BRADFORD WHITE®
WATER HEATERS

Ultra Low NOx Residential & Light Duty Commercial Gas Power Vent 75 Gallon Models

SERVICE MANUAL

Troubleshooting Guide
and Instructions for Service

(To be performed ONLY by
qualified service providers)

Models Covered by This Manual:

URG2PV75H*N
ULG2PV75H76*N
(*) Denotes Warranty Years

BRADFORD WHITE
ECO-DEFENDER
SAFETY SYSTEM® WITH SCREENLOK® TECHNOLOGY

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

As required by the state of California Proposition 65.

Save this manual for future reference

The Bradford White

UPV75 Series

Through-The-Wall Gas Water Heaters

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BRADFORD WHITE® WATER HEATERS

UPV75 Series

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

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

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

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.

Introduction

The new Bradford White URG2PV75H and ULG2PV75H 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 quieter 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 URG2PV75H and ULG2PV75H water heater uses 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 vent models.

How to Use This Manual

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 UPV 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 13 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.

UPV75 Series

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, unit must match gas type supplied.
Gas Pressure	6.0” W.C. min. for Natural Gas, 14.0” W.C. maximum.
Venting System	Power 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 @ approximately 135°F (57°C).
Pressure Switch	Normally open, closes on vacuum increase @ -1.25” W.C.; Opens on vacuum decrease @ -1.22” W.C.
Blower	115 VAC, 60 Hz, 3.1 amps, 3000 RPM.

Vent Tables

Venting Specifications for:

URG2PV75H

ULG2PV75H

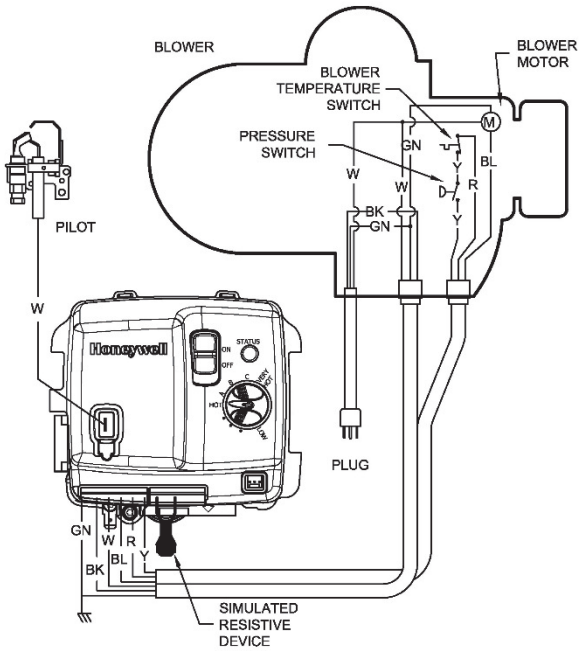
3" Diameter (7.6 cm) PVC Vent Connector Lengths			
Terminating	# of Elbows	Maximum Straight Length ft. (m)	Minimum Straight Length ft. (m)
Through the Wall	1	45 (13.7)	2 (.6)
Through the Wall	2	40 (12.2)	2 (.6)
Through the Wall	3	35 (10.7)	2 (.6)
Through the Wall	4	30 (9.2)	2 (.6)
Through the Roof	0	50 (15.2)	7 (2.1)
Through the Roof	1	45 (13.7)	7 (2.1)
Through the Roof	2	40 (12.2)	7 (2.1)
Through the Roof	3	35 (10.7)	7 (2.1)

4" Diameter (10.2 cm) PVC Vent Connector Lengths			
Terminating	# of Elbows	Maximum Straight Length ft. (m)	Minimum Straight Length ft. (m)
Through the Wall	1	175 (53.3)	10 (3.1)
Through the Wall	2	170 (51.8)	10 (3.1)
Through the Wall	3	165 (50.3)	10 (3.1)
Through the Wall	4	160 (48.8)	10 (3.1)
Through the Wall	5	155 (47.2)	12 (3.6)
Through the Roof	0	180 (54.9)	15 (4.6)
Through the Roof	1	175 (53.3)	15 (4.6)
Through the Roof	2	170 (51.8)	15 (4.6)
Through the Roof	3	165 (50.3)	15 (4.6)
Through the Roof	4	160 (48.8)	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 second. 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 26)
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 DIAGRAMS



Power Up Sequence

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

2. Simulative Resistive Device.
   To assure no outputs are energized if the “Simulated Resistive Device” is out of range, the control will test the “Simulated Resistive Device” for proper operating range. If the “Simulative Resistive Device” 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 ensure the circuit is open. Normal switch positions in the safety circuit are as follows:

   a) 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. 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.
4. Blower pre-purge period (2 seconds).
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:

   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 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 valves 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. Simulated Resistive Device Fault:
   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. **Temperature 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.

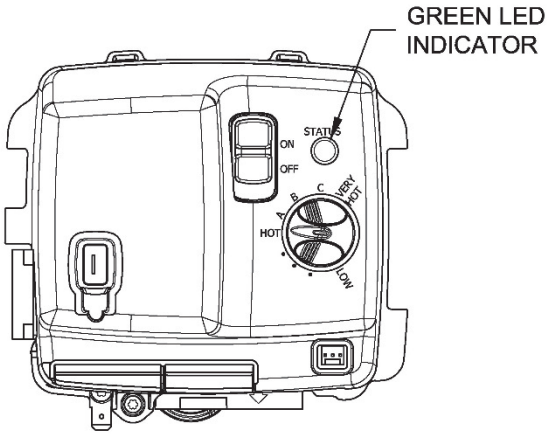
3. Pressure Switch/Blower Temperature Fault:
   a. **Pressure switch closed at start of call for heat**-the gas control waits 4 seconds then, proceeds to flash 2 times with 3 second pause. The control waits 2 minutes and then turns on blower for 30 seconds. The blower turns off after 30 seconds and the 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 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, 2 times with 3 second pause. The gas control waits 5 minutes before repeating ignition sequence.
4. Trial 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.

UPV75 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 build up on pilot electrode. 4. Wire damage to pilot assembly or bad connection at gas valve.	Page 18
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 19
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 19 4. Page 21 5 & 6 Page 23
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 27
Five flash, three second pause	Undesired-false pilot flame present.	1. Pilot valve stuck in open position.	Replace gas control, page 27

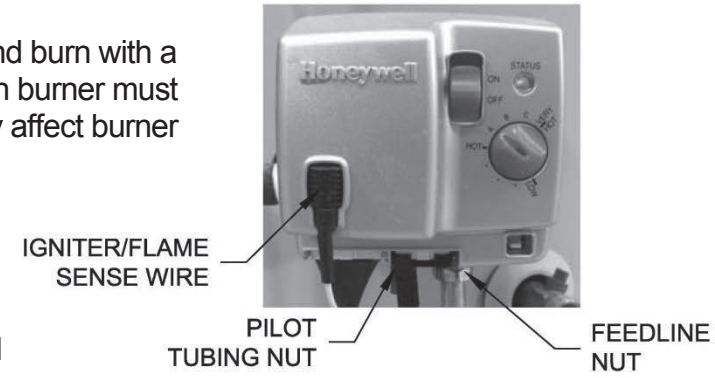
LED Status	Control Status	Probable Cause	Service Procedure
Six-one flash, three second pause	Failed to light pilot. System auto resets.	1. Unstable pilot. 2. Pilot tube blocked or restricted. 3. Oxidation build up on pilot electrode. 4. Wire damage to pilot assembly or bad connection at the gas valve.	Page 18
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 19 4. Refer to venting section of installation manual 5. Page 21 6 & 7. Page 23
Six-three flash, three second pause	Pilot flame extinguished. System auto resets.	1. Unstable pilot. 2. Pilot tube blocked or restricted. 3. Oxidation builds 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 18 5. Refer to installation manual 6. Page 25
Six-four flash, three second pause	Undesired-false pilot flame sensed. System auto resets.	Pilot valve stuck in open position.	Replace gas control, page 27
Seven flash, three second pause	Simulated resistive device fault detected.	Simulative resistance device out of specification.	Page 28
Eight-one flash, three second pause	Simulated resistive device out of specification.	Simulative 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 27
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 27
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 27

