

RESIDENTIAL GAS WATER HEATERS



Lochinvar®
High Efficiency Water Heaters, Boilers and Pool Heaters

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www.lochinvar.com



GAMA certification applies to all residential gas water heaters with capacities of 20 to 100 gallons with input rating of 75,000 BTU/Hr. or less.

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

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS:
 - 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.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

POWER DIRECT VENTED GAS MODELS
NOT FOR USE IN MANUFACTURED (MOBILE) HOMES



! WARNING

Read and understand instruction manual and safety messages before installing, operating or servicing this water heater.

Failure to follow instructions and safety messages could result in death or serious injury.

Instruction manual must remain with water heater.

• For Your Safety •

AN ODORANT IS ADDED TO THE GAS USED BY THIS WATER HEATER.

ALL TECHNICAL AND WARRANTY QUESTIONS: SHOULD BE DIRECTED TO THE LOCAL DEALER FROM WHOM THE WATER HEATER WAS PURCHASED. IF YOU ARE UNSUCCESSFUL, CONTACT RESIDENTIAL TECHNICAL ASSISTANCE AT 1-615-889-8900 OR VIA E-MAIL AT 2TECH@LOCHINVAR.COM.

**KEEP THIS MANUAL IN THE POCKET ON HEATER FOR FUTURE REFERENCE
WHENEVER MAINTENANCE ADJUSTMENT OR SERVICE IS REQUIRED.**

SAFE INSTALLATION, USE, AND SERVICE

Your safety and the safety of others is extremely important in the installation, use, and servicing of this water heater.

Many safety-related messages and instructions have been provided in this manual and on your own water heater to warn you and others of a potential hazard. Read and obey all safety messages and instructions throughout this manual. It is very important that the meaning of each safety message is understood by you and others who install, use, or service this water heater.

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
	DANGER indicates an imminently hazardous situation which, if not avoided, will result in injury or death.
	WARNING indicates a potentially hazardous situation which, if not avoided, could result in injury or death.
	CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.
	CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, could result in property damage.

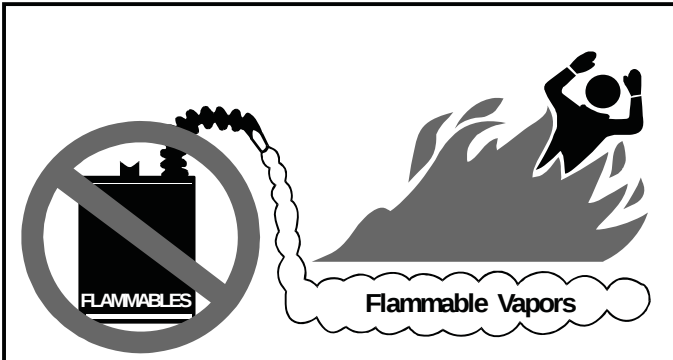
All safety messages will generally tell you about the type of hazard, what can happen if you do not follow the safety message and how to avoid the risk of injury.

The California Safe Drinking Water and Toxic Enforcement Act requires the Governor of California to publish a list of substances known to the State of California to cause cancer, birth defects, or other reproductive harm, and requires businesses to warn of potential exposure to such substances. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm. This appliance can cause low-level exposure to some of the substances included in the act.

IMPORTANT DEFINITIONS

- **Qualified Installer:** A qualified installer must have ability equivalent to a licensed tradesman in the fields of plumbing, air supply, venting, and gas supply, including a thorough understanding of the requirements of the National Fuel Gas Code as it relates to the installation of gas fired water heaters. The qualified installer must also be familiar with the design features and use of flammable vapor ignition resistant water heaters, and have a thorough understanding of this instruction manual.
- **Service Agency:** A service agency also must have ability equivalent to a licensed tradesman in the fields of plumbing, air supply, venting, and gas supply, including a thorough understanding of the requirements of the National Fuel Gas Code as it relates to the installation of gas fired water heaters. The service agency must also have a thorough understanding of this instruction manual, and be able to perform repairs strictly in accordance with the service guidelines provided by the manufacturer.
- **Gas Supplier:** The Natural Gas or Propane Utility or service who supplies gas for utilization by the gas burning appliances within this application. The gas supplier typically has responsibility for the inspection and code approval of gas piping up to and including the Natural Gas meter or Propane storage tank of a building. Many gas suppliers also offer service and inspection of appliances within the building.

GENERAL SAFETY

	 WARNING FIRE AND EXPLOSION HAZARD Can result in serious injury or death  Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. Storage of or use of gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance can result in serious injury or death.
Read and follow water heater warnings and instructions.	



⚠ WARNING

Read and understand instruction manual and safety messages before installing, operating or servicing this water heater.

Failure to follow instructions and safety messages could result in death or serious injury.

Instruction manual must remain with water heater.



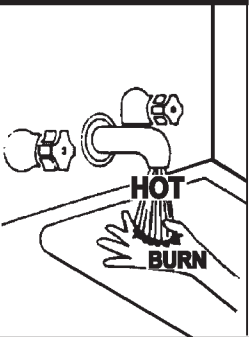
⚠ WARNING

Fire Hazard

For continued protection against risk of fire:

- Do not install water heater on carpeted floor.
- Do not operate water heater if flood damaged.

⚠ DANGER



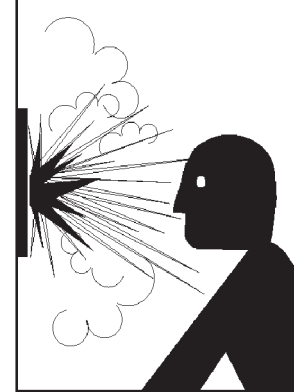
Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.



⚠ WARNING

Explosion Hazard

- Overheated water can cause water tank explosion.
- Properly sized temperature and pressure relief valve must be installed in opening provided.

⚠ WARNING

Fire or Explosion Hazard

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Avoid all ignition sources if you smell LP gas.
- Do not expose water heater control to excessive gas pressure.
- Use only gas shown on rating plate.
- Maintain required clearances to combustibles.
- Keep ignition sources away from faucets after extended period of non-use.

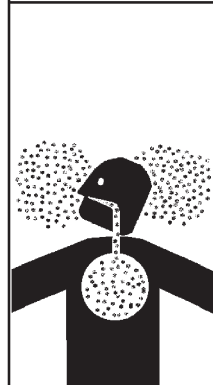


Read instruction manual before installing, using or servicing water heater.



⚠ WARNING

Breathing Hazard - Carbon Monoxide Gas



- Install vent system in accordance with codes.
- Do not operate water heater if flood damaged.
- High altitude orifice must be installed for operation above 7,700 feet (2,347 m).
- Do not operate if soot buildup.
- Do not place chemical vapor emitting products near water heater.
- Gas and carbon monoxide detectors are available.
- No vent damper installation is compatible with this power vented water heater.

Breathing carbon monoxide can cause brain damage or death. Always read and understand instruction manual.

CAUTION

Improper installation and use may result in property damage.

- Do not operate water heater if flood damaged.
- Inspect and replace anode.
- Install in location with drainage.
- Fill tank with water before operation.
- Be alert for thermal expansion.

Refer to instruction manual for installation and service.



⚠ WARNING

- Before servicing the water heater, make sure the blower assembly is unplugged or the electrical supply to the water heater is turned "OFF".
- Label all wires prior to disconnection when servicing controls. Wiring error can cause improper and dangerous operation. Verify proper operation after servicing.
- Failure to do this could result in death, serious bodily injury, or property damage.

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INTRODUCTION

Thank You for purchasing this water heater. Properly installed and maintained, it should give you years of trouble free service.

Abbreviations Found In This Instruction Manual:

- CSA - Canadian Standards Association
- ANSI - American National Standards Institute
- NFPA - National Fire Protection Association
- ASME - American Society of Mechanical Engineers
- GAMA - Gas Appliance Manufacturer's Association

This gas-fired water heater is design certified by CSA International under American National Standard/CSA Standard for Gas Water Heaters ANSI Z21.10.1 • CSA 4.1 (current edition).

PREPARING FOR THE INSTALLATION

1. Read the "General Safety" section, page 3 of this manual first and then the entire manual carefully. If you don't follow the safety rules, the water heater will not operate properly. It could cause DEATH, SERIOUS BODILY INJURY AND/OR PROPERTY DAMAGE.

This manual contains instructions for the installation, operation, and maintenance of the gas-fired water heater. It also contains warnings throughout the manual that you must read and be aware of. All warnings and all instructions are essential to the proper operation of the water heater and your safety. **READ THE ENTIRE MANUAL BEFORE ATTEMPTING TO INSTALL OR OPERATE THE WATER HEATER.**

2. The installation must conform with these instructions and the local code authority having jurisdiction. In the absence of local codes, installations shall comply with the National Fuel Gas Code ANSI Z223.1/NFPA 54-current edition and the National Electrical Code, NFPA 70-current edition. These publications are available from The National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.
3. The water heater when installed must be grounded in accordance with the local codes, or in the absence of local codes: the National Electrical Code. ANSI/NFPA 70.
4. If after reading this manual you have any questions or do not understand any portion of the instructions, call the local gas utility or the manufacturer whose name appears on the rating plate.
5. Carefully plan your placement of the water heater. Correct combustion, vent action, and vent pipe installation are very important in preventing death from possible carbon monoxide poisoning and fires, see Figures 1 and 2.

Examine the location to ensure the water heater complies with the "Locating the New Water Heater" section in this manual.

6. For California installation this water heater must be braced, anchored, or strapped to avoid falling or moving during an earthquake. See instructions for correct installation procedures. Instructions may be obtained from California Office of the State Architect, 400 P Street, Sacramento, CA 95814.
7. Massachusetts Code requires this water heater to be installed in accordance with Massachusetts 248-CMR 2.00: State Plumbing Code and 248-CMR 5.00. For more information see next page.
8. Complies with SCAQMD rule #1121 and districts having equivalent NOx requirements.

INSTALLATION REQUIREMENTS FOR THE COMMONWEALTH OF MASSACHUSETTS

For all side wall terminated, horizontally vented power vent, direct vent, and power direct vent gas fueled water heaters 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:

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 sidewall 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.

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.

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 that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

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 CSA certified.

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.**"

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.

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.

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.

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.

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.

TYPICAL INSTALLATION

GET TO KNOW YOUR WATER HEATER - GAS MODELS

- | | | |
|-------------------------------------|-------------------------------------|--------------------------------|
| A Vent Pipe-Exhaust | J Inlet Dip Tube | T Manual Gas Shut-off Valve |
| B Vent Terminal-Exhaust | K Anode** | U Ground Joint Union |
| C Intake or Combustion Air Pipe | L Hot Water Outlet | V Drip Leg (Sediment Trap) |
| D Intake or Combustion Air Terminal | M Outlet Receptacle (115 VAC) | W Drain Valve |
| E Vent Adapter | N Temperature-Pressure Relief Valve | X Gas Control Valve/Thermostat |
| F Blower Assembly | O Flue | Y Metal Drain Pan |
| G Cold Water Inlet | P Flue Baffle Assembly** | Z Inner Door |
| H Inlet Water Shut-off Valve | Q Insulation | AA Outer Door |
| I Union | R Rating Plate | BB HSI Burner Assembly*** |
| | S Gas Supply | CC FV Sensor Assembly |

* ALL PIPING MATERIALS TO BE SUPPLIED BY CUSTOMERS.

** LOCATED UNDER THE BLOWER ASSEMBLY.

*** NOT PICTURED

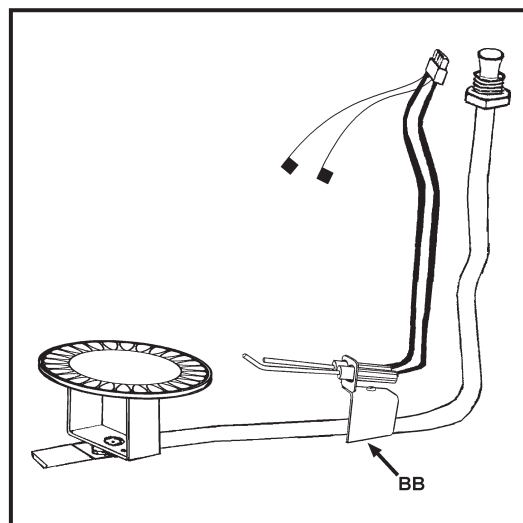
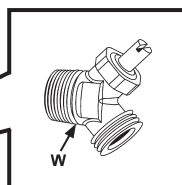
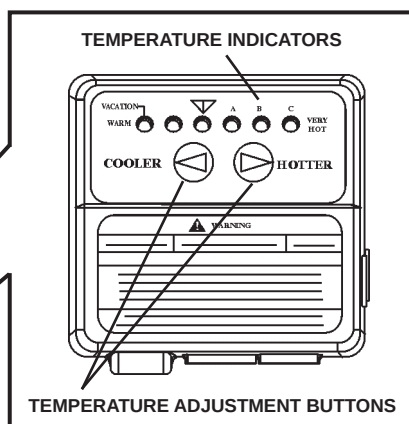
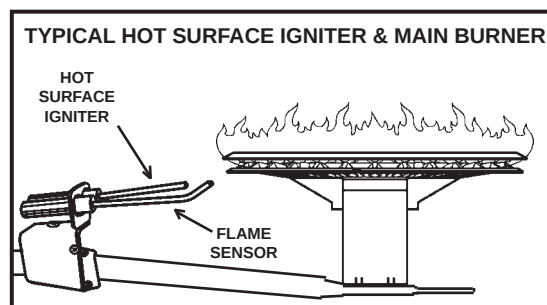
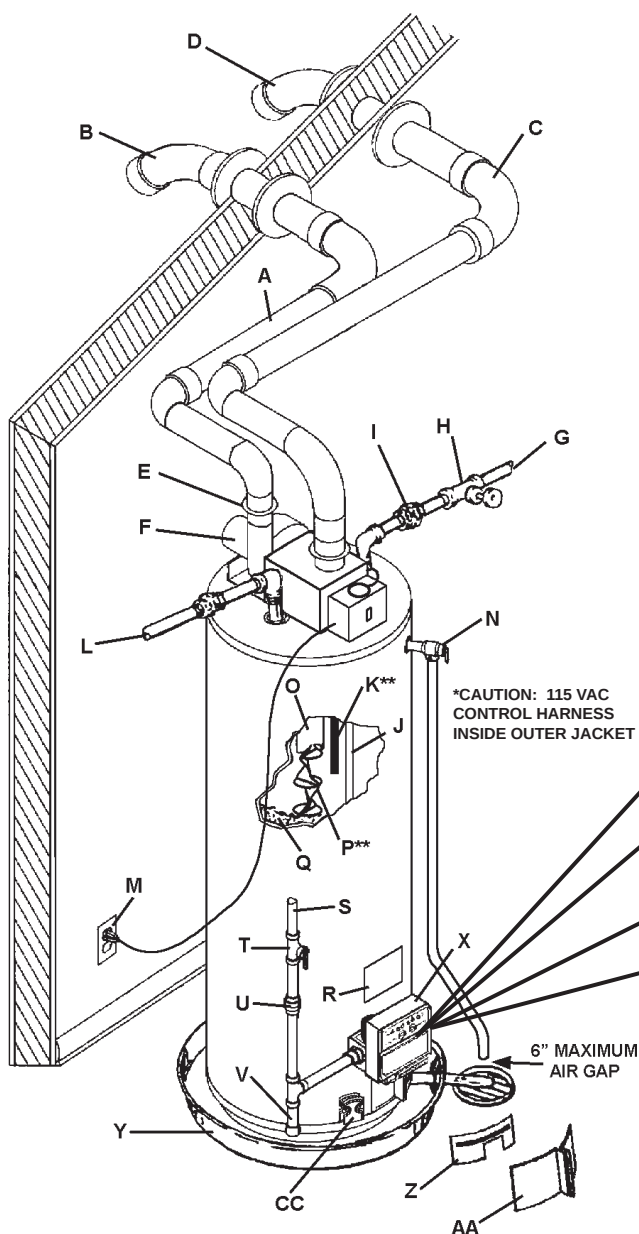


FIGURE 1.

