

Installation and Operation Instruction Manual

GAS-FIRED COMMERCIAL WATER HEATER WITH CONTINUOUS PILOT AND MILLIVOLT DAMPER

A Spanish language version of these instructions is available by contacting the manufacturer listed on the rating plate.

La versión española de estas instrucciones se puede obtener al escribirle a la fábrica cuyo nombre aparece en la placa de especificaciones.

⚠ WARNING

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

FOR YOUR SAFETY

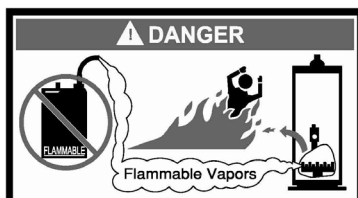
Do not store or use gasoline or other flammable, combustible, or other corrosive vapors and liquids in the vicinity of this or any other appliance.

– 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.

For your family's comfort, safety and convenience, it is recommended this water heater be installed and serviced by a plumbing professional.



CONGRATULATIONS!

You have purchased one of the finest water heaters on the market today!

This installation, operation and instruction manual will explain in detail the installation and maintenance of your new water heater. We strongly recommend that you contact a plumbing professional for the installation of this water heater.

We require that you carefully read this manual, as well as the enclosed warranty, and refer to it when questions arise. If you have any specific questions concerning your warranty, please consult the plumbing professional from whom your water heater was purchased. For your records we recommend that you write the model, serial number and installation date of your water heater in the maintenance section in the back of this manual.

This manual should be kept with the water heater.



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GENERAL INFORMATION

This gas-fired water heater is design certified by CSA International under the American National Standard, Z21.10.3 (as indicated on the rating plate) and CAN/CGA 4.3-M (as indicated on the rating plate). These standards are available from the CSA Standards Association, 5060 Spectrum Way, Mississauga, Ontario L4W 5N6 CANADA.

The warranty for this water heater is in effect only when the water heater is installed, adjusted, and operated in accordance with these Installation and Operating Instructions. The warranty does not cover damage or injury caused by the use of any energy-saving devices (other than those authorized by the manufacturer) in conjunction with this water heater. **The use of unauthorized energy-saving devices may decrease the life of the water heater and endanger life and/or property. The manufacturer will not be liable for any damage, injury, or loss of life resulting from alteration and/or failure to comply with these instructions.**

This water heater has been equipped for use with **ONE TYPE OF GAS ONLY**. Compare the information provided on the rating plate, affixed to the front of the water heater, making sure that the gas stated on the rating plate is the same as the gas to be used.

WARNING

DO NOT attempt to use this water heater with any gas other than the type listed on the rating plate. DO NOT attempt to convert this water heater for use with a gas other than the type for which it is equipped. Failure to use the proper gas can create an unsafe condition resulting in property damage, bodily injury, or death. Consult your local gas supplier or gas company if there are any questions.

This water heater must be installed in accordance with local codes. In the absence of local codes, it must be installed in compliance with the National Fuel Gas Code (ANSI Z223.1-Latest Edition), or in Canada CAN/CGA B149.1 Natural Gas Installation Code (Latest Edition) or CAN/CGA B149.2 Propane Installation Code (Latest Edition).

For installations in high altitude regions, this water heater shall be ordered from the supplier to the manufacturer's specifications for that particular altitude. Contact the company listed on the rating plate when ordering high altitude constructed water heaters.

This water heater has been designed and certified for the purpose of heating potable water. The installation and use of this water heater for any purpose other than the heating of potable water may cause damage to the water heater, create a hazardous condition, and nullify the warranty.

General Information continued-

CAUTION

Incorrect operation of this appliance may create a hazard to life and property and will nullify the warranty.

WARNING

Prior to connecting the gas supply line to a gas fired water heater, ensure that the gas supply line does not have moisture/water or dirt/scale inside the gas line. Commonly this check is done at the lowest point in the gas distribution system prior to gas burning appliances.

Do not use this appliance if any external part of the tank has been submerged in water. You should contact a qualified service technician to inspect the appliance and to replace any part of the control system including the combination gas control which has been submerged in water. See the Gas Connections section of this manual before servicing or replacing a water heater that has had any external part to the tank submerged in water.

DANGER

Do not store or use gasoline or other flammable, combustible, or corrosive vapors and liquids in the vicinity of this or any other appliance.

IMPORTANT

Before proceeding, inspect the water heater and components for possible damage. **DO NOT** install any damaged components. If damage is evident then please contact the supplier where the water heater was purchased, or the manufacturer listed on the rating plate for replacement parts.

INSTALLATION

Locating the Water Heater

WARNING

Water heaters are heat producing appliances. To avoid damage or injury there must be no materials stored against the water heater and proper care must be taken to avoid unnecessary contact (especially by children) with the water heater components.

UNDER NO CIRCUMSTANCES SHOULD FLAMMABLE MATERIALS, SUCH AS GASOLINE OR PAINT THINNER BE USED OR STORED IN THE VICINITY OF THIS WATER HEATER, VENT-AIR INTAKE SYSTEM OR IN ANY LOCATION FROM WHICH FUMES COULD REACH THE WATER HEATER OR VENT-AIR INTAKE SYSTEM.

This water heater MUST be installed indoors out of the wind and weather.

This water heater must NOT be installed in any location where gasoline or flammable vapors are likely to be present, unless the installation is such to eliminate the probable ignition of gasoline or flammable vapors.

The location of this water heater is of the utmost importance. Before installing this water heater, you must read the Installation section of these instructions. After reading these Installation and Operating

Installation (Locating The Water Heater) continued-

Instructions, select a location for the water heater where the floor is level and is easily accessible to water lines, gas supply (type identified on the rating plate), an adequate open drain, and a chimney or exhaust gas vent. **DO NOT locate the water heater where water lines could be subjected to freezing temperatures. Make sure the cold water pipes are not located directly above the gas control so that condensate during humid weather does not drip on the controls.**

Adequate clearances must be provided for easy access to controls by service personnel to enable proper cleaning, servicing, and operation of the water heater. Under no circumstances is the front of the water heater to be placed in a position where the burner tray assembly cannot slide out for removal when servicing.

Water heater corrosion and component failure can be caused by the heating and breakdown of airborne chemical vapors. Examples of some typical compounds that are potentially corrosive are: spray can propellants, cleaning solvents, refrigerator and air conditioning refrigerants, swimming pool chemicals, calcium and sodium chloride, waxes and process chemicals. These materials are corrosive at very low concentration levels with little or no odor to reveal their presence. **NOTE: DAMAGE TO THE WATER HEATER CAUSED BY EXPOSURE TO CORROSIVE VAPORS IS NOT COVERED BY THE WARRANTY. DO NOT OPERATE THE WATER HEATER IF EXPOSURE HAS OR WILL OCCUR. DO NOT STORE ANY POTENTIALLY CORROSIVE COMPOUNDS IN THE VICINITY OF THE WATER HEATER.**

WARNING

Liquefied petroleum gases/propane gas are heavier than air and will remain at floor level if there is a leak. Basements, crawl spaces, closets and areas below ground level will serve as pockets for accumulation of leaking gas. Before lighting, smell all around the appliance area for gas. Be sure to smell next to the floor.

IF YOU SMELL GAS:

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any telephone in your building.
- Immediately call your gas supplier from a telephone in another building. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

DO NOT OPERATE APPLIANCE UNTIL LEAKAGE IS CORRECTED!

WARNING

DO NOT ATTEMPT TO LIGHT ANY GAS APPLIANCE IF YOU ARE NOT CERTAIN OF THE FOLLOWING:

- Liquefied petroleum gases/propane gas and natural gas have an odorant added by the gas supplier that aids in detection of the gas.
 - Most people recognize this odor as a "sulfur" or "rotten egg" smell.
- Other conditions, such as "odorant fade" can cause the odorant to diminish in intensity, or "fade", and not be as readily detectable.
- If you have a diminished sense of smell or are in any way unsure of the presence of gas, immediately contact your gas supplier from a telephone in another building.

