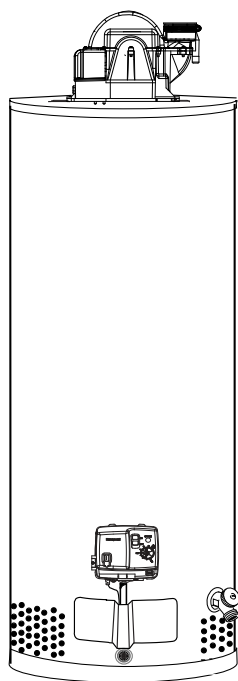


▲WARNING: This water heater is not suitable for use in manufactured (mobile) homes!

Use & Care Manual With Installation Instructions for the Installer

Residential Gas - FVIR Certified **PowerVent**[®] Water Heaters



The purpose of this manual is twofold: one, to provide the installer with the basic directions and recommendations for the proper installation and adjustment of the water heater; and two, for the owner-operator, to explain the features, operation, safety precautions, maintenance and troubleshooting of the water heater. This manual also includes a parts list.

It is very important that all persons who are expected to install, operate or adjust this water heater read the instructions carefully so they may understand how to perform these operations. If you do not understand these instructions or any terms within it, seek professional assistance.

Any questions regarding the operation, maintenance, service or warranty of this water heater should be directed to the seller from whom it was purchased. If additional information is required, refer to the section on "If you need service."

DO NOT destroy this manual. Please read carefully and keep in a safe place for future reference.



Recognize this symbol as an indication of Important Safety Information!



WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

▲ FOR YOUR SAFETY!

- Do not store or use gasoline or other flammable vapors or liquids or other combustible materials in the vicinity of this or any other appliance. To do so may result in an explosion or fire.
- **WHAT TO DO IF YOU SMELL GAS**
 - Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- Do not return to your home until authorized by the gas supplier or fire department.
- Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury, or death. Refer to this manual. Installation and service must be performed by a qualified installer, service agency or the gas supplier.



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FOR YOUR RECORDS

Write the model and serial numbers here:

You can find them on a label on the appliance.

Staple sales slip or cancelled check here.

Proof of the original purchase date is needed to obtain service under the warranty.



READ THIS MANUAL

Inside you will find many helpful hints on how to use and maintain your water heater properly. A little preventive care on your part can save you time and money over the life of your water heater.

You'll find many answers to common problems in the Troubleshooting Guide. If you review the chart of Troubleshooting Tips first, you may not need to call for service.



READ THE SAFETY INFORMATION

Your safety and the safety of others are very important. There are many important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol. Recognize this symbol as an indication of Important Safety Information! This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol and either the word "DANGER", "WARNING", "CAUTION" or "NOTICE".

These words mean:

▲ DANGER

An imminently hazardous situation that will result in death or serious injury.

▲ WARNING

A potentially hazardous situation that could result in death or serious injury and/or damage to property.

▲ CAUTION

A potentially hazardous situation that may result in minor or moderate injury.

NOTICE:

Attention is called to observe a specified procedure or maintain a specific condition.

IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

Be sure to read and understand the entire Use and Care Manual before attempting to install or operate this water heater. It may save you time and money. Pay particular attention to the Safety Instructions. Failure to follow these warnings could result in serious bodily injury or death. Should you have problems understanding the instructions in this manual, or have any questions, STOP, and get help from a qualified service technician, or the local gas utility.

NOTICE: This water heater is equipped with a flammable vapor sensor that will automatically shut down the water heater in the presence of gasoline vapors and some other flammable vapors. If the flammable vapor sensor shuts down the water heater, contact a qualified service technician. Clear any hazardous materials and ventilate the area around the water heater. **DO NOT** turn off the appliance or adjust the ON/OFF switch in any way. **DO NOT** tamper with the flammable vapor sensor. **DO NOT** submerge the flammable vapor sensor in water. **DO NOT** allow the flammable vapor sensor to come into contact with any substances such as bleach or cleaners. See the “Gas Valve LED Error Code” Section of this manual for a list of error codes.

! DANGER!

INSTALL THE BLOWER ASSEMBLY AND PROPERLY VENT THE WATER HEATER

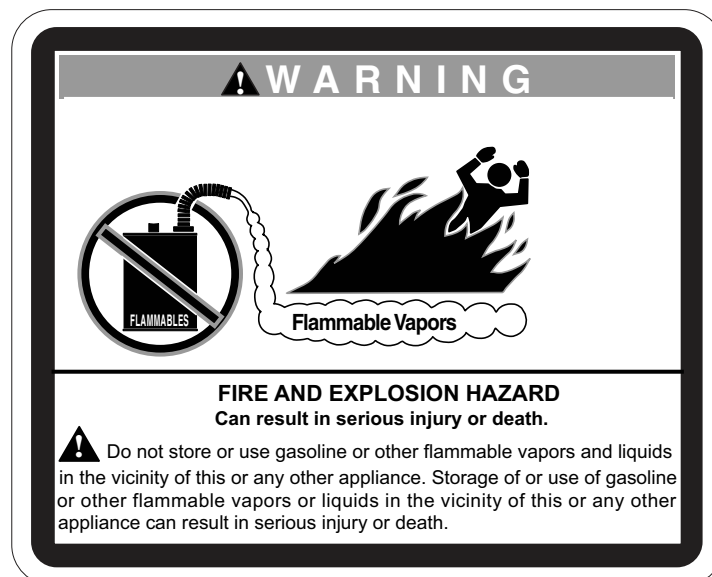


Failure to install the blower assembly and properly vent the water heater to the outdoors as outlined in the Venting Section of the Installation Instructions in this manual can result in unsafe operation of the water heater. To avoid the risk of fire, explosion, or asphyxiation from carbon monoxide, never operate this water heater unless it is properly vented and has an adequate air supply for proper operation. Be sure to inspect the vent system for proper installation at initial start-up; and at least annually thereafter. Refer to the Care and Cleaning section of this manual for more information regarding vent system inspection.



! WARNING!

Gasoline, as well as other flammable materials and liquids (which include but are not limited to adhesives, solvents, paint thinners etc.), and the vapors they produce are extremely dangerous. **DO NOT** handle, use or store gasoline or other flammable or combustible materials anywhere near or in the vicinity of a water heater or any other appliance. Be sure to read and follow warning label pictured below and other labels on the water heater, as well as the warnings printed in this manual. Failure to do so can result in property damage, bodily injury or death.



IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.



! DANGER!

WATER TEMPERATURE SETTING

Safety and energy conservation are factors to be considered when selecting the water temperature setting of a water heater's gas control. Water temperatures above 125°F (52°C) can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined on the label pictured below. This label is also located on the water heater.

DANGER

Water temperature over 125°F (52°C) can cause severe burns instantly or death from scalds.

Children, disabled and elderly are at highest risk of being scalded.

Feel water before bathing or showering.

Temperature limiting valves are available see manual.

Time/Temperature Relationship in Scalds

Water Temperature	Time To Produce a Serious Burn
120°F (49°C)	More than 5 minutes
125°F (52°C)	1½ to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (66°C)	About 1½ seconds
155°F (68°C)	About 1 second

Table courtesy of Shriners Burn Institute

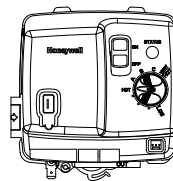
The chart shown above may be used as a guide in determining the proper water temperature for your home.

! DANGER: Households with small children, disabled, or elderly persons may require a 120°F (49°C) or lower gas control (thermostat) setting to prevent contact with “HOT” water.

Maximum water temperatures occur just after the burner has shut off. To find water temperature being delivered, turn on a hot water faucet and place a thermometer in the water stream and read the thermometer. (See pages 29 and 30 for more details).

The temperature of the water in the heater can be regulated by rotating the dial on the front of the combination gas control (thermostat). To comply with safety regulations the combination gas control (thermostat) was set at its lowest setting before the water heater was shipped from the factory.

The illustration below details the approximate water temperature for each mark on the combination gas control (thermostat), temperature knob.



! DANGER: Hotter water increases the potential for Hot Water SCALDS.

Valve Set Point	Estimated Temperature	Burns on Adult Skin
LOW	90°F (32°C)	-----
•	98°F (37°C)	-----
•	105°F (41°C)	-----
•	113°F (45°C)	-----
HOT	120°F (49°C)	More than 5 minutes
A	130°F (54°C)	About 30 seconds
B	140°F (60°C)	Less than 5 seconds
C	150°F (66°C)	About 1-1/2 seconds
VERY HOT	160°F (71°C)	About 1/2 second

NOTICE: Mixing valves are recommended for reducing point of use water temperature by mixing hot and cold water in branch water lines. It is recommended that a mixing valve complying with the Standard for Temperature Actuated Mixing Valves for Hot Water Distribution Systems, ASSE 1017 be installed. See pages 29 & 30 for more details and contact a licensed plumber or the local plumbing authority for further information.



⚠️ DANGER!

LIQUEFIED PETROLEUM (LP PROPANE OR BUTANE) AND NATURAL GAS MODELS

LP and Natural gas have an odorant added to aid in detecting a gas leak. Some people may not physically be able to smell or recognize this odorant. If you are unsure or unfamiliar with the smell of LP or natural gas, ask the gas supplier. Other conditions, such as “odorant fade”, which causes the odorant to diminish in intensity, can also hide or camouflage a gas leak.

- Water heaters utilizing LP gas are different from natural gas models. A natural gas water heater will not function safely on LP gas and vice versa.
 - No attempt should ever be made to convert the water heater from natural gas to LP gas. To avoid possible equipment damage, personal injury or fire, **DO NOT** connect the water heater to a fuel type not in accordance with the unit data plate. LP for LP units. Natural gas for natural gas units. These units are not certified for any other fuel type.
 - LP appliances should not be installed below grade (for example, in a basement) if such installation is prohibited by federal, state and/or local laws, rules, regulations or customs.
 - LP gas must be used with great caution. It is heavier than air and will collect first in lower areas making it hard to detect at nose level.
 - Before attempting to light the water heater, make sure to look and smell for gas leaks. Use a soapy solution to check all gas fittings and connections. Bubbling at a connection indicates a leak that must be corrected. When smelling to detect a gas leak, be sure to sniff near the floor also.
 - Gas detectors are recommended in LP & natural gas applications and their installation should be in accordance with the detector manufacturer’s recommendations and/or local laws, rules, regulations or customs.
 - It is recommended that more than one method, such as soapy solution, gas detectors, etc., be used to detect leaks in gas applications.
- ⚠️ DANGER:** If a gas leak is present or suspected:
- **DO NOT** attempt to find the cause yourself.
 - **DO NOT** try to light any appliance.
 - **DO NOT** touch any electrical switch.
 - **DO NOT** use any phone in your building.
 - Leave the house immediately and make sure your family and pets leave also.
 - Leave the doors open for ventilation and contact the gas supplier, a qualified service agency or the fire department.
 - Stay away from the house (or building) until the service call has been made, the leak is corrected and a qualified agency has determined the area to be safe.

IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

WARNING!

For your safety, the information in this manual must be followed to minimize the risk of fire or explosion, electric shock, or to prevent property damage, personal injury, or loss of life.



FOR INSTALLATIONS IN THE STATE OF CALIFORNIA

California Law requires that all new and replacement water heaters, and all existing residential water heaters, must be braced, anchored, or strapped to resist falling or horizontal displacement due to earthquake motion. At a minimum, any water heater shall be secured in accordance with the California Plumbing Code, or modifications made thereto by a city, country, or city and country pursuant to Section 17958.5. Generic instructions for California titled "Guidelines for Earthquake Bracing Residential Water Heaters" can be obtained by:

- Writing the California, Department of General Services, Division of State Architect, 1102 Q Street, Suite 5100, Sacramento, CA 95814
- Calling (916) 445-8100
- Following web address:
https://www.dgs.ca.gov/-/media/Divisions/DSA/Publications/gas_shutoff/waterheaterbracing



SAFETY PRECAUTIONS

Have the installer show you the location of the gas shut-off valve and how to shut it off if necessary. Turn off the manual shut-off valve if the water heater has been subjected to overheating, fire, flood, physical damage or if the gas supply fails to shut off.

- Read this manual entirely before installing or operating the water heater.
- Use this appliance only for its intended purpose as described in this Use and Care Manual.
- Be sure your appliance is properly installed in accordance with local codes and the provided installation instructions.
- **DO NOT** attempt to repair or replace any part of your water heater unless it is specifically recommended in this manual. All other servicing should be referred to a qualified technician.



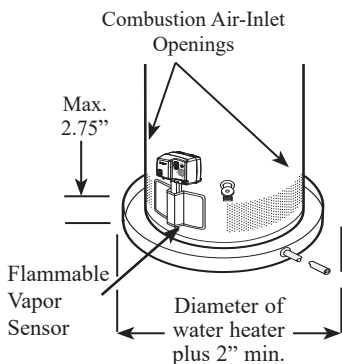
READ AND FOLLOW THIS SAFETY INFORMATION CAREFULLY.

SAVE THESE INSTRUCTIONS IMPORTANT

Carefully inspect the water heater for damage before proceeding with the installation. Of specific interest should be any dents in the combustion air inlet openings located around the perimeter of the water heater or damages to the blower assembly. If you do find damage, **DO NOT** install or attempt any repair to the water heater. Contact the manufacturer as detailed under "IF YOU NEED SERVICE" on page 40.

Installing the water heater

This water heater must be installed in accordance with these instructions, local codes, utility company requirements, and/or in the absence of local codes, use the latest edition of the American National Standard/National Fuel Gas Code. A copy can be purchased from either the American Gas Association, 400 N. Capitol Street NW, Washington, DC 20001 as ANSI standard Z223.1 or National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269 as booklet NFPA 54.



The auxiliary drain pan installation **MUST** conform to local codes.

NOTICE: DO NOT allow the drain pan to obstruct the flammable vapor sensor.

NOTICE: DO NOT allow the flammable vapor sensor to become submerged in water. Make sure the drain pan is properly drained.

▲ WARNING: Combustible construction refers to adjacent walls and ceilings and should not be confused with combustible or flammable products and materials. Combustible and/or flammable products and materials should never be stored in the vicinity of this or any gas appliance.

Location

The water heater should not be located in an area where leakage from the tank or connections will result in damage to the area adjacent to the heater or to lower floors of the structure.

When such areas cannot be avoided it is recommended that a suitable drain pan, adequately drained, must be installed under the water heater.

The water heater must be centered in the drain pan.

The drain pan must not restrict air flow to the combustion air inlet openings (perforation openings) located around the lower perimeter of the water heater.

Drain pan kits are available from the store where the water heater was purchased, or any water heater distributor.

