INTRODUCTION

Materials Needed

- Pipe joint compound resistant to L.P. gases.
- Caulking compound-silicone rubber with a temperature rating of 500°F.
- DO NOT use caulking advertised as paintable or for bathtub use as most contain fillers and will not withstand high temperatures.
- Pipe and fittings to make connections to the furnace.
- Electrical wiring supplied as needed for optional blower.
- Minimum wire size is #14 gauge copper.

Tools Needed

- Hand drill or properly grounded electric drill
- 6 ft. folding rule or tape measure
- Screwdrivers (Phillips Head)
- Pliers (wire cutting)
- Stud locator or small finishing nails.
- Tin snips
- 8 and 12 inch adjustable wrenches
- Keyhole or sabre saw
- (2) 10 inch or 12 inch pipe wrenches
- Gloves and safety glasses

Helpful Installation Information

The following booklets will help you in making the installation:

ANSI/NFPA 70, or current edition “National Electrical Code”.
In Canada: CSA C22.1 Canadian Electrical Code.

American National Standard Z223.1 or current edition of the “National Fuel Gas Code.”

Obtain from the American National Standard Institute, Inc., 1430 Broadway, New York, NY 10018. In Canada, CAN/CGA B149.

Optional Accessories

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

KIT NUMBER	WALL THICKNESS	MODELS
9301	9 inches to 15 inches	22038 / 30038 Series
9302	15 inches to 24 inches	22038 Series
9303	15 inches to 24 inches	14038 / 30038 Series
9304	9 inches to 15 inches	14038 Series

BLOWER ACCESSORIES 2302 / 2303 – To increase circulation of warmed air within the heated space, you may use Blower Accessory Kit 2302, for model series 22038 or Kit 2303 for model series 14038. Both are equipped with a two speed fan and an automatic fan switch.

THIN WALL COLLAR KIT 9307 – For walls less than 4-1/2 inches thick, a Thin Wall Collar Kit may be used to increase wall thickness.

VENT-CAP GUARD 9308 – This mounts to the outside of the exterior wall over the vent cap, to protect pedestrian traffic from heat.

VENT SHIELD DEFLECTOR 4318 – Insulated, galvanized sheet for all direct-vent models.

THERMOSTAT P322016

GAS CONVERSION KITS – Used to convert your furnace from natural gas to propane gas and from propane gas to natural gas. See page 12

INSTALLING YOUR FURNACE

Locating Your Wall Furnace

Consider the following points before attempting to install the furnace.

ALL MODELS

1. This is a direct-vent wall furnace. It must be installed on an outside wall for proper venting of flue gases. Figure 1
2. Wall furnace must be surface mounted on an outside wall up to 24-inches thick when using an optional Vent Extension Kit.
3. Check the clearances needed from the furnace and vent. Figure 1 and 2 You must place the furnace where you will have no less than the clearances shown.
4. The outside vent must be at least 18-inches away from any window or other building opening.
5. The furnace will not work if anything stops free entry of fresh air into the vent, or free flow of flue gases from it. Be sure the center of the vent cap is at least 12-inches above ground level or shrubs. Figure 1 Make sure shrubs are kept trimmed. It must also be at least 18-inches from any wall or other blockage and 30-inches below any overhang.
6. Place the furnace near the center of the space to be heated for good air circulation. Do not put it behind a door or draperies. Do not put it in a closet, alcove, hallway or other confined space where the furnace could be isolated by closing doors to the heated space.
7. Be sure that gas piping and electrical wiring (optional blower only) can be brought to the furnace.
8. Select a location that will provide adequate accessibility clearance for servicing and proper operation.

INTERIOR CLEARANCES (FIGURE 2)

14038 SERIES:

1. There must be at least 1-3/16 inches of space between the floor (top of floor covering) and the bottom of cabinet.
2. The top of the furnace must be at least 24-inches from the ceiling or other projecting overhang.
3. The side of the furnace must not be closer than 2-inches to an adjacent wall.

