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Evergreen Liquid Propane Conversion

Installing Propane Venturi

In the event that conversion from natural gas to liquid propane is required for the Evergreen boiler, please follow the instructions below and reference the Evergreen boiler manual.

Proper initial, coarse adjustment of theEvergreen gas valve for LP (liquid propane) operation must be made prior to initially lighting the LP gasboiler. Please view the technical bulletin on page 5 with instructions on adjusting the Evergreen gas valve using a properly working calibrated combustion analyzer.

If the boiler is already installed — you must turn off electrical supply to the boiler and close the external manual gas shut-off valve to isolate the boiler during conversion. Allow the boiler to cool if it has been operating. Following conversion of an installed boiler, follow all instructions in the Evergreen boiler manual to start up the boiler and verify operation of the boiler and all system components.

1. **Propane venturi will have a black label identifying venturi part number. See Figure 8, pictured right.**
2. **Verify that the label on the propane venturi is correct for the model size. See Figure 9, pictured below.**

Figure 8 Natural and Liquefied Petroleum (Propane) gas conversion kits

Natural Gas to Liquefied Petroleum (Propane) conversion kits

EVG 220 LP P/N 383-900-064 NG to Propane Gas Conversion Kit contents:		
511-050-219	Venturi - Liquefied Petroleum (Propane) Gas	1
562-150-292	Screw Pan Hd T20 M4x12 w/Square Cone Lock Washer	3
562-248-765	Washer .89 ID x 1.19 OD Garlock	1
590-318-102	O-Ring 3mm x 70mm Black	1
590-318-103	Gasket 1-Lips EPDM Ring 60 Dia MM	1
550-225-336	Label Gas Conversion	1
550-142-871	Instructions Conversion Nat to LP Gas	1

EVG 299/300 LP P/N 383-900-065 NG to Propane Gas Conversion Kit contents:		
511-050-220	Venturi - Liquefied Petroleum (Propane) Gas	1
562-150-292	Screw Pan Hd T20 M4x12 w/Square Cone Lock Washer	3
562-248-765	Washer .89 ID x 1.19 OD Garlock	1
590-318-102	O-Ring 3mm x 70mm Black	1
590-318-103	Gasket 1-Lips EPDM Ring 60 Dia MM	1
550-225-336	Label Gas Conversion	1
550-142-871	Instructions Conversion Nat to LP Gas	1

EVG 399 LP P/N 383-900-066 NG to Propane Gas Conversion Kit contents:		
511-050-221	Venturi - Liquefied Petroleum (Propane) Gas	1
562-150-292	Screw Pan Hd T20 M4x12 w/Square Cone Lock Washer	3
562-248-765	Washer .89 ID x 1.19 OD Garlock	1
590-318-102	O-Ring 3mm x 70mm Black	1
590-318-103	Gasket 1-Lips EPDM Ring 60 Dia MM	1
550-225-336	Label Gas Conversion	1
550-142-871	Instructions Conversion Nat to LP Gas	1

Figure 9 Propane gas venturi label identification (Black label)

Model	Part Number	Gas Type	Venturi Ø
EVG 220	511-050-219	LPG	30
EVG 299/300	511-050-220	LPG	34
EVG 399	511-050-221	LPG	38

3. If the jacket front door was not already removed, remove it.

LEGEND for Figures 11, 12, 13 and 14	
1 Air Silencer	**5** Gas valve
2 Air silencer clips (2)	**6** Gas pipe
3 Venturi	**7** Brass swivel nut
4 Blower	**8** Garlock Washer

Figure 11 Air silencer removal

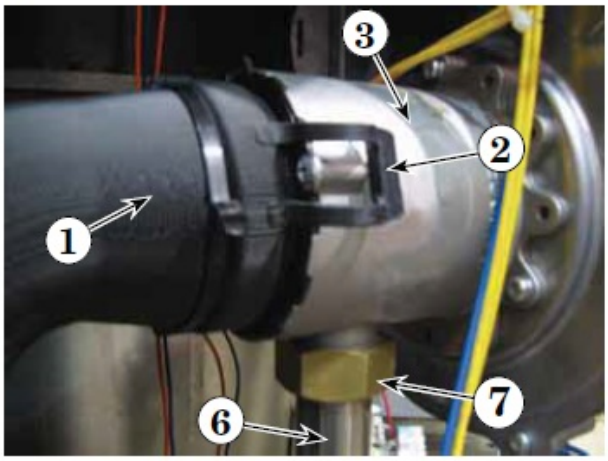
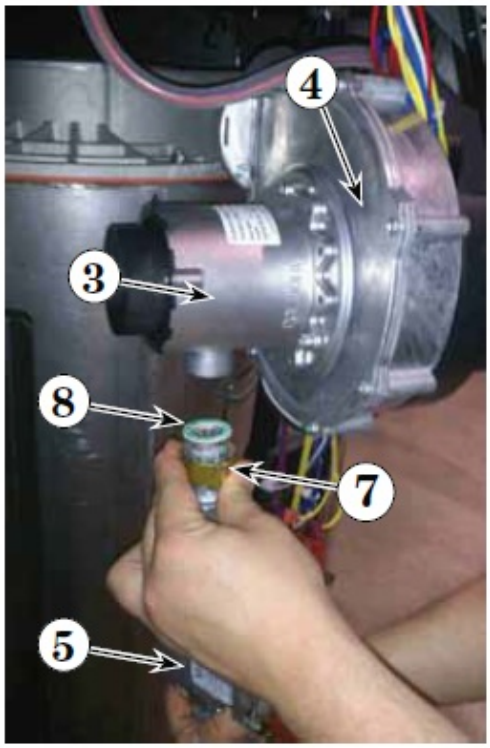


