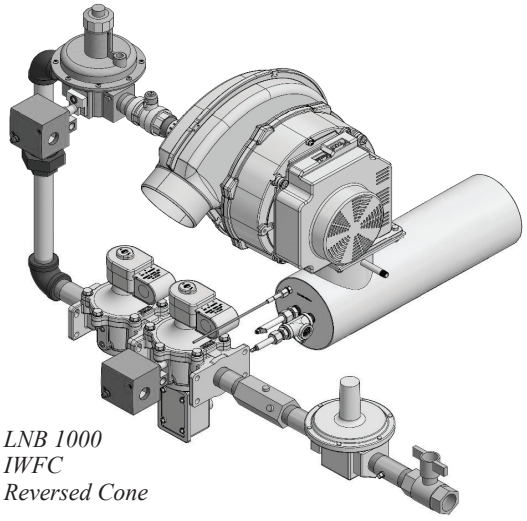
Installation and Service Instructions

LNB 500 & LNB 1000 Series

Low NO_X Burners

IWFC



LNB 1000
IWFC
Reversed Cone

⚠ 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: _____

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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.

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Part 1 - Installation

Specifications [1]

The LNB Series burners are adaptable to most applications requiring LOW NO_X emissions. The Midco LNB Series LOW NO_X Series gas burner was developed to meet the changing emission requirements required today.

MAX VELOCITY ..... 2000 FRM [5]

	LNB 500	LNB 1000
MIN INSERTION DEPTH	4.0″	4.0″
MAX INSERTION DEPTH	8.0″	8.0″

FIRING RATE (NATURAL) [2]

	LNB 500	LNB 1000
MIN MBH [3]	100	200
MAX MBH [3]	500	1000

GAS SUPPLY PRESSURE REQUIRED

NATURAL ..... Min 5.0″ W.C. Max 14.0″ W.C.
PROPANE ..... Contact factory

	LNB 500	LNB 1000
MOTOR HP	0.32 HP	0.40 HP
BLOWER FLOW RATE	229 SCFM	361 SCFM
ELECTRICAL SUPPLY	120 VAC/ 60 Hz / 5 AMPS	

FLAME SAFEGUARD - SIEMENS..Standard 120V
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 VI Burner Ignition Sequence.
[5] Contact factory for additional information

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 must be provided.
See Figures 1A and Figure 1B for opening size and mounting information. For specific installation information contact our sales engineering team.

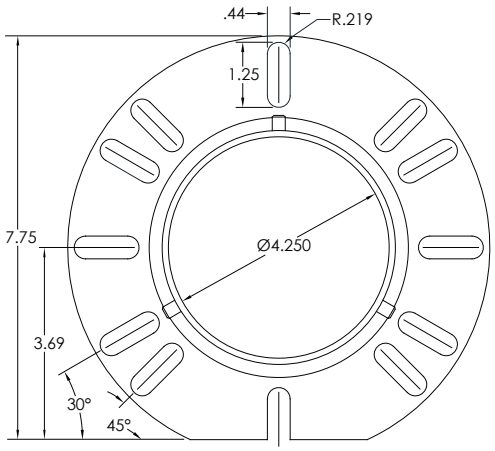


Figure 1A -
LNB 500 Mounting Flange
(LNB 500 uses a universal flange)

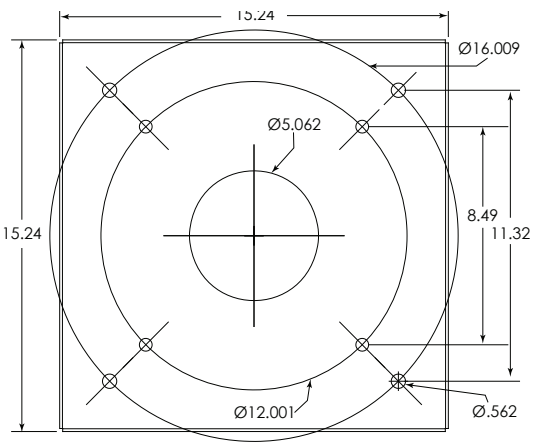


Figure 1B -
LNB 1000 Mounting Flange
(Welded)

