

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

# Use & Care Manual

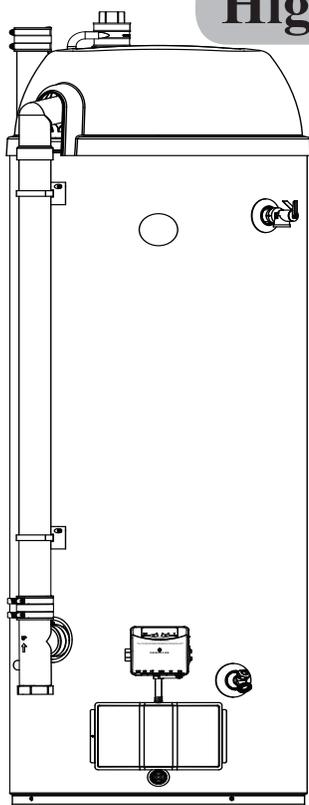
With Installation Instructions for the Installer

## Residential Gas - FVIR Certified

### High Efficiency Condensing Power Direct Vent

# Water Heaters

Residential 38 and 48 Gallon



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!**



**California Proposition 65 Warning:** This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.



**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 Control LED Error Codes” Section of this manual for a list of error codes.



### **! DANGER!**

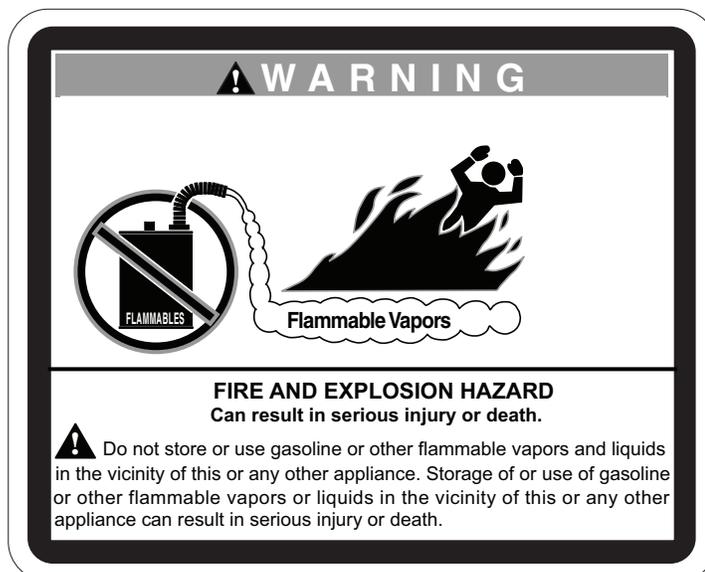
#### PROPERLY VENT THE WATER HEATER

Failure to properly vent the water heater as outlined in the Vent and Combustion Air-Inlet 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 both the vent and combustion air-inlet systems are properly installed. Be sure to inspect both the vent and the combustion air-inlet for proper installation at initial start-up; and at least periodically thereafter. Refer to the Care and Cleaning section of this manual for more information regarding vent and combustion air-inlet 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.



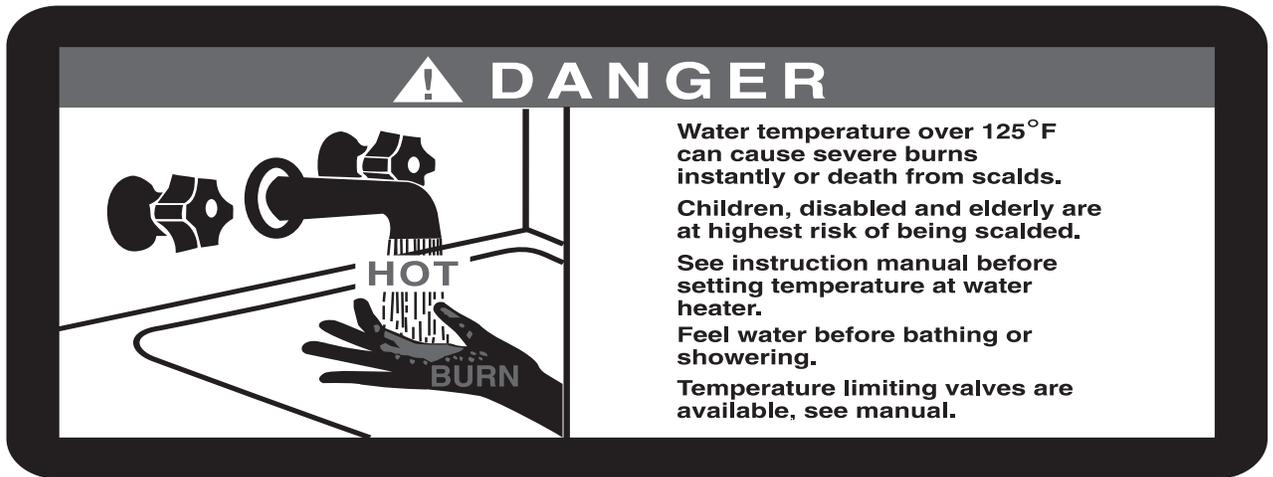
# IMPORTANT SAFETY INFORMATION READ ALL INSTRUCTIONS BEFORE USING



## ! 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 (thermostat). Water temperatures above 125°F 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.



**NOTICE:** Mixing valves are available for reducing point of use water temperature by mixing hot and cold water in branch water lines. Contact a licensed plumber or the local plumbing authority for further information.

#### Time/Temperature Relationship in Scalds

Water Temperature	Time To Produce a Serious Burn
120°F	More than 5 minutes
125°F	1½ to 2 minutes
130°F	About 30 seconds
135°F	About 10 seconds
140°F	Less than 5 seconds
145°F	Less than 3 seconds
150°F	About 1½ seconds
155°F	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.

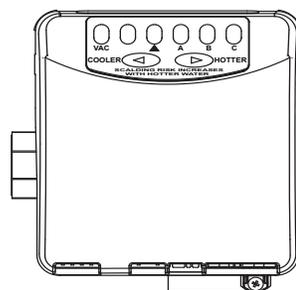
**! DANGER:** Households with small children, disabled, or elderly persons may require a 120°F or lower gas control (thermostat) setting to prevent contact with "HOT" water.

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 page 28 and 29 for more details.)

The temperature of the water in the heater can be regulated by pressing the "COOLER" or "HOTTER"

⊖ ⊕ arrow buttons on the front of the gas control (thermostat). To comply with safety regulations the gas control (thermostat) was set at its lowest setting before the water heater was shipped from the factory.

The illustration below shows the approximate water temperature for each LED Indicator on the Gas Control (Thermostat) Temperature Display.



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

Temperature Setting	Display					Burns on Adult Skin
	VAC	▲	A	B	C	
VAC = approx. 70°F	●	○	○	○	○	-----
● = approx. 110°F	○	●	○	○	○	More than 5 minutes
Both ● and ▲ = approx. 115°F	○	●	●	○	○	More than 5 minutes
▲ = approx. 120°F	○	○	●	○	○	More than 5 minutes
Both ▲ and A = approx. 125°F	○	○	●	●	○	1-1/2 to 2 minutes
A = approx. 130°F	○	○	○	●	○	About 30 seconds
Both A and B = approx. 135°F	○	○	○	●	●	About 10 seconds
B = approx. 140°F	○	○	○	○	●	Less than 5 seconds
Both B and C = approx. 145°F	○	○	○	○	●	Less than 3 seconds
C = approx. 150°F	○	○	○	○	●	About 1-1/2 seconds
C-Flashing = approx. 160°F	○	○	○	○	●	About 1/2 seconds



## **⚠️ 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

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### **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

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California Law requires that residential water heaters must be braced, anchored or strapped to resist falling or horizontal displacement due to earthquake motions. For residential water heaters up to 52-gallon capacity, a brochure with generic earthquake bracing instructions can be obtained from: Office of the State Architect, 1102 Q Street, Suite 5100, Sacramento, CA 95814 or you may call 916-445-8100 or ask a water heater dealer.

However, applicable local codes shall govern installation. For residential water heaters of a capacity greater than 52 gallons, consult the local building jurisdiction for acceptable bracing procedures.



### SAFETY PRECAUTIONS

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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.

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## SAVE THESE INSTRUCTIONS

### IMPORTANT

Carefully inspect the water heater for damage before proceeding with the installation. If you find damage to the condensate trap, PVC pipes, gas control (thermostat) or the blower assembly, **DO NOT** install or attempt any repair to the water heater. Contact the manufacturer as detailed under "IF YOU NEED SERVICE" section of this manual.

# 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.

## 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 catch pan, adequately drained, must be installed under the water heater.

The water heater must be centered in the catch pan.

Catch 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 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 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-inch stand in accordance with the National Fuel Gas Code, NFPA 54, ANSI Z223.1, 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.**

- The water heater should be installed so as to minimize the length of vent and combustion air-inlet pipe(s) and the number of vent and combination air-inlet connection fittings required.
- Hot water lines should be insulated to conserve water and energy.
- The water heater should be installed close to a condensate drain.
- The water heater, condensate lines, and water lines should be protected from exposure to freezing temperatures.
- **DO NOT** install this water heater outdoors.
- Minimum clearance from combustible construction:

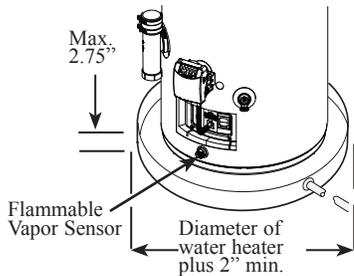
Front*	Side	Rear	Top**
0"	0"	0"	12"

\* "Front" clearance dimension is measured from front of control to the closet door.

\*\* "Top" clearance dimension is measured from the top pan of the water heater 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 installed in an alcove or closet, the entire floor must be covered by a wood or metal panel. A minimum of 24" clearance from the front and top should be available for adequate inspection and servicing.
- The water heater may be installed on combustible floors, but not directly on carpeting. If the water heater must be installed on carpeting, place a metal or wood panel beneath the water heater, extending beyond its full width and depth at least 3" in all directions.



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

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

**NOTICE: DO NOT allow the flammable vapor sensor to become submerged in water. Make sure the catch 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.**

# Installing the water heater

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## 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 water heater is due to operation in a corrosive atmosphere.

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## 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

pipng. 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 on right). 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.**

## Water Supply Connections

Refer to the illustration below for suggested typical installation. The installation of unions or flexible copper connectors is recommended on the hot and cold water connections so that the water heater may be easily disconnected for servicing if necessary. The HOT and COLD water connections are clearly marked and are 3/4" NPT on all models. Install a shut-off valve in the cold water line near the water heater.