22038 / 30038 SERIES:

1. There must be at least 5-1/2 inches of space between the floor (top of floor covering) and the bottom of cabinet.
2. The top of the furnace must be at least 30-inches from the ceiling or other projecting overhang.
3. The side of the furnace must not be closer than 2-inches to an adjacent wall.

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

HOT SPOTS

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

COLD SPOTS

Concealed pipes/ducts
Stairwells (drafts)
Doors (drafts)
Unheated rooms on other side of the wall

DEAD SPOTS

Behind doors

Corners / alcoves

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

FIGURE 1

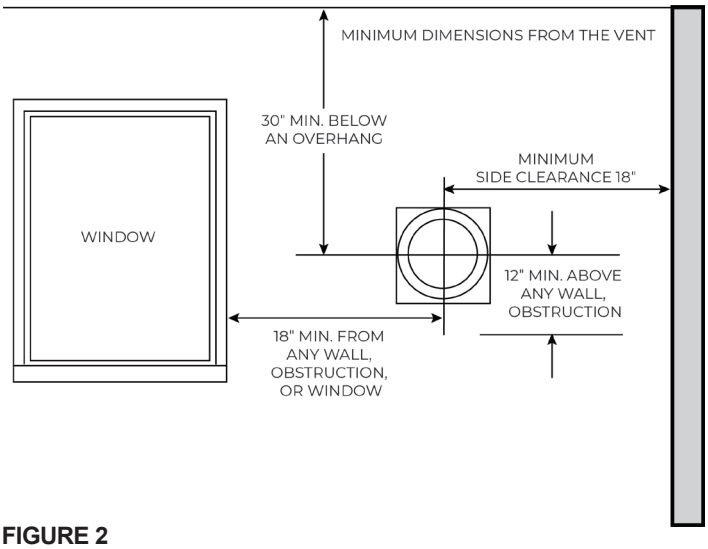
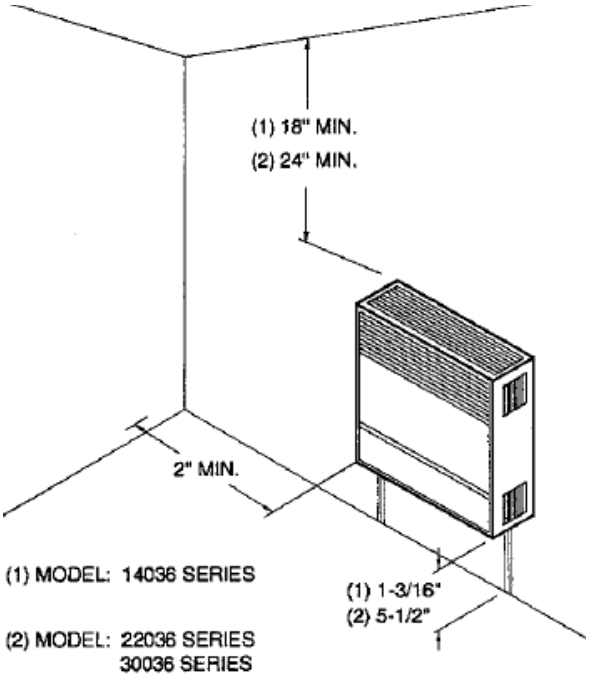


FIGURE 2



INSTALLING YOUR FURNACE

To avoid electrical shock, turn off all electrical circuits that pass through the wall where you are going to install the furnace.

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

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

FIND THE STUDS

Find the studs where the furnace is to be placed. Use a stud locator or small finishing nails. Drive a nail on the inside of the first stud. Drive a second nail on the outside of this stud.

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

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

CUT VENT OPENING

After locating the studs, use the cardboard template Figure 4. Line up the center of the stud lines on the template with the center lines you have drawn on the wall. Use the template to draw the 9-1/4 inch diameter circle on the wall. Then mark the location of the gas supply line.

Using a window, door or wall corner for reference, measure to find where the vent will be on the outside wall. Check to be sure of the proper clearances Figures 1 and 2. If necessary, relocate the furnace for proper clearances.

