Installation and Service Instructions

Midco® International Inc.
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Chicago, Illinois 60646
tel  866.705.0514
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web  www.midcointernational.com
e-mail  sales@midcointernational.com

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.

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 on makeup air unit.

- 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.

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 one of the 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.

LNB 1000 Series Low Nox Burner

Rule #1147 Code Compliance:

Code compliance is the sole responsibility of the installer.

The Midco LNB 1000 Burner has been approved to meet Rule 1147 when applied to the model makeup air unit tested. Any modifications to the LNB 1000 burner will void code compliance. Review the information included in the installation and service manual on proper operation. Refer to page 6 for additional information.

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: ____________________________

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Quality Designed for Proven Performance
Part 1 - Installation

Specifications

The LNB Series burners are adaptable to most makeup air units. The Midco LNB 1000 LOW NOx gas burner was developed to meet the changing emission requirements required today.

FIRING RATE (NATURAL) ²

<table>
<thead>
<tr>
<th></th>
<th>Push Through</th>
<th>Pull Through</th>
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<tbody>
<tr>
<td>MIN MBH ³</td>
<td>150</td>
<td>225</td>
</tr>
<tr>
<td>MAX MBH ³</td>
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GAS SUPPLY PRESSURE REQUIRED

<table>
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<tr>
<th></th>
<th>Min 5.0&quot; W.C.</th>
<th>Max 14.0&quot; W.C.</th>
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<tbody>
<tr>
<td>NATURAL</td>
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ELECTRICAL SUPPLY

<table>
<thead>
<tr>
<th></th>
<th>120 VAC/60 Hz /5 AMPS ⁴</th>
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IGNITION CONTROL MODULE VOLTAGE

<table>
<thead>
<tr>
<th></th>
<th>24 VAC</th>
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</table>

FLAME SAFETY....

Electronic flame Safety with Spark Ignited Pilot and 100% Shut-Off ⁵

Table 1. Burner Specifications

1 Standard burners are shipped as NATURAL gas models.
2 All Ratings Based on 1000 BTU/Cu. Ft. NATURAL, at sea level.
3 1 MBH = 1,000 BTU/hr.
4 Inrush AMP draw is higher - if needed, consult the factory.
5 See Section VI of Operational Sequence.

Part 1
Installation

I Equipment Preparation

LNB 1000 Installation procedure:

When installing the Midco LNB 1000 into a spray booth makeup air heater the following instructions must be followed.

The Midco LNB 1000 must be installed per the makeup air manufacturer’s instructions. If not available take the following steps. To install the burner an opening on the side of the makeup air heater must be provided. See Figure 1 for opening size and mounting information. The Midco LNB 1000 burner should be centrally located on a pull through unit to promote even heat distribution. For a push through unit the Midco LNB burner should be located in the center of the blower discharge. The opening of the combustion chamber must be facing the blower inlet (pull through type) or 90 degree to the blower inlet (push through type). See Figure 2 for proper chamber orientation. Clearance around heat chamber must be a minimum of 6" on all sides.

Figure 1 - LNB 1000 Mounting Flange
Part 1 - Installation

The Midco LNB 1000 wiring is included with the makeup air heater. Follow wiring diagram 5246-25 for proper wiring connections. When installing the Midco LNB 1000 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.

**Figure 2** - Pull Through / Push Through Chamber Orientation

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

III Piping

The Midco LNB1000 is provided with all required components to install the gas train assembly. Refer to piping diagram 5246-34 for a typical installation. Required modifications can be made to the piping layout if required. The Dungs FRG valve position CAN NOT be changed as this is critical in burner performance. There is an orifice located downstream from the Dungs FRG valve and must not be modified. When complete with gas train assembly installation turn on gas to the unit and check for any gas leaks. Repair any that were found at this time. The minimum required gas pressure at the inlet of the valve train is 5" WC and maximum gas pressure not above 14" WC. Turn off main manual gas valve before starting the unit. Consult the Midco technical support team if there are any piping questions.

IV Burner Startup

Do not have gas turned on at this time. Power up air makeup unit and the starting sequence begins. The EBM blower motor is energized and will run up to high blower speed for 20 seconds. After initial purgure the EBM blower motor will modulate down to low fire. Once EBM blower motor reaches low speed the main solenoid gas valves and ignition control will be energized. If the burner lights and the temperature control is calling for heat the burner will be modulated depending on the DC Volt signal being generated from temperature control. For complete burner startup and diagnostic information refer to complete spray booth startup instructions provided. If not available contact Midco International or spray booth manufacturer.

