

# Installation Instructions

## Gas Conversion Kit Propane-to-Natural for Standing Pilot, HSI Fixed-Speed, HSI Two-Speed, and Variable Speed Furnaces

KGAPN2301ALL

**NOTE:** Read the entire instruction manual before starting the installation.



This symbol → indicates a change since the last issue.


### SAFETY CONSIDERATIONS

Installing and servicing heating equipment can be hazardous due to gas and electrical components. Only trained and qualified personnel should install, repair, or service heating equipment.

Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on heating equipment, observe precautions in the literature, on tags, and on labels attached to or shipped with the unit, and other safety precautions that may apply.


Follow all safety codes. In the United States, follow all safety codes including the National Fuel Gas Code (NFPA No. 54-2002/ANSI Z223.1-2002). In Canada, refer to the National Standard of Canada, Natural Gas and Propane Installation Codes (NSCNGPIC), CAN/CGA-B149.1 and .2-M00.

Wear safety glasses and work gloves. Have a fire extinguisher available during start-up, adjustment procedures, and service calls.

Recognize safety information. This is the safety-alert symbol . When you see this symbol on the furnace and in instructions or manuals, be alert to the potential for personal injury.


Understand the signal words DANGER, WARNING, CAUTION, and NOTE. The words DANGER, WARNING, and CAUTION are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **would** result in minor personal injury, or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

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 **WARNING:** This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, explosion, or production of carbon monoxide may result causing property damage, personal injury, or loss of life. The qualified service agency is responsible for the proper installation of this furnace with this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit.

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 **AVERTISSEMENT:** Cette trousse de conversion ne doit être installée que par le représentant d'un organisme qualifié et conformément aux instructions du fabricant et à tous les codes et exigences pertinents de l'autorité compétente. Les instructions du présent guide doivent être suivies afin de réduire au minimum au risque d'incendie ou d'explosion de dommages matériels, de blessure ou de mort. L'organisme qualifié responsable de l'installation adéquate de cette trousse. L'installation n'est pas adéquate ni complète tant que le bon fonctionnement de l'appareil converti n'a pas été vérifié selon les instructions du fabricant fournies avec la trousse.

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### INTRODUCTION

→ This instruction covers the installation of gas conversion kit Part No. KGAPN2301ALL to convert the following furnaces from propane gas usage to natural gas usage. See the appropriate section for your furnace type.

- **Section 1** (pg. 3-12)—Models 58DFA, 58GFA, 58PAP, 58RAP, 373LAD, 383KAD, 394HAD, 396HAD, GA1AAD, and GA2AAD Induced-Combustion, Standing Pilot, Fixed-Speed, Non-Condensing Furnaces. This kit is designed for use in furnaces with 65,000 through 150,000 Btuh gas input rates. The gas valve will be either a Honeywell VR8200H or VR8300H.

→ **Table 1 — Kit Contents**

DESCRIPTION	PART NO.	QUANTITY
Regulator Spring Kit (Natural, Silver) for White-Rodgers 36E or 36F Valve	EF39ZW037	1
Regulator Spring Kit for Honeywell VR8200 and VR8300 Gas Valve	EF39ZW001	1
Pilot Orifice—Honeywell	LH32AN101	1
Main Burner Orifice (Drill Size No. 42)	LH32DB207	7
Main Burner Orifice (Drill Size No. 43)	LH32DB202	7
Main Burner Orifice (Drill Size No. 44)	LH32DB200	7
Main Burner Orifice (Drill Size No. 45)	LH32DB205	7
Conversion Rating Plate Label	327751-204	1
Conversion Responsibility Label	327751-205	1
Gas Control Conversion Label	327751-203	1
Installation Instructions	AG-GAPN-21	1
Conversion Rating Plate Label	327751-201	1
Gas Control Conversion Label	327751-202	1
Pipe Plug (1/8 in)	CA64AS001	1

- **Section 2** (pg. 13-21)—Models 58DHC, 58PAV, 58RAV, 58SSC, 58WAV, 58YAV, 58ZAV, 373LAV, 376CAV, 383KAV, 393AAV, 395CAV, 480BAV, 481BAV, GB1AAV, GB3AAV, PG8DAA, and PG8UAA Induced-Combustion, Hot-Surface Ignition, Fixed-Speed, Non-Condensing Furnaces. This kit is designed for use in furnaces with 45,000 through 155,000 Btuh gas input rates. The gas valve will be a White-Rodgers 36E or 36F with either an electric control switch or a manual control knob.
- **Section 3** (pg. 22-30)—Models 58MCA, 58MSA, 58MXA, 340MAV, 345MAV, 350MAV, 490AAV, and PG9MAA Multipoise, Hot-Surface Ignition, Fixed-Speed, Condensing Furnaces. This kit is designed for use in furnaces with 40,000 through 140,000 Btuh gas input rates. The gas valve will be a White-Rodgers 36E or 36F with either an electric control switch or a manual control knob, or a White-Rodgers automatic redundant valve.
- **Section 4** (pg. 31-41)—Models 58DXT, 58TMA, 58TUA, 58UHV, 58UXT, 58UXV, 330AAV, 330JAV, 331AAV, 331JAV, 333BAV, and 333JAV Induced-Combustion, Hot-Surface Ignition, 2-Speed and Variable-Speed, Non-Condensing Furnaces. This kit is designed for use in furnaces with 40,000 through 140,000 Btuh gas input rates equipped with a dual-fuel electric switch gas valve. Do not use this kit on furnaces equipped with a RED knob gas valve, P/N EF33CZ201.
- **Section 5** (pg. 42-50)—Models 58MVP, 58MTA, 355MAV, and 352MAV Multipoise, Hot-Surface Ignition, 2-Stage, 2-Speed and Variable-Speed, Condensing Furnaces. This kit is designed for use in furnaces with 040 through 120 size furnaces equipped with a dual-fuel electric switch gas valve. Do not use this kit on furnaces equipped with a RED knob gas valve, P/N EF33CZ201.
- • **Section 6** (pg. 51-60)—Models 312AAV, 315AAV, 312JAV, 315JAV, 58CTA, 58CVA, 58CTX and 58CVX Induced-Combustion, Hot Surface Ignition, 2-Stage 2-Speed and Variable-Speed, Non-Condensing Furnaces. This kit is designed for use in furnaces with 44,000 through 154,000 Btuh input rates. The gas valve will be a White-Rodgers 36F with electric control switch.
- • **Section 7** (pg. 61-70)—Models 310AAV, 311AAV, 310JAV, 311JAV, 58STA, 58DLA, 58STX, 58DLX, PG8MAA, and PG8JAA Induced-Combustion, Hot Surface Ignition, Fixed Speed, Non-Condensing Furnaces. This kit is designed for use in furnaces with 44,000 through 154,000 Btuh input rates. The gas valve will be a White-Rodgers 36F with electric control switch.

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**⚠ WARNING: Improper installation, adjustment, alteration, service, maintenance, or use can cause carbon monoxide poisoning, explosion, fire, electrical shock, or other conditions which could result in personal injury or death. Consult a qualified installer, service agency, local gas supplier, or your distributor or branch for information or assistance. The qualified installer or agency must use only factory-authorized kits or accessories when modifying this product. Failure to follow instructions could result in serious injury or property damage.**

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→ **⚠ WARNING: Gas supply MUST be shut off before disconnecting electrical power and proceeding with conversion. Failure to follow this warning could result in serious personal injury or property damage.**

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**DESCRIPTION AND USAGE**

This kit is designed for use in the furnaces listed above. See Table 1 for kit contents. To accommodate many different furnace models, more parts are shipped in the kit than will be needed to complete conversion. When installation is complete, discard extra parts.

## INSTALLATION

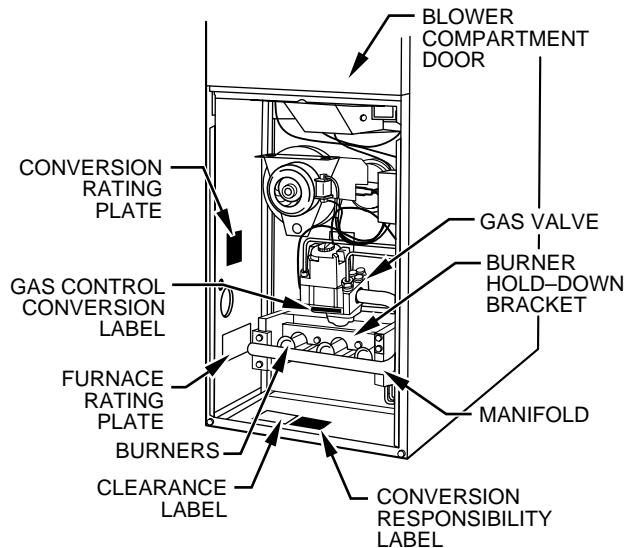
# SECTION 1—MODELS 58DFA, 58GFA, 58PAP, 58RAP, 373LAD, 383KAD, 394HAD, 396HAD, GA1AAD, AND GA2AAD INDUCED-COMBUSTION, STANDING PILOT, FIXED-SPEED, NON-CONDENSING FURNACES

### PROCEDURE 1—INSTALL PILOT ORIFICE

**NOTE:** See Fig. 1 and 2 for component location.

1. Turn off furnace gas and electrical supplies.
2. Remove furnace control access door.
3. Turn furnace gas valve control knob to OFF position.
4. Disconnect pilot gas tube and thermocouple from gas valve.
5. Remove pilot mounting screw and remove pilot assembly from burner and furnace.
6. Remove gas supply tube from pilot using a backup wrench.
7. Remove and discard propane gas pilot orifice from gas supply opening of pilot.
8. Install new natural gas pilot orifice provided in kit.
9. Reinstall pilot gas supply tube and mounting bracket on pilot. When tightening pilot tube, use backup wrench and turn pilot so that it will be at the same angle as before. (See Fig. 3.)

**NOTE:** DO NOT reinstall pilot at this time.



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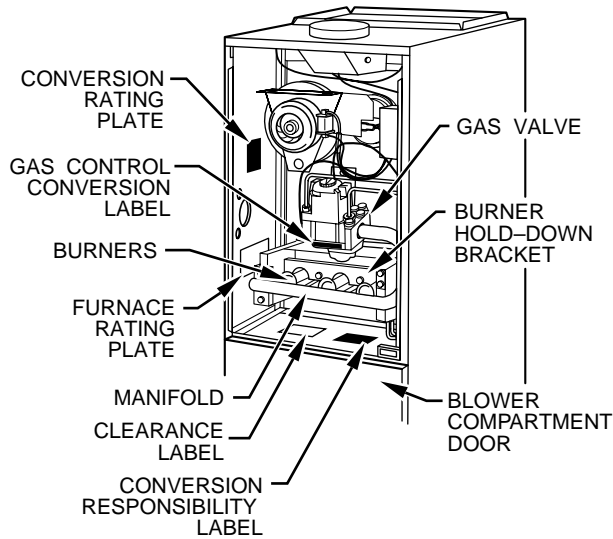
**Fig. 1—Downflow, Standing Pilot, Fixed-Speed, Non-Condensing Furnace Component and Conversion Label Location**

### PROCEDURE 2—INSTALL MAIN BURNER ORIFICES

1. Remove burner hold-down bracket.
2. Remove burners from manifold.
3. Remove and discard orifices from manifold.
4. Determine natural gas orifice size for correct input at installed altitude by using Table 2 (for upflow models) or Table 3 (for downflow models). (See also conversion kit rating plate Fig. 4.)  
Furnace gas input rate on rating plate is for installations at altitudes up to 2000 ft.  
In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level.  
In Canada, the input rating must be reduced by 10 percent for altitudes of 2000 ft to 4500 ft above sea level.
  - a. Obtain yearly heat value average (at installed altitude) for local gas supply.
  - b. Obtain yearly specific gravity average for local gas supply.
  - c. Verify furnace model and select appropriate table. Table 2 can only be used for upflow, standing pilot, non-condensing furnaces. Table 3 can only be used for downflow, standing pilot, non-condensing furnaces.
  - d. Find installation altitude in Table 2 (for upflow models) or Table 3 (for downflow models).

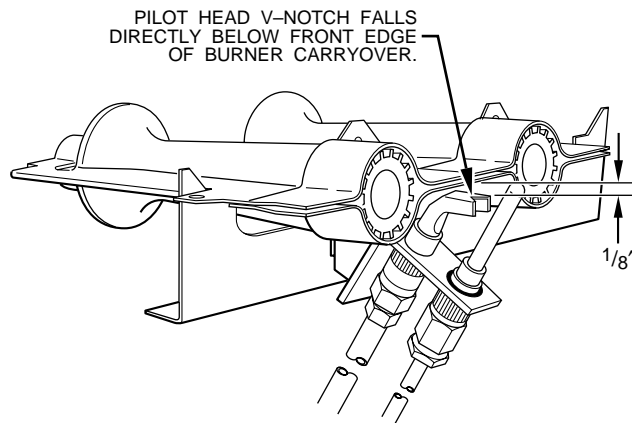
**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 2 or 3.

- e. Find closest natural gas heat value and specific gravity in Table 2 (for upflow models) or Table 3 (for downflow models).
- f. Follow heat value line and specific gravity line to point of intersection to find orifice size and manifold pressure settings for proper operation at given natural gas condition.



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**Fig. 2—Upflow, Standing Pilot, Fixed-Speed, Non-Condensing Furnace Component and Conversion Label Location**



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**Fig. 3—Position of Pilot to Burner**

**CONVERSION KIT RATING PLATE - CARRIER CORP.**

THIS APPLIANCE HAS BEEN CONVERTED TO USE NATURAL GAS FOR FUEL. REFER TO KIT INSTRUCTIONS FOR CONVERSION PROCEDURES. USE PARTS SUPPLIED BY CARRIER CORPORATION AND INSTALLED BY QUALIFIED PERSONNEL. SEE EXISTING RATING PLATE FOR APPLIANCE MODEL NO. AND INPUT RATING.

NOTE: Furnace gas input rate on rating plate is for installations up to 2000 ft. above sea level. In U.S.A. the input rating for altitudes above 2000 ft. must be derated (per chart below) for each 1000 ft above sea level. In Canada the input rating must be derated (per chart below) for altitudes of 2000 ft. to 4500 ft. above sea level.

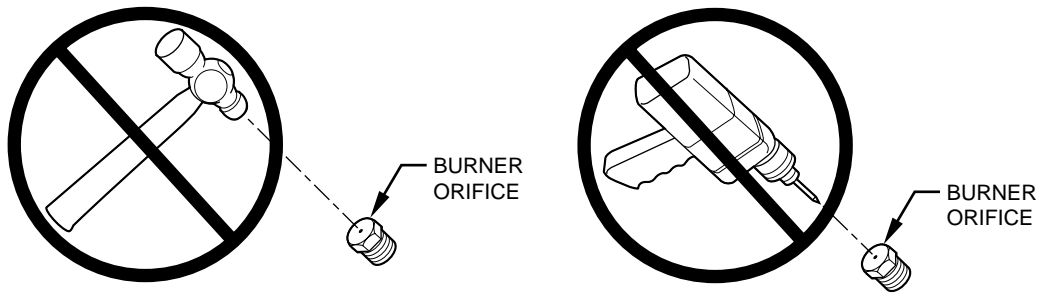
KIT NO. KGAPN2301ALL (SUPERSEDES: KGAPN1601ALL, KGAPN21012SP, KGAPN2201ALL) FUEL USED: NATURAL GAS

APPLIANCE MODELS	USA % DERATE PER 1000 FT	CANADA % DERATE FOR 2000-4500 FT	NATURAL GAS PRESSURE		
			IN. W.C. (PO C.E.)	Pa	
340MAV, 345MAV, 350MAV, 490AAV, 58MCA, 58MSA, 58MXA, PG9MAA,	2%	5%	Max. Inlet Gas Pressure (Press. Max. D'Admission De Gaz)	13.6	3,386
310AAV, 310JAV, 311AAV, 311JAV, 373LAD, 373LAV, 376CAV, 383KAD, 383KAV, 393AAV, 394HAD, 395CAV, 396HAD, 480BAV, 481BAV, 58DFA, 58DHC, 58DLA, 58DLX, 58GFA, 58PAP, 58PAV, 58RAP, 58RAV, 58SSC, 58STA, 58STX, 58WAV, 58YAV, 58ZAV, GA1AAD, GA2AAD, GB1AAV, GB3AAV, PG8DAA, PG8MAA, PG8JAA, PG8UAA,	4%	10%	Min. Inlet Gas Pressure (Press. Min. D'Admission De Gaz)	4.5	1,121
			(For Purpose of Input Adjustment) (Pour L'Adjustment D'Entree)		
			Altitude		
			Manifold Pressure	0-2,000 ft. (0 - 610 m)	3.2 - 3.8   797 - 946
			Pression Tubulure	2,000 - 10,000 ft (610 - 3050 m)	Refer to installation manual Respecter les instruction D'Installation

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**→ Fig. 4—Conversion Rating-Plate Label (Used for Orifice Size Selection for Natural Gas, Fixed Speed, Condensing and Non-Condensing Furnaces)**



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**Fig. 5—Burner Orifices**

EXAMPLE: (Using Table 2 at 0—2000 ft altitude)  
 Heat value = 1050 Btu/cu ft  
 Specific gravity = 0.62  
 Therefore: Orifice No. 44 is required.

5. Install main burner orifices. DO NOT use Teflon tape. Finger-tighten orifices at least 1 full turn to prevent cross-threading, then tighten with wrench. There are enough orifices in each kit for the largest furnace. Discard extra orifices. Orifices of other sizes must be field supplied and are available through your local distributor.

**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**

6. Reinstall main burners on manifold. Burners should be installed left to right to ensure proper alignment of the burner crossover slot. (See Fig. 3.)
7. Reinstall pilot assembly. See Fig. 3 for proper orientation of burners and pilot.
8. Reconnect pilot supply tube and thermocouple to gas valve.
9. Reinstall burner hold-down bracket.

### PROCEDURE 3—CONVERT GAS VALVE

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove regulator seal cap. (See Fig. 6.)
3. Remove adjustment screw and propane gas regulator spring.
4. Install natural gas regulator spring from Honeywell kit.
5. Replace regulator adjustment screw.

**NOTE:** DO NOT reinstall regulator seal cap at this time.

### PROCEDURE 4—CHECK INLET GAS PRESSURE

**NOTE:** This kit is to be used only when inlet gas pressure is between 4.5-in. wc and 13.6-in. wc.

1. Be sure main gas and electric supplies to furnace are off.
2. Remove 1/8-in. pipe plug from inlet pressure tap on gas valve. (See Fig. 6.)
3. Attach manometer to inlet pressure tap on furnace gas valve.

→ **⚠ CAUTION: DO NOT operate furnace more than 1 minute to check inlet gas pressure as conversion is not complete at this time. Failure to follow this caution may result in minor personal injury or product and property damage.**

4. Turn gas supply manual shutoff valve to ON position.
5. Turn furnace gas valve control knob to PILOT position and depress and hold.
6. Check pilot tube connections for gas leaks.
7. Release pilot knob and turn furnace gas valve control knob to OFF position and wait 5 minutes.
8. Light pilot in accordance with furnace lighting instructions.
9. Turn furnace gas valve control knob to ON position.
10. Turn on furnace power supply.
11. Jumper R and W thermostat connections to call for heat.

Table 2 - Upflow, Standing Pilot, Fixed-Speed, Non-Condensing Furnace  
 Orifice Size and Manifold Pressure for Correct Input Rate  
 (TABULATED DATA BASED ON 21,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. and Canada	0 to 2000	900	42	3.2	42	3.3	42	3.4	42	3.5
		925	43	3.7	43	3.8	42	3.2	42	3.3
		950	43	3.5	43	3.6	43	3.7	43	3.8
		975	43	3.3	43	3.4	43	3.5	43	3.7
		1000	44	3.6	43	3.3	43	3.4	43	3.5
		1025	44	3.4	44	3.6	43	3.2	43	3.3
		1050	44	3.3	44	3.4	44	3.5	43	3.2
		1075	45	3.8	44	3.2	44	3.3	44	3.4
		1100	46	3.8	45	3.7	44	3.2	44	3.3
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	43	3.8	42	3.2	42	3.3	42	3.4
		825	43	3.5	43	3.7	43	3.8	42	3.2
		850	43	3.3	43	3.5	43	3.6	43	3.7
		875	43	3.2	43	3.3	43	3.4	43	3.5
		900	43	3.0	43	3.1	43	3.2	43	3.3
		925	43	2.8	43	2.9	43	3.0	43	3.1
		950	43	2.7	43	2.8	43	2.9	43	2.9
		975	43	2.5	43	2.6	43	2.7	43	2.8
		1000	43	2.4	43	2.5	43	2.6	43	2.7
U.S.A. Only	3001 to 4000	775	43	3.5	43	3.7	43	3.8	42	3.2
		800	43	3.3	43	3.4	43	3.5	43	3.7
		825	43	3.1	43	3.2	43	3.3	43	3.4
		850	43	2.9	43	3.0	43	3.1	43	3.2
		875	43	2.8	43	2.9	43	3.0	43	3.1
		900	43	2.6	43	2.7	43	2.8	43	2.9
		925	43	2.5	43	2.6	43	2.7	43	2.7
		950	43	2.4	43	2.4	43	2.5	43	2.6
U.S.A. Only	4001 to 5000	750	43	3.3	43	3.4	43	3.5	43	3.6
		775	43	3.1	43	3.2	43	3.3	43	3.4
		800	43	2.9	43	3.0	43	3.1	43	3.2
		825	43	2.7	43	2.8	43	2.9	43	3.0
		850	43	2.6	43	2.7	43	2.8	43	2.8
		875	43	2.4	43	2.5	43	2.6	43	2.7
		900	43	2.3	43	2.4	43	2.5	43	2.5
		925	43	2.2	43	2.2	43	2.3	43	2.4
U.S.A. Only	5001 to 6000	725	43	3.1	43	3.2	43	3.3	43	3.4
		750	43	2.9	43	3.0	43	3.1	43	3.2
		775	43	2.7	43	2.8	43	2.9	43	3.0
		800	43	2.5	43	2.6	43	2.7	43	2.8
		825	43	2.4	43	2.5	43	2.5	43	2.6
		850	43	2.2	43	2.3	43	2.4	43	2.5
		875	43	2.1	43	2.2	43	2.3	43	2.3
		900	43	2.0	43	2.1	43	2.1	43	2.2
U.S.A. Only	6001 to 7000	675	43	3.1	43	3.2	43	3.3	43	3.4
		700	43	2.9	43	3.0	43	3.1	43	3.2
		725	43	2.7	43	2.8	43	2.9	43	2.9
		750	43	2.5	43	2.6	43	2.7	43	2.8
		775	43	2.3	43	2.4	43	2.5	43	2.6
		800	43	2.2	43	2.3	43	2.3	43	2.4
		825	43	2.1	43	2.1	43	2.2	43	2.3
		850	48	3.7	43	2.0	43	2.1	43	2.1

Table 2 - Upflow, Standing Pilot, Fixed-Speed, Non-Condensing Furnace  
Orifice Size and Manifold Pressure for Correct Input Rate

(TABULATED DATA BASED ON 21,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. Only	7001	650	43	2.9	43	3.0	43	3.1	43	3.2
		675	43	2.7	43	2.7	43	2.8	43	2.9
		700	43	2.5	43	2.6	43	2.6	43	2.7
	to 8000	725	43	2.3	43	2.4	43	2.5	43	2.5
		750	43	2.1	43	2.2	43	2.3	43	2.4
		775	43	2.0	43	2.1	43	2.2	43	2.2
		800	48	3.6	48	3.7	43	2.0	43	2.1
	825	48	3.3	48	3.5	48	3.6	48	3.7	
U.S.A. Only	8001	625	43	2.7	43	2.7	43	2.8	43	2.9
		650	43	2.5	43	2.5	43	2.6	43	2.7
		675	43	2.3	43	2.4	43	2.4	43	2.5
	to 9000	700	43	2.1	43	2.2	43	2.3	43	2.3
		725	48	3.7	43	2.0	43	2.1	43	2.2
		750	48	3.5	48	3.6	48	3.7	43	2.0
		775	49	3.8	48	3.4	48	3.5	48	3.6
U.S.A. Only	9001	600	43	2.4	43	2.5	43	2.6	43	2.7
		625	43	2.3	43	2.3	43	2.4	43	2.5
		650	43	2.1	43	2.2	43	2.2	43	2.3
	to 10000	675	48	3.6	48	3.8	43	2.1	43	2.1
		700	48	3.4	48	3.5	48	3.6	48	3.7
		725	49	3.7	49	3.8	48	3.4	48	3.5

12. When main burners ignite, confirm inlet gas pressure is between 4.5-in. wc and 13.6-in. wc.
13. Remove jumper across R and W thermostat terminals to terminate call for heat.
14. Turn furnace gas valve control knob to OFF position.
15. Turn gas supply manual shutoff valve to OFF position.
16. Turn off furnace power supply.
17. Remove manometer and reinstall plug in inlet pressure tap.

**NOTE:** Use propane-gas-resistant pipe dope on all connections to prevent gas leaks. DO NOT use Teflon tape.

**PROCEDURE 5—CHECK FURNACE OPERATION AND MAKE NECESSARY ADJUSTMENTS**

1. Be sure main gas and electric supplies to furnace are off.
2. Remove 1/8-in. pipe plug from manifold pressure tap on downstream side of gas valve. (See Fig. 6.)
3. Attach manometer to manifold pressure tap on gas valve.
4. Turn gas supply manual shutoff valve to ON position.
5. Turn on furnace power supply.
6. Turn furnace gas valve control knob to ON position.
7. Check all threaded pipe connections for gas leaks.

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**⚠ WARNING: NEVER use matches, candles, flame, or other sources of ignition to check for gas leakage. Use a soap-and-water solution to check for leaks. Failure to follow this warning could result in fire, explosion, personal injury, or death.**

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8. Light pilot in accordance with lighting instructions on furnace.
9. Turn furnace gas valve control knob to ON position.
10. Jumper R and W thermostat connections to call for heat.
11. When main burners ignite, check manifold orifices for gas leaks.

**NOTE:** The pilot flame should be soft blue in color and must provide good impingement on pilot thermocouple. The flame should extend above burner carryover port to provide proper ignition. (See Fig. 7.)

Table 3 - Downflow, Standing Pilot, Fixed-Speed, Non-Condensing Furnace  
 Orifice Size and Manifold Pressure for Correct Input Rate  
 (TABULATED DATA BASED ON 22,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. and Canada	0 to 2000	900	42	3.5	42	3.6	42	3.7	41	3.5
		925	42	3.3	42	3.4	42	3.5	42	3.7
		950	43	3.8	42	3.3	42	3.4	42	3.5
		975	43	3.6	43	3.8	42	3.2	42	3.3
		1000	43	3.5	43	3.6	43	3.7	43	3.8
		1025	43	3.3	43	3.4	43	3.5	43	3.6
		1050	44	3.6	43	3.2	43	3.4	43	3.5
		1075	44	3.4	44	3.5	43	3.2	43	3.3
		1100	44	3.3	44	3.4	44	3.5	43	3.2
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	42	3.4	42	3.5	42	3.6	42	3.7
		825	42	3.2	42	3.3	42	3.4	42	3.5
		850	43	3.7	43	3.8	42	3.2	42	3.3
		875	43	3.5	43	3.6	43	3.7	43	3.8
		900	43	3.3	43	3.4	43	3.5	43	3.6
		925	43	3.1	43	3.2	43	3.3	43	3.4
		950	43	2.9	43	3.0	43	3.1	43	3.2
				975	43	2.8	43	2.9	43	3.0
		1000	43	2.6	43	2.7	43	2.8	43	2.9
U.S.A. Only	3001 to 4000	775	42	3.2	42	3.3	42	3.4	42	3.5
		800	43	3.6	43	3.8	42	3.2	42	3.3
		825	43	3.4	43	3.5	43	3.7	43	3.8
		850	43	3.2	43	3.3	43	3.4	43	3.6
		875	43	3.0	43	3.1	43	3.3	43	3.4
		900	43	2.9	43	3.0	43	3.1	43	3.2
		925	43	2.7	43	2.8	43	2.9	43	3.0
				950	43	2.6	43	2.7	43	2.8
U.S.A. Only	4001 to 5000	750	43	3.6	43	3.8	42	3.2	42	3.3
		775	43	3.4	43	3.5	43	3.6	43	3.8
		800	43	3.2	43	3.3	43	3.4	43	3.5
		825	43	3.0	43	3.1	43	3.2	43	3.3
		850	43	2.8	43	2.9	43	3.0	43	3.1
		875	43	2.7	43	2.8	43	2.9	43	2.9
		900	43	2.5	43	2.6	43	2.7	43	2.8
				925	43	2.4	43	2.5	43	2.6
U.S.A. Only	5001 to 6000	725	43	3.4	43	3.5	43	3.6	43	3.7
		750	43	3.2	43	3.3	43	3.4	43	3.5
		775	43	3.0	43	3.1	43	3.2	43	3.3
		800	43	2.8	43	2.9	43	3.0	43	3.1
		825	43	2.6	43	2.7	43	2.8	43	2.9
		850	43	2.5	43	2.5	43	2.6	43	2.7
		875	43	2.3	43	2.4	43	2.5	43	2.6
				900	43	2.2	43	2.3	43	2.3
U.S.A. Only	6001 to 7000	675	43	3.4	43	3.5	43	3.6	43	3.7
		700	43	3.1	43	3.3	43	3.4	43	3.5
		725	43	2.9	43	3.0	43	3.1	43	3.2
		750	43	2.7	43	2.8	43	2.9	43	3.0
		775	43	2.6	43	2.7	43	2.7	43	2.8
		800	43	2.4	43	2.5	43	2.6	43	2.7
		825	43	2.3	43	2.3	43	2.4	43	2.5
				850	43	2.1	43	2.2	43	2.3



Table 3 - Downflow, Standing Pilot, Fixed-Speed, Non-Condensing Furnace  
 Orifice Size and Manifold Pressure for Correct Input Rate  
 (TABULATED DATA BASED ON 22,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. Only	7001	650	43	3.1	43	3.2	43	3.4	43	3.5
		675	43	2.9	43	3.0	43	3.1	43	3.2
		700	43	2.7	43	2.8	43	2.9	43	3.0
	to 8000	725	43	2.5	43	2.6	43	2.7	43	2.8
		750	43	2.4	43	2.4	43	2.5	43	2.6
		775	43	2.2	43	2.3	43	2.4	43	2.4
		800	43	2.1	43	2.1	43	2.2	43	2.3
U.S.A. Only	8001	625	43	2.9	43	3.0	43	3.1	43	3.2
		650	43	2.7	43	2.8	43	2.9	43	3.0
		675	43	2.5	43	2.6	43	2.7	43	2.8
	to 9000	700	43	2.3	43	2.4	43	2.5	43	2.6
		725	43	2.2	43	2.2	43	2.3	43	2.4
		750	43	2.0	43	2.1	43	2.2	43	2.2
		775	48	3.6	48	3.7	43	2.0	43	2.1
U.S.A. Only	9001	600	43	2.7	43	2.8	43	2.9	43	3.0
		625	43	2.5	43	2.6	43	2.6	43	2.7
	to 10000	650	43	2.3	43	2.4	43	2.4	43	2.5
		675	43	2.1	43	2.2	43	2.3	43	2.3
		700	48	3.7	43	2.0	43	2.1	43	2.2
		725	48	3.5	48	3.6	48	3.7	43	2.0

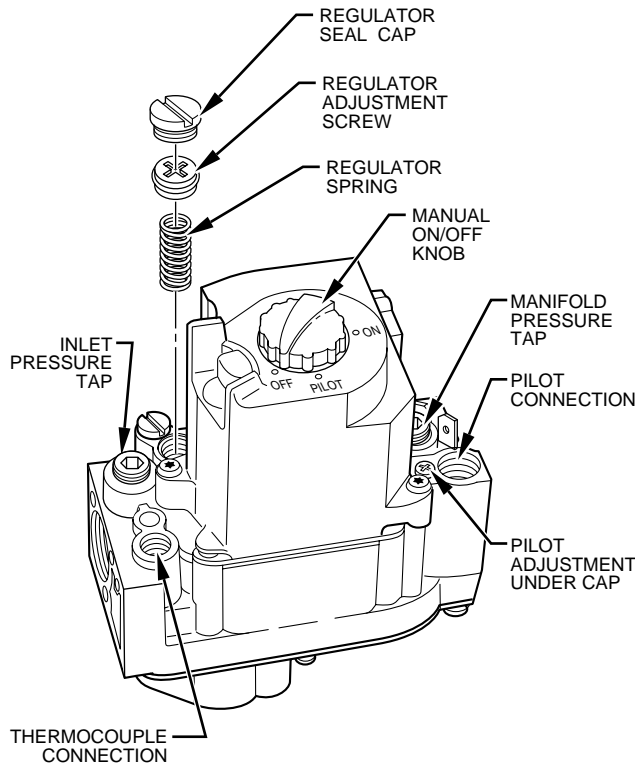
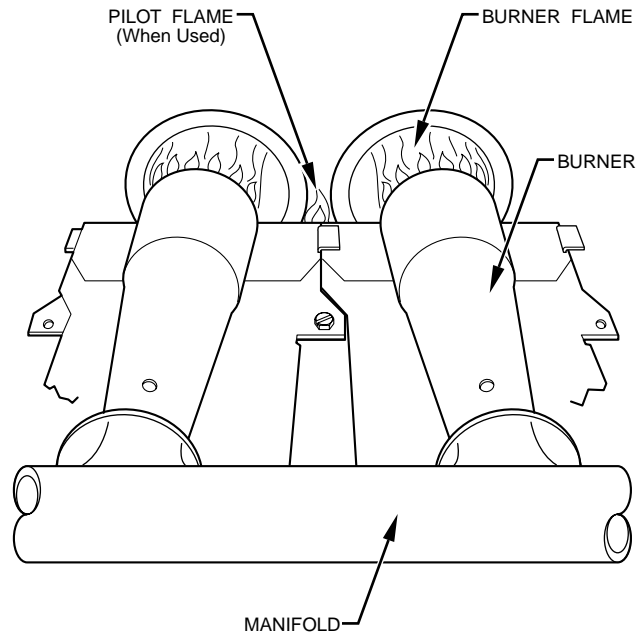


Fig. 6—Honeywell Gas Valve

12. If pilot flame requires adjustment:
  - a. Locate adjustment screw on top of gas valve. (See Fig. 6.)
  - b. Remove cap and turn adjustment screw clockwise (in) to decrease pilot gas flow and counterclockwise (out) to increase pilot gas flow.



