

TECHNICAL SERVICE BULLETIN

Date: 12/4/09	Number: 2009-12
Subject: BENCHMARK LOW NOx BOILER ANNUAL MAINTENANCE KIT, PART NUMBER 58015-01	
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1. INTRODUCTION

This Technical Service Bulletin provides the procedures to perform recommended annual maintenance on the following Benchmark Low NOx Boiler Models:

- Benchmark 2.0LN (Venturi Design)
- Benchmark 3.0LN
- Benchmark 1.5LN
- Benchmark 2.0LN (VFD Design)

The recommended annual maintenance includes performing the following tasks on the Low NOx Burner and the Condensate Trap (24060) used on Benchmark Low NOx Models:

- Low NOx Burner: Replace spark igniter, flame detector and gasket
- Condensate Trap: Clean and inspect trap. Replace trap O-ring and orifice gasket

The replacement parts required to perform the recommended maintenance tasks are included in the Annual Maintenance Kit described in section 2.

2. CONTENTS OF ANNUAL MAINTNENANCE KIT, PART NO. 58015-01

The items included in the Annual Maintenance Kit for Benchmark Low NOx Boilers are listed in the following Table:

Benchmark Low NOx Annual Maintenance Kit, Part No. 58015-01

ITEM	QTY	PART NO.	DESCRIPTION
1	1	GP-122435-S	IGNITER
2	1	66006	FLAME DETECTOR
3	1	81048	FLAME DETECTOR GASKET
4	1	84017	CONDENSATE TRAP O-RING
5	1	81092	CONDENSATE TRAP ORIFICE GASKET

3. TOOLS, TEST EQUIPMENT & MATERIALS REQUIRED

The items required to perform the inspections and replacements specified in this bulletin are listed in paragraph 3.1, 3.2 and 3.3 which follow.

3.1 Tools

Common hand tools, plus a spark gap feeler gauge are required to perform annual tasks described in this bulletin.

3.2 Test Equipment

No test equipment is required to perform the annual maintenance tasks included in this Technical Service Bulletin. However, following completion of these tasks, the Benchmark Boiler should be tested using the combustion calibration procedures specified in the applicable O & M Manuals listed in paragraph 7.2.

3.3 Materials

Expendable materials required to perform the procedures described in this bulletin are not included in the Annual Maintenance Kit. These materials may include such items as:

- Anti-seize lubricant (for spark igniter)
- Cleaning solvents and materials (for condensate trap)

WARNING

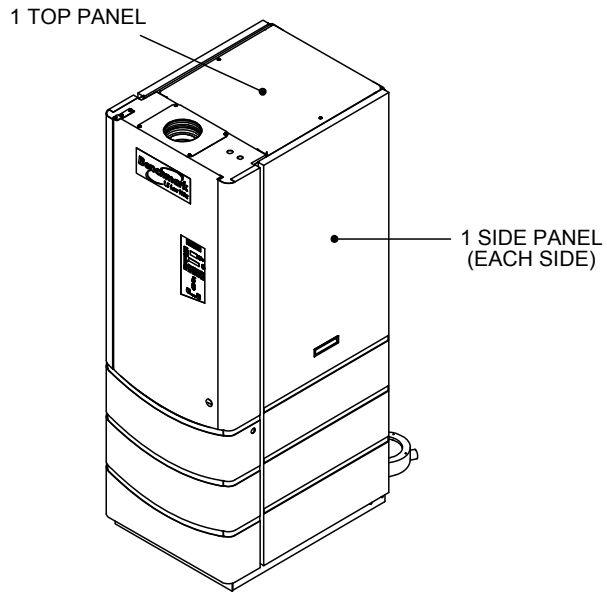
TO AVOID PERSONAL INJURY, PRIOR TO SERVICING:

- DISCONNECT ELECTRICAL POWER FROM THE UNIT
- TURN OFF THE GAS SUPPLY
- ALLOW UNIT TO COOL TO A SAFE TEMPERATURE

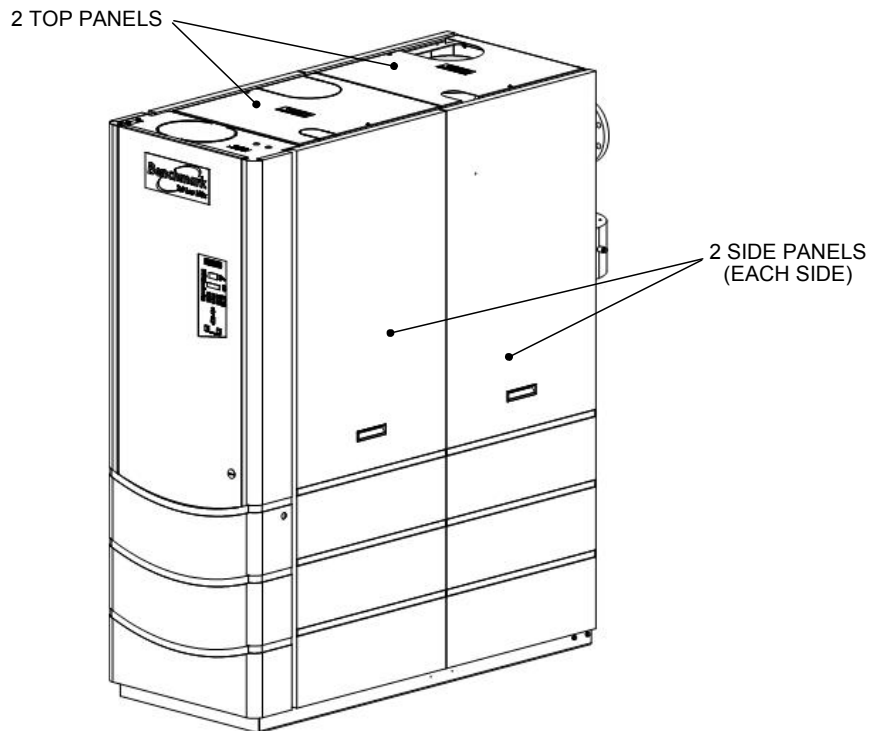
4. PRELIMINARY PROCEDURES

Prior to performing the procedures in sections 5 and 6, perform the following preliminary set-up and disassembly procedures:

1. At the front panel of the unit, set the **ON/OFF** switch on the C-More Control Panel to the **OFF** position.
2. Disconnect electrical power to the unit by turning off the external circuit breaker.
3. Turn off the external gas supply shutoff valve.
4. Remove the top panel(s) of the unit. Benchmark 1.5LN and 2.0LN (VFD Design) Models contain one (1) top panel. Benchmark 2.0LN (Venturi Design) and 3.0LN Models contain two (2) top panels as shown in Figure 1.
5. Remove the side panels of the unit. Benchmark 1.5LN and 2.0LN (VFD Design) Models contain one panel on each side. Benchmark 2.0LN (Venturi Design) and 3.0LN Models contain two (2) panels on each side as shown in Figure 1.
6. To prevent burns, allow the unit to cool to a safe temperature before proceeding.



BENCHMARK 1.5LN



BENCHMARK 3.0LN

Figure 1. Benchmark Low NOx Models

5. BENCHMARK LOW NOX BURNER MAINTENANCE

Annual maintenance for the Benchmark Low NOx burners consists of replacing the spark igniter and flame detector (with gasket) in the burner assembly. All Benchmark Low NOx models utilize identical spark igniters, part no. GP-122435-S and flame detectors, part no. 66006 with gasket, part no. 81048.

Two basic low NOx burner designs are used in Benchmark Low NOx Boiler Models.

- Benchmark 3.0LN and Benchmark 2.0LN (Venturi Design) models utilize identical burner housings and look identical when installed in their respective heat exchangers. However, the Benchmark 3.0LN contains a burner insert which is longer than the Benchmark 2.0LN (Venturi design). See Figure 2
- Benchmark 1.5LN and Benchmark 2.0 (VFD Design) burner assemblies use compact designs which also include the blower and air/fuel valve for their respective boiler models. Although the outward appearance of these two burner assemblies look virtually identical, the Benchmark 2.0LN (VFD design) utilizes a larger diameter burner plate and a longer burner insert than the Benchmark 1.5LN burner assembly. See Figure 3.

The spark igniter and flame detector replacement procedures for each Benchmark Low NOx model are identical. Therefore, refer to Figure 2 or Figure 3 for the locations of the igniter and flame detector to be replaced in your model when performing the procedures in the following paragraphs.