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

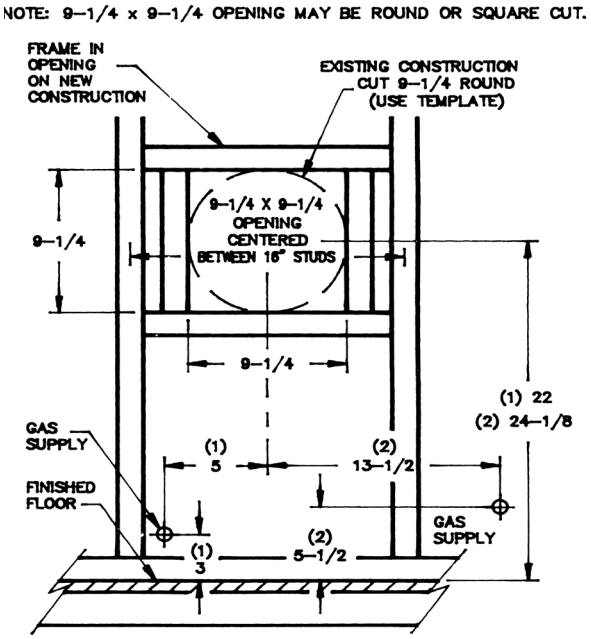
Make sure the wall openings are aligned so vent tubes and vent will fit properly.

In new construction, frame in 9-1/4 inch x 9-1/4 inch opening centered between the studs spaced 16 inches on centre and the center point located as noted in Figure 3.

GAS AND ELECTRICAL SUPPLY OPENINGS

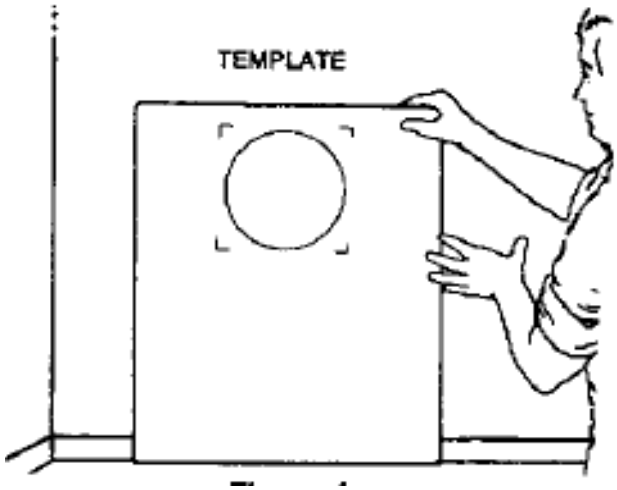
Holes must be drilled for the gas line (and electrical supply if you use an optional blower kit). Drill a 1-1/2 inch hole in the wall for the gas line where indicated on the cardboard template. Figure 4. You will have to determine whether the gas line will enter the home through the outside wall or the floor plate. These instructions can only guide you to where the gas line will enter the furnace.

FIGURE 3



1. 14036 Series
2. 22036 / 30036 Series

FIGURE 4



The gas line can be run at this time or after the furnace is mounted. See Gas Supply and Piping section.

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

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

INSTALL SPACER PLATE (Figure 5)

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

IMPORTANT: The vent tubes are factory equipped for walls 5 to 9 inches thick only. For wall thicknesses up to 24 inches, follow the instructions packed with the appropriate factory Vent Extension Kits.

FURNACE MOUNTING (Figure 5)

Set the furnace body against the wall, legs on the floor, with the vent tubes extending through the spacer plate.

Fasten the furnace to the wall through holes at the top and bottom of the support legs using the four (4) #3 round headed (long) screws provided.

Push the air inlet shield on from the exterior side of the wall. Rotate the air inlet shield until the notches on the end of the tube are straddling the standoff tabs on the mounting spacer plate. Trim the air inlet shield flush with the exterior of the wall. Never crimp the vent tubes or force them to fit.

