



INSTALLATION & OPERATING INSTRUCTION MANUAL

owners manual

MODEL NOS.

3508332

3508732

5008732

5508332

6508732

FOR USE WITH NATURAL GAS ONLY



MODEL NOS.

3508331

3508731

5008731

5508331

6508731

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

**Save This Manual For
Future Reference.**

COUNTERFLOW TOP VENT GAS WALL FURNACES

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



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 instructions.
 - 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.

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.

ALL MODELS ARE CERTIFIED FOR USE IN
CANADA EXCEPT 6508731 AND 6508732.

Williams Furnace Co., 225 Acacia St., Colton, CA 92324, USA

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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.
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.

Basic Description

Your Counterflow Top Vented Wall Furnace is shipped ready to install on the surface of a wall or recessed up to 9-1/4 inches in a wall, with wall studs spaced 16 inches center to center.

Vent piping and exhaust are not part of the Williams furnace package and must be purchased separately.

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 counterflow top vented wall furnace.

Air is drawn in at the top by the fan and discharges through a grille near the floor. A two-speed fan is used with Model 50087; 55083 and 65087 series. A single speed fan is used on all other models. The furnace contains a multi-slot burner (two on Model 50087; 55083 and 65087 series) and burns either Natural or L.P. (Liquefied Petroleum) Gas, depending on the model you have purchased.

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

The combustion system draws combustion air directly from the room in which the furnace is installed, and through ventilation grills or ducts connected to the outdoors, such as an attic or crawl space. The combustion gases are discharged through the roof within a listed vent pipe.

The furnace heat exchanger is built of heavy gauge steel treated for corrosion resistance. The fan at the top forces air down along the front, back and sides of the heat exchanger where it is discharged into the room. The furnace cabinet is also constructed of heavy gauge steel and has an enamel paint finish.

Models 3508331; 3508332; 5508331 and 5508332 are equipped with an electronic ignition automatic pilot relight system.

This appliance is equipped with a vent safety shutoff system designed to protect against improper venting of combustion products. Operation of this wall furnace when not connected to a properly installed and maintained ventilating system or tampering with the vent safety shutoff system can result in carbon monoxide (CO) poisoning and possible death.

Optional Accessories

OUTLET GRILLE REGISTER 6701 pg. 21 & 22

Lets you route some heated air to a second room. Mounts on side wall of second room and must be within 10 inches of wall furnace.

DIFFUSER GRILLE KIT 6703 Fig. 3, pg. 7

Lets you route some heated air in a two-way direction. Kit 6704 for one-way direction.

REAR OUTLET KIT 6801

Lets you route some heated air to a second room behind the furnace. Finished wall of second room must be within 10 inches of furnace. Ref. Fig. D, pg. 7. Built-in damper lets you shut off air flow to second room if desired.

SHORT REAR OUTLET KIT 6802

Lets you route some heated air to a second room behind the furnace when furnace is recessed mounted. Finished wall cannot be more than 3/4 inches from rear of furnace. Built-in damper lets you control the air flow to the second room.

TRIM STRIP KIT 4701

Provides finished edge at sides of wall furnace. Neutral beige enamel painted steel.

OVAL VENT KIT 9901

This U.L. listed B/W vent kit contains 4 feet of oval double-walled vent pipe, plate spacers and starter or hold-down plate that starts the venting from the top of furnace. See page 13 for additional items you will need.

VENT ENCLOSURE KITS 9812 or 9824

These kits are used only when the furnace is surface mounted. They enclose the vent pipe from the top of the surface to the ceiling.

SIDE GRILLE KIT 6702

Allows you to direct heated air from the side of furnace into the same room.

NOTE

All kits are identified on the carton by their Manufacturing Number respectively, 6701, 6703, 6704, 6801, 6802, 4701, 9901, 9812, 9824 and 6702. These numbers are also listed on the furnace rating plate.

Helpful Installation Information

The following booklets will help you in making the installation:

ANSI/NFPA 70-1990 or current edition "National Electrical Code." In Canada: CSA C22.1 Canadian Electrical Code.

American National Standard NFPA54/ANSI Z223.1 1988 or current edition "National Fuel Gas Code."

Obtain from -- American National Standards Institute, Inc., 1430 Broadway, New York, N.Y. 10018.

In Canada: CAN/CGA B149 Installation Code.

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. 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.
4. USE ONLY MANUFACTURER'S REPLACEMENT PARTS. USE OF ANY OTHER PARTS COULD CAUSE INJURY OR DEATH.
5. DO NOT install this furnace in an alcove.
6. DO NOT install these furnaces in a travel trailer, recreational vehicle or mobile home.
7. MAINTAIN all clearances specified in section "Locating Wall Furnace and Thermostat" and "Vent Installation."
8. 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.
9. 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.

10. ANY SAFETY SCREEN, GUARD OR PARTS REMOVED FOR SERVICING THIS APPLIANCE MUST BE REPLACED PRIOR TO OPERATING THE APPLIANCE TO AVOID PROPERTY DAMAGE, BODILY INJURY OR DEATH.
11. 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.
12. BE SURE to provide for adequate combustion and ventilation air. See page 6. The flow of this air to the furnace must not be blocked.
13. 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.
14. 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.
15. DUE TO HIGH TEMPERATURES, locate the furnace out of traffic and away from furniture and draperies.
16. ALERT children and adults to the hazards of high surface temperature and to keep away to avoid burns or clothing ignition.
17. CAREFULLY supervise young children when they are in the same room with the furnace.
18. DO NOT place clothing or other flammable material on or near furnace.
19. 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.
20. BEFORE INSTALLING: To avoid electrical shock, turn off electrical circuits that pass through the wall where you are going to install the furnace.
21. 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

The furnace is shipped in one carton containing the furnace, installation instruction booklet and hardware bag.

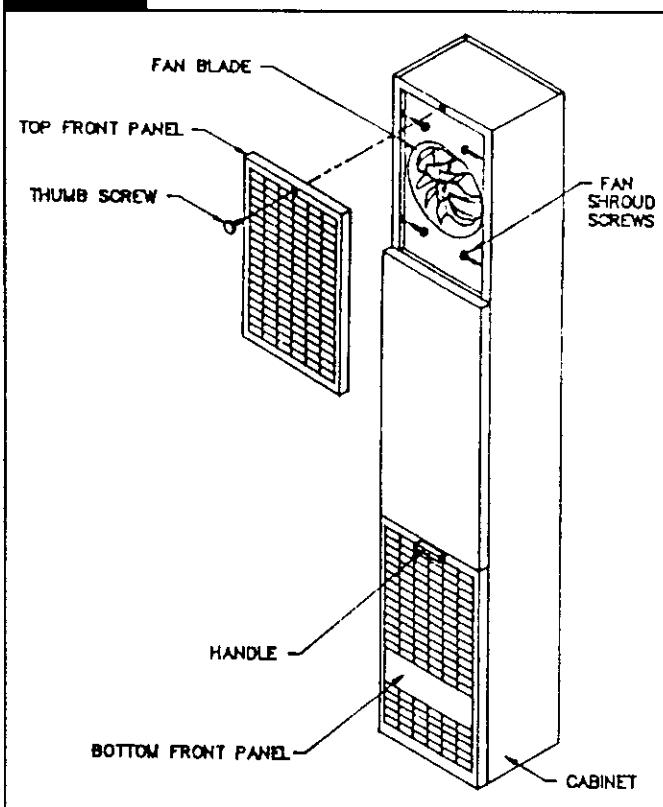
1. Lay carton horizontally. Remove top trim cover from its packing. Remove thumb screw at top of furnace, raise top front panel 1/2 inch and remove panel from cabinet. This is so you can get to the electrical connections later.
2. Place these and other parts, as they are removed from furnace, where they cannot be lost or damaged before you need them.
3. Bottom front panel can be removed by grasping just below handle and pulling it outward and then upward. See Fig. 1.

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.

4. Remove all literature and package containing thermostat, wire and metal anchors used for free standing installation.
5. Check the fan blade to be sure it spins freely.

FIG. 1



Basic Tools Needed

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

1/8" Allen wrench
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

Basic Materials

Pipe and fittings to make connections to furnace (see page 17).
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 (see page 18).
Minimum wire size is #14 gauge copper.

3/4" Quarter Round or other wood trim molding approximately 16' long or Trim Accessory 4701 is recommended.
2" x 4" x (length as required) Spacer Blocks (see Close Off Stud Space, page 12).
Oval Vent Kit 9901 is recommended.
Vent Enclosure Kit 9812 or 9824 if furnace is to be surface mounted is recommended.
1 x 1 wood strips if Optional Side Outlet Grille Register 6701 is used.

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, 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 vented wall furnace. Obtain professional help where needed.

The CHECK AND ADJUSTMENTS on page 24 are vital to the proper and safe operation of the furnace. Be sure they are done.

IMPORTANT

For satisfactory and trouble-free operation, be sure to:

1. Properly locate the furnace within the space to be heated.
2. Install the furnace in accordance with local codes or ordinances and instructions provided.
3. Maintain minimum clearance: Floor 0 inches or ceiling 4 inches, side wall 4 inches. For exception to minimum side wall clearance, see Fig. 3, pg. 7.
4. Be sure to provide enough combustion and ventilation air.

Locating Wall Furnace & Thermostat

Consider the following points before attempting to install the furnace:

CAUTION

Do not make cut-outs in wall or ceiling before checking in the attic for ceiling joist locations and proposed venting.

The counterflow vented wall furnaces are shipped ready to install on the surface of the wall or recessed up to 9-1/4 inches in the wall, with studs 16 inches center-to-center or stud space can be framed-in to 16 inches, see page 10, Recessed Mounting.

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 install the furnace in a closet, alcove, or small hallway where the furnace could be isolated by closing doors to the heater space. See Fig. 2 for the minimum clearances.

Do not install the furnace in a mobile home, trailer, or recreational vehicle.

The bottom of the furnace may rest directly on a wood or concrete floor. If floor is other than wood or concrete there must be a piece of wood or sheet metal under the furnace that is at least the same size as the bottom of the furnace.

On recessed installations the recessed portion may have 0 inches clearance to combustible material.

To provide adequate clearance and service access the front of the furnace must face the open room. Be sure that gas piping and electrical wiring can be brought to the location. See sections covering piping and electrical wiring for your type of furnace mounting.

Furnace vent must be installed directly to the outdoors so that combustion gasses will not collect inside the building.

Provide an adequate vent or flue in accordance with local codes or ordinances and instructions provided by the vent pipe manufacturer.

Check the minimum spacing needs as shown in Figs. 2 and 3, pages 6 and 7.

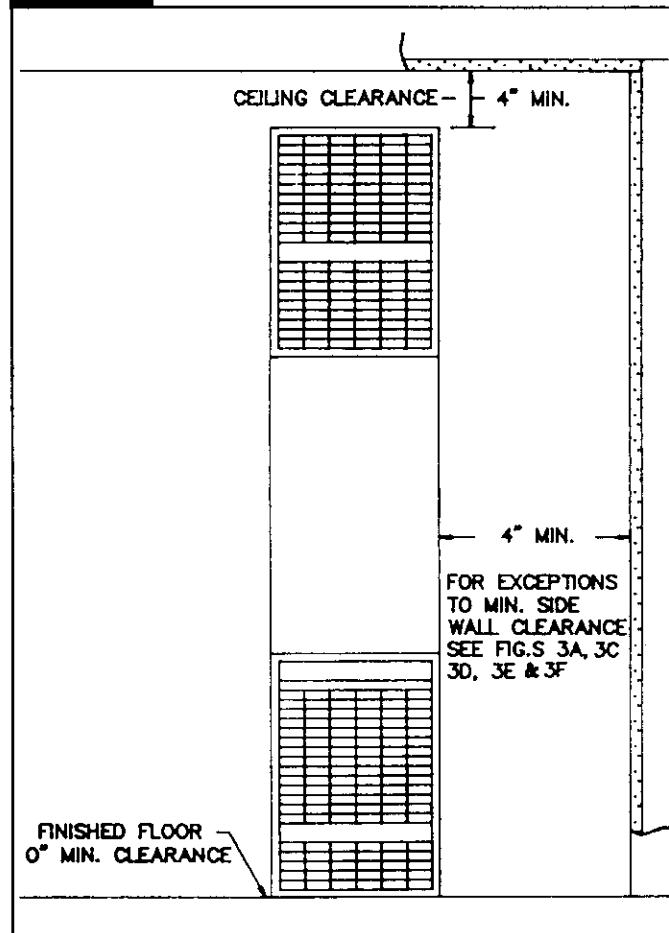
The top of the furnace must be at least 4 inches from the ceiling. See Fig. 2.

With standard furnace discharge outlet, do not install closer than 4 inches to intersecting wall. See Fig. 3B, page 7.

When using optional kits 6703 or 6704 maintain clearances as shown in Figs. 3A or 3C, page 7.

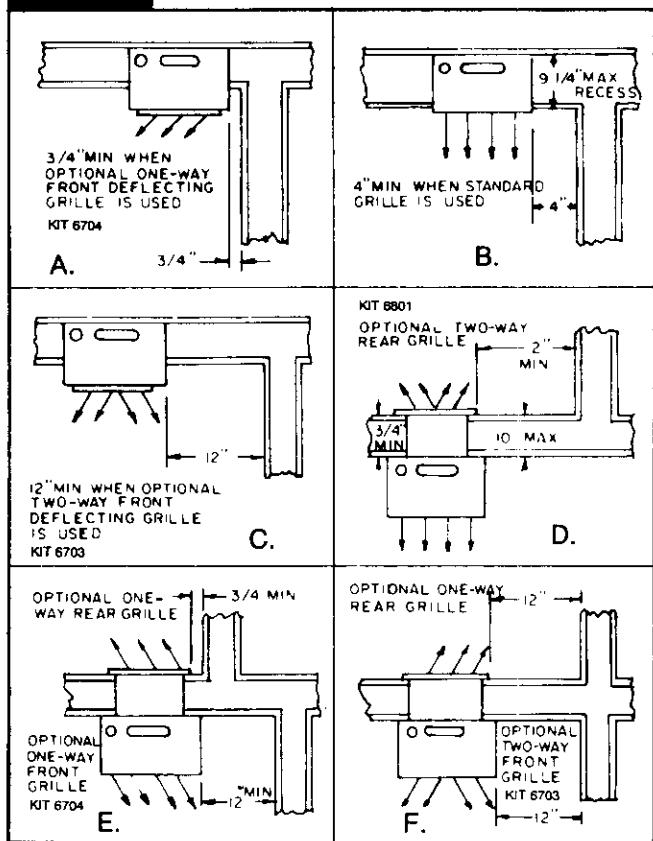
When using optional kit 6704 maintain clearance as shown in Figs. 3A and 3F, page 7. Use only optional outlet and grille kits available from manufacturer.

FIG. 2



Locating Wall Furnace & Thermostat (Con't)

FIG. 3



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 the 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

COLD SPOTS:

Concealed pipes or ducts
Stairwells - drafts
Doors - drafts
Unheated rooms on other side of wall

DEAD SPOTS:

Behind doors
Kitchen
Corners, and alcoves

After picking a location that meets the requirements, check the walls, attic and roof to make sure there are no obstructions such as pipes, electric wiring, etc., which could interfere with the installation of the furnace or vent pipe. If required, move them or pick a new location.

WARNING

DANGER OF PROPERTY DAMAGE, BODILY INJURY OR LOSS OF LIFE. DO NOT INSTALL FURNACE IN ANY AREA WHERE OXYGEN IS IN USE.

Combustion & Ventilation Air

WARNING

DANGER OF PROPERTY DAMAGE, BODILY INJURY OR DEATH

THE FURNACE AND ANY OTHER FUEL BURNING APPLIANCE MUST BE PROVIDED WITH ENOUGH FRESH AIR FOR PROPER COMBUSTION AND VENTILATION OF FLUE GASES. MOST HOMES WILL REQUIRE THAT OUTSIDE AIR BE SUPPLIED.

High humidity, especially during cold weather, may be damaging to buildings because condensation forms on windows and inside walls.

The combination of a tight energy efficient home with the use of exhaust fans, fireplaces, clothes dryers, and gas appliances results in more and more air being drawn from the house until fresh air may be sucked in to the house down the furnace flue or fireplace chimney. Carbon monoxide can be the result. Carbon monoxide or "CO" is a colorless, odorless gas produced when fuel is not burned completely or when the flame does not receive sufficient oxygen. Automobiles, charcoal, wood fires and improperly vented or air-starved coal, oil and gas furnaces or other appliances can produce carbon monoxide.

Be aware of these air-starvation signals:

1. Headaches, nausea, dizziness.
2. Excessive humidity - heavily frosted windows, moist "clammy" sensation.
3. Fireplace smokes, won't draw.
4. Furnace flue backs up.

The high cost of energy for home heating has brought about new materials and methods used to construct or remodel most current homes. The improved construction and additional insulation has reduced the heat loss and made these homes much tighter around windows and doors so that infiltrated air is minimal. This creates a problem to supply combustion and ventilation air for gas-fired or other fuel burning appliances. Any use of appliances that pull air out of the house (clothes dryers, exhaust fans, fireplaces, etc.) increases this problem and appliances could be starving for air.

In addition, these energy measures mean that your home will retain more water vapor or a higher relative humidity.

Combustion & Ventilation Air (cont.)

AIR REQUIREMENTS

The requirements for providing air for combustion and ventilation are listed in the National Fuel Gas Code NFPA 54/ANSI Z223.1 (in Canada: CAN/CGA B149). Most homes will require that outside air be supplied to the furnace area by means of ventilation grilles or ducts connecting directly to the outside or spaces open to the outdoors such as attic or crawl space. The only exception is when the furnace area meets the requirements and definitions for an unconfined space with adequate air infiltration.

WARNING

**DANGER OF PROPERTY DAMAGE,
BODILY INJURY OR DEATH**
THE FURNACE AND ANY OTHER FUEL BURNING
APPLIANCE MUST BE PROVIDED WITH ENOUGH
FRESH AIR FOR PROPER COMBUSTION AND
VENTILATION OF FLUE GASES. MOST HOMES
WILL REQUIRE THAT OUTSIDE AIR BE SUPPLIED.

All air openings and connecting ducts must comply with the following:

IF THE FURNACE IS INSTALLED IN AN AREA WITH ANOTHER GAS APPLIANCE(S), THE TOTAL INPUT RATING OF ALL APPLIANCES MUST BE CONSIDERED WHEN DETERMINING THE FREE AREA REQUIREMENTS FOR COMBUSTION AND VENTILATION AIR OPENINGS.

Ducts must have the same cross-sectional area as the free area of the openings to which they connect.

The minimum dimension of rectangular air ducts must not be less than 3 inches.

LOUVERS / GRILLES AND SCREENS COVERING FREE AREA OPENINGS

If screen is used to cover opening(s), it must not be smaller than 1/4 inch mesh. Use the free area of a louver or grille to determine the size opening required to provide the free area specified. If the free area is not known, assume a 20% free area for wood and a 60% free area for metal louvers or grilles.

EXAMPLE 1. FURNACE LOCATED IN UNCONFINED SPACE.*

*An unconfined space must have a volume of a minimum 50 cubic feet per 1000 Btuh of total of all appliances in area. Adjoining rooms may be included only if there are no doors between the rooms, or if special provisions are made such as ventilation grilles installed between connecting rooms.

Fig 6, page 9 shows the minimum area in square feet, based on 8 foot ceiling heights, required for different Btuh input ratings.

A. If your furnace is in an open area (unconfined space*) the air that leaks through the cracks around doors and windows may be enough for combustion and ventila-

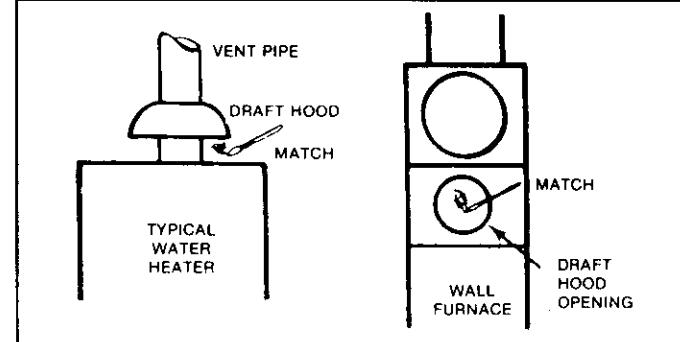
tion air. The doors should not fit tight. The cracks around windows should not be caulked or weather stripped.

To determine if infiltration air is adequate, perform the following checks:

1. Close all doors and windows. If you have a fireplace, start a fire and wait until flames are burning vigorously.

FIG. 4

DRAFT HOOD SPILLAGE



2. Turn on all exhausting devices, such as:
 - kitchen and bathroom exhaust fans
 - dryers (gas and electric)
3. Turn on all vented gas appliances, such as:
 - heating equipment (includes any room heaters)
 - water heaters
4. Wait ten (10) minutes for drafts to stabilize.
5. Check for draft hood spillage at each appliance. (Hold a lighted match 2 inches from draft opening. See Fig. 4.)