MIXING VALVE USAGE

SUGGESTED PIPING ARRANGEMENT FOR TOP CONNECTIONS

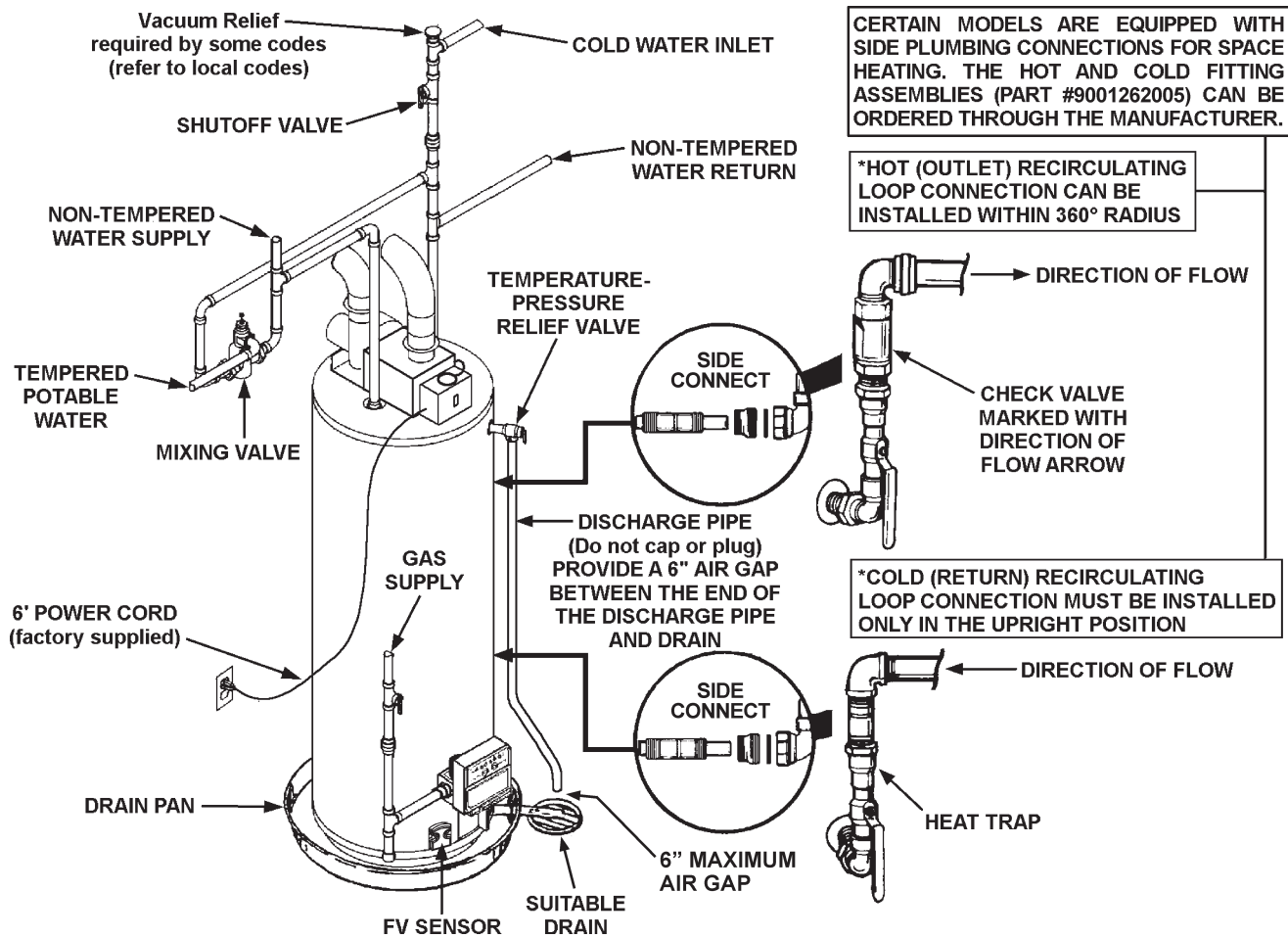


FIGURE 2.

This appliance has been design certified as complying with American National Standard/CSA Standard for water heaters and is considered suitable for:

Water (Potable) Heating and Space Heating: All models are considered suitable for water (potable) heating and space heating.

	⚠ DANGER Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death. Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury. Feel water before bathing or showering. Temperature limiting valves are available. Read instruction manual for safe temperature setting.
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HOTTER WATER CAN SCALD:

Water heaters are intended to produce hot water. Water heated to a temperature which will satisfy space heating, clothes washing, dish washing, and other sanitizing needs can scald and permanently injure you upon contact. Some people are more likely to be permanently injured by hot water than others. These include the elderly, children, the infirm, or physically/mentally disabled. If anyone using hot water in your home fits into one of these groups or if there is a local code or state law requiring a certain temperature water at the hot water tap, then you must take special precautions. In addition to using the lowest possible temperature setting that satisfies your hot water needs, a means such as a mixing valve should be used at the hot water taps used by these people or at the water heater. Mixing valves are available at plumbing supply or hardware stores. Consult a Qualified Installer or Service Agency. Follow mixing valve manufacturer's instructions for installation of the valves. Before changing the factory setting on the thermostat, read the "Temperature Regulation" section in this manual, see Figure 31.

LOCATING THE NEW WATER HEATER

FACTS TO CONSIDER ABOUT THE LOCATION

Carefully choose an indoor location for the new water heater, because the placement is a very important consideration for the safety of the occupants in the building and for the most economical use of the appliance. **This water heater is not for use in manufactured (mobile) homes or outdoor installation.**

Whether replacing an old water heater or putting the water heater in a new location, the following critical points must be observed:

1. Select a location indoors as close as practical to the vent terminal or location to which the water heater vent piping is going to be connected, and as centralized with the water piping system as possible.
2. Selected location must provide adequate clearances for servicing and proper operation of the water heater.

CAUTION

Property Damage Hazard

- All water heaters eventually leak.
- Do not install without adequate drainage.

Installation of the water heater must be accomplished in such a manner that if the tank or any connections should leak, the flow will not cause damage to the structure. For this reason, it is not advisable to install the water heater in an attic or upper floor. When such locations cannot be avoided, a suitable metal drain pan should be installed under the water heater. Metal drain pans are available at your local hardware store. Such a drain pan must have a minimum length and width of at least 2" (5.1 cm) greater than the water heater dimensions and must be piped to an adequate drain. Drain pan depth must allow for access to the outer doors for servicing the igniter and burner.

Water heater life depends upon water quality, water pressure and the environment in which the water heater is installed. Water heaters are sometimes installed in locations where leakage may result in property damage, even with the use of a metal drain pan piped to a drain. However, unanticipated damage can be reduced or prevented by a leak detector or water shut-off device used in conjunction with a piped drain pan. These devices are available from some plumbing supply wholesalers and retailers, and detect and react to leakage in various ways:

- Sensors mounted in the metal drain pan that trigger an alarm or turn off the incoming water to the water heater when leakage is detected.
- Sensors mounted in the metal drain pan that turn off the water supply to the entire home when water is detected in the drain pan.
- Water supply shut-off devices that activate based on the water pressure differential between the cold water and hot water pipes connected to the water heater.
- Devices that will turn off the gas supply to a gas water heater while at the same time shutting off its water supply.

INSTALLATIONS IN AREAS WHERE FLAMMABLE LIQUIDS (VAPORS) ARE LIKELY TO BE PRESENT OR STORED (GARAGES, STORAGE AND UTILITY AREAS, ETC.): Flammable liquids (such as gasoline, solvents, propane (LP or butane, etc.) and other substances (such as adhesives, etc.) emit flammable vapors which can be ignited by a gas

water heater's hot surface igniter or main burner. The resulting flashback and fire can cause death, serious burns to anyone in the area or property damage. This water heater is equipped with an FV sensor for detecting the presence of flammable vapors. See Figure 3. When the sensor detects those vapors, the unit will shut down and not operate. Should this happen, please refer to the troubleshooting guide in this manual. Even though this water heater is a flammable vapors ignition resistant water heater and is designed to reduce the chances of flammable vapors being ignited, gasoline and other flammable substances should never be stored or used in the same vicinity or area containing a gas water heater or other open flame or spark producing appliance.

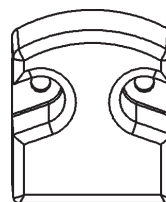


FIGURE 3.

Do not expose the FV sensor to cleaning solvents or moisture of any kind. Doing so may activate the safety system and cause the unit to shut down. Also, the water heater must be located and/or protected so it is not subject to physical damage by a moving vehicle.

⚠ WARNING

Fire or Explosion Hazard

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Avoid all ignition sources if you smell LP gas.
- Do not expose water heater control to excessive gas pressure.
- Use only gas shown on rating plate.
- Maintain required clearances to combustibles.
- Keep ignition sources away from faucets after extended period of non-use.



Read instruction manual before installing, using or servicing water heater.



⚠ WARNING

Fire Hazard

For continued protection against risk of fire:

- Do not install water heater on carpeted floor.
- Do not operate water heater if flood damaged.

This water heater must not be installed directly on carpeting. Carpeting must be protected by metal or wood panel beneath the appliance extending beyond the full width and depth of the appliance by at least 3" (7.6 cm) in any direction, or if the appliance is installed in an alcove or closet, the entire floor must be covered by the panel. Failure to heed this warning may result in a fire hazard.



Minimum clearances between the water heater and combustible construction are 0 inch at the sides and rear, 6" (15.2 cm) from the front of the jacket, and 12" (30.5 cm) from the top (standard clearance). If clearances stated on the heater differ from standard clearances, install water heater according to clearances stated on the heater.

Adequate clearance for servicing this appliance should be considered before installation, such as changing the anodes, etc.

A minimum clearance of 5" (12.7 cm) from the front of the jacket must be allowed for access to replaceable parts such as the thermostats, drain valve and relief valve. Provide 24" (61 cm) front clearance for servicing and adequate clearance between the jacket top and ceiling for servicing the flue area.

When installing the heater, consideration must be given to proper location. Location selected should be as close to the wall as practicable and as centralized with the water piping system as possible.

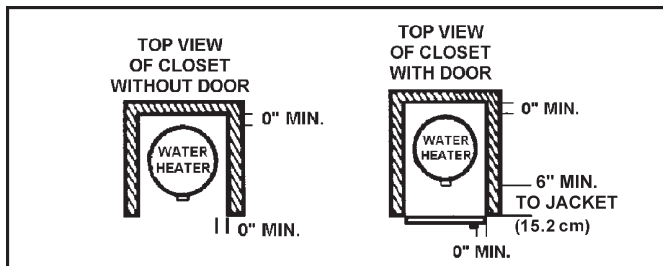


FIGURE 4.

Never obstruct the flow of ventilation air. See Figure 5. If you have any doubts or questions at all, call your gas company. Failure to provide ventilation air can result in a fire or explosion and can cause DEATH, SERIOUS BODILY INJURY, OR PROPERTY DAMAGE.

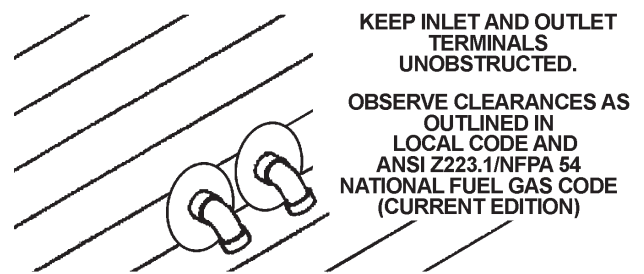
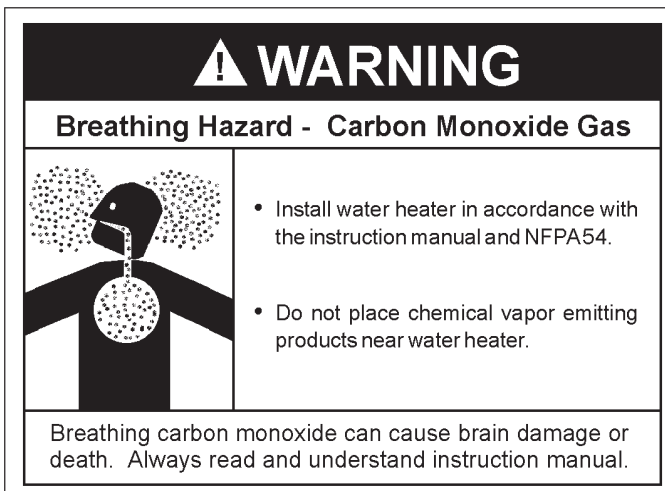


FIGURE 5.

If this water heater will be used in beauty shops, barber shops, cleaning establishments, or self-service laundries with dry cleaning equipment, it is imperative that the water heater or water heaters be installed so that combustion and ventilation air be taken from outside these areas.

Propellants of aerosol sprays and volatile compounds, (cleaners, chlorine based chemicals, refrigerants, etc.) in addition to being highly flammable in many cases, will also react to form corrosive hydrochloric acid when exposed to the combustion products of the water heater. The results can be hazardous, and also cause product failure.

COMBUSTION AIR AND EXHAUST TERMINATION CLEARANCES

Venting Through an Outside Wall - Clearances, see Figure 7.

- 0" clearance for 3" PVC, ABS, or CPVC Schedule 40 piping from combustible surfaces.
- The location selection must provide clearances for servicing and proper operation of the water heater, see Figure 6.

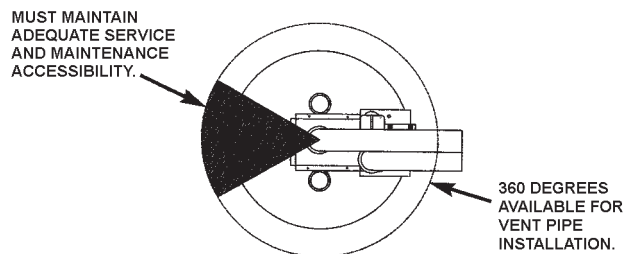
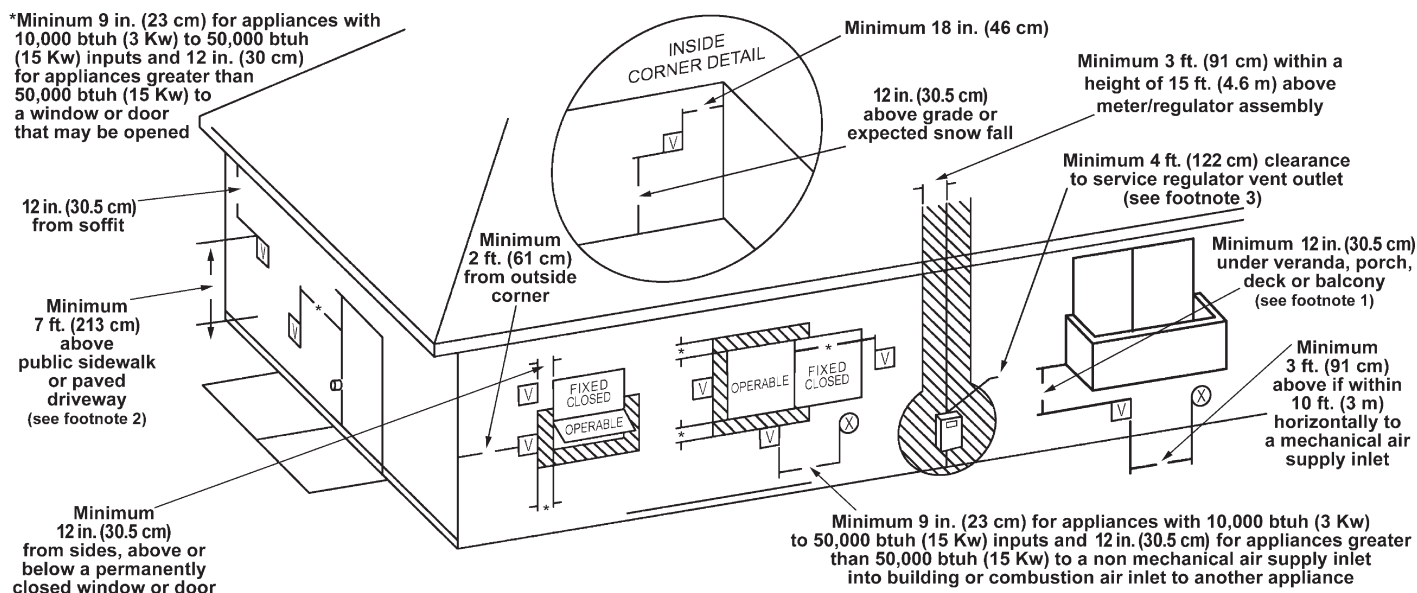


FIGURE 6.