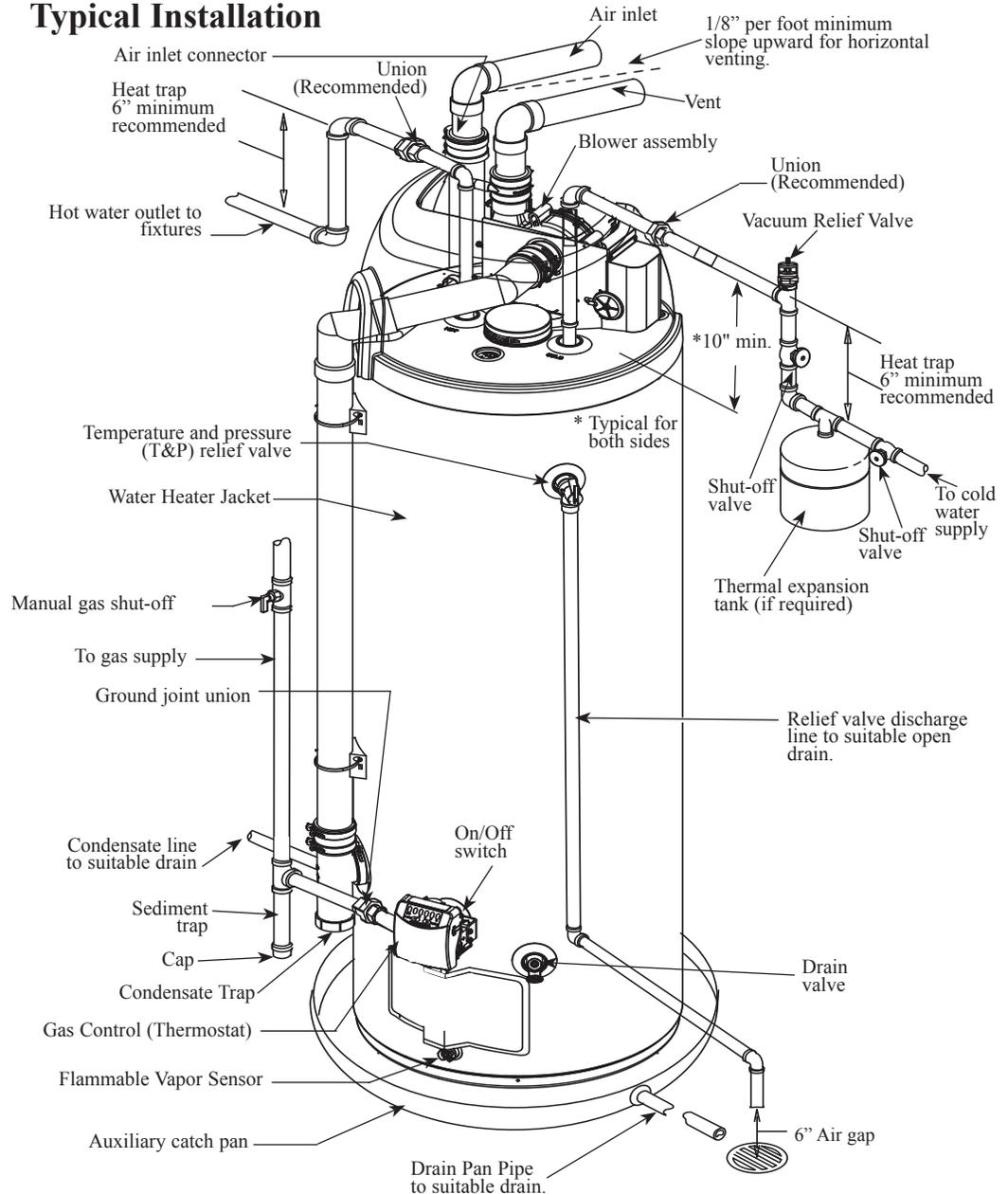
**IMPORTANT:** It is recommended that the hot and cold water piping have a minimum vertical height of 10" from

the top of the water heater before the transition into any elbow. This vertical height is needed in order to provide adequate clearance for top cap installation and removal.

To gain access to the hot and cold water connections on water heater remove the two (2) screws that secure the top cap to the water heater then pull the top cap upward and off the water heater. See illustration of top cap and screws on pages 23 & 36.

**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.**

## Typical Installation



# Installing the water heater

A new combination temperature and pressure relief valve, complying with the Standard for Relief Valves and Automatic Gas Shut-Off Devices for Hot Water Supply Systems, ANSI Z21.22, is supplied 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. Local codes shall govern the installation of relief valves.

## Relief Valve

The pressure rating of the relief valve must not exceed 150 PSI, the maximum working pressure of the water heater as marked on the rating plate.

The Btuh rating of the relief valve must equal or exceed the Btuh 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.

## Condensate Management

This water heater generates condensate and requires a drain to be located in close proximity to allow condensate to drain safely. The drain line and fittings should be installed per installation instructions.

Be sure the condensate runs freely to the drain and does not accumulate in the condensate trap or the condensate line. In cold climates, precautions may need to be taken to ensure that the condensate drain lines do not freeze. A water proof heat tape may be used to prevent freezing of condensate lines.

It is recommended that the condensate trap be primed by filling the trap with 1/4 cup of tap water before connecting the drain lines.

- Condensate is mildly acidic and should be collected and disposed per local codes. Certain local codes require condensate to be neutralized before it is disposed. Neutralizer kits are available. Contact your installer or plumbing contractor.

- Use only PVC, CPVC pipe or flexible tubing suitable for use with flue condensate as drain line. If flexible tubing is used ensure that there are no bends or twists and has gradual slope to condensate drain.

- The drain line (along its entire length) must be at least the same diameter as the drain of the condensate trap (1/2").

- The drain line must be short as possible and have a downward slope towards the condensate drain. If suitable slope is not provided, the drain line can get blocked and will cause improper operation of the water heater. If a downward slope cannot be provided, a condensate pump should be used to pump condensate to a suitable drain.

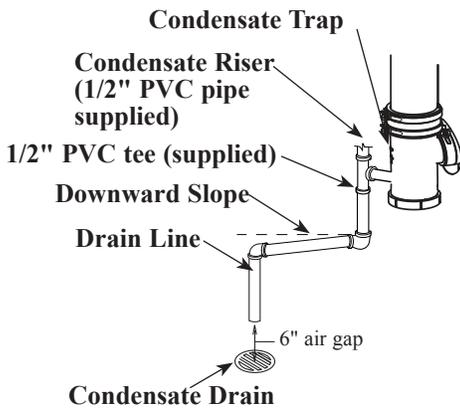
- The end of the drain line should be open to the atmosphere. The end should not be under water.

- Do not connect the drain line directly to the sewer drain.

- Do not connect the drain line with drains from other appliances.

- Do not drain condensate into the water heater drain pan.

- Do not drain condensate over public way, walkway or other areas where it will create slippery condition, which could lead to personal injury.



**NOTICE:** If water appears on the floor DO NOT assume the tank is leaking, check venting and condensate line connections.

**NOTICE:** Water Heater should be leveled for proper condensate drainage.

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**⚠ 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 a clean 1/2" black steel pipe or other approved gas piping material.

A ground joint 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 shut-off valve: See (NFGC) for complete instructions.

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

If lever type gas shut-offs are used, they shall be T-Handle type.

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 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 gas control (thermostat) inlet, particularly if teflon pipe compound is used, as the valve body may be damaged.

The minimum inlet gas pressure (with main burner on) to the water heater must be a minimum of 5" w.c. for natural gas, and a minimum of 11" w.c. for LP gas. The maximum inlet pressure to the water heater must not exceed 14" w.c. for natural gas and 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.

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**⚠ 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 shut-off 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 gas control (thermostat) should also be leak tested after the water heater is placed in operation.

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## Pressure Testing the Gas Supply System

The water heater and its manual gas shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at pressures in excess of 1/2 psi (14" w.c.).

The water heater must be isolated from the gas piping system by closing the manual gas shut-off valve during any pressure testing of the gas supply piping at pressures equal to or less than 1/2 psi (14" w.c.).

# Installing the water heater

**▲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 **5,999** feet without any change or modification.

For installation between **6,000 and 8,999** feet, refer to the Venting Information tables on **page 13** for maximum vent lengths.

Installations above **8,999** feet are not authorized.

Contact the local gas supplier for more information.

**▲DANGER:** To avoid the risk of fire, explosion, or asphyxiation from carbon monoxide, NEVER operate the water heater unless it is properly vented and the Vent and Combustion Air Inlet systems are properly installed as detailed in the "Vent and Combustion Air Inlet" section of this manual.

The vent pipe must overlap a minimum of ½" 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 vent or combustion air inlet 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.

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

## Vent and Combustion Air Inlet

This water heater is a direct vent appliance and must be installed so that all air for combustion is derived directly from the outside atmosphere and all flue gases are discharged to the outside atmosphere. For proper installation of the vent and combustion air-inlet systems, follow the instructions as detailed in this manual.

**DO NOT** connect this water heater to an existing vent or chimney - it must be vented separately from all other appliances.

**NOTICE:** This water heater is approved to use the following materials for vent and combustion air-inlet systems:

PVC (Schedule 40, Cellular Core, ASTM-F891)

PVC (DWV, ASTM-D2665)

PVC (Schedule 40, ASTM-D1785)

PVC (SDR Series, ASTM-D2241)

CPVC (CPVC 4120, ASTM-D2846)

CPVC (Schedule 40, ASTM-F441)

CPVC (SDR Series, ASTM-F442)

ABS (Schedule 40, DWV, ASTM-D2661)

ABS (Schedule 40, DWV, Cellular Core, ASTM-F628)

**DO NOT mix ABS pipe and fittings with PVC or CPVC pipe fittings.**

**NOTICE:** It is acceptable to interchange PVC and CPVC pipe and fittings.

The unit may be vented horizontally through a wall or vertically through the roof.

Vent and combustion air inlet pipe runs must be adequately supported along both vertical and horizontal lengths.

Maximum unsupported length is recommended to be no more than 4 feet.

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.

The support method used should isolate the vent and combustion air inlet 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 and combustion air inlet systems in a way that restricts the normal thermal expansion and contraction of the chosen vent material and air inlet pipe.

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

- 1 Verify that the correct materials as detailed above have been used, and that the minimum or maximum vent and combustion air inlet length and terminal locations as detailed in this manual have been met.
- 2 Carefully inspect the entire vent and combustion air inlet systems pipes 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 and combustion air inlet systems 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 these conditions 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.

## The Minimum and Maximum equivalent lengths for the vent and combustion air-inlet systems are shown in Table 1.

\*Use only Rheem 3 inch concentric termination kit (SP20245). The use of any other kit is not approved. Contact your installer or local distributor for assistance. Refer to page 37 & 38 for installation of alternate concentric vent termination.

Table 1					
From 0 ft. through 5,999 ft.					
Model	Vent & Combustion Air-Inlet System Diameter	Min. Allowed Equivalent Vent & Combustion Air-Inlet Lengths (Each Pipe Run)	Max. Allowed Equivalent Vent & Combustion Air-Inlet Lengths (Each Pipe Run)	Vent and Combustion Air-Inlet System Termination(s)	
	Inches	Feet	Feet		
38 and 48 Gallon Heaters	2	7	30	90° Elbows	Concentric*
	3	7	60	90° Elbows	Concentric*
From 6,000 ft. through 8,999 ft.					
Model	Vent & Combustion Air-Inlet System Diameter	Min. Allowed Equivalent Vent & Combustion Air-Inlet Lengths (Each Pipe Run)	Max. Allowed Equivalent Vent & Combustion Air-Inlet Lengths (Each Pipe Run)	Vent and Combustion Air-Inlet System Termination(s)	
	Inches	Feet	Feet		
38 and 48 Gallon Heaters	2	Not allowed	Not allowed	-----	-----
	3	7	45	90° Elbows	Concentric*

**NOTICE:** A 90° elbow is equivalent to 5 ft. of straight pipe. A 45° elbow is equivalent to 2.5 ft. of straight pipe. The use of a 45° elbow is preferred over a 90° elbow. The vent and combustion air-inlet terminations are not included in the equivalency calculations.

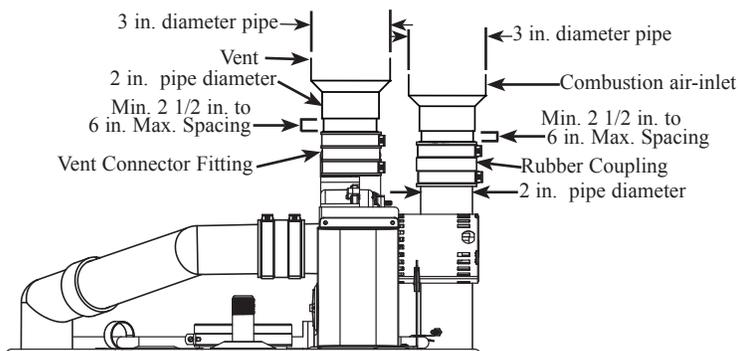
**NOTICE:** The mixing of 2" and 3" piping is not allowed. If 3" pipe is used, a 3" to 2" reducer fitting is allowed at the vent connector fitting.