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:

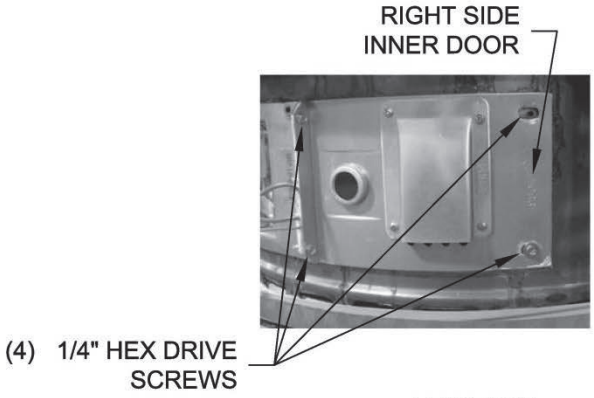
a) Water heater vent is less than the allowable vent length.
b) Gas pressure is out of specification.
c) Pilot flame not fully engulfing spark/flame sensor.

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.

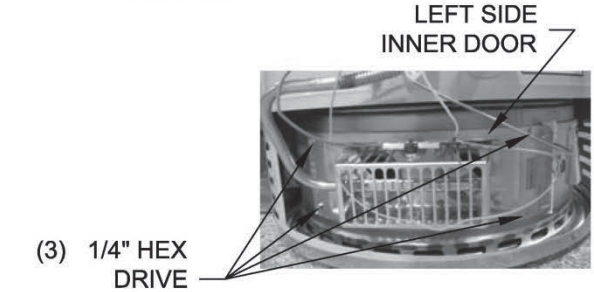


Burner Cleaning

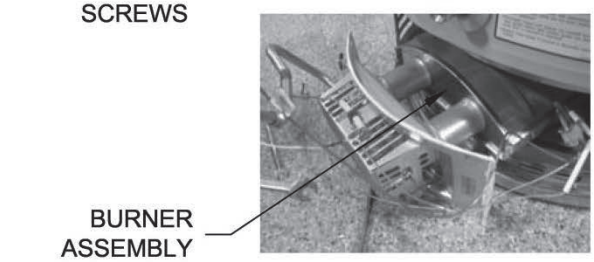
Step 1. Position the gas control power switch to the "OFF" position and unplug the heater from the wall outlet.
Step 2. Turn off gas supply to the water heater.
Step 3. Remove outer jacket door.
Step 4. Disconnect pilot tube (7/16" wrench) and feedline (¾" wrench) from gas control.
Step 5. Disconnect igniter/flame sensor wire from gas control.
Step 6. Remove the (4) ¼" hex drive screws holding the right side inner door in place.



Step 7. Remove the (4) ¼" hex drive screws holding the left side burner door in place.



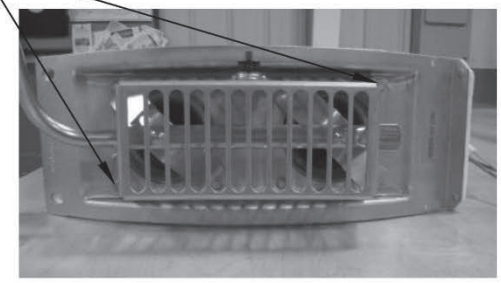
Step 8. Remove burner assembly from combustion chamber.



Burner Cleaning (cont.)

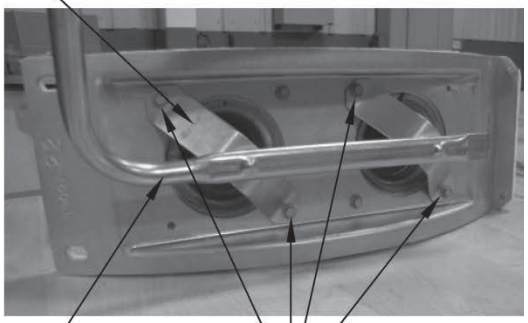
Step 9. Remove manifold mount from burner inner door by removing (2) ¼" hex drive screws.

Step 10. Use a stiff brush, compressed air and/or a vacuum to remove any debris build up from the manifold mount.

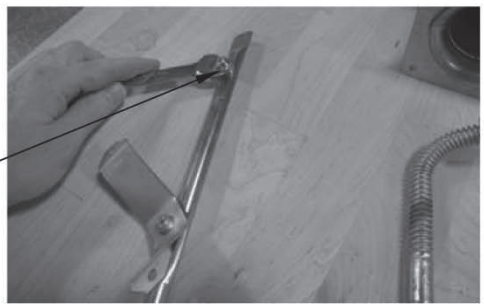


Step 11. Remove (4) ¼" hex drive screws from main burner feedline mounting brackets. Remove brackets from orifices by hand by turning counterclockwise.

Step 12. Remove main burner orifices from feedline (1/2" wrench) inspect orifice, clean or replace if necessary.

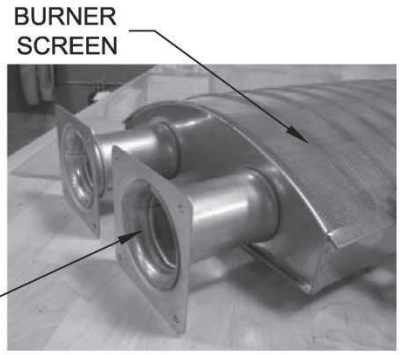


Step 13. Thoroughly inspect burner screen and burner venturis and remove any loose debris accumulation. Inspect burner screen for any openings larger than the normal screen openings.



Step 14. Reassemble burner and reinstall into water heater per service procedure XIII on page 34. 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.



Pilot Inspection, Testing and Replacement

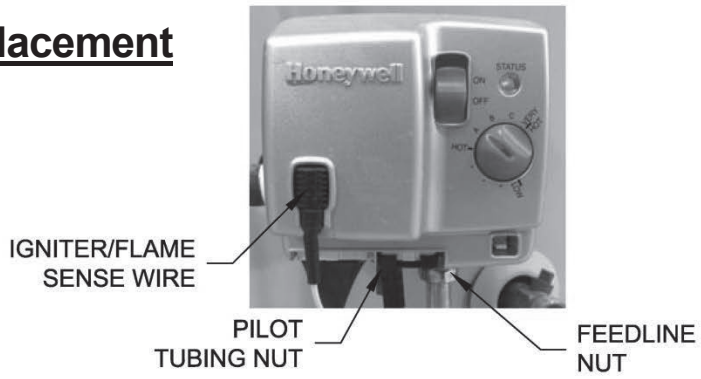
Step 1. Position the gas control power switch to the "OFF" position and unplug the heater from the wall outlet.

Step 2. Turn off gas supply to the water heater.

Step 3. Remove outer jacket door.

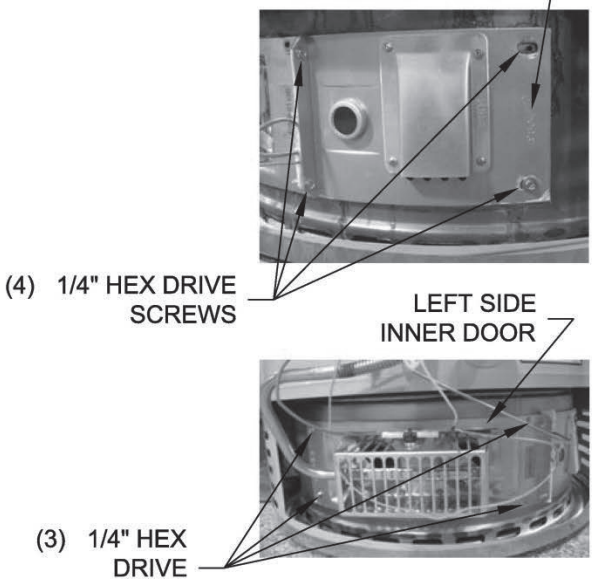
Step 4. Disconnect pilot tube ($^{7}/_{16}$" wrench) and feedline (¾" wrench) from gas control.