NOTE: Do not trim flue extension or air inlet collar.

INSTALL VENT CAP

Outside, place a single strip of mastic (provided) around the back flange of the vent cap. Figure 6 Install the vent cap by inserting it into the air inlet tube and over the vent tube.

Important: The top of the vent cap is embossed “TOP”. Install it in the correct position to prevent water from entering the wall. Level the vent cap and attach it to the outside wall with four (4) #8 roundheaded (long) screws. Figure 6

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

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

When the vent cap is to be installed on vinyl siding, or a projection within 6 inches of any side that could block the air inlet, the entire vent should be supported away from the wall at least the distance of the projection. A 2" x 4" frame, with outside dimensions that match the overall dimensions of the mounting plate, is recommended. The 2" x 4" frame protects vinyl siding from possible damage. Seat and paint all joints. The wall depth plus the additional 2" x 4" frame depth should not exceed a total depth of 13 inches.

Thermostat Installation (Sold Separately)

WALL MOUNTING

1. Use Williams thermostat P322016 or any millivolt thermostat.
2. If an existing thermostat is being replaced and is in a satisfactory location and the wiring is in good condition, use existing wiring. If in doubt, use new wiring.
3. If a new location is chosen or if this is a new installation, the thermostat wire 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.
4. Before drilling a hole in the wall at the selected location,

FIGURE 5

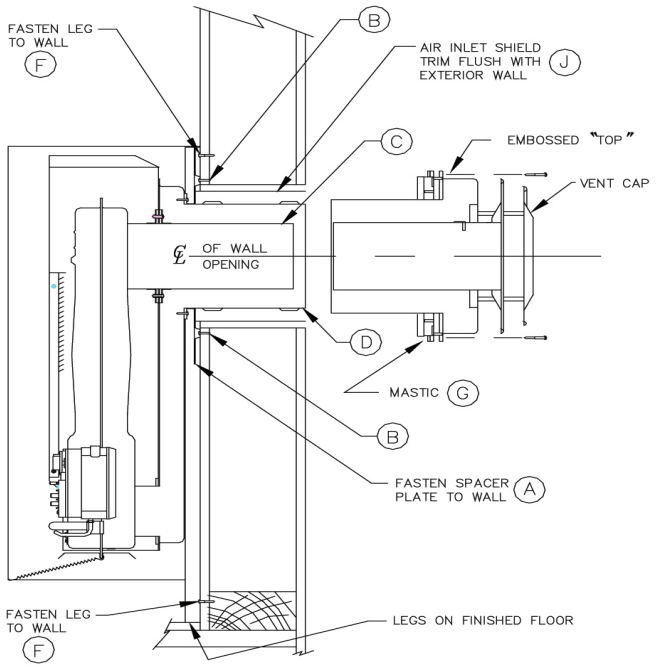
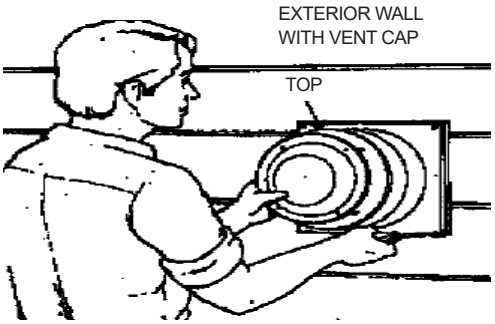


FIGURE 6



drive a small finishing nail through the ceiling in the comer 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.

5. Probe for obstructions in the partition. Then, drill a 1/2-inch hole through the wall at the selected location for the thermostat.
6. From the attic, feed the thermostat wire or a stiff wire through the wall until even with thermostat location.
7. Snag the thermostat wire through the wall so that 6 inches of wire protrudes.
8. Route wire to the furnace leaving enough excess wire to make the connections at the gas valve.

INSTALLING YOUR FURNACE

CABINET MOUNTING

1. Locate the knockout on the right side of the furnace to mount the thermostat. Remove the knockout by tapping it lightly with a screwdriver.
2. Cut the thermostat wire to the required length below.

