

Evergreen Propane Conversion – Gas Valve Adjustment

Hazard Definitions:

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

⚠ DANGER Indicates presence of hazards that will cause severe personal injury, death or substantial property damage.

⚠ WARNING Indicates presence of hazards that can cause severe personal injury, death or substantial property damage.

⚠ DANGER The use of a properly working, calibrated flue gas analyzer is **REQUIRED** to convert this unit and determine proper gas valve settings. **DO NOT perform this conversion without a flue gas analyzer. Improper gas valve settings can cause severe personal injury, death or property damage.**

⚠ WARNING Do NOT fire the Evergreen boiler after the propane conversion without utilizing a properly working, calibrated combustion analyzer to adjust the gas valve to the proper settings after the initial light off. **Do NOT allow the boiler to modulate freely until the combustion analysis and adjustment is complete.** Failure to do so may result in flashback that may cause burner/boiler damage. Please refer to the Evergreen LP conversion instructions for the proper LP conversion procedure to use in conjunction with this manual. Failure to follow all directions may cause boiler damage and could result in severe personal injury, death or substantial property damage.

Completely read LP conversion instructions and this bulletin before making any adjustments to the gas valve. Have boiler manual available for reference.

This technical bulletin describes the proper initial, coarse adjustment of the Evergreen gas valve for LP operation. **This adjustment must be made prior to initially lighting any boiler converted for propane use.** Refer to the boiler manual for conversion instructions and figures related to gas valve adjustment. Figure 1 is included in this bulletin as a reference for adjustment of the throttle adjustment and offset regulating screws, their location, and operation.

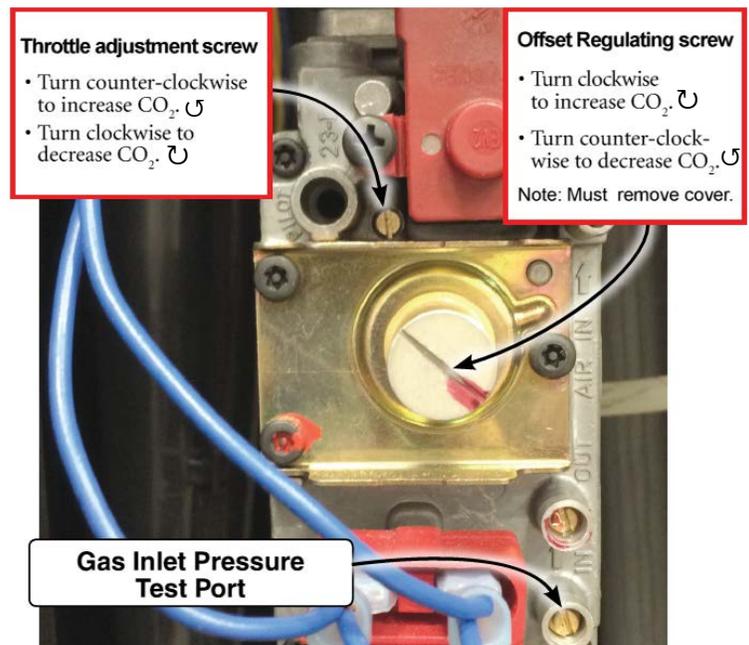
Prior to the boiler's first ignition, adjust the throttle adjustment screw by first turning the screw clockwise (⌚) until it bottoms out – do not apply any additional or excess torque. Adjust the throttle screw in a counterclockwise (⌚) direction with precisely the number of turns listed in Table 1, according to the boiler model/size.

Table 1: Course adjustment settings—Throttle and offset adjustments to be made prior to first ignition, by size.

Boiler Model	Throttle Turns (Counterclockwise ⌚ from Bottom-out Position)	Offset Turns (Counterclockwise ⌚ from Factory NG Position)
220 LP	3/4	1/4
299 LP	1-3/8	1/4
399 LP	1-5/8	1/4

After the throttle has been adjusted coarsely, the offset regulating screw must be adjusted. Remove the sealed, slotted cap protecting the white offset regulating screw before making adjustments. It is critical to be precise for the adjustment of the offset regulating screw. **DO NOT** attempt to bottom out the offset regulating screw as was done for the throttle adjustment. **Adjustments to the offset regulating screw should be made from the factory-provided natural gas position.**

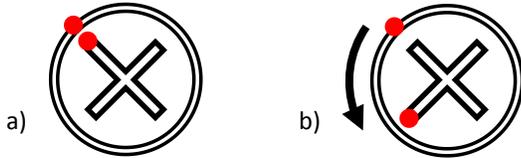
Figure 1 Gas valve adjustment locations—ONLY for use by a qualified technician, using properly working, calibrated combustion test instruments.



