

Installation Instructions and Use & Care Guide



Residential Direct Vent Water Heater with the Flammable Vapor Ignition Resistant Safety System For Installation in a Manufactured Home (Mobile Home)

- Shall not be installed in the occupied space of the manufactured (mobile) home.
- Originally shipped set for Natural Gas and convertible to L.P. Propane Gas (all parts included). See *Gas Conversion* on page 23.
- For potable water heating only. Not suitable for space heating.

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 RETURN THIS UNIT TO THE STORE



Read this manual and the labels on the water heater before you install, operate, or service it. If you have difficulty following the directions, or aren't sure you can safely and properly do any of this work yourself:

Call our Technical Assistance Hotline at 1-615-889-8900 or visit [http:// www.lochinvar.com](http://www.lochinvar.com). We can help you with installation, operations, troubleshooting, or maintenance. Before you call, write down the model and serial number from the water heater's data plate.

Incorrect installation, operation, or service can damage the water heater, your house and other property, and present risks including fire, scalding, electric shock, and explosion, causing 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.

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.

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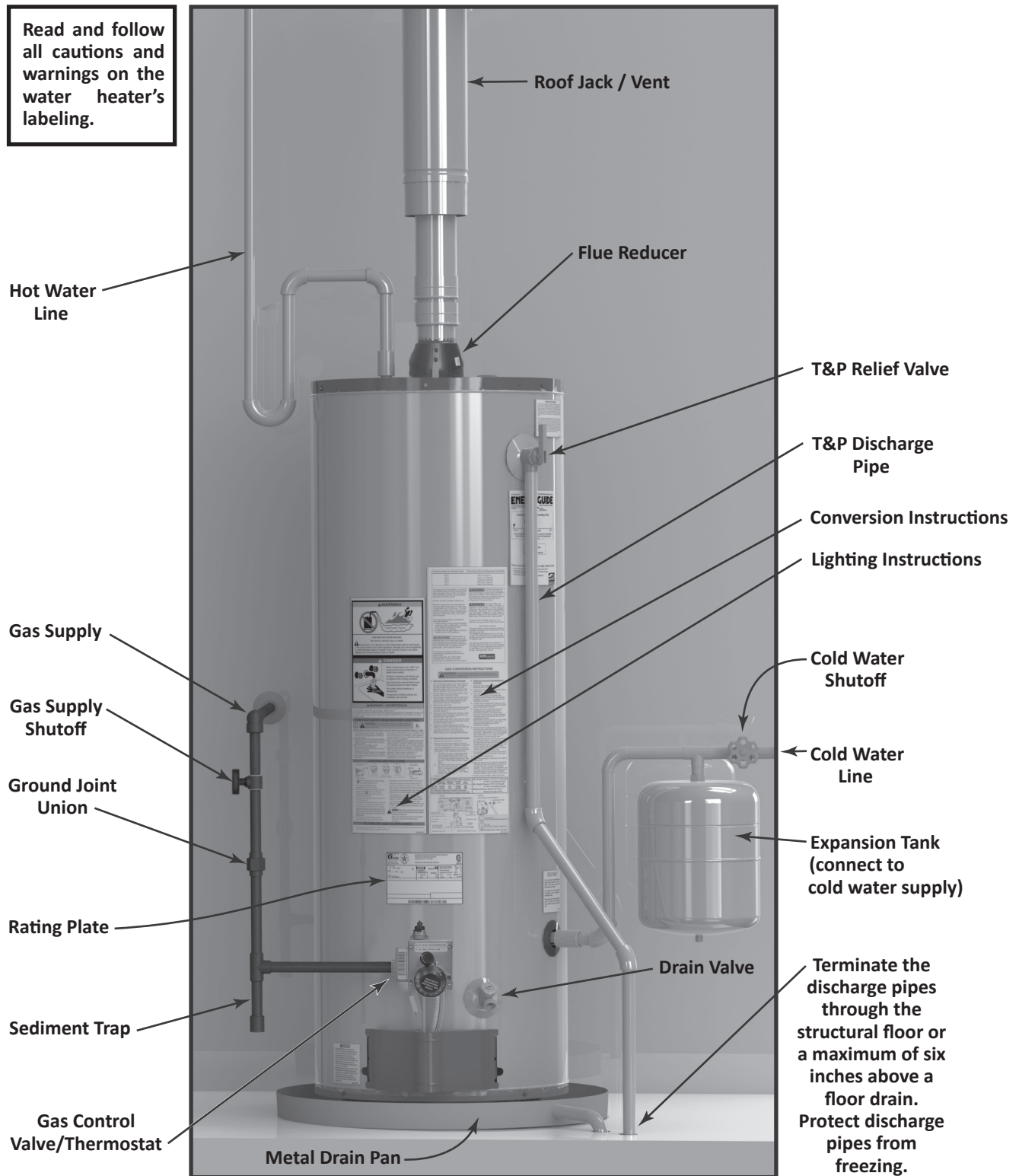


Keep this manual in the pocket on heater for future reference whenever maintenance, adjustment or service is required.

Retain your original receipt as proof of purchase.


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September 2018

COMPLETED INSTALLATION (TYPICAL)



IMPORTANT SAFETY INFORMATION

Read and follow all safety messages and instructions in this manual.



This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible property damage, serious injury or death. Do not remove any permanent instructions, labels, or the rating plate from either the outside of the water heater or on the inside of the access panels. Keep this manual near the water heater.

| | |
|---|--|
|  DANGER | DANGER indicates hazardous situation that, if not avoided, will result in death or serious injury. |
|  WARNING | WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury. |
|  CAUTION | CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. |
| NOTICE | NOTICE indicates practices not related to physical injury. |

⚠ 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.

An odorant is added by the gas supplier to the gas used by this water heater. This odorant may fade over an extended period of time. Do not depend upon this odorant as an indication of leaking gas. We recommend installing a fuel gas and carbon monoxide detector.

Important information to keep

Fill out this section and keep this manual in the pocket of the water heater for reference.

Date Installed:

Model number:

Serial number:

| Maintenance performed:* | Date: |
|-------------------------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

*Drain and flush tank and remove and inspect anode rod after first six months of operation and at least annually thereafter. Operate the Temperature and Pressure Relief Valve (T&P) annually and inspect T&P valve every 2-4 years (see the label on the T&P valve for maintenance schedule). If no label is attached to the T&P Relief Valve, follow the instructions in the T&P Relief Valve Maintenance section of this manual.

See the Maintenance section for more information about maintaining this water heater.

IMPORTANT SAFETY INFORMATION

To reduce the risk of property damage, serious injury or death, read and follow the precautions below, all labels on the water heater, and the safety messages and instructions throughout this manual.

RISKS DURING INSTALLATION AND MAINTENANCE

Lifting Risk



▲ WARNING! The water heater is heavy. Follow these precautions to reduce

the risk of property damage, injuries from lifting or impact injuries from dropping the water heater.

- Use at least two people to lift the water heater.
- Be sure you both have a good grip before lifting.
- Use an appliance dolly or hand truck to move the water heater.



Explosion Risk

▲ WARNING! Read the water heater's rating plate to determine the type of gas required. Failure to follow these instructions can result in serious injury or death from explosion, fire or carbon monoxide poisoning.

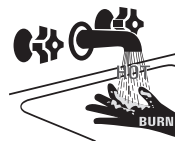
- Do not connect a natural gas water heater to an L.P. gas supply.
- Do not connect an L.P. gas water heater to a natural gas supply.
- Use a new CSA approved gas supply line.
- Install a shut-off valve on the gas supply line.
- Do not use this water heater

with any gas other than the one listed on the original rating plate unless the water heater has been properly converted. Refer to the *Gas Conversion* section of this manual to convert from one gas type to another. See page 23.

Gas Pressure

▲ WARNING! The gas supply pressure must not exceed the maximum supply pressure as stated on the water heater's rating plate. The minimum supply pressure is for the purpose of input adjustment. L.P. gas supply pressure must not exceed 13" water column. Have a qualified person (licensed plumber, gas company personnel, or authorized service technician) check for proper L.P. gas pressure. L.P. gas pressures exceeding 13" water column can result in serious injury or death from explosion or fire.

RISKS DURING OPERATION



Scalding Risk

This water heater can make water hot enough to cause severe burns instantly, resulting in severe injury or death.

- Feel water before bathing or showering.
- To reduce the risk of scalding, install Thermostatic Mixing Valves (temperature limiting valves) at each point-of-use. These valves automatically mix hot and cold water to limit the temperature at the tap. Follow manufacturer's instructions for installation and adjustment of the valves.
- The gas control valve on this water heater has been factory set to its lowest setting to reduce the risk of scalding. Higher temperatures

increase the risk of scalding, but even at 120°F, hot water can scald. If you choose a higher temperature setting, Thermostatic Mixing Valves located at each point-of-use are particularly important to help avoid scalding.

Table 1

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

For information about changing the factory temperature setting, refer to the "Adjusting the Temperature" section in this manual (page 29).

Even if you set the water heater's gas control valve to a low setting, higher water temperatures may occur in certain circumstances:

- In some cases, repeated small draws of water can cause the hot and cold water in the tank to "stack" in layers. If this happens, the water can be as much as thirty degrees hotter than the gas control valve setting. This temperature variation is the result of your usage pattern and is not a malfunction.
- Water temperature will be hotter if someone adjusted the gas control valve to a higher setting.
- Problems with the gas control valve or other malfunctions may

IMPORTANT SAFETY INFORMATION

result in higher than expected water temperatures.

- If the water heater is in a hot environment, the water in the tank can become as hot as the surrounding air, regardless of the temperature setting.
- If the water supplied to the water heater is pre-heated (for example, by a solar system) the temperature in the tank may be higher than the water heater's temperature setting.
- Should overheating occur or the burner fail to shut off, turn off the manual gas supply valve to the water heater and call a qualified person.

To reduce the risk of unusually hot water reaching the fixtures in the house, install Thermostatic Mixing Valves at each point-of-use.

If anyone in your home is at particular risk of scalding (for example, the elderly, children, or people with disabilities) or if there is a local code or state law requiring a certain water temperature at the hot water tap, these precautions are particularly important.

According to a national standard (ASSE 1070) and many local plumbing codes, the water heater's gas control valve should not be used as the sole means to regulate water temperature and avoid scalds.

Properly adjusted Thermostatic Mixing Valves installed at each point-of-use allow you to set the tank temperature to a higher setting without increasing risk of scalds. A higher temperature setting allows the tank to provide much more hot water and can help provide proper water temperatures for appliances such as dishwashers and washing machines. Higher tank temperatures (140°F) also kill bacteria that cause a condition known as "smelly water" and can reduce the levels

of bacteria that cause water-borne diseases.

Water Contamination Risk

Do not use chemicals that could contaminate the potable water supply. Do not use piping that has been treated with chromates, boiler seal, or other chemicals.

Fire Risk



This water heater is equipped with a Flammable Vapor Ignition Resistance (FVIR) system.

FVIR is designed to reduce the risk of flammable vapor-related fires. FVIR makes this product more sensitive to installation errors or improper installation environments. The FVIR system will not prevent a possible fire/explosion if the igniter is depressed and flammable vapors have accumulated in the combustion chamber with the pilot light off.

Do not attempt to light this appliance, or depress the igniter button, if you suspect flammable vapors have accumulated inside or outside the appliance. Immediately call a qualified person to inspect the appliance. Water heaters subjected to a flammable vapors incident will show a discoloration on the flame arrestor and require replacement of the entire water heater. Improper installation or an inadequate air supply can also cause the FVIR system to disable the water heater.

To reduce the risk of a fire that could result in property damage, or serious injury or death:

- Do not store things that can burn easily such as paper or clothes next to the water heater.
- Do not store or use gasoline or other

flammable substances in the vicinity of this or any other appliance.

- Keep the water heater from becoming wet. Immediately shut the water heater off and have it inspected by a qualified person if you find that the wiring, thermostat(s) or surrounding insulation have been exposed to water in any way (e.g., leaks from plumbing, leaks from the water heater itself can damage property and could cause a fire risk). If the water heater is subjected to flood conditions or the thermostat(s) have been submerged in water, the entire water heater must be replaced.
- Replace the water heater's viewport if glass is missing or damaged. Repair the combustion chamber door seals if damaged.



Explosion Risk

High temperatures and pressures in the water heater tank can cause an explosion resulting in property damage, serious injury or death. A new Temperature and Pressure (T&P) Relief Valve is included with your water heater to reduce risk of explosion by discharging hot water. Additional temperature and pressure protective equipment may be required by local codes.

A nationally recognized testing laboratory maintains periodic inspection of the valve production process and certifies that it meets the requirements for Relief Valves for Hot Water Supply Systems, ANSI Z21.22. The T&P Relief Valve's relief pressure must not exceed the working pressure rating of the water heater as stated on the rating plate.

IMPORTANT SAFETY INFORMATION

Maintain the T&P Relief Valve properly. Follow the maintenance instructions provided by the manufacturer of the T&P Relief Valve (label attached to T&P Relief Valve). If no label is attached to the T&P Relief Valve, follow the instructions in the T&P Relief Valve Maintenance section of this manual. An explosion could occur if the T&P Relief Valve or discharge pipe is blocked. Do not cap or plug the T&P Relief Valve or discharge pipe.

Fire and Explosion Risk if Hot Water is Not Used for Two Weeks or More.

▲ CAUTION! Hydrogen gas builds up in a hot water system when it is not used for a long period (two weeks or more). Hydrogen gas is extremely flammable. If the hot water system has not been used for two weeks or more, open a hot water faucet for several minutes at the kitchen sink before using any electrical appliances connected to the hot water system. If hydrogen is present there will probably be an unusual sound such as “air” escaping through the pipe as hot water begins to flow. Do not smoke or have an open flame or other ignition source near the faucet while it is open.

Carbon Monoxide Risk

▲ WARNING! This water heater operates by burning gas.



Carbon monoxide is a colorless, odorless gas that is a by-product of burning of fuels such as coal, wood, charcoal, oil,

kerosene, propane, and natural gas. Breathing excessive and abnormal amounts of carbon monoxide can cause carbon monoxide poisoning,

resulting in serious injury or death. **This water heater must be supplied with adequate combustion air and must be properly vented to the outdoors. Have a qualified person (licensed plumber, authorized gas company personnel, or authorized service technician) install the venting system using these installation instructions as well as those provided by the roof jack manufacturer.**

- Install a fuel gas and carbon monoxide detector in the living areas of your home.
- Do not install this water heater in the occupied space of the manufactured (mobile) home.
- Failure to follow these instructions can result in serious injury or death from carbon monoxide poisoning.