- The venting system must be installed in a manner which allows inspection of the installation of the venting pipes and joints as well as periodic inspection after installation as required by the National Fuel Gas Code ANSI Z223.1.

VENT TERMINATION CLEARANCES

*Minimum 9 in. (23 cm) for appliances with 10,000 btuh (3 Kw) to 50,000 btuh (15 Kw) inputs and 12 in. (30 cm) for appliances greater than 50,000 btuh (15 Kw) to a window or door that may be opened



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

1. Permitted only if veranda, porch, deck or balcony is fully opened on a minimum of two sides beneath the floor.
2. A vent shall not terminate above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.
3. Vent termination must not be within 4 feet (122 cm) of any items such as gas meters, gas valves or other gas regulating equipment.

FIGURE 7.

WIRE FENCE

When the water heater outlet terminal is low enough to be touched accidentally, or is accessible to small children, a wire mesh chain link fence (as shown in Figure 8) may be used. Care should be taken to maintain adequate ventilation around the outlet terminal. If a chain link fence is installed, it must not be used as a storage area for items that may block proper ventilation.

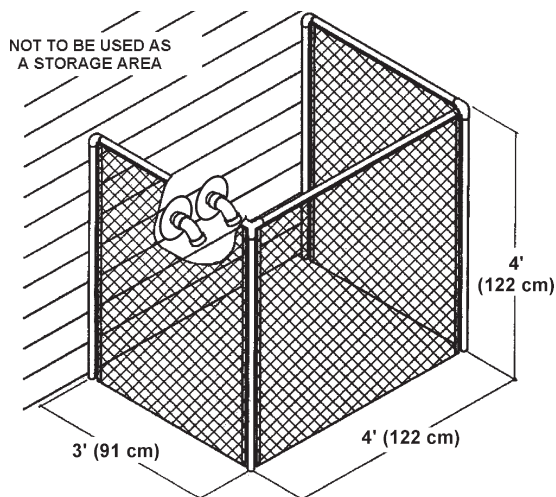


FIGURE 8.

Venting Through Roof - Clearances

- 0" clearance for 3" PVC, ABS, or CPVC Schedule 40 piping from combustible and noncombustible surfaces.

- The vent exhaust outlet and air inlet terminals shall terminate at least 18" (45.7 cm) above the roof surface, see Figure 9.

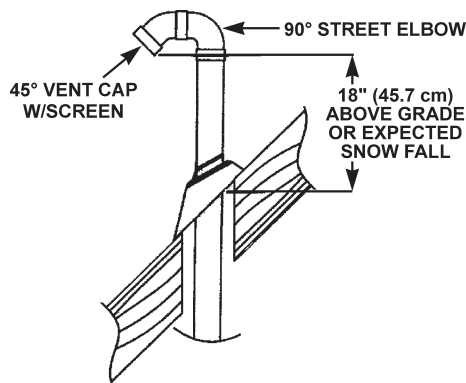


FIGURE 9.

AIR FOR VENTILATION FOR APPLIANCES LOCATED IN CONFINED SPACES

Air for ventilation should be provided if installed in a confined space. Refer to the National Fuel Gas Code, ANSI Z223.1.

INSULATION BLANKETS

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

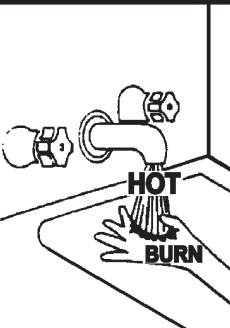
Should you choose to apply an insulation blanket to this heater, you should follow these instructions. (For identification of the components mentioned in the next column, see Figure 1.) Failure to follow these instructions can restrict the air flow required for proper combustion, potentially resulting in fire, asphyxiation, serious personal injury, or death.

 WARNING	
Breathing Hazard - Carbon Monoxide Gas	
	• Do not obstruct water heater air intake with insulating blanket. • Gas and carbon monoxide detectors are available. • Install water heater in accordance with the instruction manual.
Breathing carbon monoxide can cause brain damage or death. Always read and understand instruction manual.	

- Do not apply insulation to the top of the water heater, as this will interfere with safe operation of the water heater.
- Do not cover the outer door, gas control valve/thermostat, temperature & pressure relief valve or FV Sensor.
- Do not let insulation around the gas water heater get within 8 inches of the floor (access for servicing the burner).
- Do not cover the instruction manual. Keep it on the side of the water heater or nearby for future reference.
- Do obtain new warning and instruction labels from the manufacturer for placement on the blanket directly over the existing labels.
- Do inspect the insulation blanket frequently to make certain it does not sag, thereby obstructing access to burner.

INSTALLING THE NEW WATER HEATER

WATER PIPING



⚠ DANGER

Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.

HOTTER WATER CAN SCALD:

Water heaters are intended to produce hot water. Water heated to a temperature which will satisfy space heating, clothes washing, dish washing, cleaning and other sanitizing needs can scald and permanently injure you upon contact. Some people are more likely to be permanently injured by hot water than others. These include the elderly, children, the infirm, or physically/mentally disabled. If anyone using hot water in your home fits into one of these groups or if there is a local code or state law requiring a certain temperature water at the hot water tap, then you must take special precautions. In addition to using the lowest possible temperature setting that satisfies your hot water needs, a means such as a mixing valve should be used at the hot water taps used by these people or at the water heater, see Figure 2. Valves for reducing point of use temperature by mixing cold and hot water are also available.

Consult a Qualified Installer or Service Agency. Follow manufacturer's instructions for installation of the valves. Before changing the factory setting on the thermostat, read the "Temperature Regulation" section in this manual.

⚠ WARNING

Toxic Chemical Hazard

- Do not connect to non-potable water system.

This water heater shall not be connected to any heating systems or component(s) used with a non-potable water heating appliance.

All piping components connected to this unit for space heating applications shall be suitable for use with potable water.

Toxic chemicals, such as those used for boiler treatment shall not be introduced into this system.

When the system requires water for space heating at temperatures higher than required for domestic water purposes, a mixing valve must be installed. Please refer to Figure 2 for suggested piping arrangement.

CLOSED WATER SYSTEMS

Water supply systems may, because of code requirements or such conditions as high line pressure, among others, have installed devices such as pressure reducing valves, check valves, and back flow preventers. Devices such as these cause the water system to be a closed system.

THERMAL EXPANSION

As water is heated, it expands (thermal expansion). In a closed system the volume of water will grow. As the volume of water grows there will be a corresponding increase in water pressure due to thermal expansion. Thermal expansion can cause premature tank failure (leakage). This type of failure is not covered under the limited warranty. Thermal expansion can also cause intermittent temperature-pressure relief valve operation: water discharged from the valve due to excessive pressure build up. The temperature-pressure relief valve is not intended for the constant relief of thermal expansion. This condition is not covered under the limited warranty.

A properly sized thermal expansion tank should be installed on all closed systems to control the harmful effects of thermal expansion. Contact a plumbing service agency or your retail supplier regarding the installation of a thermal expansion tank.

NOTE: To protect against untimely corrosion of hot and cold water fittings, it is strongly recommended that dielectric unions or couplings be installed on this water heater when connected to copper pipe.

All gas piping must comply with local codes and ordinances or with the current edition of the National Fuel Gas Code (ANSI Z223.1/NFPA-54), whichever applies. Copper and brass tubing and fittings (except tin lined copper tubing) shall not be used.

CAUTION

Property Damage Hazard

- Avoid water heater damage.
- Install thermal expansion tank if necessary.
- Do not apply heat to cold water inlet.
- Contact qualified installer or service agency.

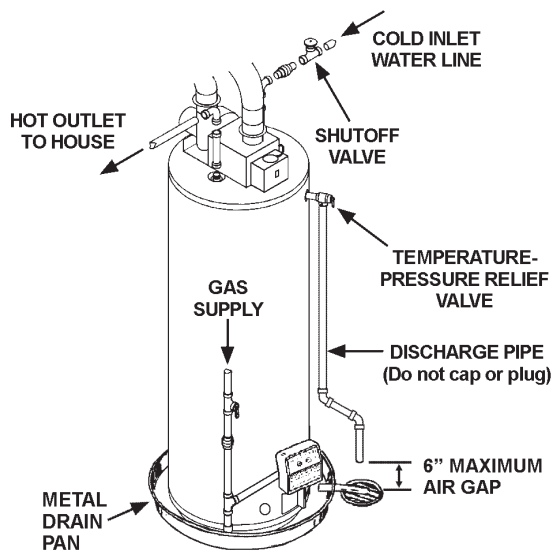


FIGURE 10.

Figure 10 shows the typical attachment of the water piping to the water heater. The water heater is equipped with 3/4 inch NPT water connections.

NOTE: If using copper tubing, solder tubing to an adapter before attaching the adapter to the cold water inlet connection. Do not

solder the cold water supply line directly to the cold water inlet. It will harm the dip tube and damage the tank.

T & P Valve and Pipe Insulation (if supplied)

1. Locate the temperature and pressure relief valve on the water heater (also known as a T&P relief valve). See Figure 11.
2. Locate the slit running the length of the T&P relief valve insulation.
3. Spread the slit open and fit the insulation over the T&P relief valve. See Figure 11. Apply gentle pressure to the insulation to ensure that it is fully seated on the T&P relief valve. Once seated, secure the insulation with duct tape. **IMPORTANT:** The insulation or tape should not block or cover the T&P relief valve drain opening. Also, the insulation or tape should not block or hinder access to the manual relief lever (Figure 11).
4. Locate the hot water (outlet) & cold water (inlet) pipes to the water heater.
5. Locate the slit running the length of a section of pipe insulation.
6. Spread the slit open and slip the insulation over the cold water (inlet) pipe. Apply gentle pressure along the length of the insulation to ensure that it is fully seated around the pipe. Also, ensure that the base of the insulation is flush with the water heater. Once seated, secure the insulation with duct tape.
7. Repeat steps 5 and 6 for the hot water (outlet) pipe.
8. Add additional sections of pipe insulation as needed.

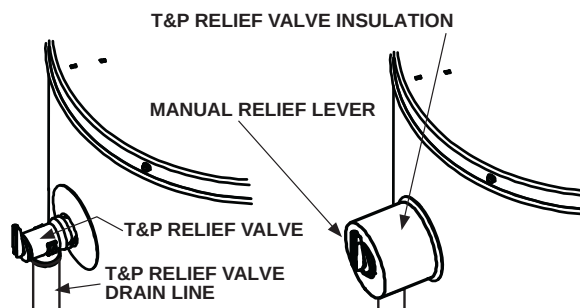


FIGURE 11.

TEMPERATURE-PRESSURE RELIEF VALVE

⚠ WARNING

Explosion Hazard

- Temperature-pressure relief valve must comply with ANSI Z21.22- CSA 4.4 and ASME code.
- Properly sized temperature-relief valve must be installed in opening provided.
- Can result in overheating and excessive tank pressure.
- Can cause serious injury or death.

This heater is provided with a properly certified combination temperature - pressure relief valve by the manufacturer. The valve is certified by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment of materials as meeting the requirements for Relief Valves for Hot Water Supply Systems, ANSI Z21.22 • CSA 4.4, and the code requirements of ASME.

If replaced, the valve must meet the requirements of local codes, but not less than a combination temperature and pressure relief valve certified as indicated in the above paragraph.

The valve must be marked with a maximum set pressure not to exceed the marked hydrostatic working pressure of the water heater (150 psi = 1,035 kPa) and a discharge capacity not less than the water heater input rate as shown on the model rating plate.

For safe operation of the water heater, the relief valve must not be removed from its designated opening nor plugged.

The temperature-pressure relief valve must be installed directly into the fitting of the water heater designed for the relief valve. Position the valve downward and provide tubing so that any discharge will exit only within 6 inches (15.2 cm) above an adequate drain or outside of the building or structure. Be certain that no contact is made with any live electrical part. The discharge opening must not be blocked or reduced in size under any circumstances. Excessive length, over 30 feet (9.14 m), or use of more than four elbows can cause restriction and reduce the discharge capacity of the valve, see Figures 10 or 14.

No valve or other obstruction is to be placed between the relief valve and the tank. Do not connect tubing directly to discharge drain unless a 6" (15.2 cm) air gap is provided. To prevent bodily injury, hazard to life, or property damage, the relief valve must be allowed to discharge water in quantities should circumstances demand. If the discharge pipe is not connected to a drain or other suitable means, the water flow may cause property damage.

CAUTION

Water Damage Hazard

- Temperature-pressure relief valve discharge pipe must terminate at adequate drain.

The Discharge Pipe:

- Shall not be smaller in size than the outlet pipe size of the valve, or have any reducing couplings or other restrictions.
- Shall not be plugged or blocked.
- Shall be of material listed for hot water distribution.
- Shall be installed so as to allow complete drainage of both the temperature-pressure relief valve, and the discharge pipe.
- Shall terminate at an adequate drain or external to the building. In cold climates, it is recommended that the discharge pipe be terminated at an adequate drain inside the building.
- Shall not have any valve between the relief valve and tank.

⚠ DANGER

Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.

The temperature-pressure relief valve must be manually operated at least once a year. Caution should be taken to ensure that (1) no one is in front of or around the outlet of the temperature-pressure relief

valve discharge line, and (2) the water manually discharged will not cause any bodily injury or property damage because the water may be extremely hot.

If after manually operating the valve, it fails to completely reset and continues to release water, immediately close the cold water inlet to the water heater, follow the draining instructions, and replace the temperature-pressure relief valve with a new one.

GAS PIPING

	⚠ WARNING
	Fire and Explosion Hazard
	• Do not use water heater with any gas other than the gas shown on the rating plate. • Excessive pressure to gas control valve can cause property damage, serious injury or death. • Turn off gas lines during installation. • Contact qualified installer or service agency.

Make sure the gas supplied is the same type listed on the model rating plate. The inlet gas pressure must not exceed 10.5 inch water column (2.6 kPa) for natural and 13 inch water column (3.2 kPa) for propane gas (L.P.). The minimum inlet gas pressure shown on the rating plate is that which will permit firing at rated input.

All gas piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1/ NFPA-54)-current edition, whichever applies. Copper and brass tubing and fittings (except tin lined copper tubing) shall not be used.

If the gas control valve/thermostat is subjected to pressures exceeding 1/2 psi (14 inches of water column or 3.5 kPa), the damage to the gas control valve/thermostat could result in a fire or explosion from leaking gas.

If the main gas line Shut-off serving all gas appliances is used, also turn "off" the gas at each appliance. Leave all gas appliances shut "off" until the water heater installation is complete.

A gas line of sufficient size must be run to the water heater. Consult the current edition of National Fuel Gas Code ANSI Z223.1/NFPA 54 and your gas supplier concerning pipe size.

There must be:

- A readily accessible manual shut off valve in the gas supply line serving the water heater, and
- A drip leg (sediment trap) ahead of the gas control valve/thermostat to help prevent dirt and foreign materials from entering the gas control valve/thermostat.
- A flexible gas connector or a ground joint union between the shut off valve and gas control valve/thermostat to permit servicing of the unit.

Be sure to check all the gas piping for leaks before lighting the water heater. Use a soapy water solution, not a match or open flame. Rinse off soapy solution and wipe dry.

⚠ WARNING	
Breathing Hazard - Carbon Monoxide Gas	
	• High Altitude Orifice must be installed for operation above 7,700 ft. (2,347 m). • Contact a qualified installer or service agency.
Breathing carbon monoxide can cause brain damage or death. Always read and understand instruction manual.	