Model Number	Length
14038 Series	31 inches
22038 Series	45 inches
30038 Series	47 inches

3. Connect the thermostat wires to terminal screws on the front of the thermostat base. See instructions packaged with thermostat.
4. Feed the thermostat wires through the knockout and to the gas valve.

IMPORTANT: Keep the thermostat wire away from the combustion chamber.

5. Mount the thermostat to the side of cabinet with the screws provided. Replace the thermostat cover.
6. Connect the thermostat wire to the gas valve. Figure 9

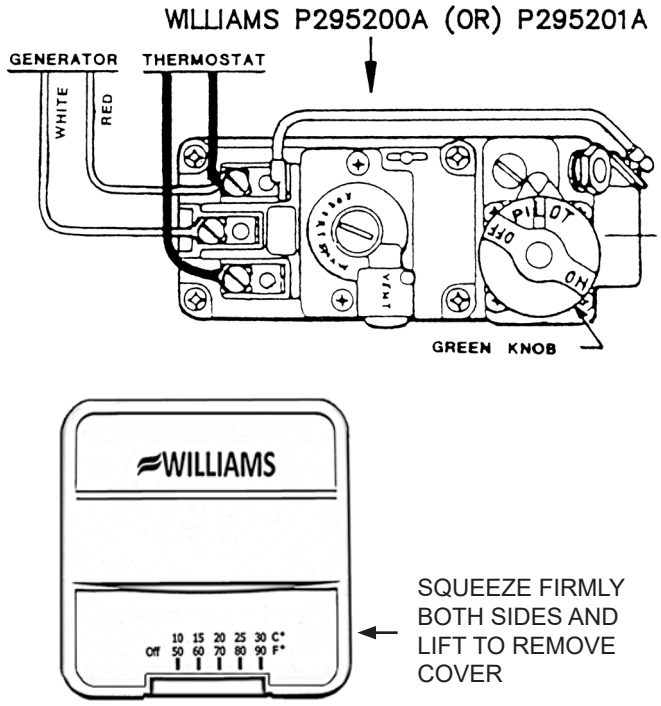
IMPORTANT: BEFORE REMOVING THE FACE PANEL DISCONNECT THERMOSTAT WIRES AT THE GAS VALVE.

Thermostat Mounting

1. To remove the thermostat cover, grasp cover and squeeze both sides firmly, then lift to remove cover. Carefully remove and discard the packing tab protecting the switch contacts.
2. Connect thermostat wires to the terminal screws on the front of thermostat base.
3. Push any excess wire back through hole in the wall and plug the hole with insulation to prevent drafts from affecting thermostat operation.
4. Being sure to level thermostat for the best appearance. Fasten the thermostat base to the wall through the mounting holes with the screws provided.
5. Replace the thermostat cover.

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

FIGURE 9



Cabinet Installation

14038 SERIES:
Set the cabinet over the furnace body, dropping the rear top flange between the support legs and wall. Open the cabinet door and attach the cabinet to the inner casing with two (2) sheet metal screws. Figure 10

22038 / 30038 SERIES:
Set the cabinet over the furnace body, dropping the rear top flange into the slot in top of the spacer plate and into the slots between the support legs and wall. When correctly positioned side-to-side, a dimple on the rear top flange will slide against the inside of each support leg. Attach two (2) tension springs through the bottom flange of the combustion chamber and the bottom of the cabinet. Fasten the trim strip to the bottom of the support legs using two (2) sheet metal (short) screws. Figure 11

