

# LP Gas (Propane) Conversion Instructions



## DANGER

**Asphyxiation Hazard.** These instructions include a procedure for adjusting the air-fuel mixture on this boiler. Always use a combustion analyzer to measure the CO<sub>2</sub> (or Oxygen) and Carbon Monoxide (CO) levels in flue gas. Adjusting the air-fuel mixture without a proper combustion analyzer will result in unreliable boiler operation, personal injury, or death due to carbon monoxide poisoning.

**Explosion Hazard, Electrical Shock Hazard, Burn Hazard.** The gas supply shall be shut off prior to disconnecting the electrical power, before proceeding with the conversion.



## WARNING

This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, an explosion or production of carbon monoxide may result causing property damage, personal injury, or loss of life. The qualified service agency is responsible for proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit.

These instructions are intended for use only with sizes listed in this document.

Consult Appendix A in Installation, Operating and Service (I, O & S) Instructions for installations above 2,000 ft. I, O & S Instructions are supplied with boiler and available on manufacturer's website.

These instructions are included in LP conversion kits listed in Table 1:

Table 1: LP Conversion Kits

Size	LP Conversion Kit	Page
085	107934-01	2-3
110	107935-01	2-3
155	107936-01	2-3
205	107937-01	2-3
270	107938-01	4
320	108015-01*	5
399	108015-02*	5

\* Also used for LP Service kit

### Required Tools/Equipment:

- 15/16" Wrench (Flare Fitting)
- 1-1/8" Wrench (Gas Flex Line)
- Torx T-25 (Gas Valve to Venturi)
- Torx T-30 (Venturi Assembly to Blower)
- Phillips Head Screwdriver
- Flat Head Screwdriver/ 5/16" Nut Driver
- 7mm Hex Head Socket (Venturi Assembly to Blower 320/399)
- 1-7/16" Wrench (Gas Valve Adaptor 320/399)
- Combustion Analyzer

### Parts Included with This Kit:

- LP Venturi
- Hardware
- Blower O-ring
- Gas Valve Coupling
- Rating Label
- Service Label

## To convert this boiler for use on LP gas, perform the following steps:

1. If not already done, install the boiler in accordance with the Installation, Operating, and Service instructions, following all instructions in Section XI “Start-up and Check-out” up to Step 10.
2. Disconnect power supply to boiler
3. Shut off gas supply to boiler

### Steps 4 thru 12 for boiler sizes 85, 110, 155 and 205 (Figure 3)

4. Disconnect tube to air proving switch and disconnect harness from rectifier module on gas valve. (Figure 8)
5. Use wrench and back up wrench to disconnect flexible gas pipe from gas valve at flare fitting (Figure 2).
6. Remove (2) screws connecting gas valve to venturi assembly. (Figure 3)
7. Remove (3) screws connecting venturi assembly to blower. (Figure 3)
8. Replace natural gas venturi assembly with propane (LP) venturi assembly, ensuring o-ring between blower and venturi assembly is in place and arrow on venturi points up. (Figure 3)
9. Secure venturi assembly to blower using (3) screws removed in step 7.
10. Ensure coupling between venturi assembly and gas valve is in place and secure using (2) screws removed in step 6.
11. Re-connect flexible gas pipe to gas valve.
12. Re-connect tube to air proving switch and reconnect harness to rectifier module on gas valve.