When installed at elevations above 7,700 feet (2,347 meters), input rating should be reduced at the rate of 4 percent for each 1,000 feet (305 meters) above sea level which requires replacement of the burner orifice in accordance with the National Fuel Gas Code ANSI Z223.1/ NFPA 54-current edition. Contact your local gas supplier for further information.

Failure to replace the standard orifice with a high altitude orifice when installed could result in improper and inefficient operation of the appliance, producing carbon monoxide gas in excess of safe limits, which could result in serious injury or death. Contact your gas supplier for any specific changes which may be required in your area.

	⚠ WARNING
	Fire and Explosion Hazard
	• Use joint compound or tape compatible with propane. • Leak test before operating heater. • Disconnect gas piping and shut-off valve before pressure testing system.

Use pipe joint compound or Teflon tape marked as being resistant to the action of petroleum [Propane (L.P.)] gases.

The appliance and its gas connection must be leak tested before placing the appliance in operation.

The appliance and its individual Shut-off valve shall be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psi (14 inches of water column or 3.5 kPa). It shall be isolated from the gas supply piping system by closing its individual manual Shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psi (14 inches of water column or 3.5 kPa).

Connecting the gas piping to the gas control valve/thermostat of the water heater can be accomplished by either of the two methods shown in Figures 12 and 13.

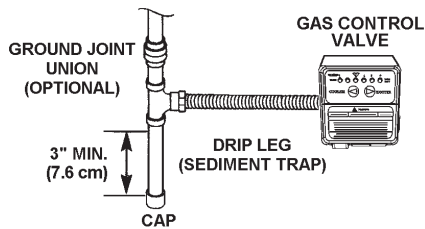


FIGURE 12. GAS PIPING WITH FLEXIBLE CONNECTOR.

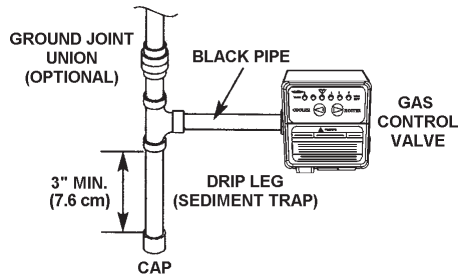


FIGURE 13. GAS PIPING WITH ALL BLACK IRON PIPE TO GAS CONTROL.

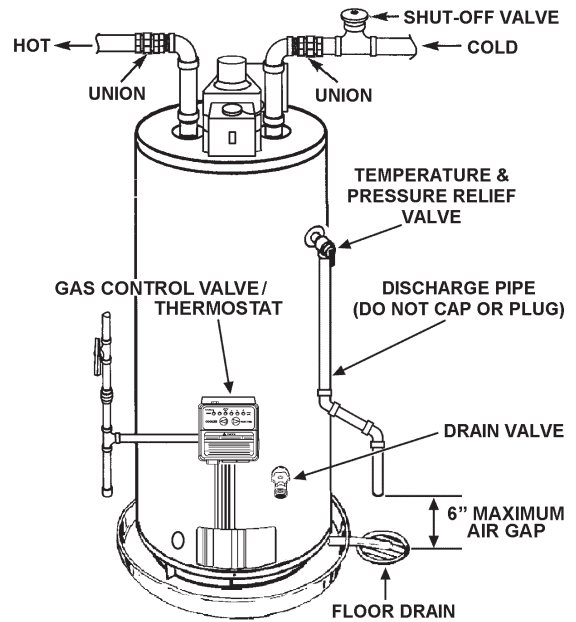


FIGURE 14.

SEDIMENT TRAPS

	⚠ WARNING Fire and Explosion Hazard
	- Contaminants in gas lines can cause fire or explosion. - Clean all gas piping before installation. - Install drip leg in accordance with NFPA54.

A sediment trap shall be installed as close to the inlet of the water heater as practical at the time of water heater 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. If a tee fitting is used, it shall be installed in conformance with one of the methods of installation shown in Figures 12 and 13.

Contaminants in the gas lines may cause improper operation of the gas control valve/thermostat and may result in fire or explosion. Before attaching the gas line, be sure that all gas pipe is clean on the inside. To trap any dirt or foreign material in the gas supply line, a drip leg (sometimes called a sediment trap) must be incorporated in the piping. The drip leg must be readily accessible. Install in accordance with the "Gas Piping" section. Refer to the current edition of the National Fuel Gas Code, ANSI Z223.1/NFPA 54.

FILLING THE WATER HEATER

CAUTION Property Damage Hazard
- Avoid water heater damage. - Fill tank with water before operating.

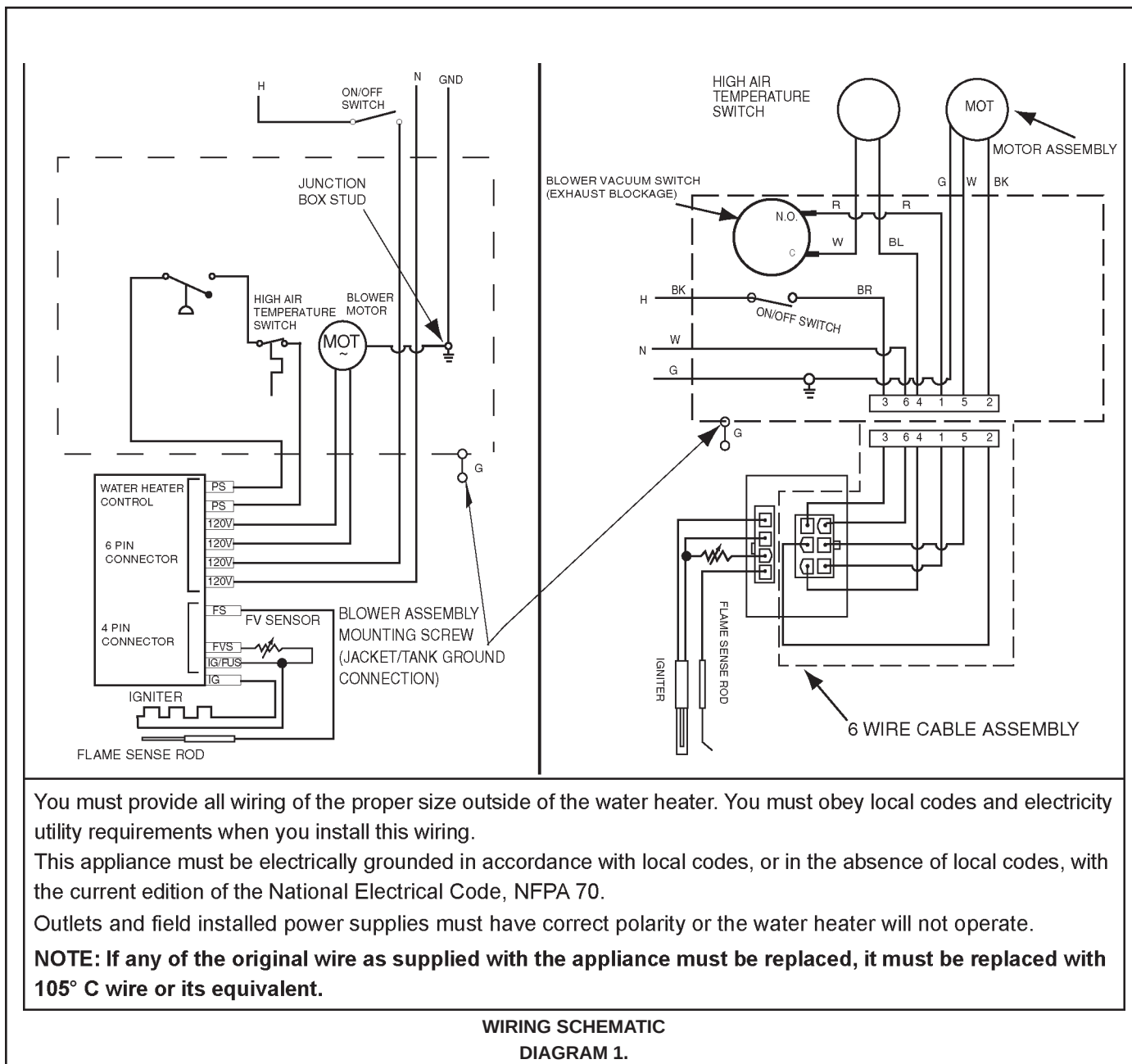
Never use this water heater unless it is completely full of water. To prevent damage to the tank, the tank must be filled with water. Water must flow from the hot water faucet before turning "ON" gas to the water heater. To fill the water heater with water:

1. Close the water heater drain valve by turning the handle to the right (clockwise). The drain valve is on the lower front of the water heater.
2. Open the cold water supply valve to the water heater.
NOTE: The cold water supply valve must be left open when the water heater is in use.
3. To insure complete filling of the tank, allow air to exit by opening the nearest hot water faucet. Allow water to run until a constant flow is obtained. This will let air out of the water heater and the piping.
4. Check all water piping and connections for leaks. Repair as needed.

BLOWER ASSEMBLY INSTALLATION

SEQUENCE OF INSTALLATION

1. This power direct vent water heater comes with the blower assembly installed.
2. After the unit is set in place, make sure the blower assembly is still mounted securely, and make sure there is no damage to the blower.
3. Make sure there is no packing material in the discharge of the blower or the intake, see Figure 15.
4. Make sure that the rubber tubing is still attached from the air pressure switch to the port on the blower housing. Make sure the rubber tubing is not folded anywhere between the pressure switch and the blower housing.
5. Make sure the ON/OFF switch is in the OFF position and that the wiring harness is connected from the blower control box



to the connector on the bottom side of the gas control valve/thermostat.

6. If the wiring harness is not factory installed, make sure the ON/OFF switch is in the OFF position and then connect the wiring harness from the blower control box to the connector on the bottom side of the gas control valve/thermostat.

⚠ WARNING

- Before servicing the water heater, make sure the blower assembly is unplugged or the electrical supply to the water heater is turned "OFF".
- Label all wires prior to disconnection when servicing controls. Wiring error can cause improper and dangerous operation. Verify proper operation after servicing.
- Failure to do this could result in death, serious bodily injury, or property damage.

7. This water heater is a polarity sensitive appliance and will not operate if the power supply polarity is reversed. The power supply

or outlet providing power to this water heater must be wired properly (correct polarity).

8. Do not plug in power cord until vent system is completely installed. This power direct vent heater operates on 110-120 Vac, therefore a grounded outlet must be within reach of the six (6) foot (1.8 m) flexible power cord supplied with the unit, see Figure 2. The power cord supplied may be used only where local codes permit. If local codes do not permit the use of a flexible power supply cord:
 - a.) Make sure the unit is unplugged from wall outlet. Remove screws and remove control box.
 - b.) Cut the flexible power cord, leaving enough to be able to make connections, then remove the strain relief fitting from box.
 - c.) Install suitable conduit fitting in side of enclosure and then follow (d.) and (e.) below.
 - d.) Splice field wiring into existing wiring using code authorized method (wire nuts, etc.).
 - e.) Be certain that neutral and live connections are not reversed when making these connections.
 - f.) Replace control box, make sure that the control box is secured shut.

VENT CONNECTIONS TO BLOWER ASSEMBLY

Figure 15 shows the typical vent connections.

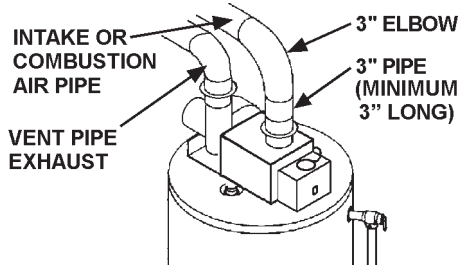


FIGURE 15.

VENTING AND INSTALLATION

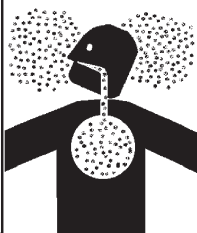
Plan the layout of the vent system from the vent termination to the water heater considering all of the 90° and 45° elbows plus the number of feet of pipe that would be needed to install the total vent system. Note: The inlet connection to the blower requires a minimum 3" long x 3" Schedule 40 PVC pipe. The water heater must be vented to the outdoors as described in these instructions. DO NOT connect this water heater to an existing vent or chimney. It must be vented separately from all other appliances. The fittings, other than the supplied Vent Termination should be equivalent to the following: PVC (Schedule 40, DWV, ASTM D-2665), CPVC (Schedule 40, DWV, ASTM F-438), ABS (Schedule 40 DWV, ASTM D-2661).

The cement used should be as recommended by the vent pipe manufacturer. See the instructions in the "VENT PIPE PREPARATION" section of this manual for the proper method of cutting and cementing the PVC pipe and fittings.

All vent gases must be completely vented to the outdoors of the structure (dwelling). When determining the installation location for a power direct vent water heater, snow accumulation and drifting should be considered in areas where applicable.

⚠ WARNING

Breathing Hazard - Carbon Monoxide Gas



- Install vent system in accordance with codes.
- Do not operate water heater if flood damaged.
- High altitude orifice must be installed for operation above 7,700 feet (2,347 m).
- Do not operate if soot buildup.
- Snow accumulation and drifting should be considered where applicable.
- Do not place chemical vapor emitting products near water heater.
- Gas and carbon monoxide detectors are available.
- Never operate the heater unless it is vented to the outdoors and has adequate air supply to avoid risks of improper operation, fire, explosion, or asphyxiation.
- Make sure the flue baffle and flue restrictor ring are properly aligned and inserted on top of the flue. This can be checked through the dilution air inlet of the blower assembly.

Breathing carbon monoxide can cause brain damage or death.
Always read and understand instruction manual.

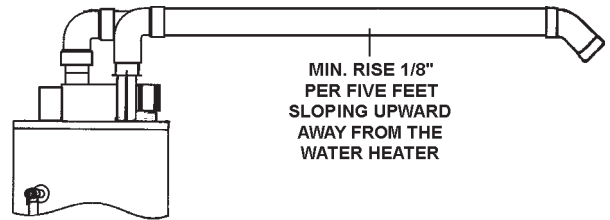


FIGURE 16.

Horizontal runs must be securely supported at 3 1/2 foot (1 m) intervals and vertical runs supported at 5 foot (1.5 m) intervals.

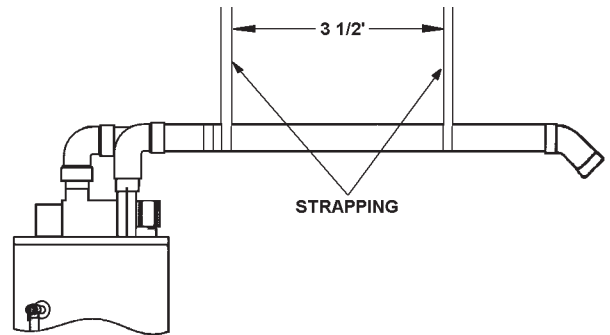


FIGURE 17.

VENTING THROUGH AN OUTSIDE WALL

A. All 75 Gallon Models

In the carton is supplied:

- Two 3" inlet and outlet PVC Schedule 40 - 45° vent caps.
- One 3" CPVC Schedule 80 - 90° elbow; used to connect the **outlet** vent pipe to the water heater when the **outlet** vent pipe is to be turned horizontally directly off the blower.
- One 5' (1.5 m) section of 3" CPVC Schedule 40 **outlet** vent pipe. (More may be required and must be purchased locally.)

Note: A 2-5/8" (66.675 mm) long section of CPVC pipe can be cut from the 5' (1.5 m) section of 3" CPVC Schedule 40 vent pipe. This is used to connect the **outlet** vent pipe elbow to the water heater when the **outlet** vent pipe is to be turned horizontally directly off the blower.