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



Step 6. Remove the (4) ¼" hex drive screws holding the right side inner door in place.

Step 7. Remove the (4) ¼" hex drive screws holding the left side burner door in place.



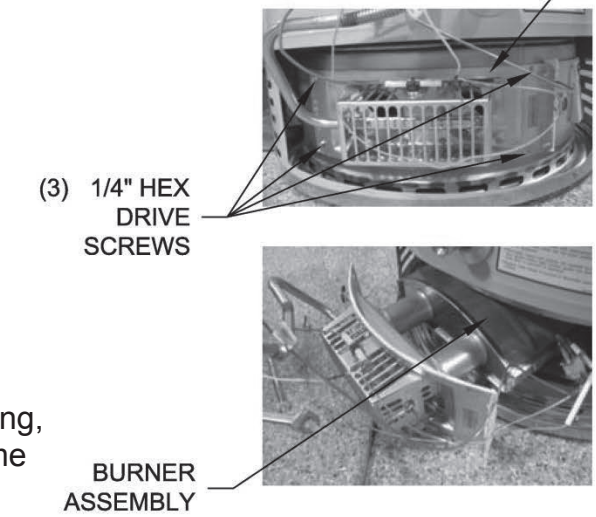
Step 8. Remove burner assembly from combustion chamber.

Step 9. Remove pilot assembly from the burner assembly (¼" nut driver).

Step 10. Visually inspect igniter/flame sense wire for damage. Replace pilot if damage is found.

Step 11. With a multi-meter set to ohms setting, check continuity through igniter/flame sense wire. Replace pilot if no continuity.

Step 12. 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 distance of $^{3}/_{32}$" (.09) from pilot hood.

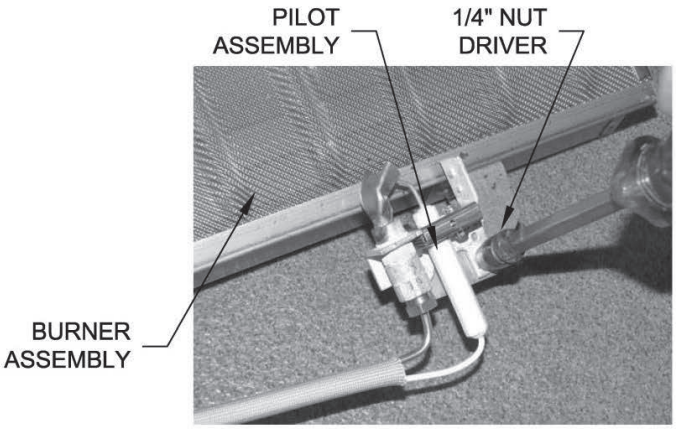


Pilot Inspection, Testing and Replacement (cont.)

Step 13. Visually inspect igniter/flame sense electrode for oxidation build up. Carefully clean any oxidation using very fine emery cloth.

Step 14. Remove pilot assembly from the burner assembly (¼" nut driver).

Step 15. Visually inspect igniter/flame sense wire for damage. Replace pilot if damage is found.



Step 16. With a multi-meter set to ohms setting, check continuity through igniter/flame sense wire. Replace pilot if no continuity.

Step 17. 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.

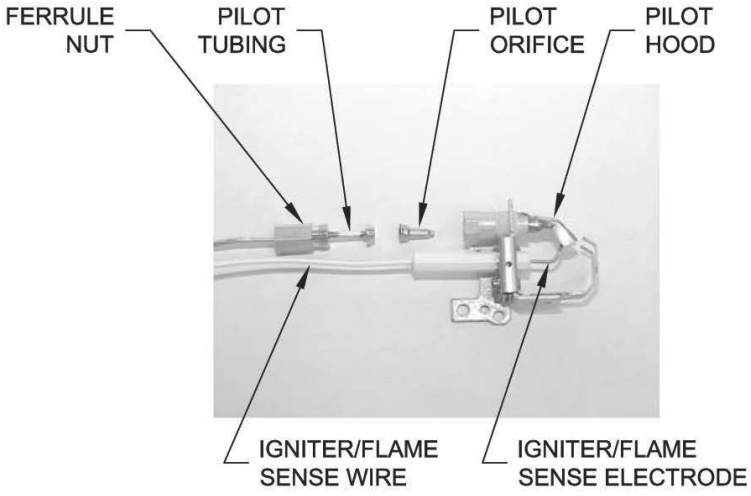
Step 18. Visually inspect pilot tubing for kinks or cracks. If damage is found, replace pilot.

Step 19. 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 20. Reassemble pilot and install on burner. Reinstall burner assembly to water heater. Restore gas supply and check for gas leaks.

Step 21. To resume operation, follow the instruction located on the lighting instruction label or the lighting instruction located in the installation and operation manual



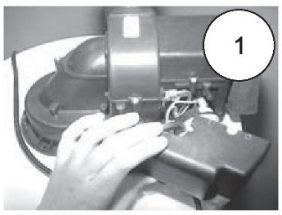
Pressure Switch Testing

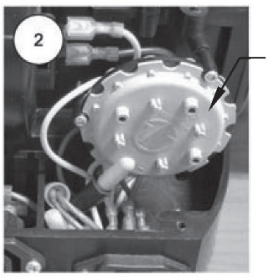
⚠ WARNING
115 volt potential exposure.
Use caution to avoid personal injury.

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

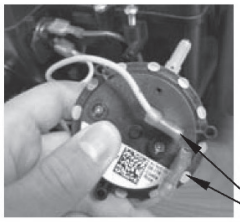
Step 2. Remove the three screws (Phillip's screw driver) from control access cover on blower assembly and remove cover (see photo 1).

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 20)

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 page 7

Y → See blower testing (page 21) 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. Remove pressure switch from blower housing by removing the two T10 screws (see photo 4a). If it does not have 2 screws, carefully remove it from the housing (see photo 4b).

Step 4. Disconnect tubing from pressure switch (see photo 5).

Step 5. Disconnect yellow wires from pressure switch (see photo 6).

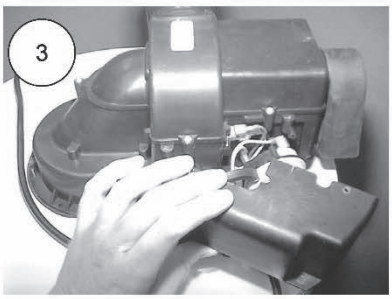
Step 6. Reconnect yellow wires from step 5 to new pressure switch.

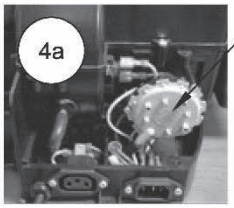
Step 7. Reconnect tubing to new pressure switch.

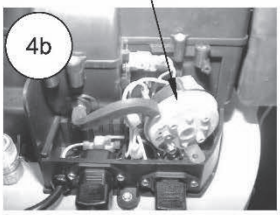
Step 8. Carefully position pressure switch into blower housing (see photo 4b).

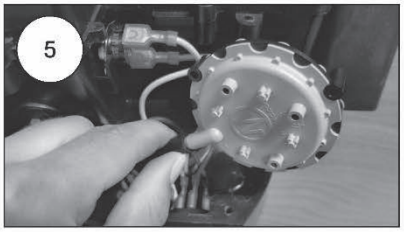
Step 9. Position gas control power switch to "ON" position and verify proper heater operation.