Gas detectors are available. Contact your gas supplier or plumbing professional for more information.

Installation (Locating The Water Heater) continued-

Proper venting practices must be considered when selecting a location for this water heater. For exact venting specifications, consult the VENTING section of these Installation and Operating Instructions.

This water heater must be located in an area where leakage of the tank, water line connections, or the combination temperature and pressure relief valve will not result in damage to the area adjacent to the water heater or to lower floors of the structure. When such locations cannot be avoided, a suitable drain pan must be installed under the water heater. The drain pan must have a minimum length and width of at least 4 in (10.2 cm) greater than the diameter of the water heater and must not restrict proper combustion air flow to the water heater. The drain pan, as described above, can be purchased from your plumbing professional. The drain pan must be piped to an adequate drain. The piping must be at least 3/4 in (1.9 cm) in diameter and pitched for proper drainage.

It is recommended that a minimum clearance of 4 in (10.2 cm) be provided on the side of the water heater for servicing and maintenance of the combination temperature and pressure relief valve.

To comply with NSF requirements this water heater is to be:

- a) Sealed to the floor with sealant, in a smooth and easily cleanable way, or
- b) Installed with an optional leg kit that includes legs and/or extensions that provide a minimum clearance of 6" beneath the water heater.

Note: Per Section 507.2 Seismic Provisions of the 2021 Uniform Plumbing Code (UPC). Water heaters shall be anchored or strapped to resist horizontal displacement due to earthquake motion. Strapping shall be at points within the upper one-third and lower one-third of its vertical dimensions. At the lower point, a distance of not less than 4 inches shall be maintained from the controls with the strapping.

Please refer to the local authority having jurisdiction to see if there are any additional local requirements regarding seismic provisions.

Minimum Clearances

WARNING

Failure to adhere to these installation and operating instructions may create a hazard to life and property and will nullify the warranty.

This installation must allow access to the front of the water heater and adequate clearance must be provided for servicing and operating this water heater. The water heater may be installed on either a combustible or non-combustible floor. If the water heater is to be installed directly on carpeting, it must be installed on top of a metal or wood panel (or equivalent) extending beyond the full width and depth of the appliance by at least 3 in (7.6 cm) in any direction or, if the appliance is to be installed in an alcove or closet, the entire floor must be covered by the panel. A minimum of 24 in (61 cm) front clearance must be provided for inspection and servicing.

WARNING

If combustible flooring is used, a leg kit must be installed before setting water heater in place.

For three (3) leg water heaters, use kit p/n 243-42726-01.

For four (4) leg water heaters, use kit p/n 243-42726-02.

The appropriate leg kit has been included with this water heater.

Minimum Clearances continued-

The National Fuel Gas Code (ANSI Z233.1-or latest edition) and CAN/CGA (B149.1-or latest edition), expressly prohibits the following:

- a) Installation of a water heater in a bathroom, bedroom, or any occupied room normally kept closed.
- b) Installation of a water heater in a garage, unless the unit is installed so that the burner and ignition devices are at least 18 in (45.8 cm) above floor level and protected to avoid damage by a moving vehicle.

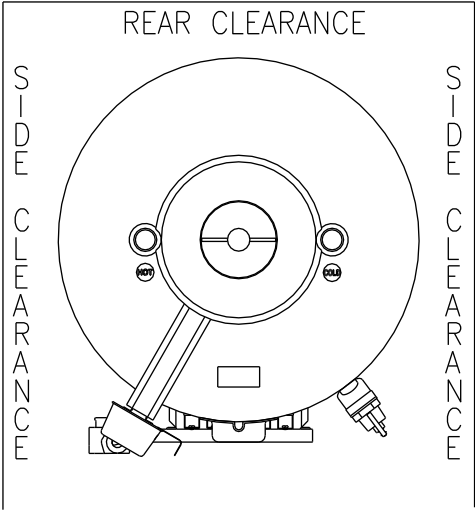


Fig. 1

Minimum Clearances continued-

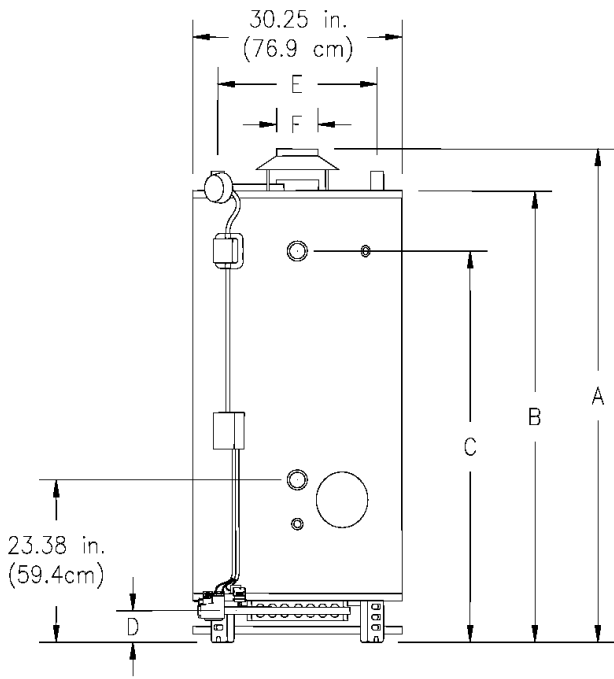


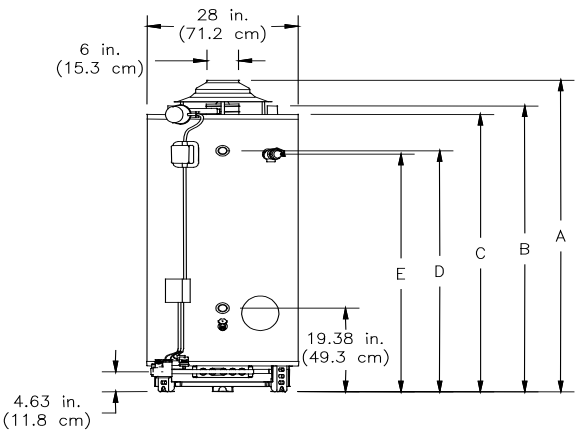
Fig. 2

Model Description			A (in)	B (in)	C (in)	D (in)	E (in)	F (in)	Clearances *		
Capac- ity (GAL)	Input (BTU/hr)								Sides and Rear (in)	Flue or Vent (in)	Ceil- ing (in)
	Nat.	LP									
100	199,999	199,999	74.88	65.19	56.38	4.56	23	6	2	6	20
100	250,000	225,000	74.88	65.19	56.38	4.56	23	6	2	6	20
100	270,000	250,000	74.88	65.19	56.38	4.56	23	6	2	6	20

Model Description			A (m)	B (m)	C (m)	D (m)	E (m)	F (m)	Clearances *		
Capacity	Input (kW)								Sides and Rear (cm)	Flue or Vent (cm)	Ceiling (cm)
(Litres)	Nat.	LP									
378	58.7	58.7	1.90	1.66	1.43	11.6	58.4	15.2	5.1	15.3	50.8
378	73.3	66.0	1.90	1.66	1.43	11.6	58.4	15.2	5.1	15.3	50.8
378	79.3	73.3	1.90	1.66	1.43	11.6	58.4	15.2	5.1	15.3	50.8