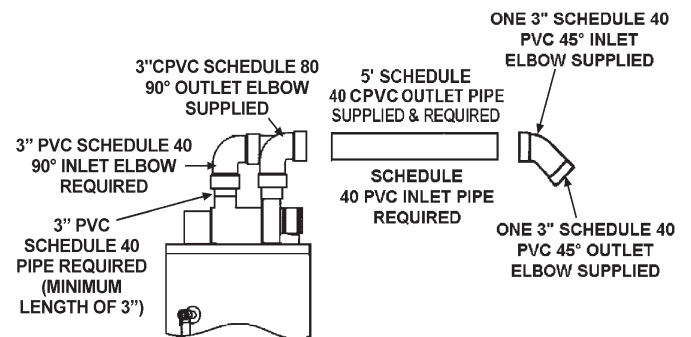


FIGURE 18.

Requirements:

- The water heater requires its own (separate) venting system.
- Only** 3" CPVC Schedule 40 piping and fittings are acceptable materials on the first five feet of the **outlet** vent system.
- 3" PVC, ABS, or CPVC Schedule 40 piping and fittings are acceptable materials for the **inlet** vent system and for the **outlet** vent system after the first five feet.

- The unit cannot be connected to existing vent piping or chimney.
- When venting through an outside wall, the vents must terminate horizontally to the outdoors.

B. All 50 Gallon 65,000 BTU/HR Models

In the carton is supplied:

- Two 3" inlet and outlet PVC Schedule 40 - 45° vent caps.
- One 3" ABS Schedule 40 - 90° street elbow; used to connect the outlet vent pipe to the water heater when the outlet vent pipe is to be turned horizontally directly off the blower.
- One 5' (1.5 m) section of 3" ABS Schedule 40 outlet vent pipe. (More may be required and must be purchased locally.)

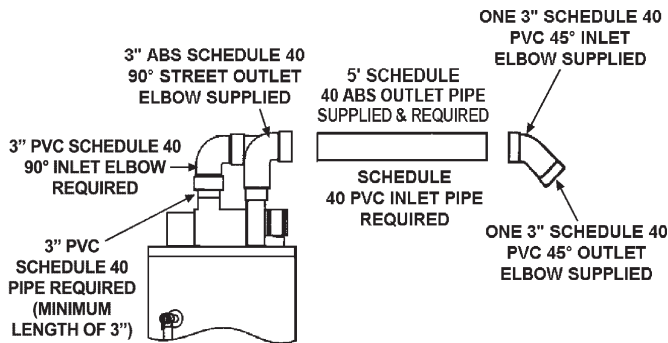


FIGURE 19.

Requirements:

- The water heater requires its own (separate) venting system.
- Only** 3" CPVC or ABS Schedule 40 piping and fittings are acceptable materials on the first five feet of the **outlet** vent system.
- 3" PVC, ABS, or CPVC Schedule 40 piping and fittings are acceptable materials for the **inlet** vent system and for the **outlet** vent system after the first five feet.
- The unit cannot be connected to existing vent piping or chimney.
- When venting through an outside wall, the vents must terminate horizontally to the outdoors.

C. All 40 and 50 Gallon 40,000 BTU/HR Models

In the carton is supplied:

- Two 3" inlet and outlet PVC Schedule 40 - 45° vent caps.
- All other piping must be supplied by the supplier.

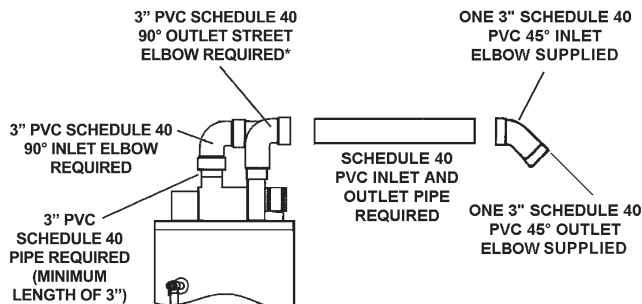


FIGURE 20.

- * If making an immediate horizontal run of vent off the blower, one 3" PVC or ABS Schedule 40 street elbow is required for the **outlet**. In addition, one 3" PVC or ABS Schedule 40 elbow and one section of 3" PVC pipe (a minimum of 3" long) is required for the **inlet**.

VENTING SYSTEM EXAMPLE INSTALLATIONS FOR ALL MODELS

Do not run the vent piping downward under any circumstances. See Figure 21.

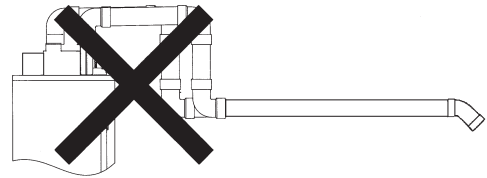


FIGURE 21.

Correct installation of the vent piping:

- Horizontal runs require a minimum 1/8" (3.2 mm) rise per five feet of length.

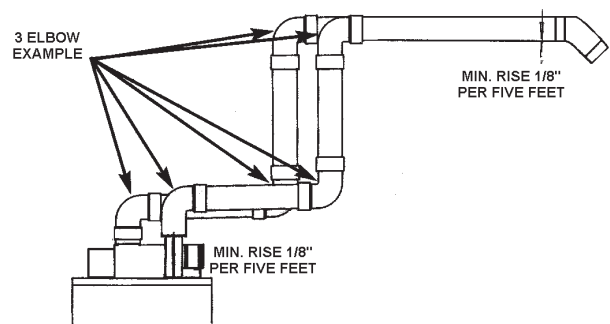


FIGURE 22.

- The total vertical and horizontal vent runs cannot exceed the maximum length with the number of 90° elbows as specified in the table below. If more elbows are required, the venting distance must be reduced 5 feet (1.5 m) for every 90° elbow:

TABLE 1: The number of 90° elbows shown in the table is for both the intake air and vent pipes. IE: The vent pipe can contain three 90° elbows, the intake air pipe can also contain three 90° elbows.	
3" DIA. VENTS MAX. LENGTH (FT.)	NUMBER OF 90° ELBOWS*
45	1
40	2
35	3

*NOTE: Two 45° elbows are equivalent to one 90° elbow. One 90° elbow equals 5 feet (1.5 m) of equivalent vent length.

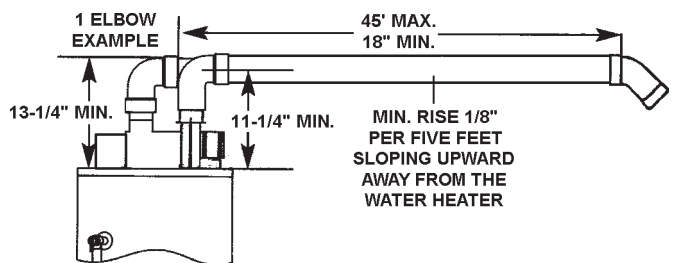


FIGURE 23A.

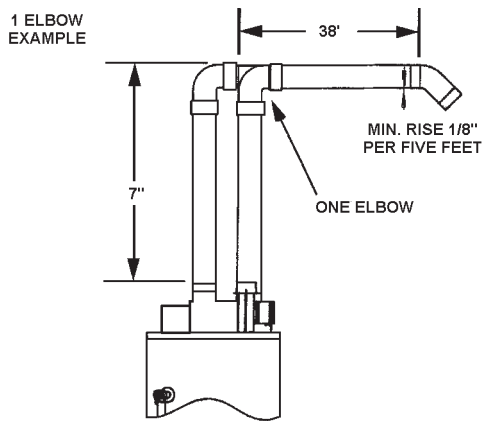


FIGURE 23B.

3. Minimum vent length for all models is 18 inches (46 cm).

VENT PIPE SEPARATION

The inlet and outlet vent pipes must be separated by a minimum distance of 6 1/2 inches (16.5 cm) up to 24 inches (61 cm) maximum.

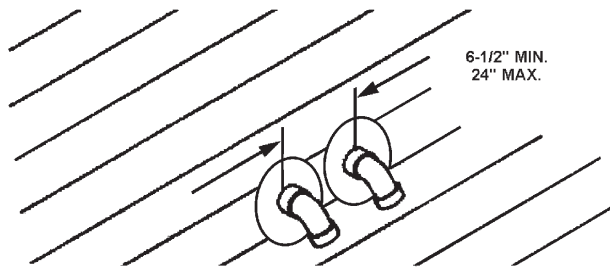


FIGURE 24.

CUTTING OPENINGS THROUGH AN OUTSIDE WALL AND COLLAR INSTALLATION

After reading the manual and determining the location for the opening in the wall, cut one 3 1/2" (9 cm) diameter hole for the inlet vent piping and one 3 1/2" (9 cm) diameter hole for the outlet vent piping through an exterior wall.

Note: When determining the location of the openings in the outside wall, allow for the 1/8" (3.2 mm) rise per five feet (1.5 m) of length required in the horizontal run. See Figure 25.

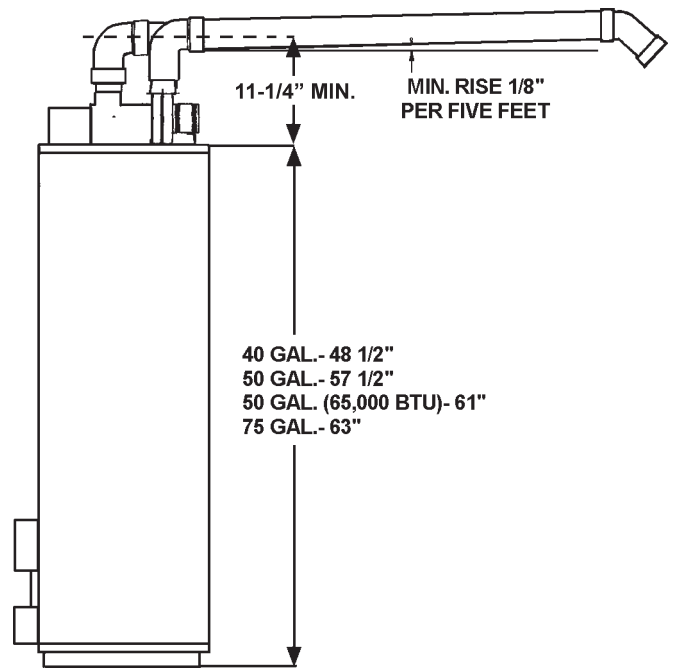


FIGURE 25.

The 3" PVC, ABS, or CPVC Schedule 40 vent pipe can be run from the water heater through the wall or from the wall to the water heater, whichever is most convenient. The vent pipe must extend a minimum of 1 1/2" (4 cm) through the exterior wall. Extending the vent cap as far as possible from the surface of the exterior wall will help minimize discoloration of the wall. Note that the inside flue mounting adaptors must be slipped over the vent piping before locating the pipe through the wall. Before securing the inside and outside collars to the wall, use a silicone sealer between pipe and opening to ensure a water and air tight seal.

INSTALLATION SHOWING USE OF PVC, ABS OR CPVC PIPE FOR INLET AND OUTLET VENT PIPING

Inlet piping through any type wall.

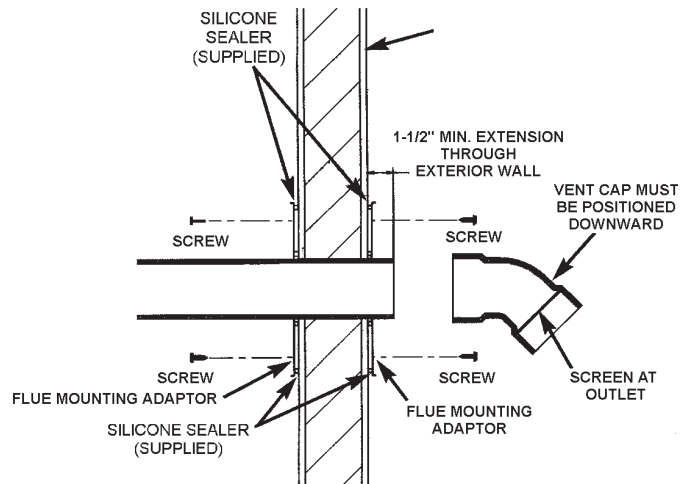


FIGURE 26.

CONNECTING VENT TO BLOWER

1. If making an immediate horizontal run of vent off the blower, install the following at the blower **inlet**: one 3" PVC Schedule 40 pipe (3" long minimum) and one 3" PVC Schedule 40 elbow. At the **outlet**, install one 3" PVC Schedule 40 street elbow. (Exception: For the **outlet**, use CPVC for 75 gallon models and ABS for 50 gallon 65,000 Btu/Hr models.) Place the elbows in the required direction on the blower, then secure as described in Figure 27.

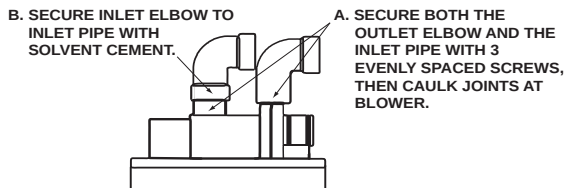


FIGURE 27.

2. If there is to be a vertical run of vent from the blower, the 3" PVC inlet and the 3" PVC (CPVC for 75 gallon models and ABS for 50 gallon 65,000 Btu/Hr models) outlet pipes must be attached to the blower and venting hood using 3 sheet metal screws each.

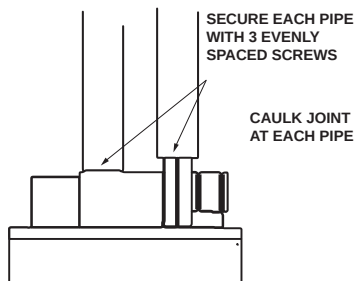


FIGURE 28.

INSTALLATION SHOWING USE OF (OPTIONAL) CONCENTRIC TERMINATION KIT

Typical Installation (see parts list):

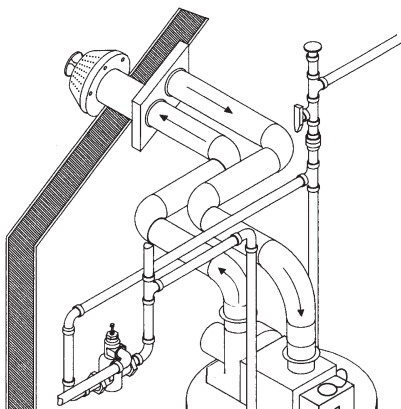


FIGURE 29A.

Optional 3" PVC Horizontal Vent Kit for 75 Gallon Models Only (see parts list):

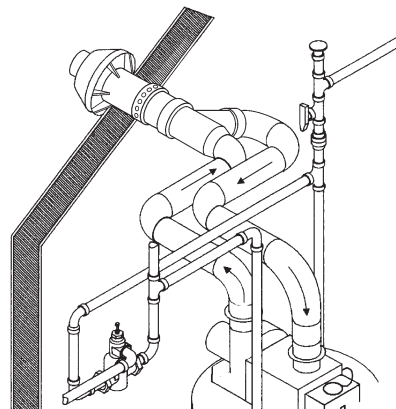


FIGURE 29B.

If this concentric termination, through the wall type of venting system is preferred, the concentric vent kit can be ordered from the Service Parts Department. Installation instructions are provided with the kit.

VENTING THROUGH A ROOF

Two 3" inlet and outlet PVC Schedule 40 - 45° vent caps are supplied.

A 5' (1.5 m) section of 3" CPVC Schedule 40 outlet vent pipe is supplied with 75 gallon models and a 5' (1.5 m) section of 3" ABS Schedule 40 outlet vent pipe is supplied with 50 gallon 65,000 Btu/Hr models. More may be required and must be purchased locally.

1. The water heater requires its own (separate) venting system.
2. Only 3" ABS Schedule 40 piping and fittings are acceptable materials on the first five feet of the outlet vent system on the 50 gallon 65,000 BTU/HR models and 3" CPVC Schedule 40 piping and Schedule 80 fittings are acceptable materials on the first five feet of the outlet vent system on 75 gallon models.
3. 3" PVC, ABS, or CPVC Schedule 40 piping and fittings are acceptable materials for the inlet vent system and for the outlet vent system after the first five feet (1.5 m).
4. The unit cannot be connected to existing vent piping or chimney.
5. Venting must terminate vertically to the outdoors.
6. The total vertical and horizontal vent runs cannot exceed the maximum length with a maximum number of 90° elbows as specified in the table below. If more elbows are required, the venting distance must be reduced 5 feet for every 90° elbow.

