

# 299/399 GAS VALVE KIT INSTRUCTIONS

## Kit #550002811

Kit installation shall be completed by qualified agency.

### **⚠ WARNING**

Fire, explosion, asphyxiation and electrical shock hazard. Improper installation could result in death or serious injury. Read this instruction and understand all requirements, including requirements of authority having jurisdiction, before beginning installation. Installation not complete until appliance operation verified per Installation, Operation & Maintenance Manual provided with boiler.

Tools required:

- 2 Crescent Wrenches
  - Slotted Screwdriver
  - Phillips Screwdriver
  - Combustion Analyzer
1. Follow instructions TO TURN OFF GAS TO APPLIANCE found on Operating Instructions label on boiler or in Installation, Operation & Maintenance Manual. Verify all electrical power to boiler is turned off.

### **⚠ WARNING**

Electrical shock hazard. Turn OFF electrical power supply at service panel.

2. Remove front jacket panel(s).

### **⚠ WARNING**

Burn hazard. Verify heat exchanger, igniter, and flame sensor have cooled or use appropriate personal protection equipment before removing.

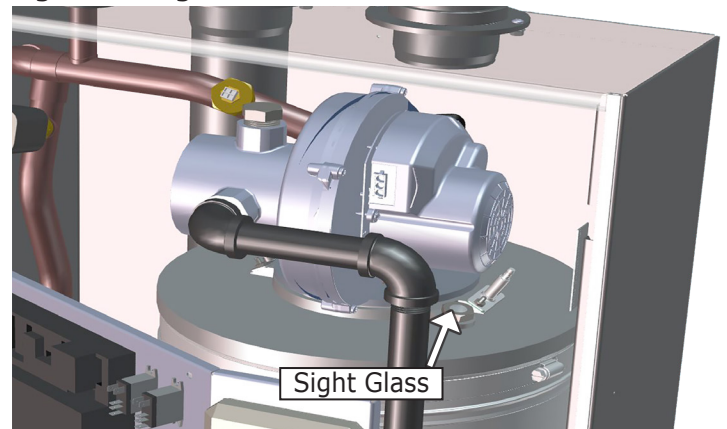
3. Inspect combustion chamber through sight glass. Verify flame is not present. See figure 1.
4. Turn off gas at manual main shutoff valve. See figure 2.

### **NOTICE**

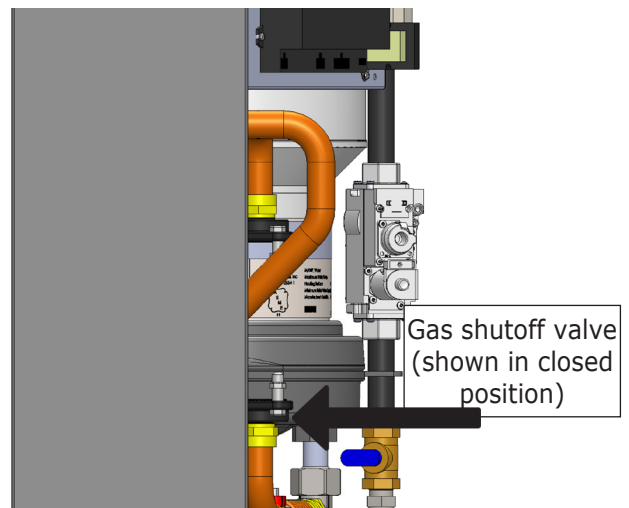
Use two (2) wrenches when tightening gas lines. Boiler components can be damaged if subjected to excessive torque.

5. Gas Valve Harness Removal. Loosen retaining screw. Disconnect harness from gas valve. See figure 3.
6. Remove 4 Phillip head screws from inlet connection of gas valve.
7. Remove four (4) screws securing outer flange to gas valve. See figure 4.
8. 299 LP/Propane units only. LP orifice is be located between gas valve and upper flange.

