INSTALLATION INSTRUCTIONS

This manual has been prepared to assist in the installation, operation and startup of your low NOx system. It is good practice to know as much as possible about a piece of equipment before trying to install and operate it. Read the contents carefully before proceeding.

NOTE

Installation requirements and instructions should always be covered in appropriate engineering drawings and specifications which detail the applicable building codes, etc. Information contained here in is to be used as a guide ONLY and not the final authority.

GENERAL

- Starting a burner with the low NOx cone system is an event which normally culminates the efforts of several different contractors, manufacturers, utility and engineering concerns, sales and factory representatives, and others.

- In order for the system to operate safely and meet its design capabilities, the interacting fuel, air, electrical, exhaust and plant heating control systems must be properly sized, selected, installed and tested. Additionally, all conditions must be such that the heat generated by the burner can be safely used or wasted without endangering personnel or equipment.

- It shall be the policy of Gordon-Piatt Energy Group, Inc. that no responsibility is assumed by the company nor any of its employees for any liability or damages caused by an inadequate or unsafe condition which is the result, either directly or indirectly, of any of the improper or inadequate conditions described above. Refer to Gordon-Piatt warranty statement Form 1158.

- To insure that a safe and satisfactory installation has been made, a pre-start inspection is necessary. This inspection must be performed by an individual who is thoroughly familiar with all aspects of proper boiler/burner installation and how it interfaces with overall plant operation.

- See the standard burner models instruction manual for installation inspection check list.

NOTE

This inspection should be performed before the burner start-up specialist is called in. An incomplete or inadequate installation may require additional time and effort by start-up personnel and cause an untimely and costly delay.

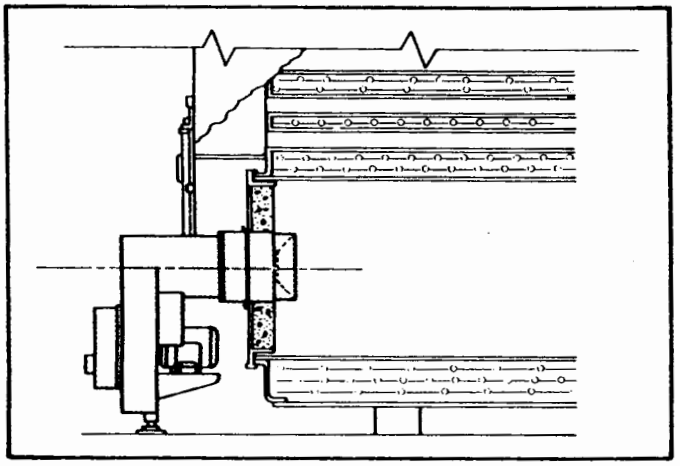
- The results of this inspection will often times identify corrections that must be made prior to start-up as well as point out potential or long range problems in plant operation if corrections are not made.

- Burner start-up is a serious matter and should not be viewed as a time for "crowd-gathering" by unconcerned, uninformed or unauthorized personnel. The number of persons present should be held to an absolute minimum.

- Instruction of operating and other concerned personnel should be done after the burner has successfully fired and adjusted by a qualified service agency or factory start-up specialist.

INSTALLATION INSTRUCTIONS (cont.)

