.  
Connect to electric power.

##### If blower motor is noisy —

Housing rattling.  
Blower dirty.  
Blower wheel bent.

Tighten screws.  
Clean blower wheel.  
Straighten or replace.

See troubleshooting section for more detailed information.

### How to Order Repair Parts

When ordering repair parts, always give the following information:

1. MODEL NUMBER
2. MFG. DATE CODE
3. PART NUMBER
4. PART DESCRIPTION

All parts listed herein may be ordered from your equipment supplier.

The Model Number of your Williams wall furnace will be found on the rating plate near gas valve, inside control compartment.



**WILLIAMS FURNACE COMPANY**  
225 Acacia Street  
Colton, CA 92324 USA  
(909) 825-0993

**MANUFACTURED  
IN THE U.S.A.**  
*Established 1916*  
**FAX: (909) 824-8009**