Installation and Service Instructions

LNB 2000
Low NOₓ Without Chamber Gas Burners

WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result, causing property damage, personal injury or death.

- In the United States, installation must conform with local codes or in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1-latest edition available from American National Standard Institute. Further reference should be made to the recommendation of your fuel supplier.

- WARNING: Additions, changes, conversions and service must be performed by an authorized Midco representative, service agency or the fuel supplier. Use only MIDCO specified and approved parts.

- INSTALLER: Inform and demonstrate to the user the correct operation and maintenance of the gas utilization equipment. Inform the user of the hazards of storing flammable liquids and vapors in the vicinity of this gas utilization equipment and remove such hazards. Affix this manual and associated literature to the burner or equipment.

- CODE COMPLIANCE IS THE SOLE RESPONSIBILITY OF THE INSTALLER.

- USER: Retain this manual for future reference. If other than routine service or maintenance as described in this manual and associated literature is required, contact a qualified service agency. DO NOT ATTEMPT REPAIRS. An inadvertent service error could result in a dangerous condition.

AVOID ERROR IN PARTS SELECTION. When ordering use complete MIDCO Part Number and Description. Furnish Burner Model Number, Bill of Material Number and Date Code (if available) from the specification plate found on the product.

IMPORTANT: Availability of parts as well as specifications are subject to change without notice. Please consult factory for item availability.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS:
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately phone your gas supplier from another building. Follow the gas supplier’s instructions. If you cannot reach your gas supplier call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

BURNER MODEL: ____________________________
BILL OF MATERIAL NUMBER: _______________
SERIAL NUMBER #: _________________________
WIRING DIAGRAM: _________________________

FOR SERVICE CONTACT
Name: ______________________________________
Address: _____________________________________
_____________________________________________
Phone: _______________________________________
Date of Installation: ___________________________

SAFETY INFORMATION TERMS: The following terms are used to identify hazards, safety precaution of special notations and have standard meanings throughout this manual. They are printed in all capital letters using a bold type face as shown below, and preceded by the exclamation mark symbol. When you see the safety alert symbol and safety information terms as shown below, be aware of the hazard potential.

DANGER: Identifies the most serious hazards which will result in severe personal injury or death.
WARNING: Signifies a hazard that could result in personal injury or death.
CAUTION: Identifies unsafe practices which would result in minor personal injury or product and property damage.
When installing the Midco LNB burner the following instructions must be followed.

The Midco LNB Burner must be installed per the equipment manufacturer’s instructions. If not available take the following steps. To install the burner an opening on the side or top of the equipment must be provided. See Figure 1 for opening size and mounting information. For application information contact our sales engineering team. Clearance around the burner fiber head must be a minimum of 6" on all sides.

### Table 1. Burner Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIN VELOCITY</td>
<td>500 FPM</td>
</tr>
<tr>
<td>MAX VELOCITY</td>
<td>2000 FPM</td>
</tr>
<tr>
<td>MIN INSERTION DEPTH</td>
<td>4.0&quot;</td>
</tr>
<tr>
<td>MAX INSERTION DEPTH</td>
<td>26.0&quot;</td>
</tr>
<tr>
<td>FIRING RATE (NATURAL)</td>
<td></td>
</tr>
<tr>
<td>MIN MBH</td>
<td>500</td>
</tr>
<tr>
<td>MAX MBH</td>
<td>2,000</td>
</tr>
<tr>
<td>GAS SUPPLY PRESSURE REQUIRED</td>
<td></td>
</tr>
<tr>
<td>NATURAL Min 6.0&quot; W.C. Max 14.0&quot; W.C.</td>
<td></td>
</tr>
<tr>
<td>PROPANE Contact factory</td>
<td></td>
</tr>
<tr>
<td>MOTOR HP</td>
<td>1.0 HP</td>
</tr>
<tr>
<td>BLOWER FLOW RATE</td>
<td>420 SCFM</td>
</tr>
<tr>
<td>ELECTRICAL SUPPLY</td>
<td>120 VAC / 60 Hz / 25 AMPS</td>
</tr>
<tr>
<td>CONTROL VOLTAGE</td>
<td>120 VAC</td>
</tr>
<tr>
<td>IGNITION TRANSFORMER</td>
<td>120 VAC</td>
</tr>
<tr>
<td>FLAME SAFETY</td>
<td></td>
</tr>
<tr>
<td>Electronic flame Safety with Direct Spark Ignition and 100% Shut-Off</td>
<td>4</td>
</tr>
</tbody>
</table>

