

MODEL G

Burner Instruction Manual

FOR

GAS FUEL SYSTEMS



Underwriters
Laboratories Inc.®
LISTED

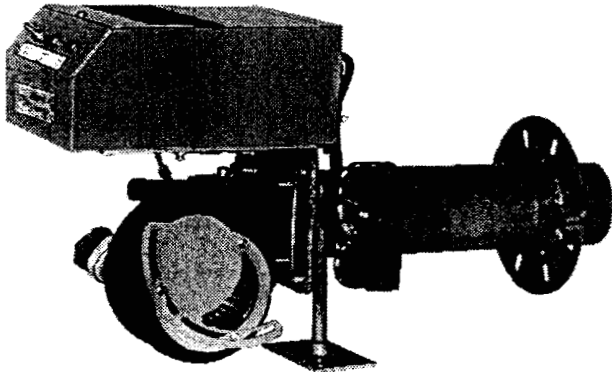
MANUFACTURED BY GORDON-PIATT ENERGY GROUP, INC.

PAT. NO. 5,090,897

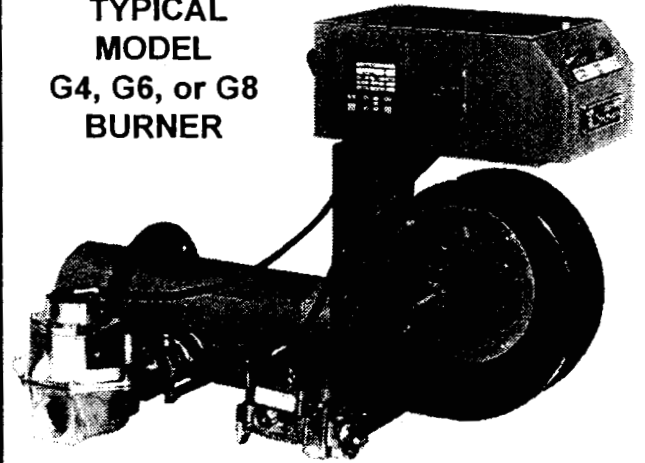
NOTE

YOUR BURNER MAY HAVE A LETTER PREFIX OR SUFFIX ADDED TO THE MODEL DESIGNATION; HOWEVER, THIS IS FOR IDENTIFICATION PURPOSES ONLY AND DOES NOT AFFECT THE INSTRUCTIONS IN THIS MANUAL.

TYPICAL
MODEL
G4.9 BURNER



TYPICAL
MODEL
G4, G6, or G8
BURNER



WARNING

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

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 call your gas supplier from a neighbor's phone. 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.

