BRADFORD WHITE®

WATER HEATERS

PDV Series

Power Direct Vent Gas Water Heaters



SERVICE MANUAL

Troubleshooting Guide
and Instructions for Service

(To be performed ONLY by
qualified service providers)

Models Covered by This Manual:

PDV Series Models:
RG2PDV40S*(N,X)
RG2PDV50S*(N,X)
RG2PDV50H*(N,X)
RG2PDV75H*(N,X)
LG2PDV50H60*(N,X)
LG2PDV75H80*(N,X)
(*) Denotes Warranty Years

DEFENDER SAFETY SYSTEM®

WARNING
CANCER AND REPRODUCTIVE HARM
WWW.P65WARNINGS.CA.GOV

As required by the state of California Proposition 65.

The Bradford White

PDV Series

Powered Direct Vent Gas Water Heaters

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BRADFORD WHITE® WATER HEATERS

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

FOR YOUR SAFETY

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

WHAT TO DO IF YOU SMELL GAS!

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

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

⚠ DANGER

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

IMPORTANT

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

⚠ WARNING

Water heaters are heat producing appliances. To avoid damage or injury, do not store materials against the water heater or vent-air intake system. Use proper care to avoid unnecessary contact (especially by children) with the water heater and vent-air intake components. **UNDER NO CIRCUMSTANCES MUST 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**

⚠ CAUTION

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

⚠ 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.

⚠ WARNING

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

- Liquefied petroleum gases/propane gas and natural gas have an odorant added by the gas supplier that aids in the 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 neighbor’s telephone.

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

⚠ WARNING

FAILURE TO INSTALL AND MAINTAIN A NEW, LISTED ¾” X ¾” TEMPERATURE AND PRESSURE RELIEF VALVE WILL RELEASE THE MANUFACTURER FROM ANY CLAIM THAT MIGHT RESULT FROM EXCESSIVE TEMPERATURE AND PRESSURES.

⚠ CAUTION

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.

PDV Series

Introduction

The new Bradford White PDV water heaters are designed to provide reliable performance with enhanced standard features. New design features include reliable spark to pilot ignition system, enhanced diagnostics, simplified servicing, significantly quiet operation, additional vent lengths, and Bradford White Defender Safety System® (not available on all models).

Spark to Pilot Ignition System - employing the spark to pilot ignition system promotes reliable and consistent pilot and main burner ignitions to provide hot water on demand.

Integrated Immersion Thermostat/Gas Control Valve with LED - was developed for ease of troubleshooting by providing simple diagnostic codes to pinpoint an installation or component performance issue.

Powerful Blower - will eliminate problems with difficult venting situations.

Quieter and Cooler Blower Operation - blower noise is significantly reduced for both interior and exterior environments. Cooler operation increases blower life by reducing bearing wear and noise.

Rugged Wiring Connections - receptacle type connections promote error free wiring.

Increased Vent Lengths - increased venting performance is achieved while maintaining Energy Factor & FHR (not applicable on all models) performance.

The PDV water heaters use a combustion system where flue gases are combined with dilution air to reduce the flue gas temperature in the blower. The diluted flue gases are evacuated to the exterior through low temperature vent materials. The gas control maintains water temperature, ignition sequence and regulates gas flow. A safety circuit consisting of a pressure switch and blower temperature switch verifies proper conditions exist for safe and reliable operation. If a situation outside of normal operating parameters exists, the gas control diagnostic LED will flash a code to positively identify an operational issue.

This service manual is designed to facilitate problem diagnosis and enhance service efficiency.

Please read the service manual completely before attempting service on this new series of power direct vent models.

How the Safety System Works

During normal operation, air for combustion is drawn into the water heater through the vent pipe from outside your building. This air travels into the closed combustion chamber. The air then mixes in a normal manner with supplied gas and it's efficiently combusted, producing low NOx emissions.

In the unlikely event trace amounts of flammable vapors are present in the area surrounding the water heater, the sealed combustion system prevents the flammable vapors from reaching the ignition source. In addition the flammable vapors sensor will stop the water heater from operating if a significant amount of flammable vapors are present.

It is intended for this manual to be used by qualified service personnel for the primary purpose of troubleshooting and repair of the Bradford White PDV Series water heaters. Understanding the sequence of operation section of this manual will contribute greatly to troubleshooting the water heater.

The Honeywell WV4462A Electronic Gas Control will display status codes in the event of abnormal operation. Status codes are listed in the troubleshooting chart beginning on page 14 of this service manual. The troubleshooting chart will also indicate the probable cause for the status code and direct the service professional to a service procedure to properly diagnose the abnormal operation.

In some difficult to diagnose conditions, it may be necessary to isolate the heater from the vent system to determine the problem.

Contact the Bradford White technical support group immediately if diagnosis cannot be made using the methods described in this service manual.

Tools Required for Service

Manometer:	A liquid “U” tube type or a digital (magnahelic) type can be used. This device is used to measure gas and/or air pressure and vacuum.
Multi-Meter:	A digital type is strongly recommended. This device is used to measure electrical values. The meter you select must have the capability to measure volts AC, volts DC, Amps, micro-amps and ohms.
Electronic Probes:	In some cases, standard multi-meter probes will damage or simply not be effective to obtain certain voltage and ohm readings. It will be necessary to have special electronic “pin” type multi-meter probes. These probes are available at most electronic wholesale outlets.
Thermometer:	Used to measure water temperature. An accurate thermometer is recommended.
Water Pressure Gage:	Used to measure water supply pressure. Also used to determine tank pressure by adapting to the drain valve of the heater.
Various Hand Tools:	Pipe wrench, channel locks, open end wrenches (3/8”, 7/16”, 1/2”), 12” crescent wrench, allen wrench set, screw drivers (common & Phillip’s), 1/4” nut driver, pliers (common & needle nose), socket set, side cutters, wire cutters, wire strippers, wire crimpers, torpedo level, small shop vac, step ladder, flashlight and 5 gallon pail.

PDV Series

Specifications

Power supply	Dedicated 115 VAC, 60 Hz, 15A.
Gas Supply Pipe	Minimum 1/2” NPT (schedule 40 black iron pipe recommended).
Approved Gas Type	Natural Gas or Propane, unit must match gas type supplied.
Gas Pressure	5.0” W.C. min. for Natural Gas, 11.0” W.C. min. for Propane, 14.0” W.C. maximum (Natural Gas & Propane).
Venting System	Power direct vent through the wall or vertical through the roof.
Approved Vent Materials	PVC, CPVC or ABS.
Minimum Clearance for Servicing	18” from top, 24” from front, 4” sides and rear.
Water Supply Pressure	150 PSI maximum allowable working pressure. Check local codes for supply pressure.
Gas Control ECO Limit	Residential 188°F (87°C), Commercial 199°F (93°C).
Residential Temperature Set Point Range	60°F (16°C) to 160°F (71°C) (approximate temperatures).
Commercial Temperature Set Point Range	80°F (27°C) to 180°F (82°C) (approximate temperatures).
Blower Temperature Switch	Normally closed, opens @ 155°F (68°C), auto reset @ 135°F (57°C).
Pressure Switch	Normally open, closes on vacuum increase @ -.80” W.C.; Opens on vacuum decrease @ -.73” W.C.
Blower	115 VAC, 60 Hz, 3.1 amps, 3000 RPM.

Vent Tables

Venting Specifications for:

RG2PDV(40,50)S

2" Diameter (5.1 cm) Vent Connector Lengths			
Terminating	# of Elbows	Maximum Straight Length ft. (m)	Minimum Straight Length ft. (m)
Through the Wall	1	30 (9.1)	2 (.6)
Through the Wall	2	25 (7.6)	2 (.6)
Through the Wall	3	20 (6.1)	2 (.6)
Through the Wall	4	15 (4.6)	2 (.6)
Through the Roof	0	35 (10.7)	7 (2.1)
Through the Roof	1	30 (9.1)	7 (2.1)
Through the Roof	2	25 (7.6)	7 (2.1)
Through the Roof	3	20 (6.1)	7 (2.1)

3" Diameter (7.6 cm) Vent Connector Lengths			
Terminating	# of Elbows	Maximum Straight Length ft. (m)	Minimum Straight Length ft. (m)
Through the Wall	1	80 (24.4)	10 (3.1)
Through the Wall	2	75 (22.9)	10 (3.1)
Through the Wall	3	70 (21.3)	10 (3.1)
Through the Wall	4	65 (19.8)	10 (3.1)
Through the Wall	5	60 (18.3)	10 (3.1)
Through the Roof	0	85 (25.9)	15 (4.6)
Through the Roof	1	80 (24.4)	15 (4.6)
Through the Roof	2	75 (22.9)	15 (4.6)
Through the Roof	3	70 (21.3)	15 (4.6)
Through the Roof	4	65 (19.8)	15 (4.6)

PDV Series

Venting Specifications for:

RG2PDV(50,75)H
LG2PDV(50,75)H

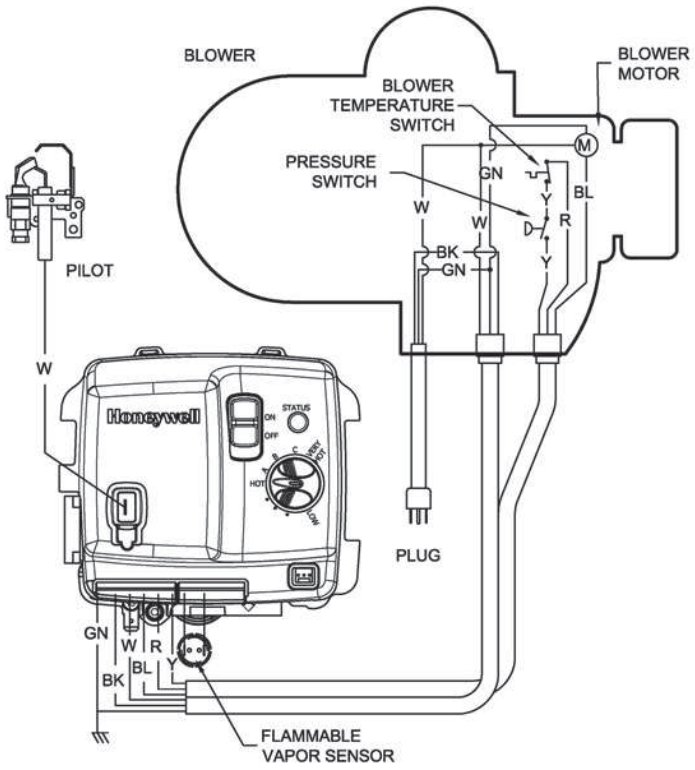
3" Diameter (7.6 cm) Vent Connector Lengths			
Terminating	# of Elbows	Maximum Straight Length ft. (m)	Minimum Straight Length ft. (m)
Through the Wall	1	55 (16.8)	2 (.6)
Through the Wall	2	50 (15.2)	2 (.6)
Through the Wall	3	45 (13.7)	2 (.6)
Through the Wall	4	40 (12.2)	2 (.6)
Through the Roof	0	60 (18.3)	7 (2.1)
Through the Roof	1	55 (16.8)	7 (2.1)
Through the Roof	2	50 (15.2)	7 (2.1)
Through the Roof	3	45 (13.7)	7 (2.1)

4" Diameter (7.6 cm) Vent Connector Lengths			
Terminating	# of Elbows	Maximum Straight Length ft. (m)	Minimum Straight Length ft. (m)
Through the Wall	1	95 (29.0)	10 (3.1)
Through the Wall	2	90 (27.4)	10 (3.1)
Through the Wall	3	85 (25.9)	10 (3.1)
Through the Wall	4	80 (24.4)	10 (3.1)
Through the Wall	5	75 (22.9)	10 (3.1)
Through the Roof	0	100 (30.5)	15 (4.6)
Through the Roof	1	95 (29.0)	15 (4.6)
Through the Roof	2	90 (27.4)	15 (4.6)
Through the Roof	3	85 (25.9)	15 (4.6)
Through the Roof	4	80 (24.4)	15 (4.6)

Control Timings

Ignition State	***Timing***
Pre-purge	15 Seconds
Trial for Ignition	90 Seconds
Flame Stabilization Period	3 Seconds
Inter-purge	15 Seconds
Flame Failure Response Time	1.5 Seconds (2 seconds. maximum; 1 second minimum.)
Post-purge	15 Seconds
PS Fault Delay (failed open/close)	Retry after 2 Minutes
Soft Lockout	Retry after 5 Minutes
ECO Limit Lockout	Indefinite (see page 25)
Verify Resistive Delay	Retry after 2 Minutes (repeats 5 times)
Flammable Vapor Sensor/Simulated Resistive Load Lockout	Indefinite (cycle power to restart)
Hardware Status Lockout	Indefinite (self clears if fault clears for at least 15 seconds)

WIRING DIAGRAM



Power Up Sequence

1. Start Up.
   Upon Power up, the control runs a safe-start check with a typical start-up delay of 1-5 seconds.

2. Flammable Vapor.
   To assure no outputs are energized if the “Flammable Vapor Sensor” is out of range, the control will test the “Flammable Vapor Sensor” or for proper operating range. If the “Flammable Vapor Sensor” is out of range, the control LED immediately flashes 7 times with 3 second pause.

Normal Heating Sequence

1. Thermostat calls for heat.
   Prior to energizing blower, gas control checks safety circuit to insure the circuit is open. Normal switch positions in the safety circuit are as follows:

   a) Exhaust pressure switch normally open.
   b) Blower temperature switch normally closed.

   If the safety circuit is closed, the control waits 4 seconds, gas control LED flashes 2 times with 3 second pause. Gas control waits 2 minutes then, blower runs for 30 seconds. This cycle repeats until safety circuit opens.

2. Blower energizes.
3. Blower pre-purge period (15 seconds)
4. Differential pressure switch proves blower/vent system operation.
   If the pressure switch does not close within 30 seconds, the control LED flashes 3 times with 3 second pause. The blower runs for 30 seconds every 2 minutes trying to get the pressure switch or blower temperature switch to close. This cycle repeats as long as there is a call for heat.

5. Trial for pilot ignition (90 seconds).
   a. The gas control lights the pilot by activating spark igniter and gas flow to pilot burner.
   b. If flame is not sensed within 90 seconds, igniter and gas flow are deactivated, blower will post purge and control LED flashes 6 times with 3 second pause.
6. Main burner ignition.
   After pilot flame is sensed, gas control activates main valve for main burner ignition. The gas control will ignore flame and pressure switch signals for 3 seconds allowing for main burner to stabilize.

Normal Heating Sequence (cont.)

7. Steady state operation.

   During steady state operation, the control monitors:

   Thermostat temperature sensor-when set point temperature is satisfied, gas valve is shut down and blower will post purge for 15 seconds. Control LED flashes a short flash once every 4 seconds (idle) status code.

   Pressure switch / blower temperature switch-if either switch opens, pilot valve and main valve is shut down. The blower continues to run for 30 seconds attempting to close the circuit. The control LED flashes 3 times with 3 second pause.

   Flame sensor-if flame is lost, pilot & main valve are shut down, blower runs for 15 seconds. Control attempts to re-light pilot 4 times. If unsuccessful, blower is shut down and control proceeds to 5 minute lockout. Control re-attempts to light pilot starting at normal heating sequence #2.

8. Thermostat satisfies. (Control LED flashing once every 4 seconds).
9. Burner off.
10. Blower post purges (15 seconds).

Abnormal Operation

1. Flammable Vapor Sensor:
   a. **If the resistance is greater than 70,000 Ohms-**the gas control immediately turns off all outputs. Control waits and monitors resistance for 30 seconds. If the resistance is greater than 65,000 ohms after 30 seconds, the gas control proceeds to verify resistive delay for 2 minutes and flashes 7 times then once with a three second pause. This process is repeated 5 times until the control either returns to normal operation or proceeds to flammable vapor lockout.
   b. **If the resistance is below 3000 Ohms-**The gas control immediately turns off all outputs and proceeds to flash 8 times then once with three second pause. The status self clears if the resistance returns to normal range for at least 15 seconds.
2. Temperature Sensor Fault:
   a. **Temperature sensor detected open circuit**–The gas control immediately turns off all outputs and proceeds to flash 8 times then, 3 times with 3 second pause. The status self clears if the fault clears for at least 15 seconds.
   b. **Thermal well sensor not reading the same temperature within ±5.5°F** – The gas control immediately turns off all outputs and proceeds to flash 8

Abnormal Operation (cont.)

times, then 3 times twice with 3 second pause. The status self clears if the fault clears for at least 15 seconds.

c. **Water temperature in excess of ECO (energy cut out) limit** -The gas control immediately turns off pilot & main valves and proceeds to flash 4 times with 3 second pause. Blower continues to run until gas control is reset. To reset control, rotate knob of temperature control to the minimum setting for at least 6 seconds before returning to desired temperature setting.

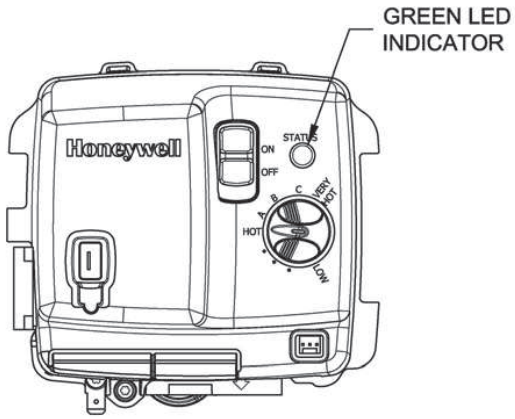
3. Pressure Switch/Blower Temperature Fault:
   a. **Pressure switch closed at start of call for heat**-the gas control waits 4 seconds then, proceeds to flash 2 times with 3 second pause. The control waits 2 minutes and then turns on blower for 30 seconds. The blower turns off after 30 seconds and the control waits for pressure switch to open. Any time the pressure switch opens, the blower turns on (or stays on) and the control proceeds to wait for pressure switch to close.
   b. **Pressure switch or blower temperature switch failed to close**-the gas control runs the blower for 30 seconds waiting for the pressure switch and/or blower temperature switch to close. If either switch does not close in 30 seconds, the blower turns off and the control flashes 3 times with 3 second pause. The gas control waits 2 minutes before turning on the blower for another 30 seconds to see the circuit close. This cycle repeats as long as there is a call for heat or until the circuit closes.
   c. **Pressure switch or blower temperature switch opens during burner operation**-the gas control turns off the pilot and main valve, runs blower for 15 seconds (inter-purge) waiting for pressure switch and/or blower temperature switch to close. If either switch fails to close, the control proceeds as described in 3b above, if the circuit closes again by the end of the inter-purge, the recycle counter is incremented, if the recycle count as not reached its limit (4), another trial for ignition begins. If the recycle count has been reached, the gas control turns off the blower and flashes 6 times then, 2 times with 3 second pause. The gas control waits 5 minutes before repeating ignition sequence.
4. Trail for Ignition Fault:
   a. **Pressure switch opens during trial**-the gas control turns off igniter and pilot valve. The gas control proceeds as described in 3b above. If the pressure switch closes within 30 seconds the gas control will continue with trial for ignition starting at blower pre-purge.
   b. **Flame not sensed**-the gas control energizes the spark igniter attempting to light the pilot and prove flame. If flame is not sensed within 90 seconds, the igniter turns off, the pilot valve is closed and the gas control runs the blower through post purge and flashes 6 times then, once with 3 second pause. The control waits 5 minutes before repeating the ignition sequence.

Abnormal Operation (cont.)

5. Flame sensing fault:
    a. **Flame lost during run**-the gas control turns off pilot and main valves, runs blower for 15 seconds (inter-purge). The gas control increments the recycle count, if the recycle count has not reached its limit (4), another trial for ignition begins. If the recycle count has been reached, the gas control turns off the blower and flashes 6 times then, 3 times with 3 second pause. The gas control waits 5 minutes before repeating the ignition sequence.
    b. **Flame sensed out of sequence**-the gas control only looks for pilot flame when the blower is running. If flame is present when the pilot valve is not open, the gas control proceeds to wait for flame loss and flashes 5 times with 3 second pause. This continues until flame is lost. Once the flame signal is lost, the control flashes 6 times then, 4 times with 3 second pause. The control waits 5 minutes before repeating the ignition sequence.

PDV Series

Observe green LED indicator on Electronic gas control. Status flash codes are displayed with a three second pause before repeating. Check and repair the system as noted in the troubleshooting table below



LED Status	Control Status	Probable Cause	Service Procedure
None, control LED not on or flashing	No electrical power	Control power switch in "OFF" position. Supply voltage interrupted.	Turn power on
Short flash, once every four seconds	Stand-by mode, Waiting for call for heat (no fault).	Temperature demand is satisfied.	Normal operation. Adjust thermostat to temp level
"Heartbeat", alternates bright/dim	Thermostat calling for heat (no fault).	Tank temperature below set point of thermostat.	Normal operation. Adjust thermostat to temp level
Short flash once per second	Weak pilot signal on last call for heat.	1. Unstable pilot. 2. Pilot tube block or restricted. 3. Oxidation builds up on pilot electrode. 4. Wire damage to pilot assembly or bad connection at gas valve.	Page 17
Two flash, three second pause	Pressure switch not working-closed position.	1. Pressure switch tubing kinked or blocked. 2. Blocked pressure tap on switch or blower. 3. Faulty pressure switch.	Page 18
Three flash, three second pause	Pressure switch or blower temp. switch not working -open position.	1. Vent blockage or improper vent configuration. 2. Pressure switch tubing kinked or blocked. 3. Faulty pressure switch. 4. Blower not spinning up to speed. 5. Blower temp or exhaust temp too high. 6. Faulty blower temperature switch.	1. Check vent or vent tables. 2 & 3 Page 18 4. Page 20 5 & 6 Page 22
Four flash, three second pause	Excessive tank temperature. System must be reset.	1. Temperature sensor out of calibration. 2. Faulty gas control. 3. Plumbing leak.	1 & 2. Replace gas control, page 26
Five flash, three second pause	Undesired-false pilot flame present.	1. Pilot valve stuck in open position.	Replace gas control, page 26

LED Status	Control Status	Probable Cause	Service Procedure
Six-one flash, three second pause	Failed to light pilot. System auto resets.	1. Unstable pilot. 2. Pilot tube blocked or restricted. 3. Oxidation build up on pilot electrode. 4. Wire damage to pilot assembly or bad connection at gas valve.	Page 17
Six-two flash, three second pause	Pressure switch or blower temp switch opened during burner operation. System auto resets.	1. Vent blockage or improper vent configuration. 2. Pressure switch tubing kinked or blocked. 3. Faulty pressure switch. 4. Vent termination being affected by wind. 5. Blower not spinning up to speed. 6. Blower temp or exhaust temp too high. 7. Faulty blower temperature switch.	1. Check vent or vent tables. 2 & 3 Page 18 4. Refer to venting section of installation manual 5. Page 20 6 & 7 Page 22
Six-three flash, three second pause	Pilot flame extinguished. System auto resets.	1. Unstable pilot. 2. Pilot tube blocked or restricted. 3. Oxidation build up on pilot electrode. 4. Wire damage to pilot assembly or bad connection at gas valve. 5. Insufficient combustion air. 6. Gas pressure is out of specification..	1-4. Page 17 5. Refer to installation manual 6. Page 24
Six-four flash, three second pause	Undesired-false pilot flame sensed. System auto resets.	Pilot valve stuck in open position.	Replace gas control, page 26
Seven flash, three second pause	Flammable vapor sensor fault detected.	Flammable vapor sensor or simulative resistance device out of specification.	Page 28
Eight-one flash, three second pause	Flammable vapor sensor out of specification.	Flammable vapor sensor or Simulated resistive device out of specification.	Page 28
Eight-two flash, three second pause	Temperature Sensor fault.	1. Damage to temperature sensor wire. 2. Temperature sensor resistance out of range.	Replace gas control, page 26.
Eight-three flash, three second pause	Gas valve electronics fault detected.	1. Control needs to be reset. 2. Control is wet or physically damaged.	1. Interrupt power supply 2. Replace gas control, page 26
Eight-four flash, three second pause	Gas valve fault detected.	1. Control needs to be reset. 2. Control is wet or physically damaged.	1. Interrupt power supply 2. Replace gas control, page 26

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Burner Inspection

At periodic intervals (every 6 months) a visual inspection should be made of the pilot and main burner for proper operation and to assure no debris is accumulating.

Pilot flame should be stable, some causes for an unstable pilot flame are:

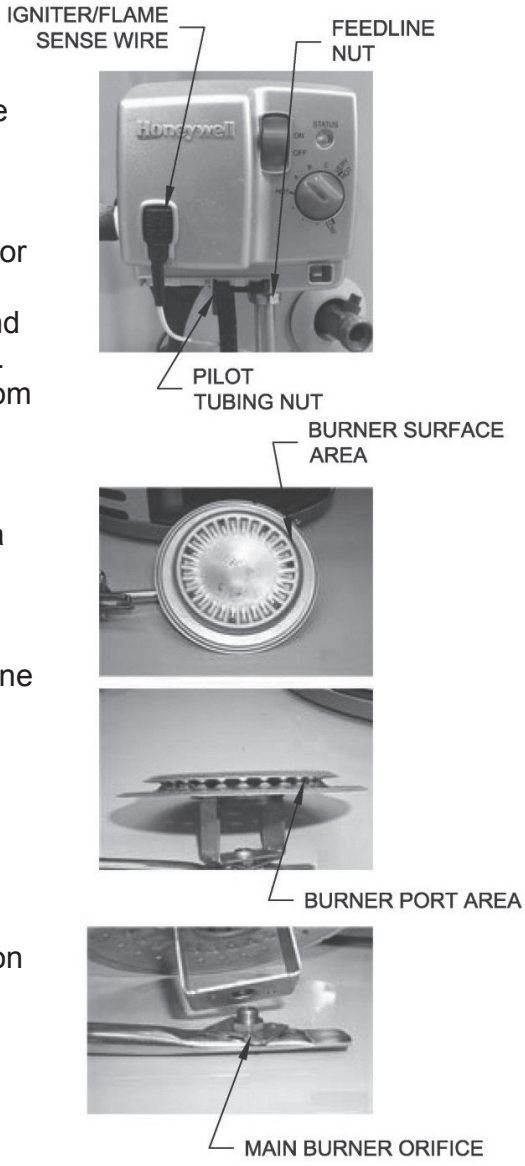
a) Water heater vent is less than the allowable vent length.
b) Gas pressure is out of specification.
c) Pilot flame not fully engulfing spark/flame sensor.

Main burner should light smoothly from pilot and burn with a blue flame with a minimum of yellow tips.

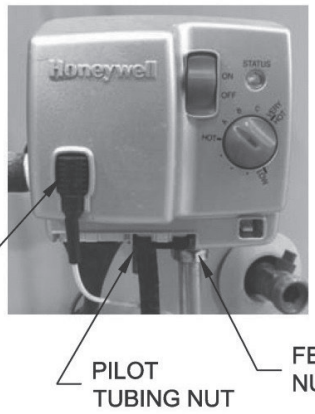
Main burner must be free from any debris accumulation that may affect burner operation (see burner cleaning procedure on page 16).

Burner Cleaning

Step 1. Position gas control power switch to the "OFF" position and unplug heater from wall outlet.
Step 2. Turn off gas supply to water heater.
Step 3. Remove outer jacket door and inner door per service procedure XIII on page 34.
Step 4. Disconnect pilot tube (7/16" wrench) and feedline (3/4" wrench) from gas control.
Step 5. Disconnect igniter/flame sensor wire from gas control.
Step 6. Remove burner assembly from combustion chamber.
Step 7. Thoroughly inspect burner surface area and burner port area and remove any loose debris.
Step 8. Unscrew burner from main burner orifice.
Step 9. Remove main burner orifice from feedline (1/2" wrench on steel burners) inspect orifice, clean or replace if necessary.
Step 10. Reassemble burner and reinstall into water heater. Restore gas supply and check for gas leaks.
Step 11. To resume operation, follow the instruction located on the lighting instruction label or the lighting instruction located in the installation and operation manual.



Pilot Testing and Replacement



Step 1. Position gas control power switch to the "OFF" position and unplug heater from wall outlet.

Step 2. Turn off gas supply to water heater.

Step 3. Remove outer jacket door and inner door per service procedure XIII on page 34.

Step 4. Disconnect pilot tubing nut (7/16" wrench) and feedline nut (3/4" wrench) from gas control.

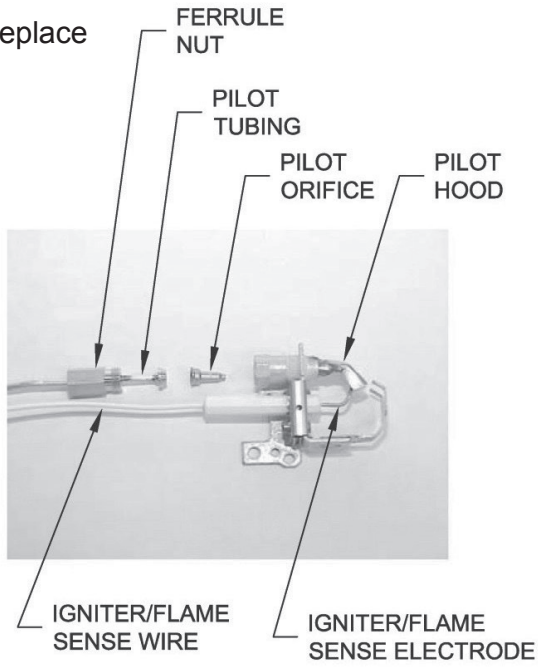
Step 5. Disconnect igniter/flame sense wire from gas control.

Step 6. Remove burner assembly from combustion chamber.

Step 7. Remove pilot assembly from feedline (1/4" nut driver).

Step 8. Visually inspect igniter/flame sense wire for damage. Replace pilot if damage is found.

Step 9. With a multi-meter set to ohms setting, check continuity through igniter/flame sense wire. Replace pilot if no continuity.



Step 10. Visually inspect igniter/flame sense electrode for deterioration. Replace pilot as necessary. Electrode should not be in contact with pilot hood, if so, carefully adjust electrode to a gap of distance of 3/32" (.09) from pilot hood.

Step 11. Visually inspect igniter/flame sense electrode for oxidation build up. Carefully clean any oxidation using very fine emery cloth.

Step 12. Visually inspect pilot tubing for kinks or cracks. If damage is found, replace pilot.

Step 13. Inspect pilot tubing and pilot orifice for blockage:

a. Remove ferrule nut from bottom of pilot assembly (7/16" wrench).

b. Remove pilot tube and pilot orifice.

c. Inspect pilot tubing and pilot orifice for blockage. Clean or replace as necessary.

Step 14. Reassemble pilot and install on feedline. Reinstall burner assembly to water heater. Restore gas supply and check for gas leaks.

Step 15. To resume operation, follow the instruction located on the lighting instruction label or the lighting instruction located in the installation and operation manual.

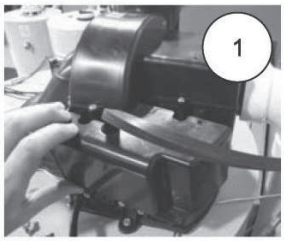
Pressure Switch Testing

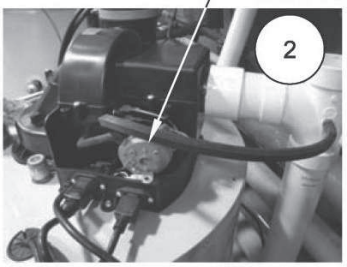
⚠ WARNING
115 volt potential exposure. Use caution to avoid personal injury.

Step 1. Position power switch on gas control to the "OFF" position.

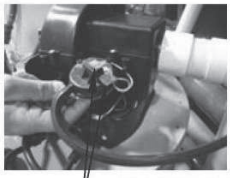
Step 2. Remove the three screws (Phillips screw driver) from control access cover on blower assembly and remove cover (see photo 1).

Step 3. Carefully remove pressure switch from blower housing (see photo 2).





Slide pressure switch in direction of arrow while tilting slightly away from blower housing.



With steps 1,2 & 3 complete, disconnect wire leads from pressure switch.

Use a multi-meter set to the ohms setting. With blower off, check across pressure switch terminals. Are switch contacts open? (no electrical continuity)

N → Check tubing and pressure tap on switch for blockage. Is there blockage?

N → Replace switch (see page 19)

Y → Clear blockage

Y → Position gas valve power switch to the "ON" position and adjust thermostat to call for heat, this will start the blower. Check with multi-meter, do pressure switch contacts close with blower running?

N → Check tubing and pressure tap on switch for blockage. Is there blockage?

N → Is vent system blocked?

N → Is vent system length within vent table specifications listed on pages 7 & 8

Y → See blower testing (page 20) Is blower OK?

Y → Switch contacts are OK. See safety circuit trace (page 29)

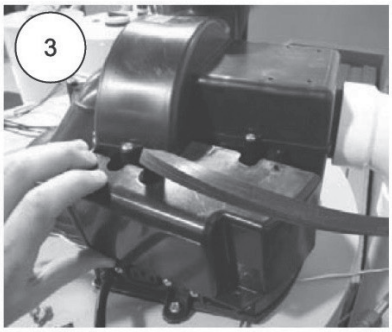
N → Reconfigure vent system to be compliant with vent tables

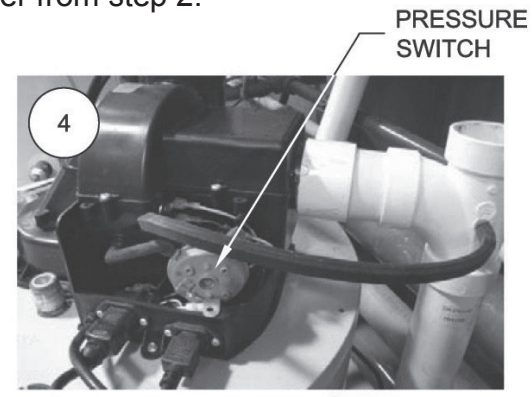
N → Correct blower problem

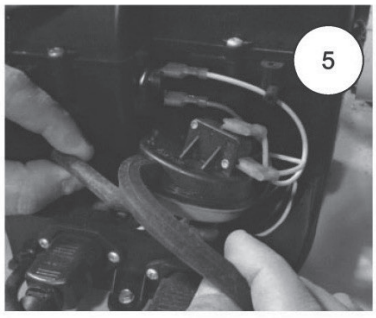
Pressure Switch Replacement

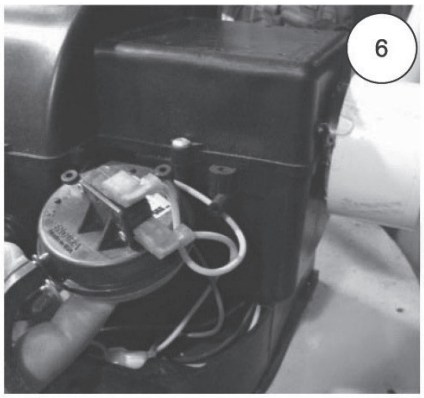
⚠ WARNING
115 volt potential exposure. Use caution to avoid personal injury.

Step 1. Position gas control power switch to “OFF” position.
Step 2. Remove the three screws (Phillip’s screw driver) from control access cover on blower assembly and remove cover (see photo 3).
Step 3. Carefully remove pressure switch from blower housing (see photo 4).
Step 4. Disconnect tubing from pressure switch. (see photo 5).
Step 5. Disconnect yellow wires from pressure switch (see photo 6).
Step 6. Reconnect wires from step 6 to new pressure switch.
Step 7. Reconnect tubing to new pressure switch.
Step 8. Carefully position pressure switch into blower housing.
Step 9. Position gas control power switch to “ON” position and verify proper heater operation.
Step 10. Replace control access cover from step 2.







