

# Trinity Lx400 & Lx400WH

## NATURAL TO LP CONVERSION INSTRUCTIONS:

Version Date: 2024-02-13

Kit Number: 99983017-1



### WARNING

This conversion kit shall be installed by a qualified installer, service agency, or the gas supplier 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 installer, service agency, or the gas supplier 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 CO<sub>2</sub>/O<sub>2</sub> and CO combustion analyzer.

NTI Trinity boilers 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 orifice; ensure the orifice being used corresponds to the boiler model being converted (Lx400 & Lx400WH models use a 6.2 mm LP-orifice). 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 99984501)
- Natural to LP Conversion Decal (p/n 99986947)
- 6.2 mm LP-orifice (p/n 99983017)

### 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

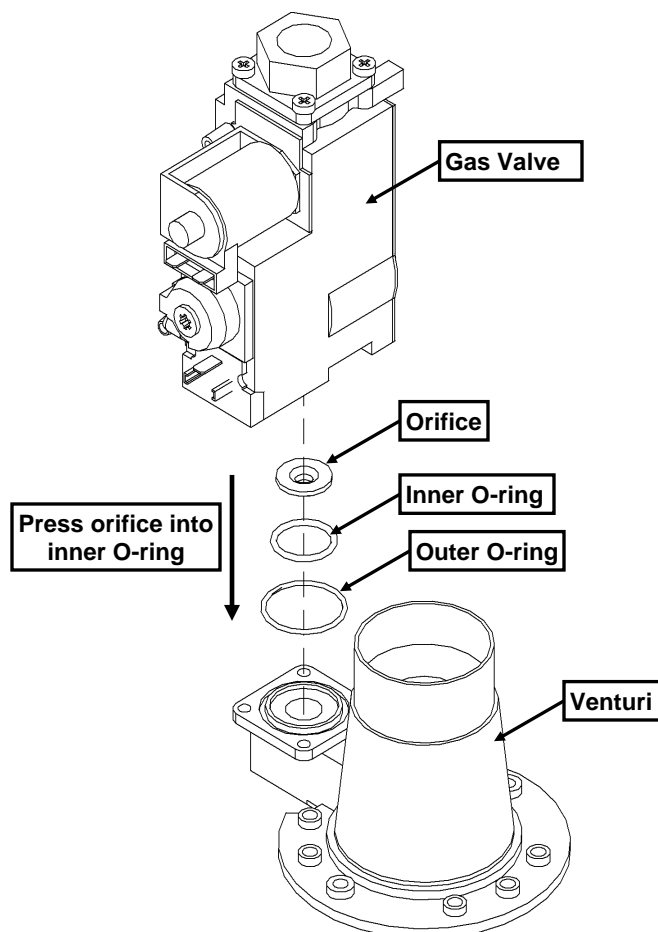
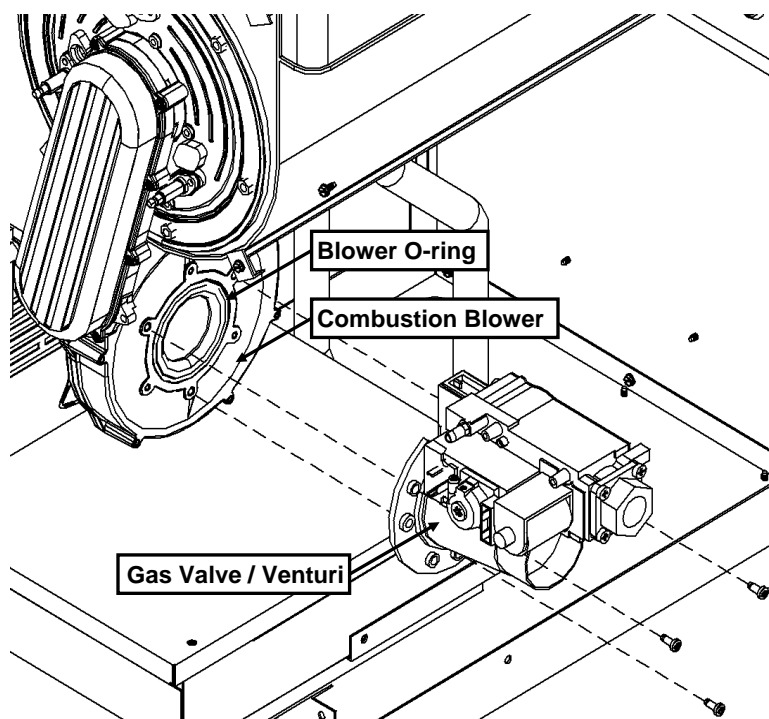
Failure to install the correct LP-orifice may result in dangerous Carbon Monoxide levels, fire or explosion leading to property damage, personal injury or death.