A03067

→ Fig. 7—Burner Flame

c. When proper adjustment is obtained, replace screw cap.

### PROCEDURE 6—SET GAS INPUT RATE

Furnace gas input rate on rating plate is for installations at altitudes up to 2000 ft. (See Fig. 4.)

In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level.

In Canada, the input rating must be reduced by 10 percent for altitudes of 2000 ft to 4500 ft above sea level.

Furnace input rate must be within  $\pm 2$  percent of input on furnace rating plate.

1. Determine natural gas orifice size and manifold pressure for correct input using Table 2 (for upflow models) or Table 3 (for downflow models).
  - a. Obtain yearly heat value average (at installed altitude) from local gas supplier.
  - b. Obtain yearly specific gravity average from local gas supplier.
  - c. Verify furnace model and select appropriate table. Table 2 can only be used for upflow, standing pilot, non-condensing furnaces. Table 3 can only be used for downflow, standing pilot, non-condensing furnaces.
  - d. Find installation altitude in Table 2 (for upflow models) or Table 3 (for downflow models).

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 2 or 3.

- e. Find closest natural gas heat value and specific gravity in Table 2 (for upflow models) or Table 3 (for downflow models).
- f. Follow heat value and specific gravity lines to point of intersection to find orifice size and manifold pressure settings for proper operation.

EXAMPLE: (Using Table 2 at 0—2000 ft altitude)  
 Heating value = 1050 Btu/cu ft  
 Specific gravity = 0.62  
 Therefore: Orifice No. 44, Manifold pressure 3.5-in. wc

- g. Check and verify burner orifice size in furnace. NEVER ASSUME ORIFICE SIZE. ALWAYS CHECK AND VERIFY.
2. Adjust manifold pressure to obtain input rate.
    - a. Remove regulator adjustment seal cap. (See Fig. 6.)
    - b. Turn adjusting screw, counterclockwise (out) to decrease manifold pressure or clockwise (in) to increase manifold pressure.

**NOTE:** This furnace has been approved for a manifold pressure of 3.2-in. wc to 3.8-in. wc when installed at altitudes up to 2000 ft. For altitudes above 2000 ft, the manifold pressure can be adjusted from 2.0-in. wc to 3.8-in. wc.

**NOTE:** If orifice hole appears damaged or it is suspected to have been redrilled, check orifice hole with a numbered drill bit of correct size. Never redrill an orifice. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics.

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**⚠ CAUTION: DO NOT bottom out gas valve regulator adjusting screw. This can result in unregulated manifold pressure and result in excess overfire and heat exchanger failures.**

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**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**

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- c. After correct manifold pressure is obtained, replace gas valve regulator adjustment screw cap and verify adjusted gas input rate using method outlined in item 3.
  - d. Burner flame should be clear blue, almost transparent. (See Fig. 7.)
3. Verify natural gas input rate by clocking gas meter.
- a. Calculate high-altitude adjustment (if necessary).

**UNITED STATES**

At installation altitudes above 2000 ft, the input rate must be reduced by 4 percent for each 1000 ft above sea level. See Table 4 for derate multiplier factor and example.

**Table 4—Altitude Derate Multiplier for U.S.A.**

ALTITUDE (FT)	PERCENT OF DERATE	DERATE MULTIPLIER FACTOR FOR U.S.A.*
0-2000	0	1.00
2001—3000	8—12	0.90
3001—4000	12—16	0.86
4001—5000	16—20	0.82
5001—6000	20—24	0.78
6001—7000	24—28	0.74
7001—8000	28—32	0.70
8001—9000	32—36	0.66
9001—10,000	36—40	0.62

\*Derate multiplier factor is based on midpoint altitude for altitude range.

**CANADA**

At installation altitudes from 2000 to 4500 ft, this furnace must be derated 10 percent by an authorized Gas Conversion Station or Dealer. To determine correct input rate for altitude, see example and use 0.90 as derate multiplier factor.

EXAMPLE: (For upflow furnace)  
 105,000 Btuh input furnace installed at 4300 ft.  
 Furnace Input Rate at Sea Level X Derate Multiplier Factor = Furnace Input Rate at Installation Altitude  
 $105,000 \times 0.82 = 86,100$

- b. Turn off all other gas appliances and pilots.
- c. Start furnace and let operate for 3 minutes.
- d. Measure time (in sec) for gas meter test dial to complete 1 revolution.
- e. Refer to Table 5 for cu ft of gas per hr.
- f. Multiply gas rate (cu ft/hr) X heating value (Btu/cu ft) using natural gas heating value from local gas utility/supplier.

EXAMPLE: (For upflow furnace at 0—2000 ft altitude)  
 Btu heating input = Btu/cu ft X cu ft/hr  
 Heating value of gas = 1050 Btu/cu ft  
 Time for 1 revolution of 2-cu ft dial = 72 sec  
 Gas rate = 100 cu ft/hr (from Table 5)  
 Btu heating input =  $100 \times 1050 = 105,000$  Btuh  
 In this example, the orifice size and manifold pressure adjustment is within  $\pm 2$  percent of the furnace input rate.

**NOTE:** Measured gas input must be within  $\pm 2$  percent of that stated on furnace rating plate when installed at sea level or derated per that stated above when installed at higher altitudes.

- 4. Remove jumper across R and W thermostat connections to terminate call for heat.
- 5. Turn furnace gas valve control knob to PILOT position.
- 6. Remove manometer and replace manifold pressure tap plug. (See Fig. 6.)

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

- 7. Turn furnace gas valve control knob to ON position.
- 8. Set room thermostat to call for heat.
- 9. Check pressure tap plug for gas leaks when main burners ignite.
- 10. Check for correct burner flame. (See Fig. 7.)
- 11. Observe unit through 2 complete heating cycles. See sequence of operation in furnace Installation, Start-Up, and Operating Instructions.
- 12. Set room thermostat to desired temperature.

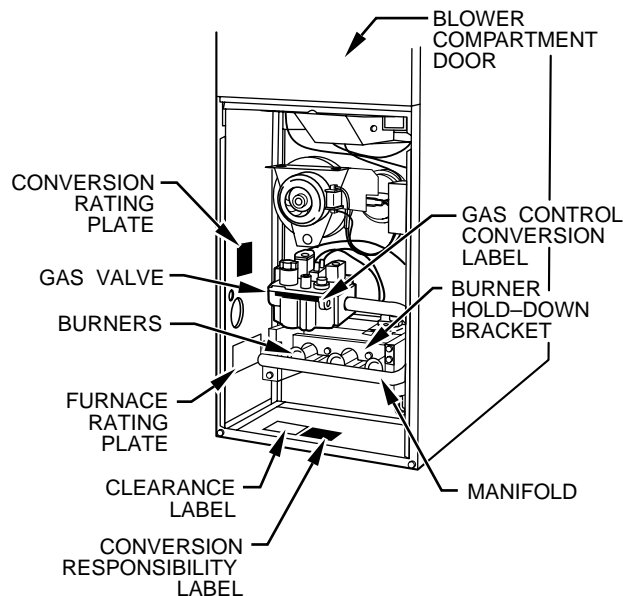
**PROCEDURE 7—LABEL APPLICATION**

**NOTE:** See Fig. 1 or 2 for label location.

**Table 5—Gas Rate (Cu Ft/Hr)**

SECONDS FOR 1 REVOLUTION	SIZE OF TEST DIAL			SECONDS FOR 1 REVOLUTION	SIZE OF TEST DIAL		
	1 Cu Ft	2 Cu Ft	5 Cu Ft		1 Cu Ft	2 Cu Ft	5 Cu Ft
10	360	720	1800	50	72	144	360
11	327	655	1636	51	71	141	355
12	300	600	1500	52	69	138	346
13	277	555	1385	53	68	136	340
14	257	514	1286	54	67	133	333
15	240	480	1200	55	65	131	327
16	225	450	1125	56	64	129	321
17	212	424	1059	57	63	126	316
18	200	400	1000	58	62	124	310
19	189	379	947	59	61	122	305
20	180	360	900	60	60	120	300
21	171	343	857	62	58	116	290
22	164	327	818	64	56	112	281
23	157	313	783	66	54	109	273
24	150	300	750	68	53	106	265
25	144	288	720	70	51	103	257
26	138	277	692	72	50	100	250
27	133	267	667	74	48	97	243
28	129	257	643	76	47	95	237
29	124	248	621	78	46	92	231
30	120	240	600	80	45	90	225
31	116	232	581	82	44	88	220
32	113	225	563	84	43	86	214
33	109	218	545	86	42	84	209
34	106	212	529	88	41	82	205
35	103	206	514	90	40	80	200
36	100	200	500	92	39	78	196
37	97	195	486	94	38	76	192
38	95	189	474	96	38	75	188
39	92	185	462	98	37	74	184
40	90	180	450	100	36	72	180
41	88	176	439	102	35	71	178
42	86	172	429	104	35	69	173
43	84	167	419	106	34	68	170
44	82	164	409	108	33	67	167
45	80	160	400	110	33	65	164
46	78	157	391	112	32	64	161
47	76	153	383	116	31	62	155
48	75	150	375	120	30	60	150
49	73	147	367				

1. Fill in Conversion Responsibility Label (327751–205) and apply to front of blower door as shown. Date, name, and address of organization making conversion are required.
2. Apply Gas Control Conversion Label (327751–203) to gas valve as shown.
3. Apply Furnace Conversion Rating Plate (327751–204) near existing furnace rating plate.
4. Replace furnace control access door.



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**Fig. 8—Downflow/Horizontal Hot-Surface Ignition, Fixed-Speed, Non-Condensing Furnace Component and Conversion Label Location**

**SECTION 2—MODELS 58DHC, 58PAV, 58RAV, 58SSC, 58WAV, 58YAV, 58ZAV, 373LAV, 376CAV, 383KAV, 393AAV, 395CAV, 480BAV, 481BAV, GB1AAV, GB3AAV, PG8DAA, AND PG8UAA INDUCED-COMBUSTION, HOT-SURFACE IGNITION, FIXED-SPEED NON-CONDENSING FURNACES**

**PROCEDURE 1—INSTALL MAIN BURNER ORIFICES**

**NOTE:** See Fig. 8 and 9 for component location.

1. Turn off furnace gas and electrical supplies.
2. Remove control access door.
3. Turn furnace gas valve control switch/knob to OFF position.
4. Remove burner hold-down bracket.
5. Remove burners from manifold.
6. Remove and discard orifices from manifold.
7. Determine natural gas orifice size for correct input at installed altitude by using Table 6 (for upflow furnaces) or Table 7 (for downflow/horizontal furnaces). (See Fig. 4.)

Furnace gas input rate on rating plate is for installations at altitudes up to 2000 ft.

In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level.

In Canada, the input rating must be reduced by 10 percent for altitudes of 2000 ft to 4500 ft above sea level.

- a. Obtain yearly heat value average (at installed altitude) for local gas supply.
- b. Obtain yearly specific gravity average for local gas supply.
- c. Verify furnace model and select appropriate table. Table 6 can only be used for upflow, hot-surface ignition, non-condensing furnaces. Table 7 can only be used for downflow/horizontal, hot-surface ignition, non-condensing furnaces.
- d. Find installation altitude in Table 6 (for upflow models) or Table 7 (for downflow/horizontal models).

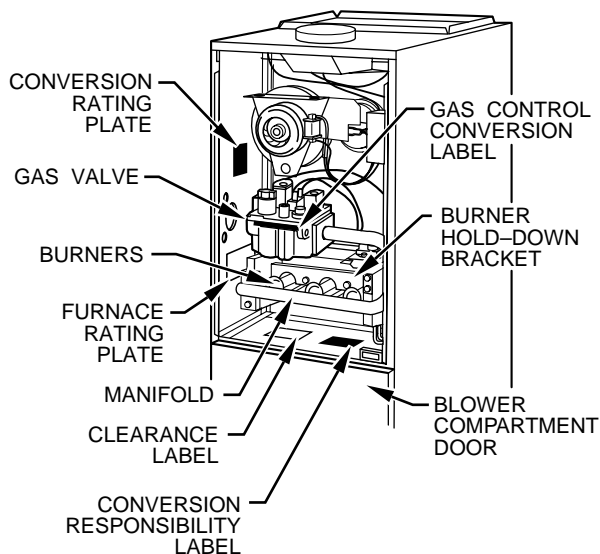
**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 6 or 7.

- e. Find closest natural gas heat value and specific gravity in Table 6 (for upflow models) or Table 7 (for downflow/horizontal models).
- f. Follow heat value and specific gravity lines to point of intersection. Find orifice size for proper operation at given natural gas condition.

EXAMPLE: (Using Table 6 for upflow furnace at 0—2000 ft altitude)  
 Heat value = 1025 Btu/cu ft  
 Specific gravity = 0.62  
 Therefore: Orifice No. 43 is required.

8. Install properly sized orifices in manifold. Do not use Teflon tape. Finger-tighten orifices at least 1 full turn to prevent cross-threading, then tighten with wrench. There are enough orifices in each kit for the largest furnace. Discard extra orifices. Orifices of other sizes must be field supplied and are available through your local distributor.

**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers, causing failures. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**



A95460

**Fig. 9—Upflow, Hot-Surface Ignition, Fixed-Speed, Non-Condensing Furnace Component and Conversion Label Location**

9. Reinstall main burners on manifold. Burners should be installed left to right to ensure proper alignment of the burner crossover slot. (See Fig. 10 for ignitor position.)
10. Reinstall burner hold-down bracket.

#### **PROCEDURE 2—CONVERT GAS VALVE**

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove regulator seal cap. (See Fig. 11, 12, or 13.)
3. Remove adjustment screw and propane gas regulator spring (white).
4. Install natural gas regulator spring (silver-10 turns) into gas valve.

→ **NOTE:** Discard labels and instructions packaged with White-Rodgers regulator spring conversion kit.

**NOTE:** DO NOT reinstall regulator seal cap at this time.

#### **PROCEDURE 3—CHECK INLET GAS PRESSURE**

**NOTE:** This kit is to be used only when inlet gas pressure is between 4.5-in. wc and 13.6-in. wc.

1. Be sure gas and electric supplies to furnace are off.
2. Remove 1/8-in. pipe plug from inlet pressure tap on gas valve. (See Fig. 11, 12, or 13.)
3. Attach manometer to inlet pressure tap on furnace gas valve.

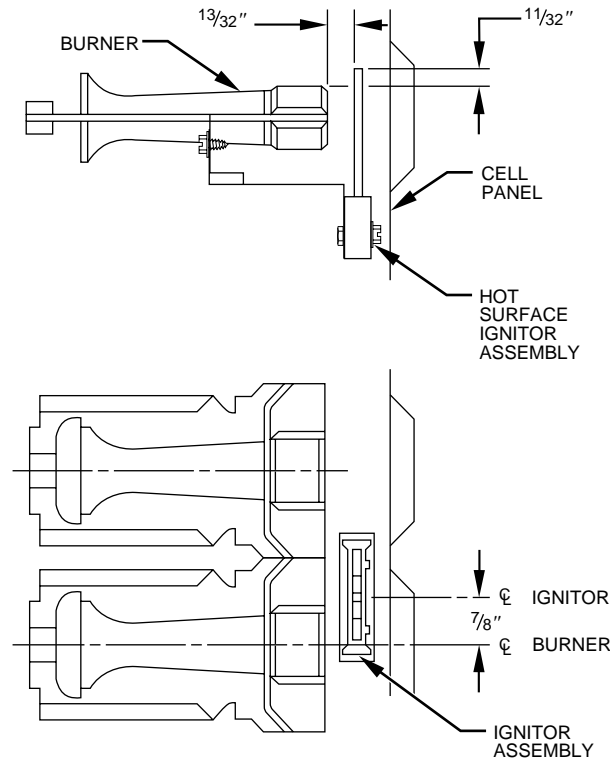
→ **⚠ CAUTION: DO NOT operate furnace more than 1 minute to check inlet gas pressure as conversion is not complete at this time. Failure to follow this caution may result in minor personal injury or product and property damage.**

4. Turn gas supply manual shutoff valve to ON position.
5. Turn furnace gas valve control switch/knob to ON position.
6. Turn on furnace power supply.
7. Jumper R and W thermostat connections to call for heat.
8. When main burners ignite, confirm inlet gas pressure is between 4.5-in. wc and 13.6-in. wc.
9. Remove jumper across R and W thermostat connections to terminate call for heat.
10. Turn furnace gas valve control switch/knob to OFF position.
11. Turn gas supply manual shutoff valve to OFF position.
12. Turn off furnace power supply.
13. Remove manometer and reinstall gas valve inlet pressure tap plug.

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

#### **PROCEDURE 4—CHECK FURNACE OPERATION AND MAKE NECESSARY ADJUSTMENTS**

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove 1/8-in. pipe plug from manifold pressure tap on gas valve. (See Fig. 11, 12, or 13.)
3. Attach manometer to manifold pressure tap on gas valve.



**Fig. 10—Position of Ignitor to Burner**

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4. Turn gas supply manual shutoff valve to ON position.
5. Turn furnace gas valve control switch/knob to ON position.
6. Check all threaded pipe connections for gas leaks.

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**⚠ WARNING: NEVER use matches, candles, flame, or other sources of ignition to check for gas leakage. Use a soap-and-water solution to check for leaks. Failure to follow this warning could result in fire, explosion, personal injury, or death.**

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7. Turn on furnace power supply.
8. Jumper R and W thermostat connections to call for heat.
9. When main burners ignite, check manifold orifices for gas leaks.

#### **PROCEDURE 5—SET GAS INPUT RATE**

Furnace gas input rate on rating plate is for installations at altitudes up to 2000 ft. (See conversion kit rating plate 327751–204, Fig. 4.)

In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level.

In Canada, the input rating must be derated by 10 percent for altitudes of 2000 ft to 4500 ft above sea level.

Furnace input rate must be within  $\pm 2$  percent of input on furnace rating plate.

1. Determine natural gas orifice size and manifold pressure for correct input using Table 6 (for upflow models) or Table 7 (for downflow/horizontal models).
  - a. Obtain yearly heat value average (at installed altitude) from local gas supplier.
  - b. Obtain yearly specific gravity average from local gas supplier.
  - c. Verify furnace model and select appropriate table. Table 6 can only be used for upflow, hot-surface ignition, non-condensing furnaces. Table 7 can only be used for downflow/horizontal, hot-surface ignition, non-condensing furnaces.
  - d. Find installation altitude in Table 6 (for upflow models) or Table 7 (for downflow/horizontal models).

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 6 or 7.

- e. Find closest natural gas heat value and specific gravity in Table 6 (for upflow models) or Table 7 (for downflow/horizontal models).
- f. Follow heat value and specific gravity lines to point of intersection to find orifice size and manifold pressure settings for proper operation.

Table 6 - Upflow, Hot-Surface Ignition, Fixed-Speed, Non-Condensing Furnace  
 Orifice Size and Manifold Pressure for Correct Input Rate  
 (TABULATED DATA BASED ON 22,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. and Canada	0 to 2000	900	42	3.5	42	3.6	42	3.7	41	3.5
		925	42	3.3	42	3.4	42	3.5	42	3.7
		950	43	3.8	42	3.3	42	3.4	42	3.5
		975	43	3.6	43	3.8	42	3.2	42	3.3
		1000	43	3.5	43	3.6	43	3.7	43	3.8
		1025	43	3.3	43	3.4	43	3.5	43	3.6
		1050	44	3.6	43	3.2	43	3.4	43	3.5
		1075	44	3.4	44	3.5	43	3.2	43	3.3
		1100	44	3.3	44	3.4	44	3.5	43	3.2
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	42	3.4	42	3.5	42	3.6	42	3.7
		825	42	3.2	42	3.3	42	3.4	42	3.5
		850	43	3.7	43	3.8	42	3.2	42	3.3
		875	43	3.5	43	3.6	43	3.7	43	3.8
		900	43	3.3	43	3.4	43	3.5	43	3.6
		925	43	3.1	43	3.2	43	3.3	43	3.4
		950	43	2.9	43	3.0	43	3.1	43	3.2
		975	43	2.8	43	2.9	43	3.0	43	3.1
		1000	43	2.6	43	2.7	43	2.8	43	2.9
U.S.A. Only	3001 to 4000	775	42	3.2	42	3.3	42	3.4	42	3.5
		800	43	3.6	43	3.8	42	3.2	42	3.3
		825	43	3.4	43	3.5	43	3.7	43	3.8
		850	43	3.2	43	3.3	43	3.4	43	3.6
		875	43	3.0	43	3.1	43	3.3	43	3.4
		900	43	2.9	43	3.0	43	3.1	43	3.2
		925	43	2.7	43	2.8	43	2.9	43	3.0
		950	43	2.6	43	2.7	43	2.8	43	2.8
U.S.A. Only	4001 to 5000	750	43	3.6	43	3.8	42	3.2	42	3.3
		775	43	3.4	43	3.5	43	3.6	43	3.8
		800	43	3.2	43	3.3	43	3.4	43	3.5
		825	43	3.0	43	3.1	43	3.2	43	3.3
		850	43	2.8	43	2.9	43	3.0	43	3.1
		875	43	2.7	43	2.8	43	2.9	43	2.9
		900	43	2.5	43	2.6	43	2.7	43	2.8
		925	43	2.4	43	2.5	43	2.6	43	2.6
U.S.A. Only	5001 to 6000	725	43	3.4	43	3.5	43	3.6	43	3.7
		750	43	3.2	43	3.3	43	3.4	43	3.5
		775	43	3.0	43	3.1	43	3.2	43	3.3
		800	43	2.8	43	2.9	43	3.0	43	3.1
		825	43	2.6	43	2.7	43	2.8	43	2.9
		850	43	2.5	43	2.5	43	2.6	43	2.7
		875	43	2.3	43	2.4	43	2.5	43	2.6
		900	43	2.2	43	2.3	43	2.3	43	2.4
U.S.A. Only	6001 to 7000	675	43	3.4	43	3.5	43	3.6	43	3.7
		700	43	3.1	43	3.3	43	3.4	43	3.5
		725	43	2.9	43	3.0	43	3.1	43	3.2
		750	43	2.7	43	2.8	43	2.9	43	3.0
		775	43	2.6	43	2.7	43	2.7	43	2.8
		800	43	2.4	43	2.5	43	2.6	43	2.7
		825	43	2.3	43	2.3	43	2.4	43	2.5
		850	43	2.1	43	2.2	43	2.3	43	2.4



Table 6 - Upflow, Hot-Surface Ignition, Fixed-Speed, Non-Condensing Furnace  
 Orifice Size and Manifold Pressure for Correct Input Rate  
 (TABULATED DATA BASED ON 22,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. Only	7001	650	43	3.1	43	3.2	43	3.4	43	3.5
		675	43	2.9	43	3.0	43	3.1	43	3.2
		700	43	2.7	43	2.8	43	2.9	43	3.0
	8000	725	43	2.5	43	2.6	43	2.7	43	2.8
		750	43	2.4	43	2.4	43	2.5	43	2.6
		775	43	2.2	43	2.3	43	2.4	43	2.4
		800	43	2.1	43	2.1	43	2.2	43	2.3
U.S.A. Only	8001	825	48	3.7	43	2.0	43	2.1	43	2.2
		625	43	2.9	43	3.0	43	3.1	43	3.2
		650	43	2.7	43	2.8	43	2.9	43	3.0
	9000	675	43	2.5	43	2.6	43	2.7	43	2.8
		700	43	2.3	43	2.4	43	2.5	43	2.6
		725	43	2.2	43	2.2	43	2.3	43	2.4
		750	43	2.0	43	2.1	43	2.2	43	2.2
U.S.A. Only	9001	775	48	3.6	48	3.7	43	2.0	43	2.1
		600	43	2.7	43	2.8	43	2.9	43	3.0
	10000	625	43	2.5	43	2.6	43	2.6	43	2.7
		650	43	2.3	43	2.4	43	2.4	43	2.5
		675	43	2.1	43	2.2	43	2.3	43	2.3
10000	700	48	3.7	43	2.0	43	2.1	43	2.2	
	725	48	3.5	48	3.6	48	3.7	43	2.0	

EXAMPLE: (Using Table 6 for upflow furnace at 0—2000 ft altitude)  
 Heating value = 1025 Btu/cu ft  
 Specific gravity = 0.62  
 Therefore: Orifice No. 43, Manifold pressure 3.5-in. wc

- g. Check and verify burner orifice size in furnace. NEVER ASSUME ORIFICE SIZE. ALWAYS CHECK AND VERIFY.
2. Adjust manifold pressure to obtain input rate.
  - a. Remove regulator adjustment seal cap. (See Fig. 11, 12, or 13.)
  - b. Turn adjusting screw, counterclockwise (out) to decrease manifold pressure or clockwise (in) to increase manifold pressure.

**NOTE:** This furnace has been approved for a manifold pressure of 3.2-in. wc to 3.8-in. wc when installed at altitudes up to 2000 ft. For altitudes above 2000 ft, the manifold pressure can be adjusted from 2.0-in. wc to 3.8-in. wc.

**⚠ CAUTION: DO NOT bottom out gas valve regulator adjusting screw. This can result in unregulated manifold pressure and result in excess overfire and heat exchanger failures.**

**NOTE:** If orifice hole appears damaged or it is suspected to have been redrilled, check orifice hole with a numbered drill bit of correct size. Never redrill an orifice. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics.

**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**

- c. After correct manifold pressure is obtained, replace gas valve regulator adjustment screw cap and verify adjusted gas input rate using method outlined in item 3.
- d. Burner flame should be clear blue, almost transparent. (See Fig. 7.)

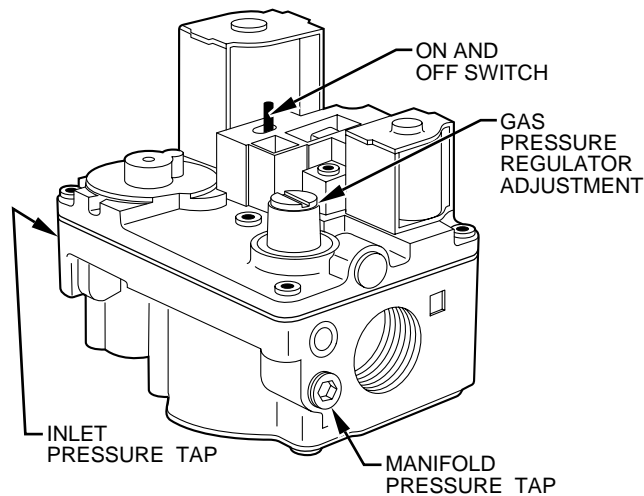
Table 7 - Downflow/Horizontal, Hot-Surface Ignition, Fixed-Speed, Non-Condensing Furnace  
 Orifice Size and Manifold Pressure for Correct Input Rate \*  
 (TABULATED DATA BASED ON 23,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. and Canada	0 to 2000	900	42	3.8	41	3.6	41	3.7	41	3.8
		925	42	3.6	42	3.7	41	3.5	41	3.6
		950	42	3.4	42	3.6	42	3.7	42	3.8
		975	42	3.3	42	3.4	42	3.5	42	3.6
		1000	43	3.8	42	3.2	42	3.3	42	3.4
		1025	43	3.6	43	3.7	43	3.8	42	3.3
		1050	43	3.4	43	3.5	43	3.7	43	3.8
		1075	43	3.3	43	3.4	43	3.5	43	3.6
		1100	44	3.6	43	3.2	43	3.3	43	3.4
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	42	3.7	42	3.8	41	3.6	41	3.7
		825	42	3.5	42	3.6	42	3.7	41	3.5
		850	42	3.3	42	3.4	42	3.5	42	3.6
		875	43	3.8	42	3.2	42	3.3	42	3.4
		900	43	3.6	43	3.7	43	3.8	42	3.2
		925	43	3.4	43	3.5	43	3.6	43	3.7
		950	43	3.2	43	3.3	43	3.4	43	3.5
				975	43	3.0	43	3.1	43	3.3
		1000	43	2.9	43	3.0	43	3.1	43	3.2
U.S.A. Only	3001 to 4000	775	42	3.5	42	3.6	42	3.7	42	3.8
		800	42	3.3	42	3.4	42	3.5	42	3.6
		825	43	3.7	42	3.2	42	3.3	42	3.4
		850	43	3.5	43	3.6	43	3.8	42	3.2
		875	43	3.3	43	3.4	43	3.6	43	3.7
		900	43	3.1	43	3.3	43	3.4	43	3.5
				925	43	3.0	43	3.1	43	3.2
		950	43	2.8	43	2.9	43	3.0	43	3.1
U.S.A. Only	4001 to 5000	750	42	3.3	42	3.4	42	3.5	42	3.6
		775	43	3.7	43	3.8	42	3.3	42	3.4
		800	43	3.5	43	3.6	43	3.7	43	3.8
		825	43	3.3	43	3.4	43	3.5	43	3.6
		850	43	3.1	43	3.2	43	3.3	43	3.4
		875	43	2.9	43	3.0	43	3.1	43	3.2
				900	43	2.8	43	2.8	43	2.9
		925	43	2.6	43	2.7	43	2.8	43	2.9
U.S.A. Only	5001 to 6000	725	43	3.7	43	3.8	42	3.2	42	3.4
		750	43	3.5	43	3.6	43	3.7	43	3.8
		775	43	3.2	43	3.4	43	3.5	43	3.6
		800	43	3.0	43	3.1	43	3.2	43	3.4
		825	43	2.9	43	3.0	43	3.1	43	3.2
		850	43	2.7	43	2.8	43	2.9	43	3.0
				875	43	2.5	43	2.6	43	2.7
		900	43	2.4	43	2.5	43	2.6	43	2.6
U.S.A. Only	6001 to 7000	675	43	3.7	43	3.8	42	3.2	42	3.3
		700	43	3.4	43	3.6	43	3.7	43	3.8
		725	43	3.2	43	3.3	43	3.4	43	3.5
		750	43	3.0	43	3.1	43	3.2	43	3.3
		775	43	2.8	43	2.9	43	3.0	43	3.1
		800	43	2.6	43	2.7	43	2.8	43	2.9
				825	43	2.5	43	2.6	43	2.6
		850	43	2.3	43	2.4	43	2.5	43	2.6

Table 7 - Downflow/Horizontal, Hot-Surface Ignition, Fixed-Speed, Non-Condensing Furnace  
Orifice Size and Manifold Pressure for Correct Input Rate \*

(TABULATED DATA BASED ON 23,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. Only	7001	650	43	3.4	43	3.5	43	3.7	43	3.8
		675	43	3.2	43	3.3	43	3.4	43	3.5
		700	43	3.0	43	3.1	43	3.2	43	3.3
	to 8000	725	43	2.8	43	2.9	43	2.9	43	3.0
		750	43	2.6	43	2.7	43	2.8	43	2.8
		775	43	2.4	43	2.5	43	2.6	43	2.7
		800	43	2.3	43	2.3	43	2.4	43	2.5
U.S.A. Only	8001	625	43	3.2	43	3.3	43	3.4	43	3.5
		650	43	2.9	43	3.0	43	3.1	43	3.2
		675	43	2.7	43	2.8	43	2.9	43	3.0
	to 9000	700	43	2.5	43	2.6	43	2.7	43	2.8
		725	43	2.4	43	2.4	43	2.5	43	2.6
		750	43	2.2	43	2.3	43	2.4	43	2.4
		775	43	2.1	43	2.1	43	2.2	43	2.3
U.S.A. Only	9001	600	43	2.9	43	3.0	43	3.1	43	3.2
		625	43	2.7	43	2.8	43	2.9	43	3.0
		650	43	2.5	43	2.6	43	2.7	43	2.8
	to 10000	675	43	2.3	43	2.4	43	2.5	43	2.6
		700	43	2.2	43	2.2	43	2.3	43	2.4
		725	43	2.0	43	2.1	43	2.1	43	2.2



A95618

Fig. 11—White-Rodgers Model 36E Gas Valve (With Electric Control Switch)

3. Verify natural gas input rate by clocking gas meter.

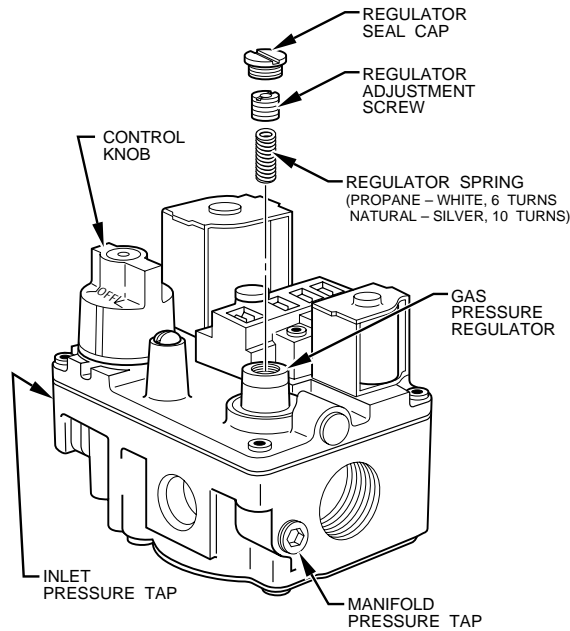
a. Calculate high-altitude adjustment (if required).