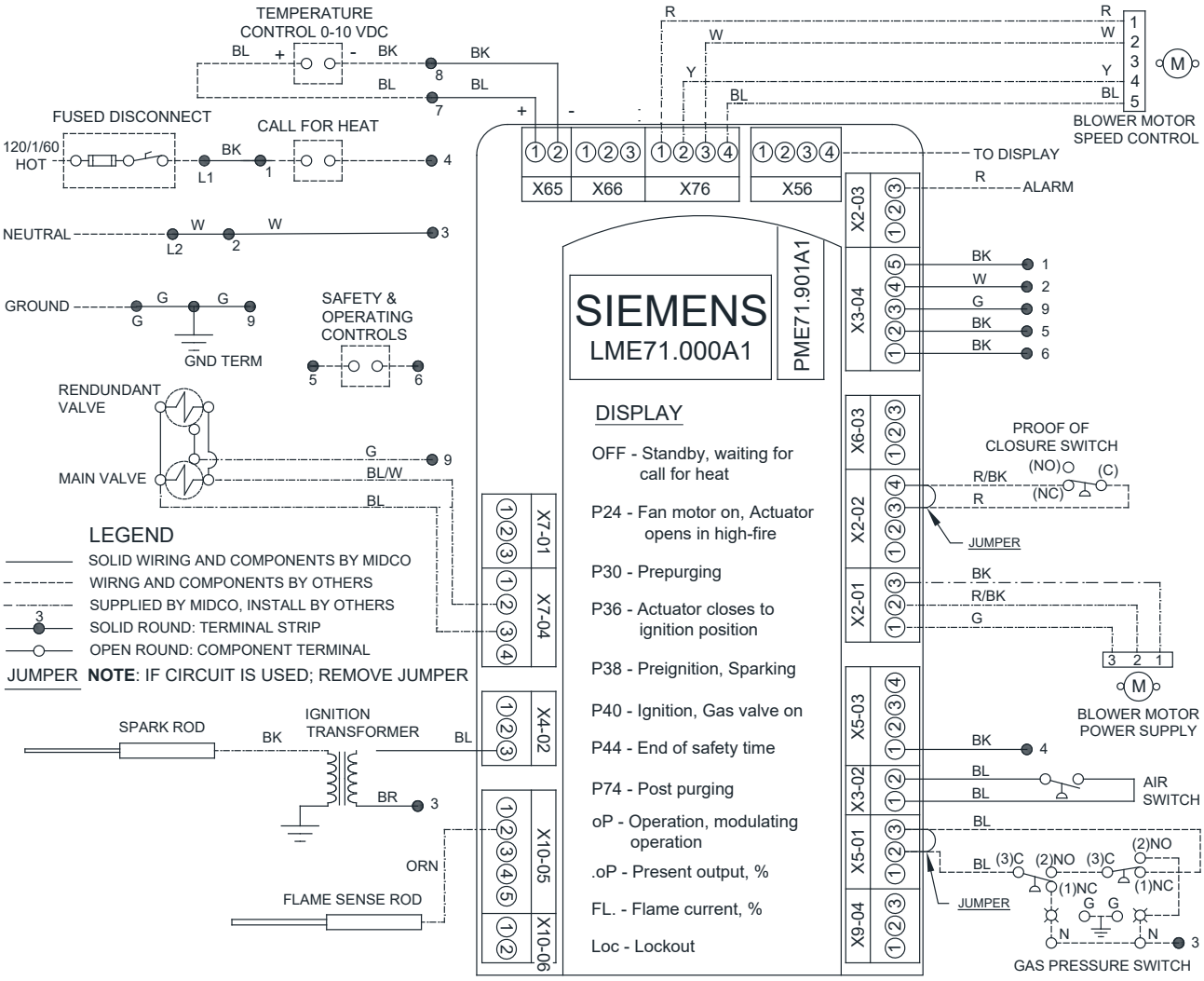


Figure 2 - *Wiring Diagram*

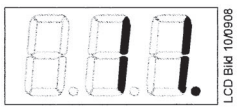
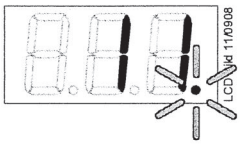
The Midco LNB wiring is included with the burner. Follow wiring diagram, shown in Figure 2, and included with the burner for proper wiring connections. When installing the Midco LNB burner all safety and operating controls must be included and connected so if any safety fails the LNB burner will not operate. Do not bypass any safety or operating control or equipment might be damaged.