This water heater is supplied with a 2" PVC (Schedule 40) 90° vent terminal. When venting with 3" pipe, Schedule 40 PVC 90° vent terminals must be used. Screens for both 2" and 3" vent terminals have been included.

Wind vane for 3" combustion inlet terminals have been included. Wind vane should be cemented to the combustion intake terminal using PVC cement. Wind vane should be cemented as shown in figure on page 16.

**IMPORTANT:** Ensure that all the coupling clamps are tightened before allowing the water heater to operate.

When using PVC, CPVC or ABS pipe and fittings, use 90° elbows of the corresponding size and material for the vent terminal and combustion air-inlet terminals.



• Maintain a minimum vertical height of 6 in. of pipe, including pipe increasers (if used), from the blower exhaust coupling before a transition into any elbow.

Elbows are limited to a total equivalent length of 20 ft. (6 m). Maximum allowed four (4) 90° elbows or eight (8) 45° elbows.

## Additional Fitting Considerations

**DO NOT** use short sweep elbows. It is recommended to use only standard and/or long sweep elbows. See examples as shown.

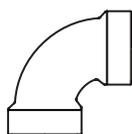
DO NOT use.



Short Sweep 90° Elbow

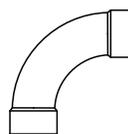
Examples of Elbows:

GOOD



Standard 90° Elbow

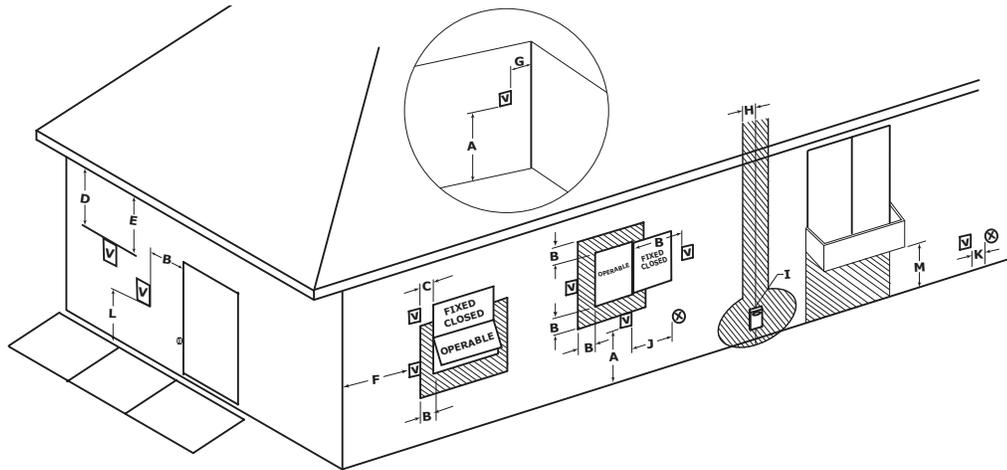
BEST



Long Sweep 90° Elbow

# Installing the Water Heater

## Direct Vent Terminal Location



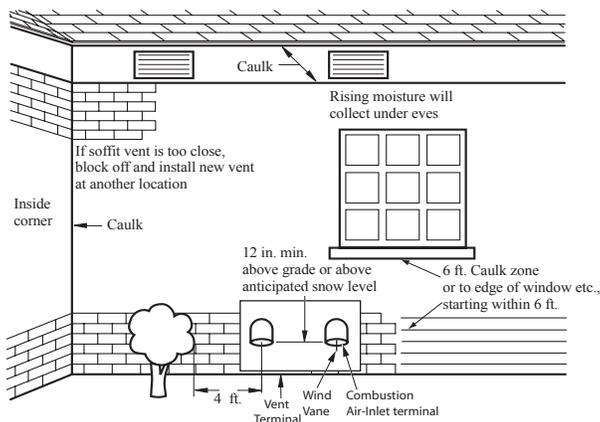
The following information should be used for determining the proper location of the vent terminal for the water heater.

<input type="checkbox"/> Vent Terminal	<input checked="" type="checkbox"/> Air Supply Inlet	<input checked="" type="checkbox"/> Area Where Terminal Is Not Permitted
US Installations <sup>1</sup>		
A = Clearance above grade, veranda, porch, deck or balcony	1 ft.	
B = Clearance to window or door that may be opened	6 in. for appliances ≤ 10,000 Btuh , 9 in. for appliances > 10,000 Btuh and ≤ 50,000 Btuh, 12 in. for appliances > 50,000 Btuh	
C = Clearance to permanently closed window		*
D = Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet from the center line of the terminal		*
E - Clearance to unventilated soffit		*
F - Clearance to outside corner		*
G - Clearance to inside corner		*
H - Clearance to each side of centerline extended above meter/regulator assembly		*
I - Clearance to service regulator vent outlet		*
J - Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance	6 in. for appliances ≤ 10,000 Btuh, 9 in. for appliances > 10,000 Btuh and ≤ 50,000 Btuh, 12 in. for appliances > 50,000 Btuh	
K - Clearance to a mechanical air supply inlet	3 ft. above if within 10 ft. horizontally	
L - Clearance above paved sidewalk or paved driveway located on public property		*
M - Clearance under veranda, porch, deck, or balcony		*

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

\* For clearances not specified in ANSI Z223.1/ NFPA 54 the following statement shall be included:

"Clearance in accordance with local installation codes and the requirements of the gas supplier and the manufacturer's installation instructions".



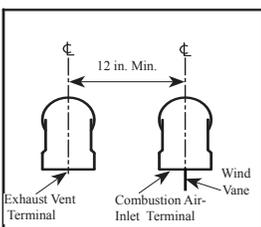
**⚠ WARNING:** Moisture in the flue gas will condense as it leaves the vent terminal. In cold weather this condensate can freeze on the exterior wall, under the eaves and on surrounding objects. Some discoloration to the exterior of the building is to be expected. However, improper location or installation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

## Terminal Location Additional Considerations

- 1 **DO NOT** install the vent terminal under any patio or deck.
- 2 To 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. of the vent and combustion air-inlet terminals.
- 6 In cold climates, precautions may need to be taken to ensure that the condensate in the vent pipe does not freeze.
- 7 Support horizontal sections of the vent and combustion air-inlet pipe every 4 ft. **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. above grade or above 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.

**NOTICE:** The vent and combustion air-inlet systems of this water heater may be installed horizontally through a wall or vertically through the roof.

The vent and combustion air-inlet terminals of the water heater must be installed in the same atmospheric pressure zone.



## Horizontal Vent and Combustion Air-Inlet Terminal Installation

Determine the locations for the vent and combustion air-inlet terminals per information on previous page and section above, then make two (2) holes through the exterior wall to accommodate the vent and combustion air-inlet pipes.

- Maintain a minimum horizontal distance of 12 in. between the vent and combustion air-inlet terminal center lines.

Insert lengths of vent and combustion air-inlet pipes through the wall as shown.

- Allow sufficient length of pipe to extend beyond the exterior wall of the building for attachment of the vent and combustion air-inlet terminals.
- Maintain a minimum distance from the vent and combustion air-inlet terminals of not less than 1 ft. above grade or above average snowfall whichever is greater.

When installing 3" vent terminals install the supplied 1/2 in. mesh metal screens inside each terminal fitting.

Connect the terminals to the vent and combustion air-inlet pipes which are extending out of the building.

- Ensure that the back of the supplied terminals are 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.

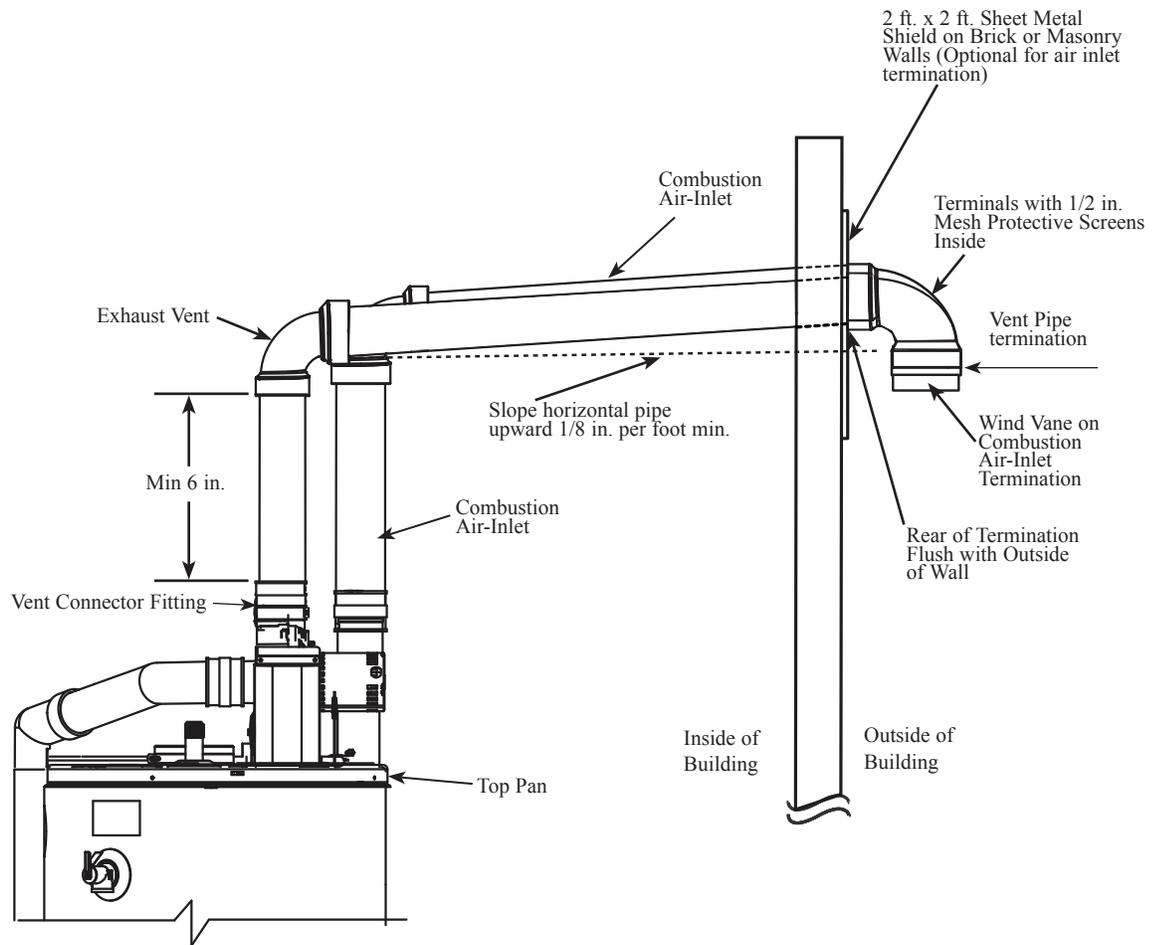
- Horizontal lengths of the vent system must slope upward a minimum of 1/8 in. per foot as shown in figure on next page.

# Installing the water heater

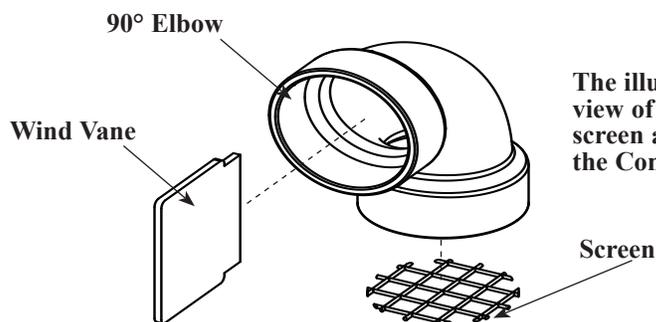
## Horizontal Vent and Combustion Air-Inlet Terminal Installation continued -

Complete the installation of the remainder of the combustion air-inlet system and attach it to the combustion air-inlet connector fitting on the water heater's combustion air-inlet tube assembly.