**UNITED STATES**

At installation altitudes above 2000 ft, the input rate must be reduced by 4 percent for each 1000 ft above sea level. See Table 8 for derate multiplier factor and example.

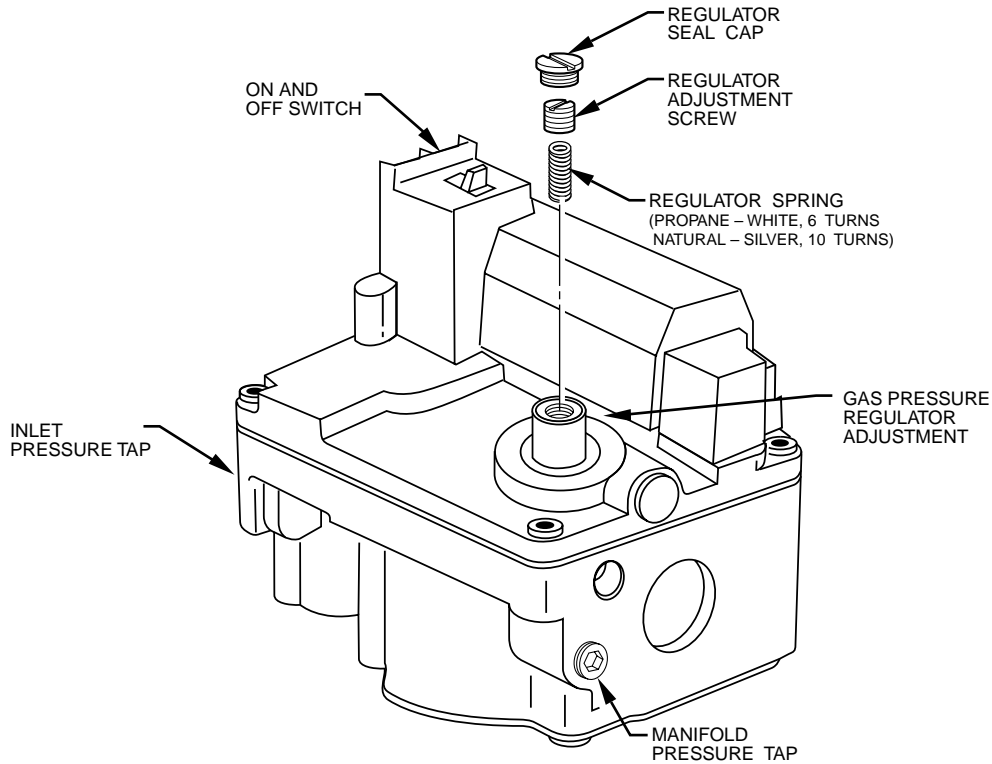
**CANADA**

At installation altitudes from 2000 to 4500 ft, this furnace must be derated 10 percent by an authorized Gas Conversion Station or Dealer. To determine correct input rate for altitude, see example and use 0.90 as derate multiplier factor.



A93359

**Fig. 12—White-Rodgers Model 36E Gas Valve (With Manual Control Knob)**



A01073

**Fig. 13—Redundant Automatic Gas Valve**

EXAMPLE: (For upflow furnace) U.S.A.  
 88,000 Btuh input furnace installed at 4300 ft.  
 Furnace Input Rate at Sea Level X Derate Multiplier Factor = Furnace Input Rate at Installation Altitude  
 $88,000 \times 0.82 = 72,160$

- b. Turn off all other gas appliances and pilots.
- c. Start furnace and let operate for 3 minutes.
- d. Measure time (in sec) for gas meter test dial to complete 1 revolution.
- e. Refer to Table 5 for cu ft of gas per hr.
- f. Multiply gas rate (cu ft/hr) X heating value (Btu/cu ft) using natural gas heating value from local gas utility/supplier.

**Table 8—Altitude Derate Multiplier for U.S.A.**

ALTITUDE (FT)	PERCENT OF DERATE	DERATE MULTIPLIER FACTOR FOR U.S.A.*
0-2000	0	1.00
2001—3000	8—12	0.90
3001—4000	12—16	0.86
4001—5000	16—20	0.82
5001—6000	20—24	0.78
6001—7000	24—28	0.74
7001—8000	28—32	0.70
8001—9000	32—36	0.66
9001—10,000	36-40	0.62

\*Derate multiplier factor is based on midpoint altitude for altitude range.

EXAMPLE: (For 110,000 Btuh input upflow furnace at 0—2000 ft altitude)

Btu heating input = Btu/cu ft X cu ft/hr

Heating value of gas = 1050 Btu/cu ft

Time for 1 revolution of 2-cu ft dial = 70 sec

Gas rate = 103 cu ft/hr (from Table 5)

Btu heating input = 103 X 1050 = 108,150 Btuh

In this example, the orifice size and manifold pressure adjustment is within  $\pm 2$  percent of the furnace input rate.

**NOTE:** Measured gas input must be within  $\pm 2$  percent of that stated on furnace rating plate when installed at sea level or derated per that stated above when installed at higher altitudes.

4. Remove jumper across R and W thermostat connections to terminate call for heat.
5. Turn furnace gas valve control switch/knob to OFF position.
6. Remove manometer and reinstall gas valve inlet pressure tap plug. (See Fig. 11, 12, or 13.)

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

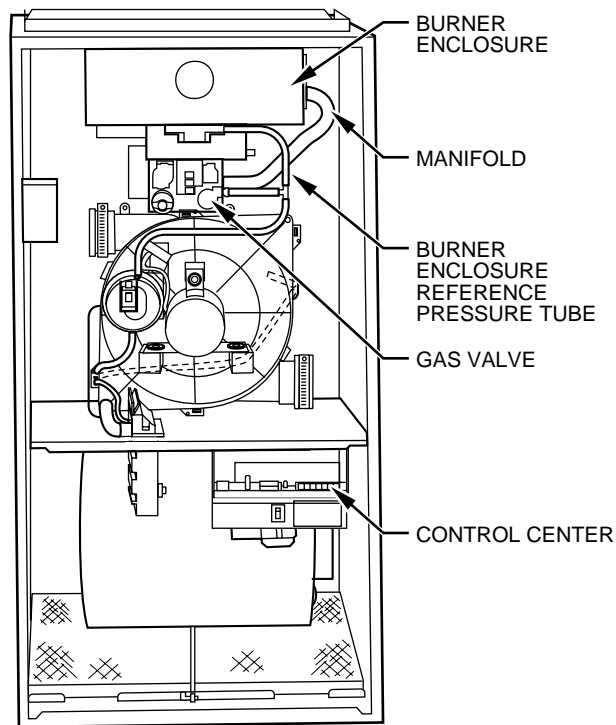
7. Turn furnace gas valve control switch/knob to ON position.
8. Set room thermostat to call for heat.
9. Check manifold pressure tap plug for gas leaks when main burners ignite.
10. Check for correct burner flame. (See Fig. 7.)
11. Observe unit through 2 complete heating cycles. See sequence of operation in furnace Installation, Start-Up, and Operating Instructions.
12. Set room thermostat to desired temperature.

#### **PROCEDURE 6—LABEL APPLICATION**

**NOTE:** See Fig. 8 or 9 for label location.

1. Fill in Conversion Responsibility Label (327751-205) and install inside furnace casing as shown. Date, name, and address of organization making conversion are required.
2. Apply Gas Control Conversion Label (327751-203) to gas valve as shown.
3. Apply Furnace Conversion Rating Plate (327751-204) near existing furnace rating plate.
4. Replace furnace control access door.

**NOTE:** Discard labels and instructions packaged with White-Rodgers regulator spring conversion kit.



A95024

**Fig. 14—Multipoise, Fixed-Speed, Condensing Furnace Component Location (Upflow Orientation Shown)**

**SECTION 3—MODELS 58MCA, 58MSA, 58MXA, 340MAV, 345MAV, 350MAV, 490AAV, AND PG9MAA MULTIPOISE, HOT-SURFACE IGNITION, FIXED-SPEED, CONDENSING FURNACES**

**PROCEDURE 1—INSTALL MAIN BURNER ORIFICES**

**NOTE:** See Fig. 14 for component location in upflow furnaces. Re-orient component arrangement when furnace is installed in other orientations.

1. Turn off gas and electrical supplies to furnace.
2. Remove main furnace door.
3. Turn furnace gas valve control switch/knob to OFF position.
4. Remove burner enclosure cover.
5. Remove gas supply piping from gas valve.

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**⚠ CAUTION:** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

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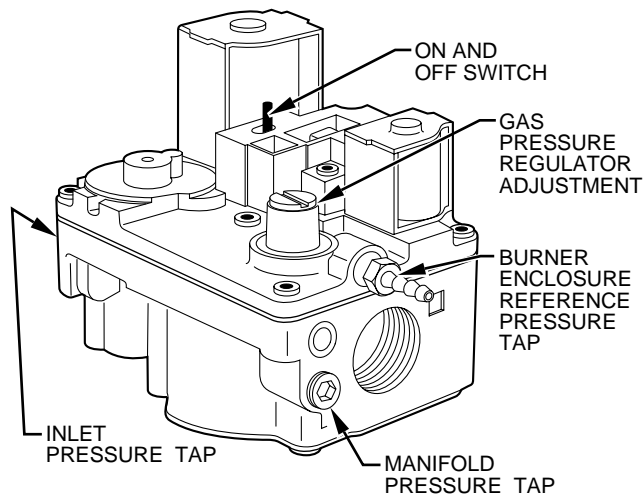


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**⚠ ATTENTION:** Lors des opérations d'entretien des commandes, étiqueter tous les fils avant de les déconnecter. Toute erreur de câblage peut être une source de danger et de panne.

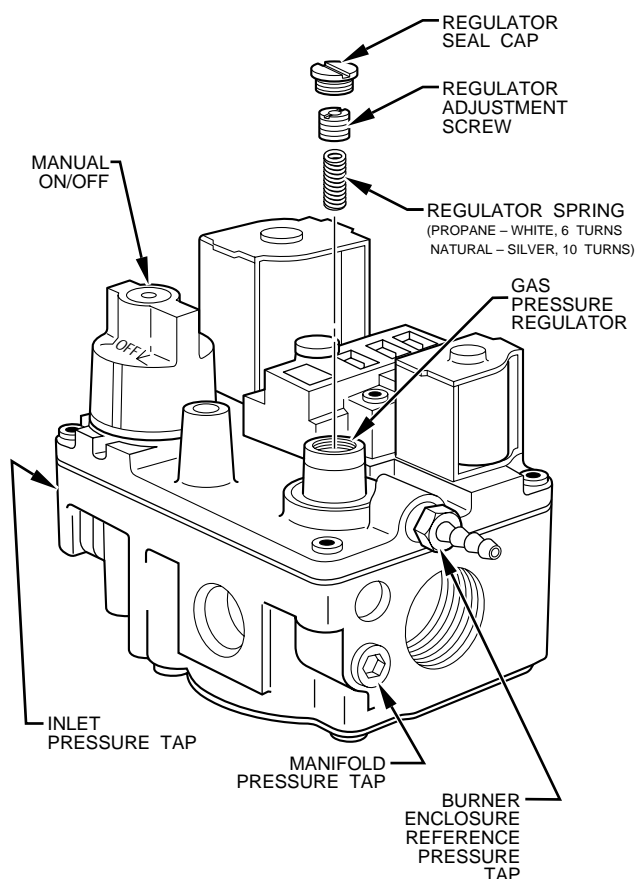
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6. Remove wires from gas valve. Note location for reassembly.
7. Remove burner enclosure pressure tube from gas valve regulator fitting. (See Fig. 14 and 15 or 16.)
8. Remove screws that secure manifold to burner enclosure and remove manifold, orifices, and gas valve as 1 assembly.
9. Remove and discard orifices from manifold.
10. Determine natural gas orifice size for correct input at installed altitude by using Table 9 or 10. (See also conversion kit rating plate 327751-204.)  
 Furnace gas input rate on rating plate is for installations at altitudes up to 2000 ft.  
 In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 2 percent for each 1000 ft above sea level.  
 In Canada, the input rating must be derated by 5 percent for altitudes of 2000 ft to 4500 ft above sea level.
  - a. Obtain yearly heat value average (at installed altitude) for local gas supply.
  - b. Obtain yearly specific gravity average for local gas supply.
  - c. Verify furnace model and size. Table 9 can only be used for 40-in. tall, multipoise, hot-surface ignition, condensing furnaces with heating sizes of 040 through 120. Table 10 can only be used for 40-in. tall, multipoise, hot-surface ignition, condensing furnaces with a 140 heating size.
  - d. Find installation altitude in Table 9 or 10.



A95622

**Fig. 15—Redundant Automatic Gas Valve (With Electric Control Switch)**



A96116

**Fig. 16—Redundant Automatic Gas Valve (With Manual Control Knob)**

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 9 or 10.

- e. Find closest natural gas heat value and specific gravity in Table 9 or 10.
- f. Follow heat value line and specific gravity line to point of intersection to find orifice size and manifold pressure settings for proper operation at given natural gas condition.

EXAMPLE: (Using Table 9 at 0—2000 ft altitude)  
Heat value = 1050 Btu/cu ft  
Specific gravity = 0.62  
Therefore: Orifice No. 45 is required.

11. Install properly sized orifices in manifold. DO NOT use Teflon tape. Finger-tighten each orifice 1 complete turn to prevent cross threading, then tighten with wrench. There are sufficient orifices for the largest size furnace. Discard extra orifices. Orifices of other sizes must be field-supplied and are available through your local distributor.

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**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**

---

12. Reinstall manifold, orifice, and gas valve assembly in burner box. Ensure manifold seal is installed properly and burners fit over orifices.
13. Reconnect wires to gas valve. Refer to furnace wire schematic for proper wire location.
14. Reinstall burner box pressure tube to gas valve regulator fitting.

**NOTE:** DO NOT reconnect gas supply or reinstall burner box cover at this time.

#### **PROCEDURE 2—CONVERT GAS VALVE**

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove regulator seal cap. (See Fig. 13, 15, or 16.)
3. Remove adjustment screw and propane gas regulator spring (white).
4. Install natural gas regulator spring (silver-10 turns) in gas valve.

→ **NOTE:** Discard labels and instructions packaged with White-Rodgers regulator spring conversion kit.

**NOTE:** DO NOT reinstall regulator seal cap at this time.

#### **PROCEDURE 3—CHECK INLET GAS PRESSURE**

**NOTE:** This kit is to be used only when inlet gas pressure is between 4.5-in. wc and 13.6-in. wc.

1. Be sure gas and electric supplies to furnace are off.
2. Remove 1/8-in. pipe plug from inlet pressure tap on gas valve. (See Fig. 13, 15, or 16.)
3. Attach manometer to inlet pressure tap on furnace gas valve. (See Fig. 15, 16, and 17.)

→ **⚠ CAUTION: DO NOT operate furnace more than 1 minute to check inlet gas pressure as conversion is not complete at this time. Failure to follow this caution may result in minor personal injury or product and property damage.**

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4. Turn gas supply manual shutoff valve to ON position.
5. Turn furnace gas valve control switch/knob to ON position.
6. Turn on furnace power supply.
7. Jumper R and W thermostat connections to call for heat.
8. When main burners ignite, confirm inlet gas pressure is between 4.5-in. wc and 13.6-in. wc.
9. Remove jumper across R and W thermostat connections to terminate call for heat.
10. Turn furnace gas valve control switch/knob to OFF position.
11. Turn gas supply manual shutoff valve to OFF position.
12. Turn off furnace power supply.
13. Remove manometer and reinstall gas valve inlet pressure tap plug.

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

#### **PROCEDURE 4—CHECK FURNACE OPERATION AND MAKE NECESSARY ADJUSTMENTS**

1. Be sure main gas and electric supplies to furnace are off.
2. Remove 1/8-in. pipe plug from manifold pressure tap on gas valve. (See Fig. 13, 15, or 16.)
3. Attach manometer to manifold pressure tap on gas valve.
4. Turn gas supply manual shutoff valve to ON position.
5. Turn furnace gas valve control switch/knob to ON position.

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**⚠ WARNING: NEVER use matches, candles, flame, or other sources of ignition to check for gas leakage. Use a soap-and-water solution to check for leaks. Failure to follow this warning could result in fire, explosion, personal injury, or death.**

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6. Check all threaded pipe connections for gas leaks.
7. Turn on furnace power supply.
8. Jumper R and W thermostat connections to call for heat.



Table 9 - Multipoise, Fixed-Speed, Condensing Furnace (040 through 120 Sizes Only)  
 Orifice Size and Manifold Pressure for Correct Input Rate  
 (TABULATED DATA BASED ON 20,000 BTUH PER BURNER, DERATED 2%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. and Canada	0 to 2000	900	43	3.5	43	3.6	43	3.8	42	3.2
		925	44	3.8	43	3.5	43	3.6	43	3.7
		950	44	3.6	44	3.8	43	3.4	43	3.5
		975	44	3.4	44	3.6	44	3.7	44	3.8
		1000	44	3.3	44	3.4	44	3.5	44	3.6
		1025	45	3.8	44	3.2	44	3.3	44	3.4
		1050	45	3.6	45	3.7	45	3.8	44	3.3
		1075	45	3.4	45	3.5	45	3.7	45	3.8
		1100	45	3.3	45	3.4	45	3.5	45	3.6
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	43	3.8	42	3.2	42	3.3	42	3.5
		825	43	3.6	43	3.7	43	3.8	42	3.2
		850	43	3.4	43	3.5	43	3.6	43	3.7
		875	44	3.7	44	3.8	43	3.4	43	3.5
		900	44	3.5	44	3.6	44	3.7	44	3.8
		925	44	3.3	44	3.4	44	3.5	44	3.6
		950	45	3.7	44	3.2	44	3.3	44	3.4
		975	45	3.6	45	3.7	45	3.8	44	3.2
		1000	45	3.4	45	3.5	45	3.6	45	3.7
U.S.A. Only	3001 to 4000	775	43	3.7	42	3.2	42	3.3	42	3.4
		800	43	3.5	43	3.6	43	3.8	42	3.2
		825	44	3.8	43	3.4	43	3.5	43	3.7
		850	44	3.6	44	3.7	44	3.8	43	3.4
		875	44	3.4	44	3.5	44	3.6	44	3.7
		900	44	3.2	44	3.3	44	3.4	44	3.5
		925	45	3.7	45	3.8	44	3.2	44	3.3
		950	45	3.5	45	3.6	45	3.7	45	3.8
U.S.A. Only	4001 to 5000	750	43	3.7	43	3.8	42	3.2	42	3.3
		775	43	3.5	43	3.6	43	3.7	43	3.8
		800	44	3.7	43	3.4	43	3.5	43	3.6
		825	44	3.5	44	3.6	44	3.7	43	3.4
		850	44	3.3	44	3.4	44	3.5	44	3.6
		875	45	3.8	44	3.2	44	3.3	44	3.4
		900	45	3.6	45	3.7	45	3.8	44	3.2
		925	45	3.4	45	3.5	45	3.6	45	3.7
U.S.A. Only	5001 to 6000	725	43	3.6	43	3.8	42	3.2	42	3.3
		750	43	3.4	43	3.5	43	3.6	43	3.8
		775	44	3.7	44	3.8	43	3.4	43	3.5
		800	44	3.4	44	3.6	44	3.7	44	3.8
		825	44	3.2	44	3.3	44	3.4	44	3.6
		850	45	3.7	45	3.8	44	3.2	44	3.4
		875	45	3.5	45	3.6	45	3.7	45	3.8
		900	45	3.3	45	3.4	45	3.5	45	3.6
U.S.A. Only	6001 to 7000	675	42	3.2	42	3.3	42	3.4	42	3.5
		700	43	3.6	43	3.7	43	3.8	42	3.3
		725	44	3.8	43	3.5	43	3.6	43	3.7
		750	44	3.6	44	3.7	44	3.8	43	3.5
		775	44	3.4	44	3.5	44	3.6	44	3.7
		800	45	3.8	44	3.3	44	3.4	44	3.5
		825	45	3.6	45	3.7	45	3.8	44	3.3
		850	45	3.4	45	3.5	45	3.6	45	3.7

Table 9 - Multipoise, Fixed-Speed, Condensing Furnace (040 through 120 Sizes Only)  
 Orifice Size and Manifold Pressure for Correct Input Rate  
 (TABULATED DATA BASED ON 20,000 BTUH PER BURNER, DERATED 2%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. Only	7001	650	43	3.8	42	3.2	42	3.4	42	3.5
		675	43	3.5	43	3.7	43	3.8	42	3.2
		700	44	3.8	43	3.4	43	3.5	43	3.6
	8000	725	44	3.5	44	3.6	44	3.8	43	3.4
		750	44	3.3	44	3.4	44	3.5	44	3.6
		775	45	3.7	44	3.2	44	3.3	44	3.4
		800	45	3.5	45	3.6	45	3.7	44	3.2
U.S.A. Only	8001	625	43	3.8	42	3.2	42	3.3	42	3.4
		650	43	3.5	43	3.6	43	3.8	42	3.2
		675	44	3.7	43	3.4	43	3.5	43	3.6
	9000	700	44	3.5	44	3.6	44	3.7	44	3.8
		725	44	3.2	44	3.4	44	3.5	44	3.6
		750	45	3.7	45	3.8	44	3.2	44	3.3
		775	45	3.4	45	3.6	45	3.7	45	3.8
U.S.A. Only	9001	600	43	3.8	42	3.2	42	3.3	42	3.4
		625	43	3.5	43	3.6	43	3.7	43	3.8
		650	44	3.7	44	3.8	43	3.4	43	3.6
	10000	675	44	3.4	44	3.5	44	3.7	44	3.8
		700	44	3.2	44	3.3	44	3.4	44	3.5
		725	45	3.6	45	3.7	45	3.8	44	3.3

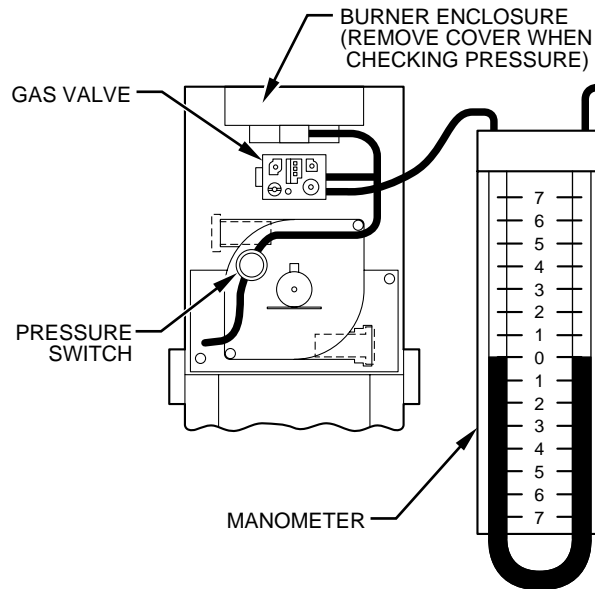


Fig. 17—Manometer Connection for Pressure Measurement  
 (Component Location May Vary Depending on Model)

9. When main burners ignite, check manifold orifices for gas leaks.

**PROCEDURE 5—SET GAS INPUT RATE**

Furnace gas input rate on rating plate is for installations at altitudes up to 2000 ft. (See conversion kit rating plate Fig. 4.)

In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 2 percent for each 1000 ft above sea level.

In Canada, the input rating must be derated by 5 percent for altitudes of 2000 ft to 4500 ft above sea level.

Furnace input rate must be within  $\pm 2$  percent of input on furnace rating plate.

1. Determine natural gas orifice size and manifold pressure for correct input.

a. Obtain yearly heat value average (at installed altitude) from local gas supplier.

Table 10 - Multipoise, Fixed-Speed, Condensing Furnace (140 Size Only)  
 Orifice Size and Manifold Pressure for Correct Input Rate  
 (TABULATED DATA BASED ON 23,000 BTUH PER BURNER, DERATED 2%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. and Canada	0 to 2000	900	42	3.8	41	3.6	41	3.7	41	3.8
		925	42	3.6	42	3.7	41	3.5	41	3.6
		950	42	3.4	42	3.6	42	3.7	42	3.8
		975	42	3.3	42	3.4	42	3.5	42	3.6
		1000	43	3.8	42	3.2	42	3.3	42	3.4
		1025	43	3.6	43	3.7	43	3.8	42	3.3
		1050	43	3.4	43	3.5	43	3.7	43	3.8
		1075	43	3.3	43	3.4	43	3.5	43	3.6
		1100	44	3.6	43	3.2	43	3.3	43	3.4
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	41	3.7	40	3.5	40	3.7	40	3.8
		825	41	3.5	41	3.6	41	3.7	40	3.6
		850	42	3.7	42	3.8	41	3.5	41	3.6
		875	42	3.5	42	3.6	42	3.7	42	3.8
		900	42	3.3	42	3.4	42	3.5	42	3.6
		925	43	3.8	42	3.2	42	3.3	42	3.4
		950	43	3.6	43	3.7	43	3.8	42	3.2
		975	43	3.4	43	3.5	43	3.6	43	3.7
		1000	43	3.2	43	3.3	43	3.4	43	3.6
U.S.A. Only	3001 to 4000	775	41	3.7	41	3.8	40	3.6	40	3.7
		800	42	3.8	41	3.6	41	3.7	41	3.8
		825	42	3.6	42	3.7	42	3.8	41	3.6
		850	42	3.4	42	3.5	42	3.6	42	3.7
		875	42	3.2	42	3.3	42	3.4	42	3.5
		900	43	3.7	43	3.8	42	3.2	42	3.3
		925	43	3.5	43	3.6	43	3.7	43	3.8
		950	43	3.3	43	3.4	43	3.5	43	3.6
U.S.A. Only	4001 to 5000	750	41	3.6	41	3.7	40	3.6	40	3.7
		775	42	3.8	41	3.5	41	3.6	41	3.7
		800	42	3.5	42	3.6	42	3.8	41	3.5
		825	42	3.3	42	3.4	42	3.5	42	3.7
		850	43	3.8	42	3.2	42	3.3	42	3.4
		875	43	3.6	43	3.7	43	3.8	42	3.3
		900	43	3.4	43	3.5	43	3.6	43	3.7
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		775	42	3.5	42	3.6	42	3.7	42	3.8
		800	42	3.2	42	3.4	42	3.5	42	3.6
		825	43	3.7	43	3.8	42	3.3	42	3.4
		850	43	3.5	43	3.6	43	3.7	42	3.2
		875	43	3.3	43	3.4	43	3.5	43	3.6
		900	43	3.1	43	3.2	43	3.3	43	3.5
U.S.A. Only	6001 to 7000	675	41	3.8	40	3.6	40	3.7	40	3.8
		700	41	3.5	41	3.6	41	3.8	40	3.6
		725	42	3.6	42	3.8	41	3.5	41	3.6
		750	42	3.4	42	3.5	42	3.6	42	3.7
		775	42	3.2	42	3.3	42	3.4	42	3.5
		800	43	3.6	43	3.8	42	3.2	42	3.3
		825	43	3.4	43	3.5	43	3.7	43	3.8
		850	43	3.2	43	3.3	43	3.4	43	3.6

Table 10 - Multipoise, Fixed-Speed, Condensing Furnace (140 Size Only)  
Orifice Size and Manifold Pressure for Correct Input Rate

(TABULATED DATA BASED ON 23,000 BTUH PER BURNER, DERATED 2%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. Only	7001	650	41	3.7	40	3.6	40	3.7	40	3.8
		675	41	3.5	41	3.6	41	3.7	41	3.8
		700	42	3.6	42	3.7	42	3.8	41	3.6
	8000	725	42	3.3	42	3.5	42	3.6	42	3.7
		750	43	3.8	42	3.2	42	3.3	42	3.4
		775	43	3.6	43	3.7	43	3.8	42	3.2
		800	43	3.3	43	3.5	43	3.6	43	3.7
U.S.A. Only	8001	825	43	3.1	43	3.2	43	3.4	43	3.5
		625	41	3.7	41	3.8	40	3.7	40	3.8
		650	42	3.8	41	3.6	41	3.7	41	3.8
	9000	675	42	3.5	42	3.7	42	3.8	41	3.5
		700	42	3.3	42	3.4	42	3.5	42	3.6
		725	43	3.7	42	3.2	42	3.3	42	3.4
		750	43	3.5	43	3.6	43	3.7	42	3.2
U.S.A. Only	9001	775	43	3.3	43	3.4	43	3.5	43	3.6
		600	41	3.7	41	3.8	40	3.6	40	3.8
	10000	625	42	3.8	41	3.5	41	3.6	41	3.8
		650	42	3.5	42	3.6	42	3.7	41	3.5
		675	42	3.2	42	3.4	42	3.5	42	3.6
10000	700	43	3.7	43	3.8	42	3.2	42	3.3	
	725	43	3.4	43	3.5	43	3.7	43	3.8	

- b. Obtain yearly specific gravity average from local gas supplier.
- c. Verify furnace model and size. Table 9 can only be used for 40-in. tall, multipoise, hot-surface ignition, condensing furnaces with heating sizes of 040 through 120. Table 10 can only be used for 40-in. tall, multipoise, hot-surface ignition, condensing furnaces with a 140 heating size.
- d. Find installation altitude in Table 9 or 10.

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 9 or 10.