Adjust the offset regulating screw using the following steps, referencing Figure 2:

1. Use a marker to mark the corner of one tip of the cross on the offset regulating screw and the corresponding location on the outside of the screw housing, as shown in Figure 2a.
2. Turn the offset regulating screw 1/4 turn counterclockwise (↺), ensuring that the tip of next the cross aligns with the mark on the outside of the screw housing, as shown in Figure 2b.

Figure 2 Offset regulating screw adjustment—(a) Marking factory-provided NG position. (b) View after 1/4 turn CCW adjustment.



Before firing, verify that the Boiler Settings are for LP gas, “Max Rate” for the input (priority) used to fire the boiler is set between 96% and 100%. Also verify that the “Min Rate” is set to 10% or the minimum rate allowed (if above 2000 ft. elevation). Adjust control settings if not at proper rate. Verify that boiler is operating at the expected firing rate at both high- and low-fire during combustion analysis. Refer to Table 2 for proper low-fire rate based on altitude settings.

⚠ DANGER During combustion analysis, ensure boiler is operating at the expected firing rate. Failure to operate boiler at proper rate during combustion testing and adjustment could result in incorrect combustion settings. Improper gas valve settings can cause severe personal injury, death or property damage.

Prior to turning on the boiler, review the procedure and control sequence for the operation of the Manual Test Mode in the section of the Boiler Manual titled “Manual Test Mode for Single and Multiple Boilers” starting on page 99. The procedure differs between boilers set as a single or multiple-boiler unit.

Do NOT allow the boiler to modulate freely until the combustion analysis and adjustment is complete. Turn on and connect properly working, calibrated combustion analyzer to the boiler flue pipe. Fire the boiler and force it to High Fire in Manual Test Mode. Adjust the high fire combustion first, using the throttle adjustment screw, to the CO₂ and CO ranges specified in Table 3, by model size. Then, force the boiler to Low Fire and adjust the offset regulating screw to the CO₂ and CO ranges specified in Table 3, by model size. Reinstall the slotted cap over the offset adjustment screw. Follow the full startup instructions found in the Evergreen Boiler Manual including the section titled “Re-check the Maximum and Minimum CO₂ and CO rate” on page 89. **The combustion values in Table 3, below, replace the values shown in in Figure 86 of the Boiler Manual on page 89 for LP units.**

Table 2: Low-fire blower speeds—Minimum blower speed settings according to altitude settings.

Altitude Setting (ft.)	Lowest Rate for Altitude		
	220	299	399
0-2000	10%	10%	10%
2500	11%	11%	12%
3000	12%	11%	12%
3500	12%	11%	12%
4000	12%	12%	13%
4500	13%	12%	13%
5000	13%	12%	13%
5500	13%	13%	14%
6000	14%	13%	14%
6500	14%	13%	14%
7000	14%	14%	15%
7500	15%	14%	15%
8000	15%	14%	16%
8500	15%	14%	16%
9000	16%	15%	16%
9500	16%	15%	17%
10000	17%	15%	17%
10500	17%	16%	17%
11000	17%	16%	18%

Table 3: Acceptable combustion values—measured values must be within the ranges given below.

Boiler Model	High Fire		Low Fire	
	% CO ₂	CO ppm	% CO ₂	CO ppm
220 LP	10.25 ±0.25	< 120	9.75 ±0.25	< 50
299 LP	10.75 ±0.50	< 120	10.25 ±0.50	< 50
399 LP	10.75 ±0.50	< 120	10.25 ±0.50	< 50

• Values above are with the boiler front door removed. Values will increase about 0.2% once the door is reinstalled.
 • REINSTALL the boiler front door after completing service.
 • The low fire CO₂ listed is typical. The valve may vary with conditions, but must be 0.35% to 0.75% lower than high fire CO₂.

To clarify, both the high fire and low fire gas valve adjustment MUST be made with a properly working, calibrated combustion analyzer according to the instructions in this bulletin and in the boiler manual to ensure safe, reliable operation.

The coarse adjustment prescribed by this bulletin should result in combustion settings that allow for ignition and are a starting point for further adjustment. If, after making the coarse adjustments prescribed above, the boiler will not light, turn the throttle screw only counterclockwise (↺) an additional 1/4 turn and attempt to light again. Repeat for a total of up to one full turn. If, after following the procedure above, the boiler still will not ignite or, during combustion analysis, the analyzer reads less than 1.0% O₂, contact Weil-McLain Technical Services for assistance.