Make certain the floor underneath the water heater is strong enough to sufficiently support the weight of the water heater once it is filled with water.

A gas fired water heater or any other appliance should not be installed in a space where liquids which give off flammable vapors are to be used or stored. Such liquids include gasoline, LP gas (butane or propane), paint or adhesives and their thinners, solvents or removers.

DO NOT block or obstruct any of the combustion air inlet openings located around the perimeter of the water heater. A minimum of 1 in. is required between these combustion air inlet openings and any obstruction.

DO NOT obstruct or block the Flammable Vapor Sensor.

Because of natural air movement in a room or other enclosed space, flammable vapors can be carried some distance from where liquids which give off flammable vapors are to be used or stored. The open flame of the water heater's pilot or main burner can ignite these vapors and create a shut down condition of the water heater which will not allow the water heater to ignite until examined by a Qualified Service Technician.

FVIR certified gas water heaters can be installed on a residential garage floor without the use of an 18 in (46 cm) stand in accordance with the National Fuel Gas Code, NFPA 54, unless otherwise directed by State and Local code requirements. The water heater must be located so it is not subject to physical damage, for example, by moving vehicles, area flooding etc.

- **DO NOT** install the water heater in a location where it may be subjected to ambient temperatures exceeding 125°F (52°C).
- The water heater should be installed so as to minimize the length of plastic vent pipe and the number of vent connection fittings required.
- Hot water lines should be insulated to conserve water and energy.
- Protect the water heater and water lines from exposure to freezing temperatures.
- **DO NOT** install the water heater in bathrooms, bedrooms, any occupied rooms normally kept closed, or in unprotected outdoor areas.
- **DO NOT** install this water heater outdoors.
- Minimum clearance from combustible construction:

*Front	Sides	Rear	**Top
3"	1"	0"	12"
(7.6 cm)	(2.5 cm)	(0 cm)	(30.5 cm)

* "Front" clearance dimension is measured from the water heater jacket to the closet door.

** "Top" clearance dimension is measured from the jacket top to the ceiling.

If the clearances stated on the Instruction/Warning Label, located on the front of the heater differ, install the water heater according to the clearances stated on the label.

- If the water heater is to be installed directly on carpeting, the water heater shall be installed on a metal or wood panel extending beyond the full width and depth of the water heater by at least 3 in. (7.6 cm) in all directions or, if the water heater is to be installed in an alcove or closet, the entire floor must be covered by a wood or metal panel.

NOTICE: For proper operation and maintenance, a minimum clearance of 1.5 inches (3.8 cm) must be provided from the combination temperature and pressure relief valve to any wall or object.

Installing the water heater

Combustion and Ventilation Air

Proper operation of the water heater requires air for combustion and ventilation. Provisions for combustion and ventilation air must comply with referenced codes and standards.

DO NOT block or obstruct any of the combustion air inlet openings located around the perimeter of the water heater. A minimum of 1 in. (2.54 cm) is required between these combustion air inlet openings and any obstruction.

NOTICE: If the water heater is installed in an unconfined space within a building of conventional frame, masonry or metal construction, infiltration air is normally adequate for proper combustion and ventilation. If the water heater is installed in a confined space, provisions for combustion and ventilation air must be made.

DO NOT obstruct or block the Flammable Vapor Sensor.

A confined space is one having a volume of less than 50 cubic feet per 1,000 Btu/H (1.42 cubic meters per .29 kw) of the aggregate input of all appliances within that space.

The air must be supplied through two permanent openings of equal area. One is to be located within 12 in. (30.5 cm) above the floor and the other is to be located within 12 in. (30.5 cm) from the ceiling.

The minimum net free area of each opening must not be less than one square inch (6.45 square cm) per 1,000 Btu/h of the total input rating of all the appliances in the enclosure [but not less than 100 square inches (6.45 square cm)], if each opening communicates with other unconfined areas inside the building.

Buildings of unusually tight construction shall have the combustion and ventilation air supplied from outdoors, or a freely ventilated attic or crawl space.

If air is supplied from outdoors, directly or through vertical ducts, there must be two openings located as specified above and each must have a minimum net free area of not less than one square inch (6.45 square cm) per 4,000 Btu/h (1.17 kw) of the total input rating of all the appliances in the enclosure.

If horizontal ducts are used to communicate with the outdoors, each opening must have a minimum net free area of not less than one square inch (6.45 square cm) per 2,000 Btu/h (.58 kw) of the total input rating of all the appliances in the enclosure. If ducts are used, the minimum dimensions of rectangular air ducts shall not be less than 3 in. (7.6 cm)

NOTICE: If the duct openings which supply combustion and ventilation air are to be covered with a protective screen or grill, the net free area (openings in the material) of the covering material must be used in determining the size of the openings. Protective screening for the openings **MUST NOT** be smaller than 1/4 in. (.64 cm) mesh to prevent clogging by lint or other debris.

Corrosive Atmospheres

NOTICE: The water heater should not be installed near an air supply containing halogenated hydrocarbons.

The air in beauty shops, dry cleaning establishments, photo processing labs, and storage areas for liquid and powdered bleaches or swimming pool chemicals often contain such halogenated hydrocarbons.

An air supply containing halogenated hydrocarbons may be safe to breathe, but when it passes through a gas flame corrosive elements are released that will shorten the life of any gas burning appliance.

Propellants from common spray cans or gas leaks from A/C and refrigeration equipment are highly corrosive after passing through a flame.

The water heater warranty is voided when failure of the heater is due to operation in a corrosive atmosphere.

Thermal Expansion

Determine if a check valve exists in the inlet water line. Check with your local water utility company. It may have been installed in the cold water line as a separate back flow preventer, or it may be part of a pressure reducing valve, water meter or water softener. A check valve located in the cold water inlet line can cause what is referred to as a **“closed water system”**. A cold water inlet line with no check valve or back flow prevention device is referred to as an **“open”** water system.

As water is heated, it expands in volume and creates an increase in the pressure within the water system. This action is referred to as **“thermal expansion”**. In an **“open”** water system, expanding water which exceeds the capacity of the water heater flows back into the city main where the pressure is easily dissipated.

A **“closed water system”**, however, prevents the expanding water from flowing back into the main supply line, and the result of **“thermal expansion”** can create a rapid and dangerous pressure increase in the

water heater and system piping. This rapid pressure increase can quickly reach the safety setting of the relief valve, causing it to operate during each heating cycle. Thermal expansion, and the resulting rapid, and repeated expansion and contraction of components in the water heater and piping system can cause premature failure of the relief valve, and possibly the heater itself. Replacing the relief valve will not correct the problem!

The suggested method of controlling thermal expansion is to install an expansion tank in the cold water line between the water heater and the check valve (see illustration below). The expansion tank is designed with an air cushion built in that compresses as the system pressure increases, thereby relieving the over pressure condition and eliminating the repeated operation of the relief valve. Other methods of controlling thermal expansion are also available. Contact your installing contractor, water supplier or plumbing inspector for additional information regarding this subject.

IMPORTANT: DO NOT apply heat to the HOT or COLD water connections. If sweat connections are used, sweat tubing to adapter before fitting adapter to the cold water connections on heater. Any heat applied to the cold water supply fittings will permanently damage the dip tube and heat traps.

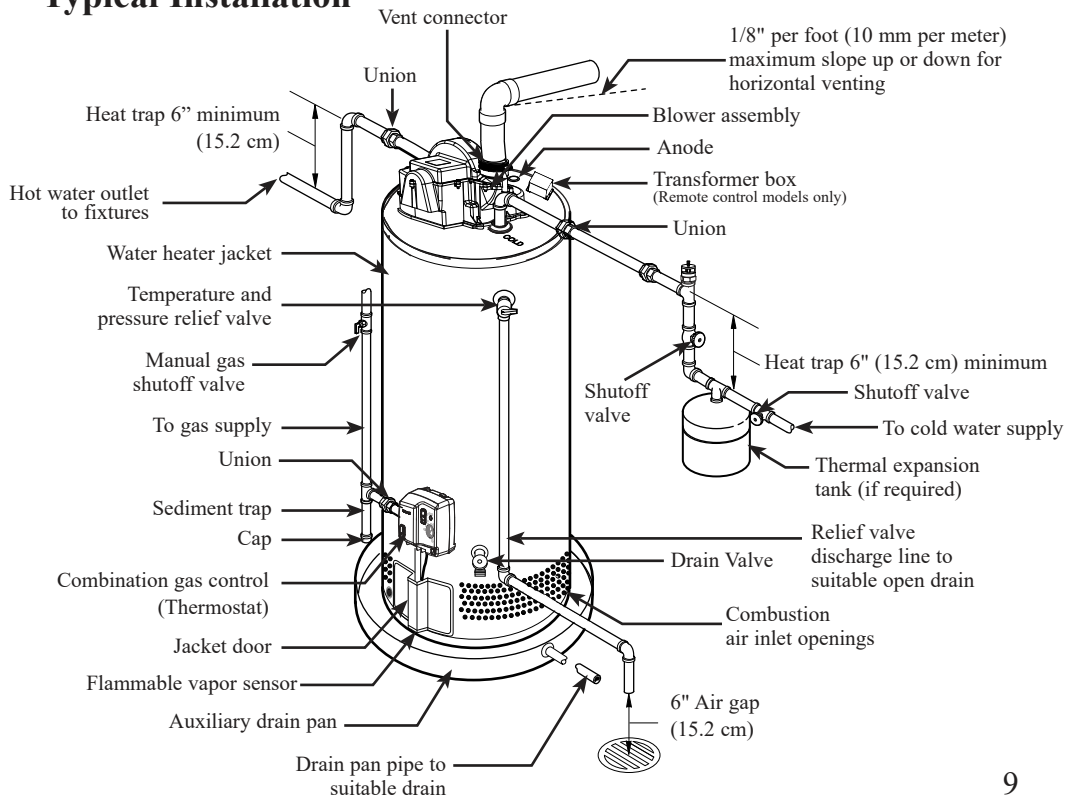
NOTICE: The National Fuel Gas Code (NFGC) mandates a manual gas shut-off valve: See (NFGC) for complete instructions. Local codes or plumbing authority requirements may vary from the instructions or diagrams provided and take precedent over these instructions.

Water Supply Connections

Refer to the illustration below for suggested typical installation. The installation of unions or flexible connectors is recommended on the hot and cold water connections so that the water heater may be easily disconnected for servicing if necessary. If flexible water connections are used, they must comply with

the standard for flexible Water Connectors, ASME A112.18.6/CSA-B125.6. The HOT and COLD water connections are clearly marked on the water heater. Install a shutoff valve in the cold water line near the water heater. Refer to the following illustration for suggested typical installation.

Typical Installation



Installing the water heater

A new combination temperature and pressure relief valve, complying with the Standard for Relief Valves for Hot Water Supply Systems, ANSI Z21.22/CSA 4.4, is factory installed and must remain in the opening provided and marked for the purpose on the water heater. No valve of any type should be installed between the relief valve and the tank.

Relief Valve

The pressure rating of the relief valve must not exceed 150 psi (1,034 kPa), the maximum working pressure of the water heater as marked on the rating plate.

The Btu/h rating of the relief valve must equal or exceed the Btu/h input of the water heater as marked on its rating plate.

Position the outlet of the relief valve above a suitable open drain to eliminate potential water damage. Piping used should be of a type approved for hot water distribution.

The discharge line must be no smaller

than the outlet of the valve and must pitch downward from the valve to allow complete drainage (by gravity) of the relief valve and discharge line.

The end of the discharge line should not be threaded or concealed and should be protected from freezing. No valve of any type, restriction, or reducer coupling should be installed in the discharge line.

▲WARNING: The tank must be full of water before heater is turned on. The water heater warranty does not cover damage or failure resulting from operation with an empty or partially empty tank.

To Fill the Water Heater

Make certain that the drain valve is closed, then open the shut-off valve in the cold water supply line.

Open each hot water faucet slowly to allow the air to vent from the water heater and piping.

A steady flow of water from the hot water faucet(s) indicates a full water heater.

DO NOT allow the flammable vapor sensor to become submerged in water.

Condensation

Condensation can form on the tank when it is first filled with water. Condensation might also occur with a heavy water draw and very cold inlet water temperatures.

Drops of water falling on the burner can produce a sizzling or pinging sound.

This condition is not unusual, and will disappear after the water becomes heated. If, however, the condensation continues, examine the piping and fittings for possible leaks.

▲WARNING: DO NOT attempt to convert this water heater for use with a different type of gas other than the type shown on the rating plate. Such conversion could result in hazardous operating conditions.

Gas Supply

The branch gas supply line to the water heater should be clean properly sized steel pipe or other approved gas piping material.

A union or ANSI design certified semi-rigid or flexible gas appliance connector should be installed in the gas line close to the water heater. The National Fuel Gas Code (NFGC) mandates a manual gas shutoff valve: See (NFGC) for complete instructions.

If flexible connectors are used, the maximum length shall not exceed 36 in. and must meet the requirements in ANSI Z21.24/CSA 6.10 - Connectors for Gas Appliances.

Compound used on the threaded joints of the gas piping must be of the type resistant to the action of LP gas. Use compound sparingly on male threads only.

Where a sediment trap is not incorporated as part of the appliance, a sediment trap

shall be installed downstream of the equipment shutoff valve as close to the inlet of the appliance as practical at the time of the appliance installation. The sediment trap shall be either a tee fitting with a capped nipple in the bottom outlet or other device recognized as an effective sediment trap.

DO NOT use excessive force (over 31.5 ft lbs.) in tightening the pipe joint at the combination gas control (thermostat) inlet, particularly if teflon pipe compound is used, as the valve body may be damaged.

The inlet gas pressure to the water heater must not exceed 10.5 in. w.c. (2.6 kPa) for natural gas, or 13 in. w.c. (3.2 kPa) for LP gas.

For purposes of input adjustment, the minimum inlet gas pressure (with main burner on) is shown on the water heater rating plate. If high or low gas pressures are present, contact your gas supplier for correction.

▲WARNING: Never use an open flame to test for gas leaks, as property damage, personal injury, or death could result.

Leak Testing

The water heater and its gas connections must be leak tested at normal operating pressures before it is placed in operation.

- 1 Turn on the manual gas shutoff valve near the water heater.
- 2 Use a soapy water solution to test for leaks at all connections and fittings. Bubbles indicate a gas leak that must be corrected.

The factory connections to the combination gas control (thermostat) should also be leak tested after the water heater is placed in operation.

Pressure Testing the Gas Supply System

The water heater and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psi (3.5 kPa).

The water heater must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psi (3.5 kPa).

▲WARNING: Failure to install a water heater suitable for the altitude at the location it is intended to serve, can result in improper operation of the appliance resulting in property damage and/or producing carbon monoxide gas, which could result in personal injury, or death.

