

Matrix M100, M100V & Trinity Tft60-110, Tft155-250, Ti100-200, Ts80, Tx200, Tx200C, Lx150-300(WH)

NATURAL TO LP CONVERSION INSTRUCTIONS:

Version Date: 2018-06-11

Kit Number: 82650-1

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 the 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, which necessitates the use of a calibrated CO₂/O₂ and CO combustion analyzer.

NTI boilers and water heaters are factory equipped to operate with Natural Gas. **BEFORE OPERATING WITH PROPANE** the specified LP-orifice must be installed between the Venturi and Gas Valve. The orifice size is stamped into each orifice; ensure the orifice being used corresponds to the appliance model being converted (see table below). Use the procedures outlined in these instructions to fully complete the Natural Gas to LP conversion.

Kit Contents:

- Natural to LP Conversion Instructions (p/n 84492)
- Natural to LP Conversion Decal (p/n 82782)
- T25 Torx Wrench (p/n 82235)
- LP-orifices (see below)

LP-orifice Identification:

Appliance Model No.	LP-orifice		
	Size (mm)	Part No.	ID Stamp
Ti100, Ts80	3.4	83216	34
Tft60, Tft85	4.15	84434	415
Lx150, Lx150E, Lx200, Lx200WH, M100, M100V, Tft110, Ti150, Ti200	5.2	82650	52
Lx300, Lx300WH, Tft155, Tft175, Tft200, Tft250, Tx200, Tx200C	6.2	84157	62

WARNING

This conversion kit **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

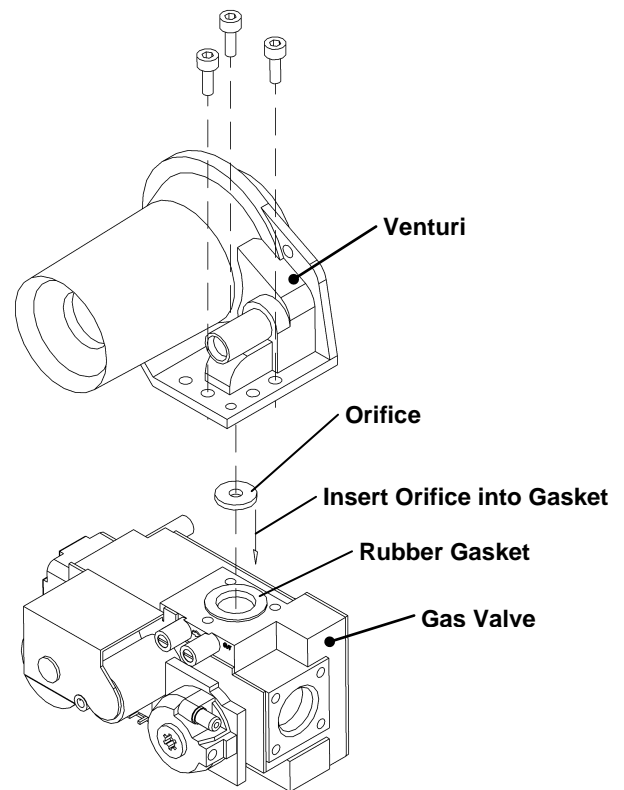
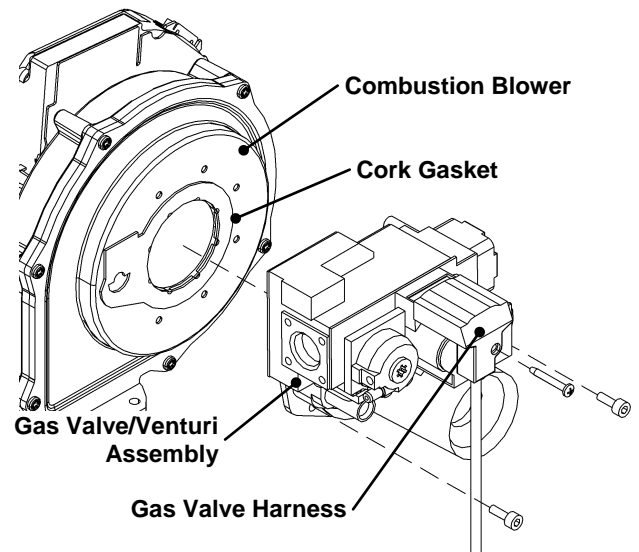
Failure to install the correct LP-orifice may result in dangerous Carbon Monoxide levels, fire or explosion leading to property damage, personal injury or death.

