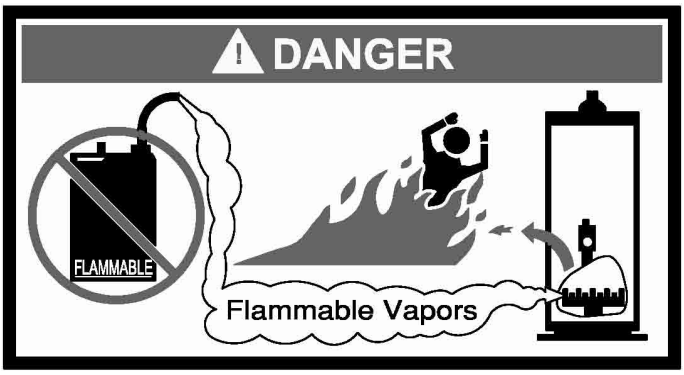
POWERED DIRECT VENT SERIES GAS-FIRED COMMERCIAL WATER HEATER





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

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance

- **WHAT TO DO IF YOU SMELL GAS**
  - Do not try to light any appliance.
  - Do not touch any electrical switch; do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.

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

INSTALLATION/OPERATION MANUAL

WITH TROUBLESHOOTING GUIDE

PLACE THESE INSTRUCTIONS ADJACENT TO WATER HEATER AND NOTIFY OWNER TO KEEP FOR FUTURE REFERENCE

238-47676-00A 3/09

SECTION I: IMPORTANT INFORMATION

READ CAREFULLY

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

The following terms are used throughout this manual to bring attention to the presence of hazards at various risk levels, or to important information concerning product life.

⚠ DANGER

Indicates an imminently hazardous situation, which, if not avoided, will result in death, serious injury or substantial property damage.

⚠ CAUTION

Indicates potentially hazardous situation, which, if not avoided, may result in moderate or minor injury or property damage.

⚠ WARNING

Indicates a potentially hazardous situation, which, if not avoided, could result in death, serious injury or substantial property damage.

NOTICE

Indicates special instructions on installation, operation or maintenance, which are important but not related to personal injury hazards.

NOTICE

This water heater has a limited warranty. The warranty for this water heater is valid only if the water heater has been installed, maintained and operated in accordance with these 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.

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

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⚠ DANGER

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

This water heater is equipped with an adjustable thermostat to control water temperature. Hot water temperatures required for automatic dishwasher and laundry use can cause scald burns resulting in serious personal injury and/or death. The temperature at which injury occurs varies with the person's age and the time of exposure. The slower response time of disabled persons increases the hazards to them. ***NEVER*** allow small children to use a hot water tap, or to draw their own bath water. ***NEVER*** leave a child or disabled person unattended in a bathtub or shower.

Toxic chemical, such as those used for boiler treatment, **must not** be introduced into potable water used for space heating.

This water heater **must not** be connected to an existing heating system or component(s) previously used with a non-potable water heating appliance.

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

⚠ WARNING

Improper installation, adjustments, alteration, service or maintenance can cause property damage, personal injury or loss of life. Failure to follow all instructions in the proper order can cause personal injury or death. Read and understand all instructions, including all those provided with the appliance before installing, starting-up, operating, maintaining or servicing this appliance. Keep this manual and literature in legible condition with this water heater for reference by owner and service technician.

This water heater requires regular maintenance and service to operate safely. Follow the instructions contained in this manual.

Installation, maintenance, and service must be performed only by a qualified, skilled and knowledgeable installer or service provider.

Installation is not complete unless a temperature and pressure relief valve is installed into the proper location at the top of this water heater.

It is the responsibility of the installing contractor to see that all controls are correctly installed and are properly operating when the installation is complete.

DO NOT operate this water heater without first being certain it is filled with water.

DO NOT tamper with or alter the water heater and/or controls.

DO NOT operate water heater with jumpered or absent controls or safety devices.

DO NOT operate water heater if any external part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system including gas controls, which has been under water.

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.

For installations in high altitude regions, this water heater must 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.

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

DO NOT operate this water heater if the input rate exceeds the rate shown on the water heater rating plate.

This water heater contains very hot water under high pressure. Do not unscrew any pipe fittings nor attempt to disconnect any components of this water heater without positively assuring the water is cool and is not under pressure. Always wear protective clothing and equipment when installing, starting up or servicing this water heater to prevent scald injuries. Do not rely on the temperature gauges to determine the temperature. Do not touch any components unless they are cool.

This water heater must be properly vented and connected to an approved vent system in good condition. **DO NOT** operate water heater with the absence of an approved vent system. A clean and unobstructed vent system is necessary to allow noxious fumes that could cause injury or loss of life to vent safely and will contribute toward maintaining the water heater's efficiency.

⚠ WARNING

This water heater needs fresh air for safe operation and must be installed so there are provisions for adequate combustion and ventilation air. Insufficient air supply will cause a recirculation of combustion products resulting in contamination that may be hazardous to life. This will result in carboning or sooting of the combustion chamber, burners, and flue tubes and creates a risk of asphyxiation.

Water heater materials of construction, products of combustion and the fuel contain carbon monoxide, nitrogen oxides, aldehydes and/or other toxic or harmful substances which can cause death or serious injury and which are known to the state of California to cause cancer, birth defects and other reproductive harm. Always use proper safety clothing, respirators and equipment when servicing or working nearby this water heater.

Flammable items, pressurized containers or any other potential fire hazardous articles must never be placed on or adjacent to the water heater. Open containers of flammable material should not be stored or used in the same room with this water heater.

Insulation blankets are not required for this water heater. This water heater meets or exceeds the ASHRAE/IES 90.1b (latest edition) standards with respect to insulation and standby loss requirements.

Setting the water temperature to the maximum set point can result in scalding hot water delivered to the faucets. It is highly recommended that the maximum setpoint be adjusted to the lowest temperature possible for the needs of the installation. See following section in this Installation/Operation Manual to change the maximum setpoint limit (max setpoint). Make sure the water heater control display is not in a public area that can result in the temperature settings being improperly adjusted.

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 connect to the hot water system. If hydrogen is present, there will be unusual sounds 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.

⚠ WARNING

Liquefied petroleum gases/propane gas is 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 THE APPLIANCE UNTIL THE LEAKAGE IS CORRECTED!

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.

SECTION II: SPECIFICATIONS

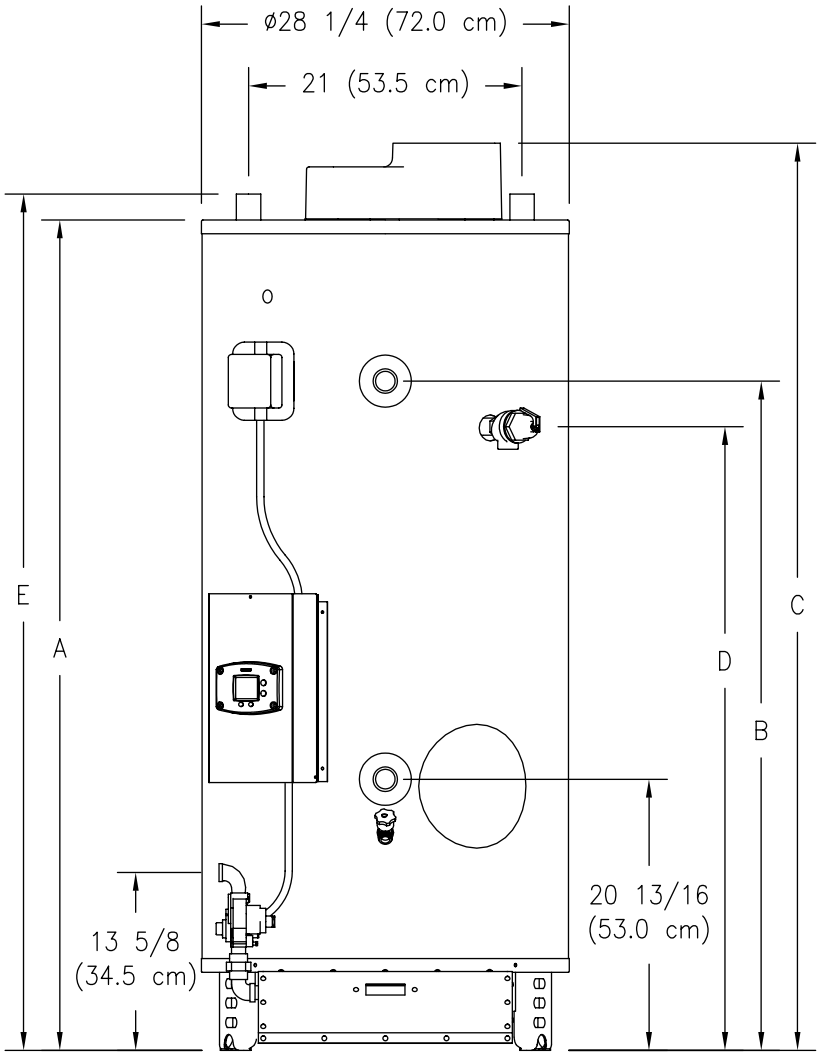


Figure 1

Model Description			Dimensions for Figure 1				
Capacity (Gal)	Input (BTU/hr) Nat.	LP	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)
100	360,000	360,000	72 7/8	60 7/16	78 11/16	56 15/16	74 13/16
80	300,000	300,000	63 7/8	51 7/16	69 11/16	47 15/16	65 13/16

Model Description			Dimensions for Figure 1				
Capacity (Liter)	Input (kW/hr) Nat.	LP	A (cm)	B (cm)	C (cm)	D (cm)	E (cm)
378.5	105.5	105.5	185.1	153.5	199.9	144.7	190.0
302.8	88.0	88.0	162.3	130.7	177.0	121.8	167.2

SECTION III: GENERAL INFORMATION

FEATURES

1. Porcelain enamel lined tank provides corrosion protection with a tough glass lining on the interior of the tank.
2. Magnesium anodes provide an extra measure of protection and extends tank life.
3. Direct Vent design with an induced draft blower. Flue gases are exhausted and combustion air is taken from outside the building through coaxial vent pipe (exhaust flue pipe inside combustion air intake pipe). Maximum venting distance is 19 ½ feet with one elbow. May be horizontally or vertically vented. See venting section for complete details.
4. Hand Hole Cleanout allows inspection of tank interior and allows the removal of lime and sediment deposits.
5. Honeywell Integrated Water Heater has the following features:
   - Attractive digital water heater display on control panel for precisely setting and displaying the temperature setpoint. Pressing temperature up and down buttons changes the temperature setpoint. Temperature format may be displayed in degrees F or degrees C.
   - Single control board with plug in wiring controls temperature, ignition, and induced draft blower operation.
   - Reduced number of parts for servicing and wiring.
   - Plug in wiring reduces chance of miswiring.
   - Water heater display will show diagnostic codes in the event the water heater needs servicing. Aids in diagnosing and servicing the water heater. Temperature of the tank sensors can be monitored in the Service Mode.
   - Water heater display can show up to 10 previous error codes to further aid in servicing the water heater.

⚠ WARNING

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.

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 shall 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 shall 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 complies 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 six (6) inches *(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 four (4) inches *(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.

DISHWASHING MACHINE REQUIREMENTS

All dishwashing machines meeting the National Sanitation Foundation requirements are designed to operate with water flow pressures between 15 and 25 pounds per square inch. Flow pressures above 25 pounds per square inch, or below 15 pounds per square inch, will result in improperly sanitized dishes.

The National Sanitation Foundation also recommends circulation of 180°F water. Where this is done, the circulation should be very gentle so that it does not cause any unnecessary turbulence inside the water heater. The circulation should be just enough to provide 180°F water at the point of take-off to the dishwashing machine. Adjust flow by means of the valve in the circulation line.

SECTION IV: INSTALLATION INSTRUCTIONS

⚠ WARNING

INSTALLATION OF THIS WATER HEATER REQUIRES ABILITY EQUIVALENT TO THAT OF A LICENSED TRADESMAN IN THE FIELD INVOLVED. PLUMBING, AIR SUPPLY, VENTING, GAS SUPPLY AND ELECTRICAL WORK ARE REQUIRED.

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.

Liquefied petroleum gases/propane gas is 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 THE APPLIANCE UNTIL THE LEAKAGE IS CORRECTED!

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 depth must be suitable for draining and collecting water, and have a minimum length and width of at least four (4) inches (10.0 cm) measured from the jacket of 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 inch (2.0 cm) in diameter and pitched for proper drainage.

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

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

Minimum Clearances

⚠ CAUTION

The National Fuel Gas Code (ANSI Z233.1- latest edition) or in Canada The National Gas or Propane Installation Code CAN/CGA (B149.1, B149.2- 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 eighteen (18) inches (*45.8 cm*) above floor level and protected to avoid damage by a moving vehicle.

If the buildings cold water supply has a back-flow preventer, check valve or water meter with check valve, provisions for thermal expansion of water in the hot water system must be provided.

The location of this water heater is of the utmost importance. Before installing this water heater, you should read the Installation section of these instructions. After reading these Installation and Operating 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 within the maximum specified venting distance to an outside wall or roof for the direct vent terminal. **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 or accumulate on the controls**.

⚠ WARNING

IF COMBUSTIBLE FLOORING IS USED, A THERMAL BREAK LEG KIT MUST BE INSTALLED BEFORE SETTING WATER HEATER IN PLACE. THE APPROPRIATE LEG KIT HAS BEEN INCLUDED WITH THIS WATER HEATER.

This installation must allow access to the front of the water heater and adequate clearance shall 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 shall 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 three (3) inches (*7.6 cm)* in any direction or, if the appliance is to be installed in an alcove or closet, the entire floor shall be covered by the panel. The panel must be strong enough to support the weight of the water heater when full of water.

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

Note: For California installation this water heater must be braced, anchored, or strapped to avoid falling or moving during an earthquake. See instructions for correct installation procedures. Instructions may be obtained from DSA Headquarters Office, 1102 Q Street, Suite 5100, Sacramento, California 95811.

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.

NOTICE

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 OR THE DIRECT VENT TERMINAL.

In order to provide clearance for the burner panel access screws to be removed, use a slab inside the drain pan to raise the water heater 1" *(2.5 cm)* so that the burner access panel clears the lip of the drain pan. There must be access to the burner assembly for servicing. Be sure the water heater remains level.

This water heater may be installed in an alcove on combustible flooring with clearances from combustible materials as shown in the following clearances illustration of this Installation and Operation Instruction Manual.

UNPACKING

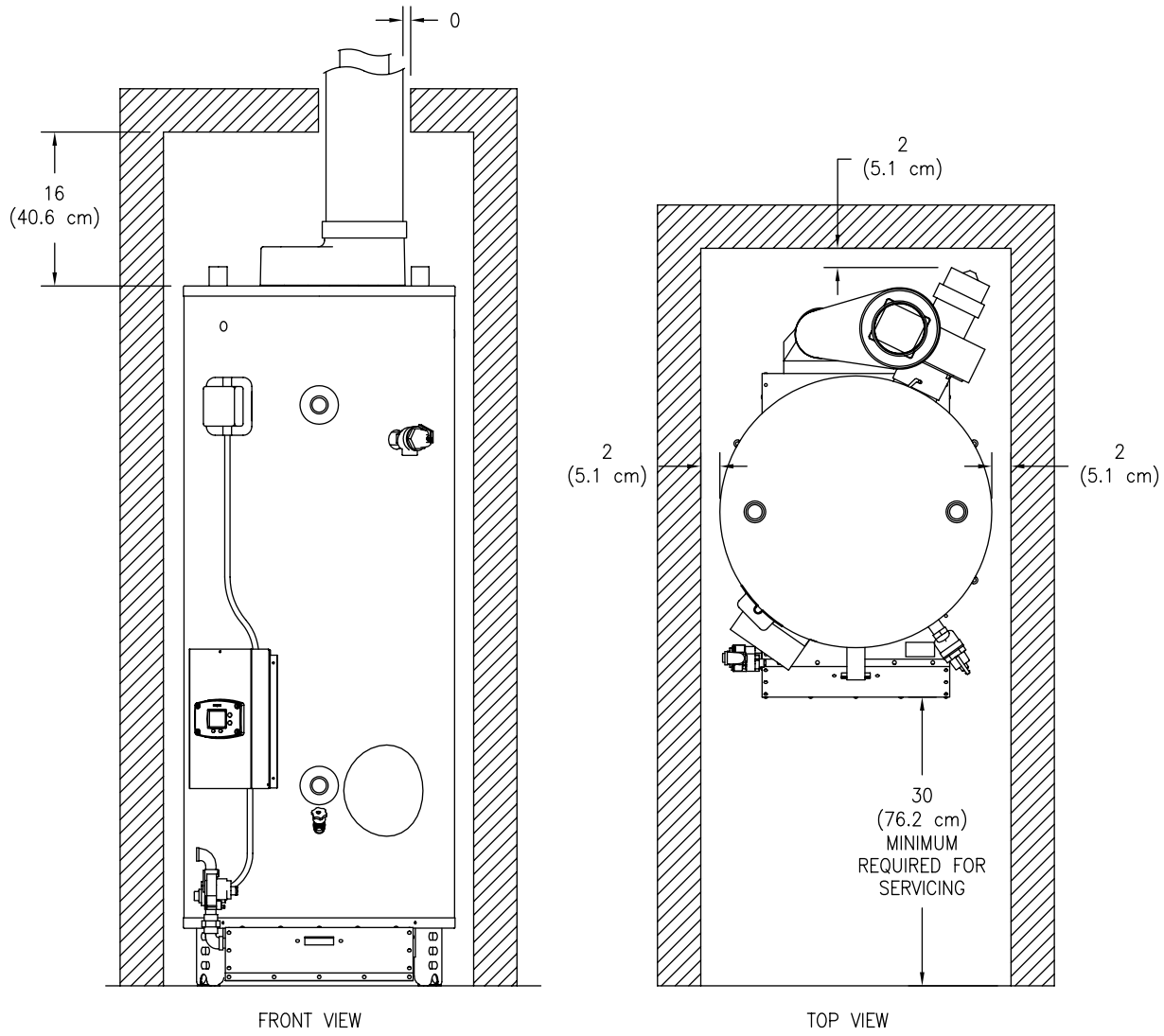
INSPECT SHIPMENT carefully for any signs of damage.

1. All equipment is carefully manufactured, inspected and packed.
2. Any claims for damage or shortage in shipment must be filed immediately with the manufacturer noted on the rating plate label.

LOCATE WATER HEATER in front of final position before removing crate.

1. LOCATE so that venting connections will be short and direct.
2. THIS WATER HEATER IS SUITABLE FOR INSTALLATION ON COMBUSTIBLE FLOOR. The thermal break leg kit supplied with the water heater must be used.
3. Proper venting practices must be considered when selecting a location for this water heater. For exact venting specifications, please consult the Venting section of these Installation and Operating Instructions.
4. It is recommended that a minimum clearance of four (4) inches *(10.2 cm)* be provided on the side of the water heater for servicing and maintenance of the combination temperature and pressure relief valve.

5. The minimum clearances to combustibles for this water heater are: two (2) inches *(5.1 cm)* from the sides and rear, two (2) inches *(5.1 cm)* from the front of the burner access box, sixteen (16) inches *(40.6 cm)* from the top jacket, zero (0) inch *(0 cm)* from the air intake boot and vent tubes and twelve (12) inches *(30.5 cm)* in any direction from the direct vent terminal. A minimum of 30 inches (76.2 cm) front clearance from the burner access panel is necessary for inspection and servicing.



Minimum Clearances

Figure 2

REMOVE CRATE

1. Remove all banding and pry off crate sides carefully so as not to damage the water heater.
2. Carefully roll/lift the water heater from the crate base.

MOVE WATER HEATER TO PERMANENT POSITION by sliding or walking. Place drain pan underneath water heater

INSTALL TEMPERATURE AND PRESSURE RELIEF VALVE (if not already installed).

This water heater must be located in an area where the general public does not have access to set temperatures.

SECTION V: VENTING

⚠ WARNING

The venting system must be installed properly following all local codes or in the absence of local codes, 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). Failure to properly install the venting system could result in property damage, personal injury, or death.

Carefully inspect the venting system of a replacement water heater installation before connecting to the venting system. All joints in the vent connector must be securely fastened with screws and fit tightly together. Inspect the venting system for signs of deterioration (rust and perforation) and replace any sections that are not in good condition.

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

DO NOT install any damaged direct vent system 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.

This is a Powered Direct Vent Gas Water Heater where all air for combustion is obtained from the outside atmosphere and all flue gases are discharged to the outside atmosphere. The venting system is a coaxial (pipe within a pipe) design where the flue products are discharged through the inside flue tube and the combustion air supply surrounds the flue tube enclosed by the outside pipe. The venting system incorporates both the combustion air supply and the flue exhaust. The venting system component, which is outside the building and takes in the combustion air supply and discharges the flue products, (while keeping them separate) is referred to as the “direct vent terminal”.

Note: Provide protection of the building materials from degradation by flue gases from the direct vent terminal.