- e. Find closest natural gas heat value and specific gravity in Table 9 or 10.
- f. Follow heat value and specific gravity lines to point of intersection to find orifice size and manifold pressure settings for proper operation.

EXAMPLE: (Using Table 9 at 0—2000 ft altitude)  
Heating value = 1050 Btu/cu ft  
Specific gravity = 0.62  
Therefore: Orifice No. 45, Manifold pressure 3.8-in. wc

- g. Check and verify burner orifice size in furnace. NEVER ASSUME ORIFICE SIZE. ALWAYS CHECK AND VERIFY.

2. Adjust manifold pressure to obtain input rate.

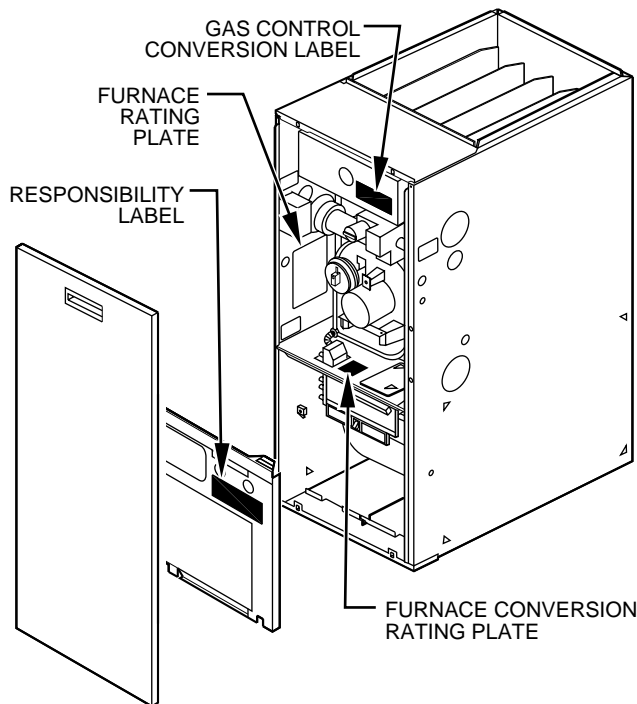
**NOTE:** Manifold pressure must always be measured with burner enclosure front REMOVED. Gas meter must always be clocked with burner enclosure front INSTALLED.

- a. Remove burner enclosure front.
- b. Remove cap that conceals adjustment screw for gas valve regulator. (See Fig. 13, 15, or 16.)
- c. Turn adjusting screw, counterclockwise (out) to decrease manifold pressure or clockwise (in) to increase manifold pressure.

**NOTE:** This furnace has been approved for a manifold pressure of 3.2-in. wc to 3.8-in. wc when installed at altitudes up to 2000 ft. For altitudes above 2000 ft, the manifold pressure can be adjusted from 2.0-in. wc to 3.8-in. wc.

**CAUTION:** DO NOT bottom out gas valve regulator adjusting screw. This can result in unregulated manifold pressure and result in excess overfire and heat exchanger failures.

**NOTE:** If orifice hole appears damaged or it is suspected to have been redrilled, check orifice hole with a numbered drill bit of correct size. Never redrill an orifice. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics.



A95025

**Fig. 18—Multipoise, Fixed-Speed, Condensing Furnace Conversion Label Location (Upflow Orientation Shown)**

**⚠ CAUTION: DO NOT** redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)

- d. Replace gas valve regulator adjustment screw cap.
  - e. Replace burner enclosure front and verify adjusted gas input rate using method outlined in item 3.
  - f. Look through sight glass in burner enclosure and check burner flame. Burner flame should be clear blue, almost transparent. (See Fig. 7.)
3. Verify natural gas input rate by clocking gas meter.

**NOTE:** Be sure all pressure tubing, combustion-air and vent pipes, and burner enclosure front are in place when checking input by clocking gas meter.

- a. Calculate high-altitude adjustment (if required).

**UNITED STATES**

At installation altitudes above 2000 ft, the input rate must be reduced by 2 percent for each 1000 ft above sea level. See Table 11 for derate multiplier factor and example.

**Table 11—Altitude Derate Multiplier for U.S.A.**

ALTITUDE (FT)	PERCENT OF DERATE	DERATE MULTIPLIER FACTOR FOR U.S.A.*
0-2000	0	1.00
2001-3000	4-6	0.95
3001-4000	6-8	0.93
4001-5000	8-10	0.91
5001-6000	10-12	0.89
6001-7000	12-14	0.87
7001-8000	14-16	0.85
8001-9000	16-18	0.83
9001-10,000	18-20	0.81

\*Derate multiplier factor is based on midpoint altitude for altitude range.

**CANADA**

At installation altitudes from 2000 to 4500 ft, this furnace must be derated 5 percent by an authorized Gas Conversion Station or Dealer. To determine correct input rate for altitude, see example and use 0.95 as derate multiplier factor.

**EXAMPLE:**

100,000 Btuh input furnace installed at 4300 ft.

Furnace Input Rate at Sea Level X Derate Multiplier Factor = Furnace Input Rate at Installation Altitude

$100,000 \times 0.91 = 91,000$

- b. Turn off all other gas appliances and pilots.
- c. Start furnace and let operate for 3 minutes.
- d. Measure time (in sec) for gas meter test dial to complete 1 revolution.
- e. Refer to Table 5 for cu ft of gas per hr.
- f. Multiply gas rate (cu ft/hr) X heating value (Btu/cu ft) using natural gas heating value from local gas utility/supplier.

**EXAMPLE:** (For all models at 0—2000 ft altitude)

Btu heating input = Btu/cu ft X cu ft/hr

Heating value of gas = 975 Btu/cu ft

Time for 1 revolution of 2-cu ft dial = 70 sec

Gas rate = 103 cu ft/hr (from Table 5)

Btu heating input =  $103 \times 975 = 100,425$  Btuh

In this example, the orifice size and manifold pressure adjustment is within  $\pm 2$  percent of the furnace input rate.

**NOTE:** Measured gas input must be within  $\pm 2$  percent of that stated on furnace rating plate when installed at sea level or derated per that stated above when installed at higher altitudes.

4. Remove jumper across R and W thermostat connections to terminate call for heat.
5. Turn furnace gas valve control switch/knob to OFF position.
6. Remove manometer and reinstall gas valve manifold pressure tap plug. (See Fig. 13 or 15 or 16 and 17.)

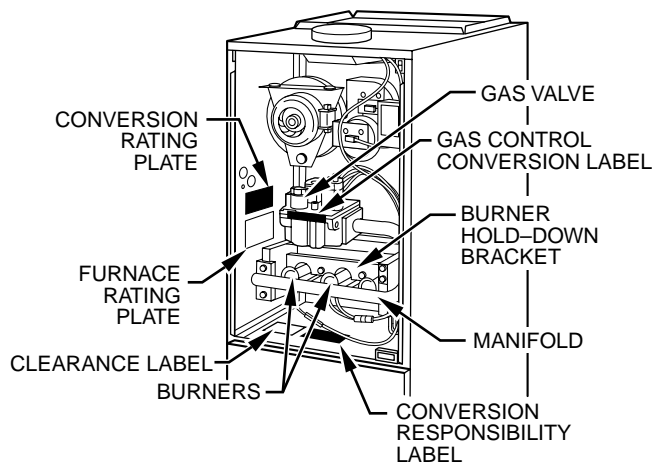
**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

7. Turn furnace gas valve control switch/knob to ON position.
8. Set room thermostat to call for heat.
9. Check inlet and manifold pressure tap plugs for gas leaks when main burners ignite.
10. Check for correct burner flame. (See Fig. 7.)
11. Observe unit through 2 complete heating cycles. See sequence of operation in furnace Installation, Start-Up, and Operating Instructions.
12. Set room thermostat to desired temperature.

**PROCEDURE 6—LABEL APPLICATION**

**NOTE:** See Fig. 18 for label location.

1. Fill in Conversion Responsibility Label (327751–205) and apply to blower access panel as shown. Date, name, and address of organization making conversion are required.
2. Apply Gas Control Conversion Label (327751–203) to burner enclosure cover as shown.
3. Apply Furnace Conversion Rating Plate (327751–204) to blower shelf as shown.
4. Reinstall main furnace door.



A99219

**Fig. 19—Upflow and Upflow/Horizontal, 2-Speed and Variable-Speed, Non-Condensing Furnace Components and Conversion Label Location**

**SECTION 4—MODELS 58DXT, 58TMA, 58TUA, 58UHV, 58UXT, 58UXV, 330AAV, 330JAV, 331AAV, 331JAV, 333BAV, AND 333JAV INDUCED-COMBUSTION, HOT-SURFACE IGNITION, 2-SPEED AND VARIABLE-SPEED, NON-CONDENSING FURNACES**

→ **⚠ WARNING:** This kit is not to be used with furnaces equipped with a gas valve that has a RED On/Off knob, P/N EF33CZ201. The RED On/Off valves are not dual-fuel gas valves and must be replaced with a new two-stage gas valve, not included with this kit. The new dual-fuel, two-stage gas valve for this furnace is available from your local distributor. Failure to follow this warning could result in fire, production of carbon monoxide, property damage, personal injury, or loss of life.

**PROCEDURE 1—INSTALL MAIN BURNER ORIFICES**

**NOTE:** See Fig. 19 or 20 for component location.

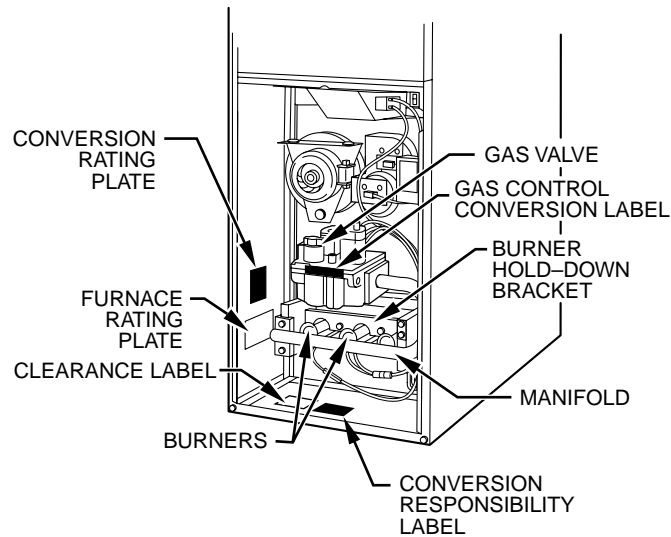
1. Turn off main furnace gas and electrical supplies.
2. Remove control access door.
3. Turn furnace gas valve switch to OFF position.
4. Remove burner hold-down bracket.
5. Remove burners from manifold.
6. Remove and discard orifices from manifold.
7. Determine natural gas orifice size for correct input at installed altitude by using Table 12 (for upflow and upflow/horizontal models) or Table 13 (for downflow and downflow/horizontal models). See also Fig. 22.  
Furnace gas input rate on rating plate is for installations at altitudes up to 2000 ft.  
In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level.  
In Canada, the input rating must be reduced by 10 percent for altitudes of 2000 ft to 4500 ft above sea level.
  - a. Obtain yearly heat value average (at installed altitude) for local gas supply.
  - b. Obtain yearly specific gravity average for local gas supply.
  - c. Verify furnace model and select appropriate table. Table 12 can only be used for upflow and upflow/horizontal, 2-speed and variable-speed, non-condensing furnaces. Table 13 can only be used for downflow and downflow/horizontal, 2-speed, non-condensing furnaces.
  - d. Find installation altitude in Table 12 (for upflow and upflow/horizontal models) or Table 13 (for downflow and downflow/horizontal models).

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 12 or 13.

- e. Find closest natural gas heat value and specific gravity in Table 12 (for upflow and upflow/horizontal models) or Table 13 (for downflow and downflow/horizontal models).
- f. Follow heat value line and specific gravity line to point of intersection to find orifice size and manifold pressure settings for proper operation at given natural gas condition.

EXAMPLE: (Using Table 12 at 0-2000 ft altitude)  
Heat value = 1050 Btu/cu ft  
Specific gravity = 0.62  
Therefore: Orifice No. 45 is required.

8. Install main burner orifices. DO NOT use Teflon tape. Finger-tighten orifices at least 1 full turn to prevent cross-threading, then tighten with wrench. There are enough orifices in each kit for the largest furnace. Discard extra orifices. Orifices of other sizes must be field supplied and are available through your local distributor.



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**Fig. 20—Downflow and Downflow/Horizontal, 2-Speed, Non-Condensing Furnace Components and Conversion Label Location**

**⚠ CAUTION: DO NOT** redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers, causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)

→ **NOTE:** Furnace models 58DXT, 58UXT, 330JAV, 331JAV, and 333JAV that reside in South Coast Air Quality Management District or Bay Area Air Quality Management District in California, or other areas that regulate NO<sub>x</sub> emissions below 40 ng/j for natural gas furnaces must be outfitted with NO<sub>x</sub> reducing device. Use kit number 322562-751 to convert to low NO<sub>x</sub> emissions furnace.

9. Reinstall main burners on manifold. Burners should be installed left to right to ensure proper alignment of the burner crossover slot. (See Fig. 10 for igniter position.)
10. Reinstall burner hold-down bracket.

→ **⚠ CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.**

**⚠ ATTENTION: Lors des opérations d'entretien des commandes, étiqueter tous les fils avant de les déconnecter. Toute erreur de câblage peut être une source de danger et de panne.**

11. Remove 2 wires to low-gas-pressure switch (LGPS).
12. Rewire unit low-pressure switch as follows:
  - a. Disconnect and discard yellow wire and splice connector attached to yellow wire from PL1-5 on control board.
  - b. Disconnect and discard yellow wire attached to NO terminal of low-pressure switch LPS located on inducer housing.
  - c. Connect yellow wire from PL1-5 on control board to NO terminal of low-pressure switch LPS located on inducer housing.
  - d. Refer to wiring label on furnace to ensure proper location of wires.
13. Be sure gas and electrical supplies to furnace are off.
14. Remove gas supply line from gas valve. The inlet gas pipe must be disconnected from valve so pressure switch can be removed.
15. Remove low-gas-pressure switch (LGPS), street elbow, and 1/8-in. pipe nipple from gas-valve inlet-pressure tap (See Fig. 21.) Reconnect gas supply line to gas valve.

**NOTE:** Use propane-gas-resistant pipe dope on all connections to prevent gas leaks. DO NOT use Teflon tape.

16. Apply pipe dope sparingly to 1/8-in. pipe plug (provided in kit) and install in 1/8-in. tapped inlet-pressure tap opening in gas valve.
17. Reconnect gas supply line to gas valve.

**PROCEDURE 2—PRE-ADJUST GAS VALVE**

→ **⚠ WARNING: This kit is not to be used with furnaces equipped with a gas valve that has a RED On/Off knob, P/N EF33CZ201. The RED On/Off valves are not dual-fuel gas valves and must be replaced with a new two-stage gas valve, not included with this kit. The new dual-fuel, two-stage gas valve for this furnace is available from your local distributor. Failure to follow this warning could result in fire, production of carbon monoxide, property damage, personal injury, or loss of life.**

**⚠ CAUTION: The gas valve must be pre-adjusted before operating on natural gas. Failure to follow this caution could result in excess overfire and short cycling. Heat exchanger failure will occur if left this way.**



Table 12 - Upflow and Upflow/Horizontal, 2-Speed and Variable Speed, Hot Surface Ignition,  
 Non-Condensing Furnace Orifice Size and Manifold Pressures for Correct Input Rate \*  
 (TABULATED DATA BASED ON 20,000 BTUH HIGH-HEAT / 13,000 BTUH LOW-HEAT PER BURNER,  
 DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low
U.S.A. and Canada	0 to 2000	900	43	3.5 / 1.5	43	3.6 / 1.5	43	3.8 / 1.6	42	3.2 / 1.3
		925	44	3.8 / 1.6	43	3.5 / 1.5	43	3.6 / 1.5	43	3.7 / 1.6
		950	44	3.6 / 1.5	44	3.8 / 1.6	43	3.4 / 1.4	43	3.5 / 1.5
		975	44	3.4 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6	44	3.8 / 1.6
		1000	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5	44	3.6 / 1.5
		1025	45	3.8 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.5
		1050	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6	44	3.3 / 1.4
		1075	45	3.4 / 1.4	45	3.5 / 1.5	45	3.7 / 1.5	45	3.8 / 1.6
		1100	45	3.3 / 1.4	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	43	3.4 / 1.4	43	3.5 / 1.5	43	3.7 / 1.5	43	3.8 / 1.6
		825	44	3.7 / 1.6	44	3.8 / 1.6	43	3.4 / 1.5	43	3.5 / 1.5
		850	44	3.5 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6	44	3.8 / 1.6
		875	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5	44	3.6 / 1.5
		900	45	3.7 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.4
		925	45	3.5 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6	44	3.2 / 1.4
		950	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6
		975	45	3.2 / 1.3	45	3.3 / 1.4	45	3.4 / 1.4	45	3.5 / 1.5
		1000	47	3.6 / 1.5	47	3.7 / 1.6	45	3.2 / 1.4	45	3.4 / 1.4
U.S.A. Only	3001 to 4000	775	44	3.7 / 1.6	44	3.8 / 1.6	43	3.4 / 1.4	43	3.5 / 1.5
		800	44	3.5 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6	44	3.8 / 1.6
		825	44	3.2 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5	44	3.6 / 1.5
		850	45	3.7 / 1.6	45	3.8 / 1.6	44	3.3 / 1.4	44	3.4 / 1.4
		875	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6	44	3.2 / 1.3
		900	45	3.3 / 1.4	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5
		925	47	3.7 / 1.6	45	3.2 / 1.4	45	3.3 / 1.4	45	3.4 / 1.5
		950	47	3.5 / 1.5	47	3.6 / 1.5	45	3.2 / 1.3	45	3.3 / 1.4
U.S.A. Only	4001 to 5000	750	44	3.4 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6	44	3.8 / 1.6
		775	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.5	44	3.6 / 1.5
		800	45	3.7 / 1.5	45	3.8 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4
		825	45	3.4 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6
		850	45	3.2 / 1.4	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5
		875	47	3.6 / 1.5	45	3.2 / 1.3	45	3.3 / 1.4	45	3.4 / 1.4
		900	47	3.4 / 1.5	47	3.6 / 1.5	47	3.7 / 1.6	45	3.2 / 1.3
		925	48	3.7 / 1.6	48	3.8 / 1.6	47	3.5 / 1.5	47	3.6 / 1.5
U.S.A. Only	5001 to 6000	725	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5
		750	45	3.6 / 1.5	45	3.8 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4
		775	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6
		800	45	3.2 / 1.3	45	3.3 / 1.4	45	3.4 / 1.4	45	3.5 / 1.5
		825	47	3.6 / 1.5	47	3.7 / 1.6	45	3.2 / 1.4	45	3.3 / 1.4
		850	48	3.8 / 1.6	47	3.5 / 1.5	47	3.6 / 1.5	47	3.7 / 1.6
		875	48	3.6 / 1.5	48	3.7 / 1.6	47	3.4 / 1.4	47	3.5 / 1.5
		900	48	3.4 / 1.4	48	3.5 / 1.5	48	3.7 / 1.5	48	3.8 / 1.6
U.S.A. Only	6001 to 7000	675	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5
		700	45	3.6 / 1.5	45	3.7 / 1.6	44	3.2 / 1.3	44	3.3 / 1.4
		725	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6
		750	47	3.7 / 1.6	45	3.3 / 1.4	45	3.4 / 1.4	45	3.5 / 1.5
		775	47	3.5 / 1.5	47	3.6 / 1.5	47	3.7 / 1.6	45	3.2 / 1.4
		800	48	3.7 / 1.6	47	3.4 / 1.4	47	3.5 / 1.5	47	3.6 / 1.5
		825	48	3.5 / 1.5	48	3.6 / 1.5	48	3.8 / 1.6	47	3.4 / 1.4
		850	48	3.3 / 1.4	48	3.4 / 1.4	48	3.5 / 1.5	48	3.7 / 1.5

Table 12 - Upflow and Upflow/Horizontal, 2-Speed and Variable Speed, Hot Surface Ignition,  
 Non-Condensing Furnace Orifice Size and Manifold Pressures for Correct Input Rate \*  
 (TABULATED DATA BASED ON 20,000 BTUH HIGH-HEAT / 13,000 BTUH LOW-HEAT PER BURNER,  
 DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low
U.S.A. Only	7001	650	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6	44	3.3 / 1.4
		675	45	3.3 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6
		700	47	3.7 / 1.6	45	3.2 / 1.4	45	3.3 / 1.4	45	3.4 / 1.4
	8000	725	47	3.4 / 1.5	47	3.6 / 1.5	47	3.7 / 1.6	45	3.2 / 1.3
		750	48	3.7 / 1.5	48	3.8 / 1.6	47	3.4 / 1.5	47	3.6 / 1.5
		775	48	3.4 / 1.5	48	3.6 / 1.5	48	3.7 / 1.6	48	3.8 / 1.6
		800	49	3.8 / 1.6	48	3.3 / 1.4	48	3.4 / 1.5	48	3.6 / 1.5
U.S.A. Only	8001	625	45	3.3 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6
		650	47	3.7 / 1.6	45	3.2 / 1.3	45	3.3 / 1.4	45	3.4 / 1.4
		675	47	3.4 / 1.4	47	3.5 / 1.5	47	3.6 / 1.5	45	3.2 / 1.3
	9000	700	48	3.6 / 1.5	48	3.7 / 1.6	47	3.4 / 1.4	47	3.5 / 1.5
		725	48	3.4 / 1.4	48	3.5 / 1.5	48	3.6 / 1.5	48	3.7 / 1.6
		750	49	3.7 / 1.6	49	3.8 / 1.6	48	3.4 / 1.4	48	3.5 / 1.5
		775	49	3.5 / 1.5	49	3.6 / 1.5	49	3.7 / 1.6	49	3.8 / 1.6
U.S.A. Only	9001	600	47	3.7 / 1.5	45	3.2 / 1.3	45	3.3 / 1.4	45	3.4 / 1.4
		625	48	3.8 / 1.6	47	3.5 / 1.5	47	3.6 / 1.5	47	3.7 / 1.6
	10000	650	48	3.5 / 1.5	48	3.7 / 1.6	48	3.8 / 1.6	47	3.4 / 1.5
		675	48	3.3 / 1.4	48	3.4 / 1.4	48	3.5 / 1.5	48	3.6 / 1.5
		700	49	3.6 / 1.5	49	3.7 / 1.6	49	3.8 / 1.6	48	3.4 / 1.4
		725	49	3.4 / 1.4	49	3.5 / 1.5	49	3.6 / 1.5	49	3.7 / 1.6

1. Be sure gas and electrical supplies to furnace are off.
2. Remove caps that conceal adjustment screws for high- and low-heat stage gas valve regulators. (See Fig. 21.)
3. Turn **low-heat** stage-adjusting screw (3/32-in. hex allen wrench) **counterclockwise (out) 1 full turn**. This will reduce the manifold pressure closer to the natural gas set point.
4. Turn **high-heat** stage-adjusting screw (3/32-in. hex allen wrench) **counterclockwise (out) 2 full turns**. This will reduce the manifold pressure closer to the natural gas set point.
5. Replace caps that conceal gas-valve-regulator adjustment screws.

### PROCEDURE 3—CHECK INLET GAS PRESSURE

**NOTE:** This kit is to be used only when inlet gas pressure is between 4.5- and 13.6-in. wc.

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove 1/8-in. pipe plug from inlet-pressure tap on gas valve. (See Fig. 21.)
3. Attach manometer to inlet-pressure tap on gas valve. (See Fig. 21 and 17.)

→ **CAUTION:** DO NOT operate furnace more than 1 minute to check inlet gas pressure as conversion is not complete at this time. Failure to follow this caution may result in minor personal injury or product and property damage.

4. Turn on furnace power supply.
5. Turn gas supply manual-shutoff valve to ON position.
6. Turn furnace gas-valve switch to ON position.
7. Jumper R-W/W1 and R-W2 thermostat connections on control. (See Fig. 23 or 33.) This runs the furnace in high heat.
8. When main burners ignite, confirm inlet-gas pressure is between 4.5-in. wc and 13.6-in. wc.
9. Remove jumper across R-W/W1 and R-W2 thermostat connections to terminate call for heat.
10. Turn furnace gas-valve switch to OFF position.
11. Turn gas supply manual-shutoff valve to OFF position.
12. Turn off furnace power supply.
13. Remove manometer and reinstall gas-valve inlet-pressure tap plug. (See Fig. 21.)

Table 13 - Downflow and Downflow/Horizontal, 2-Speed, Hot Surface Ignition,  
 Non-Condensing Furnace Orifice Size and Manifold Pressures for Correct Input Rate \*  
 (TABULATED DATA BASED ON 21,000 BTUH HIGH-HEAT / 13,500 BTUH LOW-HEAT PER BURNER,  
 DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low
U.S.A. and Canada	0 to 2000	900	42	3.2 / 1.3	42	3.3 / 1.4	42	3.4 / 1.4	42	3.5 / 1.5
		925	43	3.7 / 1.5	43	3.8 / 1.6	42	3.2 / 1.3	42	3.3 / 1.4
		950	43	3.5 / 1.4	43	3.6 / 1.5	43	3.7 / 1.5	43	3.8 / 1.6
		975	43	3.3 / 1.4	43	3.4 / 1.4	43	3.5 / 1.5	43	3.7 / 1.5
		1000	44	3.6 / 1.5	43	3.3 / 1.3	43	3.4 / 1.4	43	3.5 / 1.4
		1025	44	3.4 / 1.4	44	3.6 / 1.5	43	3.2 / 1.3	43	3.3 / 1.4
		1050	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.4	43	3.2 / 1.3
		1075	45	3.8 / 1.6	44	3.2 / 1.3	44	3.3 / 1.4	44	3.4 / 1.4
		1100	46	3.8 / 1.6	45	3.7 / 1.5	44	3.2 / 1.3	44	3.3 / 1.4
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	43	3.8 / 1.6	42	3.2 / 1.3	42	3.3 / 1.4	42	3.4 / 1.4
		825	43	3.5 / 1.5	43	3.7 / 1.5	43	3.8 / 1.6	42	3.2 / 1.3
		850	43	3.3 / 1.4	43	3.5 / 1.4	43	3.6 / 1.5	43	3.7 / 1.5
		875	43	3.2 / 1.3	43	3.3 / 1.3	43	3.4 / 1.4	43	3.5 / 1.4
		900	44	3.4 / 1.4	44	3.5 / 1.5	43	3.2 / 1.3	43	3.3 / 1.4
		925	44	3.2 / 1.3	44	3.3 / 1.4	44	3.5 / 1.4	44	3.6 / 1.5
		950	45	3.7 / 1.5	45	3.8 / 1.6	44	3.3 / 1.4	44	3.4 / 1.4
		975	46	3.7 / 1.5	46	3.8 / 1.6	45	3.8 / 1.6	44	3.2 / 1.3
		1000	46	3.5 / 1.5	46	3.6 / 1.5	46	3.8 / 1.6	45	3.7 / 1.5
U.S.A. Only	3001 to 4000	775	43	3.5 / 1.5	43	3.7 / 1.5	43	3.8 / 1.6	42	3.2 / 1.3
		800	43	3.3 / 1.4	43	3.4 / 1.4	43	3.5 / 1.5	43	3.7 / 1.5
		825	44	3.6 / 1.5	43	3.2 / 1.3	43	3.3 / 1.4	43	3.4 / 1.4
		850	44	3.4 / 1.4	44	3.5 / 1.4	44	3.6 / 1.5	43	3.2 / 1.3
		875	45	3.8 / 1.6	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5
		900	46	3.8 / 1.6	45	3.8 / 1.6	44	3.2 / 1.3	44	3.3 / 1.4
		925	46	3.6 / 1.5	46	3.7 / 1.5	45	3.7 / 1.5	45	3.8 / 1.6
		950	46	3.4 / 1.4	46	3.5 / 1.5	46	3.7 / 1.5	46	3.8 / 1.6
U.S.A. Only	4001 to 5000	750	43	3.3 / 1.4	43	3.4 / 1.4	43	3.5 / 1.5	43	3.6 / 1.5
		775	44	3.6 / 1.5	43	3.2 / 1.3	43	3.3 / 1.4	43	3.4 / 1.4
		800	44	3.3 / 1.4	44	3.4 / 1.4	44	3.6 / 1.5	43	3.2 / 1.3
		825	45	3.8 / 1.6	44	3.2 / 1.3	44	3.4 / 1.4	44	3.5 / 1.4
		850	46	3.8 / 1.6	45	3.7 / 1.5	45	3.8 / 1.6	44	3.3 / 1.3
		875	46	3.5 / 1.5	46	3.7 / 1.5	46	3.8 / 1.6	45	3.7 / 1.5
		900	47	3.8 / 1.6	46	3.5 / 1.4	46	3.6 / 1.5	46	3.7 / 1.5
		925	47	3.6 / 1.5	47	3.7 / 1.5	47	3.8 / 1.6	46	3.5 / 1.4
U.S.A. Only	5001 to 6000	725	44	3.5 / 1.5	43	3.2 / 1.3	43	3.3 / 1.4	43	3.4 / 1.4
		750	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5	43	3.2 / 1.3
		775	45	3.7 / 1.5	44	3.2 / 1.3	44	3.3 / 1.4	44	3.4 / 1.4
		800	46	3.7 / 1.5	46	3.8 / 1.6	45	3.8 / 1.6	44	3.2 / 1.3
		825	46	3.5 / 1.4	46	3.6 / 1.5	46	3.7 / 1.5	46	3.8 / 1.6
		850	47	3.7 / 1.5	47	3.8 / 1.6	46	3.5 / 1.4	46	3.6 / 1.5
		875	47	3.5 / 1.4	47	3.6 / 1.5	47	3.7 / 1.5	46	3.4 / 1.4
		900	48	3.8 / 1.6	47	3.4 / 1.4	47	3.5 / 1.5	47	3.7 / 1.5
U.S.A. Only	6001 to 7000	675	44	3.5 / 1.5	43	3.2 / 1.3	43	3.3 / 1.4	43	3.4 / 1.4
		700	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5	43	3.2 / 1.3
		725	45	3.7 / 1.5	45	3.8 / 1.6	44	3.3 / 1.4	44	3.4 / 1.4
		750	46	3.6 / 1.5	46	3.8 / 1.6	45	3.7 / 1.5	45	3.8 / 1.6
		775	46	3.4 / 1.4	46	3.5 / 1.5	46	3.6 / 1.5	46	3.8 / 1.6
		800	47	3.6 / 1.5	47	3.8 / 1.5	46	3.4 / 1.4	46	3.5 / 1.5
		825	47	3.4 / 1.4	47	3.5 / 1.5	47	3.6 / 1.5	47	3.8 / 1.6
		850	48	3.7 / 1.5	48	3.8 / 1.6	47	3.4 / 1.4	47	3.5 / 1.5

Table 13 - Downflow and Downflow/Horizontal, 2-Speed, Hot Surface Ignition,  
 Non-Condensing Furnace Orifice Size and Manifold Pressures for Correct Input Rate \*  
 (TABULATED DATA BASED ON 21,000 BTUH HIGH-HEAT / 13,500 BTUH LOW-HEAT PER BURNER,  
 DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Mnfl'd Press High/Low	Orifice No.	Mnfl'd Press High/Low	Orifice No.	Mnfl'd Press High/Low	Orifice No.	Mnfl'd Press High/Low
U.S.A. Only	7001	650	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.4	43	3.2 / 1.3
		675	45	3.7 / 1.5	45	3.8 / 1.6	44	3.3 / 1.3	44	3.4 / 1.4
		700	46	3.6 / 1.5	46	3.7 / 1.5	46	3.8 / 1.6	45	3.8 / 1.6
	8000	725	47	3.8 / 1.6	46	3.5 / 1.4	46	3.6 / 1.5	46	3.7 / 1.5
		750	47	3.5 / 1.5	47	3.7 / 1.5	47	3.8 / 1.6	46	3.5 / 1.4
		775	48	3.8 / 1.6	47	3.4 / 1.4	47	3.6 / 1.5	47	3.7 / 1.5
		800	48	3.6 / 1.5	48	3.7 / 1.5	48	3.8 / 1.6	47	3.4 / 1.4
U.S.A. Only	8001	625	45	3.7 / 1.5	45	3.8 / 1.6	44	3.3 / 1.3	44	3.4 / 1.4
		650	46	3.6 / 1.5	46	3.7 / 1.5	46	3.8 / 1.6	45	3.8 / 1.6
		675	47	3.8 / 1.6	46	3.4 / 1.4	46	3.5 / 1.5	46	3.7 / 1.5
	9000	700	47	3.5 / 1.4	47	3.6 / 1.5	47	3.7 / 1.5	46	3.4 / 1.4
		725	48	3.7 / 1.5	48	3.8 / 1.6	47	3.5 / 1.4	47	3.6 / 1.5
		750	48	3.5 / 1.4	48	3.6 / 1.5	48	3.7 / 1.5	48	3.8 / 1.6
U.S.A. Only	9001	600	46	3.6 / 1.5	46	3.7 / 1.5	46	3.8 / 1.6	45	3.7 / 1.5
		625	47	3.7 / 1.5	47	3.8 / 1.6	46	3.5 / 1.4	46	3.6 / 1.5
		650	47	3.4 / 1.4	47	3.6 / 1.5	47	3.7 / 1.5	47	3.8 / 1.6
	10000	700	48	3.4 / 1.4	48	3.5 / 1.4	48	3.6 / 1.5	48	3.7 / 1.5
		725	49	3.7 / 1.5	49	3.8 / 1.6	48	3.4 / 1.4	48	3.5 / 1.4

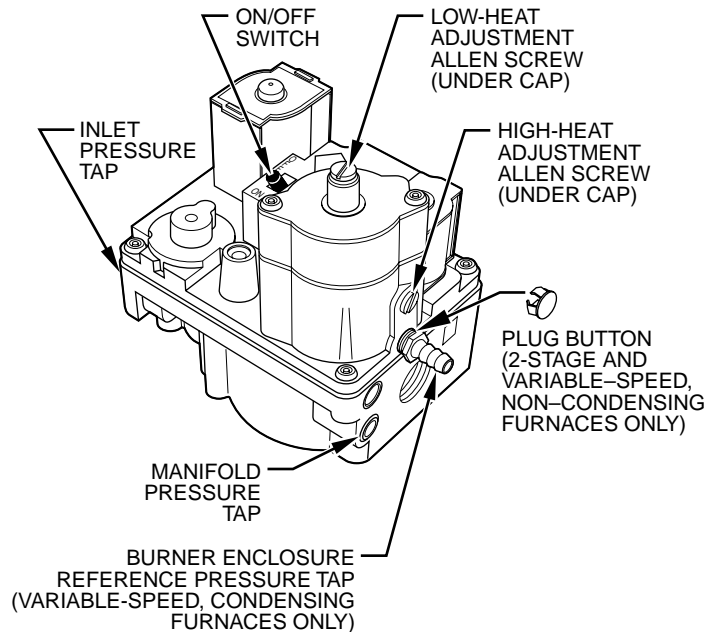


Fig. 21—Redundant Automatic 2-Stage Gas Valve  
 (No Regulator Spring Required)

A01213

**NOTE:** Use propane-gas-resistant pipe dope on all connections to prevent gas leaks. DO NOT use Teflon tape.

**PROCEDURE 4—CHECK FURNACE OPERATION AND MAKE NECESSARY ADJUSTMENTS**

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove 1/8-in. pipe plug from manifold pressure tap on downstream side of gas valve. (See Fig. 21.)
3. Attach manometer to manifold-pressure tap on gas valve. (See Fig. 21 and 17.)

