G16 SERIES UNITS

I - INTRODUCTION

The G16 is a medium high efficiency non-condensing furnace. It is available in six models with three input capacities; 50,000, 75,000, and 100,000 Btuh for either natural gas or LPG use. All G16 models are available in low NO_x versions to meet nitrogen oxide requirements in California. These special G16X models meet the California emissions standards of 40 nanograms per joule in the South Coast Air Quality Management District and the San Francisco Bay Area Air Quality Management District. **G16X models are for use with natural gas only.** These units may not be converted for LPG.

All G16 model units utilize the Lennox Duracurve heat exchanger. Flue products are removed by a factory installed induced draft blower which safely vents combustion products and operates only during the on cycle. A pressure switch prevents unit operation in case of blockage of the flue outlet.

Vertical venting is achieved through either dedicated or nondedicated venting systems. All G16 furnaces must be vented in compliance with all local codes and the National Fuel Gas Codes (ANSI-Z223.1). Canadian units must comply with CAN1 B149 Installation Code.

All G16 model units use hammock type oil impregnated wraparound filter. Johnson Controls G60 electronic ignition system is used to light the pilot on each operating cycle (intermittent pilot). A protective circuit verifies pilot flame to allow main burner ignition. Both pilot and main burner are extinguished during the off cycle. If pilot fails to light, the main gas valve will not open. Pilot ignition is fully automatic and occurs only on demand for heat. Should a loss of flame occur, the main valve closes and pilot spark recurs within 0.8 second.

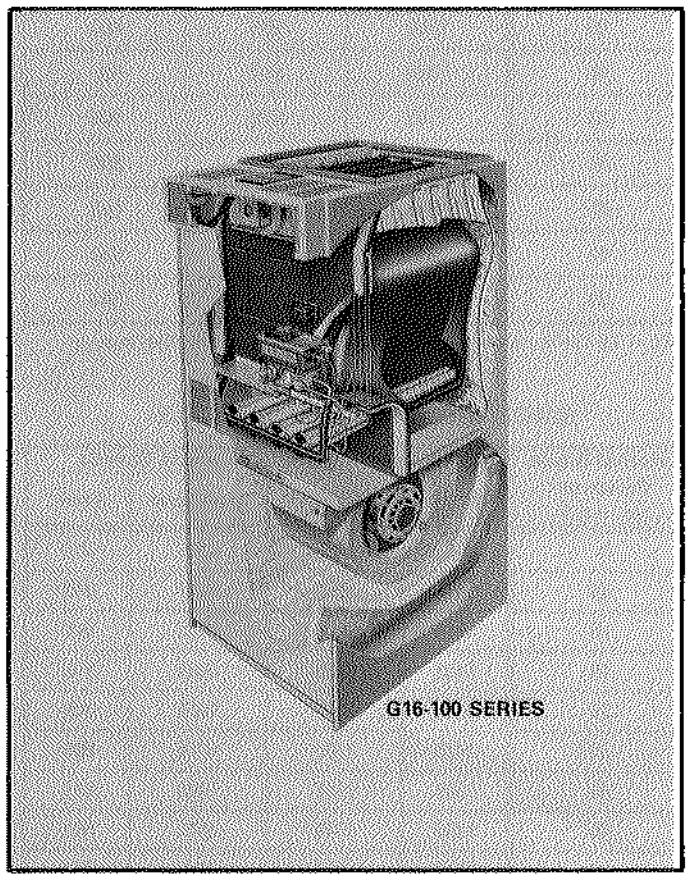


FIGURE 1

II - UNIT INFORMATION

A - Specifications

Model No.		G16Q2-50	G16Q3-50	G16Q3-75	G16Q4-75	G16Q4-100	G16Q5-100
Input Btuh		50,000	50,000	75,000	75,000	100,000	100,000
Output Btuh		41,000	41,000	61,000	61,000	81,000	81,000
†A.F.U.E.		81.0%	81.0%	80.0%	80.0%	80.1%	80.1%
Temperature rise range (°F)		35 – 65	20 – 50	35 – 65	25 – 55	35 – 65	25 – 55
High static certified by AGA (in. wg)		.50	.75	.50	.75	.50	.75
Gas piping size I.P.S. (in.) natural or LPG		1/2	1/2	1/2	1/2	1/2	1/2
Blower motor horsepower		1/4	1/3	1/3	1/2	1/2	3/4
Blower wheel nominal dia. x width (in.)		9 x 7	10 x 7	10 x 7	10 x 8	10 x 8	12 x 12
Net filter area (sq. ft.) & cut size (in.)		(5.8) 36 x 28 x 1	(5.8) 36 x 28 x 1	(5.8) 36 x 28 x 1	(6.6) 40 x 28 x 1	(8.9) 52 x 28 x 1	(8.9) 52 x 28 x 1
Tons of cooling that can be added		1, 1-1/2 or 2	2-1/2 or 3	2-1/2 or 3	3-1/2 or 4	2-1/2,3,3-1/2or4	4 or 5
Shipping weight (lbs.)		160	165	170	195	240	260
Number of packages in shipment		1	1	1	1	1	1
Electrical characteristics		120 volts – 60 hertz – 1 phase (less than 12 amps) – All Models					
Return Air Cabinet (Optional)	Model No.	RA10-16-49	RA10-16-49	RA10-16-49	RA10-16-49	RA10-16-53	RA10-16-53
	Shipping Wt. (lbs.)	54	54	54	54	56	56
*LPG Kit – Optional		LB-33151CAD (All Models)					

†Annual Fuel Utilization Efficiency based on DOE test procedures and according to FTC labeling regulations.
*LPG Kit must be ordered extra for field changeover.

B - Blower Data

G16Q2-50 BLOWER PERFORMANCE

External Static Pressure (in. wg.)	Air Volume (cfm) @ Various Speeds		
	High	Medium	Low
0	1240	980	600
.05	1225	975	602
.10	1205	975	605
.15	1185	970	605
.20	1165	970	605
.25	1140	965	600
.30	1115	955	595
.40	1060	930	580
.50	990	875	550

NOTE – All cfm is measured external to the unit with the air filter in place.

G16Q3-50 BLOWER PERFORMANCE

External Static Pressure (in. wg.)	Air Volume (cfm) @ Various Speeds			
	High	Med-High	Med-Low	Low
0	1585	1320	1100	945
.05	1575	1310	1095	940
.10	1560	1300	1087	935
.15	1535	1285	1080	930
.20	1510	1265	1070	925
.25	1480	1245	1060	920
.30	1445	1225	1045	910
.40	1380	1175	1015	890
.50	1300	1125	980	855
.60	1205	1070	905	800
.70	1080	1025	780	700

NOTE – All cfm is measured external to the unit with the air filter in place.

G16Q3-75 BLOWER PERFORMANCE

External Static Pressure (in. wg.)	Air Volume (cfm) @ Various Speeds			
	High	Med-High	Med-Low	Low
0	1560	1265	1055	910
.05	1540	1250	1047	910
.10	1510	1240	1040	907
.15	1485	1225	1030	905
.20	1455	1215	1025	900
.25	1425	1200	1015	895
.30	1395	1185	1000	885
.40	1325	1145	970	860
.50	1245	1090	925	815
.60	1130	985	830	700

NOTE – All cfm is measured external to the unit with the air filter in place.

G16Q4-75 BLOWER PERFORMANCE

External Static Pressure (in. wg.)	Air Volume (cfm) @ Various Speeds		
	High	Medium	Low
0	1815	1420	1130
.05	1790	1415	1145
.10	1765	1410	1155
.15	1740	1405	1160
.20	1715	1402	1160
.25	1680	1395	1155
.30	1655	1390	1150
.40	1590	1365	1130
.50	1500	1325	1110
.60	1355	1230	1090
.70	1165	1100	1065

NOTE – All cfm is measured external to the unit with the air filter in place.

G16Q4-100 BLOWER PERFORMANCE

External Static Pressure (in. wg.)	Air Volume (cfm) @ Various Speeds			
	High	Med-High	Med-Low	Low
0	1980	1575	1370	1080
.05	1970	1560	1355	1065
.10	1960	1550	1350	1060
.15	1940	1545	1350	1060
.20	1910	1540	1345	1060
.25	1880	1530	1345	1060
.30	1850	1520	1340	1060
.40	1780	1490	1330	1055
.50	1710	1440	1290	1040
.60	1670	1350	1230	990

NOTE – All cfm is measured external to the unit with the air filter in place.