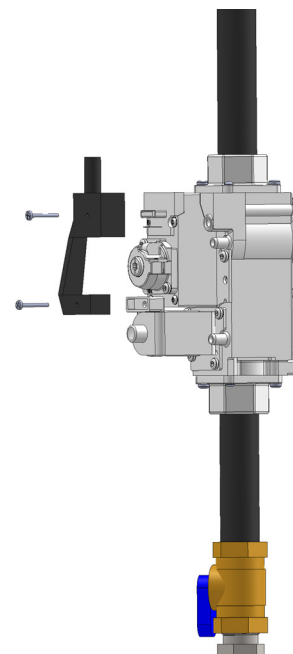
**Figure 1 - Sight Glass**



**Figure 2 - Gas Shutoff Valve**



**Figure 3 - Gas Valve Electrical Connections**



## GAS VALVE KIT INSTRUCTIONS

### **CAUTION**

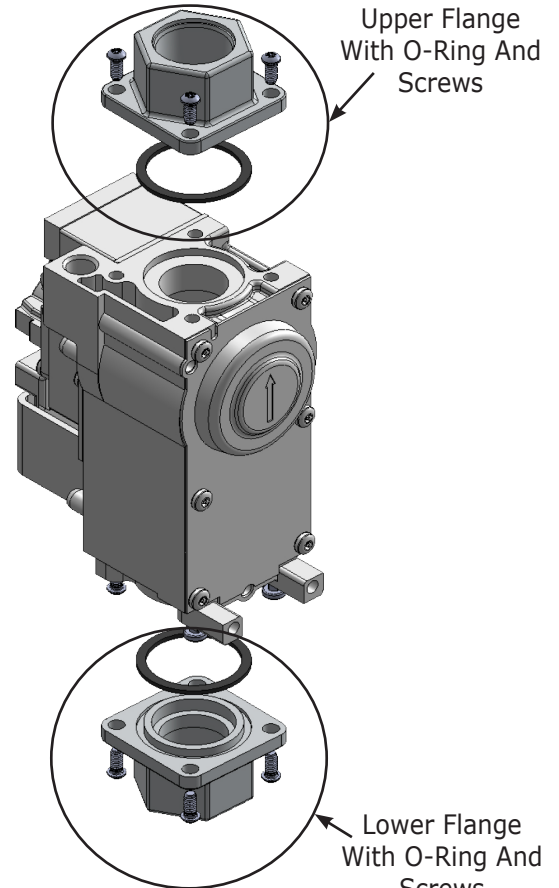
Use of combustion analyzer is manufacturer required for safe conversion. DO NOT attempt conversion without use of combustion analyzer. Failure to follow these instructions could result in carbon monoxide poisoning.

9. Install New Gas Valve
  - Attach outlet flange to gas valve.
  - 299 LP/Propane units only. Place LP orifice between upper flange and gas valve.
  - Attach inlet flange to gas valve.
10. Install Gas Valve Harness
  - Attach gas valve harness to gas valve. Secure with integral screws.
11. Gas Line Leak Test
  - Turn on gas at manual main gas shutoff valve.
  - Check for gas line leaks using gas detector, noncorrosive detection fluid, or other leak detection method acceptable to authority having jurisdiction. Correct leaks immediately.

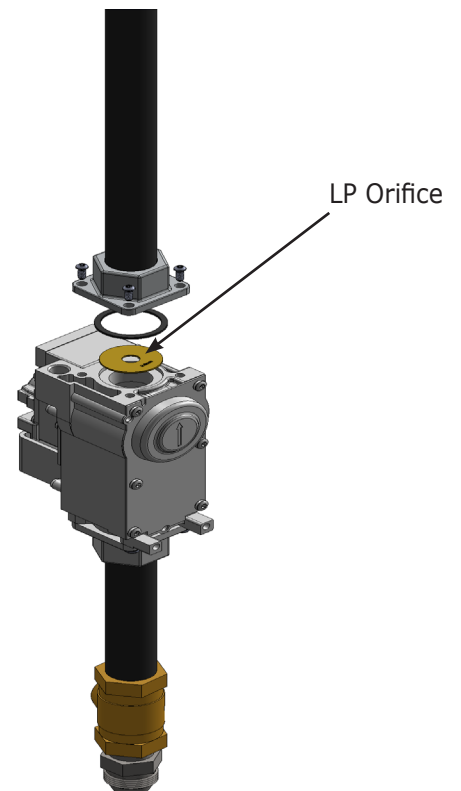
### **DANGER**

Fire hazard. Do not use matches, candles, open flames, or other methods providing ignition source. Failure to comply will result in death or serious injury.

**Figure 4 - Gas Valve with Flanges Removed**



**Figure 5 - LP Orifice Location -299 LP/Propane Units Only**



## GAS VALVE KIT INSTRUCTIONS

### Combustion Adjustment

Calibrated Combustion Analyzer is necessary for the following combustion adjustment.