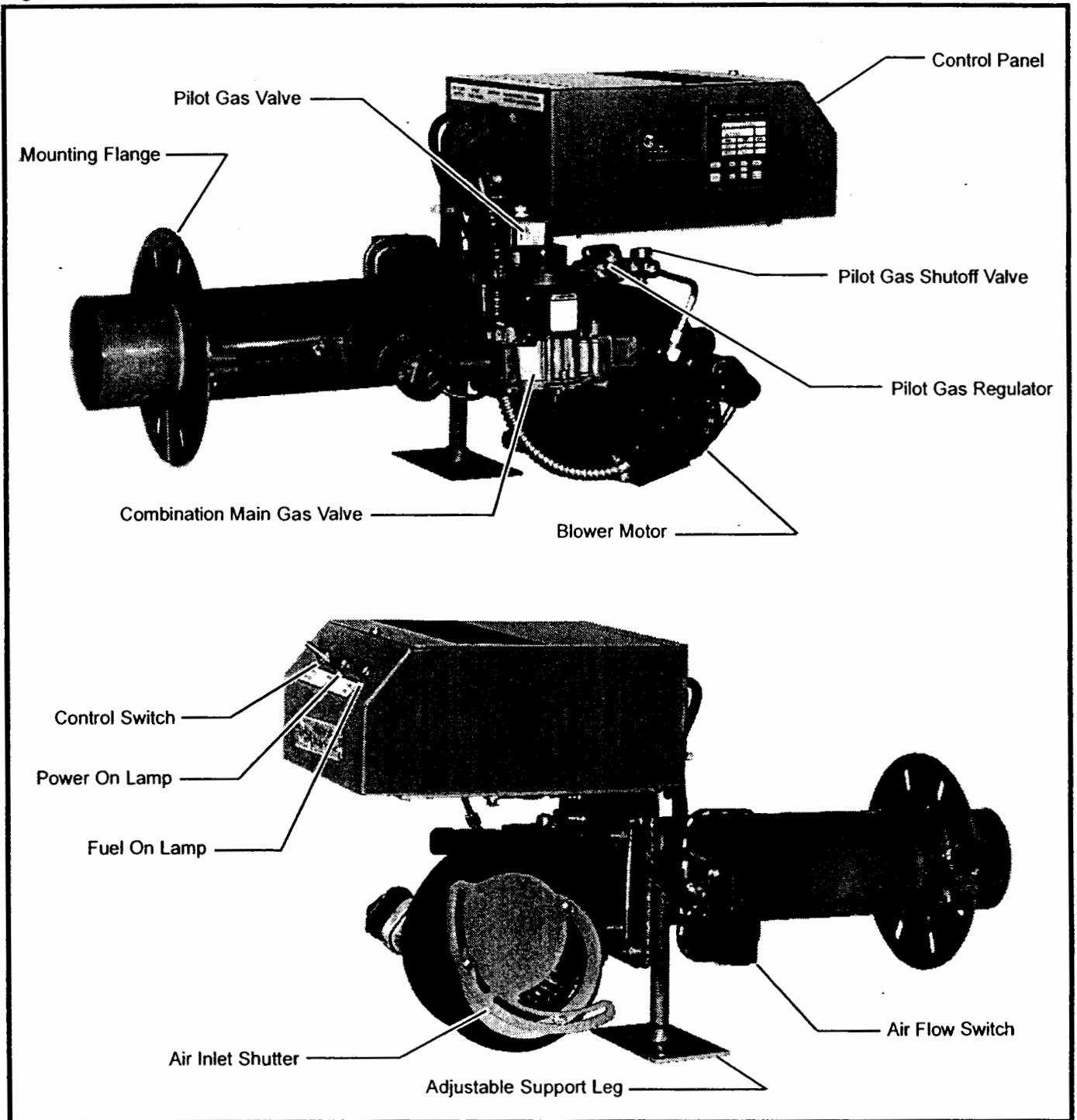


PART I

BURNER FAMILIARIZATION AND PRELIMINARY INSPECTION

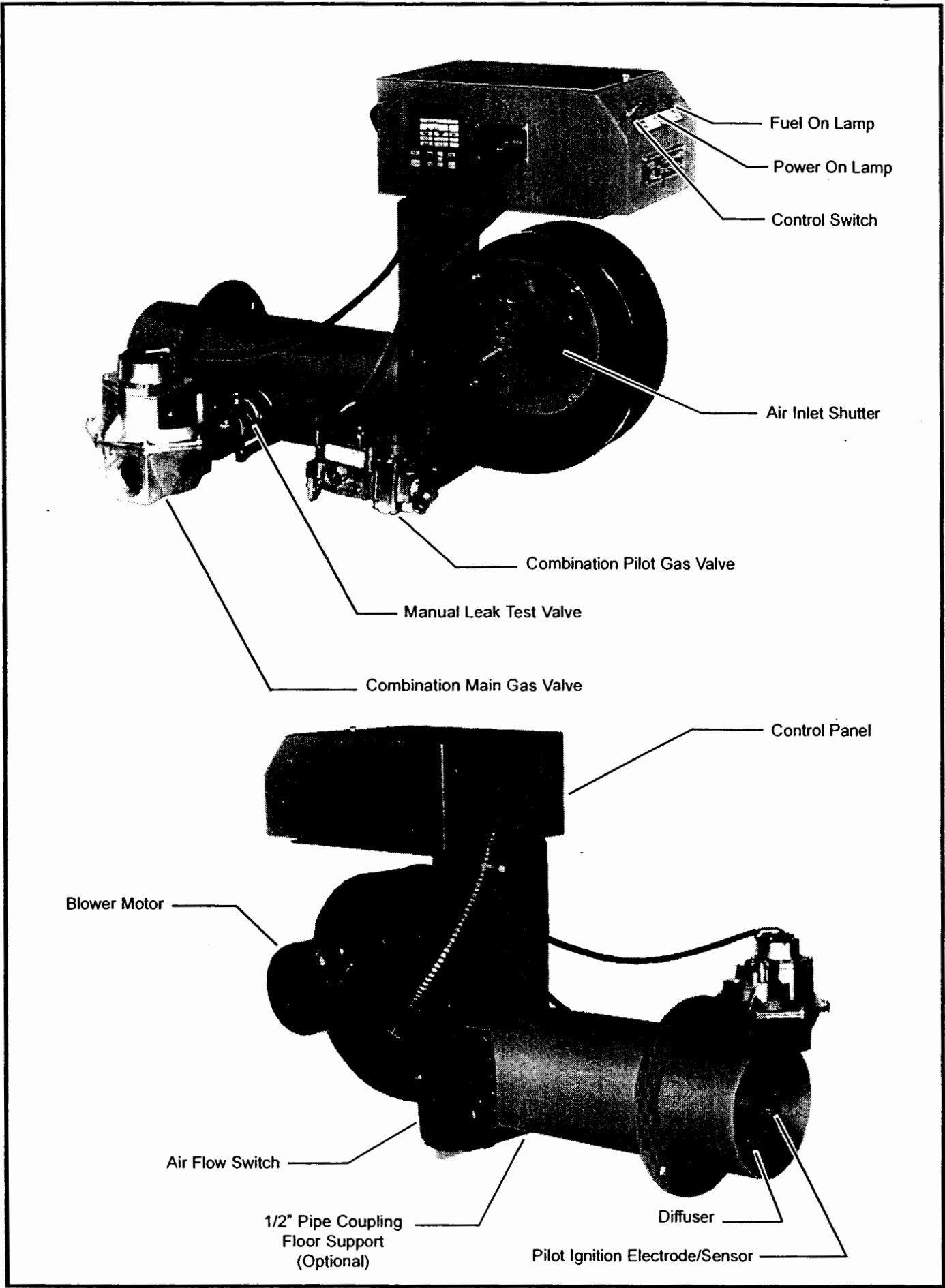
BURNER FAMILIARIZATION - Study the following burner illustrations and determine the one which matches your units. Take special note of the PART NAMES shown in the call-outs. Fuel Systems are described in detail in Part III.

Figure 1 *Burner Identification*



TYPICAL MODEL G4.9 WITH STANDARD EQUIPMENT





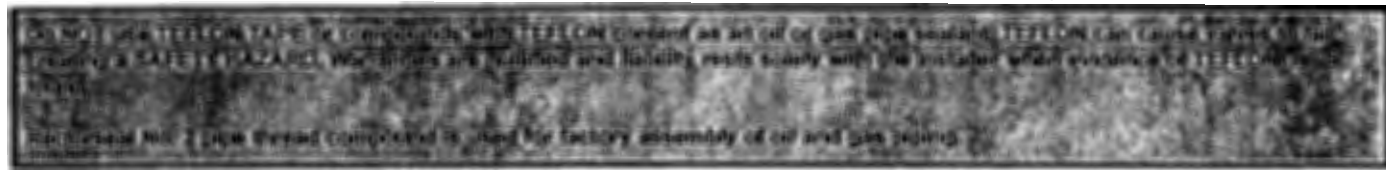
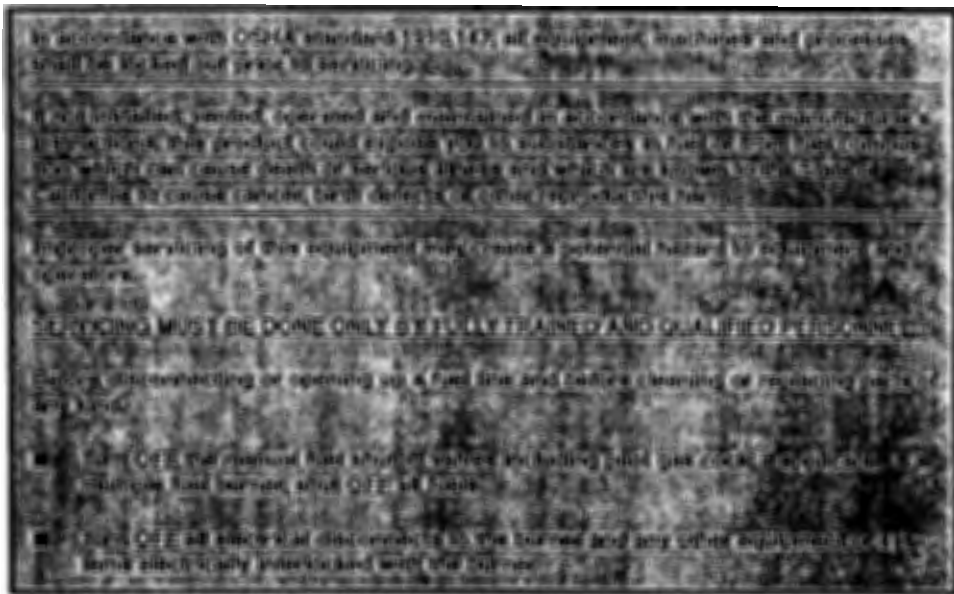
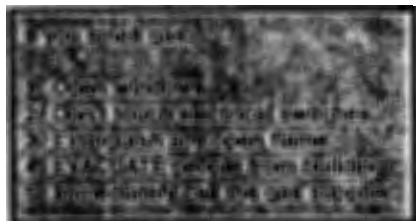
TYPICAL MODEL G6 WITH STANDARD EQUIPMENT



PART II

INTRODUCTION

WARNINGS



This manual has been prepared to assist in the installation, operation and maintenance of your burner. It is good practice to know as much as possible about a piece of equipment before trying to install or 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 herein is to be used as a guide ONLY and not as the final authority.

GENERAL INFORMATION

- Starting a burner 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 burner to operate safely and meet its design capabilities, the interfacing fuel, air, electrical, exhaust and 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 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 employee(s) for any liability or damages caused by an inoperable, inadequate or unsafe burner condition which is the result, either directly or indirectly, of any of the improper or inadequate conditions described above. 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 other plant or building control systems.



LIMIT AND OPERATING CONTROLS

Not included with burner. Must be rated & wired for 115 volts. See wiring diagram 31-000178-40, (Figure 9, Page 13) limit controls should be manual reset type.