Minimum Clearances continued-

Fig. 3



Model Designation		A (in)	B (in)	C (in)	D (in)	E (in)	Clearances *		
Capacity	Input (BTU/HR)						Sides and Rear (in.)	Flue or Vent (in.)	Ceiling (in.)
80	180,000	71.88	66.25	64.38	56.00	55.13	2	6	20
80	199,999 (235,000 LP)	71.88	66.25	64.38	56.00	55.13	2	6	20
80	250,000 (235,000 LP)	71.88	66.25	64.38	56.00	55.13	2	6	20
98	199,999	82.88	77.25	75.38	67.00	66.13	2	6	20
98	250,000 (235,000 LP)	82.88	77.25	75.38	67.00	66.13	2	6	20
100	199,999	75.50	69.88	61.88	60.38	56.88	2	6	20
100	250,000	75.50	69.88	61.88	60.38	56.88	2	6	20

Model Designation		A (m)	B (m)	C (m)	D (m)	E (m)	Clearances *		
Capacity (Liters)	Input (kW)						Sides and Rear (cm)	Flue or Vent (cm)	Ceiling (cm)
302.8	52.8	1.83	1.69	1.64	1.43	1.40	5.1	15.3	50.8
302.8	58.7 (68.9 LP)	1.83	1.69	1.64	1.43	1.40	5.1	15.3	50.8
302.8	73.3 (68.9 LP)	1.83	1.69	1.64	1.43	1.40	5.1	15.3	50.8
371.0	52.8	2.11	1.97	1.92	1.71	1.68	5.1	15.3	50.8
371.0	73.3 (68.9 LP)	2.11	1.97	1.92	1.71	1.68	5.1	15.3	50.8
378.5	52.8	1.92	1.78	1.58	1.54	1.45	5.1	15.3	50.8
378.5	73.3	1.92	1.78	1.58	1.54	1.45	5.1	15.3	50.8

Minimum Clearances continued-

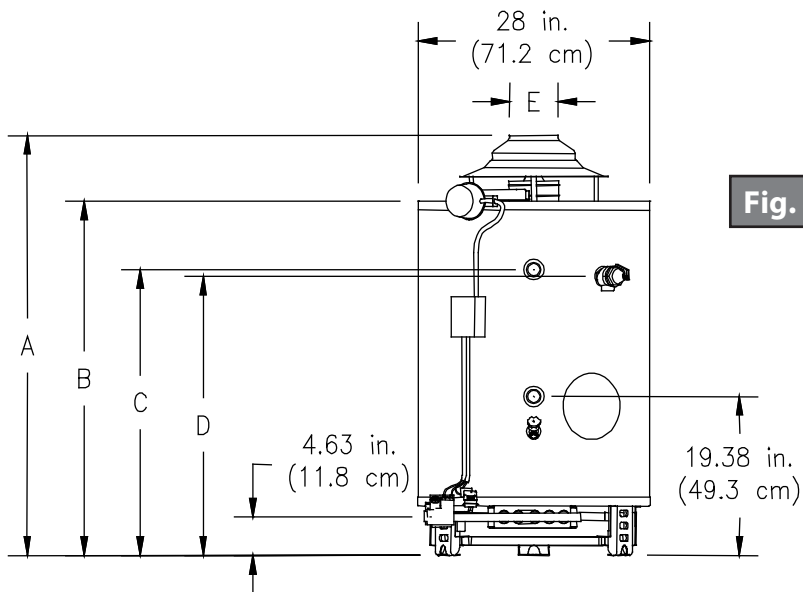


Fig. 4

Model Designation		A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	Clearances *		
Capacity (GAL)	Input (BTU/hr)						Sides and Rear (in.)	Flue or Vent (in.)	Ceiling (in.)
38	155,000	51.00	43.00	34.75	33.75	6	2	6	20
75	125,000	70.13	65.00	54.25	54.25	6	2	6	20
75	160,000	70.13	65.00	54.25	54.25	6	2	6	20

Model Designation		A (m)	B (m)	C (m)	D (m)	E (m)	Clearances *		
Capacity (Liters)	Input (kW)						Sides and Rear (cm)	Flue or Vent (cm)	Ceiling (cm)
144	45.4	1.30	1.10	0.88	0.86	15.3	5.1	15.3	50.8
284	36.6	1.78	1.65	1.38	1.38	15.3	5.1	15.3	50.8
284	46.9	1.78	1.65	1.38	1.38	15.3	5.1	15.3	50.8

- 1.*Denotes minimum clearances to combustible material. Some models may have different clearances. Check the label on the front of the water heater to verify proper installation clearances.
- 2.Model number may have a suffix "N" for natural gas or "X", "P", or "L" for liquefied petroleum (LP) gases. Some models may have "A" as a suffix or prefix. Check the rating plate on front of the water heater for model number verification.
3. Increase distances to provide clearance for servicing.

Venting

⚠ WARNING

The vent system must be installed properly. Failure to properly install the vent system could result in property damage, personal injury, or death.

This water heater has been shipped with a draft diverter for which it was designed with reference to the horizontal and vertical planes, its certified category I, per latest ANSI Z 21.10.3-2019.CSA 4.3-2019 revision. Refer to the latest edition of the National Fuel Gas Code (ANSI Z223.1-latest edition), or in Canada, the Natural Gas and Propane installation Code (B149.1-00 latest edition). If removed, the draft diverter must be replaced in the same position and secured to the jacket top by the screws with which it was installed.

This water heater must be connected to a masonry chimney or venting system approved by local codes or ordinances. When an existing Category I appliance is removed or replaced, the original venting system may no longer be sized to properly vent the attached appliances. The vent connector used to attach the draft diverter outlet to the chimney or approved vent must be of the same diameter as the draft diverter outlet or larger. For proper venting in certain installations, a larger vent connector may be needed. Consult venting tables in ANSI standard (Z223.1-or latest edition), National Fuel Gas Code or in Canada, the Natural Gas Installation Code or Propane Installation Code, CAN/CGA (B149.1 or B149.2-latest editions), or local code officials for proper application for your area.

IMPORTANT

Use of cellular core PVC (ASTM F891). Cellular core CPVC, or Radel® (polyphenylsulfone) in non-metallic venting systems is prohibited, and covering non-metallic venting with thermal insulation is prohibited.

Flue Damper

Refer to Figure 5 and follow these instructions:

1. Remove the damper from the accompanying box shipped within the crate.
2. Locate the collector outlet on top of the water heater. Place the damper over the collector outlet and rotate it to so that the wire harness on the side of the water heater can be connected to the connector plug in the damper cover. There must be adequate clearance for removal and service of the damper.
3. Verify that the damper vane will travel freely from the “closed” to “open” position and secure the flue damper to the jacket top with sheet metal screws. It must be possible to see the damper vane after the water heater has been installed.
4. Connect the wire harness on the side of the water heater to the connector plug in the damper cover. **Note:** The connector plug and socket receptacle on the wire harness can only be engaged one way (polarized).
5. The Lighting and Operating instructions are outlined in the Lighting and Shutdown Instructions section. The damper must be in the open position when the water heater main burner is operating.

Draft Diverter

This water heater has been shipped with a draft diverter for which it was designed. Remove the bag containing the legs and instructions from the draft diverter. Attach the legs to the draft diverter and attach the draft diverter to the water heater per the instructions in the bag.

Installation (Venting) continued-

⚠ WARNING

Modification to the flue damper or the draft diverter may result in personal injury, property damage or death. The flue damper and draft diverter are to be placed in position and operate exactly as stated in these instructions without modification.