Figure 12 Gas pipe loosen for propane conversion



4. Locate the blower and venturi. See Figure 11, pictured above.

5. Gently pull on both silencer retaining clips. See Figure 11, item 2 and remove air silencer from front of venturi (item 3).

6. Loosen swivel nut (Figure 11, item 7) on venturi-gas valve connection. See Figure 12, item 6, pictured right.

Figure 13 Removal of Natural gas venturi

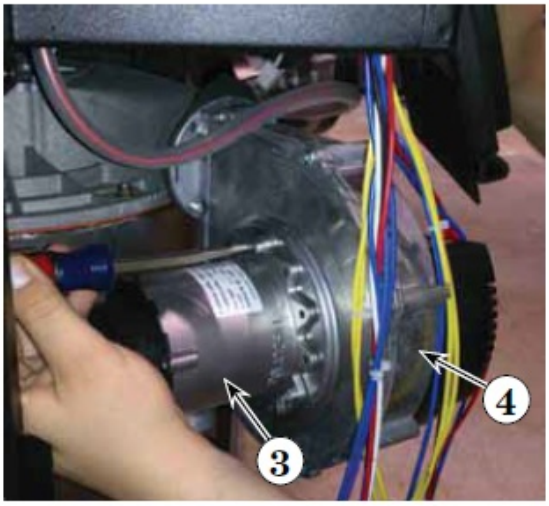
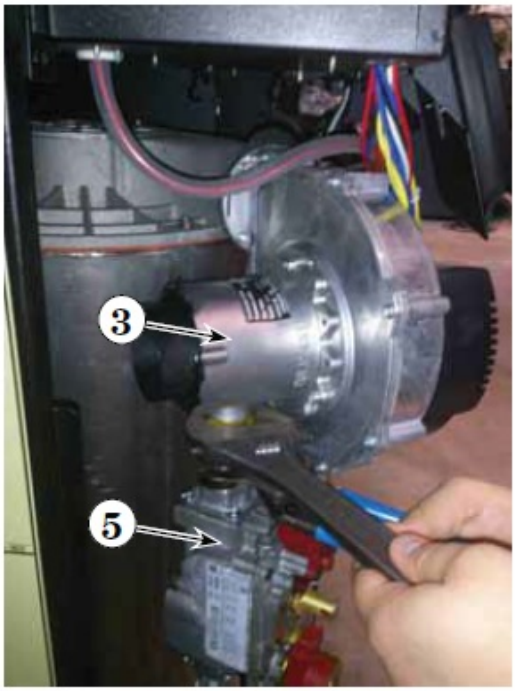


Figure 14 Installing the new propane gas venturi



7. Remove three (3) slotted T20 Torx screws holding the venturi, (Figure 13, item 3) in place. Remove venturi and o-ring, inspect blower surface. Discard old o-ring and washer gasket. See Figure 13 above.

8. Locate propane venturi in conversion kit. Propane venturi will have a black label identifying venturi part number. See Figure 8 at top of page for correct part number.

9. Install propane venturi and o-ring from conversion kit. Insert three (3) slotted Torx screws from conversion kit to hold venturi in place. Torque screws to no more than 23 inch-pounds.

10. Reassemble gas pipe with new washer from conversion kit to the venturi connection, using two wrenches to tighten swivel nut. Re-attach air silencer to venturi. See Figure 14 above. Inspect the gas pipe fitting connections on the gas valve and new venturi (Figure 14, item 3) check the seal of the connections. Failure to comply will cause a gas leak, resulting in severe personal injury or death. Do not check for gas leaks with an open flame — use bubble test. Failure to use bubble test or check for gas leaks can cause severe personal injury, death or substantial property damage.