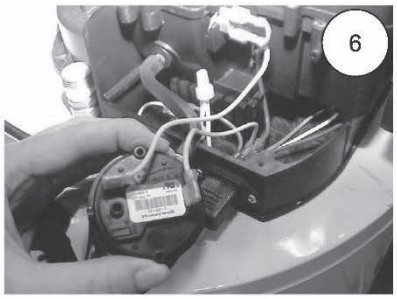
Step 10. Replace control access cover from step 2.









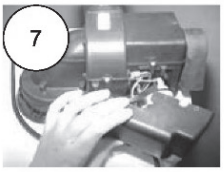


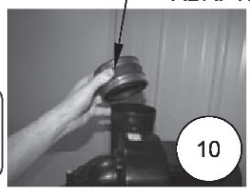
Blower Testing

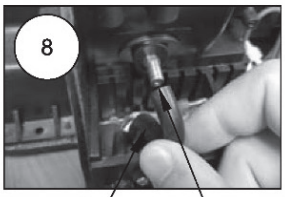
⚠ WARNING
115 volt potential exposure. Use caution to avoid personal injury.

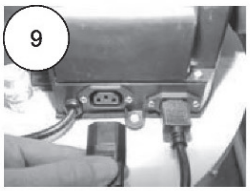
Step 1. Position gas control power switch to "ON" position and adjust control to call for heat.

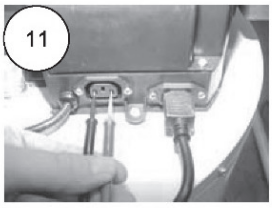
Step 2. Remove the three screws (Phillip's screw driver) from control access cover on blower assembly and remove cover (see photo 7).

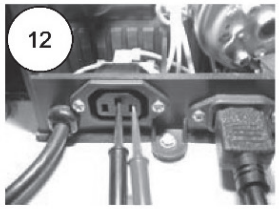


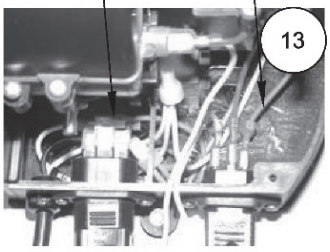








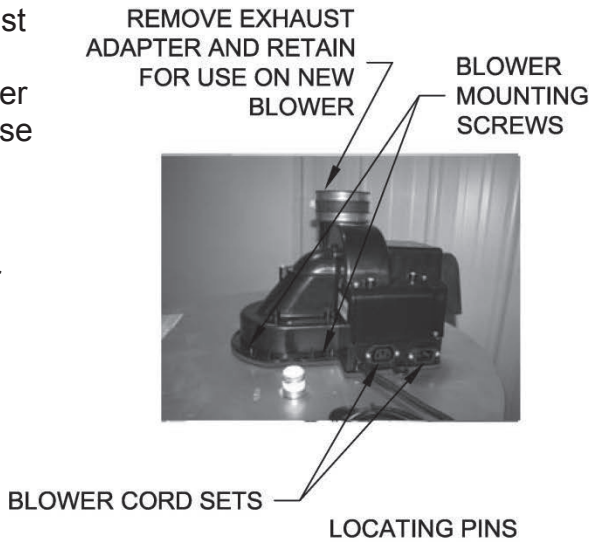




SHOWN WITH
PRESSURE SWITCH
REMOVED

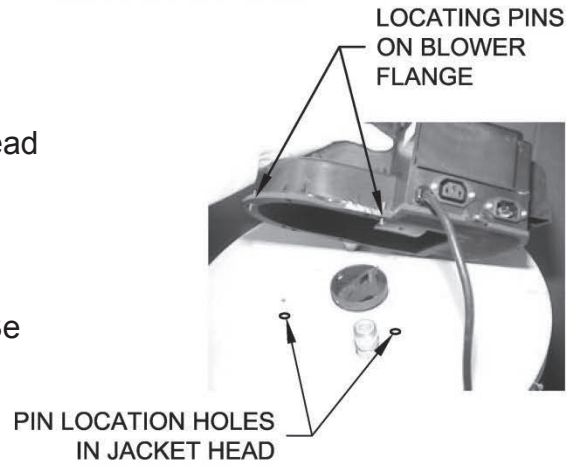
Blower Removal

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 the three blower mounting screws (¼” nut driver) and retain for use on new blower.
Step 7. Remove blower with gasket from water heater.



Blower Installation

Step 8. Clean any debris from jacket head of water heater.
Step 9. 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 10. Secure blower in place using mounting screws from step 6.
Step 11. Re-install exhaust adapter from step 4.
Step 12. Reconnect vent system to exhaust adapter.
Step 13. Reconnect cord sets from step 5.
Step 14. Plug blower power cord into wall outlet.
Step 15. Position gas control power switch to the “ON” position.
Step 16. Verify proper blower operation.



Blower Temperature Switch Testing

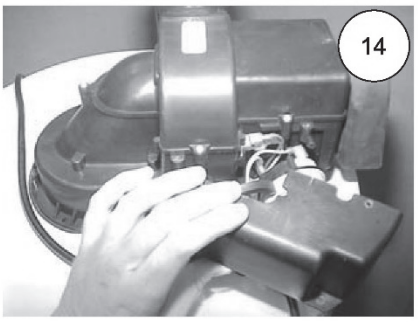
Step 1. Position power switch on gas control to the "OFF" position.

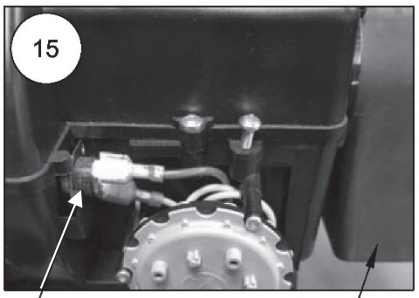
Step 2. Remove the three screws (Phillip's screw driver) from control access cover on blower and remove cover (see photo 14).

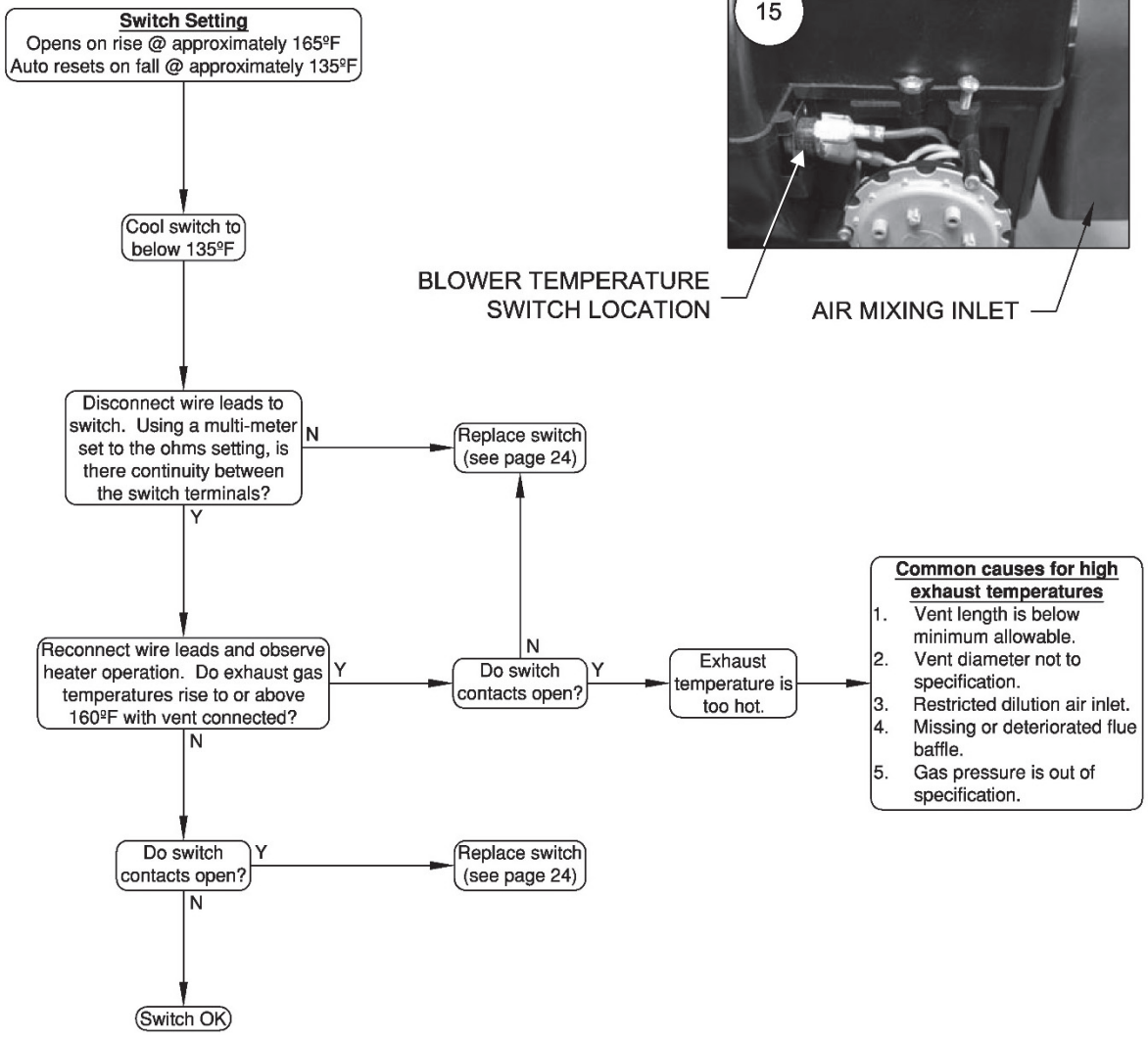
Step 3. Locate blower temperature switch (see photo 15).