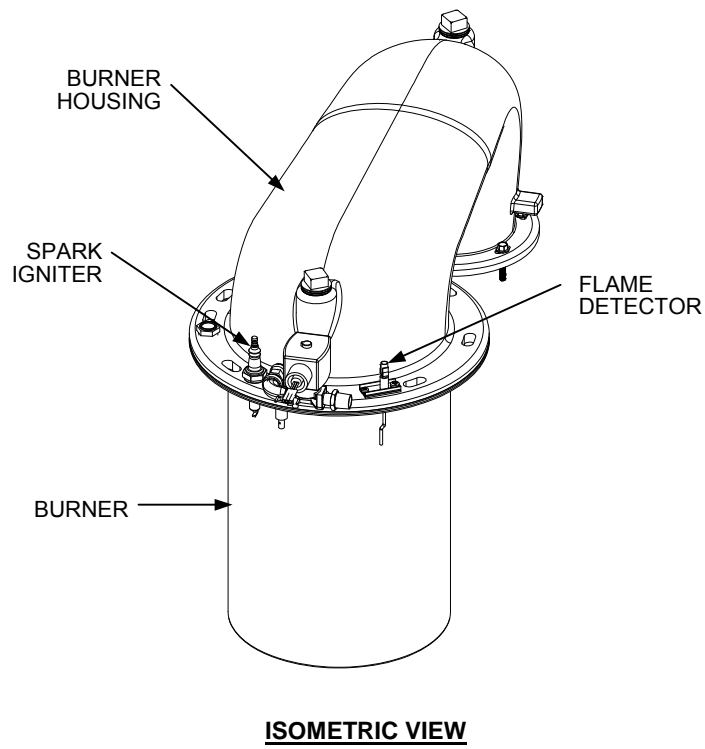
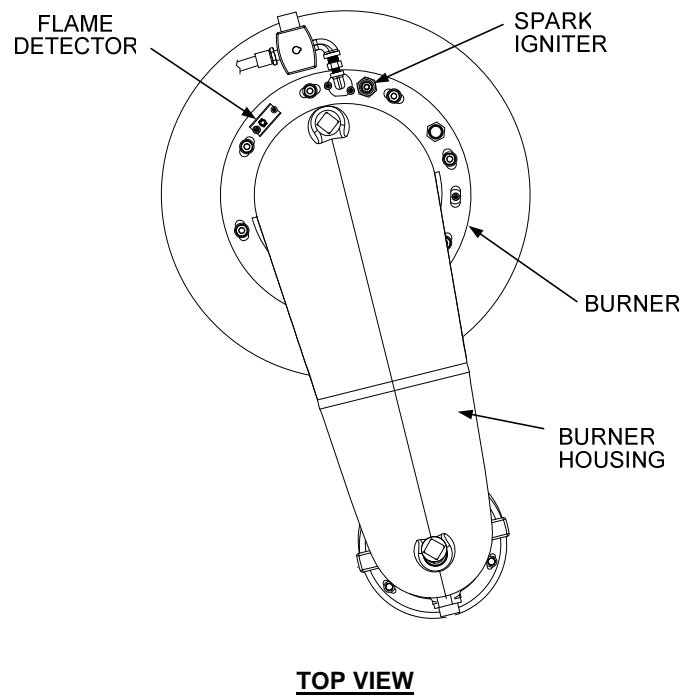
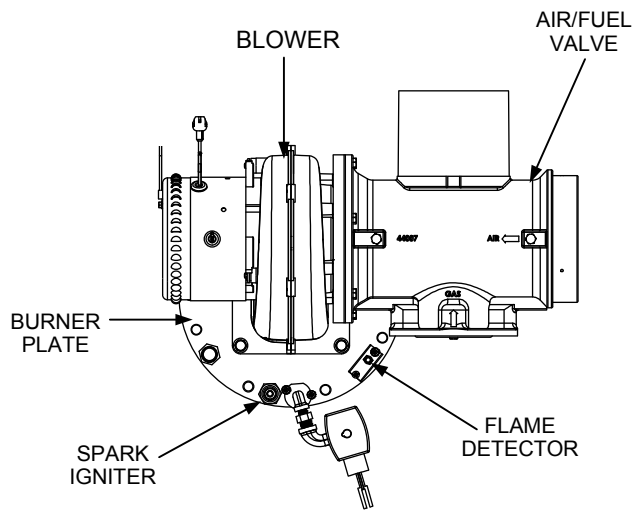
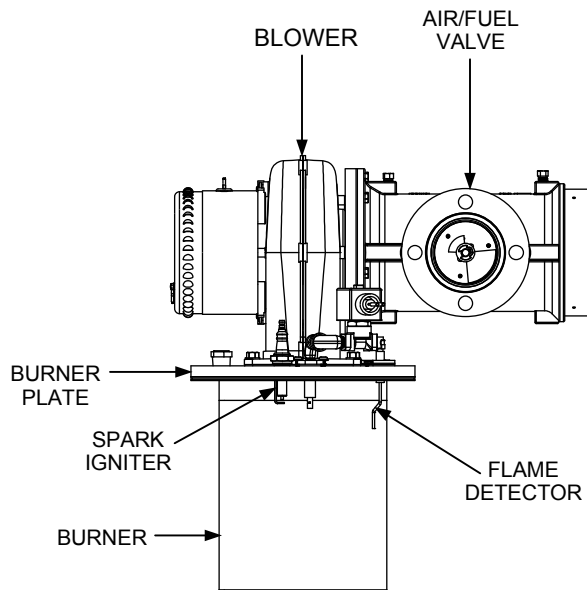