G16Q5-100 BLOWER PERFORMANCE

External Static Pressure (in. wg.)	Air Volume (cfm) @ Various Speeds				
	High	Med-High	Medium	Med-Low	Low
0	2835	2550	2290	1945	1700
.05	2820	2535	2275	1930	1690
.10	2790	2515	2265	1910	1675
.15	2760	2495	2230	1895	1650
.20	2740	2475	2210	1875	1630
.25	2700	2450	2185	1860	1615
.30	2670	2435	2160	1840	1595
.40	2600	2390	2110	1800	1550
.50	2535	2340	2050	1750	1500
.60	2450	2280	1985	1700	1450
.70	2380	2210	1910	1645	1390
.80	2290	2130	1830	1580	1310

NOTE – All cfm is measured external to the unit with the air filter in place.

C - Field Wiring (Figure 2)

High Voltage pigtail leads are provided in the make-up area of the control box for connection to power supply. A ground lug is also provided.

Blowers have multi-tap motors wired for different heating and cooling speeds. Blower motor comes factory connected to low speed (red lead) for heating and high speed (black lead) for cooling applications. Blower speeds may be changed by using the different speed taps. Refer to Section V "Temperature Rise" for blower speed selection (Table 5).

Low Voltage connections are made at the pigtail leads in the low voltage junction box.

Wiring to be done in the field, between the furnace and devices not attached to the furnace or between separate devices which are field installed and located must conform with the temperature limitation for Type T wire 63°F (17.2°C) rise.

Accessories must never be wired through fan control since it is possible to generate approx. 180 volts. This happens when the indoor blower relay is energized and the circuit is fed through the black motor lead. The motor acts as an auto transformer and generates the higher voltage through red leg to fan control. See Figure 3. Accessories must be wired through an isolated circuit and may be interconnected to blower operation with the use of a current sensing relay or sail switch.

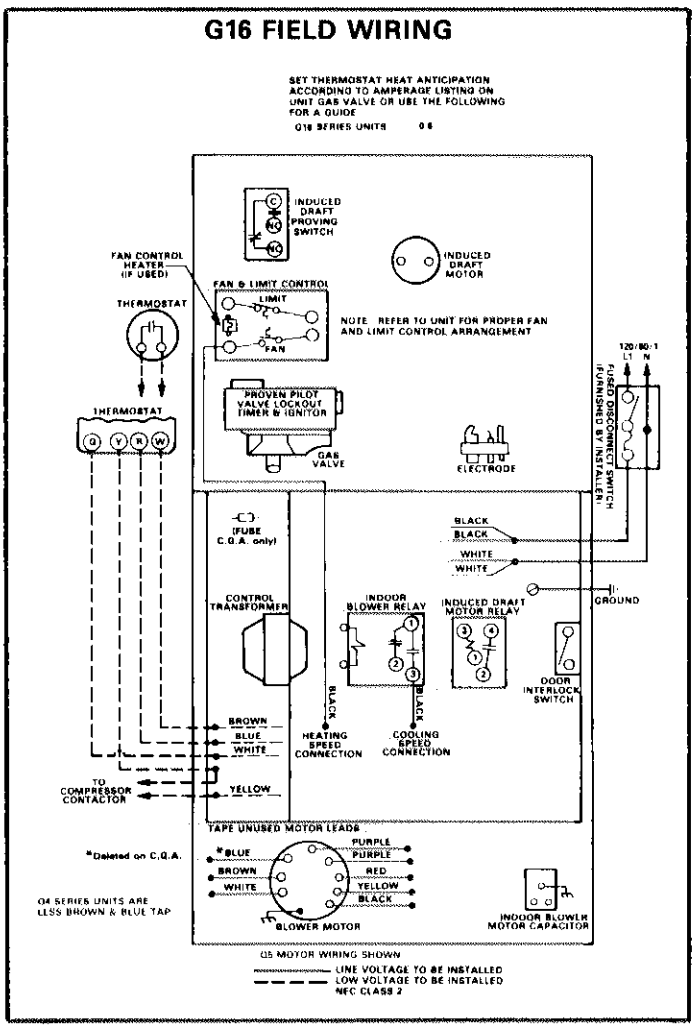


FIGURE 2

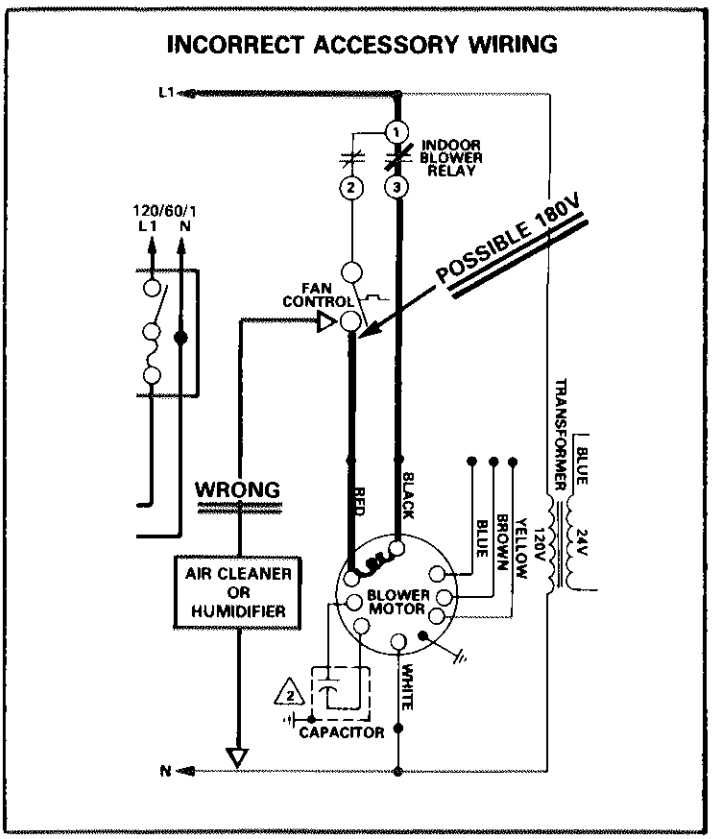


FIGURE 3

D - Gas Pressure Adjustment

Check gas line pressure with unit firing at maximum rate. A minimum of 7" w.c. ± 1" w.c. or 11" w.c. for LP gas should be maintained. After line pressure has been checked and adjusted, check regulator pressure. Correct manifold pressure for natural gas is 3.5" w.c. (89mm) + .3 or - .2" w.c. and 10.5" w.c. (267mm) ± .3" w.c. for LPG.

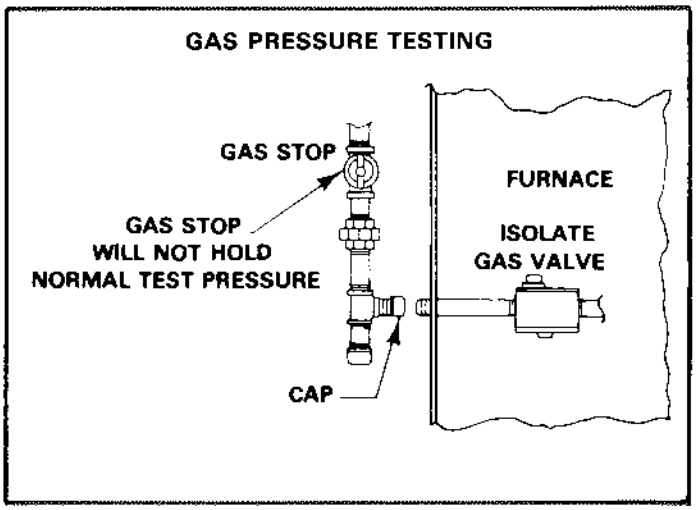


FIGURE 4

IMPORTANT - When testing pressure of gas lines, gas valve must be disconnected and isolated. Gas valves can be damaged if subjected to more than 1/2 psig (3.48 kPa).

The furnace must be isolated from the gas supply system by closing its individual manual shut-off valve during any pressure testing of the gas supply system at pressure equal to or less than 1/2 psig (3.48 kPa).

E - High Altitude Derate

Unit may be fired at full input up to 2,000 ft. (6096m) above sea level. If the heating value of the gas does not exceed values listed in Table1, derating is not required. Should the heating value of the gas exceed the table values or if unit is installed at an altitude greater than 2,000 ft. (6096m), unit must be derated. Lennox requires that derate conditions be 4% per thousand feet above sea level. Thus, at an altitude of 4,000 ft. (12,192m), if the heating value of the gas exceeds the maximum heating value of 1000 Btuh/ft³, the unit will require a 16% derate.

TABLE 1

Elevation Above Sea Level (Feet)	Maximum Heating Value Btu/ft³)
5001 — 6000	900
4001 — 5000	950
3001 — 4000	1000
2001 — 3000	1050
Sea Level — 2000	1100

III - UNIT COMPONENTS

A - Control Box

1 - **Transformer** - 30 VA, 120V primary (24 volt secondary).

