

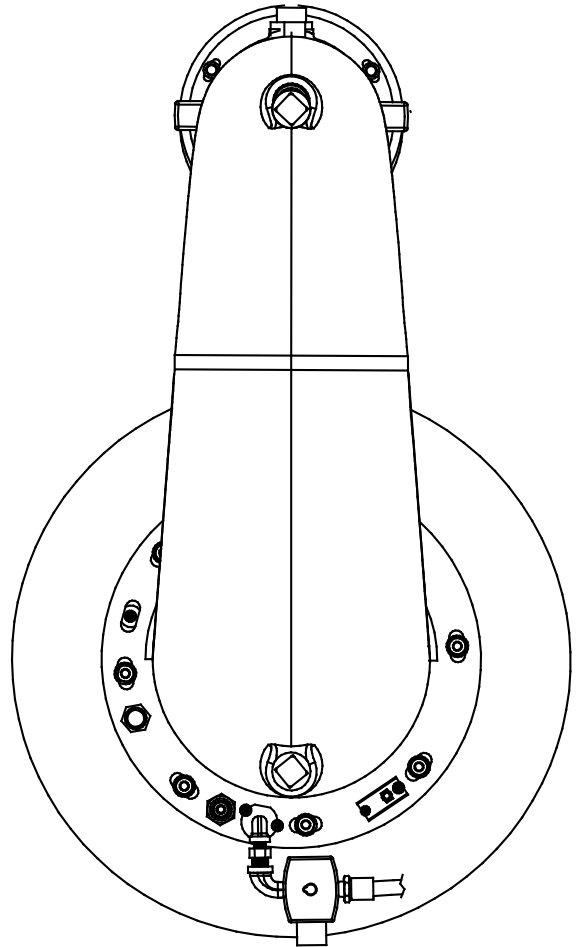
TECHNICAL INSTRUCTIONS

12-Month Maintenance
Kit P/N 58015-01
For BMK LN Boilers
(with separate Igniter and Injector)

Description of Document:

This TID provides the procedures to perform recommended annual maintenance on all the following Benchmark Low NOx Boiler Models (including Single and Dual-Fuel models):

- Benchmark 1.5LN
- Benchmark 2.0LN
- Benchmark 3.0LN



**BMK 3.0LN Burner Assembly with
Separate Igniter and Fuel Injector
(Top View)**

Latest Update: 10/07/2014

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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 1.5LN (Single and Dual-Fuel models)
- Benchmark 2.0LN (Single and Dual-Fuel models)
- Benchmark 3.0LN (Single and Dual-Fuel models)

NOTE

This document applies ONLY to units featuring a SEPARATE igniter and fuel injector tube. For newer units, or retrofitted units, with combined igniter/injector, use Maintenance kit **58025-01** and the maintenance instructions in document **TID-0131**.

2. OVERVIEW OF THE REPLACEMENT PROCEDURES

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

- **Low NOx Burner:** Replace igniter-injector and flame detector (with 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 2.1.

3. CONTENTS OF 12-MONTH MAINTENANCE KIT (P/N 58015-01)

The Annual Maintenance Kit for Benchmark Low NOx boilers is comprised of the following components:

Table 1: Annual Maintenance Kit, Part No. 58015-01

ITEM	QTY	PART NO.	DESCRIPTION
1	1	GP-122435-S	IGNITER
2	1	66034	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 document.

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 Expendable Materials

The expendable materials required to perform the annual maintenance procedures described in this bulletin include such items as:

- Anti-seize lubricant (spark igniter-injector)
- Cleaning solvents and materials (for cleaning 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 Models contain one (1) top panel. Benchmark 3.0LN Models contain two (2) top panels. See Figure 1.
5. Remove the side panels of the unit. Benchmark 1.5LN and 2.0LN Models contain one (1) panel on each side. Benchmark 3.0LN Models contain two (2) panels on each side. See Figure 1.
6. To prevent burns, allow the unit to cool to a safe temperature before proceeding.