Figure 2. Benchmark 3.0LN & 2.0LN (Venturi Design) Burner Assemblies



TOP VIEW



SIDE VIEW

Figure 3. Benchmark 1.5LN & 2.0LN (VFD Design) Burner Assemblies

5.1 Spark Igniter Replacement

Spark igniter part no. GP-122435-S is removed and replaced as follows:

1. Refer to Figure 2 (Benchmark 3.0LN & 2.0LN Venturi design), or Figure 3 (Benchmark 1.5LN & 2.0LN VFD design) for the installed location of the spark igniter.
2. Disconnect the spark igniter cable.
3. Unscrew and remove the installed spark igniter.
4. Using a spark gap feeler gauge, check to ensure that the replacement spark igniter provided in the kit is gapped at 1/8".
5. Prior to installation, a high-temperature anti-seize compound must be applied to the to the igniter threads.
6. Refer to Figure 2 or 3 and install the replacement igniter in the appropriate location. Do Not over-tighten. A slight snugging up is sufficient.
7. Reconnect the spark igniter cable.

5.2 Flame Detector Replacement

Flame detector, part no. 66006 and gasket, part no. 81048 are removed and replaced as follows:

1. Refer to Figure 2 (Benchmark 3.0LN & 2.0LN Venturi design), or Figure 3 (Benchmark 1.5LN & 2.0LN VFD design) for the installed location of the flame detector and gasket.
2. Disconnect the flame detector wire lead.
3. Unscrew and remove the installed flame detector and gasket.
4. Install the replacement flame detector and gasket provided in the maintenance kit.
5. Reconnect the flame detector wire lead.

6. CONDENSATE TRAP MAINTENANCE

Condensate trap, part no. 24060, is used with all Benchmark Low NOx Models. It is installed at the condensate drain of the exhaust manifold on Benchmark 1.5LN and 2.0LN models and at the drain of the connecting manifold on Benchmark 3.0 models. The condensate trap should be inspected, cleaned and reassembled as follows:

1. Disconnect the condensate trap from the exhaust manifold (Benchmark 1.5LN, or 2.0LN) or connecting manifold (Benchmark 3.0LN only) by loosening the hose clamps or fittings used in your installation. Figure 4 shows a sample connection for a Benchmark 2.0LN model.

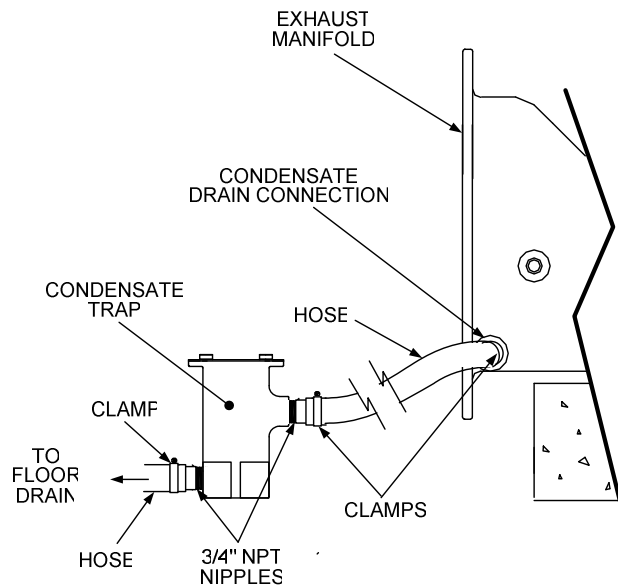


Figure 4. Condensate Trap Location

2. Remove the connections on the inlet and outlet sides of the condensate trap shown in Figures 4 and 5.
3. Refer to Figure 5 and loosen the four (4) thumbscrews securing the cover on the condensate trap. Remove the cover.
4. Remove and discard the O-ring gasket currently installed in trap. It will be replaced with the new O-ring included in the maintenance kit during reassembly.
5. Remove the float (with float guide attached) from the condensate trap.
6. Remove and discard the currently installed orifice gasket from the trap. The new orifice gasket included in the maintenance kit will be installed during reassembly.
7. Thoroughly clean the trap and float. Also inspect the drain piping for blockage. If the trap cannot be thoroughly cleaned, replace the complete condensate trap.
8. Check the condensate drain opening on the manifold (Figure 6) to ensure it is clear of blockage.