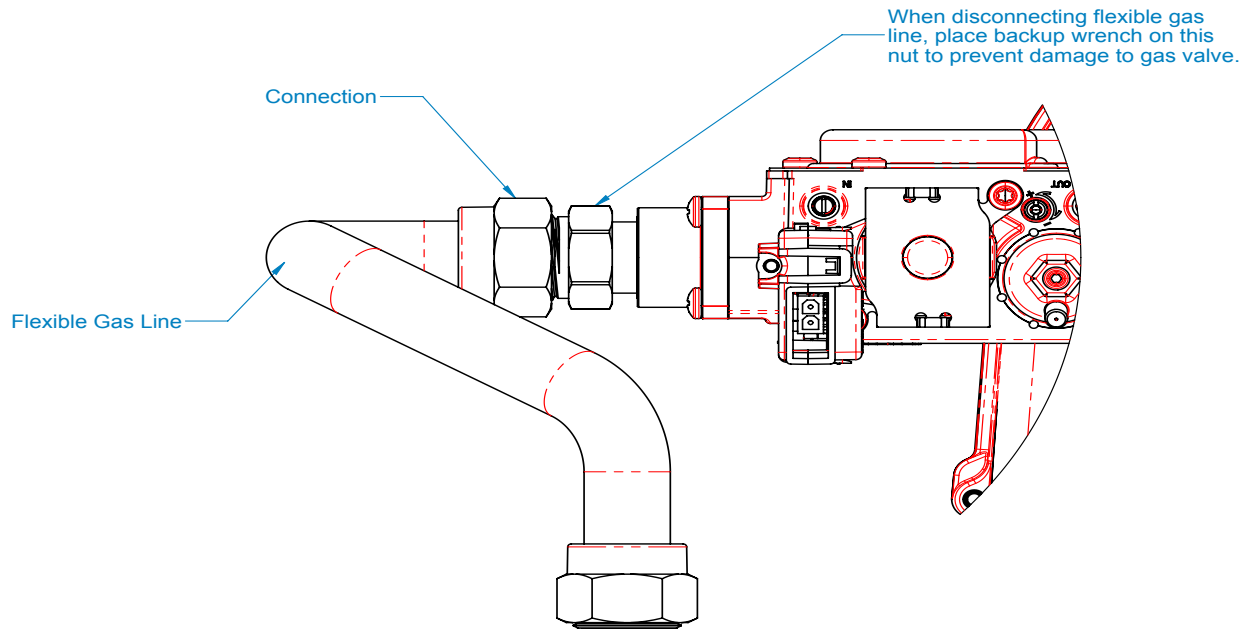
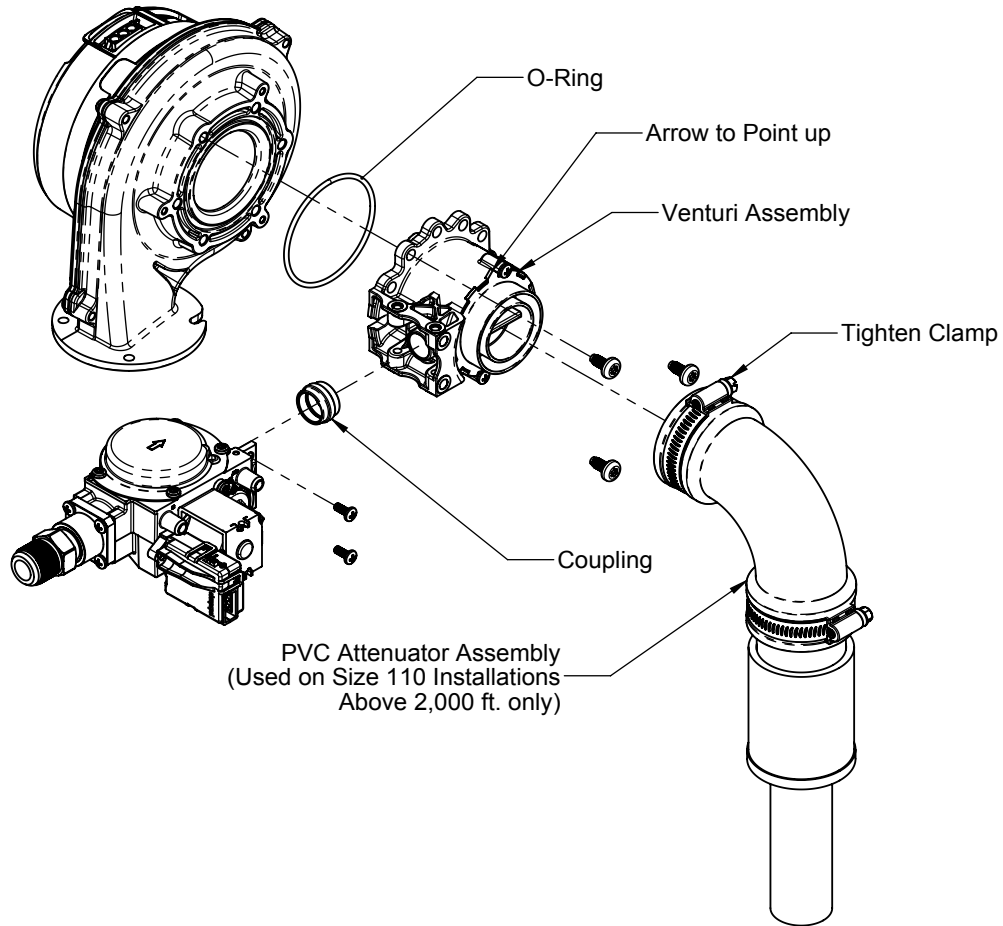