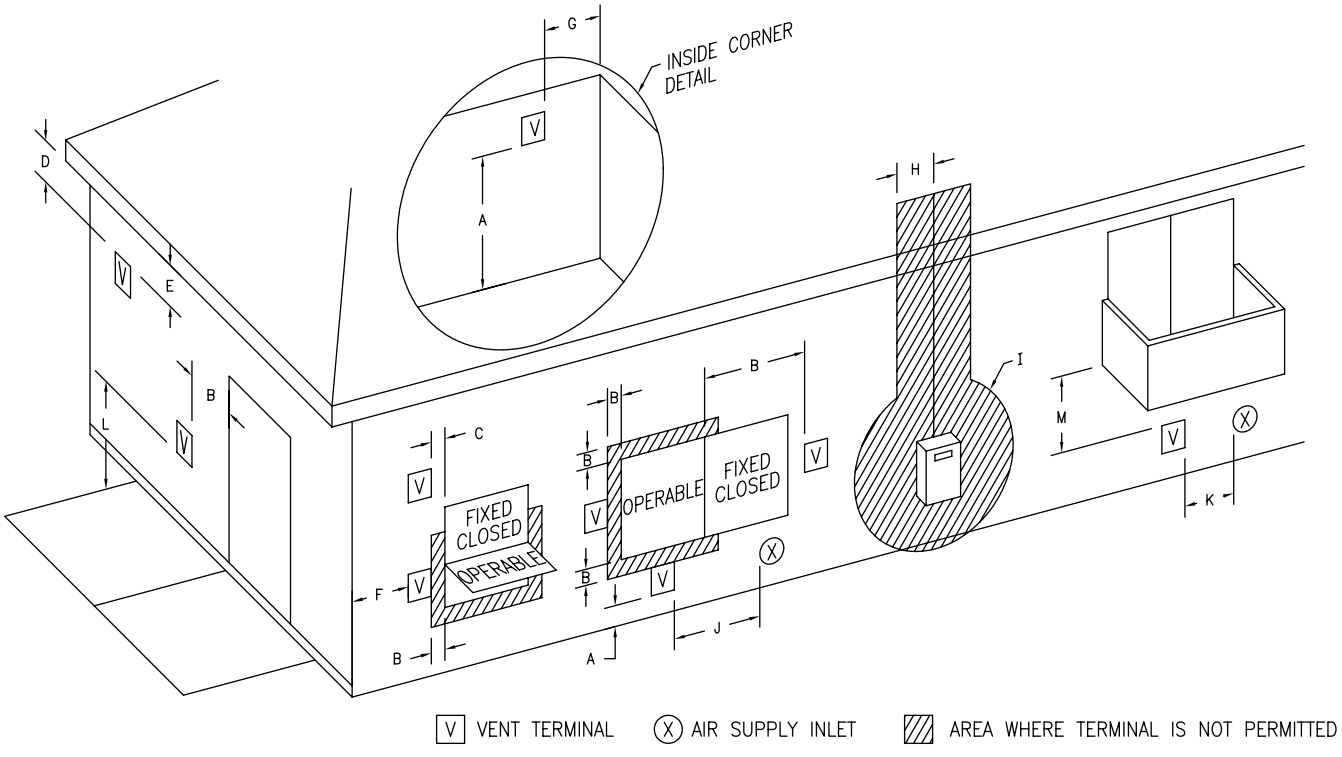


Figure 3

Direct Vent Terminal Clearances

		Canadian Installations[1]	US Installations[2]
A=	Clearance above grade, veranda, porch, deck or balcony	12 inches (30 cm)	12 inches (30 cm)
B=	Clearance to widow or door that may be opened	36 inches (91 cm)	12 inches (30 cm)
C=	Clearance to permanently closed widow	*b	*b
D=	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61 cm) from the center line of the terminal	12 inches (30 cm) *a	12 inches (30 cm) *a
E=	Clearance to unventilated soffit	12 inches (30 cm) *a	12 inches (30 cm) *a
F=	Clearance to outside corner	*b	*b
G=	Clearance to inside corner	*b	*b
H=	Clearance to each side of center line extended above meter/regulator assembly	3 feet (91 cm) within a height 15 feet (4.6 m) above the meter/regulator assembly	*b
I=	Clearance to service regulator vent outlet or oil tank vent	36 inches (91 cm)	*b
J=	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance	36 inches (91 cm)	12 inches (30 cm)
K=	Clearance to a mechanical air supply inlet	6 feet (1.83 m)	3 feet (91 cm) above if within 10 feet horizontally
L=	Clearance above paved sidewalk or paved driveway located on public property	7 feet (2.13 m)†	*b
M=	Clearance under a veranda, porch, deck, or balcony	12 inches (30 cm) ‡	*b

[1] In accordance with the current CAN/CGA-B149 *Installation Codes*.
[2] In accordance with the current ANSI Z223.1-(Latest edition)/NFPA 54 *National Fuel Gas Code*.
† A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single-family dwellings and serves both dwellings.
‡ Permitted only if a veranda, porch, deck or balcony is fully open on a minimum of two sides beneath the floor.
*a) A minimum clearance value determined by testing in accordance with section 2.20.
*b) "Clearance in accordance with local installation codes and the requirements of the gas supplier".

The vent system must terminate so that proper clearances are maintained as cited in local codes or the latest edition of the National Fuel Gas Code, ANSI Z223.1.73.4e and 7.8a, b as follows:

1. Do not terminate near soffit vents or crawl space or other area where condensate or vapor could create a nuisance or hazard or cause property damage.
2. Do not terminate the exhaust vent terminal where condensate or vapor could cause damage or could be detrimental to the operation of regulators, relief valves, or other equipment.
3. Do not terminate the exhaust vent terminal over public area or walkways where condensate or vapor can cause nuisance or hazard.
4. The vent shall terminate a minimum of 12 inches above expected snowfall level to prevent blockage of vent termination.

Vent pipes serving power vented appliances are classified by building codes as "vent connectors". Required clearances from combustible materials must be provided in accordance with information in this manual under LOCATION OF WATER HEATER and CLEARANCES, and with National Fuel Gas Code and local codes.

Horizontal And Vertical Direct Vent Lengths

This Powered Direct Vent Gas Water Heater comes with one (1) direct vent kit. The venting system supplied with this water heater is a coaxial (pipe within a pipe) design with the flue discharge tube on the inside and combustion air supply on the outside. Optional direct vent components are available that can extend the horizontal length and/or vertical height of the direct vent system to the maximum distances listed in the table below. This water heater must be installed using the supplied or optional listed components without modifications. Reference the Venting Component Tables listed in the Installation (Direct Vent System Installation) for the various system components.

Note: The supplied horizontal vent terminal may be used to vent through outside walls up to 24 in. *(61 cm)* thick.

Maximum Venting Distances (Horizontal, Vertical, or Combined)

Number of 90° Elbows	Maximum distance of straight pipe (excluding vent terminal) to exterior wall
0	22 ft. 9 in. *(7 m)*
1	19 ft. 6 in. *(6 m)*
2	16 ft. 3 in. *(5 m)*
3	13 ft. *(4 m)*

Note: Each 45° elbow reduces the maximum venting distance by 19 1/2 in. *(50 cm)*.

NOTICE

IMPORTANT - Do not exceed the venting distances or the number of elbows listed above. Exceeding the maximum venting distances may cause the water heater to malfunction or cause an unsafe condition.

Direct Vent System Installation

⚠ WARNING

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

Do not install any damaged direct vent system components. Contact the manufacturer of the water heater for replacement parts.

The flow of combustion air must not be restricted. Keep the direct vent terminal openings clear of objects, shrubs, snow and debris.

Tools Required For Direct Vent Installation

The following minimum tools are required to properly install the direct vent system. *Note: Wall construction will determine tool usage.*

- **Tape Measure**
- **Drill**
- **3/16 inch Diameter Drill Bit(s)**
- **1/8 inch Diameter Drill Bit(s)**
- **Masonry Drill Bit(s)** *(For Poured Concrete, Concrete Block and Brick Wall Construction)*
- **Reciprocating Saw w/appropriate Blade(s)** *(Dependent on Wall Construction)*
- **Chisel** *(For Poured Concrete, Concrete Block and Brick Wall Construction)*
- **Hammer** (For Poured Concrete, Concrete Block and Brick Wall Construction)
- **1/4 & 5/16 inch Nut Drivers** (*Preferred) or* **Slotted Head Screwdriver**
- **Phillips Head Screwdriver**

Materials:

- **Metal strapping to support vent piping.**

Installation Procedure

A. Determine where the vent terminal will exit through the wall or roof.

1. The supplied vent kit includes a horizontal (through the wall) vent terminal, an elbow, a condensate trap, vent connector clamps, and 6 1/2 ft. *(2 m)* of coaxial vent pipe. The 6 in. *(15.3 cm)* diameter venting system also is supplied with an 8 in. *(20.3 cm)* to 6 in. *(15.3 cm)* reducer for the water heater vent connection. The coaxial vent pipe includes both the flue exhaust (inside pipe) and combustion air intake (outside pipe). The coaxial vent pipe may be cut on the unflared end (end without gasket) as required for the installation.

2. Determine if additional venting components are required for the venting installation. Refer to the venting component table listed in the Direct Vent Installation section for available optional venting components.

3. Make sure the vent terminal location complies with the requirements described earlier and referenced in the latest edition of the National Fuel Gas Code.

4. Measure the vertical and horizontal distance from the water heater vent connection to determine the number of vent pipes needed.

Venting Component Table for 8 in. *(20.3 cm)* Diameter Vent Size
Supplied Kit Components

Quantity	Vent Length	Part Description	Part Number
2	39 3/8 in. *(100 cm)*	Coaxial vent pipe, straight section with gasket and clamp	239-41593-00
1		90° Elbow	239-41584-00
1		Flue Exhaust Cap	239-41676-00
1	23 5/8 in. *(60 cm)*	Horizontal vent Terminal	239-41589-00
1		Vent Adapter Connection Clamp	239-41459-00
1	7 1/4 in. *(18.5 cm)*	Condensate Trap Tee	239-41597-00

B. Install Vent Terminal

Note: The supplied horizontal vent terminal may be used to vent through outside walls up to 24 in. *(61 cm)* thick.

1. Horizontal Vent Terminal (Through the Wall) (Supplied)
(a) Cut an opening of at least 8 1/2 inch *(21.6 cm)* in diameter. (See Figure 4).

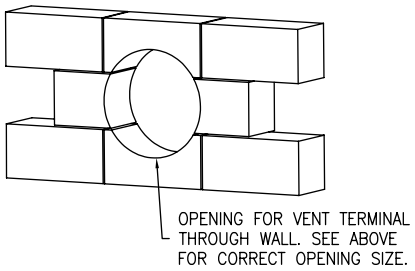


Figure 4

(b) Slide the vent terminal through the wall opening until the rib closest to the intake air openings of the terminal is even with the outside wall.

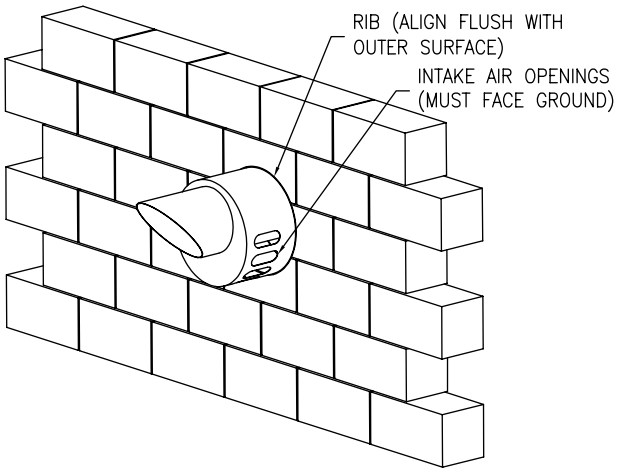


Figure 5

(c) Slide the outside wall plate over the vent terminal and fasten to the wall with 4 screws. Depending upon the wall construction, wall anchors may be required to reinforce the screws.

(d) Install the flue cap over the outside of the angled flue discharge tube of the vent terminal. Rotate the cap so that the vent discharge opening is in line with the angled opening of the vent terminal. The vent and air intake openings must both be aligned to face the ground. Tighten the screw clamp so that the cap remains firmly in place.

NOTICE

IMPORTANT - The flue cap must be installed over the angled flue discharge tube with the direct vent openings facing directly down for the water heater to operate properly during rain and wind conditions.

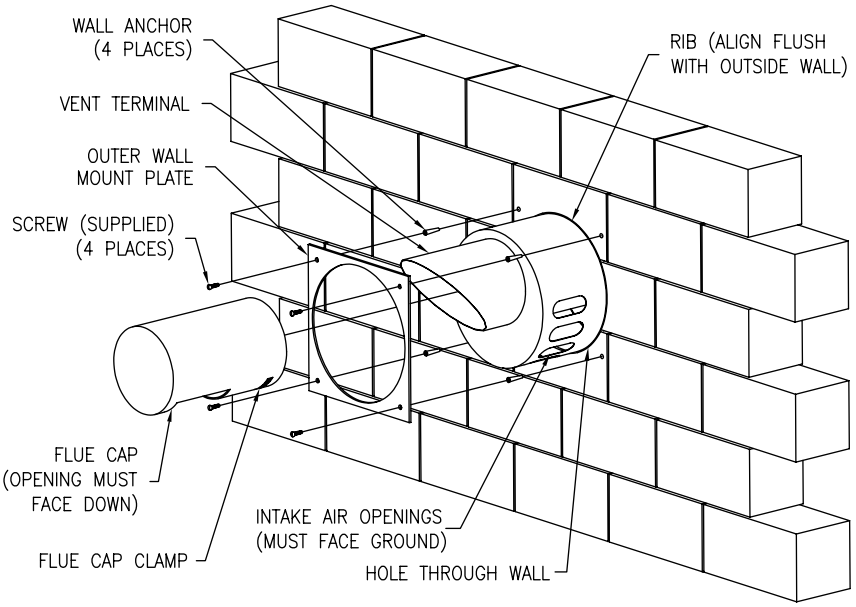


Figure 6

(e) Install inside wall plate on the inside wall and fasten with 4 screws. Depending upon the wall construction, wall anchors may be required to reinforce the screws.

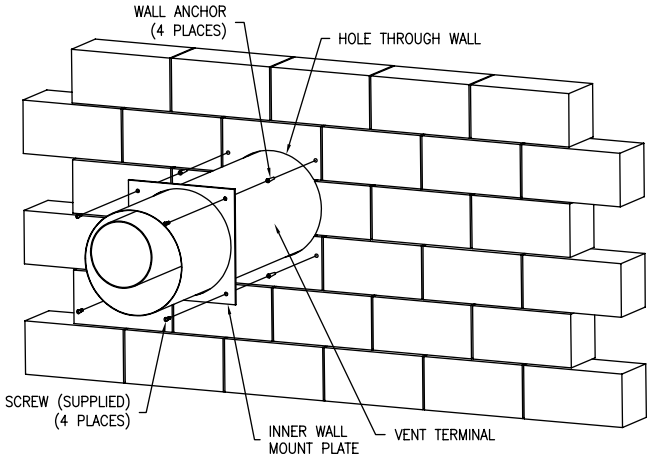


Figure 7 (Inside Wall)

2. Vertical Vent Terminal (Through the Roof - Optional)

(a) Determine the exact location where the roof vent terminal will exit the roof, making sure the venting system clears all obstructions. For pitched roofs, the vent cap must be the distance above the roofline as specified in the local codes, or in the absence of local codes refer to the latest edition of the National Fuel Gas Code. The top of the roof terminal may extend up to 2 1/2 ft. *(76.2 cm)* above the roofline as needed.

(b) Run the coaxial venting system to the proper distance below the roof sheathing required for the correct distance of the roof terminal above the roof surface. See the following sections on installing the rest of the venting system.

(c) Cut a minimum 8 1/2 inch *(21.6 cm)* minimum diameter hole centered in the desired location for the roof terminal. (See Figure 8).

(d) Center the roof flashing over the hole using either the flat roof flashing or universal flashing for pitched roofs.

(e) Slip the storm collar supplied with the roof flashing kit over the outside of the vent terminal and align with the vent pipe end below roof opening. Insert the terminal into the vent pipe.

(f) Fasten the roof flashing to the roof with nails. Seal the vent terminal and flashing to the roof.

(g) Install the gasketed clamp around the joint between the vent terminal and vent pipe.

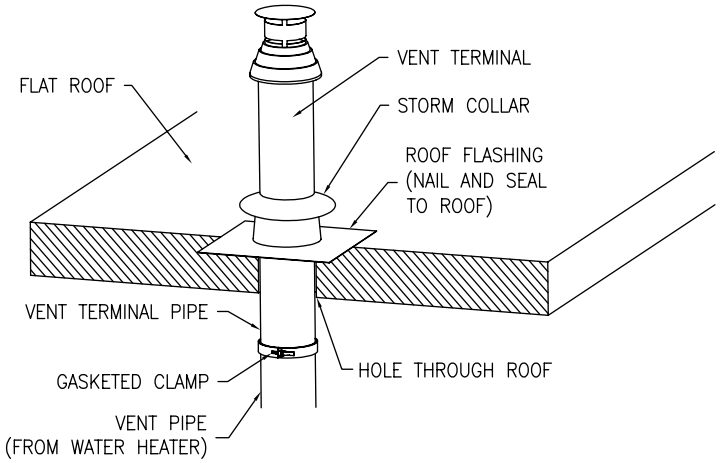


Figure 8

C. Install Vent Piping Sections

General Notes:

1) The coaxial vent pipe sections are designed to fit tightly together and seal with the integral flue pipe seal and supplied pipe clamps. No silicone caulk or special tools are required.

(2) All venting sections and fittings come complete with silicone flue pipe gaskets and outside gasketed pipe clamps for making airtight connections between the venting pipe connections.

(3) Wetting the silicone gaskets with a solution of soapy water will make the pipe connections slide together easier.

(4) The internal flue pipe of the straight vent pipe is not fastened to the outside pipe so that the last vent section can be cut to length. Remove the internal flue pipe from the outside pipe for easier handling during installation. Complete one section at a time by installing the outside pipe, then the inside flue pipe.

Installation Procedure:

(a) Raise the outside vent pipe to the vent terminal connection with the flared (female) end of the pipe toward the vent terminal. Insert the outside pipe into the vent terminal connection and grasp the end of the vent pipe while twisting and pushing the pipe until inserted all the way into the vent terminal.

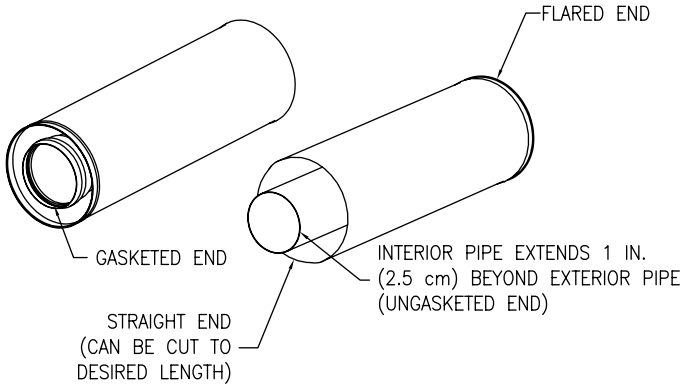


Figure 9

(b) Connect the outside pipes together using the gasketed clamps provided. The outside vent pipes have ribs located on the female end. When connecting the vent piping, the gasketed clamps must cover the ribs and joints of the connecting vent tubes (See Figure 10). Support each pipe section with hangers attached to supporting joists in the wall or ceiling.

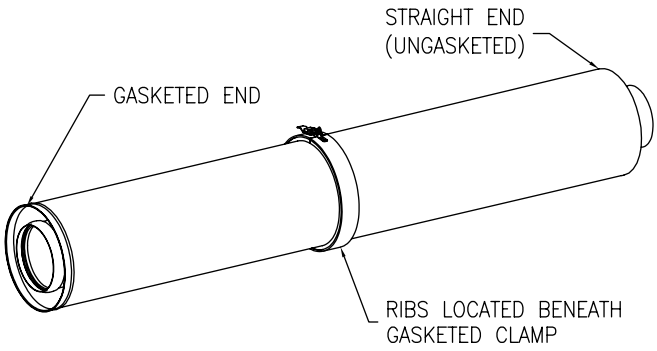


Figure 10

(c) Insert the inside flue pipe into the outer pipe with the female gasketed end toward the vent terminal. Push and twist on the end of the flue pipe until the flue pipe from the vent terminal is completely seated inside the female gasketed end.

(d) Continue connecting pipe sections together with clamps and supporting with hangers. Follow the same procedure described in the previous steps for inserting and connecting the flue tubes inside the outer vent pipes. **Install one section at a time with the outside pipe first, followed by the inside flue pipe.**

(e) The last pipe section may be cut to fit the distance required to reach the water heater vent connections. First, install the supplied condensate trap with the crimped end into the gasketed end of the elbow (horizontal vent installations) and clamp the condensate tee and elbow together. Then install the crimped end of the elbow into the vent connection of the water heater. On vertical vent installations, install the crimped end of the condensate trap directly onto the water heater vent connection.

NOTICE

IMPORTANT - In order for the condensate trap to collect and dispose of the condensate from the vent pipe, the venting system must have a downward slope of 1/4 in. per ft. *(21 mm/m)* toward the condensate trap. The condensate trap must be installed as close as possible to the vent adapter to prevent condensate from accumulating and draining into the vent adapter or blower.

(f) Carefully measure the length of straight vent pipe needed allowing for about 2 in. *(5.1 cm)* insertion into the elbow. Mark the ungasketed end of the pipe to be cut and carefully make a straight cut on the outside pipe to the desired length. **Remove the inside flue tube and cut each pipe separately.** Then cut the inside flue pipe about 1 in. *(2.5 cm)* longer than the outside pipe so that the flue pipe protrudes slightly beyond the outside pipe. Reinsert the inside flue pipe into the outside vent pipe. Connect the outside vent pipe and clamp at each end.