PRE-PURGE

Pre-purge timing of 30 seconds is standard on all units.

THERMOSTAT CONTROL

Can be operated with 24V thermostat control. See wiring diagram 31-000178-40. Jumper T1 to T2 if not used. (Figure 9, Page 13).



PART III

FUEL SYSTEM

GAS SYSTEM DESCRIPTION - The Model G burners are equipped with U.L. Listed gas trains as standard equipment.

The following schematics depict U.L. Listed systems used on burners with inputs of 100 through 2,500 MBh.

Figure 6

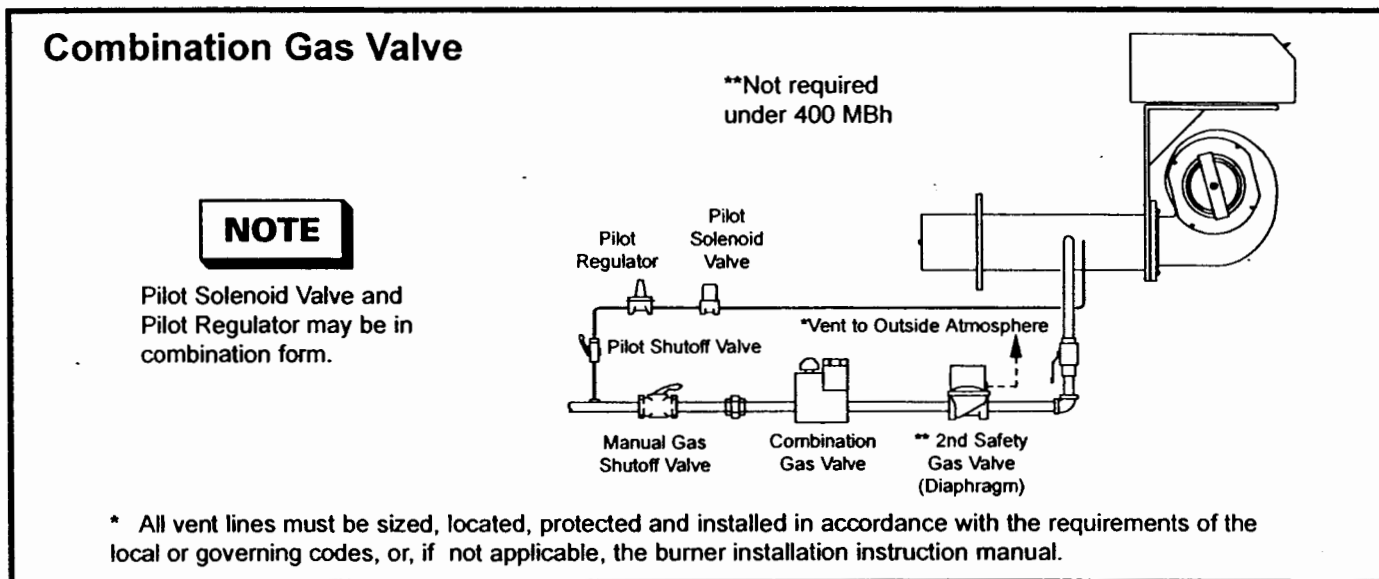
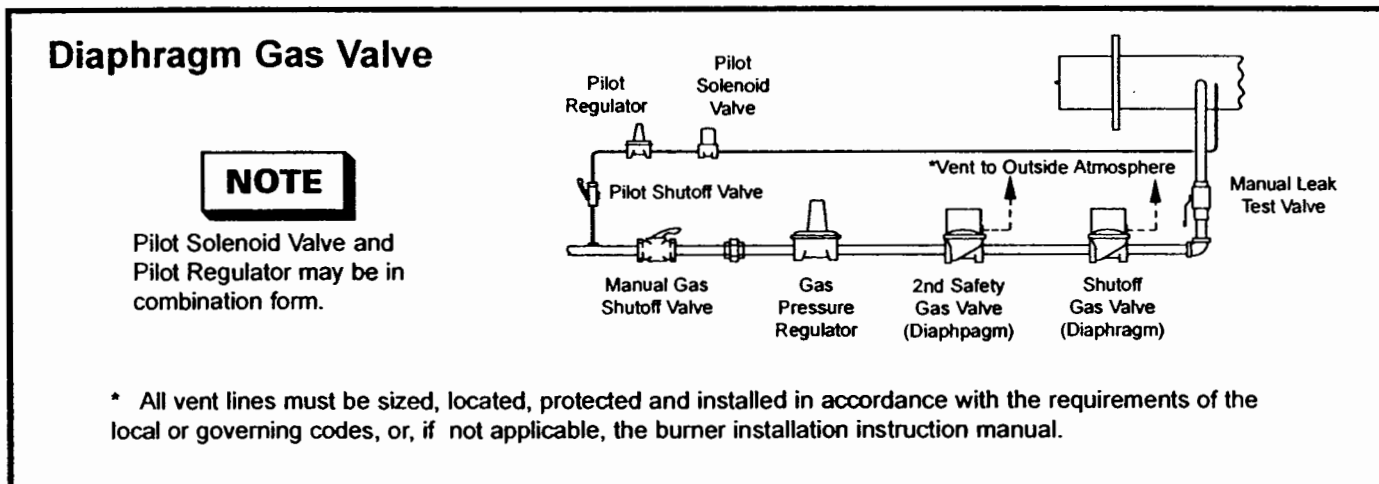


Figure 7



GAS PIPING INFORMATION - Gas piping should be sized to provide at least the required minimum pressure at the inlet to the gas train. Consult your local utility on any questions regarding gas pressure, piping pressure drops allowable, and local piping requirements.