Siemens, Control Lock Codes

Error code		Clear text	Possible cause
AZL2...	7-segment		
Loc: 2	Loc 2	No establishment of flame at the end of safety time	- 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 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
Loc: 4	Loc 4	Extraneous light	Extraneous light during burner startup
Loc: 5	Loc 5	Air pressure faulty, air pressure switch welded in working position	Time supervision air pressure switch - Air pressure switch has welded in working position
Loc: 7	Loc 7	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
Loc: 10	Loc 10	Error not relatable (application), internal 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	Error valve closure control POC
Loc: 22	Loc 22	Safety loop open	- Gas pressure switch-max open - Safety limit thermostat cut out
Loc: 60	Loc 60	Analog power source 4...20 mA, I <4 mA	Wire breakage
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 band again (parameter 650) for a time exceeding the tolerance time speed deviation (parameter 660)
Loc: 138	Loc 138	Restore process successful	Restore process successful
Loc: 139	Loc 139	No program module detected	No program module plugged in
Loc: 167	Loc 167	Manual locking	Manual locking
Loc: 206	Loc 206	AZL2... incompatible	Use the latest version
Loc: 225	Loc 225	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
Loc: 226	Loc 226	Faulty PWM fan	Parameterization error: - Speed low-fire > speed high-fire, or - Low-fire = 0 rpm, or - Maximum speed = 0 rpm
Loc: 227	Loc 227	Faulty PWM fan	One or several parameters violate the minimum/maximum limit

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

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

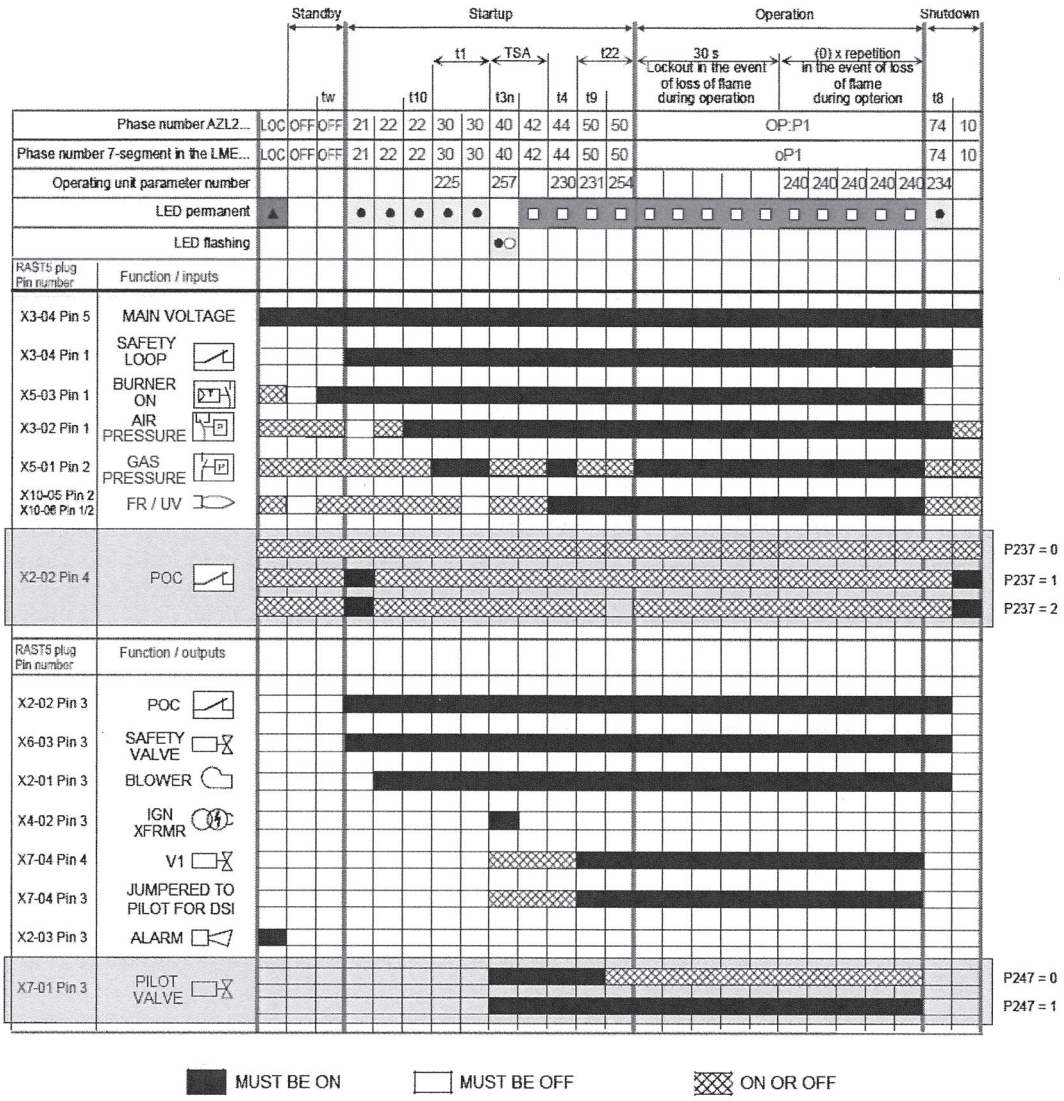
info ↵ >1 s			For reset the unit, press info ↵ for 1...3 seconds. When the button is released, **OFF** is displayed. The basic unit is reset.