## CONVERSION KIT RATING PLATE - CARRIER CORP.

THIS APPLIANCE HAS BEEN CONVERTED TO USE NATURAL GAS FOR FUEL. REFER TO KIT INSTRUCTIONS FOR CONVERSION PROCEDURES. USE PARTS SUPPLIED BY CARRIER CORPORATION AND INSTALLED BY QUALIFIED PERSONNEL. SEE EXISTING RATING PLATE FOR APPLIANCE MODEL NO. AND INPUT RATING.

NOTE: Furnace gas input rate on rating plate is for installations up to 2000 ft. above sea level. In U.S.A. the input rating for altitudes above 2000 ft. must be derated (per chart below) for each 1000 ft above sea level. In Canada the input rating must be derated (per chart below) for altitudes of 2000 ft. to 4500 ft. above sea level.

KIT NO. KGAPN2301ALL (SUPERSEDES: KGAPN1601ALL, KGAPN21012SP, KGAPN2201ALL)

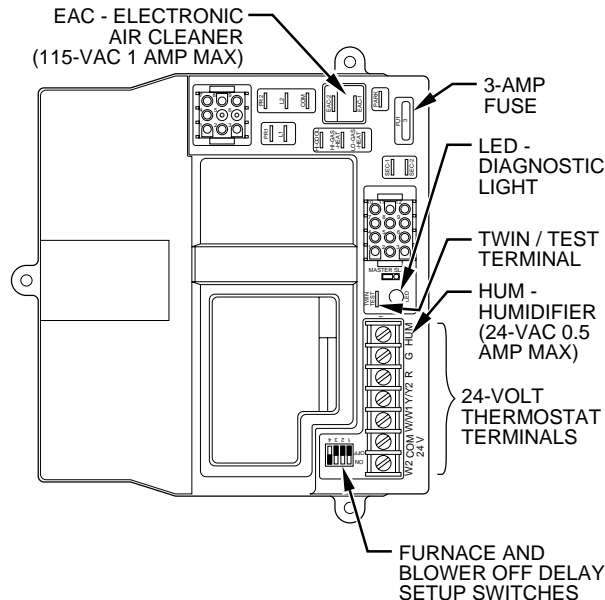
FUEL USED: NATURAL GAS

APPLIANCE MODELS	USA % DERATE PER 1000 FT	CANADA % DERATE FOR 2000-4500 FT	NATURAL GAS PRESSURE	
			IN. W.C. (PO C.E.)	Pa
352MAV, 355MAV, 58MTA, 58MVP,	2%	5%	13.6	3,386
312AAV, 312JAV, 315AAV, 315JAV, 330AAV, 330JAV, 331AAV, 331JAV, 333BAV, 333JAV, 58CTA, 58CTX, 58CVA, 58CVX, 58DXT, 58TMA, 58TUA, 58UHV, 58UXT, 58UXV	4%	10%	4.5	1,121
			(For Purpose of Input Adjustment) (Pour L'Adjustment D'Entree)	
			Altitude	
Manifold			0-2,000 ft. (0 - 610 m)	High Heat 3.2 - 3.8 797 - 946
				Low Heat 1.4 - 1.8 349 - 448
Pression Tubulure			2,000 - 10,000 ft. (610 - 3050 m)	Refer to installation manual Respecter les instruction D'Installation

327751-201 REV. B

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→ **Fig. 22—Conversion Rating-Plate Label (Used for Orifice Size Selection for Natural Gas, Hot Surface Ignition, Two-Speed and Variable Speed Furnaces)**



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**Fig. 23—Furnace Control Center for 2-Speed Condensing Furnace and 2-Speed/Variable Speed Non-Condensing Furnaces**

4. Turn gas supply manual-shutoff valve to ON position.
5. Turn furnace gas-valve switch to ON position.

**⚠ WARNING: NEVER use matches, candles, flame, or other sources of ignition to check for gas leakage. Use a soap-and-water solution to check for leaks. Failure to follow this warning could result in fire, explosion, personal injury, or death.**

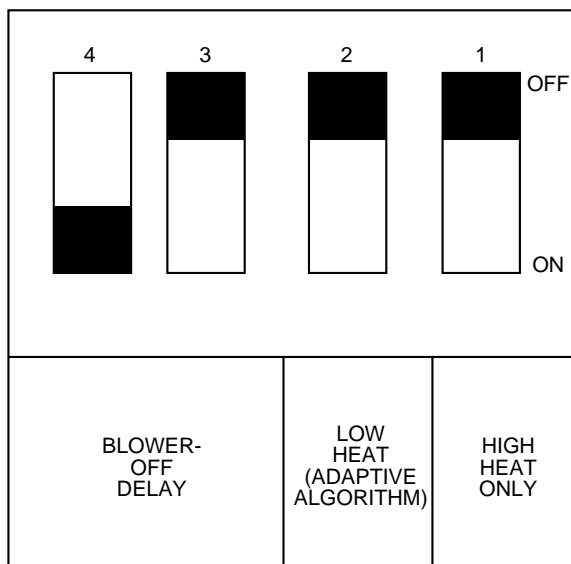
6. Check all threaded pipe connections for gas leaks.
7. Turn on furnace power supply.
- 8. Turn setup switch SW-2 (See Fig. 23 and 24) or switch SW1 (See Fig. 33) on control board to ON position. This keeps furnace in low-heat.
9. Jumper R and W/W1 thermostat connections to call for heat.
10. Check manifold orifices for gas leaks when main burners ignite.

### PROCEDURE 5—SET GAS INPUT RATE

Furnace gas input rate on rating plate is for installations at altitudes up to 2000 ft.

In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level.

In Canada, the input rating must be derated by 10 percent for altitudes of 2000 ft to 4500 ft above sea level.



A96402

**Fig. 24—Setup Switches on Furnace Control for 2-Speed Condensing Furnace and 2-Speed/Variable Speed Non-Condensing Furnaces (Factory Settings Shown)**

Furnace input rate must be within  $\pm 2$  percent of input on furnace rating plate.

The gas input rate must be set for both high- and low-heat stage. Each adjustment is made independently at the gas control regulators.

1. Determine natural gas orifice size and manifold pressure for correct input using Table 12 (for upflow and upflow/horizontal models) or Table 13 (for downflow and downflow/horizontal models).
  - a. Obtain yearly heat-value average (at installed altitude) from local gas supplier.
  - b. Obtain yearly specific-gravity average from local gas supplier.
  - c. Verify furnace model and select appropriate table. Table 12 can only be used for upflow and upflow/horizontal, 2-speed and variable-speed, hot-surface ignition, non-condensing furnaces. Table 13 can only be used for downflow and downflow/horizontal, 2-speed, hot-surface ignition, non-condensing furnaces.
  - d. Find installation altitude in Table 12 (for upflow and upflow/horizontal models) or Table 13 (for downflow and downflow/horizontal models).

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Tables 12 or 13.

- e. Find closest natural gas heat value and specific gravity in Table 12 (for upflow and upflow/horizontal models) or Table 13 (for downflow and downflow/horizontal models).
- f. Follow heat-value and specific-gravity lines to point of intersection to find orifice size and low- and high-heat stage manifold-pressure settings for proper operation.

EXAMPLE: (Using Table 12 for upflow or upflow/horizontal furnace at 0—2000 ft altitude)  
 Heating value = 1050 Btu/cu ft  
 Specific gravity = 0.62  
 Therefore: Orifice No. 45, Manifold pressure 3.8-in. wc for high-heat stage and 1.6-in. wc for low-heat stage

- g. Check and verify burner orifice size in furnace. NEVER ASSUME ORIFICE SIZE. ALWAYS CHECK AND VERIFY.

2. Adjust manifold pressure to obtain input rate.

**NOTE:** Low heat must be adjusted before high-heat.

- a. Remove caps that conceal adjustment screws for high- and low-heat stage gas valve regulators. (See Fig. 21.)
- b. Turn low-heat stage-adjusting screw (3/32-in. hex allen wrench) counterclockwise (out) to decrease input rate or clockwise (in) to increase rate.

**NOTE:** DO NOT set low-heat manifold pressure less than 1.3-in. wc or more than 1.7-in. wc for natural gas. If manifold pressure is outside this range, change main burner orifices.

**CAUTION:** DO NOT bottom out gas-valve regulator adjusting screw. This can result in unregulated manifold pressure and result in excess overfire and heat exchanger failures.

**NOTE:** If orifice hole appears damaged or it is suspected to have been redrilled, check orifice hole with a numbered drill bit of correct size. Never redrill an orifice. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics.

**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**

- c. Jumper R and W2 thermostat connections on control. (See Fig. 23 or 33.) This keeps furnace in high-heat.
- d. Turn high-heat stage-adjusting screw (3/32 hex Allen wrench) counterclockwise (out) to decrease input rate or clockwise (in) to increase input rate.

**NOTE:** DO NOT set high-heat manifold pressure less than 3.2-in. wc or more than 3.8-in. wc maximum for natural gas. If manifold pressure is outside this range, change main burner orifices.

- e. Remove jumper across R-W/W1 and R-W2 thermostat connections after high-heat stage adjustments.
  - f. Replace gas-valve regulator-adjustment screw caps.
  - g. Turn setup switch SW-2 (See Fig. 23 and 24) or switch SW1 (See Fig. 33) on control board to OFF position.
3. Verify natural gas input rate by clocking gas meter.
- a. Calculate high-altitude adjustment (if required).

**UNITED STATES**

At installation altitudes above 2000 ft, input rate must be reduced by 4 percent for each 1000 ft above sea level. See Table 14 for derate multiplier factor and example.

**Table 14—Altitude Derate Multiplier for U.S.A.**

ALTITUDE (FT)	PERCENT OF DERATE	DERATE MULTIPLIER FACTOR FOR U.S.A.*
0-2000	0	1.00
2001-3000	8-12	0.90
3001-4000	12-16	0.86
4001-5000	16-20	0.82
5001-6000	20-24	0.78
6001-7000	24-28	0.74
7001-8000	28-32	0.70
8001-9000	32-36	0.66
9001-10,000	36-40	0.62

\*Derate multiplier factor is based on midpoint altitude for altitude range.

**CANADA**

At installation altitudes from 2000 to 4500 ft, this furnace must be derated 10 percent by an authorized Gas Conversion Station or Dealer. To determine correct input rate for altitude, see example and use 0.90 as derate multiplier factor.

EXAMPLE: (For upflow and upflow/horizontal furnaces) U.S.A.  
 80,000 Btuh input furnace installed at 4300 ft.  
 Furnace Input Rate at Sea Level X Derate Multiplier Factor = Furnace Input Rate at Installation Altitude  
 80,000 X 0.82 = 65,600

**NOTE:** Low-heat must be adjusted before high-heat.

- b. Turn off all other gas appliances and pilots.
- c. Turn setup switch SW-2 (See Fig. 23 and 24) or switch SW1 (See Fig. 33) on control board to ON position. This keeps furnace in low-heat.
- d. Jumper R and W/W1 thermostat connections.
- e. Let furnace operate for 3 minutes in low-heat stage.
- f. Measure time (in sec) for gas-meter test dial to complete 1 revolution.
- g. Measure time (in sec) for gas-meter test dial to complete 1 revolution.
- h. Multiply gas rate (cu ft/hr) X heating value (Btu/cu ft) using natural gas heating value from local gas utility/supplier.

EXAMPLE: (Low-heat operation for upflow and upflow/horizontal furnaces at 0—2000 ft altitude)  
 Furnace input for low heat from rating plate is 52,000 Btuh.  
 Btu heating input = Btu/cu ft X cu ft/hr  
 Heating value of gas = 975 Btu/cu ft  
 Time for 1 revolution of 1-cu ft dial = 68 sec  
 Gas rate = 53 cu ft/hr (from Table 15)  
 Btu heating input = 53 X 975 = 51,675 Btuh  
 In this example, the orifice size and manifold pressure adjustment are within ±2 percent of the furnace input rate.

- i. Jumper R and W2 thermostat connections and repeat items e through h for high-heat stage.

**Table 15—Gas Rate (Cu Ft/Hr)**

SECONDS FOR 1 REVOLUTION	SIZE OF TEST DIAL			SECONDS FOR 1 REVOLUTION	SIZE OF TEST DIAL		
	1 Cu Ft	2 Cu Ft	5 Cu Ft		1 Cu Ft	2 Cu Ft	5 Cu Ft
10	360	720	1800	50	72	144	360
11	327	655	1636	51	71	141	355
12	300	600	1500	52	69	138	346
13	277	555	1385	53	68	136	340
14	257	514	1286	54	67	133	333
15	240	480	1200	55	65	131	327
16	225	450	1125	56	64	129	321
17	212	424	1059	57	63	126	316
18	200	400	1000	58	62	124	310
19	189	379	947	59	61	122	305
20	180	360	900	60	60	120	300
21	171	343	857	62	58	116	290
22	164	327	818	64	56	112	281
23	157	313	783	66	54	109	273
24	150	300	750	68	53	106	265
25	144	288	720	70	51	103	257
26	138	277	692	72	50	100	250
27	133	267	667	74	48	97	243
28	129	257	643	76	47	95	237
29	124	248	621	78	46	92	231
30	120	240	600	80	45	90	225
31	116	232	581	82	44	88	220
32	113	225	563	84	43	86	214
33	109	218	545	86	42	84	209
34	106	212	529	88	41	82	205
35	103	206	514	90	40	80	200
36	100	200	500	92	39	78	196
37	97	195	486	94	38	76	192
38	95	189	474	96	38	75	188
39	92	185	462	98	37	74	184
40	90	180	450	100	36	72	180
41	88	176	439	102	35	71	178
42	86	172	429	104	35	69	173
43	84	167	419	106	34	68	170
44	82	164	409	108	33	67	167
45	80	160	400	110	33	65	164
46	78	157	391	112	32	64	161
47	76	153	383	116	31	62	155
48	75	150	375	120	30	60	150
49	73	147	367				

**NOTE:** Measured gas inputs (high-heat and low-heat stage) must be within  $\pm 2$  percent of that stated on furnace rating plate when installed at sea level or derated per that stated above when installed at higher altitudes.

4. Remove jumpers across R-W/W1 and R-W2 thermostat connections to terminate call for heat.
- 5. Turn setup switch SW-2 (See Fig. 23 and 24) or switch SW-1 (See Fig. 33) on control board to OFF position.
6. Turn furnace gas-valve switch to OFF position.
7. Turn off furnace power supply.
8. Remove manometer and replace manifold-pressure tap plug. (See Fig. 21.)

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

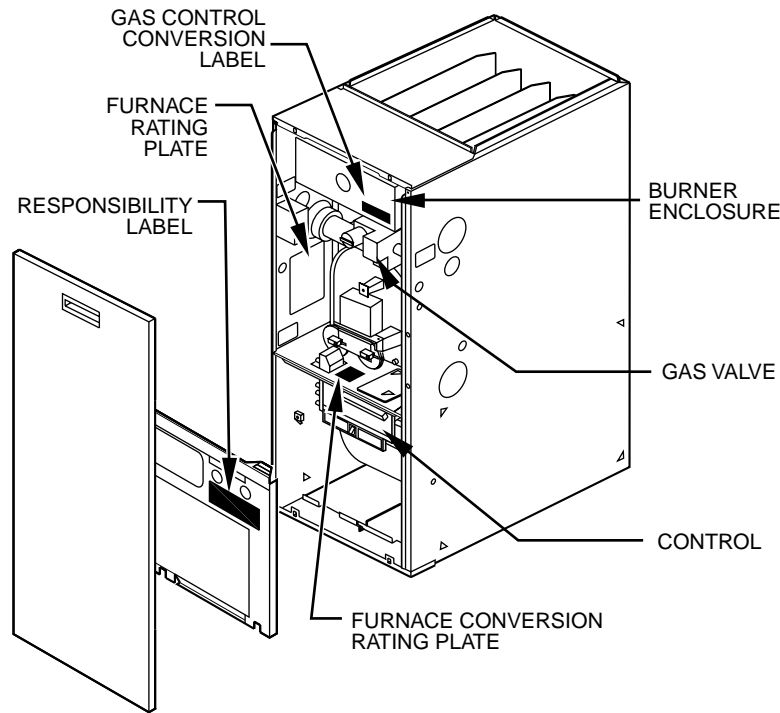
9. Turn furnace gas-valve control knob to ON position.
10. Turn on furnace power supply.
11. Set room thermostat to call for heat.
12. Check pressure tap plug for gas leaks when main burners ignite.
13. Check for correct burner flame. (See Fig. 7.)
14. Observe unit through 2 complete heating cycles. See sequence of operation in furnace Installation, Start-Up, and Operating Instructions.
15. Set room thermostat to desired temperature.



## **PROCEDURE 6—LABEL APPLICATION**

**NOTE:** See Fig. 19 or 20 for label location.

1. Fill in Conversion Responsibility Label (327751–205) and apply inside furnace as shown. Date, name, and address of organization making this conversion are required.
2. Attach Furnace Conversion Rating Plate (327751–201) near existing furnace rating plates.
3. Apply Gas Control Conversion Label (327751–202) to gas valve as shown.
4. Check for correct normal-operating sequence of ignition system as described in the furnace Installation Instructions.
5. Replace furnace control-component-access door.



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**Fig. 25—Condensing Furnace Component and Conversion Label Location**  
(component location may vary slightly depending on model)

**SECTION 5—MODELS 58MVP, 58MTA, 355MAV AND 352MAV MULTIPOISE, HOT-SURFACE IGNITION, 2-STAGE, 2-SPEED AND VARIABLE-SPEED, CONDENSING FURNACES**

→ **⚠ WARNING:** This kit is not to be used with furnaces equipped with a gas valve that has a RED On/Off knob, P/N EF33CZ201. The RED On/Off valves are not dual-fuel gas valves and must be replaced with a new two-stage gas valve, not included with this kit. The new dual-fuel, two-stage gas valve for this furnace is available from your local distributor. Failure to follow this warning could result in fire, production of carbon monoxide, property damage, personal injury, or loss of life.

**PROCEDURE 1—INSTALL MAIN BURNER ORIFICES**

**NOTE:** See Fig. 25 for component location in upflow furnaces. Re-orient component arrangement when furnace is installed in other positions.

1. Turn off furnace gas and electrical supplies to furnace.
2. Remove main furnace door.
3. Turn furnace gas-valve switch to OFF position.
4. Remove burner enclosure front.
5. Remove gas-supply pipe from gas valve.

**⚠ CAUTION:** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

**⚠ ATTENTION:** Lors des opérations d'entretien des commandes, étiqueter tous les fils avant de les déconnecter. Toute erreur de câblage peut être une source de danger et de panne.

6. Remove wires from gas valve. Note location for reassembly.
7. Remove 2 wires to low-gas-pressure switch (LGPS). Located on gas valve.
8. Remove burner-box pressure tube from gas-valve enclosure reference-pressure tap fitting. (See Fig. 21.)
9. Remove screws that secure manifold to burner box and remove manifold, orifices, and gas valve as one assembly.
10. Remove and discard orifices from manifold.
11. Determine natural gas orifice size for correct input at installed altitude by using Table 16. Furnace gas-input rate on rating plate is for installations at altitudes up to 2000 ft. In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 2 percent for each 1000 ft above sea level. In Canada, the input rating must be derated by 5 percent for altitudes of 2000 ft to 4500 ft above sea level.

- a. Obtain yearly heat-value average (at installed altitude) for local gas supply.
- b. Obtain yearly specific-gravity average for local gas supply.
- c. Verify furnace model. Table 16 can only be used for 40-in. tall, multipoise, hot-surface ignition, condensing furnaces.
- d. Find installation altitude in Table 16.

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 16.

- e. Find closest natural gas heat value and specific gravity in Table 16.
- f. Follow heat-value line and specific-gravity line to point of intersection to find orifice size and low- and high-heat manifold pressure settings.

EXAMPLE: (Using Table 16 at 0—2000 ft altitude)  
 Heat value = 1050 Btu/cu ft  
 Specific gravity = 0.62  
 Therefore: Orifice No. 45 is required.

12. Install main burner orifices. Do not use Teflon tape. Finger-tighten orifices at least 1 full turn to prevent cross-threading, then tighten with wrench. There are enough orifices in each kit for the largest furnace. Discard extra orifices. Orifices of other sizes must be field supplied and are available through your local distributor.

**NOTE:** DO NOT reinstall the manifold, orifices, gas-valve assembly, or burner-enclosure front at this time.

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**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**

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#### **PROCEDURE 2—REPOSITION AIR SHUTTER (VARIABLE SPEED 58MVP120-20 AND 355MAV060120 ONLY)**

1. Remove 2 screws holding air shutter in propane-gas usage (PROP) position.
2. Reposition air shutter to natural-gas usage (NAT) position. (See Fig. 26.) Screws will now be located in the shutter next to the NAT stamp.

**NOTE:** Air opening above burners will now be unobstructed by air shutter.

#### **PROCEDURE 3—REMOVE LOW GAS PRESSURE SWITCH AND DIVERTER PLATE**

1. Be sure gas and electrical supplies to furnace are off.
2. Remove low-gas-pressure switch (LGPS), street elbow, and 1/8-in. pipe nipple from gas-valve inlet-pressure tap. (See Fig. 21.)

**NOTE:** Use propane-gas-resistant pipe dope on all connections to prevent gas leaks. DO NOT use Teflon tape.

3. Apply pipe dope sparingly to 1/8-in. pipe plug (provided in kit) and install in 1/8-in. tapped inlet-pressure tap opening in gas valve.

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**⚠ CAUTION: Gas-valve electric switch MUST be tilted upward. Failure to follow this warning could result in property damage or death.**

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4. If unit has a diverter plate installed above combustion air-intake box, remove diverter plate as follows:
  - a. Remove front 2 screws on combustion air-intake box. (See Fig. 27.)
  - b. Remove combustion air-intake box and set aside. (See Fig. 27.)
  - c. Remove diverter plate. (See Fig. 28.)
  - d. Reinstall combustion air-intake box and replace 2 screws. (See Fig. 27.)
5. Reinstall manifold, orifice, and gas-valve assembly in burner box. Ensure manifold seal grommet is installed properly and burners fit over orifices. (See Fig. 10 for ignitor position.)
6. Reconnect wires to gas valve. See wiring label on furnace to ensure proper location of wires.
7. Rewire unit low-pressure switch as follows:
  - a. Trace one of the orange wires previously disconnected from the LGPS back to the NO terminal of the LPS. Disconnect this orange wire from the LPS and discard.
  - b. Trace the other orange wire previously disconnected from the LGPS back to its splice connection with the yellow wire of the furnace wire harness. Disconnect and discard this orange wire and the splice connector.
  - c. Connect the yellow wire of the furnace wire harness (see 'b' above) to the NO terminal of the LPS.
  - d. Refer to wiring label on the furnace to ensure proper location of wires.
8. Reinstall gas-supply pipe to gas valve using backup wrench on gas valve to prevent rotation and improper orientation.

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

9. DO NOT reinstall burner-box pressure tube to gas valve-regulator fitting or burner-enclosure front at this time.

Table 16 - Multipoise, Hot Surface Ignition, 2-Stage, 2-Speed and Variable-Speed,  
 Condensing Furnace Orifice Size and Manifold Pressures for Correct Input Rate  
 (TABULATED DATA BASED ON 20,000 BTUH HIGH-HEAT / 13,000 BTUH LOW-HEAT PER BURNER,  
 DERATED 2%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low
U.S.A. and Canada	0 to 2000	900	43	3.5 / 1.5	43	3.6 / 1.5	43	3.8 / 1.6	42	3.2 / 1.3
		925	44	3.8 / 1.6	43	3.5 / 1.5	43	3.6 / 1.5	43	3.7 / 1.6
		950	44	3.6 / 1.5	44	3.8 / 1.6	43	3.4 / 1.4	43	3.5 / 1.5
		975	44	3.4 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6	44	3.8 / 1.6
		1000	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5	44	3.6 / 1.5
		1025	45	3.8 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.5
		1050	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6	44	3.3 / 1.4
		1075	45	3.4 / 1.4	45	3.5 / 1.5	45	3.7 / 1.5	45	3.8 / 1.6
		1100	45	3.3 / 1.4	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	43	3.8 / 1.6	42	3.2 / 1.4	42	3.3 / 1.4	42	3.5 / 1.5
		825	43	3.6 / 1.5	43	3.7 / 1.6	43	3.8 / 1.6	42	3.2 / 1.4
		850	43	3.4 / 1.4	43	3.5 / 1.5	43	3.6 / 1.5	43	3.7 / 1.6
		875	44	3.7 / 1.5	44	3.8 / 1.6	43	3.4 / 1.4	43	3.5 / 1.5
		900	44	3.5 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6	44	3.8 / 1.6
		925	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5	44	3.6 / 1.5
		950	45	3.7 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.4
		975	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6	44	3.2 / 1.4
		1000	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6
U.S.A. Only	3001 to 4000	775	43	3.7 / 1.6	42	3.2 / 1.3	42	3.3 / 1.4	42	3.4 / 1.4
		800	43	3.5 / 1.5	43	3.6 / 1.5	43	3.8 / 1.6	42	3.2 / 1.3
		825	44	3.8 / 1.6	43	3.4 / 1.4	43	3.5 / 1.5	43	3.7 / 1.5
		850	44	3.6 / 1.5	44	3.7 / 1.6	44	3.8 / 1.6	43	3.4 / 1.5
		875	44	3.4 / 1.4	44	3.5 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6
		900	44	3.2 / 1.3	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5
		925	45	3.7 / 1.5	45	3.8 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4
		950	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6
U.S.A. Only	4001 to 5000	750	43	3.7 / 1.6	43	3.8 / 1.6	42	3.2 / 1.4	42	3.3 / 1.4
		775	43	3.5 / 1.5	43	3.6 / 1.5	43	3.7 / 1.6	43	3.8 / 1.6
		800	44	3.7 / 1.6	43	3.4 / 1.4	43	3.5 / 1.5	43	3.6 / 1.5
		825	44	3.5 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6	43	3.4 / 1.4
		850	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5	44	3.6 / 1.5
		875	45	3.8 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.5
		900	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6	44	3.2 / 1.4
		925	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6
U.S.A. Only	5001 to 6000	725	43	3.6 / 1.5	43	3.8 / 1.6	42	3.2 / 1.4	42	3.3 / 1.4
		750	43	3.4 / 1.4	43	3.5 / 1.5	43	3.6 / 1.5	43	3.8 / 1.6
		775	44	3.7 / 1.5	44	3.8 / 1.6	43	3.4 / 1.4	43	3.5 / 1.5
		800	44	3.4 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6	44	3.8 / 1.6
		825	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.5	44	3.6 / 1.5
		850	45	3.7 / 1.6	45	3.8 / 1.6	44	3.2 / 1.4	44	3.4 / 1.4
		875	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6
		900	45	3.3 / 1.4	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5
U.S.A. Only	6001 to 7000	675	42	3.2 / 1.3	42	3.3 / 1.4	42	3.4 / 1.4	42	3.5 / 1.5
		700	43	3.6 / 1.5	43	3.7 / 1.6	43	3.8 / 1.6	42	3.3 / 1.4
		725	44	3.8 / 1.6	43	3.5 / 1.5	43	3.6 / 1.5	43	3.7 / 1.6
		750	44	3.6 / 1.5	44	3.7 / 1.6	44	3.8 / 1.6	43	3.5 / 1.5
		775	44	3.4 / 1.4	44	3.5 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6
		800	45	3.8 / 1.6	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5
		825	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6	44	3.3 / 1.4
		850	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6

Table 16 - Multipoise, Hot Surface Ignition, 2-Stage, 2-Speed and Variable-Speed, Condensing Furnace Orifice Size and Manifold Pressures for Correct Input Rate (TABULATED DATA BASED ON 20,000 BTUH HIGH-HEAT / 13,000 BTUH LOW-HEAT PER BURNER, DERATED 2%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Mnflld Press High/Low	Orifice No.	Mnflld Press High/Low	Orifice No.	Mnflld Press High/Low	Orifice No.	Mnflld Press High/Low
U.S.A. Only	7001	650	43	3.8 / 1.6	42	3.2 / 1.4	42	3.4 / 1.4	42	3.5 / 1.5
		675	43	3.5 / 1.5	43	3.7 / 1.6	43	3.8 / 1.6	42	3.2 / 1.4
		700	44	3.8 / 1.6	43	3.4 / 1.4	43	3.5 / 1.5	43	3.6 / 1.5
	to 8000	725	44	3.5 / 1.5	44	3.6 / 1.5	44	3.8 / 1.6	43	3.4 / 1.4
		750	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5	44	3.6 / 1.5
		775	45	3.7 / 1.6	44	3.2 / 1.3	44	3.3 / 1.4	44	3.4 / 1.4
		800	45	3.5 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6	44	3.2 / 1.4
U.S.A. Only	8001	825	45	3.3 / 1.4	45	3.4 / 1.4	45	3.5 / 1.5	45	3.6 / 1.5
		625	43	3.8 / 1.6	42	3.2 / 1.4	42	3.3 / 1.4	42	3.4 / 1.5
		650	43	3.5 / 1.5	43	3.6 / 1.5	43	3.8 / 1.6	42	3.2 / 1.3
	to 9000	675	44	3.7 / 1.6	43	3.4 / 1.4	43	3.5 / 1.5	43	3.6 / 1.5
		700	44	3.5 / 1.5	44	3.6 / 1.5	44	3.7 / 1.6	44	3.8 / 1.6
		725	44	3.2 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5	44	3.6 / 1.5
U.S.A. Only	9001	750	45	3.7 / 1.5	45	3.8 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4
		775	45	3.4 / 1.5	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6
	to 10000	600	43	3.8 / 1.6	42	3.2 / 1.4	42	3.3 / 1.4	42	3.4 / 1.4
		625	43	3.5 / 1.5	43	3.6 / 1.5	43	3.7 / 1.6	43	3.8 / 1.6
		650	44	3.7 / 1.6	44	3.8 / 1.6	43	3.4 / 1.5	43	3.6 / 1.5
		675	44	3.4 / 1.4	44	3.5 / 1.5	44	3.7 / 1.5	44	3.8 / 1.6
		700	44	3.2 / 1.3	44	3.3 / 1.4	44	3.4 / 1.4	44	3.5 / 1.5
		725	45	3.6 / 1.5	45	3.7 / 1.6	45	3.8 / 1.6	44	3.3 / 1.4