9. After the above items have been inspected and thoroughly cleaned, install the new orifice gasket, part no. 81092 provided in the maintenance kit.
10. Reinstall the float and float guide removed in step 5.
11. Install the new O-ring, part no. 84017 provided in the kit and replace the condensate trap cover by tightening the four (4) thumb-screws.
12. Reassemble all piping and hose connections to the condensate trap inlet and outlet.
13. Reconnect the condensate trap to condensate drain connection on the exhaust manifold (or connecting manifold for BMK 3.0LN).

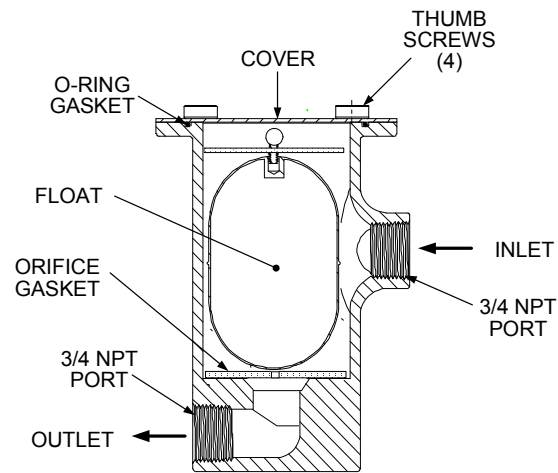


Figure 5. Condensate Trap, Part No. 24060

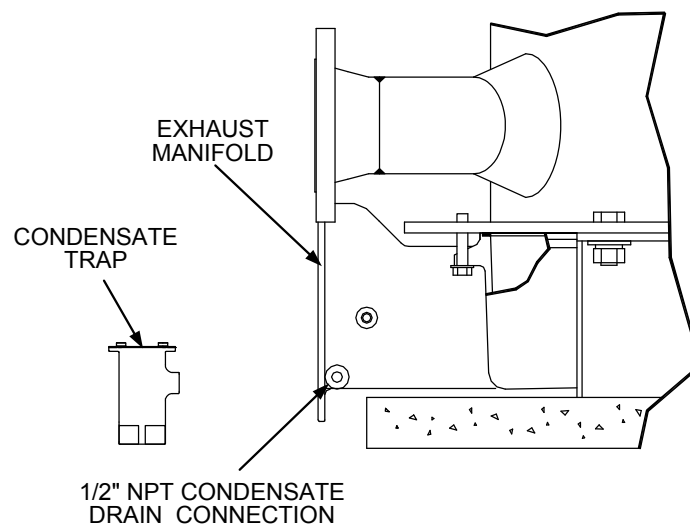


Figure 6. Benchmark 2.0LN Condensate Trap Location

7. FINAL REASSEMBLY AND TESTING

Upon completion of all annual maintenance tasks, reassemble the unit and perform the tests specified in paragraphs 7.1 and 7.2.

7.1 Reassembly and Set-Up Following Annual Maintenance

Following completion of the all required inspections and replacements, perform the following reassembly and setup procedures:

1. Turn ON the external circuit breaker to the unit.
2. At the front panel of the unit, set the **ON/OFF** switch on the C-More Control Panel to the **ON** position.
3. Press the **LOW WATER LEVEL RESET** button to reset the low water cutoff.
4. Press the **CLEAR** switch to reset the **FAULT** LED and clear any displayed error message.
5. Replace the unit side panels and top panel(s).

7.2 Final Testing Following Annual Maintenance

Upon completion of the annual maintenance procedures specified in this bulletin, perform the Combustion Calibration Tests specified in Chapter 4 of the applicable O & M Manual listed below:

BENCHMARK MODEL	O & M MANUAL
Benchmark 2.0LN (Venturi Design)	GF-110LN, or GF-110LN-M
Benchmark 3.0LN	GF-116, or GF-116M
Benchmark 3.0LN, Dual Fuel	GF-117
Benchmark 1.5LN	GF-120, or GF-120M
Benchmark 1.5LN, Dual-Fuel	GF-121