(g) Use the large clamp supplied in the vent kit with the stepped gasket to seal the elbow or condensate trap to the blower vent connector. The larger step of the gasket seals the vent pipe to the cast vent adapter.

(h) Condensate disposal: Connect either a 1 1/4 inch *(3.2 cm)* slip joint drain connection or a 1 inch *(2.5 cm)* PVC compression coupling from the condensate trap nipple to 1" *(2.5 cm)* PVC piping to a drain or condensate disposal pump. Install a drain trap after the condensate fitting to seal the venting system. Some local codes may require a condensate neutralizer before allowing the condensate to be disposed down the drain. Contact your plumbing professional.

⚠ CAUTION

A trap or loop must be installed for the condensate drain to prevent leakage of potentially hazardous flue products from being discharged into the room.

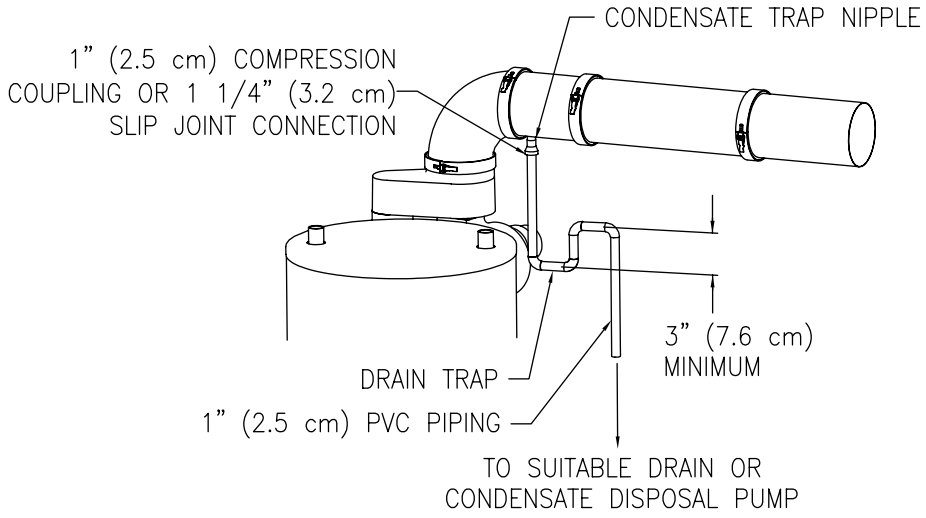


Figure 11

SECTION VI: 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 diptube 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 heater connections. It is imperative that heat is not applied to the nipples containing a plastic liner.

⚠ 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.

NOTICE

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. **NEVER OPERATE THE WATER HEATER WITHOUT FIRST BEING CERTAIN IT IS FILLED WITH WATER.**

APPROXIMATE TIME/TEMPERATURE RELATIONSHIPS IN SCALDS	
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

⚠ WARNING

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.

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 shall 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 shall also have an hourly rated temperature steam BTU discharge capacity not less than the hourly rating of the water heater.

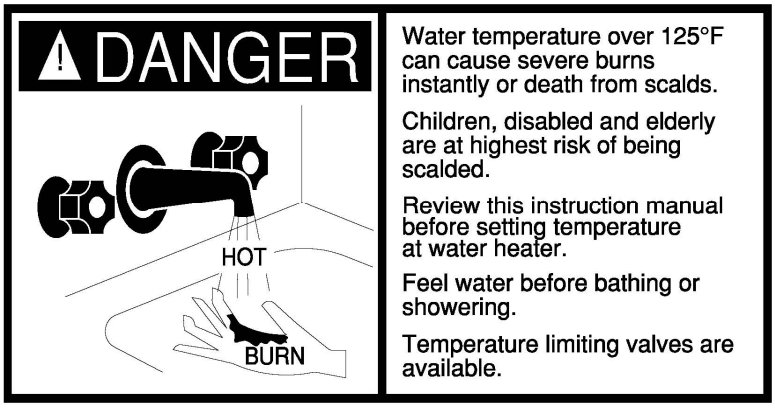
Install the combination temperature and pressure relief valve into the opening provided and marked for this purpose on the water heater.

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 complies 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 six (6) inches *(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 four (4) inches *(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.

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.



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. For information regarding space heating water connections and plumbing arrangements, refer to the section at the end of this manual.

SECTION VII: 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 one (1.0) inch *(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 fourteen (14.0) inches *(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 gas) 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 three (3) inches *(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*).

⚠ 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.

⚠ WARNING

Installation or service of this water heater requires ability equivalent to that of a licensed tradesman in the field involved. Plumbing, air supply, venting, gas supply and electrical work are required.

Light the unit in accordance with the operating instructions label attached to the water heater.

Under no circumstances should the input rate exceed the input rate shown on the water heater rating plate. Over firing could result in damage or sooting of the water heater.

If the unit is exposed to the following, do not operate water heater until all corrective steps have been made by a factory authorized independent service contractor or qualified service professional.

1. Flooding to or above the level of the burner or controls
2. External firing
3. Damage
4. Firing without water
5. Sooting

SECTION VIII: ELECTRICAL CONNECTIONS

⚠ WARNING

Turn off or disconnect the electrical power supply to the water heater before servicing. Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

All electrical wiring must be installed and grounded in accordance with local codes, or in the absence of local codes, the National Electrical Code, ANSI/NFPA 70 and/or CSA C22.2 Electrical Code.

The water heater must be wired to a 115 volt, 60 Hz, AC power supply. The water heater should be wired on a separate circuit and breaker. If a flexible line cord and plug is permitted by local code, then provide a three wire grounding type receptacle within reach of the line cord provided on the control box. Do not plug the line cord into a receptacle that can have the power supply interrupted by a switch that is used to control lights or another appliance.

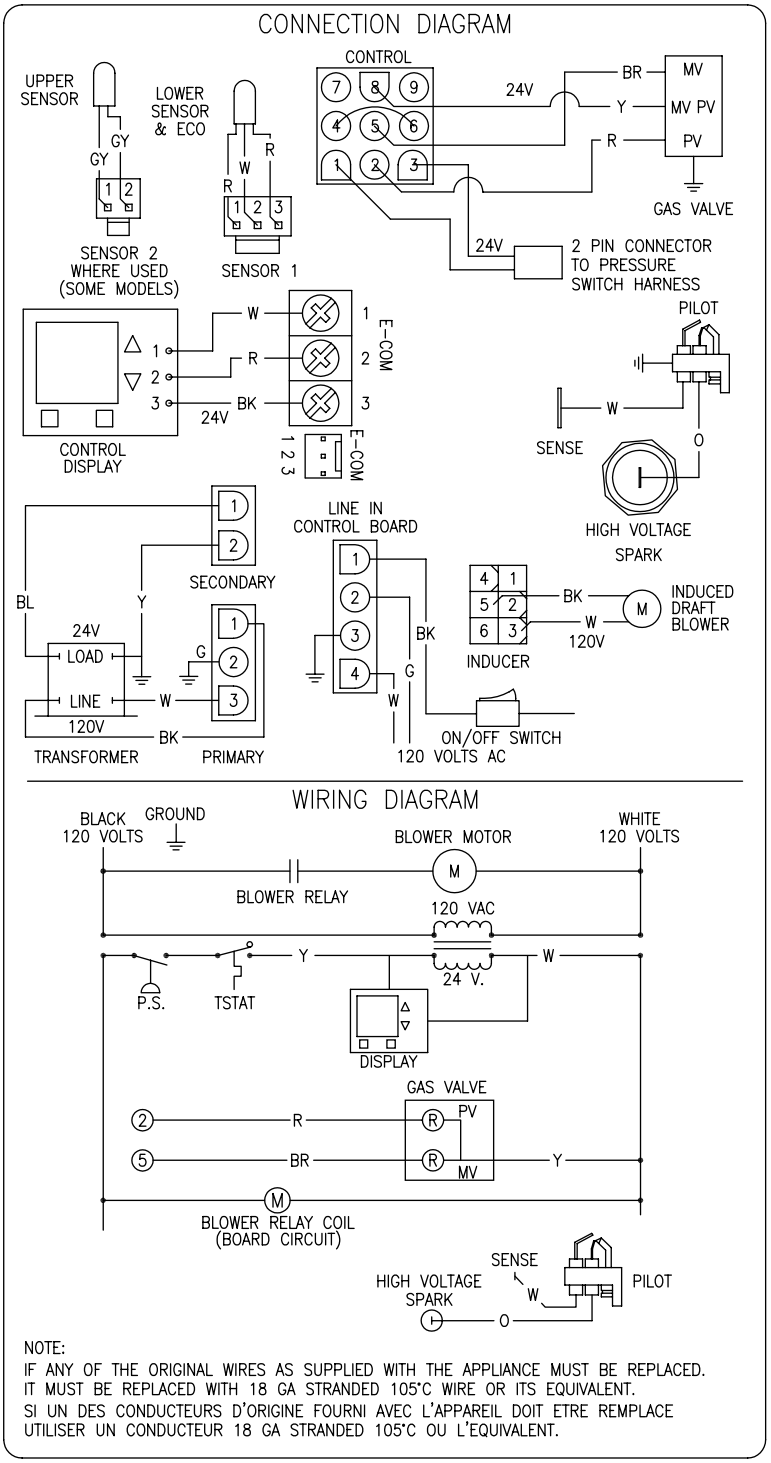
If wiring in conduit is required, cut the line cord close to the control board and make the appropriate wiring connections.

⚠ CAUTION

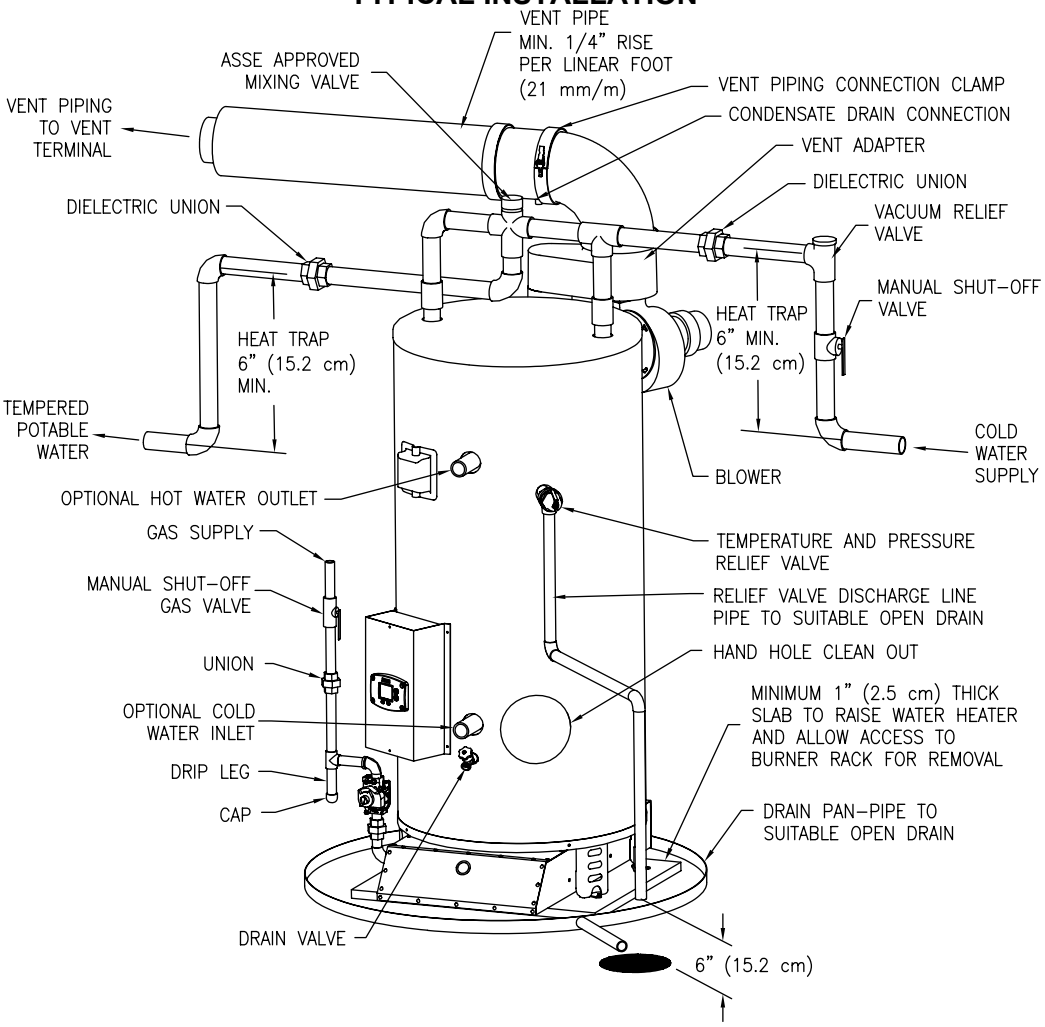
This water heater **must** be wired on a separate circuit. Failure to wire on a separate circuit may cause improper operation or failure of the electrical components of the water heater. Refer to the "Electrical Connections" section of the Installation and Operating Instructions Manual for complete instructions on electrical wiring and connections to the water heater.

Do not energize the electric circuit before the water heater tank is filled with water.

Wiring Diagram (to the right)



TYPICAL INSTALLATION



⚠ WARNING

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

NEVER OPERATE THE WATER HEATER WITHOUT FIRST BEING CERTAIN IT IS FILLED WITH WATER AND A TEMPERATURE AND PRESSURE RELIEF VALVE IS INSTALLED IN THE RELIEF VALVE OPENING OF THE WATER HEATER.

SECTION IX: OPERATING INSTRUCTIONS

Lighting and Shutdown Instructions

FOR YOUR SAFETY READ BEFORE OPERATING

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 is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.

B. BEFORE OPERATING smell all around the appliance for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

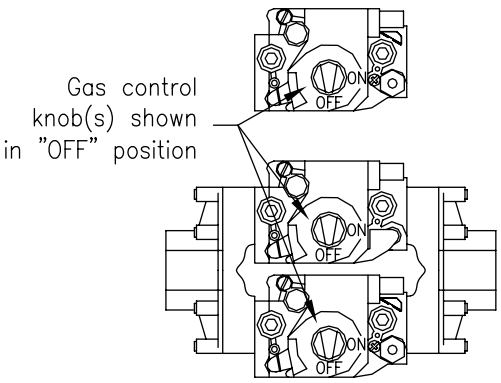
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

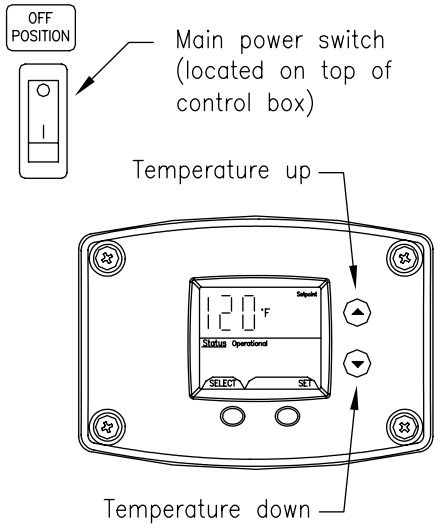
C. Use only your hand to push in or turn the gas control knob(s). Never use tools. If the knob(s) will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

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. Turn off all electrical power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
5. Turn off the main power switch.
6. Turn gas control knob(s) clockwise to "OFF."
7. 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.
8. Turn on main power.
9. Set the thermostat to desired setting.
10. Turn gas control knob(s) counterclockwise to "ON".





TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off the main power switch.
3. Turn gas control knob(s) clockwise to "OFF."

TEMPERATURE ADJUSTMENT

APPROXIMATE TIME/TEMPERATURE RELATIONSHIPS IN SCALDS	
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

⚠ 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.

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.

⚠ CAUTION

This water heater, when set at a lower temperature setting, is not capable of producing hot water of sufficient temperature for sanitizing purposes.

NOTICE

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.

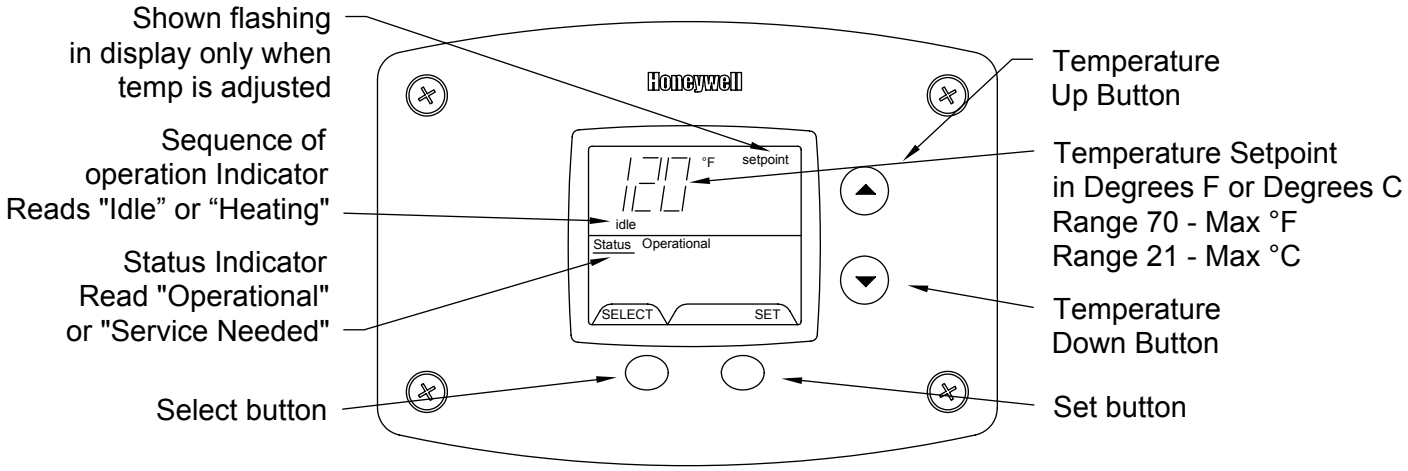
The lower the temperature setting, the greater the energy efficiency, both to heat the water and to maintain the storage temperature during standby periods. Lower water temperatures also extend tank life. Remember, no water heating system will provide exact temperatures at all times. Allow a few days of operation at this setting to determine the correct temperature setting consistent with the requirements for the installation.

The water heater temperature setting is adjusted by using the control display mounted to the front of the control panel of the water heater. The water heater thermostat is set at the lowest setpoint of 70°F when shipped from the factory. The control display shows the temperature setpoint in degrees Fahrenheit (°F) or degrees Celsius (°C), and the status of the water heater (“Idle” or “Heating”). If the water heater is functioning normally, the display will also show “Operational”.

For energy efficient operation of your water heater, the suggested initial temperature setting is 120°F (49°C). During the 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.

Water Heater Display and Control Buttons



⚠ WARNING

If the water heater display does not show "Operational" in the "Status" indicator, there may be an operating malfunction with the water heater. If this is the case, a numeric code will be displayed. Refer to the label next to the display for the definition of the error code and call your plumbing professional or service agent to service the water heater. Do not try to reset the water heater without having a qualified service person to diagnose and correct the problem. If the display is blank or does not show an error code, make sure there is power to the water heater.

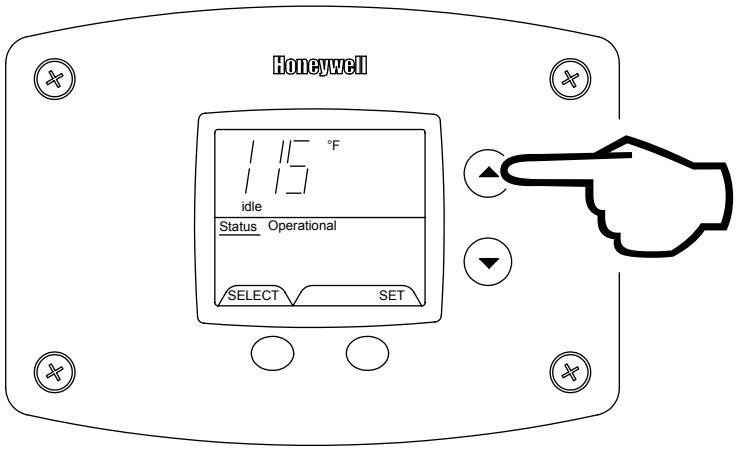
Setting the water temperature to the maximum set point can result in scalding hot water delivered to the faucets. It is highly recommended that the maximum setpoint be adjusted to the lowest temperature possible for the needs of the installation. See following section to change the maximum setpoint limit (max setpoint). Make sure the water heater control display is not in a public area that can result in the temperature settings being improperly adjusted. See previous warning on scalds and an ASSE approved mixing valve.

NOTICE

When the maximum setpoint is reached, the display will show "Max Setpoint" without the setpoint value. The maximum setting is equal to approximately 180˚F (82˚C).
The default temperature setpoint from the factory is 70˚F (21˚C).