High Altitude

Input rating of this water heater is based on sea level operation. At higher elevations the actual input rate may be lower than the value listed on the rating label due to the derating of natural gas and LP gas.

This water heater can be installed at elevations up to 7,800 ft. (2,377 m) above sea level.

IMPORTANT: Vent system lengths will vary above 2,000 ft. (609 m). Contact the water heater manufacturer for additional information (see page 14).

Installing the water heater

▲DANGER: Failure to install the blower assembly if shipped detached from the water heater and properly vent the water heater to the outdoors as outlined in the Venting section of this manual will result in unsafe operation of the water heater causing bodily injury, explosion, fire or death.

To avoid the risk of fire, explosion, or asphyxiation from carbon monoxide, NEVER operate the water heater unless it is properly vented and has adequate air supply for proper operation as outlined in the Venting section of this manual.

The vent pipe must overlap a minimum of ½ in. on each connection. It is important that the vent pipe engages fully into any pipe fitting and be kept in that position until the adhesive has fully cured. DO NOT drill or punch holes in the plastic pipe or fittings.

NOTICE: This unit is equipped with a Flammable Vapor Sensor. DO NOT apply power until enough time has passed to allow the vapors from the primer and cement to dissipate.

Venting

This water heater is a Category III appliance.

For proper installation of the vent system, follow the instructions as detailed in this manual. **DO NOT** connect this water heater to an existing vent or chimney. Common venting is NOT permitted. It must be vented separately from all other appliances.

Multi-story venting is permitted in accordance with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, and/or the Natural Gas and Propane Installation Code, CSA B149.1, (current editions).

IMPORTANT: Multi-story and common venting is **NOT** permitted for direct vent water heaters, water heaters for installation in manufactured homes (mobile homes), water heaters for installation in recreational vehicles, or water heaters for outdoor installation.

DO NOT install thermal insulation to the non-metallic vent pipes and fittings.

NOTICE: This water heater is approved to use the following materials for pipe of the vent system:

PVC (DWV, ASTM-D2665 or CSA B181.2)

PVC (Schedule 40, ASTM-D1785 or CSA B137.3)

PVC (SDR Series, ASTM-D2241 or CSA B137.3)

CPVC (CPVC 4120, ASTM-D2846 or CSA B137.6)

CPVC (Schedule 40, ASTM-F441 or CSA B137.3)

CPVC (SDR Series, ASTM-F442)

ABS (Schedule 40, DWV, ASTM-D2661 or CSA B181.1)

This water heater is approved to use the following materials for the fittings of the vent system:

PVC (Schedule 40 DWV, ASTM D2665)

CPVC (Schedule 40, ASTM F438)

ABS (Schedule 40 DWV, ASTM D2661)

DO NOT mix ABS pipe and fittings with PVC or CPVC pipe fittings. Note: It is acceptable to interchange PVC and CPVC pipe and fittings.

Use of PVC cellular core (ASTM-F891), ABS Schedule 40, DWV cellular core (ASTM – F628), or Radel® (polyphenolsulfone) in non-metallic venting systems is prohibited.

The vent system must be adequately supported along both vertical and horizontal lengths.

The vent system of this water heater may be installed horizontally through a wall or vertically through the roof.

Maximum unsupported length is recommended to be no more than 4 feet (1.22 m).

It is imperative that the first hanger be located on the horizontal length immediately adjacent to the first 90-degree elbow from the vertical rise of vent pipe connected to the water heater.

Ambient Installation Temperatures and Vent System Material Specifications		
Up to 100°F (38°C)	100°F (38°C) to 125°F (52°C) ¹	
0 to Max. ft. Equivalent Vent System Length	First 0 to 10 ft. Equivalent Vent System Length	10 to Max. ft. Equivalent Vent System Length
PVC, CPVC, or ABS	CPVC, or ABS	PVC, CPVC, or ABS

¹For installations above 100°F (38°C) ambient, change the vent system per the table above and install high temperature blower switch kit SP21171.

NOTICE: This water heater may be installed in attics and garages provided that the ambient temperatures do not exceed 125° (52°C) and the requirements as listed in the above table are followed.

The support method used should isolate the vent pipes from floor joists or other structural members to help prevent the transmission of noise and vibration.

DO NOT support, pin or otherwise secure the vent system in a way that restricts the normal thermal expansion and contraction of the chosen venting material.

If the water heater is being installed as a replacement for an existing power vent, water heater, a thorough inspection of the existing vent system must be performed prior to any installation work.

- 1 Verify that the correct materials as specified in this manual have been used, and that the minimum or maximum vent lengths and terminal location as detailed in this manual have been met.
- 2 Carefully inspect the entire vent system for any signs of cracks or fractures, particularly at the joints between elbows or other fittings and the straight length of vent pipe.

- 3 Check the vent for signs of sagging or other stresses in the joints as a result of misalignment of any components in the systems.
- 4 If any of the conditions above are found, they must be corrected in accordance with the instructions in this manual before completing the installation and putting the water heater into service.

Additional installation information for The Commonwealth of Massachusetts is located on the back page of this manual.

NOTICE: The vent piping must be connected to the blower assembly using the rubber coupling and supplied clamp. The vent pipe connection at the blower assembly must be leak tested with soap and water solution upon initial startup. Repair any leaks before allowing the water heater to operate.

Maximum and Minimum Vent Lengths for Power Vent Models:

Read these instructions thoroughly and make sure you understand all steps and procedures before proceeding with the installation.

When using 2 in. (5.1 cm) diameter pipe and fittings:

1. Connect the vent system piping to the blower assembly using the already installed 2 in. (5.1 cm) diameter rubber coupling and clamp. (See Figure 1).
2. Tighten the clamp between 30 to 40 in. lbs.
3. For the vent terminal, use the 2 in. (5.1 cm) diameter, Schedule 40, PVC, 45° elbow supplied with the water heater.

When using 3 in. (7.6 cm) diameter pipe and fittings:

1. Install a straight length of 2 in. (5.1 cm) diameter pipe to the rubber coupling on the blower assembly, followed by a 2 in. (5.1 cm) to 3 in. (7.6 cm) diameter pipe increaser fitting (See Figure 2).
2. Tighten the clamp between 30 to 40 in. lbs.
3. For the vent terminal, use a 3 in. (7.6 cm) diameter, Schedule 40, PVC, 45° elbow (not supplied).

DO NOT use unequal diameters of pipe and fittings for the vent systems except as defined previously.

IMPORTANT: Ensure that the coupling clamp is tight before allowing the water heater to operate.

When using CPVC or ABS pipe and fittings, use 90° elbows of the corresponding size and material for the vent terminal.

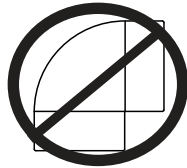
The minimum and maximum equivalent lengths for the vent system are shown in Table 1.

- The vent termination is not included in the equivalency calculations.

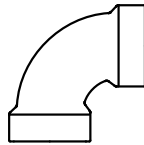
NOTICE: A 90°, 1/4 standard bend or long bend elbow is equivalent to 5 ft. (1.52 m) of straight pipe. A 45°, 1/8 standard bend or long bend elbow is equivalent to 2.5 ft. (0.76 m) of straight pipe.

DO NOT use short bend elbows. Use only standard and/ or long bend elbows. See examples below

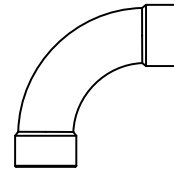
Elbow Examples



Short Bend 90° Elbow
DO NOT Use



Standard Bend 90° Elbow
OK to Use



Long Bend 90° Elbow
OK to Use

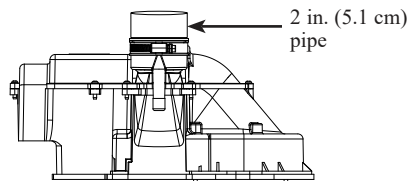


Figure 1

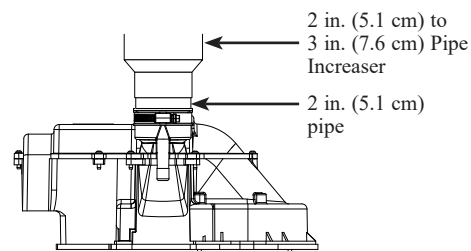


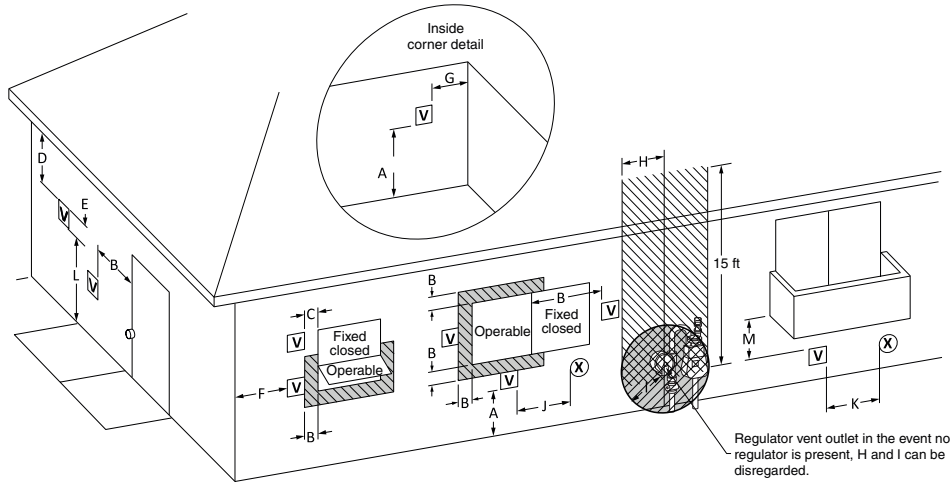
Figure 2

Installing the water heater

Table 1								
<i>From Sea Level through 2,000 Ft. (609 m) Above Sea Level</i>								
Model	Gas	Heater Input	Vent System Diameter	Min. Allowed Equivalent Vent Length		Max. Allowed Equivalent Vent Length		Vent System Termination
		Btu/hr.	Inches	Feet	Meters	Feet	Meters	
All	Natural & Propane	42,000	2	7	2.1	55	16.7	45° Elbow
		40,000 36,000 32,000	3	7	2.1	150	45.7	45° Elbow
<i>From 2,000 Ft. (609 m) through 7,800 Ft. (2,377 m) Above Sea Level</i>								
Model	Gas	Heater Input	Vent System Diameter	Min. Allowed Equivalent Vent Length		Max. Allowed Equivalent Vent Length		Vent System Termination
		Btu/hr.	Inches	Feet	Meters	Feet	Meters	
40 Gallon	Natural	40,000	2	7	2.1	25	7.6	45° Elbow
			3	7	2.1	150	45.7	45° Elbow
40 Gallon	Propane	36,000	2	7	2.1	35	10.6	45° Elbow
			3	7	2.1	150	45.7	45° Elbow
40 Gallon	Natural & Propane	36,000 32,000	2	7	2.1	40	12.2	45° Elbow
			3	7	2.1	150	45.7	45° Elbow
50 Gallon	Natural & Propane	42,000 36,000 32,000	2	7	2.1	35	10.6	45° Elbow
			3	7	2.1	150	45.7	45° Elbow



Other Than Direct Vent Terminal Clearances



V VENT TERMINAL
 X AIR SUPPLY INLET
 AREA WHERE TERMINAL IS NOT PERMITTED

The following information should be used for determining the proper location of the vent terminal for other than direct vent water heaters.

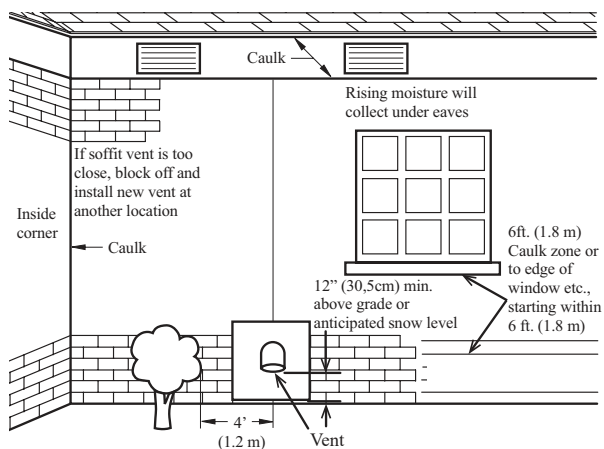
		US Installations ¹
A=	Clearance above grade, veranda, porch, deck, or balcony.	12 in (30 cm)
B=	Clearance to window or door that may be opened.	4 ft (1.2 m) below or to side of opening; 1 ft (300 mm) above opening
C=	Clearance to permanently closed window	0 in (0 cm)
D=	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61 cm) from the center line of the terminal	12 in (30 cm)
E=	Clearance to unventilated soffit	12 in (30 cm)
F=	Clearance to outside corner	24 in (61 cm)
G=	Clearance to inside corner	18 in (46 cm)
H=	Clearance to each side of center line extended above regulator vent outlet	3 ft (91 cm) within a height 15 ft (4.6 m)
I=	Clearance to regulator vent outlet	3 ft (91 cm)
J=	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance	4 ft (1.2 m) below or to side of opening; 1 ft (300 mm) above opening
K=	Clearance to a mechanical air supply inlet	3 ft (91 cm) above if within 10 ft (3 m) horizontally
L=	Clearance above paved sidewalk or paved driveway located on public property	7 ft (2.13 m) for mechanical draft systems (Category I appliances); vents for Category II and IV appliances cannot be located above public walkways or other areas where condensate or vapor can cause a nuisance or hazard
M=	Clearance under veranda, porch deck, or balcony	12 in (30 cm) [‡]

Notes:

¹In accordance with the current ANSI Z223.1/NFPA 54, National Fuel Gas Code.

[‡]Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.

Installing the water heater



⚠ WARNING: Moisture in the flue gas will condense as it leaves the vent terminal. In cold weather this condensate can freeze on the exterior wall, under the eaves and on surrounding objects. Some discoloration to the exterior of the building is to be expected. However, improper location or installation can result in severe damage to the structure or exterior finish of the building

Vent Terminal Location Considerations

- **DO NOT** terminate near soffit vents or crawl space or other area where condensate or vapor could create a nuisance hazard or cause property damage.
- **DO NOT** locate the exhaust vent terminal where condensate or vapor could cause damage or could be detrimental to the operation of regulators, relief valves, or other equipment.
- **DO NOT** locate the exhaust vent terminal over public area or walkways where condensate or vapor can cause nuisance or hazard.
- **DO NOT** locate the vent terminal in proximity to plants/shrubs.

