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Date Created: Jan/10/2020
Date Modified: Jan/10/2020

84784 Gas Valve/Blower/Venturi Assembly

⚠ WARNING The installation of this gas valve assembly must be performed by a qualified gas technician in accordance with these instructions. Installing this assembly without the proper background and training is hazardous and may result in property damage serious injury or death.

Applicable Boiler Models
- Tx101 PN# 84784

Kit Contents
- 1 Gas Valve/Blower/Venturi Assembly

Tools Required
- 8mm open ended wrench (5/16")
- Torx T25 Screwdriver
- Phillips Screwdriver
- Combustion Analyzer

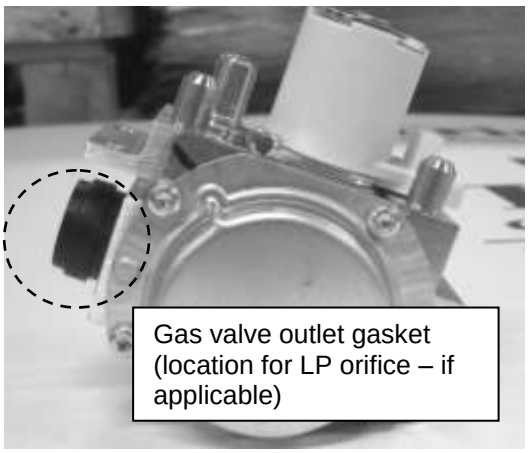
Replacement Instructions

1) Turn off power and gas to the boiler.
2) Remove wiring, air inlet pipe from combustion blower and gas line from the gas valve.
3) Loosen the blower mounting screws on the right side of the blower (do not remove)
4) Remove blower mounting screws on the left side of the blower

Note: if the blower gasket is also being replaced remove right hand screws completely

5) Transfer gas line inlet adapter to the new valve. Use care to ensure that the O-ring gasket does not fall out.
6) Transfer LP orifice: **Propane (LP):** if equipped with an LP orifice, ensure it remains inside the groove in the middle of the gas valve outlet gasket.

Figure 2



7) Drill 1/8" hole in the bottom of the air-inlet pipe assembly in accordance with the *Trinity Tx Air-inlet Pipe – Drain Hole Addition* instructions (see last page).

⚠ DANGER **Feedback Tube** – Rreconnect the tubing from the air-inlet to the gas valve feedback port. Failure to properly reconnect the feedback tube will negate the boiler's blocked vent safety shutoff mechanizm, and could lead to incorrect combustion resulting in property damage, serious injury or death.

8) Re-assemble in the reverse order and perform a combustion test

9) The valve is not set when received, proceed with the **Combustion Calibration Procedure** detailed on the following pages

⚠ DANGER **Gas Leakage –** Failure to properly seal the blower to the burner door will result in gas leakage which can result in ,fire, explosion, serious injury or death.

⚠ WARNING **Incorrect Part:** Installing the incorrect blower may lead to the boiler over firing causing serious injury or death

Combustion Calibration Procedure

To calibrate burner combustion, perform the following procedure using a calibrated combustion analyzer capable of measuring CO_2 and CO from a Natural Gas or Propane burning appliance:

1. **Set analyzer** to the appropriate fuel (Natural Gas or 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 3); set combustion according to Table 2 using the Throttle Screw; allow time for the analyzer readings to stabilize between adjustments – record CO_2 value. See *Throttle Screw Adjustment* below.
4. **Set Offset Screw** – operate burner to the minimum modulation rate (see Table 3); using the Offset Screw, set the CO_2 to 0.4-0.8% lower than the value obtained during the maximum modulation rate test (e.g. if CO_2 at Max = 9.5%, then CO_2 at Min must = 8.8-9.1%). See *Offset Screw Adjustment* below.

⚠ WARNING **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.

⚠ WARNING **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 4) is used to calibrate the CO_2 concentration with the burner operating at or near the maximum modulation rate (see Table 3). Turning the Throttle Screw in (clockwise) decreases the CO_2 concentration. Turning the Throttle Screw out (counterclockwise) increases the CO_2 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 3).

⚠ WARNING Adjustments to the **Throttle Screw** may only be made by a qualified gas technician using a calibrated combustion analyzer capable of measuring CO_2 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). Failure to follow these instructions may result in serious injury or death.

