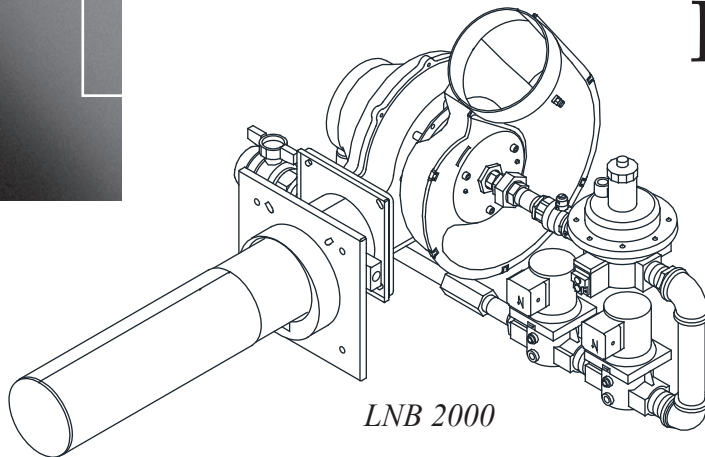


Installation and Service Instructions



LNB 2000

Low NO_x Without Chamber Gas Burners



LNB 2000

⚠ 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: _____



Midco
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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.

Quality Designed for Proven Performance



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Part 1 - Installation

Specifications ¹

The LNB 2000 burner are adaptable to most ovens and after burners. The Midco LNB Series LOW NO_x gas burners were developed to meet the changing emission requirements required today.

LNB 2000 Low NO_x burners without chamber

MIN VELOCITY	500 FPM
MAX VELOCITY	2000 FPM
* MIN INSERTION DEPTH	4.0"
* MAX INSERTION DEPTH	26.0"
FIRING RATE (NATURAL) ²	
MIN MBH ³	500
MAX MBH ³	2,000
GAS SUPPLY PRESSURE REQUIRED	
NATURAL	Min 6.0" W.C. Max 14.0" W.C.
PROPANE	Contact factory
MOTOR HP	1.0 HP
BLOWER FLOW RATE	420 SCFM
ELECTRICAL SUPPLY.....	120 VAC/ 60 Hz / 25 AMPS
CONTROL VOLTAGE	120 VAC
IGNITION TRANSFORMER	120 VAC
FLAME SAFETY	
Electronic flame Safety with Direct Spark Ignition and 100% Shut-Off ⁴	

Table 1. Burner Specifications

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.

Part 1- Installation

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.

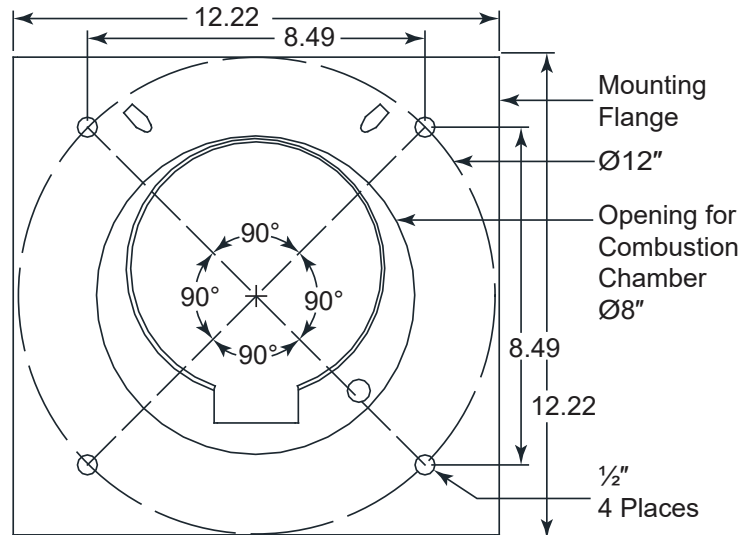


Figure 1 - LNB 2000 Mounting Flange

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.