TABLE 2: The number of 90° elbows shown in the table is for both the intake air and vent pipes. IE: The vent pipe can contain three 90° elbows, the intake air pipe can also contain three 90° elbows.

3" DIA. VENTS MAX. LENGTH (FT.)	NUMBER OF 90° ELBOWS*
45	1
40	2
35	3

*NOTE: Two 45° elbows are equivalent to one 90° elbow. One 90° elbow equals 5 feet (1.5 m) of equivalent vent length.

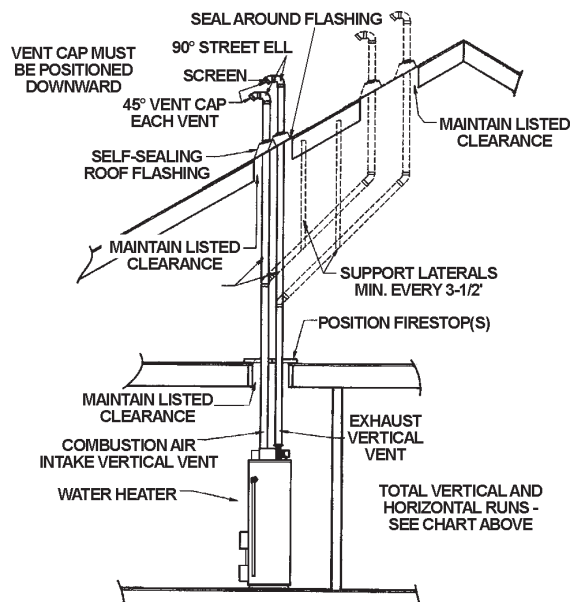


FIGURE 30.

VENT PIPE PREPARATION

1. INITIAL PREPARATION

- A. Make sure the solvent cement you are planning to use is designed for the specific application you are attempting.
- B. Know the physical and chemical characteristics and limitations of the PVC, ABS and CPVC piping materials that you are about to use.
- C. Know the reputation of your manufacturer and their products.
- D. Know your own qualifications or those of your contractor. The solvent welding technique of joining PVC, ABS and CPVC pipe is a specialized skill just as any other pipe fitting technique.
- E. Closely supervise the installation and inspect the finished job before start-up.
- F. Contact the manufacturer, supplier, or competent consulting agency if you have any questions about the application or installation of PVC, ABS and CPVC pipe.
- G. Take the time and effort to do a professional job. Shortcuts will only cause you problems and delays in start-up. By far, the majority of failures in PVC, ABS and CPVC systems are the result of shortcuts and/or improper joining techniques.

2. SELECTION OF MATERIALS

- Cutting Device - Saw or Pipe Cutter
- Deburring Tool, Knife, File, or Beveling Machine (2" [5 cm] and above)
- Brush - Pure Bristle
- Rag - Cotton (Not Synthetic)
- Primer and Cleaner
- Solvent Cement - PVC for PVC Components and CPVC for CPVC Components and ABS for ABS components.
- Containers - Metal or Glass to hold Primer and Cement. Select the type of PVC, ABS or CPVC materials to be used on the basis of their application with respect to chemical resistance, pressure rating, temperature characteristics, etc.
- Insertion Tool - Helpful for larger diameter pipe and fittings 6 inches (15.2 cm) and above.

WARNING

Fire or Explosion Hazard

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Avoid all ignition sources if you smell LP gas.
- Do not expose water heater control to excessive gas pressure.
- Use only gas shown on rating plate.
- Maintain required clearances to combustibles.
- Keep ignition sources away from faucets after extended period of non-use.

Read instruction manual before installing, using or servicing water heater.

PRIMER

It is recommended that Tetrahydrofuran (THF) be used to prepare the surfaces of pipe and fittings for solvent welding. Do not use water, rags, gasoline or any other substitutes for cleaning PVC, ABS or CPVC surfaces. A chemical cleaner such as MEK may be used.

CEMENT

The cement should be a bodied cement of approximately 500 to 1600 centipoise viscosity containing 10-20% (by weight) virgin PVC material solvated with tetrahydrofuran (THF). Small quantities of dimethyl formamide (DMF) may be included to act as a retarding agent to extend curing time. Select the proper cement; Schedule 40 cement should be used for Schedule 40 pipe. Never use all-purpose cements, commercial glues and adhesives or ABS cement to join PVC or CPVC pipe and fittings.

WARNING

Fire Hazard

- Primers and cements are extremely flammable, and must not be stored or used near heat or open flame.
- Also, use only in a well ventilated area.

APPLICATORS

Select a suitable pure bristle type paint brush. Use a proper width brush or roller to apply the primer and cement (see chart below). Speedy application of cement is important due to its fast drying characteristics.

TABLE 3: RECOMMENDED BRUSH* SIZE FOR PRIMER AND CEMENT APPLICATIONS	
Nominal Pipe (IPS)	Size Brush Width (INS.)
3	1-1/2 – 2-1/2

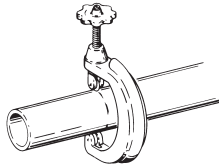
***USE ONLY NATURAL BRISTLE**

3. MAKING THE JOINT

A. Cutting

Pipe must be squarely cut to allow for the proper interfacing of the pipe end and the fitting socket bottom. This can be accomplished with a miter box saw or wheel type cutter. Wheel type cutters are not generally recommended for larger diameters since they tend to flare the corner of the pipe end. If this type of cutter is used, the flare on the end must be completely removed.

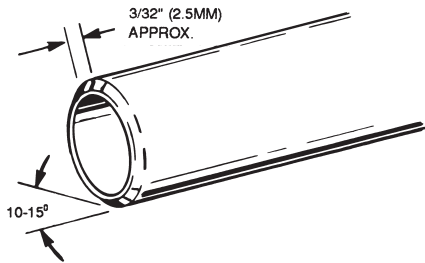
NOTE: Power saws should be specifically designed to cut plastic pipe.



STEP A

B. Deburring

Use a knife, plastic pipe deburring tool, or file to remove burrs from the end of small diameter pipe. Be sure to remove all burrs from around the inside as well as the outside of the pipe. A slight chamfer (bevel) of about 10°-15° should be added to the end to permit easier insertion of the pipe into the end of the fitting. Failure to chamfer the edge of the pipe may remove cement from the fitting socket, causing the joint to leak.



STEP B

C. Test dry fit of the joint

Tapered fitting sockets are designed so that an interfaced fit should occur when the pipe is inserted about 1/3 to 2/3 of the way into the socket. Occasionally, when pipe fitting dimensions are at the tolerance extremes, it will be possible to fully insert dry pipe to the bottom of the fitting socket. When this happens, a sufficient quantity of cement must be applied to the joint to fill the gap between the pipe and fitting. The gap must be filled to obtain a strong, leak-free joint.

D. Inspection, cleaning, priming

Visually inspect the inside of the pipe and fitting sockets and remove all dirt, grease or moisture with a clean dry rag. If wiping fails to clean the surfaces, a chemical cleaner must be used. Check for possible damage such as splits or cracks and replace if necessary.

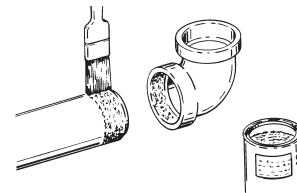
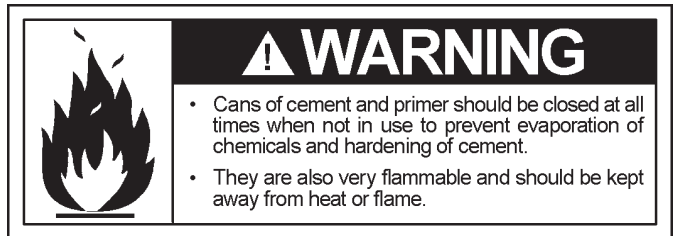
Depth-of-entry

Marking the depth of entry is a way to check if the pipe has reached the bottom of the fitting socket in Step F. Measure the fitting depth and mark this distance on the pipe O.D. You may want to add several inches to the distance and make a second mark as the primer and cement will most likely destroy your first one.

Apply primer to the surface of the pipe and fitting socket with a natural bristle brush. This process softens and prepares the PVC, ABS or CPVC for the solvent cementing step. Move quickly and without hesitation to the cementing procedure while the surfaces are still wet with primer.

E. Application of solvent cement

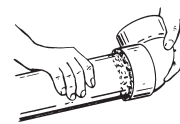
- Apply the solvent cement evenly and quickly around the outside of the pipe at a width a little greater than the depth of the fitting socket.
- Apply a light coat of cement evenly around the inside of the fitting socket. Avoid puddling.
- Apply a second coat of cement to the pipe end.



STEP E

F. Joint assembly

Working quickly, insert the pipe into the fitting socket bottom and give the pipe or fitting a 1/4 turn to evenly distribute the cement. Do not continue to rotate the pipe after it has hit the bottom of the fitting socket. A good joint will have sufficient cement to make a bead all the way around the outside of the fitting hub. The fitting will have a tendency to slide back while the cement is still wet so hold the joint together for about 15 seconds.

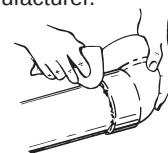


STEP F

G. Cleanup and joint movement

Remove all excess cement from around the pipe and fitting with a dry cotton rag. This must be done while the cement is still soft.

The joint should not be disturbed immediately after the cementing procedure, and sufficient time should be allowed for proper curing of the joint. Exact drying time is difficult to predict because it depends on variables such as temperature, humidity and cement integrity. For more specific information, you should contact your solvent cement manufacturer.



STEP G

FOR YOUR SAFETY READ BEFORE LIGHTING



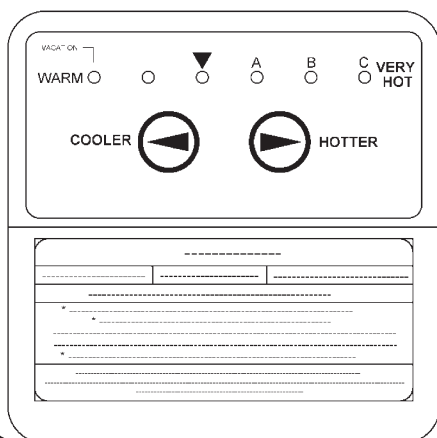
WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.



BEFORE OPERATING: ENTIRE SYSTEM MUST BE FILLED WITH WATER AND AIR PURGED FROM ALL LINES.

- 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 OPERATING** 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 a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately contact 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. Set the ON/OFF switch on the control box to the "ON" position.
3. Set the thermostat to the lowest setting by first pressing the COOLER and HOTTER buttons together and holding for 1 second. Then press the COOLER button until the Warm indicator light appears.
4. Set the ON/OFF switch on the control box to the "OFF" position.
5. This appliance is equipped with a device which automatically lights the burner.
DO NOT TRY TO LIGHT THE BURNER BY HAND.
6. Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Turn on all electrical power to the appliance.
8. Set the ON/OFF switch on the control box to the "ON" position.
9. Set the thermostat to the desired setting by first pressing the COOLER and HOTTER buttons together and holding for 1 second. Then press the HOTTER button .
10. WATER TEMPERATURE ADJUSTMENT is approximately 120°F.
CAUTION: Hotter water increases the risk of scald injury. Consult the instruction manual before changing temperature.
11. If the appliance will not operate, follow the instructions "TO TURN OFF GAS TO APPLIANCE" and call your technician or gas supplier.

WARNING: TURN OFF ALL ELECTRIC POWER BEFORE SERVICING.

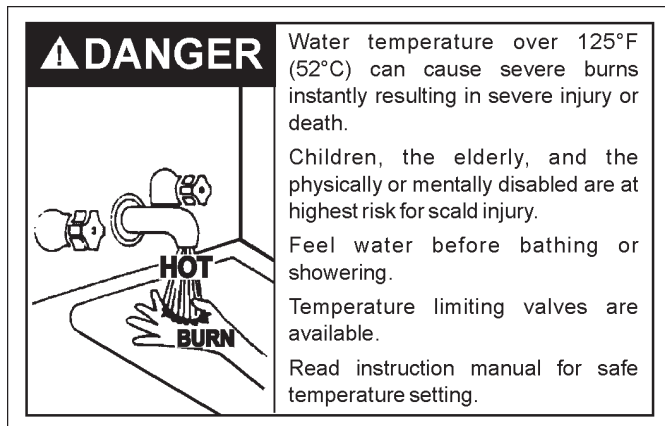
TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to the lowest setting by first pressing the COOLER and HOTTER buttons together and holding for 1 second. Then press the COOLER button until the Warm indicator light appears.
2. Set the ON/OFF switch on the control box to the "OFF" position.
3. Turn off all electrical power to the appliance if service is to be performed.

TEMPERATURE REGULATION

Due to the nature of the typical gas water heater, the water temperature in certain situations may vary up to 30°F (16.7°C) higher or lower at the point of use such as, bathtubs, showers, sink, etc.

It is recommended that lower water temperatures be used to avoid the risk of scalding. It is further recommended, in all cases, that the water temperature be set for the lowest temperature which satisfies your hot water needs. This will also provide the most energy efficient operation of the water heater.



HOT WATER CAN SCALD: Water heaters are intended to produce hot water. Water heated to a temperature which will satisfy space heating, clothes washing, dish washing, and other sanitizing needs can scald and permanently injure you upon contact. Some people are more likely to be permanently injured by hot water than others. These include the elderly, children, the infirm, or physically/mentally disabled. If anyone using hot water in your home fits into one of these groups or if there is a local code or state law requiring a certain temperature water at the hot water tap, then you must take special precautions. In addition to using the lowest possible temperature setting that satisfies your hot water needs, a means such as a mixing valve should be used at the hot water taps used by these people or at the water heater. Mixing valves are available at plumbing supply or hardware stores, see Figure 2. Follow manufacturer's instructions for installation of the valves. Before changing the factory setting on the thermostat, see Figure 31.

Never allow small children to use a hot water tap, or to draw their own bath water. Never leave a child or handicapped person unattended in a bathtub or shower.

The water heater should be located in an area where the general public does not have access. If a suitable area is not available, a cover should be installed over the thermostat to prevent tampering.

The water temperature setting was factory set at the lowest temperature; Pressing the "COOLER" button decreases temperature and pressing the "HOTTER" button increases the temperature.

Setting the water heater temperature at 120°F (49°C) (Approx. "▼" mark on temperature setting of gas control valve/thermostat) will reduce the risk of scalds. Some states require settings at specific lower temperatures.

To avoid any unintentional changes in water temperature settings, the gas control valve/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 31. 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 adjustment buttons.

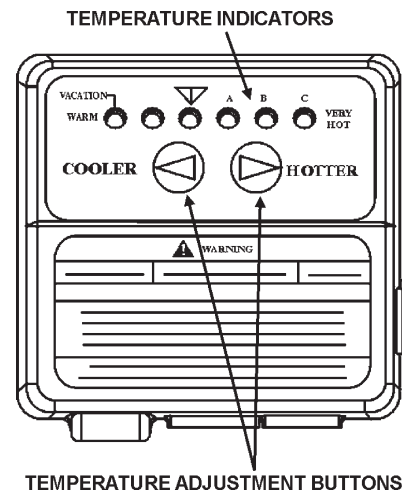
- a. To decrease the temperature press and release the "COOLER" button until the desired setting is reached.

- b. To increase the temperature press and release the "HOTTER" button until the desired setting is reached.

NOTE: 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.

Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.

GAS CONTROL VALVE/THERMOSTAT - FRONT VIEW



Temperature Setting	Display ▼ A B C	Time to Produce 2nd and 3rd Degree Burns on Adult Skin
C-Flashing = approx. 160°F (71°C)	○○○○○●	About 1/2 second
C = approx. 150°F (66°C)	○○○○○●	About 1-1/2 seconds
B = approx. 140°F (60°C)	○○○○●○	Less than 5 seconds
A = approx. 130°F (54°C)	○○○●○○	About 30 seconds
▼ = approx. 120°F (49°C)	○○●○○○	More than 5 minutes
WARM = approx. 80°F (27°C)	●○○○○○	-----

FIGURE 31.