Figure 2: Backup Wrench Detail

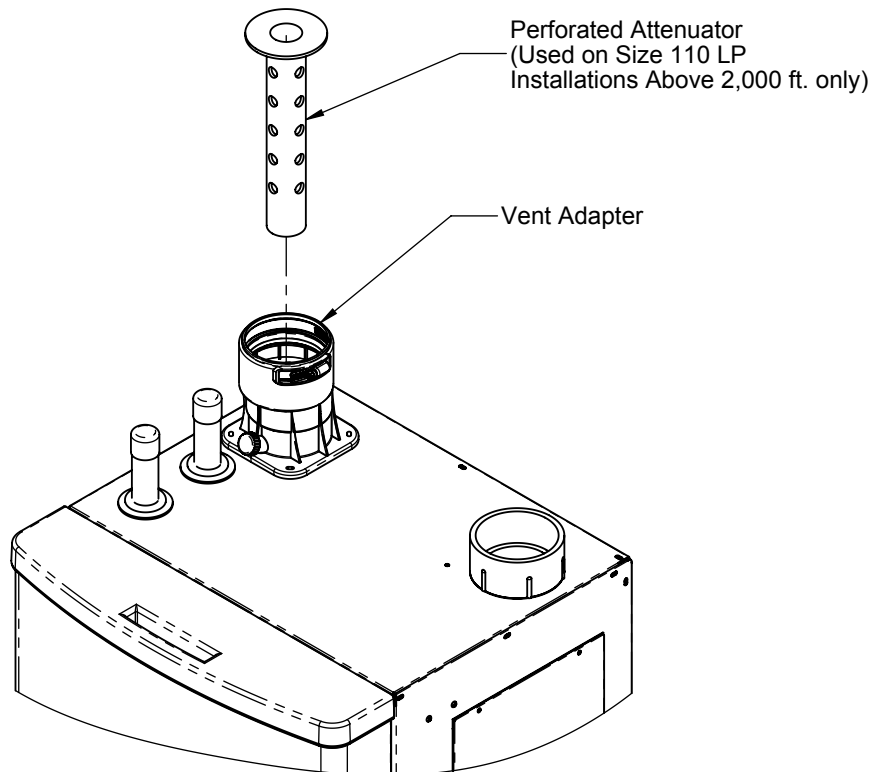
**Steps 13 thru 14 for boiler size 110 installations above 2,000ft only (Figure 3 and 4)**