- 1 **DO NOT** install the vent terminal under any patio or deck.
- 2 help prevent moisture from freezing on walls and under eaves, **DO NOT** locate the vent terminal on the side of a building with prevailing winter winds.
- 3 When terminating the vent and combustion air-inlet pipes through brick or masonry surfaces, the installation of a rust resistant sheet metal backing plates behind the vent and combustion air-inlet terminals are recommended.
- 4 **DO NOT** locate the vent terminal too close to shrubbery, as flue gasses may damage them.
- 5 Caulk all cracks, seams and joints within 6 ft. (1.83 m) of the vent and combustion air-inlet terminals.
- 6 Insulate vent pipe exposed to cold conditions (attics, crawl spaces, etc.) with inflammable material to help prevent moisture from accumulating in the vent pipe.
- 7 Support horizontal sections of the vent and combustion air-inlet pipe every 4 ft. (1.22 m). **DO NOT** rigidly secure the vent system. Provisions must be made to allow for expansion and contraction of the vent system.
- 8 **DO NOT** install the vent and combustion air-inlet terminals less than 1 ft. (30 cm) above grade or average snowfall whichever is greater.
- 9 Permanently seal annular openings around the vent and combustion air-inlet system penetrations using approved materials to prevent entry of combustion products into the building.

Horizontal Vent Installation

Read these instructions thoroughly and make sure you understand all steps and procedures before proceeding with the installation.

Determine the locations for the vent terminal then make a hole through the exterior wall to accommodate the vent pipe.

- Maintain a minimum horizontal distance of 12 in. (30.5 cm) between the vent terminal centerline. Insert vent pipe through the wall as shown.
- Allow sufficient length of pipe to extend beyond the exterior wall of the building for attachment of the vent terminal.

Place the supplied mesh metal screen inside each terminal fitting.

NOTICE: For cold climates, the screen may be removed.

Connect the terminal to the vent pipe, which extends out of the building.

- Ensure that the back of the supplied terminal is flush with the outside wall surface.

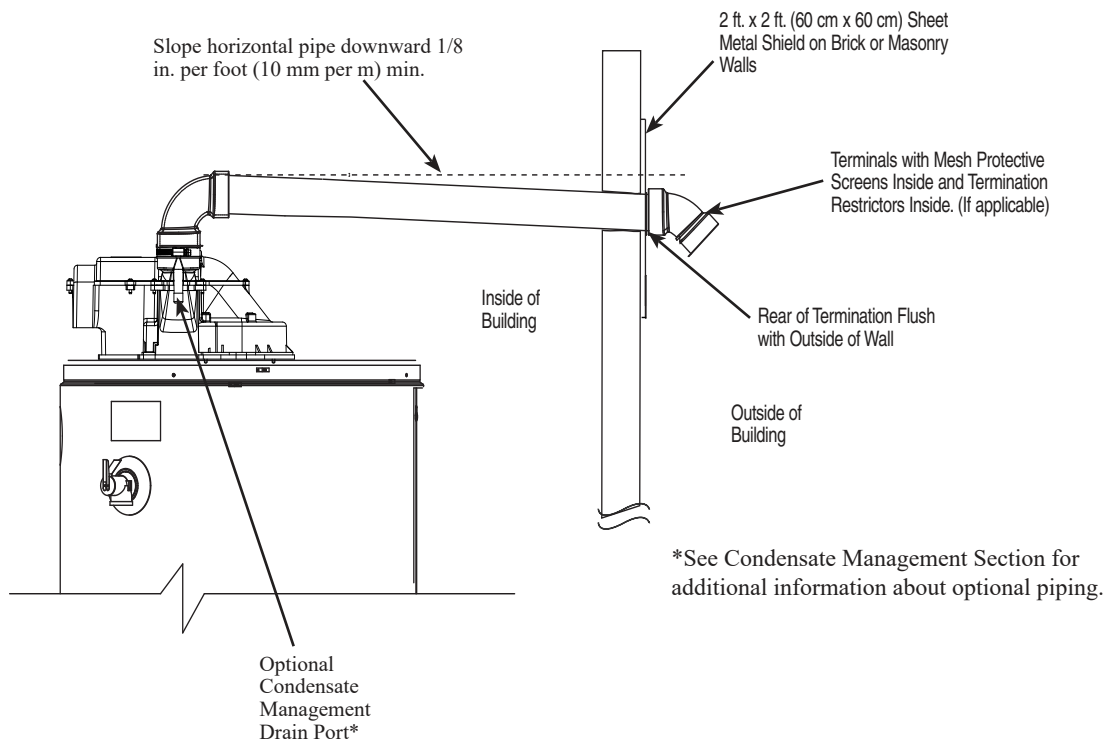
Complete the installation of the remainder of the vent system and attach it to the vent connector fitting on the water heater's blower assembly.

- Horizontal lengths of the vent system must slope downward a minimum of 1/8 in. per foot (10 mm per m);

IMPORTANT: When the vent system cannot be sloped away from the water heater or, if the vent system has vertical section(s), then all horizontal sections must slope upwards a minimum of 1/8 in. per foot (10 mm per m);

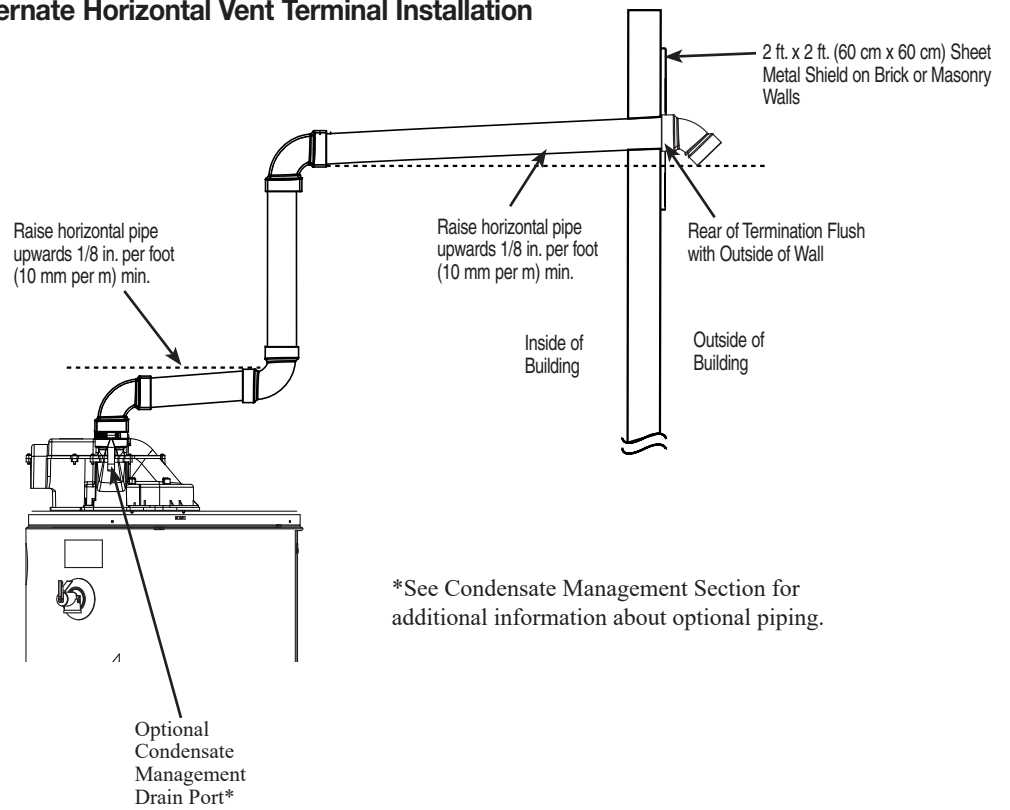
DO NOT use unequal diameters of pipe and fittings for the vent system except as defined previously. Support vertical and horizontal lengths of the vent system as previously mentioned.

Horizontal Vent Terminal Installation



Installing the water heater

Alternate Horizontal Vent Terminal Installation



Horizontal Vent Riser Terminal Installation

Read these instructions thoroughly and make sure you understand all steps and procedures before proceeding with the installation.

Determine the locations for the vent terminal then make a hole through the exterior wall to accommodate the vent pipe.

- Maintain a minimum distance from the vent terminal of not less than 1 ft. (30.5 cm) above grade or average snowfall whichever is greater.

Insert length of the vent pipe through the wall as shown.

- Allow sufficient length of pipe to extend beyond the exterior wall of the building for attachment of the vent riser assemblies as shown.
- Place the supplied mesh metal screen inside the terminal fitting.

NOTICE: For cold climates, the screen may be removed.

Connect the vent riser assembly to the vent pipe, which extends out of the building.

- Ensure that the back of the 90° elbow is flush with the outside wall surface and that the vent termination of the vent riser is parallel with the outside wall.

IMPORTANT: Remember to include the additional 90° elbows and vertical height of vent pipes of the vent riser when calculating the maximum equivalent vent system length. The maximum equivalent vent system length must be as specified in Table 1.

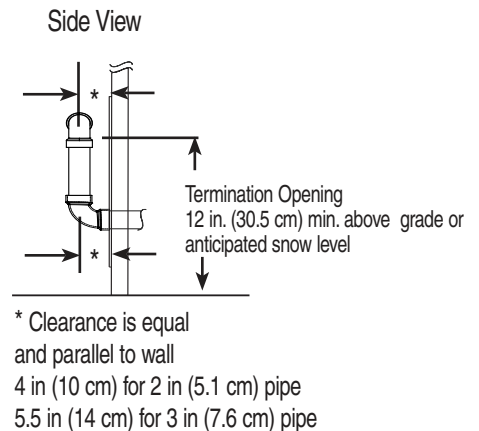
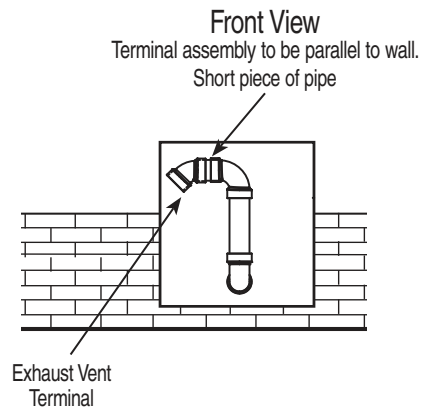
- The vent termination is not included in the equivalency calculations.

Complete the installation of the remainder of the vent system and attach it to the vent connector fitting on the water heater's blower assembly.

- **Horizontal sections of the vent system must slope downward toward the water heaters a minimum of 1/8 in. per foot (10 mm per m).**

DO NOT use unequal diameter of pipe and fittings for the vent system except as defined previously.

Support vertical and horizontal lengths of the vent system as previously mentioned.



Installing the water heater

Vertical Vent Installation

The location of the vent terminal depends on the following minimum clearances and considerations.

- 1 Minimum 12 in. (30.5 cm) above roof.
- 2 Minimum 12 in. (30.5 cm) above anticipated snow level.
- 3 Maximum 24 in. (61cm) above roof level without additional support for vent.
- 4 Four (4) ft. (1.22 m) from any gable, dormer or other roof structure with building interior access (i.e., vent, window, etc.).
- 5 Ten (10) ft. (3.05m) from any forced air inlet to the building. Any fresh or make-up air inlet such as a dryer or furnace area is considered to be a forced air inlet.
- 6 Maintain a minimum horizontal distance of 12 in. (30.5 cm) between the vent and combustion air-inlet terminal centerlines.
- 7 Maintain a minimum distance from the vent and the combustion air-inlet terminals of not less than 12 in. (30.5 cm) above grade or average snowfall, whichever is greater.

Read these instructions thoroughly and make sure you understand all steps and procedures before proceeding with the installation.

Determine the locations for the vent terminal then

make a hole through the roof and interior ceiling(s) to accommodate the vent pipe.

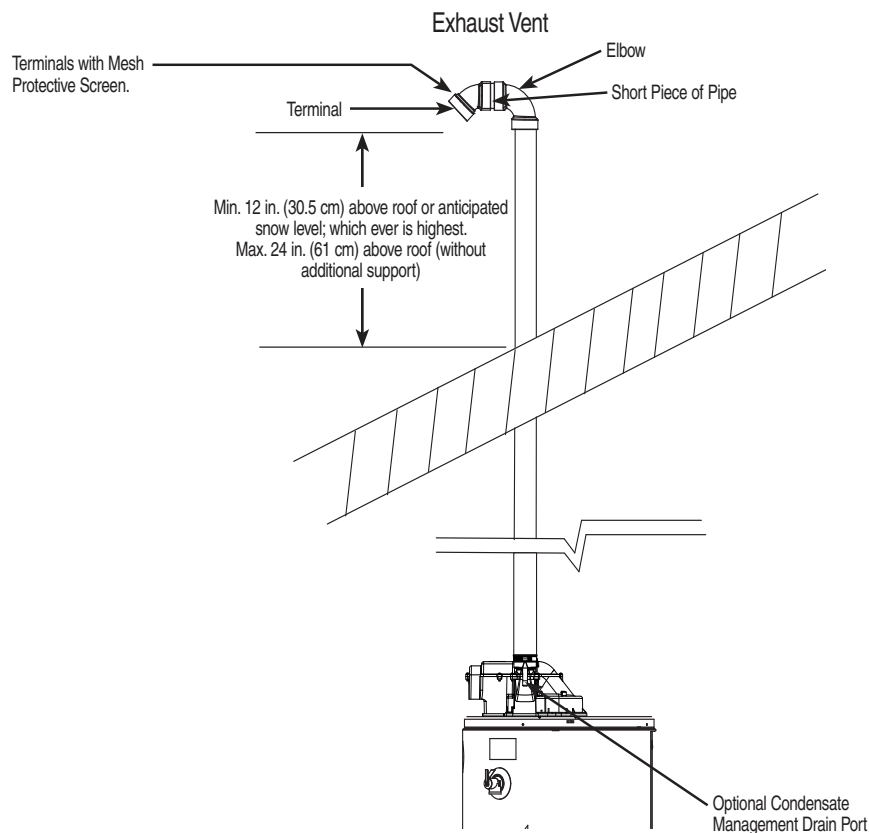
Assemble the vent pipe assembly.

Install the vent system and attach it to the vent connector fitting on the water heater's blower assembly.

Horizontal lengths of the vent system must slope towards the water heater a minimum of 1/8 in. per foot (10 mm per m).

- Support vertical and horizontal lengths of the vent system as previously mentioned.
- Determine the vent terminal height and cut the pipe accordingly.
- Insert length of vent pipes through the ceiling wall as shown.
- Install adequate flashing where the vent pipe pass through the roof.
- Connect a short piece of pipe approximately 3 in. (7.6 cm) in length between terminal and elbow.
- Place the supplied 1/2 in. (1.3 cm) mesh metal screen inside the terminal fitting then connect a short piece of pipe approximately 3 in. (7.6 cm) in length between the terminal and elbow.