B. No Spillage

Match flame pulls toward draft hood – this indicates sufficient infiltration air:

1. Return exhausting devices and appliances to the condition you found them.

C. Draft Hood Spills

If there is spillage at a draft hood (match goes out or flame wavers away from draft hood):

1. Check for plugged flue connectors and chimneys. Check and repair stoppage and test again.
2. If you have a fireplace, open a window or door near the fireplace and then check for spillage.
 - a. If spillage stops, do not use the fireplace without a nearby window or door open until you can supply fresh air by a permanent duct.
3. If you have kitchen and bathroom exhaust fans, turn them off and check for spillage.
 - a. If spillage stops, do not use exhaust fans until you can supply fresh air by a permanent duct. Circuit breakers for fans should be turned off if possible.

Combustion & Ventilation Air (cont.)

WARNING

**DANGER OF PROPERTY DAMAGE,
BODILY INJURY OR DEATH**
DRAFT HOOD SPILLAGE, WITH UNOBSTRUCTED
VENTS, INDICATES THAT ADDITIONAL AIR MUST
BE BROUGHT INTO THE STRUCTURE FROM THE
OUTSIDE. KEEP A WINDOW OPEN (MINIMUM 2
INCHES) NEAR THE APPLIANCE UNTIL A PERMA-
NENT AIR DUCT IS INSTALLED.

4. Spillage means air starvation and a fresh air duct or air intakes must be installed to provide air directly to the furnace or other gas appliance.
- D. If spillage exists or when the furnace is in a building of tight construction where the windows and doors are weatherstripped, air for combustion and ventilation must be obtained from outdoors or space open to the outdoors.

Provide an opening(s) having a total free area of 1 sq. inch per 4000 Btu of the total of all appliances. The required area is shown in Fig. 9, page 10 under the column for (40,000).

FIG. 5

FRESH AIR DUCT

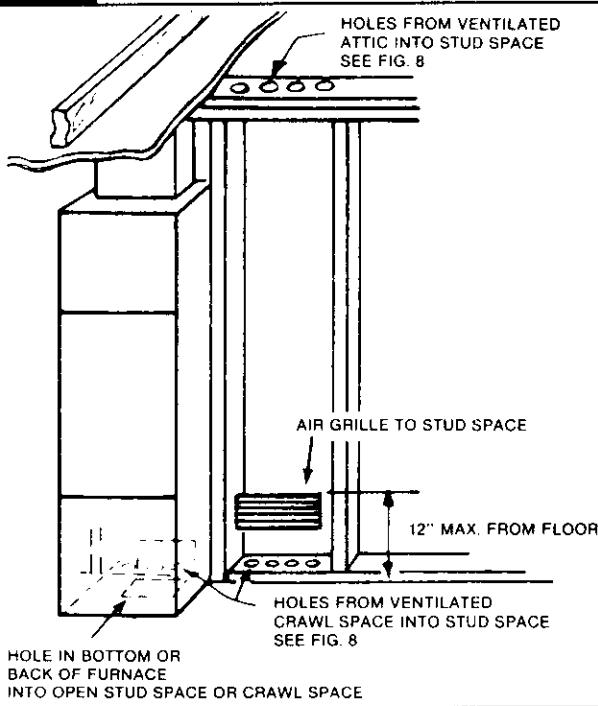


Fig. 5 shows a typical duct going into ventilated crawl space or attic.

1. Duct must terminate at a point not more than 1 foot above the floor.
2. Duct size must be at least 1 inch of free area for each 4000 Btu of input of all appliances in area.

EXAMPLE 2. FURNACE LOCATED IN CONFINED SPACE.

If furnace is installed in a confined space, it must be

provided with free air for proper combustion and ventilation of flue gases by one of the following methods.

A. All Air From Inside Building:

If the confined space adjoins an unconfined space as defined in EXAMPLE 1, provide two permanent openings, one within 12 inches of the top and one within 12 inches of the bottom of the room connecting directly to unconfined space. Each opening must have a free area of at least 100 square inches or 1 square inch per 1000 Btu combined input of appliances in one room if combined input exceeds 100,000 Btu.

WARNING

**DANGER OF PROPERTY DAMAGE,
BODILY INJURY OR DEATH**
THE ADJOINING UNCONFINED SPACE MUST
HAVE ADEQUATE AIR INFILTRATION AS DEFINED
IN EXAMPLE 1.

FOR EXAMPLE: Your furnace is rated at 50,000 Btu per hour. The water heater is rated at 30,000 Btu per hour. The total is 80,000 Btu per hour. You need two grilles, each with 100 square inches of free opening. Metal grilles have about 60% free area, so you need two metal grilles each with 160 square inches of louvered area.

Refer to Fig. 7, page 10, which shows grille installation.

Using the previous example, the two connecting rooms plus the closet must equal at least 500 sq. feet to handle the combined input 50,000 plus 30,000.

FIG. 6

MINIMUM AREA IN SQUARE FEET

4000 Btuh Per Square Inch Opening		Max. Btuh Input	*Unconfined Space Min. Area In Sq. Ft. 8' Ceiling Height
Round Duct	Rectangular Duct		
4" DIA.	3"x3" SQ.	30,000	188
4" DIA.	3"x3" SQ.	35,000	219
4" DIA.	3"x4" SQ.	40,000	250
4" DIA.	3"x4" SQ.	45,000	281
4" DIA.	3"x5" SQ.	50,000	312
4½" DIA.	3"x5" SQ.	60,000	375

*Can be two or more rooms joined by ventilation grilles.

B. All Air From Outdoors:

If confined space doesn't adjoin an unconfined space (defined in EXAMPLE 1) then air must be provided from outdoors or spaces open to outdoors such as attic or crawl spaces.

Provide two permanent openings, one within 12 inches of top, one within 12 inches of bottom of room connecting directly, or by using ducts, with the outdoors or areas open to outdoors.

If opening connects directly to, or within vertical ducts, the free area of each opening must be at least 1 square inch per 4000 Btu combined input of appliances in area.

Combustion & Ventilation Air (cont.)

If horizontal ducts are used, the free area of each opening must be at least 1 square inch per 2000 Btuh combined input of appliances in area.

FIG. 7

GRILLES CONNECTING ROOMS TO MAKE UNCONFINED SPACE

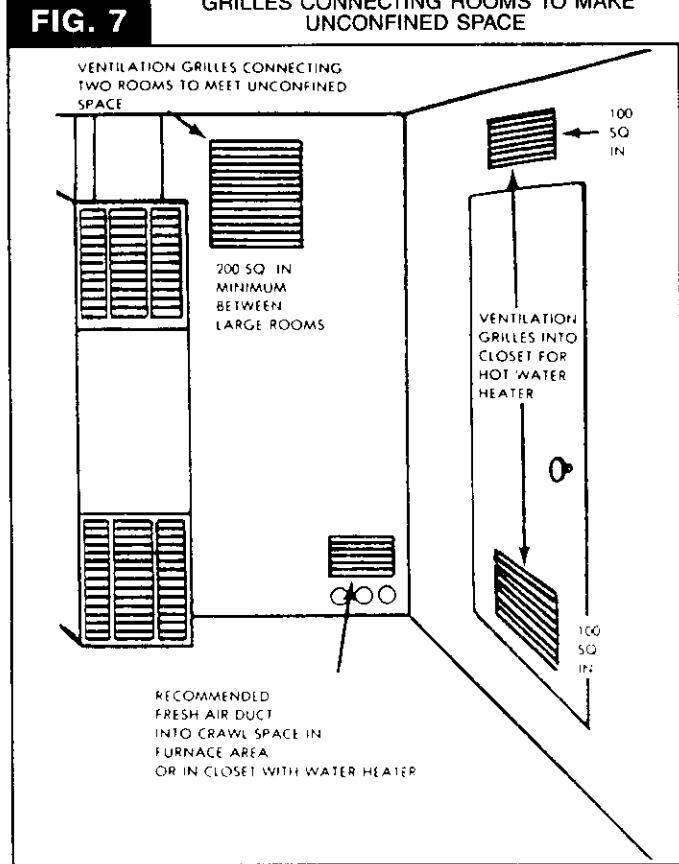
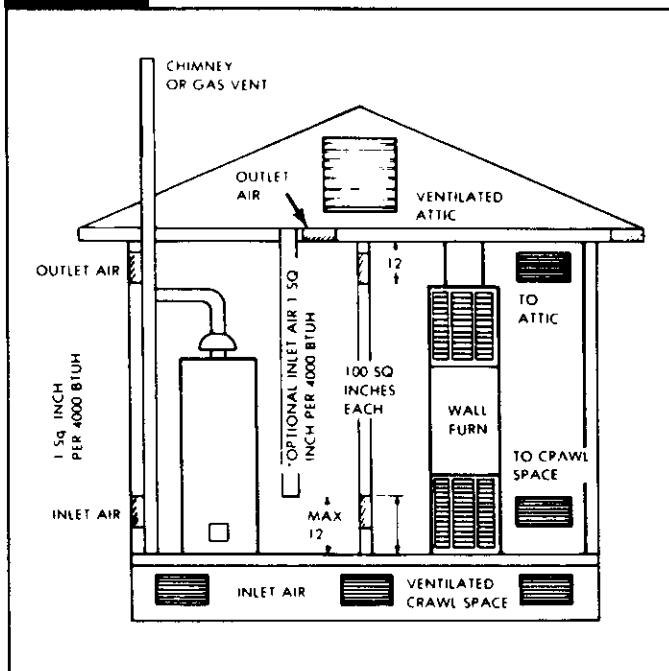


FIG. 8

AIR FROM OUTDOORS OR CRAWL SPACE



*Openings for inlet or outlet air should not be made into attic area if attic is equipped with a thermostat controlled power vent.

FIG. 9

FREE AREA IN SQ. INCHES - EACH OPENING (FURNACE ONLY) - BASED ON ONE SQ. INCH PER 4000 BTUH

Furnace Btu / Input	Sq. Inch of Opening	Req'd Number of Holes Sill or Header Plates		
		1½"	2"	3"
30,000	7.5	7	4	2
35,000	8.75	8	5	2
40,000	10.0	9	5	3
45,000	11.25	10	6	3
50,000	12.5	11	6	3
60,000	15.0	13	8	4

Recessed Mount Installation

FIND THE STUDS (See CAUTION on page 6)

Use a stud locator or small finishing nails. Repeatedly drive and remove a nail into the wall in the area of the stud until it is located. Then find the inside edge of the stud. Leave the nail at this location.

The other stud should be about 14-1/2 inches from the one found. Drive finishing nails on the insides of this stud. Draw wall cut out to required size as shown in Fig. 13, page 12. If wall studs are not on 16 inch centers see "CLOSE OFF STUD SPACE," Fig. 12, page 12.

CUT WALL OPENING

Provide an opening as shown in Fig. 10, page 11. Work from the top in the attic to cut away the ceiling plate.

ATTACH HEADER PLATE

MODELS: 5508331; 5508332; 6508731; 6508732

Locate header plate (Fig. 10, page 11) between wall studs at 88½ inches from finished floor and nail into position with end flanges pointing up.

Recessed Mount Installation (cont.)

See Fig. 10.

MODELS: 5008731; 5008732

Locate header plate between wall studs at 82½ inches from finished floor and nail into position with end flanges pointing up.

MODELS: 3508331; 3508332; 3508731; 3508732

Locate header plate between wall studs at 74 inches from finished floor and nail into position with end flanges pointing up.

ALL MODELS

Hole for electrical conduit is located on left side of header plate as you face the wall.

WARNING

REMOVE 4x14 FIBERGLASS GASKET FROM BOTTOM OF HEADER PLATE AND DISCARD. THIS GASKET IS NOT USED WHEN THE FURNACE IS RECESSED IN THE WALL.

GAS SUPPLY OPENING

A hole must be drilled for the gas line supply.

Decide whether the gas line will come through the floor or wall stud.

NOTE

If a pre-existing gas piping stub location is not compatible with hole or knock-out provided in furnace, you may make an alternate entry hole in furnace back wall per Fig. 13, page 12.

CAUTION

Be careful not to damage any furnace components while making any alternate hole.

Locate and drill one (1) 1-1/2 inch hole at selected locations per Fig. 11 and Fig. 13, page 12 or Fig. 14, page 13.

Gas line can be run at this time or done after furnace is mounted, see section GAS SUPPLY AND PIPING, page 17.

FIG. 10

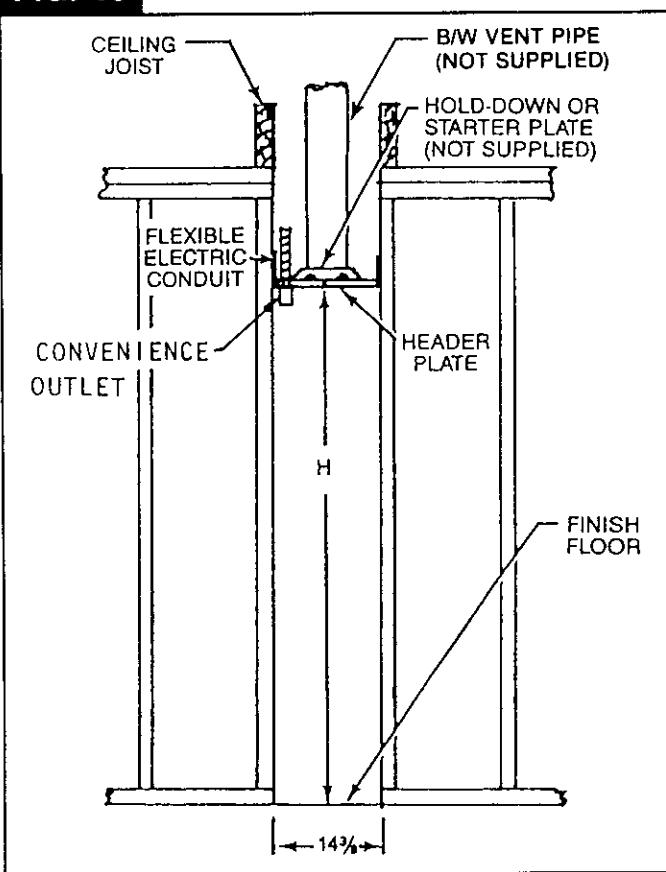
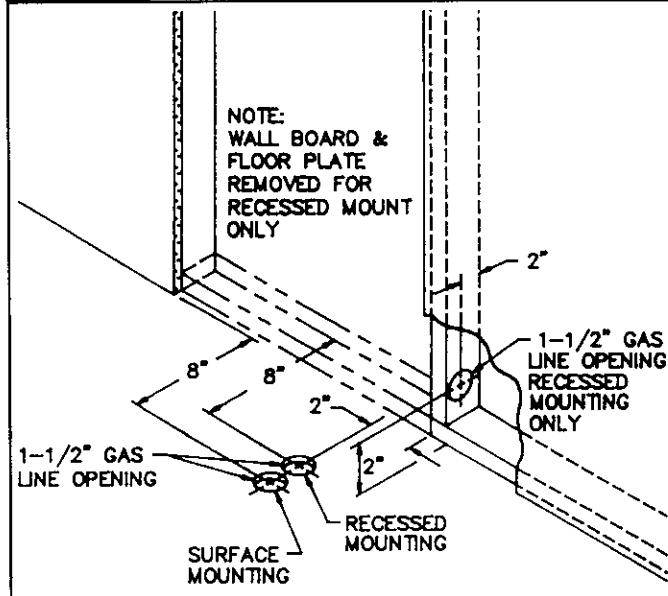


FIG. 11



CLOSE OFF STUD SPACE (If Required)

If studs are not on 16 inch centers, cut the hole for the furnace next to an existing stud and frame in the other side using a 2 x 4 and spacer blocks as required. See Fig. 12, page 12.

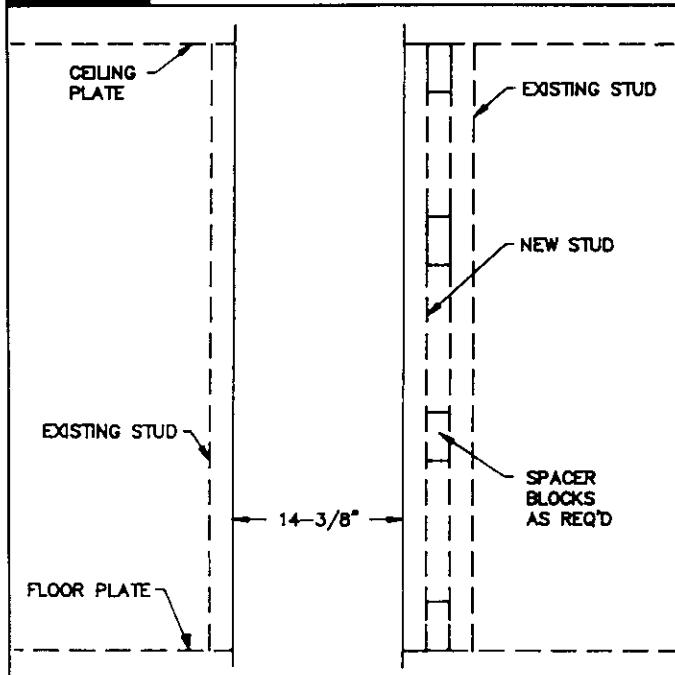
ELECTRICAL SUPPLY ROUGH-IN

Run the electrical supply with the ground wire and thermostat cable into stud space above furnace location.

Recessed Mount Installation (cont.)

FIG. 12

CLOSE OFF STUD SPACE (If Required)



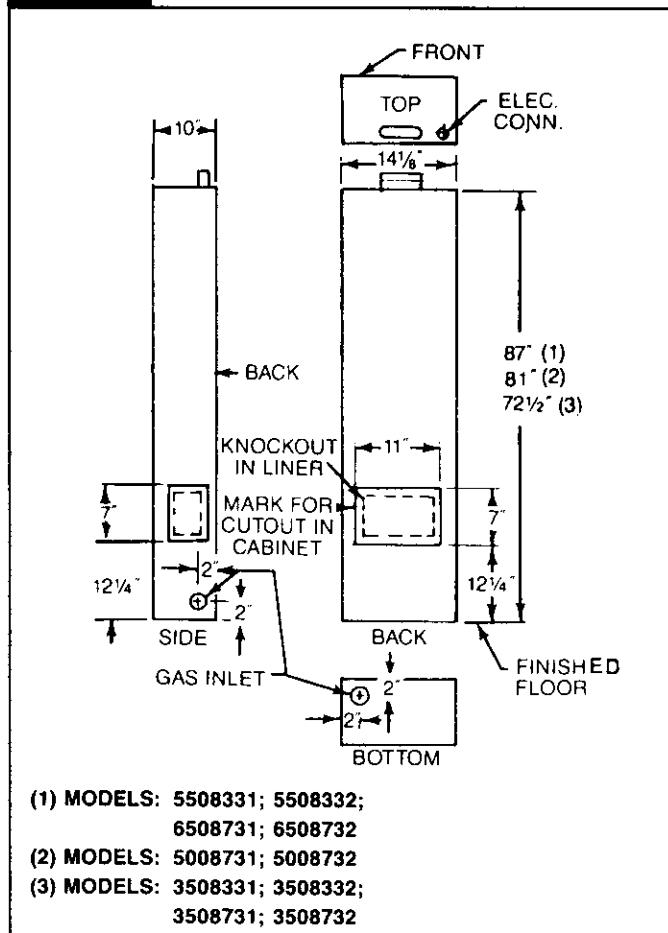
If desired, the power supply and thermostat cable can come into the wall stud space from a basement, crawl space or an adjoining stud space.

Terminate flexible electrical conduit at the junction box located on the underside of the header plate. Leave the wires long enough to connect inside the junction box to the convenience outlet.

CAUTION

Do not run wire behind flanges of header plate or in any location where it might be damaged. Avoid splicing thermostat wire unless the spliced wires are properly cleaned, soldered and taped.

FIG. 13



Surface Mount Installation

FIND THE STUDS AND CEILING JOISTS (See CAUTION on page 6)

Find two studs at spot where furnace is to be placed. Use a stud indicator 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.

Inside edge of the other stud should be about 14-1/2 inches from the one found. Drive finishing nail on inside edge of this stud.

Using the nails as a guide, draw a line up both sides to the ceiling to locate hole cut out for vent pipe and electrical connections.

CUT CEILING OPENING

Mark off and cut 3-1/2 x 12 inch rectangular hole in ceiling, centered between wall studs. The back edge of the opening should be about 1/8 inch from the wall. See Fig. 16, page 14.

ELECTRICAL SUPPLY ROUGH-IN

The electrical supply openings must be made in the wall or ceiling above furnace to match holes in furnace top. Holes in furnace top are 1 inch from the left side of furnace. See Fig. 13.

If desired, the power supply and thermostat cable can come into the wall stud space from a basement, crawl space or an adjoining stud space.

Surface Mount Installation (cont.)

At selected location, drill a 1 inch hole for 115V power supply and a 1/2 inch hole for the thermostat cable.

Run wiring through holes to above furnace top leaving enough excess wire to make electrical connections after mounting furnace.

CAUTION

Be careful not to damage any furnace components while making any alternate hole.

CAUTION

To avoid damage to wiring, be sure to route wire away from path of furnace vent.