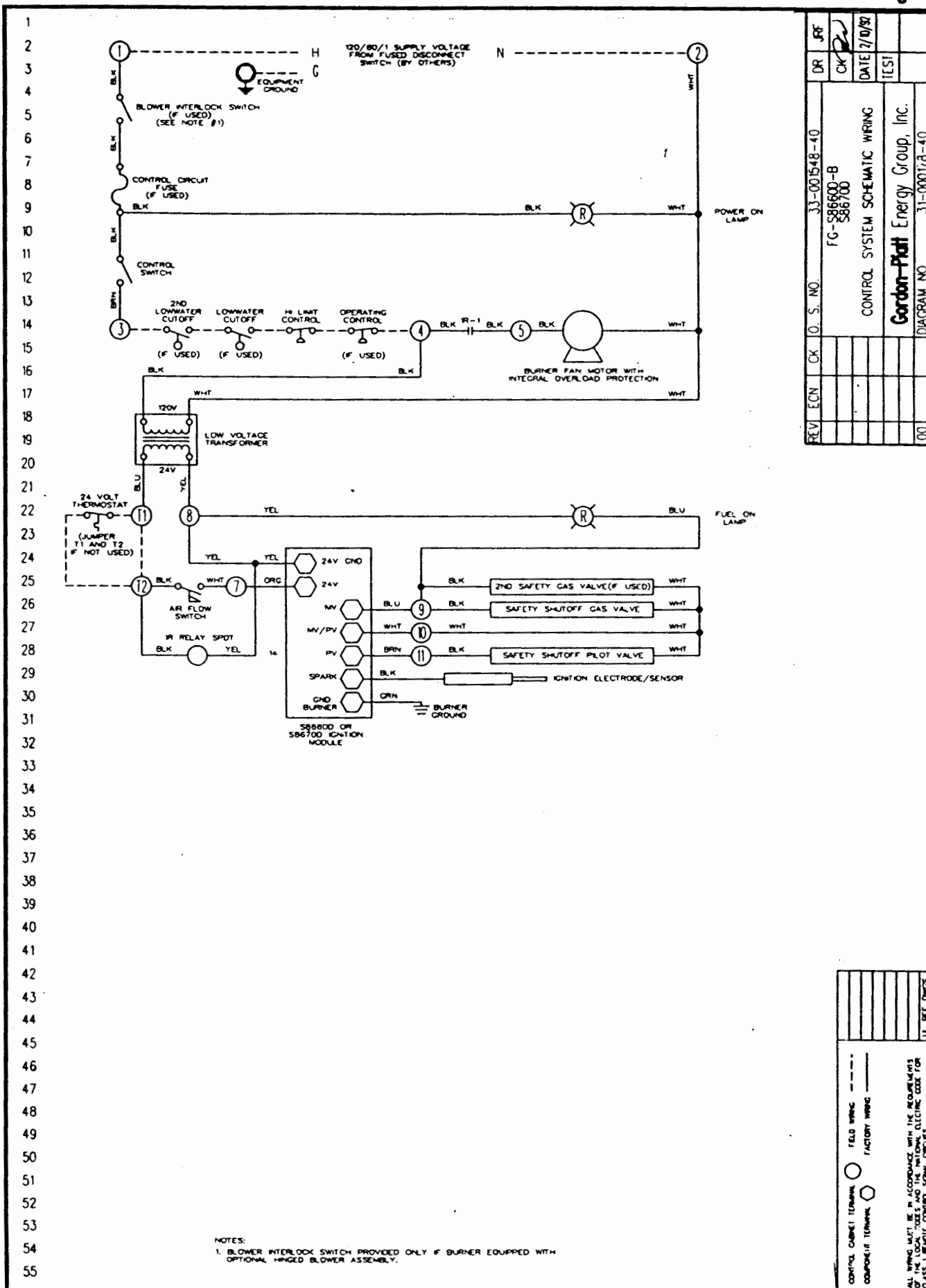
the latest revision of the American National Standard, ANSI Z223.1, and any other local codes which apply. All gas piping should be tested after installation with air pressure or inert gas of at least three times the gas pressure that will be used. The piping ahead of the main manual shutoff shall include a full size dirt pocket or trap (Figure 8).

Gas piping should be installed in accordance with



WIRING DIAGRAM

Figure 9



REV	ECN	CK	O. S. NO.	33-001548-40
				FG-586600-B
				586700
DR	JRF	CK	DATE	7/10/92
			TEST	
CONTROL SYSTEM SCHEMATIC WIRING				
Gordon-Flat Energy Group, Inc.				
			DIAGRAM NO.	31-000173-40

WIRING DIAGRAM

NOTES:
1. BLOWER INTERLOCK SWITCH PROVIDED ONLY IF BURNER EQUIPPED WITH OPTIONAL HINGED BLOWER ASSEMBLY.

CONTROL CABLE TERMINAL	FIELD WIRING
COMPONENT TERMINAL	FACTORY WIRING
ALL WIRING MUST BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL CODES AND THE NATIONAL ELECTRIC CODE FOR CLASS 1 INFINITE CONTROL SIGNAL CIRCUITS.	
UL REF DWGS	



PART IV

INSTALLATION INSTRUCTIONS

GENERAL

Check burner parts illustrated on preceding pages. The burner has been carefully checked at the factory, thus missing or damaged parts must be reported at once in order that appropriate action may be taken to replace them. Give burner model number and serial number when ordering parts.

The installation must conform with the latest revisions of local codes or, in the absence of local codes, with the Standard for the Installation of Domestic Gas Conversion Burners, ANSI Z21.8, and Addenda, Z21.8a and the National Fuel Gas Code, ANSI Z223.1.

The heat transfer surfaces of the furnace or boiler should be cleaned before the burner is mounted. Consult your local gas utility company regarding any special requirements in the preparation of the furnace or boiler.

VENTING REQUIREMENTS

Flue pipe, double acting barometric damper, draft hood, or vent should not be smaller than recommended by the furnace or boiler manufacturer, the size is typically represented by the dimension of the smoke outlet. If existing flue pipe is used, it must be cleared of all soot and other deposits.

GAS REQUIREMENTS

Maximum inlet pressure to gas train must not exceed 10.5 iwc for Natural Gas or 13 iwc for LP Gas. For maximum capacity, natural gas minimum supply pressure must be 7.5 iwc for G8 and G6 models, 5.5 iwc for G4 and G4.9 models. Lower pressures required for reduced inputs, consult factory. Minimum pressures tested were 3.5 iwc Natural and 8.0 iwc LP.

COMBUSTION AIR SUPPLY

The boiler room in which the burner is located must be provided with an adequate fresh air supply to assure proper combustion. The American National Standard ANSI Z223.1 specifies that a

permanent opening or openings having a total free area of not less than one square inch per 5,000 BTU per hour total input rating of all appliances shall be required.

WIRING

The burner is prewired at the factory as far as practical. Refer to burner wiring diagram Figure 9 for complete wiring information and study thoroughly before making any connections. Make sure all connections on the flame safeguard are tight as they may have been loosened during shipment.

Power to the burner must be 120 volts. All wiring, including electrical ground, must be done in accordance with Local Code requirements or, in the absence of local codes, with the latest revision of the National Electric Code, ANSI/NFPA 70. Burner electric power should be provided from a separate fused disconnect switch located in the Boiler Room.

BURNER GASKET

Attach a rope gasket or sheet gasket to the burner mounting flange to prevent leakage or combustion gases from the boiler firebox.

BURNER MOUNTING

Attach burner to the boiler frontplate by firmly tightening nuts on the mounting studs or clamps so that a rigid installation is accomplished. Make sure burner is level before tightening clamps. Support burner housing to base or floor. Provide adequate clearances for servicing and proper operation of the burner.



SUGGESTED INSTALLATION INSPECTION CHECKLIST

CHECK WHEN COMPLETED

GENERAL

- Is burner installed in accordance with applicable installation drawings?
- If a refractory combustion chamber is part of the installation, is it completely dry, cured, and ready for firing at full boiler input?
- Is the electrical voltage connected to the burner control cabinet 120 volt, 60 cycle, single phase?
- Has the burner wiring been checked for completeness and accuracy?
- Are the boiler mounted limit and operating controls such as low water cutoffs, high limit controls, etc., properly installed and wired?
- Is the boiler water supply, including feed pumps, properly connected and is boiler filled with water?
- Is sufficient load connected to the boiler so that it can be fired continuously at full rating without endangering personnel or equipment?
- If the installation is a hot water boiler, have the circulating pumps been completely installed, wired and tested to assure proper operation so that the burner can be fired continuously at full rating?
- For new boiler installations, has the boiler been boiled out in accordance with the boiler manufacturer's instructions?
- Have the boiler breeching connections to the stack been completed and are they open and unobstructed?
- Is draft control equipment required and, if so, installed?
- Have adequate provisions for combustion air been installed?
- Have the persons listed below been notified of the burner start-up date?
 - Owner's Representative
 - Mechanical Contractor's Representative
 - Electrical Contractor's Representative
 - Service Organization's Representative
 - Boiler Manufacturer's Representative
 - Gas Utility Co. or Inspector

- Is all specified auxiliary equipment mounted and wired? This may include outdoor temperature controls, space thermostats, water flow switches, motorized combustion air louvers, etc.?