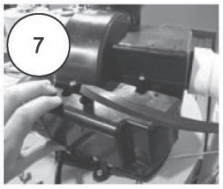


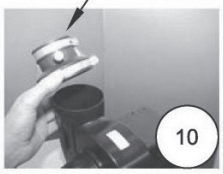
Blower Testing

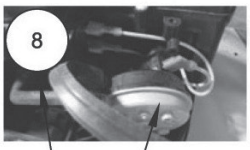
⚠ WARNING
115 volt potential exposure. Use caution to avoid personal injury.

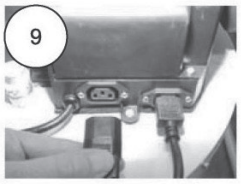
Step 1. Position gas control power switch to "ON" position and adjust control to call for heat.

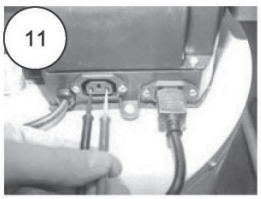
Step 2. Remove the three screws (Phillip's screw driver) from control access cover on blower assembly and remove cover (see photo 7).

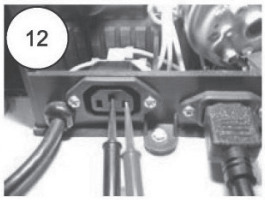


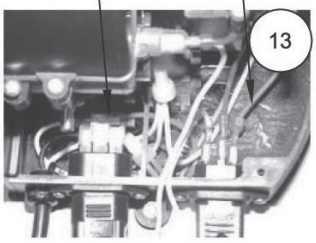










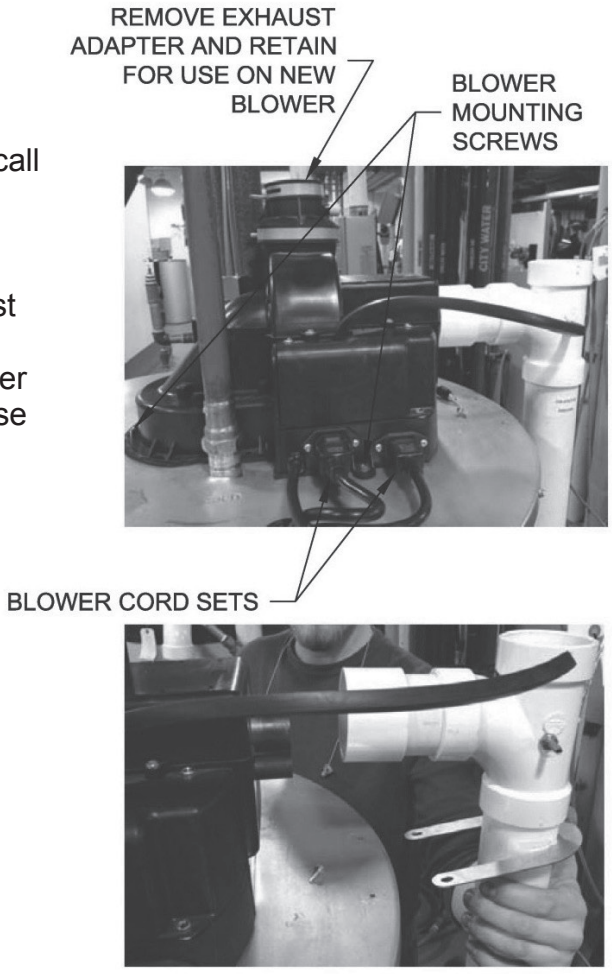


PDV Series

PDV SERVICE PROCEDURE IV
Blower testing & Replacement

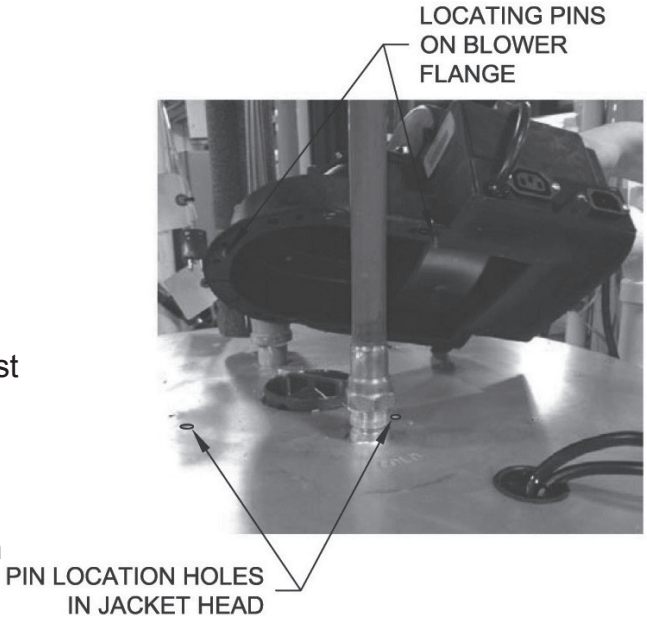
Blower Removal

Step 1. Position gas control power switch to “OFF” position and adjust control to call for heat.
Step 2. Unplug blower power cord from wall outlet.
Step 3. Disconnect vent system from exhaust adapter on top of blower.
Step 4. Remove exhaust adapter from blower (blade screw driver) and retain for use on new blower.
Step 5. Unplug cord sets from blower.
Step 6. Remove vertical air intake bracket.
Step 7. Disconnect vertical air intake from blower.
Step 8. Remove the three blower mounting screws (1/4” nut driver).
Step 9. Remove blower with gasket from water heater.



Blower Installation

Step 10. Clean any debris from jacket head of water heater.
Step 11. Set new blower with gasket in place using locating pins on blower flange to line up with location holes in jacket head. Be sure not to damage gasket.
Step 12. Secure blower in place using mounting screws from step 8.
Step 13. Re-install exhaust adapter from step 4.
Step 14. Reconnect vent system to exhaust adapter.
Step 15. Reconnect cord sets from step 5.
Step 16. Plug blower power cord into wall outlet.
Step 17. Position gas control power switch to the “ON” position.
Step 18. Verify proper blower operation.



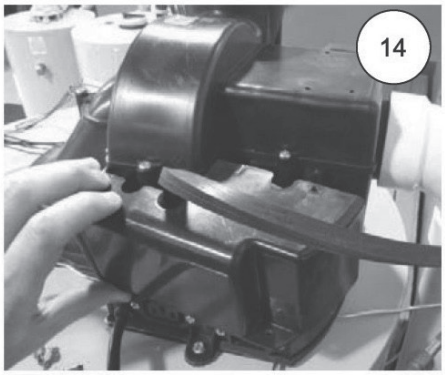
Blower Temperature Switch Testing

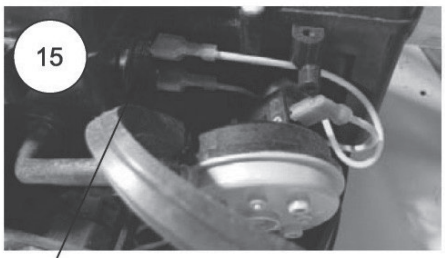
⚠ WARNING
115 volt potential exposure. Use caution to avoid personal injury.

Position the power switch on the gas control to the "OFF" position.

Step 1. Remove the three screws (Phillip's screw driver) from control access cover on blower and remove cover (see photo 14).

Step 2. Locate blower temperature switch (see photo 15).





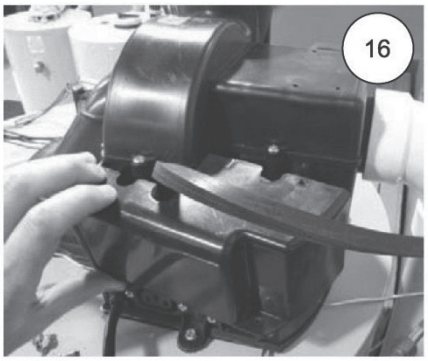
PDV Series

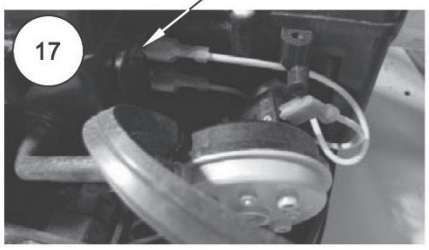
PDV SERVICE PROCEDURE V
Blower Temperature Switch Testing & Replacement

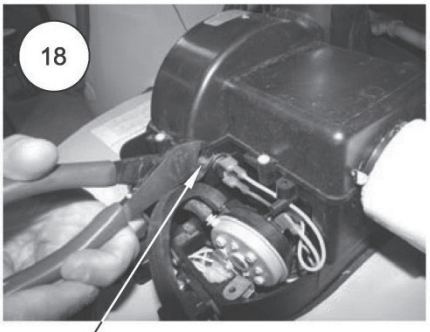
Blower Temperature Switch Replacement

⚠ WARNING
115 volt potential exposure. Use caution to avoid personal injury.

Step 1. Position gas control power switch to the “OFF” position and unplug heater from wall outlet.
Step 2. Remove the three screws (Phillip’s screw driver) from the control access cover on blower and remove cover (see photo 16).
Step 3. Locate blower temperature switch (see photo 17).
Step 4. Disconnect red and yellow wire leads from switch.
Step 5. With an appropriate tool such as side cutters, snip the retaining lug from the blower housing to allow removal of temperature switch (see photo 18).
Step 6. Remove switch from blower housing.
Step 7. Install new switch. Be sure switch is properly seated in mounting area.
Step 8. Reconnect red and yellow wires to new switch. Wires are interchangeable with either terminal.
Step 9. Position gas control power switch to the “ON” position and verify proper heater operation.
Step 10. Replace control access cover from step 2.







Honeywell Gas Control Testing & Replacement

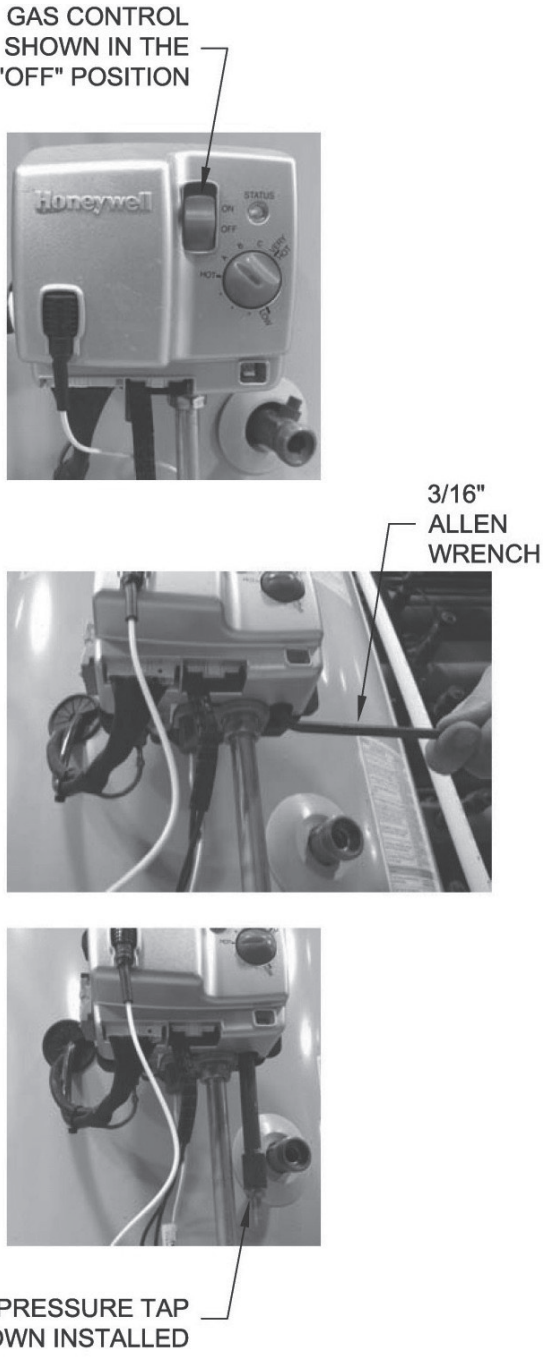
Line Pressure

The Gas Control is designed for a maximum line pressure of 14.0" W.C. and a minimum line pressure of 1.0" W.C. over the water heater's rated manifold pressure (check rating plate). Line pressure must be check with the main burner on and off to assure proper readings.

Manifold Pressure Testing

(This procedure presumes a maximum line pressure of 14.0" W.C.)

Step 1. Set the Gas Control to the "OFF" position.
Step 2. Remove pressure tap plug and install 1/8" NPT pipe, coupling & pressure tap.
Step 3. Connect manometer to pressure tap.
Step 4. Follow instructions located on the lighting instructions label and proceed to light the main burner and observe manometer reading.
Step 5. Proper operating range for Natural Gas is 4.0" ±0.5" W.C. Proper operating range for Propane gas is: 10.0" ±0.5" W.C.
Step 6. If pressure is within the range specified in the previous step, set Gas Control knob to the "OFF" position, remove manometer and pressure tap, and replace pressure tap plug. Check for gas leaks prior to placing water heater back into operation by following the instructions located on the lighting label or the lighting instructions located in the installation and operation manual.
Step 7. If gas pressure is outside the specification noted above, refer to "Honeywell Gas Control Testing, Disassembly and Replacement" to replace gas control or valve body.



ECO (Energy Cut Out) Reset

The Honeywell Gas Control is designed with an ECO device that will reset.

To reset the Gas Control after a status code (4), turn the Gas Control knob to the "OFF" position and wait a minimum of (5) minutes before relighting following the instructions located on the lighting instruction label or the lighting instructions located in the installation and operation manual.

Determine Water Temperature Inside Tank

⚠ WARNING

Stored water may be HOT WHEN PERFORMING THE FOLLOWING STEPS IN THIS PROCEDURE. Take necessary precaution to prevent personal injury.

Step 1. Position gas control power switch to "OFF" position.
Step 2. Draw approximately 4 gallons of water from drain valve into a container and discard. Draw an additional gallon and immediately measure water temperature using an accurate thermometer. It may be necessary to open a hot water faucet to allow heater to drain.
Step 3. Compare the measured water temperature with the setting on the gas control. In most instances, they should not differ by more than approx. 10°F.

Gas Control Removal From Water Heater



Step 1. Position gas valve power switch to the “OFF” position and unplug heater from power supply.
Step 2. Drain heater to a point below the gas control level.
Step 3. Turn off gas supply to water heater and disconnect gas piping from gas control.
Step 4. Disconnect wire harnesses from gas control.
Step 5. Remove outer jacket burner access door.
Step 6. Right side inner door removal.
- a. Remove (2) hex drive screws from RIGHT side inner door.
- b. Remove (2) hex drive screws from FLANGE SECTION of inner door.
- c. Remove right side inner door and set aside. Be careful not to damage gasket material in inner door.

Step 7. Removal of Gas Control
- a. Disconnect main burner feedline and pilot tube.
- b. Remove Gas Control from water heater by rotating counter clockwise. DO NOT use a wrench on the Gas Control body, damage to the Gas Control may occur. If necessary, use a length of ½” NPT pipe threaded into gas inlet of Gas Control.



Step 8. Install new Gas Control into water heater.
- a. Install new Gas Control into water heater by rotating clockwise. DO NOT use a wrench on the Gas Control body, damage to the Gas Control may occur. If necessary, use a length of ½” NPT pipe threaded into gas inlet of Gas Control.
- b. Reattach main burner feedline, pilot tube and thermopile wire.
- c. Reconnect gas supply piping to inlet of Gas Control.

Reinstallation of Inner Door Assembly.

d. Prior to reinstallation of inner door, fully inspect for the following:

-Tears
-Missing Material
-Cracks
-Dirt or debris
-Other imperfections that will inhibit proper seal
-Gasket adhesion to inner door
-Material left on combustion chamber (around opening)

If the gasket is not affected by any of the above, gasket replacement will not be required. If replacement is required, replace using new gasket kit following the instructions provided with kit.

e. Clean any gasket residue or other debris from combustion chamber surface before installing the inner door/gasket assembly.

f. Position thermopile wire and pilot tube against left side inner door flange gasket. **DO NOT ROUTE THROUGH RADIUSED CHANNEL WITH FEEDLINE**. Be sure that thermopile and pilot tube are not in position to interfere with outer jacket burner access door when reinstalled.

g. Firmly place right side inner door flange against the left side inner door flange and secure with (2) hex drive screws from step 6c. **DO NOT OVER TIGHTEN SCREWS.**

h. Align right side inner door to combustion chamber and verify the fastener holes of the combustion chamber are aligned with the right side inner door slotted openings. Verify seal integrity around combustion chamber opening. Secure right side inner door using (2) hex drive screws from step 6b. **DO NOT OVER TIGHTEN SCREWS**. Verify both left and right sides of the inner door are properly positioned and sealed against the combustion chamber.

⚠ CAUTION

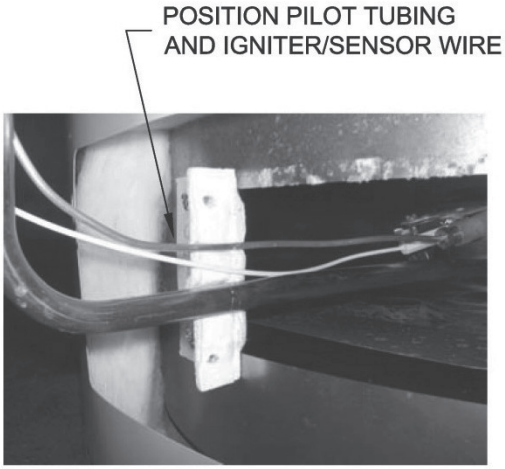
A seal breach may result in a fire or explosion causing property damage, personal injury or death.

Step 9. Replace outer jacket burner access door.

Step 10. Reconnect gas supply to Gas Control.

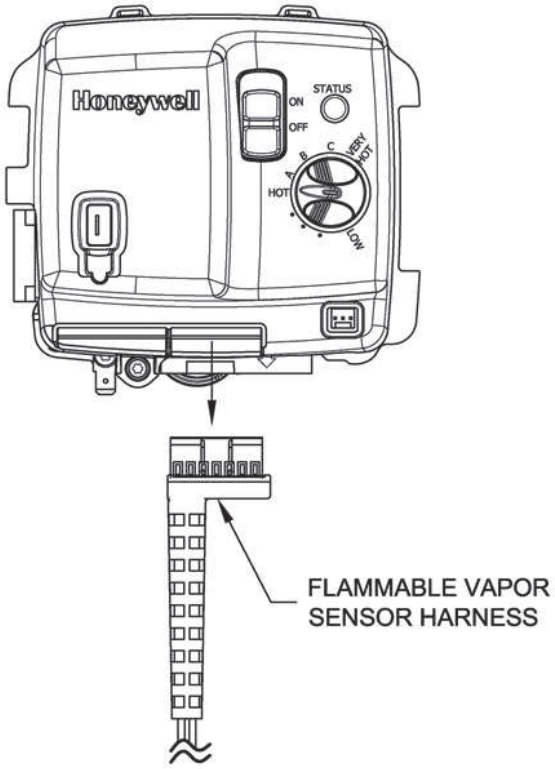
Step 11. Resume water supply to water heater. Be sure tank is full of water before resuming operation.

Step 12. To resume operation follow the instructions located on the lighting instruction label or the lighting instructions located in the installation and operation manual.



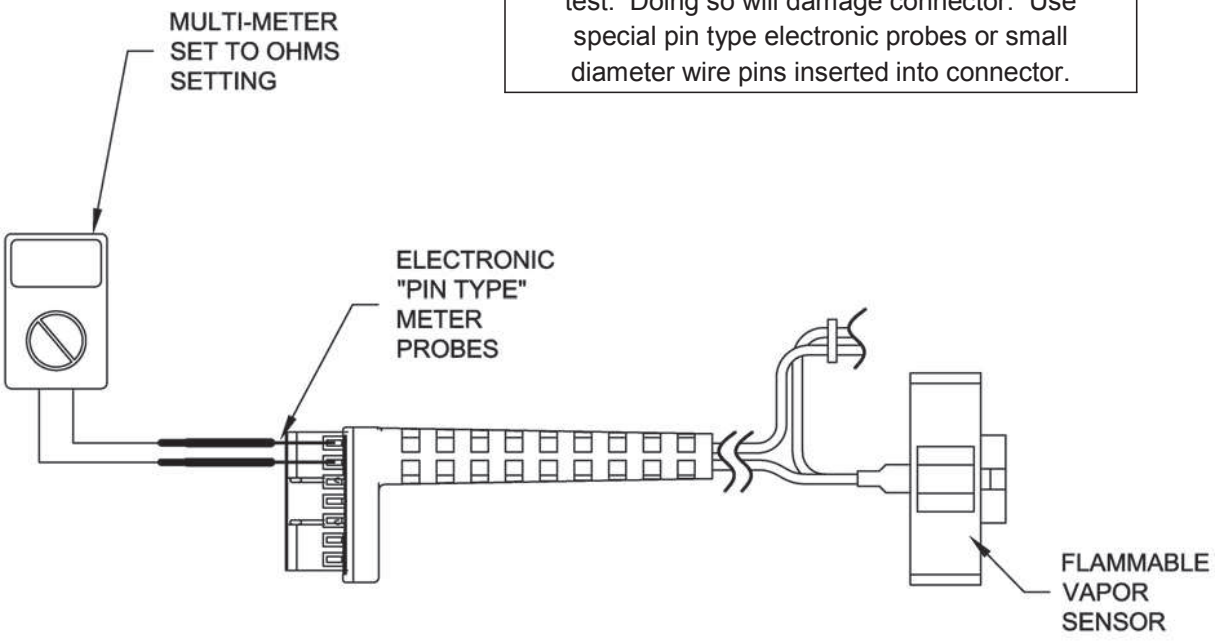
Flammable Vapor Sensor Testing

Step 1. Position power switch on gas control to the “OFF” position.
Step 2. Disconnect flammable vapor sensor from gas control.
Step 3. Using a multi-meter set to the ohms setting, check resistance of flammable vapor sensor. Resistance must be within 3,000 ohms and 48,000 ohms. If outside of this range replace Flammable Vapor Sensor.



⚠ CAUTION

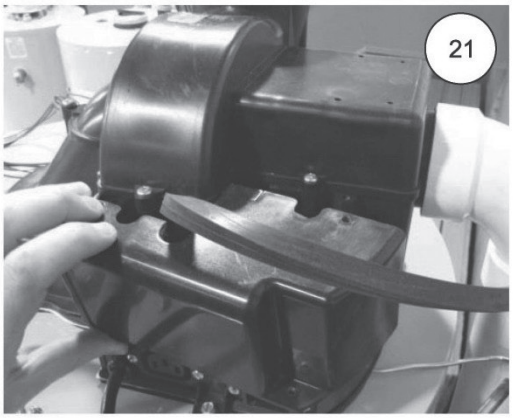
DO NOT use a standard multi-meter probe for this test. Doing so will damage connector. Use special pin type electronic probes or small diameter wire pins inserted into connector.



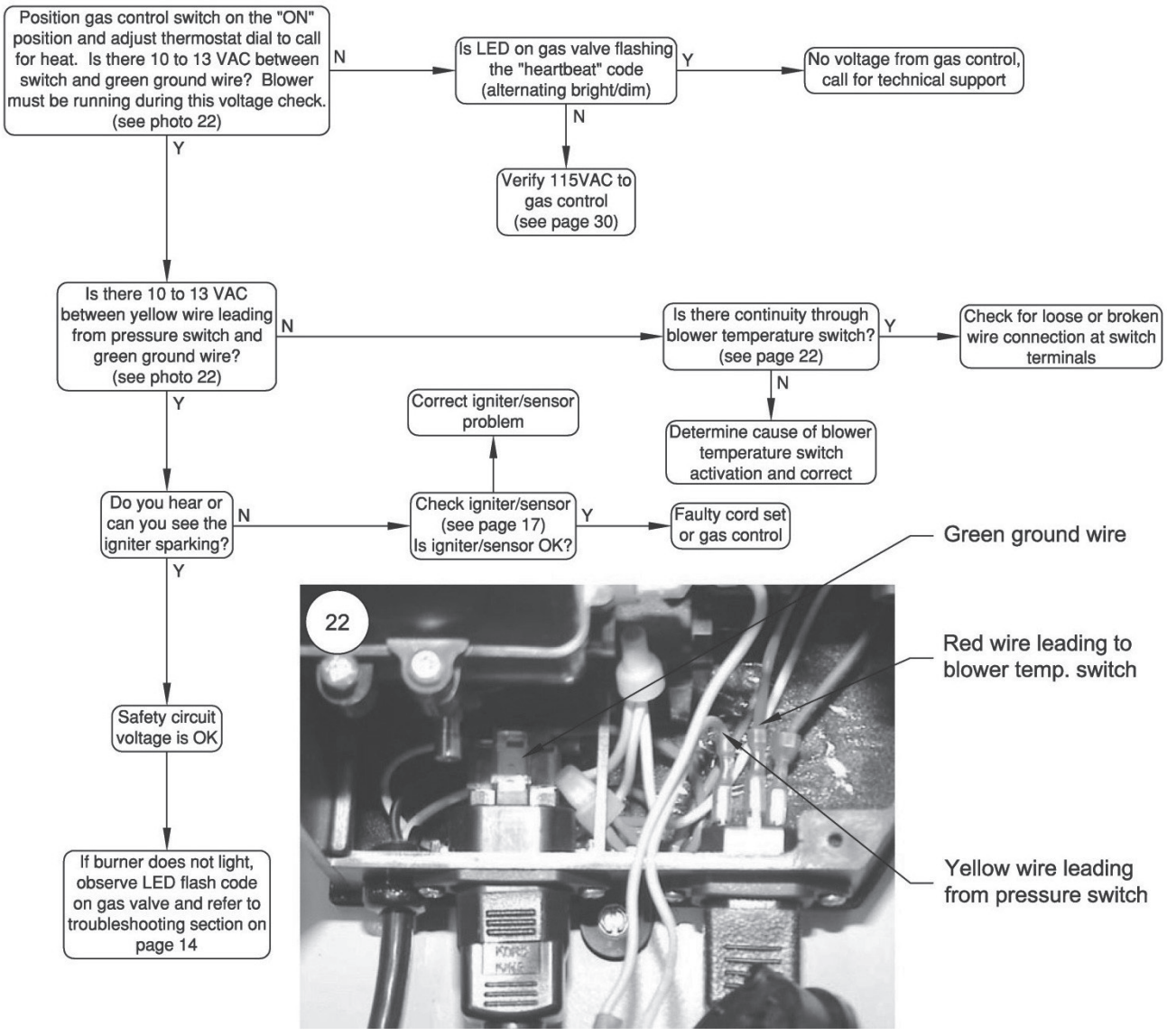
Safety Circuit Voltage Trace

⚠ WARNING
115 volt potential exposure. Use caution to avoid personal injury.

NOTE: This procedure assumes a cool tank.



Remove Three screws (Phillips Screw driver) from control access cover on blower and remove cover (see photo 21).



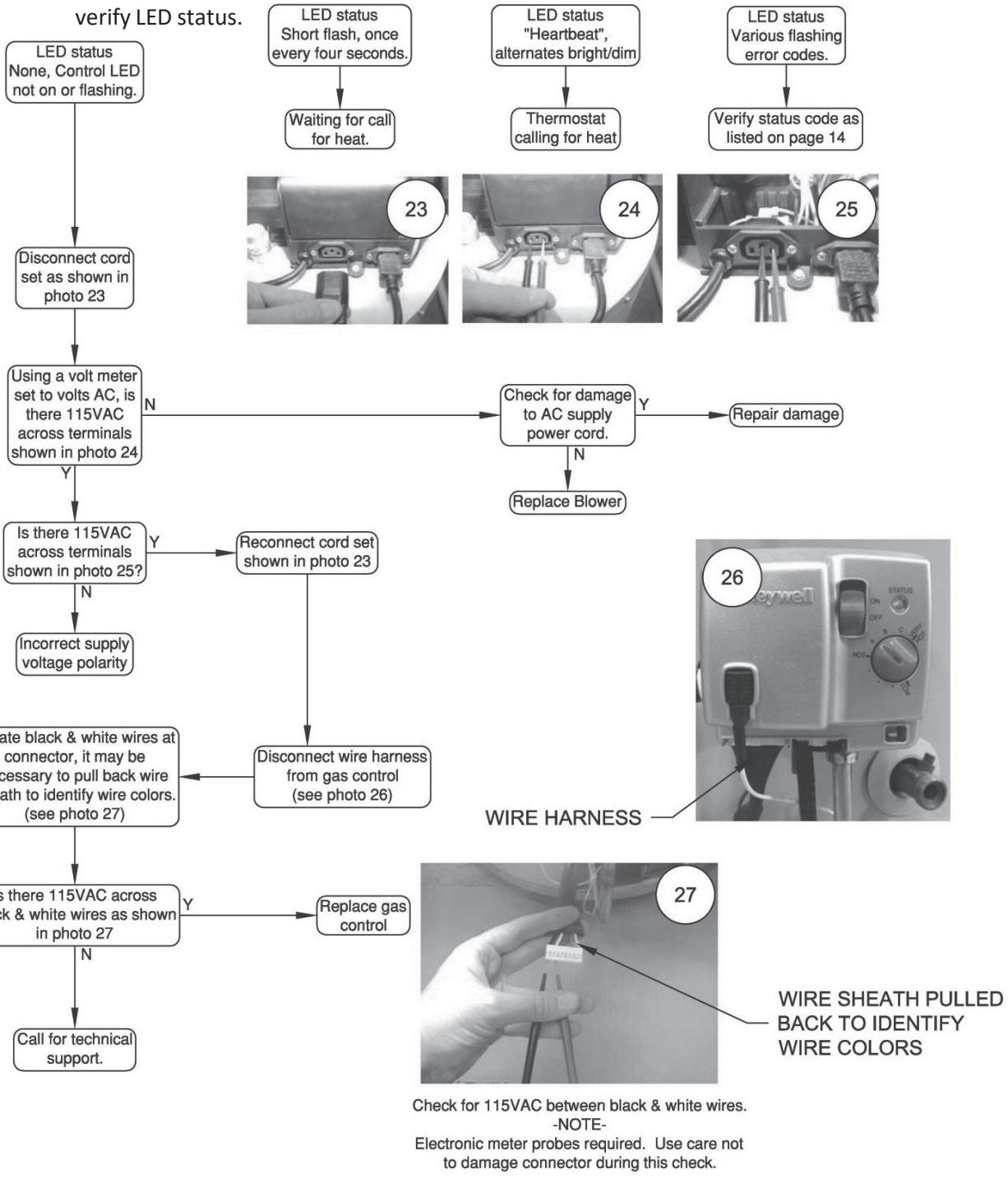
115 VAC Circuit Trace

Step 1. Verify 115 VAC and proper polarity at wall outlet.

Step 2. With unit plugged in and control power switch in the "ON" position verify LED status.

⚠ WARNING

115 volt potential exposure. Use caution to avoid personal injury.



Check for 115VAC between black & white wires.
-NOTE-
Electronic meter probes required. Use care not to damage connector during this check.

Diptube Inspection & Replacement

⚠ WARNING

Water Heater components and stored water may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

Step 1. Position on/off switch of gas control valve to “OFF” position and unplug water heater from wall outlet.

Step 2. Turn off cold water supply to water heater. Connect hose to drain valve of water heater and route to an open drain. Open a nearby hot water faucet to vent heater for draining. Open drain valve of water heater and allow heater to drain to a point below the inlet connection nipple.

Step 3. Disconnect inlet nipple from plumbing system.

Step 4. With an appropriate tool such as a pipe wrench, remove inlet nipple/dip tube from the water heater. Use caution not to damage pipe threads.

Step 5. Visually inspect inlet nipple/dip tube. Inlet nipple/dip tube should be free of cracks and any blockage. Hydrojet slots should be open and free of any blockage. Any damage such as cracks, restriction due to deformation or unintentional holes are not field repairable and the inlet nipple/dip tube must be replaced.

Step 6. Upon completion of inspection or subsequent replacement, reinstall inlet nipple/dip tube into water heater. Ensure pipe dope is used on the nipple’s threads. Connect nipple to plumbing system, resume water supply and refill with water.

Step 7. To resume operation follow the instructions located on the lighting instruction label or the lighting instructions located in the installation and operation manual.

Anode Inspection & Replacement

⚠ WARNING

Water Heater components and stored water may be HOT when performing the following steps in this procedure. Take necessary precaution to prevent personal injury.

Step 1. Position on/off switch of gas control valve to the "OFF" position and unplug water heater from wall outlet.

Step 2. Turn off cold water supply to water heater. Connect hose to drain valve of water heater and route to an open drain. Open a nearby hot water faucet to vent water heater for draining. Open drain valve of water heater and allow water heater to drain to a point below the outlet connection nipple.

Step 3. Disconnect outlet nipple from plumbing system.

Step 4. With an appropriate tool such as a pipe wrench, remove outlet nipple/anode from the water heater. Use caution not to damage pipe threads.

Step 5. Visually inspect outlet nipple/anode. Outlet nipple/anode should show signs of depletion, this is normal. If depletion is ½ of the original anode diameter (approximately ¾" diameter), replacement is recommended. If any of the steel core of the anode is exposed, replacement is recommended.

Step 6. Upon completion of inspection or subsequent replacement, reinstall outlet nipple/anode into water heater. Ensure pipe dope is used on the nipple's threads. Connect nipple to plumbing system, resume water supply and refill with water.

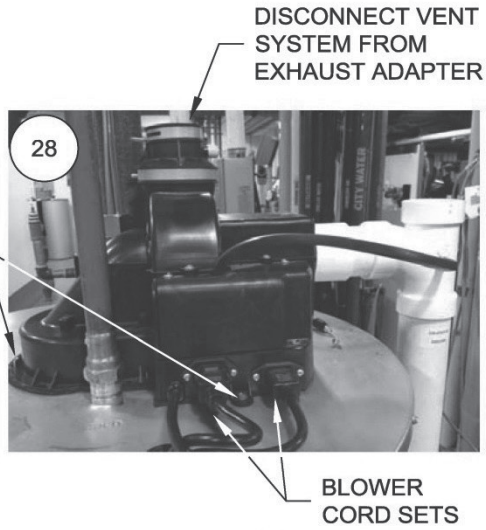
Step 7. To resume operation, follow the instructions located on the lighting instruction label or the lighting instructions located in the installation and operation manual.

Flue Baffle/Core Inspection and Replacement

Step 1. Position gas control power switch to the “OFF” position and unplug blower from wall outlet.

Step 2. Disconnect vent system from exhaust adapter on top of blower.

Step 3. Disconnect intake air piping.



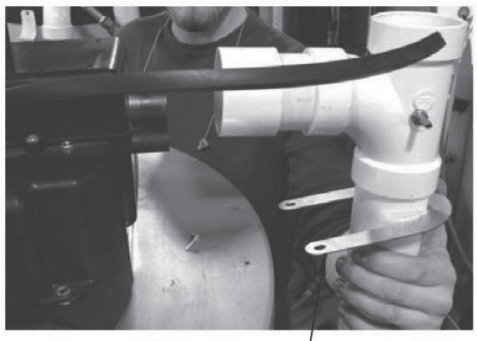
Step 4. Unplug cord sets from blower (see photo 28).

Step 5. Remove the three blower mounting screws (1/4” nut driver) (see photo 28).

Step 6. Remove blower with gasket from water heater.

Step 7. Remove flue baffle or flue core from heater (see photos 29a and 29b).

Step 8. Inspect baffle or core for deterioration, missing restrictors.
Clean any scale or debris build up. Replace with new baffle or core as necessary.



Step 9. Reinstall baffle or core into flue tube. Be sure hanger tabs are inserted into notch location at the top of the flue tube (see photos 30 & 31).