13. Attach PVC attenuator to venturi assembly. (Figure 3)

14. Insert perforated attenuator into vent adaptor (Figure 4) and skip to step 27.



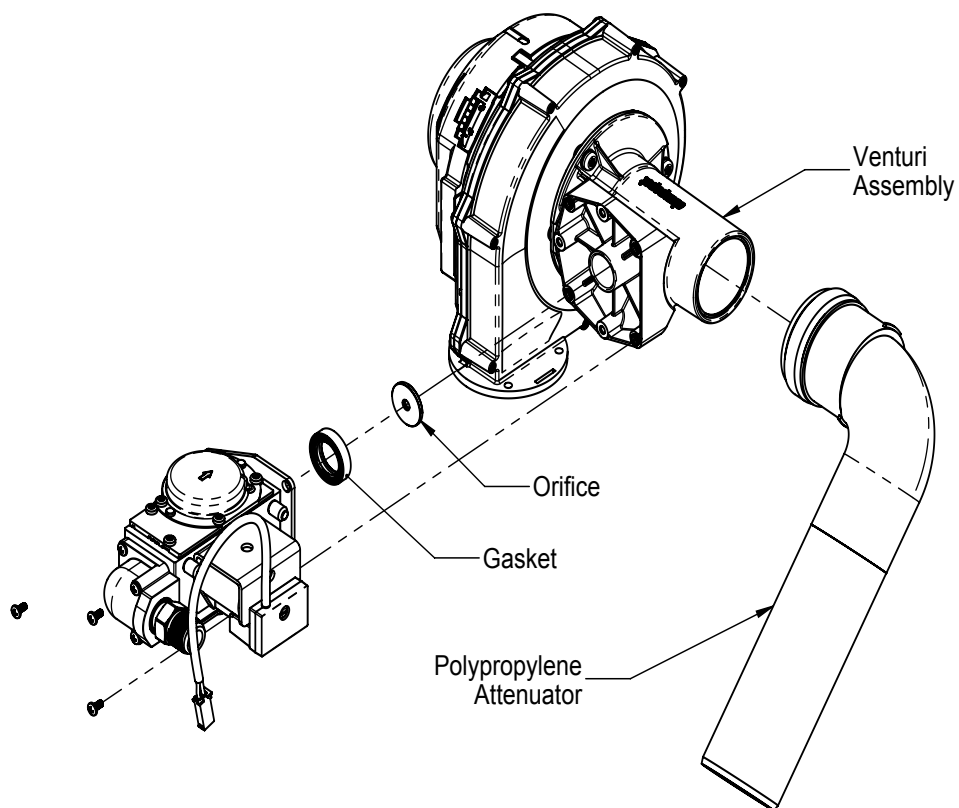
**Figure 3: 085-205 Blower/Gas Valve/Venturi Detail**