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 Installing the Orifice

1. Turn the 120VAC power supply off to the boiler.
2. Turn gas supply “shut off valve” off.
3. Remove the front cover from the unit (for Lx models also remove the plastic display molding as well as the front-top cover).
4. Remove air-inlet piping from the boiler (only the removal of the internal air-inlet piping is necessary on Ts, Lx, Tft & Tx models).
5. Disconnect gas line at union (union is internal for Tft models). Remove the gas line from the Gas Valve – non Tft models only.
6. Disconnect Gas Valve Harness and tubing (label tubing to ensure it can be reconnected properly).
7. Pay close attention to the orientation of the Venturi in relation to the Gas Valve and Combustion Blower. It is recommended to mark the components so they are reassembled in the correct orientation.
8. Using the T25 Torx wrench provided, remove the 2 screws connecting the Gas Valve/Venturi Assembly to the Combustion Blower.
9. With the Gas Valve/Venturi assembly removed from the unit, locate and remove the three screws attaching the Venturi to the Gas Valve.
10. Locate the correct Orifice; see table on Page 1 of these instructions.
11. Insert this orifice into the Rubber Gasket of the Gas Valve. The Orifice should seat securely within the gasket.
12. Re-attach the Venturi to the Gas Valve, and securely tighten the three screws, ensure the gasket is properly seated.
13. Re-attach the Gas Valve/Venturi Assembly to the Combustion Blower and securely tighten the two screws, ensure the cork gasket is properly aligned.
14. Reconnect gas line, air-inlet piping, harness and tubing (ensure the tubing is reconnected properly). Turn gas on and check for leaks.



2.0 Gas Valve and Burner Setup



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 a short time prior to activating the igniter.
4. Ensure the combustion fan post-purges for at least 5 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 2-1. 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. Open the bleed screw of the line pressure test port approximately 1-1/2 turns. This port is directly connected to the gas line feeding the boiler. See Figure 2-1.
3. Force 1/4" ID tubing over the housing of the line pressure test port; install the other end of the tubing to an appropriate line pressure test gauge or manometer. Ensure both ends of the tubing make a tight connection.
4. Turn the gas supply to the boiler on 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 I/O manual) 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. 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.
8. Continue observing the gas line pressure until the completion of a combustion analyses in case adjustments need to be made.
9. Complete pressure testing, remove the 1/4" tube from the test port and then return the bleed screw of the Line Pressure Test Port to the closed position.

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 close the bleed screw of the Line Pressure Test Port 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 wc)			CO ₂ (%)*		CO (ppm) Max.*
	Nominal/Desired	Min.	Max.	Min.	Max.	
Natural	7	4	10.5	8.7	9.9	175
Propane	11	8	13	10	11.5	175

*Note: Observe the combustion products with the burner operating at the maximum modulation rate.

Table 2-2 Minimum and Maximum Input Ratings and Respective Modulation Rates

Model	Min. Modulation Rate (RPM)	Max. Modulation Rate (RPM)	Input (MBH)	
			Min	Max ¹
Lx150	1150	5850	25	150 ²
Lx150E	925	4450	25	150
Lx200, Lx200WH	925	5950	25	199
Lx300, Lx300WH	1250	5850	55	275
Tft60	1525	4650	17 ³	60 ³
Tft85	1525	6300	17 ³	85 ³
Tft110	1625	7000	21.6 ³	108 ³
Tft155	900	3700	31	155
Tft175	900	4100	31	175
Tft200	900	4650	31	200
Tft250	900	5900	31	250
Ti100	50 ⁴	240 ⁴	15	93
Ti150, M100, M100V	50 ⁴	240 ⁴	25	150 ²
Ti200	50 ⁴	240 ⁴	25	199
Ts80	1700 (24%)	6400 (90%)	16	80
Tx200, Tx200C	1020	5280	24.9	199

Notes:

¹ Canada: Altitudes between 2000-4500 ft, de-rate by 10%. Consult local authorities for de-rating for altitudes above 4500ft.

² The maximum input when operating on LP-Gas is limited to 145 MBH for models Lx150, M100, M100V and Ti150.

³ When operating with LP-Gas models Tft60, Tft85 and Tft110 have min/max Input ratings of 17/65, 17.6/88 and 22.6/113 MBH respectfully.

⁴ Min and Max Modulation Rates listed for models Ti150, Ti200, M100 and M100V represent control Fan Base, not RPM.



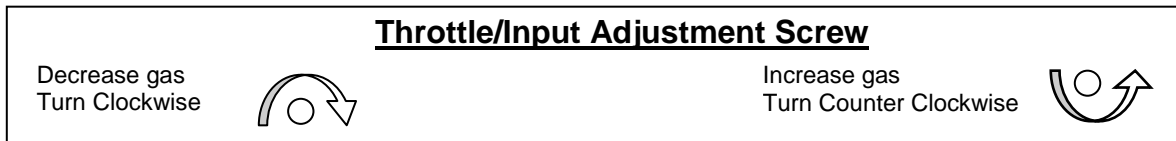
Carbon Monoxide – DO NOT leave the unit operating if producing Carbon Monoxide (CO) concentrations in excess of 175ppm. Failure to comply may result in serious injury or death.