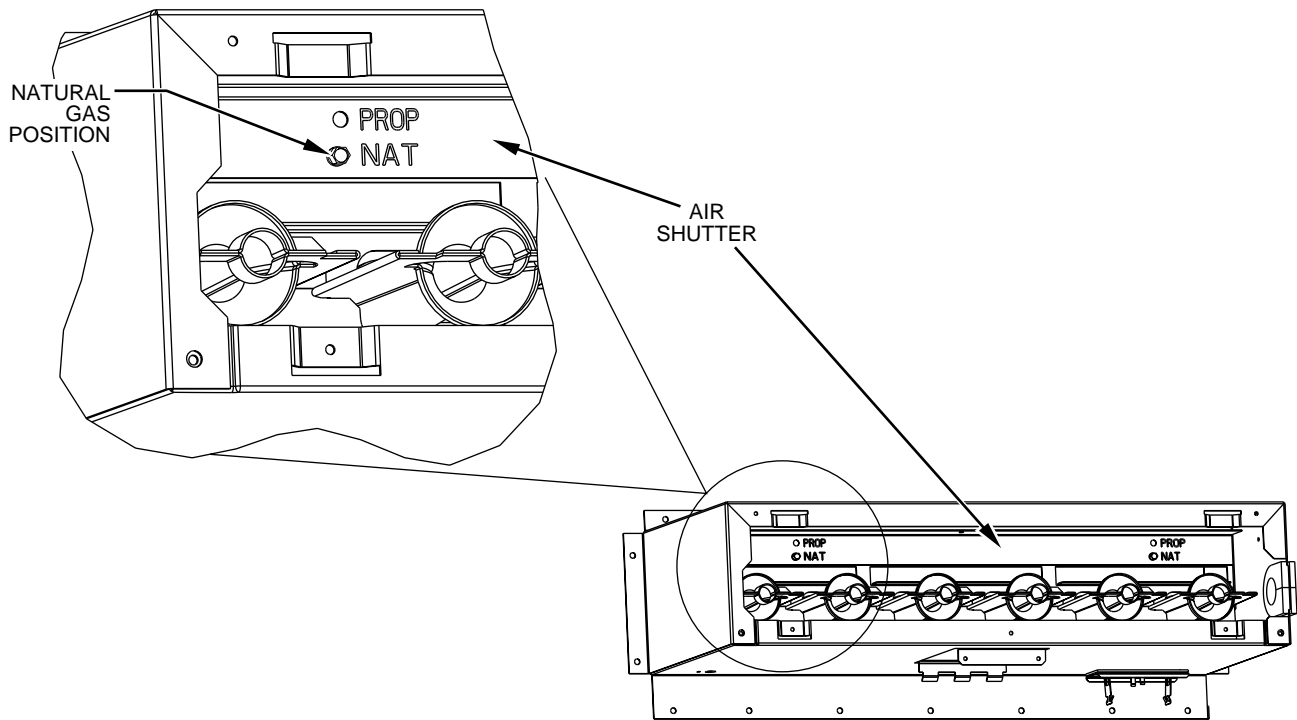
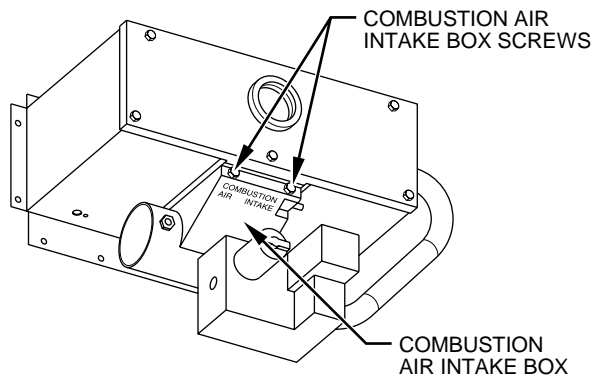


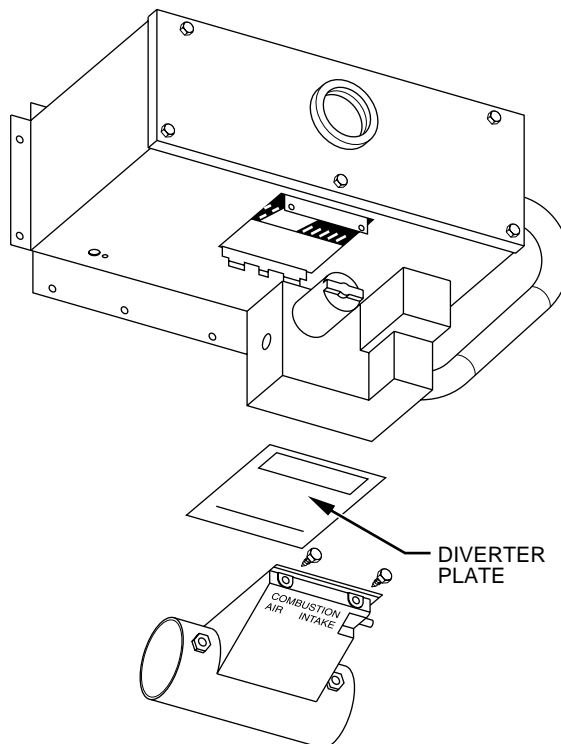
Fig. 26—Air Shutter in Natural Gas Usage (NAT) Position (58MVP 120-20 and 355MAV060120 Only)

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Fig. 27—Removing Combustion Air Intake Box



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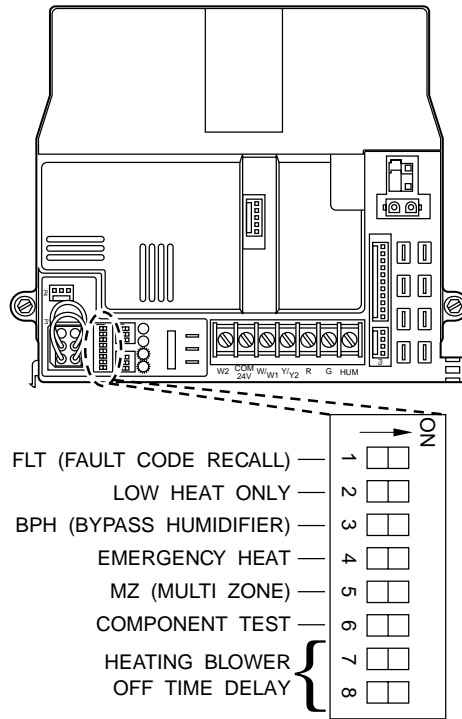
Fig. 28—Removing Diverter Plate

#### PROCEDURE 4—PRE-ADJUST GAS VALVE

→ **⚠ WARNING:** This kit is not to be used with furnaces equipped with a gas valve that has a RED On/Off knob, P/N EF33CZ201. The RED On/Off valves are not dual-fuel gas valves and must be replaced with a new two-stage gas valve, not included with this kit. The new dual-fuel, two-stage gas valve for this furnace is available from your local distributor. Failure to follow this warning could result in fire, production of carbon monoxide, property damage, personal injury, or loss of life.

**⚠ CAUTION:** The gas valve must be pre-adjusted before operating on natural gas. Failure to follow this caution could result in excess overfire and short cycling. Heat exchanger failure will occur if left this way.

1. Be sure gas and electrical supplies to furnace are off.
2. Remove caps that conceal adjustment screws for high- and low-heat stage gas valve regulators. (See Fig. 21.)
3. Turn **low-heat** stage-adjusting screw (3/32-in. hex allen wrench) **counterclockwise (out) 1 full turn**. This will reduce the manifold pressure closer to the natural-gas low-heat set point.
4. Turn **high-heat** stage-adjusting screw (3/32-in. hex allen wrench) **counterclockwise (out) 2 full turns**. This will reduce the manifold pressure closer to the natural-gas high-heat set point.
5. Replace caps that conceal gas-valve-regulator adjustment screws.



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**Fig. 29—Variable-Speed Condensing Furnace Control**

**PROCEDURE 5—CHECK INLET GAS PRESSURE**

**NOTE:** This kit is to be used only when inlet-gas pressure is between 4.5-in. wc and 13.6-in. wc.

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove 1/8-in. pipe plug from inlet pressure tap on gas valve. (See Fig. 21.)
3. Attach manometer to inlet pressure tap on gas valve. (See Fig. 21 and 17.)

→ **⚠ CAUTION: DO NOT operate furnace more than 1 minute to check inlet gas pressure as conversion is not complete at this time. Failure to follow this caution may result in minor personal injury or product and property damage.**

4. Turn on furnace power supply.
5. Turn gas-supply manual-shutoff valve to ON position.
6. Turn furnace gas-valve switch to ON position.
7. Jumper R-W/W1 and R-W2 thermostat connections on control center. (See Fig. 23, 29, 33 or 34.) This runs the furnace in high-heat.
8. When main burners ignite, confirm inlet gas pressure is between 4.5-in. wc and 13.6-in. wc.
9. Remove jumper across R-W/W1 and R-W2 thermostat connections to terminate call for heat.
10. Turn furnace gas-valve switch to OFF position.
11. Turn gas-supply manual-shutoff valve to OFF position.
12. Turn off furnace power supply.
13. Remove manometer and reinstall gas-valve inlet-pressure tap plug. (See Fig. 21.)

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

**PROCEDURE 6—CHECK FURNACE OPERATION AND MAKE NECESSARY ADJUSTMENTS**

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove 1/8-in. pipe plug from manifold-pressure tap on downstream side of gas valve. (See Fig. 21.)
3. Attach manometer to manifold-pressure tap on gas valve. (See Fig. 21 and 17.)
4. Turn gas-supply manual-shutoff valve to ON position.
5. Turn furnace gas-valve control switch/knob to ON position.
6. Check all threaded pipe connections for gas leaks.

**⚠ WARNING: NEVER use matches, candles, flame, or other sources of ignition to check for gas leakage. Use a soap-and-water solution to check for leaks. Failure to follow this warning could result in fire, explosion, personal injury, or death.**

7. Turn on furnace power supply.

- 8. Turn setup switch SW-2 (See Fig. 23 and 24) or switch SW1-2 (See Fig. 29 or 34) or switch SW1 (See Fig. 33) on control center to ON position. This keeps furnace in low-heat.
- 9. Jumper R and W/W1 thermostat connections to call for heat.
- 10. When main burners ignite, check manifold orifices for gas leaks.

### PROCEDURE 7—SET GAS INPUT RATE

Furnace gas-input rate on rating plate is for installations at altitudes up to 2000 ft.

In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 2 percent for each 1000 ft above sea level.

In Canada, the input rating must be derated by 5 percent for altitudes of 2000 ft to 4500 ft above sea level.

Furnace-input rate must be within  $\pm 2$  percent of input on furnace-rating plate.

1. Determine natural-gas orifice size and manifold pressure for correct input.
  - a. Obtain yearly heat-value average (at installed altitude) from local gas supplier.
  - b. Obtain yearly specific-gravity average from local gas supplier.
  - c. Verify furnace model. Table 16 can only be used for 40-in tall; multipoise, hot-surface ignition, condensing furnaces.
  - d. Find installation altitude in Table 16.

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 16.

- e. Find closest natural gas heat value and specific gravity in Table 16.
- f. Follow heat value and specific gravity lines to point of intersection to find orifice size and low- and high-heat manifold pressure settings for proper operation.

EXAMPLE: (Using Table 16 at 0—2000 ft altitude)  
 Heating value = 1050 Btu/cu ft  
 Specific gravity = 0.62  
 Therefore: Orifice No. 45, Manifold pressure 3.8-in. wc for high heat and 1.6-in. wc for low heat

- g. Check and verify burner orifice size in furnace. NEVER ASSUME ORIFICE SIZE. ALWAYS CHECK AND VERIFY.

---

**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**

---

2. Adjust manifold pressure to obtain input rate.

**NOTE:** Manifold pressure MUST always be measured with the burner-enclosure front REMOVED.

**NOTE:** Low-heat must be adjusted before high-heat.

- a. Remove caps that conceal adjustment screws for low- and high-heat gas-valve regulators. (See Fig. 21.)
- b. Turn low-heat adjusting screw (3/32 hex Allen wrench) counterclockwise (out) to decrease input rate or clockwise (in) to increase input rate.

**NOTE:** DO NOT set low-heat manifold pressure less than 1.3-in. wc or more than 1.7-in. wc for natural gas. If manifold pressure is outside this range, change main-burner orifices.

---

**⚠ CAUTION: DO NOT bottom out gas-valve regulator-adjusting screw. This can result in unregulated manifold pressure and result in excess overfire and heat exchanger failures.**

---

**NOTE:** If orifice hole appears damaged or it is suspected to have been redrilled, check orifice hole with a numbered drill bit of correct size. Never redrill an orifice. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics.

- c. Jumper R and W2 thermostat connections on control. (See Fig. 23, 29, 33 or 34.) This keeps furnace in high-heat .
- d. Turn high-heat adjusting screw (3/32 hex Allen wrench) counterclockwise (out) to decrease input rate or clockwise (in) to increase rate.

**NOTE:** DO NOT set high-heat manifold pressure less than 3.2-in. wc or more than 3.8-in. wc for natural gas. If manifold pressure is outside this range, change main-burner orifices.

- e. When correct input is obtained, replace caps that conceal gas-valve regulator-adjustment screws. Main-burner flame should be clear blue, almost transparent (See Fig. 7.)
- f. Remove jumper across R-W/W1 and R-W2 after high-heat stage adjustments.

- g. Turn setup switch SW-2 (See Fig. 23 and 24) or switch SW1-2 (See Fig. 29 or 34) or switch SW1 (See Fig. 33) on control board to OFF position.



3. Verify natural-gas-input rate by clocking gas meter.

a. Calculate high-altitude adjustment (if required).

UNITED STATES

At installation altitudes above 2000 ft, input rate must be reduced by 2 percent for each 1000 ft above sea level. See Table 17 for derate multiplier factor and example.

**Table 17—Altitude Derate Multiplier for U.S.A.**

ALTITUDE (FT)	PERCENT OF DERATE	DERATE MULTIPLIER FACTOR FOR U.S.A.*
0-2000	0	1.00
2001—3000	4—6	0.95
3001—4000	6—8	0.93
4001—5000	8—10	0.91
5001—6000	10—12	0.89
6001—7000	12—14	0.87
7001—8000	14—16	0.85
8001—9000	16—18	0.83
9001—10,000	18—20	0.81

\*Derate multiplier factor is based on midpoint altitude for altitude range.

CANADA

At installation altitudes from 2000 to 4500 ft, this furnace must be derated 5 percent by an authorized Gas Conversion Station or Dealer. To determine correct input rate for altitude, see example and use 0.95 as derate multiplier factor.

EXAMPLE: (For upflow furnace)  
 100,000 Btuh input furnace installed at 4300 ft.  
 Furnace Input Rate at Sea Level X Derate Multiplier Factor = Furnace Input Rate at Installation Altitude  
 100,000 X 0.91 = 91,000

b. Reinstall burner-enclosure front.

**NOTE:** Clocking gas-input rate MUST always be performed with the burner-enclosure front INSTALLED.

c. Check that gas-valve adjustment caps are in place for proper input to be clocked.

d. Obtain average yearly heat value for local gas supply.

**NOTE:** Be sure heating value of gas used for calculations is correct for your altitude. Consult local gas utility for altitude adjustment of gas heating value.

e. Check and verify orifice size in furnace. NEVER ASSUME THE ORIFICE SIZE. ALWAYS CHECK AND VERIFY.

f. Turn off all other gas appliances and pilots.

**NOTE:** Low-heat must be adjusted before high-heat.

g. Turn setup switch SW-2 (See Fig. 23 and 24) or switch SW1-2 (See Fig. 29 or 34) or switch SW1 (See Fig. 33) on control board to ON position. This runs furnace in low heat.

h. Jumper R and W/W1 thermostat connections.

i. Let furnace run for 3 minutes in low-heat operation.

j. Measure time (in sec) for gas-meter test dial to complete 1 revolution. Note reading.

k. Refer to Table 15 for cu ft of gas per hr.

l. Multiply gas rate (cu ft/hr) X heating value (Btu/cu ft).

EXAMPLE: (Low-heat operation for all models at 0—2000 ft altitude)  
 Furnace input for low heat from rating plate is 65,000 Btuh.  
 Btu heating input = Btu/cu ft X cu ft/hr  
 Heating value of gas = 975 Btu/cu ft  
 Time for 1 revolution of 2-cu ft dial = 108 sec  
 Gas rate = 67 cu ft/hr (from Table 15)  
 Btu heating input = 67 X 975 = 65,325 Btuh  
 In this example, the orifice size and manifold-pressure adjustment is within ±2 percent of the furnace input rate.

**NOTE:** Measured gas input must be within ±2 percent of that stated on furnace-rating plate when installed at sea level or derated per that stated above when installed at higher altitudes.

m. Jumper R and W2 thermostat connections and repeat items i through l for high-heat operation.

4. Remove jumper across R, W/W1, and W2 thermostat connections to terminate call for heat.

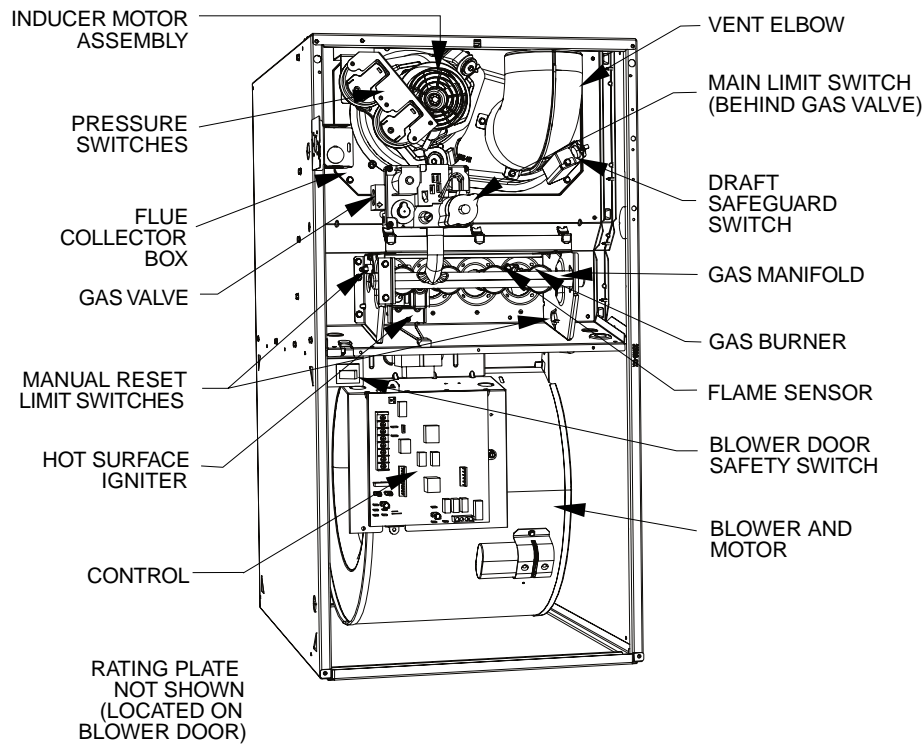
→ 5. Turn setup switch SW-2 (See Fig. 23 and 24) or switch SW1-2 (See Fig. 29 or 34) or switch SW1 (See Fig. 33) on control board to OFF position.

6. Turn furnace gas-valve-control switch to OFF position.
7. Turn off furnace power supply.
8. Remove manometer and reinstall manifold-pressure tap plug. (See Fig. 21 and 17.)
9. Turn furnace gas-valve-control switch to ON position.
10. Turn on furnace power supply.
11. Set room thermostat to call for heat.
12. Check pressure-tap plug for gas leaks when main burners ignite.
13. Check for correct burner flame. (See Fig. 7.)
14. Observe unit through 2 complete heating cycles. See sequence of operation in furnace Installation, Start-Up, and Operating Instructions.
15. Set room thermostat to desired temperature.

#### **PROCEDURE 8—LABEL APPLICATION**

**NOTE:** See Fig. 25 for label location.

1. Fill in Conversion Responsibility Label (327751–205) and apply inside furnace as shown. Date, name, and address of organization making this conversion are required.
2. Attach Furnace Conversion Rating Plate (327751–201) on blower shelf as shown.
3. Apply Gas Control Conversion Label (327751–202) to gas valve as shown.
4. Check for correct normal-operating sequence of ignition system as described in furnace Installation, Start-Up, and Operating Instructions.
5. Reinstall main furnace door.



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**Fig. 30—Component Location**

→ **SECTION 6—MODELS 312AAV, 315AAV, 312JAV, 315JAV, 58CTA, 58CVA, 58CTX AND 58CVX INDUCED-COMBUSTION, HOT SURFACE IGNITION, 2-STAGE, 2-SPEED AND VARIABLE SPEED, NON-CONDENSING FURNACES**

**PROCEDURE 1—INSTALL MAIN BURNER ORIFICES**

**NOTE:** See Fig. 30 for component location in upflow orientation. Re-orient component arrangement when furnace is installed in other orientations.

1. Turn off furnace gas and electrical supplies to furnace.
2. Remove main furnace door.
3. Turn furnace gas valve switch to "OFF" position.
4. Remove gas supply pipe to valve.

---

**⚠ CAUTION:** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

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**⚠ ATTENTION:** Lors des opérations d'entretien des commandes, étiqueter tous les fils avant de les déconnecter. Toute erreur de câblage peut être une source de danger et de panne.

---

5. Remove wires from gas valve. Note location for re-assembly.
6. Remove 2 wires from low gas pressure switch (LGPS) located on gas valve.
7. Remove the 2 screws on the left side that secure the gas manifold to the burner box. Note the location of the green ground wire for reassembly.
8. Swing manifold and orifices out from burners.
9. Slide right side of manifold out of burner box.
10. Remove and discard orifices from manifold.
11. Determine natural gas orifice size for correct input at installed altitude by using Table 18 (non—Low NOx models in any position, and Low NOx models in upflow position) or Table 19 (Low NOx models only when in downflow or horizontal position) and Fig. 22.

Furnace gas-input rate on rating plate is for installations at altitudes up to 2000 ft.

In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level.

In Canada, the input rating must be derated by 10 percent for altitudes of 2000 ft to 4500 ft above sea level.

- a. Obtain yearly heat-value average (at installed altitude) for local gas supply.
- b. Obtain yearly specific-gravity average for local gas supply.

- c. Verify furnace model. Table 18 or 19 can only be used for 33-in. tall, multipoise, hot-surface ignition, two-stage and variable speed, non-condensing furnaces.
- d. Find installation altitude in Table 18 or 19.

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 18 or 19.

- e. Find closest natural gas heat value and specific gravity in Table 18 or 19.
- f. Follow heat-value line and specific-gravity line to point of intersection to find orifice size and low- and high-heat manifold pressure settings.

EXAMPLE: (Using Table 18 at 0-2000 ft altitude)  
 Heat value = 1050 Btu/cu ft  
 Specific gravity = 0.62  
 Therefore: Orifice No. 43 is required

- 12. Install main burner orifices. Do not use Teflon tape. Finger-tighten orifices at least 1 full turn to prevent cross-threading, then tighten with wrench. There are enough orifices in each kit for the largest furnace. Discard extra orifices. Orifices of other sizes must be field supplied and are available through your local distributor

**NOTE:** DO NOT reinstall the manifold, orifices, and gas-valve assembly at this time.

**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**

**A. Remove the Spoiler Screws From the Burners**

- 1. Disconnect the hot surface ignitor from the harness.
- 2. Disconnect flame sensor from harness.
- 3. Slide burner assembly out of burner enclosure.
- 4. Remove ¼” spoiler screws from burners.

**NOTE:** It is not necessary to plug the hole in the burner when screws are removed

- 5. Slide burner assembly into slot on burner enclosure, making sure it is fully seated forward in the enclosure.
- 6. Reconnect ignitor and flame sensor.

**B. Install NOx Baffles (where required)**

The following Low NOx models must have NOx baffles installed. NOx baffles are not included in this kit and must be ordered separately or reused if retained from original conversion to propane.

58CTX	312JAV
58CVX	315JAV

- 1. Remove the ¼” screw from the hole in the heat exchanger cell panel directly below each heat exchanger inlet.
- 2. Insert the NOx baffle into each heat exchanger inlet.
- 3. Align the baffle mounting tab with the hole in the cell panel.
- 4. Insert the ¼” screw through the NOx baffle mounting tab and into the hole in the heat exchanger cell panel.
- 5. Tighten the screw securely.
- 6. Repeat the procedure for each heat exchanger inlet. (See Fig. 31.)
- 7. Remove low-gas-pressure switch (LGPS), street elbow, and 1/8-in. tee from gas-valve inlet-pressure tap. (See Fig. 32.)

**NOTE:** Use propane-gas-resistant pipe dope on all connections to prevent gas leaks. DO NOT use Teflon tape.

- 8. Apply pipe dope sparingly to 1/8-in. pipe plug (provided in kit) and install in 1/8-in. tapped inlet-pressure tap opening in gas valve.
- 9. Insert right end of manifold in right side of burner box. Swing manifold into burners and insert orifices into burners. Ensure that manifold orifices are fully inserted and the burners fit over each orifice.
- 10. Secure manifold to left side of burner rack with the 2 previously removed screws. Verify that the green ground wire is attached between the top screw and the manifold in the correct location.

**NOTE:** Failure to connect green ground wire will result in the loss of flame signal and result in a No Heat condition.

- 11. Reconnect wires to gas valve. See wiring label on furnace to ensure proper location of wires.
- 12. Rewire unit low-pressure switch LPS as follows:
  - a. Trace one of the yellow wires previously disconnected from the LGPS back to the NO terminal of the LPS. Disconnect this wire from the LPS and discard.
  - b. Trace the other yellow wire previously disconnected from the LGPS back to the furnace wire harness.
  - c. Connect the yellow wire of the furnace wire harness (see 'b' above) to the NO terminal of the LPS.

Table 18 - Multipoise, 2-Stage & Variable-Speed, Non-Condensing Furnace (Except Low NOx Models in Downflow or Horizontal Position) Orifice Size & Manifold Pressures for Correct Input  
(TABULATED DATA BASED ON 22,000 BTUH HIGH-HEAT / 14,500 BTUH LOW-HEAT PER BURNER,  
DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low
U.S.A. and Canada	0 to 2000	900	42	3.5 / 1.5	42	3.6 / 1.6	42	3.7 / 1.6	41	3.5 / 1.5
		925	42	3.3 / 1.4	42	3.4 / 1.5	42	3.5 / 1.5	42	3.7 / 1.6
		950	43	3.8 / 1.7	42	3.3 / 1.4	42	3.4 / 1.5	42	3.5 / 1.5
		975	43	3.6 / 1.6	43	3.8 / 1.6	42	3.2 / 1.4	42	3.3 / 1.4
		1000	43	3.5 / 1.5	43	3.6 / 1.6	43	3.7 / 1.6	43	3.8 / 1.7
		1025	43	3.3 / 1.4	43	3.4 / 1.5	43	3.5 / 1.5	43	3.6 / 1.6
		1050	44	3.6 / 1.6	43	3.2 / 1.4	43	3.4 / 1.5	43	3.5 / 1.5
		1075	44	3.4 / 1.5	44	3.5 / 1.5	43	3.2 / 1.4	43	3.3 / 1.4
		1100	44	3.3 / 1.4	44	3.4 / 1.5	44	3.5 / 1.5	43	3.2 / 1.4
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	42	3.4 / 1.5	42	3.5 / 1.5	42	3.6 / 1.6	42	3.7 / 1.6
		825	42	3.2 / 1.4	42	3.3 / 1.4	42	3.4 / 1.5	42	3.5 / 1.5
		850	43	3.7 / 1.6	43	3.8 / 1.6	42	3.2 / 1.4	42	3.3 / 1.4
		875	43	3.5 / 1.5	43	3.6 / 1.6	43	3.7 / 1.6	43	3.8 / 1.7
		900	43	3.3 / 1.4	43	3.4 / 1.5	43	3.5 / 1.5	43	3.6 / 1.6
		925	44	3.5 / 1.5	43	3.2 / 1.4	43	3.3 / 1.4	43	3.4 / 1.5
		950	44	3.4 / 1.5	44	3.5 / 1.5	44	3.6 / 1.6	43	3.2 / 1.4
		975	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.5	44	3.5 / 1.5
		1000	45	3.7 / 1.6	45	3.8 / 1.7	44	3.2 / 1.4	44	3.4 / 1.5
U.S.A. Only	3001 to 4000	775	42	3.2 / 1.4	42	3.3 / 1.4	42	3.4 / 1.5	42	3.5 / 1.5
		800	43	3.6 / 1.6	43	3.8 / 1.6	42	3.2 / 1.4	42	3.3 / 1.4
		825	43	3.4 / 1.5	43	3.5 / 1.5	43	3.7 / 1.6	43	3.8 / 1.6
		850	43	3.2 / 1.4	43	3.3 / 1.4	43	3.4 / 1.5	43	3.6 / 1.5
		875	44	3.5 / 1.5	44	3.6 / 1.6	43	3.3 / 1.4	43	3.4 / 1.5
		900	44	3.3 / 1.4	44	3.4 / 1.5	44	3.5 / 1.5	43	3.2 / 1.4
		925	45	3.8 / 1.6	44	3.2 / 1.4	44	3.3 / 1.5	44	3.4 / 1.5
		950	46	3.8 / 1.6	45	3.7 / 1.6	45	3.8 / 1.7	44	3.3 / 1.4
U.S.A. Only	4001 to 5000	750	43	3.6 / 1.6	43	3.8 / 1.6	42	3.2 / 1.4	42	3.3 / 1.4
		775	43	3.4 / 1.5	43	3.5 / 1.5	43	3.6 / 1.6	43	3.8 / 1.6
		800	43	3.2 / 1.4	43	3.3 / 1.4	43	3.4 / 1.5	43	3.5 / 1.5
		825	44	3.4 / 1.5	44	3.6 / 1.5	43	3.2 / 1.4	43	3.3 / 1.4
		850	44	3.2 / 1.4	44	3.4 / 1.5	44	3.5 / 1.5	44	3.6 / 1.6
		875	45	3.7 / 1.6	45	3.8 / 1.7	44	3.3 / 1.4	44	3.4 / 1.5
		900	46	3.7 / 1.6	46	3.8 / 1.7	45	3.7 / 1.6	44	3.2 / 1.4
		925	46	3.5 / 1.5	46	3.6 / 1.6	46	3.7 / 1.6	46	3.8 / 1.7
U.S.A. Only	5001 to 6000	725	43	3.4 / 1.5	43	3.5 / 1.5	43	3.6 / 1.6	43	3.7 / 1.6
		750	43	3.2 / 1.4	43	3.3 / 1.4	43	3.4 / 1.5	43	3.5 / 1.5
		775	44	3.4 / 1.5	44	3.5 / 1.5	43	3.2 / 1.4	43	3.3 / 1.4
		800	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.5	44	3.5 / 1.5
		825	46	3.8 / 1.7	45	3.8 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4
		850	46	3.6 / 1.6	46	3.7 / 1.6	46	3.8 / 1.7	45	3.8 / 1.6
		875	47	3.8 / 1.7	46	3.5 / 1.5	46	3.6 / 1.6	46	3.7 / 1.6
		900	47	3.6 / 1.6	47	3.8 / 1.6	46	3.4 / 1.5	46	3.5 / 1.5
U.S.A. Only	6001 to 7000	675	43	3.4 / 1.5	43	3.5 / 1.5	43	3.6 / 1.6	43	3.7 / 1.6
		700	44	3.6 / 1.6	43	3.3 / 1.4	43	3.4 / 1.5	43	3.5 / 1.5
		725	44	3.4 / 1.5	44	3.5 / 1.5	44	3.6 / 1.6	43	3.2 / 1.4
		750	45	3.8 / 1.7	44	3.3 / 1.4	44	3.4 / 1.5	44	3.5 / 1.5
		775	46	3.7 / 1.6	45	3.7 / 1.6	45	3.8 / 1.7	44	3.2 / 1.4
		800	46	3.5 / 1.5	46	3.6 / 1.6	46	3.8 / 1.6	45	3.7 / 1.6
		825	47	3.7 / 1.6	46	3.4 / 1.5	46	3.5 / 1.5	46	3.6 / 1.6
		850	47	3.5 / 1.5	47	3.6 / 1.6	47	3.8 / 1.6	46	3.4 / 1.5

Table 18 - Multipoise, 2-Stage & Variable-Speed, Non-Condensing Furnace (Except Low NOx Models in Downflow or Horizontal Position) Orifice Size & Manifold Pressures for Correct Input  
(TABULATED DATA BASED ON 22,000 BTUH HIGH-HEAT / 14,500 BTUH LOW-HEAT PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low
U.S.A. Only	7001	650	44	3.6 / 1.6	43	3.2 / 1.4	43	3.4 / 1.5	43	3.5 / 1.5
		675	44	3.3 / 1.5	44	3.5 / 1.5	44	3.6 / 1.6	43	3.2 / 1.4
		700	45	3.8 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.5
	8000	725	46	3.7 / 1.6	46	3.8 / 1.7	45	3.7 / 1.6	44	3.2 / 1.4
		750	46	3.4 / 1.5	46	3.6 / 1.5	46	3.7 / 1.6	46	3.8 / 1.6
		775	47	3.6 / 1.6	47	3.8 / 1.6	46	3.4 / 1.5	46	3.6 / 1.5
		800	47	3.4 / 1.5	47	3.5 / 1.5	47	3.7 / 1.6	47	3.8 / 1.6
U.S.A. Only	8001	825	48	3.7 / 1.6	48	3.8 / 1.6	47	3.4 / 1.5	47	3.6 / 1.5
		625	44	3.3 / 1.5	44	3.5 / 1.5	44	3.6 / 1.6	43	3.2 / 1.4
		650	45	3.7 / 1.6	44	3.2 / 1.4	44	3.3 / 1.4	44	3.4 / 1.5
	9000	675	46	3.6 / 1.6	46	3.8 / 1.6	45	3.7 / 1.6	45	3.8 / 1.7
		700	47	3.8 / 1.7	46	3.5 / 1.5	46	3.6 / 1.6	46	3.7 / 1.6
		725	47	3.6 / 1.6	47	3.7 / 1.6	47	3.8 / 1.7	46	3.5 / 1.5
U.S.A. Only	9001	750	48	3.8 / 1.7	47	3.5 / 1.5	47	3.6 / 1.6	47	3.7 / 1.6
		775	48	3.6 / 1.5	48	3.7 / 1.6	48	3.8 / 1.7	47	3.5 / 1.5
	10000	600	45	3.7 / 1.6	45	3.8 / 1.7	44	3.3 / 1.4	44	3.4 / 1.5
		625	46	3.6 / 1.6	46	3.7 / 1.6	46	3.8 / 1.7	45	3.8 / 1.6
		650	47	3.8 / 1.6	46	3.4 / 1.5	46	3.6 / 1.5	46	3.7 / 1.6
to	675	47	3.5 / 1.5	47	3.6 / 1.6	47	3.7 / 1.6	46	3.4 / 1.5	
	700	48	3.7 / 1.6	48	3.8 / 1.7	47	3.5 / 1.5	47	3.6 / 1.6	
725	48	3.5 / 1.5	48	3.6 / 1.6	48	3.7 / 1.6	48	3.8 / 1.7		

d. Refer to wiring label on the furnace to ensure proper location of wires.