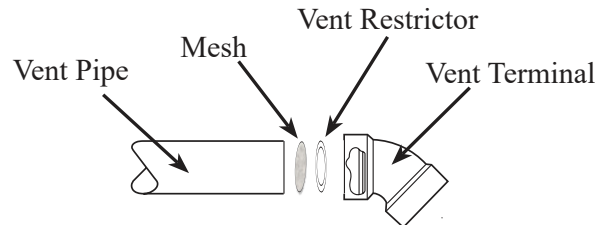
NOTICE: For cold climates, the screens may be removed.



Vent Termination Restrictor

Some water heater models are supplied with one (1) vent termination restrictor. The restrictor helps the water heater achieve peak efficiency when installed at the minimum equivalent vent length of 7 ft. (2.1 m) using 2 in. (5.1 cm) diameter pipe.

IMPORTANT: DO NOT install the termination restrictor in equivalent vent lengths longer than 7 ft. (2.1 m).



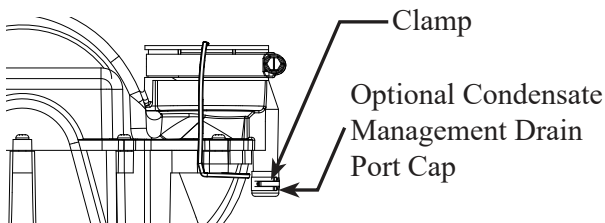
Condensate Management - Optional Piping

There is no condensate collection and disposal required for Rheem water heaters under most conditions. Installations where the vent system length is short or where it runs through conditioned space in the home, such as basements or interior walls, **DO NOT** typically cause condensation and will not require any condensation disposal methods regardless of vent pipe slope. The image on page 17 shows the recommended vent pipe slope of no less than 1/8 in. per foot (10 mm per m) away from the water heater. Any condensation in the venting system will drain toward the vent termination. The blower assembly features a capped drain port, which is not needed in this case.

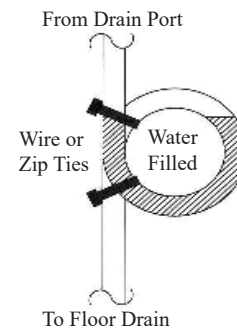
CAUTION: Make sure the drain port cap is securely in place.

There are vent piping configurations, when combined with certain environmental conditions that can produce enough condensate to require collection and disposal. When a slope away from the water heater cannot be achieved and condensate handling is required in a horizontal vent system, slope the vent pipe toward the water heater 1/8 in. per foot (10 mm per m) minimum and condensate management means as follows:

- Using a set of pliers, remove the clamp and cap from the drain port from the blower assembly.



- Connect the tubing with clamp to the condensate drain port. Ensure that the clamp securely fastens the tubing to the blower's condensate drain port.



NOTICE: The tubing must be of sufficient length to reach a floor drain, outside the building or other required condensate disposal termination requirements (Refer to local codes).

- Loop the drain tube so that it has a circular trap and secure the top and bottom of the loop with wire ties or plastic zip ties as shown. **DO NOT** restrict any portion of the drain tube. The loop and all sections of the tube must not be restricted or collapsed.
- Fill the drain tube with water so that no combustion gases might vent into the room.
- Route the drain tube to a floor drain or outside the building or refer to local codes for any condensation requirements.

Installing the water heater

NOTICE: All pipe, fittings, solvent cement, primers and procedures must conform to American National Standards Institute and American Society for Testing and Materials (ANSI/ASTM) standards.

▲WARNING: DANGER OF FIRE OR BODILY INJURY - Solvent cements and primers are highly flammable. Provide adequate ventilation and DO NOT assemble near heat source or open flame. DO NOT smoke. Avoid skin or eye contact. Observe all cautions and warnings on material containers.

▲CAUTION: For proper installation: DO NOT use solvent cement that has become curdled, lumpy or thickened.

DO NOT thin solvent cement. Observe shelf precautions printed on the containers.

For applications below 32°F (0°C) use only low temperature type solvent cement.

Appropriate solvent and cleaner must be used for the type of vent pipe used (PVC, CPVC or ABS).

Cementing Joints

All joints in the vent piping must be properly sealed and the following materials are recommended:

PVC materials should use ASTM D2564 grade cement.

CPVC materials should use ASTM F493 grade cement.

ABS materials should use ASTM D2235 grade cement.

Cleaner-Primer and Medium Body Solvent Cement:

- 1** Cut pipe end square, remove jagged edges and burrs. Chamfer end of pipe, then clean fitting socket and pipe joint area of all dirt, grease or moisture.
- 2** After checking pipe and socket for proper fit, wipe socket and pipe with cleaner-primer. Apply a liberal coat of primer to inside surface of socket and outside of pipe. **DO NOT** allow primer to dry before applying cement.
- 3** Apply a thin coat of cement evenly in the socket. Quickly apply a heavy coat of cement to the pipe end and insert pipe into fitting with a slight twisting motion until it bottoms out.

NOTICE: Cement must be fluid; if not, recoat.

- 4** Hold the pipe fitting for 30 seconds to prevent the tapered socket from pushing the pipe out of the fitting.
- 5** Wipe all excess cement from the joint with a rag. Allow 15 minutes before handling. Cure time will vary according to fit, temperature and humidity.

NOTICE: Stir the solvent cement frequently while using. Use a natural bristle brush or the dauber supplied with the can. The proper brush size is one inch.

NOTICE: This unit is equipped with a Flammable Vapor Sensor. DO NOT apply power until enough time has passed to allow the vapors from the primer and cement to dissipate.

Wiring

If local codes permit, the water heater may be connected to electric service with the power cord provided (**DO NOT** use an extension cord). A grounding receptacle is required.

If local codes **DO NOT** permit the use of cord connections, a 120 V, 50/60 Hz power supply, with suitable disconnecting means, must be connected to the black and white leads in the heater control enclosure.

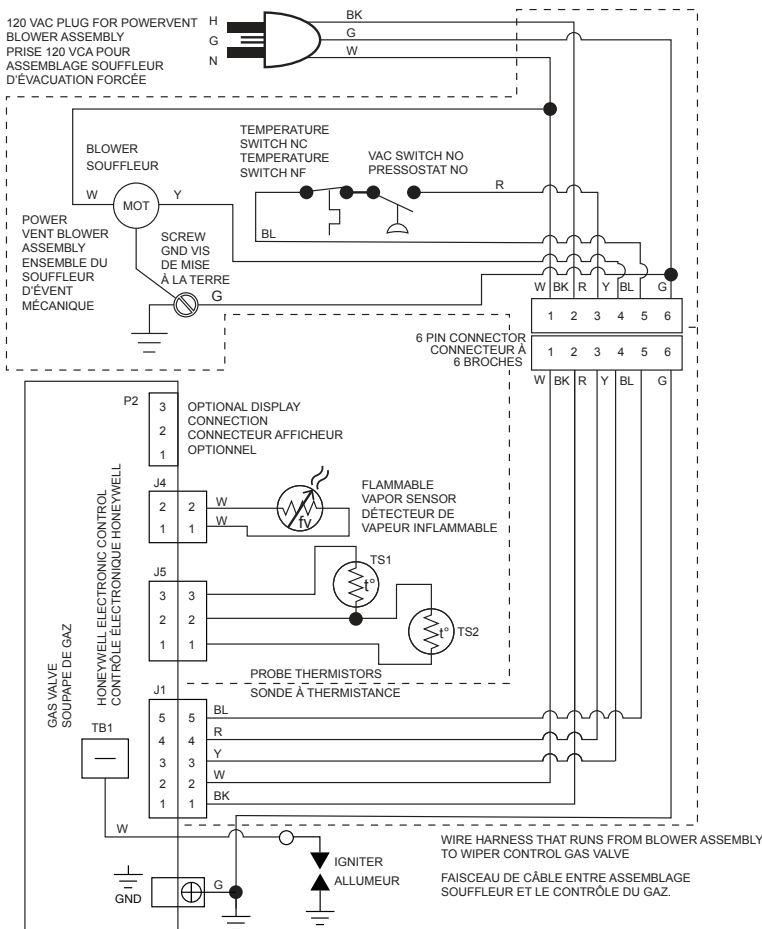
The maximum current draw is approximately 5.0 amps.

The water heater must be electrically grounded in accordance with local codes, or, in the absence of local codes, in accordance with latest edition of the National Electric Code ANSI/NFPA No. 70. Refer to the figures below for water heater internal wiring.

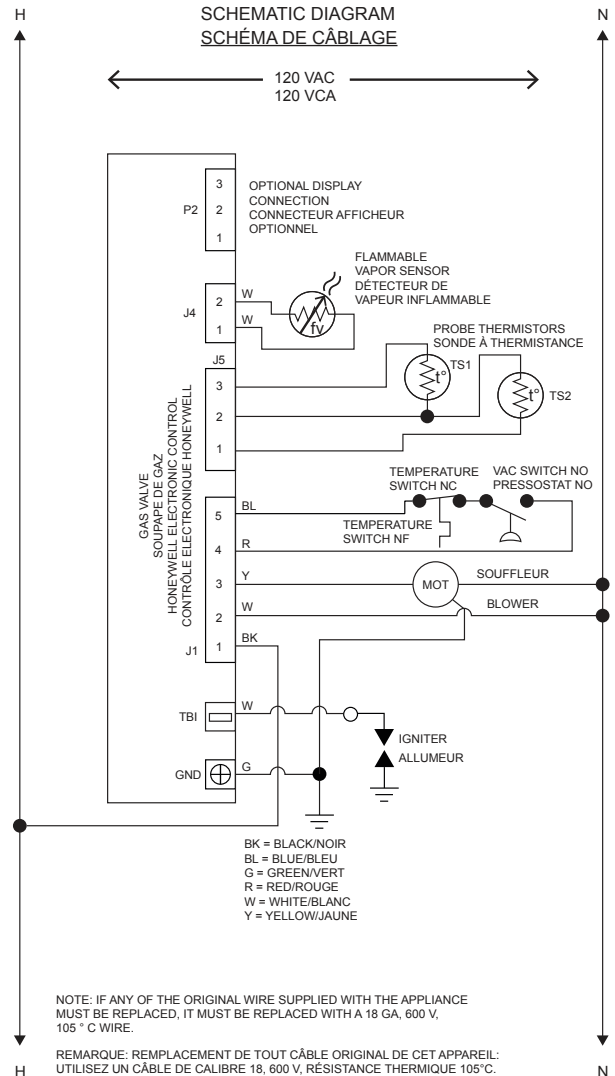
NOTICE: It is not recommended that this unit be installed on a GFCI circuit.

Wiring Diagram

CONNECTOR DIAGRAM
SCHEMA DES CONNEXIONS



SCHEMATIC DIAGRAM
SCHEMA DE CÂBLAGE



120V 50/60 Hz Less Than 5 Amps
120V 50/60 Hz, Moins de 5 A

CAUTION Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. **VERIFY PROPER OPERATION AFTER SERVICING!**

Installing the water heater

⚠ WARNING: If local codes require external application of insulation blanket kits the manufacturer's instructions included with the kit must be carefully followed.

Insulation Blankets

Insulation blankets, available to the general public, for external use on gas water heaters are not necessary. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank heaters. This water heater meets or exceeds the National Appliance Energy Conservation Act standards with respect to insulation and standby loss requirements making an insulation blanket unnecessary.

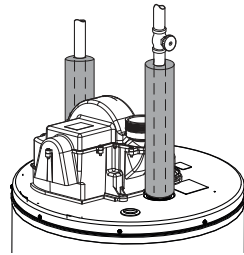
The manufacturer's warranty does not cover any damage or defect caused by installation, attachment or use of any type of energy saving or other unapproved devices (other than those authorized by the manufacturer) into, onto or in conjunction with the water heater. The use of unauthorized energy saving devices may shorten the life of the water heater and may endanger life and property.

The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices.

⚠ CAUTION: If local codes require the application of an external insulation blanket to this water heater, pay careful attention to the following so as not to restrict the proper function and operation of the water heater:

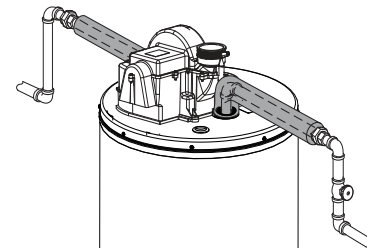
- **DO NOT** cover the operating or warning labels attached to the water heater or attempt to relocate them on the exterior of insulation blanket.
- **DO NOT** apply insulation to the top of the water heater. This will interfere with the safe operation of the blower assembly.
- **DO NOT** cover the burner access door, jacket door, combination gas control (thermostat) or pressure and temperature relief valve.
- **DO NOT** apply insulation to the bottom of the water heater or the area where the combustion air inlet openings and Flammable Vapor Sensor are located. This area must be unobstructed so as not to restrict combustion air flow to the burner or operation of the sensor.
- Inspect the insulation blanket frequently making certain it has not sagged and it is not restricting the air flow to the combustion air inlet openings (perforation holes) or the Flammable Vapor sensor located at the lower perimeter of the water heater jacket. This could result in an unsafe operating condition.

Hot and Cold Pipe Insulation Installation



Typical vertical piping arrangement

For increased energy efficiency, some water heaters have been supplied with two sections of pipe insulation.



Typical horizontal piping arrangement

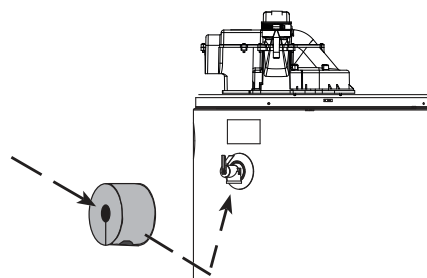
Please install the insulation, according to the illustrations above, that best meets your requirements.

T&P Insulation Installation

For increased energy efficiency, this water heater has been supplied with T&P insulation. Please install the insulation as shown below.

Slip the insulation cover over the T&P Valve through the center hole and align the hole in the side with the opening of the T&P Valve.

Ensure the T&P Valve opening is not obstructed by the insulation.

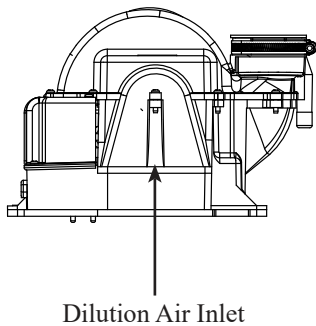


Typical Side Connect T & P Arrangement.

Heat Traps

For increased energy efficiency, some water heaters have been supplied with factory installed 3/4 in. NPT heat trap fittings in the hot outlet line and cold water inlet line.