GAS FIRE

- Has piping into building, meter and service regulator been installed, tested and ready for service?
- Are all gas train components installed and have they been properly selected, sized and assembled?
- Have properly sized vent lines been installed on all gas train components which require venting? This includes such items as pressure regulators, normally open vent valves, diaphragm valves, low and high gas pressure switches, etc.
- Have gas train piping and components been tested and proven gas tight?



The burner and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig.

The burner must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig.

- Have the gas lines been purged?
- Is the proper gas pressure available at the inlet to the controls? Maximum 0.50 psig.



PART V

BURNER ADJUSTMENT

FACTORY ADJUSTMENTS - The burner is not adjusted at the factory and must be set to meet your firing conditions. See Table 3, 4, 5 or 6 for suggested settings. These settings are acceptable for initial start-up, however, final adjustments should be based upon carefully conducted combustion testing of O_2 , CO_2 , CO and stack temperature.

FIELD ADJUSTMENTS - Illustrations which follow show the items which are subject to adjustment. Determine the applicability of each illustration to your burner, then proceed to familiarize yourself with how the item functions. Where a setting is indicated, verify the setting or make preliminary adjustments to facilitate initial start-up.

BURNER AIR AND FUEL ADJUSTMENTS

Figure 11

ADJUSTMENT OF AIR INLET SHUTTER

DESCRIPTION:

This system uses an air shutter to control the flow of combustion air and operates in a fixed position.

G4.9

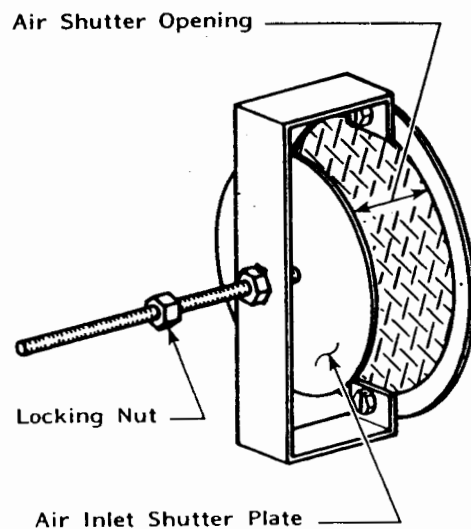
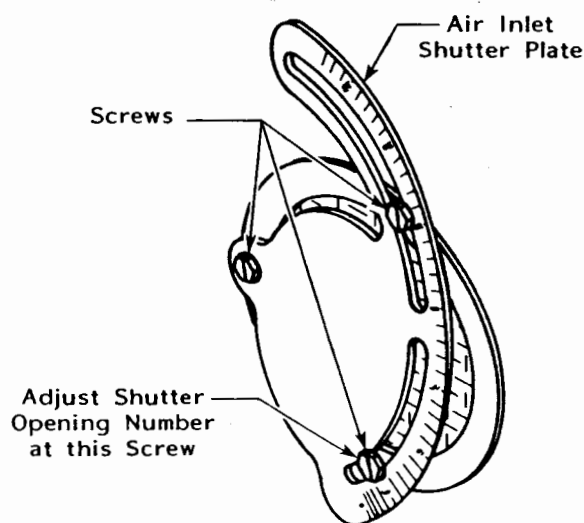
ADJUSTMENT PROCEDURE:

1. Loosen screws.
2. Turn air shutter plate clockwise to increase air flow or counter clockwise to decrease air flow.
3. Set to desired position & lock in place with the locking nut.

G4, G6 & G8

ADJUSTMENT PROCEDURE:

1. Loosen locking nut.
2. Turn air shutter plate counter clockwise to increase air flow or clockwise to decrease air flow.
3. Set to desired position and lock in place with the locking nut.





ADJUSTMENT OF MAIN GAS PRESSURE REGULATOR

DESCRIPTION:

Two types of main gas trains are supplied, one is a combination valve and regulator, the other is a separate valve and separate regulator.

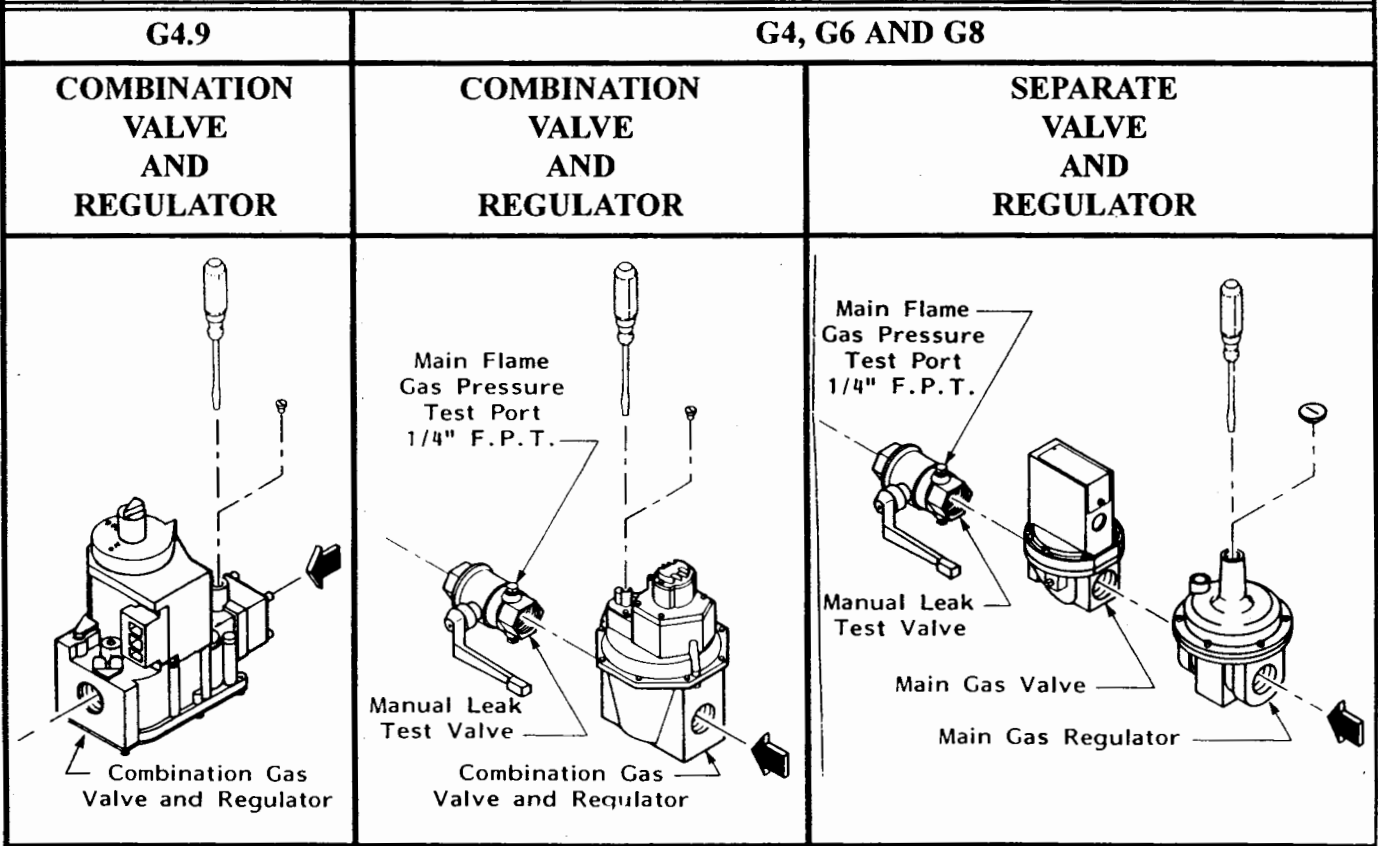
Gas flow rate is controlled by the regulator. The tension on the regulator spring must be adjusted to obtain the exact outlet gas pressure required.