⚠ WARNING

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



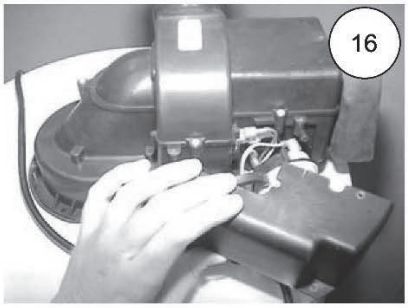


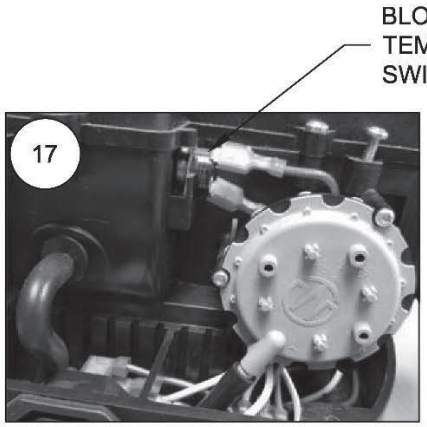


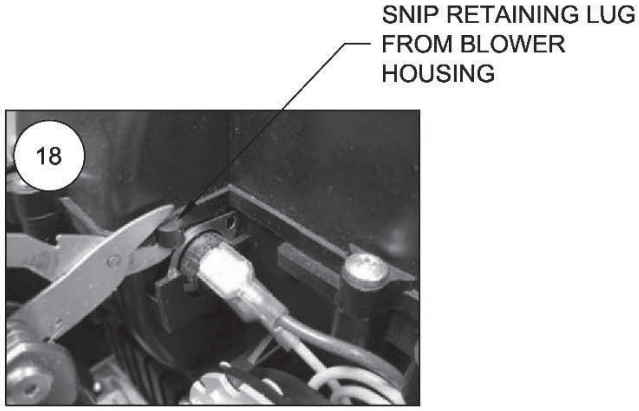
Blower Temperature Switch Replacement

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.

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







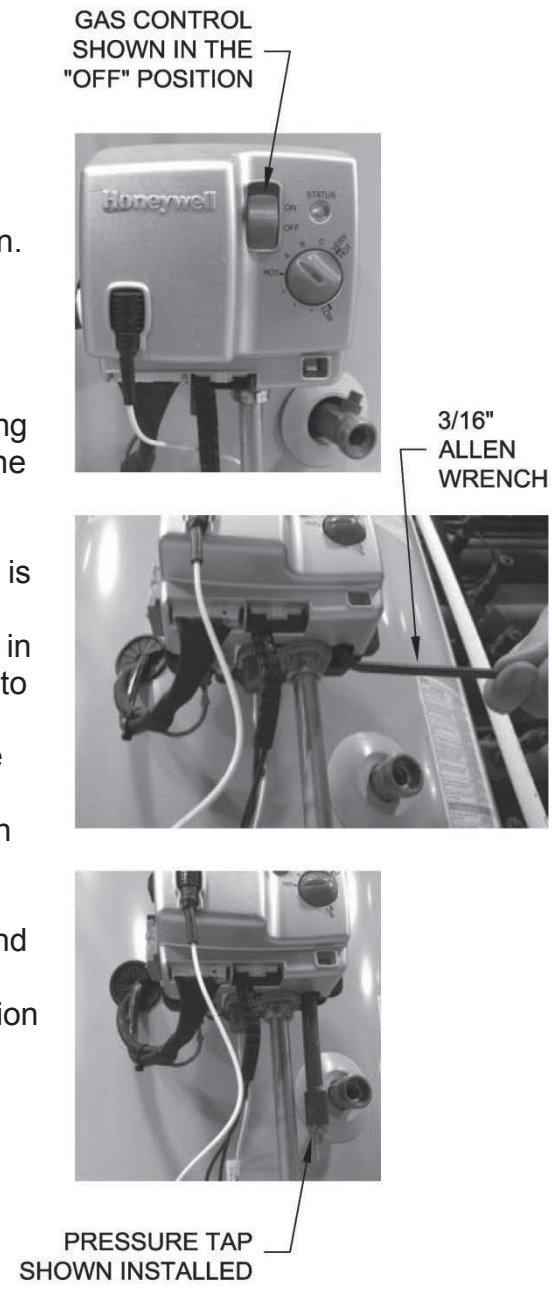
Line Pressure

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 checked 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 ($^3/_{16}$” allen wrench) 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 5.0” ±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 page 27 for gas control replacement.



ECO (Energy Cut Out)

The Honeywell gas control is designed with an ECO device that will reset.

To reset the gas control after an 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 the 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.

UPV75 Series

UPV75 SERVICE PROCEDURE VI
Gas Control
Testing and Replacement

Gas Control Removal From Water Heater

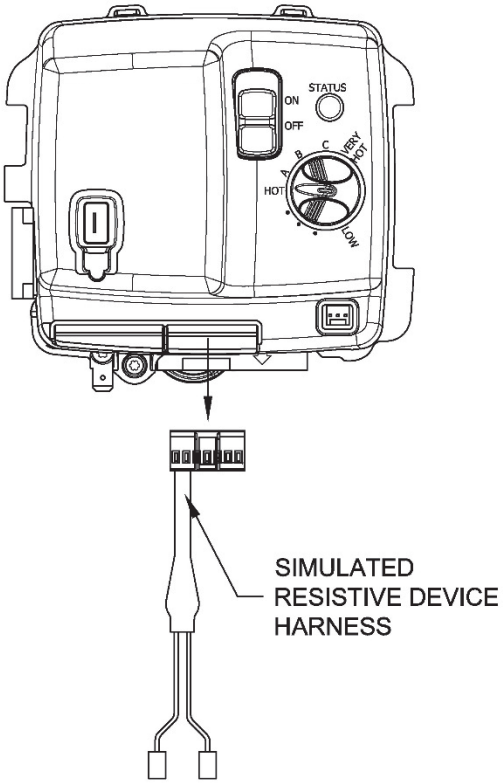
Step 1. Position the gas control power switch to the “OFF” position and unplug heater from wall outlet.
Step 2. Drain the heater to a point below the gas control level.
Step 3. Turn off the gas supply to the water heater and disconnect gas piping from the gas control.
Step 4. Disconnect wire harnesses from the gas control.
Step 5. Remove the outer jacket burner access door.
Step 6. Disconnect the main burner feedline, swing away from the gas control.
Step 7. Disconnect the pilot tube from the gas control and swing away from the gas control.
Step 8. Remove the gas control from the water heater by rotating it 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 the gas inlet of the gas control.