Burn Risk

This water heater's venting system can become hot enough to burn. Do not touch the venting system while water heater is on, or until the water heater is turned off and the venting allowed to cool.

Installation Accessories

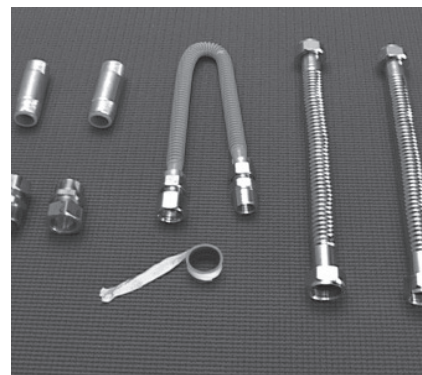


Figure 1: Gas Water Heater Hook-Up Kit

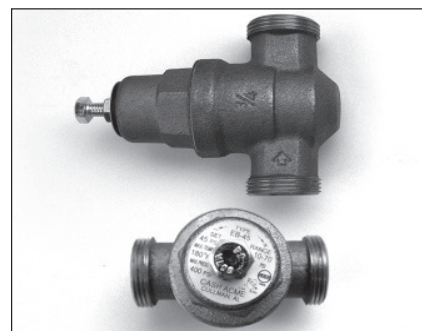


Figure 2: Install a Pressure Reducing Valve set to 50 to 60 PSI.

GETTING STARTED

1 Review all of the instructions before you begin work. Improper installation can damage the water heater, your home and other property, and can present risks of serious injury or death.

2 This water heater is design-certified by CSA International as a Category I, non-direct vented water heater which takes its combustion air through openings in an enclosure. (See *Enclosure Installation Requirements*.) This water heater must be installed according to all local and state codes or, in the absence of local and state codes, the “National Fuel Gas Code”, ANSI Z223.1(NFPA 54)-current edition. This is available from the following:

CSA America, Inc.
8501 East Pleasant Valley Road
Cleveland, OH 44131

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02269

Manufactured home manufacturers: The installation must conform to *The Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280*. This standard is available through the U.S. Department of Housing and Urban Development (HUD), 451 7th Street S.W., Washington D.C. 20410.

Check with local code officials about codes governing this installation. Have your installation inspected by a code official to ensure the installation meets all local codes.

NOTICE: If you lack the necessary skills required to properly install this water heater, or you have difficulty following the instructions, you should not proceed but have a qualified person perform the installation of this water heater.

Massachusetts code requires this water heater to be installed in accordance with Massachusetts 248-CMR 2.00 and 248-CMR 5.00: State Plumbing Code. Other local and state authorities may have similar requirements or other codes applicable to the installation of this water heater.

NOTICE: The state of California requires bracing, anchoring, or strapping the water heater to avoid its moving during an earthquake. Contact local utilities for code requirements in your area, visit <http://www.dsa.dgs.ca.gov>, or call 1-916-445-8100 and request instructions. Other locations may have similar requirements. Check with your local and state authorities.

3 Before you start, be sure you have the following tools and supplies:

- Common plumbing tools (depending on what type of water pipes you have).
- Thread sealant tape or pipe joint compound approved for potable water.
- For homes with copper pipes, you may purchase a Gas Water Heater Hook-Up Kit (available at your local hardware store) with compression fittings that don't require soldering. This kit includes two 12" flex water lines, two compression fittings, an 18" flexible gas line, two nipples, and thread sealant tape.
- For homes with plastic pipe, use threaded connectors suitable for the specific type of plastic pipe used: CPVC or PEX (cross-linked polyethylene). Do not use PVC pipe.
- Non-corrosive gas leak detection solution made from hand dishwashing soap mixed with water

(1 part soap to 15 parts water) or children's soap bubbles and a small, soft-bristled brush.

- An appliance dolly or hand truck to move the water heater.

Recommended Accessories:

- A metal drain pan.
- Automatic water leak detection and shut-off device.
- Pressure Reducing Valve.
- Thermal Expansion Tank.
- Thermostatic Mixing Valves at each point-of-use.
- Fuel gas and carbon monoxide detector.

4 Review the following requirements and recommendations before installing the water heater.

Vent System Requirements

▲ WARNING! Carbon Monoxide Hazard. This water heater must be supplied with adequate air and vented to outdoors. The vent system must be installed by a qualified person. Examples of a qualified person include gas technicians, authorized gas company personnel, and authorized service technicians. Failure to properly vent the water heater can result in severe injury or death from carbon monoxide poisoning.

To reduce the risk of carbon monoxide poisoning, install a fuel gas and carbon monoxide detector. Install and maintain the detector in accordance with the manufacturer's instructions and local codes.

This water heater uses a direct vented,

GETTING STARTED

single-pipe vent system to remove exhaust gases created by the burning of fossil fuels. Air for combustion is ducted in from the outside (see *Enclosure Installation Requirements*).

This water heater must be properly vented for the removal of exhaust gases to the outside atmosphere. Correct installation of the vent pipe system is mandatory for the proper and efficient operation of this water heater and is an important factor in the life of the unit.

The vent pipe must be installed according to all local and state codes or, in the absence of local and state codes, the *National Fuel Gas Code*, ANSI Z223.1 (NFPA 54)-current edition. Manufactured home manufacturers must conform with *The Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280*. The vent pipe installation must not be obstructed so as to prevent the

removal of exhaust gases to the outside atmosphere.

IMPORTANT:

- Do not use a vent damper anywhere in the vent system of this water heater.
- DO not common vent this water heater with any other appliance.
- This water heater must have a properly-installed draft hood and be connected to a listed roof jack that terminates to the outdoors. The roof jack vent pipe must be secured to the flue reducer with sheet metal screws. (Roof jack not furnished.)

The following roof jack models are certified for use with this water heater and are available from your water heater supplier:

Roof Jack for roof pitch of 7-12 or less:

| TABLE 2 | |
|------------|---|
| KIT NUMBER | MAXIMUM LENGTH BETWEEN ROOF AND CEILING |
| 100285331 | 12" |
| 100285333 | 32" |
| 100285412 | 60" |
| 100285414 | 95" |

Install the roof jack according to its manufacturer's instructions.

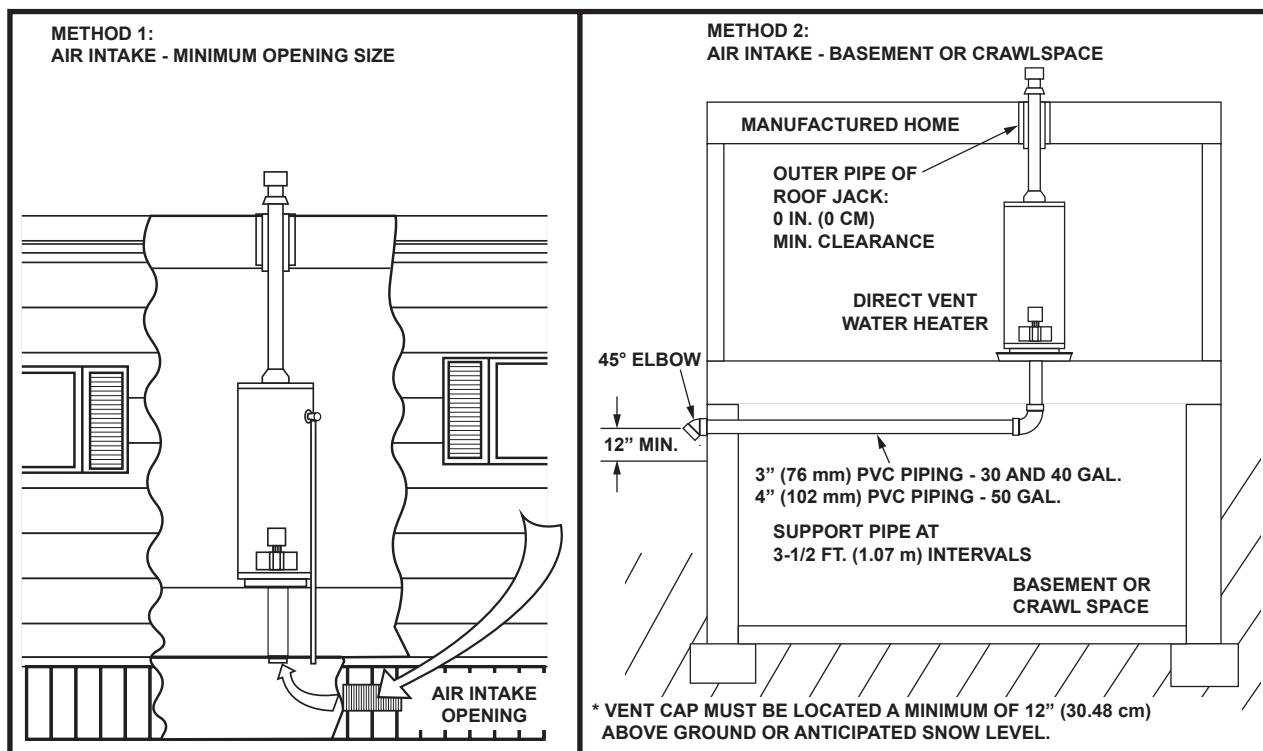


Figure 3: Enclosure Configurations

Enclosure Installation Requirements

▲ WARNING! Do not store or use flammable materials, vapors, or liquids in the water heater enclosure. Do not use the enclosure as a storage area.

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

This manufactured home gas-fired water heater is for use in a manufactured home. You should carefully choose an indoor location for the new water heater, because the placement is a very important consideration for the safety of your occupants in the building and for the most economical use of the appliance. This water heater is for use only in a manufactured home and not intended for outdoor installation.

NOTICE: This water heater has been designed and certified as a direct vent (sealed combustion) unit and no draft diverter is to be used.

Minimum clearances between the water heater and combustible surfaces are stated on the label adjacent to the gas control valve/thermostat. The water heater is certified for installation on a combustible floor. Minimum vent clearances: 6" (15.2 cm). Provide 24" (61 cm) front clearance for servicing and adequate clearance between the jacket top and ceiling for servicing the flue area. Roof jack: surface of outer pipe has a minimum clearance of 0" (0 cm).

The combustion and ventilation air flow must not be obstructed.

Combustion air shall not be supplied from occupied spaces. Instead, combustion air must be supplied from outside the manufactured home by way of the furnished air intake duct assembly. The air intake duct assembly is 3" (7.62 cm) in diameter for 30 and 40 Gallon models or 4" (10.2 cm) in diameter for 50 Gallon models.

The following methods may be used to provide sufficient combustion and ventilation air to the water heater when it is installed in the enclosure. See Figure 3: Enclosure Configurations.

IMPORTANT:

A 3-1/2" (8.89 cm) diameter floor opening beneath the water heater is required to accommodate the air intake duct assembly for 30 and 40 Gallon models. A 4-1/2" (11.43 cm) diameter floor opening is required beneath the water heater for 50 Gallon models. The weight of the water heater itself seals the water heater to the air intake duct assembly.

Method 1

When a manufactured home is skirted, an air intake opening with a minimum free area of 32 square inches (206.45 cm²) must be provided in the skirt. If the opening is covered by louvers or screen, the total free area must be 32 square inches (206.45 cm²). Other gas fired appliance in the home will require additional free air openings; consult these manufacturers for correct sizing. See Figure 3.

Method 2

If the manufactured home is installed over a basement or crawlspace, combustion air must be supplied from outside the manufactured home. The combustion air intake piping can be 3" (76 mm) PVC for 30 and 40 gallon

models and 4" (102 mm) PVC for 50 Gallon models. The air intake piping cannot exceed the lengths shown in Table 3 (page 19), including vertical and horizontal runs, or have more than 3 elbows. All horizontal runs require adequate support at 3-1/2 foot (1.07 m) intervals. See Figure 3

IMPORTANT: The drain pan must not cover any portion of the air intake opening in the floor.

Also, if the manufactured home is skirted, an air intake opening with a minimum free area of 32 square inches must be provided in the skirt. Other gas fired appliances in the home may require additional free air openings. Consult the manufacturers for correct sizing.

IMPORTANT:

- The water heater must be secured with brackets/straps as described in *Securing the Water Heater*, page 16.
- A discharge line must be installed as described in the typical installation graphic. See *COMPLETED INSTALLATION (TYPICAL)*, page 2.
- There must be adequate space (clearances) for periodic servicing (e.g., a minimum of 24 inches of front clearance). The installation must allow a minimum clearance from combustible surfaces as stated on the rating plate.
- It is recommended that the water heater be installed in a metal drain pan. The drain pan should be piped to an adequate drain or through the structural floor of the enclosure.
- Do not obstruct the combustion and ventilation air openings.
- If the water heater is installed directly

GETTING STARTED

on carpeting, it shall be installed on a metal or wood panel extending beyond the full width and depth of the water heater by at least 3 in (76.2mm) in any direction. If the water heater is installed in an alcove or closet, the entire floor shall be covered by the aforesaid panel.

- Prevent the water lines and discharge lines from freezing.

General Requirements

- The water heater shall not be installed in the occupied space of the manufactured (mobile) home.
- Inspect and maintain your water heater in accordance with this manual's instructions. Inspect the drain pan, pipes, and surrounding area regularly and fix any leaks found.

Gas Piping Requirements

Gas piping must be installed according to local and state codes or, in the absence of local and state codes, the *National Fuel Gas Code*, ANSI Z223.1(NFPA 54)-current edition. Manufactured home manufacturers must conform with *The Manufactured Home Construction and Safety Standard*, Title 24 CFR, Part 3280.

NOTICE: When installing gas piping, apply pipe joint compound or thread sealant tape approved for fuel gases.