ADJUSTMENT PROCEDURE: See manufacturer's instructions for detailed procedures.

1. For initial start-up, determine set pressure as specified in Table 3, 4, 5 or 6 for appropriate firing rate & fire box pressure.
2. Connect "U" tube water manometer to 1/4" F.P.T. pressure tap of burner manual leak test valve or outlet pressure tap of combination gas valve.
3. Remove regulator adjustment screw cap.
4. With screwdriver, rotate adjustment screw "clockwise" to increase or "counterclockwise" to decrease pressure.
5. Replace regulator adjustment screw cap.
6. Disconnect manometer and plug pressure tap.

NOTE

Pressure at which gas will be delivered to the burner cannot be determined without gas flowing through the regulator. Be prepared to adjust the regulator as the burner is test fired.





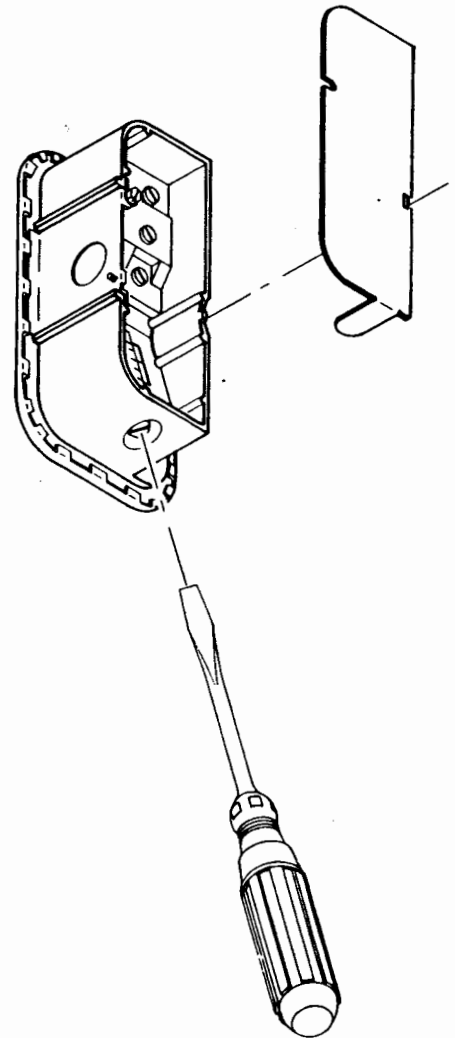
ADJUSTMENT OF AIR FLOW SWITCH

DESCRIPTION:

The air flow switch is used to prove the flow of combustion air from the blower assembly. It causes the fuel valve to close or fail to open upon loss of or inadequate combustion air.

ADJUSTMENT PROCEDURE:

1. Switches should be set to break (open) when combustion air is substantially reduced.
2. If applicable, remove cover to adjusting screw.
3. Turn adjusting screw clockwise to increase set point or counterclockwise to decrease set point.





MBh FIRING RATE	FIREBOX PRESSURE iwc																													
	-.10						0						+.25						+.50						+.75					
	SHUTTER OPENING (inches)	MANIFOLD GAS PRESSURE iwc	PILOT GAS PRESSURE iwc	MAIN GAS ORIFICE I.D.	PILOT GAS ORIFICE I.D.		SHUTTER OPENING (inches)	MANIFOLD GAS PRESSURE iwc	PILOT GAS PRESSURE iwc	MAIN GAS ORIFICE I.D.	PILOT GAS ORIFICE I.D.		SHUTTER OPENING (inches)	MANIFOLD GAS PRESSURE iwc	PILOT GAS PRESSURE iwc	MAIN GAS ORIFICE I.D.	PILOT GAS ORIFICE I.D.		SHUTTER OPENING (inches)	MANIFOLD GAS PRESSURE iwc	PILOT GAS PRESSURE iwc	MAIN GAS ORIFICE I.D.	PILOT GAS ORIFICE I.D.		SHUTTER OPENING (inches)	MANIFOLD GAS PRESSURE iwc	PILOT GAS PRESSURE iwc	MAIN GAS ORIFICE I.D.	PILOT GAS ORIFICE I.D.	
AIR DIFFUSER P/N 915006-3900 3 1/4 INCHES O.D.																														
400	3/16	2.4	2.2	1/2	.094	3/16	2.5	2.2	1/2	.094	1/4	2.8	2.4	1/2	.094	1/4	2.8	2.4	1/2	.094	1/4	2.8	2.4	1/2	.094	1/4	2.8	2.4	1/2	.094
450	3/16	3.0	2.2	1/2	.094	1/4	3.0	2.4	1/2	.094	5/16	3.0	2.5	1/2	.094	3/8	3.0	2.7	1/2	.094	3/8	3.0	2.7	1/2	.094	3/8	3.0	2.7	1/2	.094
500	5/16	3.3	2.5	1/2	.094	1/2	3.0	2.5	OT	.106	1/2	3.0	2.5	OT	.106	5/8	2.9	2.6	OT	.106	5/8	2.9	2.6	OT	.106	5/8	2.9	2.6	OT	.106
550	5/8	3.0	2.6	OT	.106	13/16	3.2	2.8	OT	.106	1.0	3.4	2.5	OT	.125	1 1/2	3.6	2.5	OT	.125	1 1/2	3.6	2.5	OT	.125	1 1/2	3.6	2.5	OT	.125
600	1 1/2	3.7	2.5	OT	.125	1 1/2	3.6	2.6	OT	.125	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