These heat trap fittings may require 90° 3/4 in. NPT elbow(s) 3/4 in. coupling(s) depending on your installation needs. See Illustration of nipples and heat traps on page 38.



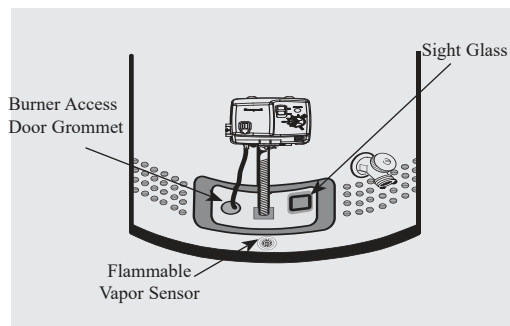
During Installation of this water heater.....

DO

- **DO** check inlet gas pressure to ensure that it is within the range specified on the rating plate.
- **DO** provide adequate air for combustion and ventilation as discussed in the Use and Care Manual and the National Fuel Gas Code.
- **DO** maintain proper clearances to combustibles as specified on the rating plate.
- **DO** allow enough time for joint cement vapors to dissipate **BEFORE** applying power to the water heater.
- **DO** ensure that the venting system complies with the guidelines found in the Use and Care Manual and National Fuel Gas Code.
- **DO** contact a qualified service technician if the main burner will not stay lit. The burner chamber is designed to be sealed utilizing a gasket and tamper resistant screws.

DON'T

- **DON'T** block or restrict Combustion Air Inlet Openings or the Flammable Vapor Sensor located around the lower portion of the water heater jacket.
- **DON'T** block or restrict the Blower Assembly Dilution Air holes (see diagram to the left).
- **DON'T** remove the Burner Access Door unless absolutely necessary. This should only be done by a qualified service technician. A new burner access door gasket must be installed on any burner access door that has been removed.
- **DON'T** install this water heater where standing water may occur. The base of the water heater is meant to be mounted on a dry surface.
- **DON'T** allow cleaners, solvents, or other materials to come into contact with the Flammable Vapor Sensor.
- **DON'T** operate the water heater if the sight glass or burner access door grommet is damaged or broken (See below).



Installation Checklist

A. Water Heater Location

- In a location where the vent system will be within the requirements specified this manual.
- Indoors and protected from freezing temperatures.
- Proper clearance from combustible surfaces observed and water heater not installed on carpeted floor.
- Sufficient fresh air supply for proper operation of water heater.
- Air supply free of corrosive elements and flammable vapors.
- Provisions made to protect area from water damage.
- Sufficient room to service heater.
- Combustible materials, such as clothing, cleaning materials, rags, etc. clear of the base of the heater.
- Clearances of 1 in. (2.5 cm) from combustion air inlet openings observed
- Flammable vapor sensor is not blocked.

B. Water Supply

- Water heater completely filled with water.
- Air purged from water heater and piping.
- Water connections tight and free of leaks.

C. Gas Supply

- Gas line equipped with shutoff valve, union and sediment trap.
- The required inlet gas pressure to the water heater is shown on the water heater rating plate.
- Soap and water solution used to check all connections and fittings for possible gas leak.
- Gas Company inspected installation (if required).

D. Relief Valve

- Temperature and Pressure Relief Valve properly installed and discharge line run to open drain.
- Discharge line protected from freezing.

E. Venting

- Water Heater vented separately from all other appliances.
- Blower assembly properly installed.
- Proper materials and techniques used in vent assembly.
- Vent pipe properly secured to exhaust connector of the blower assembly.
- Vent system supported at required intervals.
- Appropriate minimum clearances observed.
- Precautions taken to prevent moisture damage around vent termination.
- Vapors from non-metallic pipe cement and primer have dissipated prior to applying electrical power.

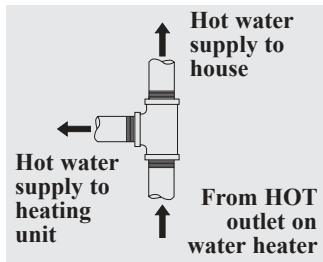
F. Wiring

- Correct power supply (120 V).
- Electrical connections tight.
- Heater properly grounded and proper polarity observed.

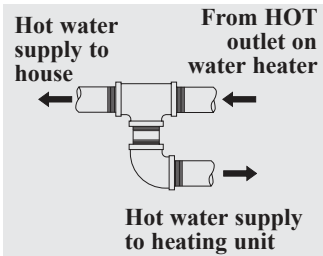
Supplemental instructions for gas water heaters installed in potable water/space heating applications.

Local codes or plumbing authority requirements may vary from the instructions or diagrams provided in this manual and take precedent over these instructions.

Combination Potable Water and Space Heating Application



Tee fitting for vertical hot water supply lines.



Tee fitting for horizontal hot water supply lines.

Tee fitting must be installed as shown. This ensures that any air in the water lines will be purged through the domestic water faucets and showers.

⚠ DANGER: When this system requires water for space heating at elevated temperatures (above 125°F [52°C.]), a mixing valve complying with the Standard for Temperature Actuated Mixing Valves for Hot Water Distribution Systems, ASSE 1017 must be installed in the hot water supply line to the house in order to reduce the scald hazard potential. Water heater for combination water/space heating shall not be used in space-heating-applications only

⚠ DANGER: Any piping or components used in the installation of this water heater in a combination potable and space heating application must be suitable for use with drinking water.

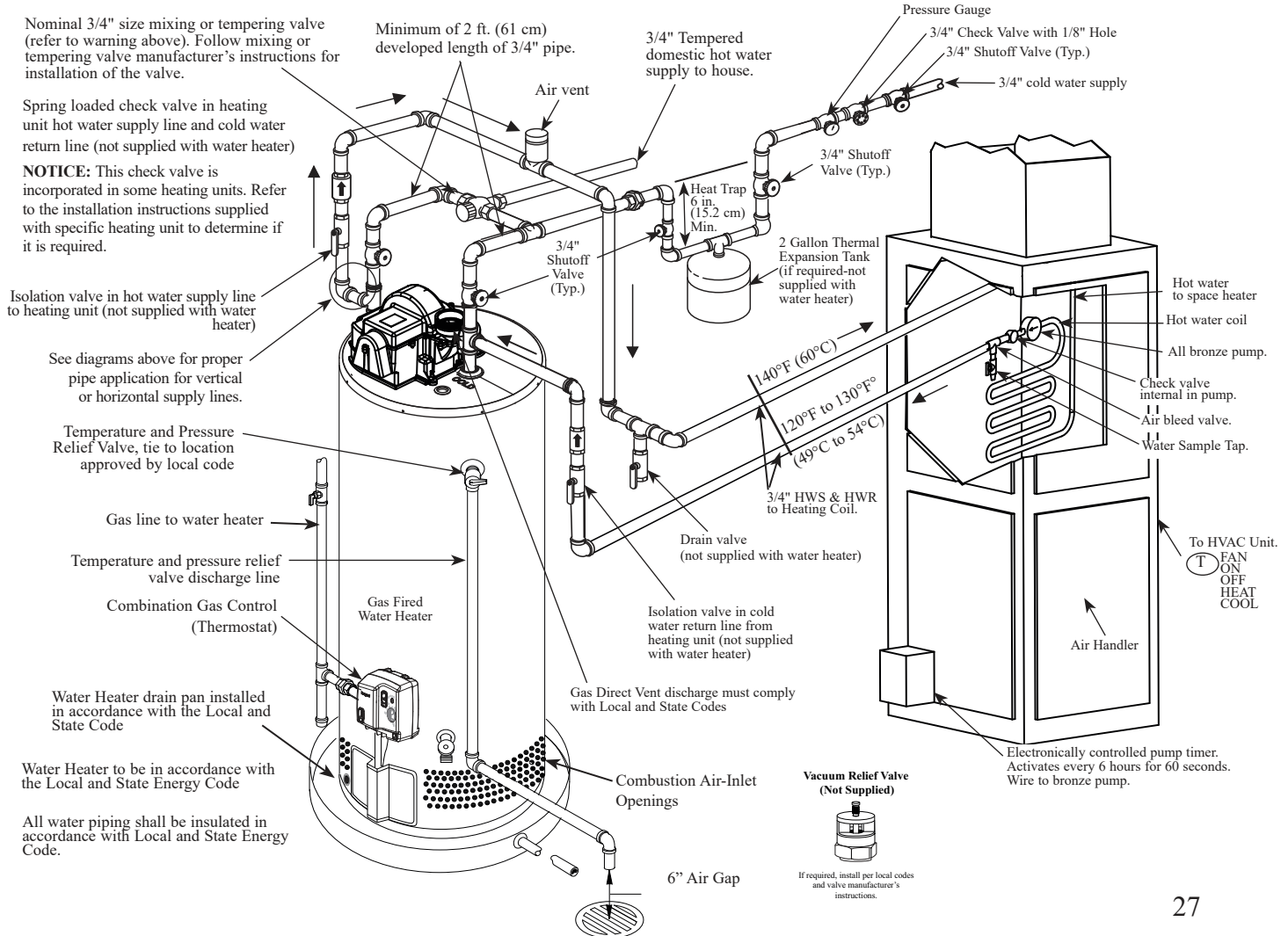
NOTICE: Suitable for combination

water (potable) heating and space heating and not suitable for space heating applications only.

⚠ DANGER: If this water heater is installed in an application intended to supply domestic hot water needs and hot water for space heating purposes, DO NOT connect the heater to an existing heating unit or components of a heating system that have previously been used with a non drinking water system. Toxic chemicals such as those used for boiler treatment may be present and will contaminate the drinking water supply causing possible health risks. Never introduce toxic chemicals, such as those used for boiler treatment, into this system.

NOTICE: 50 ft. (15.2 m) maximum distance from water heater to fan coil (developed length) is required for Massachusetts State.

Typical Piping Diagram for Combination Potable/Space Heating Installation



Lighting the water heater

Before operating this water heater, be sure to read and follow the instructions on the label pictured below and all other labels on the water heater, as well as the warnings printed in this manual. Failure to do so can result in unsafe operation of the water heater resulting in property damage, personal injury, or death. Should you have any problems reading or following the instructions in this manual, STOP, and get help from a qualified person.

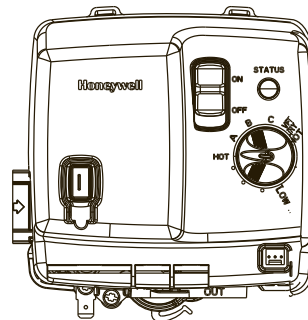
FOR YOUR SAFETY READ BEFORE OPERATING

⚠ WARNING: If you do not follow these instructions and use the Use & Care Manual 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 PUTTING THIS APPLIANCE INTO SERVICE - Smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- WHAT TO DO IF YOU SMELL GAS
- **DO NOT** try to light any appliance.
 - **DO NOT** touch any electric switch;
 - **DO NOT** use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas suppliers instructions.
- If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to rotate the gas control's temperature knob. Never use tools. If the knob will not turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in fire or explosion.
- D. **DO NOT** use this appliance if any part has been under water. Immediately call a qualified installer or service agency to replace a flooded water heater. Do not attempt to repair the unit! It must be replaced!

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Slide the "ON/OFF" switch located on the gas control to the "OFF" Position.
3. Turn off all electric power to the appliance.
4. Rotate the gas control temperature knob to "LOW".
5. This appliance has an automatic spark ignition system. **DO NOT** open the door of this appliance and try to light the pilot by hand!.
6. Wait five (5) minutes to clear out any gas. If you smell gas, stop! Follow "B" in the safety information above on the label. If you do not smell gas, go to the next step.
7. Turn on all electric power to the appliance.
8. Slide the "ON/OFF" switch located on the gas control to the "ON" position.
9. Rotate the gas control, temperature knob to the desired setting.
10. 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. Rotate the gas control thermostat knob to the lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.

Operating the water heater

▲ CAUTION: Hydrogen gas can be produced in a hot water system served by this water heater that has not been used for a long period of time (generally two weeks or more). **HYDROGEN GAS IS EXTREMELY FLAMMABLE!!** To dissipate such gas and to reduce risk of injury, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will be an unusual sound such as air escaping through the pipe as the water begins to flow. **DO NOT** smoke or use an open flame near the faucet at the time it is open.

Safety Precautions

- A** **DO** turn off manual gas shutoff valve if water heater has been subjected to over heating, fire, flood, physical damage or if the gas supply fails to shut off.
 - B** **DO NOT** turn on water heater unless it is completely filled with water.
 - C** **DO NOT** turn on water heater if cold water supply shutoff valve is closed.
 - D** **DO NOT** allow combustible materials such as newspaper, rags or mops to accumulate near water heater.
 - E** **DO NOT** store or use gasoline or other flammable vapors and liquids, such as adhesives or paint thinner, in vicinity of this or any other appliance. If such flammables must be used, open doors and windows for ventilation, and all gas burning appliances in the vicinity should be shut off including their pilot burners, to avoid vapors lighting.
- NOTICE: Flammable vapors can be drawn by air currents from surrounding areas to the water heater.**
- F** If there is any difficulty in understanding or following the Operating Instructions or the Care and Cleaning section, it is recommended that a qualified person or serviceman perform the work.

Operating Procedure

This heater is equipped with an electronically lit pilot to light the main burner. The pilot is automatically lit each time there is a demand for heating the water. On initial start-up, it is recommended that the outer door be removed (leave inner door in place for safety) to determine if the pilot and main burner are operating properly.

Once filled with water, it is necessary to plug the power cord in and slide the switch on the combination gas control (thermostat) to the "ON" position. The blower will start and within

seconds the pilot will light followed by the main burner. After the main burner ignites, replace the outer door.

If no main burner flame is established, the gas control will go through three trials for ignition before going into a lock-out. A warning light will alert the user of this lock-out condition. If this happens, refer to "Troubleshooting Guide."

Water Temperature Setting

The temperature of the water in the water heater can be regulated by turning the knob on the front of the combination gas control (thermostat). Safety and energy conservation are factors to be considered when selecting the water temperature setting of the water heater's combination gas control (thermostat(s)). The lower the temperature setting, the greater the savings in energy and operating costs.

To comply with safety regulations, the combination gas control (thermostat) was set at 120°F (49°C) before the water heater was shipped from the factory. The recommended starting point temperature is 120°F (49°C).

Water temperatures above 125°F (52°C) can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined in this manual and on the label located on the water heater near the gas control thermostat.

Mixing valves are recommended for reducing point of use water temperature by mixing hot and cold water in branch water lines. It is recommended that a mixing valve complying with the Standard for Temperature Actuated Mixing Valves for Hot Water Distribution Systems, ASSE 1017 be installed. See page 4 for more details and contact a licensed plumber or the local plumbing authority for further information.