**Figure 4: Vent Attenuator for 110 LP Installations above 2,000ft.**

**Steps 15 thru 21 for boiler size 270 (Figure 5)**

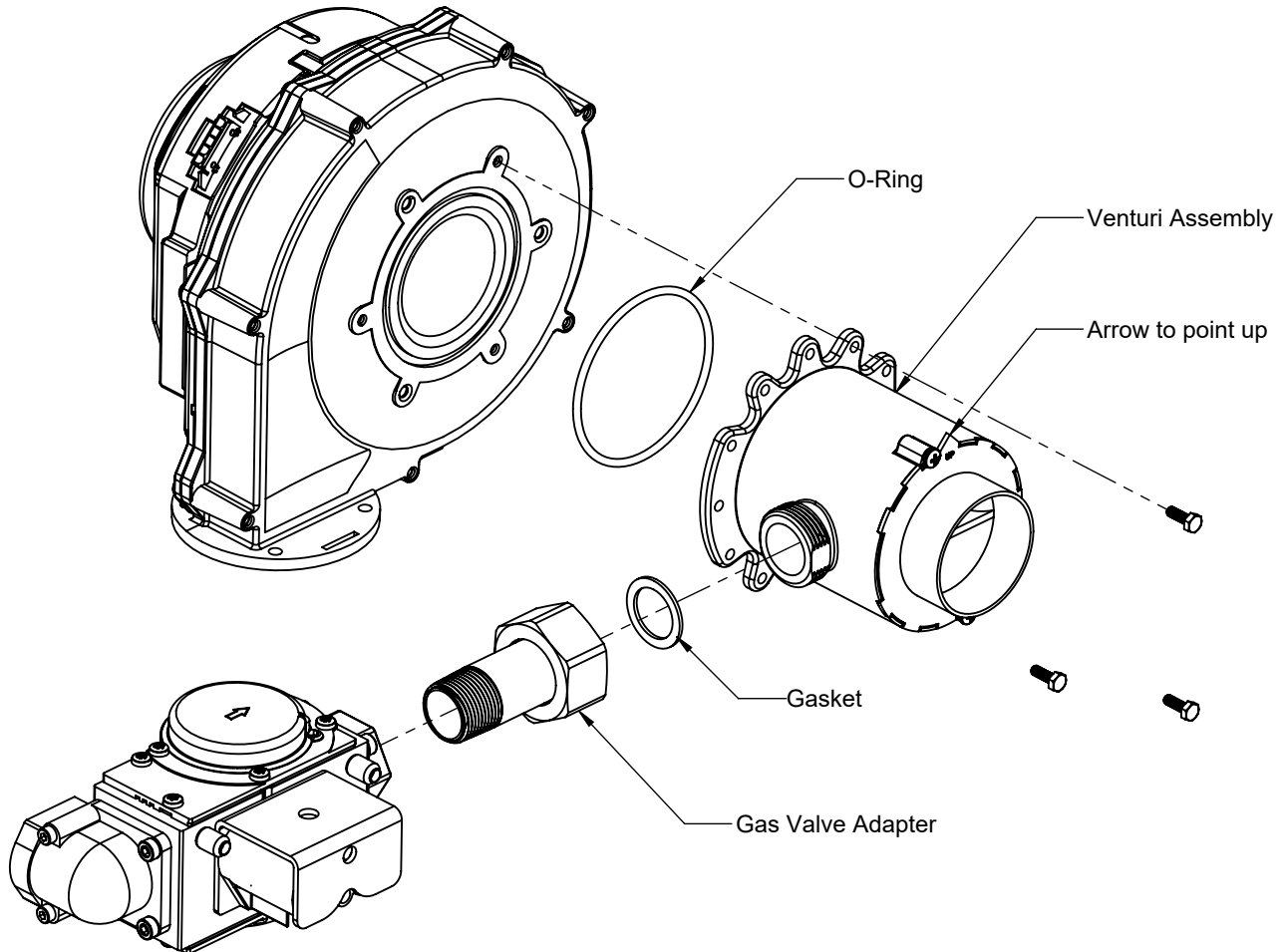
15. Remove attenuator from venturi assembly, disconnect tube to air proving switch, and disconnect harness from rectifier module on gas valve. (Figure 9)
16. Use wrench and back up wrench to disconnect flexible gas pipe from gas valve at flare fitting (Figure 2).
17. Remove (3) screws connecting gas valve to venturi assembly. (Figure 5)
18. Remove gasket from gas valve outlet, insert factory supplied orifice into groove of gasket and replace. (Figure 5)
19. Secure gas valve to venturi assembly using (3) screws removed in step 17.
20. Re-connect flexible gas pipe to gas valve.
21. Re-attach attenuator to venturi assembly. Re-connect tube to air proving switch, reconnect harness to rectifier module on gas valve and skip to step 27.



**Figure 5: 270 Blower/Gas Valve/Venturi Detail**

**Steps 22 thru 26 for boiler sizes 320 and 399 (Figure 6)**

22. Loosen union between gas valve and venturi assembly
23. Remove (3) screws connecting venturi assembly to blower.
24. Replace natural gas venturi assembly with propane (LP) venturi assembly, ensuring o-ring between blower and venturi assembly is in place and arrow on venturi points up.
25. Secure venturi assembly to blower using (3) screws removed in step 23.
26. Tighten union between gas valve and venturi assembly, and ensure gasket is between gas valve adaptor and venturi. Gas valve is oriented as shown in Figure 6.