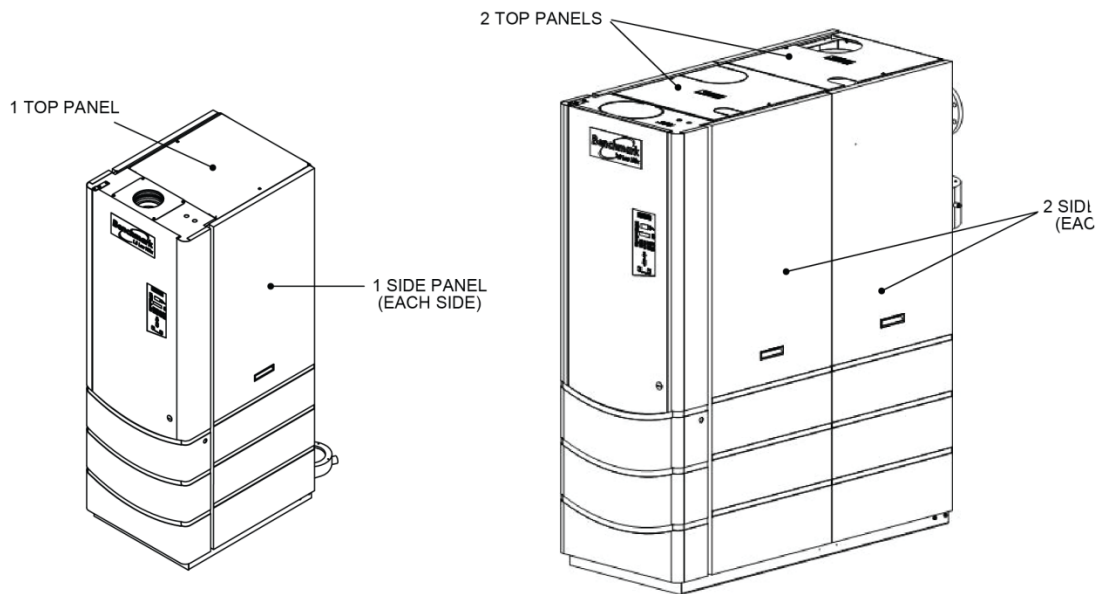


Figure 1: Removable Covers for BMK1.5/2.0 (Left) and BMK3.0 (Right)

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. 66034 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.