Gas Control Installation Into Water Heater

Step 1. Install a new gas control into the 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.
Step 2. Reattach the main burner feedline, pilot tube, igniter sensor wire and wire harnesses from steps 4, 6 and 7.
Step 3. Re-install the outer jacket burner access door from the previous step 5.
Step 4. Reconnect gas supply piping to the inlet of the gas control and check for leaks.
Step 5. To resume operation, follow the instructions located on the lighting instruction label or the lighting instructions located in the installation and operation manual.

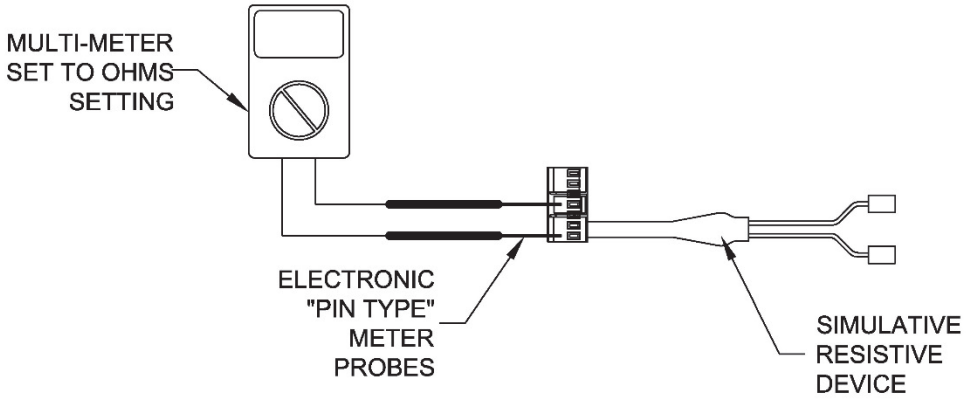
Simulative Resistance Device Testing

Step 1. Position power switch on gas control to the “OFF” position.
Step 2. Disconnect simulated resistive device harness from gas control.
Step 3. Using a multi-meter set to the ohms setting, check resistance of simulative resistance device. Resistance must be between 3,000 ohms and 48,000 ohms. If outside of this range replace the simulated resistive device.



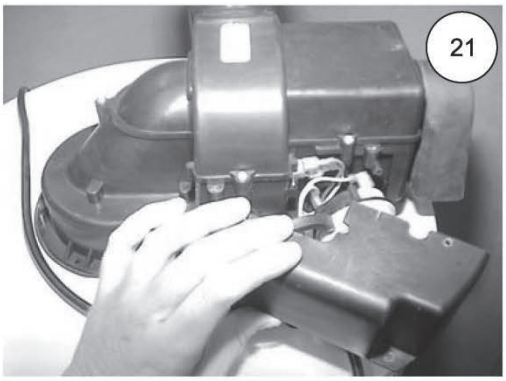
⚠ CAUTION

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



Safety Circuit Voltage Trace

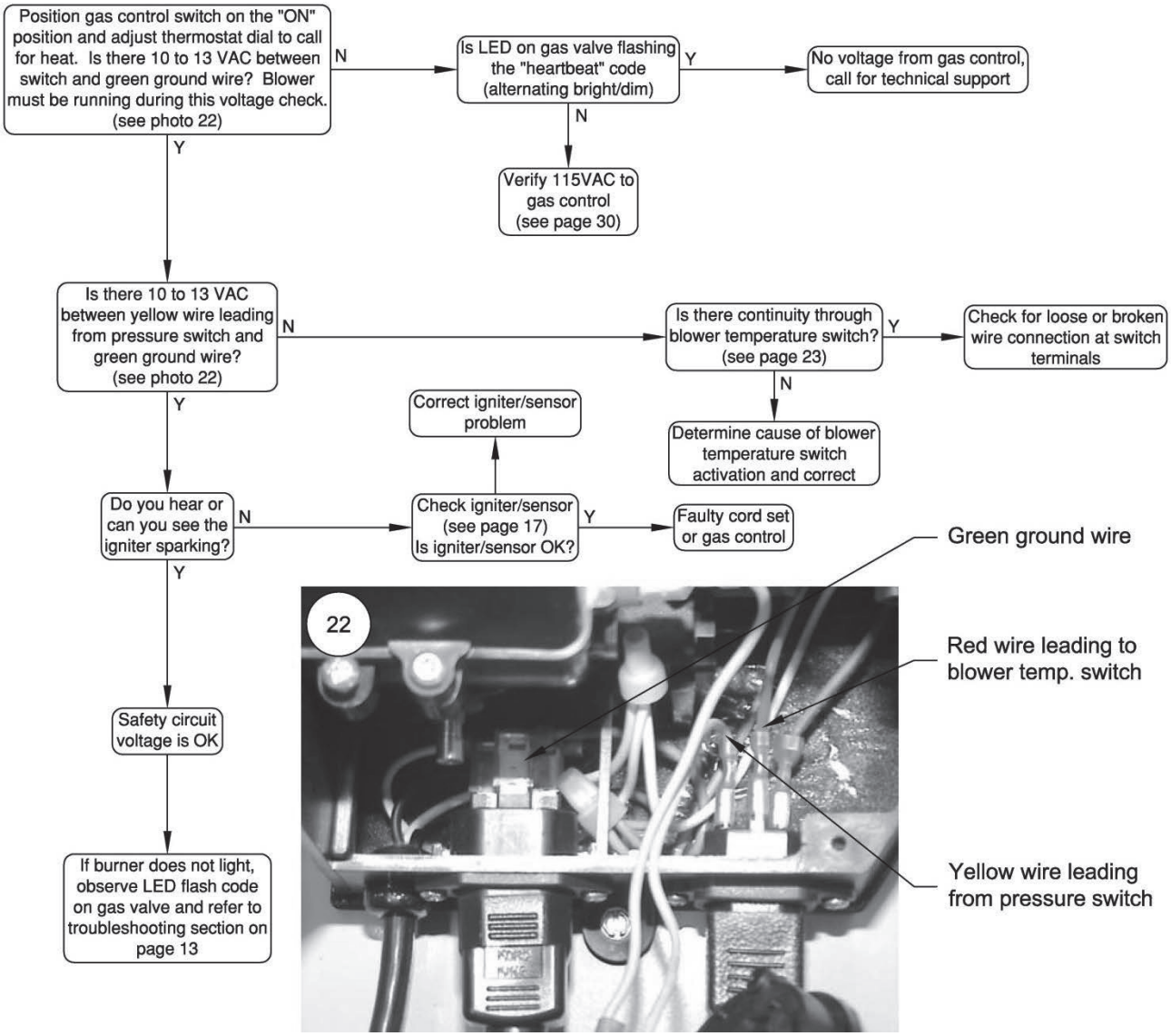
NOTE: This procedure assumes a cool tank.



⚠ WARNING

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

Remove three screws (Phillip's screw driver) from control access cover on the blower and remove the cover (see photo 21).