2 - **Indoor Blower Relay** - Single-pole, double-throw, 24V.

3 - **Interlock Switch** - 20A 125-250VAC N.O. single-pole, single-throw switch. De-energizes main electrical supply when blower access panel is removed from unit.

4 - **Induced Draft Motor Relay** - Single-pole, single-throw, 24V. Energizes induced draft blower.

B - Parts Arrangement (Figure 5)

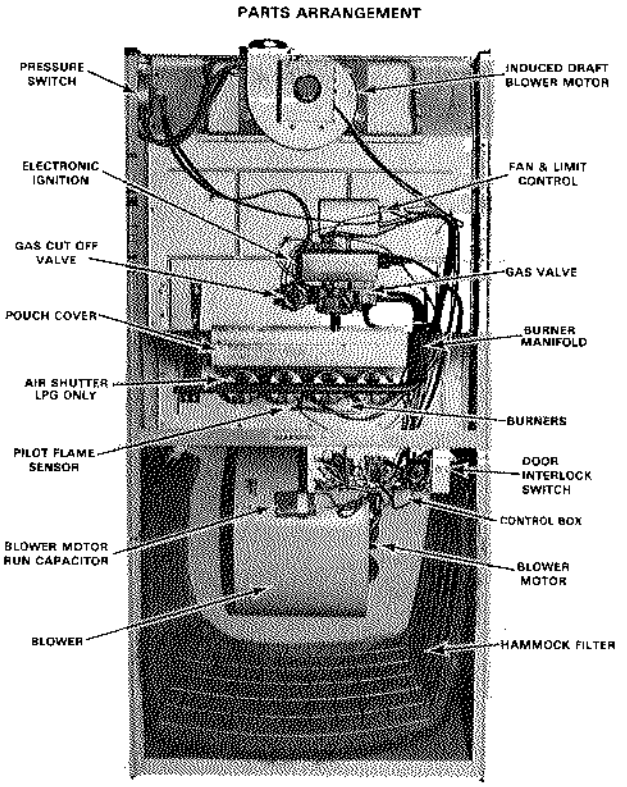


FIGURE 5

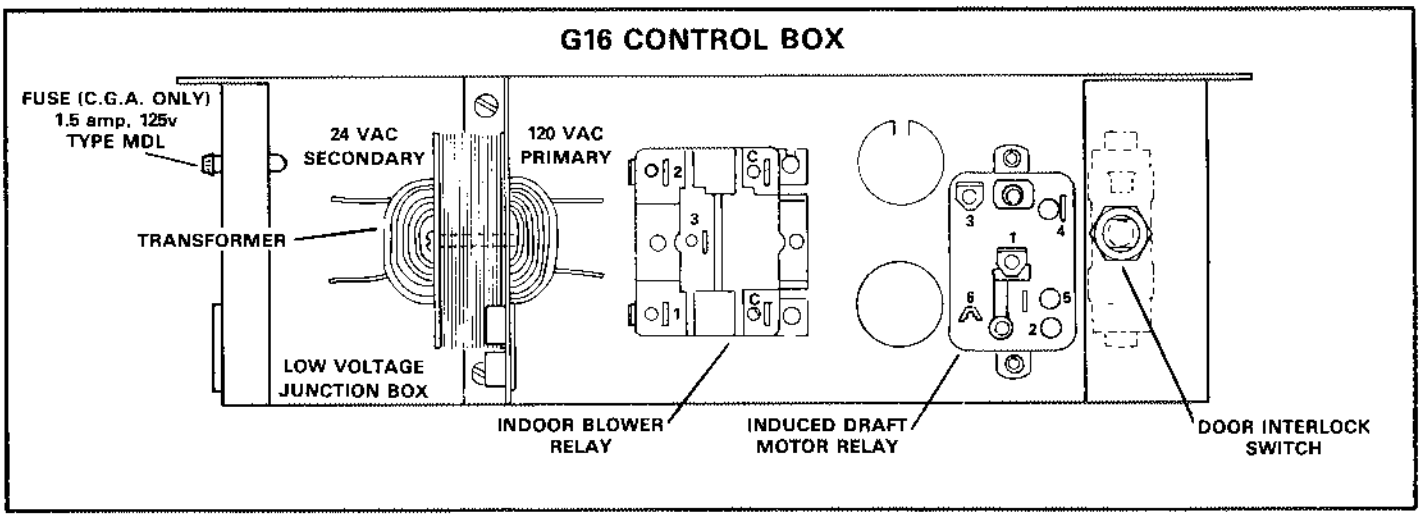


FIGURE 6

1 - Pressure Switch (Figure 7)

Single-pole, double throw snap action switch. Closes on a pressure rise at values shown in Table 2. Used as a pressure switch for the induced draft blower, preventing operation of the ignition system until the induced draft blower motor comes up to speed. Pressure switch also prevents unit operation in case of blockage of flue outlet.

TABLE 2

Model Number	A.G.A. Pressure Rating	C.G.A. Pressure Rating
G16/G16XQ2 & Q3-50	.50" w.c. ± .05" w.c.	.50 ± .05
G16/G16XQ3-75	.60" w.c. ± .05" w.c.	.60 ± .05
G16/G16XQ4-75	.70" w.c. ± .05" w.c.	----
G16/G16XQ4 & Q5-100	.70" w.c. ± .05" w.c.	.60 ± .05

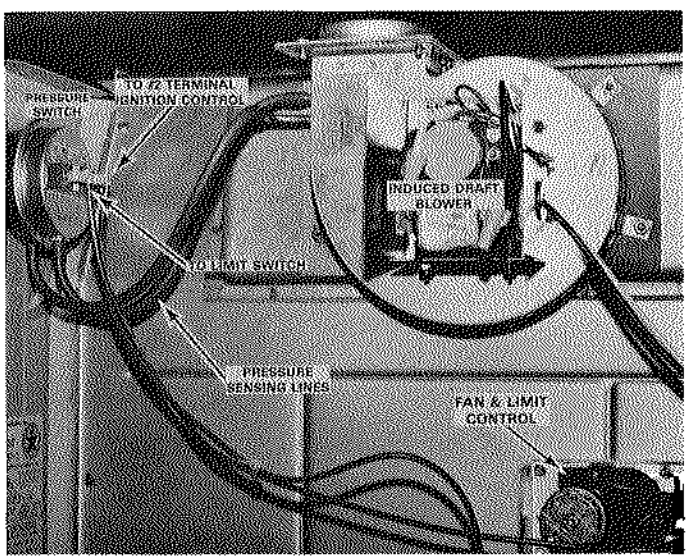


FIGURE 7

2 - Fan/Limit Control (Figure 8)

G16 series furnaces use either Camstat or Honeywell combination fan and limit control with sure start heater. Refer to Table 3 for factory fan and limit control settings. Fan control may be adjusted if necessary. **Caution: Limit control is preset at factory. Do not attempt to alter setting. On Honeywell control, hold wheel firmly when setting or changing fan settings to prevent alteration of limit setting.** Fan/limit control assures positive blower operation within 30 to 80 seconds after burner comes on.

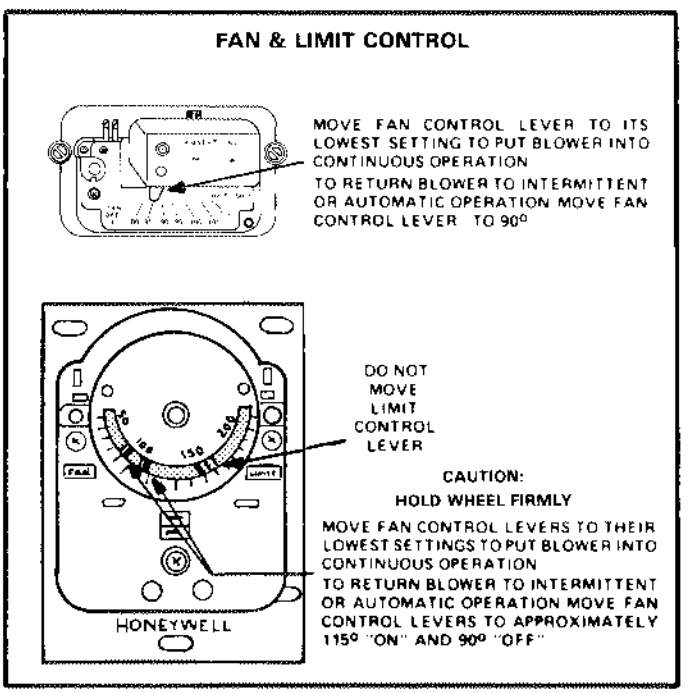


FIGURE 8

TABLE 3
FAN AND LIMIT CONTROLS

Model No.	Factory Fan Settings OFF	ON	Factory Pre-set Limit	Make
G16/G16X-Q2-50 series	80°F	120°F	170°F	Honeywell
G16/G16X-Q3-50 series	80°F	110°F	150°F	Camstat
G16/G16X-Q3-75 series	80°F	110°F	170°F	Camstat
G16/G16X-Q4-75 series	80°F	110°F	150°F	Camstat
G16/G16X-Q4-100 series	80°F	120°F	150°F	Honeywell
G16/G16X-Q5-100 series	80°F	110°F	190°F	Camstat

3 - Manual Gas Shut-Off Valve

G16 furnaces utilize Penn-Johnson electronic ignition systems and are equipped with a manual shut-off valve factory installed adjacent to the gas valve. Shut-off valve must not be moved to the gas line external to unit to satisfy local code. If codes require an external gas valve, it must be in addition to this valve.