G6 Table of Suggested Settings

Table 1

MBh FIRING RATE	FIREBOX PRESSURE iwc																													
	-.10						0						+.25						+.50						+.75					
	SHUTTER OPENING (inches)	MANIFOLD GAS PRESSURE iwc	PILOT GAS PRESSURE iwc	MAIN GAS ORIFICE I.D.	PILOT GAS ORIFICE I.D.		SHUTTER OPENING (inches)	MANIFOLD GAS PRESSURE iwc	PILOT GAS PRESSURE iwc	MAIN GAS ORIFICE I.D.	PILOT GAS ORIFICE I.D.		SHUTTER OPENING (inches)	MANIFOLD GAS PRESSURE iwc	PILOT GAS PRESSURE iwc	MAIN GAS ORIFICE I.D.	PILOT GAS ORIFICE I.D.		SHUTTER OPENING (inches)	MANIFOLD GAS PRESSURE iwc	PILOT GAS PRESSURE iwc	MAIN GAS ORIFICE I.D.	PILOT GAS ORIFICE I.D.		SHUTTER OPENING (inches)	MANIFOLD GAS PRESSURE iwc	PILOT GAS PRESSURE iwc	MAIN GAS ORIFICE I.D.	PILOT GAS ORIFICE I.D.	
AIR DIFFUSER P/N 915006-4000 5 13/16 INCHES O.D.																														
500	--	--	--	--	--	5/16	3.5	2.4	5/8	.106	7/16	3.8	2.5	5/8	.106	1/2	2.9	2.5	13/16	.106	11/16	3.3	2.5	13/16	.106	11/16	3.3	2.5	13/16	.106
550	3/8	3.7	2.4	5/8	.106	1/2	3.3	2.5	13/16	.106	11/16	3.3	2.6	13/16	.106	13/16	3.4	2.5	13/16	.106	--	--	--	--	--	--	--	--	--	--
600	5/8	3.3	2.5	13/16	.106	1 1/8	3.9	3.0	13/16	.106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
650	1 1/8	3.7	3.0	13/16	.106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
AIR DIFFUSER P/N 915006-0406 5 9/16 INCHES O.D.																														
600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5/16	3.7	2.3	5/8	.094	3/8	2.2	2.5	OT	.094	3/8	2.2	2.5	OT	.094
650	--	--	--	--	--	5/16	3.7	2.8	5/8	.094	3/8	2.3	2.5	OT	.094	7/16	2.5	2.6	OT	.094	1/2	2.7	2.7	OT	.094	1/2	2.7	2.7	OT	.094
700	3/8	2.3	2.5	OT	.094	7/16	2.3	2.6	OT	.094	1/2	2.6	2.7	OT	.094	5/8	2.8	2.2	OT	.106	13/16	3.1	2.4	OT	.106	13/16	3.1	2.4	OT	.106
750	1/2	2.5	2.7	OT	.094	1/2	2.6	2.7	OT	.094	11/16	3.0	2.3	OT	.106	7/8	3.2	2.4	OT	.106	1 3/8	3.5	2.5	OT	.106	1 3/8	3.5	2.5	OT	.106
800	5/8	2.8	2.2	OT	.106	11/16	3.0	2.3	OT	.106	13/16	3.4	2.7	OT	.106	1 7/16	3.6	2.6	OT	.106	--	--	--	--	--	--	--	--	--	--
850	13/16	3.2	2.5	OT	.106	1 3/8	3.5	2.5	OT	.106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
900	2 1/16	4.3	2.8	OT	.106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
AIR DIFFUSER P/N 915006-0404 5 5/16 INCHES O.D.																														
700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1/2	3.1	3.0	13/16	.081	1/2	3.1	3.0	13/16	.081
750	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7/16	3.1	2.7	13/16	.081	11/16	2.4	2.6	OT	.094	11/16	2.4	2.6	OT	.094
800	--	--	--	--	--	3/8	2.9	2.6	13/16	.081	1/2	3.2	3.0	13/16	.081	5/8	3.5	2.5	13/16	.094	3/4	2.7	2.7	OT	.094	3/4	2.7	2.7	OT	.094
850	7/16	3.2	2.7	13/16	.081	1/2	3.4	3.0	13/16	.081	5/8	3.7	2.5	13/16	.094	3/4	2.8	2.7	OT	.094	7/8	3.0	2.9	OT	.094	7/8	3.0	2.9	OT	.094
900	9/16	3.6	2.4	13/16	.094	5/8	3.9	2.5	13/16	.094	3/4	2.8	2.7	OT	.094	1.0	3.2	2.3	OT	.106	1 1/4	3.4	2.6	OT	.106	1 1/4	3.4	2.6	OT	.106
950	11/16	2.8	2.6	OT	.094	13/16	2.9	2.7	OT	.094	15/16	3.1	2.9	OT	.094	1 7/16	3.5	2.8	OT	.106	1 15/16	3.7	3.0	OT	.106	1 15/16	3.7	3.0	OT	.106
1000	7/8	3.1	2.9	OT	.094	15/16	3.2	2.9	OT	.094	1 3/8	3.5	2.7	OT	.106	2 1/16	3.9	3.1	OT	.106	--	--	--	--	--	--	--	--	--	--
1050	1 1/8	3.4	2.5	OT	.106	1 3/8	3.6	2.7	OT	.106	2 1/16	3.9	3.1	OT	.106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1100	1 9/16	3.7	2.8	OT	.106	2 1/16	3.9	3.1	OT	.106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1150	2.0	4.0	3.0	OT	.106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Top pilot air inlet uses plug P/N 230610-0001 and bottom inlet Open Tube.

NOTE

1. Maximum capacities and air shutter settings are based on 2,000 ft. altitude and 1,000 BTU per cubic foot natural gas at .60 sp. gravity /2500 BTU/cu. ft., 1.55 sp. gravity propane gas.
2. Burner models are suffixed with G for Gas, 03 for 1/3 hp motors, flame safeguard model/ignition module, and gas system. Example: G4-G-03-S8660D-B
3. Pilot gas pressure measured at outlet of pilot valve.
4. Dimensions and pressures given in above table are for reference only. Actual settings must be determined at time of burner start-up by fully trained and qualified personnel.

ABBREVIATIONS: iwc = Inches Water Column, O.T. = Open Tube, NA = Not Applicable.



PART VI BURNER START-UP

CAUTION

Burner start-up, adjustment and service must be done by fully trained and qualified personnel.

A representative of the owner or the operator of the equipment should be present to receive instruction in care and adjustment of the unit. Upon completion of the initial start-up, he should sign the start-up form acknowledging that instruction has been received and a date established for start of free service period, if provided.

Proper combustion adjustments involve setting the fuel input rate and the combustion air to achieve maximum practical efficiency. The gas input is adjusted by regulating the main gas pressure regulator (Fig. 13).

The operator should become familiar with the location and purpose of all controls covering the burner's operation. Schematic wiring diagrams and identification photographs in this manual show the most important valves, instruments and electrical controls which regulate the burner operation.

CAUTION

Examine the material list, wiring diagram and other information supplied with your burner.

BEFORE START-UP

1. **VOLTAGE CHECK - 115 VOLT MOTOR & 120 VOLT CONTROLS** - With burner control switch OFF turn on burner power at disconnect switch or breaker. Check voltage with meter between terminals 1 and 2. If voltage is not within +10% -15% of 120 volts, contact local utility.

2. **CALL FOR HEAT** - Operating and limit controls must be calling for burner operation. These controls may include the low water cut off, steam pressure or hot water temperature controls, end switch on automatic draft control combustion air damper switch and other remote switches or controls, if used.
3. **PURGE GAS LINE** -

CAUTION

Purging of gas lines must be done in accordance with American National Standard, ANSI Z223.1.

4. **LUBRICATION** - If blower motor is equipped with lubrication devices, add (2) drops of SAE20 lubricating oil to each bearing.
5. **AIR INLET SHUTTER** - Adjust air inlet shutter to position indicated in Table 3, 4, 5 or 6 for firing rate of your burner.

NOTE

In order to determine which table of settings applies to your burner, you must know the burner model, firing rate, air diffuser part number, which can be obtained from the order entry form and material list, and firebox pressure. If the firebox pressure is unknown an approximate value can be obtained by measuring the firebox pressure during the burner prepurge cycle, with a "U" tube water manometer.