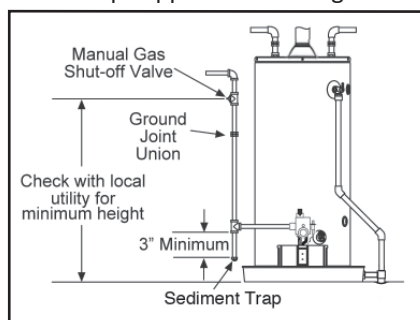


Figure 4: Gas Piping

1. Install a readily accessible manual shut-off valve in the gas supply line as recommended by the local utility. Know the location of this valve and how to turn off the gas to this unit.
2. Install a Sediment Trap as shown in the Gas Piping figure (page 10). The Sediment Trap must be no less than three inches long for the accumulation of dirt, foreign material, and water droplets.
3. Install a ground joint union between the gas control valve and the manual gas shut-off valve. This is to allow easy removal of the gas control valve.
4. Turn the gas supply on and check for leaks. Use a small, soft-bristled brush to apply a hand dishwashing soap and water mixture (1 part soap to 15 parts water) or children's soap bubbles to all connection points of the gas piping. Saturate all the connections and check for gas leaks (which will appear as small bubbles). If any leaks are detected, tighten the appropriate connection(s) and re-check.

Gas Pressure

NOTICE: When testing gas pipes with a test pressure of more than ½ psi (3.5 kPa), disconnect the gas line at the manual shut off valve and cap the gas line. Do not subject the water heater's gas control valve or manual shut off valve to more than ½ psi (3.5 kPa) pressure for any reason. If you are pressure testing the gas line with test pressure of ½ psi (3.5 kPa) or less, you may isolate the water heater from the gas line by closing the manual shut off valve.

LP Gas Only

Liquefied petroleum gas is over 50% heavier than air and in the occurrence of a leak in the system, the gas will settle at floor level. Basements, crawl spaces, skirted areas under mobile homes (even when ventilated), closets and areas below ground level will serve as pockets for the accumulation of gas.

Before lighting an L.P. gas water heater, smell all around the appliance at floor level. If you smell gas, do not attempt to light the water heater. Follow the instructions as given in the warning on the front cover of this manual.

When your L.P. tank runs out of fuel, turn off the gas at all gas appliances including pilot lights. After the tank is refilled, all appliances must be re-lit according to their manufacturer's instructions.

▲ WARNING! Have a qualified person make sure that the L.P. gas operating pressure does not exceed 13" water column. Examples of a qualified person include: licensed plumbers, authorized gas company personnel, and authorized service personnel. Failure to do so can result in death, explosion, or fire.

INSTALLATION

Step 1:

✓ Verify that your home is equipped and up-to-date for proper operation

Installing a new water heater is the perfect time to examine your home's plumbing system and make sure the system is up to current code standards. There have likely been plumbing code changes since the old water heater was installed. We recommend installing the following accessories and any other needed changes to bring your home up to the latest code requirements. Updating your plumbing system can help extend the life of your water heater, avoid damage to your home and property, and reduce the risk of serious injuries or death. Inspect your home and install any devices you need to comply with current codes and assure that your new water heater performs at its best. Check with your local plumbing official for more information.

✓ Water pressure

Most codes allow a maximum incoming water pressure of 80 psi (we recommend a working pressure no higher than 50-60 psi). Check your home's water pressure with a pressure gauge and adjust if necessary. High water pressure can damage the water heater, piping, and other appliances.

HOW: Purchase an inexpensive water pressure gauge at your local plumbing supplier. Connect the water pres-

sure gauge to an outside faucet and measure the maximum water pressure experienced throughout a 24-hour period (highest water pressures often occur at night).

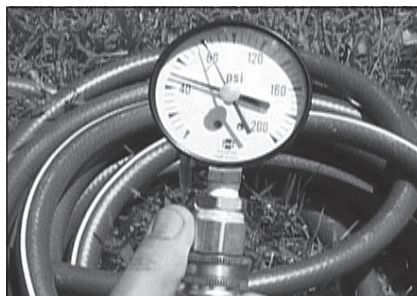


Figure 5: Use a Water Pressure Gauge to make sure your home's water pressure is not too high.

To adjust your home's water pressure: Locate your home's Pressure Reducing Valve (PRV) on the main incoming (cold) water supply line and adjust the water pressure control to between 50 and 60 psi. If your home does not have a Pressure Reducing Valve, install a PRV on the home's main water supply line and set it to between 50 and 60 psi. Pressure Reducing Valves are available at your local plumbing supplier.

BACKGROUND: Over the years, many utilities have increased water supply pressures so they can serve more homes. In some homes today, pressures can exceed 100 psi. High water pressures can damage water heaters, causing premature leaks. If you have replaced toilet valves, had a water heater leak, or had to repair appliances connected to the plumbing system, pay particular attention to your home's water pressure. When purchasing a PRV, make sure the PRV has a built-in bypass.

✓ Water pressure increase caused by thermal expansion

Verify that you have a properly sized Thermal Expansion Tank. We recommend installing an expansion tank if your home does not have one. Plumbing codes require a properly pressurized, properly sized Thermal Expansion Tank in almost all homes.



Figure 6: A Thermal Expansion Tank helps protect the home's plumbing system from pressure spikes.

HOW: Connect the Thermal Expansion Tank (available at most hardware stores.) to the cold water supply line near the water heater. The expansion tank contains a bladder and an air charge. To work properly, the Thermal Expansion Tank must be sized according to the water heater's tank capacity and pressurized to match the home's incoming water pressure. Refer to the instructions provided with the Thermal Expansion Tank for installation details.

BACKGROUND: Water expands when heated, and the increased volume of water must have a place to go, or thermal expansion will cause large increases in water pressure (despite

INSTALLATION

the use of a Pressure Reducing Valve in the home's main water supply line). The Safe Drinking Water Act of 1974 requires the use of backflow preventers and check valves to restrict water from your home reentering the public water system. Backflow preventers are often installed in water meters and may not be readily visible. As a result, most all plumbing systems today are now "closed," and almost all homes now need a Thermal Expansion Tank.

A Thermal Expansion Tank is a practical and inexpensive way to help avoid damage to the water heater, washing machine, dishwasher, ice maker, and even toilet valves. If your toilet occasionally runs for no apparent reason (usually briefly at night), that may be due to thermal expansion increasing the water pressure temporarily.

Water Pipe and Tank Leaks

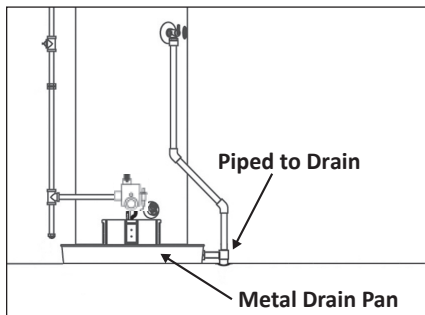


Figure 7: A metal drain pan piped through the floor to the outside (or to an adequate drain) can help protect flooring from leaks and drips.

Leaks from plumbing pipes or from the water heater itself can damage property and could cause a fire risk.

- Install an automatic leak detection and shutoff device (available at your

local plumbing supplier). These devices can detect water leaks and can shut off the water heater's water supply if a leak occurs.

- Install a metal drain pan (available at your local plumbing supplier) under the water heater to catch condensation or leaks from the piping connections or tank. Most codes require, and we recommend, installing the water heater in a metal drain pan that is piped through the floor to the outside or to an adequate drain. The drain pan must be at least two inches wider than the diameter of the water heater. Install the drain pan so the water level would be limited to a maximum depth of 1-3/4". The pan must not restrict air flow to the burner.

Water Temperature Regulation

Install Thermostatic Mixing Valves to regulate the temperature of the water supplied to each point-of-use (for example, kitchen sink, bathroom sink, bath, shower). Install and adjust the mixing valve according to its manufacturer's instructions.

▲ WARNING! Even if the water heater's thermostat is set to a relatively low temperature, hot water can scald. Install Thermostatic Mixing Valves at each point-of-use to reduce the risk of scalding.



Figure 8: Thermostatic Mixing Valves installed at each point-of-use can help avoid scalding

BACKGROUND: A Thermostatic Mixing Valve, installed at each point-of-use, mixes hot water from the water heater with cold water to more precisely regulate the temperature of hot water supplied to fixtures. If you aren't sure if your plumbing system is equipped with properly installed and adjusted Thermostatic Mixing Valves at each point where hot water is used, contact a qualified person.

Step 2:

Ensure that the enclosure is prepared for installation

▲ WARNING! Do not store or use flammable materials, vapors, or liquids in the same location where this water heater is installed.

Before installing your water heater, ensure that the water heater can be:

- Installed in an enclosure that meets the requirements outlined in *Enclosure Installation Requirements* (page 9).
- Protected from freezing.
- Set in a metal drain pan piped to an adequate drain.

INSTALLATION

- Provided with adequate space (clearances) for periodic servicing. (There must be a minimum of 24 inches of front clearance.)
- Installed with a minimum clearance from combustible surfaces as stated on the rating plate.
- Installed on a floor that can support the weight of a water heater full of water.
- A 3-1/2" (8.89 cm) diameter floor opening beneath the water heater is required to accommodate the air intake duct assembly for 30 and 40 Gallon models. A 4-1/2" (11.43 cm) diameter floor opening is required beneath the water heater for 50 Gallon models. The weight of the water heater itself seals the water heater to the air intake duct assembly.

NOTICE: The state of California requires bracing, anchoring, or strapping the water heater to avoid its moving during an earthquake. Contact local utilities for code requirements in your area, visit <http://www.dsa.dgs.ca.gov>, or call 1-916-445-8100 and request instructions. Other locations may have similar requirements. Check with your local and state authorities. See also *Securing the Water Heater* (page 16).

Step 3:

Removing the old water heater

- 1 Read each installation step and decide if you have the necessary skills to install the water heater. Only proceed if you are comfortable you can safely perform the work. If you are

not sure, have a qualified person perform the installation.

- 2 On the old water heater, turn the control knob on the gas control valve to the OFF position.

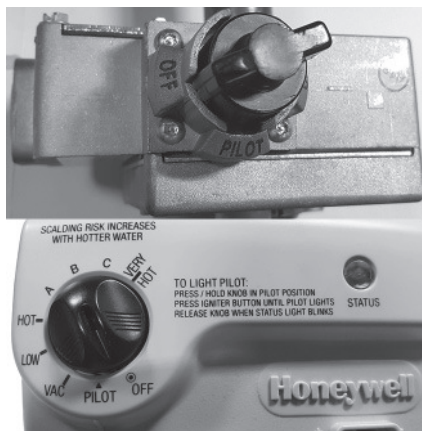


Figure 9: Turn gas control/temperature knob OFF.

- 3 Turn the manual gas valve for the water heater's supply line OFF.
- 4 Open a hot water faucet and let the hot water run until it is cool. (This may take 10 minutes or longer.)



Figure 10: Let the hot water run until it is cool.

▲ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

- 5 Connect a garden hose to the drain valve and place the other end of the hose in a

drain, outside, or in buckets. (Sediment in the bottom of the tank may clog the valve and prevent it from draining. If you can't get the tank to drain, contact a qualified person.)

- 6 Turn the cold water supply valve OFF.

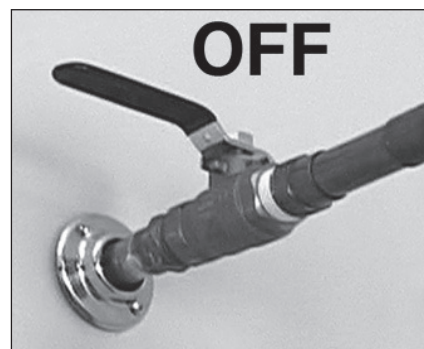


Figure 11: Cold water supply in off position.

- 7 Using a standard flat-blade screwdriver, open the drain valve. Sediment build up in the bottom of the water heater may hinder or prevent draining.



Figure 12: Draining the old water heater.

- 8 Also open a hot water faucet to help the water in the tank drain faster.
- 9 When the tank is empty, disconnect the Temperature & Pressure (T&P) Relief Valve discharge pipe. You may be able to reuse the discharge pipe, but do not reuse the old T&P Relief Valve. A new T&P Relief Valve comes with your new water heater.

INSTALLATION



Figure 13: Removing the T&P Relief Valve discharge pipe.

- 10** Allow the vent pipe (roof jack) and draft hood to cool. Once cooled, disconnect the vent pipe from the draft hood. You may need to support the vent pipe until the new water heater is in place.



Figure 14: Disconnect the vent pipe (roof jack) from the draft hood.

- 11** Disconnect the water pipes. Many water pipes are connected by a threaded union which can be disconnected with wrenches. If you must cut the water pipes, cut the pipes close to the water heater's inlet and outlet connections, leaving the water pipes as long as possible. If necessary, you can make them shorter later when you install the new water heater.

- 12** Confirm the manual gas valve for the water heater's supply line is turned off. Disconnect the gas line from the water heater's gas control valve and cap it.

- 13** Remove the old water heater. Use an appliance dolly or hand truck to move the water heater.

⚠ WARNING! Use two or more people to remove or install a water heater. Failure to do so can result in back or other injury.

Step 4:

Installing the New Water Heater

- 1** Completely read all instructions before beginning. If you are not sure you can safely complete the installation, seek assistance from any of the following sources:
- Schedule an appointment with a qualified person to install your water heater.
 - Contact the manufacturer listed on the water heater's rating plate.
- 2** Locate the position of the 3-1/2" (8.9 cm) or 4-1/2" (11.4 cm) hole to be cut in the floor, see Figures 15 and 16.

- 3** Set the water heater in place taking care not to damage the drain pan. When installing directly on carpet, the water heater must be installed on a wood or metal base that extends beyond the dimensions of the water heater (width and depth) by at least 3 inches (76.2 mm) in any direction. If the water heater is installed on carpet in an alcove or closet, the entire floor must be covered by a wood or metal panel.
- NOTICE:** Most codes require setting the water heater in a metal drain pan piped to an adequate drain or external to the structure. The drain pan helps avoid property damage which may occur from condensation or leaks in the piping connections or tank. The drain pan must be at least two inches wider than the diameter of the water heater. Install the drain pan so the water level is limited to a maximum depth of 1-3/4".