Note:
For meaning of the error and diagnostic codes, see chapter *Error code list...*

Chart 2 *- Siemens Control - Display of Flame Current*

II Wiring 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*

II Wiring Continued

The differential air pressure switch assembly provided should be installed as shown in Figure 3.

Pressure Differential Switch

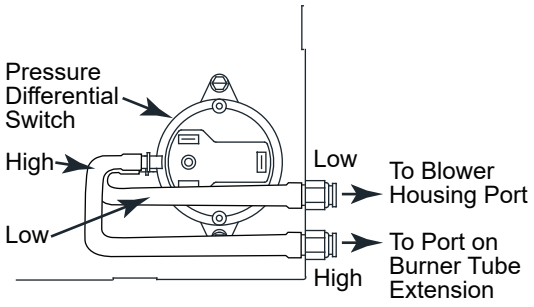


Figure 3- *Pressure Differential Switch Tube Connections*

III Piping

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 outlet gas pressure should be set at 5″ 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.

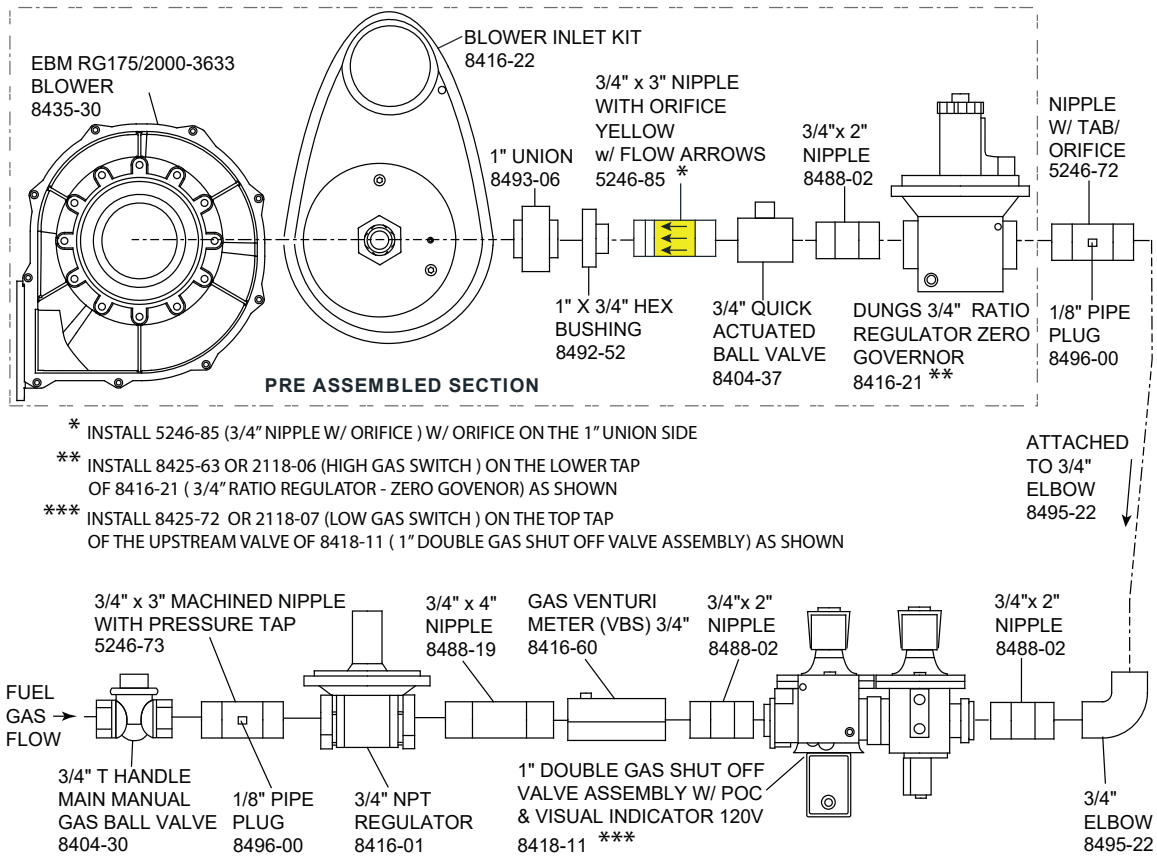


Figure 4A - *Piping - LNB 500 - IWFC - Reversed Cone*

III Piping Continued

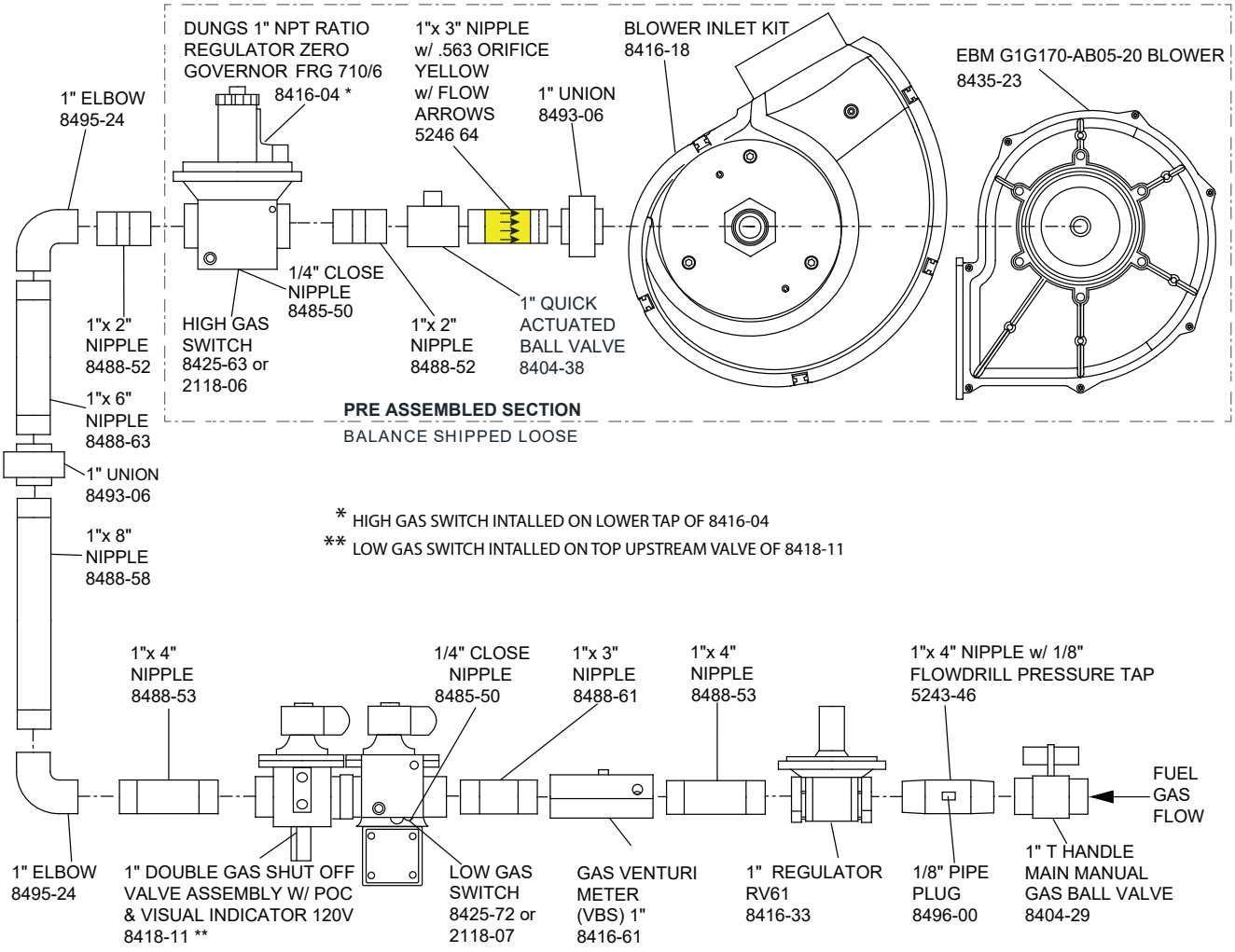


Figure 4B - *Piping - LNB 1000 - IWFC - Reversed Cone*

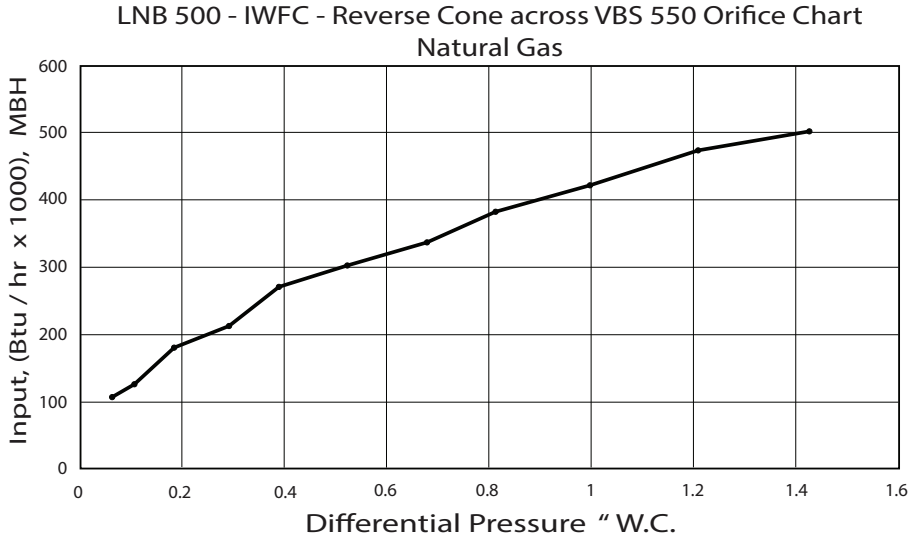


Chart 4 - *Gas Pressure - LNB 500 - IWFC - Reversed Cone*