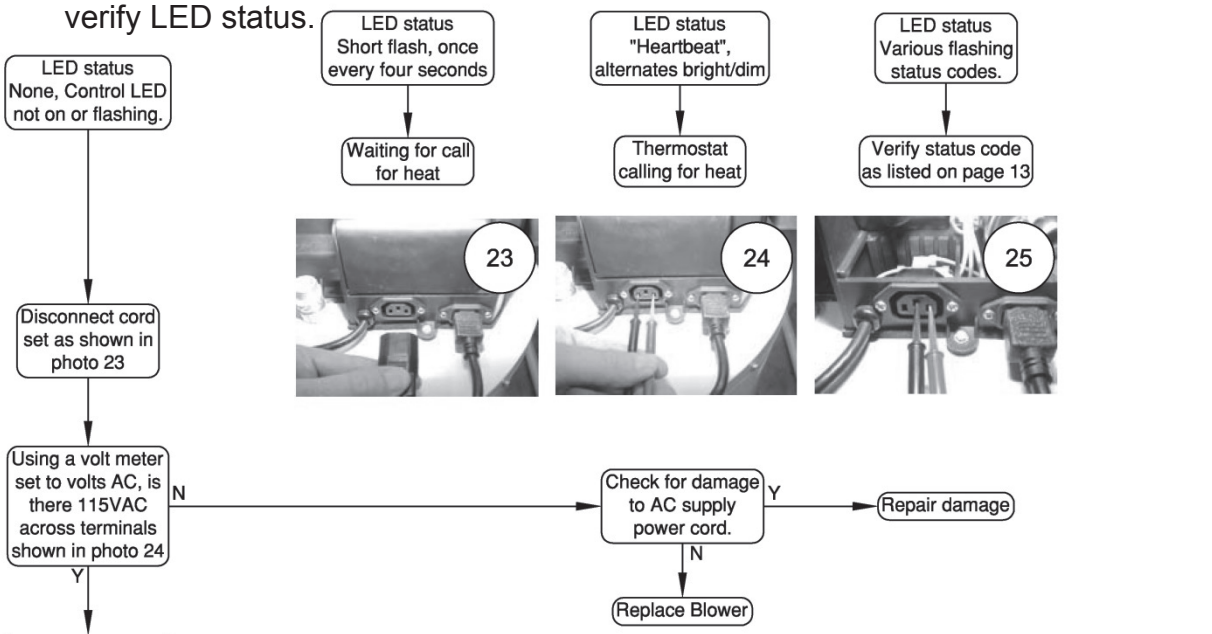
115 VAC Circuit Trace

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

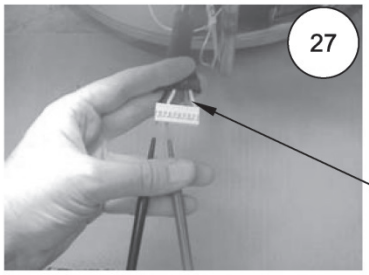
Step 2. With unit plugged in and control power switch in the "ON" position verify LED status.

⚠ WARNING

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



WIRE HARNESS FROM BLOWER



WIRE SHEATH PULLED BACK TO IDENTIFY WIRE COLORS

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 a hose to the drain valve of the 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 the inlet nipple from plumbing system.

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

Step 5. Visually inspect the inlet nipple/dip tube. The inlet nipple/diptube 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 the 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 the 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 Inspection and Replacement

Step 1. Position the 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. Unplug cord sets from the blower (see photo 28).

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

Step 5. Remove blower with gasket from water heater.

Step 6. Remove flue baffle from heater (see photos 29a-b).

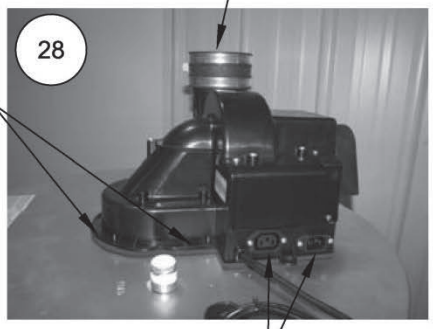
Step 7. Inspect baffle for deterioration and any missing restrictors. Clean any scale or debris build up. Replace with a new flue baffle as necessary.

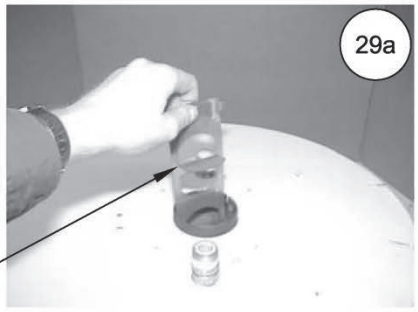
Step 8. Reinstall the baffle into the flue tube.

Step 9. Check burner to insure no scale has accumulated during this operation. See burner cleaning procedure on page 15.

Step 10. Reinstall the blower onto the water heater. Connect vent system and cords set to blower. Plug water heater into a wall outlet.

Step 11. To resume operation follow the lighting instructions located on the lighting instruction label or the lighting instructions located in the installation and operation manual.



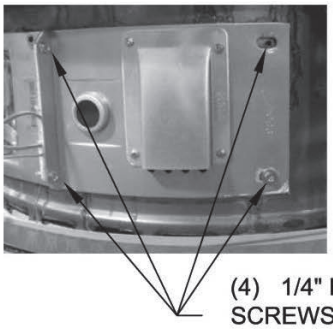


UPV75 Series

UPV75 SERVICE PROCEDURE XIII
Inner Door/Gasket Removal, Inspection & Replacement

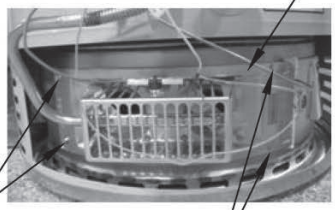
Inner Door Removal Procedure

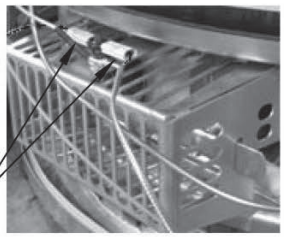
Step 1. Position gas control power switch to the “OFF” position.
Step 2. Remove outer jacket burner access door.
Step 3. Disconnect main burner feedline (3/4” wrench), pilot tube (7/16” wrench) and white igniter/flame sense wire from the gas valve.
Step 4. Remove (4) ¼” hex drive screws from right side inner door.
Step 5. Remove (4) ¼” drive screws from left side burner door.
Step 6. Remove the connectors attached to the resettable thermal switch on the manifold mount.
Step 7. Remove inner door and inspect per step 8.



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

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





If the gasket is not affected by any of the above, gasket replacement may not be 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 1. 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 2. 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.

Installation of Inner Door With Gasket

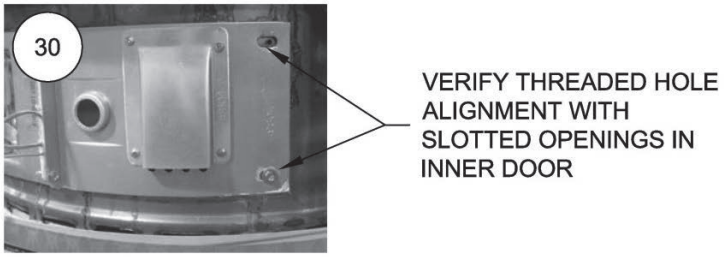
Step 1. Clean any residual gasket residue or other debris from combustion chamber surface before installing the inner door/gasket assembly.

Step 2. Place the burner door into position first. Tighten the feedline nut to the gas valve. Use the ¼" hex drive screw without the built-in washer to secure the burner door to the chamber at position #1 & #2. Use the ¼" hex drive screws with the built-in washer to secure the door at positions #3 & #4 (see photo of left side inner door on page 34). **DO NOT OVER TIGHTEN SCREWS.**

Step 3. Position thermopile wire, pilot tube and igniter wire against burner door flange gasket.

Step 4. Firmly place right side inner door flange against the burner door flange and secure with 2 ¼" drive screws. **DO NOT OVER TIGHTEN SCREWS.**

Step 5. 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 opening (see photo 30). Verify seal integrity around combustion opening. Secure right side inner door using ¼" hex drive screws. **DO NOT OVER TIGHTEN SCREWS**. Verify both burner and right sides of the inner door are properly positioned and sealed against the combustion chamber.



