SUPPLEMENTAL INSTRUCTIONS

90-50/75/100 REPLACEMENT BURNER KIT INSTALLATION INSTRUCTIONS

IMPORTANT: These instructions replace any existing replacement burner kit instructions in the boiler installation manual, the boiler user's manual, or any existing supplemental instructions or addendums.

⚠ CAUTION ⚠

Please read these instructions carefully before starting the adjustment or conversion process. These changes must be performed by a qualified service agency.

⚠ WARNING ⚠

Prior to performing any work on the boiler, the gas supply and electrical supply must be turned OFF!!

All 90-50/75/100 Natural and LP units installed at high altitude, installations above 5,000 ft, require a gas manifold adjustment.

For model 90-75 LP units only at altitudes above 5,000 ft, install 90-75 LP High Altitude Orifice Kit #55001603. For all other altitudes use the factory installed orifice.

Reference *90-100 SERIES HIGH ALTITUDE MANIFOLD PRESSURE ADJUSTMENT AND LP CONVERSION INSTRUCTIONS* (part number 240005980) for complete details on high altitude installations.

PARTS INCLUDED IN THIS KIT

Part Number	Description	Quantity
1050040	90-50/75/100 Worgas Burner	1
109006405	90-75 Restrictor Plate	1
109006406	90-50 Restrictor Plate	1
42531100	90-100 Air Baffle	1
43800013	Replacement Igniter Kit	1
14631023	Burner Gasket	1
14631025	Mixer Gasket	1
19934	Burner Repl Label	1
19919	90-50/75/100 Repl Kit Inst	1

IMPORTANT: Combustion test equipment must be used to verify performance after any changes are made to the boiler.