FIGURE 10

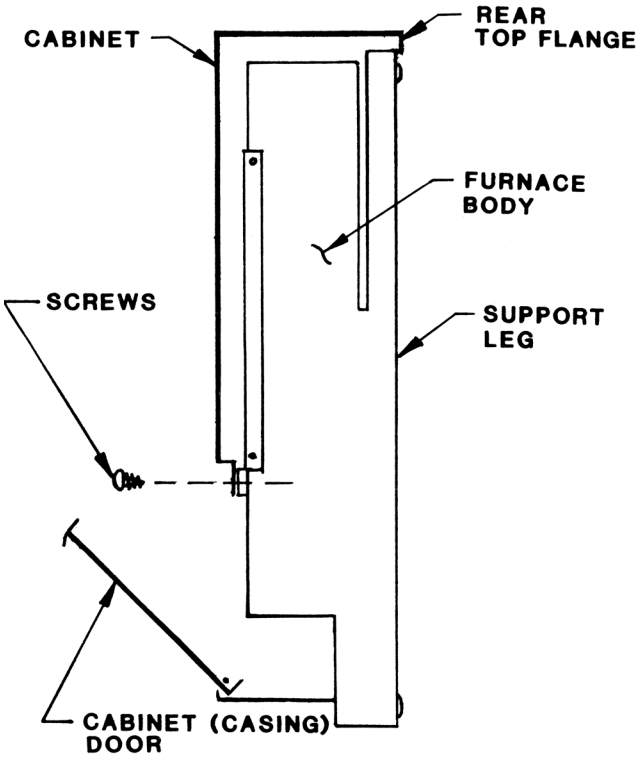
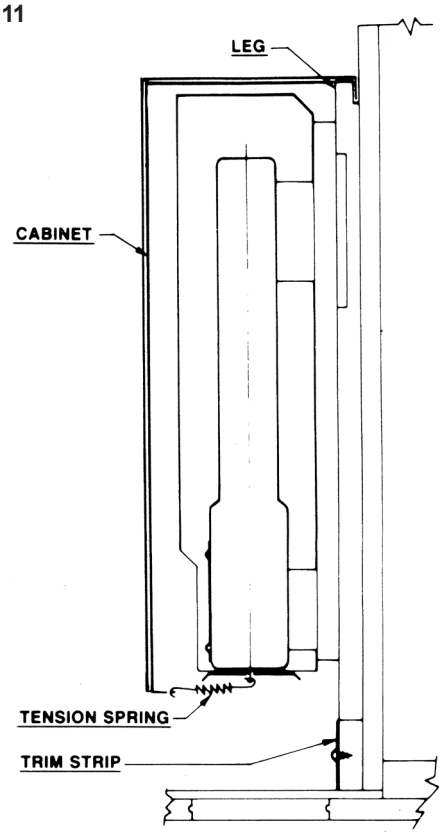


FIGURE 11



Gas Supply and Piping

The gas control valve is shipped with a sealed cover over the gas inlet tapping. Do not remove seal until you are 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. Furnaces designated for use with propane gas have orifices sized for commercially pure propane gas. They cannot be used with butane or a mixture of butane and propane.

GAS SUPPLY

Minimum gas supply pressure for natural gas to the furnace control valve is 5 inches water column and must not be more than 7 inches water column.

Minimum gas supply pressure for propane gas to the furnace control valve must be at least 11 inches water column and must not exceed 13 inches water column.

Gas pressures and pressures to the burners must not exceed the rated input and pressure shown on the rating plate. For natural gas, the manifold pressure should be 4 inches water column. The manifold pressure should be 10 inches water column for propane gas. An orifice change may be required to suit the gas supplied.

Orifice Sizes

The efficiency rating of these appliances is a product thermal efficiency rating determined under continuous operating conditions and determined independently of any installed system. For elevations above 2,000 feet reduce ratings 4% for each 1,000 feet above sea level.