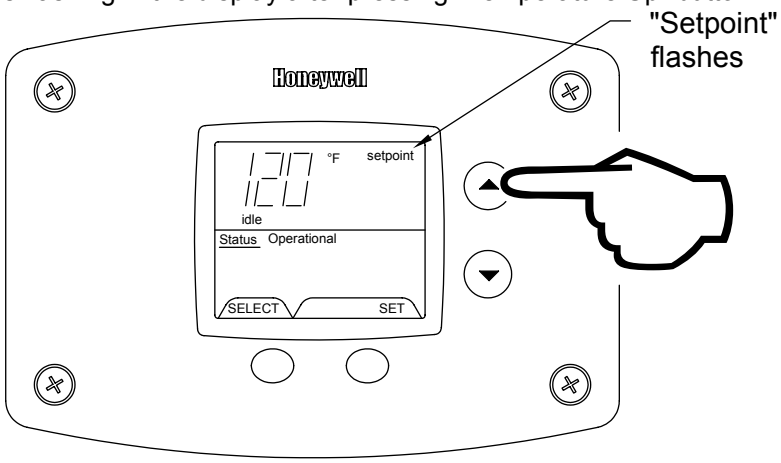
To Increase Setpoint Temperature

Step 1: Depress and hold “Temperature Up” button until desired setpoint temperature appears in the display.



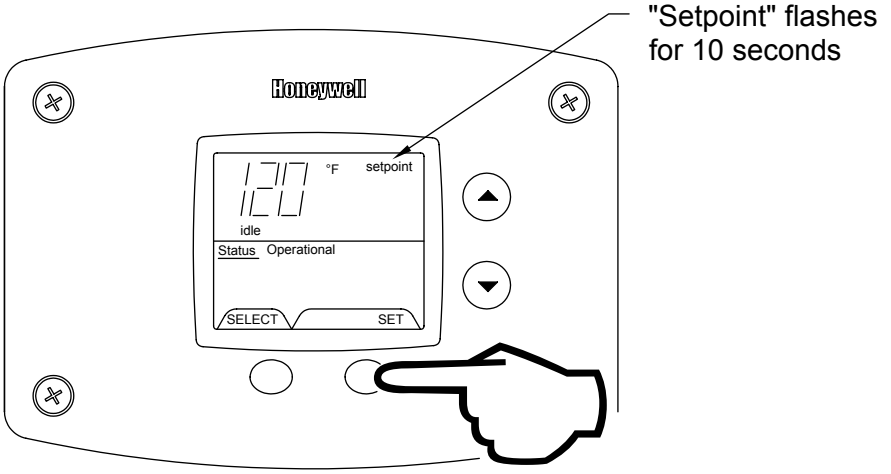
Step 1

Step 2: “Setpoint” indicator begins flashing in the display after pressing “Temperature Up” button.



Step 2

Step 3: Press “SET” button for new setting to take effect immediately. “Setpoint” will stop flashing. If the “SET” button is not pressed, the new temperature setting will take effect in approximately 10 seconds.

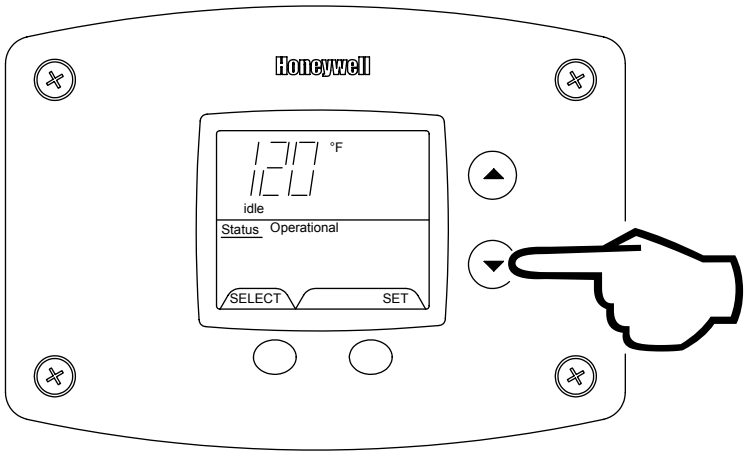


Step 3

Press SET Button for setting to to take effect immediately

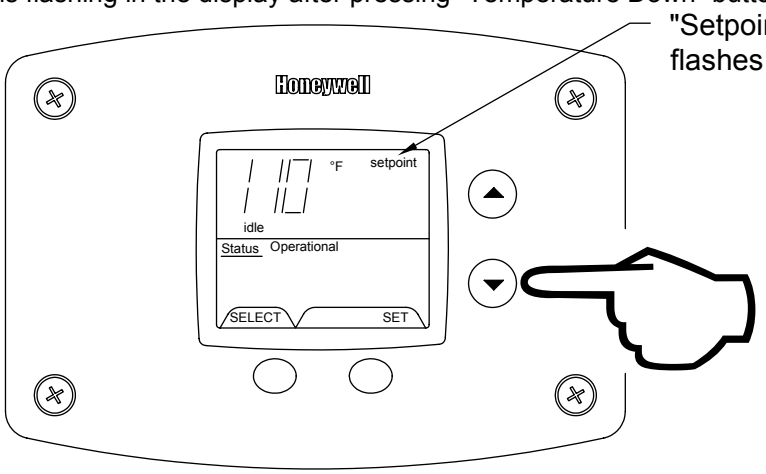
To Decrease Setpoint Temperature

Step 1: Depress and hold “Temperature Down” button until desired setpoint temperature appears in the display.



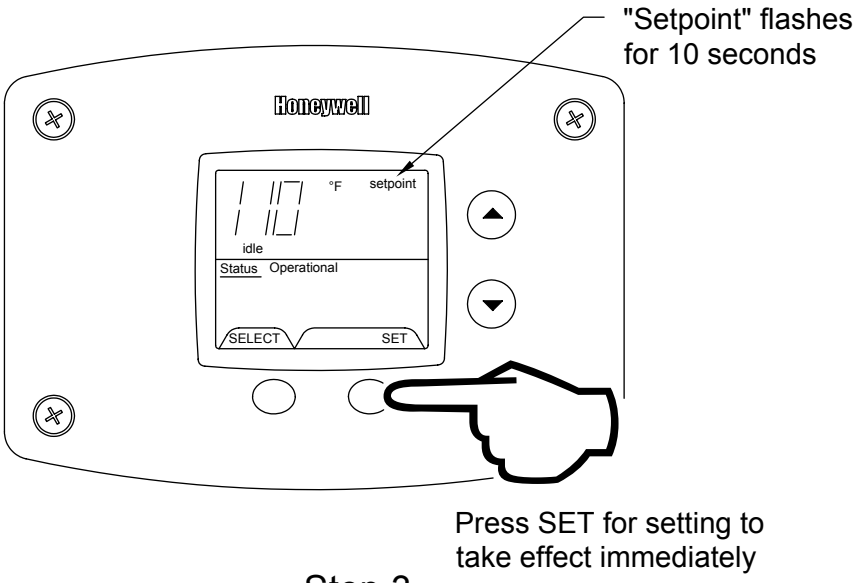
Step 1

Step 2: “Setpoint” indicator begins flashing in the display after pressing “Temperature Down” button.



Step 2

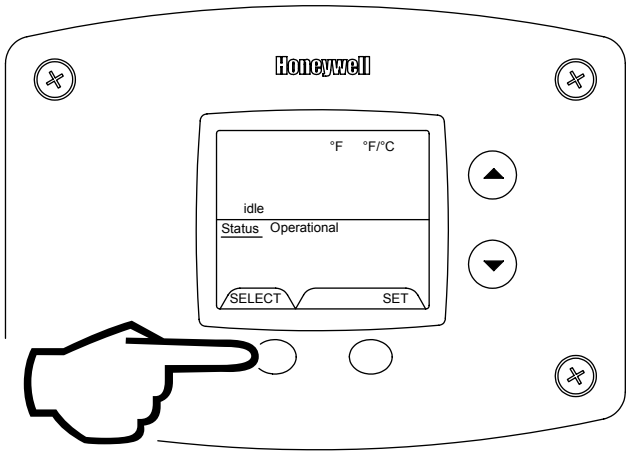
Step 3: Press “SET” button for new setting to take effect immediately. The setpoint will stop flashing. If the “SET” button is not pressed, the new temperature setting will take effect in approximately 10 seconds.



Step 3

To Change Temperature Format in Display from °F to °C or ˚C to ˚F:

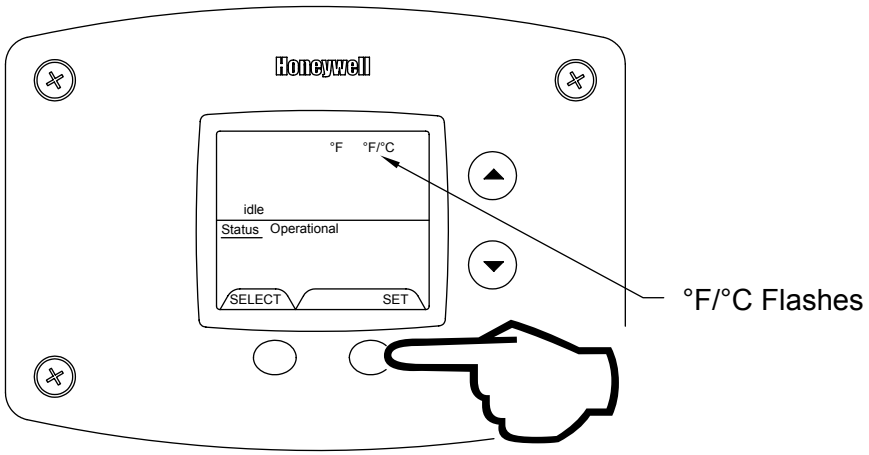
Step 1: Press “SELECT” button until °F/°C is displayed.



Press select

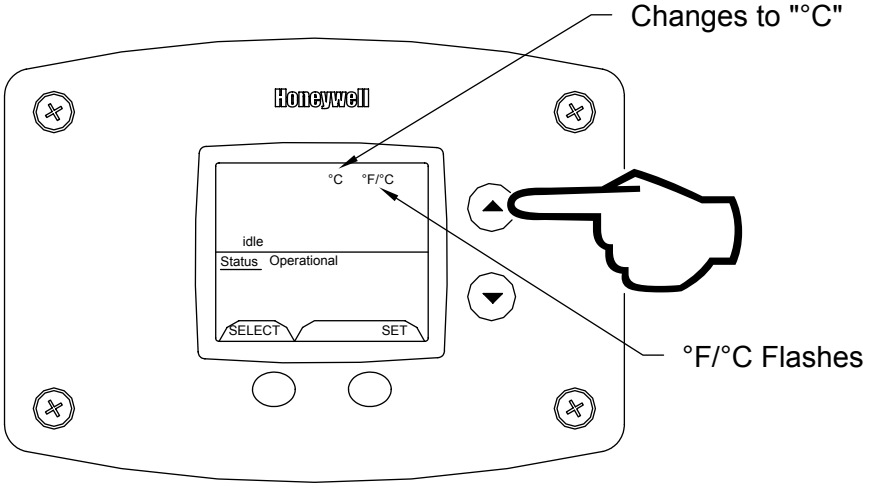
Step 1

Step 2: Press “SET” button to change temperature format. Symbol °F/°C will flash.



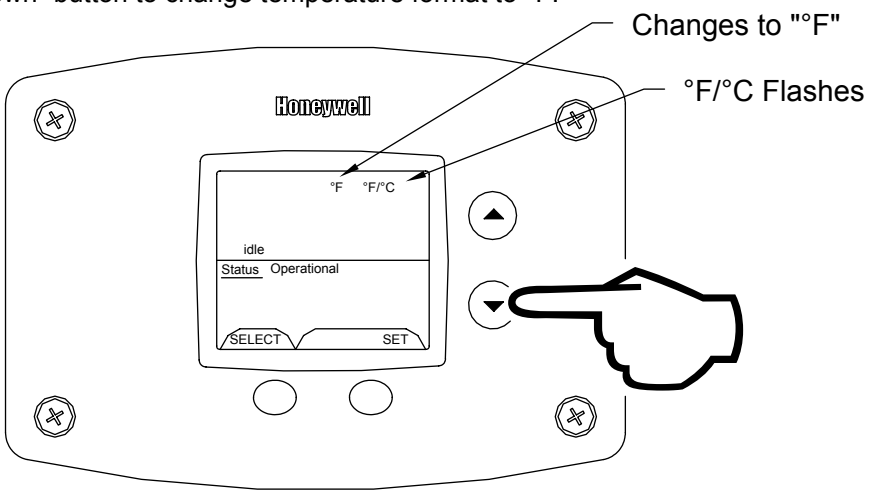
Step 2

Step 3a: Press “Temperature Up” button to change temperature format to °C.



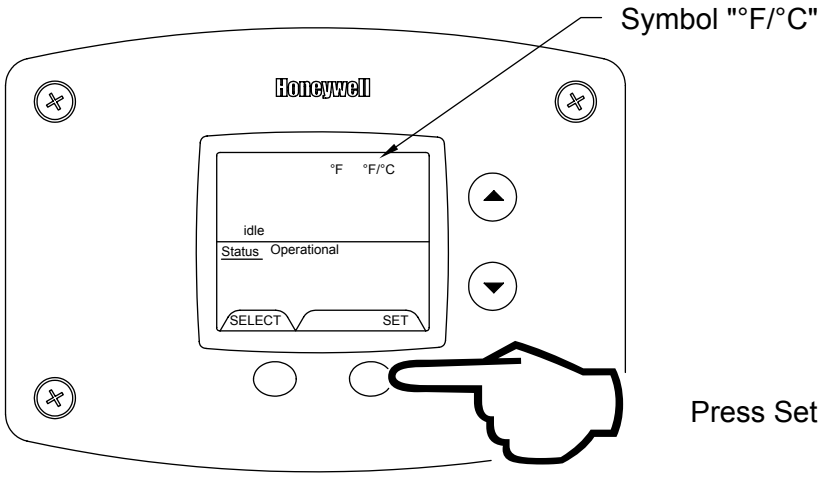
Step 3a

Step 3b: Press “Temperature Down” button to change temperature format to °F.



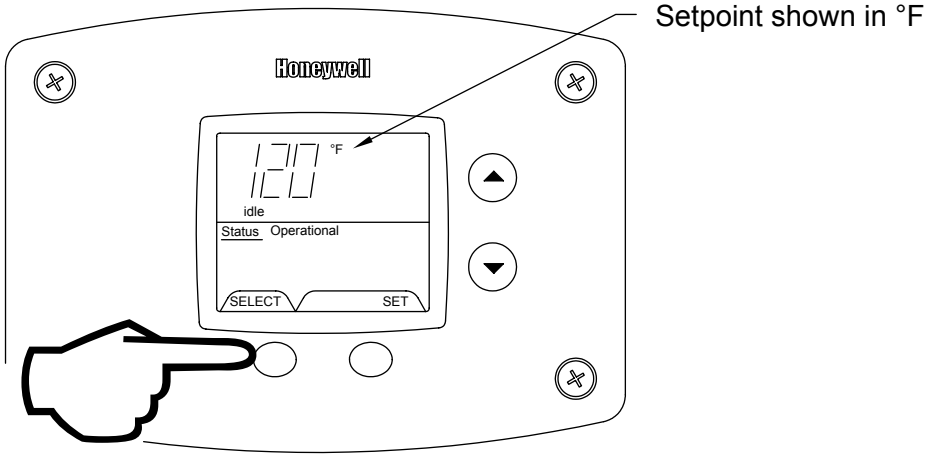
Step 3b

Step 4: Press “SET” button to confirm ˚F or ˚C format. °F/°C will stop flashing. Setpoint display will appear in the format selected (˚F or ˚C) in 10 seconds.



Step 4

Step 5: Pressing “SELECT” button will return display to setpoint in format selected (˚F or ˚C) immediately.



Step 5

An automatic gas shut-off device (ECO) is incorporated in the sensor and control board 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*) and follow applicable Lighting Instructions to place the water heater in operation. The water heater must have the problem corrected by a qualified service person before putting the water heater back in operation. 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 should be 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. If the burner flame does not appear as described, an air shutter adjustment may be required. The burner tube flames should light smoothly from the pilot.

NOTICE

IMPORTANT- In the event of an emergency, turn off the gas and electric (if applicable) to the appliance.

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.

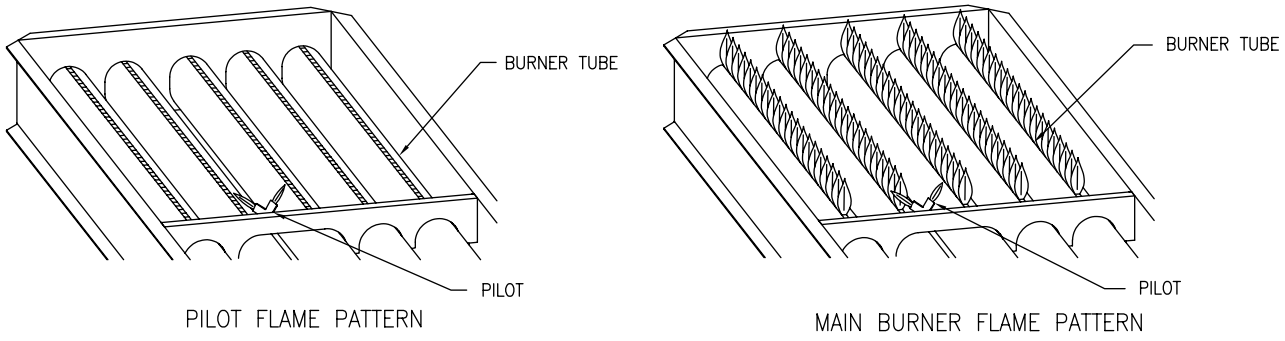


Figure 8

⚠ WARNING

Water heaters are heat producing appliances. To avoid damage or injury there shall be no materials stored against the water heater or vent system, and proper care shall be taken to avoid unnecessary contact (especially by children) with the water heater and vent system. **UNDER NO CIRCUMSTANCES SHALL 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.**

SECTION X: MAINTENANCE

NOTICE

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

1. A qualified service technician should perform the following maintenance 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.
2. 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.
3. The entire combustion system must be sealed for this water heater to function properly. Make sure the burner access panel is kept tightly sealed. The combustion air supply pipe at the rear of the water heater must be tightly clamped to the vent adapter and combustion air box boot. Replace any damaged parts. The entire venting system and combustion air supply parts must be inspected at least annually for integrity of all joints and gaskets.

⚠ WARNING

The ventilation air system may be **HOT**.

4. The flow of combustion and ventilation air **MUST NOT** be restricted. Keep the direct vent terminal openings clear of objects, shrubs, snow, and debris. Check to make sure the vent terminal is not damaged.
5. At all times keep the water heater area clear and free from combustible materials, gasoline and other flammable vapors and liquids.
6. 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 illustration of the proper burner flame pattern.
7. At annual intervals check the flue baffles for deterioration and scale or carbon deposits. Clean if necessary and brush the flue tubes if excessive scale or deposits are found on the baffles. Replace any baffles that have become excessively warped or deteriorated. Check the flue collector gasket for integrity and replace if necessary. Cleaning of the flue baffles and flue tubes should be done prior to cleaning the burners, since deposits may fall on the burners during cleaning or checking the baffles.
8. 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. Inspect the pilot. Carefully clean the electrode and flame sensor rod with emery cloth. The spark electrode (rod closest to the pilot hood) gap should be 1/8”.

NOTICE

It is imperative for proper operation of the water heater that the main burner rack be replaced in the original location.

To remove the burner rack assembly, follow the procedure outlined below:

a) Shut off the gas and electrical supply to the water heater.
b) Remove the pilot tube fittings at the gas valve and combustion box.
c) Disconnect wires to gas valve. Open control box and disconnect pilot spark and flame sensor wires. Remove the wire raceway cover below the control box.
d) Disconnect the gas pipe union below the gas valve.
e) Remove the three screws securing the gasketed manifold pipe flange on the left side of the combustion box.
f) Remove the burner access panel from the front of the combustion box.
g) Carefully remove and push the pilot wire grommet into the combustion box with the pilot wires.
h) Disconnect the pilot tube fitting on the inside bulkhead fitting of the combustion box.
I) Un-thread the gas pipe assembly from the manifold inside the combustion box.
j) Remove the screw securing the burner rack on the top right panel of the combustion box.
k) Slide out the burner rack assembly.

To reinstall the burner rack, reverse the above procedure.

9. At least once a year, check the combination temperature and pressure relief valve to insure 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.

⚠ 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.

Keep clear of the 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.

10. Monthly drain off a gallon of water to remove silt and sediment.

⚠ WARNING

THIS WATER MAY BE HOT!

11. 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.
12. 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. Refer to filling and draining the water heater.
13. Four sacrificial anode rods have been installed in the tank head to extend tank life. The anode rods should be inspected annually for corrosion and replaced when necessary to prolong tank life. Water conditions in your area will influence the time interval for inspection and replacement of the anode rod. 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. Contact the plumbing professional who installed the water heater or the manufacturer listed on the rating plate for anode replacement information.
14. Oil the induced draft blower motor in the ports of the front and rear motor bearings every 6 months with 4 drops each of SAE 20 motor oil.
15. The vent system must be inspected at least once a year to ensure against leakage of exhaust products.

⚠ CAUTION

FOR YOUR SAFETY, **DO NOT** ATTEMPT REPAIR OF COMBINATION GAS CONTROL, BURNERS OR GAS PIPING. REFER REPAIRS TO A QUALIFIED SERVICE TECHNICIAN.

TO FILL THE WATER HEATER

1. Close the water heater drain valve by turning the knob or valve stem 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.
5. To restore operation of the water heater, refer to operating instruction label on the water heater.