**Figure 6: 320-399 Blower / Gas Valve / Venturi Detail**

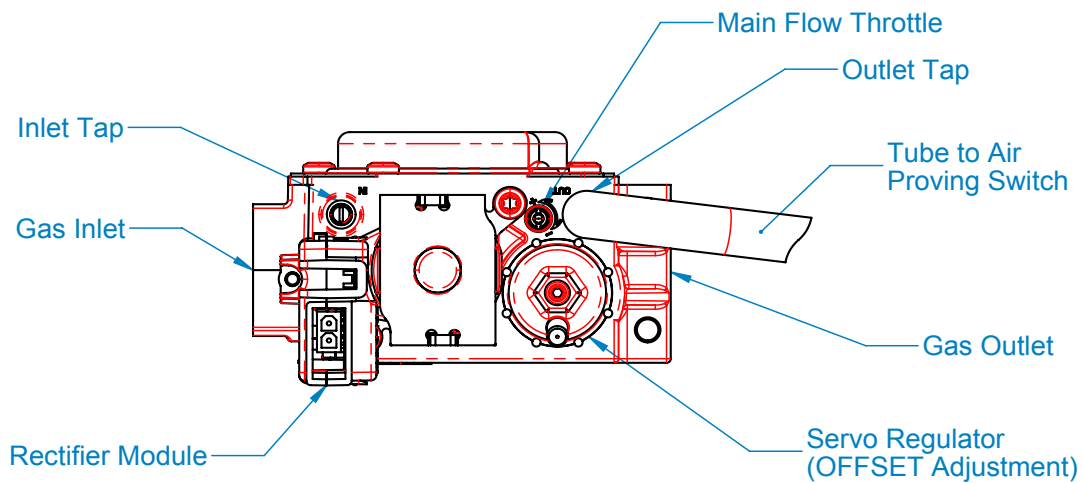
27. Before attempting to start the boiler, turn the throttle (Figure 8 and 9) clockwise until it stops (several full turns).
28. Turn throttle counter-clockwise the exact number of turns shown in Table 7.

**WARNING**

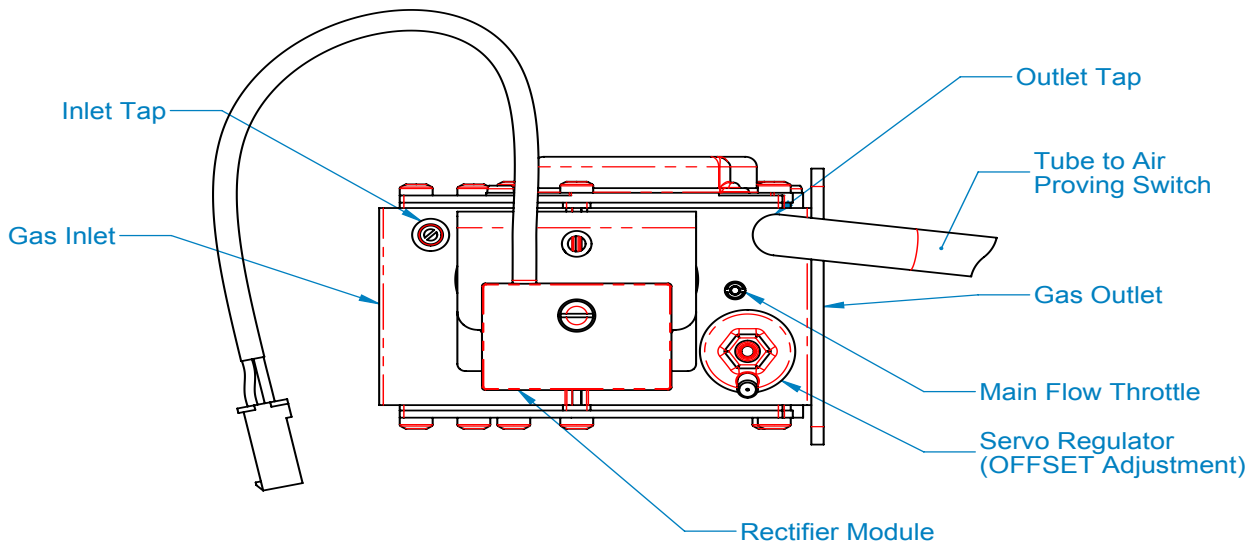
The throttle adjustments shown in Table 7 are approximate. The final throttle setting must be found using a combustion analyzer. Leaving the boiler in operation with a CO level in excess of 200PPM air-free could result in injury or death from carbon monoxide poisoning.