- A. Burner input (CFH Gas)
- B. Percent CO₂ or O₂
- C. CO indication
- D. Stack Temperature
- E. Firebox Pressure (iwc)
- F. Fuel Pressure (iwc - Gas) (main and pilot)
- G. Voltage to burner

9. Give instruction to owner (operator).

WARNING

"Should overheating occur: (1) Shut off the manual gas control(s) to the burner, (2) Do Not shut off the control switch to the pump or blower."



PERIODIC TESTING RECOMMENDED CHECK LIST

ITEM	FREQUENCY	ACCOMPLISHED	REMARKS
Check burner and boiler control linkage	Daily	Operator	Make visual inspection
Check fuel system for leaks	Daily	Operator	Make inspection visually and with leak detection instrumentation
Gauges, monitors and indicators	Daily	Operator	Make visual inspection and record readings in log
Oil pump inlet vacuum	Daily	Operator	Make visual inspection and record readings in log
Oil pressure at pump, burner, and/or regulating valve	Daily	Operator	Make visual inspection and record readings in log
Instrument and equipment settings	Daily	Operator	Make visual check against recommended specifications
Check burner flame	Daily	Operator	Visual inspection for changes
Firing rate control	Weekly Semiannually Annually	Operator Service technician Service technician	Verify factory settings Verify factory settings Check with combustion test
Stack temperature	Daily	Operator	Record in log
Flue, vent, stack or outlet dampers	Monthly	Operator	Make visual inspection of linkage, check for proper operation
Igniter	Weekly	Operator	Make visual inspection, check flame signal strength if meterfitted (see "Combustion safety controls")
Oil nozzle(s) and Strainers	Semiannually	Operator	Check for dirt and wear
Fuel Valves			
Pilot and main	Weekly	Operator	Open limit switch - make aural and visual check - check valve position indicators and check fuel meters if so fitted
Pilot and main gas or main oil	Annually	Service technician	Perform leakage tests - refer to instructions
Combustion safety controls			
Flame failure	Weekly	Operator	Close manual fuel supply for (1) pilot, (2) main fuel cock, and/or valve(s); check safety shutdown timing; log
Flame signal strength	Weekly	Operator	If flame signal meter installed, read and log; for both pilot and main flames, notify service organization if readings are very high, very low, or fluctuating; refer to instructions
Pilot turndown tests	As required/annually	Service technician	Required after any adjustments to flame scanner mount or pilot burner verify annually-refer to instructions
Refractory hold in	As required/annually	Service technician	See "Pilot turndown tests"



TROUBLE	PROBABLE CAUSE	ACTION
Blower Motor does not operate when switch is closed.	Power disconnected	Check voltage between terminals 1 & 2. If no voltage, check power supply, 120 volt, 60 hertz.
	Operating control not calling for heat or high limit control open.	Check voltage between terminals 2 & 3, 2 & 4 or T2 & 2. If no voltage, check for open operating, limit control or thermostat.
	Overload tripped out on motor.	Reset. Check motor current for possible overload.
	Defective motor.	If voltage at motor terminals is correct, replace motor.
Motor runs but ignition spark does not occur.	Air flow switch fails to make.	Adjust per instruction manual. See Figure 15.
	Ignition cable or electrode loose or grounded.	Check to insure that ignition cable is securely plugged into electrode. Check cable and clean if necessary. Remove and check electrode insulator for cracks.
	Low voltage control Transformer defective	Check for 24 volts on flame safeguard/ignition module. Replace transformer if required.
	Defective flame safeguard-ignition module	Replace flame safeguard/ ignition module.
Motor runs, ignition spark occurs, but gas pilot does not ignite	No gas being supplied to pilot.	Check all manual gas valves leading to burner to insure that they are open or that separate manual pilot valve is open. Pilot orifice plugged, clean.
	Pilot gas valve does not open.	Check for 24 volt to coil on trial for ignition. Check valve action by sound and feel. Replace coil or valve body as needed. If no voltage to coil, replace the flame safeguard control.
	Improper pilot air supply - Should be between .25 to .40 iwc on pilot line during prepurge.	Adjust air shutter / Check pilot air inlet tubes.
Motor runs, gas pilot establishes, pilot flame does not prove	Improper gas flow	Increase or decrease gas pressure to pilot.
	Flame sensor dirty/scaled.	Clean/descale or replace sensor rod.
	Defective flame safeguard-ignition module.	Replace module.
<p>Motor runs, gas pilot establishes, main gas flame does not ignite.</p> <p>NOTE</p> <p>Failure to prove pilot by indication of fuel on light within 2 seconds may indicate poor flame signal.</p> <p>See Ignition Module manual for instructions or See Flame Sensor Circuit section.</p>	Manual valve(s) not in proper position.	Turn to On or Open position.
	Main Gas Valve does not open.	Check for 24 volt to coil of main gas valve. Check valve action by sound and feel. Replace coil or valve body as needed. If no voltage to coil, replace the flame safeguard module.
	Excessive air to fuel ratio.	If gas flow rate is less than 50% of rated capacity, increase gas pressure or decrease air inlet shutter.
	Manifold gas pressure low.	Adjust pressure regulator to value shown on burner material list or Table 3, 4, 5 or 6.
		Inlet pressure to combination gas control or main shutoff cock too low. If it is , consult your local gas utility company,
		See material list or Table 3, 4, 5 or 6 for proper size.
Lockout on flame failure.	Interrupted fuel supply.	Establish fuel supply to burner.
	Improper combustion.	Adjust burner to obtain a clean flame.
	Weak flame signal.	Refer to flame safeguard control manufacturer's bulletin. Adjust pilot if necessary.
Carbon Monoxide (CO) formation	Flame impingement on cold surface due to excessive firing rate.	Check gas flow rate. Adjust flow rate, if necessary. Check gas orifice size versus burner material list.
Check CO with reliable instrument. Be certain to check for CO before leaving burner location.	Flame impingement on a cold surface due to undersized chamber.	See Specification Table.
	Insufficient combustion air.	Increase air shutter opening or decrease gas pressure.



Typical
Model
G4, G6 or G8 Burner

① Combustor (Size 8 Only)

② Combustion Head & Panel
Mounting Bracket Assembly

③ Control Panel

④ Control Panel Cover

⑤ Air Flow Switch

⑥ Combination
Pilot Gas
Valve (Optional)

⑦ Pilot Gas Train
■ Pilot Gas Valve
■ Mounting Bracket
■ Pilot Regulator

⑧ Inlet Gas Orifice

⑨ Manual Leak Test Valve

⑩ Main Gas Valve

⑪ Main Gas Regulator

⑫ Combination Main
Gas Valve and Regulator
(Optional)

⑬ Manual Shutoff Valve

⑭ Diffuser

⑮ Gas Manifold Assembly

⑯ Pilot Gas Orifice

⑰ Pilot Air Pickup
Tube Plug (If Required)

⑱ Copper Gasket

⑲ Pilot Ignition Electrode/
Sensor Assembly

⑳ Electrode Locking Nut

㉑ Blower Mounting Plate

㉒ Air Inlet Shutter Bracket

㉓ Air Inlet Shutter

㉔ Air Inlet Guard

㉕ Air Inlet Cone

㉖ Blower Housing

㉗ Sight Glass Assembly

㉘ Gasket

㉙ Sight Glass

㉚ Sight Glass Holder

㉛ Blower Wheel

㉜ Blower Motor Mounting Plate

㉝ Blower Motor