4 - Electronic Ignition Components (Figure 9)

Individual mated components consist of pilot assembly, ignition control, and gas valve. Figure 9 shows correct pilot assembly orientation. The normal operating range is from 1.5 (minimum) to 2.5 + microamps. Ratings below .7 microamps will lockout system.

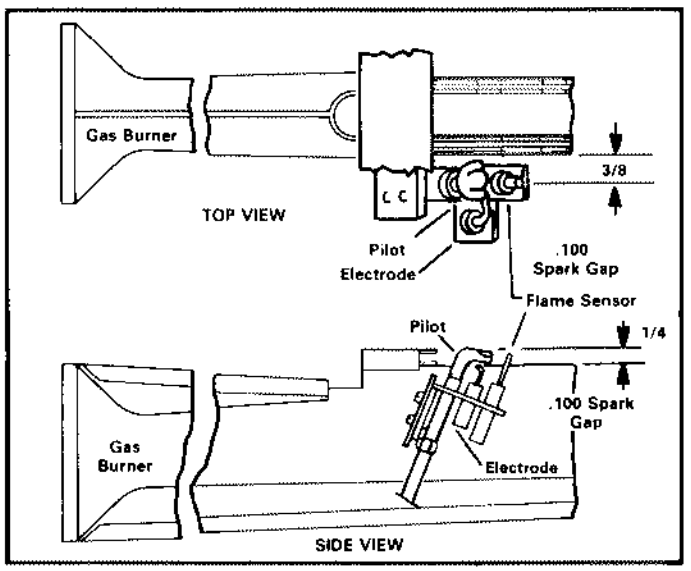


FIGURE 9

a - Pilot Assembly (Figure 10)

The Penn-Johnson electronic ignition system uses a sensing probe to verify conditions through "flame rectification" to prove pilot flame. The pilot assembly consists of pilot gas tubing, sensor, electrode and pilot hood.

Flame rectification is the property of a gas flame which permits it to act as a DC current path between two metal objects when AC voltage is applied to the flame sensor and the pilot burner tip by the G60 circuitry. Electrons are discharged alternately from the pilot tip to the flame sensor and back. More electrons will hit the pilot tip than the flame sensor since the grounding area is so much larger. The end result is a pulsating DC current flowing through the flame in one direction (flame sensor to pilot tip) which is of a much larger magnitude than that flowing in the opposite direction (pilot burner tip to flame sensor). This pulsating DC current is the only type of signal which the G60 sensing circuit will accept as proof of flame. Both the rectified DC current and current path must exist before the G60 will allow the main gas valve to open.

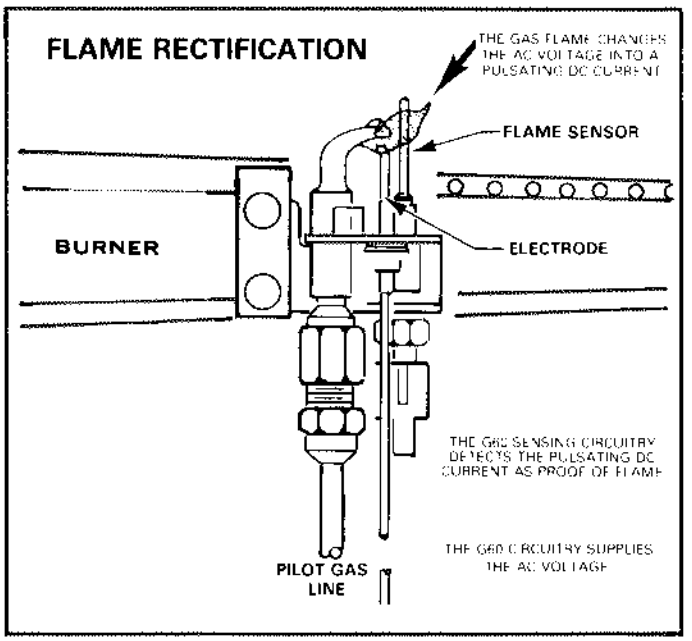


FIGURE 10

b - Ignition Control (Figure 11)

This solid state control lights the pilot during each running cycle. Main burner and pilot are extinguished during the "off" cycle. On a call for heat, the pilot valve and sparking circuit are energized. After the pilot has proven, the main gas valve is energized, spark is de-energized and main burners ignite from the pilot flame. When thermostat demand is satisfied, main gas valve and pilot gas valve are de-energized shutting off pilot and main burner gas supply. If loss of proof of flame signal occurs before thermostat is satisfied, main valve closes and spark re-occurs in 0.8 second repeating the cycle. If pilot proof of flame signal is not established at end of trial for ignition, 60-120 seconds, pilot gas valve closes, spark is de-energized and lockout occurs.

If lockout occurs, the thermostat demand must be interrupted for 30 seconds to reset control. If electrical power supply is interrupted during trial for ignition or during main burner operation, the pilot gas valve and main gas valve if open will close. Upon power restoration, normal sequence of operation will resume.

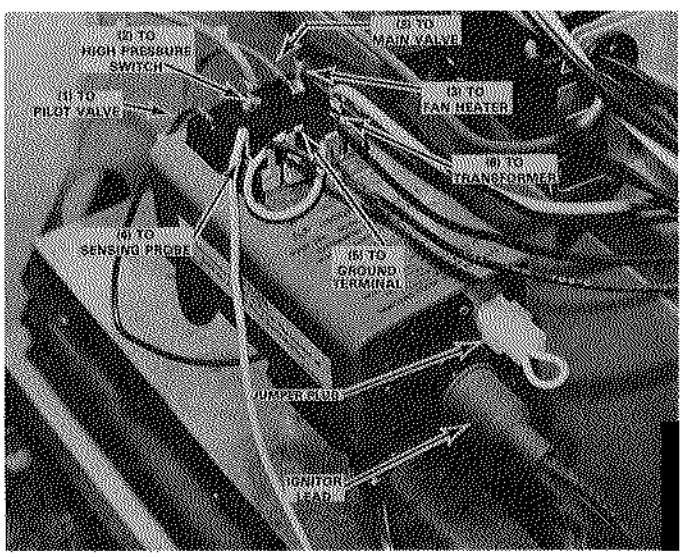


FIGURE 11

If a gas supply failure occurs during main burner operation, the flame sensor detects loss of flame and the main valve will close in 0.8 second. Pilot valve remains open and spark re-occurs. Trial for ignition occurs if gas supply is restored within 60-120 seconds and normal operating sequence resumes. After a 60-120 second trial for ignition, lockout occurs to completely shut down the system.