Offset Screw Adjustment

The gas valve Offset Screw (see Figure 4) is used to calibrate the CO_2 offset at minimum modulation vs. maximum modulation. Turning the Offset Screw in (clockwise) increases the CO_2 concentration at minimum modulation rate. Turning the Offset Screw out (counterclockwise) decreases the CO_2 concentration at minimum modulation rate. Typical adjustment required is 0 - $^1/_{8^{th}}$ 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 3).

⚠ WARNING

Adjustments to the **Offset Screw** may only be made by a qualified gas technician using a calibrated combustion analyzer capable of measuring CO_2 and CO, and only with the burner at the minimum modulation rate (see Table 3). 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 Test

The boiler gas valve is equipped with a line pressure test port; see Figure 4. 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. 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 4.
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. 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. 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 3) and compare the observed line pressure with Table 2. The pressure will be lowest during the maximum flow of gas.
7. Adjust the gas line pressure to ensure the parameters in Table 2 are attained under all conditions. If possible adjust the line pressure to the "Nominal/Desired" value listed in Table 2, while the unit is operating at the maximum modulation rate, see Table 3.
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, 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 Line Pressure and Combustion Parameters

Gas	Line Pressure (inches w.c.)			CO_2 (%)		CO (ppm)
	Nominal/Desired	Min.	Max.	Min.	Max.	Max.
Natural	7	4	10.5	9.0	9.5	175
Propane	11	8	13	10.0	10.8	175

Notes:

[1] Combustion calibration must only be performed with the burner operating at maximum modulation rate; when tested at minimum modulation rate the CO_2 must be 0.4-0.8% lower than CO_2 at maximum modulation rate.

Table 3 Minimum and Maximum Modulation Rates

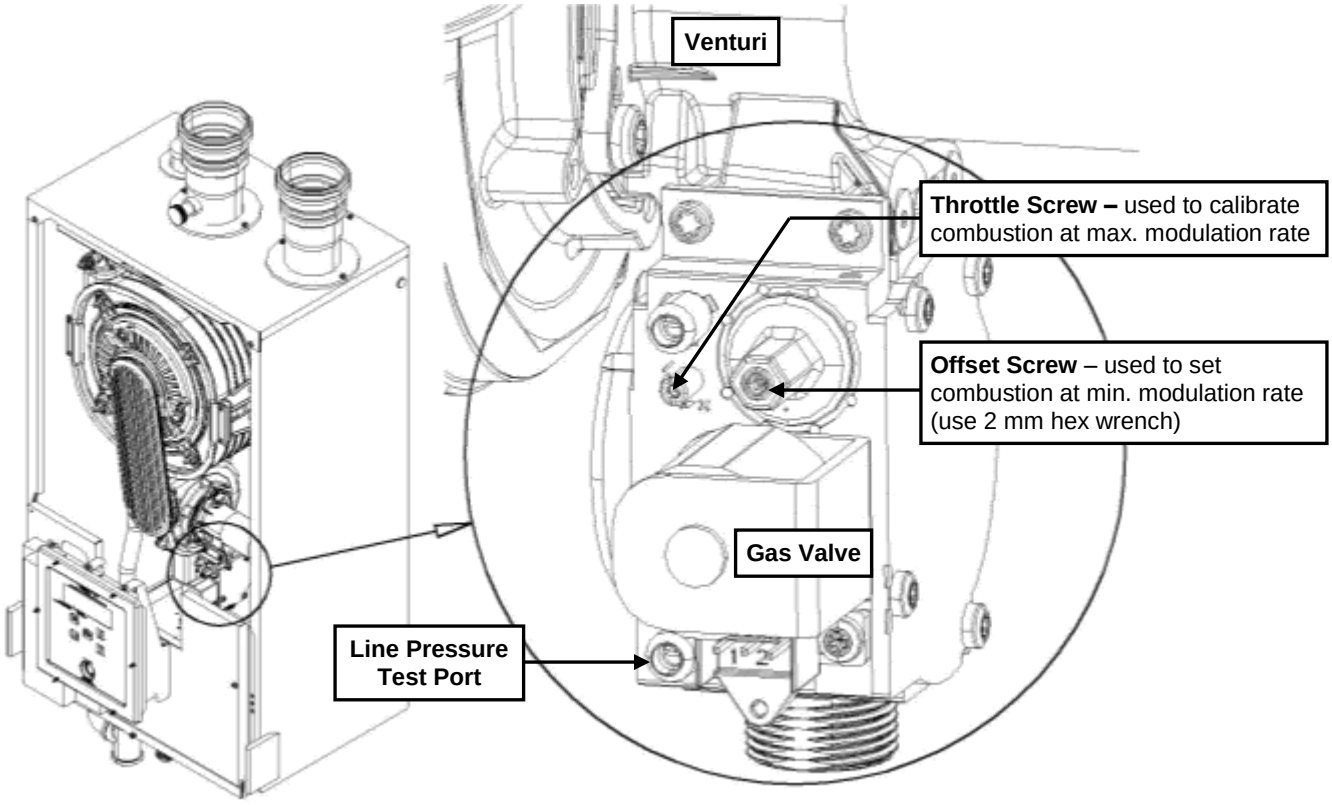
Model	Gas Type	Min. Modulation Rate (RPM)	Max. Modulation Rate (RPM)
Tx51	N/A	1380	5460
Tx81		1260	5700
Tx101			5820
Tx151/C		1380	6420
Tx200/C		1020	5280
VM110/P	NG	1680	7800
	LP		7680