13. Reinstall gas-supply pipe to gas valve using backup wrench on gas valve to prevent rotation and improper orientation.

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

#### PROCEDURE 2—PRE-ADJUST GAS VALVE

**⚠ CAUTION:** The gas valve must be pre-adjusted before operating on natural gas. Failure to follow this caution could result in excess overfire and short cycling. Heat exchanger failure will occur if left this way.

1. Be sure gas and electrical supplies to furnace are off.
2. Remove caps that conceal adjustment screws for high- and low-heat stage gas valve regulators. (See Fig. 32.)
3. Turn **low-heat** stage-adjusting screw (3/32-in. hex allen wrench) **counterclockwise (out) 1 full turn**. This will reduce the manifold pressure closer to the natural-gas low-heat set point.
4. Turn **high-heat** stage-adjusting screw (3/32-in. hex allen wrench) **counterclockwise (out) 2 full turns**. This will reduce the manifold pressure closer to the natural-gas high-heat set point.
5. Replace caps that conceal gas-valve-regulator adjustment screws.

#### PROCEDURE 3—CHECK INLET GAS PRESURE

**NOTE:** This kit is to be used only when inlet-gas pressure is between 4.5-in. wc and 13.6-in. wc.

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove 1/8-in. pipe plug from inlet pressure tap on gas valve. (See Fig. 32.)
3. Attach manometer to inlet pressure tap on gas valve. (See Fig. 17 and 32.)

**⚠ CAUTION:** DO NOT operate furnace more than 1 minute to check inlet gas pressure as conversion is not complete at this time. Failure to follow this caution may result in minor personal injury or product and property damage.

4. Turn on furnace power supply.
5. Turn gas-supply manual-shutoff valve to ON position.
6. Turn furnace gas-valve switch to ON position.

Table 19 - Multipoise, 2-Stage & Variable-Speed, Low NOx Non-Condensing Furnace  
(Downflow or Horizontal Position) Orifice Size & Manifold Pressures for Correct Input  
(TABULATED DATA BASED ON 21,000 BTUH HIGH-HEAT / 14,500 BTUH LOW-HEAT PER BURNER,  
DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low	Orifice No.	Mnflid Press High/Low
U.S.A. and Canada	0 to 2000	900	42	3.2 / 1.5	42	3.3 / 1.6	42	3.4 / 1.6	42	3.5 / 1.7
		925	43	3.7 / 1.8	43	3.8 / 1.8	42	3.2 / 1.5	42	3.3 / 1.6
		950	43	3.5 / 1.7	43	3.6 / 1.7	43	3.7 / 1.8	43	3.8 / 1.8
		975	43	3.3 / 1.6	43	3.4 / 1.6	43	3.5 / 1.7	43	3.7 / 1.7
		1000	44	3.6 / 1.7	43	3.3 / 1.6	43	3.4 / 1.6	43	3.5 / 1.7
		1025	44	3.4 / 1.6	44	3.6 / 1.7	43	3.2 / 1.5	43	3.3 / 1.6
		1050	44	3.3 / 1.6	44	3.4 / 1.6	44	3.5 / 1.7	43	3.2 / 1.5
U.S.A. and Canada	2001 to 4500	1075	45	3.8 / 1.8	44	3.2 / 1.5	44	3.3 / 1.6	44	3.4 / 1.6
		1100	46	3.8 / 1.8	45	3.7 / 1.8	44	3.2 / 1.5	44	3.3 / 1.6
		800	43	3.8 / 1.8	42	3.2 / 1.5	42	3.3 / 1.6	42	3.4 / 1.6
		825	43	3.5 / 1.7	43	3.7 / 1.7	43	3.8 / 1.8	42	3.2 / 1.5
		850	43	3.3 / 1.6	43	3.5 / 1.6	43	3.6 / 1.7	43	3.7 / 1.8
		875	43	3.2 / 1.5	43	3.3 / 1.6	43	3.4 / 1.6	43	3.5 / 1.7
		900	44	3.4 / 1.6	44	3.5 / 1.7	43	3.2 / 1.5	43	3.3 / 1.6
U.S.A. Only	3001 to 4000	925	44	3.2 / 1.5	44	3.3 / 1.6	44	3.5 / 1.6	44	3.6 / 1.7
		950	45	3.7 / 1.8	45	3.8 / 1.8	44	3.3 / 1.6	44	3.4 / 1.6
		975	46	3.7 / 1.8	46	3.8 / 1.8	45	3.8 / 1.8	44	3.2 / 1.5
		1000	46	3.5 / 1.7	46	3.6 / 1.7	46	3.8 / 1.8	45	3.7 / 1.8
		775	43	3.5 / 1.7	43	3.7 / 1.7	43	3.8 / 1.8	42	3.2 / 1.5
		800	43	3.3 / 1.6	43	3.4 / 1.6	43	3.5 / 1.7	43	3.7 / 1.7
		825	44	3.6 / 1.7	43	3.2 / 1.5	43	3.3 / 1.6	43	3.4 / 1.6
U.S.A. Only	4001 to 5000	850	44	3.4 / 1.6	44	3.5 / 1.7	44	3.6 / 1.7	43	3.2 / 1.5
		875	45	3.8 / 1.8	44	3.3 / 1.6	44	3.4 / 1.6	44	3.5 / 1.7
		900	46	3.8 / 1.8	45	3.8 / 1.8	44	3.2 / 1.5	44	3.3 / 1.6
		925	46	3.6 / 1.7	46	3.7 / 1.8	45	3.7 / 1.8	45	3.8 / 1.8
		950	46	3.4 / 1.6	46	3.5 / 1.7	46	3.7 / 1.7	46	3.8 / 1.8
		750	43	3.3 / 1.6	43	3.4 / 1.6	43	3.5 / 1.7	43	3.6 / 1.7
		775	44	3.6 / 1.7	43	3.2 / 1.5	43	3.3 / 1.6	43	3.4 / 1.6
U.S.A. Only	5001 to 6000	800	44	3.3 / 1.6	44	3.4 / 1.6	44	3.6 / 1.7	43	3.2 / 1.5
		825	45	3.8 / 1.8	44	3.2 / 1.5	44	3.4 / 1.6	44	3.5 / 1.6
		850	46	3.8 / 1.8	45	3.7 / 1.8	45	3.8 / 1.8	44	3.3 / 1.6
		875	46	3.5 / 1.7	46	3.7 / 1.7	46	3.8 / 1.8	45	3.7 / 1.8
		900	47	3.8 / 1.8	46	3.5 / 1.7	46	3.6 / 1.7	46	3.7 / 1.8
		925	47	3.6 / 1.7	47	3.7 / 1.8	47	3.8 / 1.8	46	3.5 / 1.7
		725	44	3.5 / 1.7	43	3.2 / 1.5	43	3.3 / 1.6	43	3.4 / 1.6
U.S.A. Only	6001 to 7000	750	44	3.3 / 1.6	44	3.4 / 1.6	44	3.5 / 1.7	43	3.2 / 1.5
		775	45	3.7 / 1.8	44	3.2 / 1.5	44	3.3 / 1.6	44	3.4 / 1.6
		800	46	3.7 / 1.8	46	3.8 / 1.8	45	3.8 / 1.8	44	3.2 / 1.5
		825	46	3.5 / 1.7	46	3.6 / 1.7	46	3.7 / 1.8	46	3.8 / 1.8
		850	47	3.7 / 1.8	47	3.8 / 1.8	46	3.5 / 1.7	46	3.6 / 1.7
		875	47	3.5 / 1.7	47	3.6 / 1.7	47	3.7 / 1.8	46	3.4 / 1.6
		900	48	3.8 / 1.8	47	3.4 / 1.6	47	3.5 / 1.7	47	3.7 / 1.7
U.S.A. Only	7001 to 8500	675	44	3.5 / 1.7	43	3.2 / 1.5	43	3.3 / 1.6	43	3.4 / 1.6
		700	44	3.3 / 1.6	44	3.4 / 1.6	44	3.5 / 1.7	43	3.2 / 1.5
		725	45	3.7 / 1.8	45	3.8 / 1.8	44	3.3 / 1.6	44	3.4 / 1.6
		750	46	3.6 / 1.7	46	3.8 / 1.8	45	3.7 / 1.8	45	3.8 / 1.8
		775	46	3.4 / 1.6	46	3.5 / 1.7	46	3.6 / 1.7	46	3.8 / 1.8
		800	47	3.6 / 1.7	47	3.8 / 1.8	46	3.4 / 1.6	46	3.5 / 1.7
		825	47	3.4 / 1.6	47	3.5 / 1.7	47	3.6 / 1.7	47	3.8 / 1.8
850	48	3.7 / 1.7	48	3.8 / 1.8	47	3.4 / 1.6	47	3.5 / 1.7		

Table 19 - Multipoise, 2-Stage & Variable-Speed, Low NOx Non-Condensing Furnace  
 (Downflow or Horizontal Position) Orifice Size & Manifold Pressures for Correct Input  
 (TABULATED DATA BASED ON 21,000 BTUH HIGH-HEAT / 14,500 BTUH LOW-HEAT PER BURNER,  
 DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Mnfl'd Press High/Low	Orifice No.	Mnfl'd Press High/Low	Orifice No.	Mnfl'd Press High/Low	Orifice No.	Mnfl'd Press High/Low
U.S.A. Only	7001	650	44	3.3 / 1.6	44	3.4 / 1.6	44	3.5 / 1.7	43	3.2 / 1.5
		675	45	3.7 / 1.8	45	3.8 / 1.8	44	3.3 / 1.6	44	3.4 / 1.6
		700	46	3.6 / 1.7	46	3.7 / 1.8	46	3.8 / 1.8	45	3.8 / 1.8
	8000	725	47	3.8 / 1.8	46	3.5 / 1.7	46	3.6 / 1.7	46	3.7 / 1.8
		750	47	3.5 / 1.7	47	3.7 / 1.8	47	3.8 / 1.8	46	3.5 / 1.6
		775	48	3.8 / 1.8	47	3.4 / 1.6	47	3.6 / 1.7	47	3.7 / 1.7
		800	48	3.6 / 1.7	48	3.7 / 1.8	48	3.8 / 1.8	47	3.4 / 1.6
U.S.A. Only	8001	825	48	3.3 / 1.6	48	3.5 / 1.6	48	3.6 / 1.7	48	3.7 / 1.8
		625	45	3.7 / 1.8	45	3.8 / 1.8	44	3.3 / 1.6	44	3.4 / 1.6
		650	46	3.6 / 1.7	46	3.7 / 1.8	46	3.8 / 1.8	45	3.8 / 1.8
	9000	675	47	3.8 / 1.8	46	3.4 / 1.6	46	3.5 / 1.7	46	3.7 / 1.7
		700	47	3.5 / 1.7	47	3.6 / 1.7	47	3.7 / 1.8	46	3.4 / 1.6
		725	48	3.7 / 1.8	48	3.8 / 1.8	47	3.5 / 1.7	47	3.6 / 1.7
U.S.A. Only	9001	750	48	3.5 / 1.7	48	3.6 / 1.7	48	3.7 / 1.8	48	3.8 / 1.8
		775	49	3.8 / 1.8	48	3.4 / 1.6	48	3.5 / 1.7	48	3.6 / 1.7
	10000	600	46	3.6 / 1.7	46	3.7 / 1.8	46	3.8 / 1.8	45	3.7 / 1.8
		625	47	3.7 / 1.8	47	3.8 / 1.8	46	3.5 / 1.7	46	3.6 / 1.7
		650	47	3.4 / 1.6	47	3.6 / 1.7	47	3.7 / 1.8	47	3.8 / 1.8

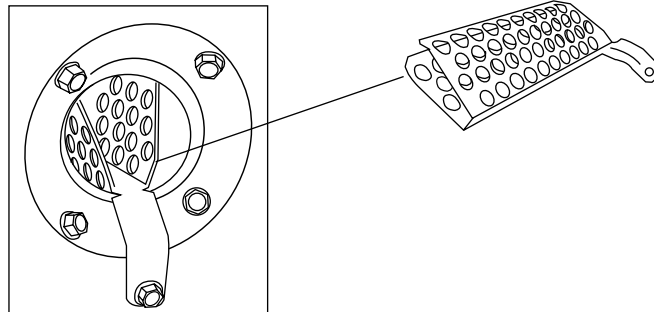


Fig. 31—NOx Baffle Installation

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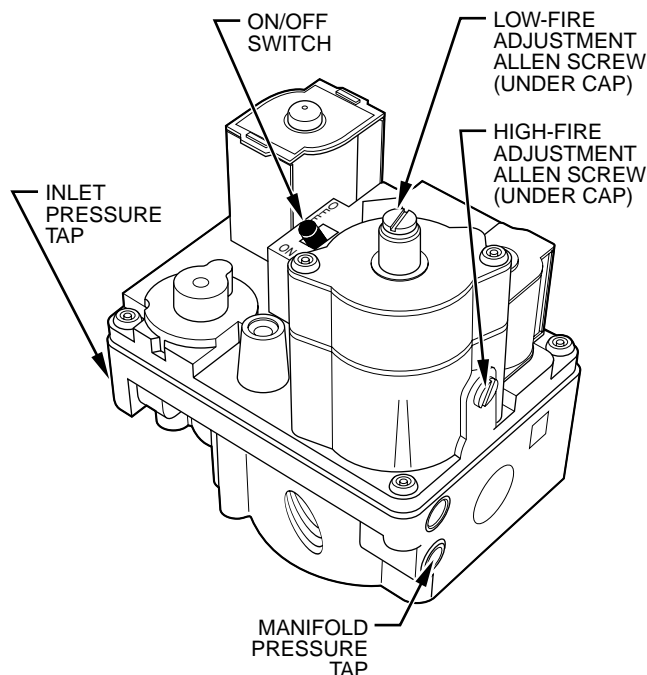
7. Jumper R-W/W1 and R-W2 thermostat connections on control center. (See Fig. 33 or 34.) This runs the furnace in high-heat.
8. When main burners ignite, confirm inlet gas pressure is between 4.5-in. wc and 13.6-in. wc.
9. Remove jumper across R-W/W1 and R-W2 thermostat connections to terminate call for heat.
10. Turn furnace gas-valve switch to OFF position.
11. Turn gas-supply manual-shutoff valve to OFF position.
12. Turn off furnace power supply.
13. Remove manometer and reinstall gas-valve inlet-pressure tap plug. (See Fig. 32.)

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

**PROCEDURE 4—CHECK FURNACE OPERATION AND MAKE NECESSARY ADJUSTMENTS**

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove 1/8-in. pipe plug from manifold-pressure tap on downstream side of gas valve. (See Fig. 32.)
3. Attach manometer to manifold-pressure tap on gas valve. (See Fig. 17 and 32.)
4. Turn gas-supply manual-shutoff valve to ON position.
5. Turn furnace gas-valve control switch to ON position.





A00158

**Fig. 32—Redundant Automatic 2-Stage Gas Valve  
(No Regulator Spring Change Required)**

6. Check all threaded pipe connections for gas leaks.

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**⚠ WARNING: NEVER use matches, candles, flame, or other sources of ignition to check for gas leakage. Use a soap-and-water solution to check for leaks. Failure to follow this warning could result in fire, explosion, personal injury, or death.**

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7. Turn on furnace power supply.
8. Turn the appropriate set-up switch on control center to the ON position. This will lock the furnace in low heat. (See Fig. 33 or 34.)
  - a. For furnaces with PSC blower motors, turn LHT switch ON to lock the furnace in low-heat. (See Fig. 33.)
  - b. For furnaces with ECM blower motors, turn switch SW1-2 ON to lock the furnace in low-heat. (See Fig. 34.)
9. Jumper R and W/W1 thermostat connections to call for heat.
10. When main burners ignite, check manifold orifices for gas leaks.

#### **PROCEDURE 5—SET GAS INPUT RATE**

Furnace gas-input rate on rating plate is for installations at altitudes up to 2000 ft.

In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level.

In Canada, the input rating must be derated by 10 percent for altitudes of 2000 ft to 4500 ft above sea level.

Furnace-input rate must be within  $\pm 2$  percent of input on furnace-rating plate.

The gas input rate must be set for both high-and-low-heat stage. Each adjustment is made independently at the gas control regulators.

1. Determine natural-gas orifice size and manifold pressure for correct input using Table 18 or 19.
  - a. Obtain yearly heat-value average (at installed altitude) from local gas supplier.
  - b. Obtain yearly specific-gravity average from local gas supplier.
  - c. Verify furnace model. Table 18 or 19 can only be used for 33-in tall; multipoise, hot-surface ignition, two-stage and variable speed, non-condensing furnaces.
  - d. Find installation altitude in Table 18 or 19.

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 18 or 19.

- e. Find closest natural gas heat value and specific gravity in Table 18 or 19.
- f. Follow heat value and specific gravity lines to point of intersection to find orifice size and low- and high-heat manifold pressure settings for proper operation.
- g. Check and verify burner orifice size in furnace.

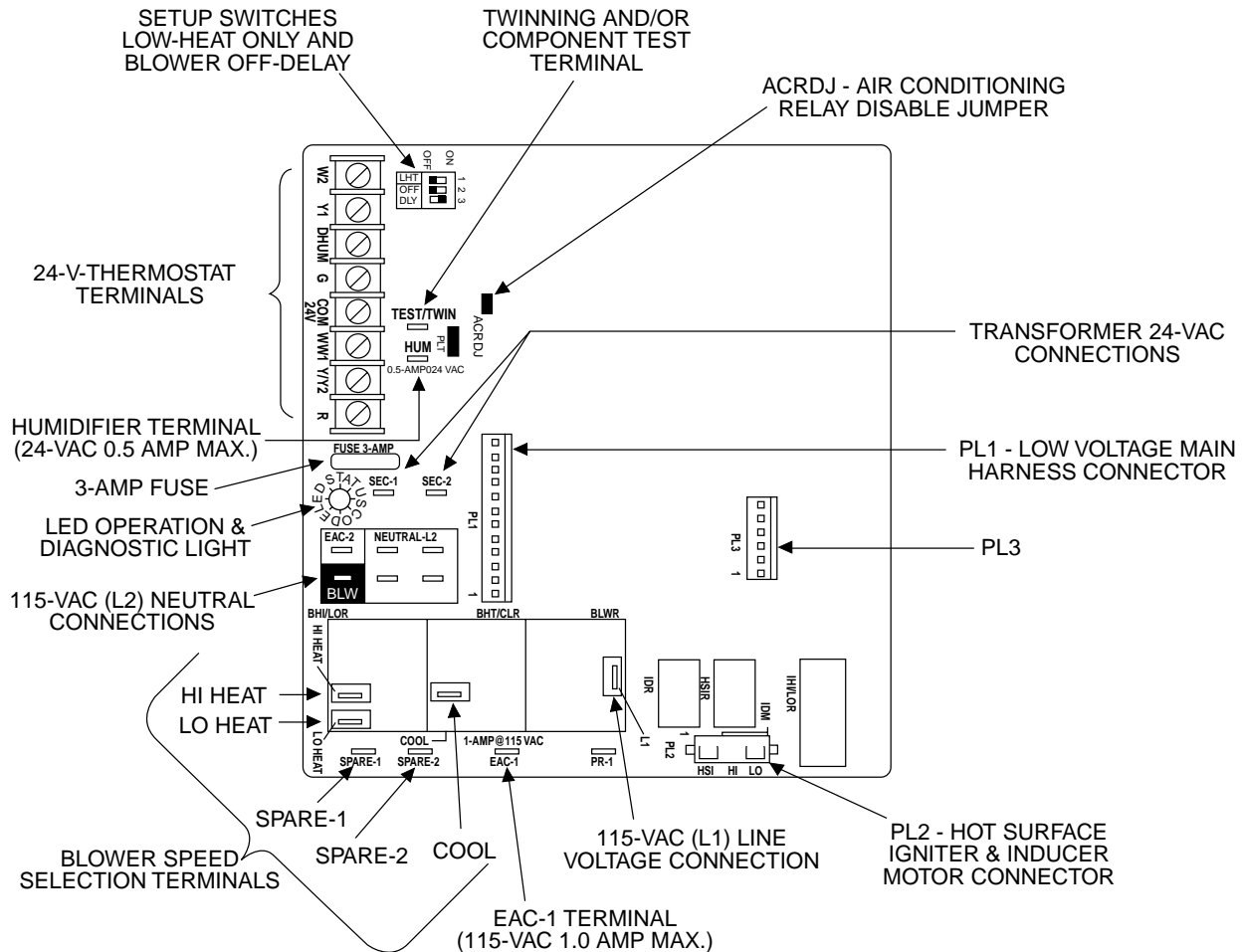


Fig. 33—2-Stage Furnace Control-PSC Blower Motor

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EXAMPLE: (Using Table 18 at 0-2000 ft altitude)

Heating value = 1050 Btu/cu ft

Specific gravity = 0.62

Therefore: Orifice No. 43, Manifold pressure 3.4-in. wc for high heat and 1.5-in. wc for low heat

NEVER ASSUME ORIFICE SIZE. ALWAYS CHECK AND VERIFY.

2. Adjust manifold pressure to obtain input rate.

**NOTE:** Low-heat must be adjusted before high-heat.

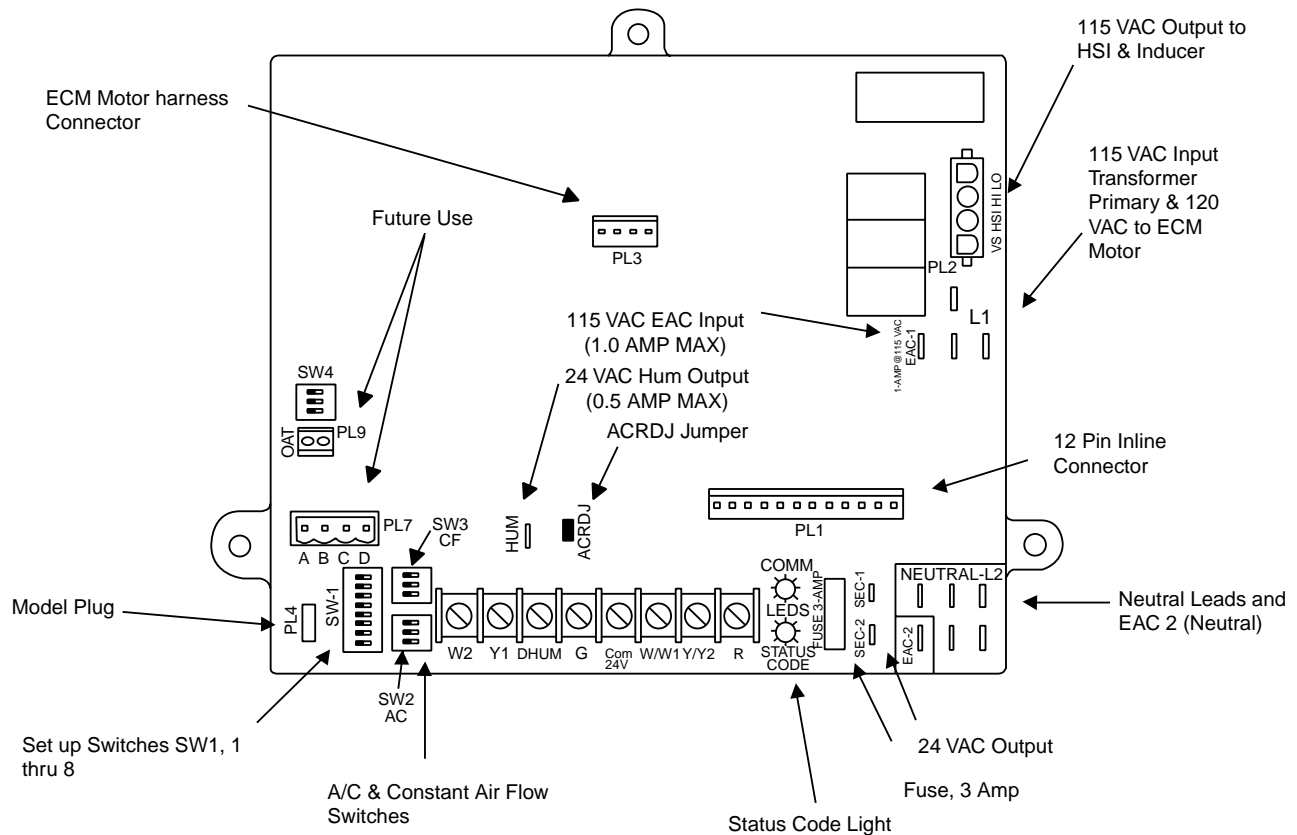
- Remove caps that conceal adjustment screws for low- and high-heat gas-valve regulators. (See Fig. 32.)
- Turn low-heat adjusting screw (3/32 hex Allen wrench) counterclockwise (out) to decrease input rate or clockwise (in) to increase input rate.

**NOTE:** DO NOT set low-heat manifold pressure less than 1.3-in. wc or more than 1.7-in. wc for natural gas. If manifold pressure is outside this range, change main-burner orifices.

**CAUTION:** DO NOT bottom out gas-valve regulator-adjusting screw. This can result in unregulated manifold pressure and result in excess overfire and heat exchanger failures.

**NOTE:** If orifice hole appears damaged or it is suspected to have been redrilled, check orifice hole with a numbered drill bit of correct size. Never redrill an orifice. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics.

**CAUTION:** DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)



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**Fig. 34—Variable Speed Furnace Control-ECM Blower Motor**

- c. Jumper R and W2 thermostat connections on control. (See Fig. 33 or 34.) This keeps furnace in high-heat.
- d. Turn high-heat adjusting screw (3/32 hex Allen wrench) counterclockwise (out) to decrease input rate or clockwise (in) to increase rate.

**NOTE:** DO NOT set high-heat manifold pressure less than 3.2-in. wc or more than 3.8-in. wc for natural gas. If manifold pressure is outside this range, change main-burner orifices.

- e. When correct input is obtained, replace caps that conceal gas-valve regulator-adjustment screws. Main-burner flame should be clear blue, almost transparent. (See Fig. 7.)
  - f. Remove jumper across R-W/W1 and R-W2 after high-heat stage adjustments.
  - g. Turn setup switch LHT or SW1–2 on control center to OFF position. (See Fig. 33 or 34.)
3. Verify natural-gas-input rate by clocking gas meter.
- a. Calculate high-altitude adjustment (if required).

**UNITED STATES**

At installation altitudes above 2000 ft, input must be reduced by 4 percent for each 1000 ft above sea level. See Table 20 for derate multiplier factor and example.

**CANADA**

At installation altitudes from 2000 to 4500 ft, this furnace must be derated 10 percent by an authorized Gas Conversion Station or Dealer. To determine correct input rate for altitude, see example and use 0.90 as derate multiplier factor.

EXAMPLE: (For upflow furnace USA)  
 100,000 Btuh input furnace installed at 4300 ft.  
 Furnace Input Rate at Sea Level X Derate Multiplier Factor = Furnace Input Rate at Installation Altitude  
 100,000 X 0.82 = 82,000

- b. Check that gas-valve adjustment caps are in place for proper input to be clocked.
- c. Obtain average yearly heat value for local gas supply.

**NOTE:** Be sure heating value of gas used for calculations is correct for your altitude. Consult local gas utility for altitude adjustment of gas heating value.

- d. Check and verify orifice size in furnace. NEVER ASSUME THE ORIFICE SIZE. ALWAYS CHECK AND VERIFY.
- e. Turn off all other gas appliances and pilots.

**NOTE:** Low-heat must be adjusted before high-heat.

- f. Turn the appropriate set-up switch on control center to the ON position. This will lock the furnace in low-heat. (See Fig. 33 or 34.)