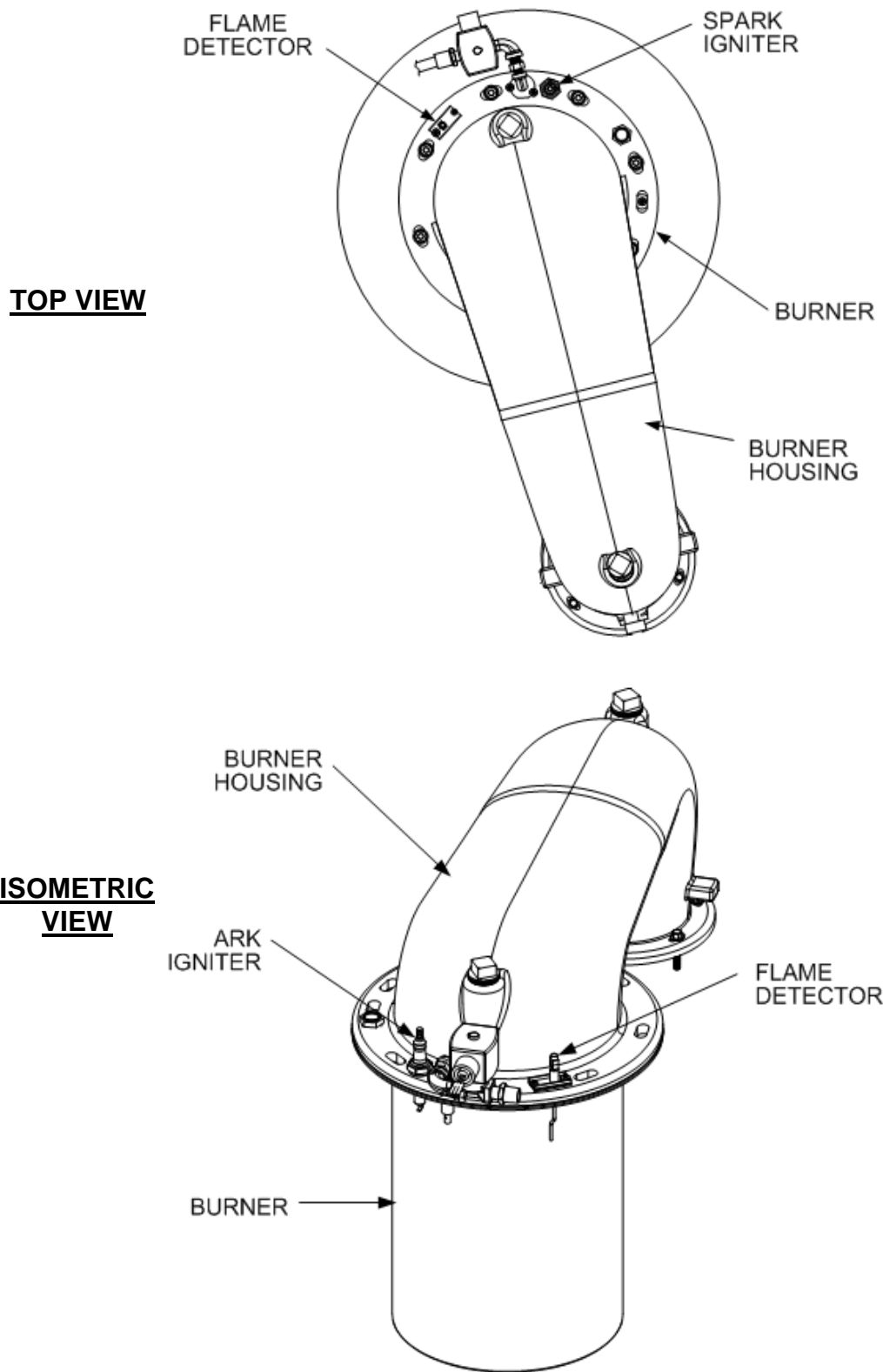


Figure 2: BMK 3.0LN Burner Assembly (Top and Isometric Views)