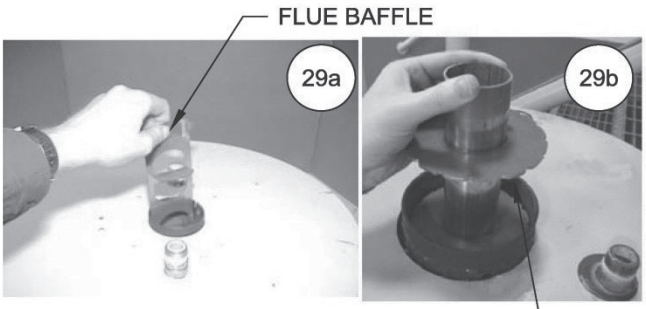
Step 10. Check burner to insure no scale has accumulated during this operation. See burner cleaning procedure on page 16.

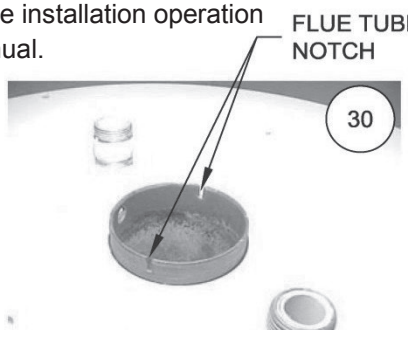
Step 11. Reinstall blower on water heater.

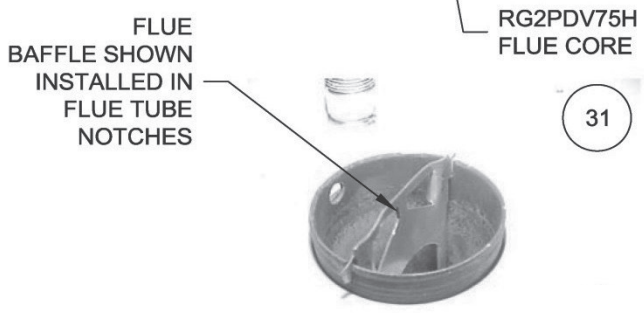
Step 12. Reinstall vent system with the support bracket

Step 13. Connect cord sets to blower. Plug water heater into wall outlet.

Step 14. To resume operation follow the lighting instruction location on the lighting instruction label or the lighting instructions located in the installation operation manual.

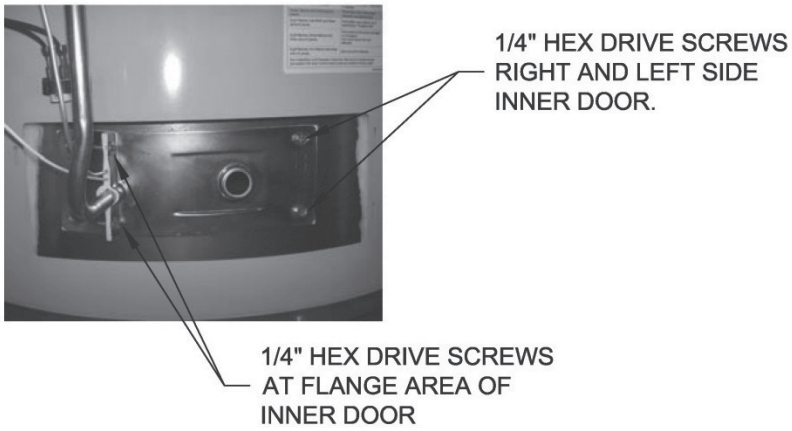






Inner Door Removal Procedure

Step 1. Position gas control power switch to the “OFF” position.
Step 2. Remove outer jacket burner access door.
Step 3. Remove wire tie from feedline.
Step 4. Remove (2) ¼” hex drive screws from right side inner door.
Step 5. Remove (2) ¼” drive screws from flange section of inner door.
Step 6. Remove (2) ¼” drive screws from left side inner door.
Step 7. Remove inner door and inspect per step 8.



Step 8. Fully inspect inner door gaskets for the following:

-Tears
-Missing material
-Cracks
-Dirt or debris
-Other imperfections that will inhibit proper seal
-Gasket adhesion to inner door
-Material left on combustion chamber (around opening)

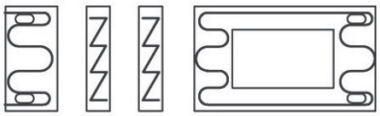
If the gasket is not affected by any of the above, gasket replacement is not required. If replacement is required, proceed to **Inner Door Gasket Replacement Procedure.**

Inner Door Gasket Replacement Procedure

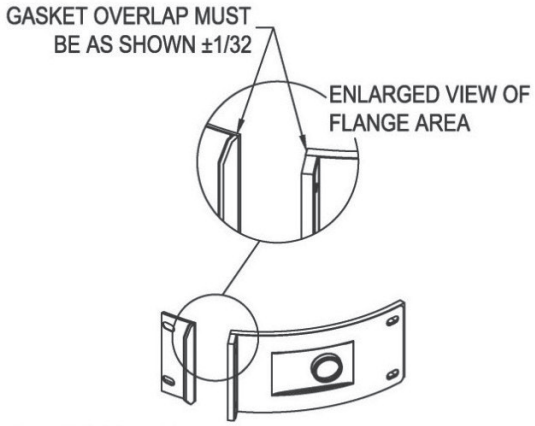
⚠ WARNING

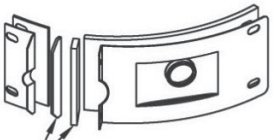
If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

Step 9. After inspection of inner door as noted in step 8, completely remove gasket and adhesive residue from right and left side inner doors as needed.
Step 10. Use RTV sealant (recommended bead size 1/8”) to secure the inner door gasket to the inner door sections (right & left). Refer to illustration on next page for proper application. Note the overlap configuration in the flange area of the inner door. Set the flange section first, this will help to achieve the proper overlap position.



RECOMMENDED PATTERN
FOR RTV SEALANT





PLACE FLANGE
SECTIONS FIRST

EXPANDED VIEW

VIEW WITH GASKETS
IN PLACE

Installation of Inner Door with Gasket

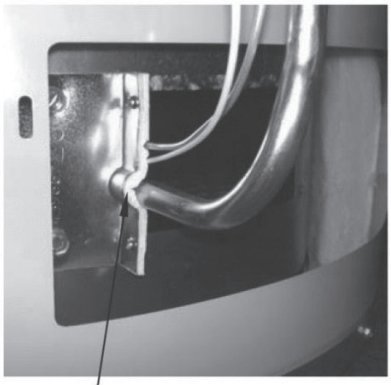
Step 11. Clean any residual gasket residue or other debris from combustion chamber surface before installing the inner door/gasket assembly.

Step 12. Place the left side inner door into position first. Firmly position the radiused channel of the inner door around the feedline. Using the ¼" hex drive screws from step 6, secure left side inner door in place. **DO NOT OVER TIGHTEN SCREWS**

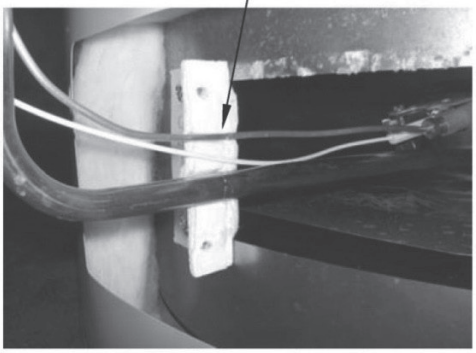
Step 13. Position pilot tube and igniter/sensor wire against left side inner door flange gasket. **DO NOT ROUTE THROUGH RADIUSED CHANNEL WITH FEEDLINE.**

⚠ WARNING

Stripped fastener connections may allow for seal breach of inner door. A seal breach may result in a fire or explosion causing property damage, personal injury or death. Do not over tighten screws in steps 12, 14 and 15.



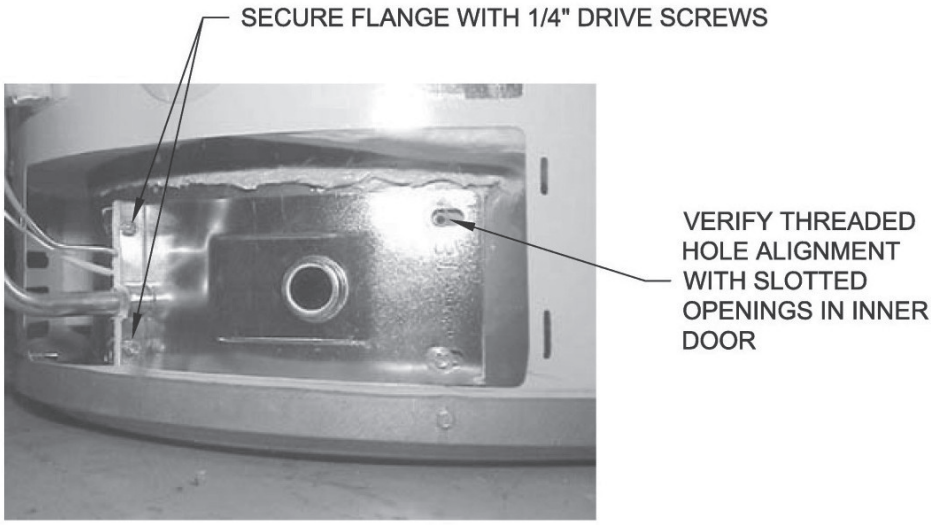
RADIUSED
CHANNEL FOR
FEEDLINE



Installation of Inner Door with Gasket (cont.)

Step 14. Firmly place right side inner door flange against the left side inner door flange and secure with (2) ¼" hex drive screws from step 5. **DO NOT OVER TIGHTEN SCREWS**.

Step 15. Align right side inner door to combustion chamber and verify the fastener holes of the combustion chamber are aligned with right side inner door slotted opening. Verify seal integrity around combustion opening. Secure right side inner door using ¼" hex drive screws from step 4. **DO NOT OVER TIGHTEN SCREWS**. Verify both left and right sides of inner door are properly positioned and sealed against the combustion chamber.



Step 16. Replace outer jacket burner access door.

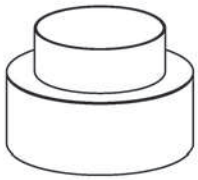
Step 17. To resume operation follow the instructions located on the lighting instruction label or the lighting instructions located in the installation and operation manual.

Frozen Exhaust Vent Terminal(s)

If an intake or exhaust vent terminal is blocked with ice or snow due to severe conditions, the pressure switch and control will not allow the burner to operate. This will result in a three flash status code. Once the blockage is removed (through melting or other means) the controls will let the burner operate. The position of the vent terminals in relation to each other and terminals from other appliances can have an effect on the potential for blockage due to ice or snow. See the installation instructions for recommended positioning of the terminals.

Testing under severe conditions has shown that the optional concentric vent terminal is resistant to ice blockage. Contact Bradford White or the supplier of the water heater for information about ordering the optional concentric vent terminal.

Bradford White has also developed an air intake relief device that can be installed in the air intake near the water heater temporarily enabling the water heater to operate with a frozen intake terminal. Contact Bradford White or the supplier of the water heater for information about the air intake relief device.



AIR INTAKE RELIEF DEVICE



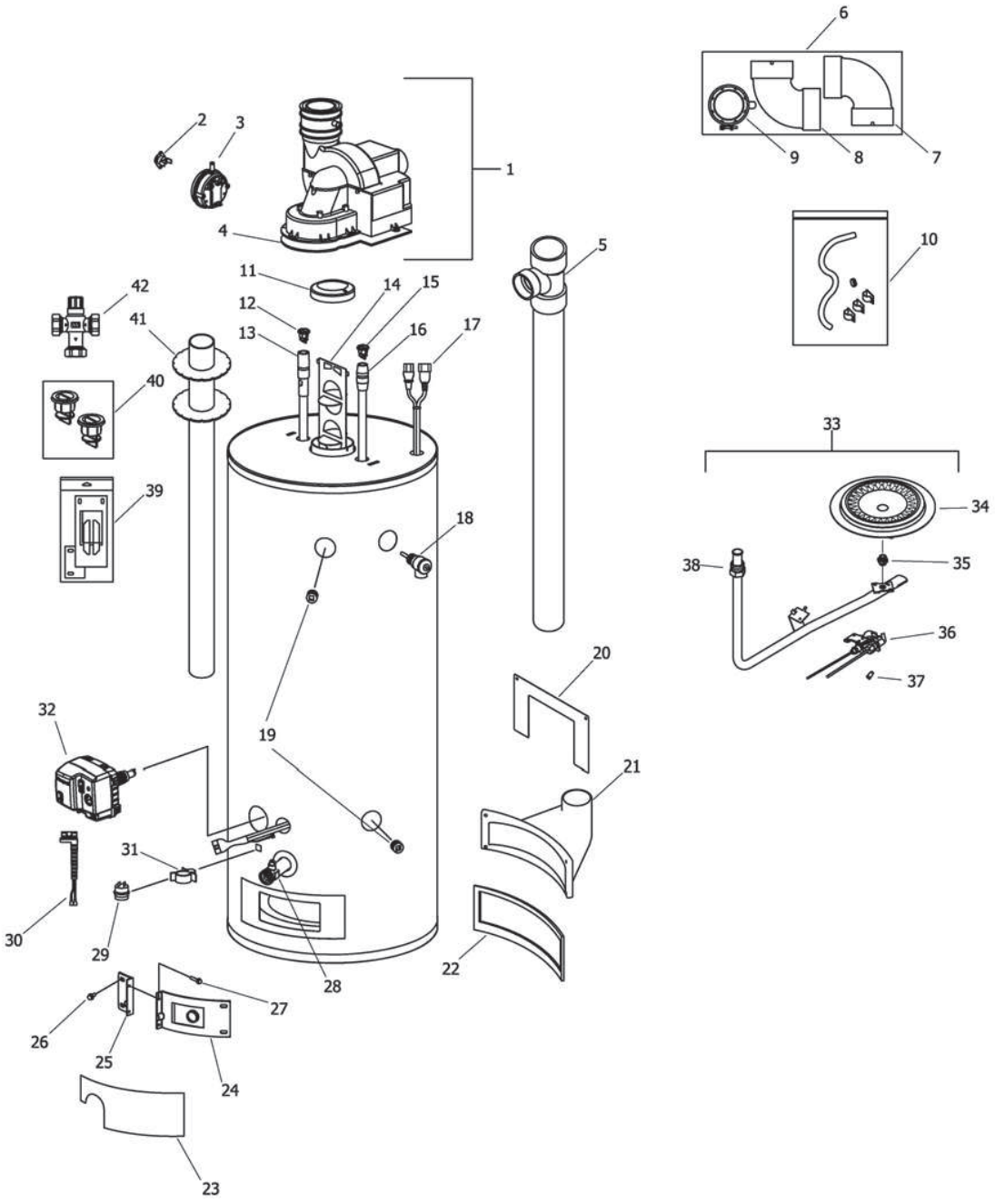
AIR INTAKE RELIEF DEVICE (SECTION VIEW)

Glossary of Terms

BTU	British Thermal Units
GPM	Gallons per minute
Hz	Hertz
KWh	kilowatt hour Light
LED	Emitting Diode National
NPT	Pipe Thread Ohm
Ohms	s of resistance Pounds
PSI	per square inch
RPM	Revolutions per minute
ECO	Energy Cut Out
VAC	Volts Alternating Current
" W.C.	Inches of Water Column
ºC	Degrees Centigrade
ºF	Degrees Fahrenheit

PDV Series

Parts List



1. Blower Complete
2. Temperature Switch
3. Pressure Switch
4. Blower Gasket
5. Tee and Vent Pipe Ass'y
6. Vent Adapter w/ Term.
7. Intake Terminal
8. Vent Terminal Elbow
9. Exhaust adapter
10. Condensate Hose Kit
11. Flue Reducer (50H Only)
12. Heat Trap Outlet
13. Hot Water Outlet Anode
14. Flue Baffle (except 75H)
15. Heat Trap Inlet
16. Inlet Dip Tube
17. Wire Harness
18. T&P Valve
19. ¾ NPT Plug
20. Direct Vent boot escutcheon
21. Air intake boot
22. Air intake boot gasket
23. Outer Door
24. Right side inner door
25. Left side inner door
26. Screw #10-12 x ¾
27. Screw #8-15 x ¾
28. Drain valve
29. FV Sensor
30. FV Sensor harness
31. FV Sensor Clip
32. Gas Control
33. Burner Assy.
34. Main Burner
35. Main Burner Orifice
36. Pilot Assy.
37. Pilot Orifice
38. Feedline
39. Inner Door Gasket Kit
40. Kit-Heat Trap insert
41. Flue core (75H only)
42. ASSE Approved Mixing Valve

BRADFORD WHITE WATER HEATERS

NOTES

BRADFORD WHITE®

WATER HEATERS

Ambler, PA

For U.S. and Canada field service,
contact your professional installer or
local Bradford White sales representative.

Sales/**800-523-2931**

Technical Support/**800-334-3393**
*Email/**techserv@bradfordwhite.com***

Warranty/**800-531-2111**
*Email/**warranty@bradfordwhite.com***

Service Parts/**800-538-2020**
*Email/**Parts@bradfordwhite.com***

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international@bradfordwhite.com

BRADFORD WHITE™

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*Parts/**orders@bradfordwhitecanada.com***
*Orders/**ca.orders@bradfordwhite.com***

www.bradfordwhite.com

POWERED DIRECT VENT GAS WATER HEATER

A Spanish language version of these instructions is available by contacting the company listed on the rating plate.
La version espanola de estas instrucciones se puede obtener al escribirle a la fabrica cuyo nombre aparece en la placa de especificaciones.

INSTALLATION AND OPERATING INSTRUCTION MANUAL

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

FOR YOUR SAFETY

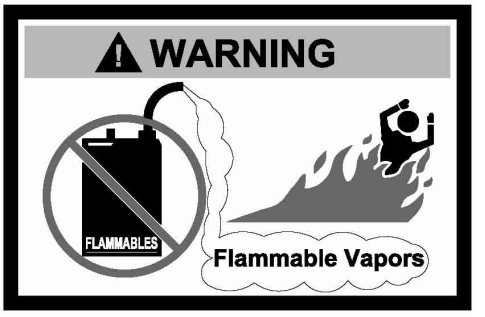
- **Do not store or use gasoline or other flammable, combustible, or corrosive vapors and liquids in the vicinity of this or any other appliance.**

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

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

WARNING
CANCER AND REPRODUCTIVE HARM
WWW.P65WARNINGS.CA.GOV

As required by the state of California Proposition 65.



CONGRATULATIONS!

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

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

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

This manual should be kept with the water heater.

Special Flammable Vapor Ignition Resistant System:

This water heater is equipped with a Flammable Vapor Ignition Resistant System. In the event of improper usage or storage of gasoline or other flammable materials in the location where the water heater is installed, the technology will resist ignition of the flammable vapors outside the confines of the water heater.

The Flammable Vapor Ignition Resistant System features:

- Flammable Vapor Sensor.
- Automatic Ignition Device.
- Sight Window to observe operation of pilot and burner.

FOR YOUR SAFETY: Activation of the Flammable Vapor Ignition Resistant System occurs when flammable vapors are present in the room where the water heater is installed. If flammable vapors are detected and/or sensed:

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Leave the premises and immediately call the fire department from a neighbor's phone. Follow the fire department's instructions.

Once the flammable vapor has been evacuated, contact your plumbing professional or the manufacturer for further instructions. Replacement of a Flammable Vapor Ignition Resistant System equipped water heater due to a flammable vapor shutdown is not covered under the terms of the limited warranty.

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GENERAL INFORMATION

This gas-fired water heater's design is certified by CSA International under the *American National Standard Z21.10.1* and *CSA 4.1-M*, most current editions at the time of manufacture. This is a category III water heater.

This water heater must be installed in accordance with local codes or, in the absence of local codes, the *National Fuel Gas Code, ANSI Z223.1*-Latest Edition) and/or in Canada *CAN/CGA B149 Installation Codes* (Latest Editions). The warranty for this water heater is in effect only when the water heater is installed, adjusted, and operated in accordance with these Installation and Operating Instructions. The manufacturer will not be held liable for any damage resulting from alteration and/or failure to comply with these instructions.

This water heater is not design certified for installation in a mobile home. Such an installation may create a hazardous condition and will nullify the warranty.

⚠ CAUTION

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

⚠ WARNING

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

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

⚠ DANGER

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

IMPORTANT

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

General Information continued-

Make sure that you check the rating plate and combination gas control on the water heater to be certain that the type of gas being supplied corresponds with the marking on the rating plate and combination gas control.

A sacrificial anode is used to extend tank life. The removal of this anode, except for inspection and/or replacement, will nullify the warranty. In areas where water is unusually active, an odor may occur at the hot water faucet due to a reaction between the sacrificial anode and the impurities in the water. If this should happen, an alternative anode may be purchased from the supplier that installed this water heater. This will minimize the odor while protecting the tank. Additionally, the water heater should be flushed with appropriate dissolvers to eliminate any bacteria.

INSTALLATION

Locating the Water Heater

⚠ WARNING

Water heaters are heat producing appliances. To avoid damage or injury, do not store materials against the water heater or vent-air intake system. Use proper care to avoid unnecessary contact (especially by children) with the water heater and vent-air intake components. **UNDER NO CIRCUMSTANCES MUST 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.**

DO NOT install the water heater in any location where gasoline or flammable vapors are likely to be present.

Water heaters in residential garages must be installed and located, or protected, to avoid physical damage. For other installations refer to local codes. In the absence of local codes, the water heater 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).

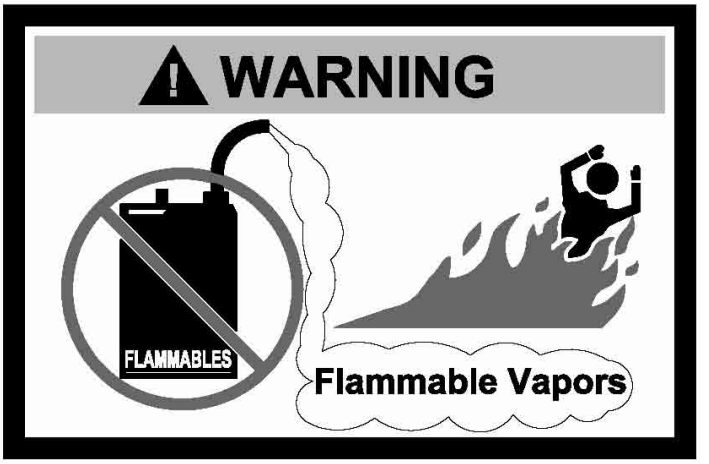
The location of this water heater is of the utmost importance. Before installing this water heater, read the installation section of these instructions. After reading these installation and operating instructions, select a location for the water heater where the floor is level and is easily accessible to gas and water supply lines. **DO NOT locate the water heater where water lines could be subjected to freezing temperatures**. **Make sure the cold water pipes are not located directly above the gas control so that condensate during humid weather does not drip on the controls**.

Installation (Locating the Water Heater) continued-

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

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.



⚠ WARNING

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

IF YOU SMELL GAS:

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

DO NOT OPERATE APPLIANCE UNTIL THE LEAKAGE IS CORRECTED!

⚠ WARNING

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

- **Liquefied petroleum gases/propane gas and natural gas have an odorant added by the gas supplier that aids in the 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 neighbor's telephone.**

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

The water heater must be located close enough to the outside wall to keep the venting distance within the maximum distance described in the installation instructions. Locate the water heater as close as possible to the vent opening. Read the venting section in this installation instruction manual before locating the water heater.

This water heater must be located in an area where leakage of the tank or water line connections and 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 adequately piped for proper drainage must be installed under 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 *(1.9 cm)* in diameter and pitched for proper drainage.

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.

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, CA 95811.

Minimum Clearances

⚠ WARNING

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

This installation must allow access to the front of the water heater and adequate clearance must be provided for servicing and operating this water heater. The water heater may be installed on either a combustible or non-combustible floor. If the water heater is to be installed directly on carpeting, it must be installed on top of a metal or wood panel 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 must be covered by the panel. The minimum clearances to combustibles for this water heater are: zero (0) inch *(0 cm)* from the sides and rear, five (5) inches *(12.7 cm)* from the front of the jacket, zero (0) inch *(0 cm)* from the vent connector and fifteen (15) inches *(38.1 cm)* from the jacket top. Increase distances to provide clearance for servicing.

Venting

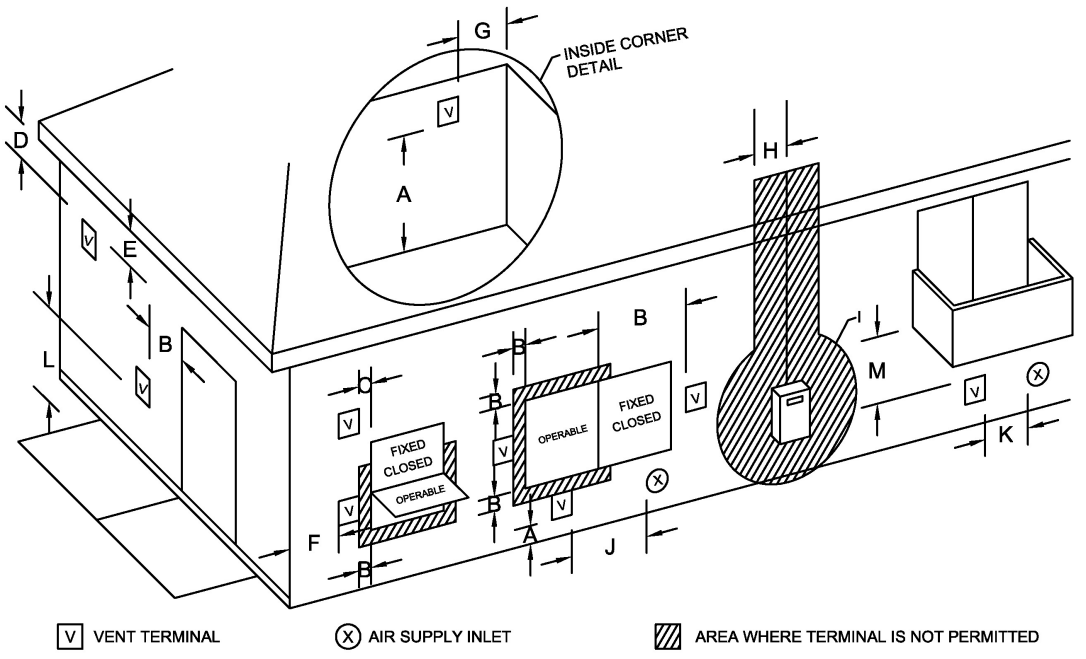


Figure 1 – Direct Vent Terminal Clearances

Venting continued-

		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 window or door that may be opened	6 in. (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 12 in. (30 cm) for appliances > 10,000 Btuh (3 kW) and ≤100,000 Btuh (30 kW), 36 in. (91 cm) for appliances >100,000 Btuh (30 kW))	4 ft (1.2 m) below or to side of opening; 1 ft (300 mm) above opening
C=	Clearance to permanently closed window	*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	*b	*b
E=	Clearance to unventilated soffit	*b	*b
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	12 inches (30 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)†	7 feet (2.13 m)†
M=	Clearance under a veranda, porch, deck, or balcony	12 inches (30 cm) ‡	12 inches (30 cm) ‡

[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".

This water heater has a certified category III, per latest ANSI Z 21.10.3-2015.CSA 4.3-2015 revision. Refer to the latest edition of the National Fuel Gas Code (ANSI Z223.1-latest edition), or in Canada, the Natural Gas and Propane installation Code (B149.1-00 latest edition).

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" *(25.4 cm)* above expected snowfall level to prevent blockage of vent termination.

NOTICE

In locations where sustained outside air temperatures are below freezing, it is possible for the vent terminations to accumulate ice build-up due to adverse local climate conditions (prevailing wind direction, wind speed, termination orientation, etc.). The optional concentric vent terminal is more resistant to this ice build-up. In more severe temperature conditions, an optional manufacturer approved air intake relief device is available and may be installed, per the instructions, to prevent nuisance shut down of the water heater. The air intake relief device may be installed with the concentric vent termination or the standard separate vent terminations. Consult the concentric vent and/or the air intake relief device instructions for installation requirements.

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.

Clearance to combustibles for all venting pipes and terminals

For installations in the US	For installations in the CANADA
0" minimum	Refer to vent pipe and terminal manufacturer's installation instructions for clearances to combustibles

DO NOT place of insulation or other materials in the required clearance spaces between the venting to combustible material unless otherwise specified.

⚠ WARNING

Risk of carbon monoxide poisoning or fire due to joint separation or pipe breakage.

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. The acceptance of the venting system is dependent upon full compliance with these installation instructions.

Venting system **must not** pass through rated fire separations.

The venting system must be free to expand and contract. This venting system **must be** supported in accordance with these instructions.

NOTICE

For installations in Canada, field supplied vent piping must comply with CAN/CGA B149.1 (latest edition) and be certified to the Standard For Type BH, Class II, 65°C, Gas Venting Systems, ULC S636. Components of this listed system shall not be interchanged with other vent systems or unlisted pipe/fittings. All components and specified primers and cements of the certified vent system must be from a single system manufacturer and not intermixed with other system manufacturer's vent system parts. The supplied vent connector and vent termination are certified under ULC S636 and are also certified as part of the water heater. Refer to the following tables for approved venting materials, primers, and cements. All approved primers and cements are to be used within their marked time limitations.

Approved Venting Materials

For installations in the US only	For installations in CANADA
• PVC DWV (ASTM D-2665) • PVC Sch. 40, 80, 120 (ASTM-D1785) • CPVC Sch. 40, 80 (ASTM-F441) • CPVC (ASTM D2846) • ABS Sch. 40 DWV (ASTM D2661)	• ULC S636 approved PVC for flue gas venting rated Class II, 65°C • ULC S636 approved CPVC for flue gas venting rated Class II, 65°C

Approved Primers and Cements

For installations in the US only	For installations in CANADA
• PVC and CPVC Primer (ASTM-F656) • PVC Cement (ASTM D-2564) • CPVC Cement (ASTM F493) • ABS Primer and Cement (ASTM D-2235)	• ULC S636 approved Primer and Cement for flue gas venting rated Class II, 65°C

NOTICE

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

Venting System Condensation

Condensate formation does not occur in all installations of power direct vented water heaters, but should be protected against on installations where condensation can form in the venting system.

Formation of condensation in the venting system of Power Vented water heaters is dependent upon installation conditions including, but not limited to:

Ambient temperature and humidity of installation location;
Ambient temperature and humidity of venting space;
Vent distance and slope;
And product usage.

In order to effectively control condensate from adversely affecting the mechanical components of the water heater several methods may be employed:

1. For horizontal installations the vent pipe can be installed with a downward slope (not less than 1/8" *(3 mm)*) and away from the blower.
2. In order to prevent condensate from draining back into the blower (vertical or horizontal runs), an optional condensate kit is available as a service part (Condensate kit, p/n 239-45875-00). A factory supplied exhaust adapter with drain outlet mounts directly to the blower outlet and is secured with two hose clamps, one to the blower and the other to the vent pipe. Tubing is provided to drain any accumulated condensate away from the water heater and to a suitable drain. The kit comes complete with instructions for proper installation.

PART I - Venting Specifications for:

75 Gallon *(283.9L)*

This water heater is a power vented appliance and is designed to intake and exhaust the products of combustion through 3” *(7.6 cm)* or 4” *(10.2 cm)* diameter vent pipe to the outdoors. This water heater may be either vented horizontally through the wall or vertically through the roof. Use a 3” *(7.6 cm)* to 4” *(10.2 cm)* reducer to connect to the intake and outlet when using 4” *(10.2 cm)* vent pipe. Apply the proper cement at the joint locations. Table 1 lists the maximum vent lengths for this water heater using 3” *(7.6 cm)* intake and exhaust pipe. If possible, locate the water heater so that the venting length and number of elbows are kept to the minimum distance necessary to reach the outside. If the installation requires venting lengths that exceed the lengths listed for 3” *(7.6 cm)* vent pipe in Table 1, then use 4” *(10.2 cm)* vent pipe for the vent connector.

Venting continued-

Table 2 lists the venting distances allowed with 4" *(10.2 cm)* diameter vent pipe. **When venting with 4" *(10.2 cm)* vent pipe**, use a 4" *(10.2 cm)* to 3" *(7.6 cm)* reducer to exit through the building wall with 3" *(7.6 cm)* vent pipe. Use the 3" *(7.6 cm)* vent terminal supplied with the water heater to terminate on the outside of the building. If the length of 3" *(7.6 cm)* vent pipe needed to go through the wall is greater than 14" *(35.5 cm)*, use 4" *(10.2 cm)* to go through the wall and reduce to 3" *(7.6 cm)* vent pipe immediately after exiting the outside wall. Refer to the venting illustrations on the following pages. Make sure the vent pipe terminal elbow fitting is at least 1" *(2.5 cm)* away from the edge of the wall.

IMPORTANT

The minimum equivalent length for the exhaust portion of the vent is 7 feet. The maximum equivalent vent length for the exhaust is 60 feet for 3" diameter pipe and 100 feet for 4" diameter pipe. The intake portion of the vent must be equal to or less than the vent length of the exhaust. The tables below are provided for your quick reference, some installations may require a greater number of elbows. When calculating equivalent vent length, one 90º elbow is equivalent to 5 feet.

TABLE 1 - VENT CONNECTOR LENGTHS FOR 3" *(7.6 cm)* DIAMETER VENT PIPE

Terminating	# of Elbows (excl. vent term.)	Maximum straight Length ft. *(m)*		Minimum straight Length ft. *(m)*
			75 gal.	
Through the Wall	1		55 *(16.8)*	2 *(.6)*
Through the Wall	2		50 *(15.2)*	2 *(.6)*
Through the Wall	3		45 *(13.7)*	2 *(.6)*
Through the Wall	4		40 *(12.2)*	2 *(.6)*
Through the Roof	0		60 *(18.3)*	7 *(2.1)*
Through the Roof	1		55 *(16.8)*	7 *(2.1)*
Through the Roof	2		50 *(15.2)*	7 *(2.1)*
Through the Roof	3		45 *(13.7)*	7 *(2.1)*

TABLE 2 -VENT CONNECTOR LENGTHS FOR 4" *(10.2 cm)* DIAMETER VENT PIPE			
Terminating	**# of 90° Elbows (excl. vent term.)**	**Maximum straight Length** ft. *(m)* **75 gal.**	**Min straight Length** ft. *(m)*
Through the Wall	1	95 *(29.0)*	10 *(3.1)*
Through the Wall	2	90 *(27.4)*	10 *(3.1)*
Through the Wall	3	85 *(25.9)*	10 *(3.1)*
Through the Wall	4	80 *(24.4)*	10 *(3.1)*
Through the Wall	5	75 *(22.9)*	10 *(3.1)*
Through the Roof	0	100 *(30.5)*	15 *(4.6)*
Through the Roof	1	95 *(29.0)*	15 *(4.6)*
Through the Roof	2	90 *(27.4)*	15 *(4.6)*
Through the Roof	3	85 *(25.9)*	15 *(4.6)*
Through the Roof	4	80 *(24.4)*	15 *(4.6)*

NOTE: When using 4" *(10.2 cm)* vent pipe, use two 4" *(10.1 cm)* to 3" *(7.6 cm)* reducers for each portion of the vent. One reducer is installed just after the blower and the other reducer is used just prior to exiting the building. Exit the building wall with 3" *(7.6 cm)* vent pipe using the 3" *(7.6 cm)* 90° vent terminal supplied. Two 45° elbows are equivalent to one 90° elbow.