III Piping Continued

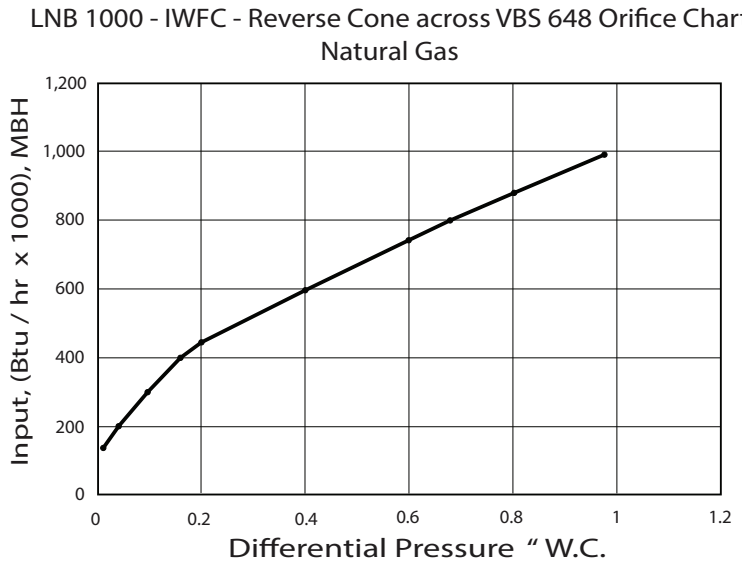


Chart 5 - *Gas Pressure - LNB 1000 IWFC - Reversed Cone*

IV Burner Startup

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 equipment 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 one barb fitting on first pressure tap of VBS Venturi.
11. Attach one barb fitting on second pressure tap.
12. Turn on gas.
13. Check gas pressure on side inlet of first solenoid gas valve.
14. Gas pressure should be 5″ minimum / 14″ maximum WC. Adjust main gas pressure if required.
15. Turn on burner 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 0.05″ WC for Low fire.
20. Turn off power to burner.
21. Reinstall DC Volt signal to Siemens control board.
22. Turn on power to burner.
23. Set temperature control.
24. Burner lights and ramps up to high fire.
25. Check gas pressure on side inlet of first solenoid gas valve.
