

Firetube Giant FTG 600-1400

NATURAL GAS TO LP CONVERSION INSTRUCTIONS:

Version Date: 2017-05-04

Kit Number: 85418-1



WARNING

This conversion shall be performed 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 the proper application of these instructions. The conversion 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, which necessitates the use of a calibrated CO₂/O₂ and CO combustion analyzer.

NTI boilers are factory equipped to operate with Natural Gas. **BEFORE OPERATING WITH PROPANE** the boiler's gas valve must be adjusted according to these instructions. Use the procedures outlined in these instructions to fully complete the Natural Gas to LP conversion.

Kit Contents:

- Natural Gas to LP Conversion Instructions (p/n 85445)
- Natural Gas to LP Conversion Decal (p/n 85418)

WARNING

These instructions **CANNOT** be used to convert NTI appliance models not referenced in these instructions. Contact NTI for the Natural Gas to LP conversion kit and instructions for other models.

WARNING

Failure to apply these instructions properly may result in dangerous Carbon Monoxide levels, fire or explosion leading to property damage, personal injury or death.

ATTENTION: LIQUEFIED PETROLEUM (LP) PROPANE

Liquefied Petroleum (LP) propane gas is heavier than air; therefore, it is imperative that your boiler is not installed in a pit or similar location that will permit heavier than air gas to collect. Local Codes may require appliances fueled with LP gas be provided with an approved means of removing unburned gases from the room. Check your local codes for this requirement.

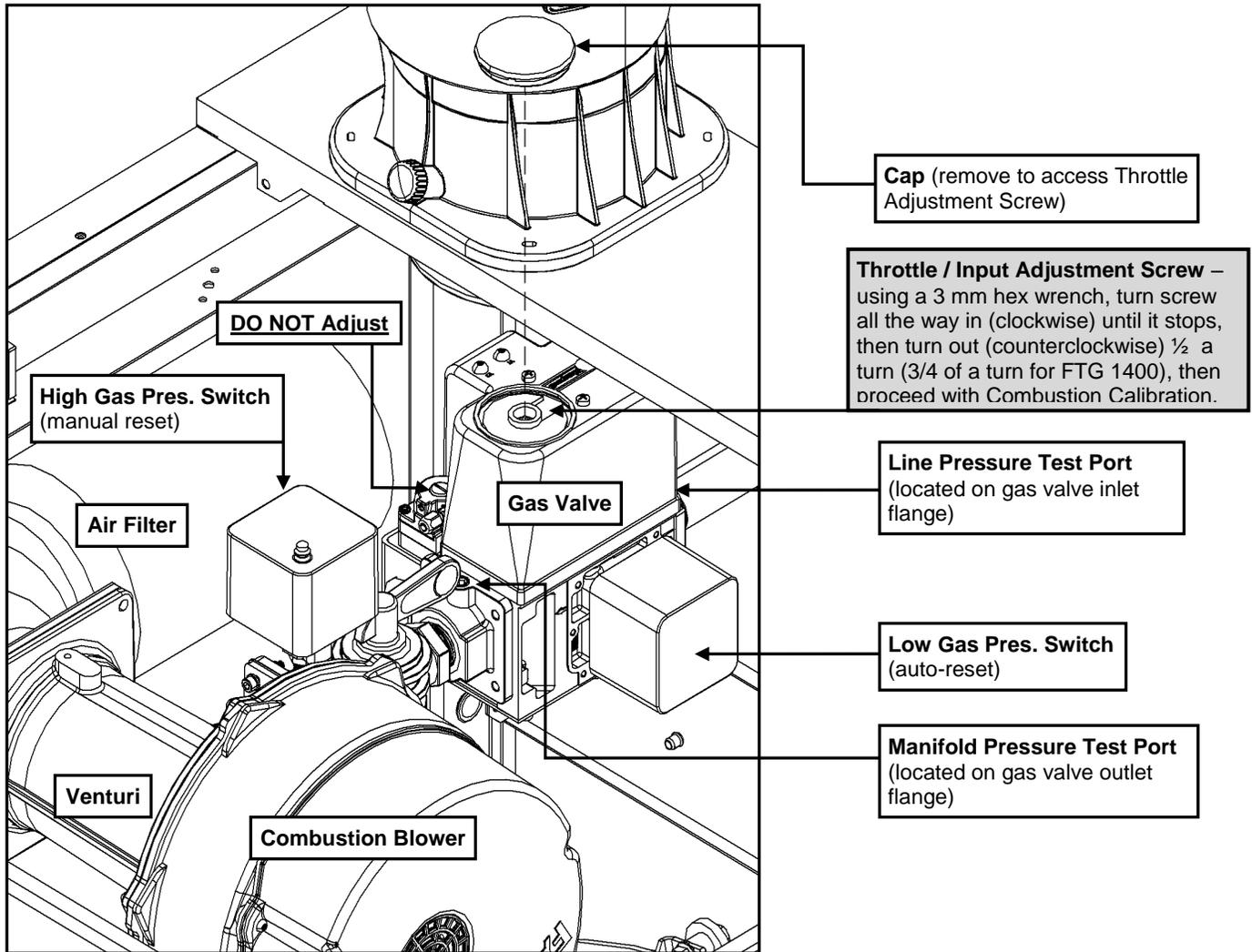
1.0 Adjusting the Gas Valve

NOTICE

The FTG 600, FTG 800, FTG 1200 & FTG 1400 are converted from Natural to LP Gas by adjusting the Throttle/Input Screw located on the gas valve; unlike most LP conversions an LP orifice is **NOT** used.