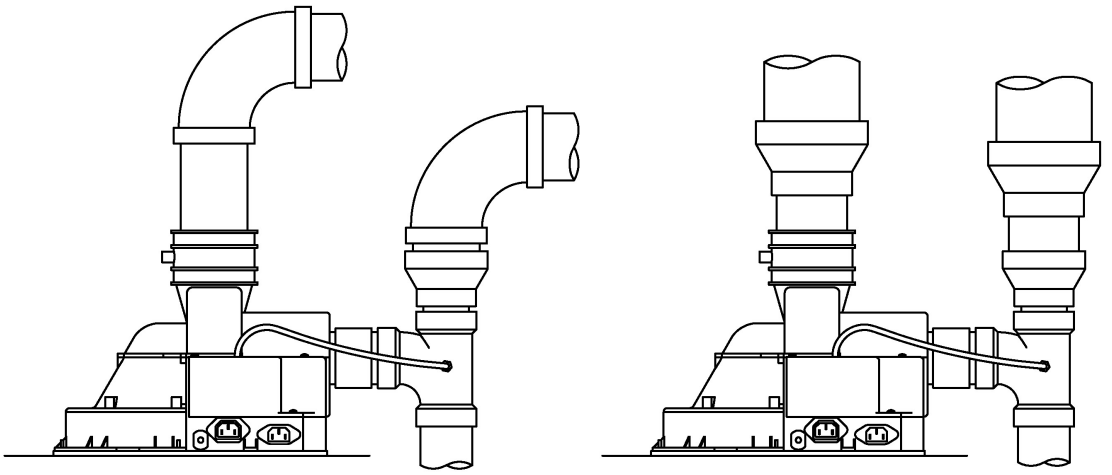


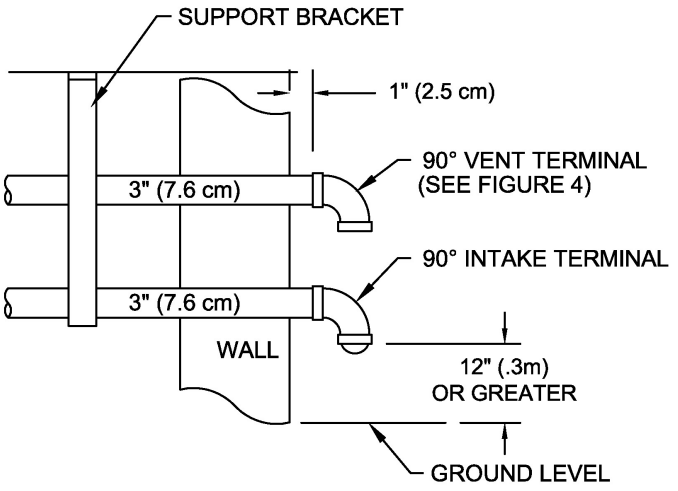
Figure 2

IMPORTANT

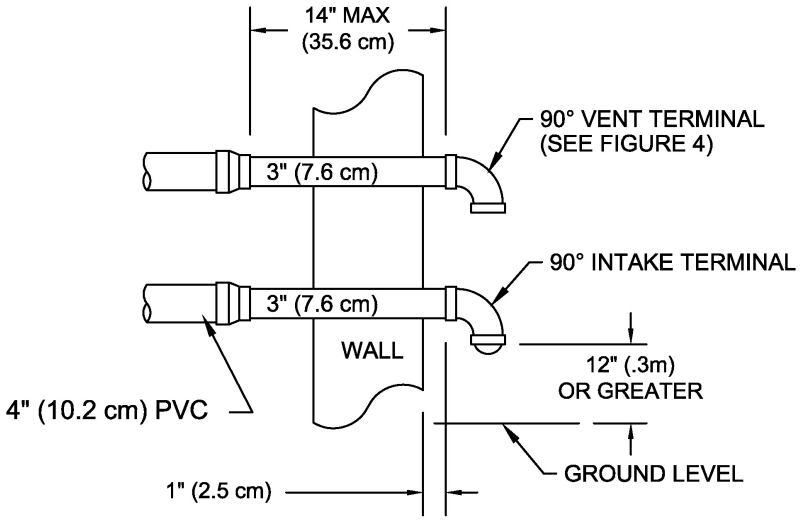
All of the Venting connections must be leak checked with a soap and water solution upon initial startup of the water heater. Any leaks must be repaired before continuing operation of the water heater.

THROUGH THE WALL VENTING: (HORIZONTAL VENTING WITH STANDARD VENT TERMINALS).

Cut two 3 1/2 in. *(8.9 cm)* diameter holes in the wall at the point where the vent connector is going to pass through the wall. Use the proper cement to secure the 90° vent terminal provided with the water heater to the vent connector. The distance between the edges of the 90° vent terminal and the exterior wall (see Figure 3) must be 1 in. *(2.5 cm)*. The exhaust and intake must not be less than 16” (40.6 cm) apart and the exhaust terminal must be a minimum of 3 in. higher than the intake terminal (see figure 4a). Use the proper cement and assembly procedures to secure the vent connector joints between the terminal and the blower outlet. Provide support brackets for every 5 feet *(1.5m)* of horizontal vent.



3” VENT INSTALLATION



4” VENT INSTALLATION

Figure 3

Venting continued-

Vent terminal configurations for through the wall venting.

When venting through the wall, the exhaust terminal must exit the structure at a minimum distance of 16” (40.6 cm) from the intake terminal. The exhaust terminal must not be located below the intake terminal for any reason (see figure 4a below for examples of acceptable vent terminal configurations).

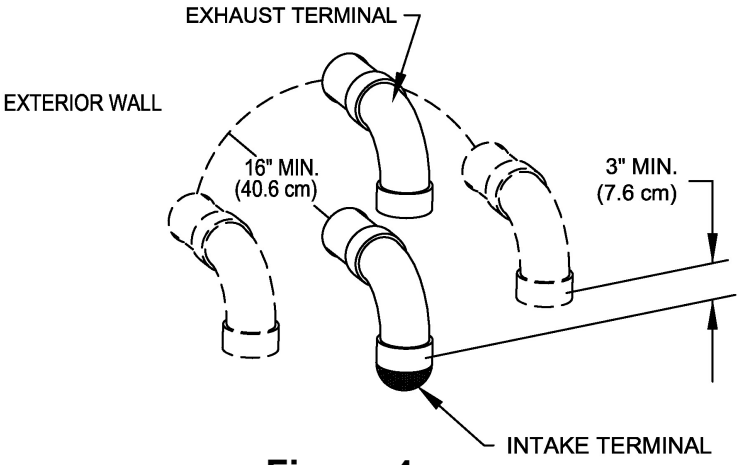


Figure 4a

⚠ CAUTION

NEVER INSTALL AIR INTAKE ABOVE EXHAUST

When local conditions present a risk of ice accumulation on the vent terminals, the configurations in 4b and 4c or the concentric termination are preferred.

The air intake screen can be removed for cold installations but this may make the air intake susceptible to debris buildup from birds or other animals. If the air intake screen is removed to prevent freezing, it is recommended that the air inlet screen be installed during the spring.

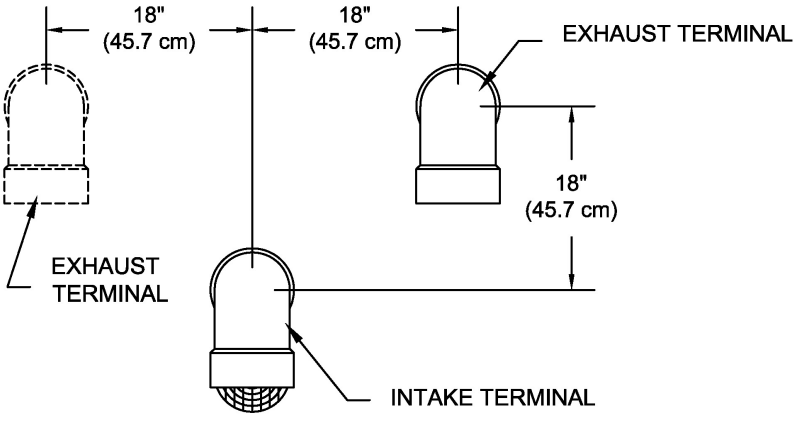


Figure 4b

Venting continued-

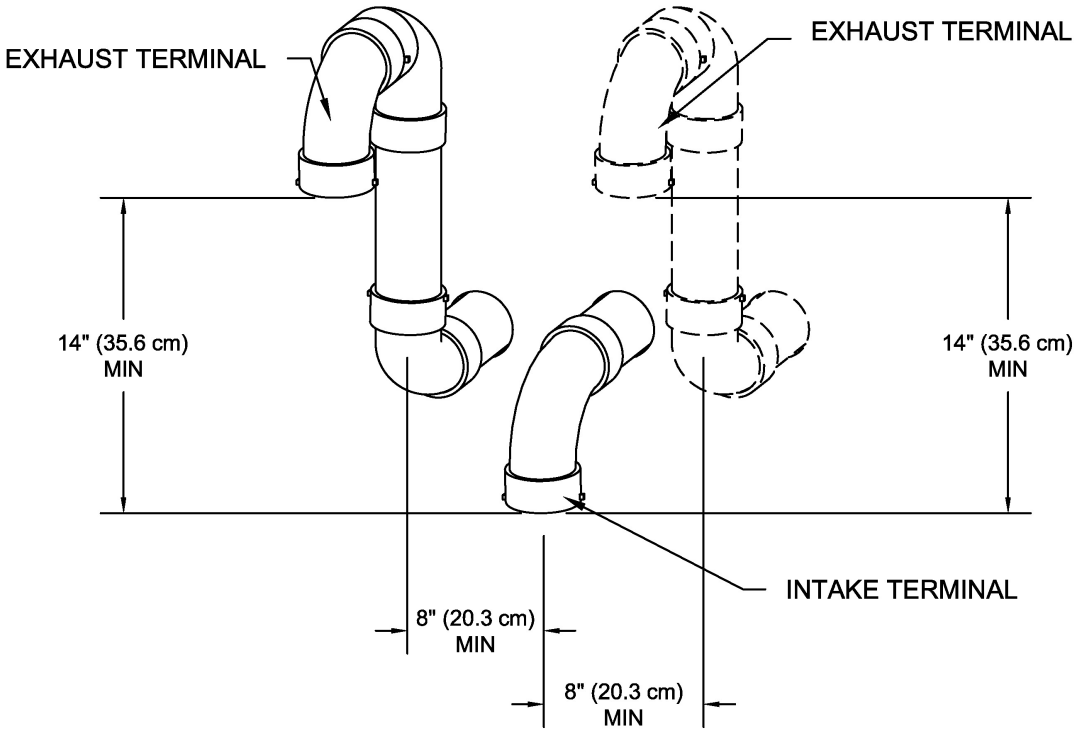


Figure 4c

IMPORTANT

When using the vent terminal configuration shown in 4c the extra elbows must be accounted for in the total vent length see Table 3 or Table 4.

Venting continued-

THROUGH THE WALL VENTING: (HORIZONTAL VENTING WITH CONCENTRIC VENT).

Cut one 4 5/8 in. *(11.7 cm)* diameter hole in the wall at the point where the vent connector is going to pass through the wall. Use the proper cement to secure the vent terminal to the vent connector. Use the proper cement and assembly procedures to secure the vent connector joints between the terminal and the blower outlet. Provide support brackets for every 5 feet *(1.5 m)* of horizontal vent.

IMPORTANT

When using the concentric vent terminal the maximum vent length is reduced by 20 feet.

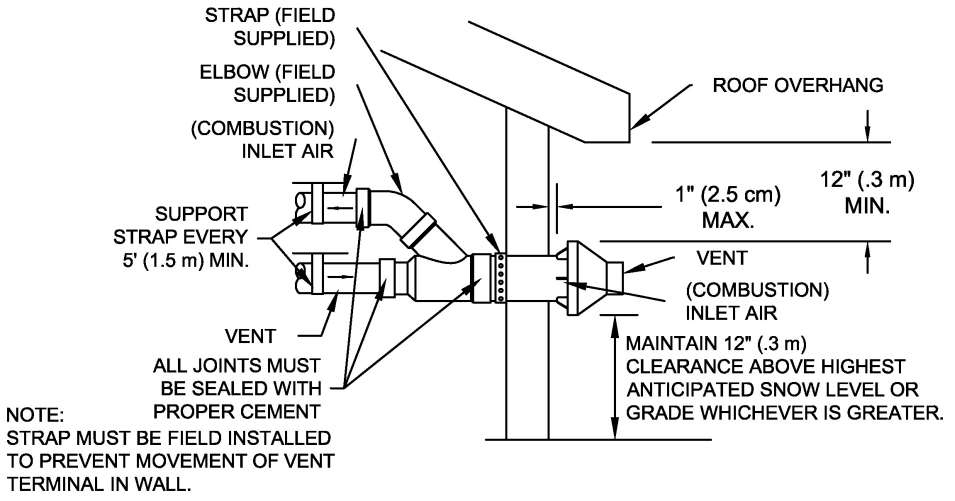


Figure 5a

Venting continued-

It is acceptable to install a 90 degree elbow on IPEX concentric vent terminations use with this power direct vent water heater (see Figure 5b). A short length of appropriate diameter vent pipe should be used to transition from the vent terminal to the 90 degree elbow. Approved venting materials along with primers and cements are listed at the beginning of this venting section. When the 90 degree elbow is used the equivalent length of the elbow and short length of vent pipe must be factored into the total vent/air intake pipe determinations (see Tables 1 and 2 for appropriate vent connector lengths).

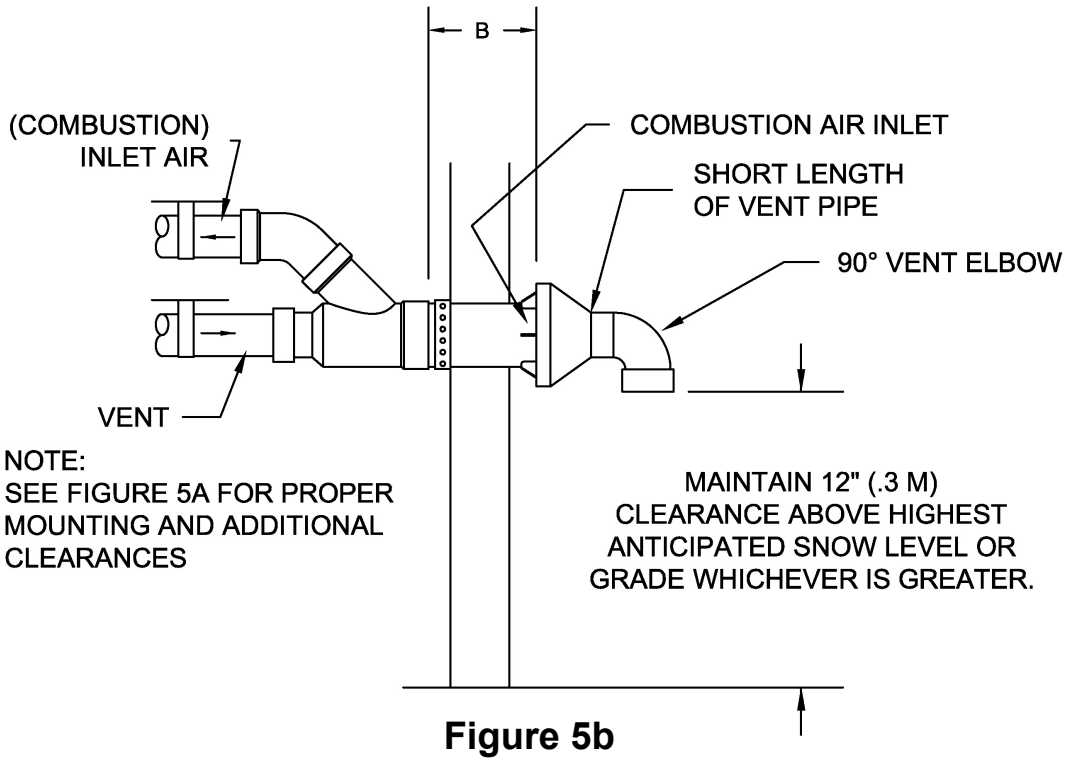


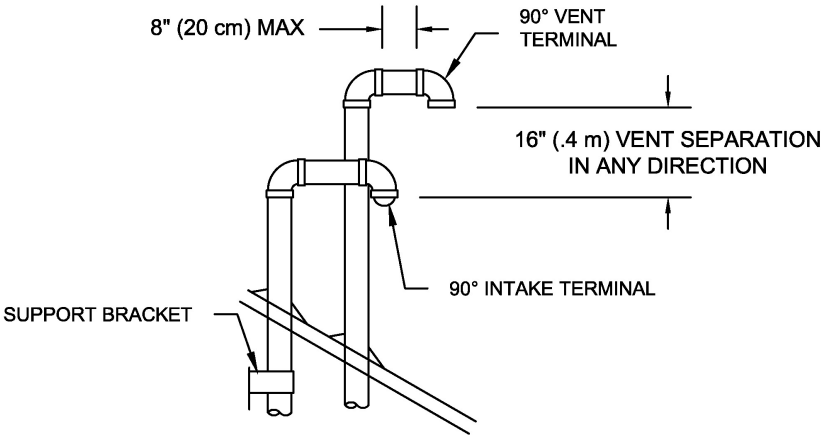
Figure 5b

(B) DIMENSION	
MIN	**MAX**
12” *(30.5 CM)*	44” *(111.8 CM)*

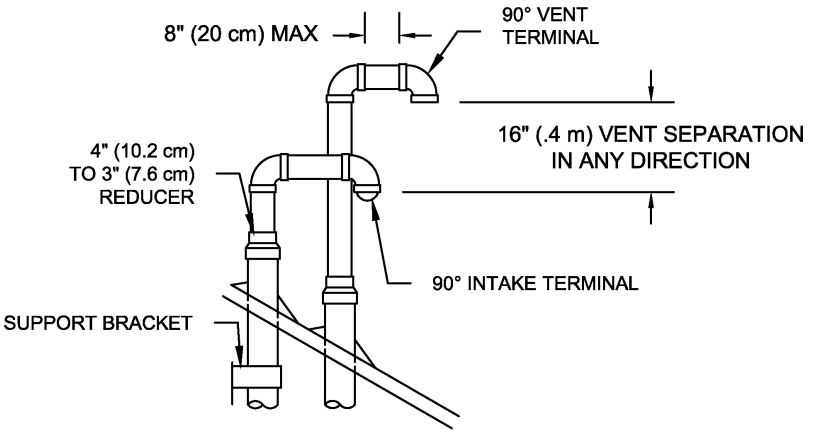
THROUGH THE ROOF VENTING: (VERTICAL VENTING STANDARD TERMINALS).

Cut the necessary holes through the roof and ceiling and install the vent connector as shown in Figure 6. Make sure that the installation meets the local codes and/or The National Fuel Gas Code ANSI Z223.1 (Latest Edition) or CGA/CAN B149 Installation Code (latest edition).

Venting continued-



3" VENT INSTALLATION



4" VENT INSTALLATION

Figure 6

NOTE: For installations requiring both horizontal and vertical runs, the following rule must be followed: Total length of straight pipe (both horizontally and vertically) must not exceed the maximum equivalent length listed in these instructions.

Venting continued-

THROUGH THE ROOF VENTING: (VERTICAL VENTING CONCENTRIC VENT TERMINAL):

Cut the necessary holes through the roof and ceiling and install the vent connector as shown in Figure 7. Make sure that the installation meets the local codes and/or the National Fuel Gas Code ANSI Z223.1 (Latest Edition) or *CAN/CGA B149* installation code (latest edition). **A condensate kit must be installed when venting through the roof.**

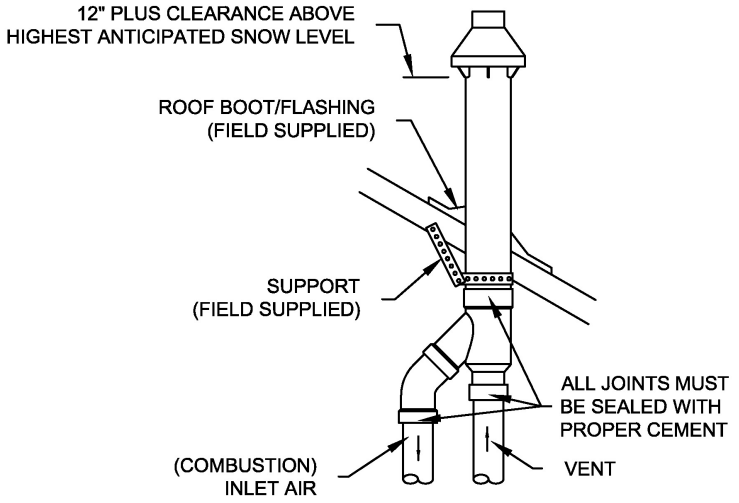


Figure 7

NOTE: For installations requiring both horizontal and vertical runs, the following rule must be followed. Total length of straight pipe (both horizontally and vertically) must not exceed the equivalent length listed in these instructions. For the concentric vent terminal the maximum vent length is reduced by 20 feet.

⚠ CAUTION

FOR VERTICAL INSTALLATIONS WITH CONCENTRIC VENT TERMINAL, CONDENSATE KIT, P/N 239-45875-00, MUST BE USED.

THROUGH THE WALL VENTING WITH LOW GROUND CLEARANCE:

When venting cannot exit through the wall at a height greater than or equal to 12” *(30.5 cm)* above the ground, or anticipated snow level, the installation must be modified as shown below (see Figure 8). Refer to Table 3 for maximum venting lengths using 3” *(7.6 cm)* vent pipe or Table 4 for maximum lengths using 4” *(10.2 cm)* vent pipe. The exhaust and intake terminals must not be less than 16 in. *(40.6 cm)* apart (see figure 4a).

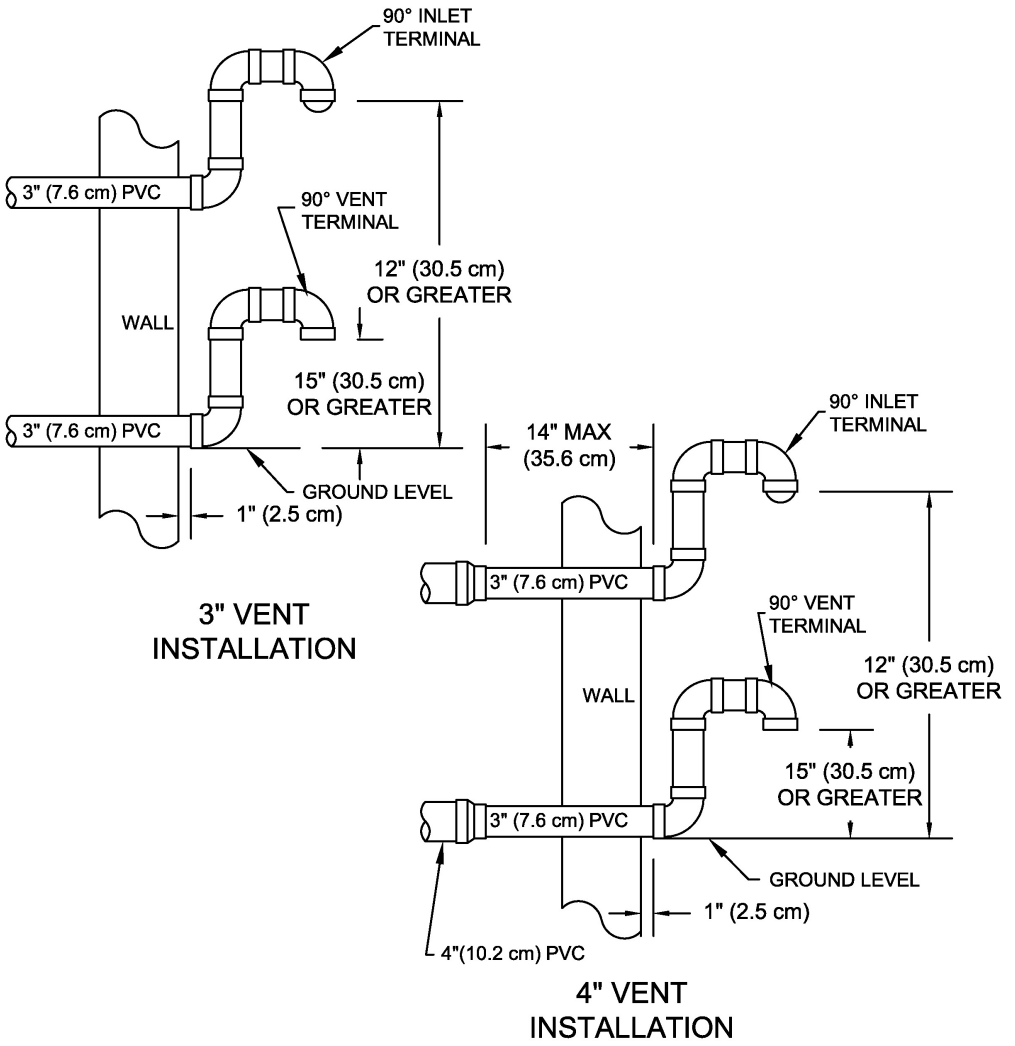


Figure 8

TABLE 3			
3" *(7.6 cm)* VENT CONNECTOR LENGTHS FROM INSIDE WALL FOR LOW GROUND CLEARANCE INSTALLATIONS			
Terminating	**# of Elbows (excl. vent term.)**	**Max Straight Length *ft. (m)***	**Min straight Length *ft. (m)***
		75 gal.	
(2) 90° Elbows with (1) 90° Elbow	1	40 *(12.2)*	5 *(1.5)*
(2) 90° Elbows with (1) 90° Elbow	2	35 *(10.7)*	5 *(1.5)*
(2) 90° Elbows with (1) 90° Elbow	3	30 *(9.1)*	5 *(1.5)*
(2) 90° Elbows with (1) 90° Elbow	4	25 *(7.6)*	5 *(1.5)*

TABLE 4			
4" *(10.2 cm)* VENT CONNECTOR LENGTHS FROM INSIDE WALL FOR LOW GROUND CLEARANCE INSTALLATIONS			
Terminating (Reduce 4" to 3") *(Reduce 10.1 cm to 7.6 cm)*	**# of Elbows (excl. vent term.)**	**Max straight Length *ft. (m)***	**Min straight Length *ft. (m)***
		75 gal.	
(2) 90° Elbows with (1) 90° Elbow	1	85 *(25.9)*	10 *(3.1)*
(2) 90° Elbows with (1) 90° Elbow	2	80 *(24.4)*	10 *(3.1)*
(2) 90° Elbows with (1) 90° Elbow	3	75 *(22.9)*	10 *(3.1)*
(2) 90° Elbows with (1) 90° Elbow	4	70 *(21.)*	10 *(3.1)*
(2) 90° Elbows with (1) 90° Elbow	5	65 *(19.8)*	10 *(3.1)*

HIGH ALTITUDE INSTALLATIONS FOR ELEVATIONS OVER 2,500 FEET *(762 m)* ABOVE SEA LEVEL

The capacity of the induced draft blower declines with increasing altitude due to a reduction in the air density. In order to assure safe and reliable performance of the water heater, contact the supplier for high altitude kit.

VENT PIPE PREPARATION AND JOINING

Most failures in vent systems result from improper preparation and joining of pipe and fittings. The guidelines below must be followed when installing the venting system. If you have any question about the application or installation of the venting system, contact the vent pipe manufacturer, supplier, or your plumbing professional.

1) Specific cleaners, solvents, primers and cements are available for PVC, CPVC, and ABS pipe. Be sure these materials match the type of pipe to be installed. The vent pipe manufacturers joining instructions must be followed in all cases. Never use all-purpose cements, commercial glues and adhesives or ABS cement to join PVC or CPVC pipe and fittings. Refer to the table at the beginning of the "VENTING" section for approved primers and cements.
    a) **CLEANERS, SOLVENTS, PRIMERS AND CEMENTS ARE FLAMMABLE. Do not store or use these materials near heat or open flame, or in the vicinity of other appliances.**
2) Use proper cutting, deburring and applicator tools to ensure proper preparation and joining of pipe and fittings.
    a) Cutting Tools
        i) A square cut must be achieved with a miter box saw or pipe cutter to ensure a proper mating with the female. If a pipe cutter is used, the burr created at the outer edge of the pipe must be removed.
    b) Deburring Tools
        i) A file, knife or plastic deburring tool can be used to remove burrs. Burrs must be removed from the inside and outside edges of the pipe to ensure a proper seal.
    c) Applicator Tools
        i) A natural bristle paintbrush or roller may be used to apply cement. Prompt application of the cement is important due its fast drying properties.
3) Inspection, Cleaning, Priming and Cementing
    a) Inspect the pipe inside and out for dirt, dust, moisture or grease etc. Check pipe and fittings for splits or cracks and replace if found.
    b) Clean pipe and fittings are imperative for proper joining. Following cutting and deburring, wipe away any foreign material with a clean dry rag. If wiping fails to thoroughly clean surfaces, chemical cleaning is necessary.
    c) Primer must be applied to the pipe surface and fitting socket with a natural bristle brush. This serves to soften and prepare the pipe for cementing.
    d) Cementing must be done quickly to avoid over-drying before joining.
        i) Apply one coat to the outside end of the pipe at a width slightly greater than the depth of the socket.
        ii) Apply a coat around the inside of the fitting socket.
        iii) Apply a second coat around the end of the pipe.
4) Joining
    a) Joints should be made immediately after cement is applied.
    b) After fully inserting pipe into fitting socket, hold joint together for about 15 to 20 seconds.
    c) Remove excess cement from around pipe and fitting with a clean rag.
    d) Cement drying times may vary. Be sure to allow for the recommended drying time before disturbing joints.

For more specific and detailed information about the above, contact the vent pipe manufacturer, supplier, or competent professional.

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 of the water heater. The fittings at the cold water inlet and hot water outlet are dielectric waterway fittings with 3/4" NPT male thread. 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 of the water heater. Sweat the tubing to the adapter before fitting the adapter to the water connections. It is imperative that heat is not applied to the nipples containing a plastic liner.

⚠ WARNING

FAILURE TO INSTALL AND MAINTAIN A NEW, LISTED 3/4" X 3/4" TEMPERATURE AND PRESSURE RELIEF VALVE WILL RELEASE THE MANUFACTURER FROM ANY CLAIM THAT MIGHT RESULT FROM EXCESSIVE TEMPERATURE AND PRESSURES.

If this water heater is installed in a closed water supply system, such as 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. 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.**

⚠ WARNING

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

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

Note: Some models may already be equipped or supplied with a combination temperature and pressure relief valve. Verify that the combination temperature and pressure relief valve 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.

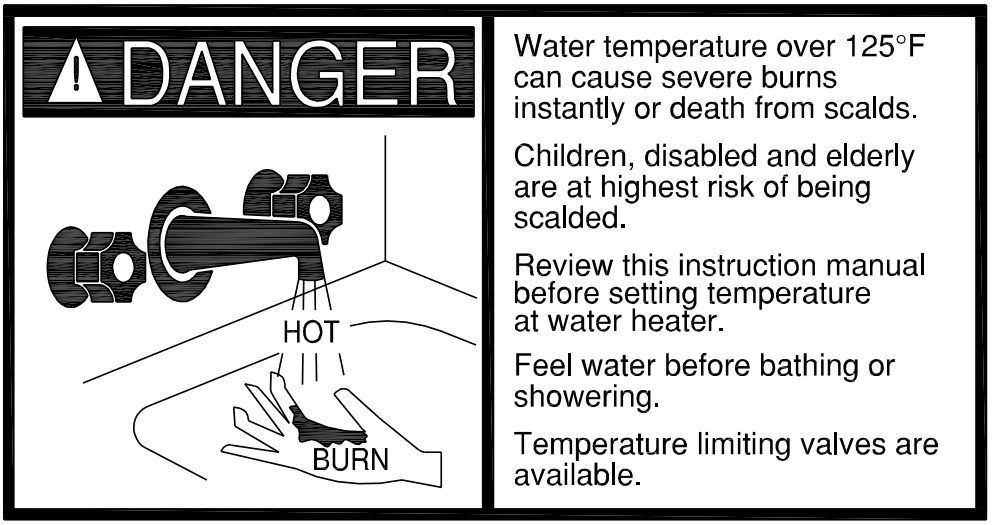
Do not place a valve between the combination temperature and pressure relief valve and the tank.

Water Connections continued-

⚠ WARNING

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

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.



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

Gas Connections

⚠ WARNING

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

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!**

Gas Connections continued-

⚠ 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.

Electrical Connections

All electrical wiring and connections must be in accordance with the National Electric Code ANSI/NFPA No. 70 (latest edition), or the Canadian Electrical Code C22.1 (latest edition) and any local codes which may apply. The water heater must be electrically grounded.

If a flexible line cord and plug is permitted by local code, then provide a (3) three wire grounding type receptacle within 6 feet *(1.9 m)* of the water heater and use the flexible cord provided. Do not plug the line cord into a receptacle that can have its power supply interrupted by a switch that is used to turn on and off lights.

If wiring in conduit is required, cut the flexible line cord flush with the bushing. Remove the junction box cover and pull the pressure switch outside of the junction box. Cut the three wires from the line cord at the bushing inside of the junction box. Drill a hole to receive the 1/2” electrical conduit connector on the backside of the blower. Wire the power supply into the circuit at the appropriate locations. Replace the pressure switch and junction box cover.

⚠ CAUTION

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.

Wiring Diagram

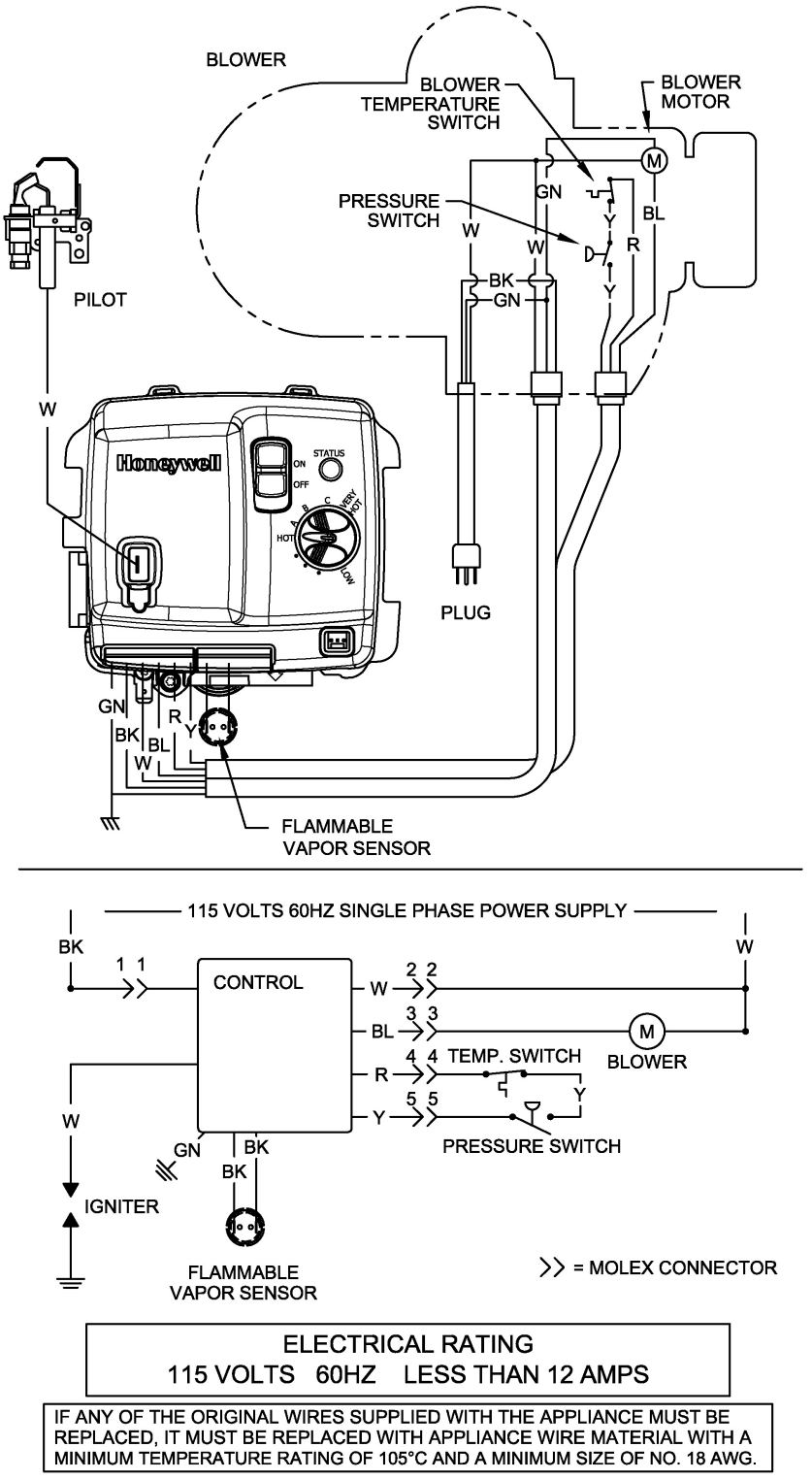


Figure 9

GENERAL OPERATION

⚠ WARNING

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

TO FILL THE WATER HEATER

1. Close the water heater drain valve by turning the stem clockwise.
2. Open the cold water supply shut-off valve.
3. Open several hot water faucets to allow air to escape from the system.
4. When a steady stream of water flows from the faucets, the water heater is filled. Close the faucets and check for water leaks at the water heater drain valve, combination temperature and pressure relief valve and the hot and cold water connections.