GAS SUPPLY OPENING

A hole may need to be drilled for the gas line supply.

Decide whether the gas line will come through the floor or wall.

NOTE

If you decide to route gas line through right side of furnace, simply remove the knock-out provided in furnace side.

NOTE

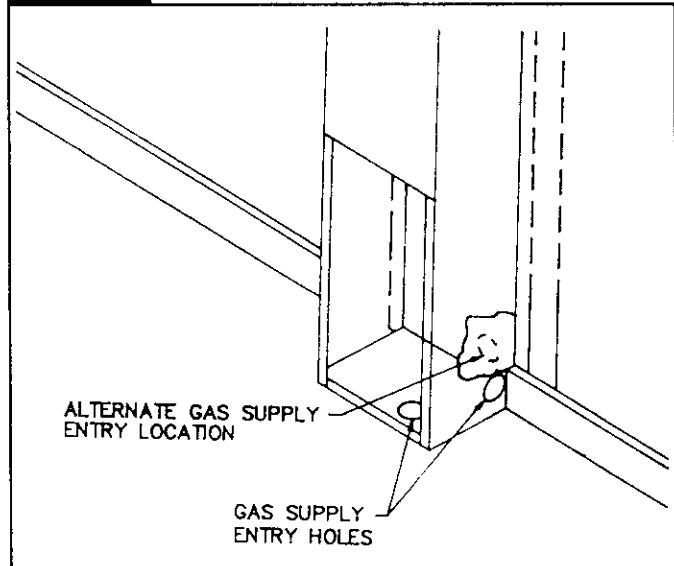
If a pre-existing gas piping stub location is not compatible with hole or knock-out provided in furnace, you may make an alternate entry hole in furnace back wall per Fig. 14.

Locate and drill one (1) 1-1/2 inch hole at selected location per Fig. 11, page 11; Fig. 13, page 12; or Fig. 14.

Gas line can be run at this time or done after the furnace is mounted, see section CONNECTING GAS LINE.

FIG. 14

ALTERNATE GAS SUPPLY OPENING



General Vent Installation

The vent installation must comply with all local codes and ordinances. If in doubt, consult your local codes or inspector.

The furnace vent must be directed to the outdoors so that harmful combustion gases will not collect inside the building.

This furnace must not be connected to a chimney flue serving a separate solid-fuel burning appliance.

Use U.L. listed B/W Vent Kit 9901. You must provide other items, not contained in kit, necessary to complete your specific venting situation through the roof. Refer to typical venting system shown in Fig. 18, page 15.

Type B/W gas vent shall extend from the header plate of the vented wall furnace to a point above the highest ceiling plate within a stud space through which the vent passes, without any offsets or crossovers therein. After a type B/W gas vent passes through the highest ceiling plate within a stud space above the furnace which it

serves, the vent system may be completed with a type B gas vent, of the same manufacturer, and offsets or breakovers shall not be greater than 45 degrees from vertical.

NOTE

The B/W vent must extend through the ceiling and roof terminating at least 12 feet above the finished floor on which the furnace rests.

First vent pipe offset (if required) is recommended not to be any closer than 2'-0" from header plate.

ATTACH HEADER & HOLD-DOWN PLATE (SURFACE MOUNT)

Remove the fiberglass flue collar from the furnace flue extension. This gasket is not used when the furnace is surface mounted.

Make sure that the 4 x 4 inch gasket is in position on the header plate.

General Vent Installation (cont.)

Discard the three (3) square gaskets, as they are not used when furnace is surface mounted.

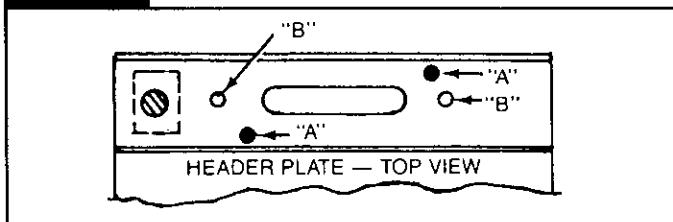
Slide header plate over the furnace flue extension with the junction box entering the opening in top of furnace.

Refer to Fig. 15.

Fasten to matching holes in the furnace top through holes "A" in the header plate, using two (2) #8 x 3/8 inch screws provided.

Fasten the hold-down plate or starter plate to the top of the header plate using holes "B" in the header plate.

FIG. 15



ALL MODELS

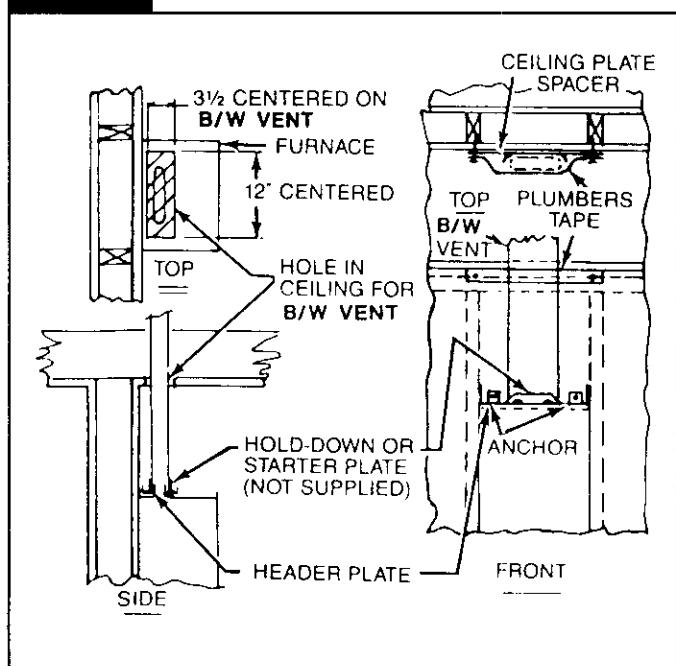
ATTACH HOLD-DOWN PLATE (RECESSED MOUNT)

NOTE

Header plate should already be attached to wall studs. See ATTACH HEADER PLATE, page 10 and 11.

Fasten hold-down plate to top of header plate using two (2) screws provided.

FIG. 16



INSTALL CEILING PLATE SPACERS (SURFACE MOUNT)

Refer to Fig. 16.

Only one (1) plate spacer is required for surface mounting within a single story dwelling.

Cut 2 inches off each end of plate spacer.

Drill two (2) 3/16 inch holes in each end of plate spacer. See Fig. 18, page 15.

Fasten plate spacer to wall by nailing through one (1) drilled hole in each end, into the wall board and ceiling plate.

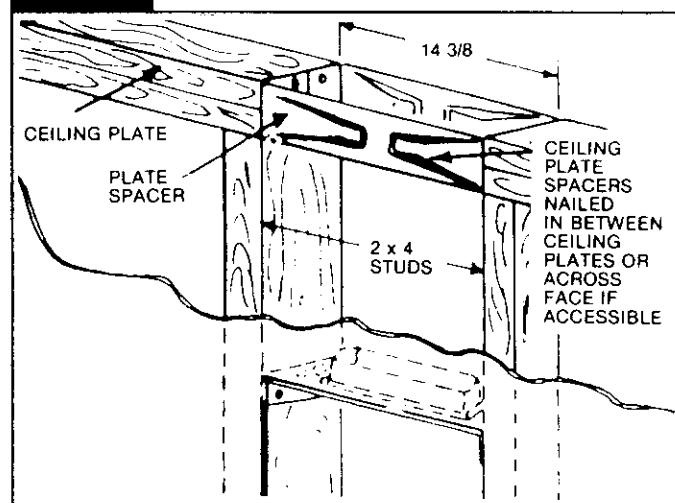
INSTALL CEILING PLATE SPACER (RECESSED MOUNT)

Refer to Fig. 17.

Two ceiling plate spacers are in the B/W vent kit. They must be fastened along each long edge of the ceiling hole to hold the oval vent pipe in the center of the hole.

Nail the ceiling plate spacers either across or in between the cut out section of ceiling plate. If nailed between, ends must be bent at 90 degrees.

FIG. 17 CEILING PLATE SPACERS - RECESSED MOUNT



INSTALL SURFACE VENT (SURFACE MOUNT)

NOTE

For surface mounting, it will be helpful to complete the gas piping supply to the furnace before installing the vent pipe. See section GAS SUPPLY & PIPING, page 17.

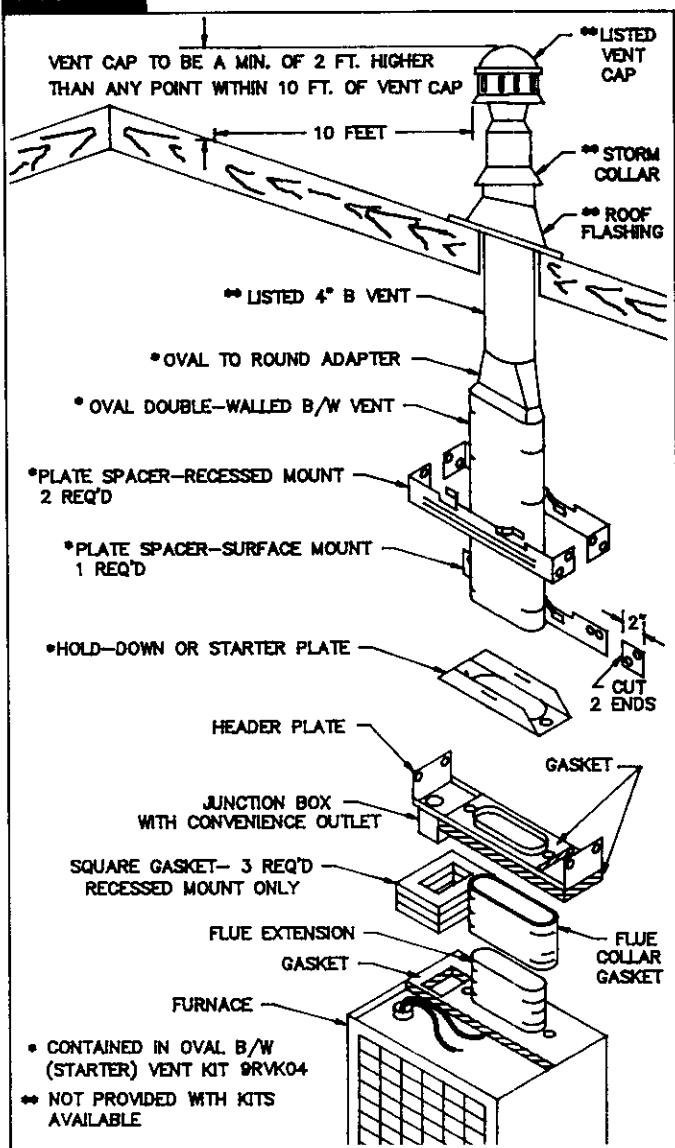
Carefully move the furnace into position under the ceiling cutout.

Insert first lengths of oval, double wall vent pipe up through the ceiling cutout.

General Vent Installation (cont.)

FIG. 18

TYPICAL VENT INSTALLATION



Lower vent pipe to the hold-down plate. Push the vent pipe into the hold-down plate until it is completely seated. (Hold-down cleats will engage the groove in the vent pipe.)

Secure hold-down plate to vent pipe using two (2) screws.

Using plumbers tape to secure vent to the plate spacer, nail through one (1) hole in each end of plate spacer, into the wall and ceiling plate.

INSTALL FURNACE VENT (RECESSED MOUNT)

Lower first lengths of oval, double wall vent pipe through the plate spacers to the hold-down plate.

Push the vent pipe into the hold-down plate until it is completely seated. (Hold-down cleat will engage the groove in the vent pipe.)

Secure hold-down plate to vent pipe using two (2) screws.

COMPLETE THE VENTING

Refer to Fig. 18.

Install oval to round adapter. Complete the piping extending it through the roof. Use 4" round, double wall (Type B) vent pipe, roof flashing, storm collar, and vent top as shown. The vent cap must be at least 2 feet higher than any point that is within 10 feet horizontally of the vent cap. There must be at least 1 inch clearance between the vent pipe and any combustible material.

IMPORTANT

Area above header within the stud space MUST be kept clear of any attic insulation to allow the free circulation of air around oval vent piping.

Mounting Your Furnace

To obtain adequate clearance for fastening furnace or to install gas supply fittings, it may be necessary to remove the burner and control assembly as follows:

Remove burner compartment door by pulling door top out and up.

Locate the air discharge shield. It is secured across the top of the burner control compartment. Remove two (2) screws and shield and set aside.

DISCONNECT WIRING

MODELS 3508331; 3508332; 5508331; 5508332

Remove the screws holding the ignition control unit and cover to the furnace casing.

Disconnect wires to free control module from its mounting location. Mark or tag each wire removed for its exact reconnection. See Fig. 19, page 16.

ALL OTHER MODELS

Disconnect two (2) 24 volt wires from the gas valve. Disconnect two (2) wire connectors from junction block midway on the thermocouple.

REMOVE BURNER AND CONTROLS

MODELS: 3508331; 3508332; 3508731; 3508732

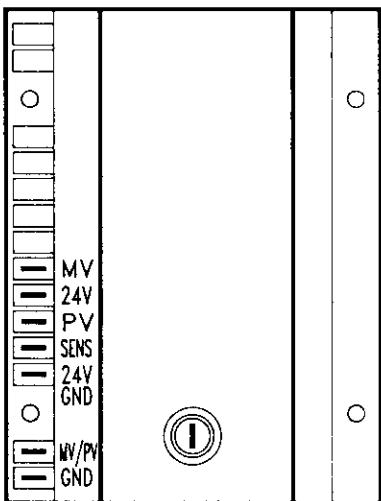
Locate the burner and screws that secure it. Remove the two (2) screws (one from each end). Lift one end of the burner at a time until free. Remove burner and controls from the compartment.

ALL OTHER MODELS

Locate the burner and hex nuts that secure it. Remove the two (2) hex nuts (one from each end). Flip up the wire hinges. Lift one end of burner at a time until free. Remove burner and controls from the compartment.

Mounting Your Furnace (cont.)

FIG. 19



WILLIAMS IGNITION CONTROL
PART NUMBER P321910

LA707-01.DWG

POSITION FURNACE (RECESSED MOUNT ONLY)

NOTE

If your furnace is surface mounted, your mounting was started during VENT INSTALLATION, page 13. To complete furnace mounting, go on to FASTEN FURNACE BOTTOM on this page.

ALL MODELS

Make sure that the flue collar gasket, Fig. 18, page 15, is in place over the flue extension. Check to see if header plate gaskets are in place.

Hold the furnace at a slight angle (top closer to the wall than bottom) with the flue extension centered under the oval hole in the header plate.

NOTE

Electrical wiring should already be routed to the header plate. If not, see sections on ELECTRICAL SUPPLY ROUGH-IN, page 12.

Place three (3) square gaskets over the junction box. See Fig. 18, page 15.

ALL MODELS

Lift furnace up so that the flue extension enters the oval hole in the header plate.

Straighten the furnace by pushing furnace bottom into the stud space.

IMPORTANT

AFTER FURNACE HAS BEEN PLACED IN POSITION, MAKE SURE THE GASKETS ARE PRESSING AGAINST THE FURNACE TOP TO ELIMINATE AIR LEAKS.

FASTEN FURNACE BOTTOM (SURFACE AND RECESSED MOUNT)

NOTE

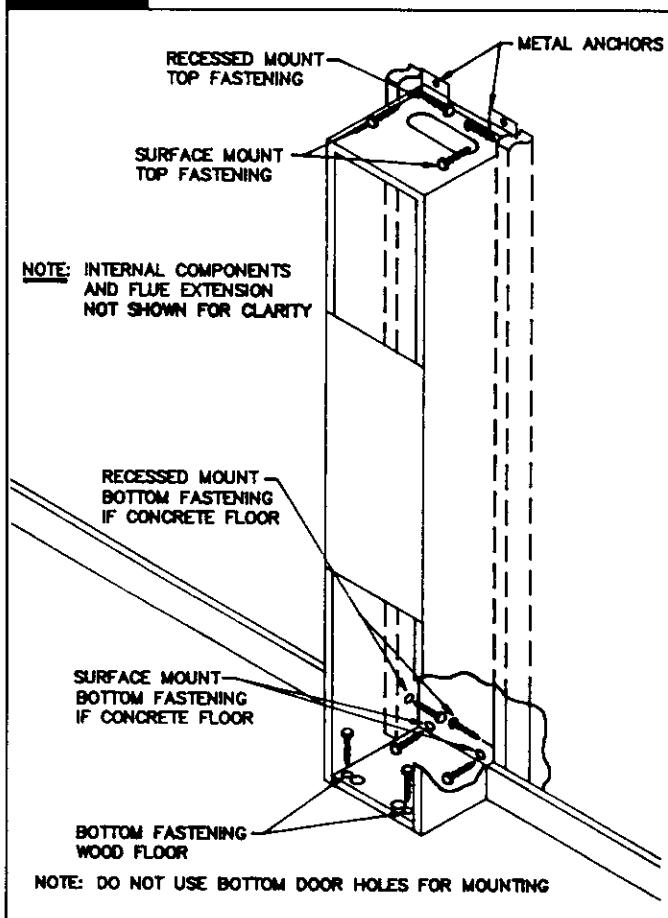
Fasteners are not furnished because of different requirements of various types of wall construction.

Fasten furnace to floor through holes provided in furnace bottom. If you have concrete flooring, use an alternate fastening method. See Fig. 20.

If burner and control assembly were removed, replace them by reversing "DISCONNECT WIRING" and "REMOVE BURNER AND CONTROLS" sections on page 15.

FIG. 20

FURNACE MOUNTING



Mounting Your Furnace (cont.)

IMPORTANT

TO PREVENT DAMAGE TO WIRING, MAKE SURE NOT TO PINCH THE WIRES BETWEEN FURNACE COMPONENTS. KEEP THEM ROUTED AWAY FROM THE BURNER.

Resecure the air discharge shield across the top of the burner and controls compartment. Small leg of "L" shape must be positioned toward floor, pointing away from front of furnace.

FASTEN FURNACE TOP (SURFACE MOUNTING)

Fasten furnace top to wall using two (2) metal anchors (packed in plastic bag with thermostat) by placing them

over the back flange of furnace top and screwing to wall. See Fig. 20, page 16.

FASTEN FURNACE TOP (RECESSED MOUNTING)

Fasten furnace top by drilling two (2) holes through the side flanges of furnace top and securing with two (2) screws or nails into the wall studs. See Fig. 20, page 16.

CAUTION

Be careful not to damage furnace components or wiring when drilling holes.

Gas Supply and Piping

Gas control valve, within the furnace, is shipped with a seal over gas inlet tapping. Do not remove 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 CAN NOT 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" water 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 pressure 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 10.5 inches water column for L.P. Gas. See page 32 for operation above 2000 feet altitude. Orifice change may be required to suit gas supplied. Check with your local gas supplier.

ORIFICE SIZES

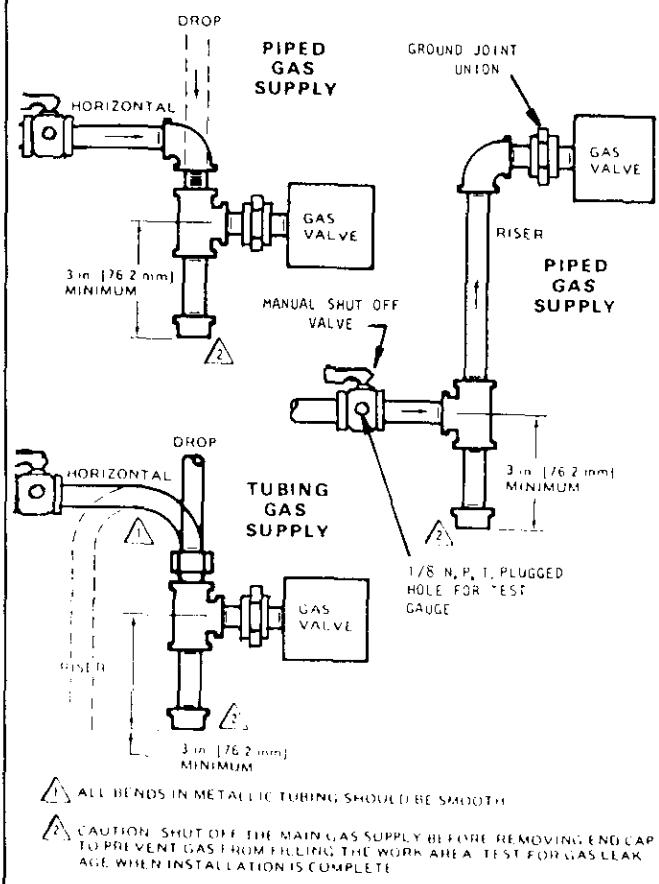
Furnace Technical Information, page 32, shows the correct orifice sizes for the different input ratings when using Natural or L.P. Gas.

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.