26. Inlet pressure to side inlet of first solenoid gas valve at high fire should be 5″ WC minimum.
27. Readjust main gas pressure regulator if required.
28. Check differential gas pressure at barb fittings.
29. Differential gas pressure for high fire should be 1.5″ WC minimum for LNB500 and 1.0″ WC minimum for LNB 1000
30. To adjust high fire final setting the manual valve downstream of Dungs valve can be closed slightly.

V Burner Ignition Sequence

Burner Ignition Sequence.

1. Call for heat
   a. LNB Burner blower will go to maximum speed
2. After 20 seconds delay
   a. LNB burner will go to minimum speed
   b. Ignition control will be energized
   c. Ignition control will send 120V to the spark generator
   d. Main gas valves will be energized

If Burner ignites

A. Ignitor will be de-energized
B. LNB Burner will modulate based on 2-10 VDC signal from the temperature control

If Burner does not ignite

A. Igniter will be de-energized
B. LNB burner blower will go to maximum speed
C. Re-set Siemens Control.

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

VI Maintenance

The LNB burner will require maintenance every 12-18 months depending on usage. There are four components that should be inspected. The blower, ignition and flame sensing assembly, burner chamber and burner head should be inspected. Turn off the main gas manual valve and main panel disconnect to ensure 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. Inspect the heat chamber. To inspect the burner head look into the heat chamber 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.

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.

VII Spark Rod Settings and Flame Rod Locations

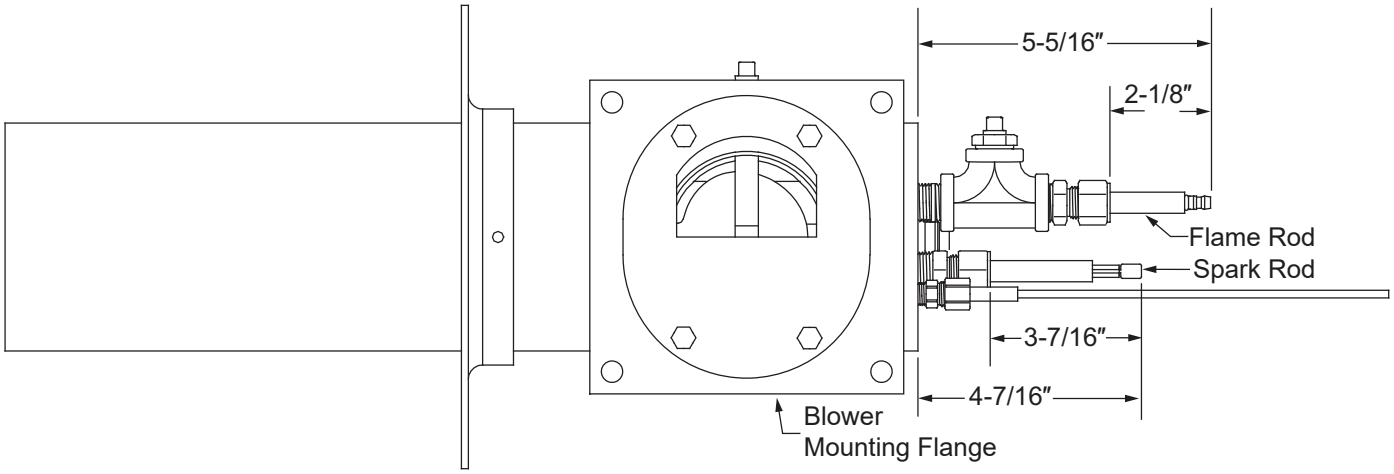


Figure 5A - *Spark Rod Settings and Flame Rod Locations*
LNB 500 - IWFC - Reversed Cone