**Table 7: Starting Number of Throttle Turns for Conversion to LP Gas**

Boiler Size	#Counter-clockwise Turns (From Fully Closed)
085	10.0
110	10.0
155	9.0
205	14.0
270	3.5
320	4.0
399	5.0



**Figure 8: 085-205 Gas Valve Detail**



**Figure 9: 270-399 Gas Valve Detail**



## WARNING

**All combustion performance numbers MUST be verified with a combustion analyzer. Failure to do so could result in substantial property damage, severe personal injury or death.**

29. Select the correct boiler size, altitude, and fuel using the touch screen display.
  - a. Check boiler's rating label for actual boiler size.
  - b. Confirm installation altitude.
  - c. Press "Adjust" button on the Home screen.
  - d. Press "Adjust" button on the Adjust Mode screen.
  - e. Press "Login" button to access Password screen.
  - f. Press 5-digit display to open a keypad. **Enter the password "86"** and press the return arrow to close keypad. Press "Save" button.
  - g. Press "Adjust" button to enter Adjustment Mode.
  - h. Press "Modulation Setup" menu button.
  - i. Press "Adjust" button after reading Warning screen.
  - j. Use the  $\downarrow/\uparrow$  arrow buttons to select the correct size, altitude, and fuel of your boiler. Press the (Check with Circle) button to enter your selection.
  - k. Press "Enter" button until display stops blinking, press next and repeat until "Completed" is displayed.
  - l. Press X to exit.
  - m. Press "Confirm" to verify correct size, altitude, and fuel is displayed.
30. Attempt to start the boiler using the operating instructions located on inside of boiler front door. If the boiler does not light on the first try for ignition, allow boiler to make at least four more attempts to light. If boiler still does not light, turn the throttle counter-clockwise in 1/8 turn increments, allowing the boiler to make at least four tries for ignition at each setting, until the boiler lights.
31. After the burner lights, force the burner to high fire by entering the Adjust Menu and then High Fire Hold as described in Section XI "Start-up and Checkout" of I, O & S Instructions. Allow the boiler to operate for approximately 5 minutes before taking combustion readings. Note: after 10 minutes, the boiler is automatically released from high fire hold.
32. Perform a combustion test, sampling flue products from the tap in front of the vent adaptor.
33. With burner at high fire, adjust throttle as needed to obtain CO<sub>2</sub> (or O<sub>2</sub>) setting shown in Table 10:
  - To reduce CO<sub>2</sub> (increase O<sub>2</sub>) turn throttle clockwise. ⤵
  - To increase CO<sub>2</sub> (reduce O<sub>2</sub>) turn throttle counter clockwise. ⤴Make adjustments in increments of 1/8 and 1/4 turns and allow the boiler at least a minute to respond to each adjustment before making another.
34. Force burner to low fire by entering the Adjust Menu and then Low Fire hold as described in Section XI "Start-up and Checkout". Allow the boiler to operate for approximately 5 minutes before taking combustion readings.