Support vertical and horizontal lengths of the vent and combustion air-inlet systems as previously mentioned.

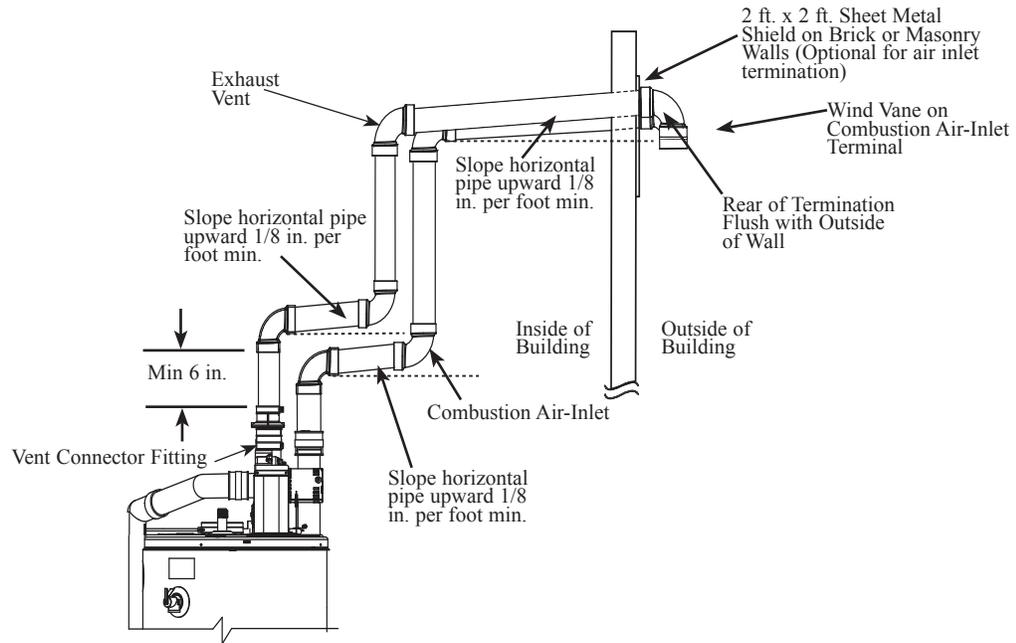


## Horizontal Vent and Combustion Air-Inlet Terminal Installation



The illustration on the left is an enlarged view of the elbow, "Wind Vane", and screen assembly which must be installed on the Combustion Air-Inlet Termination.

## Alternate Horizontal Vent and Combustion Air-Inlet Terminal Installation



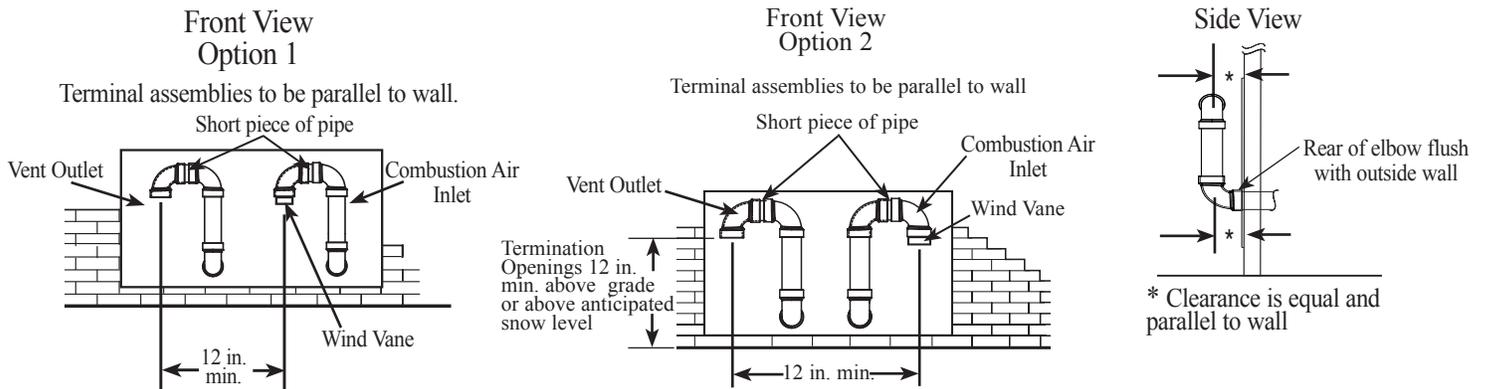
## Horizontal Vent and Combustion Air-Inlet Alternate Vent Riser Terminal Installation

Maintain a minimum distance from the vent and combustion air-inlet terminals of not less than 1 ft. above grade or above average snowfall whichever is greater.

Connect the vent riser assemblies to the vent and combustion air-inlet pipes which are extending out of the building.

- Ensure that the back of the 90° elbows are flush with the outside wall surface and that the vent and combustion air-inlet terminations of the vent risers are parallel with the outside wall.

**IMPORTANT:** Remember to include the additional 90° elbows and vertical height of the vent and combustion air-inlet pipes of the vent riser when calculating the maximum equivalent vent and combustion air-inlet system lengths. The maximum equivalent vent and combustion air-inlet system lengths must be as specified on page 13.



# Installing the Water Heater

## Vertical Vent and Combustion Air-Inlet Installation

The location of the vent and combustion air-inlet terminals depends on the following minimum clearances and considerations.

- 1 Minimum 12 in. above roof.
- 2 Minimum 12 in. above anticipated snow level.
- 3 Maximum 24 in. above roof level without additional support for vent.
- 4 Four (4) ft. from any gable, dormer or other roof structure with building interior access (i.e., vent, window, etc.).
- 5 Ten (10) ft. 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. between the vent and combustion air-inlet terminal center lines.

Determine the locations for the vent and combustion air-inlet terminals then make two (2) holes through the roof and interior ceiling(s) to accommodate the vent and combustion air-inlet pipes.

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 upwards a minimum of 1/8 in. per foot.

Install the combustion air-inlet system and attach it to the combustion air-inlet rubber coupling on the water heater's combustion air-inlet tube assembly.

Support vertical and horizontal lengths of the vent and combustion air-inlet systems as previously mentioned.

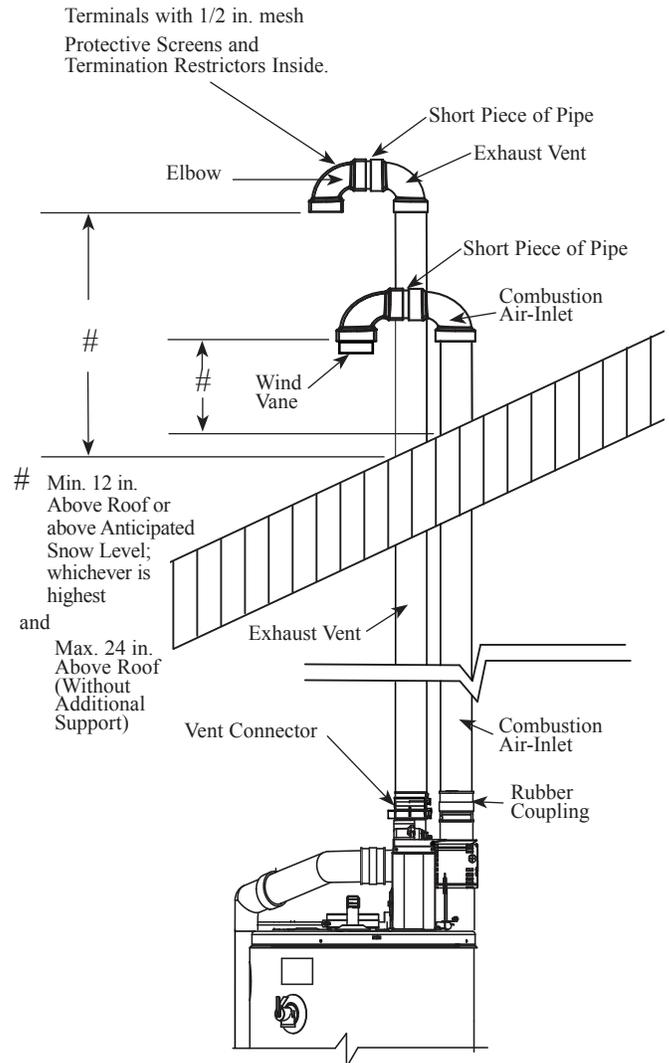
Determine the vent and combustion air-inlet terminal heights and cut the pipe accordingly. Insert lengths of vent and combustion air-inlet pipes through the ceiling wall as shown.

Install adequate flashing where the vent and combustion air-inlet pipes pass through the roof.

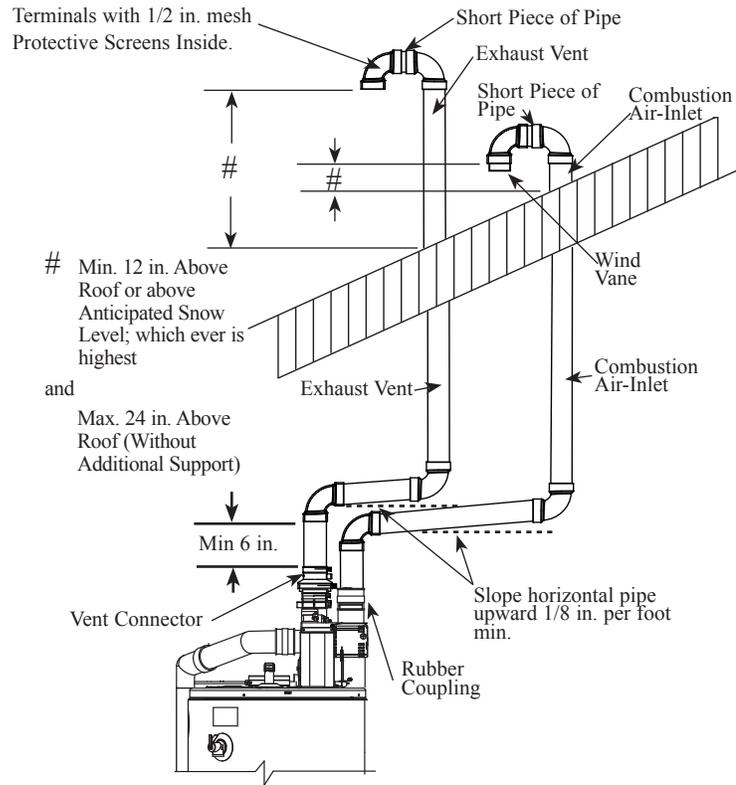
Connect vent elbow onto vertical pipe through roof.

Connect a short piece of pipe approximately 3 in. between the terminals and elbows.