JOHNSON CONTROLS
G60 ELECTRONIC IGNITION SYSTEM

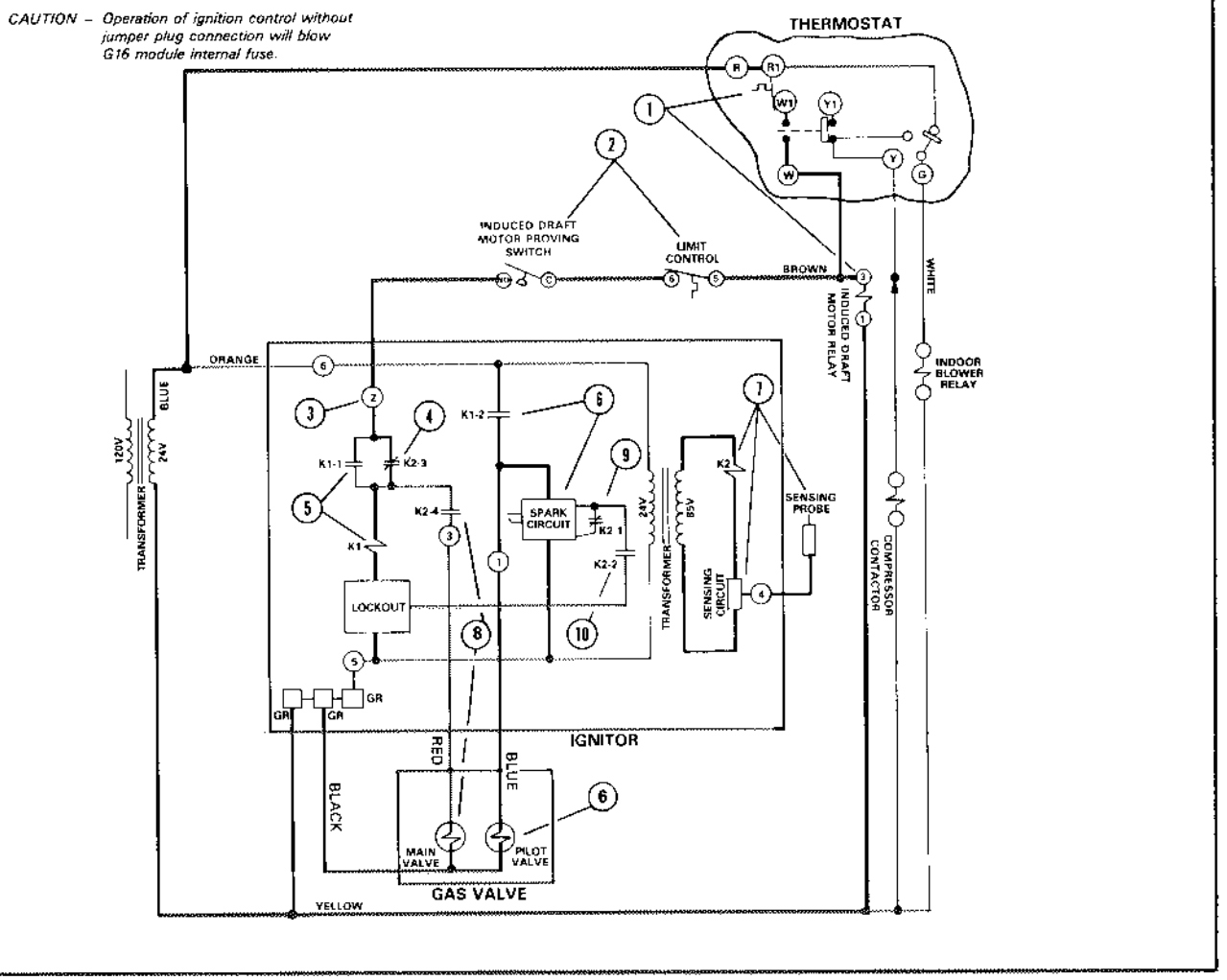


FIGURE 12

SEQUENCE OF OPERATION

1. Thermostat R to W closes on a heat demand energizing induced draft motor relay and completes circuit through:
2. Limit control and induced draft motor proving switch.
3. To power terminal 2 of G60 spark ignitor.
4. Power is fed thru K2-3 N.C. contacts.
5. K1 relay is energized to "latch in" circuit thru contacts K1-1.
6. K1-2 N.O. contacts close simultaneously to energize pilot valve and spark circuit.
7. With sparking and pilot gas flow, pilot is ignited. Sensing probe monitors pilot flame and closes the sensing circuit to power K2 relay.
8. K2-4 N.O. contacts close to energize the main gas valve. With main gas flow, pilot ignites burners to complete ignition.
9. K2-1 contacts open to terminate sparking.

NOTE - There is a bleed-off capacitor with spark circuit to keep ignitor sparking 8 to 10 seconds after the circuit opens.

10. K2-2 N.O. contacts close to prevent a system lockout. These contacts must close within 30 seconds after control is energized or system will lockout.

CAUTION: Do Not attempt to check out ignition system by manually lighting the pilot with a match. This could result in the main valve being energized immediately.

3 - Penn-Johnson Gas Valve (Figure 13)

All G16 model units utilize a 100% lockout gas valve. Gas valves are redundant incorporating 2 internal solenoids which are both energized on a heating demand. Should one solenoid stick open, the other assures gas shut-off. Natural gas to LPG conversion requires the installation of an LPG kit (part number LB-33151CAD). Manifold pressure must be adjusted from 3.5" w.c. for natural gas to 10.5" w.c. for LPG.

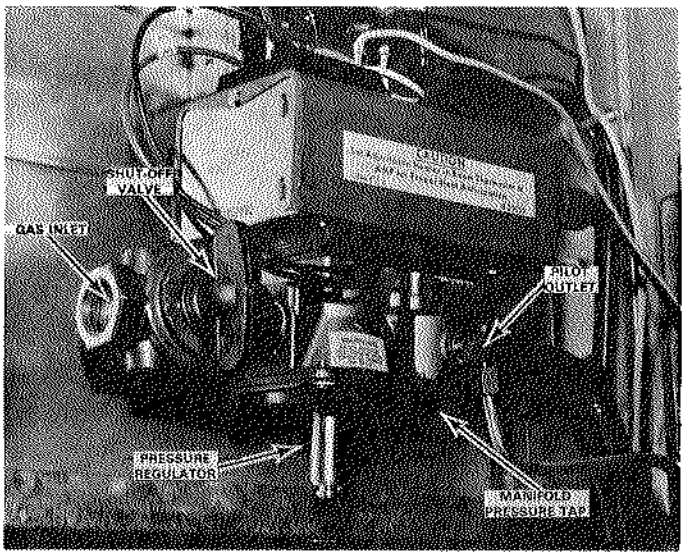


FIGURE 13

4 - Burner Assembly (Figure 14)

All G16 model units incorporate aluminized steel burners with four rows of continuous ports. A crossover ignitor, perpendicular to the main burner, carries a positive flame from burner to burner to achieve sure ignition of all burners.

NOTE: G16X series units are equipped with flame rods and are approved for use with natural gas only.

An LPG conversion kit (part number LB-33151CAD) is available for natural gas to LPG conversion. Conversion kit contains air shutter plate, LPG manifold orifice and gas valve regulator changeover components.

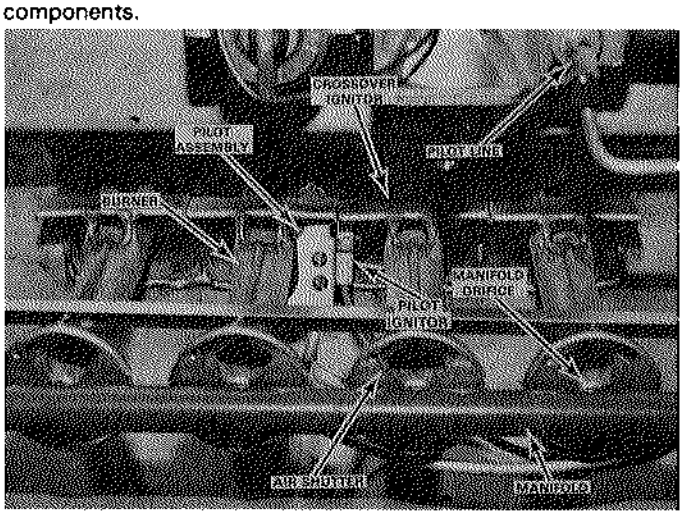


FIGURE 14

NOMINAL ORIFICE DRILL SIZE	
Natural Gas	**L.P. Gas**
#43 (0.0890")	#53 (0.0595")

TABLE 4

IV - VENTING

Venting may be achieved vertically through either dedicated or non-dedicated venting systems. All single-wall vent pipe must be sized per National Fuel Gas Code and must have all seams and joints sealed with pressure sensitive aluminum foil tape or high temperature silicone rubber sealant. All type B-1 vent pipe must be sealed at all joints.

Aluminum foil tape must meet provisions of SMACNA AFTS-100-73 standards. Lennox aluminum foil tape (part number 75F801) has a temperature rating of 400°F (204°C) and may be ordered from Lennox Parts Dept. Silicone rubber sealant must have a temperature rating of 514°F (250°C). Use Dow corning RTV-732 or equivalent.

All vent pipe passing through floors, ceilings and walls must be fire-stopped according to the requirements of the National Fuel Gas Code (ANSI-Z223.1).