II

Wiring

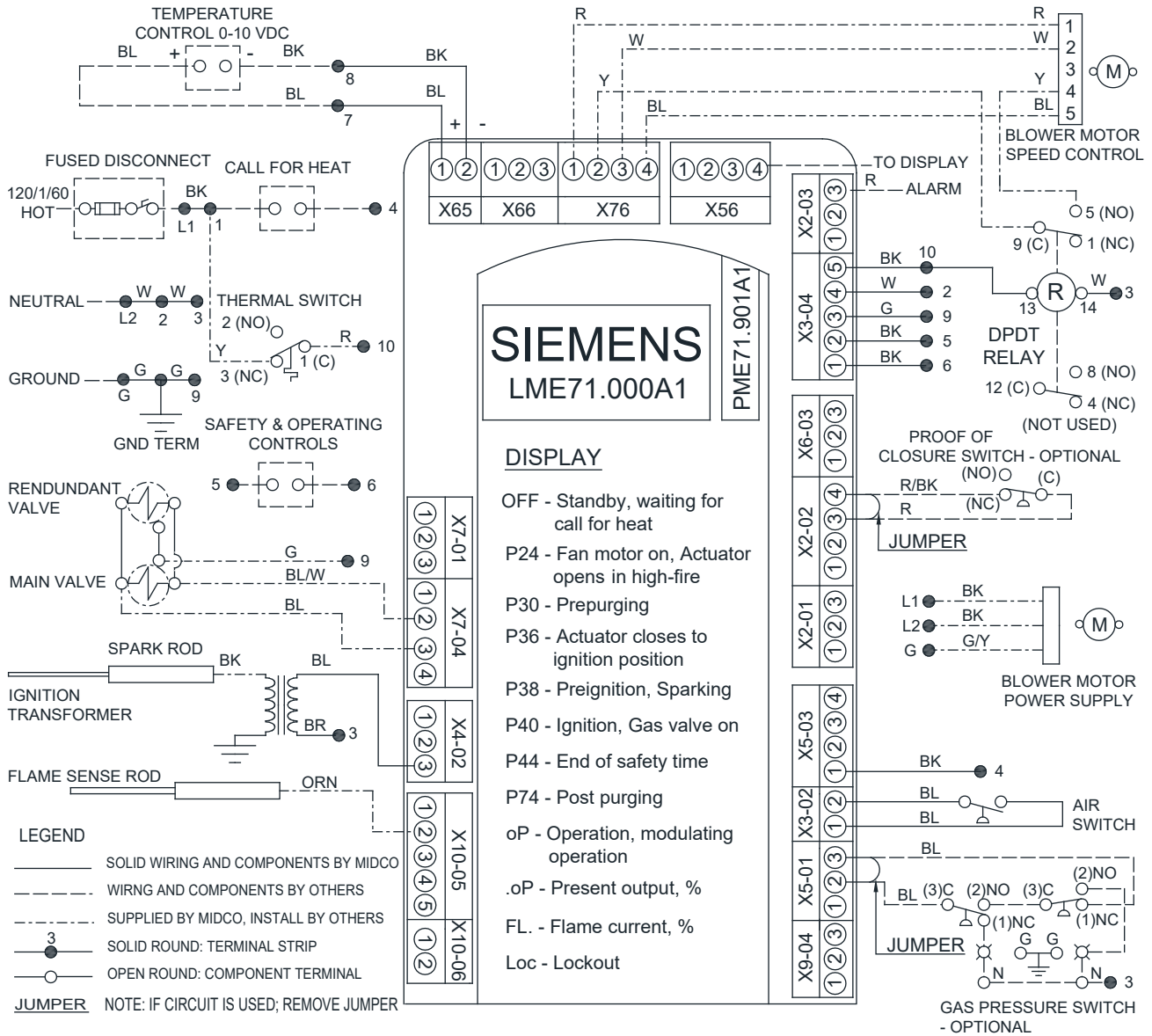


Figure 3 - Wiring Diagram

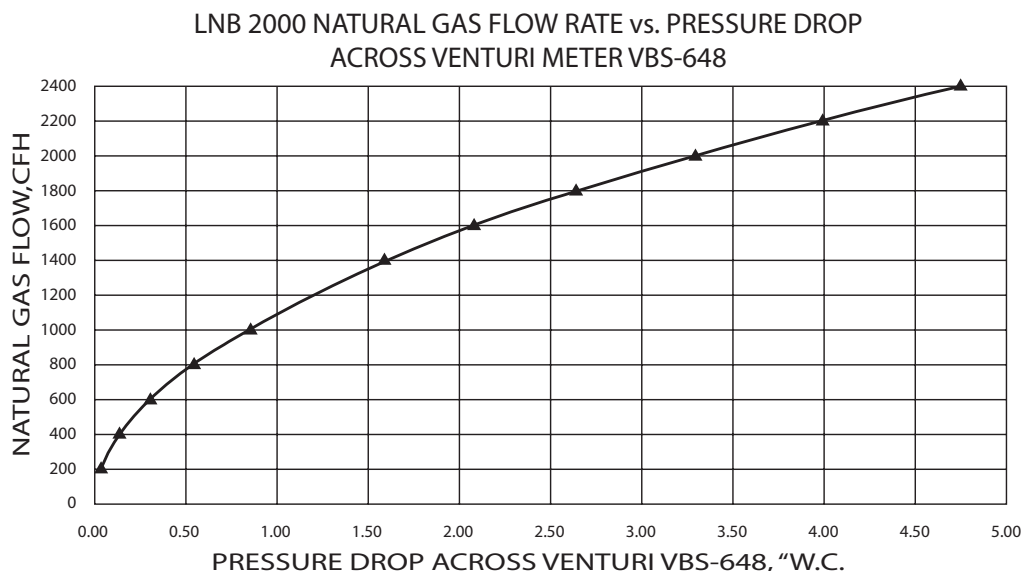


Chart 1 - LNB 2000 - Natural Gas Flow Rate vs. Pressure Drop - (Venturi VBS - 648)

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.

IV Burner Startup

Part 1 - Installation & Service

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.

Fault Code		Description of Fault	Possible Cause
AZL2.....	7-segment		
Loc: 2	Loc 2	No flame at startup	<ul style="list-style-type: none"> - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner, no fuel - Faulty ignition equipment
Loc: 3	Loc 3	Air pressure switch open	<ul style="list-style-type: none"> - Setpoint of switch is incorrect - Wiring of switch is incorrect
Loc: 4	Loc 4	Extraneous light	Extraneous light during burner startup
Loc: 5	Loc 5	Air pressure switch closed	<ul style="list-style-type: none"> - Setpoint of switch is incorrect - Wiring of switch is incorrect
Loc: 6	Loc 6	Actuator position fault	Actuator faulty or blocked: <ul style="list-style-type: none"> - Faulty connection - Wrong adjustment
Loc: 7	Loc 7	Loss of flame	Too many losses of flame during operation <ul style="list-style-type: none"> - Faulty or soiled flame detector - Poor adjustment of burner
Loc: 10	Loc: 10	Wiring or other error	Wiring error or internal error, output contacts, other faults