## Exhaust Vent and Combustion Air-Inlet Pipe Through Roof



## Alternate Vent and Combustion Air-Inlet Pipe Through Roof



# 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 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 and combustion air inlet 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

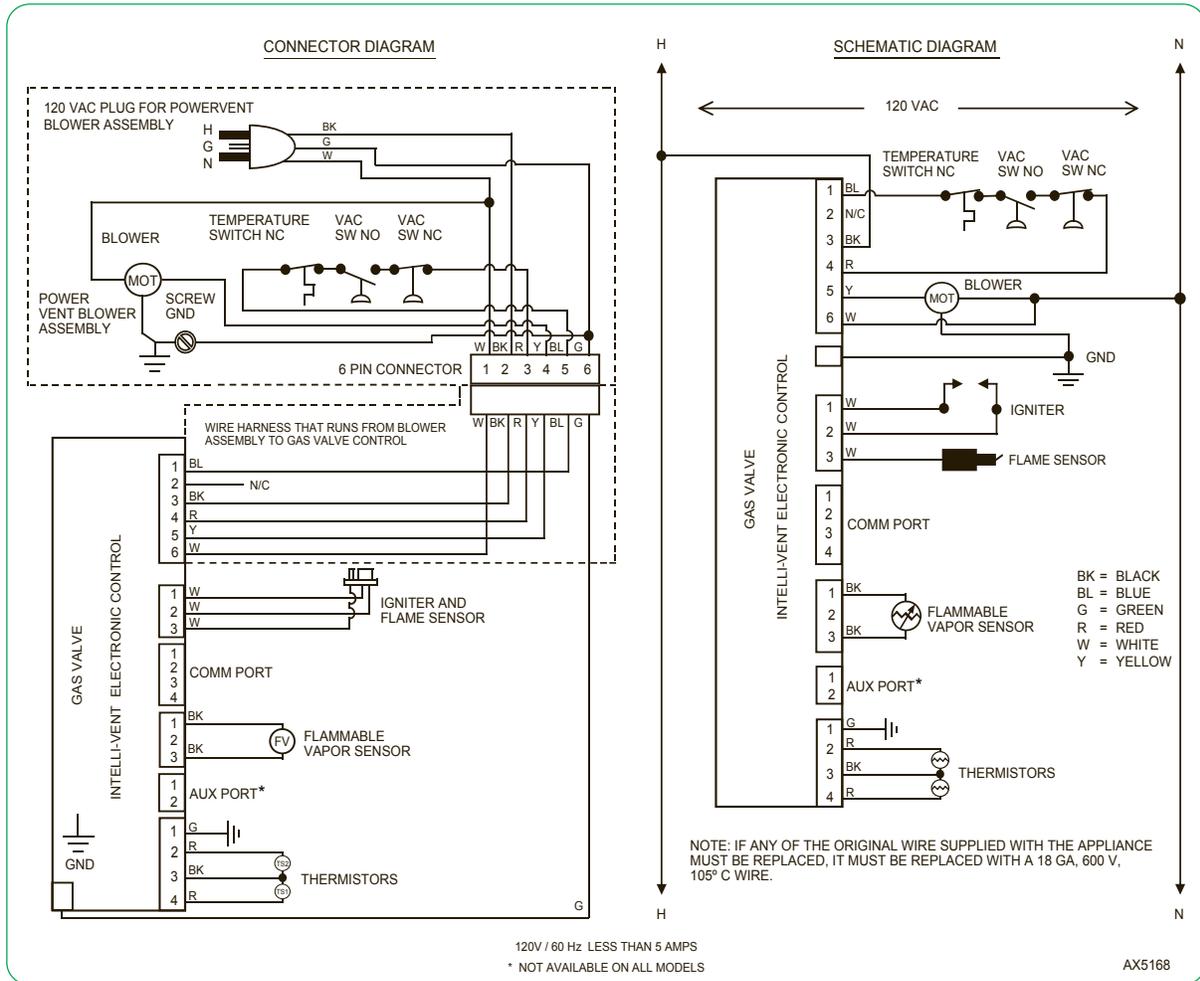
If local codes permit, the water heater may be connected to electric service with the power cord provided (DO NOT use an extension cord). A grounding receptacle is required.

If local codes do not permit the use of cord connections, a 120 V, 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.



**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

## Insulation Blankets

**⚠ 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, 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.

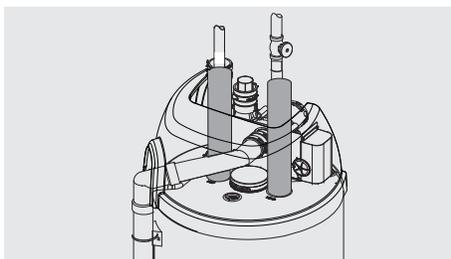
The manufacturer's warranty does not cover any damage or defect caused by installation, attachment or use of any type of energy saving or other unapproved devices (other than those authorized by the manufacturer) into, onto or in conjunction with the water heater. The use of unauthorized energy saving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

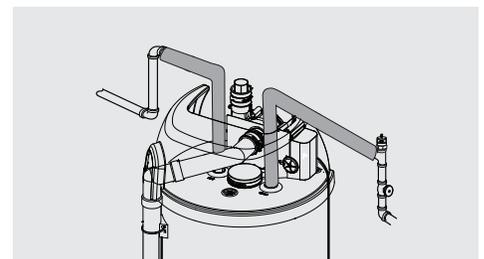
- **DO NOT** cover the operating or warning labels attached to the water heater or attempt to relocate them on the exterior of insulation blanket.
- **DO NOT** apply insulation to the top of the water heater. This will interfere with the safe operation of the blower assembly.
- **DO NOT** cover the burner access door, jacket door, condensate trap, 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 Flammable Vapor Sensor is located. This area must be unobstructed so as not to restrict operation of the sensor.
- Inspect the insulation blanket frequently making certain it has not sagged down onto the Flammable Vapor sensor located around 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 24" sections of pipe insulation.



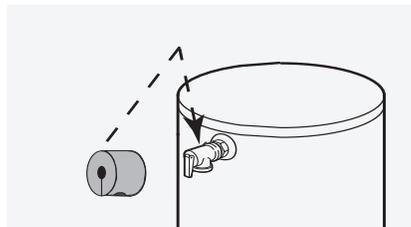
Typical horizontal piping arrangement

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

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## Temperature & Pressure (T&P) Insulation Installation

For increased energy efficiency, this water heater has been supplied with a 2 3/8" section of T&P insulation. Install the insulation as shown below.



**Typical Side Connect T & P Arrangement.**

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.

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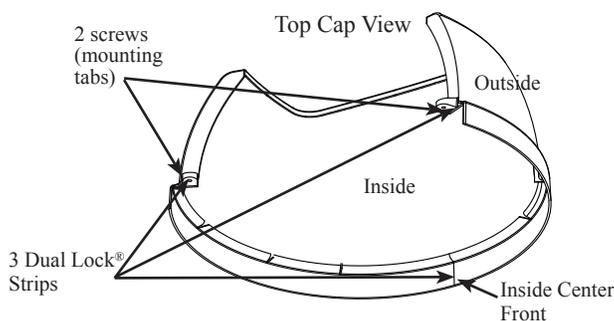
## Heat Trap

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

These heat traps may require a minimum of one (1) 90° 3/4" NPT elbow and may require an additional 90° 3/4" NPT elbow or a 3/4" coupling depending on your installation needs. See Illustration of nipples and heat traps on page 36.

---

## Top Cap Installation



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

Carefully remove the Top Cap from the water heater carton. Install the water heater as specified per this Use & Care Manual.

**NOTICE:** Also see information as detailed in "Water Supply Connections" section.

Locate the small plastic bag containing the three (3) Dual Lock® strips and two (2) sheet metal screws to be used to attach the Top Cap in the Use & Care Manual bag. Peel off one side of the Dual Lock® strips and firmly press near the Top Cap mounting tabs and the inside center front of the rim on the Top Cap, see figure on left.

Peel off the other side of the Dual Lock® strips and place the Top Cap on the top front center of the water heater ensuring that it is aligned correctly and properly positioned on top of the water heater. Press firmly to ensure proper attachment is made.

Align holes in mounting tabs on the Top Cap with the holes in the top of the heater then secure the Top Cap to the water heater with the two (2) #8 sheet metal screws (supplied).

**IMPORTANT:** Do not over tighten the screws as this may damage the Top Cap.

# Installing the water heater

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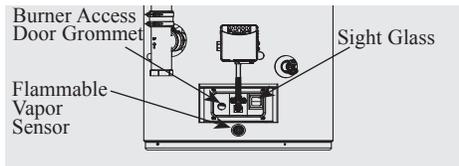
## During Installation of this water heater.....

### DO

- DO** check inlet gas pressure to ensure that it is within the range specified on the rating plate.
- DO** 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.
- DO** provide proper slope for condensate drain line.

### DON'T

- DON'T** block the Flammable Vapor Sensor located around the lower portion of the water heater jacket.
- 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 illustration at left).



# Installation Checklist

---

## A. Water Heater Location

- In a location where the vent and combustion air-inlet systems will be within the requirements specified in 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.
  - 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 shut-off valve, union and sediment trap.
  - Approved pipe joint compound used.
  - Soap and water solution used to check all connections and fittings for possible gas leak.
  - Check inlet gas pressure (with main burner on).
  - 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 and combustion air-inlet systems

- Heater vented separately from all other appliances.
  - Blower assembly properly installed.
  - Proper materials and techniques used in the installation of the vent and combustion air-inlet systems.
  - Vent pipe properly secured to the exhaust connector of the blower assembly.
  - Vent and combination air-inlet systems supported at required intervals.
  - Appropriate minimum clearances observed.
  - Precautions taken to prevent moisture damage around vent termination.
  - Vapors from vent pipe cement and primer have dissipated prior to applying electrical power.
  - Combustion air-inlet pipe properly secured to the combustion air-inlet rubber coupling.
  - Horizontal section of vent sloped upward.
- 

## F. Wiring

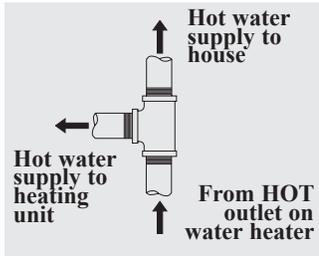
- Correct power supply (120 V).
  - Electrical connections tight.
  - Heater properly grounded and proper polarity observed.
- 

## G. Condensate Line

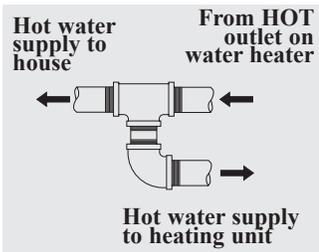
- Sloped toward drain.
- Condensate drain line hoses clamped.
- Condensate drain protected from freezing (if necessary).
- Check for leaks in the condensate trap and line connections.

# 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.



Tee fitting for vertical hot water supply lines.



Tee fitting for horizontal hot water supply lines.

## Combination Potable Water and Space Heating Application

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), a mixing or tempering valve must be installed in the hot water supply line to the house in order to reduce the scald hazard potential.

**⚠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 (potable) water heating and space heating applications. **DO NOT** use for space heating application 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' - 0" maximum distance from water heater to fan coil (developed length) is required for Massachusetts State.

## Typical Piping Diagram for Combination Potable/Space Heating Installation

Nominal 3/4" size mixing or tempering valve (refer to warning above). Follow mixing or tempering valve manufacturer's instructions for installation of the valve.

Spring loaded check valve in heating unit hot water supply line and cold water return line (not supplied with water heater)

**NOTE:** This check valve is incorporated in some heating units. Refer to the installation instructions supplied with specific heating unit to determine if it is required.

Isolation valve in hot water supply line to heating unit (not supplied with water heater)

See diagrams above for proper pipe application for vertical or horizontal supply lines.