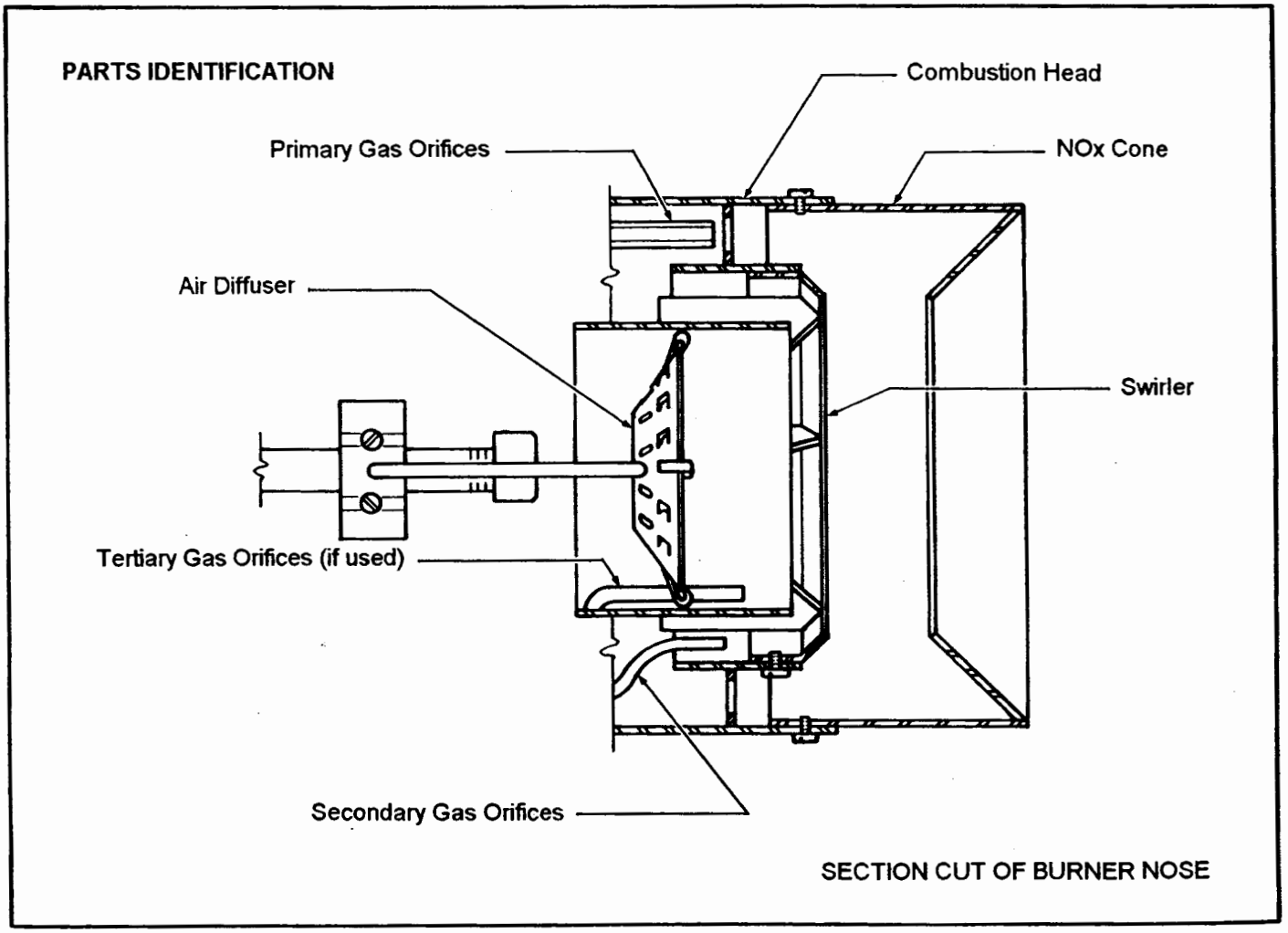
Typical Installation
For forced, natural or induced draft application



Model LNF installed in a Scotch marine type boiler

See standard burner model installation instructions for general installation requirements. The only exception to standard burner installation is **the refractory in the frontplate must be flush with the end of the combustion head and not the NOx cone**. The NOx cone must extend into the combustion chamber beyond the refractory. See figure for typical illustration. Various burner nose lengths can be supplied to adapt to different frontwall thicknesses

The LN series burners can be used to fire firetube, watertube and cast iron boilers. Frontplates and refractories are available to adapt burner to boiler or other appliance.



Typical Low NOx Combustion Head

BURNER ADJUSTMENTS

FACTORY ADJUSTMENTS - The burner is adjusted at the factory to meet "dry run" conditions. Adjustments and initial settings must be checked prior to initial light-off and settings must be verified by combustion tests.

CAUTION

Do not set fire visually on forced draft burners. Instruments are the only safe and reliable means to determine the proper adjustments.

AIR AND FUEL ADJUSTMENT MECHANISM - Various adjustment mechanisms control the air and fuel available for combustion. These will vary by the type of burner and the method used to control the air-fuel ratio.

See the standard burner instruction manual for the methods to adjust the various linkage systems available. The air-fuel control, drawer assembly and primary air adjustments are the same for the LN series burners and the standard burners.

BURNER START-UP

CAUTION

This manual has been prepared as a guide in burner start-up operation. It is written for the start-up specialist who is thoroughly qualified both by training and experience.

Prior to start-up of your LN series burner, review the start-up section in the appropriate standard burner manual for gas firing. Follow this start-up procedure for initial burner start-up and safety checks including the flame safeguard. In addition to the standard burner start-up procedure, there are several items that require extra care in adjustment or monitoring.

With the gas input rate established, perform a final flue gas analysis at low, high and several intermediate firing rates. The final air settings should produce a high fire O2 between 3 to 4% with Co less than 200 ppm (or local requirements) and a NOx level several ppm below that required. Low fire setting should produce an O2 level between 4 and 6% with required CO and NOx levels. Unlike a standard model burner, increasing O2 levels above 6% will normally cause a large increase in CO levels.

The primary air sleeve adjustment will affect all the combustion parameters. Typically, moving the primary air sleeve forward to closed position will decrease the O2 reading, increase the CO reading and decrease the NOx level, conversely, an increasing primary setting typically increases the O2, decreases the CO and increases the NOx reading. A compromise adjustments must be obtained to bring all readings to desired levels.

On a standard burner the drawer assembly position normally does not affect the combustion reading when firing gas. On the LN series the drawer assembly position can affect NOx levels by several ppm, so adjustments should be made until the lowest NOx levels are found and good combustion occurs.

When operating a unit for low NOx the window of operation or "forgiveness" of adjustments becomes much narrow. Therefore additional care must be taken when adjusting or tuning the equipment.

SUPPLEMENTARY DATA

This manual should be kept with other boiler room equipment literature as a complete reference source for maintenance and service.