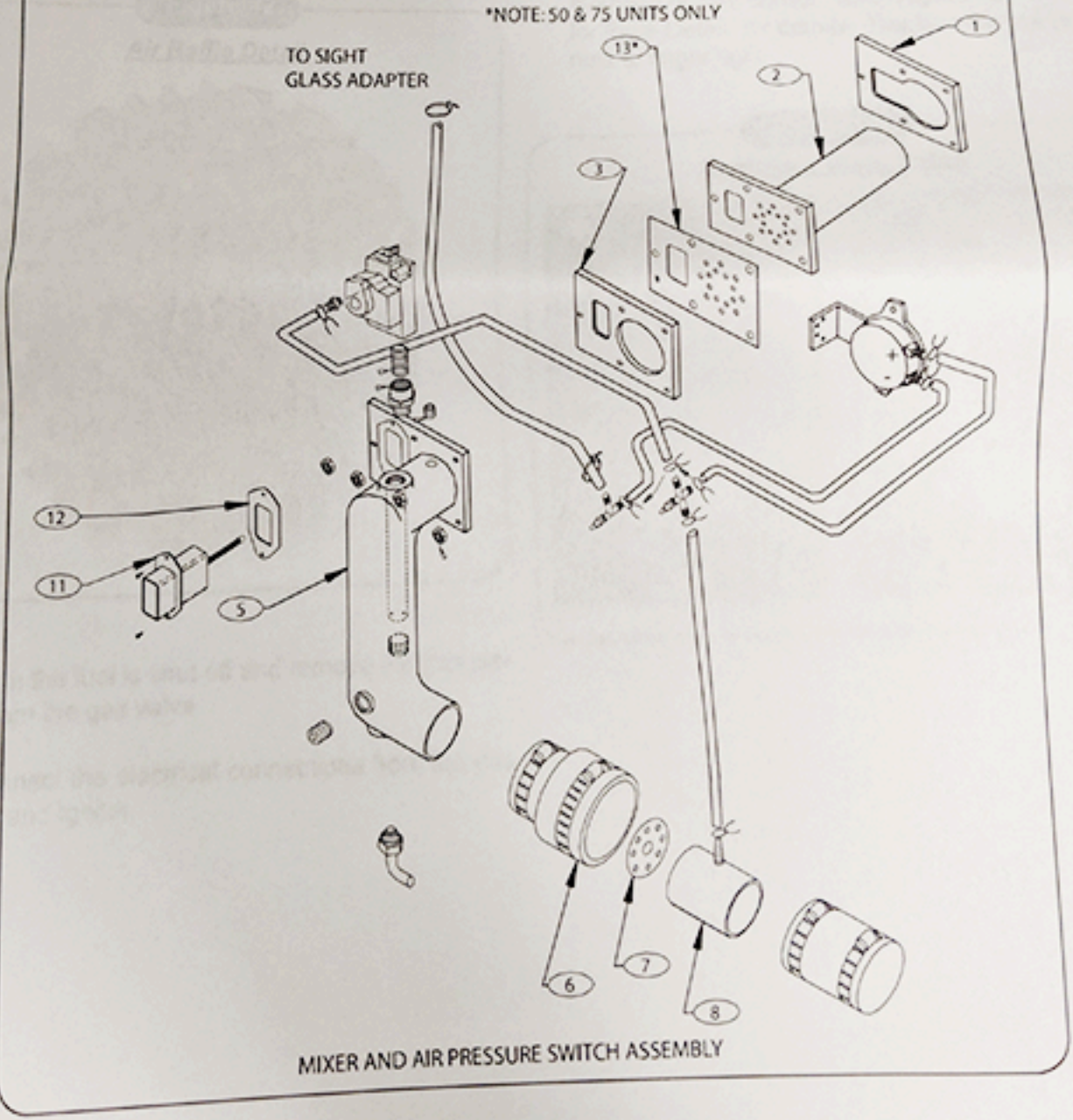
INSTALLATION INSTRUCTIONS

Verify that the gas supply has been shut off and electrical power has been disconnected before performing any work on this boiler.

1. Refer to the kit contents and "***Figure #1*** – Mixer and Air Pressure Switch Assembly" to become familiar with the components.

2. Identify the following parts:
   a. Burner – item 2
   b. Mixer casting – item 5
   c. 2" x 2-1/2" flexible coupling – item 6
   d. Air baffle – item 7
   e. Air inlet pipe – item 8
   f. Restrictor plate – item 13
   g. Hot surface igniter – item 11

Figure #1



MIXER AND AIR PRESSURE SWITCH ASSEMBLY

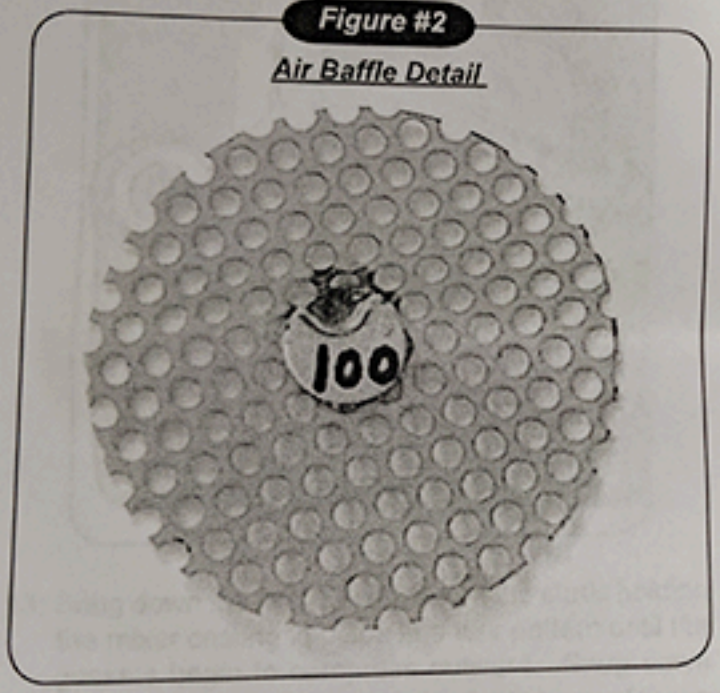
3. Drill a hole in the combustion air vent pipe large enough to accommodate the combustion analyzer probe.

4. Remove the air inlet pipe by loosening the hose clamp on the 2" x 2-1/2" flexible coupling.

5. In some 90-100 models the air baffle may need to be replaced. Verify that the correct air baffle is installed or change the air baffle to the one supplied with the kit. The correct air baffle will have a ⅛" diameter solid slug labeled "100" welded to a round screen. See "***Figure #2*** – 100 Air Baffle Detail" for details.