Temperature and Pressure Relief Valve, tie to location approved by local code

Gas line to water heater

Temperature and pressure relief valve discharge line

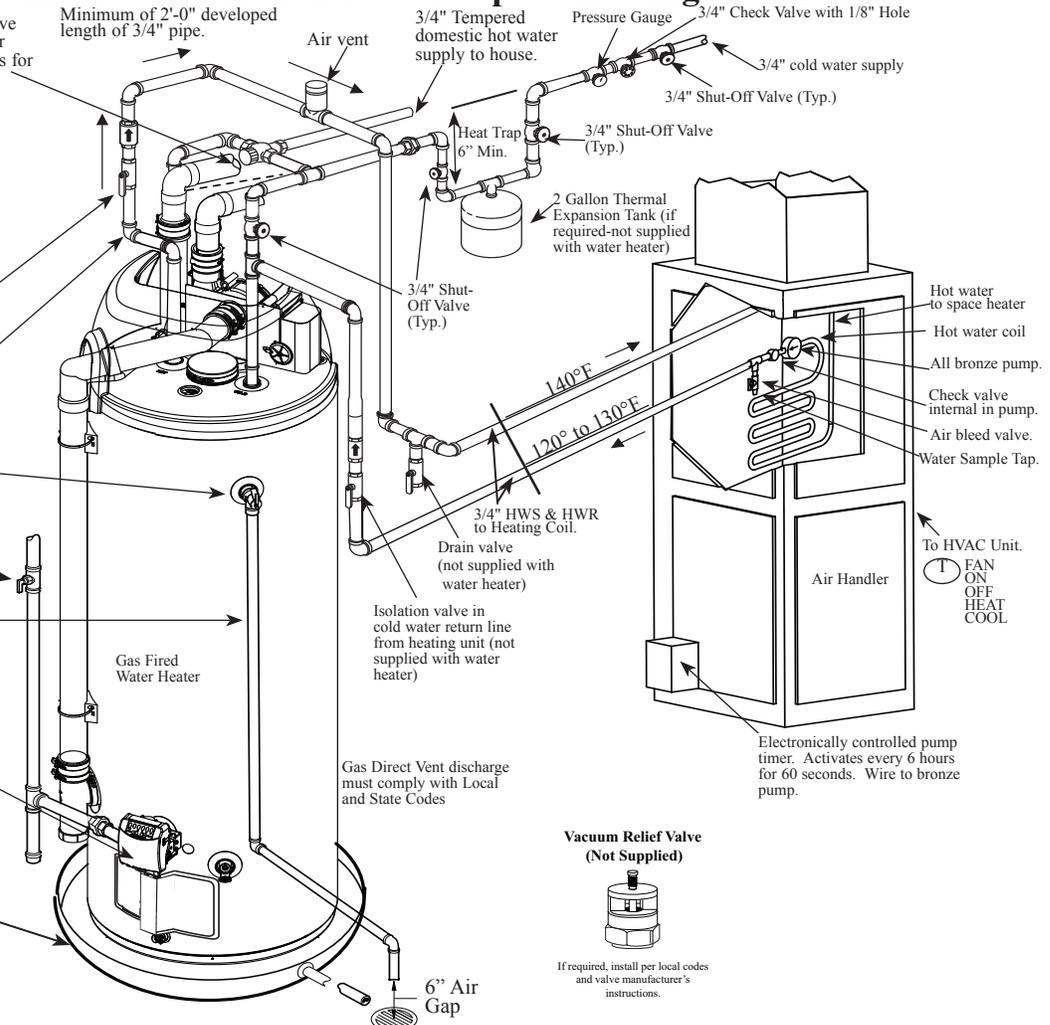
Gas Control (Thermostat)

Water Heater to be in accordance with the Local and State Energy Code

All water piping shall be insulated in accordance with Local and State Energy Code.

Water Heater drain pan installed in accordance with the Local and State Code

Minimum of 2'-0" developed length of 3/4" pipe.



Vacuum Relief Valve (Not Supplied)



If required, install per local codes and valve manufacturer's instructions.

# 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.

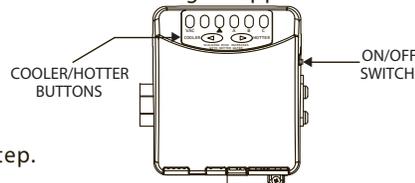
## FOR YOUR SAFETY READ BEFORE OPERATING

**⚠ WARNING:** If you do not follow these instructions and the Use & Care Manual instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do **NOT** try to light the burner by hand.
- 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 supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in the gas control buttons. Never use tools. If the control buttons will not push in, don't try to repair them, 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. Toggle the "ON/OFF" switch located on the gas control to the "ON" position.
3. Set the thermostat to the lowest setting by pressing the COOLER (⊖) and HOTTER (⊕) buttons at the same time and holding them for (1) second. Depress the COOLER (⊖) button until only the VAC indicator light is lit.
4. Toggle the "ON/OFF" switch located on the gas control to the "OFF" position.
5. Turn off all electrical power to the appliance.
6. This appliance is equipped with a Hot Surface Ignition System which automatically lights the burner. Do **NOT** open the inner door of this appliance and try to light the burner by hand!
7. Wait five (5) minutes to clear out any gas. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you do not smell gas, go ahead to the next step.
8. Turn on all electrical power to the appliance.
9. Toggle the "ON/OFF" switch located on the gas control to the "ON" position.
10. Set thermostat to the desired temperature setting by pressing the COOLER (⊖) and HOTTER (⊕) buttons at the same time and holding them for (1) second. Depress the HOTTER (⊕) button until the desired temperature display setting is lit. The preferred starting point for temperature setting is indicated by ▲ on the thermostat.
11. 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 GAS OFF TO THE APPLIANCE

1. Set the thermostat to the lowest setting by first depressing the COOLER (⊖) and HOTTER (⊕) buttons at the same time and holding for (1) second. Depress the COOLER (⊖) button until only the VAC indicator light is lit.
2. Toggle the "ON/OFF" switch located on the gas control to the "OFF" position.
3. Turn off all electrical power to the appliance.

# Operating the water heater

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**▲ 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 not turn off manual gas shut-off 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 shut-off 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.

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## Operating Procedure

This heater is equipped with a hot surface ignitor to light the main burner. There is no pilot light to be lit, but on initial start-up, it is recommended that the outer door be removed (leave inner door in place for safety) to determine if the hot surface ignitor and main burner are operating properly.

Once filled with water, it is only necessary to plug the power cord in and make sure the “ON/OFF” switch located on the gas control (thermostat) is in the “ON” position to put the water heater into operation. Within seconds the hot surface ignitor should heat

up, then the gas control (thermostat) should open and the main burner ignite. After the main burner ignites, replace the outer door. If no main burner flame is established, the gas control (thermostat) 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.”

**TO SHUT OFF WATER HEATER** – Turn switch on the gas control (thermostat) to the “OFF” position.

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## Water Temperature Setting

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

The temperature of the water in the water heater can be regulated by pressing the buttons on the front of the gas control (thermostat).

Safety and energy conservation are factors to be considered when selecting the water temperature setting of the water heater’s gas control (thermostat(s)). The lower the temperature setting, the greater the savings in energy and operating costs.

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

Water temperatures above 125°F 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 available for reducing point of use water temperature by mixing hot and cold water in branch water lines. Contact a licensed plumber or the local plumbing authority for further information. (See page 4 for more details.)

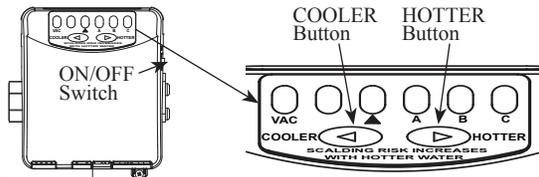
The chart on the next page may be used as a guide in determining the proper water temperature for your home.

## 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.

To avoid any unintentional changes in water temperature settings, the gas control (thermostat) has a tamper resistant feature for changing the temperature setting. To change the temperature setting follow these instructions.

1. "Wake Up" the temperature indicators by holding down both "COOLER" and "HOTTER" temperature adjustment buttons at the same time for one second, see Figure below. One or two of the temperature indicators will light up. These indicators will only remain on for 30 seconds if no further buttons are pressed. After 30 seconds the control will go back to "Sleep" mode.
2. Release both of the temperature buttons.
  - a. To decrease the temperature press and release the "COOLER" button until the desired setting is reached.
  - b. To set temperature up to 140°F press and release the "HOTTER" button until the desired temperature is reached.



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

c. To set temperature above 140°F follow these instructions:

- i. Press and hold the "HOTTER" button for a few seconds, until all temperature indicator lights come on for one second and then turn off.
- ii. Now press and release the "HOTTER" button until the desired temperature is reached. The maximum temperature setting is 160°F.
- iii. To decrease the temperature press and

### Time/Temperature Relationship in Scalds

Water Temperature	Time To Produce a Serious Burn
120°F	More than 5 minutes
125°F	1½ to 2 minutes
130°F	About 30 seconds
135°F	About 10 seconds
140°F	Less than 5 seconds
145°F	Less than 3 seconds
150°F	About 1½ seconds
155°F	About 1 second

Table courtesy of Shriners Burn Institute

release the "COOLER" button until the desired temperature is reached.

**NOTICE: Holding down the button will not continue to lower or raise the temperature setting. The button must be pressed and released for each temperature change desired.**

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 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.

Always supervise young children or others who are incapacitated.

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

The 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 (shut-off) valve to the appliance.**

If the water heater has been subjected to fire, flood or physical damage, turn off the manual gas (shut-off) valve, and do not operate the water heater again until it has been checked by a qualified service technician.

**NOTICE: 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.**

Temperature Setting	Display			Burns on Adult Skin
	VAC	▲	A B C	
VAC = approx. 70°F	●	○	○ ○ ○ ○ ○	-----
● = approx. 110°F	○	●	○ ○ ○ ○ ○	More than 5 minutes
Both ● and ▲ = approx. 115°F	○	●	○ ○ ○ ○ ○	More than 5 minutes
▲ = approx. 120°F	○	○	● ○ ○ ○ ○	More than 5 minutes
Both ▲ and A = approx. 125°F	○	○	● ● ○ ○ ○	1-1/2 to 2 minutes
A = approx. 130°F	○	○	○ ● ○ ○ ○	About 30 seconds
Both A and B = approx. 135°F	○	○	○ ● ● ○ ○	About 10 seconds
B = approx. 140°F	○	○	○ ○ ○ ● ○ ○	Less than 5 seconds
Both B and C = approx. 145°F	○	○	○ ○ ○ ● ● ○	Less than 3 seconds
C = approx. 150°F	○	○	○ ○ ○ ○ ● ○	About 1-1/2 seconds
C-Flashing = approx. 160°F	○	○	○ ○ ○ ○ ○ ●	About 1/2 seconds

# Operating the water heater

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## Sequence of Operation

During initial start-up or a call for heat, the control will verify the pressure switch is open.

Once the control verifies the blower pressure switch is open, the control will energize the blower motor for the pre-purge sequence.

The control will verify the blower pressure switch has closed, ensuring that the blower is functioning properly and that the condensate, combustion air inlet and venting systems are not blocked.

The control will then proceed through a sequence of self-diagnostics before initiating a trial for ignition.

During the trial for ignition, the hot surface ignitor will warm up.

Once the hot surface ignitor warms up, the main gas control (thermostat) will open allowing gas to flow to the main burner.

Once the main burner ignites, the control will verify that the burner flame is present through the flame sense circuit. The hot surface ignitor will then turn off.

The main burner will remain lit throughout the heat cycle until the water temperature setting is reached.

Once the water temperature setting is reached, the control will close the main gas control (thermostat) which will extinguish the main burner flames.

The blower motor will stay energized for an additional few seconds after the control verifies that the burner flame is extinguished in order to clear combustion gases from the water heater.

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 vapor sensor)
- Some other flammable materials and their vapors

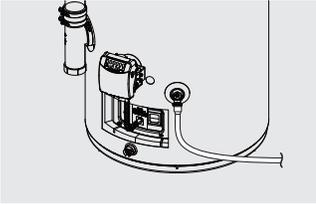
If the flammable vapor sensor shuts down the water heater, then the electronic control will display the appropriate error code and you should then promptly contact a qualified service technician.

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

# Care and cleaning of the water heater

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## Draining the Water Heater



**▲ CAUTION:** Shut off gas to the water heater gas control (thermostat) at the 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 drain valve.

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**▲ 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.

**▲ 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.

## 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 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.

Inspect the combustion air-inlet pipe and vent pipes. Make certain that all joints are secure and that vent pipe supports are all in place. Check the outdoor vent and air inlet pipes to see that it is free of obstructions, and that there is no damage nearby caused by condensate.

At least once a year, 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 several gallons to flush 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. If allowed to accumulate, these solids can cover the gas control (thermostat) sensors, causing the sensors to operate erratically. Because accumulated solids can prevent the gas control (thermostat) sensors from accurately reading the water temperature, the water at the fixture can be hotter than the gas control (thermostat) setting. 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" 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 devices 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 condensate, combustion air inlet and venting systems. Contact a Qualified Service Technician if this occurs.