TO DRAIN THE WATER HEATER

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

1. Shut off the gas supply to the water heater.
2. Turn off/disconnect all electric power to the water heater.
3. Close the cold water supply shut-off valve.
4. Open the drain valve on the water heater by turning the stem counter-clockwise. The drain valve has threads on the end that will allow the connection of a standard hose coupling.
5. Open a hot water faucet to allow air to enter the system.

To refill the water heater, refer to “To Fill the Water Heater.”

Lighting and Shutdown instructions

FOR YOUR SAFETY READ BEFORE LIGHTING

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

A. This appliance 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 area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle to the floor.

WHAT TO DO IF YOU SMELL GAS

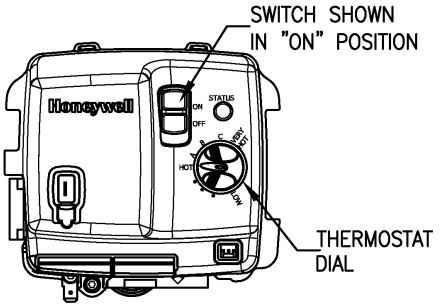
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to slide the gas control switch. Never use tools. If the switch cannot be moved by hand, do not try to repair it, call a 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.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above.
2. Turn off all electric power to the appliance.
3. Set the thermostat to lowest setting.
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.



5. Slide the switch on the right side of the gas valve down to the "OFF" position
6. Wait five (5) minutes to clear out any gas. then smell for gas, including near the floor. If you the smell gas, STOP! Follow "B" in the safety information at left on this label. If you don't smell gas, go to the next step.
7. Slide the switch on the right side of the gas valve up to the "ON" position.
8. Set thermostat to desired setting.
9. Turn on all electric power to the appliance.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Turn off all electric power to the appliance if service is to be performed.
2. Set the thermostat to the lowest setting.
3. Slide the switch on the right side of the gas valve down to the "OFF" position.

Thermostat Adjustment

The thermostat dial is adjusted to its lowest setting when shipped from the factory. When adjusting the thermostat, it should be remembered that lower temperature settings are more energy efficient. To adjust the thermostat turn the dial clockwise until the minimum acceptable temperature is set. It is suggested that the starting point setting not exceed the 120°F *(49°C)* or “HOT” setting on the thermostat.

Note: Taupe/Silver faceplate is approximately160º F maximum set point, Dark (battleship) grey is approximately 180º F, maximum set point.

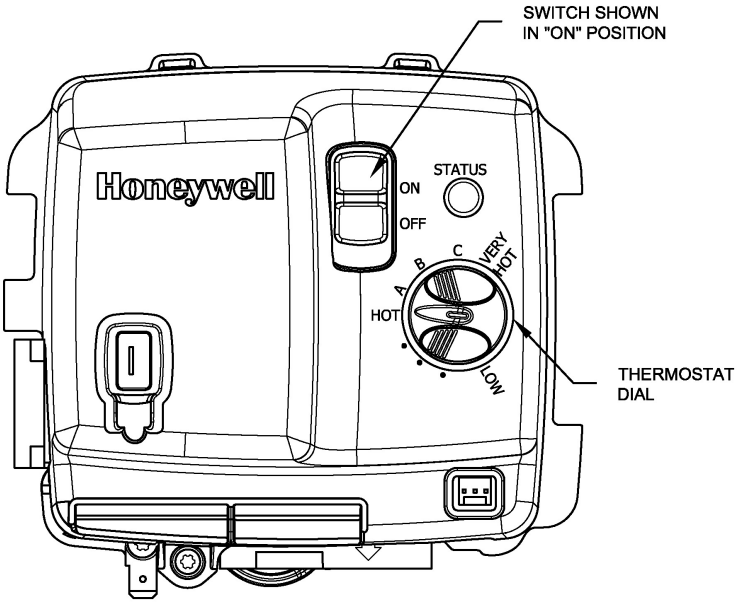


Figure 10

⚠ 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 water temperatures by mixing cold and hot water in branch water lines. A licensed plumbing professional or local plumbing authority should be consulted.

Note: This water heater is equipped with an energy cut out device to prevent overheating. Should overheating occur, turn off the electrical supply to the water heater and contact a qualified service technician.

Burner Flame Check

Steel Burner: These models are equipped with self-adjusting air mixture and do not have an adjustable air shutter (See Figure 11). At periodic intervals a visual check of the main burner and pilot flames should be made to determine if they are burning properly. The main burner flame should light smoothly from the pilot.

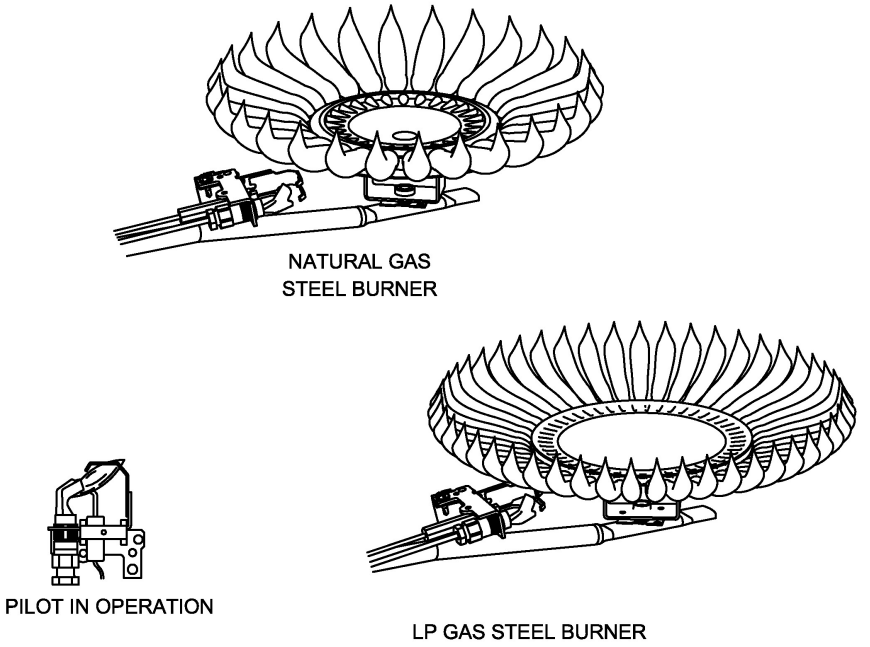


Figure 11

⚠ WARNING

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

MAINTENANCE

⚠ WARNING

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

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.

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

1. Annually check the operation of the thermostat.

2. The flow of combustion and ventilation air **MUST NOT** be restricted. Clear the combustion air openings of any dirt, dust, or other restrictions. **WARNING!** The ventilation air system may be **HOT**.

3. At all times keep the water heater area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

4. Bi-annually conduct a visual check of the main and pilot burner flames to determine that they are burning properly. See Burner Flame Check section. If sooting or other burner anomalies are evident, shut down the water heater by turning off the gas per the instructions listed in this manual or as listed on the water heater.

5. Annually remove the inner door and main burner 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 as needed. Wire brush and/or vacuum clean the combustion chamber as needed to remove scale deposits and debris. **NOTE:** It is imperative for proper operation of the water heater that the inner door be replaced in the original location.

⚠ WARNING

- Do not operate water heater with jumpered, altered, loosely tightened or absent controls and/or components.
- Do not operate water heater with replacement controls and/or components which are not exact duplicates of original equipment.
- Thoroughly inspect and replace, (as needed) burner inner door gasket and/or sight window gasket any time burner inner door is removed or disturbed.
- Replace water heater if involved in flammable vapor incident.
- This water heater is equipped with a flammable vapor sensor. If the sensor is exposed to flammable vapor, the water heater control will shut down the water heater and display a code of 7 flashes and then a 3 second pause.
- If a 7 flash error code is present, check to see if flammable vapor is present in the area. If flammable vapor is present or suspected in the area, immediately leave the area and contact a service professional.
  - Do not try to light any appliance.
  - Do not touch any electric switch; do not use any phone in your building.
- If you are certain there is no flammable vapor present, check the flammable vapor sensor to make certain it has not become disconnected from the control.
- See the instruction manual for troubleshooting.

⚠ 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.

⚠ WARNING

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

6. 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.

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

⚠ WARNING

THIS WATER MAY BE HOT.

8. If the combination temperature and pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. **Do not plug the combination temperature and pressure relief valve outlet.**

9. A combination sacrificial anode rod/hot water outlet nipple has been installed to extend tank life. The anode rod should be inspected periodically (every 2 years) and replaced when necessary to prolong tank life. Water conditions in your area will influence the time interval for inspection and replacement of the anode rod. Contact the plumbing professional who installed the water heater or the manufacturer listed on the rating plate for anode replacement information. The use of a water softener may increase the speed of anode consumption. More frequent inspection of the anode is needed when using softened (or phosphate treated) water.

10. The blower has sealed motor bearings and does <u>not</u> require adding oil.

⚠ CAUTION

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

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

Provide the part name, model and serial numbers of the water heater 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: 5,277,171; 5,341,770; 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; 6,056,542; 6,142,216; 6,442,178; 6,684,821; 6,935,280; 7,063,132; 7,063,133; 7,007,748; 7,270,087; 7,334,419; 7,337,517; 7,409,925; 7,458,341; 7,559,293; 7,621,238; 7,634,976; 7,650,859; 7,665,210; 7,665,211; 7,699,026; 7,866,168; 7,900,589; 7,971,560; 7,992,526 8,082,888; 8,146,772; Other U.S. and Foreign patent applications pending. Current Canadian Patents: 2,092,105; 2,107,012; 2,108,186; 2,112,515; 2,143,031; 2,239,007; 2,262,174; 2,314,845; 2,409,271; 2,476,685; 2,504,824; 2,548,958

Complete the following information and retain for future reference:

Model No:

Serial No:

Service Phone
Days: Nights:

Address:

Supplier:

Supplier Phone No:

TROUBLESHOOTING

LED Status	Control Status	Probable Cause
None (LED not on or flashing)	Electrical power not present.	Control power switch in “OFF” position. Supply voltage interrupted.
One short flash every four seconds	Stand-by mode, Thermostat is satisfied (no faults).	Temperature demand is satisfied (no call for heat).
Alternates bright and dim (Heartbeat)	Thermostat calling for heat (no fault).	Tank temperature below set point of thermostat.
Short flash once every second	Weak pilot signal on last call for heat.	1. Unstable pilot. 2. Pilot tube block or restricted. 3. Oxidation build up on pilot electrode. 4. Wire damage to pilot assembly or bad connection at gas valve.
Short flash once every two seconds	Idle remote command off	1. Control put in idle or Sabbath mode from accessory module
Two flashes, three second pause	Pressure switch not working-closed position.	1. Pressure switch tubing kinked or blocked. 2. Blocked pressure tap on switch. 3. Faulty pressure switch.
Three flashes, three second pause	Pressure switch or blower temperature switch not working - open position.	1. Vent blockage or improper vent configuration. 2. Pressure switch tubing kinked or blocked. 3. Blower not spinning up to speed. 4. Vent temperature too high 5. Faulty pressure switch or vent limit switch.
Four flashes, three second pause	Excessive tank temperature. System must be reset.	1. Excessive sediment 2. Hot water entering the tank from another source in the potable loop. 3. Faulty gas valve.
Five flashes, three second pause	False pilot flame present.	1. Pilot valve stuck in open position.
Six flashes-one flash, three second pause (Soft lockout)	Failed to light pilot. System auto resets after 5 minutes.	1. Unstable pilot. 2. Pilot tube blocked or restricted. 3. Oxidation build up on pilot electrode. 4. Wire damage to pilot assembly or bad connection at gas valve.

Troubleshooting continued-

LED Status	Control Status	Probable Cause
Six flashes-two flashes, three second pause (Soft lockout)	Pressure switch or blower temperature switch opened during burner operation. System auto resets after 5 minutes.	1. Pressure switch tubing kinked or blocked. 2. Vent blockage or improper vent configuration. 3. Vent termination being affected by windy conditions. 4. Blower not spinning up to speed. 5. Vent temperature too high. 6. Faulty pressure switch or blower temp. switch.
Six flashes-three flashes, three second pause (Soft lockout)	Pilot flame extinguished. System resets after 5 minutes.	1. Unstable pilot. 2. Pilot tube blocked or restricted. 3. Oxidation build up on pilot electrode. 4. Wire damage to pilot assembly or bad connection at gas valve. 5. Insufficient combustion air.
Six flashes-four flashes, three second pause (Soft lockout)	Undesired-false pilot flame sensed. System auto resets.	Pilot valve stuck in open position.
Seven flashes, three second pause	Flammable vapor sensor fault detected, see warning label	1. Flammable vapor present 2. Flammable vapor sensor exposed to excessive moisture 3. Flammable vapor sensor exposed to extreme ambient temp
Eight flashes-one flash, three second pause	Flammable vapor sensor out of specification. Possible short.	1. Flammable vapor sensor out of specification 2. Possible short.
Eight flashes, two flashes, three second pause	Temperature sensor fault	1. Damage to sensor or wire in control's well. 2. Control's sensor resistance out of range. 3. Replace control.
Eight flashes-three flashes, three second pause	Electronics fault detected	1. Verify control is not wet or physically damaged 2. Reset control on/off switch. 3. Replace electronic module if 8-3 error persists
Eight flashes-four flashes, three second pause	Gas valve fault detected.	1. Verify control is not wet or physically damaged. 2. Reset control on/off switch. 3. Replace gas control if 8-4 error persists

Control Sequence of Operation

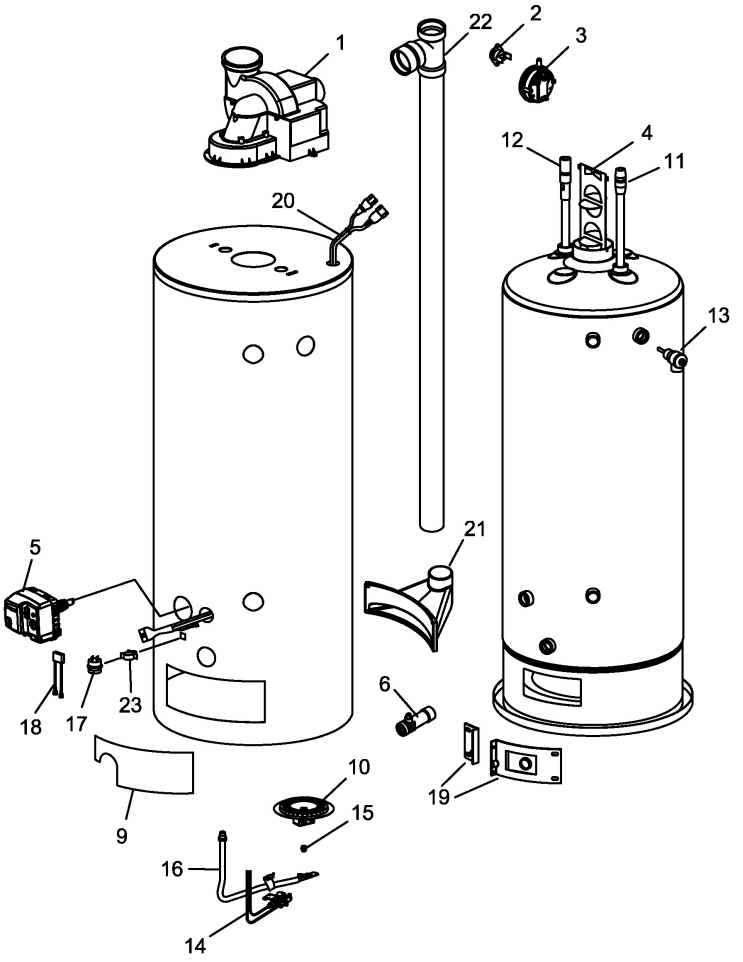
Start up Sequence

Upon powering up, the control checks for the presence of the vapor sensor, if the resistance is in the expected range the control will begin normal operation after 5 to 8 seconds.

Normal Heating Sequence

1. The thermostat senses a need for heat.
2. The control checks the pressure switch condition.
3. If the pressure switch is open, the control sends power to the blower motor.
4. The blower starts moving combustion air through the combustion system.
5. The pressure switch closes.
6. The control senses the closed pressure switch and starts the ignition process by providing a spark at the pilot electrode and allowing gas to flow to the pilot.
7. When the pilot is lit the gas control senses the pilot flame and opens the main gas valve.
8. The main burner is lit.
9. The main burner and blower continue to operate until the thermostat is satisfied.
10. When the thermostat is satisfied the main and pilot gas valves close.
11. The blower operates for a short post purge period before shutting down.
12. The water heater remains in the stand-by mode until the next call for heat.

PARTS LIST DRAWING



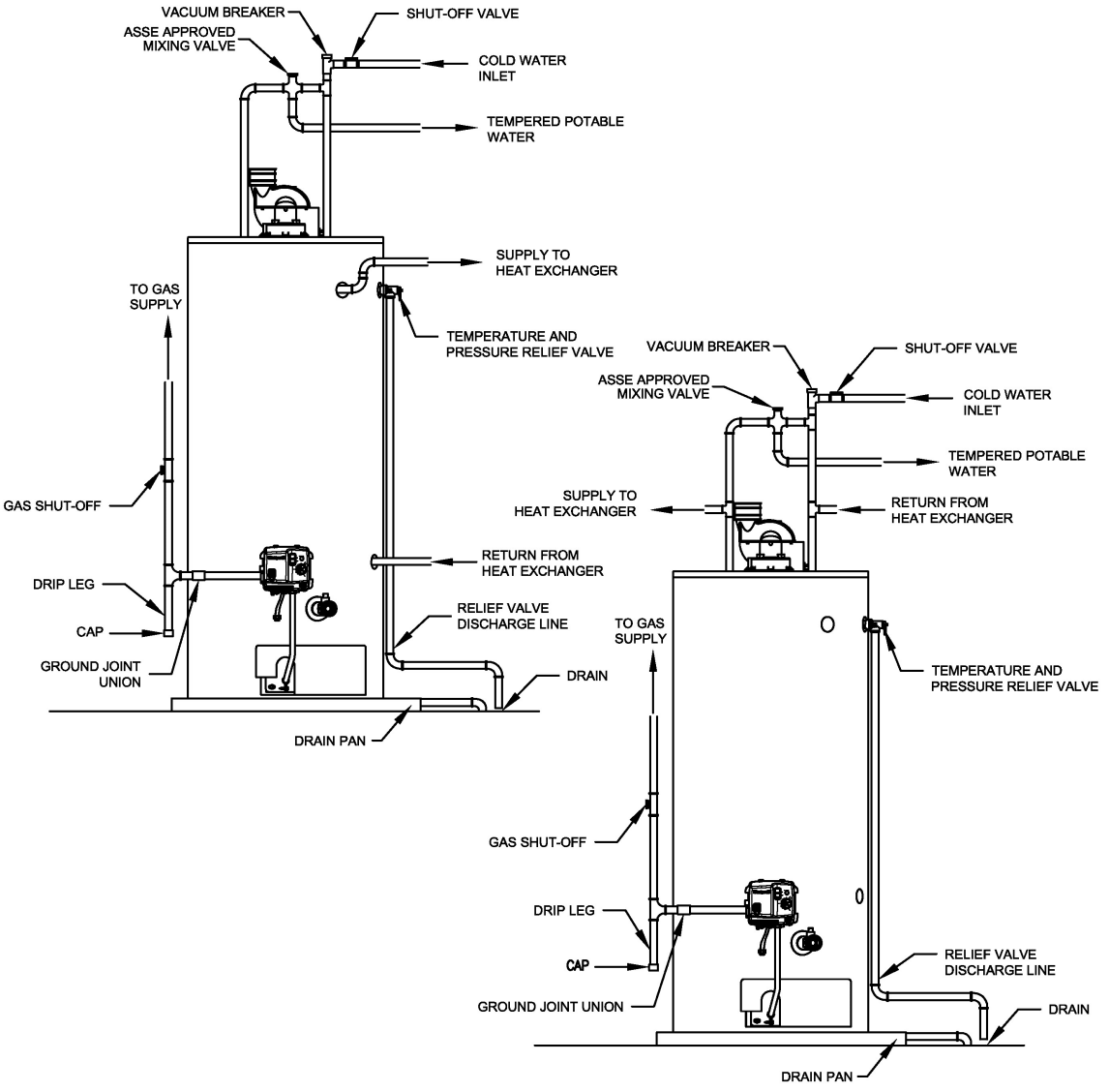
PARTS LIST

PART NAME AND DESCRIPTION	
1. Blower Assembly	13. T&P Relief Valve
2. Temp. Switch	14 Pilot Assembly
3. Pressure Switch N.O.	15. Main Burner Orifice
4. Flue Baffle	16. Gas Feed line
5. Honeywell Gas Control Valve	17. Flammable Vapors Sensor
6. Drain Valve	18. Sensor Harness
7. Fiberglass Insulation (not shown)	19. Inner Door Assembly
8. Foam Insulation (not shown)	20. Blower Harness
9. Outer Door	21. Air intake boot
10. Steel Burner	22. Tee and vent pipe assembly
11. Diptube–Nipple	23. Vapor switch mounting bracket
12. Anode–Nipple	

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

Please refer to the illustrations below for the suggested piping arrangement.



SUPPLEMENT – VENTING INSTRUCTIONS FOR INSTALLATION AND OPERATION INSTRUCTION MANUALS FOR THE FOLLOWING PRODUCT TYPES:

HIGH EFFICIENCY CONDENSING COMMERCIAL, COMMERCIAL POWER DIRECT VENT, LIGHT DUTY COMMERCIAL POWER DIRECT VENT, LIGHT DUTY COMMERCIAL POWER VENT, RESIDENTIAL POWER DIRECT VENT, RESIDENTIAL POWER VENT MODEL SERIES, ULTRA LOW NOx RESIDENTIAL POWER DIRECT VENT, ULTRA LOW NOx LIGHT DUTY POWER DIRECT VENT, ULTRA LOW NOx RESIDENTIAL POWER VENT, ULTRA LOW NOx LIGHT DUTY POWER VENT, HIGH PERFORMANCE SERIES POWER VENT, COMBI POWER VENT, SOLAR POWER VENT GAS BACKUP.

INSTALLATION OF CENTROTHERM INNOFLUE® SINGLE WALL POLYPROPYLENE VENTING SYSTEMS

This supplement is for the installation of polypropylene single wall venting system manufactured by Centrotherm ECO Systems, LLC. The Centrotherm venting system is a CSA approved alternative to the PVC, ABS, and CPVC venting components for the High Efficiency Condensing Commercial, Commercial Power Direct Vent, Light Duty Commercial Power Direct Vent, Light Duty Commercial Power Vent, Residential Power Direct Vent, Residential Power Vent Model Series, Ultra Low NOx Residential Power Direct Vent, Ultra Low NOx Light Duty Power Direct Vent, Ultra Low NOx Residential Power Vent, Ultra Low NOx Light Duty Power Vent, High Performance Series Power vent, Combi Power Vent, Solar Power Vent Gas Backup Model Series.

The Centrotherm venting system components are ULC S636 approved and listed by a recognized agency and may be installed in the U.S. and Canada. All components used must be from the same manufacturer and are designed for use with the above noted products. The Centrotherm components may be purchased from plumbing supply distributors. The vent size diameter and maximum vent lengths must be followed as detailed in the Installation and Operating Instruction Manual that was supplied with the water heater. Thoroughly read and understand the venting section of the instruction manual supplied with the water heater before proceeding with the following instructions in this supplement. The vent terminals supplied with the water heater or the factory approved accessory vent terminal kits must be used with this venting system.

⚠ WARNING
The venting system must be properly installed. Failure to properly install the vent system could result in property damage, personal injury, or death.
DO NOT install damaged venting system components. If damage is evident then please contact the supplier where the water heater or venting system components were purchased for replacement parts.
Use only the vent terminals provided or factory authorized terminals for venting this water heater.
The water heater requires its own separate venting system. Do not connect the exhaust vent into an existing vent pipe or chimney.
All of the exhaust venting connections must be leak checked with a soap solution upon initial start-up of the water heater. Any leaks must be repaired before continuing operation of the water heater.
Do not terminate the venting where noise from the exhaust or intake will be objectionable. This includes locations close to or across from windows and doors. Avoid anchoring the vent and intake pipes directly to framed walls, floors, or ceilings unless rubber isolation pipe hangers are used. This prevents any vibrations from being transmitted into the living spaces.
Do not exceed the venting distances or the number of elbows listed in the instruction manual supplied with the water heater. Exceeding the maximum venting distances may cause the water heater to malfunction or cause an unsafe condition.
DO NOT operate this water heater until the venting installation is complete and the piping completed. Failure to complete installation before operation can result in property damage, personal injury, or death.

⚠ WARNING

DO NOT install Centrotherm Innoflue venting components with any other manufacturer's vent components. Centrotherm Innoflue components must be used exclusively throughout the entire venting system from the water heater coupling or vent connection to the outside wall or ceiling near the vent terminal location.

This supplement is intended only for additional information for installing Centrotherm Innoflue single wall venting system and the instruction manual supplied with the water heater must be followed for the detailed information provided for the venting system installation.

Step 1: Thoroughly read and understand the venting section of the Installation and Operating Instruction Manual that was supplied with the water heater before determining the location of the water heater and the vent terminals. Locate the water heater for the shortest practical vent length to the outside. Measure the total venting distance required to reach the outside wall or roof. Determine the diameter of the venting components to use for the length of vent pipe (and combustion air supply for direct vent models) required by referring to the venting tables in the instruction manual for the maximum vent length for each diameter pipe size. Obtain all the necessary venting system components for the installation.

Step 2: Before installation, inspect each vent component for damage making sure the gaskets for each component are fully intact and in undamaged condition. Do not attempt to install or repair damaged components. If a gasket is damaged, these are available from the supplier of Centrotherm Innoflue components. Do not use gaskets from another manufacturer and do not try to repair the gasket.

Step 3: A Centrotherm PVC to Polypropylene adapter (Centrotherm ISAGL part series) must be used to connect into a PVC coupling or tee (Commercial and Residential Power Direct Vent air intake connections), condensate elbow (High Efficiency Commercial Condensing models) or the exhaust outlet adapter for Commercial Power Direct Vent and Residential Power Vented models. To make the insertion of the gasketed fittings into the coupling easier, Centrocerin gasket lubricant is recommended. Centrocerin is a water based lubricant available from your Centrotherm supplier. If Centrocerin is not available, water may be used. DO NOT use any other kind of lubricant which may damage the gaskets.

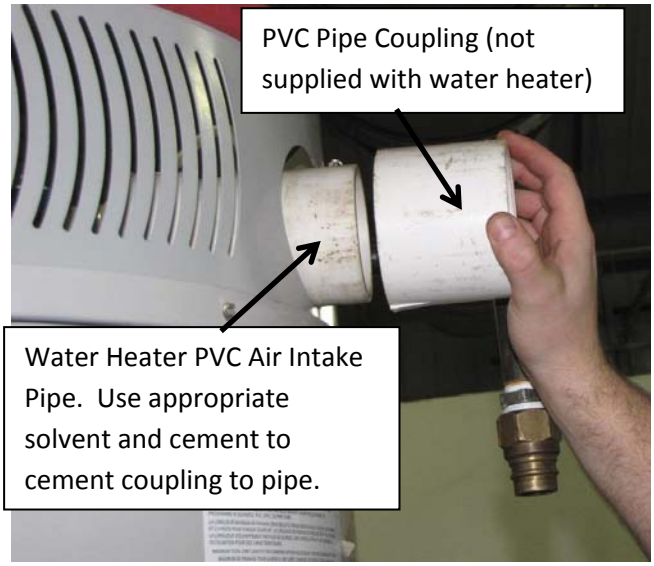
Apply lubricant using your finger to the gasket surface and inside of the coupling and insert the male end of the adapter with the exterior gasket into the coupling, condensate elbow or exhaust outlet adapter connection. If a larger vent diameter size is to be used, use the appropriately sized reducer coupling first on the water heater intake or exhaust vent connection as detailed in the installation manual supplied with the water heater. See the following photos.

⚠ WARNING

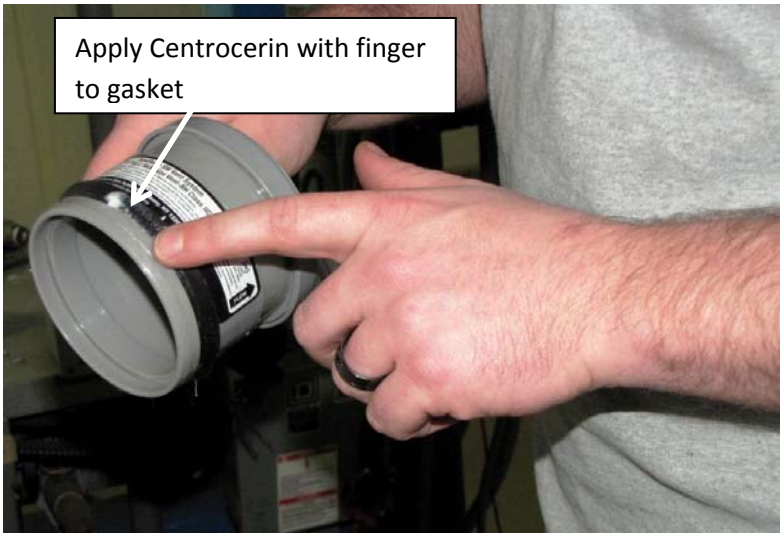
Use only water or Centrocerin lubricant for lubricating the gaskets and pipe ends to allow easy insertion. DO NOT use any other kind of lubricant, since deterioration of the gasket may result, which may allow dangerous flue gases to leak into the room. If the vent pipe needs to be disassembled after the gasket has dried, wet the joint thoroughly to loosen the connection.

High Efficiency Condensing Commercial Models: Use the appropriate primer and cement (refer to venting section of instruction manual with water heater) for cementing a PVC coupling (not supplied with water heater) to the end of the PVC air intake pipe connection. Apply Centrocerin lubricant with your finger to the male gasketed end of the Centrotherm PVC adapter and fully insert into the air intake coupling. Loosen the Centrotherm flue pipe clamp (Centrotherm p/n IAFC03) and install on the end of the PVC coupling so that the 3 clamp hooks secure the PVC adapter to the PVC coupling. See following photos.

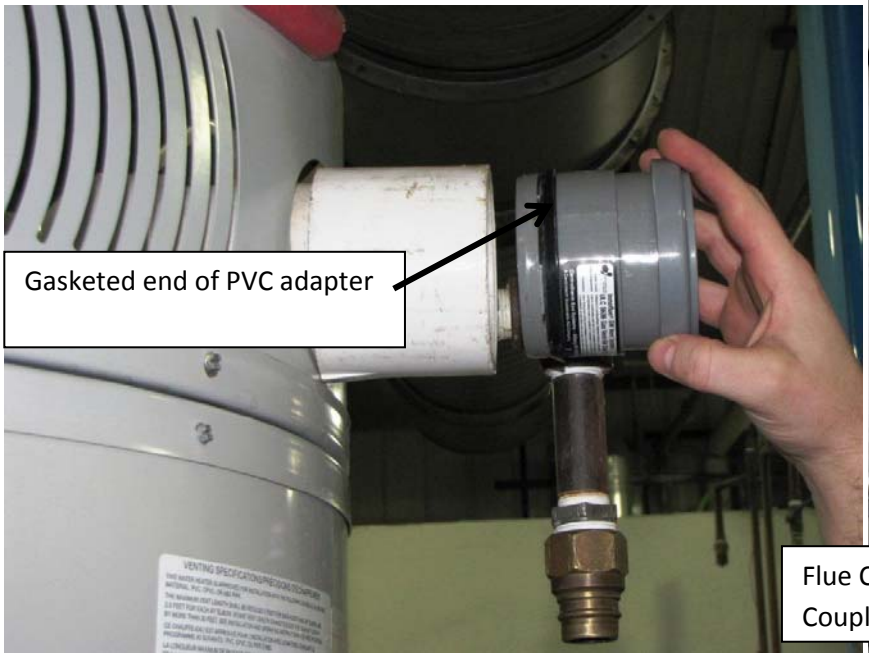
Install PVC pipe coupling over air intake pipe connection and cement to pipe using appropriate solvent and cement.



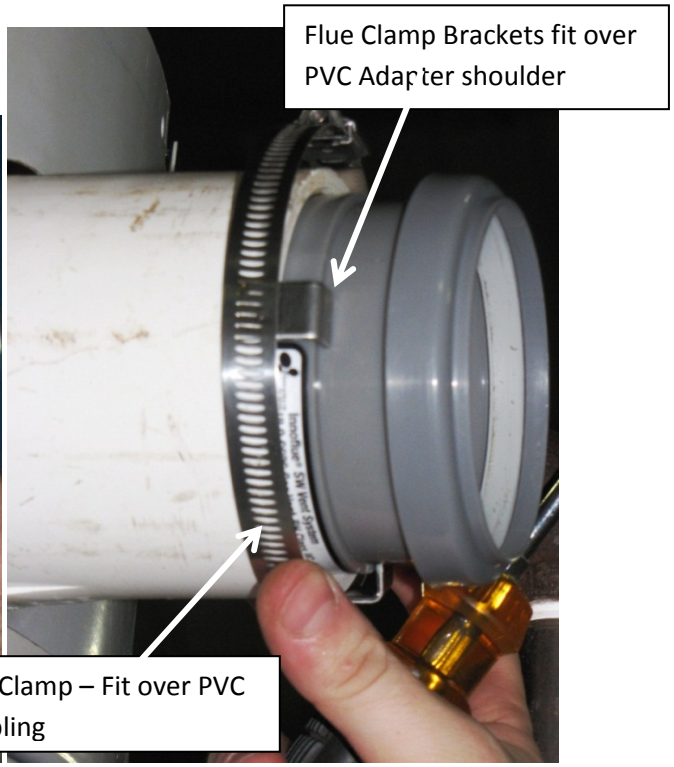
Apply Centrocerin Lubricant to PVC Adapter gasket using finger



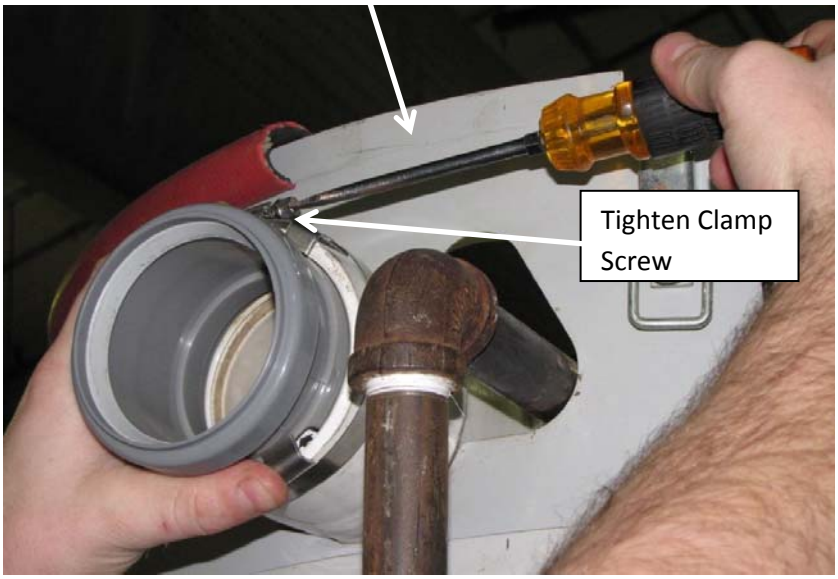
Insert male gasketed end of Centrotherm PVC adapter into PVC pipe coupling.