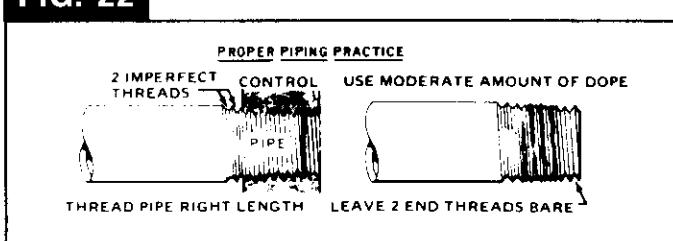
Determine the minimum pipe size from Fig. 23, page 18, basing the length of the run from the gas meter or source to the unit.

FIG. 21



Gas Supply and Piping (cont.)

FIG. 22



All piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1), whichever applies. In Canada: Follow CAN 1-B149 Installation Code.

Refer to Fig. 21, page 17, 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 LP Gas installation, use compound resistant to action of liquified 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.
6. Provide a 1/8 NPT test gauge connection immediately before the gas supply connection to the furnace.

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 manual shutoff 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. Drip leg and ground joint union are still required.

Tighten all joints securely.

CHECKING THE GAS PIPING

Test all piping for leaks. When checking gas piping to the furnace with gas pressure 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 soapsuds (or a liquid detergent) to each joint. Bubbles forming indicates a leak. Correct even the slightest leak at once.

FIG. 23

GAS PIPE SIZES			
NATURAL GAS			
PIPE CAPACITY - BTU PER HOUR (INCLUDES FITTINGS)			
PIPE SIZE	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)			
PIPE SIZE	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

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.) 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 STARTUP OF UNIT BEFORE THOROUGHLY VENTILATING AREA.

Electrical Wiring

All electrical work must conform to your local codes and ordinances or in their absence, with National Electrical Code, ANSI/NFPA 70. If you are not familiar with wiring codes, in general, have a competent electrician do this job. In Canada: Follow C22.1, Canadian Electrical Code.

ELECTRICAL CONNECTION

REMOVE FAN SHROUD

Take out four screws holding fan shroud to side flanges of cabinet and remove shroud. See Fig. 1, page 5.

WARNING

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

**TURN OFF ELECTRIC POWER AT FUSE BOX
OR SERVICE PANEL BEFORE MAKING ANY
ELECTRICAL CONNECTIONS.**

INSULATE WHERE NECESSARY.

**ALL LINE VOLTAGE AND GROUND CONNEC-
TIONS MUST BE COMPLETED BEFORE
ELECTRICAL POWER IS RESTORED.**

ELECTRICAL POWER SUPPLY

A branch circuit including this furnace must not exceed 15 Amperes, or run a separate 115V, 60 Hz, 15 Ampere circuit from a separate circuit breaker or fuse in your service entrance panel to the furnace junction box. Do not run supply wires inside the furnace cabinet, except from the top of cabinet down to junction box.

JUNCTION BOX

CAUTION

Be careful not to damage the fan blade when making the 115V connection to the convenience outlet.

115V supply wiring connection is made within the upper left corner of the furnace cabinet.

Locate 115V plug and push into the convenience outlet attached to the bottom of header plate. (It protrudes through the rectangular opening in the furnace top.)

ALL MODELS

Reinstall fan shroud to furnace front. Slots in fan shroud allow up/down adjustment. Make sure the fan blade spins freely. Tighten screws securely.

Replace top front panel and secure with thumbscrew.

Refer to paragraph covering GAS AND ELECTRICAL SUPPLY OPENINGS, page 13. Follow Wiring Diagrams, pages 37 or 38.

If you have any doubt regarding electrical hookup, or compliance with code or ordinance, consult your electrical inspector or a licensed electrician.

GROUNDING

A ground lug is installed for the ground connection. Use a copper conductor (#14 AWG) from the unit to a grounded connection in the electric service panel or a properly driven and electrically grounded ground rod.

LOW VOLTAGE CONNECTIONS

CAUTION

The Heat Anticipator WILL BURN OUT if 24 volts are applied directly to thermostat by shorting out the gas valve or primary control during testing or by incorrect wiring.

WALL THERMOSTAT WIRING

Run thermostat wire to the furnace.

Avoid splicing thermostat wire unless the spliced wires are properly cleaned, soldered and taped.

Connect thermostat to two wires marked "Thermostat" extending from top of furnace, using two wire nuts provided. See Wiring Diagrams, pages 37 or 38.

CAUTION

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

COMPLETE WIRING DIAGRAMS ON PAGES 37 AND 38.

Thermostat Installation

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. Refer to Fig. 24.
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 wall until even with thermostat location.
6. Snag thermostat cable through hole and pull cable through hole in wall so that 6 inches of cable protrudes.
7. Route cable to wall furnace.

MOUNTING THE THERMOSTAT

1. To remove thermostat cover, squeeze both sides and lift. See Fig. 25.
2. Connect thermostat wires to the terminal screws on the 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.

THERMOSTAT HEAT ANTICIPATOR

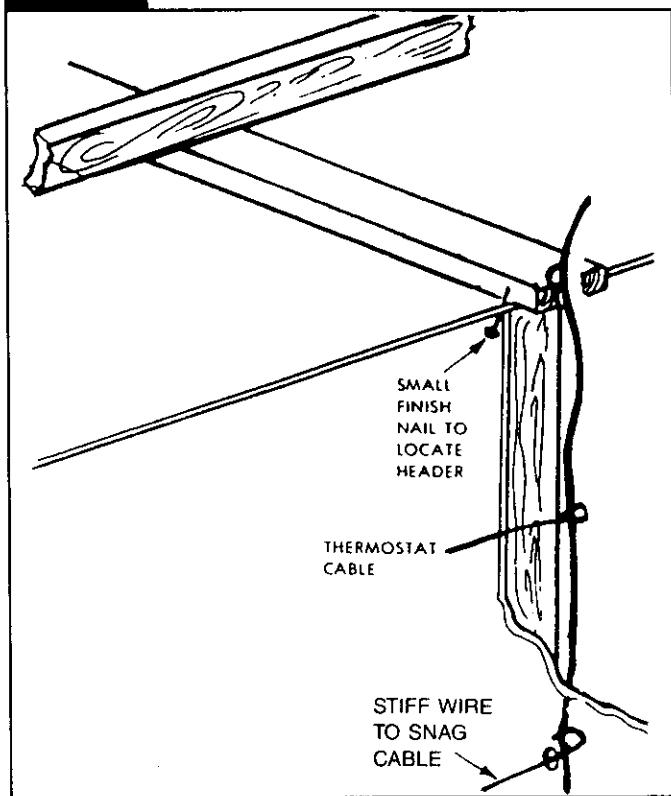
SET THE THERMOSTAT HEAT ANTICIPATOR

A simple method of setting the heat anticipator in a 24-volt thermostat (without an A.C. ammeter) is to first read the label on the gas control valve and match its rating.

Example: If the ampere draw for the valve is .5 amps, set thermostat heat anticipator at the same setting (.5). (Fig. 26, page 21.)

FIG. 24

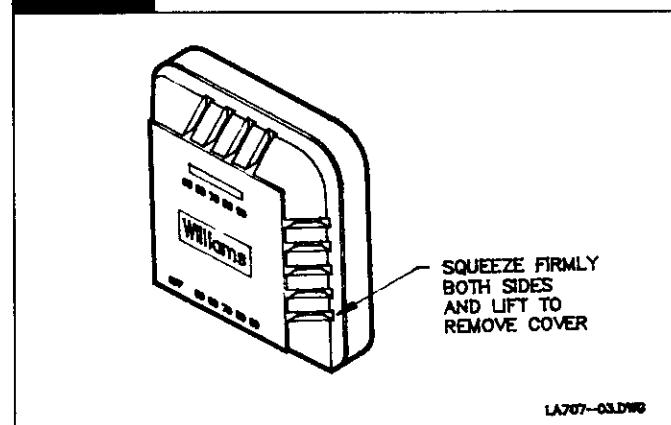
ROUTE THERMOSTAT CABLE



ADJUST THERMOSTAT ANTICIPATOR

Many factors affect this setting — room size, length of thermostat wire, thermostat location, etc. Additional small adjustments to increase or decrease heating cycles (4-6 per hour typical) may be required. If an amp meter is available, see instructions supplied with thermostat.

FIG. 25

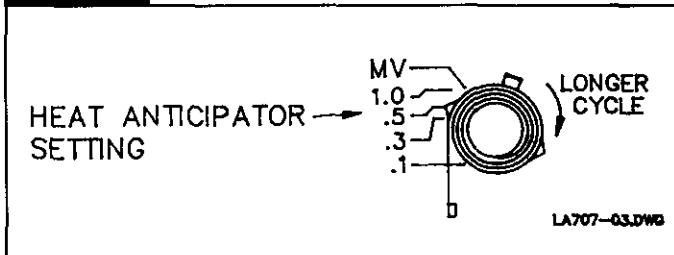


NOTE

Use heavier wire size if more than 20 ft. of wire is required.

Thermostat Installation (Con't)

FIG. 26



For longer "ON" time, move anticipator clockwise.
For shorter "ON" time, move anticipator counterclockwise.

NOTE

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

When all is adjusted properly, the furnace burner should shut off slightly before the desired room temperature is reached. The stored heat in the appliance is enough to bring room temperature up to desired level. The heat anticipator thus makes it possible to maintain very close temperature control.

Optional Accessory Installation

SIDE OUTLET NO. 6701

REAR OUTLET NO. 6801

SHORT REAR OUTLET NO. 6802

CAUTION

Use only Boots and Grilles provided by the manufacturer.

CLEARANCES

IMPORTANT

Carefully follow all measurements and clearances given to ensure proper installation.

When SIDE OUTLET 6701 is used, the furnace casing must be exactly 4 inches from an adjacent side wall (except may be 3/4" minimum when 1-WAY FRONT DIFFUSING GRILLE is used). See Figs. 28 and 29, page 22.

When REAR OUTLET 6801 or SHORT REAR OUTLET 6802 are used, the furnace casing must be a minimum of 12 inches from an adjacent side wall. See Figs. 3D and 3F, page 7.

CUT CASING OPENING(S)

Before setting the furnace into position, cut a 5 x 7 inch rectangular opening for Side Register, or 7 x 11 inch opening for a Rear Outlet Register where marked on the furnace casing. Cut carefully as edges must be straight and smooth. See Fig. 13, page 12.

CUT WALL OPENING(S)

Make an opening(s) in the wall(s) for a Side and/or a Rear Outlet Register. See Fig. 27.

FIG. 27

CUT WALL OPENING

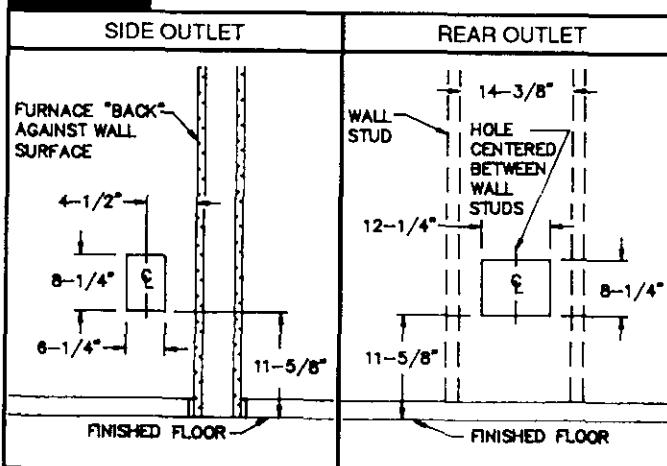
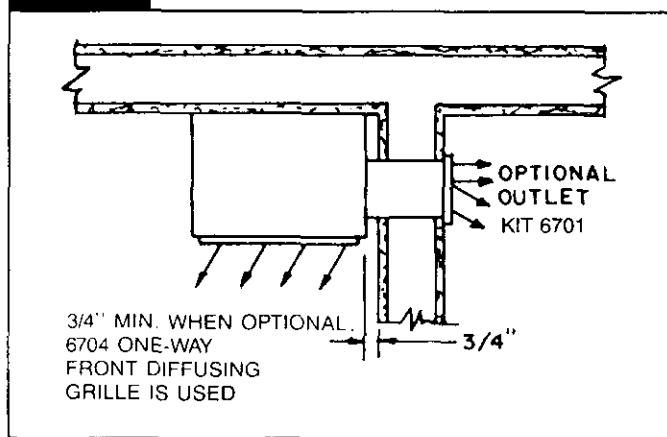


FIG. 28



Optional Accessory Installation (cont.)

INSTALL PLASTERGROUNDS

Install Plastergrounds as shown in Figs. 29 and 30. Flanges of Plastergrounds extend the normal thickness of plaster. If "DRYWALL" or other thin material, flanges must be trimmed off flush with wall surface.

FIG. 29

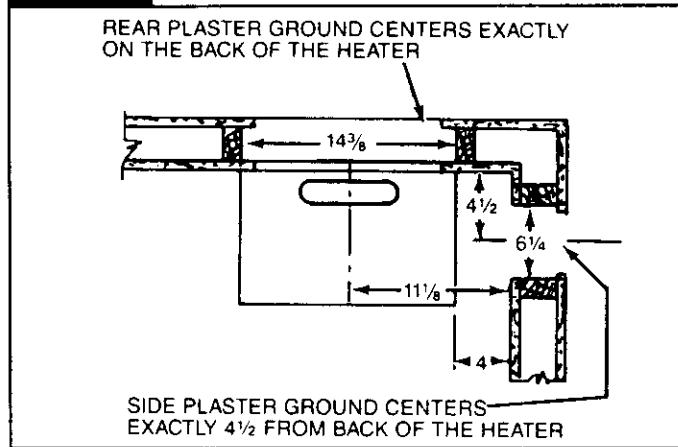
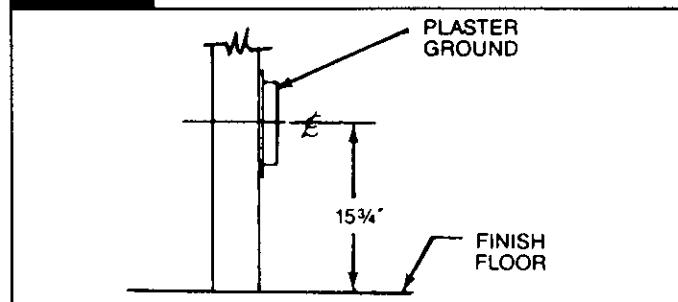


FIG. 30



MOUNTING

Refer to Fig. 31.

BEFORE placing the furnace into position, place Out Boot against the furnace casing with inside of flanges exactly on edges of hole in casing. Mark hole locations on casing through the holes in Out Boot flanges.

Drill #33 holes in casing at marked locations.

Remove knockout plate and knockouts for screws from Inner Liner.

SIDE REGISTER ONLY

Secure a 1 x 1 wood strip (not included in this kit) to wall surface next to side outlet as a backup for metal filler strips.

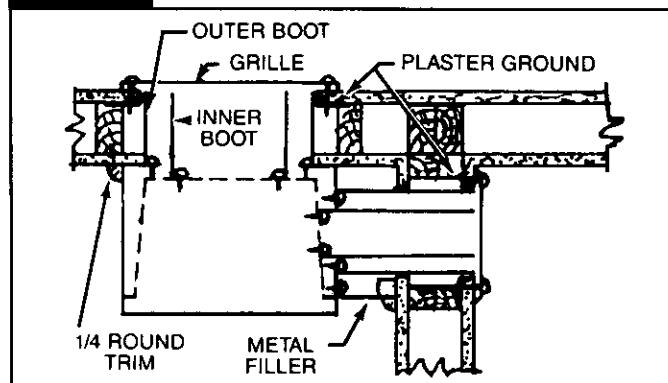
Fasten metal filler strips to side of furnace casing with front surface exactly opposite front of wood backup strip.

SIDE AND REAR OUTLET REGISTERS

Place furnace in position.

With furnace in position, pass Outer Boot through Plastergrounds, holding it firmly against furnace casing. Mark and cut off the end of the Outer Boot flush with the wall surface.

FIG. 31



Press Inner Boot against furnace Inner Liner, mark and cut off flush with the wall surface.

Fasten Outer Boot securely to furnace casing with screws provided.

SIDE OUTLET ONLY

Position Inner Boot against furnace Inner Liner and fasten securely through all holes with screws provided.

REAR OUTLET ONLY

Place Inner Boot in position and fasten with screws along the top and bottom edges only. Place Damper Assembly inside Inner Boot and fasten with one (1) screw on each side. Thread chain through key hole in clip on Outer Grille and attach the Bell end.

SIDE AND REAR OUTLETS

Place Outlet Grille into position, drill through the wall material and Plasterground with a #33 drill bit, using the holes in grille as a template and secure with screws provided.

VENT ENCLOSURE KIT INSTALLATION (SURFACE MOUNT ONLY)

Refer to Fig. 32, page 23.

Cut Side Panels to fit between the top of furnace casing and ceiling.

Fasten Side Panels to wall parallel to furnace casing sides.

Cut Front Panel height to fit. Note that the bottom edge of Front Panel is notched to fit into the furnace casing recess.

Fasten Front Panel to Side Panels with screws provided.

SIDE CASING GRILLE KIT NO. 6702

See clearances Fig. 33, page 23.

Locate marked opening(s) on furnace casing. Mark and cut an opening 1 inch wider than opening already marked (1/2 inch larger on all four sides). See Fig. 13, page 12.

Remove knockout plate and knockouts for screws from furnace inner liner.

Optional Accessory Installation (cont.)

Fasten Boot to Inner Liner with screws provided.

Using holes in grille as a template, drill two (2) #33 holes in out casing and fasten securely with screws provided.

FIG. 32

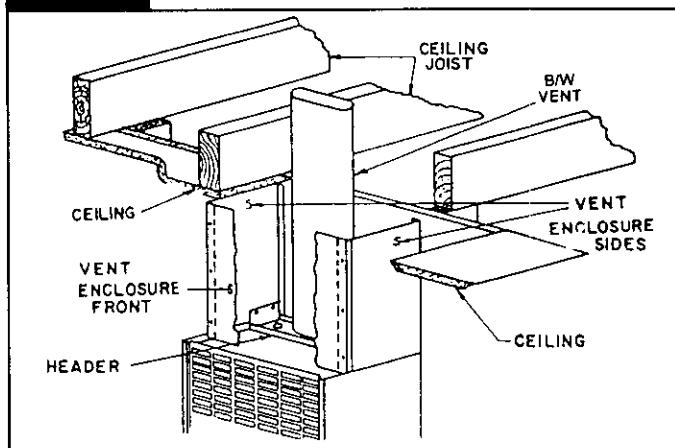
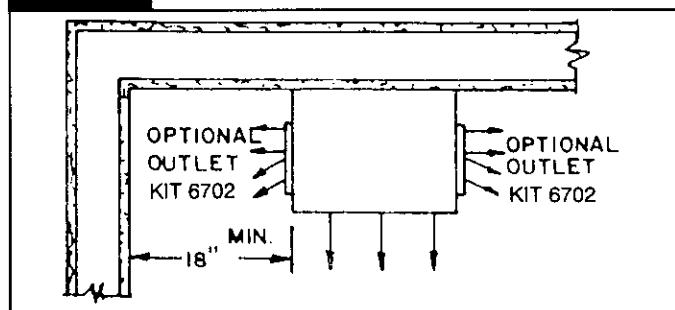


FIG. 33



2-WAY FRONT DIFFUSING GRILLE KIT NO. 6703

Refer to Fig. 34.

CAUTION

For use only in conjunction with a front outlet when the furnace is spaced at least 12 inches from an intersection wall (see Fig. 35).

Metal clips on backside of grille snap into side louvers of front warm air outlet. Adjust clips with pliers if necessary. Grille may also be attached with sheet metal screws.

1-WAY FRONT DIFFUSING GRILLE KIT NO. 6704

Follow instructions for 2-WAY FRONT DIFFUSING GRILLE 6703 above, except furnace clearance to an adjacent wall must be 3/4 inch minimum. See Fig. 28, page 21.

TRIM STRIP KIT NO. 4701

When desired, optional Trim Strip Kit may be used to cover the crack between furnace and wall. See Figs. 36 and 37. Place strips tight against furnace with other edge against wall surface and fasten to wall with escutcheon pins provided. Cut off trim strips to fit each furnace as required.

NOTE

Quarter-round wood molding may be used for trim if desired, which may be painted to match the wall.