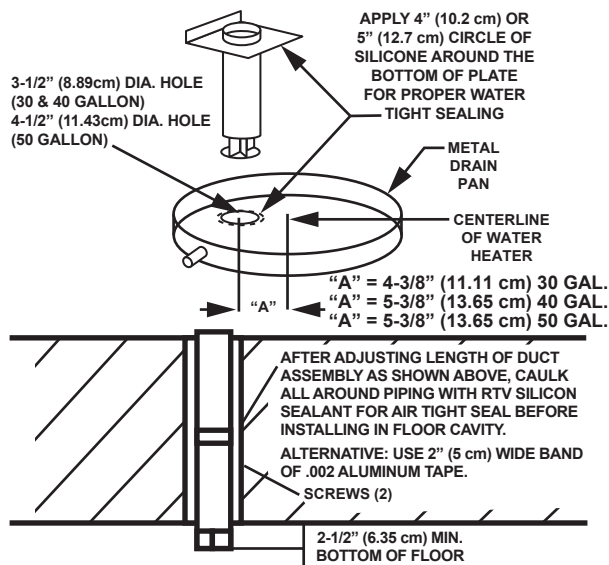


Figure 15: Air Intake Duct Sizing Dimensions

INSTALLATION

4 Verify that the water heater is set in place properly. Check that:

- There is adequate space to install the T&P Relief Valve discharge pipe and that it can be piped to a separate drain (and not into the drain pan).
- There is adequate access and space around the water heater for future maintenance.

The water heater is installed vertically.

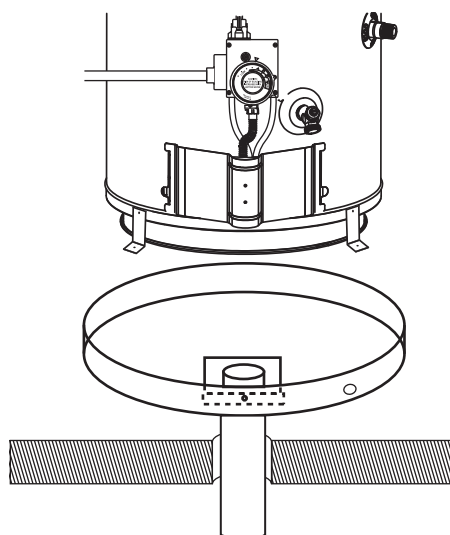


Figure 16: Air Intake Duct Installation - Drain Pan

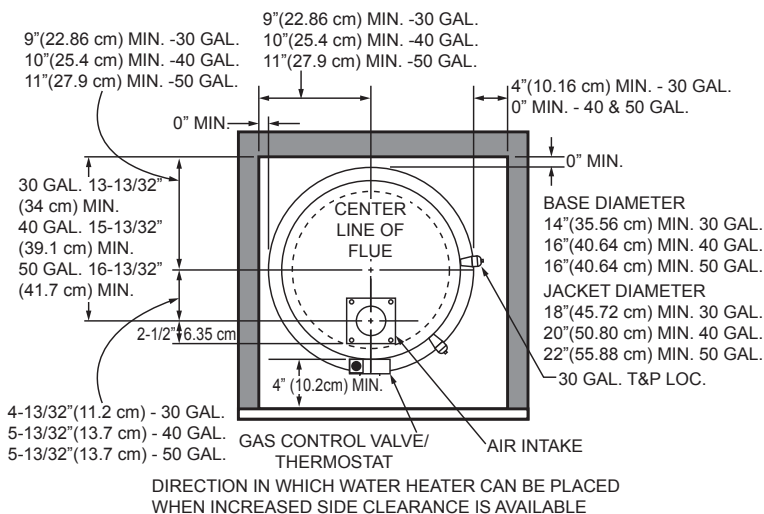


Figure 17: Water Heater Installation - Enclosure

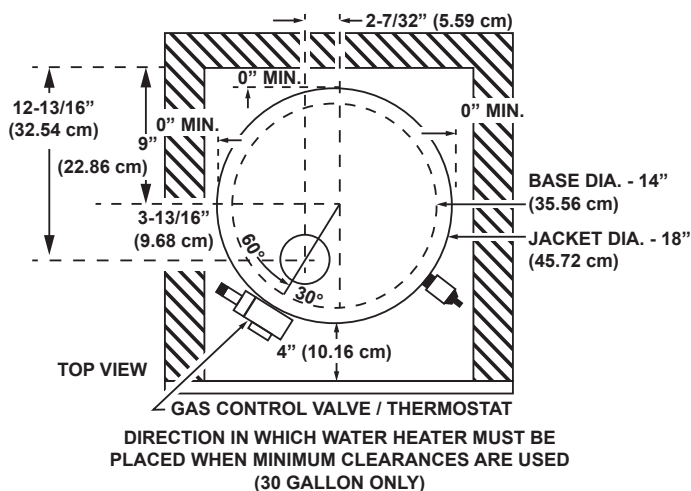


Figure 18: Water Heater Installation - Enclosure Alternate Position

INSTALLATION

- 5** Insert the duct assembly as shown in Figure 19 with lip facing forward, and using only nails, secure the duct assembly to the floor.

APPLY 4" (10.16 cm) OR 5" (12.7 cm) CIRCLE OF SILICONE AROUND OPENING FOR AIR TIGHT SEAL.

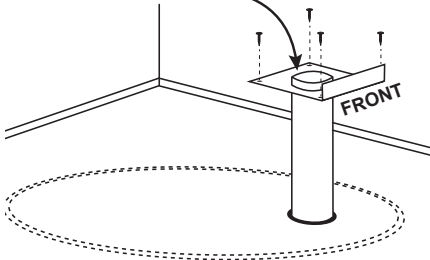


Figure 19: Air Intake Duct Sizing Installation

- 6** Set the water heater in place against the lip of the duct assembly as shown in Figure 20.

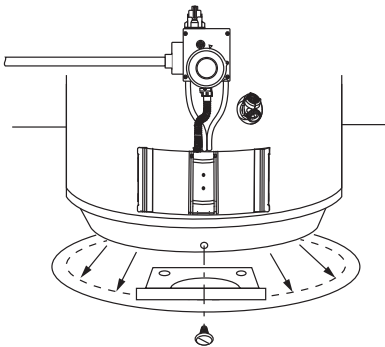


Figure 20: Setting the Water Heater in place.

- 7** Secure the water heater to the duct assembly using the screw provided.

NOTICE: See pages 17 and 18 for installing an air intake through an outside wall when the manufactured home is located over a basement or crawl space.

SECURING WATER HEATER TO THE FLOOR AND WALL (USE METHOD A OR B)

The water heater must be secured to the floor and to the wall of the enclosure.

METHOD A: use the three mounting brackets and screws packaged in the carton with the water heater. The two small brackets are used to attach the water heater to the floor and the one large bracket is used to secure the top of the water heater to the wall.

METHOD B: use metal tape also called “plumbers tape” to secure the water heater to the enclosure. See the figure below as reference for attaching the tape.

Because of installation variances, these brackets can be located at any points around the circumference of the jacket. When the bracket locations are determined, use a 1/8 inch SAE drill bit to set a pattern. Drill only through the outer jacket of the water heater. Then using the screws provided, secure the bracket to the water heater, floor and wall. See Figure 21.

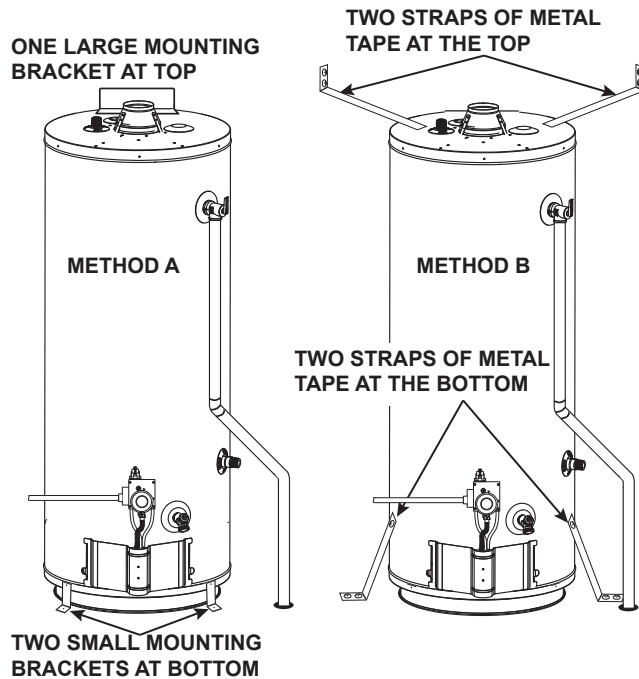


Figure 21: Methods to secure the water heater

INSTALLATION

MANUFACTURED HOME INSTALLED OVER BASEMENT OR CRAWL SPACE - AIR INTAKE THROUGH AN OUTSIDE WALL

ALL 30 AND 40 GALLON MODELS

3" (76 mm) PVC Schedule 40 intake air vent piping:

Optional Kit No. 100109072 contains a 3" (76 mm) PVC Schedule 40-45° vent cap with screen and two 3" (76 mm) wall collars.

ALL 50 GALLON MODELS

4" (102 mm) PVC Schedule 40 intake air vent piping:

Optional Kit no. 100109073 contains a 4" (102 mm) PVC Schedule 40-45° vent cap with screen and two 4" (102 mm) wall collars.

ALL MODELS

1. PVC, ABS or CPVC Schedule 40 piping and fittings are acceptable materials for the air intake vent system.
2. The intake air vent system must terminate horizontally to the outdoors.
3. Remove the screws which attach the wind baffle to the existing metal air intake vent pipe underneath the home. Discard the wind baffle and screws. See Figure 22.

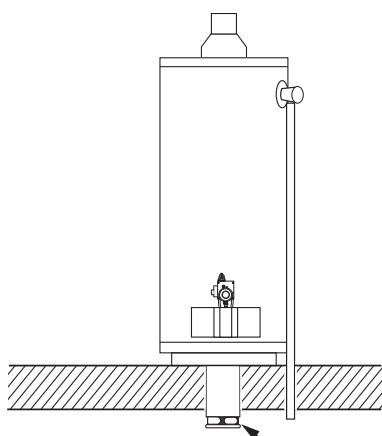


Figure 22: Wind Baffle

4. Attach a 3" (76 mm) or 4" (102 mm) PVC street elbow to the metal air intake vent using 3 sheet metal screws. Continue PVC piping to outside wall and terminate with vent cap and screen. See Figure 23 and Table 3.

3" (76 mm) size - 30 and 40 gallon models.

4" (102 mm) size - 50 gallon models.
See pages 13 and 14 for cementing instructions.

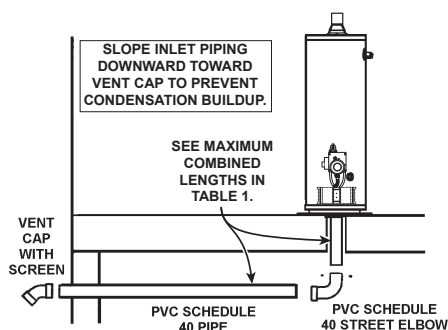


Figure 23: Inlet Air Installation

NOTICE: Vent cap must be located a minimum of 12" (30.48 cm) above the ground or anticipated snow level.

| Table: 3 | | | |
|--------------|-----|------------|----------------------------------|
| Water Heater | Gas | Vent Dia. | Do Not Exceed: |
| 30 Gal | NAT | 3" (76mm) | 17 ft. (5.18 m) length; 3 elbows |
| 30 Gal | LP | 3" (76mm) | 12 ft. (3.66 m) length; 3 elbows |
| 40 Gal | NAT | 3" (76mm) | 30 ft. (9.1 m) length; 3 elbows |
| 40 Gal | LP | 3" (76mm) | 20 ft. (6.1 m) length; 3 elbows |
| 50 Gal | NAT | 4" (102mm) | 30 ft. (9.1 m) length; 3 elbows |
| 50 Gal | LP | 4" (102mm) | 30 ft. (9.1 m) length; 3 elbows |

5. Vertical and horizontal runs must be securely supported at 3-1/2 foot (1.07 m) intervals. See Figure 20.

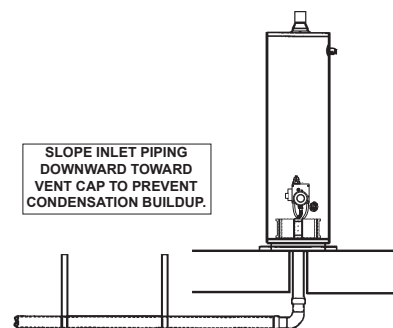


Figure 24: Inlet Air Pipe Supports

6. The intake air vent piping can be installed with no more than 3 elbows. See Figure 25.

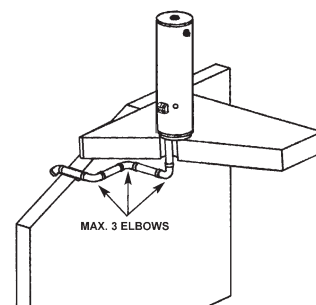


Figure 25: Air Intake

INSTALLATION

CUTTING OPENING THROUGH AN OUTSIDE WALL AND COLLAR INSTALLATION

Determine the location for the opening in the wall. For a 30 or 40 gallon model, cut a 3-3/4" (9.5 cm) hole through the outside wall. For a 50 Gallon model, cut a 4-3/4" (12 cm) hole through the outside wall.

The 3" (76 mm) or 4" (102 mm) 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" (3.81 cm) through the exterior wall. Note that the inside collar 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. See Figure 26.

INSTALLATION SHOWING USE OF PVC, ABS OR CPVC PIPE

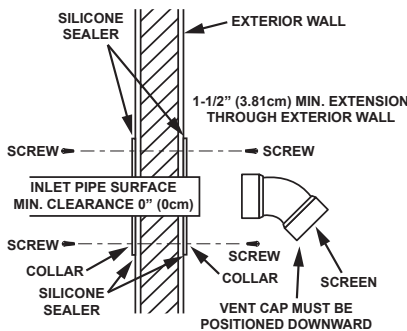


Figure 26: Outside Wall Inlet Air Installation

NOTICE: Wall collars are for aesthetic purposes and are not required for the heater to operate.

CEMENTING PVC, ABS OR CPVC PIPE AND FITTINGS

Read and observe all safety information printed on primer, cleaner, and cement containers.

Primer, cleaner, and cements are extremely flammable. They are harmful or fatal if swallowed. The vapors are harmful. They may irritate eyes and skin and can be absorbed through the skin.