The chart on the next page may be used as a guide in determining the proper water temperature for your home.

▲ DANGER: Hotter water increases the Potential for Hot Water SCALDS. Households with small children, disabled, or elderly persons may require a 120°F (49°C) or lower gas control (thermostat) setting to prevent contact with HOT water.

Operating the water heater

Water Temperature Setting...

Maximum water temperatures occur just after the burner has shut off. To determine the water temperature, turn on a hot water faucet and place a thermometer in the water stream.

If an adjustment to the water temperature is preferred, then refer to the Water Heater User Display – Operation Instructions for instruction on adjusting the local and remote user display temperature setpoints.

The reference mark "LOW" represents an approximate water temperature of 90°F (32°C).
 The reference mark "HOT" represents an approximate water temperature of 120°F (49°C).
 The reference mark "A" represents an approximate water temperature of 130°F (54°C).
 The reference mark "B" represents an approximate water temperature of 140°F (60°C).
 The reference mark "C" represents an approximate water temperature of 150°F (66°C).
 The reference mark "VERY HOT" represents an approximate water temperature of 160°F (71°C).

A condition known as “stacking” or “layering” can occur when a series of short and frequent hot water draws are taken.

The hottest temperature water will be at the top of the tank, closest to the outlet pipe delivering hot water to the home.

Stacking can cause this top layer of water to be hotter than the water toward the bottom of the tank near the combination gas control (thermostat). Therefore, always remember to test the water temperature with your hand before use and remember that hotter water increases the risk of scald injury.

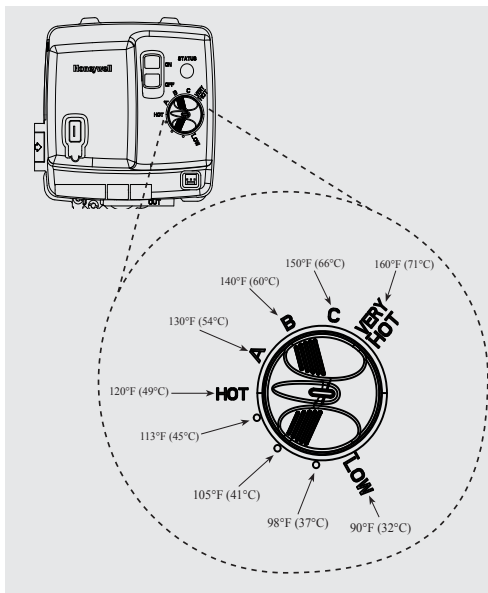
Also, always supervise young children or others who are incapacitated.

The combination gas control (thermostat) is constructed with a built in safety shutoff device designed to shutoff the gas supply to the burner if the main burner is extinguished for any reason.

The combination gas control (thermostat) is also equipped with a gas shut off device that will shut off the gas supply to the burner if the water heater exceeds normal operating temperatures. Refer to the “Before You Call For Service” section of this manual, or contact your dealer.

▲ WARNING: Should overheating occur or the gas supply fail to shut off, turn off the manual gas (shutoff) valve to the appliance

If the water heater has been subjected to fire, flood or physical damage, turn off the manual gas control (shutoff) valve and **DO NOT** operate the water heater again until it has been checked by a qualified service technician.



Time/Temperature Relationship in Scalds

Water Temperature	Time To Produce a Serious Burn
120°F (49°C)	More than 5 minutes
125°F (52°C)	1½ to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (66°C)	About 1½ seconds
155°F (68°C)	About 1 second

Table courtesy of Shriners Burn Institute

Sequence of Operation...

1. During initial start-up or a call for heat, the control will verify the vacuum switch is open.
2. Once the control verifies the blower vacuum switch is open, the control will energize the blower motor for the pre-purge sequence (approximately 5 seconds).
3. The control will verify the blower vacuum switch has closed, ensuring that the blower is functioning properly and that the venting system is not blocked.
4. The control will then proceed through a sequence of self-diagnostics before initiating a trial for ignition.
5. During the trial for ignition, the pilot will spark in an attempt to light the pilot. Once the pilot flame is established, the main gas valve will open allowing gas to flow to the main burner.
6. The main burner and pilot will remain lit throughout the heat cycle until the water temperature setting is reached.
7. Once the water temperature setting is reached, the control will close the main gas valve and pilot valve which will extinguish both the main burner and pilot burner flames.
8. The blower motor will stay energized for an additional 30 seconds after the control verifies that the burner flame is extinguished in order to clear combustion gases from the water heater.
9. After the post-purge sequence, the control will de-energize the blower motor and go into a stand-by mode awaiting the next call for heat.

This water heater is equipped with a flammable vapor sensor that is monitored continuously by the electronic control in all modes of operation.

In the event that flammable vapors are detected, the control will automatically shut down the water heater and prevent the water heater from being started again.

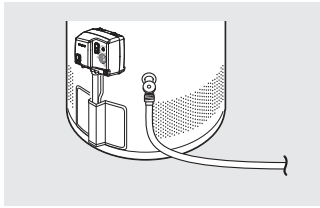
The following is a list of materials that will cause the Flammable Vapor Sensor to shut down the water heater.

- Vapors of Gasoline.
- Vapors of certain flammable paints, stains, and thinners.
- Vapors of vent pipe cement & solvents.
- Bleach (direct contact with flammable vapors sensor).
- Some other flammable materials and their vapors.

If the flammable vapor sensor shuts down the water heater, then the electronic control will display the appropriate error code and you should then promptly contact a qualified service technician.

Refer to the “WARNING” on page 3 for additional information.

Care and cleaning of the water heater



Draining the Water Heater

▲ CAUTION: Shut off gas to the water heater at the gas control (thermostat) gas cock or manual shut-off valve before draining water.

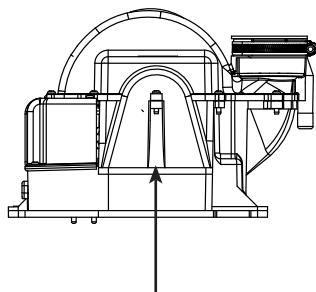
▲ DANGER: Before manually operating the temperature and pressure relief valve, make certain no one will be exposed to the hot water released by the valve. The water drained from the tank may be hot enough to present a scald hazard and should be directed to a suitable drain to prevent injury or damage.

Before turning off the cold water supply to the water heater, open a hot water faucet allowing sufficient cold water into the tank to prevent the risk of a scald injury while draining the water heater. Once the water in the tank is no longer hot, turn off the cold water supply to the water heater. Open a hot water faucet or lift the handle on the relief valve to admit air to the tank.

Attach a garden hose to the drain valve on the water heater and direct the stream of water to a drain. Open the valve.

▲ DANGER: Before manually operating the relief valve, make certain no one will be exposed to the danger of the hot water released by the valve. The water may be hot enough to create a scald hazard. The water should be released into a suitable drain to prevent injury or property damage.

▲ DANGER: Hotter water increases the potential for Hot Water Scalds.



Dilution Air Inlet

Routine Preventative Maintenance

Properly maintained, your water heater will provide years of dependable trouble-free service.

It is recommended that a periodic inspection of the combination gas control (thermostat), burner, relief valve, internal flue-way and venting system should be made by service personnel qualified in gas appliance repair.

It is suggested that a routine preventative maintenance program be established and followed by the user.

Periodically inspect the vent system. Make certain that all joints are secure and that vent pipe supports are all in place. Check the outdoor vent terminal to see that it is free of obstructions, and that there is no damage nearby caused by condensate.

Inspect dilution air inlet and combustion air inlet openings. Make certain no blockage exists. Clean any lint, dirt or oil accumulation that may exist.

Periodically clean the screens in the vent terminal (if applicable).

Periodically, lift and release the lever handle on the temperature pressure relief valve, located near the top of the water heater, to make certain the valve operates freely. Allow few quarts to be drained through the discharge line to an open drain.

NOTICE: If the temperature and pressure relief valve on the water heater discharges periodically, this may be due to thermal expansion in a closed water system. Contact the water supplier or your plumbing contractor on how to correct this.

DO NOT plug the relief valve outlet.

A water heater's tank can act as a settling basin for solids suspended in the water. It is therefore not uncommon for hard water deposits to accumulate in the bottom of

the tank. It is suggested that a few quarts of water be drained from the water heater's tank every month to clean the tank of these deposits.

Rapid closing of faucets or solenoid valves in automatic water using appliances can cause a banging noise heard in a water pipe. Strategically located risers in the water pipe system or water hammer arresting devices can be used to minimize the problem.

The anode rod should be removed from the water heater's tank annually for inspection and replaced when more than 6 in. (15.2 cm) of core wire is exposed at either end of the rod.

Make sure the cold water supply is turned off before removing anode rod.

This water heater incorporates a combustion shut off device that shuts the operation of the water heater down if undesirable combustion conditions occur, such as the presence of flammable vapors or blockage of the combustion air inlet openings. Please contact a Qualified Service Technician if this occurs.

DO NOT obstruct the flow of combustion and ventilation air.

▲ DANGER: Failure to perform the recommended Routine Preventative Maintenance can harm the proper operation of this water heater, which can cause carbon monoxide dangers, excessive hot water temperatures and other potentially hazardous conditions.

▲ DANGER:
Keep appliance area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

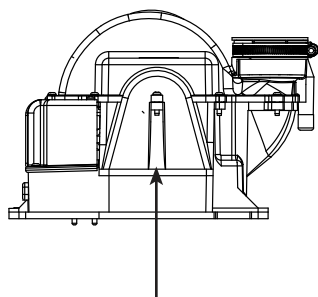
Housekeeping

Visually inspect the pilot.

Make sure that the combustion air inlet openings located around the perimeter of the water heater are not blocked or obstructed. A minimum clearance of 1 in. (2.5 cm) is required between the combustion air inlet openings and any object.

DO NOT obstruct or block the Flammable Vapor Sensor. The sensor does not require any maintenance or cleaning.

DO NOT expose the flammable vapor sensor to water, solvents or cleaning agents.



Dilution Air Inlet

Venting System Inspection

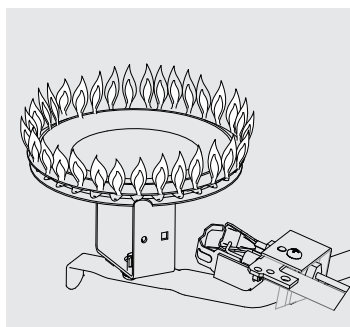
Inspect the vent system. Make certain that all joints are secure and vent system supports are all in place. Check the outdoor vent system terminal to see if it is free of obstructions and that there is no damage nearby caused by condensate.

Inspect dilution inlet. Make certain no blockage exists. Clean any lint, dirt or oil accumulation that may exist.

Test for spillage at the dilution air inlet after 5 minutes of burner operation. Place a blown out match or candle close to the dilution air holes. The smoke from the candle or match should be drawn into the dilution air holes. If the smoke is pushed away from the dilution air inlet, the blower or vent system may be blocked. Contact qualified service personnel.

Periodically clean the screens in the vent terminal (if applicable).

In applicable climates, periodically inspect the vent and air-inlet terminals to ensure they are not blocked by snow.



Proper burner flame pattern

Burner Inspection

Visually inspect the pilot flame and main burner periodically.

Through the sight glass, inspect the pilot and burner lighting. If any unusual pilot or burner operation is noted, the water heater should be shut off until qualified service assistance can be obtained.

▲ CAUTION: For your safety, cleaning of the burner must be performed only by qualified service personnel, as it involves the disconnection of gas piping and leak testing. The burner chamber is a sealed area. If the burner access door is removed, the burner access door gasket must be replaced.

For cleaning, remove the burner from the water heater. A vacuum cleaner can be used on the burner and floor shield inside the water heater. The burner can also be cleaned by scrubbing with mild detergent.

Care and cleaning of the water heater

NOTICE: Refer to the Hydrogen Gas Caution in the Operating Instructions.

Vacation and Extended Shut-Down

If the water heater is to remain idle for an extended period of time, the power and water to the appliance should be turned off to conserve energy and prevent a build-up of dangerous hydrogen gas.

The water heater and piping should be drained if they might be subjected to freezing temperatures.

After a long shut-down period, the water heater's operation and controls should be checked by qualified service personnel. Make certain the water heater is completely filled again before placing it in operation.

NOTICE: DO NOT remove the anode rod from the water heater's tank, except for inspection and/or replacement, as operation with the anode rod removed will greatly shorten the life of the glass lined tank and will exclude warranty coverage.

Anode Rod

This water heater is equipped with an anode rod designed to prolong the life of the glass lined tank. The anode rod is slowly consumed, thereby eliminating or minimizing corrosion of the glass lined tank.

Water sometimes contains a high sulfate and/or mineral content and together with cathodic protection process can produce a hydrogen sulfide, or rotten egg odor in the heated water. Chlorination of the water supply should minimize the problem.

Before You Call For Service...



Troubleshooting Tips

Save time and money! Review the charts on the following pages first and you may not need to call for service.

This water heater incorporates a combustion shut off device that shuts the operation of the water heater down if undesirable combustion conditions occur, such as the presence of flammable vapors or blockage of the vent and/or combustion air-inlet openings. Please contact a Qualified Service Technician if this occurs.

Problem	Possible Causes	What To Do
Condensation	This usually happens when a new water heater is filled for the first time.	● This is normal. After the water in the tank warms up, the condensation will disappear. Refer to page 10 for more information.
	Moisture from the products of combustion condensing on the tank surface.	● This is normal and will disappear in time. Refer to page 10 for more information.
	An undersized water heater will cause condensation.	● Use a water heater size that meets the requirements of your needs.
Yellow flame or soot	Scale on top of the burner.	● Contact a qualified service technician to remove scale.
	Vent or combustion air inlet openings are restricted.	● Remove obstruction or debris from vent and/or combustion air-inlet openings on water heater jacket.
	Not enough combustion or ventilation air supplied to the water heater location.	● Proper operation of the water heater requires air for combustion and ventilation. See the Combustion and Ventilation Air information in the “Installing The Water Heater” section of this manual.
Unable to light the main burner	Air in gas line.	● Contact a qualified service technician to purge the air from the gas line.
	Blocked vent system.	● Contact a qualified service technician to evaluate vent system for blockage.
	Pressure switch.	● Contact a qualified service technician.
	Wire connection not fully secured.	● Contact a qualified service technician to confirm wire connections.
	Combustion shutoff device tripped.	● Combustion shutoff device should be inspected by a qualified service technician.
	Gas control problem.	● Contact a qualified service technician.
Main burner does not stay lit	Combustion shutoff device Tripped.	● The combustion shutoff device should be inspected by a qualified service technician.
	Thermal cutoff device tripped.	● Contact a qualified service technician.