1 Standard burners are shipped as NATURAL gas models. Consult Midco for propane applications.
2 All Ratings Based on 1000 BTU/Cu. Ft. NATURAL gas, at sea level.
3 1 MBH = 1,000 BTU/hr., Min MBH depends on system velocity.
4 See Section IV Burner Ignition Sequence.
When installing the Midco LNB burner all safety and operating controls must be included and connected so if any safety fails the LNB burner will not operate. Do not bypass any safety or operating control or equipment might be damaged.

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**Figure 3 - Wiring Diagram**
Part 1 - Installation

The Midco LNB is provided with all required gas train assembly components. Refer to piping diagram Figure 4a and 4b for a typical installation. Modifications can be made to the piping layout if required. The Ratio Regulator Zero Governor valve position SHOULD NOT be changed as this is critical in burner performance. The orifice located downstream from the Ratio Regulator Zero Governor valve must not be modified. When the gas train assembly installation is complete turn on gas to the unit and check for any gas leaks. Repair any leaks that are found at this time. The minimum required gas pressure at the inlet of the valve train is 5" W.C. and maximum gas pressure is 14" W.C.. The main gas pressure regulator should be set at 6" W.C. when burner is at high fire. Turn off main manual gas valve before starting the unit. Consult the Midco technical support team if there are any piping questions. See Burner Startup, section IV, for operating instructions.

Figure 4a - Piping - LNB 2000 - Standard Valve Train

Figure 4b - Piping - LNB 2000- NFPA Valve Train
The LNB Series of burners need to be set correctly to maintain Low NOx emissions.

**LNB with Siemens Control**

1. Burner should be prewired and installed on equipment.
2. To begin burner setup, remove 2-10V DC signal to Siemens control board.
3. Turn on power.
4. Do not turn on gas at this time.
5. Burner blower motor will ramp up to high fire purge.
6. Burner blower motor will ramp down to low fire.
7. Burner will lockout with no gas flow.
8. Reset Siemens control by pressing info button for 3 seconds.
9. Install a differential manometer.
10. Attach hose to pressure tap of VBS Venturi.
11. Attach second hose to pressure tap of VBS Venturi.
12. Turn on gas.
13. Check gas pressure on side inlet of first solenoid gas valve.
14. Gas pressure should be a minimum of 7" and a maximum of 14" WC. Adjust main gas pressure if required.
15. Turn on power.
16. Burner will go through sequencing and light.
17. Burner low fire flame should be mostly blue with slight orange tips.
18. Adjust low fire as required by turning Dungs valve top screw CW for more gas, CCW for less gas.
19. Differential pressure should be approximately 0.01" WC for Low fire.
20. Document minimum temperature rise at low fire.
21. Turn off power to equipment.
22. Reinstall DC Volt signal to Siemens control board.
23. Turn on power to equipment.
24. Set temperature control above operating temperature.
25. Burner lights and ramps up to high fire.
26. Check gas pressure on side inlet of first solenoid gas valve.
27. Inlet pressure to side inlet of first solenoid gas valve at high fire should be 6" WC minimum.
28. Readjust main gas pressure regulator if required.
29. Check differential gas pressure at Venturi.
30. Differential gas pressure should be 3.4" WC for high fire.
31. To adjust high fire final setting the manual valve downstream of Dungs valve can be closed slightly. If higher pressure required adjust main gas pressure regulator or inlet pressure from site regulator.

**Chart 1 - LNB 2000 - Natural Gas Flow Rate vs. Pressure Drop - (Venturi VBS - 648)**

![Graph](image-url)
IV Burner Startup Continued

Procedure for technicians to program Siemens module when using the Ametek N8.9 blower on LNB 2000 burner

Required Equipment: Siemens display unit # AZL23.00A9

**SIEMENS (AZL23.00A9) - DISPLAY**

1) Power unit with ON/OFF switch in off position.