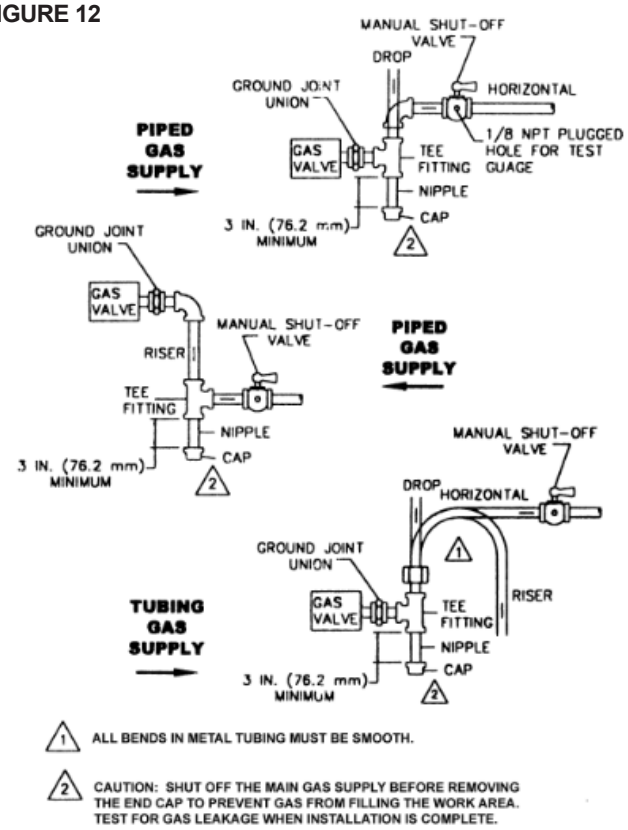
The correct orifice sizes for the different input ratings when using natural or propane gas are:

CAPACITY AND ORIFICE SIZING						
MODEL NUMBER	GAS TYPE	INPUT RATING BUT/hr.	HEATING CAPACITY RATING BUT/hr.	MAIN BURNER ORIFICE		
				DRILL	DEC	QTY
14038	NATURAL	14,000	9,800	#50	.0700	1
14038	PROPANE	14,000	9,800	#56	.0460	1
22038	NATURAL	22,000	16,210	#44	.0860	1
22038	PROPANE	22,000	16,210	N/A	.0560	1
30038	NATURAL	30,000	21,000	#39	.0990	1
30038	PROPANE	30,000	21,000	N/A	.0640	1

INSTALLING YOUR FURNACE

CONVERSION KITS	
DESCRIPTION	**MODELS**
NATURAL GAS TO PROPANE GAS FOR 14038 SERIES	8939
NATURAL GAS TO PROPANE GAS FOR 22038 SERIES	8940
NATURAL GAS TO PROPANE GAS FOR 30038 SERIES	8941
PROPANE GAS TO NATURAL GAS FOR 14038 SERIES	8942
PROPANE GAS TO NATURAL GAS FOR 22038 SERIES	8943
PROPANE GAS TO NATURAL GAS FOR 30038 SERIES	8944

FIGURE 12



Gas Piping

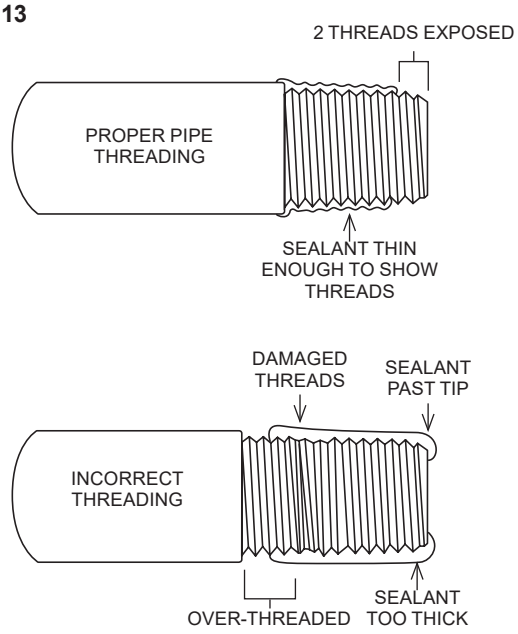
The gas supply line must be of an adequate size to handle the BTU/ hr. requirements and length of the run for the unit being installed.

Determine the minimum pipe size from Figure 14, basing the length of the run from the gas meter or source to the unit.

All piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1 NFPA No. 54), whichever applies. (In Canada: CAN/C.G.A B149). Refer to Figure 12 for the general layout of the unit. It shows the basic fittings needed.