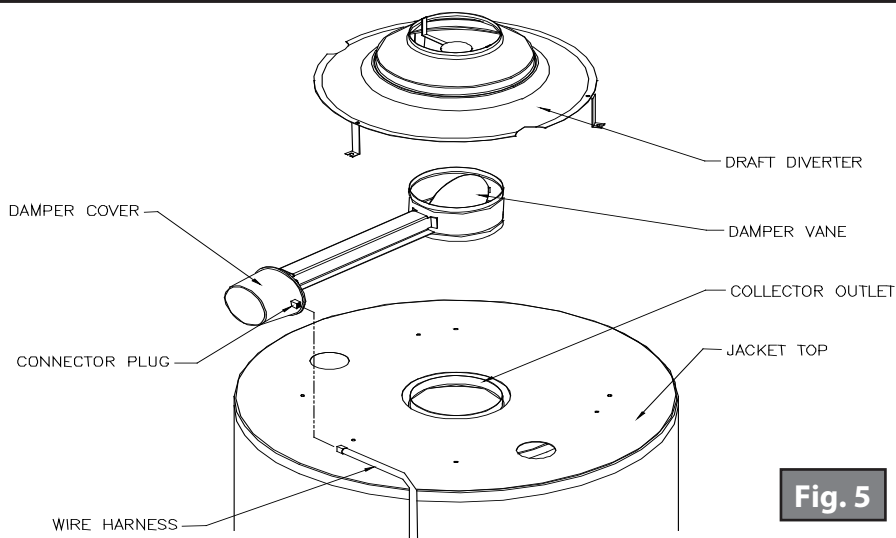


Fig. 5

In a horizontal application, it is important that condensate not be allowed to buildup in the exhaust vent pipe. To prevent this from happening the pipe should be installed with a slight upward slope so the condensate will run back toward the water heater. The vent system should be supported every 5 feet (1.5 m) of vertical run and every 3 feet (1 m) of horizontal run of vent pipe length. The venting system should have horizontal runs sloping upwards not less than $\frac{1}{4}$ inch (21 mm/m) from the appliance to the vent terminal.

Combustion Air Supply

⚠ WARNING

Liquefied petroleum gases/propane gas are heavier than air and will remain at floor level if there is a leak. Basements, crawl spaces, closets and areas below ground level will serve as pockets for accumulation of leaking gas. Before lighting, smell all around the appliance area for gas. Be sure to smell next to the floor.

IF YOU SMELL GAS:

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any telephone in your building.
- Immediately call your gas supplier from a telephone in another building. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

DO NOT OPERATE APPLIANCE UNTIL LEAKAGE IS CORRECTED!

Installation (Combustion Air Supply) continued-

All Air from Outdoors: Provide two permanent openings, one commencing within 12 in (31 cm) of the top and one commencing within 12 in (31 cm) from the bottom of the enclosure. The openings must communicate directly or by ducts with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors.

1. When communicating with the outdoors through vertical ducts, each opening must have a minimum free area of 1 in²/4000 BTU/hr (550 mm²/kW) of total input rating of all equipment in the enclosure.
2. When communicating with the outdoors through horizontal ducts, each opening must have a minimum free area of 1 in²/2000 BTU/hr (1100 mm²/kW) of total input rating of all equipment in the enclosure.
3. When ducts are used, they must be of the same cross-sectional area as the free area of the openings to which they connect. The minimum dimension of rectangular air ducts cannot be less than 3 in (8 cm).

Provide one permanent opening, commencing within 12 in (31 cm) of the top of the enclosure. The appliance must have clearance of at least 1 in (3 cm) from the sides and back and 6 in (16 cm) from the front of the appliance. The opening must communicate directly or by ducts with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors and has a minimum free area of the following:

1. 1 in²/3000 BTU/hr (700 mm²/kW) of the total input rating of all appliances located in the enclosure.
2. Not less than the sum of the areas of all vent connectors in the space.

CAUTION

The draft diverter relief opening of the water heater and combustion air inlet must be in the same atmospheric pressure zone. Large exhaust fans in kitchens and other locations can lower the air pressure inside an enclosure and interfere with the proper operation and venting of the water heater. In these cases, the water heater should be installed in a separate room with the combustion and ventilation air supplied directly from outdoors as previously described.

Specialty Engineered Installations

The requirements noted under *Confined Spaces* above must not necessarily govern when special engineering, approved by the authority having jurisdiction, provides an adequate supply of air for combustion, ventilation, and dilution of flue gases.

Water Connections

Note: BEFORE PROCEEDING WITH THE INSTALLATION, CLOSE THE MAIN WATER SUPPLY VALVE.

After shutting off the main water supply, open a faucet to relieve the water line pressure to prevent any water from leaking out of the pipes while making the water connections to the water heater. After the pressure has been relieved, close the faucet. The COLD water inlet and HOT water outlet are identified on the top and front of the water heater. Make sure the dip tube is in place before making the cold water connection. Make the proper plumbing connections between the water heater and the plumbing system to the house. Install a shut-off valve in the cold water supply line.

CAUTION

If sweat fittings are to be used, DO NOT apply heat to the nipples on top or side of the water heater. Sweat the tubing to the adapter before fitting the adapter to the water connections. It is imperative that heat is not applied to the nipples containing a plastic liner.

Installation (Water Connections) continued-

WARNING

Failure to install and maintain a new, listed temperature and pressure relief valve will release the manufacturer from any claim which might result from excessive temperature and pressures.

If this water heater is installed in a closed water supply system, such as the one having a back-flow preventer in the cold water supply, provisions must be made to control thermal expansion. **DO NOT** operate this water heater in a closed system without provisions for controlling thermal expansion. Warranties do not cover damages from thermal expansions such as pressure bulges and/or deformities. Your water supplier or local plumbing inspector should be contacted on how to control this situation.

After installation of the water lines, open the main water supply valve and fill the water heater. While the water heater is filling, open several hot water faucets to allow air to escape from the water system. When a steady stream of water flows through the faucets, close them and check all water connections for possible leaks.

CAUTION

Keep clear of combination temperature and pressure relief valve discharge line outlet. The discharge may be hot enough to cause scald injury. The water is under pressure and may splash.

Never operate the water heater without first being certain it is filled with water.

Installation (Water Connections) continued-

WARNING

For protection against excessive temperatures and pressure, install temperature and pressure protective equipment required by local codes, but not less than a combination temperature and pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment or materials as meeting the requirements of the Standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems, ANS Z21.22 and the Standard CAN1-4.4 Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves. The combination temperature and pressure relief valve must be marked with a maximum set pressure not to exceed the maximum working pressure of the water heater. The combination temperature and pressure relief valve must also have an hourly rated temperature steam BTU discharge capacity not less than the hourly rating of the water heater.

Install the combination temperature and pressure relief valve into the opening provided and marked for this purpose on the water heater.

Note: Some models may already be equipped or supplied with a combination temperature and pressure relief valve. Verify that the combination temperature and pressure relief valve is in compliance with local codes. If the combination temperature and pressure relief valve does not comply with local codes, replace it with one that does. Follow the installation instructions above on this page.

Install a discharge line so that water discharged from the combination temperature and pressure relief valve will exit within 6 in (15.2 cm) above, or any distance below the structural floor and cannot contact any live electrical part. The discharge line is to be installed to allow for complete drainage of both the combination temperature and pressure relief valve and the discharge line. The discharge opening must not be subjected to blockage or freezing. **DO NOT** thread, plug or cap the discharge line. It is recommended that a minimum clearance of 4 in (10.2 cm) be provided on the side of the water heater for servicing and maintenance of the combination temperature and pressure relief valve.

DO NOT place a valve between the combination temperature and pressure relief valve and the tank.

This water heater can deliver scalding temperature water at any faucet in the system. Be careful whenever using hot water to avoid scalding injury. Certain appliances such as dishwashers and automatic clothes washers may require increased temperature water. By setting the thermostat on this water heater to obtain the increased temperature water required by these appliances, you may create the potential for scald injury.