Always store primer, cleaner, and cements in cool, dry, well ventilated places. Keep containers closed. Use them in well ventilated areas. Wear impervious clothing while handling. Do not smoke, eat, or drink while handling. Wash thoroughly after handling and before eating. Wear eye protection when handling. If swallowed, drink water, do not induce vomiting, and call a physician or poison control center immediately. If inhaled, get fresh air and seek medical attention if ill feelings persist. In case of eye and skin contact, immediately flush with plenty of water for 15 minutes and seek medical attention if irritation persists. **KEEP OUT OF REACH OF CHILDREN.**

All primers, cleaners, and cements must meet all local codes and applicable standards of the American Society For Testing Materials Standards.

Before using primers, cleaners and cements, stir or shake, making sure contents are liquid. Do not use if found to be lumpy or jelly-like.

1. Cut pipe ends squarely removing all burrs and dirt.
2. Dry fit pipe and fittings to be connected for proper fit.

3. Clean pipe and fitting with primer/cleaner.
4. Apply a thin coat of cement to fitting, avoiding puddling inside.
5. Apply a liberal coat of cement to pipe, leaving no voids.
6. **QUICKLY** assemble parts while cement is fluid! If you wait too long, recoat pipes.
7. Push pipe completely into socket of fitting, turning as it goes until it bottoms.
8. Hold pipe and fitting together for 30 seconds. Then carefully clean off excess with a cloth. Allow connections a sufficient time to cure before disturbing.
9. Remember that vent pipes must be adequately and securely supported.

| TABLE 4: APPROX. SETTING TIME FOR 2-1/2" (63.5mm) TO 4" (102mm) PIPE JOINTS | | |
|---|-------------------|--------------|
| | MOVEMENT OF JOINT | COMPLETE SET |
| 90°F (32.2°C) TO 150°F (65.6°C) | 3/4HR. | 8 HRS. |
| 50°F (10°C) TO 90°F (32.2°C) | 1 HR. | 15 HRS. |
| 0°F (-17.77°C) TO 50°F (10°C) | 1-1/3 HR. | 18 HRS. |

INSTALLATION

ROOF JACK KIT MODELS VENT KIT- 12 INCH (100288331), VENT KIT - 32 INCH (100285333), VENT KIT - 60 INCH (100285412) AND VENT KIT - 95 INCH (100285414)

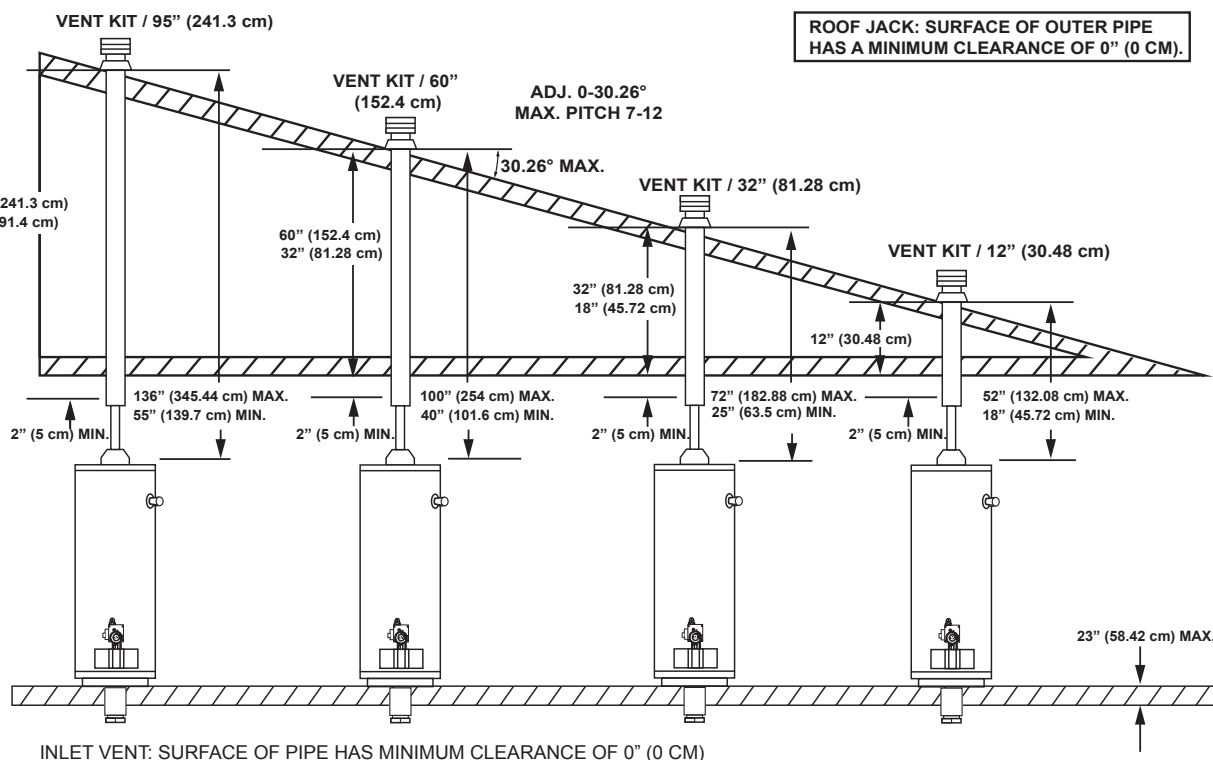


Figure 27: Roof Jack Installation

| TABLE 5: ROOF JACK KITS | |
|-------------------------|---|
| KIT NUMBER | MAXIMUM LENGTH BETWEEN ROOF AND CEILING |
| 100285331 | 12" |
| 100285333 | 32" |
| 100285412 | 60" |
| 100285414 | 95" |

A certified roof jack (vent kit) from the manufacturer must be installed with the water heaters covered by this manual. Roof jack kits are ordered separately. See Figure 27 to determine which roof jack is needed for the installation.

NOTICE: Install the roof jack according to its manufacturer's instructions.

An optional Roof jack Extension Pipe (100108866) may be required where local codes require the roof jack cap (outlet) to terminate above the peak of the roof.

NOTICE: DO NOT common vent this water heater with any other appliance.

1. Cut a 5-1/2" (14 cm) diameter hole through the roof and ceiling directly in line with the flue connection on top of the water heater. For a sloped roof, the roof hole may have to be enlarged to allow the roof jack to be installed vertically.
2. Telescope down the flue pipe in the roof jack assembly to a length that will project at least 6" (15.24 cm) below the finished ceiling before installing the roof jack assembly.

NOTICE: Flue pipe joints have silicone seals that must remain in place. A soapy water solution sprayed around the seal area will enable the flue pipe and outer pipe below to telescope more freely.

3. Telescope down the outer pipe of the roof jack assembly to a length that will project at least 2" (5 cm) below the finished ceiling before installing the roof jack assembly. See Figure 28.

INSTALLATION

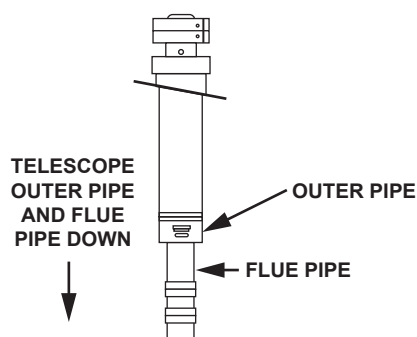


Figure 28: Roof Jack Placement

4. Ease the roof jack assembly through the roof and ceiling openings. The roof jack flashing tilts up to 30.26° degrees for use on a sloping roof.
5. Use sealant or caulk on the roof to seal under flashing of the roof jack assembly. Use roof nails or screws on wood construction or sheet metal screws on metal roofs (nails and screws not provided). See Figure 29.

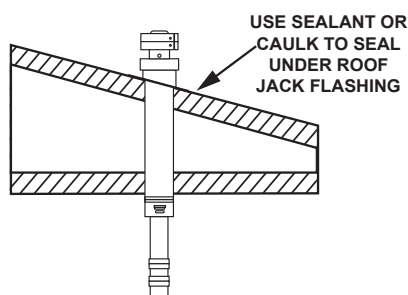


Figure 29: Sealing Roof Jack

6. Extend the flue pipe downward until it is close to the flue reducer. See Figure 30.

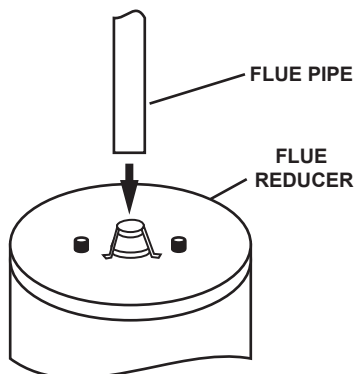


Figure 30: Attach Flue Pipe to Vent Reducer

7. Fit the bottom opening of the pipe over the top opening of the flue reducer. See Figure 31. Ensure that there is no gap and that the seal is complete.
8. Secure the flue pipe to the reducer with three (3) evenly-spaced sheet metal screws (Figure 31). **Do not leave any open holes in the flue reducer or flue pipe.**

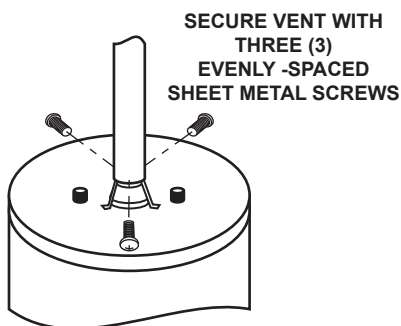


Figure 31: Securing the Flue to Vent Reducer

NOTICE: All joints for vent piping between roof jack and water heater are sealed from the manufacturer. No additional sealing of vent pipe is necessary.

INSTALLATION

Step 5:

Connect the Temperature and Pressure (T&P) Relief Valve/Pipe

Most T&P Relief Valves are pre-installed at the factory. In some cases, they are shipped in the carton and must be installed in the opening marked “T&P Relief Valve” and according to local codes.

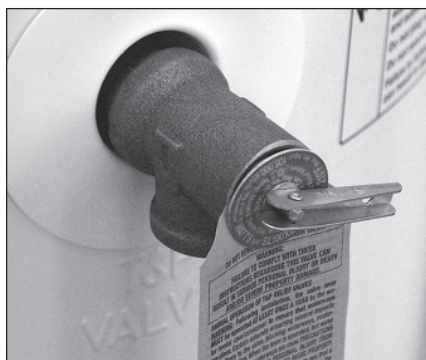


Figure 32: Temperature and Pressure Relief Valve

▲ WARNING! To avoid serious injury or death from explosion, install a T&P Relief Valve according to the following instructions:

1 If the T&P Relief Valve was not factory installed, install the new T&P Relief Valve that came with your water heater. Do not reuse an old T&P Relief Valve. The discharge pipe should be at least 3/4" inside diameter and sloped for proper drainage. Install it to allow complete drainage of both the T&P Relief Valve and the discharge pipe.

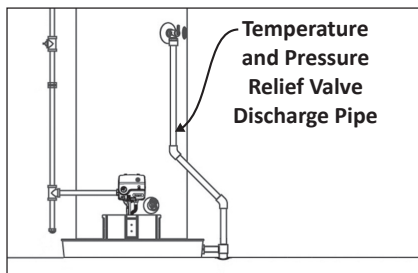


Figure 33: Temperature and Pressure Relief Valve Pipe

The discharge pipe must not be smaller than the pipe size of the T&P Relief Valve. The pipe must also be able to withstand 250°F (121°C) without distortion. Use only copper or CPVC pipe. Do not use any other type of pipe, such as PVC, iron, flexible plastic pipe, or any type of hose.

Terminate the discharge pipe a maximum of six inches above a floor drain or through the structural floor to the outside. Do not drain the discharge pipe into the drain pan; instead pipe it separately to an adequate drain or outside the building. In cold climates, terminate the discharge pipe inside the building to an adequate drain. Outside drains could freeze and obstruct the drain line—protect the discharge pipe from freezing.

Do not place any valve or other restriction between the tank and T&P Relief Valve. Do not cap, block, plug, or insert any valve between the T&P Relief Valve and the end of the discharge pipe. Do not insert or install any reducer in the discharge pipe.

Step 6:

Install Shutoff and Thermostatic Mixing Valves

1 If one is not already installed, install a manual shutoff valve in the cold water line that supplies the water heater. Install the shutoff valve near the water heater so that it is readily accessible. Only use a full-flow ball or gate valve compatible with potable water.

2 Install a Thermostatic Mixing Valve at each point-of-use (for example, kitchen sink, bathroom sink, bath, shower) per the valve manufacturer's instructions.



Figure 34: Install Thermostatic Mixing Valves at each point where hot water will be used.

▲ WARNING! Even if the water heater's thermostat is set to a relatively low temperature, hot water can scald. Install Thermostatic Mixing Valves at each point-of-use to reduce the risk of scalding.

INSTALLATION

3 For water heaters that are fed by a solar water heating system (or any other pre-heating system), always install a Thermostatic Mixing Valve or other temperature limiting device in the inlet water supply line to limit water supply inlet temperature to 120°F. Solar water heating systems can supply water with temperatures exceeding 180°F and may result in water heater malfunction.

▲ WARNING! Hot water provided by solar heating systems can cause severe burns instantly, resulting in severe injury or death.

Step 7:

Connect the Water Supply

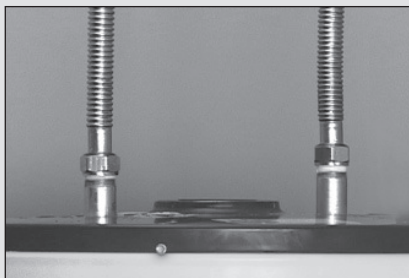
Note that all piping and components connected to the water heater must be suitable for use with potable water.

1 Determine the type of water pipes in your home. Most homes use copper water pipes, but some use CPVC or cross-linked polyethylene (PEX). Use fittings appropriate for the type of pipe in your home. Do not use iron or PVC pipe.