Install Centrotherm Flue Clamp (IAFC03) over the PVC coupling so that clamp brackets secure the shoulder of PVC adapter fitting.



Tighten clamp screw securely to secure the PVC Adapter to
the cemented PVC coupling. Refer to the instruction manual for appropriate solvent and cement.

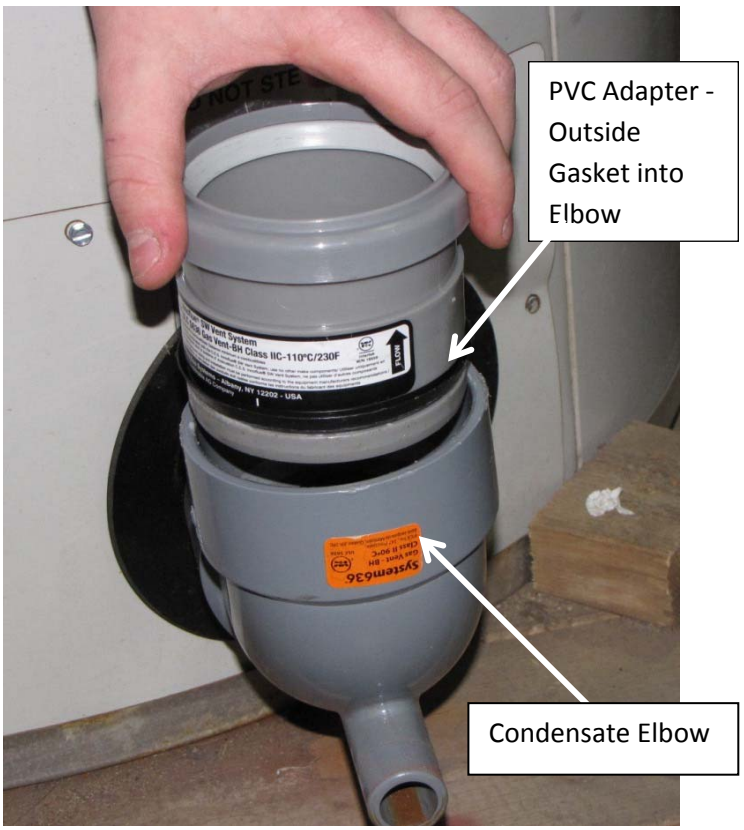


⚠ WARNING

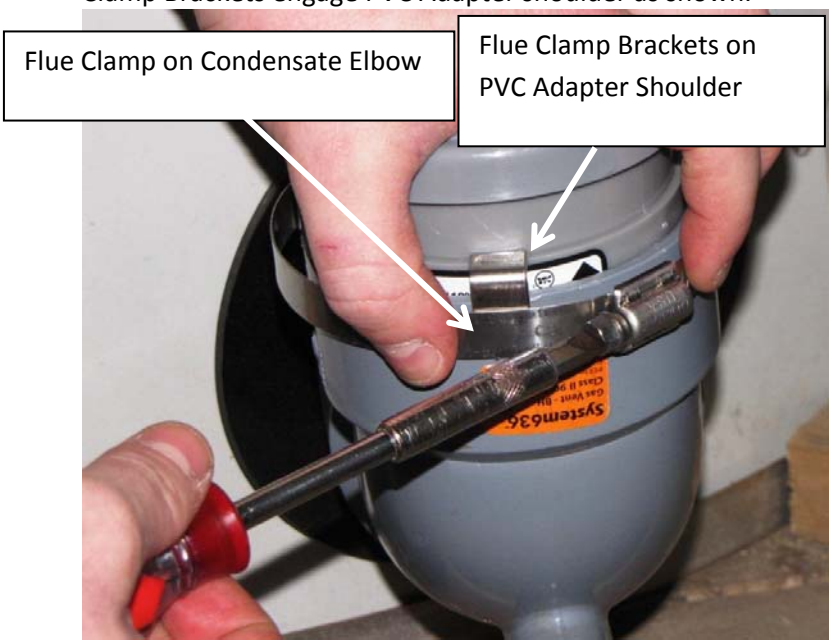
Centrotherm Flue Clamps (p/n: IAFC02, 03, or 04) MUST be properly installed to secure the PVC Vent Adapter. DO NOT operate the vent system without first installing the Flue Clamps.

For High Efficiency Commercial Model series exhaust connection, apply Centrocerin lubricant with finger to outside gasket and insert PVC adapter into the condensate elbow. Insert PVC Adapter fitting into Condensate Elbow as shown.

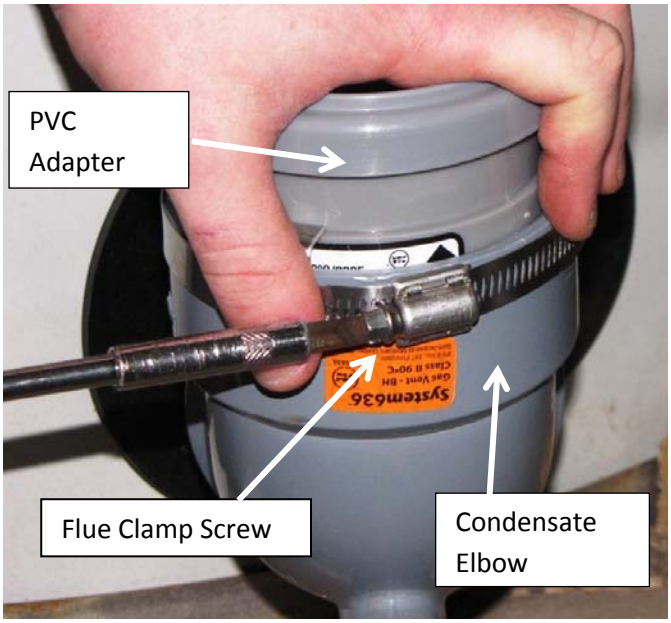




Install Centrotherm Flue Clamp around outside of elbow so that Clamp Brackets engage PVC Adapter shoulder as shown.



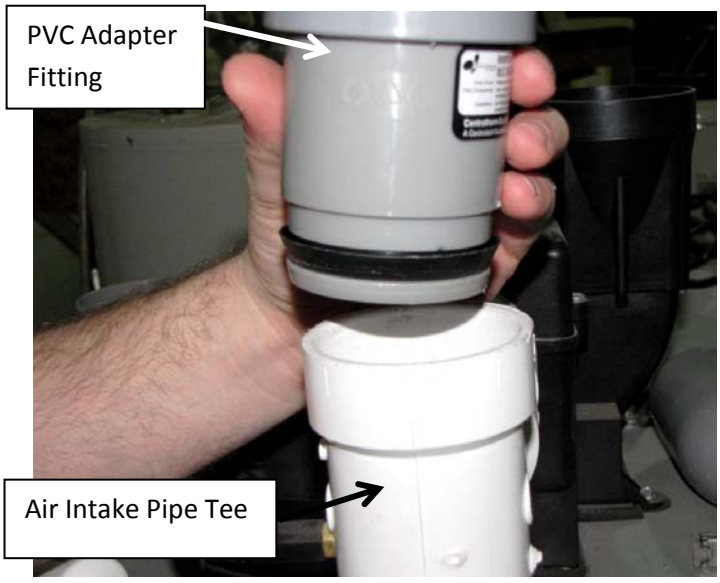
Tighten Flue Clamp Screw to secure PVC Adapter into Condensate Elbow



Commercial and Residential Power Direct Vent Models and Residential Power Vent Models:

For installations of commercial and residential power direct vent models, install the PVC adapter into the air intake pipe tee as shown.

Install the Flue Clamp over the Air Intake Pipe Tee and tighten Flue Clamp Screw to secure the PVC adapter.

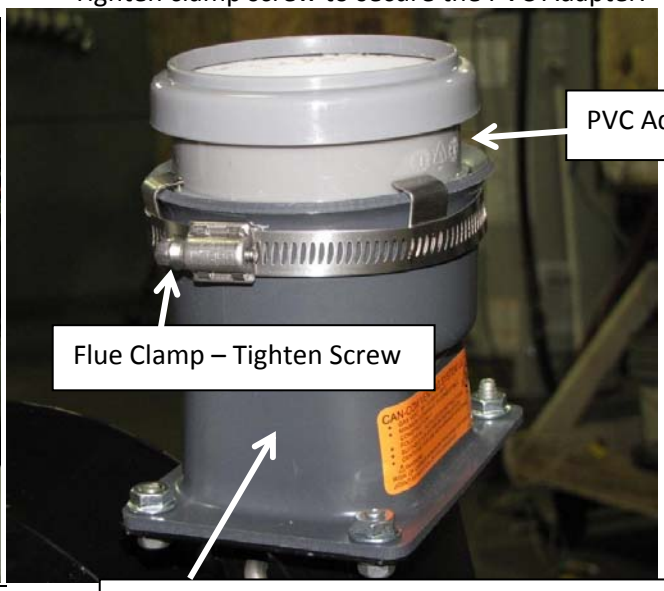




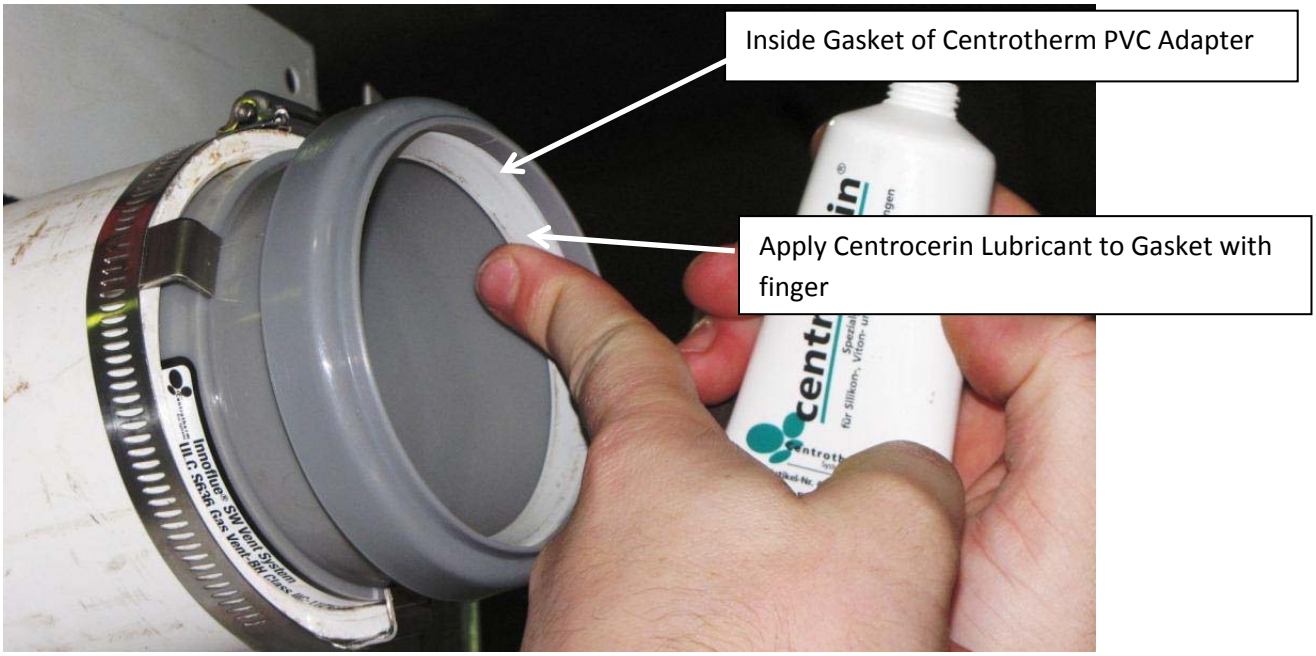
For the exhaust venting for all power vent and power direct vent models, insert the PVC Adapter into the Exhaust Outlet Adapter. On residential models, tighten the clamp to secure the PVC Adapter.



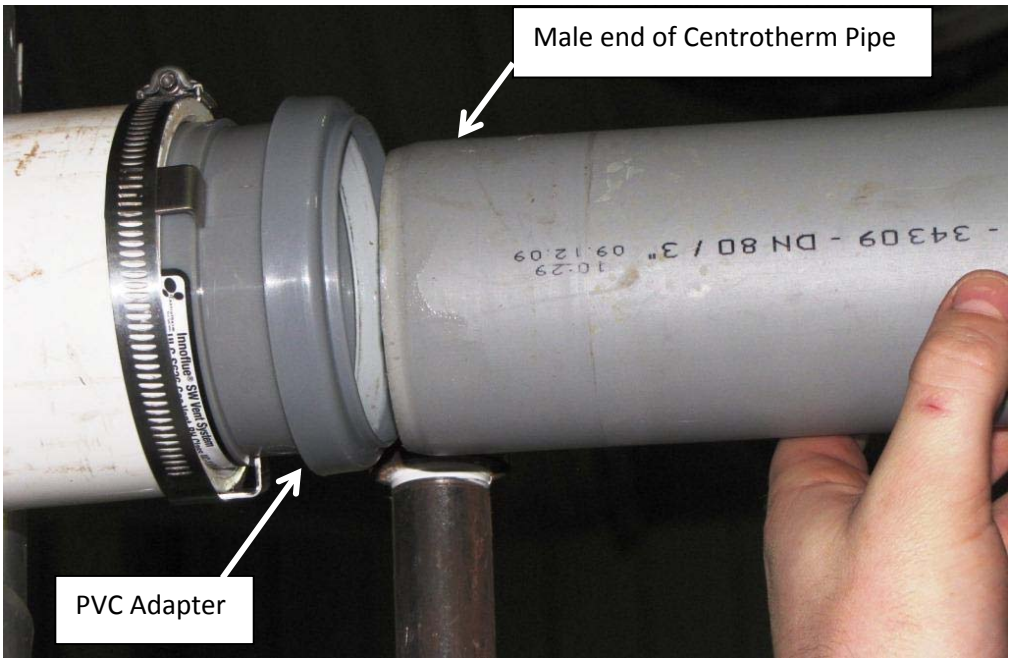
For Commercial Power Direct Vent models, insert PVC Adapter into Exhaust Outlet Adapter.
Install Flue Clamp over Exhaust Outlet Adapter and Tighten clamp screw to secure the PVC Adapter.



Step 4: Lubricate the inside gasket of the PVC adapter and the male end (without gasket) of the elbow or straight section of pipe for running the exhaust or intake pipe from the water heater. Insert the male end of the elbow or straight section into the PVC adapter. Use a twisting motion while pushing the male end of the pipe or elbow into the PVC adapter to fully seat into the gasket. The male end of the pipe or elbow must always point toward the water heater.
Apply Centrocerin lubricant to the inside gasket of the PVC adapter.



Insert the male end of the straight pipe or elbow into the flanged gasketed end of the PVC adapter. Push the pipe or elbow into the adapter using a twisting motion to fully insert the pipe into the gasket inside the adapter.



⚠ WARNING

Make sure pipe sections are fully inserted into the PVC adapter and/or gasketed end of Centrotherm fitting. Insertion depth is no less than 2 inches.

Step 5: Centrotherm supplied support brackets must be used to support the pipe sections. The vent pipe sections **must be** supported a minimum of every 5 feet (1.5 meters) of vertical run or every 3 feet (1 meter) of horizontal run of pipe. Consult local codes for additional requirements. In addition, support brackets must be installed on both sides of elbows used in the venting system.

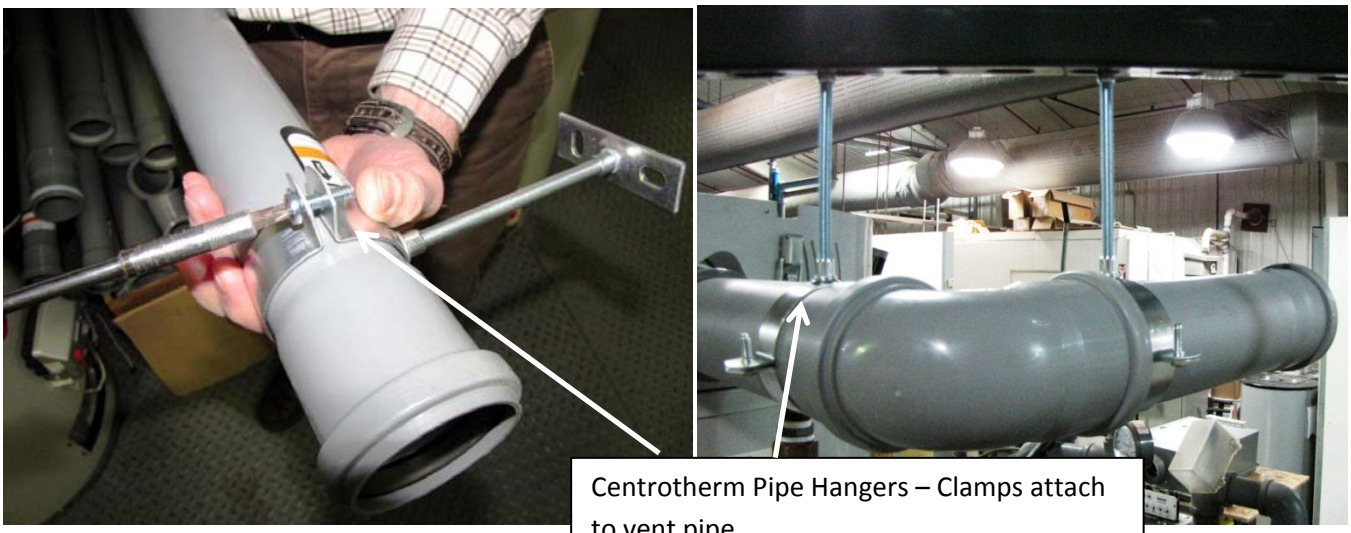
High Efficiency Commercial Condensing Models:

For horizontal sections of flue pipe, the pipe must be installed with a slight upward slope of approximately 5/8 inch per foot (5.6 cm per meter) toward the water heater (as recommended by Centrotherm) to allow condensate to drain into the condensate elbow.

Residential and Commercial Power Direct Vent and Residential Power Vent Models:

To prevent condensate from accumulating in the exhaust blower, install the horizontal vent pipe with a downward slope toward the vent terminal of 5/8 inch per foot (5.6 cm per meter) of horizontal vent pipe. An optional condensate kit is available for residential power vent models or a tee fitting with a condensate drain loop may be used on commercial power direct vent models to prevent condensate accumulation in the blower for long vertical runs of vent pipe. Refer to the venting section of the Installation and Operating Instructions supplied with the water heater.

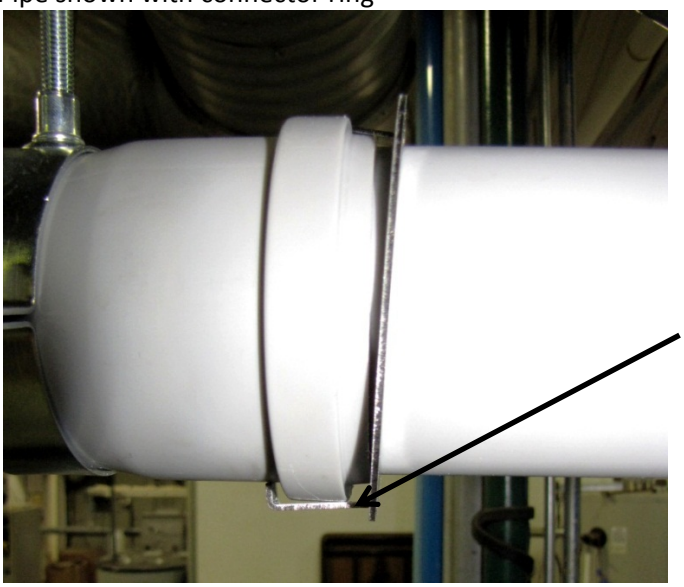
Installing pipe clamp around pipe every 3 feet to support pipe. Install pipe clamps on each side of elbow.



Centrotherm Pipe Hangers – Clamps attach to vent pipe.

Steel joint connector rings (available from Centrotherm supplier) must be used at each pipe joint. The connector rings ensure that the joints do not separate under heavy loads. These connector rings must be used to comply with ULC-S636 requirements. See following photo with the joint connector attached to the pipe sections.

Pipe shown with connector ring



⚠ WARNING

DO NOT operate vent system without properly installing Connector Rings.

Centrotherm Connector Ring. Hooked bracket over bottom joint as shown

Step 6: If any of the straight pipe sections need to be cut, use a hack saw and make a straight cut on the male (ungasketed) end of the pipe. When making the cut, allow for the 2" minimum (51 mm) insertion distance inside the female end of the pipe. Using a razor knife, deburr the edges of the cut pipe to make an approximately 15 degree bevel to avoid any sharp edges that may damage the gasket.

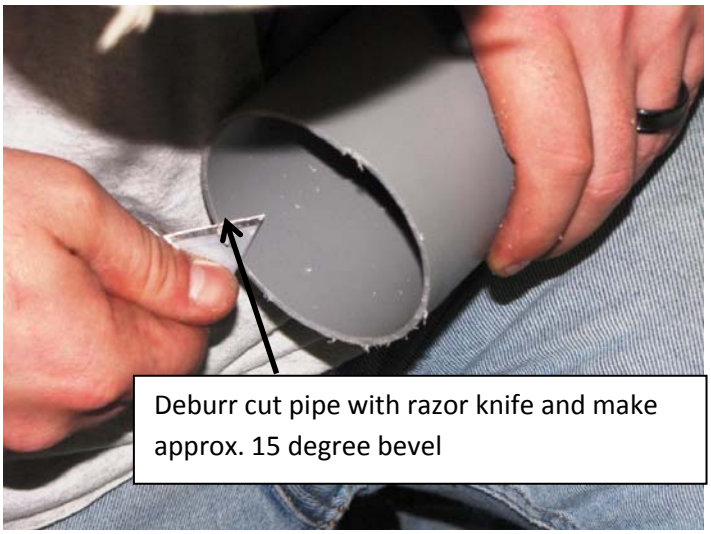
⚠ WARNING

Cut pipe edges must be properly deburred. Damage to the gasket from not deburring the edges of the cut male end may result in the release of dangerous flue products.

Cut end of pipe to length using a hacksaw. Cut male end only and allow for 2” insertion depth into female end of fitting.

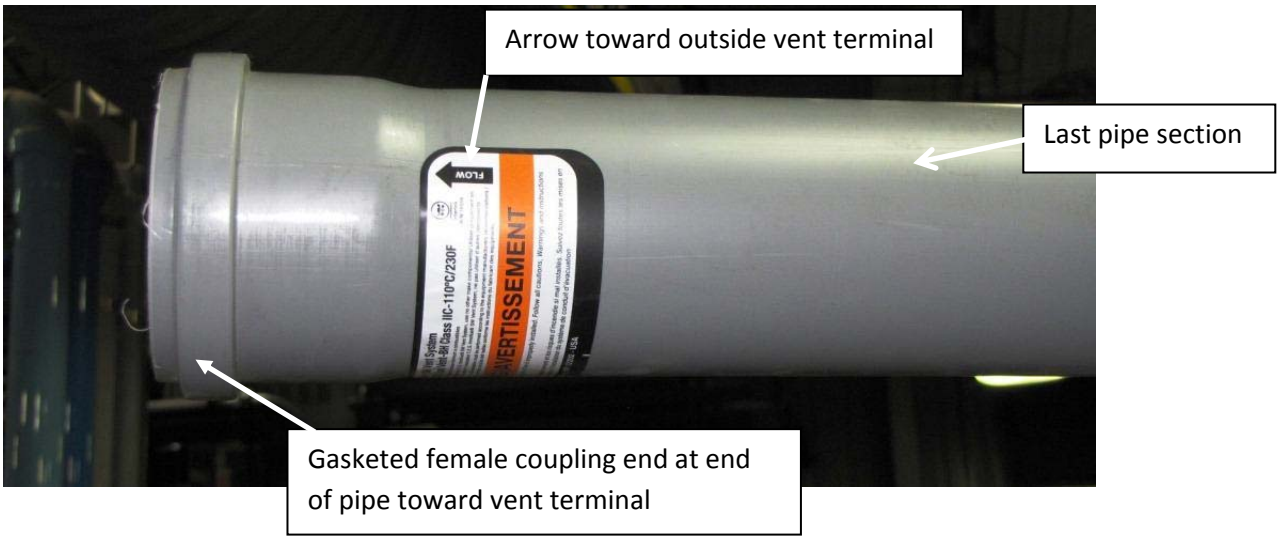
Deburring cut pipe edge with razor knife to create smooth 15° (approx.) bevel to prevent gasket damage.



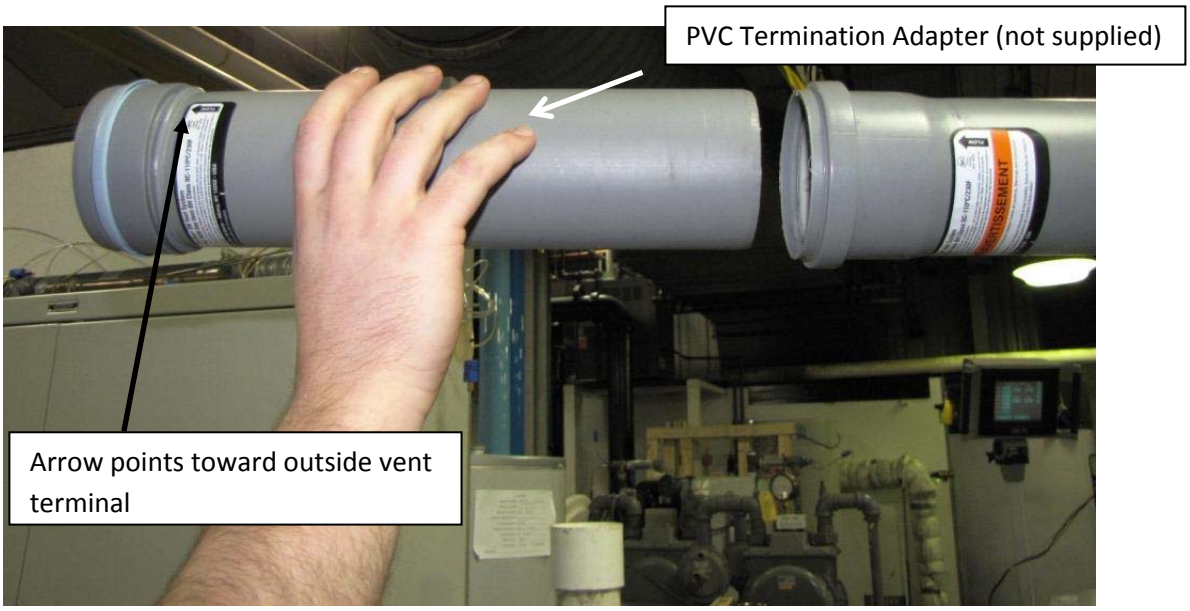


Step 7: Continue installing straight sections of pipe and elbows and support with pipe support clamps as previously shown a minimum of every 36 inches (1 meter). Run the vent pipe near the outside wall or roof to be terminated. A Centrotherm ISTAGL-0202, 0303, or 0404 PVC Termination Adapter (2”, 3” or 4” diameters) must be used to connect the Centrotherm polypropylene vent pipe to PVC pipe first before exiting the wall or roof. The Centrotherm polypropylene to PVC Vent Adapter has a male ungasketed end and a male outside gasket on the other end. The ungasketed end of the Centrotherm PVC Termination Adapter is inserted into the last section of the gasketed end of vent pipe. The arrow on the Centrotherm PVC termination adapter must point toward the vent terminal. Connect the PVC coupling and flue pipe clamp to the gasketed end of the PVC Termination Adapter. Cut the PVC pipe to the length needed to exit the wall or roof. Refer to the installation instruction manual supplied with the water heater for information regarding the location of the vent terminals.

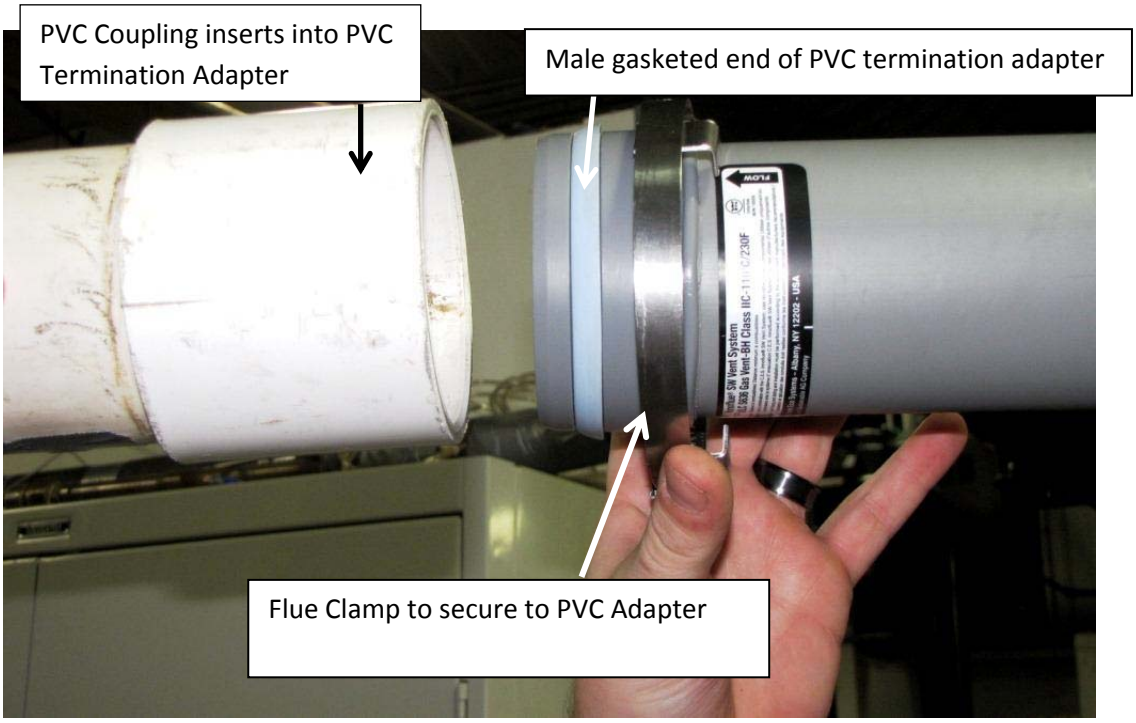
Cut the male end of the last piece of pipe to the length as needed to get near the exiting wall or ceiling of the desired outside vent terminal location. Install this last section of pipe.



Install the appropriate diameter Centrotherm ISTAGL PVC Termination Adapter on the end of the last pipe.



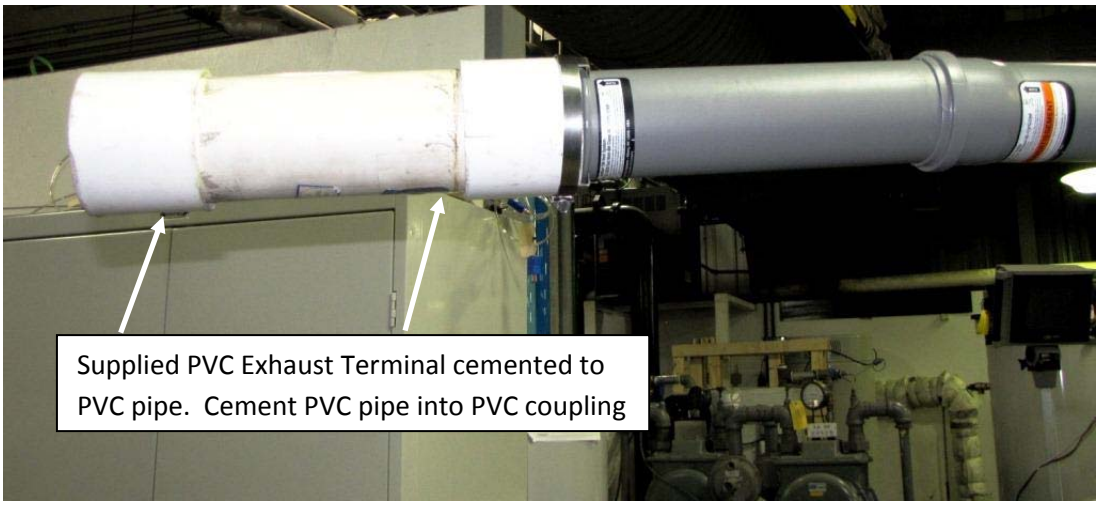
Install a PVC coupling onto the male gasketed end of the Centrotherm PVC Termination Adapter. A reducer coupling may be needed to use the supplied vent terminals if a larger pipe diameter size was used. Cement the straight section of PVC pipe to the PVC pipe coupling. Install the PVC pipe to exit the wall or roof, and then cement the vent terminal onto the PVC or CPVC pipe. Refer to the venting section of the water heater Installation and Operating Instruction manual for the appropriate solvent and cement to use. The exhaust vent terminal for the EF model series is shown. Use the vent terminals supplied with the water heater. See the following photos.



⚠ WARNING

A Centrotherm ISTAGL series PVC Vent Termination Adapter must be used at the end of the last section of polypropylene vent pipe to connect to the PVC pipe coupling. The arrow must point toward the vent terminal. DO NOT USE THE SAME PVC ADAPTER THAT IS USED TO CONNECT TO THE WATER HEATER.

Secure the PVC coupling to the PVC Terminal Adapter with the Centrotherm Flue Pipe Clamp. Cement a short section of PVC pipe into the PVC pipe coupling. Cement the supplied PVC exhaust terminal coupling onto the PVC pipe.



Step 8: After the venting system installation is completed, start the water heater and check all joints for leaks using a soapy water solution. Any leaks found must be repaired. If a gasket is damaged, replacement gaskets may be obtained from the local Centrotherm supplier.

⚠ WARNING

All of the exhaust venting connections must be leak checked with a soap solution upon initial start-up of the water heater. Any leaks must be repaired before continuing operation of the water heater.
Periodically check all venting system connections for leakage. Replace any defective venting components. Refer to the maintenance section of the Installation and Operating Instructions for further details.

SUPPLEMENT – VENTING INSTRUCTIONS FOR INSTALLATION AND OPERATION INSTRUCTION MANUALS FOR THE FOLLOWING PRODUCT TYPES:

HIGH EFFICIENCY CONDENSING COMMERCIAL, COMMERCIAL POWER DIRECT VENT, LIGHT DUTY COMMERCIAL POWER DIRECT VENT, LIGHT DUTY COMMERCIAL POWER VENT, RESIDENTIAL POWER DIRECT VENT, RESIDENTIAL POWER VENT MODEL SERIES, ULTRA LOW NOx RESIDENTIAL POWER DIRECT VENT, ULTRA LOW NOx LIGHT DUTY POWER DIRECT VENT, ULTRA LOW NOx RESIDENTIAL POWER VENT, ULTRA LOW NOx LIGHT DUTY POWER VENT, HIGH PERFORMANCE SERIES POWER VENT, COMBI POWER VENT, SOLAR POWER VENT GAS BACKUP.