FIG. 34

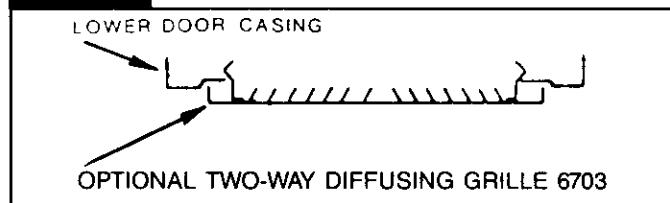


FIG. 35

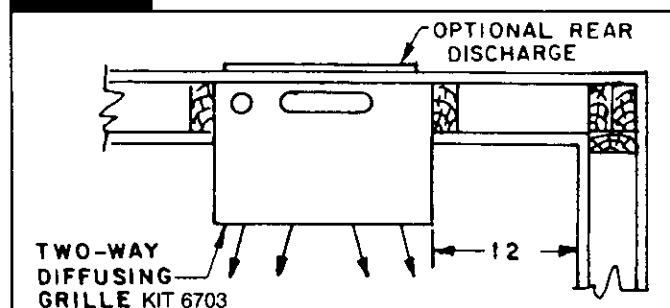


FIG. 36

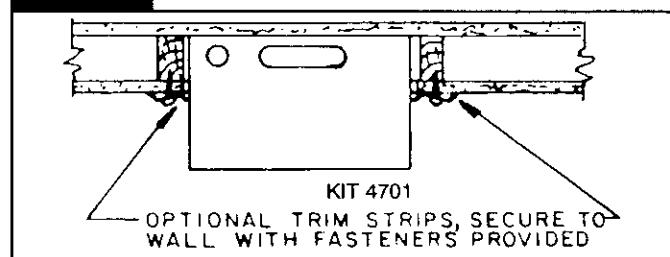
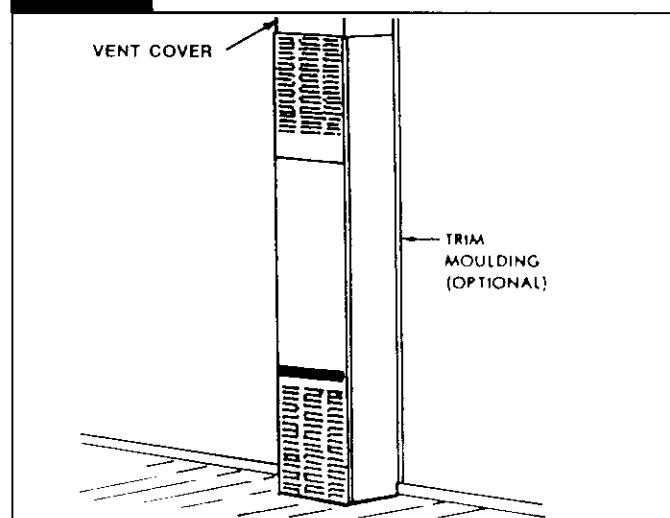


FIG. 37



INSTALL VENT COVER (PROVIDED) (RECESSED MOUNT ONLY)

Place Vent Cover on top of furnace, see Fig. 37. Press snug against wall and secure through bottom to top of furnace with screw provided.

Start-Up Procedure

Start the furnace using the procedures in section OPERATING YOUR FURNACE.

WARNING

DANGER OF BODILY INJURY OR DEATH.
LIQUIFIED 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 electric power immediately. Recheck for wiring errors, or obstructions in or near fan motor.

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 NATIONAL 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 sooting 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.

CHECK GAS INPUT AND PRESSURES

For furnace located at elevations 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.	10.5

Rated input will be obtained on 2500 Btu propane at 10.5 inch manifold pressure with factory-sized orifices. If LP gas having a different heating value is supplied, orifices must be changed by a qualified service technician 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 flow must be made by changing the size of the burner orifice. Check with your local gas supplier for proper orifice sizing.

CHECK THE GAS INPUT (NATURAL GAS ONLY)

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

1. Turn off gas supply to all other appliances except the furnace.
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. This gives the seconds per cubic foot of gas being delivered to the furnace.
3. Assuming natural gas with a heating value of 1000 Btu per cubic foot and 34 seconds per cubic foot used as determined by step (2), then:
Second per hour = 3,600
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.
4. Relight all other appliances turned off in step 1 above. Be sure all pilot burners are operating.

ADJUST PILOT BURNER (STANDING PILOT MODELS ONLY)

Pilot flame should surround 3/8 inch to 1/2 inch of the thermocouple tip. To adjust, remove pilot adjustment screw on gas valve. Turn screw counterclockwise to increase flame, clockwise to decrease. Replace cap.

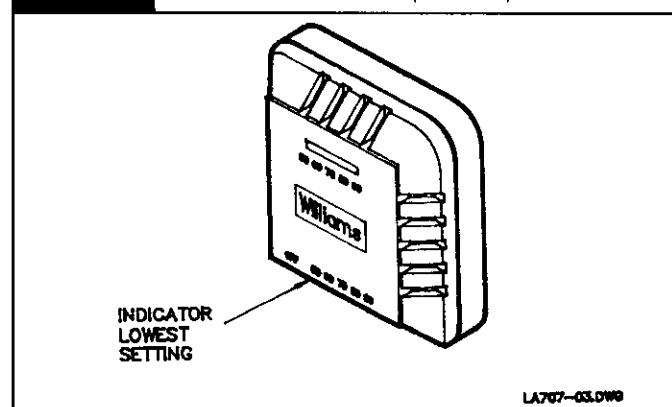
CHECK THERMOSTAT

Check thermostat operation. When set above temperature shown on the thermostat, the main burner should light. Make certain the thermostat turns off the furnace when room temperature reaches the selected setting and starts the furnace when room temperature falls a few degrees.

MAKE SURE THERMOSTAT ANTICIPATOR IS SET PROPERLY, SEE PAGE 20.

FIG. 38

THERMOSTAT (TYPICAL)



LA707-03.DWG

Operating Your Furnace

STANDING PILOT MODELS*

3508731; 3508732

5008731; 5008732

6508731; 6508732

NOTE:

For models equipped with WILLIAMS gas valve P322041 or P322042 refer to this sheet and sheet 26 for "SAFETY & LIGHTING INSTRUCTION" and "TURN GAS OFF TO APPLIANCE."

For models equipped with WILLIAMS gas valve P321704 or P321705 refer to this sheet and sheet 27 for "SAFETY & LIGHTING INSTRUCTIONS" and "TURN GAS OFF TO APPLIANCE."

(All other models refer to sheet 28, 29 & 30.)

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

Keep all access doors and panels in place except for inspection and maintenance.

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.

NOTE: Models 3508731; 3508732 are equipped with a single speed fan.

TWO-SPEED FAN OPERATION

MODELS: 5008731; 5998732; 6508731; 6508732

For models equipped with WILLIAMS gas valve P322041 or P322042.

Blower will first operate at low speed then shift to high speed as the furnace heats up.

For models equipped with WILLIAMS gas valve P321704 or P321705.

Models are equipped with a two-rate control valve. The rate knob on the gas valve is marked "LO" and "HI." Turn the rate knob to the "LO" position and the room thermostat will operate the main burner at about 70% of maximum capacity, blower will operate at low speed. Turn the rate knob to the "HI" position only when a fast heat-up is desired during extremely cold weather. High operation develops maximum capacity of the furnace, blower will first operate at low speed then shift to high speed as the furnace heats up.

WARNING

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

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

SAFETY LIMIT CONTROL

These furnaces are protected against unsafe operation by five automatic safety controls: (1) A safety pilot acts to shut OFF the gas valve in case of pilot failure; (2) A redundant gas valve; (3) A limit switch shuts down the main burner to prevent overheating the furnace cabinet; (4) A vent safety shutoff device shuts down the main burner to protect against improper venting of combustion products. These limit switches will reset when furnace cools; and (5) A thermal overload protects the motor against burnout caused by current surges or if anything should block the flow of air through the furnace. This switch will reset itself when the motor cools down and it cannot be adjusted.

IMPORTANT

KEEP BURNER AND CONTROL COMPARTMENT CLEAN.

WARNING

DANGER OF PROPERTY DAMAGE
BODILY INJURY OR DEATH.

IF THE FURNACE OVERHEATS OR FAILS TO SHUT OFF, CLOSE MANUAL GAS VALVE FOR THE FURNACE BEFORE TURNING OFF ELECTRIC POWER.

FOR YOUR SAFETY, READ BEFORE LIGHTING

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 or strike a match.
- 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.

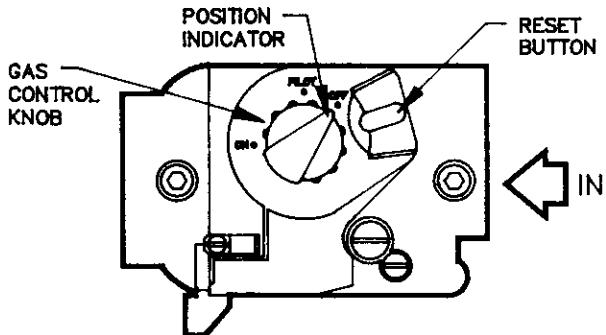
C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

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.

NOTES: FOR ADDITIONAL INFORMATION REFER TO THE INSTALLATION AND OPERATION INSTRUCTION MANUAL SUPPLIED WITH THIS APPLIANCE OR CONTACT THE MANUFACTURER IDENTIFYING THE PRODUCT BY ITS MODEL NUMBER LOCATED ON THE RATING PLATE, FOUND NEAR THE GAS VALVE.

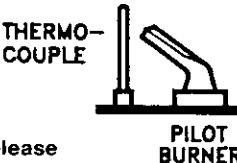
LIGHTING INSTRUCTIONS

1. STOP! Read the safety information above.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. Remove control access panel.
5. Turn gas control knob clockwise  to "OFF".



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 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. Turn knob on gas control counterclockwise  to "PILOT".
10. Push in red reset button all the way and hold in. Immediately light the pilot. Continue to hold the red reset button in for about (1) minute after the pilot is lit. Release button and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 5 through 10.
 - If button 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". Knob can be turned to "ON" only if red reset button is up.
13. Replace control access panel.
14. Turn on all electric power to the appliance.
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. Remove control access panel.
4. Push in gas control knob slightly and turn clockwise  to "OFF". Do not Force.
5. Replace 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.

FOR YOUR SAFETY, READ BEFORE LIGHTING

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.

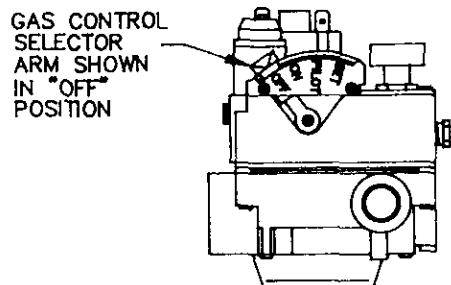
WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance or strike a match.
- 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.

NOTES: FOR ADDITIONAL INFORMATION REFER TO THE INSTALLATION AND OPERATION INSTRUCTION MANUAL SUPPLIED WITH THIS APPLIANCE OR CONTACT THE MANUFACTURER IDENTIFYING THE PRODUCT BY ITS MODEL NUMBER LOCATED ON THE RATING PLATE, FOUND NEAR THE GAS VALVE.

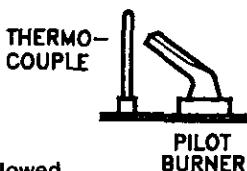
LIGHTING INSTRUCTIONS

1. **STOP!** Read the safety information above.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. Remove control access panel.
5. From "ON" position, depress and move selector arm on gas control to "OFF" position. Do not force.



6. Wait five 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 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. Hold lighted match at pilot burner.
10. Move selector arm to "SET" position and light pilot. Hold in "SET" position for 1/2 minute after pilot is lit.
NOTE: Sufficient time must be allowed for pilot flame to heat thermocouple and hold safety magnet in locked-up position. Also, time must be allowed for air to be purged from gas lines during first starting operation.
11. Release selector arm, and if pilot remains lit, move selector arm to "ON" position.
 - If the pilot will not stay lit after several tries, move the selector arm to "OFF" and call your service technician or gas supplier.
12. Close pilot observation door and tighten wingnut (if equipped).
13. Replace control access panel.
14. Turn on all electric power to the appliance.
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. Remove control access panel.
4. From "ON" position, depress and move selector arm on gas control to "OFF" position. Do not force.
5. Replace 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.

Operating Your Furnace

ELECTRONIC IGNITION MODELS*

3508331; 3508332

5508331, 5508332

NOTE:

For models equipped with WILLIAMS gas valve P322043 or P322044 refer to this sheet and sheet 29 for "SAFETY & LIGHTING INSTRUCTION" and "TURN GAS OFF TO APPLIANCE."

For models equipped with WILLIAMS gas valve P321897 or P321898 refer to this sheet and sheet 30 for "SAFETY & LIGHTING INSTRUCTIONS" and "TURN GAS OFF TO APPLIANCE."

(All other models refer to sheet 25, 26 & 27.)

THE FURNACE WORKS LIKE THIS:

1. Thermostat turns on the control module.
2. Automatic relight system (in module) opens gas valve and electronically ignites pilot. After pilot flame has been established and proven by the control module, main gas valve circuit opens and pilot lights main burners.
3. Heat builds up in the furnace and starts the fan. The heated air comes out the front bottom louvered panel at floor level.
4. When the thermostat setting is reached, it shuts off the main burner.
5. The fan runs until the heat is removed from furnace, then it turns off.

IMPORTANT

KEEP BURNER AND CONTROL COMPARTMENT CLEAN.

SAFETY LIMIT CONTROL

These furnaces are protected against unsafe operation by three automatic safety controls: (1) The electronic ignition system; (2) A limit switch shuts down the main burner to prevent overheating the furnace cabinet; this limit switch will reset when furnace cools; (3) A thermal overload protects the motor against burnout caused by current surges or if anything should block the flow of air through the furnace, the switch will turn the main burner off. When motor cools down, this switch will reset itself. This switch cannot be adjusted.

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.

NOTE: Models 3508331; 3508332 are equipped with a single speed fan.

TWO-SPEED FAN OPERATION

MODELS: 5508331; 5508332

For models equipped with WILLIAMS gas valve P322043 or P322044.

Blower will first operate at low speed then shift to high speed as the furnace heats up.

For models equipped with WILLIAMS gas valve P321897 or P321898.

Models are equipped with a two-rate control valve. The rate knob on the gas valve is marked "LO" and "HI." Turn the rate knob to the "LO" position and the room thermostat will operate the main burner at about 70% of maximum capacity, blower will operate at low speed. Turn the rate knob to the "HI" position only when a fast heat-up is desired during extremely cold weather. High operation develops maximum capacity of the furnace, blower will first operate at low speed then shift to high speed as the furnace heats up.

WARNING

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

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

Keep all access doors and panels in place except for inspection and maintenance.

WARNING

DANGER OF PROPERTY DAMAGE, BODILY INJURY OR DEATH

IF THE FURNACE OVERHEATS OR FAILS TO SHUT OFF, CLOSE MANUAL GAS VALVE FOR THE FURNACE BEFORE TURNING OFF ELECTRIC POWER.

FOR YOUR SAFETY, READ BEFORE LIGHTING

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

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

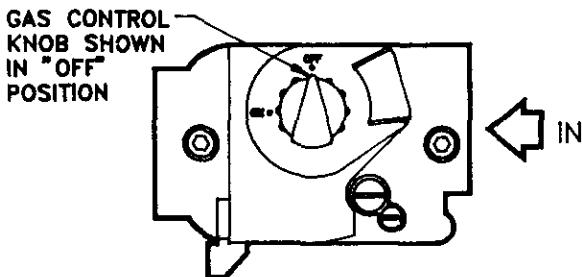
- Do not try to light any appliance or strike a match.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

- 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.

NOTES: FOR ADDITIONAL INFORMATION REFER TO THE INSTALLATION AND OPERATION INSTRUCTION MANUAL SUPPLIED WITH THIS APPLIANCE OR CONTACT THE MANUFACTURER IDENTIFYING THE PRODUCT BY ITS MODEL NUMBER LOCATED ON THE RATING PLATE, FOUND NEAR THE GAS VALVE.

LIGHTING INSTRUCTIONS

1. **STOP!** Read the safety information above.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
5. Remove control access panel.
6. Turn gas control knob clockwise  to "OFF".



7. 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 next step.

8. Turn the gas control knob counterclockwise  to "ON".
9. Replace control access panel.
10. Turn on all electric power to the appliance.
11. Turn thermostat to on (HEAT) position. Set thermostat higher than room temperature. Pilot will automatically light and main burner(s) will light in approximately 45 seconds.

NOTE: On initial start-up or after prolonged shut down, several ignition cycles may be required to purge gas lines. To accomplish the recycle - repeat steps 6 through 11 until pilot is established.

12. Set thermostat to desired setting.
13. After the room thermostat turns the system off, a delay of approximately one minute is required before the system can be turned on again.
14. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

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.
3. Remove control access panel.
4. Push in gas control knob slightly and turn clockwise  to "OFF". Do not Force.
5. Replace 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.

FOR YOUR SAFETY, READ BEFORE LIGHTING

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

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

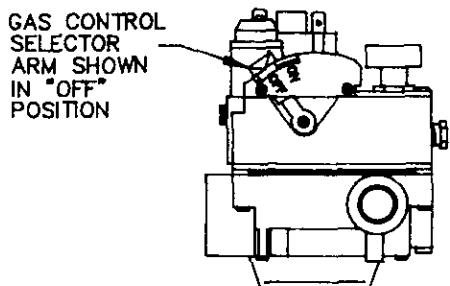
- Do not try to light any appliance or strike a match.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

- If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or move the selector arm. Never use tools. If the arm will not push in or 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.
- 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.

NOTES: FOR ADDITIONAL INFORMATION REFER TO THE INSTALLATION AND OPERATION INSTRUCTION MANUAL SUPPLIED WITH THIS APPLIANCE OR CONTACT THE MANUFACTURER IDENTIFYING THE PRODUCT BY ITS MODEL NUMBER LOCATED ON THE RATING PLATE, FOUND NEAR THE GAS VALVE.

LIGHTING INSTRUCTIONS

- 1. STOP! Read the safety information above.
- 2. Set the thermostat to lowest setting.
- 3. Turn off all electric power to the appliance.
- 4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
- 5. Remove control access panel.
- 6. From "ON" position, depress and move selector arm on gas control to "OFF" position. Do not force.



- 7. 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 next step.

- 8. Move selector arm to "ON" position.
- 9. Replace control access panel.
- 10. Turn on all electric power to the appliance.
- 11. Turn thermostat to "ON" (HEAT) position. Set thermostat higher than room temperature. Pilot will automatically light and main burner(s) will light in approximately 45 seconds.

NOTE: On initial start-up or after prolonged shut down, several ignition cycles may be required to purge gas lines. To accomplish the recycle - repeat steps 6 through 11 until pilot is established.

- 12. Set thermostat to desired setting.
- 13. After the room thermostat turns the system off, a delay of approximately one minute is required before the system can be turned on again.
- 14. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

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.
- 3. Remove control access panel.
- 4. From "ON" position, depress and move selector arm on gas control to "OFF" position. Do not Force.
- 5. Replace 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

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.

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.

COMBUSTION AND VENTILATION AIR

The combustion and ventilation air supply must not be blocked.

Do not put anything in or on the furnace cabinet.

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

FURNACE AREA

Keep the area near the furnace clear and free from combustible materials, gasoline, and other flammable liquids and vapors.

ANNUAL UPKEEP NEEDED

It is recommended that a qualified service technician perform these checks at the beginning of each heating season.

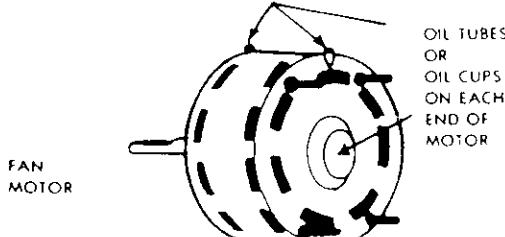
CLEANING AND OILING

Shut off electricity, then remove cabinet door and front panel. Clean any lint or dirt from fan blades, fan motor, and exposed air passages. Use a brush.

Put 5 drops of SAE 20 oil in each of the two cups or oil tubes on the fan motor. See Fig. 39, below.

FIG. 39

MOTOR OIL HOLES



PILOT BURNER

Light pilot using instructions in OPERATING YOUR FURNACE (on pages 25 through 30, depending on your model). Leave thermostat at lowest setting.

Pilot flame should surround 3/8 to 1/2 inch of the thermocouple tip. Refer to Fig. 42, Page 32. If flame needs adjusting, do it as follows:

ADJUST PILOT BURNER (see Fig. 42, page 32)

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 lit except for electronic ignition models.
4. Replace screw cover over pilot adjusting screw.

BURNER FLAME

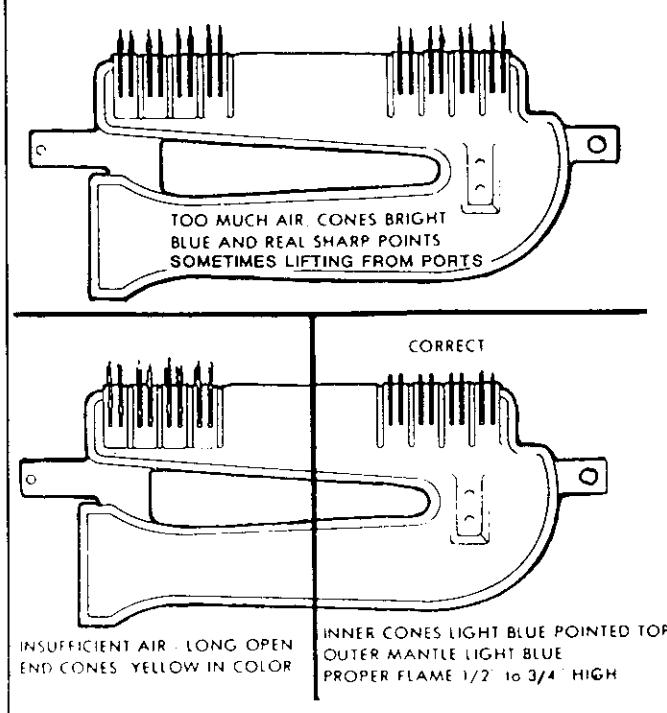
Start the furnace and let it operate about 10 minutes then look at the burner flame. Flames should be soft and blue, see Fig. 40. If flames appear abnormal, contact the gas company or a qualified service technician immediately.