Model	Gas Type	Min. Modulation Rate (RPM)	Max. Modulation Rate (RPM)
FTV110/C	NG	1620	7620
	LP	1860	8040
FTV150/C	N/A	1740	8220
FTV190/C		1620	8280
VM153/P	NG	1740	7980
	LP		7500

Notes:

[1] Use Installer Menu setting 2-15 to force the burner to operate at the max. (2-15 = 3) and min. (2-15 = 1) modulation rates; see Section 17.0 DISPLAY MENU GUIDE.

Figure 4 Gas Valve and Venturi Assembly (Tx Illustrated)



Trinity Tx Air-inlet Pipe – Drain Hole Addition
(factory equipped post s/n 116575)

Instructions:

Working with the boiler turned off, drill a 1/8" diameter hole in bottom of air-inlet pipe as close to the clamp as possible. (Figure 5)

Figure 5

Remove the air-inlet pipe assembly from the boiler to clean out any filings created by drilling the hole.
Reinstall air-inlet pipe – make sure the feedback tube is reconnected to both the gas valve and the air-inlet pipe. Figure 6 shows how the finished product should look.

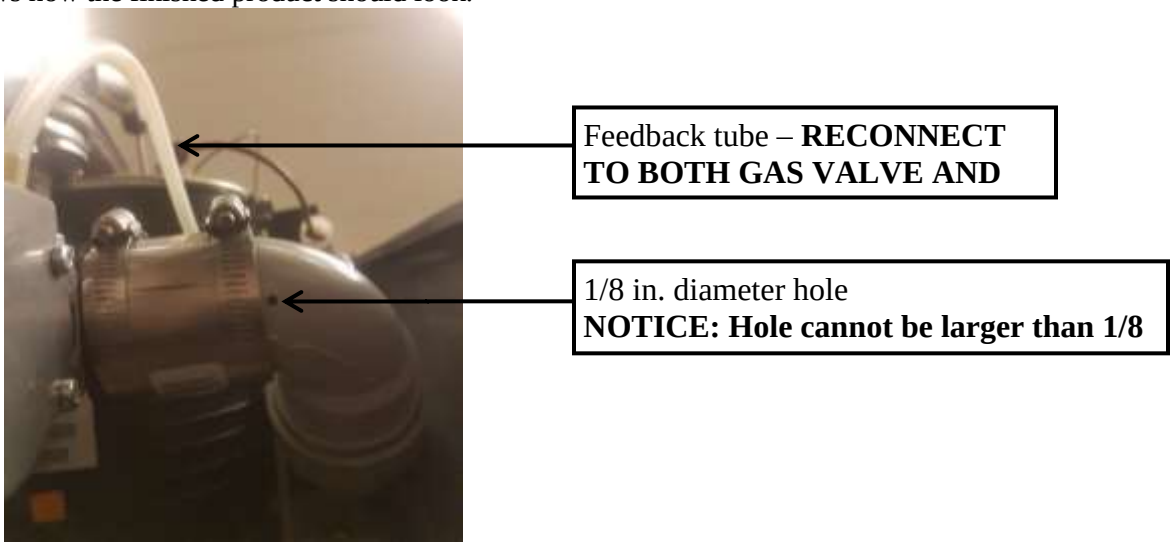


Figure 6

⚠ WARNING

Carbon Monoxide Poisoning – adding a hole to the air-inlet assembly of a Trinity Tx boiler, in any location other than the one illustrated, or of a larger diameter, may defeat the boiler's blocked vent safety shutoff mechanism, which protects against extremely high Carbon Monoxide (CO) concentration in the event the air-inlet pipe is blocked. Failure to correctly follow these instructions may result in serious injury or death.