TO DRAIN THE WATER HEATER

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

1. Reduce the thermostat to the lowest setting. Depress the control panel rocker switch on the top of the control box to the “OFF” position. Disconnect power to the water heater.
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 or valve stem 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.”

Contact your supplier, plumbing professional or contact the company at the address given on the rating plate of the water heater for replacement parts.

Provide the part name as well as the model and serial number(s) of the water heater(s) when ordering parts.

READ THE WARRANTY FOR A FULL EXPLANATION OF THE LENGTH OF TIME THAT PARTS AND THE WATER HEATER ARE WARRANTED.

Manufactured under one or more of the following U.S. Patents: RE.34,534; B1 5,341,770; 4,416,222; 4,628,184; 4,669,448; 4,672,919; 4,808,356; 4,829,983; 4,861,968; 4,904,428; 5,000,893; 5,023,031; 5,052,346; 5,081,696; 5,092,519; 5,115,767; 5,199,385; 5,277,171; 5,372,185; 5,485,879; 5,574,822; 5,596,952; 5,660,165; 5,682,666; 5,761,379; 5,943,984; 5,954,492; 5,988,117; 6,142,216; 6,395,280 6,684,821; 7,063,132; 7,007,748
Other U.S. and Foreign patent applications pending. Current Canadian Patents: 1,272,914; 1,280,043; 1,289,832; 2,045,862; 2,092,105; 2,107,012; 2,108,186; 2,112,515

Complete the following information and retain for future reference:

Model No:_____

Serial No:_____

Service Phone

Days:_____ Nights:_____

Address:_____

Supplier:_____

Supplier Phone No:_____

SECTION XI: DIAGNOSTIC AND TROUBLESHOOTING GUIDE

DIAGNOSTIC GUIDE FOR HONEYWELL INTEGRATED CONTROL SYSTEM SEQUENCE OF OPERATION FOR PDV MODELS

1. When the tank temperature drops below the temperature setpoint on the display, the control sends power to the induced draft blower to start the ignition sequence.
2. When blower reaches the full operating speed, the pressure switch closes, completing the 24 volt circuit to the safety circuit of the control. If the exhaust vent becomes blocked or the blower fails, the pressure switch will open, the gas valves close, and the blower stops after a 5 second post-purge. The blower will restart and continue to operate in the lockout condition until the blockage is removed or the venting problem is corrected. Error code 29 will appear on the water heater display.
3. The control will continue to operate the blower for 15 seconds to "prepurge" any flue products remaining before starting the ignition sequence.
4. After the prepurge period, the control sends 24 volt power to the pilot valve "PV" terminals on the gas valve allowing pilot gas to flow to the pilot. The control also sends high voltage through the pilot electrode to spark to the pilot hood and ignite the pilot gas. If the pilot does not ignite within 90 seconds, the pilot valve is denergized and the sparking stops for 75 seconds. The control will attempt to ignite the pilot two more times. If the pilot does not light on the 3rd attempt, the control will go into "soft lockout" for 1 hour and then will repeat the 3 ignition attempts. The blower is off during the "soft lockout" period.
5. When the pilot is lit, the flame is sensed by the flame sense rod. The flame sense signal received by the control board causes the sparking to stop and the main gas valve to open. The main burners ignite from the pilot flame. The pilot is continually monitored by the flame sensing circuit. If for any reason, the pilot flame is not sensed by the flame sensing circuit, the gas valves close. After a 75 second delay, the pilot valve opens and the pilot electrode sparks to relight the pilot. The same sequence will occur in the event of a power supply or gas supply interruption.
6. The main burners continue to operate until the water temperature in the tank increases past the control setpoint, which will cause the gas valve to close. The blower stops operating 5 seconds after the gas valve closes. The water heater remains in the standby mode until the temperature drops below the setpoint and initiates another heating cycle.
7. If for some reason, the tank temperature should reach or exceed 200˚F, then the control closes the gas valve and goes into a "hard lockout" state and will not operate until reset by a qualified service person. The display will read "error code 65", which indicates the tank high limit temperature has been exceeded. No attempt should be made to reset the control until a service person has corrected the cause of the high limit condition. Refer to the diagnostic service section at the end of this Installation and Operating Instructions Manual.

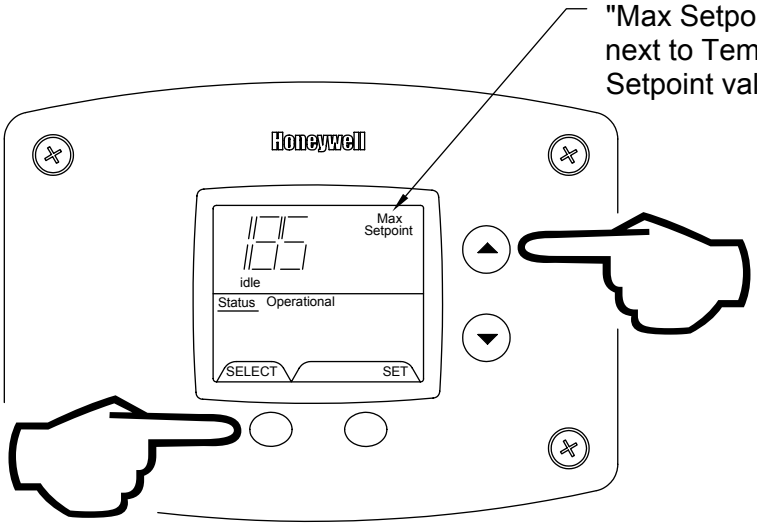
ACCESSING SERVICE MODE ON THE WATER HEATER DISPLAY (FOR SERVICE PERSONNEL ONLY)

The display has a “service mode” for changing the maximum setpoint and accessing information in aiding servicing of the water heater. This procedure is for service and installation personnel only. To enter the Service Mode, follow the steps illustrated below:

⚠ WARNING

The following procedure is for service and installation personnel only. Resetting lockout conditions without correcting the malfunction can result in a hazardous condition.

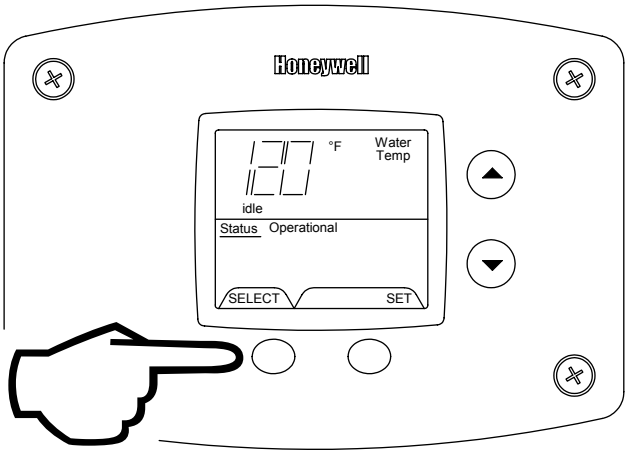
Step 1: Press “Select” and “Temperature Up” buttons together and hold for 3 seconds until “Max Setpoint” is shown in the display.



NOTICE

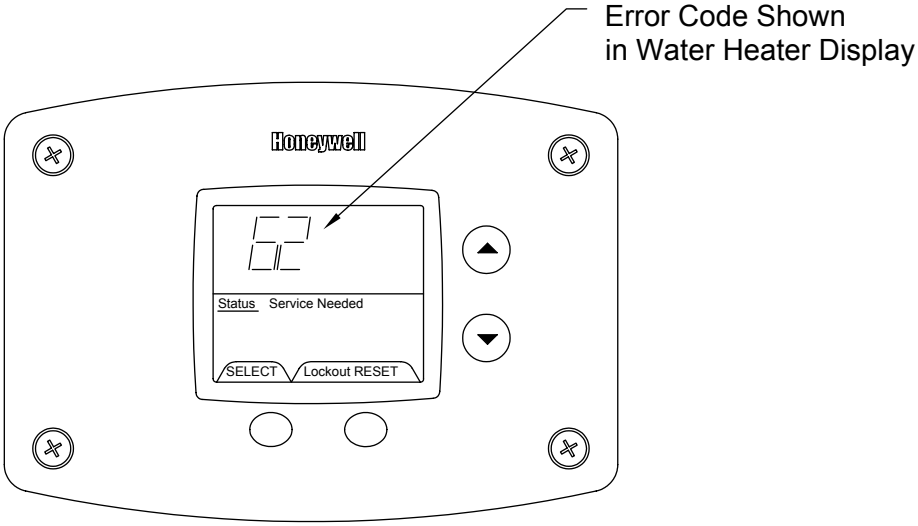
30 Seconds after the last button press, the display will automatically return to the “User Mode”. Simultaneously pressing the “Select” and “Temperature Up” buttons will switch the display immediately to the “User Mode”.

Step 2: Pressing “Select” button will change display to next mode

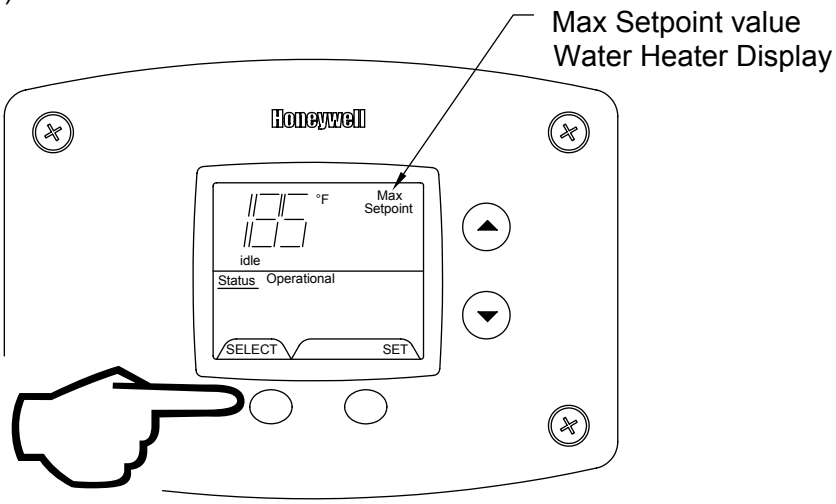


The following is the sequence of modes available in "Service Mode" by pressing the "Select" button:

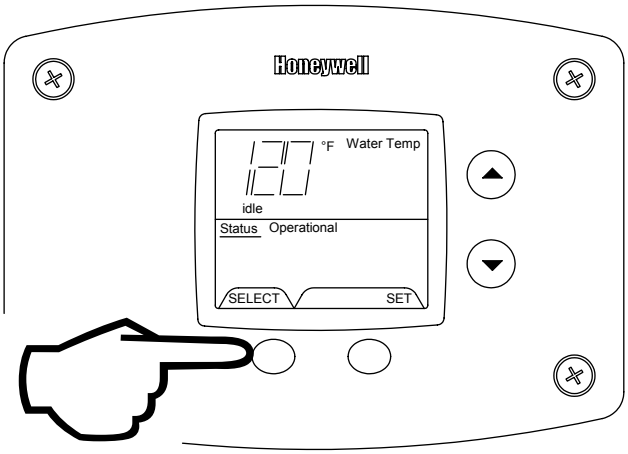
Error Code Number (Display/Reset). This is only shown if there is an operating error in the "User Mode".



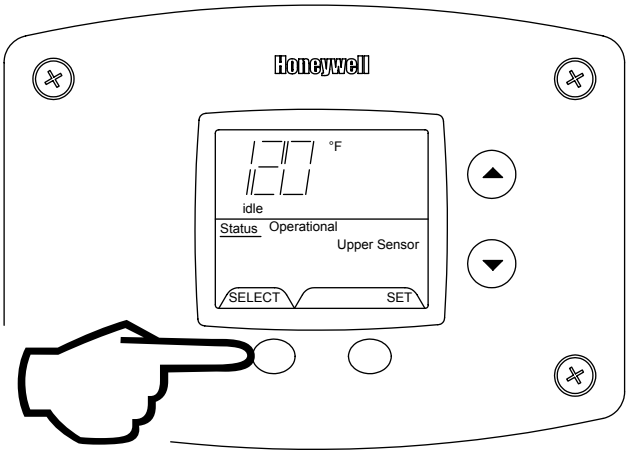
1. Max Setpoint (Display/Change)



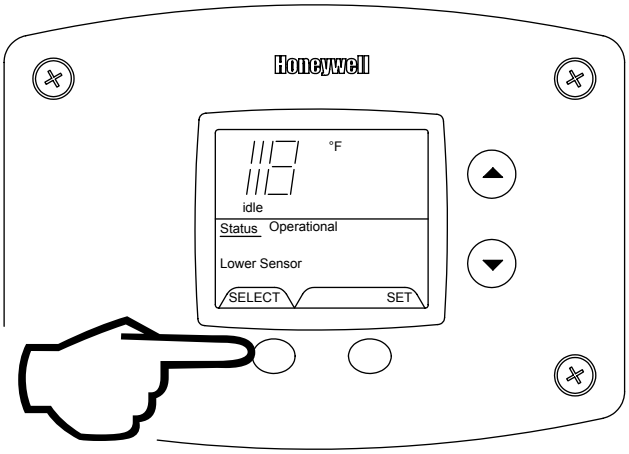
2a. Water Temperature Average (Displays average if there are two sensors – sensor temperature displayed if single sensor is used).



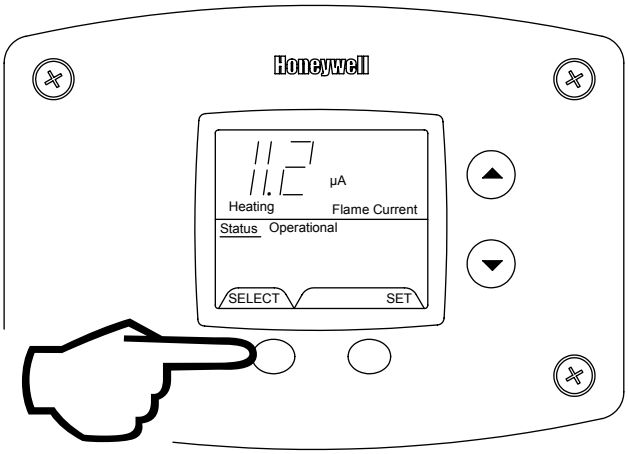
2b. Water Temperature - Upper Sensor (Displays if there is an upper sensor – some models)



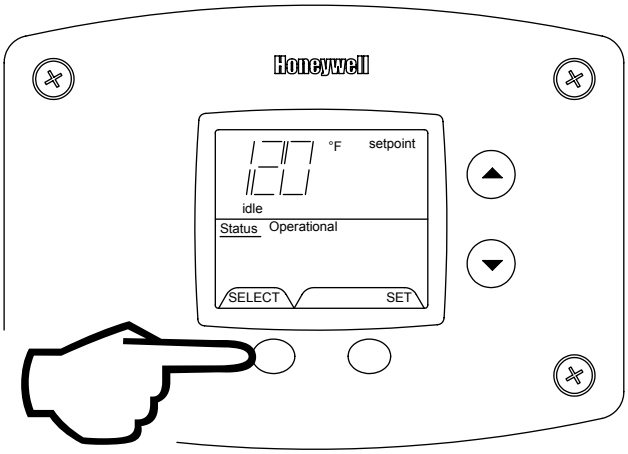
2c. Water Temperature - Lower Sensor (Displays if there are two sensors)



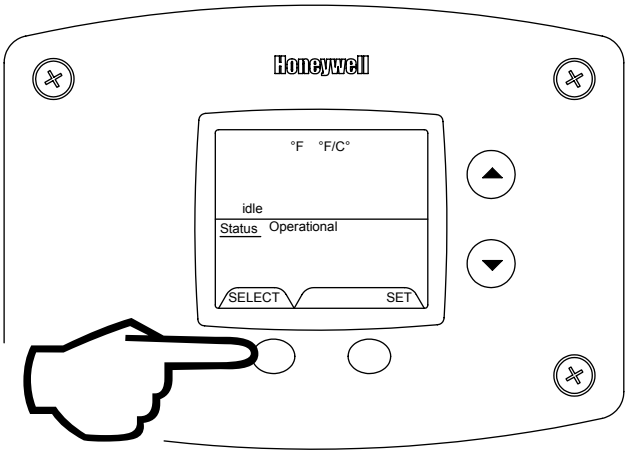
3. Flame Current of Pilot Flame Sensor (Displays only in the Heating Cycle)



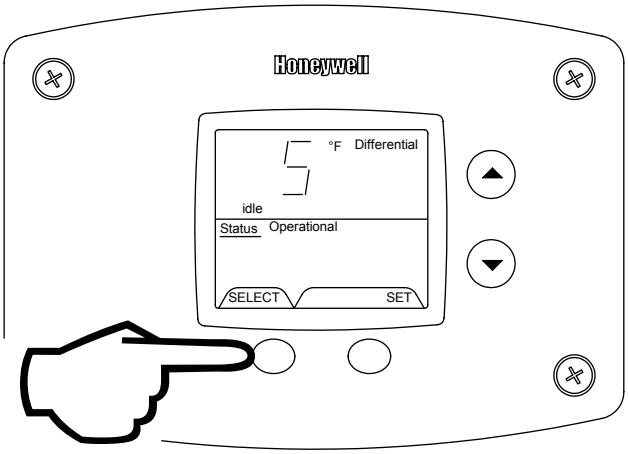
4. Setpoint (Displayed/Change)



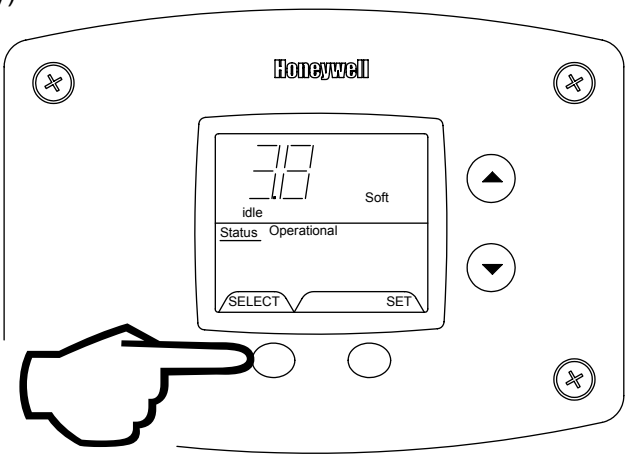
5. ˚F/˚C (Display/Change)



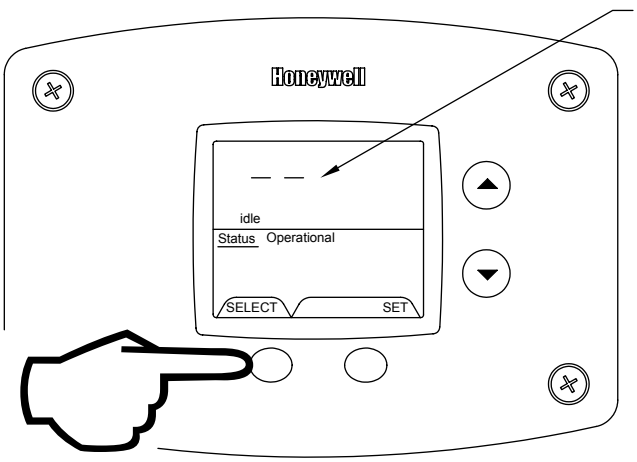
6. Differential (Display only – shows the differential of the thermostat)



7. Software Version (Display only)



8. Error Code History (Displays if there are present error codes or up to 10 previous error codes). Water Heater Display will show -- if there are no error codes.

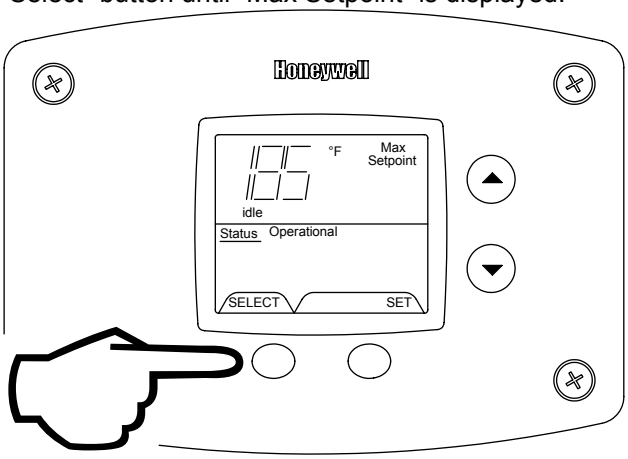


To change the Maximum Setpoint Limit (Max Setpoint) for the temperature setpoint:

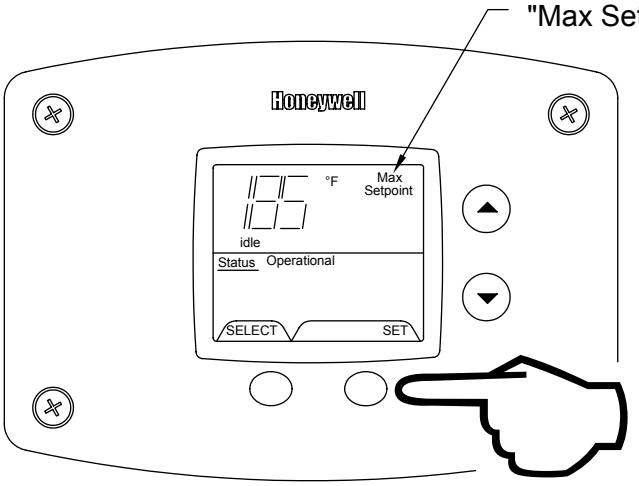
⚠ WARNING

Setting the water temperature to the maximum set point can result in scalding hot water delivered to the faucets. It is highly recommended that the maximum setpoint be adjusted to the lowest temperature possible for the needs of the installation. See following section to change the maximum setpoint limit (max setpoint). Make sure the water heater control display is not in a public area that can result in the temperature settings being improperly adjusted. See previous warning on scalds and an ASSE approved mixing valve.