VENTING SYSTEM

Make sure that no parts of the vent air system are blocked or rusted. Clean or replace before using furnace.

FIG. 40

MAIN BURNER FLAME PATTERN



How To Care For Your Furnace (Con't)

BURNER CLEANING

Check burner. If cleaning is required, contact a qualified service technician to clean and service burner.

WARNING

DANGER OF BODILY INJURY OR DEATH
MAKE SURE ELECTRIC POWER AND GAS SUPPLY ARE OFF BEFORE REMOVING PANELS OR DOORS, ETC.

CLEANING BURNER COMPARTMENT

Because cold air is attracted to the flame during furnace operation, a build up of lint from bedding and dust, etc., in the burner area will occur each heating season. It is necessary to clean this area regularly. Use a vacuum cleaner with a narrow attachment to reach small areas. Be careful in and around the pilot. A change in its adjustment could be made if struck during cleaning.

TO REMOVE BURNER(S)

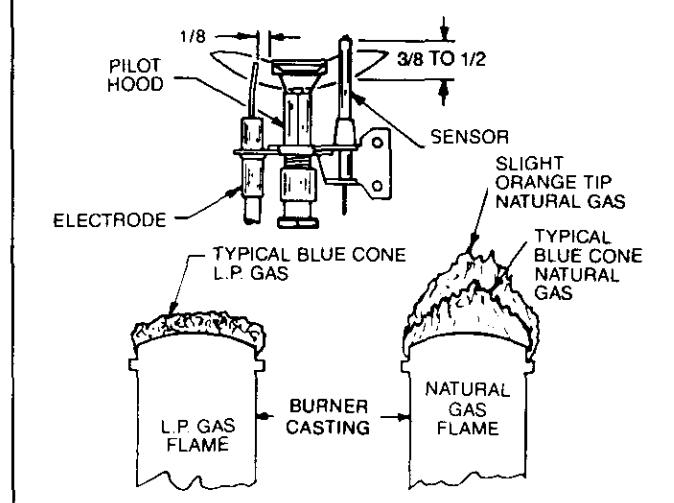
Disconnect gas line inside cabinet.

Refer to "Mounting Your Furnace" section (pages 15, 16 and 17).

Check the spark gap. It must be carefully adjusted to specifications as illustrated (Fig. 42) for ignition device to function properly.

FIG. 42

PILOT FLAME AND SPARK GAP



Furnace Technical Information

MODEL NUMBER	TYPE GAS	INPUT** RATING		MAIN BURNER ORIFICE		
		HI-FIRE	LO-FIRE	DRILL	DEC.	QTY.
3508732	NAT	35,000	24,500	#38	.1015	1
3508731	L.P.	35,000	24,500	#52	.0635	1
3508332	NAT	35,000	24,500	#38	.1015	1
3508331	L.P.	35,000	24,500	#52	.0635	1
5008732	NAT	50,000	35,000	#43	.0890	2
5008731	L.P.	50,000	35,000	#54	.0550	2
5508332	NAT	55,000	38,500	#42	.0935	2
5508331	L.P.	55,000	38,500	#54	.0550	2
6508732	NAT	65,000	45,500	#38	.1015	2
6508731	L.P.	65,000	45,500	#52	.0635	2

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

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.

Troubleshooting Chart

FOR MODELS: 3508731; 3508732; 5008731; 5008732; 6508731; 6508732

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
1. Pilot will not stay lit after following lighting instructions.	<ul style="list-style-type: none"> a. Thermocouple producing insufficient millivoltage. b. Loose or dirty thermocouple connection at gas valve. c. Thermocouple defective. d. Thermomagnet pilot safety defective. e. Vent safety shutoff device. 	<ul style="list-style-type: none"> a. Check pilot flame — must impinge on thermocouple. Pilot flame may be low or blowing (high) causing safety to drop out. Pilot orifice or aerating hole may be plugged (check for spiders, webs or other organic material). Be sure the thermocouple is fully inserted in bracket. b. Clean and/or tighten thermocouple fitting at connection to valve. c. 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. d. Replace gas valve after above is checked out. e. Check wiring connections from valve to vent safety shutoff device. Be sure all connections are tight. Check for blocked vent.
2. Main burner will not come ON — pilot burning and thermostat set for heat.	<ul style="list-style-type: none"> a. Gas valve not turned ON. b. Electric power to furnace turned OFF. c. Low voltage transformer or limit switch defective. d. Wall thermostat defective. e. Burner orifice plugged. f. Gas valve defective. 	<ul style="list-style-type: none"> a. Turn gas valve knob to "ON" position — if no main gas flow, proceed to Step "b". b. Check for line voltage at furnace — if okay and no main gas flow, proceed to Step "c". c. Check for 24 volts at the low voltage terminals of the transformer. If no voltage, turn OFF electric power to furnace. Remove one wire from limit switch and check for continuity across both terminals. No continuity — replace limit switch. With a good limit switch back in the circuit and the electric power turned ON — if no voltage, replace transformer. NOTE: Before replacing the transformer or limit switch, check wiring for loose connections or broken wires and repair as needed. If voltage is present at transformer, proceed to Step "d". d. With thermostat set for heat (contacts closed) check for voltage at terminals on gas valve. If no voltage is present replace defective thermostat. NOTE: Before replacing thermostat, be sure to check wiring from furnace to thermostat for loose connections or broken wires and replace as needed. If voltage is present at terminals on gas valve and still no gas flow to main burners, proceed to Step "e". e. Clean or replace orifice — if okay and still no gas flow to main burners, proceed to Step "f". f. Replace defective gas valve.
3. Burner comes "ON" but goes OFF before blower turns ON.	<ul style="list-style-type: none"> a. Defective wiring. b. Defective limit switch. 	<ul style="list-style-type: none"> a. Turn OFF electric power to furnace. Remove top front panel, fan shroud and blower wheel. Refer to Wiring Diagram and check all wiring inside junction box. Remove center front panel and check all wiring inside switch box containing fan, limit and selector switches. Correct if necessary. If correct, proceed to Step "b". NOTE: Selector switch used only on Models 5008731; 5008732; 6508731; 6508732. b. If burner goes OFF in less than five minutes from room temperature start, check limit control switch. If defective, replace. NOTE: Blower should turn "ON" within three minutes after burner is "ON" from a room temperature start. If not, proceed to Step "c".

*Also applicable to Models equipped with an electric intermittent pilot system.

(continued next page)

Troubleshooting Chart

FOR MODELS: 3508731; 3508732; 5008731; 5008732; 6508731; 6508732

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
3. Burner comes "ON" but goes OFF before blower turns ON. (cont.)	<ul style="list-style-type: none"> c. Defective motor (2-speed). d. Defective motor (1-speed). e. Defective fan switch. 	<ul style="list-style-type: none"> c. Jumper across fan switch, turn electric power ON, motor should rotate. A 2-speed motor is used — jumper from "brown" terminal on fan switch to #2 (red) terminal on selector switch, motor should rotate on "LOW" speed. Jumper from same "brown" terminal on fan switch to #3 (black) terminal on selector switch, motor should rotate on "HIGH" speed. Replace motor if defective. d. Jumper across fan switch, turn electric power ON, motor should rotate. Replace motor if defective. e. If, after checking above possibilities, problem still exists, replace fan switch.
*4. Burner comes "ON", blower comes "ON", but cycles "ON" and "OFF" while burner remains "ON".	<ul style="list-style-type: none"> a. Furnace not operating at full rate. 	<ul style="list-style-type: none"> a. Check for low gas pressure at gas valve — should be 4" W.C. for Natural Gas, 11" W.C. for L.P. Gas. Check burner orifice.
*5. Burner comes "ON", blower comes "ON", but burner cycles "OFF" and "ON" with blower "ON".	<ul style="list-style-type: none"> a. Furnace operating over-rate. b. Line voltage too low. c. Recirculation. d. Loss of circulating air due to leakage. 	<ul style="list-style-type: none"> a. Check for high gas pressure at gas valve — correct if necessary. See correct pressure above. b. Check line voltage to motor, if below 115 volts motor will run too slow. c. Heated air discharging against an object causing recirculation, such as a hall installation or a large piece of furniture within 4' of discharge. d. Check header plate installation and proper use of gaskets. Repair as necessary.
*6. Furnace operates but turns "OFF" before room temperature is attained.	<ul style="list-style-type: none"> a. Thermostat location. b. Defective thermostat. 	<ul style="list-style-type: none"> a. Check location of thermostat. It should not be in the path of warm air discharge from furnace, near a lamp, or above a TV set or stereo. b. Check thermostat calibration or replace.
*7. Furnace operates but will not shut "OFF" when room temperature is attained.	<ul style="list-style-type: none"> a. Thermostat wiring defective. b. Thermostat location. c. Improper thermostat anticipator setting. 	<ul style="list-style-type: none"> a. Check thermostat wiring from furnace to thermostat — may be shorted together by a nail or staple. b. Check thermostat location — if an outside wall or a hole in wall behind thermostat causing cold air to contact thermostat, relocate. c. Set anticipator per THERMOSTAT ANTICIPATOR, page 20.
*8. Abnormal operation.	<ul style="list-style-type: none"> a. Blower noise. b. Expansion noise ticking. c. Burner resonance. d. Selector switch defective. (2-speed). 	<ul style="list-style-type: none"> a. Check motor mounts — they may be loose. Blower wheel could be out of balance. Set screw may be loose on motor shaft. Blower may be rubbing on fan shroud. Motor may need oiling. Correct as needed. b. Check installation — casing may be twisted or not level at time of installation causing combustion chamber to bind on its locating pins. c. Usually associated with L.P. Gas operation. Adjust primary air screw in throat of each cast iron burner after about 10 minutes of operation. Adjust to obtain a soft blue flame without streaming yellow tips. d. During normal furnace operation motor will be on "LOW" speed when operating on minimum input capacity and on "HIGH" speed when operating on maximum input capacity. If there is no change in motor speed, replace selector switch.

*Also applicable to Models with an electric intermittent pilot system.

Troubleshooting Chart

FOR MODELS: 3508331; 3508332; 5508331; 5508332

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
1. No spark — no pilot gas.	a. No main power. b. Faulty transformer. c. Faulty thermostat. d. Faulty limit switch. e. Faulty ignition control. f. Faulty wiring. g. Vent safety shutoff device.	a.-e. Perform normal system checks of main power, transformer, thermostat, limit switch, and replace faulty component. With power ON, turn thermostat to the lowest setting, wait 10 seconds and return to HIGH setting. With power ON and thermostat set at its highest position, set voltmeter to 24V scale and attach probes to terminals "TR" and "TH" on the ignition control unit. If you read 24V and there still is no spark or pilot gas, the ignition control is defective and must be replaced. f. Test wiring. Repair or replace. g. Check wiring connections from valve to vent safety shutoff device, be sure all connections are tight. Check for blocked vent.
2. Spark — but no pilot gas.	a. Faulty ignition. b. No gas supplied to pilot valve. c. Manual valves in OFF position. d. Faulty pilot valve. e. Faulty wiring. f. Restricted pilot line or clogged pilot orifice.	a. See 1e. b. Check for availability of gas at gas control. Make sure the manual valve (gas cock) on the gas control are in the full ON position. No pilot gas could be caused by a plugged pilot tubing. Also check the pilot adjustment at the gas control. c. See 2b. d. See 2b. e. See 1f. f. See 2b.
3. Pilot gas — but no spark.	a. Faulty ignition control. b. Broken or shorted electrode assembly.	a. With power ON, turn thermostat to the lowest setting, wait 10 seconds and return to high setting. With power ON and thermostat set at its highest position, set voltmeter to 24V scale and attach probes to terminals "24V" (*TH) and "GRD" (*TR) on the ignition control unit. If you read 24V and there is still no spark or pilot gas, the ignition control is defective and must be replaced. With thermostat turned to its highest setting, set test meter to 24V scale. Touch probes to "PV/MV" and "PV" terminals on Gas Valve. If you do not get a 24V reading, check wiring. If wiring tests okay, check ignition control. Connect probes to "PV/MV" AND "PV" terminals on ignition control. If you do not read 24V, the ignition control must be replaced. b. Remove wire at "PV/MV" terminal at the ignition control, being careful not to touch any metal parts; disconnect the electrode wire at the ignition control. Connect one end of a jumper wire to terminal "GND". (DO NOT REMOVE EXISTING WIRE.) Attach the other end of the jumper wire to the metal blade of a small screwdriver. Position end of metal blade approx. 1/8" from terminal. Reconnect "PV/MV" terminal. Sparking should occur between screwdriver blade and terminal. If no sparking occurs, the ignition control must be replaced. Check the pilot and electrode assembly for proper electrode gap (3/32" to 1/8") or any possible shorting of electrode to surrounding metal surfaces. Make sure the spark ignitor and electrode connections to the ignition control are tight. The ignition control and pilot burner must both be chassis ground. If there is still no spark, the pilot and electrode assembly must be replaced.

(continued next page)

Troubleshooting Chart

FOR MODELS: 3508331; 3508332; 5508331; 5508332

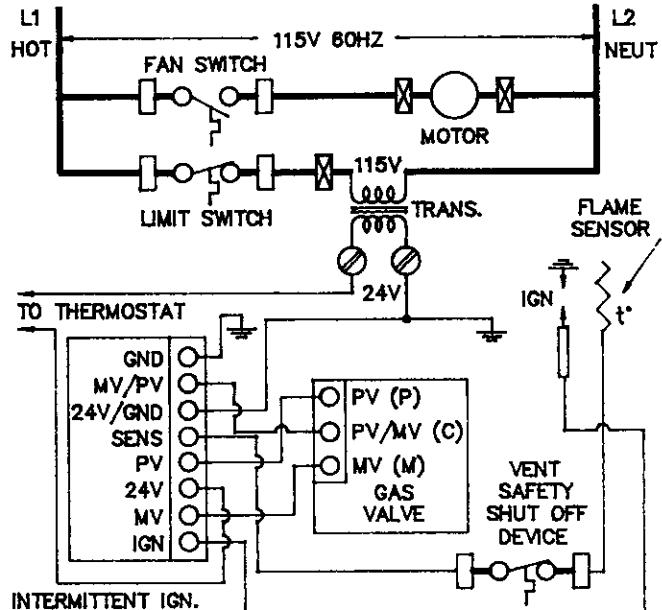
SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
4. Pilot lit, but main burner won't come ON.	<ul style="list-style-type: none"> a. Faulty ignition control. b. Faulty wiring. c. Low pilot flame. d. Improper alignment of sensor in pilot flame. e. Faulty flame sensor. 	<ul style="list-style-type: none"> a. See 3a. b. See 1f. c. NOTE: Wait at least 90 seconds after pilot lights before doing the check out procedures for problem number 4. With thermostat ON, be sure that the pilot and sensor are properly aligned so that the pilot flame impinges the top 3/4 inch of the sensor. Be sure that the sensor is pushed all the way into pilot bracket. Adjust pilot flame with pilot adjustment, if necessary. Also check inlet supply pressure and pilot orifice. If pilot hood or sensor is bent, the defective unit should be replaced. If main burner still won't come ON, make sure the main burner orifices are clear. If orifices are clear, set voltmeter to 24V scale and touch probes to the terminals of the main gas operator on the gas valve. Attach to terminal "MV", "PV/MV" on Gas Valve. If you read 24V and the burner won't turn ON, replace entire gas valve. d. When main burner comes ON, ensure that the pilot flame is strong, sensor is properly aligned, and pilot flame impinges the top 3/4 inch of the sensor. (See procedures for check for proper pilot flame and alignment in problem 4c.) Check the pilot and electrode assembly for proper electrode gap (3/32" to 1/8") or any possible shorting of electrode to surrounding metal surfaces. Make sure the spark ignitor and electrode connections to the ignition control are tight. The ignition control and pilot burner must both be chassis ground. If there is still no spark, the pilot and electrode assembly must be replaced. e. BE SURE POWER IS "OFF", BEFORE PERFORMING THIS TEST!! Set test meter to "ohm" scale or use continuity checker. Touch one end of probes to top of flame sensor, the other to "SENSE" terminal on the ignition control. Ohmmeter should read "0", continuity should be evident. If you don't obtain a reading, remove wiring from sensor and test both individually. If continuity is not evident, replace wiring and/or sensor. There should be NO continuity between sensor and "GND" terminal on the ignition control. Testing wiring and sensor individually, determine which is shorted on ground. Replace or repair. Turn ON power.
5. Pilot cycles OFF and ON by itself.	<ul style="list-style-type: none"> a. Faulty pilot valve. b. Faulty wiring. 	<ul style="list-style-type: none"> a. See 2b. b. See 1f.
6. Main burner shuts down before thermostat is satisfied.	<ul style="list-style-type: none"> a. Low pilot flame. b. Improper alignment of sensor in pilot flame. c. Pilot flame being drawn away from sensor. d. Improper heat anticipator setting. e. Faulty limit. 	<ul style="list-style-type: none"> a. See 4c. b. See 4d. c. When main burner comes ON, ensure that the pilot flame is strong, sensor is properly aligned and pilot flame impinges the top 3/4 inch of the sensor. (See procedures for checking for proper pilot flame and alignment in problem 4d.) If the pilot flame is drawn away from the sensor when the main burner comes "ON", the cause could be the manual valve is not in the full ON position or the inlet gas pressure with the main burner ON. NOTE: Low inlet gas pressure to the gas control can be caused by several problems and is not within the scope of the procedures outlined in this service guide. Consult your local utility or gas supplier. d. See 6c. Check the setting of the heat anticipator in the wall thermostat. Set it to setting specified on the gas control. e. The system may be cycling on a faulty limit. Using a test meter set to the 110 volt scale, check for a voltage reading across the limit when the main burner shuts OFF. If you get a 24 volt or 110 volt reading on shutdown, replace defective limit switch.

Wiring Diagrams

FOR MODELS:
3508331 and 3508332

FOR MODELS:
5508331 and 5508332

FOR 35M B.T.U.
FAN TYPE VENTED WALL FURNACE
WITH INTERMITTENT IGNITION CONTROL SYSTEM



INTERMITTENT IGN.
CONTROL MODULE

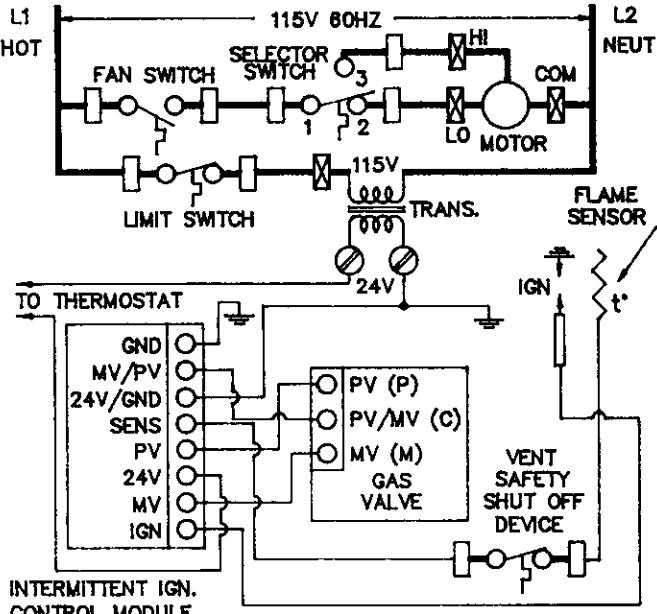
LEGEND

- FACTORY WIRED LINE VOLTAGE
- FACTORY WIRED LOW VOLTAGE
- 1/4 QUICK CONNECT TERMINAL FOR FACTORY WIRING
- ☒ WIRE CONNECTOR FOR FACTORY WIRING LINE VOLTAGE
- ∅ SCREW TERMINAL LOW VOLTAGE

NOTES:

1. 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 115V - 60Hz. - less than 3 amps.
2. MOTOR IS THERMALLY OVERLOAD PROTECTED.
115V, 60Hz - LESS THAN 3 AMPS.