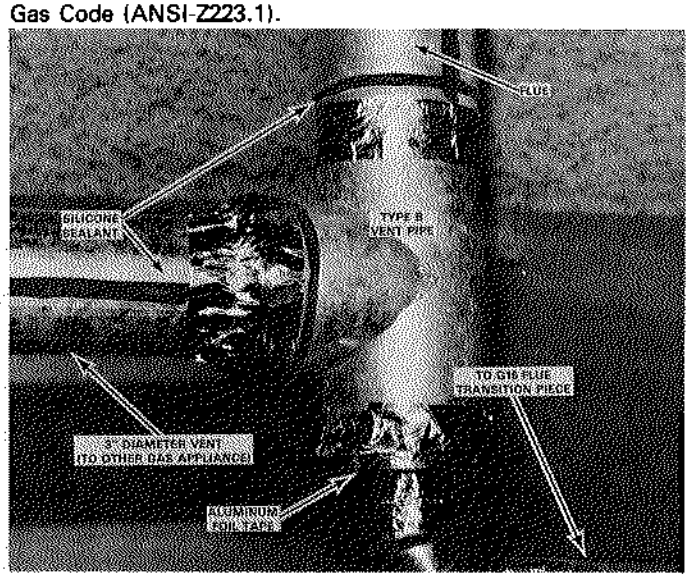


FIGURE 15

V - TEMPERATURE RISE

Temperature rise for the G16 depends on unit input, blower speed, and external static pressure unit is operating against. The blower speed must be set for unit operation within the range of 'AIR TEMP. RISE °F' listed on the unit raing plate.

1 - Place plenum thermometer in warm air and return air plenums. Locate thermometer in warm air plenum where it will not "see" heat exchanger, thus picking up radiant heat.
2 - Set thermostat to highest setting. Allow unit to run for 10 minutes.
3 - After plenum thermometers have reached their highest and steadiest readings, subtract the two readings. The difference should be in the range listed on unit rating plate. If this temperature is low, decrease blower speed; if high, increase blower speed. To change blower motor speed refer to Table 5, Speed Selection Chart.

TABLE 5

BLOWER SPEED SELECTION

IMPORTANT: To prevent motor burnout, never connect more than one motor lead to any one connection. Tape unused motor leads separately.

SPEED	BLOWER MOTOR LEAD					
	Q2-50	Q3-50	Q3-75	Q4-75	Q4-100	Q5-100
Low	Red	Red	Red	Red	Red	Red
Medium Low		Yellow	Yellow	-	Yellow	Yellow
Medium	Yellow	.....	.....	Yellow	-	Blue
Medium High		Brown	Brown		Brown	Brown
High	Black	Black	Black	Black	Black	Black

(Q3-50, Q3-75 & Q5-100 AGA only)

G16 SEQUENCE OF OPERATION

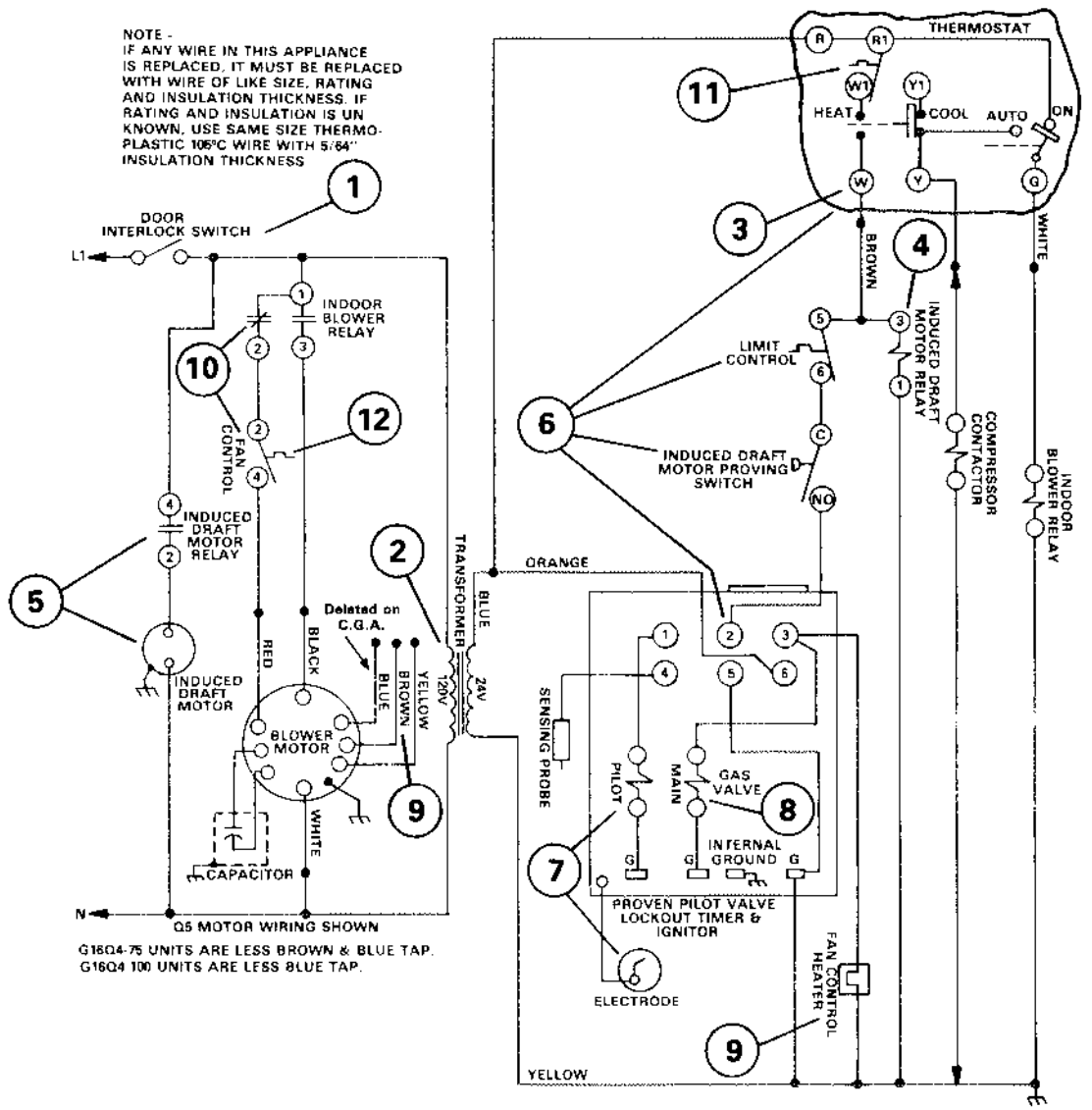


FIGURE 16

VI - SCHEMATIC WIRING DIAGRAM OPERATING SEQUENCE (Figure 16)

1 - Line potential feeds through door interlock. Access panel must be in place to energize unit.

2 - Transformer provides 24 volts to power control circuit.

3 - On a heating demand, thermostat bulb makes providing 24V at "W" leg.

4 - Induced draft motor relay is energized from "W" leg.

5 - Induced draft motor relay N.O. contacts close and energize the induced draft motor.

6 - When the induced draft motor comes up to speed, the induced draft motor proving switch closes completing the circuit from "W" leg of thermostat through limit control to ignition control terminal 2.

7 - Pilot gas valve and pilot ignition spark are energized.

8 - After pilot flame has been proven by ignition control, main gas valve is energized and spark is de-energized. (Main gas valve will open only on proof of pilot flame.)

9 - As the main gas valve is energized, the fan control heater is activated.

10 - In approximately 30-80 seconds N.O. fan control contacts close energizing blower motor from N.C. blower motor relay contacts to the heating speed tap.

11 - As heating demand is satisfied, thermostat heat bulb breaks de-energizing ignition control, gas valve, and fan control heater.

12 - Blower motor continues running until furnace temperature drops below fan control set point.

VII - MAINTENANCE

A - Burners

1 - Burner Flame - Fire burners and allow to operate for a few minutes to establish normal burning conditions. Check burner flame by observation. Flame should be predominately blue in color, strong in appearance, and rise directly from the burner ports into heat exchanger. Check to see that flame is burning from all continuous ports and that flame does not impinge on the sides of the heat exchanger.

2 - Cleaning Burners (Fig. 17, 18, 19)

a - Turn off gas and power supply to clean burners. Remove burners and clean top of burner ports with wire brush.

NOTE - For UNITS WITH FLAME RODS, remove two springs and withdraw rods from back of burner. Clean flame rods with wire brush.

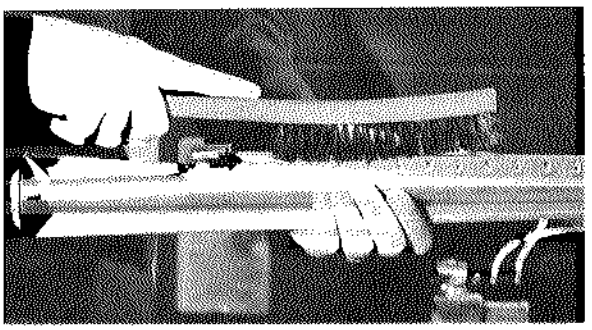


FIGURE 17

b - Clean burner ports by inserting a cleaning tool (made from a piece of sheet metal cut to fit burner ports) and work in and out of each port.