⚠ CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. VERIFY PROPER OPERATION AFTER SERVICING..

⚠ CAUTION: For your safety DO NOT attempt repair of gas piping, combination gas control (thermostat), burners, vent system, or other safety devices. Refer repairs to qualified service personnel.

Before You Call For Service...

Troubleshooting Tips



Save time and money! Review the charts on the following pages first and you may not need to call for service.

This water heater incorporates a combustion shutoff device that shuts the operation of the water heater down if undesirable combustion conditions occur, such as the presence of flammable vapors or blockage of the vent and /or combustion air inlet openings. Please contact a Qualified Service Technician if this occurs.

Problem	Possible Causes	What To Do
Rumbling noise	Scale and sediment in tank.	<ul style="list-style-type: none"> ● Drain the water heater to remove salt and sediment from the tank. Refer to page 32.
Relief valve producing popping noise or draining	Pressure build up caused by thermal expansion in a closed system.	<ul style="list-style-type: none"> ● This is an unacceptable condition and must be corrected. Contact the water supplier or plumbing contractor on how to correct this. DO NOT plug the relief valve outlet.
Not enough or no hot water	Water usage may have exceeded the capacity of the water heater.	<ul style="list-style-type: none"> ● Wait for the water heater to recover after an abnormal demand.
	Low gas pressure.	<ul style="list-style-type: none"> ● Check gas supply pressure and manifold pressure.
	The combination gas control (thermostat) may be set too low.	<ul style="list-style-type: none"> ● See the “Water Temperature Setting” of The Water Heater section of this manual.
	Leaking or open hot water faucets.	<ul style="list-style-type: none"> ● Make sure all faucets are closed.
	Check valve error codes.	<ul style="list-style-type: none"> ● Refer to gas valve error code table on page 37.
	Blower unplugged.	<ul style="list-style-type: none"> ● Plug in. Verify power supply (120VAC).
	Combustion shutoff system tripped	<ul style="list-style-type: none"> ● Contact a qualified service technician.
Water is too hot	The combination gas control (thermostat) is set too high.	<ul style="list-style-type: none"> ● See the “Water Temperature Setting” of The Water Heater section of this manual.
	Gas combination control (thermostat) defective.	<ul style="list-style-type: none"> ● Contact a qualified service technician to replace the combination gas control (thermostat).

⚠ CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. **VERIFY PROPER OPERATION AFTER SERVICING.**

⚠ CAUTION: For your safety **DO NOT** attempt repair of gas piping, combination gas control (thermostat), burners, vent system or other safety devices. Refer repairs to qualified service personnel.

Gas Valve LED Codes

LCD CODE (Models equipped with optional display)	LED STATUS	PROBLEM	SOLUTION
None	Short flash once every four seconds	None	No solution required
None	“Heartbeat”, alternates bright/dim	None	No solution required
12	One flash every three seconds	Low flame signal	<ol style="list-style-type: none"> 1. Gas supply pressure is too low. Increase the inlet gas supply pressure. 2. Low voltage to the water heater. Increase supply voltage to rated voltage. 3. Replace the pilot assembly.
44	Two flashes every three seconds	Pressure switch failed closed.	<ol style="list-style-type: none"> 1. Verify that the wiring to the blower pressure switch is correct. 2. Verify that the wiring to the blower pressure switch is connected properly. 3. Replace the blower assembly.
46	Three flashes every three seconds	Pressure and/or blower thermal switch failed open.	<ol style="list-style-type: none"> 1. Verify that the wiring to the blower pressure switch and thermal switch is correct. 2. Verify that wiring to the blower pressure switch and thermal switch is connected properly. 3. Check the vent system for blockage or obstructions. 4. Replace the blower assembly.
31	Four flashes every three seconds	TCO activated.	<ol style="list-style-type: none"> 1. Make sure the tank is full of water. 2. Reset the TCO and check for proper combination gas control (thermostat) cycling.
14	Five flashes every three seconds	Flame out of sequence	<ol style="list-style-type: none"> 1. Replace the combination gas control (thermostat).
11	Six flashes of one, every three seconds	System in lockout. Failed trial for ignitions.	<ol style="list-style-type: none"> 1. Gas supply is off or too low to operate. Turn on the gas supply and/or increase the inlet gas supply pressure. 2. Replace the pilot assembly. 3. Replace the combination gas control (thermostat).
45	Six flashes of two, every three seconds	System in lockout. Blower pressure switch and/or thermal switch open.	<ol style="list-style-type: none"> 1. Verify that the wiring to the blower pressure switch and thermal switch is correct. 2. Verify that wiring to the blower pressure switch and thermal switch is connected properly. 3. Check the vent system for blockage or obstructions. 4. Replace the blower assembly.
13	Six flashes of three, every three seconds	System in lockout. Flame lost.	<ol style="list-style-type: none"> 1. Gas supply pressure is too low. Increase the inlet gas supply pressure. 2. Check the combustion air-inlet openings around the water heater jacket for blockage or obstructions. 3. Replace the pilot assembly.
14	Six flashes of four, every three seconds	System in lockout. Flame sense out of sequence.	<ol style="list-style-type: none"> 1. Replace the combination gas control (thermostat).
10	Six flashes of five, every three seconds	System in lockout. Failed Ignition attempts.	<ol style="list-style-type: none"> 1. Gas supply is off or too low to operate. Turn on the gas supply and/or increase the inlet gas supply pressure. 2. Replace the pilot assembly. 3. Replace the combination gas control (thermostat).
47	Seven flashes every three seconds	System in lockout. Flammable vapor sensor.	<ol style="list-style-type: none"> 1. Flammable vapor sensor detected the presence of flammable vapors. Verify that no gasoline or flammable vapors are present. 2. Reset the combination gas control (thermostat). 3. Replace the flammable vapor sensor.
49	Eight flashes of one, every three seconds	Flammable vapor sensor, fault detected.	<ol style="list-style-type: none"> 1. Replace the flammable vapor sensor. 2. Replace the combination gas control (thermostat).
89	Eight flashes of two, every three seconds	Temperature sensor fault detected.	<ol style="list-style-type: none"> 1. Check the wiring connections of the connection of the combination gas controls (thermostat), thermal well. 2. Replace the thermal well of the combination gas control (thermostat).
15	Eight flashes of three, every three seconds	Electronics fault detected.	<ol style="list-style-type: none"> 1. Replace combination gas control (thermostat). 2. Replace the thermal well of the combination gas control (thermostat).
93	Eight flashes of four, every three seconds	Combination gas control (thermostat) fault detected.	<ol style="list-style-type: none"> 1. Cycle power to the combination gas control (thermostat). 2. Replace the combination gas control (thermostat).

⚠ CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. **VERIFY PROPER OPERATION AFTER SERVICING.**

⚠ CAUTION: For your safety **DO NOT** attempt repair of gas piping, combination gas control (thermostat), burners, vent system or other safety devices. Refer repairs to qualified service personnel.

Replacement Parts

For 40 and 50 gallon models equipped for use with Natural or Liquefied Petroleum / LP gas.

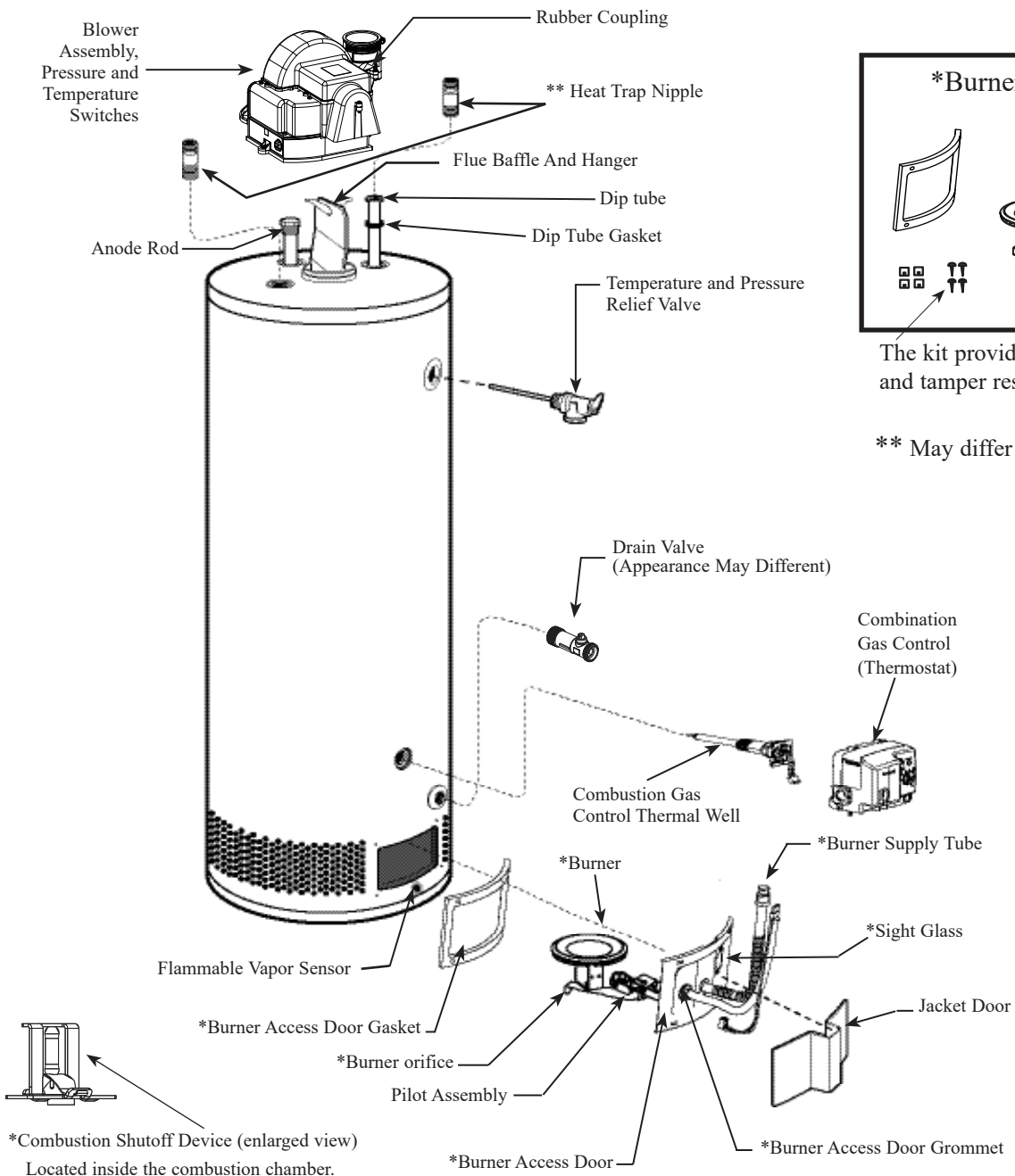
Instructions For Placing a Parts Order

All parts orders should include:

- 1 The model and serial number of the water heater from the rating plate.
- 2 Specify type of gas (Natural or Liquefied Petroleum / LP gas) as marked on the rating plate.
- 3 Part description (as noted below) and number of parts desired.
- 4 Refer to page 40.

CAUTION: For your safety, DO NOT attempt repair of gas piping, combination gas control (thermostat), burners, vent system or other safety devices. Refer repairs to qualified service personnel.

Use only original equipment replacement parts.



Notes...



IF YOU NEED SERVICE



1. Should you have any questions about your new water heater, or if it requires adjustment, repair, or routine maintenance, it is suggested that you first contact your installer, plumbing contractor or previously agreed upon service agency. In the event the firm has moved, or is unavailable, refer to the telephone directory, commercial listings or local utility for qualified service assistance.
2. Should your problem not be solved to your complete satisfaction, you should then contact the Manufacturer's National Service Department at the following address:
800 Interstate Park Drive
Montgomery, Alabama 36109
Phone: 1-866-279-4566.

When contacting the manufacturer, the following information will be requested:

- a. Model and serial number of the water heater as shown on the rating plate attached to the jacket of the heater.
- b. Address where the water heater is located and physical location.
- c. Name and address of installer and any service agency who performed service on the water heater.
- d. Date of original installation and dates any service work was performed.
- e. Details of the problems as you can best describe them.
- f. List of people, with dates, who have been contacted regarding your problem.

Important Instructions for the Commonwealth of Massachusetts

The Commonwealth of Massachusetts requires compliance with regulation 5.08: Modifications to NFPA-54, Chapter 10 : 248 CMR 4.00 and 5.00 for installation of through – the – wall vented gas appliances as follows:

(1) Revise NFPA-54 section 10.5.4.2 by adding a second exception as follows:

Existing chimneys shall be permitted to have their use continued when a gas conversion burner is installed, and shall be equipped with a manually reset device that will automatically shut off the gas to the burner in the event of a sustained back-draft.

(2) Revise 10.8.3 by adding the following additional requirements:

(a) For all side wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than seven (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

1. **INSTALLATION OF CARBON MONOXIDE DETECTORS.** At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard wired carbon monoxide detectors

a. In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.

b. In the event that the requirements of this subdivision can not be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

2. **APPROVED CARBON MONOXIDE DETECTORS.** Each carbon monoxide detector as required in accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

3. **SIGNAGE.** A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet

above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, "GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS".

4. **INSPECTION.** The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a)1 through 4.

(b) **EXEMPTIONS:** The following equipment is exempt from 248 CMR 5.08(2)(a)1 through 4:

1. The equipment listed in Chapter 10 entitled "Equipment Not Required To Be Vented" in the most current edition of NFPA 54 as adopted by the Board; and

2. Product Approved side wall horizontally vented gas fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.

(c) **MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM PROVIDED.** When the manufacturer of Product Approved side wall horizontally vented gas equipment provides a venting system design or venting system components with the equipment, the instructions provided by the manufacturer for installation of the equipment and the venting system shall include:

1. Detailed instructions for the installation of the venting system design or the venting system components; and

2. A complete parts list for the venting system design or venting system.

(d) **MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM NOT PROVIDED.** When the manufacturer of a Product Approved side wall horizontally vented gas fueled equipment does not provide the parts for venting the flue gases, but identifies "special venting systems", the following requirements shall be satisfied by the manufacturer:

1. The referenced "special venting system" instructions shall be included with the appliance or equipment installation instructions; and

2. The "special venting systems" shall be Product Approved by the Board, and the instructions for that system shall include a parts list and detailed installation instructions.

(e) A copy of all installation instructions for all Product Approved side wall horizontally vented gas fueled equipment, all venting instructions, all parts lists for venting instructions, and/or all venting design instructions shall remain with the appliance or equipment at the completion of the installation.