11. If boiler has not been turned on, follow instructions on the initial screens to select propane as the gas type. If natural gas was already selected in the boiler control, the gas type parameter will need to be adjusted. In the contractor menu, under the Boiler Settings menu, adjust the "LP Gas" setting to "YES". Turn to page 7 to view instructions for this.

12. Follow instructions on the technical bulletin attached at the top of this page or in the Evergreen boiler manual starting on page 88 to adjust combustion values for propane gas.

DANGER: The use of a 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.

13. Restore electrical power, turn on gas by opening manual gas valve, check for leaks.

14. After installation is complete and boiler is set up for propane gas, attach the propane conversion

label next to the boiler rating label (left side of cabinet).

15. Reinstall jacket door, secure the latches and perform a complete startup sequence. Please refer to the Evergreen boiler manual for start up instructions starting on page 84.

WARNING: DO NOT operate the boiler with the jacket door removed except for inspection and testing as directed in this manual.

Please feel free to contact me If you have any questions or comments about this matter. Thank you.

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Evergreen Liquid Propane Conversion – Gas Valve Adjustment

Hazard Definitions:

The following defined terms are used throughout this manual 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.**

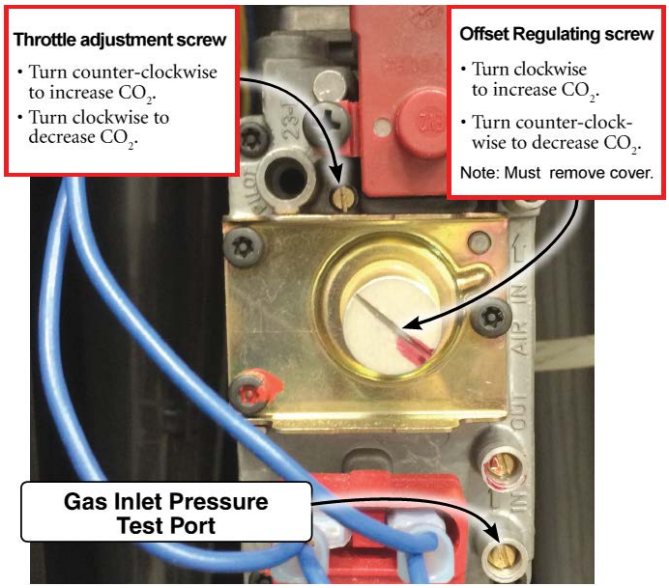
⚠ WARNING Do NOT fire the Evergreen™ boiler after the Liquid Propane conversion without utilizing a properly working, calibrated combustion analyzer to adjust the gas valve to the proper settings after the initial light off. **Do NOT allow the boiler to modulate freely until the combustion analysis and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

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 the LP gas boiler. Refer to the boiler manual for instructions and figures related to gas valve adjustment. Figure 1 is included in this bulletin as a reference of throttle and offset locations.

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 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.

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.

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



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.** 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 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.

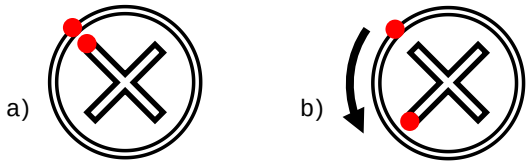


Table 1: Course adjustment settings—Throttle and offset adjustments to be made prior to first ignition, by size.

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

Before firing, verify that the "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.**

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%

Review the procedure and control sequence for the operation of the Manual Test Mode in the section of the boiler manual "Manual Test Mode for Single and Multiple Boilers". 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. 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 specification in the boiler manual, reproduced in Table 3. Then, force the boiler to low fire and adjust the offset regulating screw to the specification in the boiler manual, reproduced in Table 3. Follow the full startup instructions found in the Evergreen Boiler Manual.

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

Boiler Model	High Fire		Low Fire	
	% CO2	CO ppm	% CO2	CO ppm
220 LP	10.75 ±0.50	< 120	10.25 ±0.50	< 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