To protect against injury, you should install an ASSE approved mixing valve in the water system. This valve will reduce point of discharge temperature by mixing cold and hot water in branch supply lines. Such valves are available from the manufacturer of this water heater or a local plumbing supplier. Please consult with a plumbing professional. Turn to the end of these instructions for information regarding space heating water connections and plumbing arrangements.

Installation (Water Connections) continued-

⚠ WARNING

Hydrogen gas can be produced in an operating water heater that has not had water drawn from the tank for a long period of time (generally two weeks or more). **HYDROGEN GAS IS EXTREMELY FLAMMABLE.** To prevent the possibility of injury under these conditions, we recommend the hot water faucet to be open for several minutes at the kitchen sink before you use any electrical appliance which is connected to the hot water system. If hydrogen is present, there will be an unusual sound such as air escaping through the pipes as hot water begins to flow. **DO NOT** smoke or have open flame near the faucet at the time it is open.



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

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

Review this instruction manual before setting temperature at water heater.

Feel water before bathing or showering.

Temperature limiting valves are available, contact local plumbing supplier.

Approximate Time/Temperature Relationships in Scalds	
120°F (49°C)	More than 5 minutes
125°F (52°C)	1 1/2 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 1 1/2 seconds
155°F (68°C)	About 1 second

Gas Connections

The gas supply lines must meet all requirements of the National Fuel Gas Code (ANSI Z223.1-Latest Edition), or in Canada CAN/CGA B149.1 Natural Gas Installation Code (Latest Edition) or CAN/CGA B149.2 Propane Installation Code (Latest Edition). The minimum permissible gas supply pressure for the purpose of input adjustment is 1 in (0.25 kPa) water column above the operating manifold pressure. See the rating plate and gas valve for the manifold pressure and gas type. The maximum permissible gas supply pressure is 14 in (3.5 kPa) water column for natural gas and liquefied petroleum gases/propane gas.

1. Connect this water heater only to the type of gas (Natural or Propane) as shown on the rating plate. Use clean black iron pipe or equivalent material approved by local codes and ordinances (dirt and scale from the pipe can enter the gas valve and cause it to malfunction). The inlet gas line must have a minimum length of 3 in (7.6 cm) drip leg (sediment trap) installed as close to the water heater's gas valve as possible. A ground joint union must be installed as close to the water heater as possible in the gas supply line feeding the water heater to permit servicing of the water heater. Compounds used on the threaded joints of the gas piping must be resistant to the action of liquefied petroleum gases/propane gas. **DO NOT** apply pipe dope to the gas valve inlet and make certain that no pipe dope has become lodged in the inlet screen of the gas valve. Extreme care must be taken to ensure no pipe dope enters the gas valve. Avoid excessive torque when tightening the gas supply line to the gas valve. Excessive torque may result in cracking of the gas valve housing and could create a gas leak. The suggested maximum torque is 31.5 ft. lbs. (4.4 kg-m).

Gas Connections continued-

WARNING

The manufacturer of this water heater will not be liable for any damage or injury caused as a result of a cracked gas inlet as a result of excessive torque.

2. This water heater and its gas connection must be leak tested before placing the water heater in operation. Check for gas leaks with a soap and water solution and a brush or a commercial leak detector fluid. **NEVER USE A MATCH OR OPEN FLAME FOR TESTING!**

CAUTION

The water heater and individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of the system at test pressures in excess of 1/2 psi (3.5 kPa). The water heater must be isolated from the gas supply piping system by closing its manual shutoff valve during any pressure testing of the gas supply system at test pressures equal to or less than 1/2 psi (3.5 kPa). The supply line must be capped when not connected to the water heater.

3. While checking for leaks care must be taken to prevent solution from contacting the electrical connections at the control. If electrical connections at the control become wet, they must be thoroughly dried before attempting to operate the water heater.

GENERAL OPERATION

WARNING

Water heaters are heat producing appliances. To avoid damage or injury there must be no materials stored against the water heater or vent-air intake system, and proper care must be taken to avoid unnecessary contact (especially by children) with the water heater and vent-air intake system.

UNDER NO CIRCUMSTANCES SHOULD FLAMMABLE MATERIALS, SUCH AS GASOLINE OR PAINT THINNER BE USED OR STORED IN THE VICINITY OF THIS WATER HEATER OR IN ANY LOCATION FROM WHICH FUMES COULD REACH THE WATER HEATER.

TO FILL THE WATER HEATER

1. Close the water heater drain valve by turning the knob clockwise. If alternative water connections are provided but not used, make certain they are plugged (i.e. rear connections).
2. Open the cold water supply shut-off valve.
3. Open several hot water faucets to allow air to escape from the system.
4. When a steady stream of water flows from the faucets, the water heater is filled. Close the faucets and check for water leaks at the water heater drain valve, combination temperature and pressure relief valve and the hot and cold water connections.

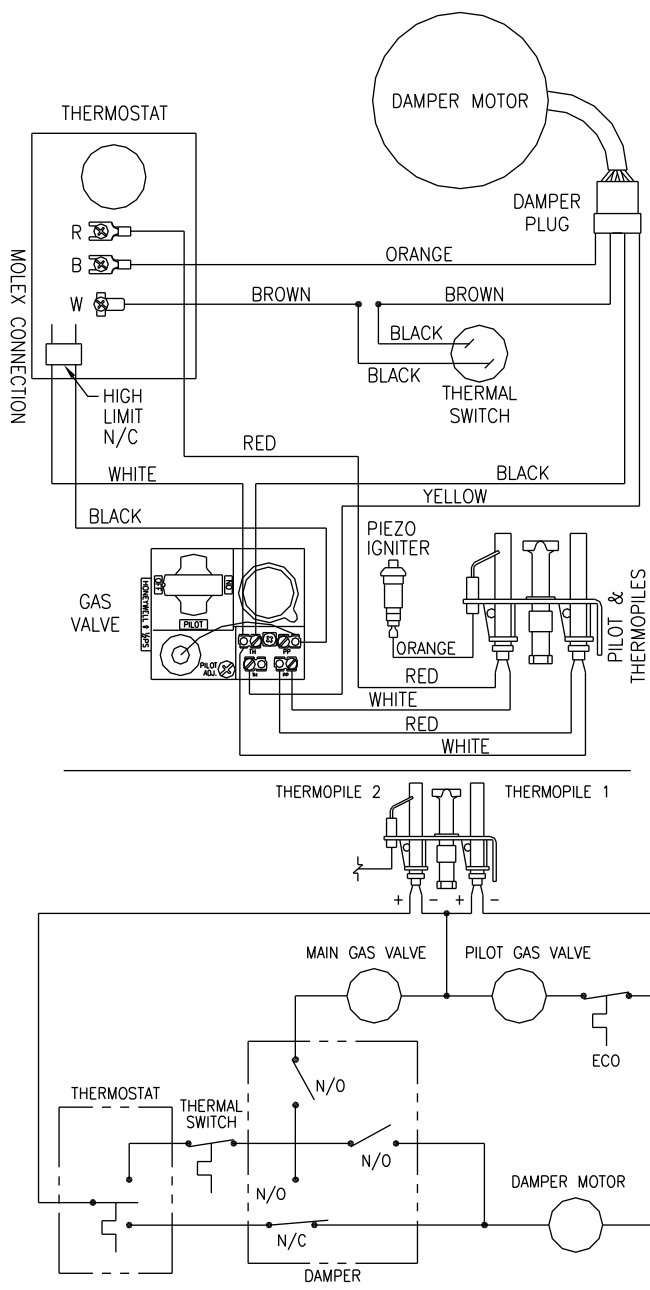
TO DRAIN THE WATER HEATER

Should it become necessary to completely drain the water heater, make sure you follow the steps below:

1. Rotate the thermostat dial counterclockwise to the lowest position.
2. Rotate and partially depress gas control knob clockwise to the "OFF" position.
3. Shut off the gas supply to the water heater.
4. Close the cold water supply shut-off valve.
5. Open the drain valve on the water heater by turning the knob counter-clockwise. The drain valve has threads on the end that will allow the connection of a standard hose coupling.
6. Open a hot water faucet to allow air to enter the system.