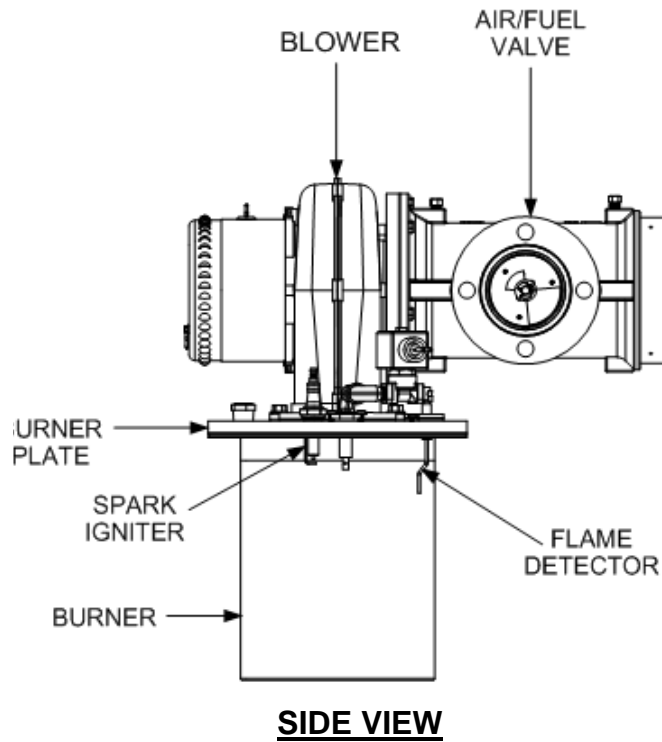
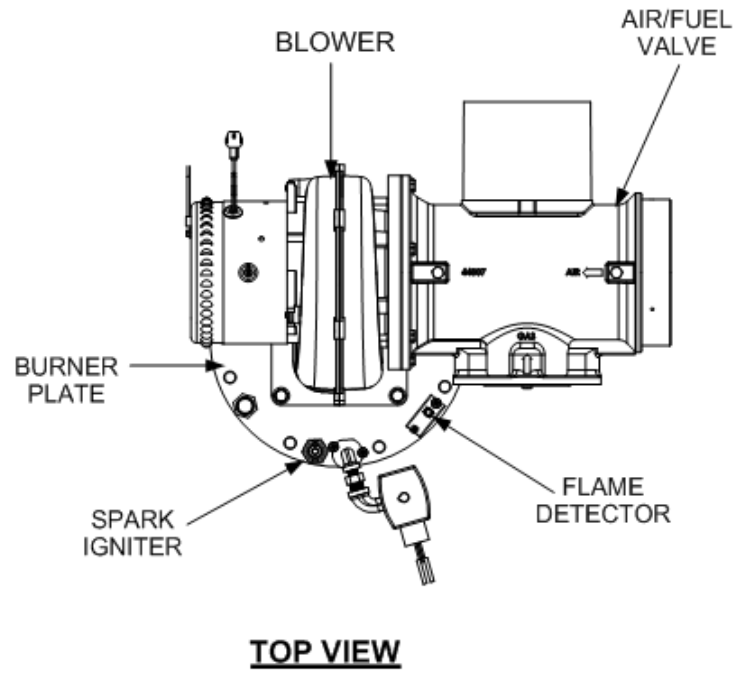


Figure 3: Benchmark 1.5LN & 2.0LN Burner Assemblies

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), or Figure 3 (Benchmark 1.5LN & 2.0LN) 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. 66034 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.

NOTE

As previously noted, there are two slightly different types of condensate traps that may be used in your configuration; an older style with a separate inlet adapter, and a newer style with a built-in adapter (see Figure 4). Maintenance is the same, except that the newer style does not need an orifice gasket (Step 6).

The condensate trap used on all BMK LN units should be inspected and cleaned 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.
2. Remove the connections on the inlet and outlet sides of the condensate trap, shown in Figures 4 and 5.

3. Refer to Figure 4 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 older style trap. (This step is not necessary for newer style traps as they do not have this gasket). The new orifice gasket included in the maintenance kit will be installed into the older style traps 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 5) to ensure it is clear of blockage.