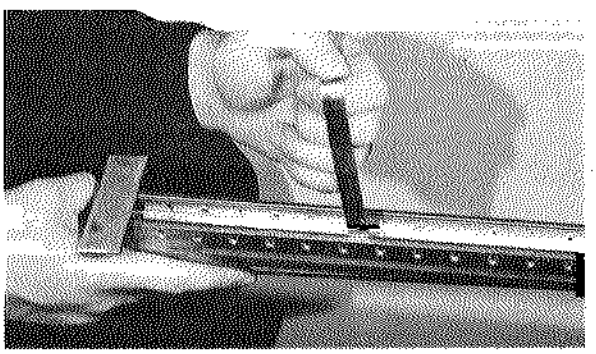


FIGURE 18

c - Clean inside of burners with a bottle brush.

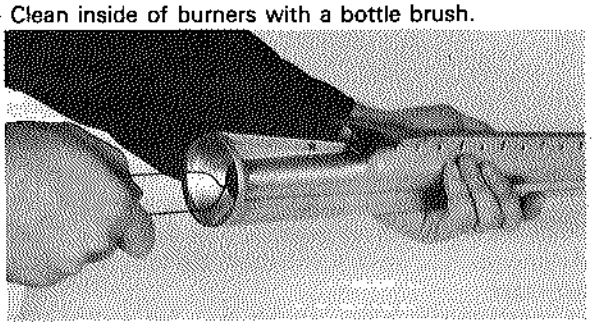


FIGURE 19

d - Replace burners making certain to fully engage in rear receiving slots in heat exchanger.

e - Check for proper burner cross-over ignitor piece allignment.

f - Turn on electrical and gas supply.

g - Check for gas leaks.

h - Check pilot and burner flame.

B - Checking Vent Cap

The vent cap should be periodically inspected, especially at the beginning of the heating season. Inspect for signs of sooting, corrosion and any obstruction in passageway. Pressure switch will prevent unit operation in case of blockage in flue vent.

C - Cleaning Induced Draft Blower (Figures 20 & 21)

To insure efficient operation, the induced draft blower must be kept clean.

a - Shut off power to unit.

b - Disconnect wiring and remove screws securing induced draft blower motor assembly.

c - Remove blower housing and motor assembly from unit.

d - Using small brush, clean blower wheel blades.

Caution — If blower wheel must be removed, loosen Allen screw and pull wheel out of housing. When replacing wheel, make certain flat on motor shaft matches up with Allen screw. Tighten security. Wheel must be centered side to side in the housing.

Important — Air shutter plate is sized specifically for each unit to provide correct restriction at flue outlet. Air shutter plate must be in place during unit operation. See Figure 21 for correct location and opening dimension (A).

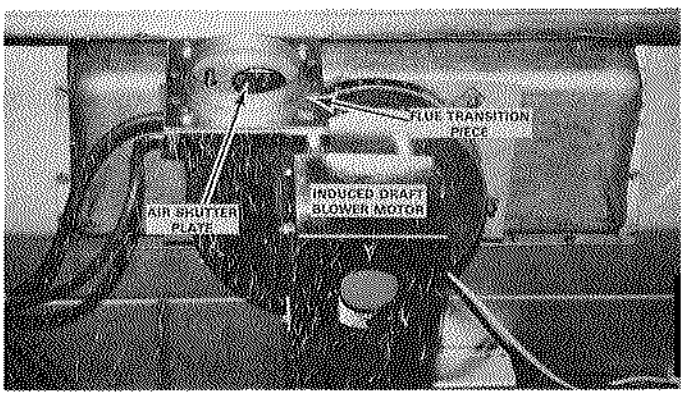
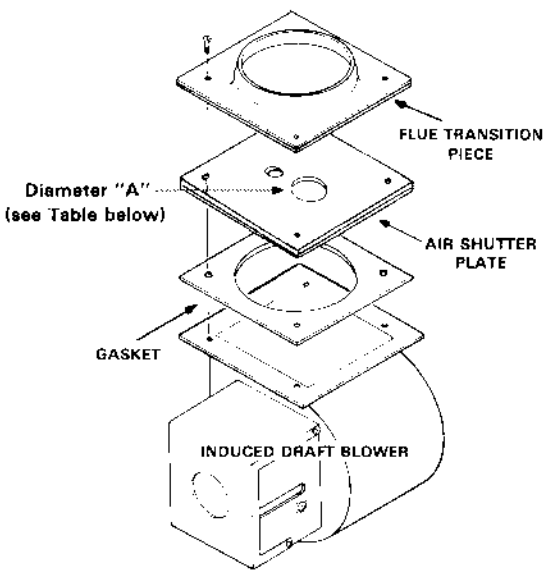


FIGURE 20

FLUE TRANSITION ASSEMBLY



DIAMETER "A"

Model No.	A.G.A. /C.G.A.	C.G.A. Hi Alt.
G16/G16X-50	1" (25mm)	1-1/16" (27mm)
G16/G16X-75	1-1/4" (32mm)	1-3/8" (35mm)
G16/G16X-100	1-13/32" (36mm)	1-1/2" (38mm)

FIGURE 21

D - Indoor Blower (Figure 22)

a - Check for balance and clean wheel.

b - If in need of lubrication refer to manufacturer's lubrication instructions on motor. If no instructions are available, use the following as a guide:

(1) Motors Without Oiling Ports - Prelubricated and sealed. No further lubrication is required.

(2) Direct Drive Motors With Oiling Ports - Prelubricated for an extended period of operation. For extended bearing life, lubricate with a few drops of SAE No. 10 nondetergent oil once every two years. It may be necessary to remove blower assembly for access to oiling ports.

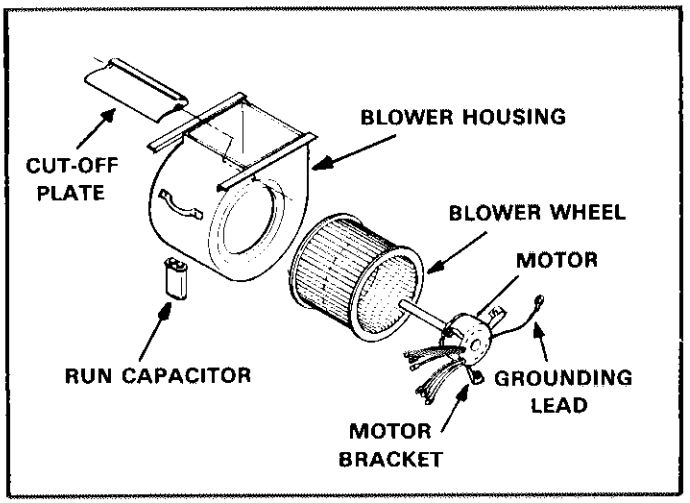


FIGURE 22

E - Inspecting and Cleaning Flue Passages (Figure 23)

If it should become necessary to clean the flue gas passageways, use the following steps.

1 - Turn off both electrical and gas power supplies to furnace. Refer to Parts Arrangement (Figure 7) for parts identification for disassembly and reassembly procedures.

2 - Remove burner access panel, upper access panel, induced draft blower, flue collector and gasket, and pouch cover.

3 - Disconnect supply gas piping and pilot assembly. Remove manifold assembly.

4 - Pull burners from heat exchanger.

5 - Insert a 2 ft. long steel rod that has a 20 in. length of chain attached to one end, into top opening of the heat exchanger.

6 - "Shake" the rod so that the chain drops through the clamshell into burner cavity in bottom of heat exchanger.

7 - Attach the bottom of chain to another 2 ft. long rod (Figure 23).

8 - Push and pull the rods back and forth up and down with a vigorous motion. The chain will dislodge the soot and scale deposits inside the heat exchanger. Repeat for each clamshell.

9 - With shop vacuum or rags, clean out the soot and scale deposits from the bottom of heat exchanger.