2 Connect the cold water supply using 3/4 inch National Pipe Thread “NPT” to the fitting marked “C” (COLD). For ease of removing the water heater for service or replacement, connect the water pipes with a coupling called a union. We recommend using a dielectric-type union (available at your local plumbing supplier). Dielectric unions can help prevent corrosion caused by tiny electric currents

IF YOU HAVE COPPER PIPES:

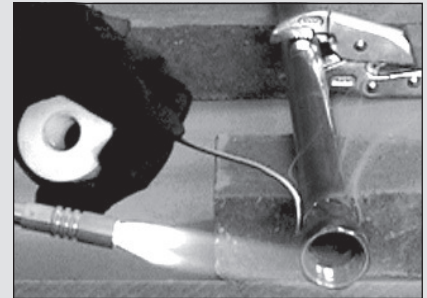
If your home has copper water pipes, you can solder the water pipe connections or use compression fittings which don’t require soldering. Compression fittings are easier to install than soldering pipe. Check with local plumbing officials to determine what types of pipe materials are suitable for your location. Do not use lead-based solder.



Compression fittings don’t require soldering.

NOTICE: Do not solder pipes while they are attached to the water heater. The water heater’s inlet and outlet

connections contain non-metallic parts which could be damaged. The proper way to connect the water heater to copper water pipes is as follows:



- Solder a short length of pipe (about a foot or so) to a threaded adapter using only 95/5 tin-antimony or equivalent solder. Attach the threaded adapters to the water heater’s connections (using thread sealant tape or pipe joint compound). Connect the home’s water pipes by soldering, keeping the connections at the water heater cool with wet rags.

common in copper water pipes and can help extend the life of the water heater. Dielectric unions can help prevent corrosion caused by tiny electric currents common in copper water pipes and can help extend the life of the water heater.

NOTICE: Most water heater models contain energy saving heat traps in the inlet and outlet connections. Do not remove the heat traps.

- 3** Connect the hot water supply using 3/4 inch NPT to the fitting marked “H” (HOT).
- 4** Install insulation (or heat tape) on the water pipes especially if the indoor installation area is subject to freezing temperatures. Insulating the hot

water pipes can increase energy efficiency.

- 5** Adjust (or install) the home’s Pressure Reducing Valve to 50-60 psi and install a Thermal Expansion Tank.



Figure 35: A Pressure Reducing Valve is required if your home’s water pressure is above 80 psi.

INSTALLATION



Figure 36: The Thermal Expansion Tank should be pressurized with air, using a hand pump, to match the home's incoming water pressure.

Step 8:

Verify Connections and Completely Fill Tank

To remove air from the tank and allow the tank to fill completely with water, follow these steps:

- 1** Remove the aerator at the nearest hot water faucet. This allows debris in plumbing system to be washed out of the pipes.
- 2** Turn the cold water supply back on and fill the tank.
- 3** Open a hot water faucet and allow the water to run until it flows with a full stream.
- 4** Let the water run full stream for three minutes.
- 5** Close the hot water faucet and replace the aerator.
- 6** Check inlet and outlet connections and water pipes for leaks. Dry pipes connections so that any drips or leaks will be apparent. Repair any leaks. Almost all leaks occur at connections and are not a tank leak.

Step 9:

Gas Conversion

New installations only:

Complete Step 9 if you are converting your water heater to use LP (Propane) Gas. If the gas supplied to your home is natural gas, skip Step 9 and proceed to Step 10 on page 25.

This water heater is originally shipped for use with **Natural Gas** but can be converted to LP (Propane) Gas by following the instructions outlined below.

To convert this water heater, you must change both the conversion fitting in the gas control valve/thermostat AND manifold/burner assembly (supplied). Both the gas valve and the manifold burner assembly must be correct for the type of gas used. If you are unsure about converting this water heater to use a different type of gas, contact a qualified person such as a plumber or your gas supplier.

▲ WARNING!

- **For your safety, the following procedures should be performed by a qualified person.**
- Do not connect a natural gas water heater to an LP gas supply.
- Do not connect an LP gas water heater to a natural gas supply.
- Failure to follow these instructions can result in serious injury or death from explosion, fire or carbon monoxide poisoning.

Conversion Procedure:

Contact your gas company to determine the type of gas supplied to your home.

Check the setting of the conversion fitting in the gas control valve (Figure 38).

Check the label on the manifold burner assembly door.

Make sure both the conversion fitting (Figure 38) and the manifold burner assembly (see door label) are for the type of gas supplied to your home.

If you are converting this water heater from Natural to LP or from LP to Natural, follow these steps:

- a. Remove the manifold burner assembly. See *Removing the Manifold Assembly*, page 23.
- b. Install the correct conversion manifold burner assembly. See *Installing the Conversion Manifold Assembly*, page 24.
- c. Convert the gas control valve/thermostat to the same type of gas. See *Converting the Gas Control Valve/Thermostat*, page 24.
- d. Place sticker next to rating plate showing the type of gas to which this water heater has been converted.

Removing the Manifold Assembly

1. Turn off the gas supply to the water heater at the manual gas shut-off valve (Figure 39). This valve is typically located beside the water heater. Note the position of the shut-off valve in the open/on position, then proceed to turn it off.
2. On the lower front of the water heater, locate the gas control valve/thermostat (Figure 37). Before performing any maintenance, it is important to turn the temperature dial on the gas control valve/thermostat to its lowest setting.

INSTALLATION

- On top of the gas control valve/thermostat, turn the gas control knob to the "OFF" position.
- Remove the outer door.
- Remove the two screws securing the manifold/burner assembly to the combustion chamber (Figure 37).
- Disconnect the following items from the gas control valve/thermostat: thermocouple, pilot tube, and manifold tube (each has right-hand threads). See Figure 37.

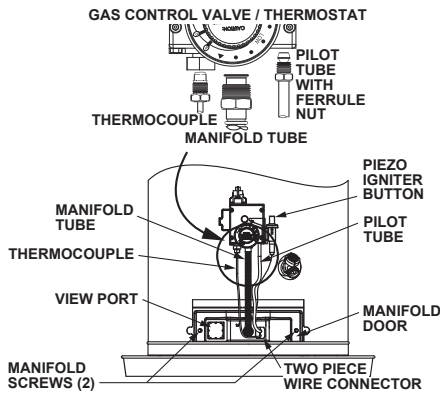


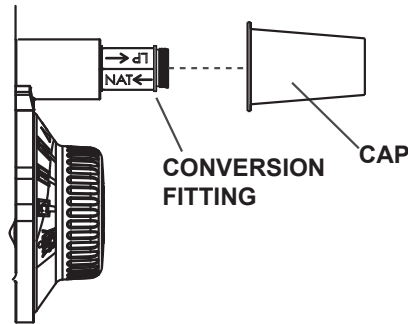
Figure 37: Gas Control Valve/Thermostat Components

- Disconnect the igniter wire from the piezo igniter button. See Figure 37.
- Grasp the manifold tube and push down slightly to free the manifold, pilot tube, and thermocouple.
- Carefully remove the manifold/burner assembly from the burner compartment.

NOTICE: Be sure not to damage internal parts

Converting the Gas Control Valve/Thermostat

NATURAL GAS CONFIGURATION:
"NAT" ARROW POINTS TOWARD THE GAS CONTROL VALVE/ THERMOSTAT. BLUE BAND TOUCHES METAL BOSS.



LP GAS CONFIGURATION:
"LP" ARROW POINTS TOWARD THE GAS CONTROL VALVE/ THERMOSTAT. RED BAND TOUCHES METAL BOSS.

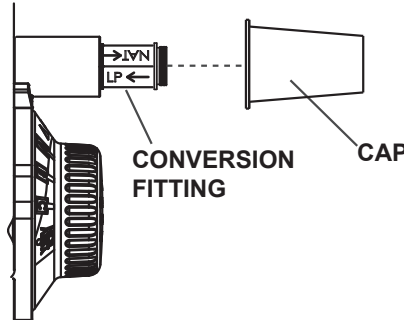


Figure 38: Gas Conversion

- Remove the cap (shown in Figure 38).
- Remove the conversion fitting by turning it counter-clockwise with a flathead screwdriver.
- Thread the opposite end of the conversion fitting into the opening by turning it clockwise, then tighten it hand tight.
 - If you are converting the unit to use LP gas (propane),

verify that the "LP" arrow on the fitting is pointing toward the gas control valve/thermostat. The red band on the fitting should touch the metal boss. See Figure 31.

- If you are converting the unit to use natural gas, verify that the "NAT" arrow on the fitting is pointing toward the gas control valve/thermostat. The blue band on the fitting should touch the metal boss. See Figure 38.

- Replace the cap.

Installing the Conversion Manifold Assembly

- Check the door gasket for damage or imbedded debris prior to installation.
- Inspect the view port for damage and replace as required (Figure 37).
- Insert the conversion manifold assembly into the burner compartment, making sure that the tip of the manifold tube engages in the slot of the bracket inside the combustion chamber. See Figure 39 and Figure 40.

Tip must engage slot in bracket.

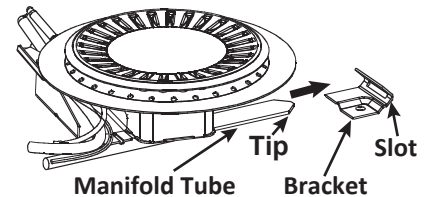


Figure 39: Inside view of combustion chamber.

INSTALLATION

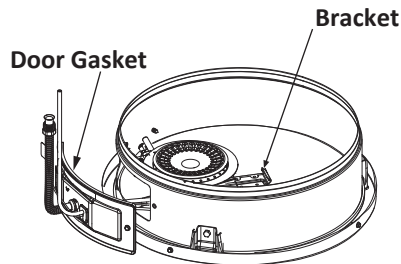


Figure 40: Combustion Chamber

4. Inspect the door gasket and make sure there is no fiberglass insulation between the gasket and the combustion chamber (Figure 40).
5. Replace the two screws that secure the manifold assembly door to the combustion chamber, then tighten them securely (Figure 37, page 24). There should be no space between the gasket part of the manifold door and the combustion chamber. **IMPORTANT:** Do not operate the water heater if the door gasket does not create a seal between the manifold door and the combustion chamber.
6. Reconnect the manifold tube, pilot tube, and thermocouple to the gas control valve/thermostat. See Figure 37. Do not cross-thread or apply any thread sealant to these fittings. The thermocouple nut should be started and turned all the way in by hand. Tighten an additional quarter turn with a 7/16" open-end wrench.

NOTICE: If you were supplied with a new ferrule nut in a parts kit, follow these steps to connect the pilot tube:

- A. Install the ferrule nut into the gas valve at the pilot tube location, hand tight only.
- B. Insert the pilot tube into the

ferrule nut until the tube bottoms out, then tighten the nut with a 7/16" wrench until the crimp connection seals to the pilot tube.

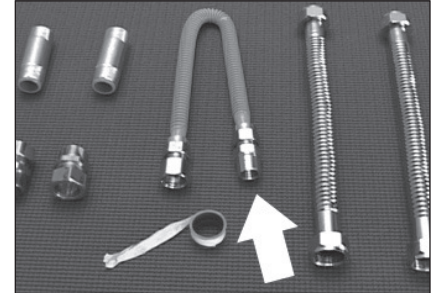
- C. Continue to tighten until the nut is tight in the gas valve.
7. Reconnect the igniter wire.
 8. If you are working with a water heater that is already installed, complete the following sub-steps. If this is a new installation, skip the following sub-steps and go to *Step 12*.
 - A. Turn the gas supply on.
 - B. Follow the Lighting Instructions.
 - C. With the main burner lit, check for leaks at the manifold and pilot connections by brushing on an approved non-corrosive leak detection solution. If such a solution is not available, use a mixture of hand dish washing soap and water (one part soap to 15 parts water). Bubbles forming indicate a leak. Correct any leak found.
 - D. Verify proper operation; replace outer door.
 - E. Place the conversion label next to the rating plate. (The conversion label shows the type of gas that your water heater has been converted to use.)

Step 10:

Make Gas Connections

The Gas Water Heater Hook-Up Kit (available at your local plumbing supplier) includes a flexible gas connector

with compression fittings to connect the home's gas line to the water heater's gas control valve. Follow the kit's installation instructions to attach the flexible gas connector.



Flexible gas line connector.

Once you've made the gas connections, use a small, soft-bristled brush to apply a hand dishwashing soap and water mixture or children's soap bubbles (1 part soap to 15 parts water) to all connection points of the gas line and flexible gas connector (if used). Make sure to generously coat all the connections and check for gas leaks (which will appear as small bubbles). If any leaks are detected, turn the gas supply off, tighten the leaking connection and re-check.

INSTALLATION

BEFORE LIGHTING THE WATER HEATER...

Make sure all checklist items have been completed.

Water Heater Location

- ✓ Installation area free of corrosive or flammable materials, liquids or vapors.
- ✓ Proper clearances from combustible surfaces maintained and sufficient room to service the water heater.
- ✓ Not installed directly on a carpeted floor.
- ✓ Metal drain pan installed and piped to an adequate drain or through the floor to the outside of the structure.

Combustion Air Supply and Ventilation

- ✓ Adequate air supply for water heater and any other nearby gas appliances.
- ✓ Are the openings of sufficient size?
- ✓ Ductwork is the same cross-sectional area as the openings?

Vent Pipe System

- ✓ Vent pipe (roof jack) securely fastened to the flue reducer with screws and supported properly. Follow the roof jack manufacturer's instructions.
- ✓ Approved vent (roof jack). See page 8.
- ✓ Vent system installed according to local and state codes or, in the absence of local and state codes, the "National Fuel Gas Code", ANSI Z223.1 (NFPA 54)-current edition. Manufactured home manufacturers must conform with *The Manufac-*

tured Home Construction and Safety Standard, Title 24 CFR, Part 3280.

- ✓ Check existing vent system for rust, restrictions/obstructions.

Water System Piping

- ✓ Temperature and pressure relief valve properly installed with a discharge line that runs through the floor to the outside or to an adequate drain and is protected from freezing.
- ✓ Water pipes free of leaks.
- ✓ Water heater completely filled with water.
- ✓ Thermal Expansion Tank installed
- ✓ Water Pressure Reducing Valve installed and adjusted to 50-60 psi.
- ✓ Thermostatic Mixing Valves installed at each point-of-use.

Gas Supply and Piping

- ✓ Gas type is the same as that listed on the water heater's rating plate (**or** the same as what is listed on the conversion label **if** the water heater was properly converted).
- ✓ Gas line equipped with shut-off valve.
- ✓ Adequate gas pipe size and approved gas pipe material.
- ✓ All gas connections and fittings leak checked and any leaks corrected.