# Care and cleaning of the water heater

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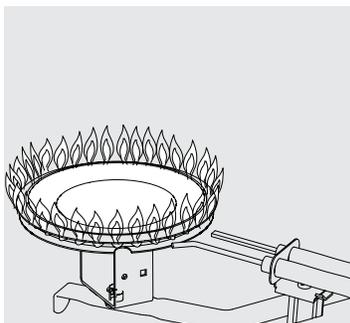
**▲ DANGER: Combustible materials, such as clothing, cleaning materials, or flammable liquids, etc., must not be placed against or next to the water heater.**

## Housekeeping

To ensure sufficient ventilation and combustion air supply, proper clearances must be maintained.

**DO NOT** obstruct or block the Flammable Vapor Sensor. The sensor

does not require any maintenance or cleaning. **DO NOT** get Flammable Vapor Sensor wet. **DO NOT** expose to cleaning agents.



Proper burner flame pattern

## Burner Inspection

Visually inspect the hot surface ignitor and burner annually.

Through the sight glass, inspect the hot surface ignitor with the main burner off and inspect the main burner while firing.

If any unusual 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.

## Combustion Air-Inlet and Vent System Inspection

Inspect the combustion air-inlet and vent systems. Make certain that all joints are secure and that combustion air-inlet and vent system supports are all in place.

Check the outdoor combustion air-inlet

and vent system terminals to see that they are free of obstructions, and that there is no damage nearby caused by condensate.

**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 devices 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 systems. 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.	<ul style="list-style-type: none"> <li>This is normal. After the water in the tank warms up, the condensation will disappear. If, however, the condition persists, examine the piping and fittings for possible leaks.</li> </ul>
	Moisture from the products of combustion condensing on the tank surface.	<ul style="list-style-type: none"> <li>This is normal and will disappear in time. Excessive condensation can cause main burner outage.</li> </ul>
	An undersized water heater will cause condensation.	<ul style="list-style-type: none"> <li>Use a water heater size that meets the requirements of your needs.</li> </ul>
Yellow flame or soot	Scale on top of the burner.	<ul style="list-style-type: none"> <li>Contact a qualified service technician to remove scale.</li> </ul>
	Vent and/or combustion air-inlet pipes are blocked.	<ul style="list-style-type: none"> <li>Remove obstruction or debris from vent and/or combustion air-inlet pipes.</li> </ul>
Unable to light the main burner	Air in gas line.	<ul style="list-style-type: none"> <li>Contact a qualified service technician to purge the air from the gas line.</li> </ul>
	Blocked vent and/or combustion air-inlet pipes.	<ul style="list-style-type: none"> <li>Contact a qualified service technician to evaluate vent and/or combustion air-inlet pipes for blockage.</li> </ul>
	Pressure Switches	<ul style="list-style-type: none"> <li>Make sure the pressure switch hose is not "kinked".</li> </ul>
	Wire Connection not fully secured.	<ul style="list-style-type: none"> <li>Contact a qualified service technician to confirm wire connections.</li> </ul>
	Combustion Shut-off Devices tripped.	<ul style="list-style-type: none"> <li>Combustion shut-off devices should be inspected by a qualified service technician.</li> </ul>
	Gas Control Problem	<ul style="list-style-type: none"> <li>Contact a qualified service technician.</li> </ul>
Main burner does not stay lit	Gas Control's (Thermostat's) gas shut-off device has opened.	<ul style="list-style-type: none"> <li>Contact a qualified service technician.</li> </ul>

**⚠ CAUTION:** Make certain power to water heater is "OFF" by unplugging blower power cord from power outlet before removing protective cover FOR ANY REASON.

**⚠ 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, gas control (thermostat), burners, vent and/or combustion air-inlet systems 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 shut off devices 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 systems. Contact a Qualified Service Technician if this occurs.

Problem	Possible Causes	What To Do
Rumbling noise	Scale and sediment	<ul style="list-style-type: none"> <li>● Drain the water heater to remove scale and sediment from the tank. Refer to the top of page 31.</li> </ul>
Relief valve producing popping noise or draining	Pressure build up caused by thermal expansion to a closed system.	<ul style="list-style-type: none"> <li>● 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.</li> </ul>
Not enough or no hot water	Water usage may have exceeded the capacity of the water heater.	<ul style="list-style-type: none"> <li>● Wait for the water heater to recover after an abnormal demand.</li> </ul>
	Low gas pressure.	<ul style="list-style-type: none"> <li>● Check gas supply pressure and manifold pressure.</li> </ul>
	The gas control (thermostat) may be set too low.	<ul style="list-style-type: none"> <li>● See the “Water Temperature Setting” of The Water Heater section of this manual.</li> </ul>
	Leaking or open hot water faucets.	<ul style="list-style-type: none"> <li>● Make sure all faucets are closed.</li> </ul>
	Check valve error codes.	<ul style="list-style-type: none"> <li>● Refer to gas valve error code table on page 35.</li> </ul>
	“ON/OFF” switch turned off.	<ul style="list-style-type: none"> <li>● Turn switch to “ON” position.</li> </ul>
	Blower unplugged.	<ul style="list-style-type: none"> <li>● Plug in. Verify power supply (120VAC).</li> </ul>
	Combustion Shut-off Devices tripped.	<ul style="list-style-type: none"> <li>● Contact a qualified service technician.</li> </ul>
Water is too hot	The gas control (thermostat) is set too high.	<ul style="list-style-type: none"> <li>● See the “Water Temperature Setting” of The Water Heater section of this manual.</li> </ul>
	Gas Control (Thermostat) Defective.	<ul style="list-style-type: none"> <li>● Contact a qualified service technician to replace the gas control (thermostat).</li> </ul>

**▲ CAUTION:** Make certain power to water heater is "OFF" by unplugging blower power cord from power outlet before removing protective cover FOR ANY REASON.

**▲ 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, gas control (thermostat), burners, vent and/or combustion air-inlet systems or other safety devices. Refer repairs to qualified service personnel.

# Gas Control LED Error Codes

LED Status	Problem	Solution
● ○ ○ ● ○ ○ VAC ▲ A B C	An open earth ground circuit to the ignition system.	<ol style="list-style-type: none"> <li>1. Check that the earth ground connection is properly connected.</li> <li>2. Check that the ground conductor on the water heater is properly connected.</li> </ol>
● ○ ● ○ ● ○ VAC ▲ A B C	Wiring error or a high resistance to earth ground.	<ol style="list-style-type: none"> <li>1. Check proper connection of line neutral and hot wires.</li> <li>2. Check that the water heater is securely connected to earth ground.</li> </ol>
● ○ ● ○ ○ ○ VAC ▲ A B C	Pressure switch remained closed longer than 5 seconds after the call for heat began.	<ol style="list-style-type: none"> <li>1. Pressure switch wiring is incorrect.</li> <li>2. Replace pressure switch.</li> </ol>
● ○ ● ○ ○ ● VAC ▲ A B C	Pressure or temperature switch remained open longer than 5 seconds after the combustion blower was energized.	<ol style="list-style-type: none"> <li>1. Pressure or temperature switch(es) wiring is incorrect.</li> <li>2. Pressure switches tubing is not connected correctly.</li> <li>3. Air inlet, exhaust or condensate lines obstructed.</li> <li>4. Check vent and air inlet pipe size used is per this installation instructions.</li> <li>5. Check maximum number of elbows or maximum equivalent feet of vent and air inlet pipe does not exceed recommended length in these installation instructions.</li> <li>6. Replace faulty switch(es) on blower assembly.</li> </ol>
● ○ ● ○ ● ● VAC ▲ A B C	Error in the hot surface ignitor circuit.	<ol style="list-style-type: none"> <li>1. Check that all wiring is correct and secure.</li> <li>2. Replace hot surface ignitor.</li> </ol>
● ○ ○ ● ● ○ VAC ▲ A B C	System in lockout.	<ol style="list-style-type: none"> <li>1. Gas supply is off or too low to operate.</li> <li>2. Hot surface ignitor not positioned correctly.</li> <li>3. Low voltage to the water heater.</li> <li>4. Electric polarity to unit is incorrect - test and correct.</li> <li>5. Replace gas control (thermostat).</li> <li>6. Check that the flame sensor rod is making good contact with burner flame.</li> </ol>
● ○ ○ ○ ● ● VAC ▲ A B C	Problem in the gas valve driver circuit.	<ol style="list-style-type: none"> <li>1. Turn power to the water heater off for 10 seconds and then back on.</li> <li>2. If error code persists, replace gas control (thermostat).</li> </ol>
● ● ● ● ● ● VAC ▲ A B C	Problem with the internal circuit.	<ol style="list-style-type: none"> <li>1. Turn power to the water heater off for 10 seconds and then back on.</li> <li>2. If error code persists, replace gas control (thermostat).</li> </ol>
● ○ ○ ○ ● ○ VAC ▲ A B C	Flame signal sensed out of proper sequence.	<ol style="list-style-type: none"> <li>1. Turn power to the water heater off for 10 seconds and then back on.</li> <li>2. If error code persists, replace gas control (thermostat).</li> </ol>
● ○ ○ ● ● ● VAC ▲ A B C	ECO activated.	<ol style="list-style-type: none"> <li>1. Turn power to the water heater off for 10 seconds and then back on.</li> <li>2. If error code persists, replace gas control (thermostat).</li> </ol>
● ○ ● ● ○ ○ VAC ▲ A B C	One of the temperature adjust buttons stuck closed.	<ol style="list-style-type: none"> <li>1. Press and release each of the buttons once. Cycle water heater power off and on.</li> <li>2. If error code persists, replace gas control (thermostat).</li> </ol>
● ○ ● ● ○ ● VAC ▲ A B C	Water temperature sensor error, open or shorted.	<ol style="list-style-type: none"> <li>1. Check that all wiring is correct and secure.</li> <li>2. Turn power off.</li> <li>2. Turn power to the water heater off for 10 seconds and then back on.</li> <li>3. If error code persists, replace gas control (thermostat).</li> </ol>
● ○ ○ ● ○ ● VAC ▲ A B C	Flammable sensor problem.	<ol style="list-style-type: none"> <li>1. Check for correct wiring to FV sensor.</li> <li>2. Check for open circuits to FV sensor.</li> <li>3. Replace FV sensor.</li> </ol>
● ○ ○ ○ ○ ● VAC ▲ A B C	Flammable vapors near water heater. Control in lockout.	<ol style="list-style-type: none"> <li>1. FV sensor detected presence of flammable vapors.</li> <li>2. Contact a service agency.</li> </ol>
● ● ○ ○ ● ○ VAC ▲ A B C	Weak flame current.	<ol style="list-style-type: none"> <li>1. Check that the flame sensor rod is making good contact with burner flame.</li> <li>2. Contact a service agency.</li> </ol>

# Replacement Parts

For 38 and 48 gallon models using natural or LP gas.