Figure #2

Air Baffle Detail



6. Confirm the fuel is shut off and remove the gas piping from the gas valve

7. Disconnect the electrical connections from the gas valve and igniter.

8. Remove the five (5) ¼" nuts from the studs holding the mixer casting in place.

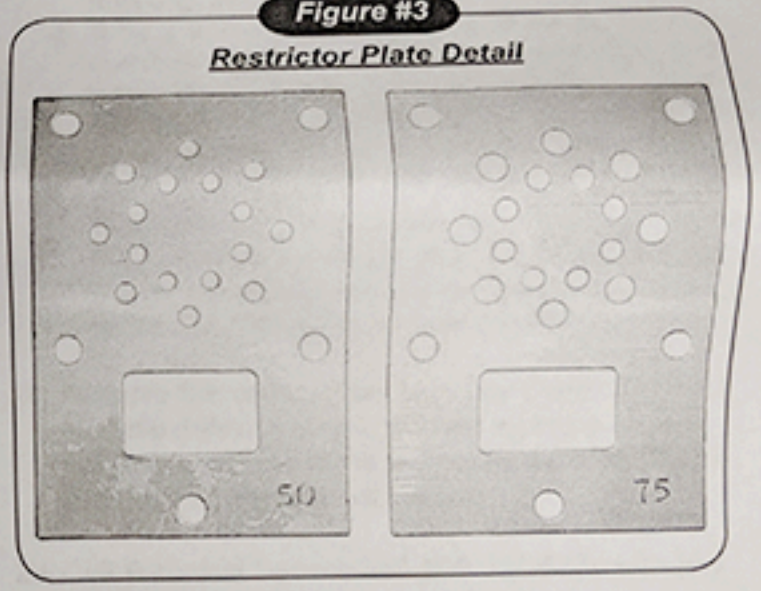
9. Remove the mixer casting, and igniter.

10. Remove the burner from the burner opening. Discard the old burner, igniter and gaskets. Replace with the new burner, igniter and gaskets supplied in the kit.

11. Install the new the burner gasket, replacement burner, restrictor plate (needed only on a 90-50 or 90-75), and mixer gasket from the replacement kit. The plates can be identified by the "50" or "75" stamped on one corner. See "***Figure #3*** – Restrictor Plate Detail" for details. Replace the five (5) ¼" nuts to finger tight.

Figure #3

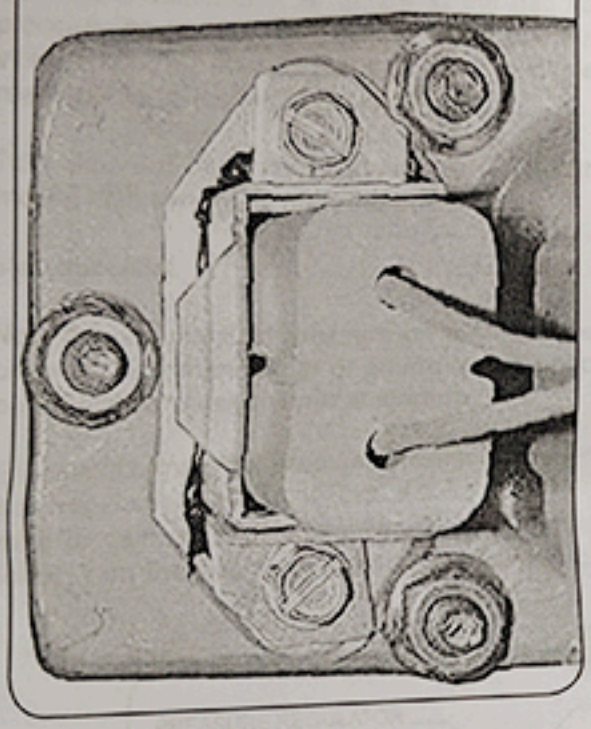
Restrictor Plate Detail



12. Install the new hot surface igniter in the correct orientation; the tab must be pointing to the left when installed. See "***Figure #4*** - Igniter Details" for details. The igniter is extremely fragile! Take care not to damage the igniter during installation!

Figure #4

Igniter Detail



13. Snug down the five (5) ¼" nuts on the studs holding the mixer casting in place in a star pattern until the gaskets begin to compress outward. Snug down the igniter screws. Do not over tighten any of these connections.

14. Reinstall the electrical and gas connections.

15. Reassemble the air intake piping and any hoses disconnected during the procedure.

16. Attach the "Replacement Burner Information" label inside the boiler jacket next to the rating plate.

17. Turn the electrical power and gas supply back on.

18. Be sure to operate the boiler through at least 6 ignition cycles and check the combustion products with a combustion analyzer to verify the proper operation of the boiler before leaving the job site.

    a. Calibrate the combustion analyzer to ensure a correct reading.
    b. Insert the combustion analyzer probe in the hole drilled in *Step 3*.
    c. Take a combustion sample and verify that the manifold pressure, CO, $\%CO_2$, and $\%O_2$ are within the recommended value range for the installation. Refer to ***Tables #1 & #2*** for details, these values are for reference only and will change with altitude, vent length, manifold pressure, calorific value of gas, etc. See the ***MANIFOLD PRESSURE ADJUSTMENT*** section of these instructions for details on how to adjust the manifold pressure if needed.

19. Remove the combustion analyzer probe and seal the hole drilled in step 3 with an appropriate material able to withstand the temperatures of the boiler flue gas (ex: metallic duct tape).