FOR 55M B.T.U.
FAN TYPE VENTED WALL FURNACE
WITH INTERMITTENT IGNITION CONTROL SYSTEM



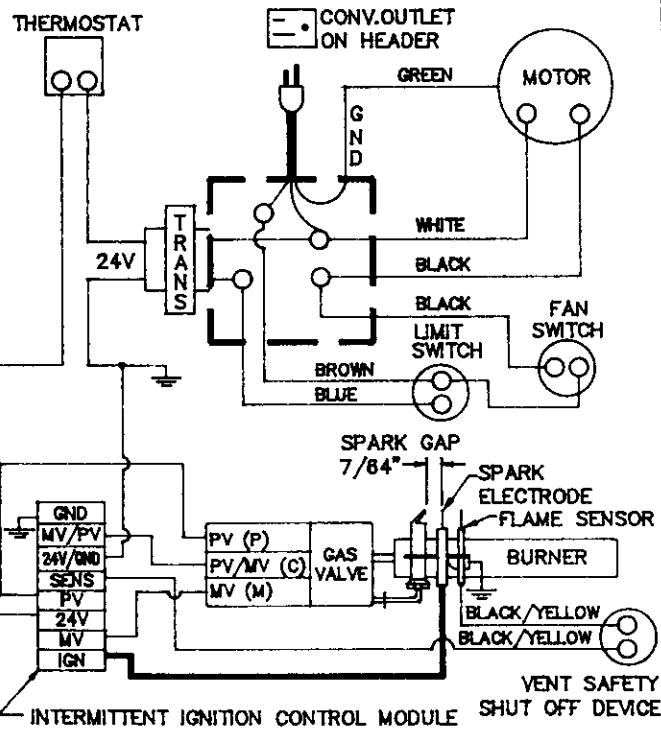
INTERMITTENT IGN.
CONTROL MODULE

LEGEND

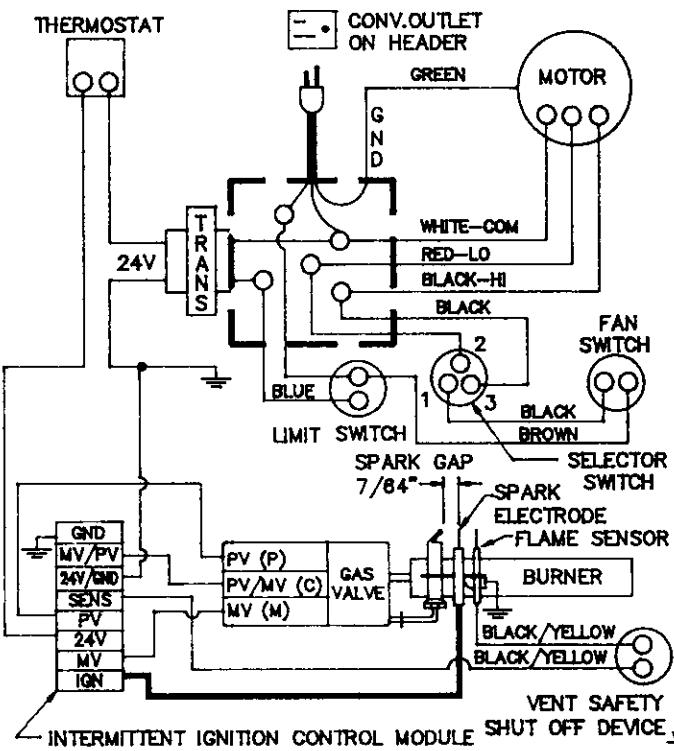
- FACTORY WIRED LINE VOLTAGE
- FACTORY WIRED LOW VOLTAGE
- 1/4 QUICK CONNECT TERMINAL FOR FACTORY WIRING
- ☒ WIRE CONNECTOR FOR FACTORY WIRING LINE VOLTAGE
- ∅ SCREW TERMINAL LOW VOLTAGE

NOTES:

1. 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 115V - 60Hz. - less than 3 amps.
2. MOTOR IS THERMALLY OVERLOAD PROTECTED.
115V, 60Hz - LESS THAN 3 AMPS.



INTERMITTENT IGNITION CONTROL MODULE

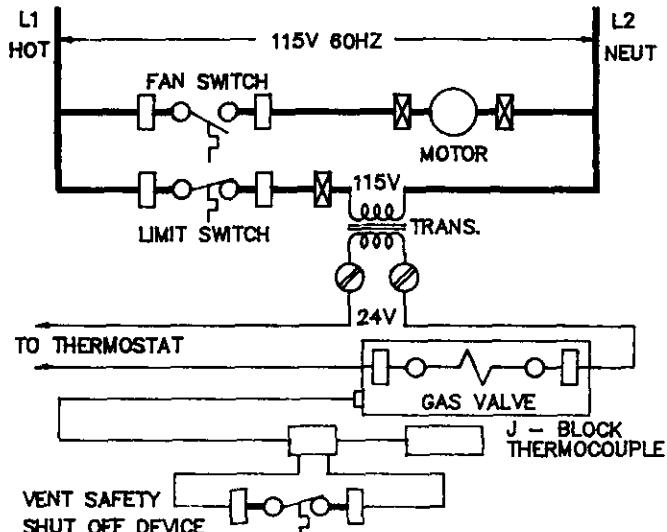


Wiring Diagrams

FOR MODELS:
3508731 and 3508732

FOR MODELS:
5008731 and 5008732
6508731 and 6508732

FOR 35M B.T.U.
FAN TYPE VENTED WALL FURNACE
WITH CONTINUOUS PILOT CONTROL SYSTEM



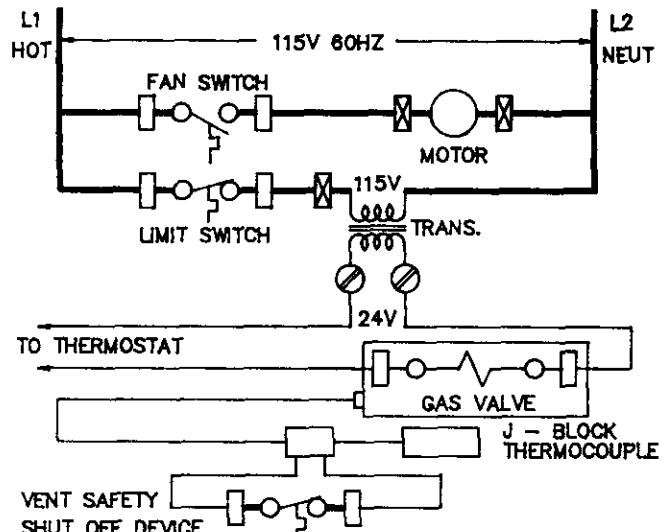
LEGEND

- FACTORY WIRED LINE VOLTAGE
- FACTORY WIRED LOW VOLTAGE
- 1/4 QUICK CONNECT TERMINAL FOR FACTORY WIRING
- ☒ WIRE CONNECTOR FOR FACTORY WIRING LINE VOLTAGE
- ∅ SCREW TERMINAL LOW VOLTAGE

NOTES:

1. 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 115V - 60Hz. - less than 3 amps.
2. MOTOR IS THERMALLY OVERLOAD PROTECTED. 115V. 60Hz - LESS THAN 3 AMPS.

FOR 50M AND 65M B.T.U.
FAN TYPE VENTED WALL FURNACE
WITH CONTINUOUS PILOT CONTROL SYSTEM

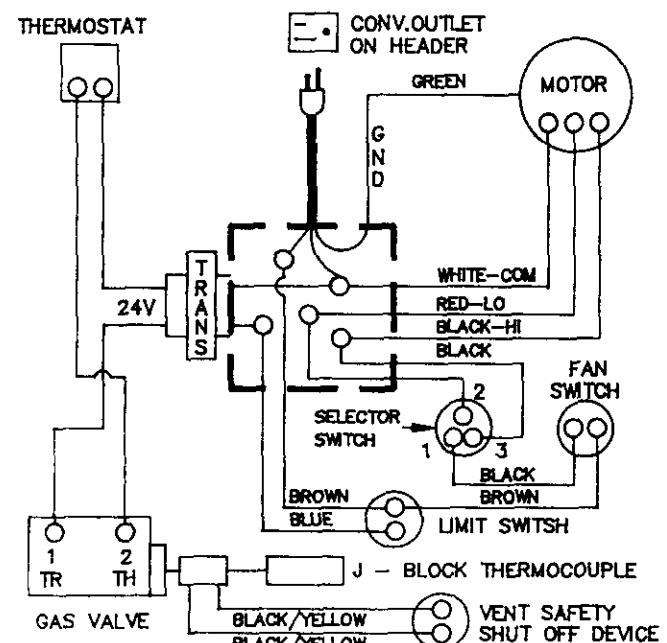
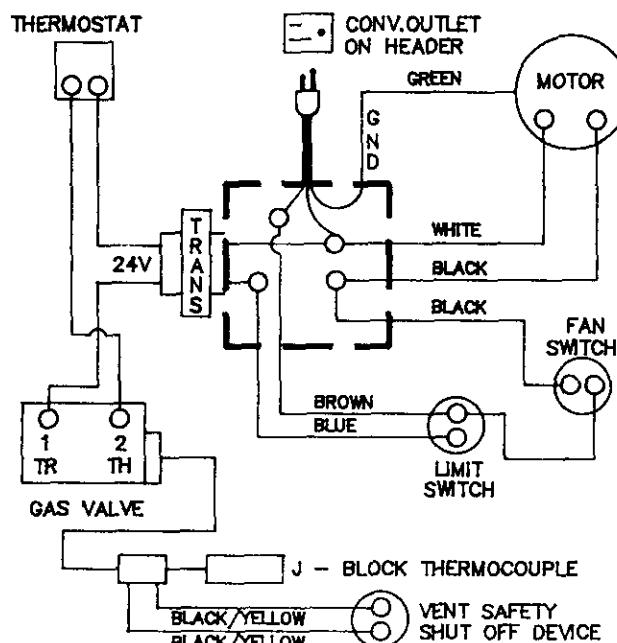


LEGEND

- FACTORY WIRED LINE VOLTAGE
- FACTORY WIRED LOW VOLTAGE
- 1/4 QUICK CONNECT TERMINAL FOR FACTORY WIRING
- ☒ WIRE CONNECTOR FOR FACTORY WIRING LINE VOLTAGE
- ∅ SCREW TERMINAL LOW VOLTAGE

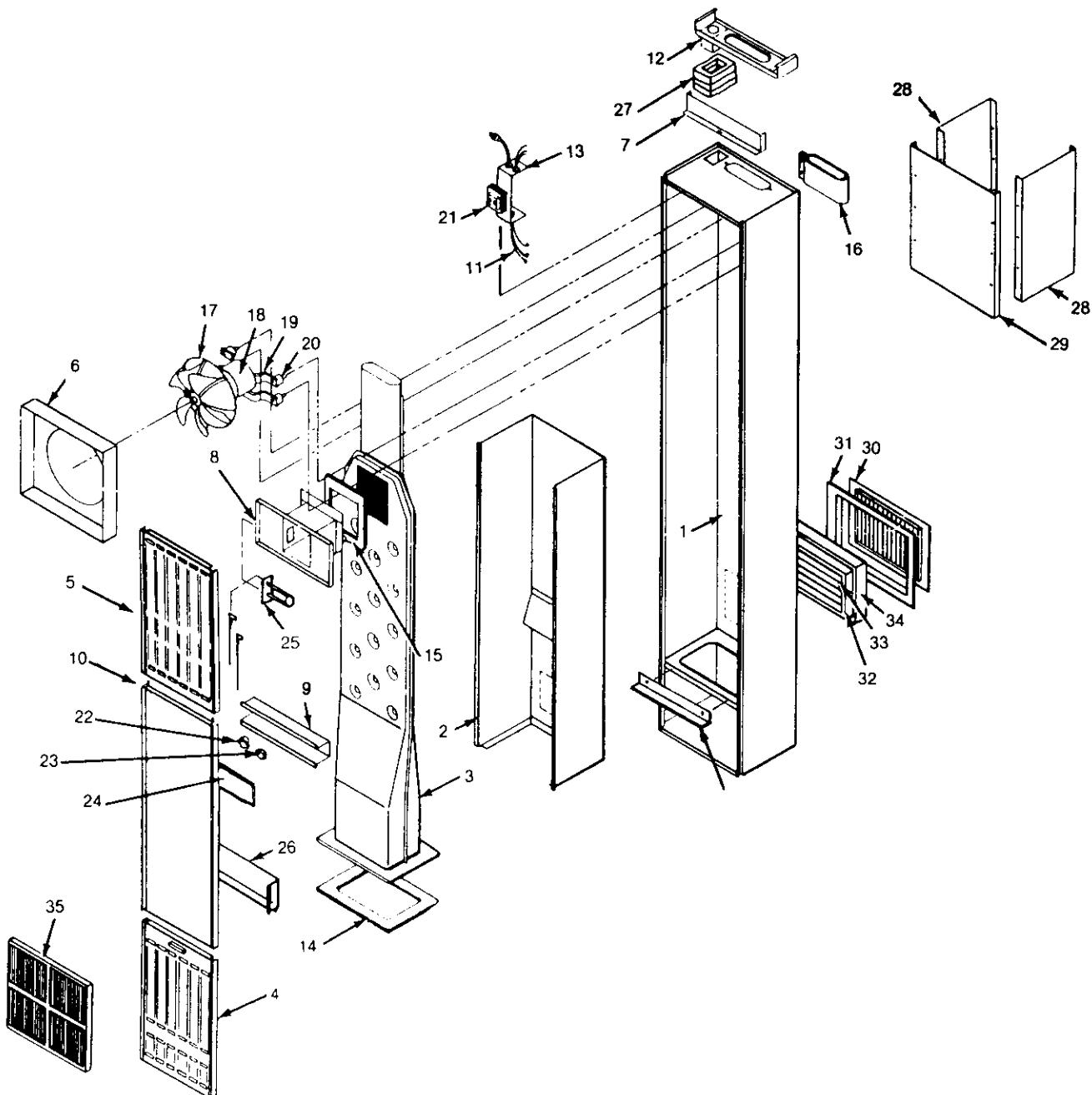
NOTES:

1. 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 115V - 60Hz. - less than 3 amps.
2. MOTOR IS THERMALLY OVERLOAD PROTECTED. 115V. 60Hz - LESS THAN 3 AMPS.



Williams Top Vent Gas-Fired Wall Furnace

REPAIR PARTS FOR MODELS
3508331; 3508332; 3508731 and 3508732
CABINET and BODY
ASSEMBLY



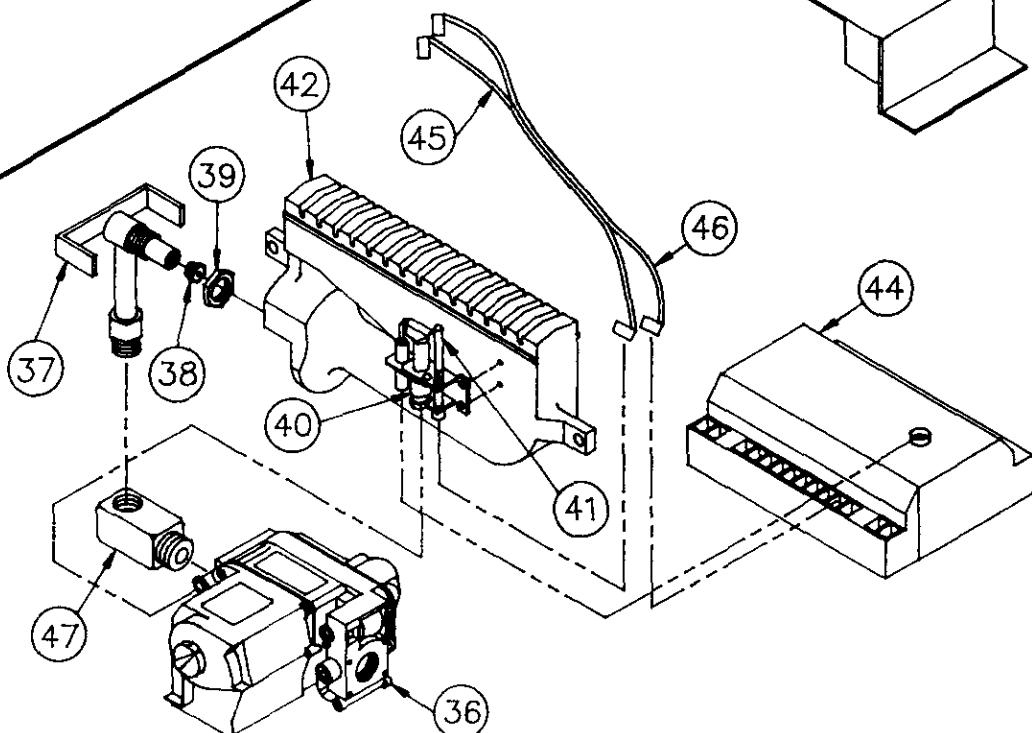
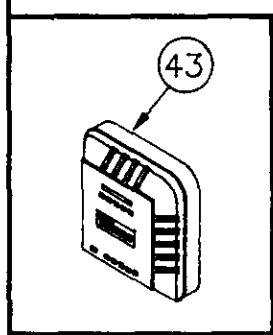
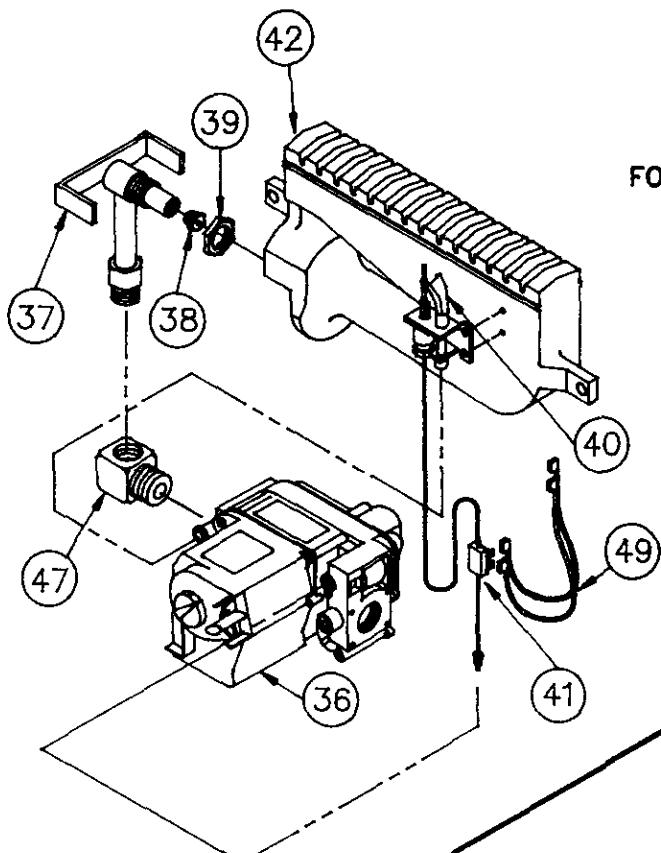
USE ONLY MANUFACTURER'S AUTHORIZED PARTS

FOR PARTS LIST SEE PAGES 41 AND 42.

Williams Top Vent Gas-Fired Wall Furnace

CONTROL ASSEMBLY
FOR MODELS
3508731 and 3508732

FOR PARTS LISTING SEE PAGE 42



CONTROL ASSEMBLY FOR MODELS—
3508331 and 3508332

FOR PARTS LISTING SEE PAGE 42

Williams Top Vent Gas-Fired Wall Furnace

REPLACEMENT PARTS LIST FOR MODELS 3508331; 3508332; 3508731 and 3508732

REF. NO.	DESCRIPTION	PART NO. FOR MODEL:			
		3508331	3508332	3508731	3508732
1	Outer Casing, Less Front Panel	12C10	12C10	12C10	12C10
2	Inner Liner	12B15	12B15	12B15	12B15
3	Heating Element	12C18	12C18	12C18	12C18
4	Bottom Front Panel	12B49	12B49	12B49	12B49
5	Top Front Panel	12B50	12B50	12B50	12B50
6	Fan Shroud	12B03-1	12B03-1	12B03-1	12B03-1
7	Vent Cover	7B12	7B12	7B12	7B12
8	Draft Hood	12B12	12B12	12B12	12B12
9	Switch Box	11B05	11B05	11B05	11B05
10	Center Front Panel	12C21	12C21	12C21	12C21
11	Internal Wires (All Except Ign. Control)	3508331	3508332	3508731	3508732
12	Header Plate	7B57	7B57	7B57	7B57
13	Junction Box	12B05	12B05	12B05	12B05
14	Gasket-Element Base	P026500	P026500	P026500	P026500
15	Draft Hood Gasket	P107900	P107900	P107900	P107900
16	Flue Collar Gasket	P027100	P027100	P027100	P027100
17	Fan Blade	P300500	P300500	P300500	P300500
18	Motor	P322544	P322544	P322544	P322544
19	Motor Support (2 Req.)	7B46	7B46	7B46	7B46
20	Vibration Isolators (4 Req.)	P022800	P022800	P022800	P022800
21	Transformer, 115V-24V	P024200	P024200	P024200	P024200
22	Limit Switch	P309600	P309600	P309600	P309600
23	Fan Switch	P200200	P200200	P200200	P200200
24	Switch Box Cover	11C68	11C68	11C68	11C68
25	Limit Switch	P321127	P321127	P321127	P321127
26	Deflector Baffle Handle	11C63	11C63	11C63	11C63
27	Header Gasket (3 Req.)	7A68	7A68	7A68	7A68
27A	Lower Element Base Angle	7A117	7A117	7A117	7A117
28	★ Vent Enclosure Side (2 Req.)				
29	★ Vent Enclosure Front	9812	9812	9812	9812
28	★ Vent Enclosure Side (2 Req.)				
29	★ Vent Enclosure Front	9824	9824	9824	9824
30	★ Rear Grille, Two-Way				
31	★ Plaster Ground				
32	★ Rear Inner Boot, 10-3/4 Inches Long	6801	6801	6801	6801
33	★ Damper				
34	★ Rear Outer Boot, 10 Inches Long				
30	★ Rear Grille, Two-Way				
31	★ Plaster Ground				
32	★ Rear Inner Boot, 1-5/8 Inches Long	6802	6802	6802	6802
33	★ Damper				
34	★ Rear Outer Boot, 7/8 Inches Long				
35	★ Diffusing Grille Kit - Two-Way	6703	6703	6703	6703
35	★ Diffusing Grille Kit - One-Way	6704	6704	6704	6704
★	★ Trip Strip Kit (Not Shown)	4701	4701	4701	4701
★	★ Oval B/W Vent Kit (Not Shown)	9901	9901	9901	9901

★ Not available separately, in kit form only.