#### NOTICE

Before setting combustion in HIGH fire, activate all heating zones to dump heat generated by the boiler running on high fire.

1. Enter installer menu (Enter + Menu buttons for 4 seconds).
  - A. Scroll down to System Test.
  - B. Push Enter button to enter System Test. When "System Test Off" displays, push Enter button and "Off" will start flashing.
  - C. Scroll up to High Power and push Enter. "High Power" will stop flashing and becomes solid.
  - D. Unit is now locked in high fire.

#### ⚠ WARNING

Fire, explosion, asphyxiation and electrical shock hazard. Read this instruction and understand all requirements, including requirements of authority having jurisdiction before making adjustments. Failure to follow these instructions could result in death or serious injury.

2. Perform combustion test on HIGH fire using calibrated combustion analyzer. See Figure 8 for combustion analyzer port location. Adjust CO<sub>2</sub> to within specifications by rotating the Throttle Screw, counterclockwise ↺ to increase CO<sub>2</sub> level, clockwise ↻ to decrease CO<sub>2</sub> level. See Figure 6.
 

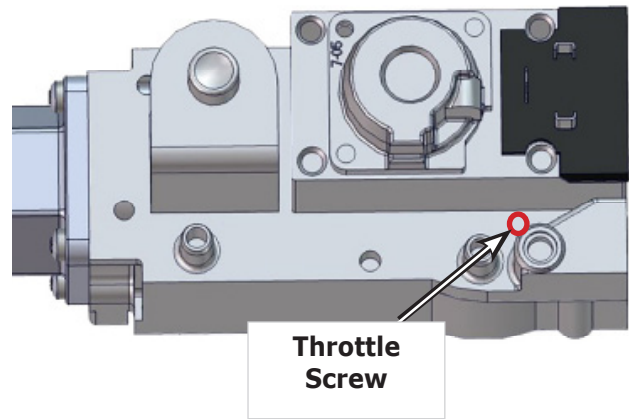
After adjusting CO<sub>2</sub> to correct level, verify:

  - (1) CO PPM level is in specified range and
  - (2) flame signal is in specified range. See Appendix A page 75 of Installation, Operation and Maintenance Manual.

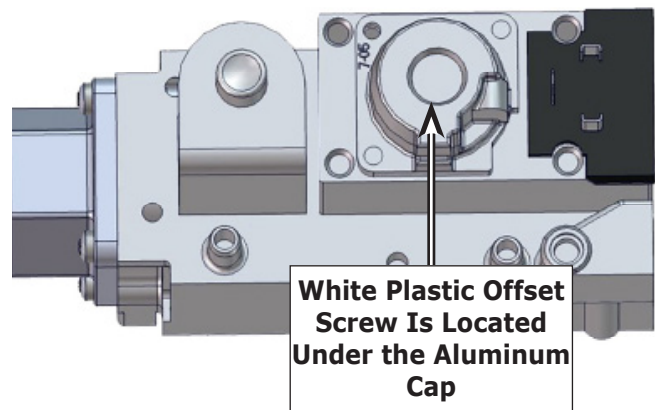
CO<sub>2</sub> level, CO PPM level, and flame signal for HIGH fire are given in the following table.

HIGH Fire Combustion - 299 MBH					
Gas	CO <sub>2</sub>			CO	Flame signal μA
	Min	Max	Design Target		
Natural Gas	9.0%	9.3%	9.3%	<200ppm	6.5 - 7.5
Propane	10.0%	11.0	11.0%		

**FIGURE 6 - Model 299/399 MBH**



**FIGURE 7 - Offset Screw Location - Model 299/399 MBH**



- (3) See Flame appearance Figure 9.

HIGH Fire Combustion - 399 MBH					
Gas	CO <sub>2</sub>			CO	Flame signal μA
	Min	Max	Design Target		
Natural Gas	9.3%	9.7%	9.5%	<200ppm	6.5 - 7.5
Propane	10.0%	11.0	10.5%		

## GAS VALVE KIT INSTRUCTIONS

3. Switch to LOW fire in boiler System Test. On user interface push Enter. "HIGH power" starts flashing. Scroll down to "Low Power". Push Enter. "Low Power" stops flashing and becomes solid. Boiler is now locked in LOW fire.