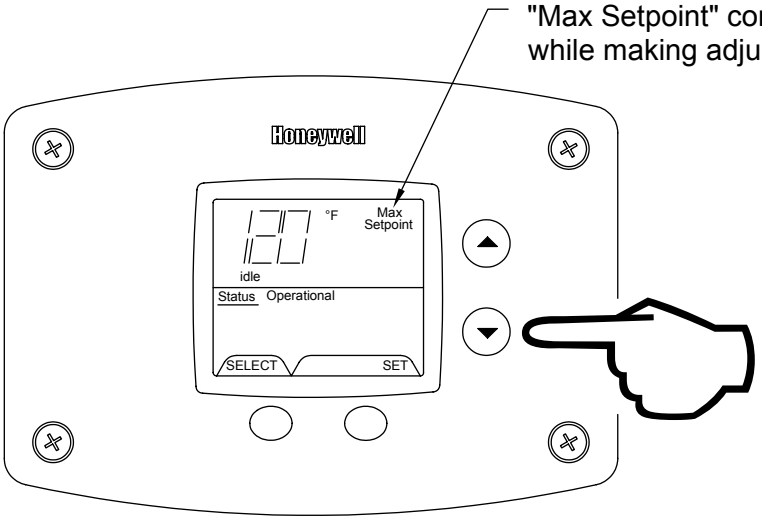
Step 1: In service mode press the “Select” button until “Max Setpoint” is displayed.



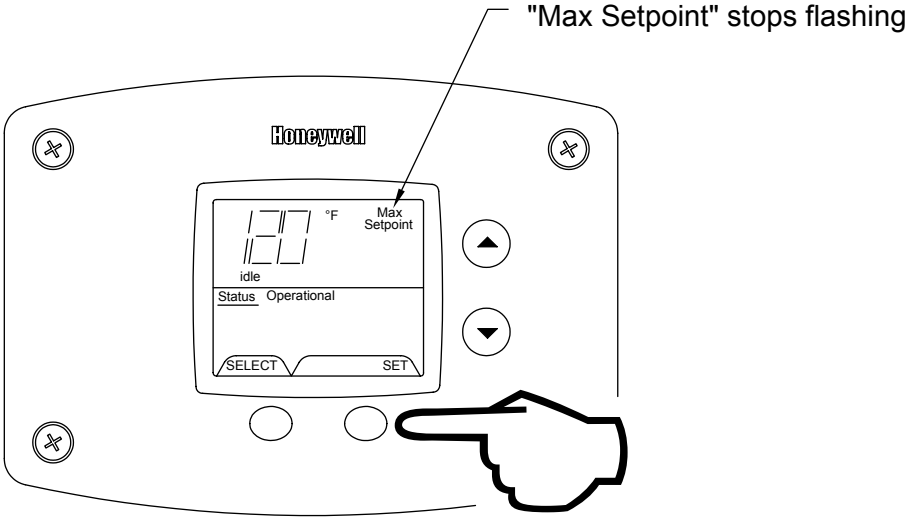
Step 2: Press “Set” button to enter setting mode. “Max Setpoint” will flash to indicate setting mode.



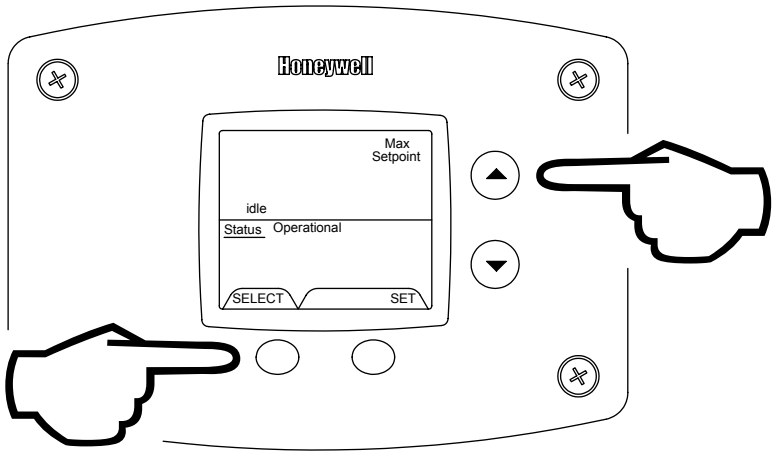
Step 3: Press the “UP” or “DOWN” buttons to change the maximum setpoint value. This will limit the maximum setpoint the user can select. Note: The maximum setpoint is approximately 180˚F.



Step 4: Press “Set” button to confirm new “Max Setpoint” value and stop setting mode.



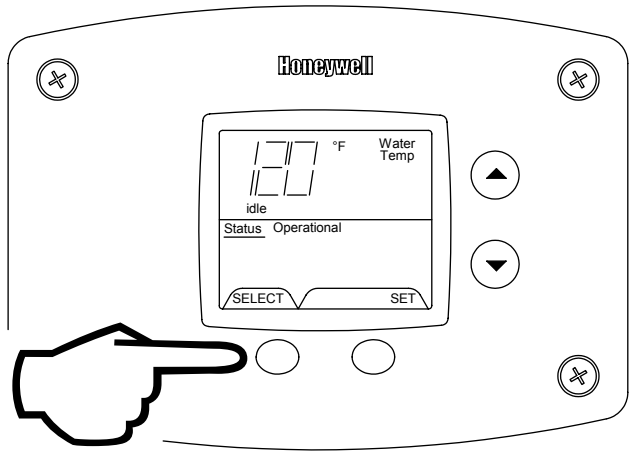
Step 5: 30 Seconds after the last button press, the Water Heater Display will go back to “User Mode”. It will read “Max Setpoint” without showing a temperature value if the temperature setpoint is at the maximum setting. The Water Heater Display can be set back to the “User Mode” immediately by pressing both the “Temperature Up” and “Select” buttons together for 3 seconds.



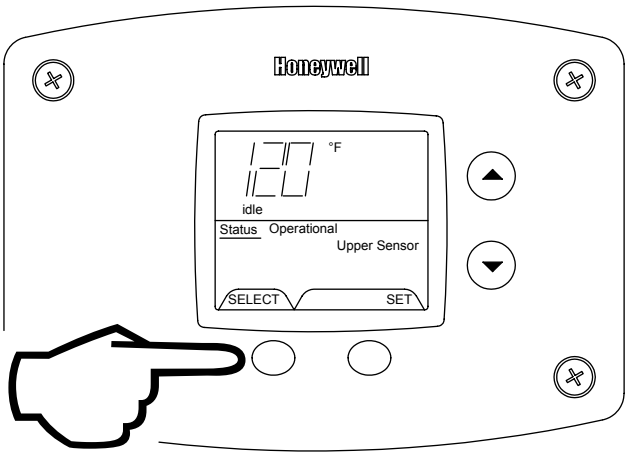
Exiting Service Mode

Display of Water Temperature:

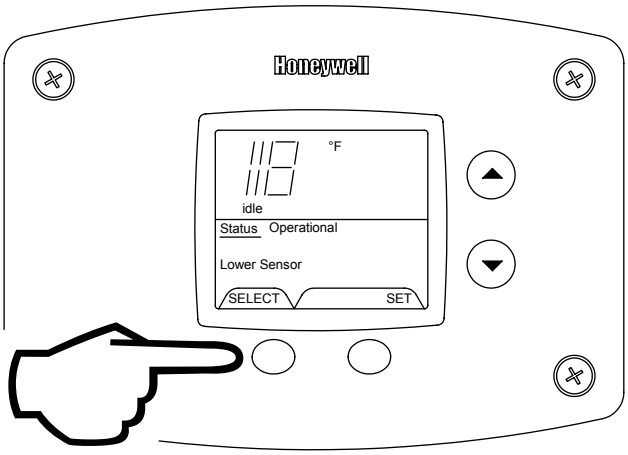
Step 1: In Service Mode, Press the “Select” button until “Water Temp” is displayed in the upper right section of the water heater display. For water heaters using two temperature sensors in the tank, this will be the average reading between the two sensors. For water heaters using a single sensor, this is the reading for the sensor.



Step 2: For water heaters using two temperature sensors, pressing the “Select” button again displays the Upper Sensor temperature reading. “Upper Sensor” will be displayed in the lower right side of the status window of the water heater display.

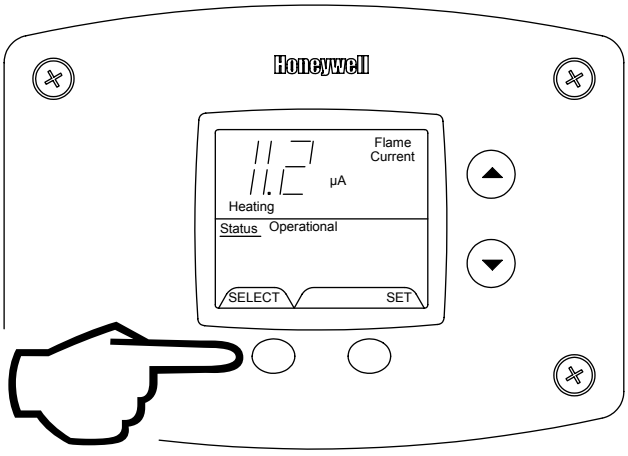


Step 3: For water heaters using two temperature sensors, pressing the “Select” button again displays the Lower Sensor temperature reading. “Lower Sensor” will be displayed in the lower left side of the status window of the water heater display.



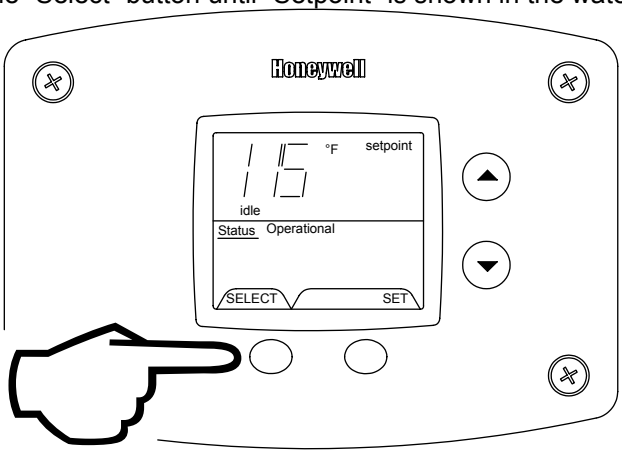
To Display Flame Sense Current of the Pilot Flame Sensor:

The pilot flame sense current is available only when the burners are in operation. Step 1: Make sure the status displays “Heating” or draw enough hot water to start the burners. Step 2: Enter the “Service Mode” described previously. Step 3: Press the “Select” button until a number value is displayed with “Flame Current” to the right of the number. The value displayed is in microamps (μA).

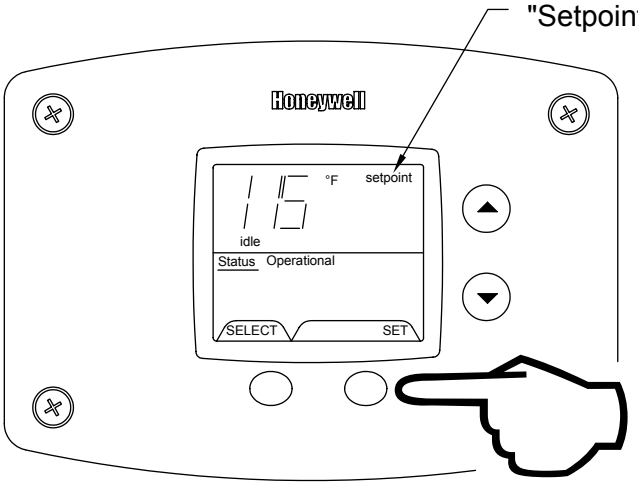


To Display and Change Temperature Setpoint:

Step 1: In “Service Mode” press the “Select” button until “Setpoint” is shown in the water heater display.



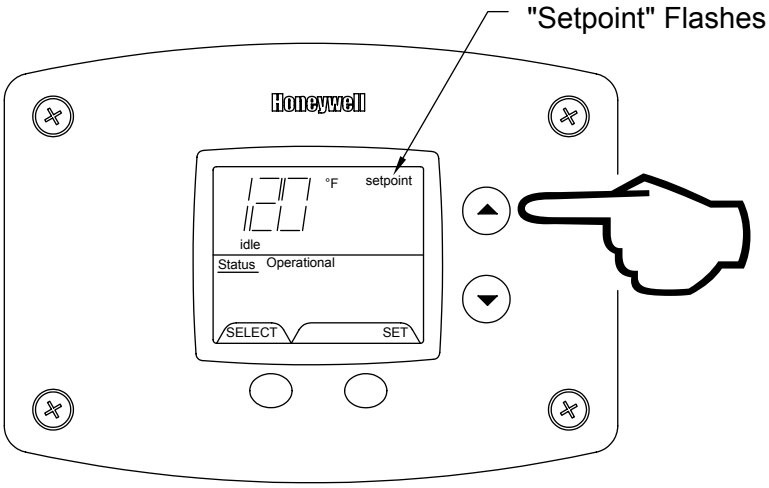
Step 2: Press the “Set” button to enter the setting mode. “Setpoint” will flash in the water heater display.



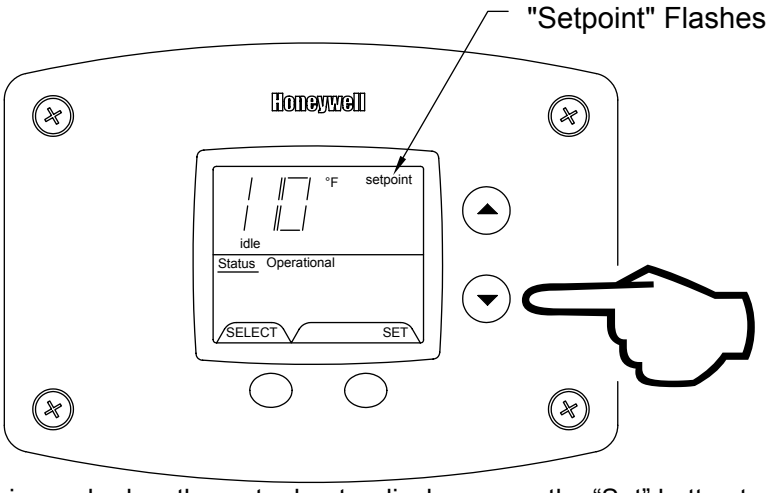
Step 3: To raise the temperature setpoint, press the “Temperature Up” button until the desired temperature is shown on the water heater display.

NOTICE

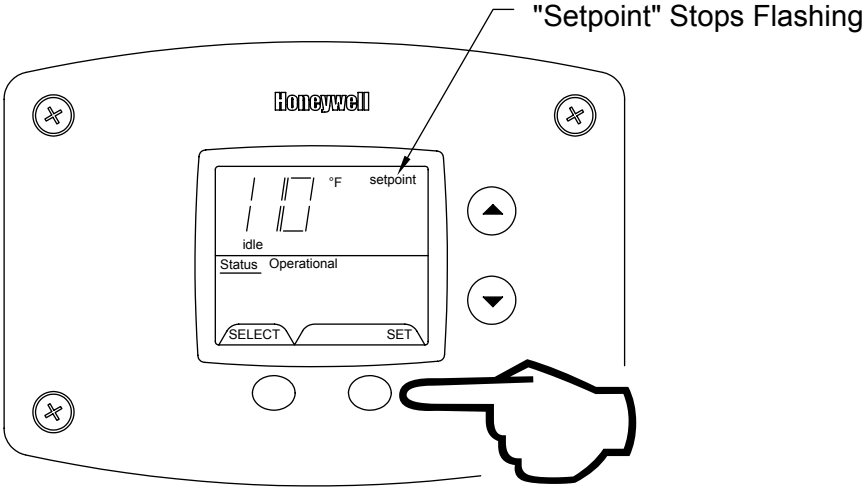
Note: The maximum temperature that can be set in the Water Heater Display is limited to the “Max Setpoint” described previously. To change the “Max Setpoint”, refer to the procedure “To Change the Maximum Setpoint Limit…” described previously under “Accessing the Service Mode on the Water Heater Display”.



Step 4: To lower the temperature setpoint, press the “Temperature Down” button until the desired temperature is shown on the water heater display.

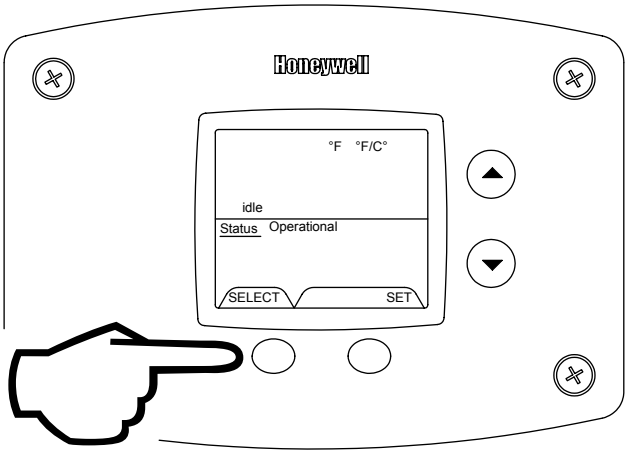


Step 5: When the desired setpoint is reached on the water heater display, press the “Set” button to confirm the new setpoint. “Setpoint” stops flashing in the water heater display.

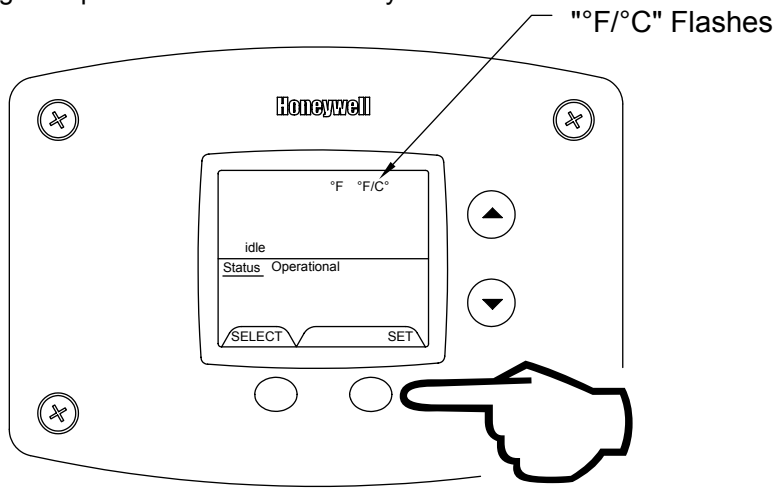


To Display and Change Temperature Format (˚F/˚C):

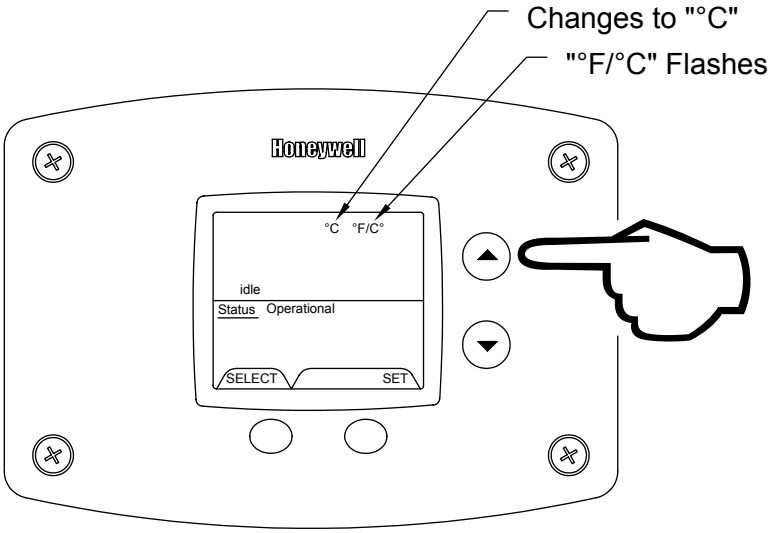
To Change Temperature Format in Display from ˚F to ˚C or ˚C to ˚F:
Step 1: While in “Service Mode”, press “Select” button until “˚F/˚C” is shown in the upper right portion of the water heater display.



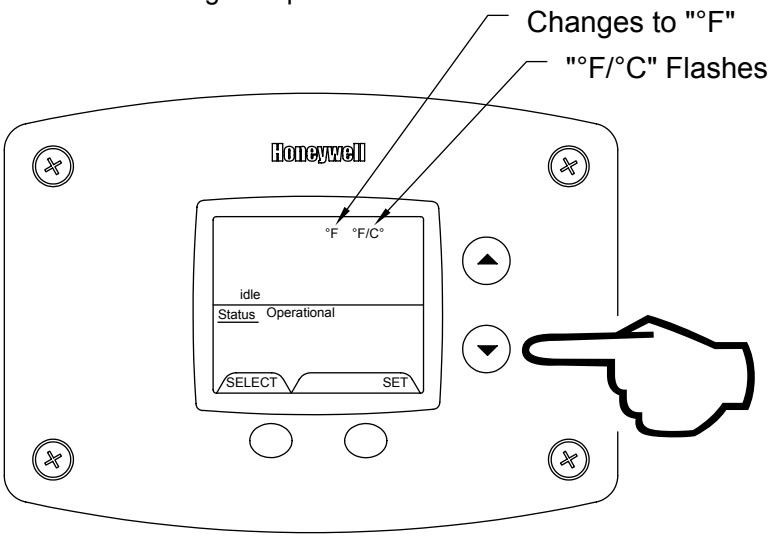
Step 2: Press “Set” button to change temperature format. “˚F/˚C” symbol will flash in the water heater display.