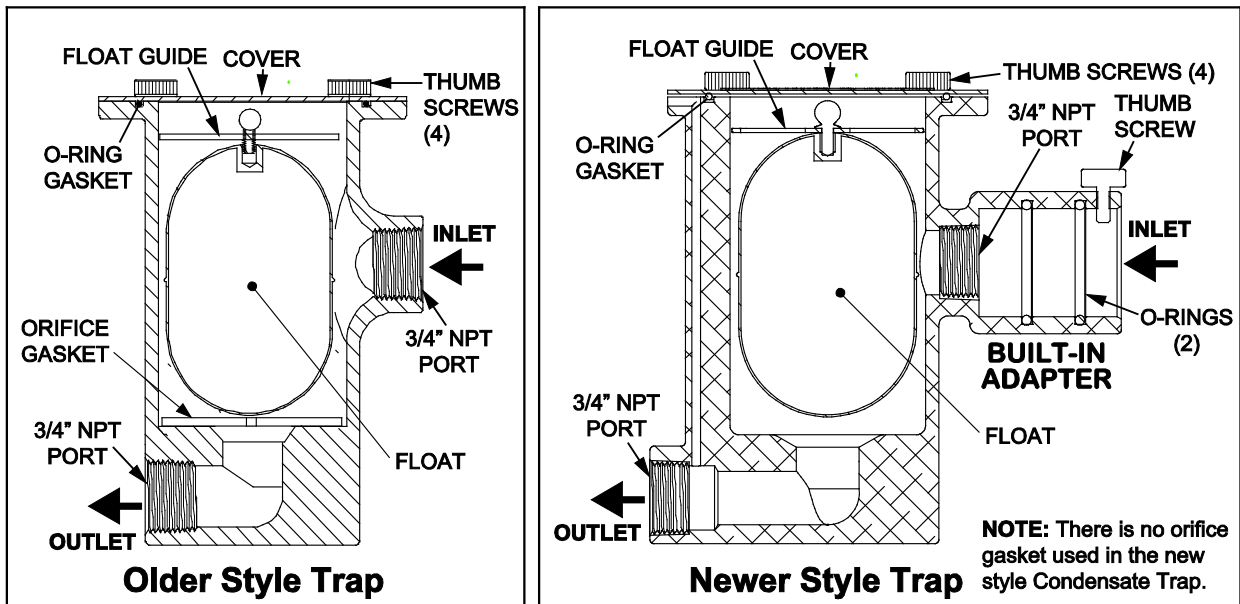


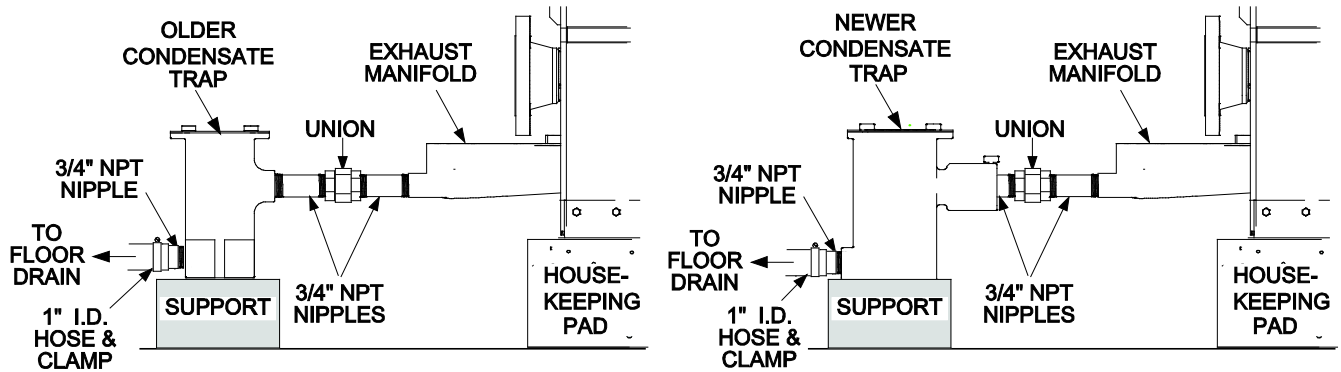
Figure 4: Condensate Trap, Part No. 24060 Cross-Sectional View (Older and Newer)

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).

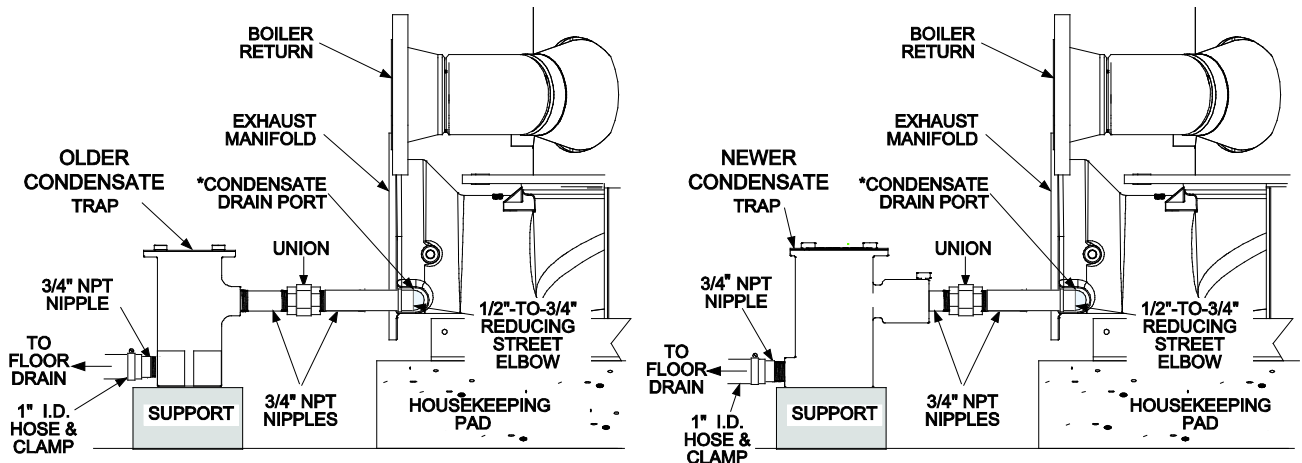
12-Month Maintenance Kit #58015-01 for BMK LN (w/Separate Igniter & Injector)