Loc: 12	Loc: 12	Valve proving	Fuel valve 1 leak
Loc: 13	Loc: 13	Valve proving	Fuel valve 2 leak
Loc: 14	Loc: 14	POC error	Incorrect POC wiring
Loc: 22	Loc: 22	Safety loop open	<ul style="list-style-type: none"> - Incorrect safety loop wiring - Safety limit thermostat cut out
Loc: 60	Loc: 60	Analog input out of range	Wiring of analog input
Loc: 83	Loc: 83	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 again (parameter 650.00) for a time exceeding the max speed deviation allowed (parameter 660)
Loc: 138	Loc: 138	Restore process successful	Restore process successful - no fault
Loc: 139	Loc: 139	No program module detected	No program module plugged in
Loc: 167	Loc: 167	Manual lockout	Manual lockout
Loc: 225	Loc: 225	PWM blower speed fault	Fan speed dropped below the minimum speed during prepurge (parameter 675.00) or during ignition, the speed of the PWM blower exceeded the max ignition speed (parameter 675.01)
Loc: 226	Loc: 226	PWM blower parameterization fault	Parameter setting error. The following are not allowed: <ul style="list-style-type: none"> - Speed low-fire (P1) > speed high-fire (P2) - Speed low-fire (P0) = 0 - Maximum blower speed (parameter 519) = 0
Loc: 227	Loc: 227	PWM blower parameterization fault	Parameter setting error. The following must be met: <ul style="list-style-type: none"> - 516.00 ≤ P0 ≤ 516.01 - 517.00 ≤ P1 ≤ 517.01 - 518.00 ≤ P2 ≤ 518.01