INSTALLATION OF DURAVENT POLYPRO® SINGLE WALL POLYPROPYLENE VENTING SYSTEMS

This supplement is for the installation of polypropylene single wall venting system manufactured by M&G DuraVent, Inc. The DuraVent Polypro venting system is a CSA approved alternative to the PVC, ABS, and CPVC venting components for the High Efficiency Condensing Commercial, Commercial Power Direct Vent, Light Duty Commercial Power Direct Vent, Light Duty Commercial Power Vent, Residential Power Direct Vent, Residential Power Vent Model Series, Ultra Low NOx Residential Power Direct Vent, Ultra Low NOx Light Duty Power Direct Vent, Ultra Low NOx Residential Power Vent, Ultra Low NOx Light Duty Power Vent, High Performance Series Power vent, Combi Power Vent, Solar Power Vent Gas Backup Model Series.

The DuraVent venting system components are ULC S636 approved and listed by a recognized agency and may be installed in the U.S. and Canada. All components used must be from the same manufacturer and are designed for use with the above noted products. The DuraVent components may be purchased from plumbing supply distributors. The vent size diameter and maximum vent lengths must be followed as detailed in the Installation and Operating Instruction Manual that was supplied with the water heater. Thoroughly read and understand the venting section of the instruction manual supplied with the water heater before proceeding with the following instructions in this supplement. The vent terminals supplied with the water heater or the factory approved accessory vent terminal kits must be used with this venting system.

⚠ WARNING
The venting system must be properly installed. Failure to properly install the vent system could result in property damage, personal injury, or death.
DO NOT install damaged venting system components. If damage is evident then please contact the supplier where the water heater or venting system components were purchased for replacement parts.
Use only the vent terminals provided or factory authorized terminals for venting this water heater.
The water heater requires its own separate venting system. Do not connect the exhaust vent into an existing vent pipe or chimney.
All of the exhaust venting connections must be leak checked with a soap solution upon initial start-up of the water heater. Any leaks must be repaired before continuing operation of the water heater.
Do not terminate the venting where noise from the exhaust or intake will be objectionable. This includes locations close to or across from windows and doors. Avoid anchoring the vent and intake pipes directly to framed walls, floors, or ceilings unless rubber isolation pipe hangers are used. This prevents any vibrations from being transmitted into the living spaces.
Do not exceed the venting distances or the number of elbows listed in the instruction manual supplied with the water heater. Exceeding the maximum venting distances may cause the water heater to malfunction or cause an unsafe condition.
DO NOT operate this water heater until the venting installation is complete and the piping completed. Failure to complete installation before operation can result in property damage, personal injury, or death.

⚠ WARNING

DO NOT install Duravent Polypro venting components with any other manufacturer's vent components. Duravent components must be used exclusively throughout the entire venting system from the water heater coupling or vent connection to the outside wall or ceiling near the vent terminal location.

This supplement is intended only for additional information for installing Duravent Polypro single wall venting system and the instruction manual supplied with the water heater must be followed for the detailed information provided for the venting system installation.

Step 1: Thoroughly read and understand the venting section of the Installation and Operating Instruction Manual that was supplied with the water heater before determining the location of the water heater and the vent terminals. Locate the water heater for the shortest practical vent length to the outside. Measure the total venting distance required to reach the outside wall or roof. Determine the diameter of the venting components to use for the length of vent pipe (and combustion air supply for direct vent models) required by referring to the venting tables in the instruction manual for the maximum vent length for each diameter pipe size. Obtain all the necessary venting system components for the installation.

Step 2: Before installation, inspect each vent component for damage making sure the gaskets for each component are fully intact and in undamaged condition. Do not attempt to install or repair damaged components. If a gasket is damaged, these are available from the supplier of DuraVent components. Do not use gaskets from another manufacturer and do not try to repair the gasket.

Step 3: A DuraVent PVC to Polypropylene adapter (referred by DuraVent as Appliance Adapters, 2PPS-AD, 3PPS-AD, or 4PPS-AD) must be used to connect into a PVC coupling or tee (Commercial and Residential Power Direct Vent air intake connections), condensate elbow (High Efficiency Commercial Condensing models) or the exhaust outlet adapter for Commercial Power Vent and Residential Power Vent models. To make the insertion of the gasketed fittings into the coupling easier, rotate the joints slightly and use water to lubricate the gaskets. DO NOT use any other kind of lubricant.

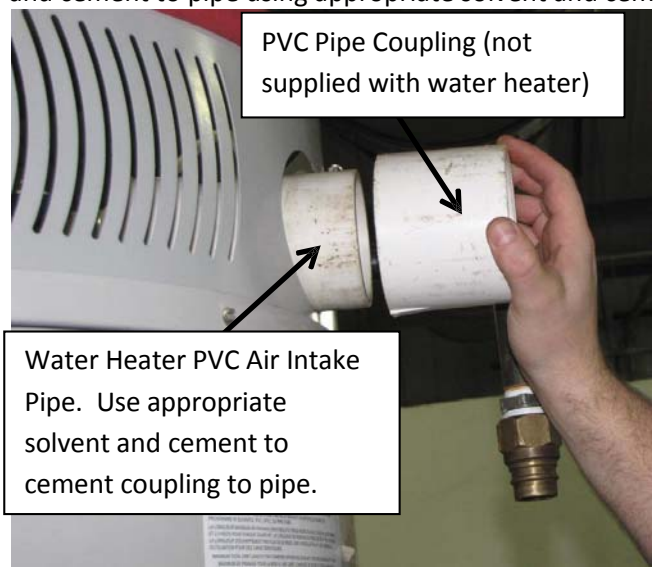
Wet the gasket surface and inside of the coupling using your finger or wet paper towel and insert the male end of the adapter with the exterior gasket into the coupling, condensate elbow or exhaust outlet adapter connection. If a larger vent diameter size is to be used, use the appropriately sized reducer coupling first on the water heater intake or exhaust vent connection as detailed in the installation manual supplied with the water heater. See the following photos.

⚠ WARNING

Use only water for lubricating the gaskets and pipe ends to allow easy insertion. DO NOT use any other kind of lubricant, since deterioration of the gasket may result, which may allow dangerous flue gases to leak into the room. If the vent pipe needs to be disassembled after the gasket has dried, wet the joint thoroughly to loosen the connection.

High Efficiency Condensing Commercial Models: Use the appropriate primer and cement (refer to venting section of instruction manual with water heater) for cementing a PVC coupling (not supplied with water heater) to the end of the PVC air intake pipe connection. Using your finger, wet with water the male gasketed end of the DuraVent PVC to PolyPro adapter and fully insert into the air intake coupling. Loosen the DuraVent adapter connector clamp (PPS-PAC) and install over the PVC coupling. See following photos.

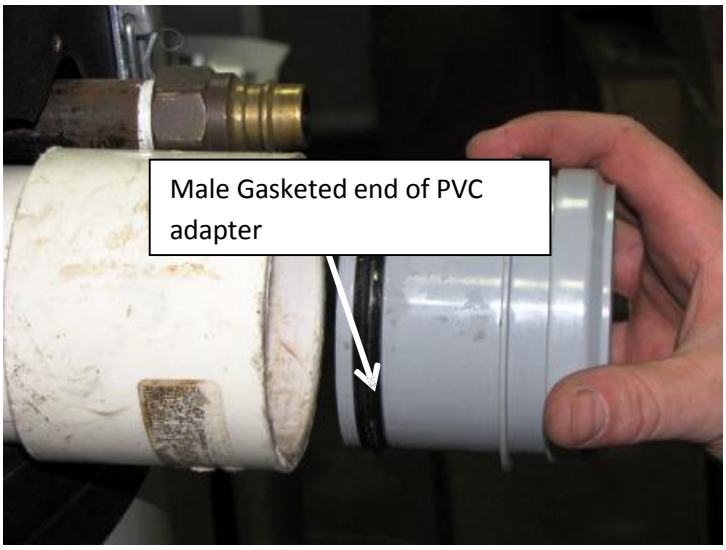
Install PVC pipe coupling over air intake pipe connection and cement to pipe using appropriate solvent and cement.



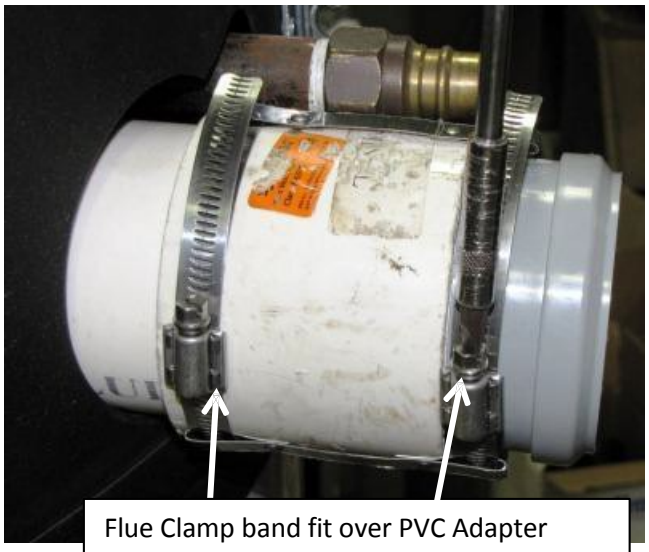
Wet gaskets of DuraVent PVC Adapter using finger.



Insert male gasketed end of DuraVent PVC adapter into PVC pipe coupling.



Install DuraVent Adapter Connector Clamp (PPS-PAC) over the PVC coupling so that clamp brackets secure the shoulder of PVC adapter fitting. Tighten clamp screws securely.



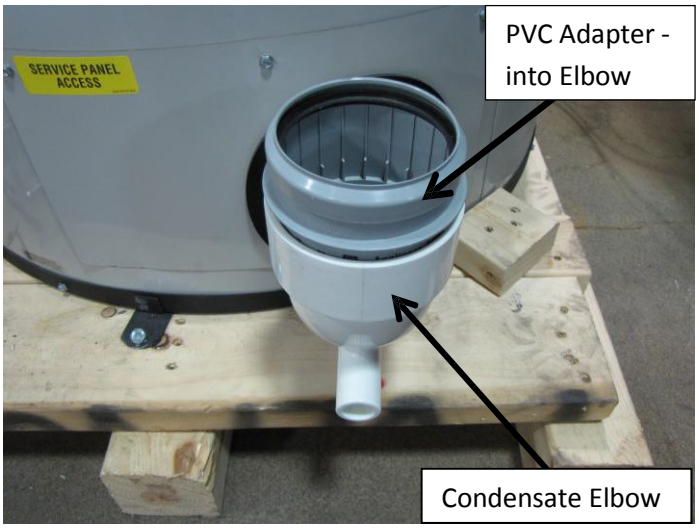
⚠ WARNING

DuraVent Adapter Connector Clamps (p/n: PPS-PAC) MUST be properly installed to secure the PVC Vent Adapter. DO NOT operate the vent system without first installing the Flue Adapter Connector Clamps.

For High Efficiency Commercial Model series exhaust connection, wet outside gasket with finger and insert PVC adapter into the condensate elbow. Insert DuraVent PVC Adapter fitting into Condensate Elbow as shown.



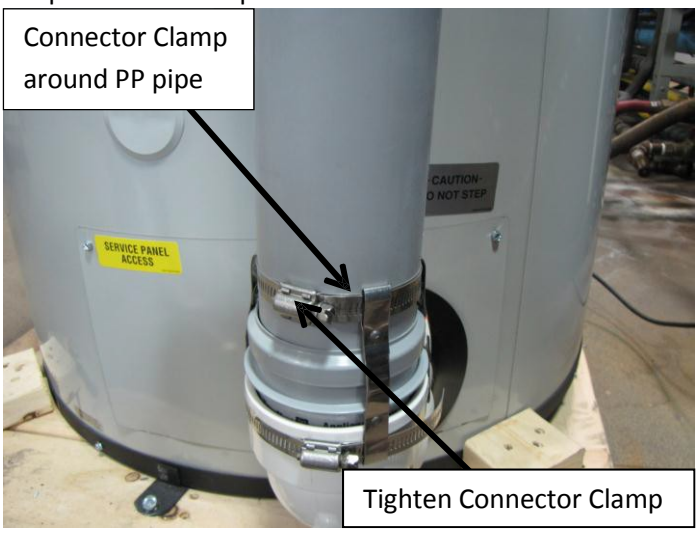
Wet gasket with water using finger of PVC Adapter



Install DuraVent Connector Clamp around outside of Condensate Elbow as shown.



Tighten Connector Clamp Screw to secure PVC Adapter and Adapter and Vent Pipe into condensate Elbow.



Commercial and Residential Power Direct Vent / Power Vent Models:

For installation of commercial and residential power vent models, install the male end of the PVC to PolypPro adapter into the air intake pipe tee as shown.	Install the adapter connector clamp over the PVC adapter. Then install the elbow or vent pipe section into the PVC adapter. Tighten the clamp bands of the adapter connector to the air intake tee and pipe elbow or straight pipe section to secure vent pipe to the water heater air intake tee as shown below.

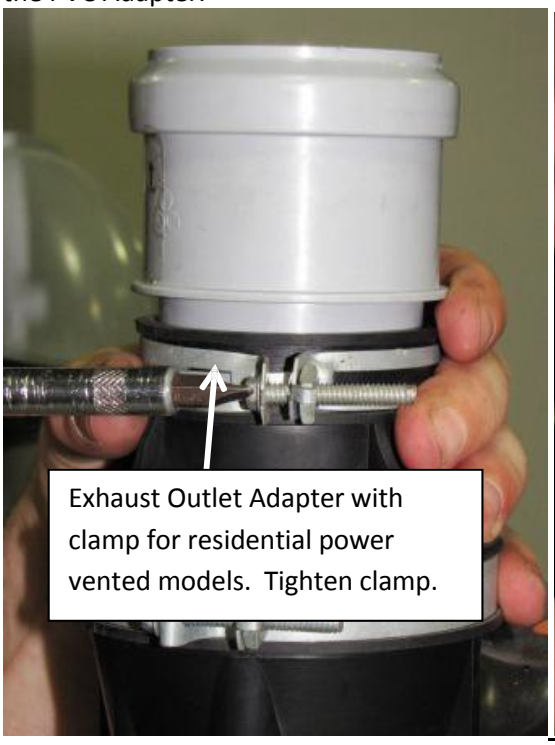
PVC Adapter Fitting





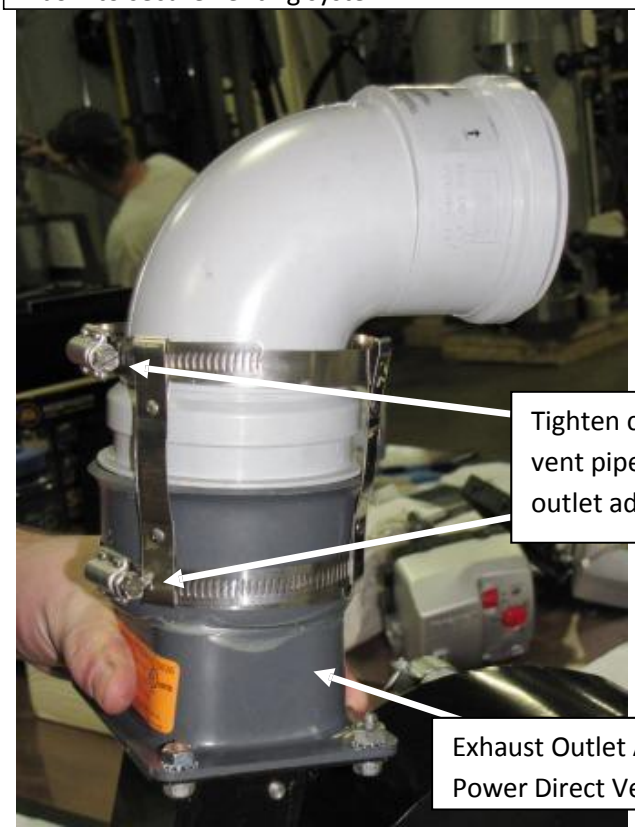
For the exhaust venting for all power vent and power direct vent models, insert the PVC Adapter into the Exhaust Outlet Adapter. On residential models, tighten the clamp to secure the PVC Adapter.

For Commercial Power Direct Vent models, insert PVC Adapter into Exhaust Outlet Adapter.



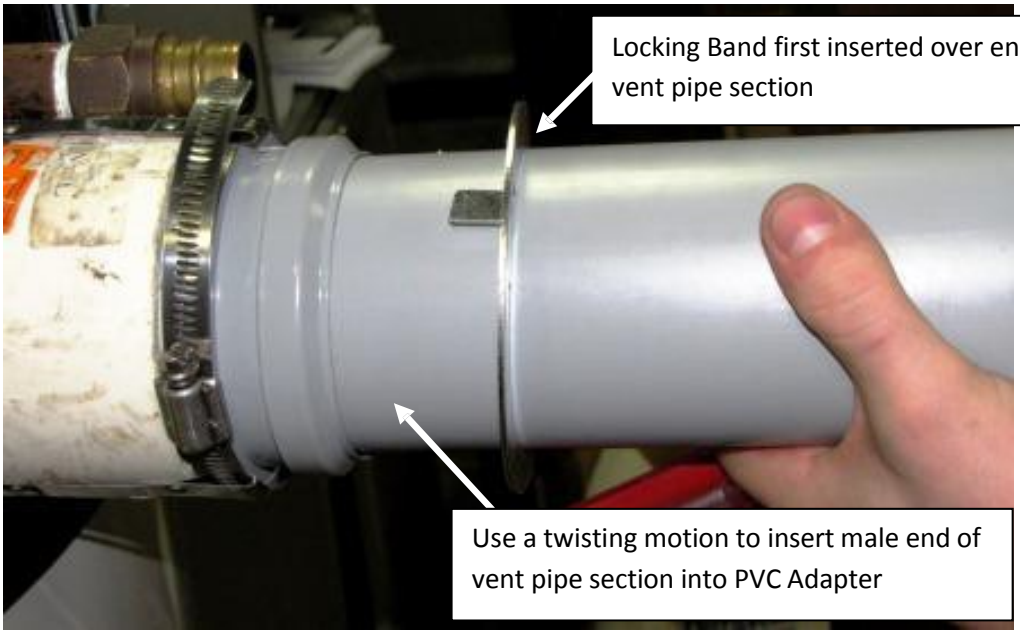


Install the Adapter Connector Clamp over the PVC adapter and install the elbow or next section of straight pipe into the PVC adapter. Then tighten the clamp bands of the Adapter Connector around the Exhaust Outlet Adapter and Elbow to secure venting system.

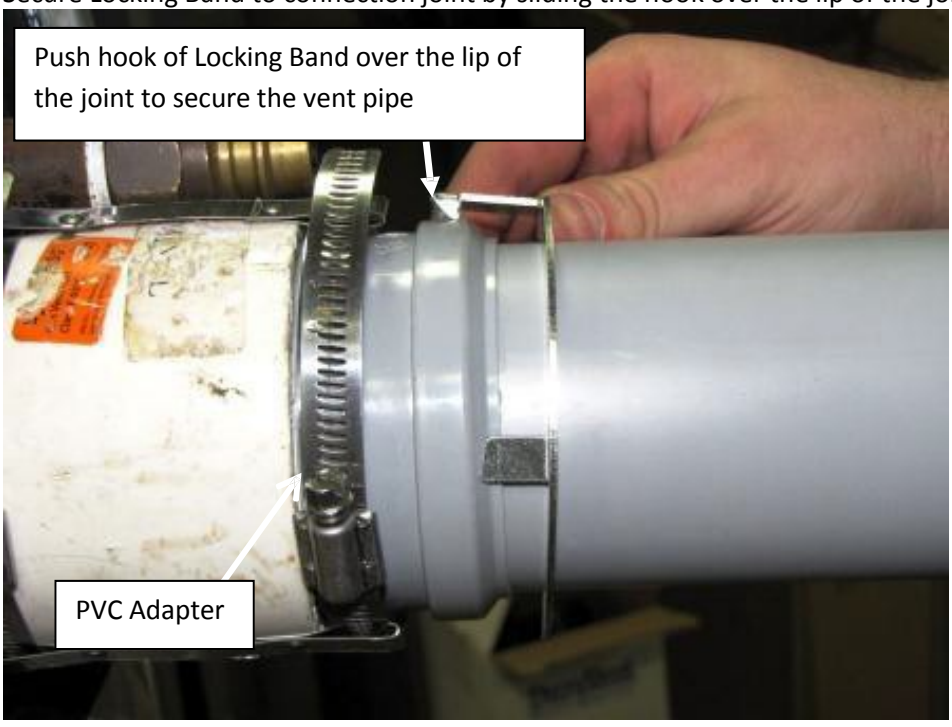


Step 4: Using a finger or paper towel, wet with water the inside gasket of the PVC adapter and the male end (without gasket) of the elbow or straight section of pipe for running the exhaust or intake pipe from the water heater.

Steel joint Locking Bands (available from DuraVent supplier) must be used at each pipe joint. The connector rings ensure that the joints do not separate under heavy loads. These connector rings must be used to comply with ULC-S636 requirements. See following photo with the joint connector attached to the pipe sections.
Insert a Locking Band over the male end of the vent pipe section with the hook and leg facing the joint. Insert the male end of the elbow or straight section into the PVC adapter. Use a twisting motion while pushing the male end of the pipe or elbow into the PVC adapter to fully seat into the gasket. The male end of the pipe or elbow must always point toward the water heater.



Secure Locking Band to connection joint by sliding the hook over the lip of the joint as shown below.



⚠ WARNING

DO NOT operate vent system without properly installing Locking Bands.

⚠ WARNING

Make sure pipe sections are fully inserted into the PVC adapter and/or gasketed end of DuraVent fitting. Insertion depth is no less than 2 inches.

Step 5: DuraVent supplied support brackets must be used to support the pipe sections. The vent pipe sections **must be** supported a minimum of every 10 feet (3 meters) of vertical run or on every horizontal pipe section. Consult local codes for additional requirements.

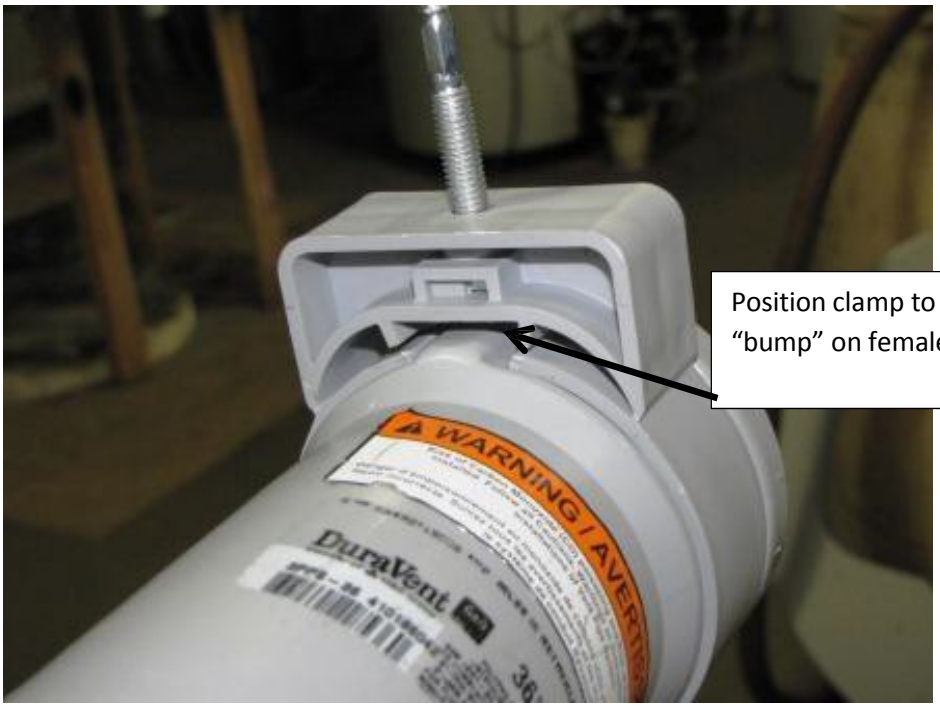
DuraVent supplies two types of approved clamps available for hanging the vent pipe. The Polypropylene snap style clamp can be attached at either the male or female end of the pipe. Determine the location for the anchor bolt mounting to the wall or framing member. Mount the anchor bolt supplied with the clamp. Align the encapsulated nut of the clamp with the anchor bolt and rotate the body of clamp with the nut onto the threads of the anchor bolt. With the vent pipe in place, the clamp is then snapped together by closing the clamp around the vent pipe body or female end of the pipe.

The metal Wall Strap type clamp can only be mounted on the body of the vent pipe. Open the metal clamp to fit around the body of the vent pipe and slide into the desired location to secure to the wall or ceiling. Secure to the wall or structural member by using (2) 1 ½" #8 wood screws or equivalent (not supplied with clamp). Secure the clamp around the vent pipe by tightening the nuts and bolts of the clamp.

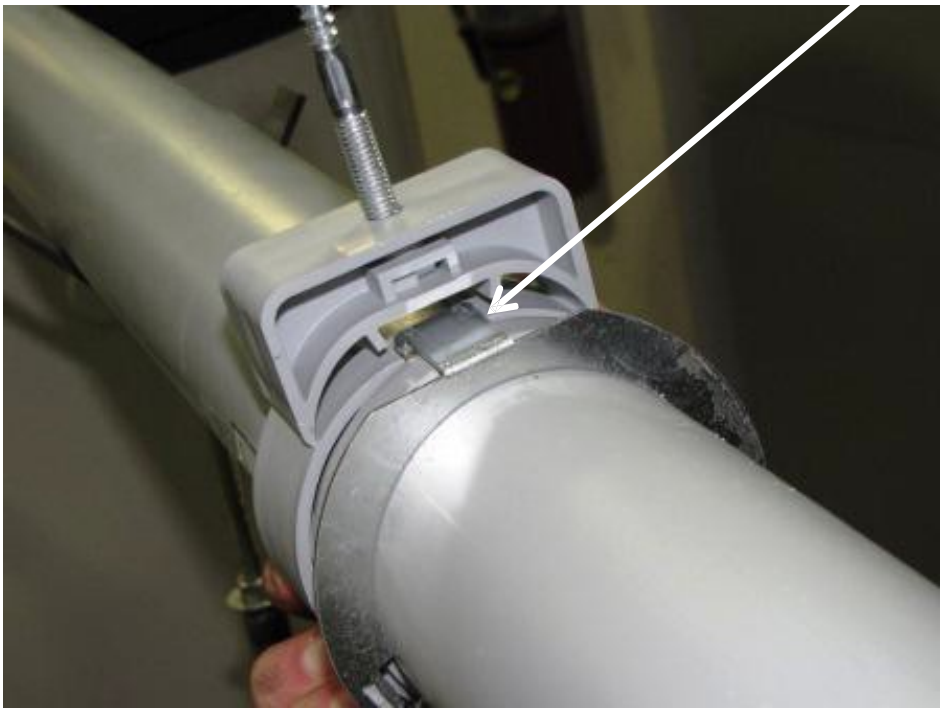




Plastic Clamp also fits over Female Flange of DuraVent Vent Pipe Sections



Plastic Clamp opening allows room for Locking Bands to hook over flared female joint



Tighten Metal Clamp around body of vent pipe.



Metal clamp fastens to wall with wood screws



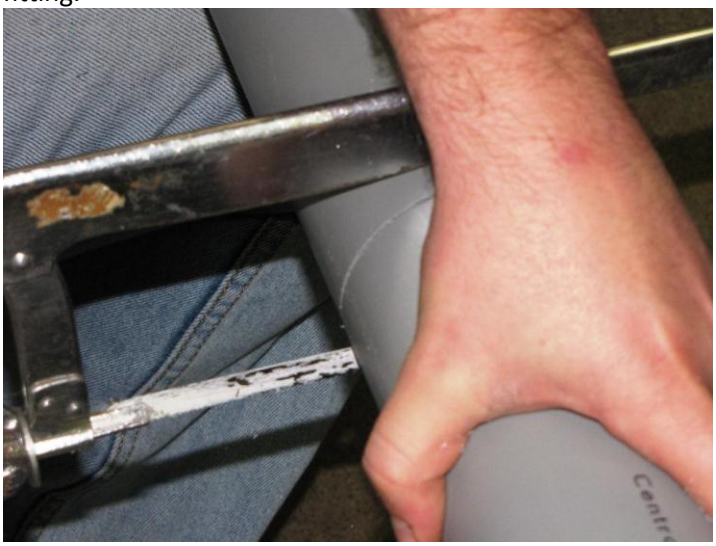
High Efficiency Commercial Condensing Models:
For horizontal sections of flue pipe, the pipe must be installed with a slight upward slope of approximately ¼ inch per foot (20 mm per meter) toward the water heater to allow condensate to drain into the condensate elbow.
Residential and Commercial Power Direct Vent / Power Vent Models:
To prevent condensate from accumulating in the exhaust blower, install the horizontal vent pipe with a downward slope toward the vent terminal of ¼ inch per foot (20 mm per meter) of horizontal vent pipe. An optional condensate kit is available for residential power vent models or a tee fitting with a condensate drain loop may be used on commercial power direct vent models to prevent condensate accumulation in the blower for long vertical runs of vent pipe. Refer to the venting section of the Installation and Operating Instructions supplied with the water heater.

Step 6: If any of the straight pipe sections need to be cut, use a hack saw and make a straight cut on the male (ungasketed) end of the pipe. When making the cut, allow for the 2" minimum (51 mm) insertion distance inside the female end of the pipe. Make sure the cuts are made square and use a razor knife to deburr the edges of the cut pipe to avoid any sharp edges that may damage the gasket.
DuraVent has adjustable vent pipe sections available, which allow 4.5 inches (114 mm) of adjustment to the length.

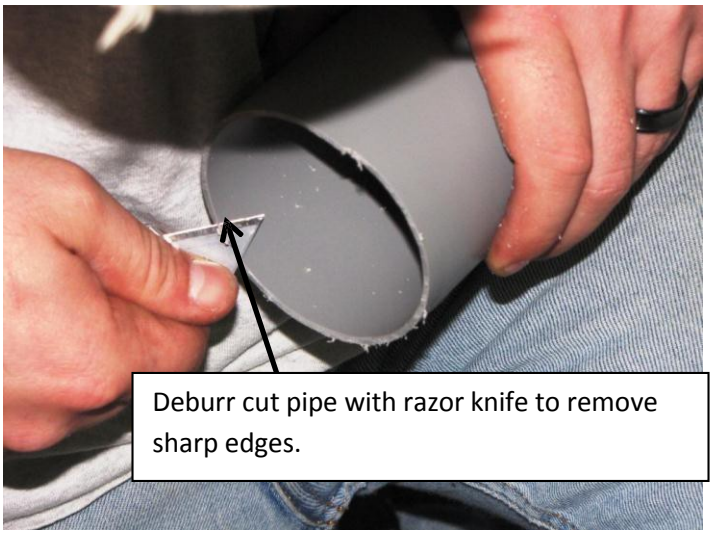
⚠ WARNING

Cut pipe edges must be properly deburred. Damage to the gasket from not deburring the edges of the cut male end may result in the release of dangerous flue products.

Cut end of pipe to length using a hacksaw. Cut male end only and allow for 2” insertion depth into female end of fitting.



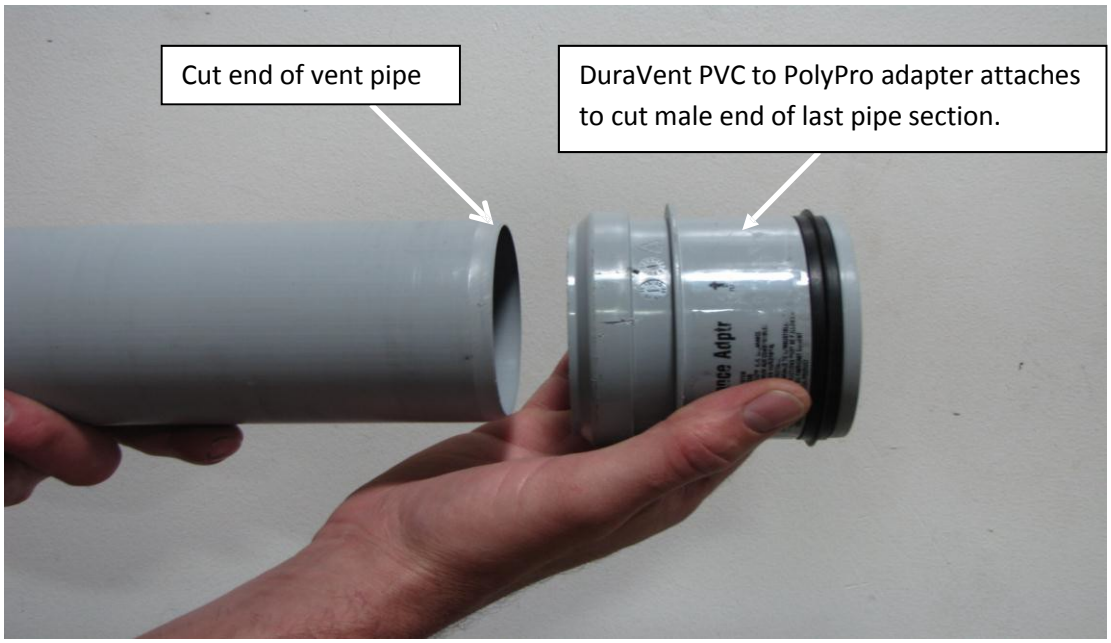
Deburring cut pipe edge with razor knife to remove sharp edges to prevent gasket damage.



Step 7: Continue installing straight sections of pipe and elbows and support with pipe support clamps as previously shown on every horizontal pipe section or at least every 10 feet (3 meters) for vertical runs. Run the vent pipe near the outside wall or roof to be terminated. A DuraVent PVC to PolyPro Adapter (2”, 3” or 4” diameters) must be used to connect the DuraVent polypropylene vent pipe to PVC pipe first before exiting the wall or roof. The female flared end (inside gasket) of the last DuraVent pipe section must be cut off at the proper length needed. Connect the female end of the PVC Adpater into the end of the last pipe. Connect the PVC coupling over the male gasketed end of the PVC Termination Adapter. Secure the PVC pipe coupling to the DuraVent PVC adapter with the Adapter Connector Clamp and detailed previously. Cut the PVC pipe to the length needed to exit the wall or roof. Refer to the installation instruction manual supplied with the water heater for information regarding the location of the vent terminals.