1. Locate the Throttle/Input Adjustment Screw on the gas valve, see Figure 1-1.
2. Turn the Throttle Screw all the way in (clockwise until it stops).
3. Turn the Throttle Screw counterclockwise (out) $\frac{1}{2}$ of a turn ($\frac{3}{4}$ of a turn for FTG 1400).
4. Proceed to Section 2.0, *Gas Valve and Burner Setup*, for instructions on how to test the Gas Line Pressure and perform the Combustion Calibration.

Figure 1-1 Throttle/Input Screw Adjustment



2.0 Gas Valve and Burner Setup

WARNING

Failure to perform the Gas Valve and Burner Setup correctly may result in incorrect operation, component failure, property damage, serious injury or death.

Operating Sequence

Prior to commencing the Gas Valve and Burner Setup, perform the following operating sequence check:

1. Turn the supply of gas to the boiler off.
2. Set the thermostat to the highest setting.
3. Ensure the combustion fan pre-purges for at least 30 seconds prior to activating the igniter.
4. Ensure the combustion fan post-purges for at least 60 seconds prior to reactivating the igniter.
5. Set the thermostat to the lowest setting and continue with the Gas Valve and Burner Setup procedure outlined below.

Gas Line Pressure

The boiler gas valve is equipped with a line pressure test port; see Figure 1-1. Use the following procedure to measure the gas line pressure to the boiler to ensure it falls within the range given in Table 2-1:

1. Turn the supply of gas to the boiler off.
2. Using a 3/16 in. hex wrench, remove the plug from the flange located at the inlet of the gas valve, identified as **Line Pressure Test Port** in Figure 1-1. In place of the plug, install a *1/8 NPT x hose barb adapter*, suitable for connecting the tubing of the gas pressure manometer being used to measure gas line pressure.
3. Slide the gas pressure manometer tubing over the *hose barb adapter* installed in step 2; connect the other end of the tubing to gas pressure manometer. Ensure both ends of the tubing make a tight connection.
4. Open the supply of gas to the boiler and check for gas leaks.
5. Observe the line pressure under static conditions and compare it to Table 2-1. The pressure will be greatest under static conditions.
6. With all other gas appliances in the application running, operate the burner to the maximum firing rate (see Table 2-2) and compare the observed line pressure with Table 2-1. The pressure will be lowest during the maximum flow of gas.
7. Adjust the gas line pressure to ensure the parameters in Table 2-1 are attained under all conditions (see NOTICE below). If possible adjust the line pressure to the "Nominal/Desired" value listed in Table 2-1, while the unit is operating at the maximum modulation rate, see Table 2-2.
8. Continue observing the gas line pressure until the completion of the combustion analyses, in case adjustments need to be made.
9. Complete pressure testing, turn the gas supply off, and then reinstall the Line Pressure Test Port plug, applying appropriate thread sealant to the threads prior to installing. Turn gas on and check for leaks.

NOTICE

The line pressure is a function of the gas supply and is affected solely by field provided parameters such as line size and regulator settings. Under no circumstances can the boiler gas valve influence or be used to adjust the gas line pressure.

⚠ DANGER

Failure to properly install the Line Pressure Test Port plug will cause a severe leakage of gas, resulting in a fire or explosion causing property damage, serious injury or death.

Table 2-1 Line Pressure and Combustion Parameters

Gas	Line Pressure (inches w.c.)			CO ₂ (%)*		CO (ppm) Max.*
	Nominal/Desired	Min.	Max.	Min.	Max.	
Natural	7	4	10.5	8.7	9.5	175
Propane	11	8	13	10	10.8	175

Notes:

- ¹ Combustion calibration must only be performed with the burner operating at maximum modulation rate.
- ² Combustion values listed are for burner operation at maximum modulation rate; CO₂ and CO values will be lower at minimum modulation rate.
- ³ When tested at minimum modulation rate, the CO₂ must be 0.5-1.0% lower than CO₂ at maximum modulation rate.

Table 2-2 Minimum and Maximum Modulation and Input Rates

Model	Min. Modulation Rate (RPM)	Max. Modulation Rate (RPM)	Input Rate (MBH)	
			Min	Max *
FTG 600	1150	5600	80	600
FTG 800	1150	7450	80	800
FTG 1200	1050	8100	120	1200
FTG 1400	1050	7800	140	1400

* Canada: Altitudes between 2000-4500 ft, de-rate by 10%. Consult local authorities for de-rating for altitudes above 4500ft.