20. Call Technical Service at 1-800-325-5479 with any questions.

MANIFOLD PRESSURE ADJUSTMENT

1. Turn off the manual gas valve.

2. Remove the manifold pressure tap plug marked "Outlet Pressure Tap" from the gas valve using a 3/16" Allen wrench. Install a ⅛" NPT x ¼" barbed fitting. See ***Figure #5*** for details.

3. Connect a manometer or gauge to the gas valve pressure tap barbed fitting just installed in the previous step. The manometer should be capable of reading 1 to 15 inches of water column.

4. Turn electrical power and gas supply on. Set thermostat high enough to start the boiler.

5. Start the boiler.

6. Note the gas manifold pressure on the manometer or gauge. The manometer or gauge reading should be 2½ inches water column at start up.

7. To adjust the manifold pressure, remove the "Pressure Regulator Adjustment Cap" located on the gas valve to gain access to the regulator adjustment screw. Turn the adjustment screw clockwise to increase the pressure and counterclockwise to decrease the pressure. See ***Figure #5*** for details.

> ***NOTE:*** When doing this procedure, place the pressure regulator cap back in place to get the correct reading. By not putting the cap in place you will get a false reading of the manifold pressure.

8. Adjust manifold pressure using known gas Btu value and known altitude of installation to the value published in this manual. See ***Tables #1*** through **#3** on the following pages for details.

9. Once the correct pressure reading is obtained and remains steady, shut off the boiler at the thermostat, shut off the manual gas valve, and the electrical supply. Remove the manometer or gauge, ⅛" barbed fitting and replace the pressure tap plug.

10. Restore the electrical and gas supply restart the boiler and check for gas leaks using soapy water or a commercial leak detector.

Be sure to operate the boiler through at least 6 ignition cycles to check for the operation of the boiler before leaving the job site.

Figure #5

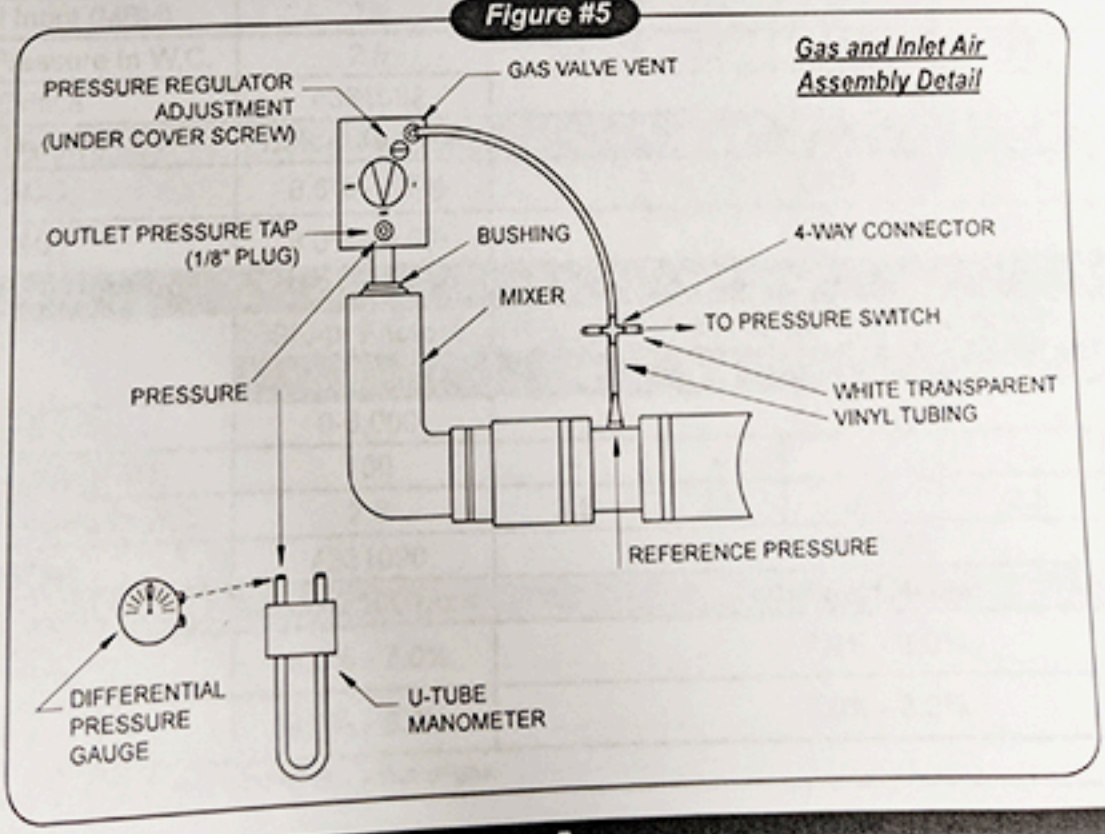


TABLE #1: SEA LEVEL RATINGS – NATURAL AND PROPANE GASES

Model	Input *(MBH)	++Heating Capacity *(MBH)	Net I=B=R Rating *(MBH)
90-50	50	45	39
90-75	75	68	59
90-100	100	90	78

*1 MBH = 1,000 Btuh Btuh = British Thermal Units Per Hour
++The Heating Capacity is based on the D.O.E. (Department of Energy) test procedure.