### **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 Changing 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.
4. Remove internal air-inlet piping from the boiler.
5. Disconnect gas line at union.
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. Remove the 3 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 four screws attaching the Venturi to the Gas Valve.
10. Remove the 8.0 mm Natural Gas orifice and replace it with the 6.2 mm Propane orifice. If necessary, replace the Inner O-ring (included in kit).
11. Ensure the orifice and O-rings are properly seated, then re-attach the Venturi to the Gas Valve, and securely tighten the four screws.
12. Re-attach the Gas Valve/Venturi Assembly to the Combustion Blower and securely tighten the three screws. Ensure the Blower O-ring is in place.
13. Reconnect the gas-line, air-inlet piping, harness and tubing (ensure the tubing is reconnected properly). Turn gas on and check for leaks. Proceed to Section 2.0 *Gas Valve and Burner Setup*.



## 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.

### Combustion Calibration Procedure

To calibrate burner combustion, perform the following procedure using a calibrated combustion analyzer capable of measuring CO<sub>2</sub> and CO from a Natural Gas or Propane burning appliance:

1. **Set analyzer** to the appropriate fuel (Propane).
2. **Gas Line Pressure Test** – monitor gas line pressure throughout all combustion tests and verify it is maintained within tolerance. See *Gas Line Pressure Test* below.
3. **Set Throttle Screw** – operate burner to the maximum modulation rate (see Table 2-2); set combustion according to Table 1-1 using the Throttle Screw; allow time for the analyzer readings to stabilize between adjustments – record CO<sub>2</sub> value. See *Throttle Screw Adjustment* below.
4. **Set Offset Screw** – operate burner to the minimum modulation rate (see Table 2-2); using the Offset Screw, set the CO<sub>2</sub> to 0-0.5% lower than the value obtained during the maximum modulation rate test (e.g. if CO<sub>2</sub> at Max = 10.0%, then CO<sub>2</sub> at Min must = 9.5-10.0%). See *Offset Screw Adjustment* below.



**Combustion Calibration is mandatory** upon installation and during each annual service. Failure to perform the Combustion Calibration in accordance with these instructions may result in incorrect combustion leading to burner damage or excessive Carbon Monoxide concentrations causing property damage, personal injury or death.



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

### Throttle Screw Adjustment

The gas valve Throttle Screw (see Figure 2-1) is used to calibrate the CO<sub>2</sub> concentration with the burner operating at or near the maximum modulation rate (see Table 2-2). Turning the Throttle Screw in (clockwise) decreases the CO<sub>2</sub> concentration. Turning the Throttle Screw out (counterclockwise) increases the CO<sub>2</sub> concentration. Typical adjustment required is 0 – 1/2 of a turn in or out from the factory setting.

#### NOTE:

Calibration of the Throttle Screw should only be performed with the burner operating at or near the maximum modulation rate (see Table 2-2).



Adjustments to the **Throttle Screw** may only be made by a qualified gas technician using a calibrated combustion analyzer capable of measuring CO<sub>2</sub> 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.

### Offset Screw Adjustment

The gas valve Offset Screw (see Figure 2-1) is used to calibrate the CO<sub>2</sub> offset at minimum modulation vs. maximum modulation. Turning the Offset Screw in (clockwise) increases the CO<sub>2</sub> concentration at minimum modulation rate. Turning the Offset Screw out (counterclockwise) decreases the CO<sub>2</sub> concentration at minimum modulation rate. Typical adjustment required is 0 - 1/8<sup>th</sup> of a turn in or out from the factory setting.

#### NOTE:

Calibration of the Offset Screw must only be performed with the burner operating at the minimum modulation rate (see Table 2-2).



## WARNING

Adjustments to the Offset Screw may only be made by a qualified gas technician using a calibrated combustion analyzer capable of measuring CO<sub>2</sub> and CO, and only with the burner at the minimum modulation rate (see Table 2-2). Attempting to set the Offset Screw while the burner is operating at a modulation rate other than the minimum will result in incorrect combustion and may lead to burner damage or excessive CO.

## 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" tubing 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 <sub>2</sub> (%) <sup>1</sup>		CO (ppm) Max. <sup>1</sup>
	Nominal/Desired	Min.	Max.	Min.	Max.	
Natural	7	4	10.5	8.5	9.5	175
Propane	11	8	13	9.5	10.5	175

### Notes:

<sup>1</sup> Combustion calibration must only be performed with the burner operating at maximum modulation rate; when tested at minimum modulation rate the CO<sub>2</sub> must be 0-0.5% lower than CO<sub>2</sub> at maximum modulation rate.