1. Use new, properly reamed pipe free from chips such as steel or black iron pipe and fittings that are approved by local codes. Metal chips and debris can damage the gas valve.
2. Do not thread the pipe too far. Distortion or malfunction may result from excess pipe within the control valve. Apply a moderate amount of good quality dope to the pipe threads only. Leave the two end threads bare. Figure 13 On propane gas installations, use a compound resistant to action of liquefied petroleum gases.
3. Use ground joint unions.
4. Install a drip leg (sediment trap) to trap dirt and moisture before it can enter the gas valve. The nipple must be a minimum of 3-inches long.
5. Install a manual shutoff valve.
6. Provide a 1/8" NPT test gauge connection immediately before the gas supply connection to the furnace.

FIGURE 13



GAS CONNECTION

If installation is for propane gas, use a two-stage regulator and make all connections from the storage the tank to furnace.

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

The connection between the shutoff valve and the burner control assembly can be made with an A.G.A / C.G.A. design certified flexible connector if allowed by local codes.

Tighten all joints securely.

CHECKING THE GAS PIPING

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

⚠ **WARNING:** Danger of property damage, bodily injury or death. Never use a match or open flame to test for leaks. Never exceed specified pressures for testing. Higher pressures may damage the gas valve and cause over firing which may result in combustion chamber failure. Liquefied petroleum gas (L.P.G.) 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 the unit before thoroughly ventilating the area and smelling near the floor for gas odor.

When an existing category I heater is removed or replaced, the original venting system may no longer be sized to properly vent the attached appliances

FIGURE 14

GAS PIPE SIZES			
NATURAL GAS PIPE CAPACITY - BTU/hr. (includes fittings) **PIPE SIZE**			
LENGTH OF PIPE - FT.	**1/2"**	**3/4"**	**1"**
20	92,000	190,000	350,000
40	63,000	130,000	245,000
60	50,000	105,000	195,000
PROPANE GAS PIPE CAPACITY - BTU/hr. (includes fittings) **PIPE SIZE**			
LENGTH OF PIPE - FT.	**1/2"**	**3/4"**	**1"**
20	189,000	393,000	732,000
40	129,000	267,000	504,000
60	103,000	217,000	409,000

INSTALLATIONS IN THE STATE OF MASSACHUSETTS

All installations in the State of Massachusetts must use the following requirements when installing, maintaining or operating direct-vent propane or natural gas-fired space heaters.

For direct-vent appliances, mechanical-vent heating appliances or domestic hot water equipment, where the bottom of the vent terminal and the air intake is installed below four feet above grade the following requirements must be satisfied:

1. If there is not one already present, on each floor level where there are bedroom(s), a carbon monoxide detector and alarm shall be placed in the living area outside the bedroom(s). The carbon monoxide detector shall comply with NFPA 720 (2005 Edition).
2. A carbon monoxide detector shall be located in the room that houses the appliance or equipment and shall:

a. Be powered by the same electrical circuit as the appliance or equipment such that only one service switch services both the appliance and the carbon monoxide detector.
b. Have battery back-up power;
c. Meet ANSI/UL 2034 Standards and comply with NFPA 720 (2005 Edition); and
d. Have been approved and listed by a Nationally Recognized Testing Laboratory as recognized under 527 CMR.

A CARBON MONOXIDE DETECTOR SHALL:

a. Be located in the room that houses the appliance or equipment;
b. Be either hard-wired or battery powered or both; and
c. Shall comply with NFPA 720 (2005 Edition).

3. A product-approved vent terminal must be used, and if applicable, a product-approved air intake must be used. Installation shall be in strict compliance with the manufacturer's instructions. A copy of the installation instructions shall remain with the appliance or equipment at the completion of the installation.
4. A metal or plastic identification plate shall be mounted at the exterior of the building, four feet directly above the location of vent terminal. The plate shall be of sufficient size to be easily read from a distance of eight feet away, and read "Gas Vent Directly Below".