Chart 1 - Siemens Control - Lock Codes - Error Code List





Part 1 - Installation, Service


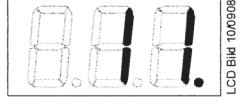


IV Burner Startup Continued Siemens Control Flame Current


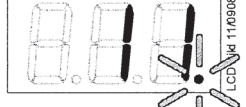




Note:





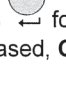

This display is only possible in operating mode or standby!

			Press  for display of the flame signal amplifier. Signal lamp blinks green. Display shows FL.1 .
---	---	---	---

 1...3 s			When pressing  (1...3 seconds), the flame signal current is displayed. Signal lamp blinks green. Example: 11 .
--	---	---	--

 >3 s			When pressing  (>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. Display: Point . blinks, value 11 does not.
---	---	---	---

14.4.3 Reset

  >1 s		 	For reset the unit, press  for 1...3 seconds. When the button is released, OFF is displayed. The basic unit is reset.
--	---	--	---

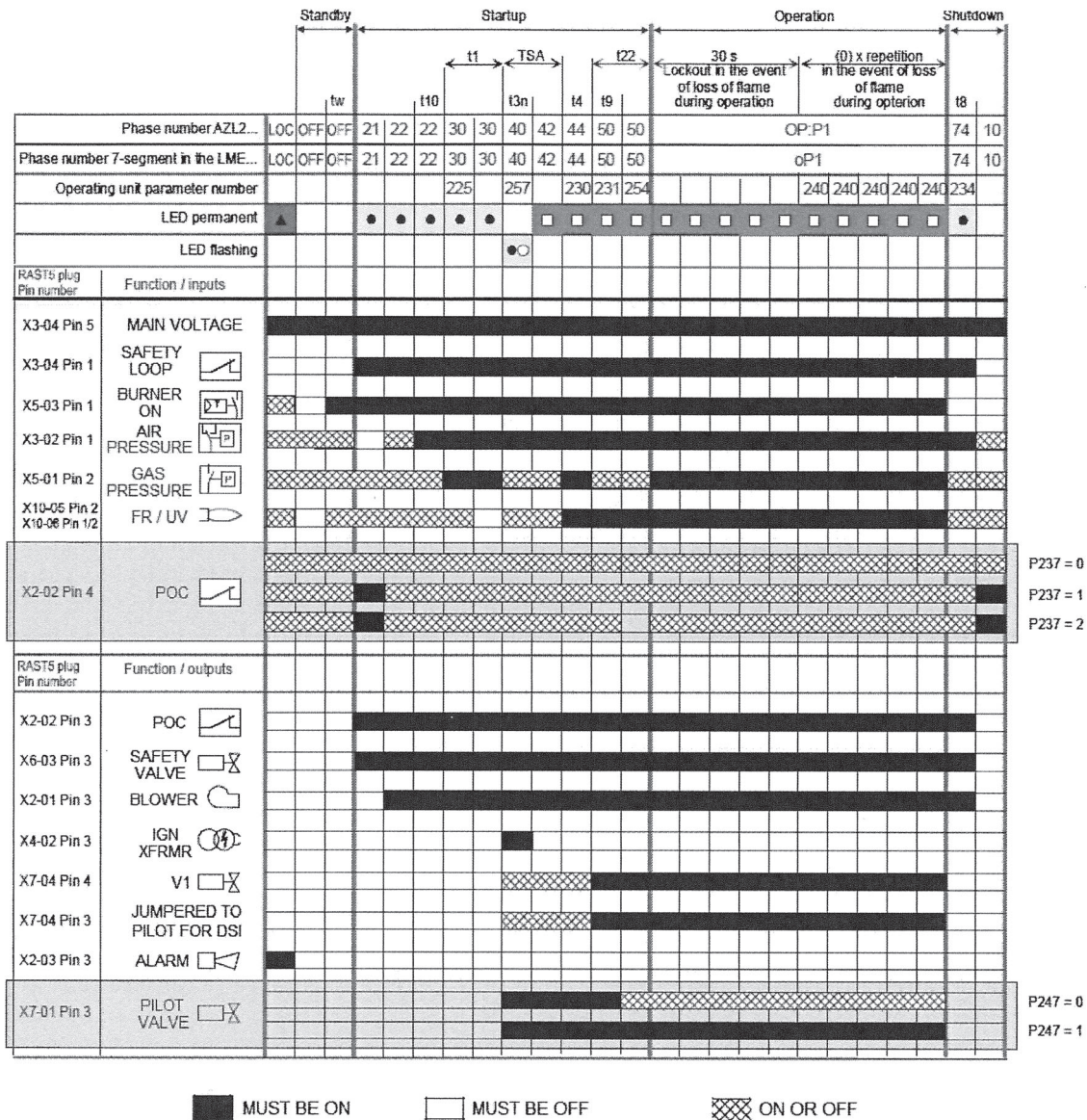


Note:

For meaning of the error and diagnostic codes, see chapter *Error code list...* (Chart 1)

Chart 2 - Siemens Control - Display of Flame Current

IV Burner Startup Continued Siemens Control Sequence of Operation



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

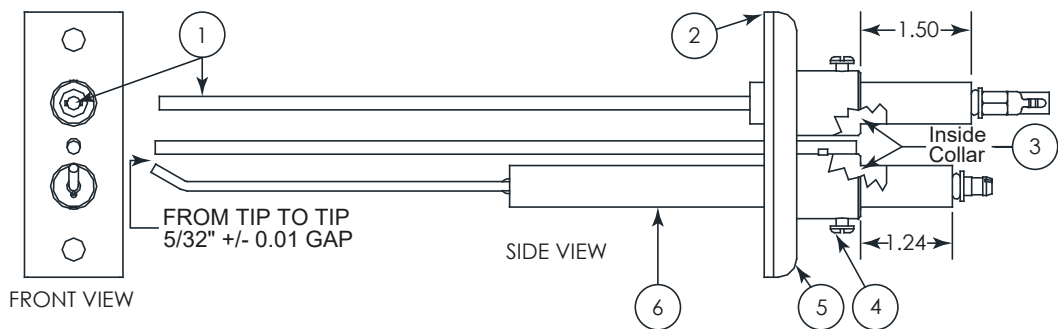
Chart 3 - Siemens Control - Sequence of Operation

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) 1/2" 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 re-energize heater and cycle as shown in section IV - Burner Startup.

When using this burner system in an environment that is dusty or located in which the air has particulates of debris in the air, it is highly recommended to purchase and install an air filter on the inlet of the air intake. Not doing so will allow the burner efficiency and combustion characteristics to degrade over time. The particulates in the incoming air will clog the internal side of the burner fiber head. The installation of a K & N Automotive Air Filter # RD-600, #RP-5167, #RP-5113, or equivalent is recommended. These types of filters are washable and reusable. Maintenance on these filters is recommended every 12 months.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	5247-35	Flame Rod Assembly LNB 7"	1
2	5247-11P	Igniter Flange Gasket 7"	1
3	8451-06	9/16" I.D. Electrode Bushing (inside)	2
4	HARDWARE	#8-32 X 1/4" Slotted Pan Head Screw	2
5	5247-10	Ignition Assembly Weldment 7"	1
6	5247-12	Spark Rod Assembly LNB 7"	1

Figure 5 - LNB 2000 Spark Ignitor Assembly
(For re-order Kit # 5247-09R)

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.