Technical Instruction Document

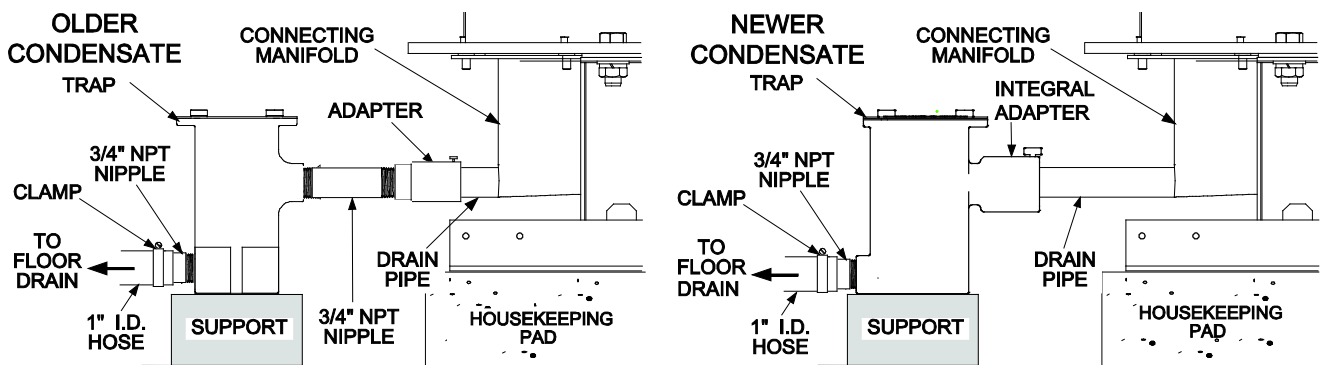
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BMK1.5LN Partial Left Side View (Older and Newer Trap Installation)



BMK2.0LN Partial Left Side View (Older and Newer Trap Installation)



BMK3.0LN Partial Left Side View (Older and Newer Trap Installation)

Figure 5: Benchmark Low NOx – Sample Condensate Trap (24060) Installations

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 any sheet metal panels previously removed from the boiler.

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 1.5LN	GF-120
Benchmark 1.5LN, Dual-Fuel	GF-121
Benchmark 2.0LN	GF-123
Benchmark 2.0LN, Dual-Fuel	GF-127
Benchmark 3.0LN	GF-116
Benchmark 3.0LN, Dual Fuel	GF-117

NOTES:

12-Month Maintenance Kit #58015-01 for BMK LN (w/Separate Igniter & Injector)

Technical Instruction Document

TID-0073_0C

Change Log

Date	Description	Changed By
07/12/2012	Rev A: Initial release	Curtis Harvey
09/12/2014	Rev B: PIR 1079: Flame rod part number changed to P/N 66034, renumbered figures	Chris Blair
10/07/2014	Rec C: PIR 934-114: Changed reference to instruction doc # for combined ignitor-injector from TID-0055 to TID-0131	Chris Blair



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