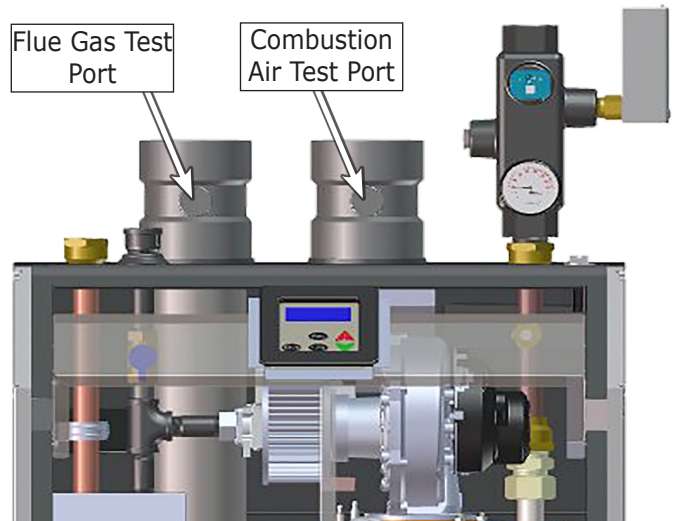
**Adjust Offset Screw slowly and in small steps, no more than 1/8 of a turn each time.**

Perform combustion test on LOW fire using calibrated combustion analyzer. Adjust CO<sub>2</sub> to within specifications by turning Offset Screw, clockwise ↻ to increase CO<sub>2</sub> level, counterclockwise ↻ to decrease CO<sub>2</sub> level. After adjusting CO<sub>2</sub> to correct level, verify (1) CO PPM level is in specified range and (2) flame signal is in specified range. CO<sub>2</sub> level, CO PPM level, and flame signal for LOW fire see following tables.

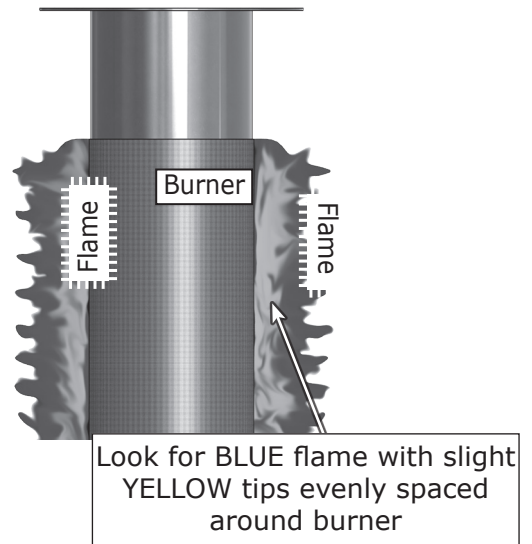
LOW fire combustion -299/ 399 MBH					
Gas	CO <sub>2</sub>		Design Target	CO	Flame signal
	Min	Max			µA
Natural Gas	8.8%	9.2%	9.0%	<100ppm	>4.5
Propane	9.8%	10.5%	10.0%		

4. See Figure 7 for location of Offset Screw on modulating gas valve of various boiler models. T40 male Torx bit is necessary for removal of Offset Screw cap and adjustment of Offset Screw.
5. Set boiler to High Power using System Test to confirm combustion in High Fire (Step 2).
6. Combustion setting is now complete.
  - A. Exit System Test mode by pushing Enter. High Power will start flashing.
  - B. Scroll down to "OFF". Push Enter button "OFF" stops flashing.
  - C. Push Menu button twice to escape Installer Manual. Boiler returns to CH mode or DHW mode depending on type of call for heat available.
7. Check ignition quality 4 times with front jacket off. Close internal manual gas valve for 5 seconds and then re-open it. Boiler will go through post purge – prepurge – ignition sequence. Reset boiler if boiler goes into lockout.
8. Check ignition quality 4 times with the front jacket on. Close the external gas shutoff valve for 5 seconds and re-open it. Boiler will go through a post purge – prepurge – ignition sequence. Reset the boiler if boiler goes into lockout.
9. Install front jacket panel(s).

**FIGURE 8 - Combustion Analyzer Port - 399 MBH**



**FIGURE 9 - Burner Flame**



299/399 Gas Valve Kit # 550002811		
Gas Valve, VR4615	-	1
Gas Valve Flange Kit	-	1
Instructions	240010104	1