FOR YOUR INFORMATION

START UP CONDITIONS

CONDENSATE

Whenever the water heater is filled with cold water, some condensate will form while the burner is on. A water heater may appear to be leaking when in fact the water is condensate. This usually happens when:

- A new water heater is filled with cold water for the first time.
- Burning gas produces water vapor in water heaters, particularly high efficiency models where flue temperatures are lower.
- Large amounts of hot water are used in a short time and the refill water in the tank is very cold.

Moisture from the products of combustion condense on the cooler tank surfaces and form drops of water which may fall onto the burner or other hot surfaces to produce a "sizzling" or "frying" noise.

Because of the suddenness and amount of water, condensate water may be diagnosed as a "tank leak". After the water in the tank warms up (about 1-2 hours), the condition should disappear.

Do not assume the water heater is leaking until there has been enough time for the water in the tank to warm up.

An undersized water heater will cause more condensation. The water heater must be sized properly to meet the family's demands for hot water including dishwashers, washing machines and shower heads.

Excessive condensate may be noticed during the winter and early spring months when incoming water temperatures are at their lowest.

Good venting is essential for a gas fired water heater to operate properly as well as to carry away products of combustion and water vapor.

SMOKE/ODOR

It is not uncommon to experience a small amount of smoke and odor during the initial start-up. This is due to burning off of oil from metal parts, and will disappear in a short while.

CAUTION

Improper installation and use may result in property damage.

- Avoid water heater damage.
- Install thermal expansion tank or device if necessary.
- Contact qualified installer or service agency.

CLOSED WATER SYSTEMS

Water supply systems may, because of code requirements or such conditions as high line pressure, among others, have installed devices such as pressure reducing valves, check valves, and back flow preventers. Devices such as these cause the water system to be a closed system.

THERMAL EXPANSION

As water is heated, it expands (thermal expansion). In a closed system the volume of water will grow. As the volume of water grows there will be a corresponding increase in water pressure due

to thermal expansion. Thermal expansion can cause premature tank failure (leakage). This type of failure is not covered under the limited warranty. Thermal expansion can also cause intermittent temperature-pressure relief valve operation: water discharged from the valve due to excessive pressure build up. The temperature-pressure relief valve is not intended for the constant relief of thermal expansion. This condition is not covered under the limited warranty.

A properly sized thermal expansion tank should be installed on all closed systems to control the harmful effects of thermal expansion. Contact a plumbing service agency or your retail supplier regarding the installation of a thermal expansion tank.

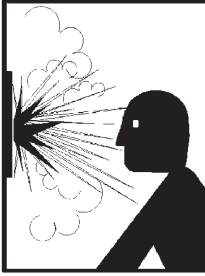
STRANGE SOUNDS

Possible noises due to expansion and contraction of some metal parts during periods of heat-up and cool-down do not necessarily represent harmful or dangerous conditions.

Condensation causes sizzling and popping within the burner area during heating and cooling periods and should be considered normal. See "Condensate" in this section.

OPERATIONAL CONDITIONS

"AIR" IN HOT WATER FAUCETS



⚠ WARNING

Explosion Hazard

- Flammable hydrogen gases may be present.
- Keep all ignition sources away from faucet when turning on hot water.

HYDROGEN GAS: Hydrogen gas can be produced in a hot water system that has not been used for a long period of time (generally two weeks or more). Hydrogen gas is extremely flammable and explosive. To prevent the possibility of injury under these conditions, we recommend the hot water faucet, located farthest away, be opened for several minutes before any electrical appliances which are connected to the hot water system are used (such as a dishwasher or washing machine). If hydrogen gas is present, there will probably be an unusual sound similar to air escaping through the pipe as the hot water faucet is opened. There must be no smoking or open flame near the faucet at the time it is open.

HIGH WATER TEMPERATURE SHUT OFF SYSTEM

This water heater is equipped with an automatic gas shut-off system. This system works when high water temperatures are present. Turn "OFF" the entire gas supply to the water heater. The high temperature shut-off is built into the gas control valve/thermostat. It is non-resettable. If the high temperature shut-off activates, the gas control valve/thermostat must be replaced. Contact your gas supplier or service agency.

PERIODIC MAINTENANCE

VENTING SYSTEM INSPECTION



WARNING

Breathing Hazard - Carbon Monoxide Gas



- Flue gases may escape if vent pipe is not connected.
- Be alert for obstructed, sooted or deteriorated vent system to avoid serious injury or death.
- Do not store corrosive chemicals in vicinity of water heater.
- Chemical corrosion of flue and vent system can cause serious injury or death.

Breathing carbon monoxide can cause brain damage or death.
Always read and understand instruction manual.

At least once a year a visual inspection should be made of the venting system. You should look for:

1. Obstructions which could cause improper venting. The combustion and ventilation air flow must not be obstructed.
2. Damage or deterioration which could cause improper venting or leakage of combustion products.

Be sure the vent piping is properly connected to prevent escape of dangerous flue gasses which could cause deadly asphyxiation.

Obstructions and deteriorated vent systems may present serious health risk or asphyxiation.

Chemical vapor corrosion of the flue and vent system may occur if air for combustion contains certain chemical vapors. Spray can propellants, cleaning solvents, refrigerator and air conditioner refrigerants, swimming pool chemicals, calcium and sodium chloride, waxes, bleach and process chemicals are typical compounds which are potentially corrosive.

If after inspection of the vent system you found sooting or deterioration, something is wrong. Call the local gas utility to correct the problem and clean or replace the flue and venting before resuming operation of the water heater.

BURNER OPERATION AND INSPECTION

Flood damage to a water heater may not be readily visible or immediately detectable. However, over a period of time a flooded water heater will create dangerous conditions which can cause **DEATH, SERIOUS BODILY INJURY, OR PROPERTY DAMAGE**. Contact a qualified installer or service agency to replace a flooded water heater. Do not attempt to repair the unit! It must be replaced!

At least once a year a visual inspection should be made of the main burner and the hot surface igniter assembly for proper flame

characteristics and ignition sequences. This can be done by viewing the main burner operation through the Viewport on the Outer Door, see Figure 1. The main burner should provide complete combustion of gas, ignite rapidly, give reasonably quiet operation, and cause no excessive flame lifting from the burner ports. If the proper flame characteristics are not evident as in Figure 32, make sure that the flow of combustion and ventilation air is not blocked in the venting system.

You should also check for sooting. Soot is not normal and will impair proper combustion. A visual inspection of the main burner and HSI igniter assembly should also be done at least once a year, see Figure 32.

Soot build-up indicates a problem that requires correction before further use. Turn "OFF" gas to water heater and leave off until repairs are made, because failure to correct the cause of the sooting can result in a fire causing death, serious injury, or property damage.

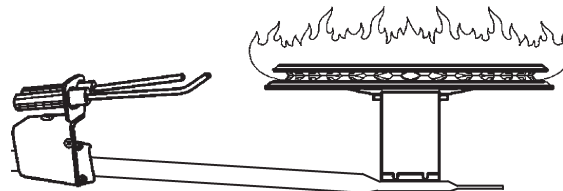


FIGURE 32.

BURNER CLEANING

In the event your burner or burner air openings require cleaning, turn the blower switch to the "OFF" position and allow the burner to cool. Call a service agency to remove and clean the burner and correct the problem that required the burner to be cleaned.

HOUSEKEEPING



DANGER

Fire and Explosion Hazard



- Do not use or store flammable vapor products such as gasoline, solvents or adhesives in the same room or area near water heater or other appliance.
- Visibly inspect air intake screen at least once every six months and clean if needed.
- Can cause serious injury or death.

Vacuum around base of water heater for dust, dirt, and lint on a regular basis.

ANODE ROD

CAUTION

Property Damage Hazard

- Avoid water heater damage.
- Inspection and replacement of anode rod required.

Each water heater contains at least one anode rod, which will slowly deplete (due to electrolysis), prolonging the life of the water heater by protecting the glass-lined tank from corrosion. Adverse water quality, hotter water temperatures, high hot water usage, and water softening methods can increase the rate of anode rod depletion. Once the anode rod is depleted, the tank will start to corrode, eventually developing a leak.

Certain water conditions will cause a reaction between the anode rod and the water. The most common complaint associated with the anode rod is a "rotten egg smell" produced from the presence of hydrogen sulfide gas dissolved in the water. **IMPORTANT:** Do not remove this rod permanently as it will void any warranties. The parts list includes a special anode rod that can be ordered if water odor or discoloration occurs. **NOTE:** This rod may reduce but not eliminate water odor problems. The water supply system may require special filtration equipment from a water conditioning company to successfully eliminate all water odor problems.

Artificially softened water is exceedingly corrosive because the process substitutes sodium ions for magnesium and calcium ions. The use of a water softener may decrease the life of the water heater tank.

The anode rod should be removed from the water heater tank every 3 years for inspection. **NOTE:** Artificially softened water requires the anode rod to be inspected annually.

The following are typical (but not all) signs of a depleted anode rod:

- The majority of the rod's diameter is less than 3/8" (9.5 mm).
- Significant sections of the support wire (approx. 1/3 or more of the anode rod's length) are visible.

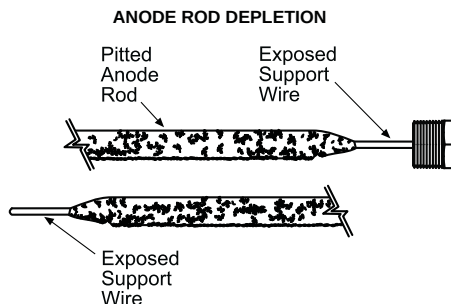


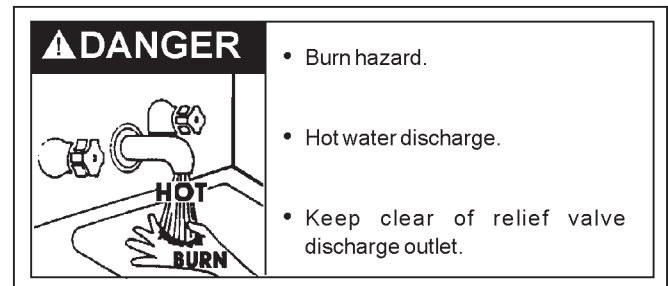
FIGURE 32B.

If the anode rod shows signs of either or both, it should be replaced. **NOTE:** Whether re-installing or replacing the anode rod, check for any leaks and immediately correct if found. In situations where clearance above the water heater is limited, it may be necessary to bend the anode rod for removal. Flexible anode rods are available for replacement.

In replacing the anode:

1. Turn off gas supply to the water heater.
2. Shut off the water supply and open a nearby hot water faucet to depressurize the water tank.
3. Drain approximately 5 gallons (18.9 L) of water from the tank (Refer to the "Draining and Flushing" section for proper procedures). Close drain valve.
4. Remove old anode rod.
5. Use Teflon® tape or approved pipe sealant on threads and install new anode rod.
6. Turn on water supply and open nearby hot water faucet to purge air from water system. Check for any leaks and immediately correct any if found.
7. Restart the water heater as directed under the "Operating Your Water Heater" section. See the "Repair Parts Illustration" section for anode rod location.

TEMPERATURE-PRESSURE RELIEF VALVE OPERATION



The temperature-pressure relief valve must be manually operated at least once a year.

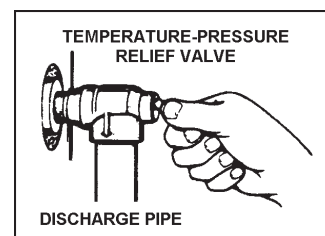


FIGURE 33.

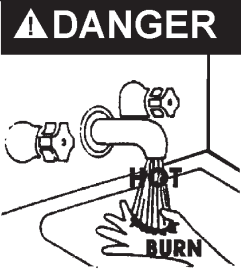
When checking the temperature-pressure relief valve operation, make sure that (1) no one is in front of or around the outlet of the temperature-pressure relief valve discharge line, and (2) that the water discharge will not cause any property damage, as the water may be extremely hot, see Figure 33.

If after manually operating the valve, it fails to completely reset and continues to release water, immediately close the cold water inlet to the water heater, follow the draining instructions, and replace the temperature-pressure relief valve with a new one.

If the temperature-pressure relief valve on the appliance weeps or discharges periodically, this may be due to thermal expansion.

You may have a check valve installed in the water line or a water meter with a check valve. Consult your local water supplier or service agency for further information. Do not plug the temperature-pressure relief valve.

DRAINING AND FLUSHING

	• Hot water discharge burn hazard. • Keep clear of relief valve discharge unit. • Temperature limiting valves are available. • Read instruction manual for safe temperature setting.
---	--

It is recommended that the tank be drained and flushed every 6 months to remove sediment which may build up during operation. The water heater should be drained if being shut down during freezing temperatures. To drain the tank, perform the following steps:

1. Set the blower switch to the "OFF" position.
2. Turn off the gas to the water heater at the manual gas shut-off valve.
3. Open a nearby hot water faucet until the water is no longer hot.
4. Close the cold water inlet valve.
5. Connect a hose to the drain valve and terminate it to an adequate drain or external to the building.
6. Open the water heater drain valve and allow all of the water to drain from the tank. Flush the tank with water as needed to remove sediment.
7. Close the drain valve, refill the tank, and restart the heater as directed in this manual.

If the water heater is going to be shut down for an extended period, the drain valve should be left open.

IMPORTANT: Condensation may occur when refilling the tank and should not be confused with a tank leak.

DRAIN VALVE WASHER REPLACEMENT

(See Figure 34)

1. Turn "OFF" gas supply to water heater.
2. Follow "Draining" instructions.
3. Turning counterclockwise (↺), remove the hex cap below the screw handle.
4. Remove the washer and put the new one in place.
5. Screw the handle and cap assembly back into the drain valve and retighten using a wrench. **DO NOT OVER TIGHTEN.**
6. Follow instructions in the "Filling The Water Heater" section.
7. Check for leaks.
8. Follow the lighting instructions in the "Lighting" section to restart the water heater.

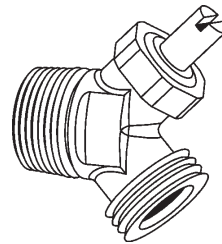


FIGURE 34.

SERVICE

If a condition persists or you are uncertain about the operation of the water heater contact a service agency.

Use this guide to check a "Leaking" water heater. Many suspected "Leakers" are not leaking tanks. Often the source of the water can be found and corrected.

If you are not thoroughly familiar with gas codes, your water heater, and safety practices, contact your gas supplier or qualified installer to check the water heater.

LEAKAGE CHECKPOINTS

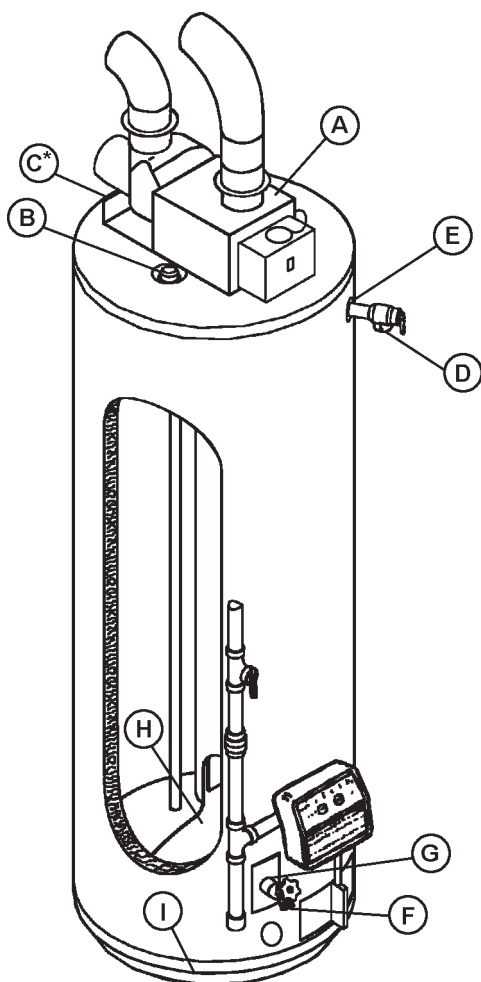


FIGURE 35.