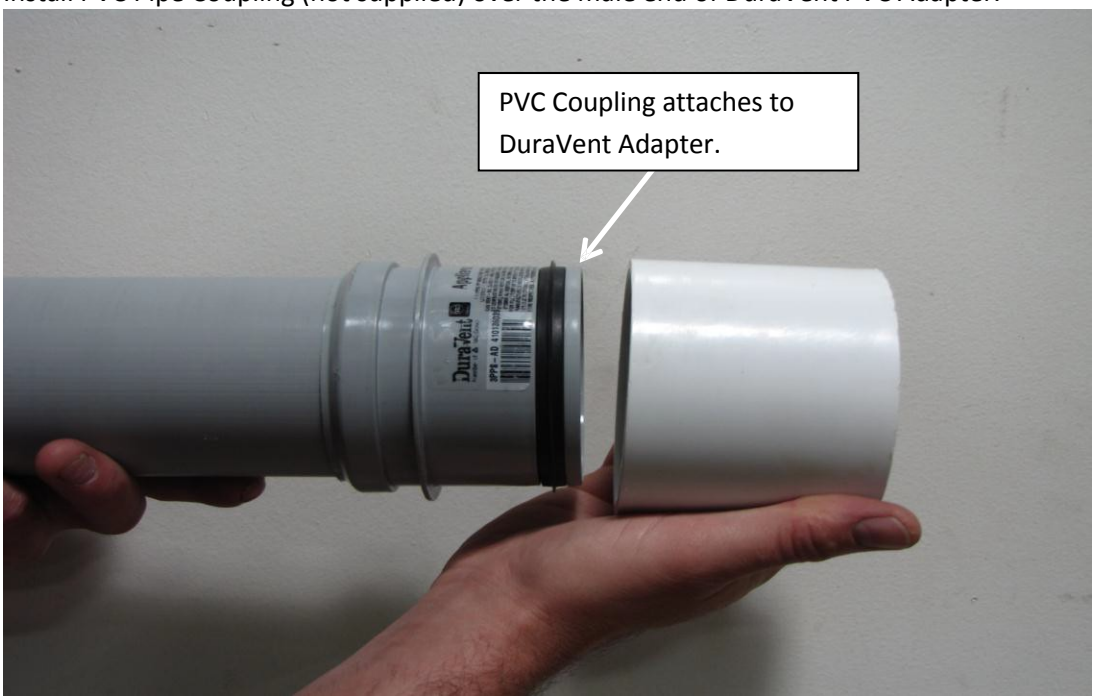
Cut the male end of the last piece of pipe to the length as needed to get near the exiting wall or ceiling of the desired outside vent terminal location. Install this last section of pipe.

Install the appropriate diameter DuraVent PVC Adapter on the end of the last pipe.

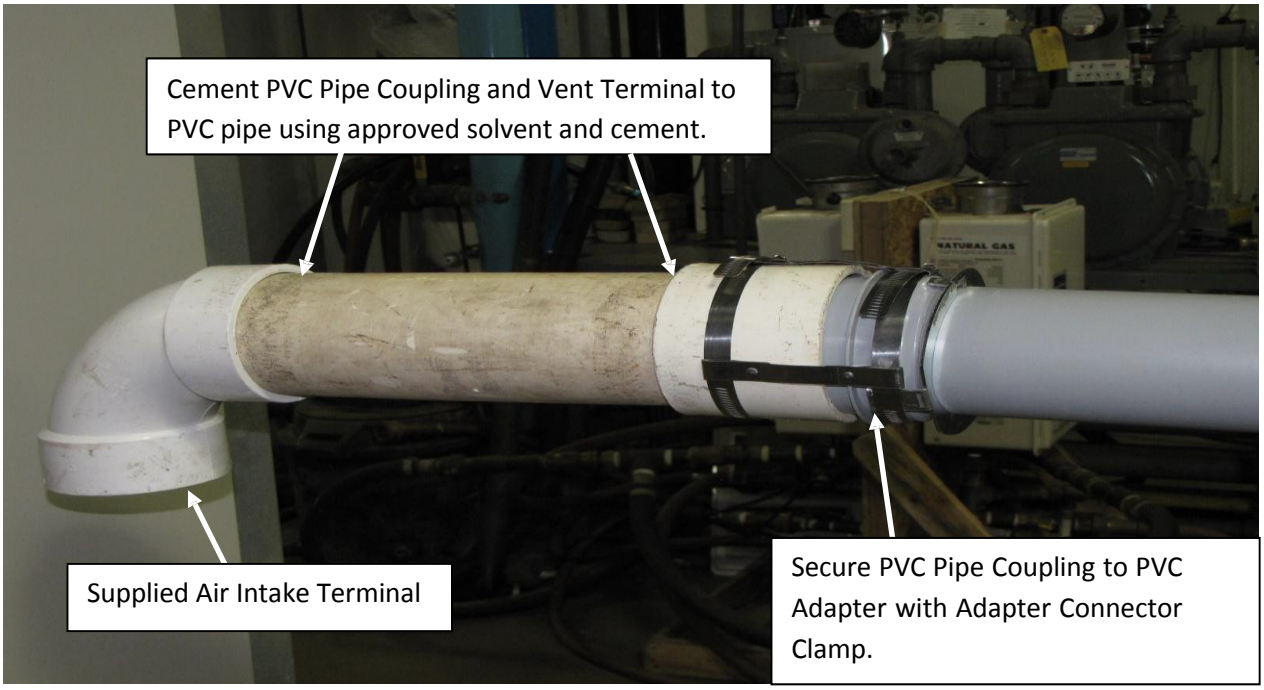


Install a PVC coupling onto the male gasketed end of the DuraVent PVC Adapter. A reducer coupling may be needed to use the supplied vent terminals if a larger pipe diameter size was used. Cement the straight section of PVC pipe to the PVC pipe coupling. Install the PVC pipe to exit the wall or roof, and then cement the vent terminal onto the PVC or CPVC pipe. Refer to the venting section of the water heater Installation and Operating Instruction manual for the appropriate solvent and cement to use. The exhaust vent terminal for the EF model series is shown. Use the vent terminals supplied with the water heater. See the following photos.

Install PVC Pipe Coupling (not supplied) over the male end of DuraVent PVC Adapter.



Secure the PVC coupling to the PVC Terminal Adapter with the DuraVent Flue Pipe Clamp. Cement a short section of PVC pipe into the PVC pipe coupling. Cement the supplied PVC exhaust terminal coupling onto the PVC pipe.



Step 8: After the venting system installation is completed, start the water heater and check all joints for leaks using a soapy water solution. Any leaks found must be repaired. If a gasket is damaged, replacement gaskets may be obtained from the local DuraVent supplier.

⚠ WARNING

All of the exhaust venting connections must be leak checked with a soap solution upon initial start-up of the water heater. Any leaks must be repaired before continuing operation of the water heater.
Periodically check all venting system connections for leakage. Replace any defective venting components. Refer to the maintenance section of the Installation and Operating Instructions for further details.

Service Manual Supplement – Quick Service Guide for PV-Series, PDV-Series, and RG*F-Series Products

Power Vent, Power Direct Vent, & Fan Assisted Water Heaters - ICON

Error Code	Definition	Service Action	Possible Parts Needed
No LED	No power to the unit or switch is off	Turn power on Verify 120 volts present at outlet	None
One short flash every four seconds	Standby mode / unit up to temp	None	None
Bright/dim alternating LED	Thermostat calling for heat	None	None
Short flash once every second	Weak pilot signal on last call for heat	Inspect and clean pilot assembly Check continuity on flame sensor	1) Pilot assembly 2) Gas valve
Two flashes three second pause	Pressure switch not working - closed position	Inspect pressure switch tubing and ports Bypass pressure switch & temp switch for testing Measure vacuum on pressure switch	1) Pressure switch 2) Temp switch
Three flashes three second pause	Pressure switch or temp switch stuck open	Check vent for blockage Verify blower spinning up to speed Measure vacuum on pressure switch Inspect pressure switch tubing and ports Bypass pressure switch & temp switch for testing	1) Pressure switch 2) Temp switch 3) Blower assembly 4) Gas valve
Four flashes three second pause	High tank temperature	Check temp probe ohms - compare with sensor temp chart	1) Thermowell 2) Gas valve
Five flashes three second pause	False pilot flame sensed Pilot valve stuck open	Check for flame sensor short to ground Gas valve stuck open - replace valve	1) Pilot assembly 2) Gas valve
Six flashes - one flash, three second pause	Pilot failed to light	Inspect and clean pilot Verify gas flow Check connection at gas valve	1) Pilot assembly 2) Gas valve
Six flashes - two flashes, three second pause	Pressure switch or temp switch opened during operation	Check vent for blockage Measure vacuum on pressure switch Verify blower spinning up to speed Bypass pressure switch & temp switch for testing	1) Pressure switch 2) Temp switch 3) Blower assembly
Six flashes - three flashes, three second pause	Pilot flame extinguished	Inspect and clean pilot Check connection at gas valve	1) Pilot assembly 2) Gas valve
Six flashes - four flashes, three second pause	False pilot flame sensed Pilot valve stuck open	Check for flame sensor short to ground Gas valve stuck open - replace valve	1) Pilot assembly 2) Gas valve
Seven flashes	Flammable vapor sensor/simulated resistive device fault	Verify resistance is between 3.0 - 48 KOhms Verify no flammable vapors present Check sensor harness	1) Flammable vapor sensor 2) Harness
Eight flashes - one flash, three second pause	Flammable vapor sensor out of spec, possible short	Verify resistance is between 3.0 - 48 KOhms Verify no flammable vapors present Check sensor harness	1) Flammable vapor sensor 2) Harness 3) Gas valve
Eight flashes - two flashes, three second pause	Thermowell sensor damaged or unplugged	Check temp probe ohms - compare with sensor temp chart	1) Gas valve
Eight flashes - three flashes, three second pause	Gas valve electronics fault	Reset gas valve; if problem persists replace gas valve	1) Gas valve
Eight flashes - four flashes, three second pause	Gas valve fault detected	Reset gas valve; if problem persists replace gas valve	1) Gas valve

NOTE: **Check all wire connections**
Check gas inlet and manifold gas pressure
Check for grounding connections

BRADFORD WHITE®
WATER HEATERS

REPLACEMENT PARTS LIST

Residential & Light Duty Commercial Gas Power Direct Vent (PDV) Models



DEFENDER SAFETY SYSTEM®

Includes Hydrojet® Total Performance System

Effective: June, 2018
ECO 8195

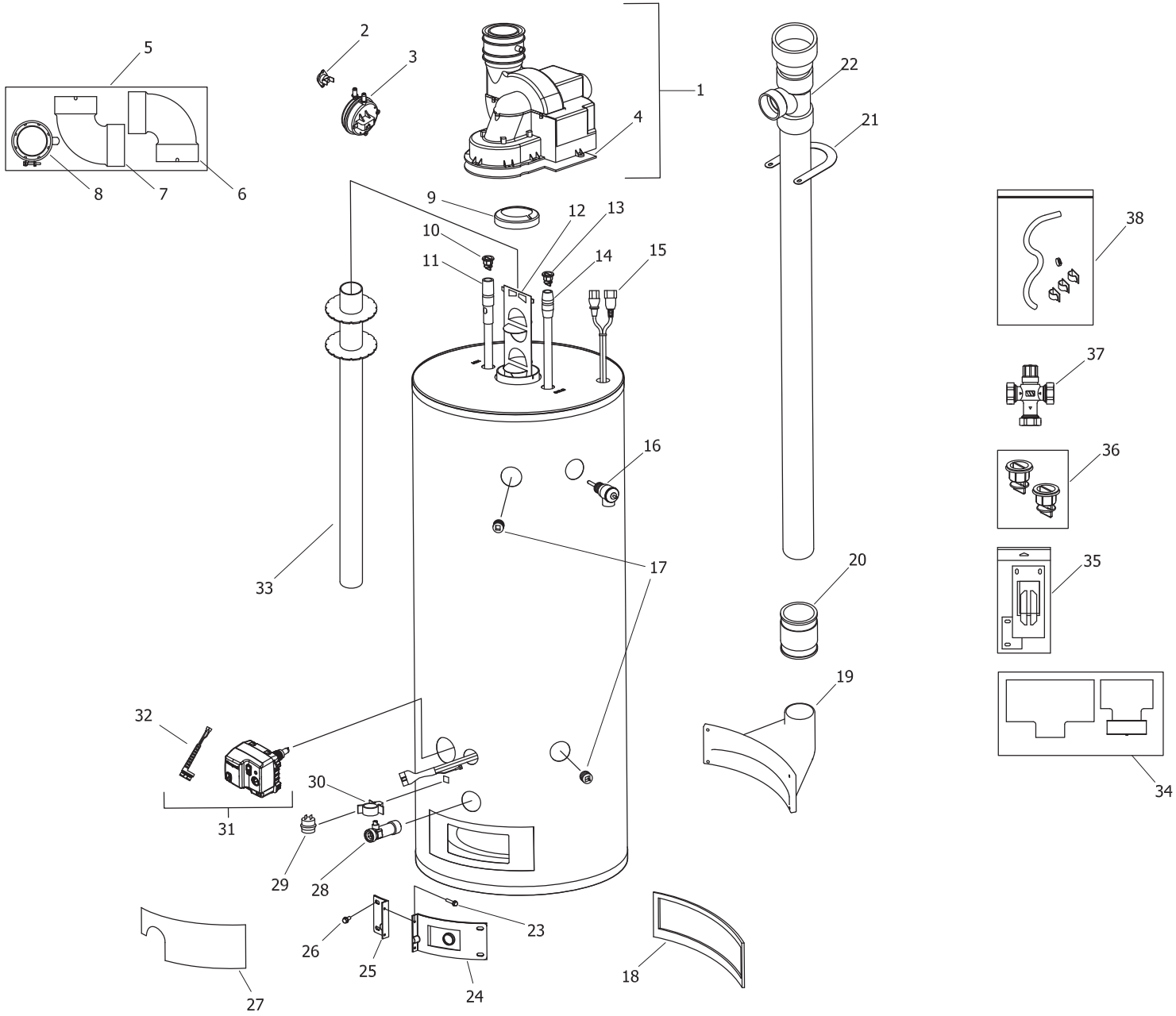
NOTE: BOTH MODEL AND SERIAL NUMBERS ARE REQUIRED FOR ORDERING REPLACEMENT PARTS

Dimensions and specifications subject to change without notice.

WARNING
CANCER AND REPRODUCTIVE HARM
WWW.P65WARNINGS.CA.GOV

As required by the state of California Proposition 65.

Parts Book # 238-51513-00B



BRADFORD WHITE
WATER HEATERS

Item	Description	Model RG2PDV40S*	Model RG2PDV50S*	Model RG2PDV50H*	Model LG2PDV50H*	Model RG2PDV75H*	Model LG2PDV75H*
1	Blower Assembly (Normal Alt.) 0 Ft. to 2,000 Ft.	265-47386-00	265-47386-00	265-47387-00	265-47387-00	265-47387-00	265-47387-00
	Blower Assembly (-475 model suffixes) 0 ft. to 7,000 Ft.	239-48527-00	239-48527-00	239-48528-00	239-48528-00	239-48528-00	239-48528-00
2	Blower Temperature Switch	239-48752-00	239-48752-00	239-48752-00	239-48752-00	239-48752-00	239-48752-00
3	Pressure Switch Exhaust (Normal Alt.) 0 Ft. to 2,000 Ft.	239-48058-01	239-48058-01	239-48058-01	239-48058-01	239-48058-01	239-48058-01
	Pressure Switch Exhaust (-475 model suffixes) 0 Ft. to 7,000 Ft.	239-48058-02	239-48058-02	239-48058-02	239-48058-02	239-48058-02	239-48058-02
4	Blower Gasket	239-45866-00	239-45866-00	239-45866-00	239-45866-00	239-45866-00	239-45866-00
5	Vent Adapter with Vent Terminal	239-47992-00	239-47992-00	239-48781-00	239-48781-00	239-48781-00	239-48781-00
6	Intake Vent Terminal Elbow	239-39831-00	239-39831-00	239-40579-00	239-40579-00	239-40579-00	239-40579-00
7	Exhaust Vent Terminal Elbow	239-39831-00	239-39831-00	239-40579-00	239-40579-00	239-40579-00	239-40579-00
8	Exhaust Adapter	239-45709-00	239-45709-00	239-45639-00	239-45639-00	239-45639-00	239-45639-00
9	Flue Reducer	---	---	243-42572-00	243-42572-00	---	---
10	Heat Trap Insert (Outlet)	239-45167-00	239-45167-00	239-45167-00	239-45167-00	239-45167-00	239-45167-00
11	Hot Water Outlet Anode (Magnesium)▲#	224-47776-19	224-47776-19	224-47776-19	224-47776-19	224-47776-19	224-47776-19
	Hot Water Outlet Anode (Aluminum)▲#	224-32999-42	224-32999-42	224-32999-42	224-32999-42	224-32999-42	224-32999-42
	Hot Water Outlet Anode (A420 Aluminum)▲#	224-49560-08	224-49560-08	224-49560-08	224-49560-08	224-49560-10	224-49560-10
12	Flue Baffle	239-45372-00	239-45372-00	239-45373-00	239-45373-00	---	---
13	Heat Trap Insert (Inlet)	239-51556-00	239-51556-00	239-51556-00	239-51556-00	239-45167-00	239-45167-00
14	Cold Water Inlet Diptube (Polysulfone) ▲▲	---	---	---	---	229-45092-09	229-45092-09
	Cold Water Inlet Diptube (PEX) ▲▲	229-51230-20	229-51230-20	229-51230-26	229-51230-29	---	---
15	Blower Harness	239-45617-03	239-45617-03	239-45617-02	239-45617-02	239-45617-02	239-45617-02
16	T&P Relief Valve	230-40594-02	230-40594-02	230-40594-02	230-40594-02	230-40594-02	230-40594-02
17	3/4 NPT Plug	---	---	239-11638-00	239-11638-00	239-11638-00	239-11638-00
18	Air Intake Boot Gasket	239-47832-00	239-47832-00	239-47832-00	239-47832-00	239-47832-00	239-47832-00
19	Air Intake Boot	239-47514-18	239-47514-20	239-47514-18	239-47514-18	239-47514-22	239-47514-22
20	Coupling-2 X 2	239-47850-00	239-47850-00	239-47850-00	239-47850-00	239-47850-00	239-47850-00
21	Bracket-Vertical intake	239-47671-02	239-47671-02	239-47671-01	239-47671-01	239-47671-01	239-47671-01
22	Tee and vent pipe Assembly	239-51391-02	239-51391-02	239-47622-01	239-47622-01	239-51391-03	239-51391-03
23	Screw-#8-18 x 3/4 HWH	239-44195-00	239-44195-00	239-44195-00	239-44195-00	239-44195-00	239-44195-00
24	Right Side Inner Door	239-45642-18	239-45642-20	239-45642-18	239-45642-18	239-47504-22	239-47504-22
25	Left Side Inner Door	239-43968-18	239-43968-20	239-43968-18	239-43968-18	239-43968-20	239-43968-20
26	Screw-#10-12 x 3/4 HWH	239-44113-00	239-44113-00	239-44113-00	239-44113-00	239-44113-00	239-44113-00
27	Outer Door	243-43962-00	243-43962-00	243-43962-00	243-43962-00	243-43962-00	243-43962-00
28	Brass Drain Valve	265-42351-02	265-42351-02	265-42351-02	265-42351-02	265-42351-02	265-42351-02
29	Flammable Vapor Sensor	239-45560-00	239-45560-00	239-45560-00	239-45560-00	239-45560-00	239-45560-00
30	Flammable Vapor Sensor Clip	239-45648-00	239-45648-00	239-45648-00	239-45648-00	239-45648-00	239-45648-00
31	Gas Valve (Natural Gas)	239-48795-02	239-48795-02	265-48795-02	265-48795-04	265-48795-02	239-48795-04
	Gas Valve (LP Gas)	239-48796-02	239-48796-02	239-48796-02	239-48796-04	239-48796-02	239-48795-04
32	Flammable Vapor Sensor Harness	239-49791-00	239-49791-00	239-49791-00	239-49791-00	239-49791-00	239-49791-00
33	Flue Core	---	---	---	---	239-47658-00	239-47658-00
34	Air Inlet Relief Device	239-48391-00	239-48391-00	239-48392-00	239-48392-00	239-48392-00	239-48392-00
35	Inner Door Gasket Kit	239-44078-00	239-44078-00	239-44078-00	239-44078-00	239-47792-00	239-47792-00
36	Heat Trap Insert Kit (Inlet & Outlet)	265-51572-00	265-51572-00	265-51572-00	265-51572-00	265-45420-00	265-45420-00
37	ASSE Approved Mixing Valve (Optional)	239-51778-00	239-51778-00	239-51778-00	239-51778-00	239-51778-00	239-51778-00
38	Condensate Hose Kit (Optional)	239-45875-00	239-45875-00	239-45875-00	239-45875-00	239-45875-00	239-45875-00

*Applies to all warranties

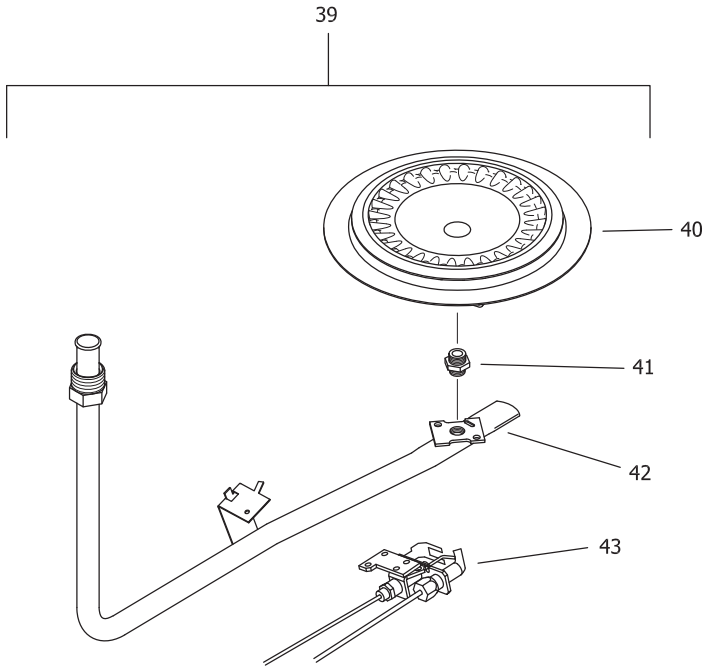
Please order the specific component required for the quickest delivery.

▲Order with item 10

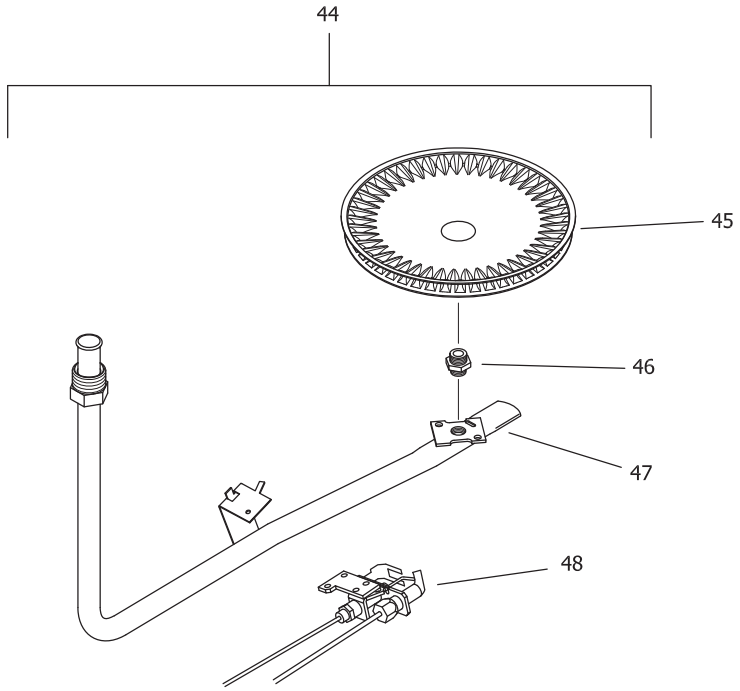
Anode may need to be cut to length

▲▲Order with item 13

BRADFORD WHITE WATER HEATERS



NATURAL GAS BURNER ASSEMBLY



LP GAS BURNER ASSEMBLY

Item	Description	Model RG2PDV40S*	Model RG2PDV50S*	Model RG2PDV50H*	Model LG2PDV50H*	Model RG2PDV75H*	Model LG2PDV75H*
	NAT Gas Burner Assembly						
39	Nat. Gas Burner Assembly Complete***	265-47785-02-32	265-47785-03-32	265-47784-02-28	265-47784-02-28	265-51383-01-20	265-51383-01-20
40	Nat. Gas Burner**	228-47000-00	228-47000-00	228-42506-00	228-42506-00	228-42506-00	228-42506-00
41	Nat. Gas Main Burner Orifice 0 Ft. to 2,000 Ft.**	234-41034-32	234-41034-32	234-41034-28	234-41034-28	234-41034-20	234-41034-20
	Nat. Gas High Altitude Orifice 0 Ft. to 7000 Ft. (-475 model suffixes) **	234-41034-36	234-41034-36	234-41034-30	234-41034-30	234-41034-26	234-41034-26
	Nat. Gas High Altitude Orifice Kit 0 Ft. to 10,000 Ft.	265-51380-06-40	265-51380-06-40	265 51380 06 31	265 51380 06 31	265 51380 02 29	265 51380 02 29
42	Nat. Gas Feedline	233-47374-02	233-47374-03	243-47784-02	233-47374-02	233-47374-04	233-47374-04
43	Nat. Gas Pilot Assembly**	233-45653-05	233-45653-05	233-45653-05	233-45653-05	233-45653-05	233-45653-05
	LP Gas Burner Assembly						
44	LP Gas Burner Assembly Complete***	265-47917-02-49	265-47917-03-49	265-47376-01-44	265-47376-01-44	265-47376-03-39	265-47376-03-39
45	LP Gas Burner**	228-46964-00	228-46964-00	228-47000-00	228-47000-00	228-47000-00	228-42506-00
46	LP Gas Main Burner Orifice 0 Ft. to 2,000 Ft.**	234-47064-49	234-47064-49	234-47064-44	234-47064-44	234-47064-39	234-47064-39
	LP Gas High Altitude Orifice 0 Ft. to 7,000 Ft. (-475 model suffixes) **	234-47064-51	234-47064-51	234-47065-47	234-47064-47	234-47064-43	234-47064-43
	LP Gas High Altitude Orifice Kit Over 7,001 Ft. to 10,000 Ft.	265-51433-05-52	265-51433-05-52	265 51433 05 49	265 51433 05 49	265 51433 01 44	265 51433 01 44
47	LP Gas Feedline	233-47672-02	233-47672-03	233-47672-02	233-47672-02	233-47672-04	233-47672-04
48	LP Gas Pilot Assembly**	233-45653-04	233-45653-04	233-45653-04	233-45653-04	233-45653-04	233-45653-04
	LP to Natural Gas Conversion Kit Norm Alt. 0 Ft. to 2,000 Ft.	265-46493-94	265-46493-95	265-46493-49	265-46493-112	265-46493-113	265-46493-115
	LP to Natural Gas Conversion Kit (High Alt.) 0 Ft. to 7,000 Ft.	265-46493-110	265-46493-111	265-46493-57	265-46493-60	265-46493-114	265-46493-116

*Applies to all warranties

**Inner door gasket kit (item# 35) recommended

***Ordering a complete burner assembly may increase delivery time.

Please order the specific component required for the quickest delivery.

BRADFORD WHITE®

WATER HEATERS

Ambler, PA

For U.S. and Canada field service,
contact your professional installer or
local Bradford White sales representative.

Sales/**800-523-2931**

Technical Support/**800-334-3393**
*Email/**techserv@bradfordwhite.com***

Warranty/**800-531-2111**
*Email/**warranty@bradfordwhite.com***

Service Parts/**800-538-2020**
*Email/**Parts@bradfordwhite.com***

International:
international@bradfordwhite.com

BRADFORD WHITE™

CANADA

Halton Hills, Ontario, Canada

Sales & Technical Support/**866-690-0961**
905-203-0600

*Fax/**905-636-0666***

Email
*Warranty/**bwccwarranty@bradfordwhite.com***
*Technical Support/**BWCCTech@bradfordwhite.com***
*Parts/**orders@bradfordwhitecanada.com***
*Orders/**ca.orders@bradfordwhite.com***

www.bradfordwhite.com

BRADFORD WHITE CORPORATION

LIMITED RESIDENTIAL WATER HEATER WARRANTY

WHAT DOES THIS LIMITED WARRANTY COVER?

This limited warranty covers both the glass-lined tank and component parts for leakage or other malfunction caused by defects in materials and/or workmanship. It extends to the first buyer and to any subsequent owner(s) as long as the water heater remains installed at its original place of installation in the USA, CANADA or Puerto Rico. For other countries please see chart on reverse side.

WHAT DOES THIS LIMITED WARRANTY NOT COVER?

1. This limited warranty does not cover leakage or other malfunction caused by:
   a) Excessive use and specifically, non residential use.
   b) Defective Installation, and specifically, any installation which is made:
      i. in violation of applicable state or local plumbing, housing or building codes, or
      ii. without a certified American Gas Association, ASME, or comparable combination temperature and pressure relief valve, or
      iii. contrary to the written instructions furnished with the unit.
   c) Adverse local conditions, and specifically, sediment or lime precipitate in the tank or corrosive elements in the atmosphere.
   d) Misuse, and specifically, operation, and maintenance contrary to the written instructions furnished with the unit, removal of magnesium anode, disconnection, alteration or addition of non-approved components or apparatus, operation with fuels or at settings other than those set forth on the rating plate or accidental or other exterior damage.
2. This warranty also does not cover:
   a) Production of noise, taste, odors, discoloration or rusty water.
   b) Incidental property damage, loss of use, inconvenience or other incidental or consequential costs.
   c) Costs associated with the replacement and/or repair of the unit, including:
      i. any freight, shipping or delivery charges
      ii. any removal, installation or re-installation charges
      iii. any material, and/or permits required for installation, re-installation or repair
      iv. charges to return the defective water heater and/or component part to the manufacturer.

WHAT IS THE PERIOD OF COVERAGE?

This limited warranty runs from date of installation (or without proof of installation, from three (3) months after the date of manufacture) for the period specified on the following chart. To determine length of coverage, check model number listed on the rating plate of appliance against this chart.

USA, CANADA AND PUERTO RICO

MODEL NUMBER PREFIX	LIMITED TANK** WARRANTY	LIMITED PARTS** WARRANTY
JI, MI, M3, MS, (U)DS, MIMH, MIMS, MII, M4, (U)DH1, M1XR, (M,U)2XR, (U)PDX2, M2, M1, AST, (M,U)1TW, (M,U)2TW, GX, CDW, CSW, U1, U2, U4, SSW, SDW, SDC, (U)PDX1, D4, (M,U)4TW, (M,U)4XRTW, HE4, (U)PDX4, WH, (U)RG, RE, RC	1, 2, 3, 5, 6, 8 or 10 YRS	1 or 6 YRS*
M-III, M2HE	6 or 10 YRS	6 or 10 YRS*

NOTE: The duration of the tank warranty will be found in the model number.
i.e.; RG240T1N has a 1 Year tank warranty
RG240T2N has a 2 Year tank warranty
RG240T6N has a 6 Year tank warranty
RG240T10N has a 10 Year tank warranty

* All (1) year tank warranted units only have a one year parts warranty. All MIII, M2HE (6) year tank warranted units have a (6) year parts warranty. All MIII, M2HE, (10) year tank warranted units have a (10) year parts warranty.

** Any (1) to (8) year tank warranted water heater used for other than a single family housing unit will be covered for only one year on tank and parts regardless of any other warranty period specified. Any (10) year warranted water heater used for other than a single family housing unit will be covered for three years on tank and one year on parts regardless of any other warranty period specified. All replacement water heaters and parts carry the balance of the original warranty, i.e. if an original (10) year tank warranted water heater develops a leak due to defects in materials/workmanship after only (9) years, the replacement unit is warranted for only the balance remaining from the original (10) year warranty, or (1) year in this example.

WHAT IS THE DURATION OF THE IMPLIED WARRANTY?

ANY IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY IMPOSED ON THE SALE OF THE WATER HEATER UNDER THE LAWS OF THE STATE OF SALE ARE LIMITED IN DURATION TO ONE YEAR FROM DATE OF ORIGINAL INSTALLATION.

HOW DOES STATE LAW RELATE TO THE WARRANTY?

Some states do not allow:

1. Limitations on how long an implied warranty lasts.
2. Limitations on incidental or consequential damages.

So the above limitations or exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

•Restrictions are not applicable to implied warranties in California. See "Special State Provisions" on reverse side.

LIMITED RESIDENTIAL WATER HEATER WARRANTY (CONTINUED)

WHAT WILL WE DO TO CORRECT PROBLEMS?

If a defect occurs within the warranty period, we will:

1. Provide a replacement water heater of our manufacture (or at our option repair) any unit which develops a leak in the steel tank within the tank warranty period. To obtain a replacement, you must forward the rating plate from the defective unit to us. If government regulations require the replacement water heater to have features not found in the defective water heater, you will be required to pay the difference in price represented by those government required features.
2. Provide a replacement part (or at our option repair) any part which fails to function within the parts warranty period. To obtain a replacement, you must forward the defective part to us. If government regulations require the replacement part to have features not found in the defective part, you will be required to pay the difference in price represented by those government required features.

We do reserve the right to verify any claims of defect by inspection.

WHAT WILL WE NOT DO?

We will not:

1. Repair or replace any water heater, or part, subject to conditions outlined in "What Does This Limited Warranty Not Cover?"
2. Reimburse any costs associated with repair and/or replacement.
3. Replace and/or repair any water heater without complete model/serial number.
4. Replace any water heater without prior receipt of actual rating plate from appliance.

HOW DO YOU GET WARRANTY ASSISTANCE?

Upon discovering a defect or problem, you should:

1. Contact either the installer or dealer, or
2. Contact us:

BRADFORD WHITE CORPORATION
WARRANTY SUPPORT GROUP
200 LAFAYETTE
MIDDLEVILLE, MI 49333
(800) 531-2111

WHAT SHOULD YOU DO TO KEEP THE WARRANTY IN EFFECT?

To facilitate warranty assistance, you should:

1. Follow all instructions enclosed with the product.
2. Retain all bills of sale or receipts for proof of installation, etc.
3. Contact your installer, dealer or our Warranty Department as soon as any problem or defect is noticed.
4. When necessary, allow us, or our chosen representative, to inspect the unit.
5. For your reference, fill in the Model and Serial Number found on the unit's Rating Plate:

Model Number_____

Serial Number _____

Date of Installation _____

SPECIAL STATE PROVISIONS

For water heaters installed in California or Oregon, paragraphs 2 (c), (i) and (iv) of the paragraph "WHAT DOES THIS WARRANTY NOT COVER?" do not apply.

All other terms and conditions of this warranty apply as stated.

FOR INSTALLATIONS OUTSIDE THE USA, CANADA OR PUERTO RICO (All other terms and conditions of the Limited Warranties apply)

MODEL NUMBER PREFIX	LIMITED TANK** WARRANTY	LIMITED PARTS** WARRANTY
JI, MI, M3, MS, (U)DS, MIMH, MIMS, MII, MIII, BW, M4, (U)DH1, M1XR, (M,U)2XR, (U)PDX2, M2, M1, M2HE, AST, (M,U)1TW, (M,U)2TW, GX, CDW, CSW, U1, U2, U4, SSW, SDW, SDC, (U)PDX1, D4, PE, (M,U)4TW, (M,U)4XRTW, HE4, (U)PDX4, WH, (U)RG, RE, RC	1, 2, 3, 5, 6, 8 or 10 YRS	1 or 2 YRS*

NOTE: The duration of the tank warranty will be found in the model number.

i.e.; RG240T1N has a 1 Year tank warranty
RG240T2N has a 2 Year tank warranty
RG240T6N has a 6 Year tank warranty
RG240T10N has a 10 Year tank warranty

* All (1) year tank warranted units only have a one year parts warranty.

** ***Any*** water heater used for other than a single family housing unit will be covered for only one year on tank and parts regardless of any other warranty period specified. All replacement water heaters and parts carry the balance of the original warranty, i.e. if an original ten (10) year tank warranted water heater develops a leak due to defects in materials/workmanship after only nine (9) years, the replacement unit is warranted for only the balance remaining from the original ten (10) year warranty, or one (1) year in this example.

PLEASE RETAIN THIS WARRANTY IN A SAFE LOCATION FOR FUTURE REFERENCE.