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

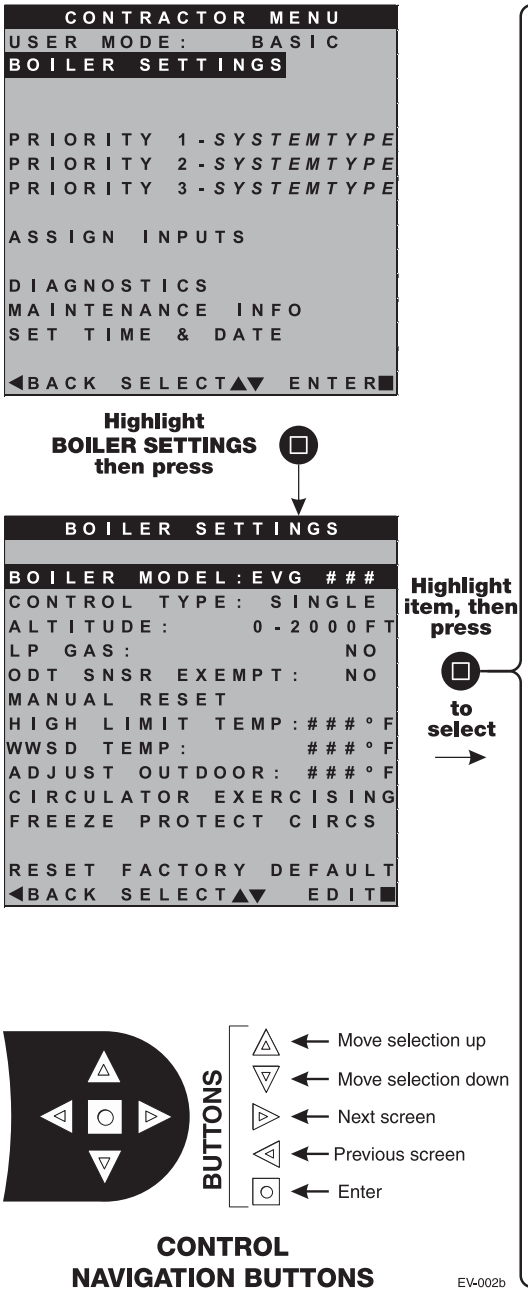
The coarse adjustment prescribed by this bulletin should result in combustion settings that allow for ignition and are a starting point for further adjustment. If, after following the procedure above, the boiler will not ignite or, during combustion analysis, the analyzer reads less than 1.0% O_2, contact Weil-McLain Technical Services for assistance.

BOILER SETTINGS menu, BASIC mode

⚠WARNING **Boiler Model, Altitude and Fuel Type are critical settings.** Failure to set correctly could result in severe personal injury, death or substantial property damage.

1. Access contractor menus by pressing and holding the UP and DOWN arrow keys at the same time for 7 seconds.
2. See Figure 71, page 73 for the screen sequences up to the CONTRACTOR menu.

Figure 72 Evergreen BASIC mode BOILER SETTINGS options (USER MODE must be set to BASIC)



MENU ITEM	DESCRIPTION
BOILER MODEL	• ⚠WARNING MUST be set to correct model. • Check the boiler model against the model listed on the boiler's rating plate. Change the selection to the correct model if not. Also verify the model number on the Evergreen control display at power-up. Failure to correct would result in severe personal injury, death or substantial property damage.
CONTROL TYPE	• Select single, master or shadow. Must be set to Single for basic mode.
HIGH ALTITUDE	• ⚠WARNING MUST be set to correct value if altitude over 2,000 feet — values selectable in 500 feet increments.
LP GAS	• ⚠WARNING MUST be correct — YES if LP Gas is used or NO if natural gas is used. Follow screen instructions to change if necessary.
ODT SENSOR EXEMPT	• Select YES only if boiler is exempt from the requirement for outdoor reset operation stipulated in Section 303 of the 2007 Energy Act. See information provided elsewhere in this manual.
MANUAL RESET HIGH LIMIT TEMP	• If boiler outlet water temperature exceeds this temperature, the Evergreen control will shut down the boiler and enter lockout. Changing this setting is NOT recommended.
WWSD TEMP	• WWSD stands for warm weather shutdown. It means the boiler will not be allowed to fire if the outside temperature is greater than the WWSD setting. When the boiler is kept off because the outside temperature is above WWSD, the graphic display will show WWSD, and the boiler will remain in standby until the outside temperature drops below WWSD temperature. WWSD does not apply to DHW systems. The outdoor sensor must be installed to use this function.
ADJUST OUTDOOR	• Use this setting to calibrate the outdoor sensor when needed to compensate for variations in lead length or other factors that could affect total resistance in sensor circuit.
CIRCULATOR EXERCISING	• For each circulator, select whether you want the control to automatically start the circulator and run for 10 seconds for each 72-hour period of inactivity.
FREEZE PROTECT CIRCS	• This function automatically fires the boiler at low fire and starts the circulators chosen if the heat exchanger sensors detect a temperature less than 45 °F. Burner is turned on if temperature drops below 40 °F. Circulators and burner turn off when the temperature rises above 48 °F.
RESET FACTORY DEFAULTS	• Use this function to restore all control settings to factory default values — will require complete restart and setup of control after resetting. Record information from the MAINTENANCE screen and any history information that may be of use in the future. ALL stored data is eliminated when reset to defaults except for boiler model number.

Screens shown above are typical only. Actual screens depend on control settings chosen.