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

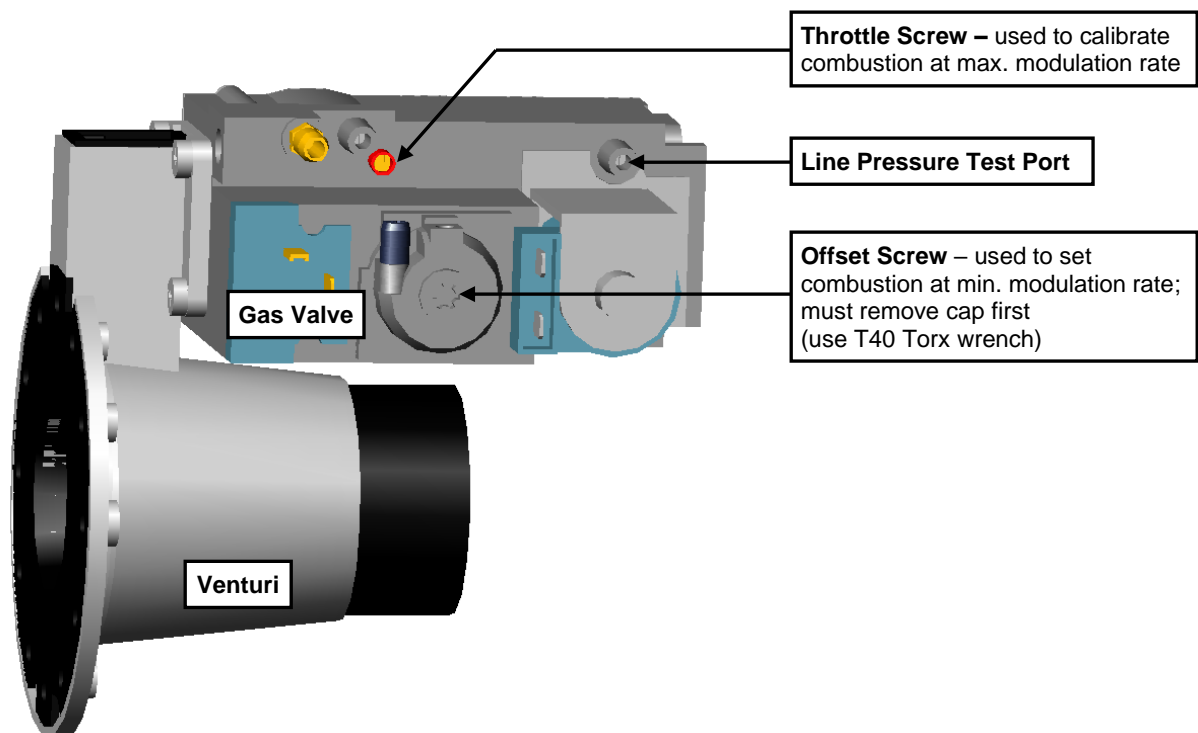
Model	Min. Modulation Rate (RPM)	Max. Modulation Rate (RPM)	Input (MBH)	
			Min	Max <sup>1</sup>
Lx400 & Lx400WH	1550	7250	75	399

### Notes:

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

<sup>2</sup> Use *Diagnostic Test*, accessed from the *Diagnostic* menu of the display, to force max. and min. modulation rates; see Appendix A – Controller and Touchscreen Display Instructions, Section 5 DIAGNOSTICS PAGE.

Figure 2-1 Gas Valve and Venturi Assembly



### 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

<b>FACTORY SET FOR NATURAL GAS</b> Field converted to Propane Gas <input checked="" type="checkbox"/> Date: <b>February 13, 2024</b>		<b>ADJUSTER A L'USINE POUR GAZ NATURAL</b> Convertie au propane sur place <input type="checkbox"/> Date: _____
<b>Gas Pressure</b> [Pression du Gaz]	<b>Natural</b> [Naturel]	<b>Propane</b>
<b>Maximum Inlet Gas Pressure</b> [Pression maximale d'entrée du gaz]	10.5" wc [2.6 kPa]	13" wc [3.2 kPa]
<b>Minimum Inlet Gas Pressure</b> [Pression minimum d'entrée du gaz]	4" wc [1 kPa]	8" wc [2 kPa]
<b>Manifold Pressure</b> [Pression d'admission]	0" wc [0 kPa]	0" wc [0 kPa]

Figure 3-2 Conversion Decal

This appliance was converted on **13 /02 / 2024**  
(Day / Month / Year)

to **Propane** gas, with Kit No. **99983017-1**

by **Company Name, Street #, City, State/Province, Zip/Postal Code**

\_\_\_\_\_  
(name and address of organization making this conversion)

that accepts responsibility for the correctness of the conversion.

**Reference rating plate for gas input and pressures.**