Read this manual first. Then before checking the water heater make sure the gas supply has been turned "OFF", and never turn the gas "ON" before the tank is completely full of water.

Never use this water heater unless it is completely filled with water. To prevent damage to the tank, the tank must be filled with water. Water must flow from the hot water faucet before turning "ON" gas to the water heater.

- A. Water at the blower assembly is water vapor which has condensed out of the combustion products. This is caused by a problem in the vent. Contact the gas utility.
- B. *Condensation may be seen on pipes in humid weather or pipe connections may be leaking.
- C. *The anode rod fitting may be leaking (anode is located under the Blower Assembly).
- D. Small amounts of water from temperature-pressure relief valve may be due to thermal expansion or high water pressure in your area.
- E. *The temperature-pressure relief valve may be leaking at the tank fitting.
- F. Water from a drain valve may be due to the valve being slightly opened.
- G. *The drain valve may be leaking at the tank fitting.
- H. Combustion products contain water vapor which can condense on the cooler surfaces of the tank. Droplets form and drip onto the burner or run on the floor. This is common at the time of start-up after installation and when incoming water is cold.

- I. Water in the water heater bottom or on the floor may be from condensation, loose connections, or the relief valve. DO NOT replace the water heater until a full inspection of all possible water sources is made and necessary corrective steps taken.

Leakage from other appliances, water lines, or ground seepage should also be checked.

- * To check where threaded portion enters tank, insert cotton swab between jacket opening and fitting. If cotton is wet, follow "Draining" instructions in the "Periodic Maintenance" section and then remove fitting. Put pipe dope or Teflon tape on the threads and replace. Then follow "Filling the Water Heater" instructions in the "Installing the New Water Heater" section.



⚠ WARNING

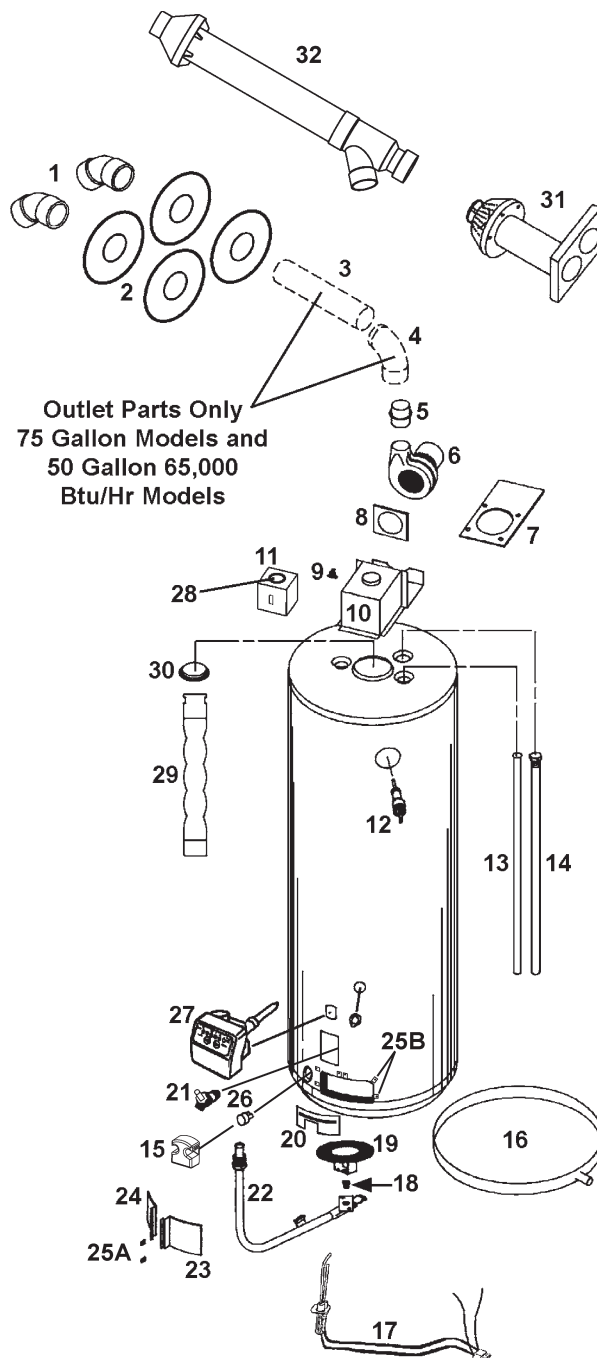
Read and understand instruction manual and safety messages before installing, operating or servicing this water heater.

Failure to follow instructions and safety messages could result in death or serious injury.

Instruction Manual must remain with water heater.

REPAIR PARTS LIST

Key No.	Part Description
1	Vent Cap w/Screen
2	Adaptor, Flue Mounting
3	5' ABS Schedule 40 Vent Pipe (50 gal. 65,000)
3	5' CPVC Schedule 40 Vent Pipe (75 gal.)
4	90° ABS Schedule 40 Elbow (50 gal. 65,000)
4	90° CPVC Schedule 80 Elbow (75 gal.)
5	Vent/Blower Adapter
6	Blower
7	Flue Adaptor Gasket (6' x 10.102")
8	Blower Gasket
9	Venting; Manual Reset Switch
10	Vent Hood Assembly
11	Junction Box
12	T & P Valve
13	Dip Tube
14	Anode Rod
15	FV Sensor Bracket
16	Metal Drain Pan
17	Hot Surface Ignition Assembly
18	Orifice
19	Burner Assembly
20	Inner Door
21	Drain Valve
22	Manifold
23	Right Access Door w/Gasket
24	Left Access Door w/Gasket
25A	Access Door Clips (2)
25B	Jacket/Access Door Clips (6)
26	FV Sensor
27	Gas Control Valve/Thermostat
28	Pressure Switch (Air)
29	Flue Baffle Assembly
30	Baffle Adaptor Collar Assembly
31	Optional (Deluxe) Horizontal Vent Kit
32	Optional (3") PVC Horizontal Vent Kit (75 Gallon Only)



Now that you have purchased this water heater, should a need ever exist for repair parts or service, simply contact the company it was purchased from or direct from the manufacturer listed on the rating plate on the water heater.

Be sure to provide all pertinent facts when you call or visit.

Selling prices will be furnished on request or parts will be shipped at prevailing prices and you will be billed accordingly.

The model number of your Gas Water Heater will be found on the

rating plate located above the gas control valve/thermostat.

WHEN ORDERING REPAIR PARTS, ALWAYS GIVE THE FOLLOWING INFORMATION:

- MODEL NUMBER
- TYPE GAS (NATURAL OR PROPANE (L.P.))
- SERIAL NUMBER
- PART DESCRIPTION

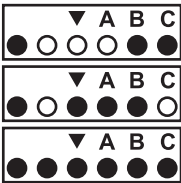
THIS IS A REPAIR PARTS LIST, NOT A PACKING LIST.

TROUBLESHOOTING GUIDELINES

TROUBLE SHOOTING

Please check guidelines below. For your safety, water heater service should be performed only by a qualified service technician. Read the GENERAL SAFETY INFORMATION section first.

#	LED STATUS	PROBLEM	SOLUTION
1		The gas control valve/thermostat has sensed inadequate or no earth ground.	1 Ensure the wall outlet (power supply) is properly grounded. 2 Ensure all ground connections/wires on the water heater are securely connected.
2		The gas control valve/thermostat has sensed reversed polarity in the 120 VAC power supply.	1 Ensure the wall outlet/power supply is properly wired. 2 Ensure all internal 120 VAC wiring connections and wiring harness have no reversed wires. 120 VAC "hot" wire must connect to the on/off switch.
3		Pressure switch circuit remaining closed for more than 5 seconds after heating cycle begins. Blower may not start in this condition.	1 Ensure air pressure switch circuit wiring is correct and the air pressure switch is not jumpered. 2 Replace the air pressure switch.
4		Pressure switch circuit remains open longer than 5 seconds after the blower is energized. Blower may run continuously in this condition.	1 Ensure the air pressure switch sensing tube is properly connected at both ends and is not kinked or damaged. 2 Ensure the correct size of vent and intake air pipe (direct vent products) was used per the installation instructions in the manual that came with the water heater. 3 Ensure maximum number of elbows or maximum equivalent feet of vent or intake air pipe has not been exceeded per the installation instructions in the manual that came with the water heater. 4 Ensure there are no obstructions in the vent or intake air pipe.
5		The gas control valve/thermostat has detected an open igniter circuit.	1 Check wiring to the hot surface igniter assembly - replace igniter assembly if wiring is damaged or worn. 2 Check resistance of the igniter at igniter assembly plug - should be between 11 and 18 ohms at room temperature (77° F at plug end) - replace igniter if open or shorted. 3 Check igniter assembly plug and the socket on the gas control valve/thermostat for good connection. 4 Replace igniter assembly if the plug is worn or damaged. 5 Replace the gas control valve/thermostat if the igniter assembly socket on the bottom of the control is worn or damaged.
6		Ignition/flame failure. The gas control valve/thermostat has reached the maximum number of retries (3) for ignition and is currently locked out for one hour. Cycle the power to the water heater off and on to reset.	1 Ensure flame sensor is making good contact with the burner flame and ensure flame is steady. Also ensure supply and manifold gas pressures are within the requirements in the installation manual. 2 Gas supply is turned off - pressure is too low. 3 Ensure the flame sensor is clean - use fine steel wool to clean the flame sensor. 4 Check igniter assembly plug and the socket on the bottom of the gas control valve/thermostat for good connection. Replace igniter assembly if the plug is worn or damaged. Replace the gas control valve/thermostat if socket is worn or damaged. 5 Replace igniter assembly.

#	LED STATUS	PROBLEM	SOLUTION
7		Self diagnostic check has detected a problem with the gas valve driver circuit, internal microprocessor, or other internal circuits.	1 Turn the power off for 10-20 seconds then on again to clear these error codes. 2 If any of these error codes persist or cannot be cleared - replace the gas control valve/thermostat.
8			
9			
10		The gas control valve/thermostat has sensed main burner flame out of proper sequence.	1 Turn the power off for 10-20 seconds then on again to clear these error codes. 2 Replace the gas control valve/thermostat if this error code persists.
11		Water temperature in the tank has exceeded 195° F and has activated the ECO (energy cut off) high temperature limit.	1 Turn the power off for 10-20 seconds then on again to clear these error codes. 2 Replace the gas control valve/thermostat if the error code persists.
12		Self diagnostic check has detected that one or both of the temperature adjust buttons are stuck.	1 Press and release both temperature adjust buttons several times - cycle water heater power off and on. 2 Replace the gas control valve/thermostat if the error code persists.
13		Self diagnostic check has detected the water temperature sensor (located in the control valve's immersion probe) is either open or shorted.	1 Turn the power off for 10-20 seconds then on again to clear these error codes. 2 Replace the gas control valve/thermostat if the error code persists.
14		Self diagnostic check has detected the FV (flammable vapor) sensor is either open or shorted.	1 Turn off power to the water heater. Ensure all FV sensor wiring, the ignitor assembly plug, and the ignitor assembly socket on the bottom of the Intellivent control are making good contact. Repair or replace any worn/damaged components that are not making good connection. 2 Replace the FV sensor.
15		Self diagnostic check has detected the presence of flammable vapors from the FV (flammable vapor) sensor.	1 Do not touch any electrical switch, do not use any phone in your building, and do not try to light any appliance. 2 Smell around the water heater to ensure there are no gas leaks at the gas control valve/thermostat, in the supply gas line(s), or any other type of flammable vapor(s) in the area. 3 Carefully inspect the area surrounding the water heater for any substances such as gasoline, paint, paint thinners, varnish, or cleaners that could emit flammable vapors. Remove anything that can potentially emit flammable vapors from the area and store it properly in a different location. 4 Call the technical information support phone number shown on the water heater labeling for further assistance.
16		The gas control valve/thermostat has detected the air pressure switch circuit is opening repeatedly during one heating cycle. LDO (Lint, Dust, and Oil) lockout condition.	1 On models equipped with a dilution air intake screen on the blower assembly - check/clean this screen. 2 On models equipped with a combustion air intake screen on the base ring (bottom) of the water heater - check/clean the screen. 3 Ensure intake air screen(s) on models so equipped are not obstructed.

TROUBLESHOOTING GUIDELINES

These guidelines should be utilized by a qualified service agent. When calling for service notify the service agent that this is a "Flammable Vapor Ignition Resistant" Product.

PROBLEM	CAUSE	SOLUTION
NOT ENOUGH OR NO HOT WATER	1. Blower will not run.	
	A) "ON/OFF" control switch turned off.	Turn switch to the "ON" position.
	B) Blower unplugged.	Plug blower back into 115 vac. outlet.
	C) No power at outlet.	Repair service to outlet.
	D) Thermostat defective.	Replace thermostat.
	E) Control harness defective.	Replace control harness.
	F) High limit control circuit open.	Replace ECO.
	G) Blower motor defective.	Replace blower assembly.
	3. Thermostat problems	
	A) Thermostat set too low.	Turn temperature control higher.
	B) Thermostat or ECO defective.	Replace thermostat or ECO as required.
	4. Others	
	A) Heater undersized.	Reduce hot water use.
	B) Low gas pressure.	Contact dealer.
VENT PIPE DEFORMED OR DISCOLORED	C) Incoming water is unusually cold.	Allow more time for heater to reheat.
	D) Leaking hot water pipes or fixtures.	Have plumber check and repair leaks.
	Defective air flow restrictor.	Take unit out of service immediately; call a service representative.
	Not enough dilution air to mix with flue gases in inlet elbow.	Proper dilution air must be provided for combustion and dilution of flue temperature. Refer to the "INSTALLING THE NEW WATER HEATER" section in the manual.
YELLOW FLAME	Dilution air too hot for mixing with flue gases.	Supply air is too hot. Check for heat sources around intake terminal and blockage of dilution air leg.
	Wrong burner orifice.	Install correct orifice.
	Dirt in burner ports.	Turn off heater and gas, clean burner head.
CONDENSATION	Combustion air path restricted.	Check intake venting arrangement for obstructions.
	Not enough dilution air for proper combustion.	Check intake venting arrangement for obstructions.
	Water on the floor under heater.	See "CONDENSATION" section.
WATER LEAKS	Water dripping from blower assembly.	Provide drip "TEE" to catch condensation from horizontal section of exhaust vent close to blower assembly.
	Improperly sealed hot or cold supply connections, relief valve, drain valve or thermostat threads.	Tighten threaded connections.
	Leakage from other appliances or water lines.	Inspect other appliances near water heater.
LEAKING T & P VALVE	Condensation of flue products.	See "CONDENSATION" section.
	Thermal expansion in closed water system.	Install thermal expansion tank (DO NOT plug T & P valve).
HOT WATER ODORS (Refer to CATHODIC PROTECTION)	Improperly seated valve.	Check relief valve for proper operation (DO NOT plug T & P valve).
	High sulfate or mineral content in water supply.	Drain and flush heater thoroughly then refill.
WATER TOO HOT	Bacteria in water supply.	Chlorinate water supply.
	Thermostat set too high.	Refer to "TEMPERATURE REGULATION" section.
WATER HEATER SOUNDS SIZZLING - RUMBLING	Condensation dripping on burner.	See "CONDENSATION" section.
	Sediment at bottom of heater tank.	Clean sediment from tank. Refer to "DRAINING" instructions in the "MAINTENANCE" section.
SOOTING	Improper combustion.	Refer to the "COMBUSTION AIR AND VENTILATION" section.
HEATER LIGHT GOES OUT IN 4-5 SECONDS	Outlet polarity is reversed.	Test polarity and correct.
VENT GAS ODORS	Lack of air supply.	Immediately shut down the water heater and contact a service agency to determine cause.
	Improperly installed vent piping.	
	Downdraft.	
	Poor Combustion.	

NOTES

NOTES



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