To refill the water heater, refer to "To Fill the Water Heater

Wiring Diagrams



IF ANY OF THE ORIGINAL WIRES AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH 18. GA STRANDED 105° WIRE OR ITS EQUIVALENT.

Lighting & Shutdown Instructions

FOR YOUR SAFETY READ BEFORE LIGHTING

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

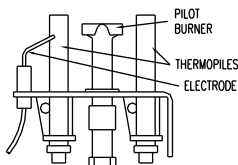
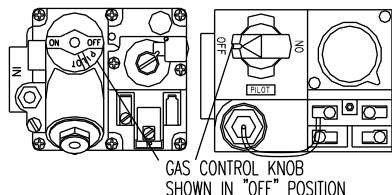
- A. This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.
- B. **BEFORE LIGHTING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbors phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
 - D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

LIGHTING INSTRUCTIONS

1. **STOP!** read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Push in gas control knob slightly and turn clockwise ↻ to "OFF."



- NOTE:** Knob cannot be turned from "PILOT" to "OFF" unless knob is pushed in slightly. Do not force.
4. Wait (5) minutes to clear out any gas. If you then smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
 5. Find pilot - follow metal tube from gas control. The pilot is located in the center of the burner rack between two burner tubes.

6. Turn knob on gas control counterclockwise ↻ to "PILOT."
7. Push in control knob all the way and hold in. Immediately depress piezo igniter button until you hear a "click" sound, then release. Continue to hold down the gas control knob for approximately one (1) minute after pilot is lit. If pilot is not lit, continue to depress the gas control knob and it should pop back up. Pilot should remain lit. If it goes out, repeat steps 3 through 7.
 - 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 to "OFF" and call your service technician or gas supplier.
8. Turn gas control knob counterclockwise ↻ to "ON."
9. Set the thermostat to desired setting.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Push in gas control knob slightly and turn clockwise ↻ to "OFF." Do not force.

Temperature Adjustment

The temperature selector knob of the thermostat has been adjusted to its lowest setting when shipped from the factory.

The marking on the thermostat temperature scale (shown below) is the preferred starting point for setting the temperature control. For energy-efficient operation of your water heater, the suggested initial temperature setting is approximately 120°F (49°C). Households with small children may require a 120°F (49°C) or lower temperature setting to reduce the risk of scald injury. Some states require a lower temperature setting. Full counterclockwise rotation of the temperature selector dial is the minimum temperature setting for thermostats (see Figure 6). Full clockwise rotation of the temperature selector dial is the maximum temperature setting.

NOTE: The lower the temperature setting, the greater the energy efficiency, both to heat the water and to maintain its temperature during standby periods. Lower water temperatures also extend tank life. Remember, no water heating system will provide exact temperatures at all times. Allow a few days of operation at this setting to determine the correct temperature setting consistent with your needs. **NOTE:** This water heater, when set at a lower temperature setting, is not capable of producing hot water of sufficient temperature for sanitizing purposes.

During winter season or any cold period, you may desire a higher temperature setting to adjust for the colder incoming water. This adjustment, however, may cause additional condensation to form on the cooler tank surface. This does not mean the tank is leaking. During summer months, the warmer incoming water temperatures will benefit the performance of your water heater and reduce the amount of condensation developed.

Condensation does not mean your tank is leaking. Over 40% of reported tank leaks on installation are proven to be condensation. To avoid unnecessary expense and inconvenience, make sure the tank is leaking before calling a service person.

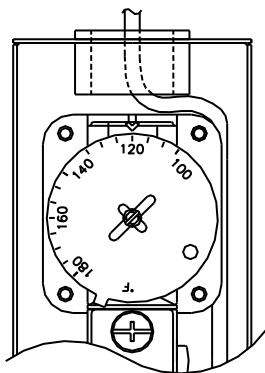


Fig. 6

General Operation (Temperature Adjustment) continued-

DANGER

Hotter water increases the risk of scald injury. Scalding may occur within five (5) seconds at a temperature setting of 140°F (60°C). To protect against hot water injury, install an ASSE approved mixing valve in the water system. This valve will reduce point of discharge temperature by mixing cold and hot water in branch water lines. A licensed plumbing professional or local plumbing authority should be consulted.

Note: This water heater is equipped with an energy cut out device to prevent overheating. Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance and call a qualified service technician.

Note: Whenever the water heater is filled with cold water, condensate will form on the cool tank surface and drops of water will fall on the hot burner and combustion chamber surfaces producing a “sizzling” noise. Condensation is normal and does not indicate a leak. It will disappear when the tank becomes heated.

An automatic gas shut-off device (ECO) is incorporated in the thermostat which will shut off all gas supply to the burner and pilot if the water heater temperature exceeds 200°F (93°C). Should the ECO function (open), the water temperature should be reduced to approximately 120°F (49°C). Follow applicable Lighting Instructions to place the water heater in operation. If a problem exists, contact your dealer for service. It is recommended that all service work be performed by a qualified service agency.

If the water heater is to remain idle for 30 days or more or is subjected to freezing temperatures while shut off, the water heater and piping should be fully drained (see To Drain the Water Heater) and the drain valve should be left fully open.

WARNING

Hydrogen gas can be produced in an operating water heater that has not had water drawn from the tank for a long period of time (generally two weeks or more). HYDROGEN GAS IS EXTREMELY FLAMMABLE. To prevent the possibility of injury under these conditions, we recommend the hot water faucet to be open for several minutes at the kitchen sink before you use any electrical appliance which is connected to the hot water system. If hydrogen is present, there will be an unusual sound such as air escaping through the pipes as hot water begins to flow. DO NOT smoke or have open flame near the faucet at the time it is open.

Burner Flame Check

At the time of installation and at periodic intervals (about every 3 months), a visual check of the pilot and burner flames should be made to determine if they are burning properly. No adjustment to the air shutter is required for this heater. The burner flames should be blue with yellow tips. A blue-orange flame is characteristic of operation on liquefied petroleum (LP) gas. The burner tube flames should light smoothly from the pilot.

IMPORTANT

In the event of an emergency, turn off the gas to the appliance.