## WARNING

**Asphyxiation Hazard. Use combustion analyzer for all gas valve adjustments. Low fire offset screw is very sensitive. Adjust offset no more than 1/8 turn before checking combustion with analyzer. Maximum total offset adjustment  $\pm 1$  turn. Adjustments greater than  $\pm 1$  turn may damage regulator diaphragm. Failure to follow these instructions could result in death, serious injury or substantial property damage.**

35. With burner at low fire, adjust offset regulator as needed to obtain CO<sub>2</sub> (or O<sub>2</sub>) setting shown in Table 10.
  - To reduce CO<sub>2</sub> (increase O<sub>2</sub>) turn offset regulator counter-clockwise. ⤵
  - To increase CO<sub>2</sub> (reduce O<sub>2</sub>) turn offset regulator clockwise. ⤴Make adjustments in increments no more than 1/8 turns and allow the boiler at least a minute to respond to each adjustment before making another.

**Table 10: Acceptable Combustion Readings for LP Gas (Propane) Operation**

Acceptable %CO <sub>2</sub> Combustion Readings for LP Gas (Propane)									
Size	Altitude								Max. CO Air Free
	0-2,000 ft		2,001-6,000 ft		6,001-7,800 ft		7,801-10,100 ft		
	Range	Target	Range	Target	Range	Target	Range	Target	
85	10.5-11.2	11.0	10.2-10.5	10.5	10.3-10.6	10.6	10.3-10.5	10.5	COAF readings must be less than 200 ppm
110					10.0-10.3	10.3			
155	10.0-10.5	10.5	10.1-10.4	10.4	9.9-10.2	10.2	9.9-10.2	10.2	
205			10.2-10.5	10.5					
270			9.8-10.0	10.0	9.7-9.9	9.9			
320			10.3-10.6	10.6	10.1-10.4	10.4			
399			9.9-10.2	10.2					

\*Low Fire Range and Target values are the same as High Fire above. Ensure low fire CO<sub>2</sub> reading is less than or equal to high fire CO<sub>2</sub> reading.

Acceptable %O <sub>2</sub> Combustion Readings for LP Gas (Propane)									
Size	Altitude								Max. CO Air Free
	0-2,000 ft		2,001-6,000 ft		6,001-7,800 ft		7,801-10,100 ft		
	Range	Target	Range	Target	Range	Target	Range	Target	
85	5.0-3.9	4.2	5.4-5.0	5.0	5.2-4.8	4.8	5.3-5.0	5.0	COAF readings must be less than 200 ppm
110					5.7-5.2	5.2			
155	5.7-5.0	5.0	5.5-5.1	5.1	5.8-5.4	5.4	6.5-6.1	6.1	
205			5.4-5.0	5.0					
270			6.0-5.7	5.7	6.1-5.8	5.8			
320			5.2-4.8	4.8	5.5-5.1	5.1			
399			5.8-5.4	5.4					

\*\*Low Fire Range and Target values are the same as High Fire above. Ensure low fire O<sub>2</sub> reading is greater than or equal to high fire O<sub>2</sub> reading.

**Table 11: Minimum and Maximum Inlet Pressure**

Size	Min. (in. wc)	Max. (in. wc)
85-399	8.0	14.0

36. Verify gas inlet pressure is between values listed in Table 11 with all gas appliances (including converted boiler) both on and off.
37. A sheet of yellow labels is provided in the envelope with these instructions for boilers converted from natural to LP gas. Select the respective firing rate for the boiler being converted from this sheet of labels and apply them as follows:
  - Apply the "Rating Plate Label" adjacent to the rating plate.
  - Apply the "Gas Valve Label" to a conspicuous area on the gas valve.
  - Apply the "Boiler Conversion Label" to a conspicuous surface on, or adjacent to, the outer boiler jacket. Fill in the date of the conversion and the name and address of the company making the conversion with a permanent marker.
38. A label with acceptable LP combustion readings is provided with these instructions. Affix this label in a conspicuous location on the boiler.
39. Refer to the Section XI " Start-up and Checkout" in the I, O, and S Instructions and perform any checks not already completed.