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.

OPERATION

Lighting Instructions

▲ WARNING! Explosion Hazard – Replace viewport if glass is missing or damaged. Failure to do so can result in death, explosion or fire.

Read and understand these directions thoroughly before attempting to light or re-light the pilot. Make sure the viewport is not missing or damaged. Make sure the tank is completely filled with water before lighting the pilot. Check the rating plate near the gas control valve to ensure the correct gas type. Do not use this water heater with any gas other than the one listed on the rating plate. If you have any questions or doubts, consult your gas supplier or gas utility company.

NOTICE! A newly installed water heater will have air in the gas line. It may take several lighting attempts to clear all the air from the gas line and light the pilot.

Follow these steps to light the pilot:

- 1 Make sure the manual gas valve for the water heater's supply line is ON.

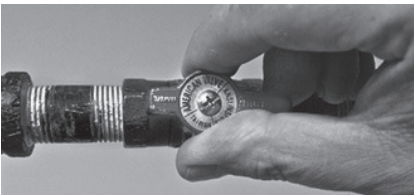


Figure 41: Gas valve in "on" position

- 2 Set the thermostat to lowest setting (PILOT LIGHTING). Turn thermostat dial fully clockwise until it stops.



Figure 42: Gas control/valve.

- 3 Turn the gas control knob counterclockwise to pilot.

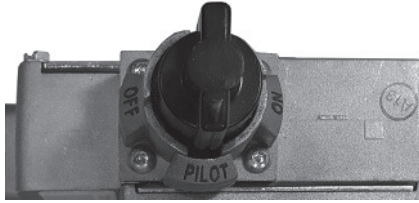


Figure 43: Set Gas Control Knob to Pilot

- 4 Remove the outer door located below the gas control.
 - 5 This unit is equipped with a push button pilot ignitor, which is used to light the pilot. Locate the ignitor on the gas control.
 - 6 Turn the gas control knob counterclockwise to pilot.
 - 7 The pilot is located on the left side of the burner. It can be located by looking through the glass view port while pressing the piezo ignitor button several times. Look for a spark at the pilot location.
 - 8 Continue to hold the gas control knob down for about one (1) minute after the pilot is lit. Release the gas control knob and it will pop back up. Pilot should remain lit. If it goes out, repeat step (3) through (9). It may take several minutes for air to clear the lines before the pilot will light.
- If knob does not pop up when released, stop and immediately call your service technician or gas supplier.
 - If the pilot will not stay lit after several tries, turn the gas control knob clockwise to 'OFF' and call your service technician or gas supplier.

- 9 Once the pilot flame is established replace the outer burner door.
- 10 At arm's length away, turn gas control knob counterclockwise to 'ON'.
- 11 Set thermostat to desired setting.

Shut down Instructions

Turn the gas control/temperature knob counterclockwise to the "OFF" setting. The status light will stop blinking and stay on for a short time after the water heater is turned off.

Emergency Shut down

Should overheating occur or the gas supply fail to shut off, turn off the water heater's manual gas control valve and call a qualified person.

Checking the Vent System and Air Supply

Once the water heater is lit and the gas control knob is set to the desired temperature, the burner will light (if the tank is cold). Perform an air supply and vent test to make sure the unit is venting properly and the air supply is adequate:

- 1 The main burner must be on for this test. With a newly installed water heater full of cold water, turning the temperature control knob to HOT should cause the main burner to come on. You can view the burner through the sight glass at the base of the water heater.

Temperature Control System

Adjusting the Temperature

With the installation steps completed, you may adjust the water heater's temperature setting if desired.

1 Set the gas valve to the desired temperature. The "▲" setting sets the water temperature to approximately 120°F, reducing the risk of scald injury. You may wish to set a higher temperature to provide hot water for automatic dishwashers or laundry machines, to provide more hot water capacity, and to reduce bacterial growth. Higher tank temperatures (140° F) kill bacteria that cause a condition known as "smelly water" and can reduce the levels of bacteria that cause water-borne diseases.

▲ WARNING! Higher temperatures increase the risk of scalding, but even at 120°F, hot water can scald (see Table 1 on page 4).

If you increase the water heater's temperature setting, install Thermostatic Mixing Valve(s) at each point-of-use to reduce the risk of scalding.

2 To adjust the water heater's thermostat:

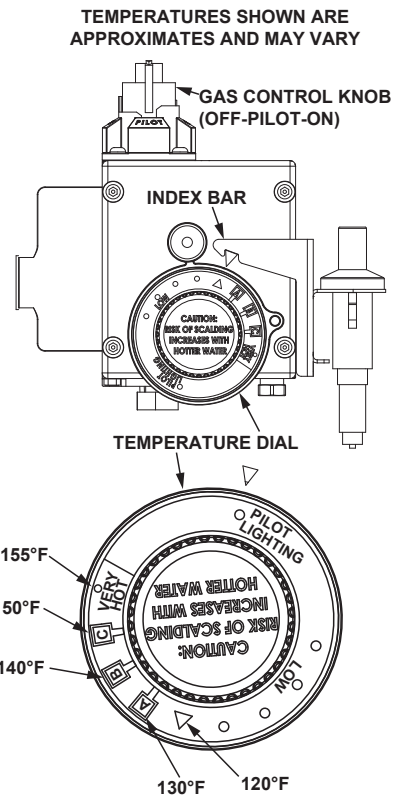


Figure 44: Temperature Settings

Turn the gas control knob on the gas control valve to the right to the following settings.

- "A" 130°F
- "B" 140°F
- "C" 150°F
- "VERY HOT" 155°F

NOTICE: The temperatures above are approximates. The actual temperature of the heated water may vary.

3 Wait for the water to heat up. If you have no hot water after two hours, refer to the Troubleshooting section (page 30).

NOTICE: If the tank is full of cold water, condensation may form inside the water heater. This condensation may drop on the burner causing a sizzling sound. In some cases, you may see a small puddle on the floor. Condensation is normal and should go away once the tank reaches its normal operating procedure.

▲ WARNING! If you have increased the temperature setting and the Thermostatic Mixing Valves are not set properly (or not installed) you could scald yourself while checking the temperature.

4 Check water temperature at several points of use in your home (for example, bathtub faucet, shower, or lavatory sink) and adjust the Thermostatic Mixing Valves as needed. If you aren't sure how to adjust the Thermostatic Mixing Valve settings, or aren't sure if you have Thermostatic Mixing Valves, contact a qualified person.

TROUBLESHOOTING

No Hot Water

Use the following step-by-step plan as a guide to help determine why you have no hot water:

1 Checking the Pilot Light

Check the spark igniter. Dim the room lights and look through the viewport while clicking the igniter button.

If you don't see a spark through the viewport, check to make sure the igniter wire is firmly inserted into the white connector.

If you see a spark, make sure the gas supply valve is turned on, and try lighting the pilot using the lighting instructions on page 28.

If the pilot still does not light, call a qualified person.

Insufficient Hot Water or Slow Hot Water Recovery

▲ WARNING! Because of the increased risk from scalding, if you set the water heater's gas control knob higher than 120°F, install Thermostatic Mixing Valves at each point-of-use. Due to the increased risk of scalding, do not set the temperature of the Thermostatic Mixing Valves above 120°F.

If the hot water is simply not warm enough, there are several possible causes:

- Faulty Thermostatic Mixing Valve in a faucet or shower control (check other faucets in the house for hot water).
- Water heater's capacity too small (or usage too high).
- Reversed plumbing connections or melted dip tube (usually

found soon after new installation).

- Plumbing leak.
- Sediment or lime build up in the bottom of the tank.

Thermostatic Mixing Valves. If the hot water is simply not warm enough, make sure the faucet you are checking doesn't have a defective Thermostatic Mixing Valve. Many shower controls now have built-in mixing valves. If these devices fail, they can reduce the amount of hot water the shower or faucet delivers even though there is plenty of hot water in the tank. Always check the water temperature at several faucets to make sure the problem is not in a faucet or shower control.

Undersized Water Heater. If your water heater runs out of hot water quickly, it may be too small for your needs. If the water heater is old, consider replacing it with a larger model. If the water heater is in good condition, you may be able to meet your family's hot water needs with the existing water heater by installing Thermostatic Mixing Valves at each point-of-use and then turning the gas control knob to a higher setting.

You can also reduce your home's hot water needs by washing clothes in cold water, installing flow restrictors on shower heads, repairing leaky faucets, and taking other conservation steps.

Reversed Connections or Melted Dip Tube. Check the hot and cold water connections and make sure your home's hot water pipe is connected to the hot water outlet on the water heater. Usually, reversed connections are found soon after the installation of a new unit. If copper pipes were soldered while they were attached to the water heater, the dip tube may

have melted. The dip tube is a long, plastic tube inside the tank attached to the cold water inlet. If the dip tube has melted, it can be replaced by removing the cold water inlet connection, removing the old dip tube and installing a new one.

Plumbing Leak. Even a small leak in the hot water side of the home's plumbing system can make it appear that the water heater is producing little to no hot water. In this case, the burner will be on all or almost all the time, yet you will have very little hot water. Locate and repair the leak.

Sediment or Lime in Tank. With an existing water heater, if you have some hot water but not as much as you're used to, there may be a build up of sediment or lime on the bottom of the tank. Sediment or lime build up can reduce the efficiency of your water heater. Heavy deposits can damage the water heater. See the Maintenance section for steps on draining and flushing the water heater.

Temperature Too High

Adjust the thermostat on the water heater to a lower setting. Install or adjust Thermostatic Mixing Valves for each point-of-use (see the valve manufacturer's instructions).

Low Water Pressure

Check both the cold and hot water at a sink to determine if the lower pressure is only on the hot water side. If both hot and cold faucets have low pressure, call your local water utility. If the low pressure is only on the hot water side, the primary causes are:

- Melted heat traps or dip tube. Soldering copper pipes while they are connected to the water heater

can melt the heat traps inside the hot and cold water connections or the dip tube (cold water side). Melted heat traps or a melted dip tube can restrict the flow of hot water. If that's the case, replace the heat traps or dip tube.

- Partially closed supply valve. Open the water heater's supply valve fully.

Drips from T&P Relief Valve Discharge Pipe

A small amount of water dripping from the Temperature and Pressure (T&P) Relief Valve usually means the home's water pressure is too high and/or you need a Thermal Expansion Tank. See Step 1 in the Installation section of this manual for more information.

A large amount of hot water coming from the T&P discharge pipe may be due to the tank overheating. If the T&P relief valve is discharging large amounts of very hot water, turn the gas supply valve off and call a qualified person.

▲ WARNING! Do not cap or plug the T&P Relief Valve or discharge pipe, and do not operate the water heater without a functioning T&P Relief Valve—this could cause an explosion.

Water Pressure too High. High water pressure can cause the T&P Relief Valve to drip. Install a Pressure Reducing Valve (PRV) on the main cold water supply line. Adjust the PRV to between 50 and 60 psi.

Thermal Expansion Tank. Install a Thermal Expansion Tank. If a Thermal Expansion Tank is already installed and the T&P Relief Valve discharge pipe drips, the home's water pressure

may be too high or the Thermal Expansion Tank may be defective. Refer to the instructions that came with the Thermal Expansion Tank for more information.

Debris. In rare cases, debris can stick inside the T&P Relief Valve preventing the valve from sealing fully. In that case, the T&P Relief Valve discharge pipe will drip. You may be able to clear debris from the T&P Relief Valve by manually operating the valve, allowing small quantities of water to flush out the debris. Refer to the T&P Relief Valve Maintenance section of this manual.

▲ WARNING! When manually operating the temperature-pressure relief valve, make sure that no one is in front of or around the discharge outlet. The water may be extremely hot and could cause severe burns. Also ensure that the water discharge will not cause property damage.

If the water pressure is between 50 and 60 psi, a Thermal Expansion Tank is installed and properly pressurized, and the valve has been cleared of any debris, and it still drips, the valve may be broken—have a qualified person replace the T&P Relief Valve.

Water Odor

Harmless bacteria normally present in tap water can multiply in water heaters and give off a "rotten egg" smell. Although eliminating the bacteria that causes "smelly water" is the only sure treatment, in some cases, the standard anode rod that came with your water heater can be replaced with a special zinc anode rod which may help reduce or eliminate the odor. Contact a qualified person.

NOTICE: To protect the tank, an anode rod must be installed in the water heater at all times or the warranty is void.

In cases where the "rotten egg" smell is very strong, you could increase the tank temperature to 140°F in order to reduce bacterial growth in the tank.

▲ WARNING! Because higher temperatures increase the risk of scalding, if you set the thermostat(s) higher than 120°F, Thermostatic Mixing Valves at each point-of-use are particularly important.

MAINTENANCE

Routine Maintenance

Routine maintenance will help your water heater last longer and work better. If you can't perform these routine maintenance tasks yourself, contact a qualified person.

Draining and Flushing the Water Heater

Tap water contains minerals that can form sediment in the bottom of the tank. The amount of sediment formed depends on the hardness of your tap water, the temperature settings, and other variables. We recommend draining and flushing the water heater after the first six months of operation to determine the amount of sediment build up. If there is little sediment, drain and flush the tank annually. If there is a lot of sediment, drain and flush the tank more often. Draining sediment extends the life of the water heater.

To Drain and Flush the Tank:

- 1 Turn the gas control knob on the gas control valve to the OFF position.

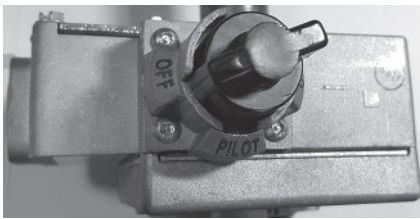


Figure 45: Turn gas control/temperature knob OFF.

- 2 Turn the manual gas valve for the water heater's supply line OFF.
- 3 Open a hot water faucet and let the hot water run until it is cool (This may take 10 minutes or longer).



Figure 46: Let the hot water run until it is cool.

▲ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

- 4 Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or in buckets. Note that sediment in the bottom of the tank may clog the valve and prevent it from draining. If you can't get the tank to drain, contact a qualified person.

- 5 Turn the cold water supply valve OFF.
- 6 Open the drain valve on the water heater.