2) Using Siemens display press & hold “F & A” together until “CODE” is displayed on screen. Enter password L 7 U N I _ by using the “-” or “+” buttons. Press Enter after each letter or number of password. After the last letter “I” is entered press Enter twice. The screen will show parameter 400 flashing.

3) Press Enter, display will show “Run”, then press escape, display will show P0. Use “+” button to change to P1. Press & hold “A” button while also pressing “+” button to increase number to 1200 then press enter. Display will change to P2. Press & hold “A” button while also pressing “+” button to increase number from 6000 to 8000. Press Enter then press Escape to return to parameter 400 flashing.

4) Next press “+” button to get to parameter 500 then press Enter. Display will show parameter 503.00 then press Enter and .00 will be flashing. Press “+” button to advance to parameter 503.01 then press Enter. Use “+” button to increase to 8000 then press Enter then press Escape twice to get back to 503 flashing.

5) Next press “+” button to advance to parameter 519 then press Enter. Use the “+” button to advance number to 8400. Press Enter then Escape to get back to parameter 519 flashing.

6) Next use “+” button to advance to parameter 523 then press Enter. Use “+” button to increase number to 29.98 then press Enter then press Escape to return to parameter 500 flashing. Press Escape again to return display to OFF.

**BURNER CONTROL (LME71) - DISPLAY**

7) Back up the new programming by pressing Escape. Hold down Escape until the display flashes. Next use “+” or “-” button to show BAC on display then press Enter. Press Enter again to get display to OFF.
### IV Burner Startup

**Continued**

**Siemens Control Lock Codes**

<table>
<thead>
<tr>
<th>Error code</th>
<th>Clear text</th>
<th>Possible cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loc: 2</td>
<td>Loc 2</td>
<td>No establishment of flame at the end of safety time</td>
</tr>
<tr>
<td>Loc: 3</td>
<td>Loc 3</td>
<td>Air pressure faulty (air pressure switch welded in no-load position, decrease to specified time (air pressure switch flame-on response time)) - Air pressure switch faulty - Loss of air pressure signal after specified time - Air pressure switch has welded in no-load position</td>
</tr>
<tr>
<td>Loc: 4</td>
<td>Loc 4</td>
<td>Extraneous light - Extraneous light during burner startup</td>
</tr>
<tr>
<td>Loc: 5</td>
<td>Loc 5</td>
<td>Air pressure faulty, air pressure switch welded in working position - Time supervision air pressure switch - Air pressure switch has welded in working position</td>
</tr>
<tr>
<td>Loc: 7</td>
<td>Loc 7</td>
<td>Loss of flame - Too many losses of flame during operation (limitation of repetitions) - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner</td>
</tr>
<tr>
<td>Loc: 10</td>
<td>Loc 10</td>
<td>Error not relatable (application), internal error - Wiring error or internal error, output contacts, other faults</td>
</tr>
<tr>
<td>Loc: 12</td>
<td>Loc 12</td>
<td>Valve proving - Fuel valve 1 leak</td>
</tr>
<tr>
<td>Loc: 13</td>
<td>Loc 13</td>
<td>Valve proving - Fuel valve 2 leak</td>
</tr>
<tr>
<td>Loc: 14</td>
<td>Loc 14</td>
<td>POC error - Error valve closure control POC</td>
</tr>
<tr>
<td>Loc: 22</td>
<td>Loc 22</td>
<td>Safety loop open - Gas pressure switch-max open - Safety limit thermostat cut out</td>
</tr>
<tr>
<td>Loc: 60</td>
<td>Loc 60</td>
<td>Analog power source 4..20 mA, I &lt;4 mA - Wire breakage</td>
</tr>
<tr>
<td>Loc: 83</td>
<td>Loc 83</td>
<td>Faulty PWM fan - PWM fan does not reach the target speed within the preset period of time, or - After reaching the target speed, the PWM fan leaves the tolerance band again (parameter 650) for a time exceeding the tolerance time speed deviation (parameter 690)</td>
</tr>
<tr>
<td>Loc: 138</td>
<td>Loc 138</td>
<td>Restore process successful - Restore process successful</td>
</tr>
<tr>
<td>Loc: 139</td>
<td>Loc 139</td>
<td>No program module detected - No program module plugged in</td>
</tr>
<tr>
<td>Loc: 206</td>
<td>Loc 206</td>
<td>AZL2... incompatible - Use the latest version</td>
</tr>
<tr>
<td>Loc: 225</td>
<td>Loc 225</td>
<td>Faulty PWM fan - Fan speed dropped below the minimum prepurge PWM (parameter 675.00) after reaching the prepurge speed, or - After reaching the ignition load speed, the maximum ignition load PWM (parameter 675.01) was exceeded</td>
</tr>
<tr>
<td>Loc: 226</td>
<td>Loc 226</td>
<td>Faulty PWM fan - Parameterization error: - Speed low-fire &gt; speed high-fire, or - Low-fire = 0 rpm, or - Maximum speed = 0 rpm</td>
</tr>
<tr>
<td>Loc: 227</td>
<td>Loc 227</td>
<td>Faulty PWM fan - One or several parameters violate the minimum/maximum limit</td>
</tr>
</tbody>
</table>