For part illustration see pages 39 and 40.

Note: Screws and bolts are standard hardware items, available locally.

(continued on next page)

Williams Top Vent Gas-Fired Wall Furnace

REPLACEMENT PARTS FOR MODELS 3508331; 3508332; 3508731 AND 3508732

REF. NO.	DESCRIPTION	PART NO. FOR MODEL:			
		3508331	3508332	3508731	3508732
36	Valve, WILLIAMS Nat. Valve, WILLIAMS L.P.G.	— P322044	P322043 —	— P322042	P322041 —
37	Manifold	12A01	12A01	12A01	12A01
38	Orifice Fitting, Specify Model & Gas	P090500	P090500	P090500	P090500
39	Locknut	P026200	P026200	P026200	P026200
40	Pilot, Cast Iron Burner, Robertshaw L.P.G. Pilot, Cast Iron Burner, Robertshaw Nat. Pilot, Formed Steel Burner, Robertshaw Nat.	P229200 — —	— P229100 P229300	P179800 — —	— P179700 P321837
41	Junction Block Thermocouple	—	—	P321828	P321828
41	Flame Sensor	P271100	P271100	—	—
42	Burner, Cast Iron, Nat. or L.P.G. Burner, Formed Steel, Nat. Gas Only	P025600 —	P025600 7C52	P025600 —	P025600 7C52
43	Thermostat	P322017	P322017	P322017	P322017
44	Ignition Control	P321910	P321910	—	—
45	Wire Assembly	P321522	P321522	—	—
46	Wire Assembly	P321935	P321935	—	—
47	Manifold Adapter	P321887	P321887	P321888	P321888
48	Ignition Control Shield	7C79	7C79	—	—
49	Wire Assembly (2 Required)	—	—	P321935	P321935
☆	Ignition Control Wires (Not Shown)	31B036	31B036	—	—

NOTE: Screws and bolts are standard hardware items, available locally.

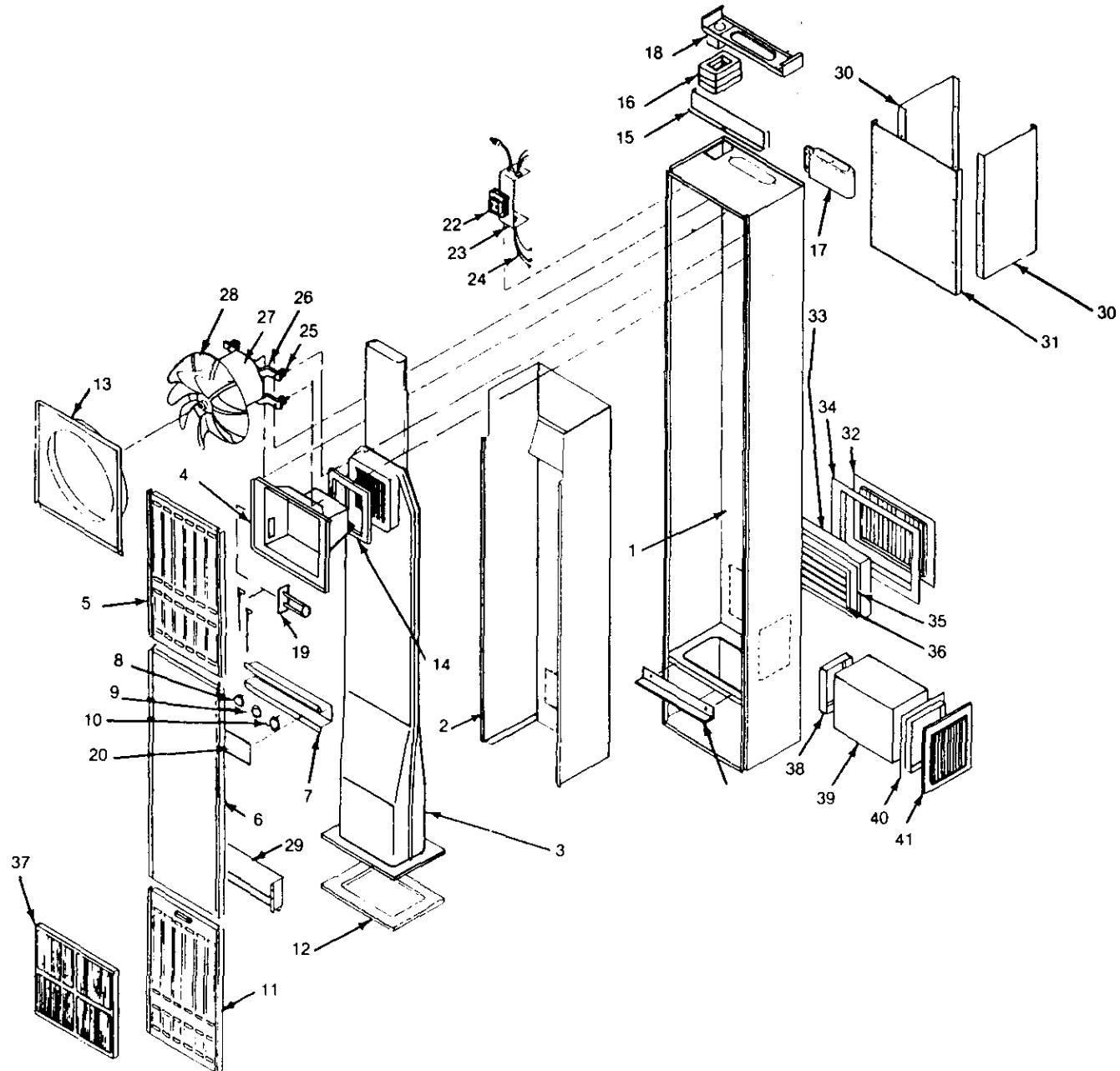
For parts illustration see page 40.

Williams Top Vent Gas-Fired Wall Furnace

REPAIR PARTS FOR MODELS

5008731; 5008732; 5508331; 5508332; 6508731 and 6508732

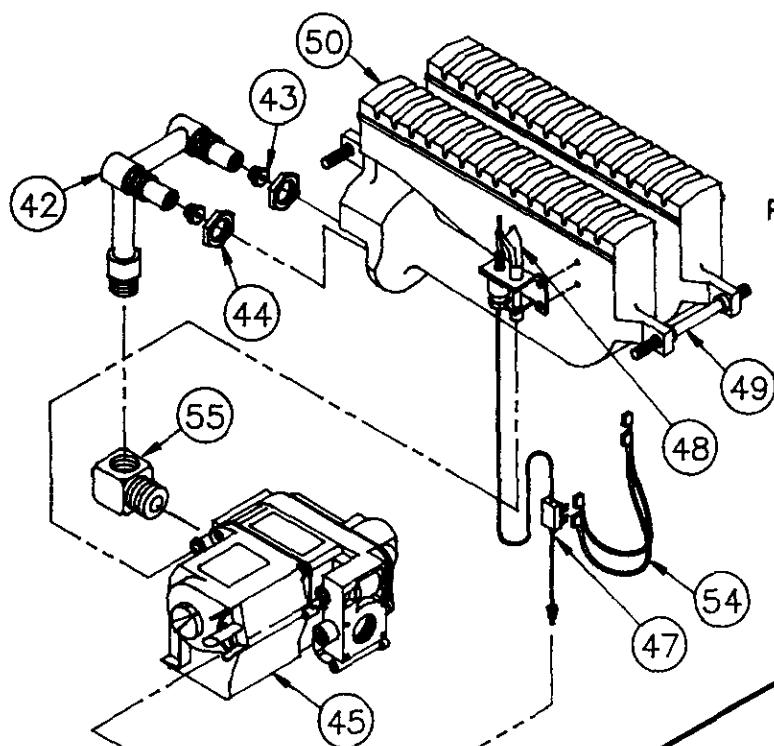
CABINET and BODY ASSEMBLY



USE ONLY MANUFACTURER'S AUTHORIZED PARTS

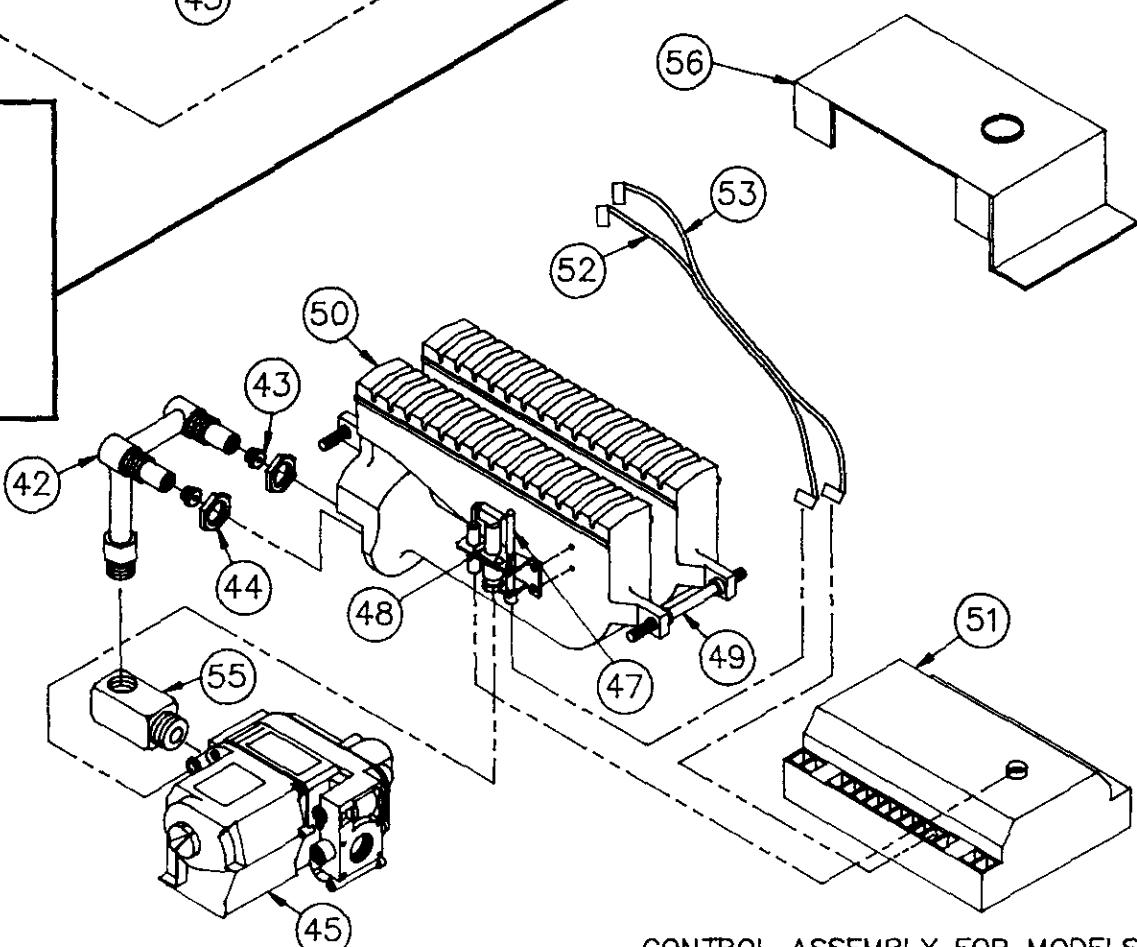
FOR PARTS LIST SEE PAGES 45 AND 46.

Williams Top Vent Gas-Fired Wall Furnace



CONTROL ASSEMBLY
FOR MODELS
5008731 and 5008732
6508731 and 6508732
FOR PARTS LISTING SEE PAGE 46

USE ONLY MANUFACTURER'S
AUTHORIZED PARTS



CONTROL ASSEMBLY FOR MODELS—
5508331 and 5508332
FOR PARTS LISTING SEE PAGE 46

Williams Top Vent Gas-Fired Wall Furnace

REPLACEMENT PARTS FOR MODELS 5008731; 5008732; 5508331; 5508332; 6508731 AND 6508732

REF. NO.	DESCRIPTION	PART NO. FOR MODEL:					
		5008731	5008732	5508331	5508332	6508731	6508732
1	Outer Casing, Less Front Panel	7C55-4	7C55-4	7C55-3	7C55-3	7C55-3	7C55-3
2	Inner Liner	11B46	11B46	7B79	7B79	7B79	7B79
3	Heating Element	7C69	7C69	7C68	7C68	7C54-3	7C54-3
4	Relief Opening Pan	7D10	7D10	7D10	7D10	7D09	7D09
5	Top Front Panel	7B126	7B126	7B126	7B126	7B126	7B126
6	Center Front Panel	11C60	11C60	11C59	11C59	11C59	11C59
7	Switch Box	11B05	11B05	11B05	11B05	11B05	11B05
8	Limit Switch	P200300	P200300	P296001	P296001	P200300	P200300
9	Selector Switch	P213400	P213400	P296201	P296201	P296201	P296201
10	Fan Switch	P200200	P200200	P200200	P200200	P200200	P200200
11	Bottom Front Panel	11B103	11B103	11B103	11B103	11B103	11B103
12	Element Base Gasket	P026500	P026500	P026500	P026500	P026500	P026500
13	Fan Shroud	7B106	7B106	7B106	7B106	7B106	7B106
14	Relief Pan Gasket	P028300	P028300	P028300	P028300	P028300	P028300
15	Vent Cover	7B12	7B12	7B12	7B12	7B12	7B12
16	Header Gasket (3 Req.)	7A68	7A68	7A68	7A68	7A68	7A68
17	Flue Collar Gasket	P027100	P027100	P027100	P027100	P027100	P027100
18	Header	7B114	7B114	7B57	7B57	7B57	7B57
19	Limit Switch	P321127	P321127	P321127	P321127	P321127	P321127
20	Switch Box Cover	11C68	11C68	11C68	11C68	11C68	11C68
21	Lower Element Base Angle	7A117	7A117	7A117	7A117	7A117	7A117
22	Transformer, 115V/24V	P024200	P024200	P024200	P024200	P024200	P024200
23	Junction Box	7B29	7B29	7B29	7B29	7B29	7B29
24	Internal Wires (All Except Ign. Control)	5008731	5008732	5508331	5508332	6508731	6508732
25	Vibration Isolators (4 Req.)	P022800	P022800	P022800	P022800	P022800	P022800
26	Motor Support (2 Req.)	7B46	7B46	7B46	7B46	7B46	7B46
27	Motor	P062101	P062101	P062101	P062101	P321601	P321601
28	Fan Blade	P200600	P200600	P200600	P200600	P014300	P014300
29	Deflector Baffle Handle	11C63	11C63	11C63	11C63	11C63	11C63
30	★ Vent Enclosure Side (2 Req.)	9812	9812	9812	9812	9812	9812
31	★ Vent Enclosure Front						
30	★ Vent Enclosure Side (2 Req.)	9824	9824	9824	9824	9824	9824
31	★ Vent Enclosure Front						
32	★ Rear Grille, Two-Way						
33	★ Rear Outer Boot, 10" Long						
34	★ Plaster Ground	6801	6801	6801	6801	6801	6801
35	★ Rear Inner Boot, 10-3/4" Long						
36	★ Damper						
32	★ Rear Grille, Two-Way						
33	★ Rear Outer Boot, 7/8" Long						
34	★ Plaster Ground	6802	6802	6802	6802	6802	6802
35	★ Rear Inner Boot, 1-5/8" Long						
36	★ Damper						
37	★ Diffusing Grille Kit (Two-Way)	6703	6703	6703	6703	6703	6703
37	★ Diffusing Grille Kit (One-Way)	6704	6704	6704	6704	6704	6704

NOTE: Screws and bolts are standard hardware items, available locally.

★ Not available separately, in kit form only.

For parts illustration see pages 43 and 44.

Williams Top Vent Gas-Fired Wall Furnace

REPLACEMENT PARTS FOR MODELS 5008731; 5008732; 5508331; 5508332; 6508731 AND 6508732

REF. NO.	DESCRIPTION	PART NO. FOR MODEL:					
		5008731	5008732	5508331	5508332	6508731	6508732
38	★ Side Inner Boot, 10-3/4" Long						
39	★ Side Outer Boot, 10" Long						
40	★ Side Plaster Ground	6701	6701	6701	6701	6701	6701
41	★ Side Grille						
38	★ Side Inner Boot, 1" Long	6702	6702	6702	6702	6702	6702
41	★ Side Grille						
★	★ Trim Strip Kit (Not Shown)	4701	4701	4701	4701	4701	4701
★	★ Oval B/W Vent Kit (Not Shown)	9901	9901	9901	9901	9901	9901
42	Manifold	7B80	7B80	7B80	7B80	7B80	7B80
43	Orifice Fitting, Specify Model & Gas (2 Req.)	P090500	P090500	P090500	P090500	P090500	P090500
44	Locknut (2 Req.)	P026200	P026200	P026200	P026200	P026200	P026200
45	Valve, WILLIAMS Nat.	—	P322041	—	P322043	—	P322041
	Valve, WILLIAMS L.P.G.	P322042	—	P322044	—	P322042	—
46	Thermostat	P322017	P322017	P322017	P322017	P322017	P322017
47	Junction Block Thermocouple	P321828	P321828	—	—	P321828	P321828
47	Flame Sensor	—	—	P271100	P271100	—	—
48	Pilot, Cast Iron Burner, Robertshaw L.P.G.	P179800	—	P229200	—	P179800	—
	Pilot, Cast Iron Burner, Robertshaw Nat.	—	P179700	—	P229100	—	P179700
	Pilot, Formed Steel Burner, Robertshaw Nat.	—	P321837	—	P229300	—	—
49	Burner Spacer, Cast Iron Burner (2 Req.)	P018100	P018100	P018100	P018100	P018100	P018100
	Burner Spacer, Formed Steel Burner (2 Req.)	—	P230500	—	P230500	—	—
50	Burner, Cast Iron, Nat. or L.P.G. (2 Req.)	P025600	P025600	P025600	P025600	P025600	P025600
	Burner, Formed Steel, Nat. Gas Only (2 Req.)	—	7C52	—	7C52	—	—
51	Ignition Control	—	—	P321910	P321910	—	—
52	Wire Assembly	—	—	P321524	P321524	—	—
53	Wire Assembly	—	—	P322048	P322048	—	—
54	Wire Assembly (2 Req.)	P322048	P322048	—	—	P322048	P322048
55	Manifold Adapter	P321888	P321888	P321887	P321887	P321888	P321888
56	Ignition Control Shield	—	—	7C79	7C79	—	—
57	Ignition Control Wires (Not Shown)	—	—	31B036	31B036	—	—

NOTE: Screws and bolts are standard hardware items, available locally.

★ Not available separately, in kit form only.

For parts illustration see pages 43 and 44.

Notes



owners manual

SERVICE

MODEL NOS.

3508331**3508332****3508731****3508732****5008731****5008732****5508331****5508332****6508731****6508732**

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
<p>Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.</p>	<p>If you smell gas:</p> <ol style="list-style-type: none"> 1. Open windows. 2. Don't touch electrical. 3. Extinguish any open flame. 4. Immediately call your gas supplier.

POSSIBLE CAUSE	WHAT TO DO
<p>If fan motor is noisy — Housing rattling. Fan dirty. Fan blade bent. Motor bearings need oiling.</p>	<p>Tighten screws. Clean fan blade. Replace fan blade. Oil motor.</p>
<p>If fan does not run — Fuse blown or tripped circuit breaker. Motor bearings need oiling.</p>	<p>Replace fuse or reset breaker. Oil motor.</p>
<p>If your furnace is not heating or not giving enough heat — Fuse blown or tripped circuit breaker. Thermostat is not set correctly. Air flow restricted.</p>	<p>Replace fuse or reset breaker. Reset thermostat to desired setting. Check that doors, drapes or furniture are not blocking furnace louvers.</p>
<p>If your furnace short cycles — Thermostat anticipator not set correctly.</p>	<p>Set anticipator (See Page 20).</p>
<p>If your furnace pops and cracks — Heat exchanger expansion and contraction.</p>	<p>Normal condition, especially with newer furnaces.</p>

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