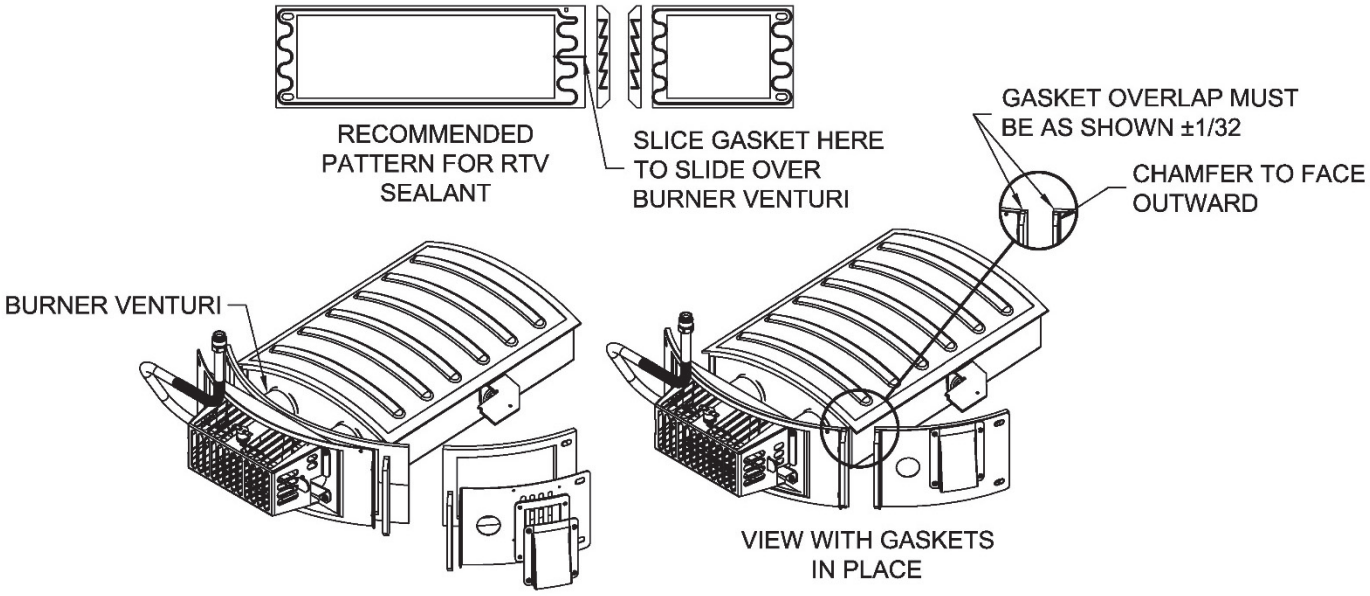
Installation of Inner Door With Gasket (cont.)

Step 6. Replace outer jacket burner access door.

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.

⚠ 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 2, 4 and 5.



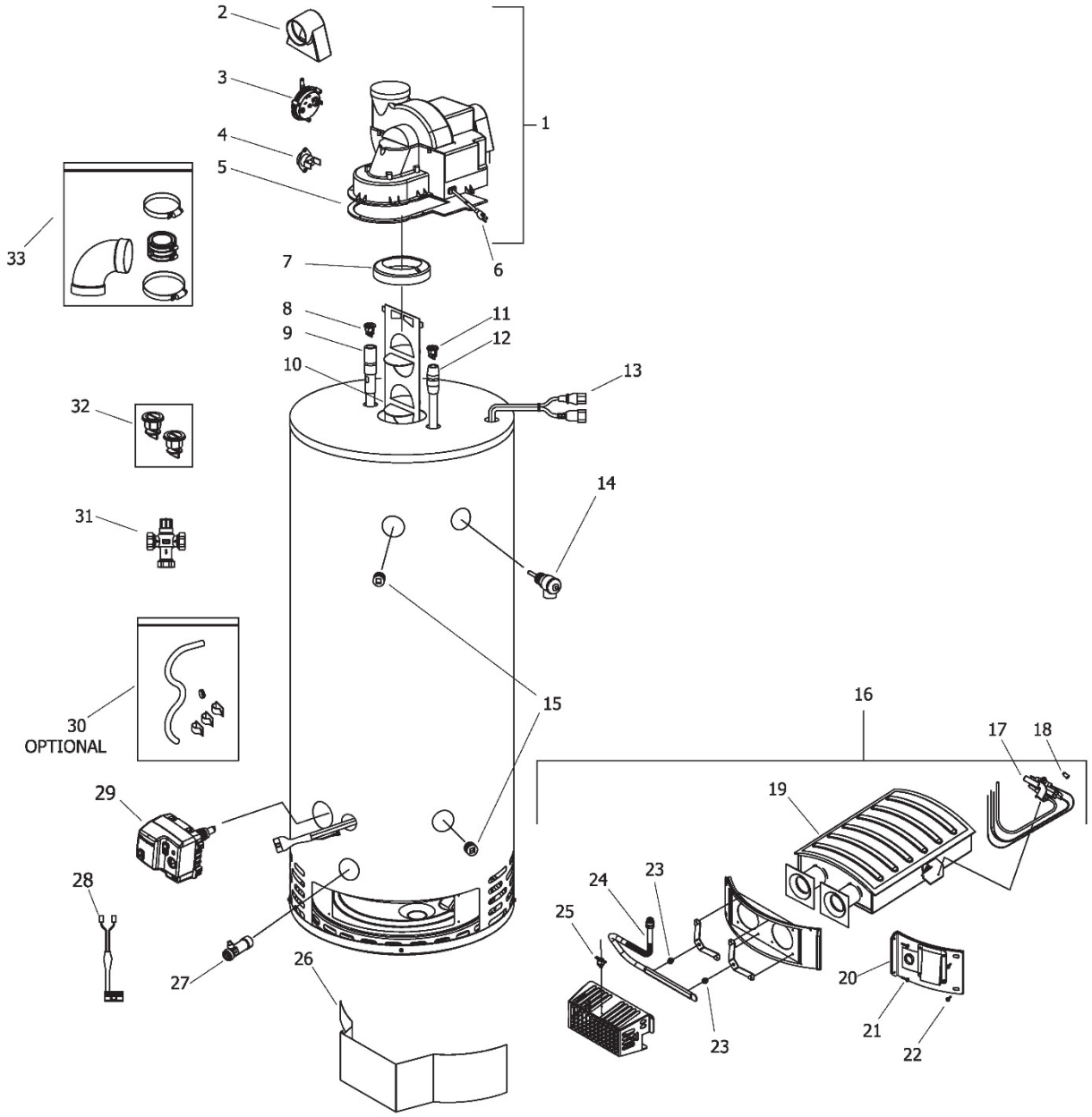
Frozen Exhaust Vent Terminal

If the 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.

Glossary of Terms

BTU	British Thermal Units
GPM	Gallons per Minute
Hz	Hertz
kWhr	Kilowatt Hour
LED	Light Emitting Diode
NPT	National Pipe Thread
Ohms	Ohms of resistance
PSI	Pounds 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

UPV75 Series



1. Blower Complete
2. Air Mixing Inlet Cover
3. Pressure Switch
4. Blower Temp. Switch
5. Blower Gasket
6. Blower Power Cord
7. Flue Reducer
8. Heat Trap Outlet
9. Hot Water Outlet Anode
10. Flue Core
11. Heat Trap Inlet
12. Inlet Dip Tube
13. Wire Harness
14. T&P Valve
15. ¾ NPT Plug
16. Burner Assy.
17. Pilot Assembly
18. Pilot Orifice
19. Main Burner
20. Right Side Inner Door
21. Screw #8-15 x ¾
22. Screw #10-12 x ¾
23. Main Burner Orifice
24. Main Burner Feedline
25. Resettable Thermal Switch
26. Outer Door
27. Drain Valve
28. Simulative Resistive Device
29. Gas Control
30. Condensate hose kit
31. ASSE Approved Mixing Valve
32. Kit-Heat Trap insert
33. Vent adapter w/ vent term.

NOTES

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WATER HEATERS

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Technical Support	800-334-3393
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