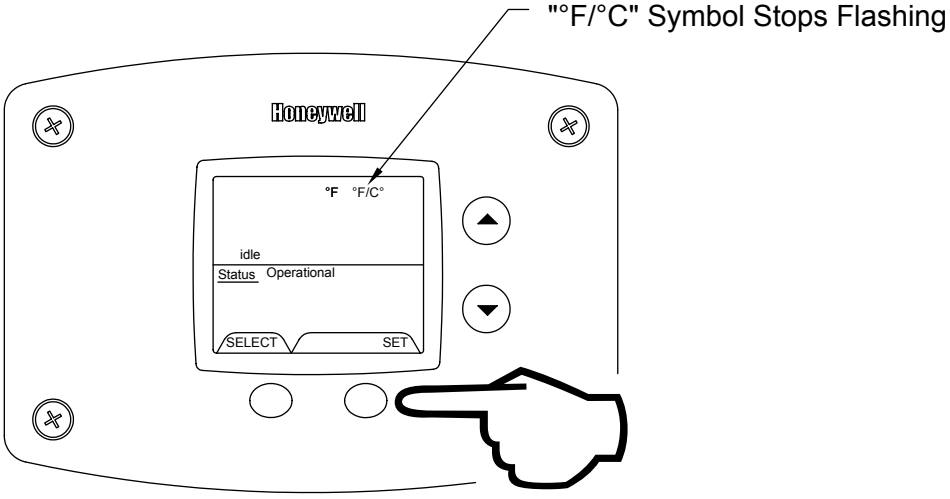
Step 3a: Press “Temperature Up” button to change temperature format to ˚C



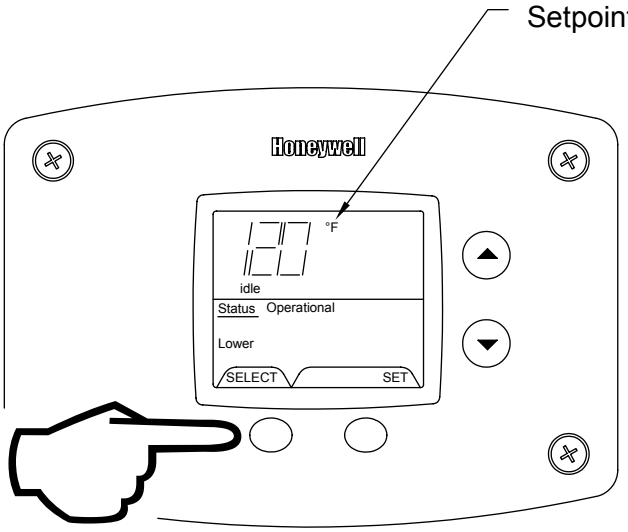
Step 3b: Press “Temperature Down” button to change temperature format to ˚F.



Step 4: Press “Set” button to confirm ˚F or ˚C format. ˚F/˚C will stop flashing.



Step 5: Pressing “Select” button will return display to setpoint in format selected (˚F or ˚C) immediately.



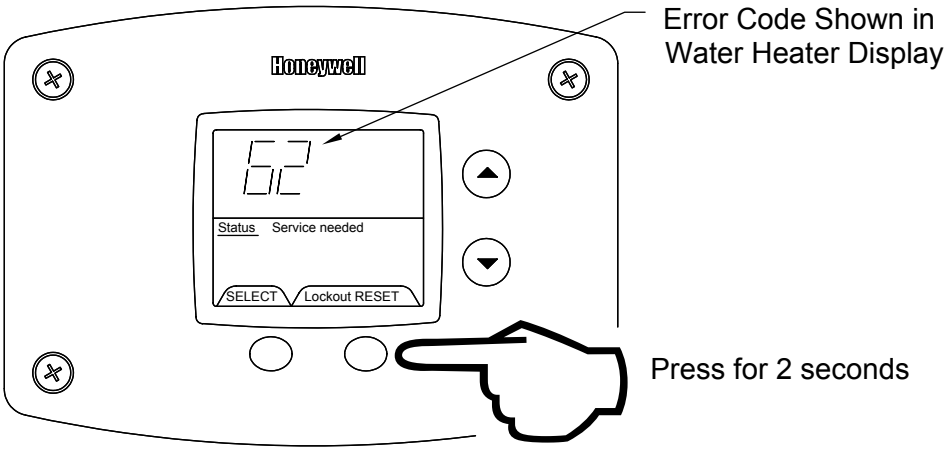
How to reset the control from Lockout Conditions:

⚠ WARNING

The following procedure is for service and installation personnel only. Resetting lockout conditions without correcting the malfunction can result in a hazardous condition.

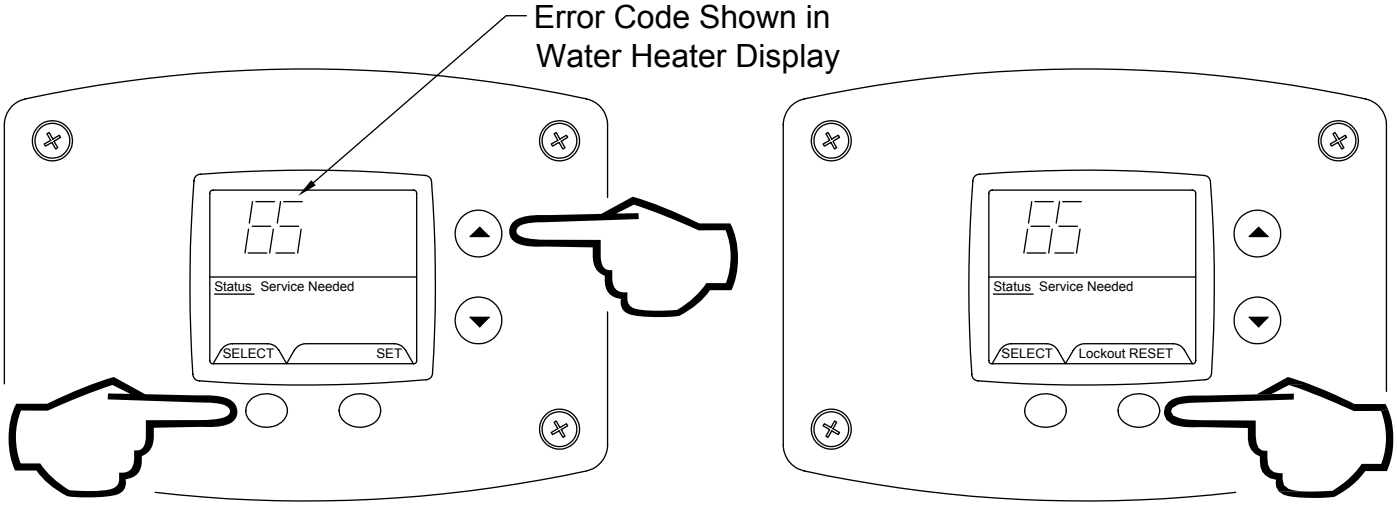
If an error code is displayed (except for #4, low flame sense current), the water heater will be in a “lockout condition” with the water heater display showing the error code number and “Service Needed” in the status section of the display window. Error codes 62 (maximum number of retries detected) and 63 (maximum number if ignition recycles detected) are “Soft Lockouts” in which the control can be reset in the “User Mode” by pressing the lower right button under “Lockout Reset” shown in the lower right portion of the display. The control will also go through 3 attempts to relight the burners every hour in the soft lockout condition.

Resetting Error Codes in Soft Lockout Condition



All other error codes will put the water heater into a “Hard Lockout” condition, in which the water heater will not operate and cannot be reset in the “User Mode”. To reset a hard lockout, first enter the “Service Mode” described earlier by pressing both the “Temperature Up” and “Select Buttons” at the same time for 3 seconds. Then press the lower right button under “Lockout Reset” in the water heater display and hold for 3 seconds.

Resetting Error Codes in Hard Lockout Condition



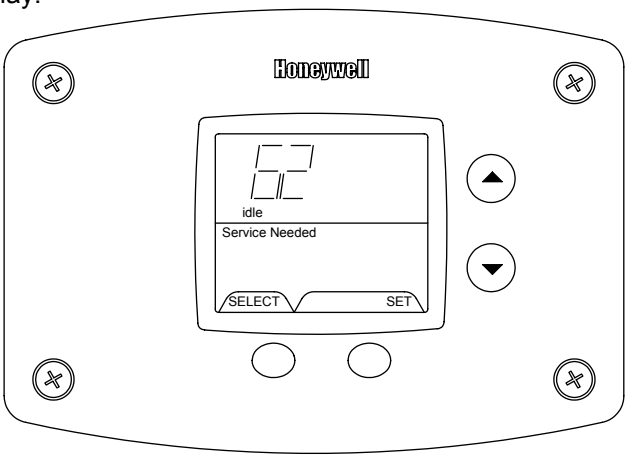
Step 1: Press for 3 seconds to enter service mode.

Step 2: Press for 3 seconds to reset control in service mode.

Error Codes and Error History Display:

If there is an operating problem with the water heater, an error code number will appear on the water heater display with "Service Needed" to the right of the "Status" indicator. The error code label is located below the water heater display and the following section in this Installation and Operating Instruction Manual explains the error codes with corrective actions to repair the water heater.

Example of Error Code in the Display:



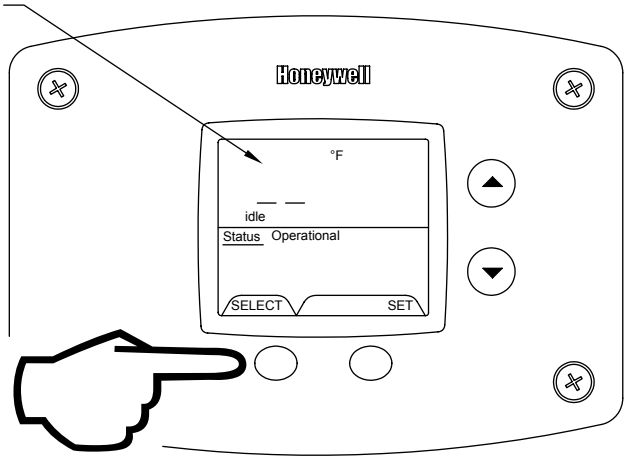
Error Code History:

In "Service Mode" pressing the "Select" button after the "Software Version" (item 8 in the previously described sequence of service modes) will show an error code history, if there have been any previous operating problems with the water heater. If the display shows --, there is not a current error code.
The Water Heater Display will provide up to 10 previous error codes. The oldest error code will be stored in code index #1 and the most recent in code index #10 (if there are 10 error codes).

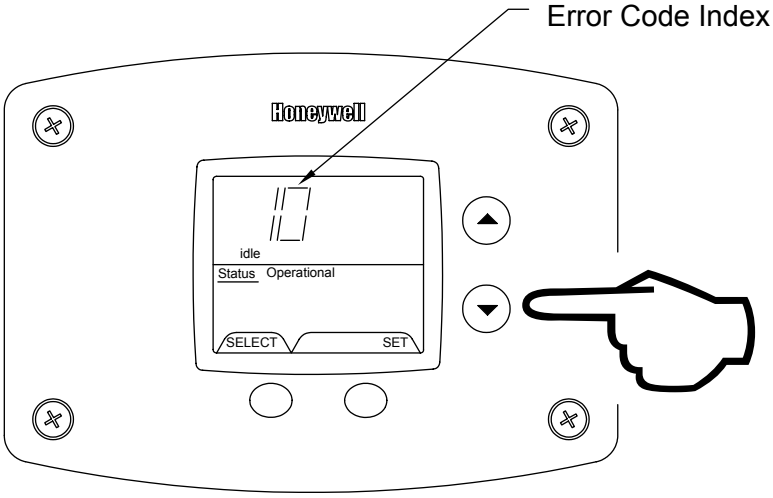
To view previous error codes:

Step 1:
In "Service Mode" press the "Select" button until the next display after the "Software Version". If there are no current error codes, the display will show -- .

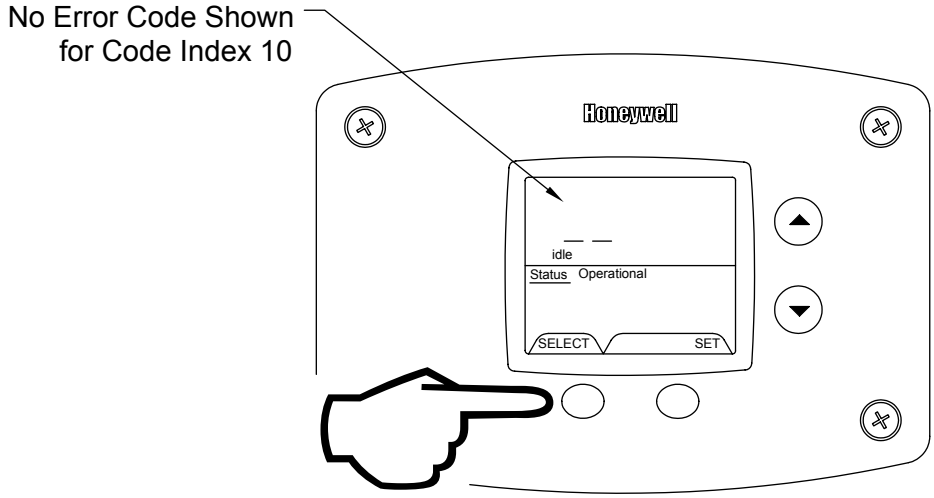
No Current Error Code



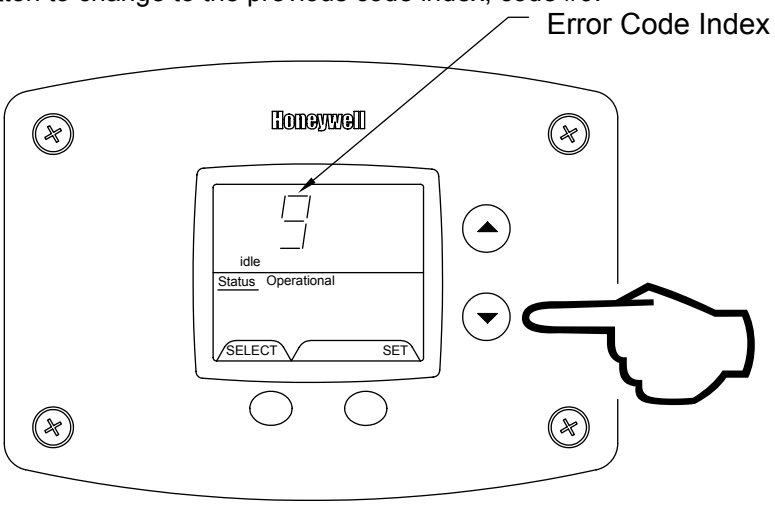
Step 2:
Press the “Temperature Down” button to select the error code index, starting with the most recent error code “10”.



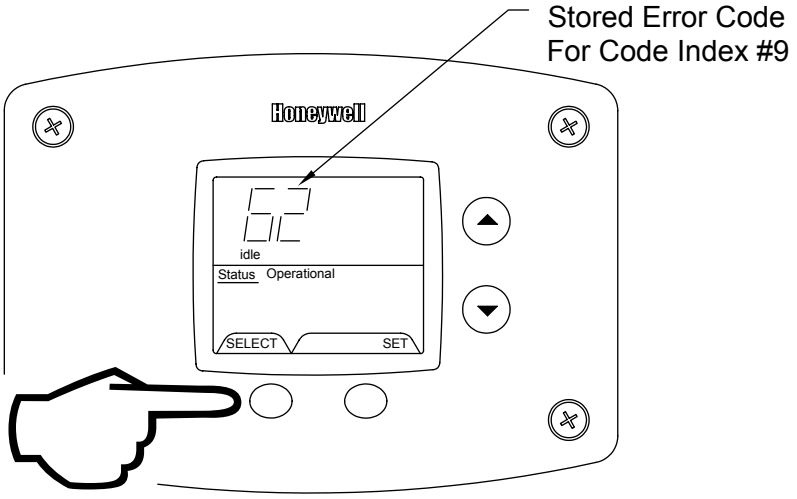
Step 3:
Press the “Select” button to view the error code for “code 10”. If there is a number displayed, note what the number is. The label next to the water heater display will identify the code number. If no number is displayed with only a “--“ in the water heater display, then there has not been an error code for error code index 10.



Step 4:
Press the “Temperature Down” button to change to the previous code index, code #9.

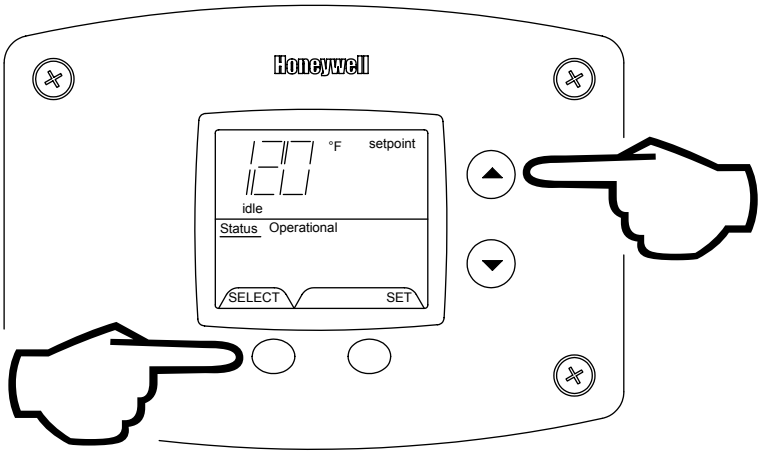


Step 5:
Press the “Select” button for code index #9 to view if there are any code numbers.



Step 6:
Continue pressing the “Temperature Down” button to change to the next error code index and press “Select” to view the error code number, if any, for that index number. Continue on to index #1, the oldest error code index. The water heater display will store up to 10 error codes with the oldest code starting in code index #1 with the most recent code in code index #10.

Step 7: 10 seconds after the last button press, the Water Heater Display will revert back to the current error code display. To exit Service Mode, either wait 30 seconds or press Temperature Up button and Select Button for 3 seconds.



Exiting Service Mode

DIAGNOSTIC ERROR CODES AND TROUBLESHOOTING PROCEDURES FOR HONEYWELL INTEGRATED CONTROLS (PDV AND INDUCED DRAFT MODEL SERIES)

Error Code	Definition of Code	Cause of Problem and Actions Taken to Correct
4	Low Flame Sense Current	Determine flame sense current in the Service Mode with the water heater operating. If less than 1.0 microamps, check pilot flame sense rod and wire. Clean flame sense rod with emery cloth. If problem is not solved, replace pilot.
2	Pressure Switch Failed to Open (Stuck Closed)	The pressure switch contacts did not return back to the normally open position at the end of the last heating cycle. The control checks to make sure the pressure switch is in the normally open position before allowing the blower to start the ignition sequence. Check to make sure the pressure switch tubing is not blocked. If the pressure switch tubing is clear, replace the pressure switch.
29	Pressure Switch Failed to Close	The pressure switch contacts did not close after the blower was energized. Check to make sure the blower is energized at the beginning of the heating cycle. If the blower did not start, check to make sure there is power to the motor. Replace blower or control board if defective. Check to make sure the venting system is not blocked. Make sure the vent length does not exceed the specified limits. Make sure the vent terminal is not blocked. Check to make sure the pressure switch tubing is clear. Replace the pressure switch if the venting system has checked out O.K. Control will reset once problem is corrected.
6	Flame Sensed Out of Normal Sequence (Before Opening Gas Valve or After Closing Gas Valve)	Check to make sure gas valve has closed. No voltage should be present at the gas valve before or after ignition cycle. Make sure wire positions on the wire harness are correct. If gas valve is stuck open, replace.