TABLE #1: SERIES 90 NATURAL GAS

SERIES 90-50						
	Stock Factory	Btu Value of Natural Gas++				
	Settings	750	850	950	1000	1050
Altitude in Ft.	0-5,000	5,000-10,000				
Normal Input (MBH)	50	–	–	–	–	–
Manifold Pressure In W.C.	2.5	4	4	3.5	2.5	2.5
Orifice	4331094	4331094				
CO ppm	Below 100 ppm	Below 100 ppm				
$\%CO_2$	4.5% - 5.5%	6.5% - 7.5%				
$\%O_2$	9.0% - 11.0%	8.0% - 9.0%				
SERIES 90-75						
	Stock Factory	Btu Value of Natural Gas++				
	Settings	750	850	950	1000	1050
Altitude in Ft.	0-5,000	5,000-10,000				
Normal Input (MBH)	75	–	–	–	–	–
Manifold Pressure In W.C.	2.5	3.5	3.5	2.5	2.5	2.5
Orifice	4331092	4331092				
CO ppm	Below 100 ppm	Below 100 ppm				
$\%CO_2$	6.5% - 7.5%	7.5% - 8.5%				
$\%O_2$	8.0% - 9.0%	7.0% - 8.0%				
SERIES 90-100						
	Stock Factory	Btu Value of Natural Gas++				
	Settings	750	850	950	1000	1050
Altitude in Ft.	0-5,000	5,000-10,000				
Normal Input (MBH)	100	–	–	–	–	–
Manifold Pressure In W.C.	2.5	3.5	3.5	2.5	2.5	2.5
Orifice	4331090	4331090				
CO ppm	Below 100 ppm	Below 100 ppm				
$\%CO_2$	6.0% - 7.0%	7.0% - 8.0%				
$\%O_2$	8.0% - 9.0%	7.0% - 8.0%				

++Contact local gas utility or distributor for Btu value of gas.

TABLE #2: SERIES 90 PROPANE GAS

SERIES 90-50						
	Stock Factory	Btu Value of LP Gas++				
	Settings	2300	2350	2400	2450	2500
Altitude in Ft.	0-5,000	5,000-10,000				
Normal Input (MBH)	50	–	–	–	–	–
Manifold Pressure In W.C.	2.5	3	3	2.5	2.5	2.5
Orifice	4331095	4331095				
CO ppm	**Below 100 ppm**	**Below 100 ppm**				
$\%CO_2$	5.0% - 6.0%	7.5% - 8.5%				
$\%O_2$	9.0% - 10.0%	9.0% - 10.0%				

SERIES 90-75*						
	Stock Factory	Btu Value of LP Gas++				
	Settings	2300	2350	2400	2450	2500
Altitude in Ft.	0-5,000	5,000-10,000				
Normal Input (MBH)	75	–	–	–	–	–
Manifold Pressure In W.C.	2.5	3.5	3.5	3.5	3	3
Orifice	4331093	55001603				
CO ppm	**Below 100 ppm**	**Below 100 ppm**				
$\%CO_2$	7.0% - 8.0%	8.5% - 9.5%				
$\%O_2$	8.0% - 9.0%	8.5% - 9.5%				

** For model 90-75 LP units only at altitudes above 5,000 ft., install 90-75 High Altitude Orifice Kit #55001603. For all other altitudes use factory installed orifice.*

SERIES 90-100						
	Stock Factory	Btu Value of LP Gas++				
	Settings	2300	2350	2400	2450	2500
Altitude in Ft.	0-5,000	5,000-10,000				
Normal Input (MBH)	100	–	–	–	–	–
Manifold Pressure In W.C.	2.5	3	3	3	2.5	2.5
Orifice	4331091	4331091				
CO ppm	**Below 100 ppm**	**Below 100 ppm**				
$\%CO_2$	7.5% - 8.5%	8.5% - 9.5%				
$\%O_2$	8.0% - 9.0%	7.0% - 8.0%				

++Contact local gas utility or distributor for Btu value of gas.