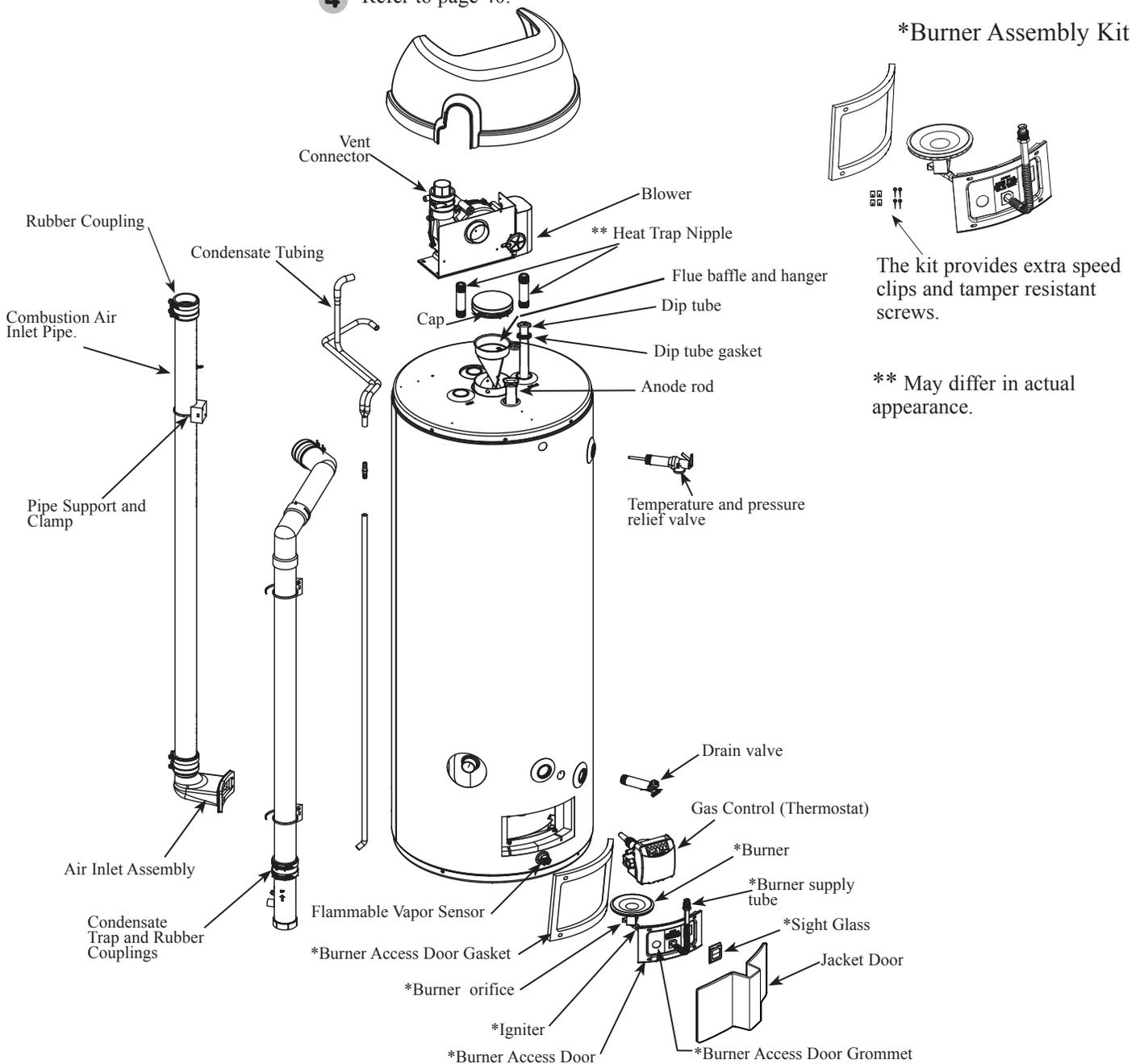
## Instructions For Placing a Parts Order

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 LP) 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, gas control (thermostat), burners, vent connectors or other safety devices. Refer repairs to qualified service personnel.**

**Use only original equipment replacement parts.**



# Alternate Vent Termination

## INSTALLATION INSTRUCTIONS

### for Alternate Concentric Terminal:

Use only Rheem 3" vent kit part number SP20245.

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

#### INSPECT SHIPMENT:

Inspect contents for possible missing or damaged components. (See Figure 1) This kit includes:

- Qty. 1 (one) – 3 3/16" x 7 1/2" PVC Modified Reducer Rain Cap (part # 68-23421-03C)
- Qty. 1 (one) – 2 7/8" Diameter PVC Exhaust Pipe 37 1/8" long (part # 68-23421-03B)
- Qty. 1 (one) – 4 1/2" Diameter PVC Air-inlet Pipe – 24" long (part # 68-23421-03A)
- Qty. 1 (one) – 3 1/4" x 3 3/4" x 4 7/8" PVC Wye (part # 68-23421-03D)
- Qty. 1 (one) – SDR 35 90° PVC Elbow

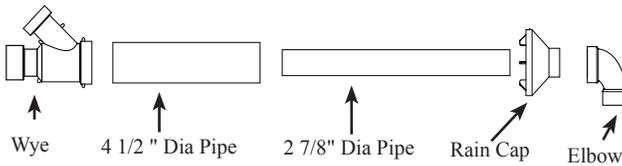


FIGURE 1

**▲WARNING:** These instructions are intended as an aid to qualified service personnel for proper installation, adjustment, and operation of this kit. Read these instructions thoroughly before attempting installation, adjustment, or operation. Failure to follow these instructions can result in improper installation, adjustment, service, or maintenance possibly resulting in fire, electrical shock, property damage, personal injury, or death.

**▲WARNING:** This kit is to be used only for vent & combustion air-inlet termination for Power Direct Vent Gas Water Heaters. Do not use this kit to terminate any other type of appliance. Failure to follow this warning could result in fire, personal injury, or death.

**LOCATION:** The Concentric Vent & Combustion Air-Inlet Termination Kit can be installed in a horizontal or vertical (roof) orientation. Before installation procedures begin, determine the best location for the termination kit.

**IMPORTANT:** When installing the kit, consider the following when choosing a location:

- Kit is positioned where vent gases will not damage nearby structure.
- Kit is positioned so that wind will not cause combustion products, leaves, snow, or other

debris from entering the combustion air-inlet.

- Kit is positioned where it will not get damaged by foreign objects (i.e.: balls, stones, etc.).
- Kit is positioned where vent gases will not be inhaled or cause a nuisance.

**NOTE:** Ensure that the heights of the vent and/or combustion air-inlet openings are above the anticipated snow level by a minimum of 1 ft.

#### SECTION 1: HORIZONTAL INSTALLATION

##### STEP 1:

Cut a 5" diameter opening in the sidewall and install field supplied weather-seal boot/flashing for a 4 1/2" PVC pipe.

##### STEP 2:

From inside, insert the 4 1/2" diameter combustion air-inlet pipe through the seal boot so that a maximum of 1" clearance occurs between the outside wall and rain cap fins (See Figure 2). Ensure that no insulation or debris is accumulated in the pipe.

##### STEP 3:

Secure the combustion air-inlet pipe using a field supplied perforated strap or a suitable type material. (See Figure 2)

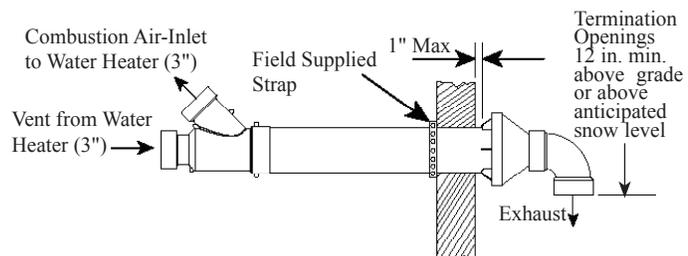


FIGURE 2

##### STEP 4:

Assemble the vent pipe assembly by cleaning and cementing the rain cap to the 2 7/8" diameter vent pipe. Assemble the supplied SDR 35 90° PVC elbow by cleaning and cementing to the rain cap. (See Figure 3)

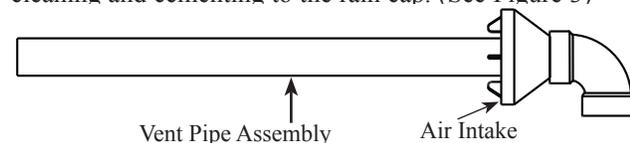


FIGURE 3

# Alternate Vent Termination

## Alternate Concentric Terminal Installation: *Continued*

**⚠ WARNING:** Do not operate the water heater with the rain cap and elbow removed or recirculation of combustion products may occur. The vent and combustion air-inlet systems may also take in water, causing damage to the water heater. Failure to follow this warning could result in damage to the unit, improper operation, personal injury, or death.

**STEP 5:**  
From the outside, slide the vent pipe assembly through the combustion air-inlet pipe and cement the rain cap to the combustion air-inlet pipe. From the inside, cement the wye fitting to the combustion air-inlet pipe. (See Figure 2)

**STEP 6:**  
Complete the installation of the remainder of the vent and combustion air-inlet systems as required on pages 12 thru 20 of the Use and Care manual.

### SECTION 2: VERTICAL INSTALLATION

**STEP 1:**  
Cut a 5" diameter opening in the roof and install field-supplied weather-seal boot/flashing for a 4 1/2" PVC pipe.

**STEP 2:**  
From inside, insert the 4 1/2" diameter combustion air-inlet pipe up through the seal boot, ensuring that no insulation or debris accumulate in the pipe. Ensure termination height is above the 12" minimum clearance anticipated snow level.

**STEP 3:**  
Secure the combustion air-inlet pipe using a field supplied perforated strap or a suitable type material. (See Figure 4)

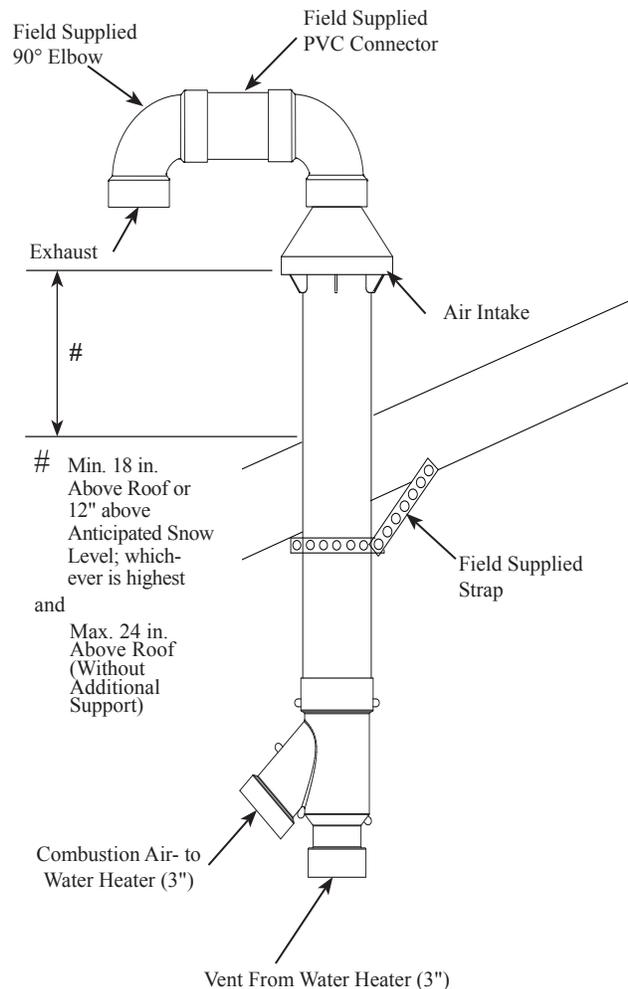
**STEP 4:**  
Assemble the vent pipe assembly by cleaning and cementing the rain cap to the 2 7/8" diameter exhaust pipe. Assemble the supplied 90° elbow by cleaning and cementing to the rain cap. Assemble the field supplied SDR 35 PVC connector and SDR 35 90° PVC elbow by cleaning and cementing together as shown in Figure 4.

**⚠ WARNING:** Do not operate the water heater with the rain cap removed or recirculation of combustion products may occur. The vent air pipes may also take in water, causing damage to the water heater. Failure to follow this warning could result in injury to the unit, improper operation, personal injury, or death.

**STEP 5:**  
From the roof top, slide the vent pipe assembly

down through the intake pipe and cement the rain cap to the intake pipe. From the inside, cement the wye fitting to the intake pipe. (See Figure 4)

**STEP 6:**  
Complete the installation of the remainder of the vent and combustion air-inlet systems as required on pages 12 thru 20 of the Use and Care manual.



**FIGURE 4**

**NOTICE:** The concentric terminal assembly is designed to accept 3" diameter pipe. If a 2" diameter pipe is used a 3" to 2" reducer fitting must be installed to the vent and combustion air inlet connections of the concentric terminal assembly.

**Notes:**

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# 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:

1241 Carwood Court  
Montgomery, Alabama 36117  
Phone: 1-800-432-8373.

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.