Error Code	Definition of Code	Cause of Problem and Actions Taken to Correct
23	Flame Detected Before Ignition	Check to make sure gas valve has closed. No voltage should be present at the gas valve before the ignition cycle. Make sure wire positions on the wire harness are correct. If gas valve is stuck open, replace.
24	Flame Detected After Heating Cycle Completes	Check to make sure gas valve has closed. No voltage should be present at the gas valve before the ignition cycle. Make sure wire positions on the wire harness are correct. If gas valve is stuck open, replace.
31	Upper Sensor Readings Faulty	Resistance of upper sensor out of operating range. Check continuity of wire harness to upper sensor, and if O.K., replace upper sensor.
32	Lower Sensor Readings Faulty	Resistance of lower sensor out of operating range. Check continuity of wire harness to lower sensor, and if O.K., replace lower sensor.
57	Flame Rod Shorted to Ground	Pilot flame sensor rod is shorted to ground. Check to see if flame sensor wire has bare spots touching metal parts of if flame sensor rod is touching the pilot shield or other metal parts. Replace pilot if flame sense wire is damaged or flame rod is bent. Make sure pilot shield is not touching the pilot flame sensor.
58	AC Line Frequency Error – Signal Too Noisy or Frequency Incorrect	Check line voltage frequency to the water heater. Determine if there are wide fluctuations. Call an electrician if the problem persists. The water heater should be on a separate line.
59	Line Voltage Too Low or High	Check line voltage to the water heater. Determine cause of low or high voltage. Call an electrician or your utility. The water heater should be on a separate line.
61	DC Output Voltage Unstable	Check line voltage to the water heater for erratic readings. Also check wiring to make sure there are no shorts. If power supply and wiring are O.K., replace control board.
62	Maximum Number of Retries Detected	Pilot is either not lighting or not staying lit during ignition cycle. Check inlet gas pressure for minimum pressure on rating label. Is pilot electrode sparking? Check gas valve wire harness for broken wires or shorts. If 24 volts is present between PV and PV/MV terminals at the gas valve, replace gas valve. Check for voltage output to the yellow and red gas valve wires on the control board pins. If during the ignition trial period, there is no voltage present at the control board pin terminal for the red and yellow wires leading to the gas valve, then replace the control board. Replace pilot if wires are damaged or electrode is damaged.
63	Maximum Number of Ignition Recycles Detected	Pilot flame is lost during run cycle, then restablished on ignition cycle. Check inlet gas pressure. Is gas pressure dropping below the minimum operating pressure on the rating label after the main gas valve opens? Is the gas pipe size to the water heater adequate? Check the pilot shield position and condition of the burners. Clean or replace as needed. Check the pilot flame and observe the microamp output on the run cycle. Check the pilot tubing to the pilot and replace if crimped or damaged. Replace pilot if wires, flame sensor, or electrode is damaged.
64	Electronics Failure	Replace control board.
65	High Water Temperature (Over 200˚F)	Water temperature in tank has exceeded 200˚F. Check lower sensor. Make sure sensor is fully inserted into the well (clip on sensor wire secures sensor in place). Check lower and upper (where used) sensor readings. If not within specifications, replace sensor. If sensor and wire harnesses check O.K., replace control board.

Procedure for Checking Thermostat Sensors

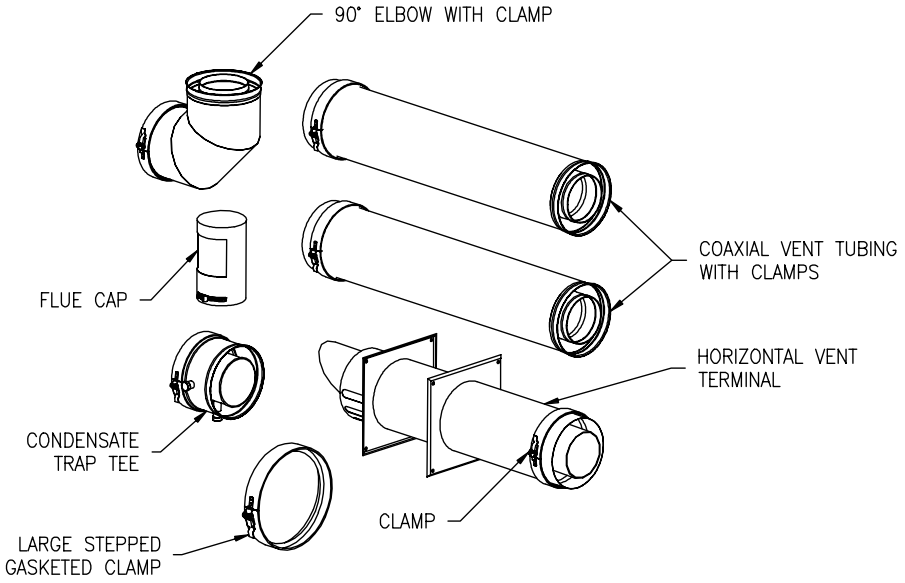
Set the thermostat above water temperature (See temperature adjustment section) and observe system through one (1) complete cycle. Make sure system operates as desired.

To check the upper sensor or lower sensor assembly, compare the resistance of the sensor terminals (blue leads for upper sensor, yellow and black lead for lower sensor) as measured by an ohmmeter to the water temperature as measured by an accurate thermometer. Thermistor resistance increases as the temperature decreases. The tables below show the correct sensor resistance at various temperatures. Replace the sensor if the ohm reading in the chart does not approximate the reading from the sensor at the temperature measured in the tank.

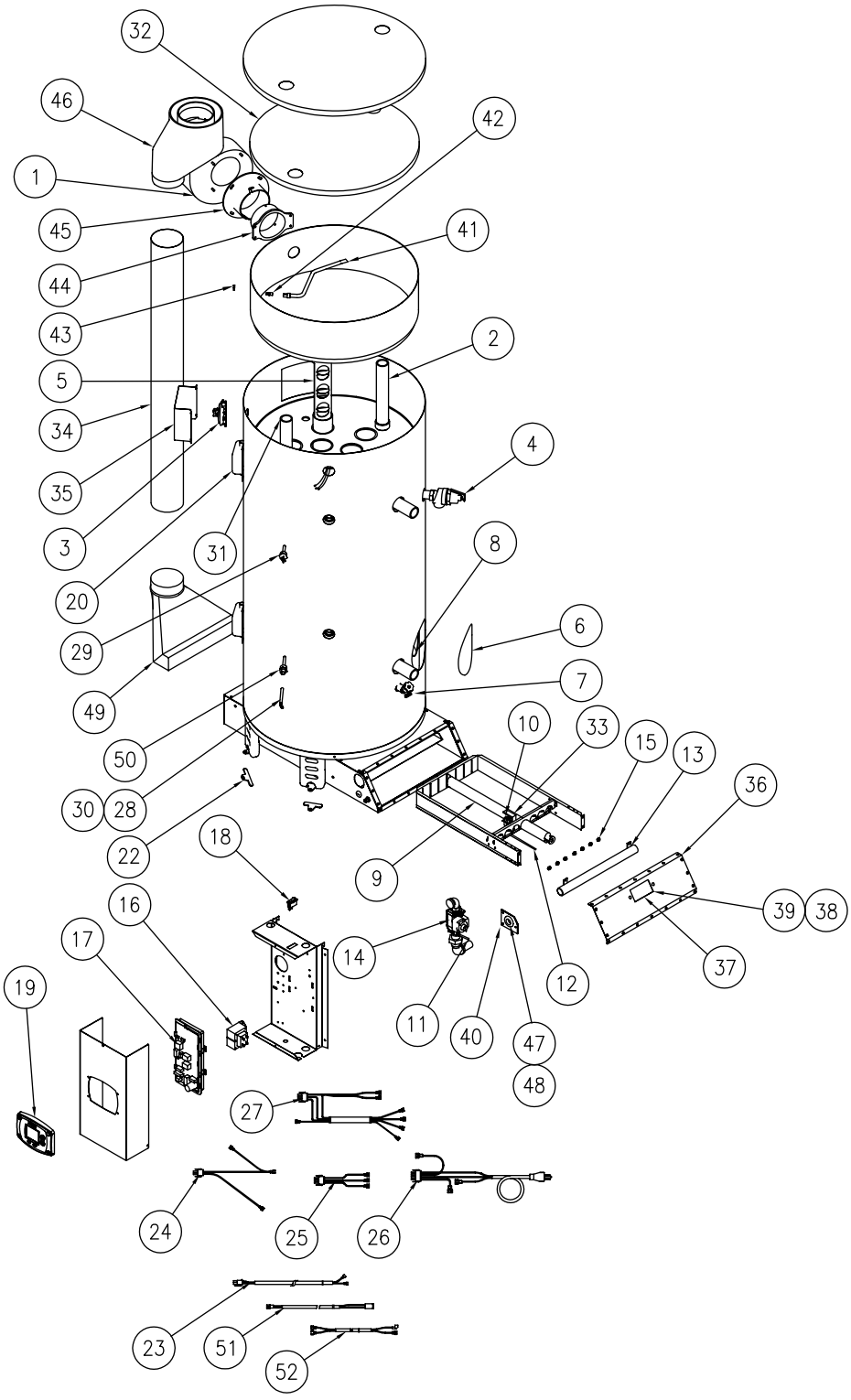
In Degrees F										
°F	0	1	2	3	4	5	6	7	8	9
40	26109	25400	24712	24045	23399	22771	22163	21573	21000	20445
50	19906	19383	18876	18383	17905	17440	16990	16553	16128	15715
60	15314	14925	14548	14180	13823	13477	13140	12812	12494	12185
70	11884	11592	11308	11032	10763	10502	10248	10000	9760	9526
80	9299	9078	8862	8653	8449	8250	8057	7869	7685	7507
90	7333	7165	7000	6839	6683	6531	6383	6238	6098	5961
100	5827	5697	5570	5446	5326	5208	5094	4982	4873	4767
110	4663	4562	4464	4368	4274	4183	4094	4006	3922	3839
120	3758	3679	3602	3527	3453	3382	3312	3244	3177	3112
130	3048	2986	2925	2866	2808	2752	3697	3643	2590	2538
140	2488	2439	2391	2344	2298	2253	2209	2166	2124	2083
150	2043	2004	1966	1928	1891	1856	1820	1786	1753	1720
160	1688	1656	1625	1595	1566	1567	1509	1481	1454	1427
170	1402	1376	1351	1327	1303	1280	1257	1235	1213	1191
180	1170	1150	1129	1110	1090	1071	1053	1035	1017	999
190	982	965	949	933	917	901	886	871	857	842
200	828	814	801	788	775	762	749	737	725	713

In Degrees C										
°C	0	1	2	3	4	5	6	7	8	9
0	32648	31026	29495	28049	26682	25389	24166	23010	21915	20879
10	19898	18968	18088	17253	16461	15710	14998	14322	13680	13071
20	12492	11942	11419	10922	10450	10000	9572	9165	8778	8409
30	8057	7722	7403	7099	6808	8532	6268	6016	5775	5546
40	5327	5117	4917	4726	4543	4368	4201	4042	3889	3742
50	3602	3468	3340	3217	3099	2986	2878	2774	2675	2579
60	2488	2400	2316	2235	2157	2083	2011	1942	1876	1813
70	1752	1693	1637	1582	1530	1480	1432	1385	1340	1297
80	1256	1216	1177	1140	1105	1070	1037	1005	974	944
90	916	888	861	835	810	786	763	741	719	698

SECTION XII: PARTS LIST



8" *(20.3 cm)* VENT KIT



PART NAME AND DESCRIPTION
1. Induced Draft Blower Assembly
2. Diptube
3. Pressure Switch
4. T&P Valve
5. Flue Baffle
6. Cleanout Access (Jacket) Cover
7. Drain Valve
8. Cleanout Cover
8a. Cleanout Cover O-Ring
8b. Cleanout Cover Gasket
9. Main Burner Tubes
10. Pilot Assembly
11. Pilot Supply Tube (Control Side)
12. Pilot Supply Tube (Burner Side)
13. Main Burner Manifold
14. Gas Valve
15. Main Burner Orifice
16. Transformer
17. Integrated control board
18. On/Off Switch
19. Temperature Display
20. Utility Cover
21. Anode Rods (Not Pictured)
22. Tank Leg Thermal Break
23. Blower Wiring harness
24. Secondary T'former Wire Assy
25. Primary T'former Wire Assy
26. Power Cord Wiring Harness
27. Control/Gas Valve Harness
28. Lower Sensor
29. Upper Temperature Sensor
30. Lower Sensor Retaining Clip
31. Outlet Nipple
32. Collector Head
33. Pilot Shield
34. Combustion Air Intake Pipe
35. Pressure Switch Cover
36. Burner Access Panel
37. Sight Glass
38. Sight Glass Backing Plate
39. Sight Glass Gasket
40. Gas Manifold Flange
41. Pressure Tube
42. Hose Barb
43. Pressure Tube Retaining Nut
44. Collector Transition
45. Blower Transition
46. Vent Adapter
47. Rubber Grommet
48. Sealing Flange Gasket
49. Combustion Air Transition
50. Lower Thermostat Well
51. Upper Sensor Wire Harness
52. Pressure Switch Wire Harness

REPLACEMENT PARTS LIST FOR POWERED DIRECT VENT MODELS

Contact your supplier, plumbing professional or the company listed on the rating plate of the water heater for replacement parts.

Provide the part name as well as the model and serial number(s) of the water heater(s) when ordering parts. When applicable, the following information shall be provided: type of gas, voltage and amperage, item number (from the following list) and description (from the following list).

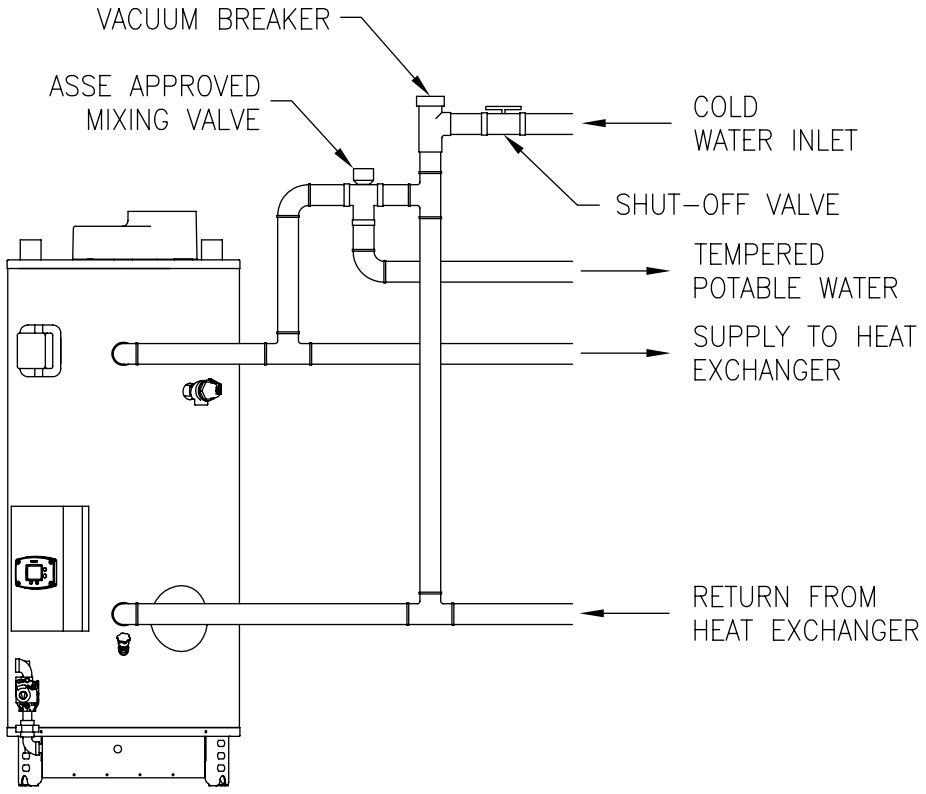
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SECTION XIII: INSTALLATION FOR POTABLE WATER AND SPACE HEATING

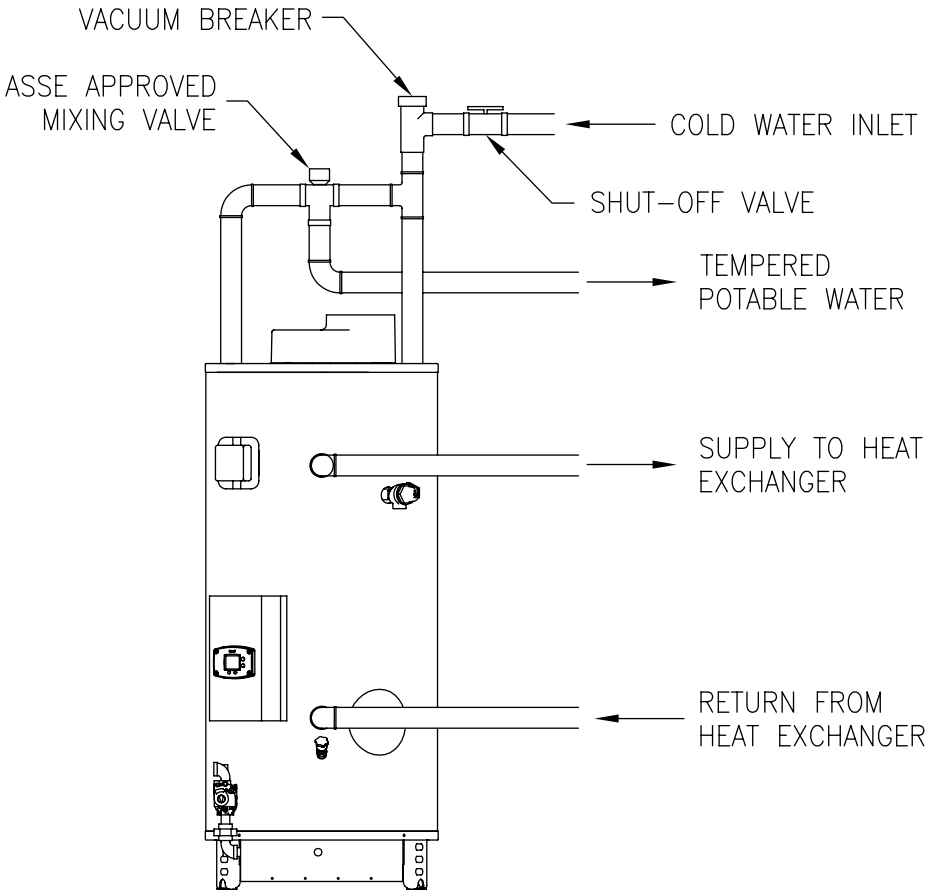
THE FOLLOWING INSTRUCTIONS ARE FOR INSTALLATION OF:
GAS WATER HEATERS SUITABLE FOR WATER (POTABLE) HEATING AND SPACE HEATING

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 feet.
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, such as an ASSE approved mixing valve shall be installed to temper the water for those uses in order to reduce the scald hazard potential.

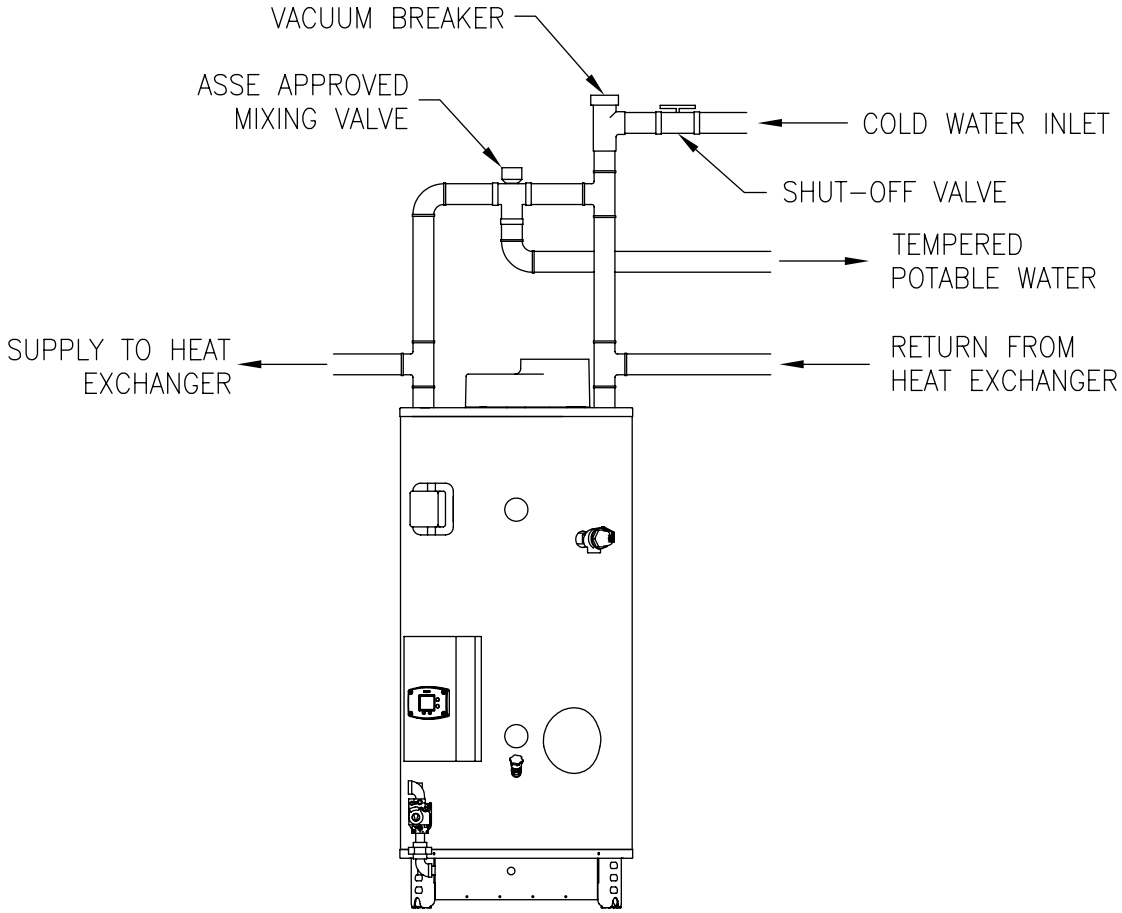
Please refer to the illustrations below and on the following pages for suggested piping arrangements.



Suggested Piping Arrangement For Side Connections



Suggested Piping Arrangement For Top & Side Connections



Suggested Piping Arrangement For Top Connections

SECTION XIV: NOTES