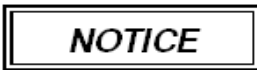
Manifold Pressure - DO NOT adjust or measure the Manifold Pressure of the boiler. Correct manifold pressure is factory set. Field adjustment could result in improper burner operation resulting in fire, explosion, property damage or death.

Adjustment

Throttle / Input Screw Adjustments - The appliance is equipped with a Throttle/Input Adjustment Screw located on the Gas Valve/Venturi Assembly. 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 CO₂ level and flow of gas in the combustion air stream. Typical adjustment required is 0-3 full turns in or out from the factory setting. See Figure 2-1 for Throttle screw location and Table 2-1 for appropriate CO₂ levels.



Adjustments to the Throttle/Input-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.



Ts80 models require an initial adjustment of two (2) full turns counterclockwise of the Throttle Screw prior to performing the Combustion Calibration.

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:

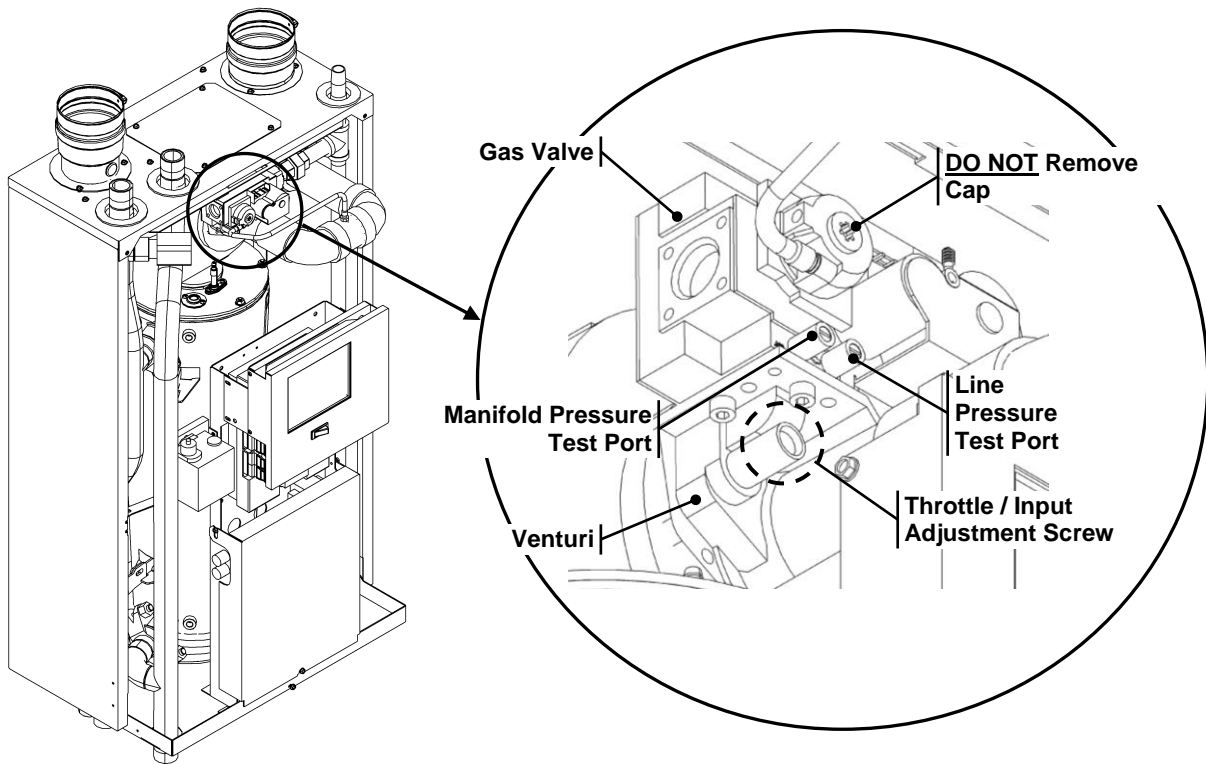
1. Operate the unit at the maximum modulation rate, see Table 2-2.
2. Ensure the gas line pressure is maintained within tolerance, see Table 2-1.
3. While at the maximum modulation rate, measure the CO₂ and CO; adjust as necessary, using the Throttle Screw, to be within the limits listed in Table 2-1.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



Failure to perform the flue gas analysis and adjustment 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 property damage, serious injury or death.

Figure 2-1 Gas Valve and Venturi Assembly

(model Tft60-110 illustrated)



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. 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>January 12, 2015</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

Attach this decal below the existing rating plate decal. →

This appliance was modified with kit #82650-1, by John Smith, which accepts responsibility that this conversion was completed properly.

THIS CONTROL WAS CONVERTED FOR USE WITH LP GAS.

Reference rating plate for propane Input and Gas Pressure.