V Burner Setup

The Midco LNB 1000 burner comes with a limiting gas orifice which is required to maintain the Low NOx readings and firing rate. The orifice is located between the dungs valve and EBM blower inlet. Do not attempt to modify the location or orifice size. The burner is factory set and should not require any additional setup. Attach a differential gas pressure manometer to check gas flow. The locations for attaching the gas pressure manometer are located on the 1" coupling and 1" X 3" nipple where the orifice is located. Refer to piping diagram, Figure # 4, for proper location. Remove the 1/8" plug on both fittings. Attach a barb fitting in order to hook up the required tubing to the gas pressure manometer. Set temperature control below booth temperature so burner will light and stay at low fire. Energize burner power switch.
The burner blower will be energized and start sequence will begin. Once main flame established the burner will start at low fire. The gas pressure at the two gas pressure taps will be approximately .1″ WC to .25″ WC. This is the minimum firing rate for the Midco LNB 1000 burner. Set temperature control to 70 degrees above booth temperature. The EBM blower will begin to increase in speed and the gas pressure will increase to approximately 5″ WC differential pressure. If the settings are not within the required pressures check to make sure there is a minimum gas pressure of 5″ WC at the side tap on the upstream solenoid gas valve.

Burner Ignition Sequence:

1. Call for heat
   a. LNB Burner blower will go to maximum speed
   b. Ignition control will pre-purge for 30 seconds
   c. SCEBM-1 control LED will flash red
2. After 30 seconds delay, ignition control is energized
   a. LNB burner will go to minimum speed
   b. Ignition control will send 120V to the spark generator
   c. SCEBM-1 control LED will remain solid red.
3. Trial for ignition.
   a. LNB burner blower stays at minimum speed
   b. Main gas valves will be energized
   c. SCEBM-1 control LED will flash red/green.

If Burner ignites

A. Ignitor will be de-energized
B. Check DC micro amps signal which needs to be above 1.5 micro amps
C. LNB Burner will modulate based on 2-10 VDC signal from the temperature control
D. SCEBM-1 control LED will remain solid green

If Burner does not ignite

A. Igniter will be de-energized
B. LNB burner blower will go to maximum speed
C. SCEBM-1 control LED will slowly flash red.
D. Power will need to be de-energized

For additional trouble shooting information contact Midco International as shown on front page.

The LNB 1000 burner will require maintenance every 12-18 months depending on usage. There are four components that should be inspected. The EBM blower, pilot assembly, burner chamber and 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 EMB blower. To inspect the burner inlet loosen the union between the Dungs valve and blower. Loosen the 4 ½” bolts attaching the burner to the makeup air heater. This will allow removal of the Midco LNB 1000 burner. Inspect the heat chamber. To inspect the burner head you can look into the heat chamber and if any issue contact Midco for replacement. The flame sensor and spark rod can be removed by loosen to two nuts holding the pilot assembly. To clean the sensor and spark rod if required you can use steel wool or sand paper. If any crack on the porcelain 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 makeup air heater and cycle as shown in section IV - Burner Startup.
The Midco LNB 1000 burner uses a direct spark pilot. The LNB direct spark pilot is factory set. The spark gap should be set an 3/16" 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 Internation as shown on the front page.

### Code Compliance

To maintain the Midco burner certification to Rule # 1147 Follow Section V for Burner Setup. Do not modify or replace any component supplied with the LNB 1000 burner or the Midco Certification will be voided. To properly identify which air makeup unit is certified to be code compliant contact sales@midcointernational.com

<table>
<thead>
<tr>
<th>Item</th>
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<th>Description</th>
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<tbody>
<tr>
<td>1</td>
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<td>Flame Rod LNB Assembly</td>
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</tr>
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<td>2</td>
<td>5246-24</td>
<td>1/2&quot; O.D. Electrode Bush</td>
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<tr>
<td>3</td>
<td>5246-43</td>
<td>Spark Rod Assembly LNB</td>
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<td>5246-48</td>
<td>Igniter Flange Gasket Spark</td>
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<td>5</td>
<td>8451-06</td>
<td>9/16&quot; I.D. Electrode Bushing</td>
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<tr>
<td>6</td>
<td>Hardware</td>
<td>#8-32 X 1/4&quot; Slotted Pan Head Screw</td>
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*Figure 5 - Pilot assembly*