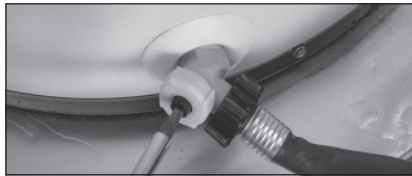


Figure 47: Draining the water heater.

- 7 Also open a hot water faucet to help the water in the tank drain faster.
- 8 Remove and inspect the anode rod and replace if depleted. The anode rod requires a 1 1/16" socket.

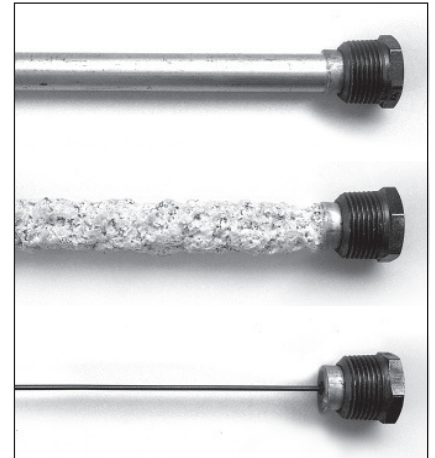


Figure 48: Anode rods from new (top) to partially depleted (middle) to fully depleted stage (bottom).

Anode Rod. The anode rod is a sacrificial metal rod that helps avoid corrosion and premature failure (leaks) in the tank. The anode rod is a consumable item. Inspect the anode rod after the first six months of operation when you drain and flush the tank. Replace the anode rod if it is substantially worn out or depleted. Thereafter, inspect the anode rod annually or more frequently if needed. If you use a water softener, your anode rod will deplete faster than normal. Inspect the anode rod more frequently, replacing the anode rod if it is depleted. Obtain a new anode rod from your local plumbing supplier or have a qualified person replace it. (Anode rods are a consumable item and are not covered under warranty).

- 9 If a large amount of sediment was present when the tank was drained, flush the tank by opening the cold water supply valve and letting the water run until no more sediment drains from the tank. Close the drain valve when you are done.

MAINTENANCE

10

Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is open and the drain valve is closed. Allow a hot water faucet to run full for at least three minutes to make sure the tank has all the air removed and is completely full of water. Once you are certain the tank is completely full of water, close the hot water faucet.

11

Relight the pilot using the instructions on page 28 and adjust the gas control knob to the desired temperature. It may take an hour or more for the tank of cold water to heat up.

Visual Inspection

On an annual basis, visually inspect the venting and air supply system, piping systems, main burner, pilot burner, and the air filter.

Check the water heater for the following:

- Obstructions, damage, or deterioration in the venting system. Make sure the ventilation and combustion air supplies are not obstructed. Check the air filter for dust or other debris and clean if needed.
- Build up of soot and carbon on the main burner and pilot burner. The burner may be cleaned with soap and hot water.
- Inspect the burner flames through the viewport and compare them to the drawing below. A properly operating burner should produce a soft blue flame. Blue tips with yellow inner cones are satisfactory. The tips of the flame may have a slight yellow tint. The flame should not be all yellow or have a sharp blue-orange color. Contaminated air may cause an orange colored flame. Contact a qualified technician if the flame is not satisfactory.

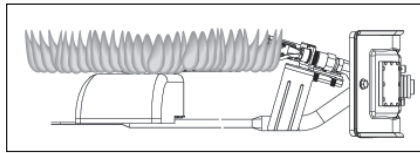


Figure 49: Burner Flames

- Leaking or damaged water and gas piping.
- Remove any flammable, corrosive or combustible materials near the water heater.

If you lack the necessary skills required to properly perform this visual inspection or if the burner needs to be cleaned, get help from a qualified person.

T&P Relief Valve Maintenance



Figure 50: T&P Relief Valve.

Read and follow the operating and annual maintenance instructions provided by the manufacturer of the T&P Relief Valve (yellow label attached to T&P Relief Valve). If no label is attached to the T&P Relief Valve, follow the instructions in this section. Minerals in the water can form deposits that cause the valve to stick or create blocked passages, making the T&P Relief Valve inoperative. Follow these guidelines:

- At least annually, operate the T&P Relief Valve manually to ensure the waterways are clear and the valve mechanism moves freely (above). Before operating the valve manually, check that it will discharge in a place for secure disposal.

▲ WARNING! Hot water will be released. Before operating the T&P

relief valve manually, check that it will discharge in a safe place. If water does not flow freely from the end of the discharge pipe, turn the gas control knob to the OFF position and call a qualified person to determine the cause.

- At least every five years, have a qualified person inspect the T&P Relief Valve and discharge pipe. Damage caused by corrosive water conditions, mineral deposits, or other problems can only be determined when a qualified person removes and inspects the valve and its components.

A dripping T&P Relief Valve is usually caused by the home's water pressure being too high or the lack of a Thermal Expansion Tank. If your T&P Relief Valve drips, see page 31.

A T&P relief valve that has been allowed to drip for an appreciable period of time should be inspected for mineral buildup.

Removing and Replacing the Gas Control Valve/Thermostat

IMPORTANT: The gas control valve/thermostat is a standard valve with wire leads that connect to a thermal switch.

Removing the Gas Control Valve/Thermostat:

1

Turn the gas control/temperature knob to the "OFF" position.

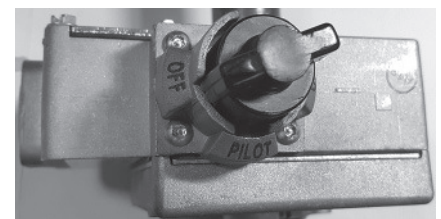


Figure 51: Gas control/valve.

MAINTENANCE

2

Turn off the gas at the manual shut-off valve on the gas supply pipe.



Figure 52: Gas valve in "off" position.

3

Drain the water heater. Refer to the "Draining and Flushing the Water Heater" section (see page 32) and follow the procedure.

4

Disconnect the igniter wire from the piezo igniter lead wire. Disconnect the pilot tube (7/16" SAE wrench) and manifold tube (3/4" SAE wrench) at the gas control valve/thermostat. See Figure 51.

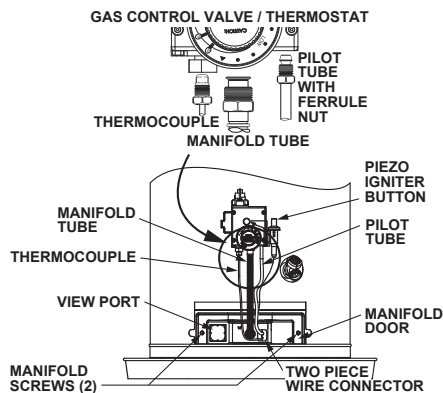


Figure 53: Gas valve connections.

5

Disconnect the ground joint union in the gas piping. Disconnect the remaining pipe from the gas control valve/thermostat.

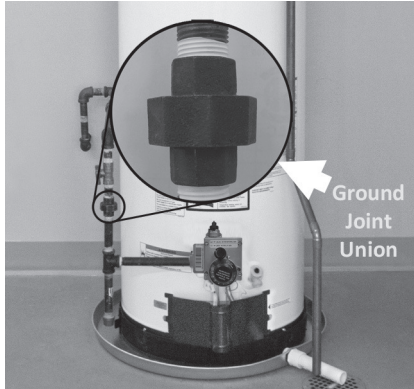


Figure 54: Ground joint union connection.

6

To remove the gas control valve/thermostat, thread a 4" section of gas pipe into the inlet and use it to turn the gas control valve/thermostat (counterclockwise.) Do not use pipe wrench or equivalent to grip body. Damage may result, causing leaks. Do not insert any sharp objects into the inlet or outlet connections. Damage to the gas control valve/thermostat may result.

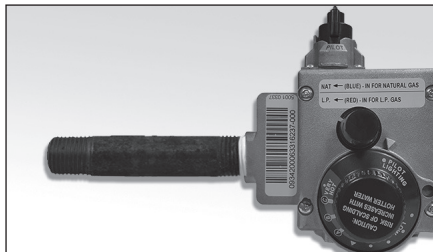


Figure 55: Gas control/valve with threaded pipe.

Replacing Gas Control Valve/Thermostat:

To replace the gas control valve/thermostat, reassemble in reverse order. When replacing the gas control valve/thermostat, thread a 4" section of gas pipe into the inlet and use it to turn the gas control valve/thermostat (clockwise.)

DO NOT OVER TIGHTEN, damage may result.

- Be sure to use approved thread seal-

ant tape or pipe joint compound on the gas piping connections and fitting on the back of the gas control valve that screws into tank.

- Be sure to remove the pilot ferrule nut from the new gas control valve/thermostat.



Figure 56: Gas valve in "on" position.

- Turn the gas supply on and check for leaks. Test the water heater by brushing on an approved noncorrosive leak detection solution. Bubbles forming indicate a leak. Correct any leak found.
- Be sure tank is completely filled with water before lighting and activating the water heater. Follow the "Lighting Instructions" on page 28.
- If additional information is required, contact the manufacturer listed on the water heater's rating plate.

REPAIR PARTS LIST

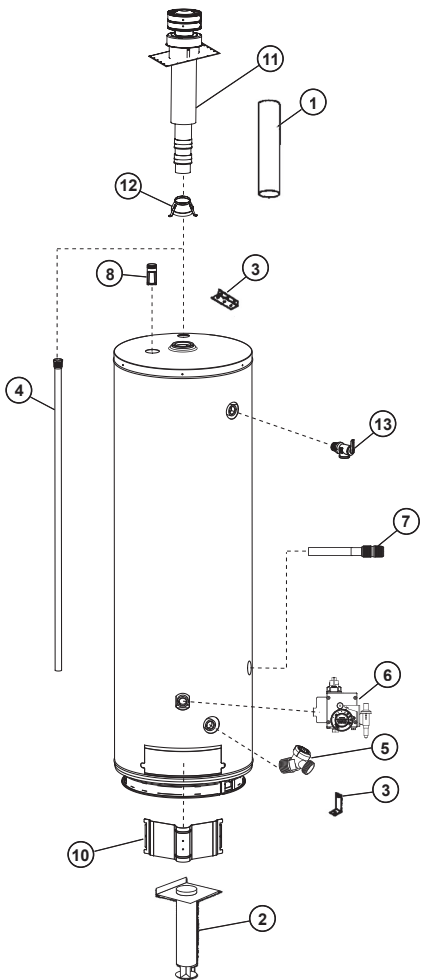
Repair parts may be ordered through your plumber, local distributor, or by calling our Technical Assistance Hotline. When ordering repair parts always give the following information:

NOTICE: When ordering replacement parts, have the following information ready:

- Model and serial number
- Type of gas used
- Item number
- Parts description

Legend

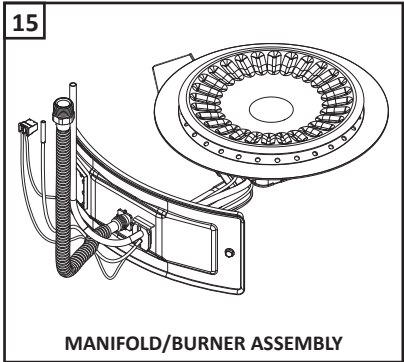
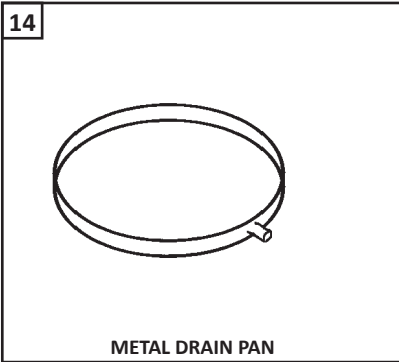
- ▲ Special anode rod (see page 31)
- Temperature and Pressure Relief Valve is required but may be factory installed



PARTS LIST

| Item No. | Parts Description |
|----------|--|
| 1 | 10" Extension Pipe (Optional) |
| 2 | Air Duct Assembly (14.5" to 24" [36.8cm to 61cm] Long) |
| 3 | Angle Brackets (Kit) |
| 4 | Anode Rod ▲ |
| 5 | Drain Valve |
| 6 | Gas Control Valve / Thermostat |
| 7 | Inlet Tube |
| 8 | Nipple w/Heat Traps |
| 9 | Optional 3" (76mm) Outside Wall Intake Air Vent Kit 100109072 ** |
| 9 | Optional 4" (102mm) Outside Wall Intake Air Vent Kit 100109073 ** |
| 10 | Outer Door |
| 11 | Roof Jack 12" / 30.48 cm (100285331) * |
| 11 | Roof Jack 32" / 81.28 cm (100285333) * |
| 11 | Roof Jack 60" / 152.4 cm (100285412) * |
| 11 | Roof Jack 95" / 241.3 cm (100285414) * |
| 12 | Flue Reducer |
| 13 | Temperature-Pressure Relief Valve (T & P Valve) ■ |
| 14 | Metal Drain Pan |
| 15 | Manifold/Burner Assembly (Natural Gas) (Shown on next page) |
| 15 | Manifold/Burner Assembly (Propane [L.P.] Gas) (Shown on next page) |
| 16 | Burner (Shown on next page) |
| 17 | Burner Orifice (Natural Gas) (Shown on next page) |
| 17 | Burner Orifice (Propane [L.P.] Gas) (Shown on next page) |
| 18 | Manifold Door Gasket (Shown on next page) |
| 19 | Manifold Component Block w/ Clip (Shown on next page) |
| 20 | Pilot Assembly with Tubing and Fittings (Shown on next page) |

* Roof jack sold separately.
** Not Shown



REPAIR PARTS LIST

LISTED PARTS KITS AND ILLUSTRATIONS

- Item 15: Manifold door assembly which contains the manifold tube, gasket, door, pilot tube, thermocouple, manifold component block with retainer clip, burner, and pilot assembly. (Natural Gas)
- Item 15: Manifold door assembly which contains the manifold tube, gasket, door, pilot tube, thermocouple, manifold component block with retainer clip, burner and pilot assembly. (L.P.)
- Item 16: Contains burner (Natural Gas)
- Item 16: Contains burner (L.P. Gas)
- Item 17: Contains burner orifice (Natural Gas)
- Item 17: Contains burner orifice (L.P. Gas)
- Item 18: Contains manifold door gasket
- Item 19: Contains manifold component block with retainer clip
- Item 20: Contains pilot assembly with tubing and fittings.