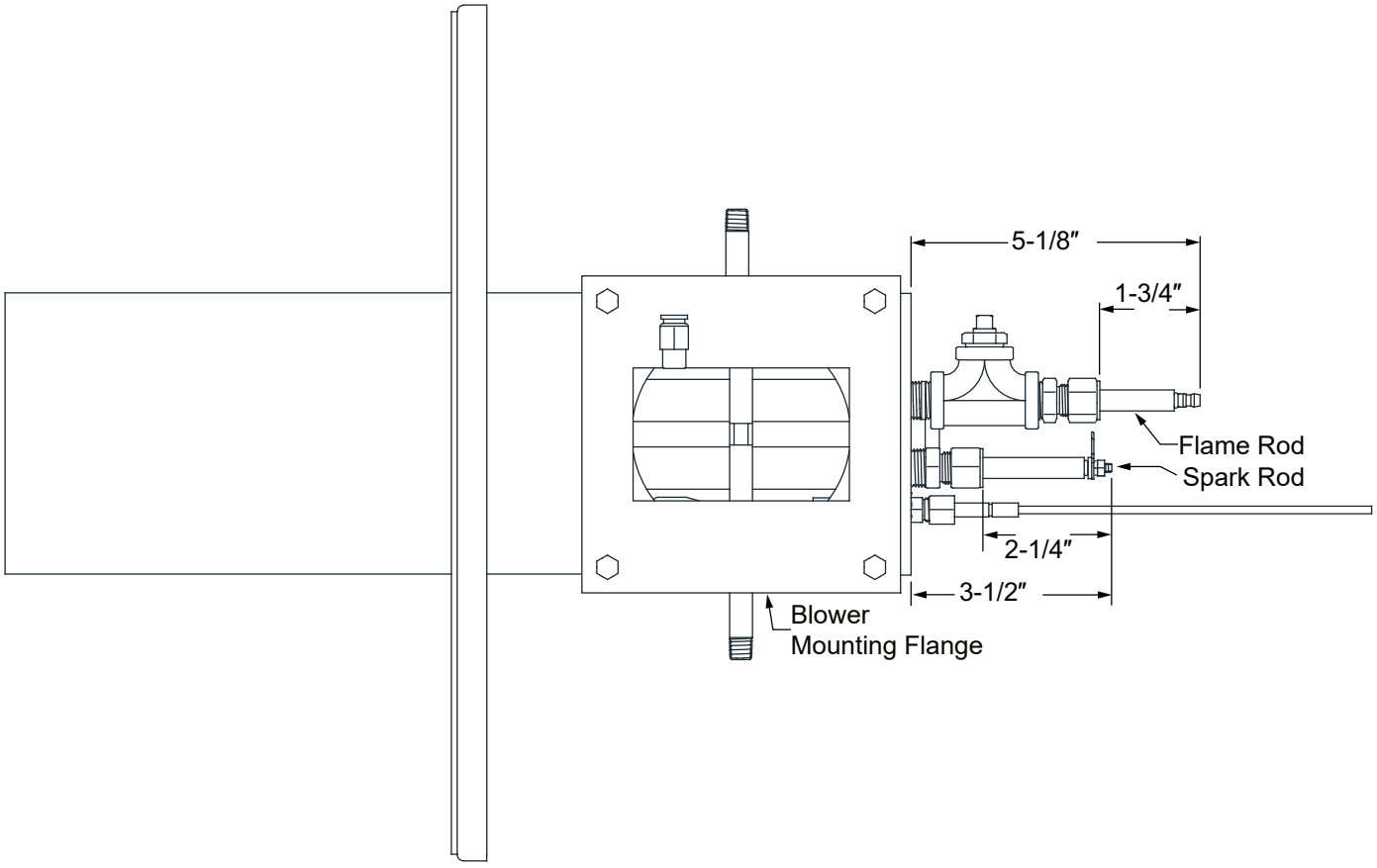


Figure 5B - *Spark Rod Settings and Flame Rod Locations*
LNB 1000 - IWFC - Reversed Cone

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