*Chart 1 - Siemens Control - Lock Codes - Error Code List*
Note:
This display is only possible in operating mode or standby!

<table>
<thead>
<tr>
<th>+</th>
<th>Press for display of the flame signal amplifier. Signal lamp blinks green.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="chart2.png" alt="" /></td>
<td>Display shows FL.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>+</th>
<th>When pressing (1...3 seconds), the flame signal current is displayed. Signal lamp blinks green.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="chart2.png" alt="" /></td>
<td>Example: 11.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>+</th>
<th>When pressing (&gt;3 seconds), the point after the number begins to blink. When the button is released, the value is displayed for 2 minutes. Signal lamp blinks green. Then, the normal display appears.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="chart2.png" alt="" /></td>
<td>Display: Point , blinks, value 11 does not.</td>
</tr>
</tbody>
</table>

### 14.4.3 Reset

<table>
<thead>
<tr>
<th>Info</th>
<th>For reset the unit, press for 1...3 seconds. When the button is released, OFF is displayed.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="chart2.png" alt="" /></td>
<td>The basic unit is reset.</td>
</tr>
</tbody>
</table>

Note:
For meaning of the error and diagnostic codes, see chapter Error code list...(Chart 1)
**IV Burner Startup Continued**

**Siemens Control Sequence of Operation**

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**DISPLAY**

1. **OFF** - Standby, waiting for call for heat
2. **P21** - Test; combustion air switch open, POC closed
3. **P22** - Combustion air blower on, Test; combustion air switch closed
4. **P30** - Purge (parameter 225), Test; gas pressure switches closed
5. **P40** - Trial for ignition (parameter 257)
6. **P42** - Flame detection (spark off, pilot stands alone)
7. **P44** - Pilot stabilize time (parameter 230)
8. **P50** - Main and pilot overlap time (parameter 231)
9. **oP1** - Operate, main on, pilot off

*Chart 3 - Siemens Control - Sequence of Operation*
Part 2 - Maintenance

V Maintenance

The LNB burner will require maintenance every 12-18 months depending on usage. Inspect blower, ignition and flame sensing assembly, burner head should be inspected. Turn off the main gas manual valve and main panel disconnect to insure unit will not start. Remove the flame sensor wire, spark cable and wiring harness attached to the blower. To inspect the blower inlet loosen the union between the Ratio Regulator Zero Governor valve and blower. Loosen the four (4) ½” bolts attaching the burner to the heater. This will allow removal of the Midco LNB burner. Visually inspect the burner head if any issue are found contact Midco for replacement. The flame sensor and spark rod can be removed by loosening two nuts holding the ignition and flame sensing assembly. To clean the sensor and spark rod use steel wool or sand paper. If the porcelain is cracked then the sensor or igniter needs replacing. Reinstall the LNB burner and make sure gas union and wiring were reinstalled. Open manual gas valve and reenergize heater and cycle as shown in section IV - Burner Startup.

VI Direct Spark Ignitor Assembly

The Midco LNB burner uses a direct spark ignition. The LNB direct spark ignition is factory set. The spark gap should be set at 5/32” from center ground rod. Inspect porcelain on the flame rod and spark rod. Any signs of a crack the rods should be replaced. For proper parts selection contact Midco International as shown on the front page. When re-installing a direct spark ignition the flame rod should be installed on the right side of the unit.