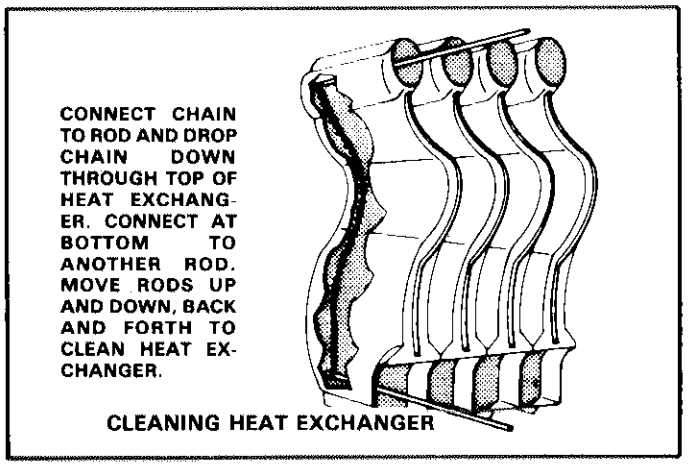


FIGURE 23

10 - Replace burners making sure to fully engage in rear receiving slot in heat exchanger.

11 - Resecure gas manifold and piping.

12 - Replace flue collector and gasket, pouch cover, induced draft blower, upper access panel and burner access panel.

13 - Turn on gas and electrical supply. Check for gas leaks.

F - Filter

Filters must be replaced when dirty to assure proper furnace operation.

a - Turn OFF electrical power to furnace.

b - After blower rotation has stopped, remove access panel.

c - Slide entire one piece hammock filter assembly from unit.

d - Release media holding tabs by sliding holding plates lengthwise. Rotate, holding plates up and remove media from frame.

e - Clip new filter media to frame with colored side out. Close holding plates and hooking tabs.

f - Slide hammock assembly back into unit and reinstall access panel.

G - Electrical

a - Check all wiring for loose connections.

b - Check for correct voltage at unit (unit operating).

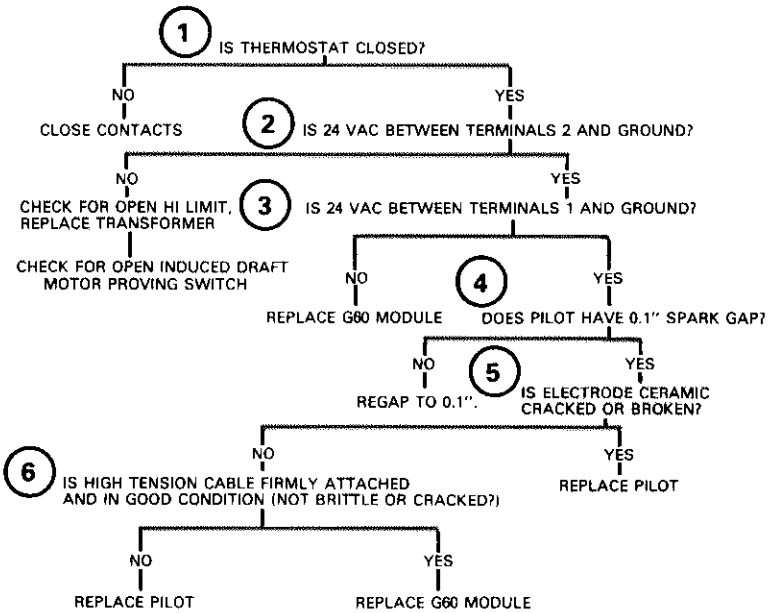
c - Check amp-draw on blower motor.

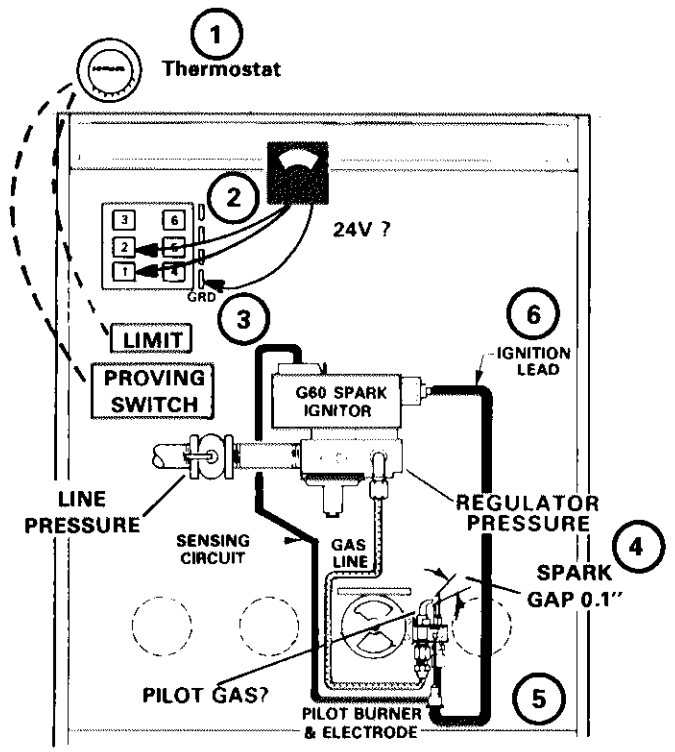
H - Fan & Limit Control

Check fan and limit control for proper operation and settings. Readjust fan on/off settings if improperly set. Caution - on Honeywell control, hold wheel plate firmly when setting fan on/off to prevent accidental change of limit setting.

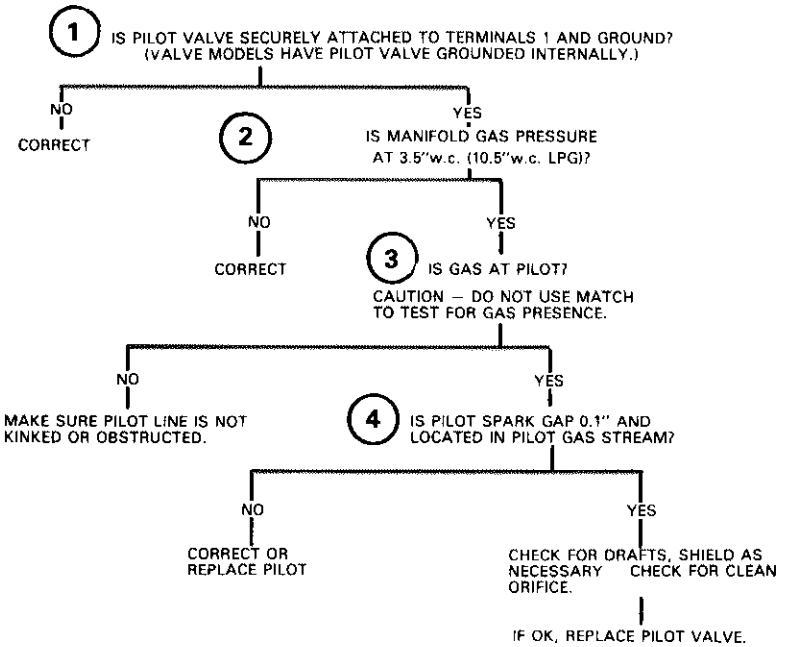
VII — TROUBLESHOOTING

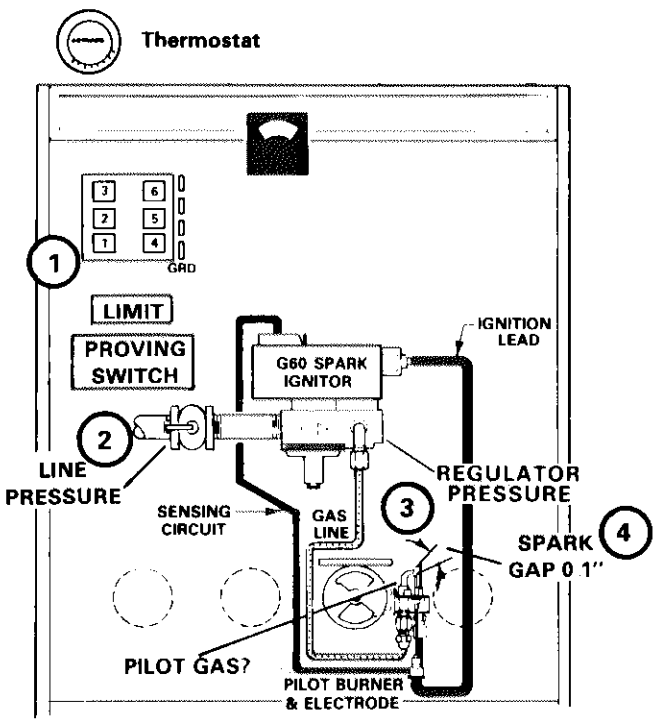
TROUBLESHOOTING ELECTRONIC IGNITION
A — NO SPARK — SYSTEM DOES NOT WORK





TROUBLESHOOTING ELECTRONIC IGNITION
B — SPARK IS PRESENT — PILOT WILL NOT LIGHT





TROUBLESHOOTING ELECTRONIC IGNITION
C – PILOT LIGHTS – MAIN GAS VALVE WILL NOT OPEN