Burner Flame Check continued-

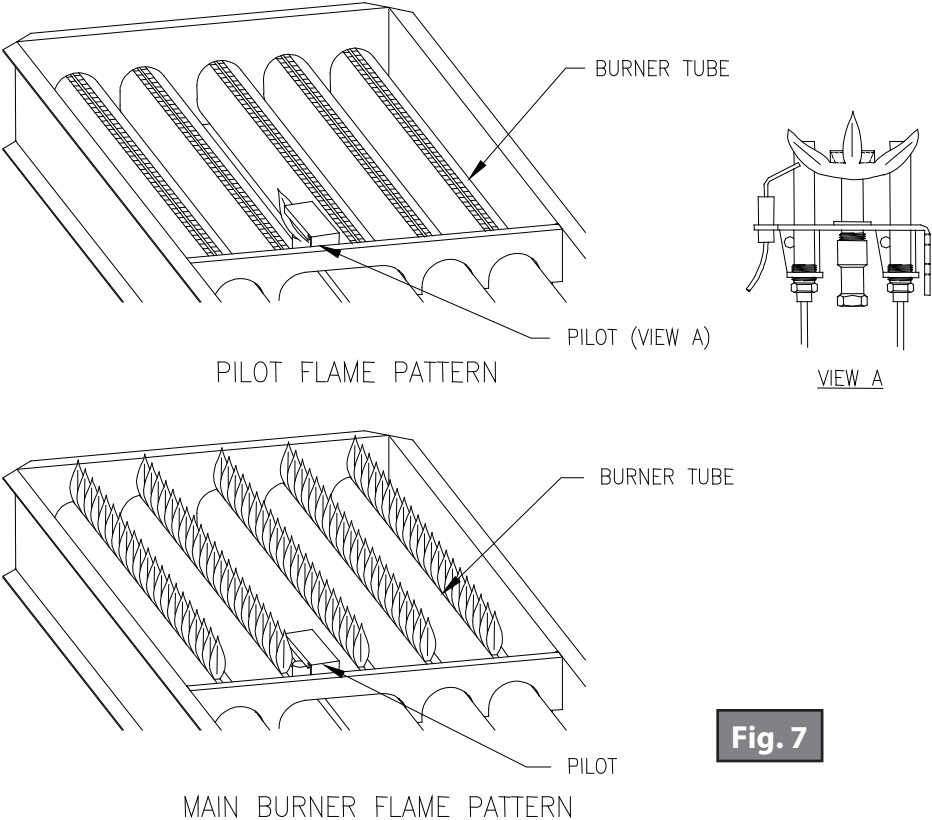


Fig. 7

⚠ WARNING

Water heaters are heat producing appliances. To avoid damage or injury there must be no materials stored against the water heater or vent system, and proper care must be taken to avoid unnecessary contact (especially by children) with the water heater and vent system. **UNDER NO CIRCUMSTANCES SHOULD FLAMMABLE MATERIALS, SUCH AS GASOLINE OR PAINT THINNER BE USED OR STORED IN THE VICINITY OF THIS WATER HEATER, VENT SYSTEM OR IN ANY LOCATION FROM WHICH FUMES COULD REACH THE WATER HEATER OR VENT SYSTEM.**

IMPORTANT

The water heater should be inspected at a minimum annually by a qualified service technician for damaged components and/or joints not sealed. **DO NOT** operate this water heater if any part is found damaged or if any joint is found not sealed.

⚠ WARNING

Do not run out of propane gas. Damage to the water heater may occur.

MAINTENANCE

The following maintenance should be performed by a qualified service technician at the minimum periodic intervals suggested below. In some installations, the maintenance interval may be more frequent depending on the amount of use and the operating conditions of the water heater. Regular inspection and maintenance of the water heater will help to insure safe and reliable operation.

1. Annual checks of the ignition systems, temperature controls and any other water heater controls are necessary to ensure proper operation. Also, all safety shut-off valves must be checked to verify proper operation and tightness.
2. The flow of combustion and ventilation air must **NOT** be restricted. Clear the combustion air openings of any dirt, dust, or other restrictions. **WARNING! The ventilation air system may be HOT.**
3. At all times keep the water heater area clear and free from combustible materials, gasoline and other flammable vapors and liquids.
4. Bi-annually conduct a visual check of the pilot and burner flames to determine that they are burning properly. See "Burner Flame Check" section for an example of proper burner flame pattern.
5. Annually remove the main burner rack assembly to clean orifices and related parts of any dirt or other foreign material. Inspect the burner ports for obstructions or debris and clean with a wire brush, vacuum, or use a mild detergent solution to clean as needed. **NOTE:** It is imperative for proper operation of the water heater that the main burner rack be replaced in the original location.

WARNING

When lifting lever of the combination temperature and pressure relief valve, hot water will be released under pressure. Be careful that any released water does not result in bodily injury or property damage.

6. At least once a year, check the combination temperature and pressure relief valve to ensure that the valve has not become encrusted with lime. Lift the lever at the top of the valve several times until the valve seats properly without leaking and operates freely.
7. Monthly drain off a gallon of water to remove silt and sediment.
8. If the combination temperature and pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. **DO NOT** plug the combination temperature and pressure relief valve outlet.
9. All models are equipped with a cleanout opening to aid in removal of hard water deposits from the tank bottom. If this water heater operates under hard water conditions, the following should be performed at least every 3 months: Drain the water heater. Remove the cleanout jacket cover and tank cover. When cleaning the tank, care must be taken to avoid trying to break deposits loose as this could damage the glass lining and shorten the life of the water heater. After cleaning, replace the cleanout tank cover and jacket cover, and refill with water.
10. A combination sacrificial anode rod/hot water outlet nipple has been installed to extend tank life. The anode rod should be inspected periodically (every 2 years) and replaced when necessary to prolong tank life. The removal of this anode, except for inspection and/or replacement, will nullify the warranty. Water conditions in your area will influence the time interval for inspection and replacement of the anode rod. Contact the plumbing professional who installed the water heater, or the manufacturer listed on the rating plate for anode replacement information. The use of a water softener may increase the speed of anode consumption. More frequent inspection of the anode is needed when using softened (or phosphate treated) water.
11. The vent system must be inspected at least once a year to ensure against leakage of exhaust products.
12. Vent pipe and vent hood screen should be cleaned of any foreign material. The screen is located inside the vent hood outlet and is accessible from the outside of the hood. Do not reach inside the vent hood when the water heater is in operation.

Maintenance continued-

⚠ CAUTION

For your safety. Do not attempt repair of combination gas control, burners or gas piping. Refer repairs to a qualified service technician.

Contact your supplier or plumbing professional for replacement parts or contact the company at the address given on the rating plate of the water heater. For faster service, provide the part name, model and serial numbers of the water heater when ordering parts.

IMPORTANT

Read the warranty for a full explanation of the length of time that parts and the water heater are warranted.

This product is covered under one or more of the following patents and or patent pending applications:

CA2,430,807 CA2,844,271 EP1369647 GB1369647 NL1369647 TWI276761 US7,559,293
US7,900,589 US7,007,748 CA2,476,685 US7,063,132 CA2,409,271 US6,684,821 US7,337,517
US7,665,211 US7,665,210 US7,699,026 CA2,504,824 US6,935,280 AU2007201423
CA2,583,609 EP1840484 GB1840484 NL0840484 US7,634,976 US7,270,087 US7/621,238
US7,334,419 US7,866,168 CA2,491,181 US7,063,133 CA2,677,549 US8,082,888
AU2007201424 CA2,583,108 EP1840481 GB1840481 NL1840481 CA2,659,534 US7,971,560
US7,992,526 US8,146,772 US8,707,558 CA2,548,958 MX243220 US6,422,178 TWI649522
US9,429,337 CA3,001,716 GB2558134 GB2013252.8 US10,866,010 US17/109,618
US10,503,183 US20/42096 CA2,949,830 DE112015002523.5 GB2540513 US9,574,792
US15/436,425 CA3,059,965 EP18784108.5 MX/a/2019/012268 US15/486,816 US17/038,087
US7,007,316 US7,243,381 CA2,784,312 US8,787,742 DE112014002713.8 GB2533862
US9,964,241 US6,644,393 US8,851,022 USD636,857 US8,931,438 CA2,899,271 US10,495,343
CA2,918,211 US10,094,619 US15/621,063 US16/474,833 US16/281,599

Complete the following information and retain for future reference:

Model No: _____

Serial No: _____

Service Phone: _____

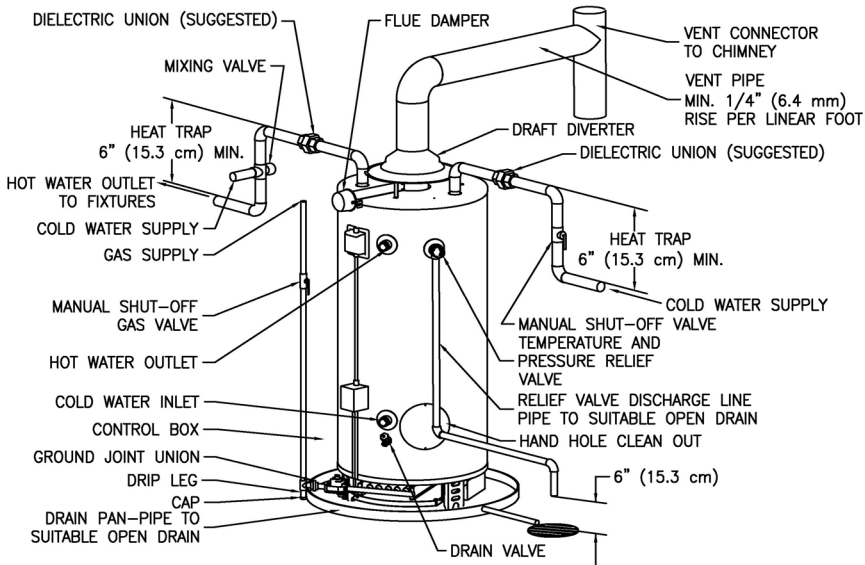
Days: _____ **Nights:** _____

Address: _____

Supplier: _____

Supplier Phone No: _____

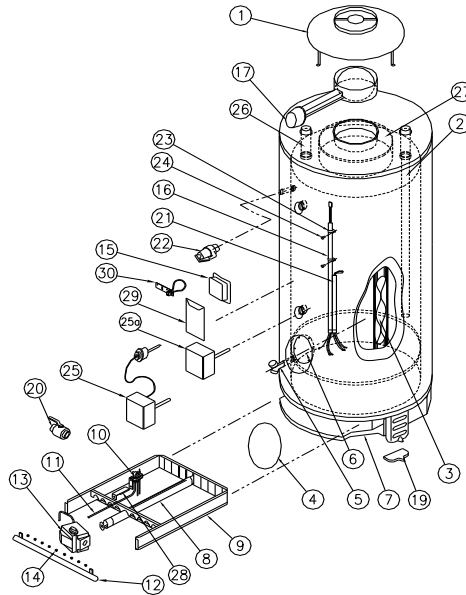
TYPICAL INSTALLATION



Operating and Troubleshooting Guide – Sequence of Normal Operation

1. When the temperature of the water in the tank falls the switch in the thermostat completes a circuit between the thermopiles and the damper.
2. As a result of the completed circuit the damper vane moves to the open position.
3. When the damper vane reaches the full open position two switches are closed completing a circuit that powers the main gas valve.
4. The main burner is ignited by the standing pilot.
5. When the temperature of the water in the tank reaches the thermostat set point, the switch in the thermostat moves to a position that breaks the circuit powering the main valve and completes the circuit to the thermal switch.
6. When the main gas valve closes, and the temperature in the combustion chamber decreases the thermal switch closes completing the circuit between the thermopiles, thermostat, thermal switch and damper.
7. The damper vane moves to the closed position.
8. The damper remains closed with the water heater in the standby mode until the water temperature falls low enough to activate the thermostat.

PART LIST & DRAWING



PART NAME AND DESCRIPTION

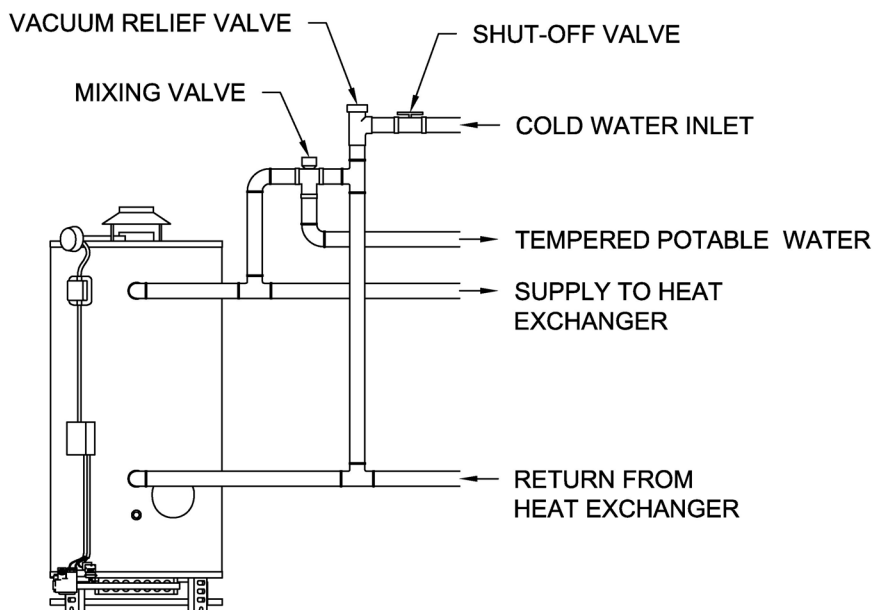
1. Drafthood	16. Wire Harness MV Valve to Thermostat
2. Diptube	17. Flue Damper
3. Flue Baffle	18. Anode Rod (Not Pictured)
4. Cleanout Access (Jacket) Cover	19. Leg Thermal Break
5. Drain Valve	20. Manual Shut Off Valve (Applicable Model)
6. Cleanout Cover	21. Wire Harness Millivolt Damper
6a. Cleanout Cover O-Ring (Not Pictured)	22. T&P Valve
6b. Cleanout Cover Gasket A.S.M.E. (Not Pic)	23. Nylon Cable Clamp
7. Heat Shield	24. Self Tapping Screw
8. Main Burner Tube(s)	25. Thermostat Dual Probe
9. Burner Tray	25a. Thermostat Single Probe
10. Pilot Burner Assembly	26. Outlet Nipple
11. Pilot Supply Tube	27. Collector Head
12. Main Burner Manifold	28. Pilot Shield
13. Gas Valve	29. Service Part–Envelope/Instructions
14. Main Burner Orifice	30. Service Part
15. Utility Cover	

THE FOLLOWING INSTRUCTIONS ARE FOR INSTALLATION OF GAS WATER HEATERS SUITABLE FOR WATER (POTABLE) HEATING AND SPACE HEATING:

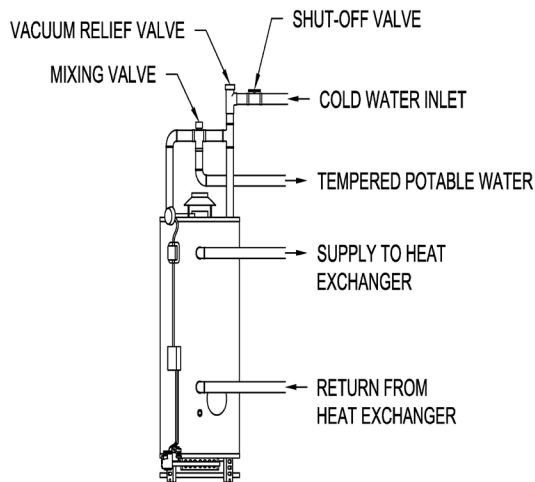
1. All piping components connected to this water heater for space heating applications must be suitable for use with potable water. In Massachusetts, space heating piping length must NOT exceed 50 ft.
2. Toxic chemicals, such as those used for boiler treatment, must NOT be introduced into potable water used for space heating.
3. This water heater must NOT be connected to an existing heating system or component(s) previously used with a non-potable water heating appliance.
4. When the system requires water for space heating at temperatures higher than required for other uses, a means such as an ASSE approved mixing valve shall be installed to temper the water for those uses in order to reduce scald hazard potential.

Please refer to the illustrations below and on the following pages for suggested piping arrangements.

Suggested Piping Arrangement For Side Connections



Suggested Piping Arrangement For Top Connections



Suggested Piping Arrangement For Side Connections (If Applicable)