Figure 5 - LNB 2000 Spark Ignitor Assembly
(For re-order Kit # 5247-09R)
Products manufactured by Midco International Inc. (hereinafter Midco) are guaranteed to be free from defects in workmanship and materials, under normal use and service, for a period of twelve (12) months from the date of installation, or 18 months from date of manufacture or whichever occurs first.

If a part is defective due to workmanship or materials and the part is removed from the product within the applicable warranty period and returned to Midco in accordance with the procedure described below, Midco will at its option either repair or replace the part. This warranty extends only to persons or organizations who purchase products for resale. The warranty does not cover labor and/or freight.

The expressed warranty above constitutes the entire warranty of Midco with respect to the products in its publications and is IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MIDCO BE RESPONSIBLE FOR ANY CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER.

Instructions for returned goods are as follows:

a. Identified with Midco's "Return Authorization Number -(RAN)
   *(Available only directly from Midco. Contact Customer Service
   to obtain a tag.)

b. Protected from shipping damage.

c. Received transportation pre-paid at:
   Midco International Inc.
   Return Goods Dept.
   4140 West Victoria Street
   Chicago, Illinois 60646-6727

d. Found by Midco's inspection to be defective in workmanship
   or materials under normal use and service.

e. Handled in accordance with one of the two following
   procedures, as specified by the customer making the return:
   1. Credit Procedure. If replacement part was purchased
      from Midco, credit will be issued at the net price in effect at the
      time of purchase with presentation of Midco's invoice number
      and date.

   2. Repair or Replacement Procedure. Midco will, at
      its option, either repair or replace the part free of charge and
      return it or its replacement lowest cost transportation pre-paid.
      The replacement will be, at Midco's option, either a functionally
      equivalent new or replacement product. Premium transportation
      will be used at customer's request and expense.

Note: All Midco burners have a specification plate showing Model, Bill of Material and Serial No./Date Code numbers. All three (3) numbers must be shown on your Midco Return Goods Tag. The Serial No./Date Code is necessary to determine Warranty coverage. For example: 2898 indicates that the unit was manufactured in the 28th week of 1998. If the Date Code is beyond the Warranty period, a receipt or invoice showing purchase, delivery or installation date is required.

Final disposition of any warranty claim will be determined solely by Midco. If an inspection by Midco does not disclose any defect covered by this warranty, the product will be returned, scrapped, repaired, or replaced as instructed by the customer. Products returned to the customer will be sent shipping charges collect.

If you have any questions relative to product returns to Midco, call, write or e-mail:

Midco International Inc.
Warranty Returns/Customer Service Manager
4140 West Victoria Street
Chicago, Illinois 60646-6727
tel 773.604.8700
fax 773.604.4070
email returns@midcointernational.com
web www.midcointernational.com

Call the factory for Instructions on returned goods. No equipment may be returned without written authorization from MIDCO. Returned goods must be shipped prepaid to the factory.

WARNING: Improper installation and use of this product could result in personal or property injury.
Final disposition of any warranty claim will be determined solely by Midco.
If an inspection by Midco does not disclose any defect covered by this warranty, the product will be returned, scrapped, repaired, or replaced as instructed by the customer. Products returned to the customer will be sent shipping charges collect.

Call factory for information (866 705 0514)
Fill out form and fax to 866 580 8700 or copy and mail to:

Midco® International Inc Limited Warranty Policy
Exclusions Terms, Customer Requirements and Instructions

Final disposition of any warranty claim will be determined solely by Midco.
If an inspection by Midco does not disclose any defect covered by this warranty, the product will be returned, scrapped, repaired, or replaced as instructed by the customer. Products returned to the customer will be sent shipping charges collect.

Call factory for information (866 705 0514)
Fill out form and fax to 866 580 8700 or copy and mail to:

Midco® International Inc
4140 West Victoria Street
Chicago, Illinois 60646

Date of Purchase

End User Name

Company Name

Street & Apt. No.

City, State, Zip

E-mail Address

Web Address

Telephone

Fax

Burner [ ] HMA [ ] Low NOx [ ]

Model Number

Serial Number

Installation Date

Purchased from - Name:

Address

City, State, Zip
Midco International Inc.
Attn: Warranty Department
4140 West Victoria Street
Chicago, Illinois 60646