⚠ WARNING

Carbon Monoxide - Never leave the unit operating while producing Carbon Monoxide (CO) concentrations in excess of 175ppm. Failure to follow this warning may result in serious injury or death.

⚠ WARNING

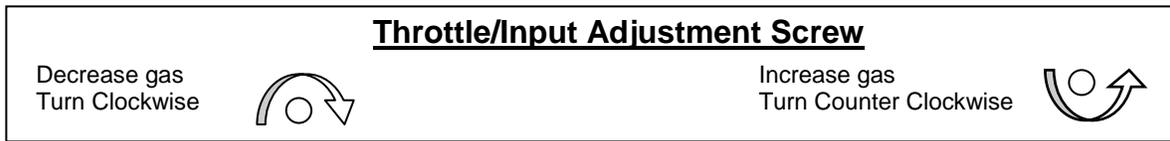
Manifold Pressure - DO NOT adjust or measure the Manifold Pressure of the boiler. Correct manifold pressure is factory set. Field adjustment could result in improper burner operation resulting in fire, explosion, property damage or death.

⚠ WARNING

Adjustments to the **Throttle/Input Adjustment Screw** may only be made by a qualified gas technician, while using a calibrated combustion analyzer capable of measuring CO₂ and CO. Adjustments may only be performed if the gas line pressure is maintained above minimum levels throughout the duration of the test, see Table 2-1. Failure to follow these instructions may result in serious injury or death.

Adjustment

Throttle / Input Screw Adjustments - The boiler is equipped with a Throttle/Input Adjustment Screw, located under a plastic cap on the top of the Gas Valve; see Figure 1-1. It is used to adjust the flow of gas leaving the gas valve entering the Venturi and then the combustion air stream. Turn the Throttle screw in (clockwise) to reduce the flow of gas, make combustion leaner, and reduce the concentration of CO₂ in the flue gases. Turn the Throttle screw out (counterclockwise) to increase the concentration of CO₂ and flow of gas in the combustion air stream. Typical adjustment required is 0-1/8 of a turn in or out from starting point (see Section 1.0). See Figure 1-1 for Throttle screw location and Table 2-1 for appropriate CO₂ levels.



Combustion Calibration - To calibrate burner operation, perform the following procedure using a calibrated combustion analyzer capable of measuring CO₂ and CO from Natural and Propane Gas burning boilers:

1. Operate the unit at the maximum modulation rate, see Table 2-2.
2. Ensure the gas line pressure is maintained within tolerance, see Table 2-1.
3. While at the maximum modulation rate, measure the CO₂ and CO; adjust as necessary, using the Throttle Screw, to be within the limits listed in Table 2-1.
4. Operate the unit at the minimum modulation rate (see Table 2-2). Ensure the combustion remains smooth and CO₂ and CO values are lower than the values obtained during maximum modulation, as per notes in Table 2-1. If not, do not adjust further, contact NTI for assistance.



Failure to perform the flue gas analysis and adjustment as detailed in this section may result in erratic and unreliable burner operation, leading to reduced efficiency, increased fuel consumption, reduced component life, heat exchanger combustion deposits, and general unsafe operation. Failure to follow these instructions may result in serious injury or death.

3.0 Labeling

As the certified installer of the LP Conversion Kit, you must indicate on the boiler that it has been converted for use with Propane (LP) Gas:

1. **Update Rating Plate Decal** – Locate the rating plate decal on the side of the appliance, using a regular ink pen, check the box next to “Field converted to Propane Gas” and fill in the date; depress hard enough to permanently etch the decal (see Figure 3-1).
2. **Conversion Decal** - Fill out the required information on the Conversion Decal (included in this kit) and affix it to the boiler cabinet adjacent to the rating plate decal, and in a location where it can be easily seen (see Figure 3-2).

Figure 3-1 Update the Rating Plate Decal

FACTORY SET FOR NATURAL GAS Field converted to Propane Gas <input checked="" type="checkbox"/> Date: <u>March 29, 2016</u>	ADJUSTER A L'USINE POUR GAZ NATURAL Convertie au propane sur place <input type="checkbox"/> Date: _____	
Gas Pressure [Pression du Gaz]	Natural [Naturel]	Propane
Maximum Inlet Gas Pressure [Pression maximale d'entrée du gaz]	10.5" wc [2.6 kPa]	13" wc [3.2 kPa]
Minimum Inlet Gas Pressure [Pression minimum d'entrée du gaz]	4" wc [1 kPa]	8" wc [2 kPa]
Manifold Pressure [Pression d'admission]	0" wc [0 kPa]	0" wc [0 kPa]

Figure 3-2 Conversion Decal

THIS CONTROL WAS CONVERTED FOR USE WITH PROPANE GAS.
This appliance has been adjusted for use with Propane Gas, in accordance with the instructions provided with NTI kit # 85418-1, by <u>John Smith</u> , which accepts responsibility that the conversion was performed properly.
Reference rating plate for Propane Input and Gas Pressure