**Table 20—Altitude Derate Multiplier for U.S.A.**

ALTITUDE (FT)	PERCENT OF DERATE	DERATE MULTIPLIER FACTOR FOR U.S.A.*
0–2000	0	1.00
2001–3000	8–12	0.90
3001–4000	12–16	0.86
4001–5000	16–20	0.82
5001–6000	20–24	0.78
6001–7000	24–28	0.74
7001–8000	28–32	0.70
8001–9000	32–36	0.66
9001–10,000	36–40	0.62

- (1.) For furnaces with PSC blower motors, turn LHT switch ON to lock the furnace in low heat. (See Fig. 33.)
- (2.) For furnaces with ECM blower motors, turn switch SW1–2 ON to lock the furnace in low heat. (See Fig. 34.)
- g. Jumper R and W/W1 thermostat connections.
- h. Let furnace run for 3 minutes in low-heat operation.
- i. Measure time (in sec) for gas-meter test dial to complete 1 revolution. Note reading.
- j. Refer to Table 15 for cu ft of gas per hr.
- k. Multiply gas rate (cu ft/hr) X heating value (Btu/cu ft).

**NOTE:** Measured gas input must be within  $\pm 2$  percent of that stated on furnace-rating plate when installed at sea level or derated per that stated above when installed at higher altitudes.

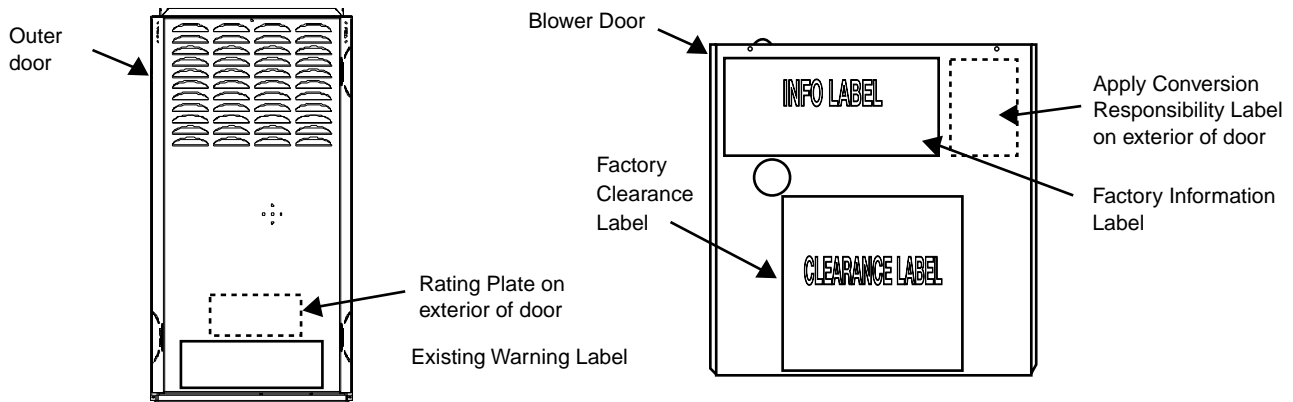
EXAMPLE: (Low-heat operation for all models at 0-2000 ft altitude)  
 Furnace input for low heat from rating plate is 65,000 Btuh.  
 Btu heating input = Btu/cu ft X cu ft/hr  
 Heating value of gas = 975 Btu/cu ft  
 Time for 1 revolution of 2-cu ft dial = 108 sec  
 Gas rate = 67 cu ft/hr (from Table 15)  
 Btu heating input = 67 X 975 = 65,325 Btuh  
 In this example, the orifice size and manifold-pressure adjustment is within  $\pm 2$  percent of the furnace input rate.

1. Jumper R and W2 thermostat connections and repeat items i through l for high-heat operation.
4. Remove jumper across R, W/W1, and W2 thermostat connections to terminate call for heat.
5. Turn setup switch LHT or SW1-2 to OFF position. (See Fig. 33 or 34.)
6. Turn furnace gas-valve-control switch to OFF position.
7. Turn off furnace power supply.
8. Remove manometer and reinstall manifold-pressure tap plug. (See Fig. 17 and 32.)
9. Turn furnace gas-valve-control switch to ON position.
10. Turn on furnace power supply.
11. Set room thermostat to call for heat.
12. Check pressure-tap plug for gas leaks when main burners ignite.
13. Check for correct burner flame. (See Fig. 7.)
14. Observe unit through 2 complete heating cycles. See sequence of operation in furnace Installation, Start-Up, and Operating Instructions.
15. Set room thermostat to desired temperature.

**PROCEDURE 6—LABEL APPLICATION**

**NOTE:** See Fig. 35 for label locations.

1. Fill in Conversion Responsibility Label (327751-205) and apply inside furnace as shown. Date, name, and address of organization making this conversion are required.
2. Attach Furnace Conversion Rating Plate (327751-201) as shown.
3. Apply Gas Control Adjustment Label (327751-202) to gas valve.
4. Check for correct normal-operating sequence of ignition system as described in furnace Installation, Start-Up, and Operating Instructions.
5. Reinstall main furnace door.



A02203

Fig. 35—Label Application

→ **SECTION 7—MODELS 310AAV, 311AAV, 310JAV, 311JAV, 58STA, 58DLA, 58STX AND 58DLX INDUCED COMBUSTION, HOT SURFACE IGNITION, FIXED SPEED, NON-CONDENSING FURNACES**

**PROCEDURE 1—INSTALL MAIN BURNER ORIFICES**

**NOTE:** See Fig. 36 for component location in upflow orientation. Re-orient component arrangement when furnace is installed in other orientations.

1. Turn off furnace gas and electrical supplies to furnace.
2. Remove main furnace door.
3. Turn furnace gas valve switch to "OFF" position.
4. Remove gas supply pipe to valve.

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**⚠ CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.**

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**⚠ ATTENTION: Lors des opérations d'entretien des commandes, étiqueter tous les fils avant de les déconnecter. Toute erreur de câblage peut être une source de danger et de panne.**

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5. Remove wires from gas valve. Note location for re-assembly.
6. Remove 2 wires from low gas pressure switch (LGPS) located on gas valve.
7. Remove the 2 screws on the left side that secure the gas manifold to the burner box. Note the location of the green ground wire for reassembly.
8. Swing manifold and orifices out from burners.
9. Slide right side of manifold out of burner box.
10. Remove and discard orifices from manifold.
11. Determine natural gas orifice size for correct input at installed altitude by using Table 21 (non—Low NOx models in any position, and Low NOx models in upflow position) or Table 22 (Low NOx models only when in downflow or horizontal position) and Fig. 4.

Furnace gas-input rate on rating plate is for installations at altitudes up to 2000 ft.

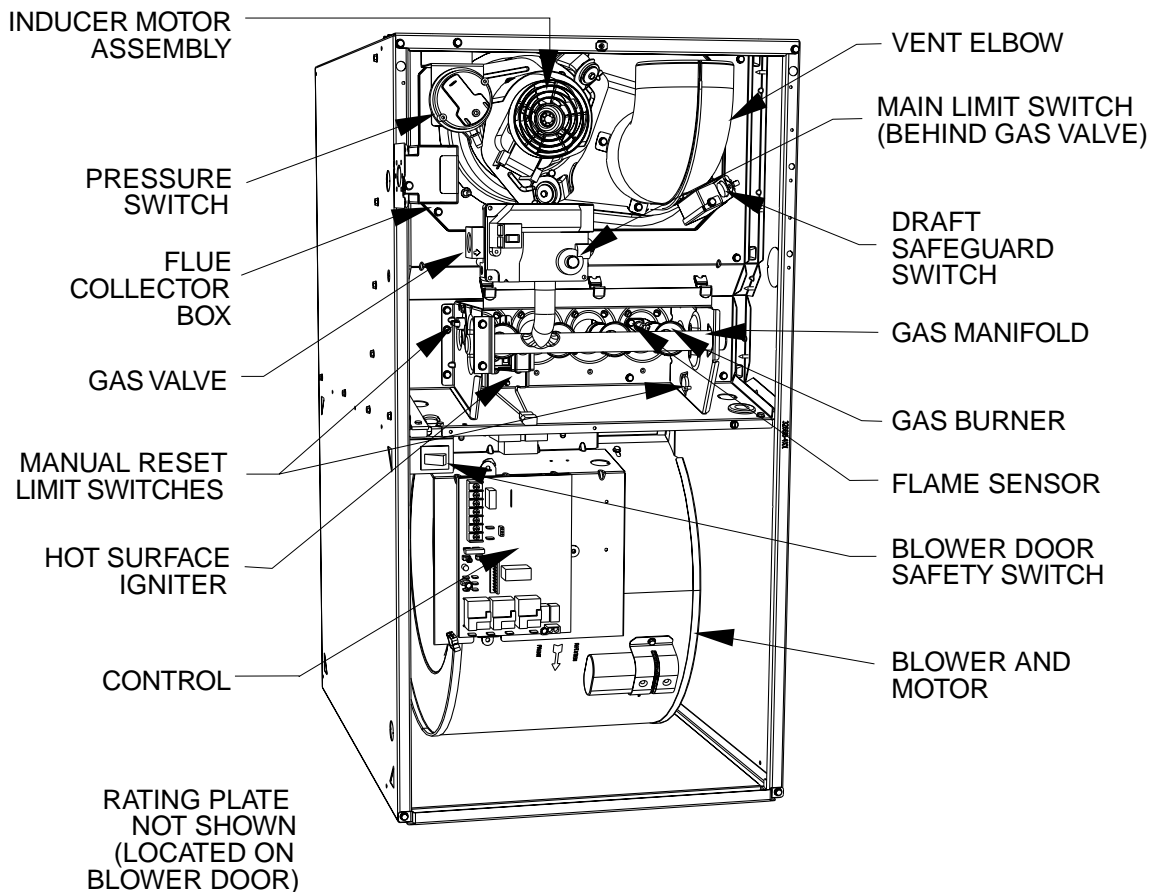
In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level.

In Canada, the input rating must be derated by 10 percent for altitudes of 2000 ft to 4500 ft above sea level.

- a. Obtain yearly heat-value average (at installed altitude) for local gas supply.
- b. Obtain yearly specific-gravity average for local gas supply.
- c. Verify furnace model. Table 21 or 22 can only be used for 33-in. tall, multipoise, hot-surface ignition, non-condensing furnaces.
- d. Find installation altitude in Table 21 or 22.

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 21 or 22.

- e. Find closest natural gas heat value and specific gravity in Table 21 or 22.
- f. Follow heat-value line and specific-gravity line to point of intersection to find orifice size and low- and high-heat manifold pressure settings.



A03059

Fig. 36—Component Location

EXAMPLE: (Using Table 21 at 0-2000 ft altitude)  
 Heat value = 1050 Btu/cu ft  
 Specific gravity = 0.62  
 Therefore: Orifice No. 43 is required

12. Install main burner orifices. Do not use Teflon tape. Finger-tighten orifices at least 1 full turn to prevent cross-threading, then tighten with wrench. There are enough orifices in each kit for the largest furnace. Discard extra orifices. Orifices of other sizes must be field supplied and are available through your local distributor.

**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**

**NOTE:** DO NOT reinstall the manifold, orifices, and gas-valve assembly at this time.

**A. Remove the Spoiler Screws from the Burners**

1. Disconnect the hot surface ignitor from harness.
2. Disconnect flame sensor from harness.
3. Slide burner assembly out of burner enclosure.
4. Remove ¼" spoiler screws from burners.

**NOTE:** It is not necessary to plug the hole in the burner when screws are removed.

5. Slide burner assembly into slot on burner enclosure, making sure it is fully seated forward in the enclosure.
6. Reconnect ignitor and flame sensor.

Table 21 - Multipoise, Fixed-Speed, Non-Condensing Furnace (Except Low NOx Models in Downflow or Horizontal Position) Orifice Size and Manifold Pressure for Correct Input Rate  
(TABULATED DATA BASED ON 22,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. and Canada	0 to 2000	900	42	3.5	42	3.6	42	3.7	41	3.5
		925	42	3.3	42	3.4	42	3.5	42	3.7
		950	43	3.8	42	3.3	42	3.4	42	3.5
		975	43	3.6	43	3.8	42	3.2	42	3.3
		1000	43	3.5	43	3.6	43	3.7	43	3.8
		1025	43	3.3	43	3.4	43	3.5	43	3.6
		1050	44	3.6	43	3.2	43	3.4	43	3.5
		1075	44	3.4	44	3.5	43	3.2	43	3.3
		1100	44	3.3	44	3.4	44	3.5	43	3.2
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	42	3.4	42	3.5	42	3.6	42	3.7
		825	42	3.2	42	3.3	42	3.4	42	3.5
		850	43	3.7	43	3.8	42	3.2	42	3.3
		875	43	3.5	43	3.6	43	3.7	43	3.8
		900	43	3.3	43	3.4	43	3.5	43	3.6
		925	43	3.1	43	3.2	43	3.3	43	3.4
		950	43	2.9	43	3.0	43	3.1	43	3.2
				975	43	2.8	43	2.9	43	3.0
		1000	43	2.6	43	2.7	43	2.8	43	2.9
U.S.A. Only	3001 to 4000	775	42	3.2	42	3.3	42	3.4	42	3.5
		800	43	3.6	43	3.8	42	3.2	42	3.3
		825	43	3.4	43	3.5	43	3.7	43	3.8
		850	43	3.2	43	3.3	43	3.4	43	3.6
		875	43	3.0	43	3.1	43	3.3	43	3.4
		900	43	2.9	43	3.0	43	3.1	43	3.2
		925	43	2.7	43	2.8	43	2.9	43	3.0
				950	43	2.6	43	2.7	43	2.8
U.S.A. Only	4001 to 5000	750	43	3.6	43	3.8	42	3.2	42	3.3
		775	43	3.4	43	3.5	43	3.6	43	3.8
		800	43	3.2	43	3.3	43	3.4	43	3.5
		825	43	3.0	43	3.1	43	3.2	43	3.3
		850	43	2.8	43	2.9	43	3.0	43	3.1
		875	43	2.7	43	2.8	43	2.9	43	2.9
		900	43	2.5	43	2.6	43	2.7	43	2.8
				925	43	2.4	43	2.5	43	2.6
U.S.A. Only	5001 to 6000	725	43	3.4	43	3.5	43	3.6	43	3.7
		750	43	3.2	43	3.3	43	3.4	43	3.5
		775	43	3.0	43	3.1	43	3.2	43	3.3
		800	43	2.8	43	2.9	43	3.0	43	3.1
		825	43	2.6	43	2.7	43	2.8	43	2.9
		850	43	2.5	43	2.5	43	2.6	43	2.7
		875	43	2.3	43	2.4	43	2.5	43	2.6
				900	43	2.2	43	2.3	43	2.3
U.S.A. Only	6001 to 7000	675	43	3.4	43	3.5	43	3.6	43	3.7
		700	43	3.1	43	3.3	43	3.4	43	3.5
		725	43	2.9	43	3.0	43	3.1	43	3.2
		750	43	2.7	43	2.8	43	2.9	43	3.0
		775	43	2.6	43	2.7	43	2.7	43	2.8
		800	43	2.4	43	2.5	43	2.6	43	2.7
		825	43	2.3	43	2.3	43	2.4	43	2.5
				850	43	2.1	43	2.2	43	2.3

Table 21 - Multipoise, Fixed-Speed, Non-Condensing Furnace (Except Low Nox Models in Downflow or Horizontal Position) Orifice Size and Manifold Pressure for Correct Input Rate  
(TABULATED DATA BASED ON 22,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS								
			0.58		0.60		0.62		0.64		
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	
U.S.A. Only	7001	650	43	3.1	43	3.2	43	3.4	43	3.5	
		675	43	2.9	43	3.0	43	3.1	43	3.2	
		700	43	2.7	43	2.8	43	2.9	43	3.0	
	8000	to	725	43	2.5	43	2.6	43	2.7	43	2.8
		750	43	2.4	43	2.4	43	2.5	43	2.6	
		775	43	2.2	43	2.3	43	2.4	43	2.4	
		800	43	2.1	43	2.1	43	2.2	43	2.3	
825	48	3.7	43	2.0	43	2.1	43	2.2			
U.S.A. Only	8001	625	43	2.9	43	3.0	43	3.1	43	3.2	
		650	43	2.7	43	2.8	43	2.9	43	3.0	
		675	43	2.5	43	2.6	43	2.7	43	2.8	
	9000	to	700	43	2.3	43	2.4	43	2.5	43	2.6
		725	43	2.2	43	2.2	43	2.3	43	2.4	
		750	43	2.0	43	2.1	43	2.2	43	2.2	
		775	48	3.6	48	3.7	43	2.0	43	2.1	
U.S.A. Only	9001	600	43	2.7	43	2.8	43	2.9	43	3.0	
		625	43	2.5	43	2.6	43	2.6	43	2.7	
		650	43	2.3	43	2.4	43	2.4	43	2.5	
	10000	to	675	43	2.1	43	2.2	43	2.3	43	2.3
		700	48	3.7	43	2.0	43	2.1	43	2.2	
		725	48	3.5	48	3.6	48	3.7	43	2.0	

**B. Install NOx Baffles (where required)**

The following models must have NOx baffles installed. NOx baffles are not included in this kit and must be ordered separately or reused if retained from original conversion to propane.

<b>58STX</b>	<b>310JAV</b>	<b>PG8JAA</b>
<b>58DLX</b>	<b>311JAV</b>	

1. Remove the 1/4" screw from the hole in the heat exchanger cell panel directly below each heat exchanger inlet.
2. Insert the NOx baffle into each heat exchanger inlet.
3. Align the baffle mounting tab with the hole in the cell panel.
4. Insert the 1/4" screw through the NOx baffle mounting tab and into the hole in the heat exchanger cell panel.
5. Tighten the screw securely.
6. Repeat the procedure for each heat exchanger inlet. (See Fig. 31.)
7. Remove low-gas-pressure switch (LGPS), street elbow, and 1/8-in. tee from gas-valve inlet-pressure tap. (See Fig. 37.)

**NOTE:** Use propane-gas-resistant pipe dope on all connections to prevent gas leaks. DO NOT use Teflon tape.

8. Apply pipe dope sparingly to 1/8-in. pipe plug (provided in kit) and install in 1/8-in. tapped inlet-pressure tap opening in gas valve.
9. Insert right end of manifold in right side of burner box. Swing manifold into burners and insert orifices into burners. Ensure that manifold orifices are fully inserted and the burners fit over each orifice.
10. Secure manifold to left side of burner rack with the 2 previously removed screws. Verify that the green ground wire is attached between the topscrew and the manifold in the correct location.

**NOTE:** Failure to connect green ground wire will result in the loss of flame signal and result in a NO Heat condition.

11. Reconnect wires to gas valve. See wiring label on furnace to ensure proper location of wires.
12. Rewire unit low pressure switch LPS as follows:
  - a. Trace one of the yellow wires previously disconnected from the LGPS back to the NO terminal of the LPS. Disconnect this wire from the LPS and discard.
  - b. Trace the other yellow wire previously disconnected from the LGPS back to the furnace wire harness.
  - c. Connect the yellow wire of the furnace wire harness (see 'b' above) to the NO terminal of the LPS.



Table 22 - Multipoise, Fixed-Speed, Low NOx Non-Condensing Furnace  
(Downflow or Horizontal Position) Orifice Size and Manifold Pressure for Correct Input Rate  
(TABULATED DATA BASED ON 21,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. and Canada	0 to 2000	900	42	3.2	42	3.3	42	3.4	42	3.5
		925	43	3.7	43	3.8	42	3.2	42	3.3
		950	43	3.5	43	3.6	43	3.7	43	3.8
		975	43	3.3	43	3.4	43	3.5	43	3.7
		1000	44	3.6	43	3.3	43	3.4	43	3.5
		1025	44	3.4	44	3.6	43	3.2	43	3.3
		1050	44	3.3	44	3.4	44	3.5	43	3.2
		1075	45	3.8	44	3.2	44	3.3	44	3.4
		1100	46	3.8	45	3.7	44	3.2	44	3.3
U.S.A. and Canada	U.S.A. Altitudes 2001 to 3000 or Canada Altitudes 2001 to 4500	800	43	3.8	42	3.2	42	3.3	42	3.4
		825	43	3.5	43	3.7	43	3.8	42	3.2
		850	43	3.3	43	3.5	43	3.6	43	3.7
		875	43	3.2	43	3.3	43	3.4	43	3.5
		900	43	3.0	43	3.1	43	3.2	43	3.3
		925	43	2.8	43	2.9	43	3.0	43	3.1
		950	43	2.7	43	2.8	43	2.9	43	2.9
		975	43	2.5	43	2.6	43	2.7	43	2.8
		1000	43	2.4	43	2.5	43	2.6	43	2.7
U.S.A. Only	3001 to 4000	775	43	3.5	43	3.7	43	3.8	42	3.2
		800	43	3.3	43	3.4	43	3.5	43	3.7
		825	43	3.1	43	3.2	43	3.3	43	3.4
		850	43	2.9	43	3.0	43	3.1	43	3.2
		875	43	2.8	43	2.9	43	3.0	43	3.1
		900	43	2.6	43	2.7	43	2.8	43	2.9
		925	43	2.5	43	2.6	43	2.7	43	2.7
		950	43	2.4	43	2.4	43	2.5	43	2.6
U.S.A. Only	4001 to 5000	750	43	3.3	43	3.4	43	3.5	43	3.6
		775	43	3.1	43	3.2	43	3.3	43	3.4
		800	43	2.9	43	3.0	43	3.1	43	3.2
		825	43	2.7	43	2.8	43	2.9	43	3.0
		850	43	2.6	43	2.7	43	2.8	43	2.8
		875	43	2.4	43	2.5	43	2.6	43	2.7
		900	43	2.3	43	2.4	43	2.5	43	2.5
		925	43	2.2	43	2.2	43	2.3	43	2.4
U.S.A. Only	5001 to 6000	725	43	3.1	43	3.2	43	3.3	43	3.4
		750	43	2.9	43	3.0	43	3.1	43	3.2
		775	43	2.7	43	2.8	43	2.9	43	3.0
		800	43	2.5	43	2.6	43	2.7	43	2.8
		825	43	2.4	43	2.5	43	2.5	43	2.6
		850	43	2.2	43	2.3	43	2.4	43	2.5
		875	43	2.1	43	2.2	43	2.3	43	2.3
		900	43	2.0	43	2.1	43	2.1	43	2.2
U.S.A. Only	6001 to 7000	675	43	3.1	43	3.2	43	3.3	43	3.4
		700	43	2.9	43	3.0	43	3.1	43	3.2
		725	43	2.7	43	2.8	43	2.9	43	2.9
		750	43	2.5	43	2.6	43	2.7	43	2.8
		775	43	2.3	43	2.4	43	2.5	43	2.6
		800	43	2.2	43	2.3	43	2.3	43	2.4
		825	43	2.1	43	2.1	43	2.2	43	2.3
		850	48	3.7	43	2.0	43	2.1	43	2.1

Table 22 - Multipoise, Fixed-Speed, Low NOx Non-Condensing Furnace  
 (Downflow or Horizontal Position) Orifice Size and Manifold Pressure for Correct Input Rate  
 (TABULATED DATA BASED ON 21,000 BTUH PER BURNER, DERATED 4%/1000 FT ABOVE SEA LEVEL)

ALTITUDE RANGE (ft)		AVG. GAS HEAT VALUE AT ALTITUDE (Btu/cu ft)	SPECIFIC GRAVITY OF NATURAL GAS							
			0.58		0.60		0.62		0.64	
			Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure	Orifice No.	Manifold Pressure
U.S.A. Only	7001	650	43	2.9	43	3.0	43	3.1	43	3.2
		675	43	2.7	43	2.7	43	2.8	43	2.9
		700	43	2.5	43	2.6	43	2.6	43	2.7
	8000	725	43	2.3	43	2.4	43	2.5	43	2.5
		750	43	2.1	43	2.2	43	2.3	43	2.4
		775	43	2.0	43	2.1	43	2.2	43	2.2
		800	48	3.6	48	3.7	43	2.0	43	2.1
U.S.A. Only	8001	825	48	3.3	48	3.5	48	3.6	48	3.7
		625	43	2.7	43	2.7	43	2.8	43	2.9
		650	43	2.5	43	2.5	43	2.6	43	2.7
	9000	675	43	2.3	43	2.4	43	2.4	43	2.5
		700	43	2.1	43	2.2	43	2.3	43	2.3
		725	48	3.7	43	2.0	43	2.1	43	2.2
		750	48	3.5	48	3.6	48	3.7	43	2.0
U.S.A. Only	10000	775	49	3.8	48	3.4	48	3.5	48	3.6
		600	43	2.4	43	2.5	43	2.6	43	2.7
		625	43	2.3	43	2.3	43	2.4	43	2.5
		650	43	2.1	43	2.2	43	2.2	43	2.3
		675	48	3.6	48	3.8	43	2.1	43	2.1
U.S.A. Only	9001	700	48	3.4	48	3.5	48	3.6	48	3.7
		725	49	3.7	49	3.8	48	3.4	48	3.5

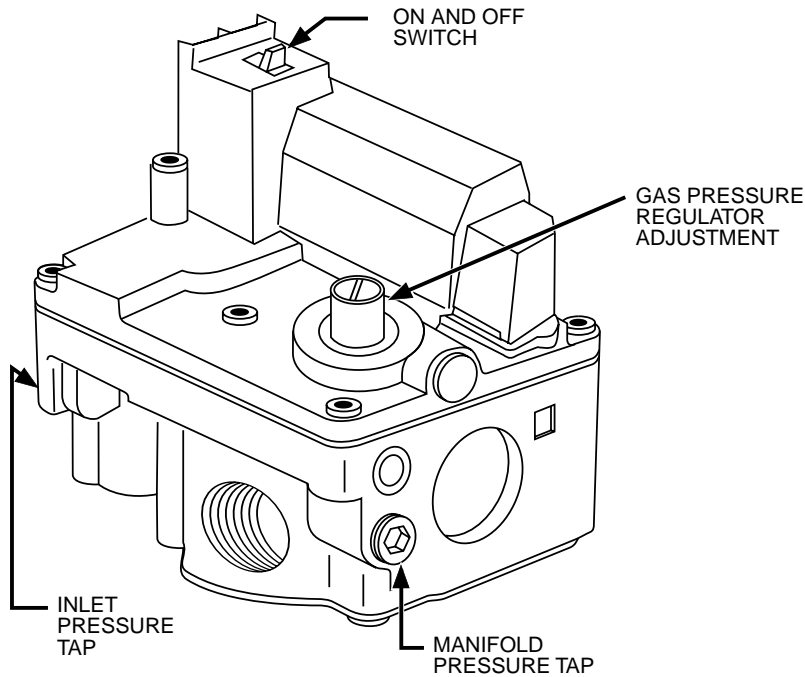


Fig. 37—Redundant Automatic Gas Control Valve

A00157

d. Refer to wiring label on the furnace to ensure proper location of wires.

13. Reinstall gas-supply pipe to gas valve using backup wrench on gas valve to prevent rotation and improper orientation.

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

## PROCEDURE 2—CONVERT GAS VALVE

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove regulator seal cap. (See Fig. 37.)
3. Remove adjustment screw and propane gas regulator spring (white).
4. Install natural gas regulator spring (silver-10 turns) into gas valve.

**NOTE:** DO NOT reinstall regulator seal cap at this time.

## PROCEDURE 3—CHECK INLET GAS PRESSURE

**NOTE:** This kit is to be used only when inlet gas pressure is between 4.5-in. wc and 13.6-in. wc.

1. Be sure gas and electric supplies to furnace are off.
2. Remove 1/8-in. pipe plug from inlet pressure tap on gas valve. (See Fig. 37.)
3. Attach manometer to inlet pressure tap on furnace gas valve.

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**⚠ CAUTION: DO NOT operate furnace more than 1 minute to check inlet gas pressure as conversion is not complete at this time. Failure to follow this caution may result in minor personal injury or product and property damage.**

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4. Turn gas supply manual shutoff valve to ON position.
5. Turn furnace gas valve control switch/knob to ON position.
6. Turn on furnace power supply.
7. Jumper R and W thermostat connections to call for heat.
8. When main burners ignite, confirm inlet gas pressure is between 4.5-in. wc and 13.6-in. wc.
9. Remove jumper across R and W thermostat connections to terminate call for heat.
10. Turn furnace gas valve control switch to OFF position.
11. Turn gas supply manual shutoff valve to OFF position.
12. Turn off furnace power supply.
13. Remove manometer and reinstall gas valve inlet pressure tap plug.

**NOTE:** Use propane-gas-resistant pipe dope to prevent gas leaks. DO NOT use Teflon tape.

## PROCEDURE 4—CHECK FURNACE OPERATION AND MAKE NECESSARY ADJUSTMENTS

1. Be sure main gas and electrical supplies to furnace are off.
2. Remove 1/8-in. pipe plug from manifold pressure tap on gas valve. (See Fig. 37.)
3. Attach manometer to manifold pressure tap on gas valve (See Fig. 17 and 37.)
4. Turn gas supply manual shutoff valve to ON position.
5. Turn furnace gas valve control switch to ON position.

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**⚠ WARNING: NEVER use matches, candles, flame, or other sources of ignition to check for gas leakage. Use a soap-and-water solution to check for leaks. Failure to follow this warning could result in fire, explosion, personal injury, or death.**

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6. Check all threaded pipe connections for gas leaks.
7. Turn on furnace power supply.
8. Jumper R and W thermostat connections to call for heat.
9. When main burners ignite, check manifold orifices for gas leaks.

## PROCEDURE 5—SET GAS INPUT RATE

Furnace gas input rate on rating plate is for installations at altitudes up to 2000 ft. (See conversion kit rating plate 327751-204.)

In the U.S.A., the input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level.

In Canada, the input rating must be derated by 10 percent for altitudes of 2000 ft to 4500 ft above sea level.

Furnace input rate must be within  $\pm 2$  percent of input on furnace rating plate.

1. Determine natural gas orifice size and manifold pressure for correct input using Table 21 or 22.
  - a. Obtain yearly heat value average (at installed altitude) from local gas supplier.
  - b. Obtain yearly specific gravity average from local gas supplier.
  - c. Verify furnace model. Table 21 or 22 can only be used for 33-in tall; multipoise, hot-surface ignition, non-condensing furnaces.
  - d. Find installation altitude in Table 21 or 22.

**NOTE:** For Canada altitudes of 2000 to 4500 ft, use U.S.A. altitudes of 2001 to 3000 ft in Table 21 or 22.

- e. Find closest natural gas heat value and specific gravity in Table 21 or 22.
- f. Follow heat value and specific gravity lines to point of intersection to find orifice size and manifold pressure settings for proper operation.
- g. Check and verify burner orifice size in furnace.

NEVER ASSUME ORIFICE SIZE. ALWAYS CHECK AND VERIFY.

EXAMPLE: (Using Table 21 at 0-2000 ft altitude)  
 Heat value = 1050 Btu/cu ft  
 Specific gravity = 0.62  
 Therefore: Orifice No. 43 is required, Manifold pressure 3.4-in. wc

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**⚠ CAUTION: DO NOT redrill burner orifices. Improper drilling (burrs, out-of-round holes, etc.) can cause excessive burner noise and misdirection of burner flames. This can result in flame impingement of the burners and heat exchangers causing failure. Obtain new orifices if orifice size must be changed. (See Fig. 5.)**

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- 2. Adjust manifold pressure to obtain input rate.
  - a. Remove regulator adjustment seal cap. (See Fig. 37.)
  - b. Turn adjusting screw counterclockwise (out) to decrease input rate or clockwise (in) to increase input rate.

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**⚠ CAUTION: DO NOT bottom out gas-valve regulator-adjusting screw. This can result in unregulated manifold pressure and result in excess overfire and heat exchanger failures.**

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**NOTE:** If orifice hole appears damaged or it is suspected to have been redrilled, check orifice hole with a numbered drill bit of correct size. Never redrill an orifice. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics.

**NOTE:** DO NOT set manifold pressure less than 3.2-in. wc or more than 3.8-in. wc for natural gas. If manifold pressure is outside this range, change main-burner orifices.

- c. When correct input is obtained, replace valve regulator adjustment caps and verify adjusted gas input using method outlined in item 3. below.
- d. Main-burner flame should be clear blue, almost transparent. (See Fig. 7.)
- e. Remove jumper across R-W thermostat connections.
- 3. Verify natural-gas-input rate by clocking gas meter.
  - a. Calculate high-altitude adjustment (if required).

**UNITED STATES**

At installation altitudes above 2000 ft, the input rate must be reduced by 4 percent for each 1000 ft above sea level. See Table 23 for derate multiplier factor and example.

**CANADA**

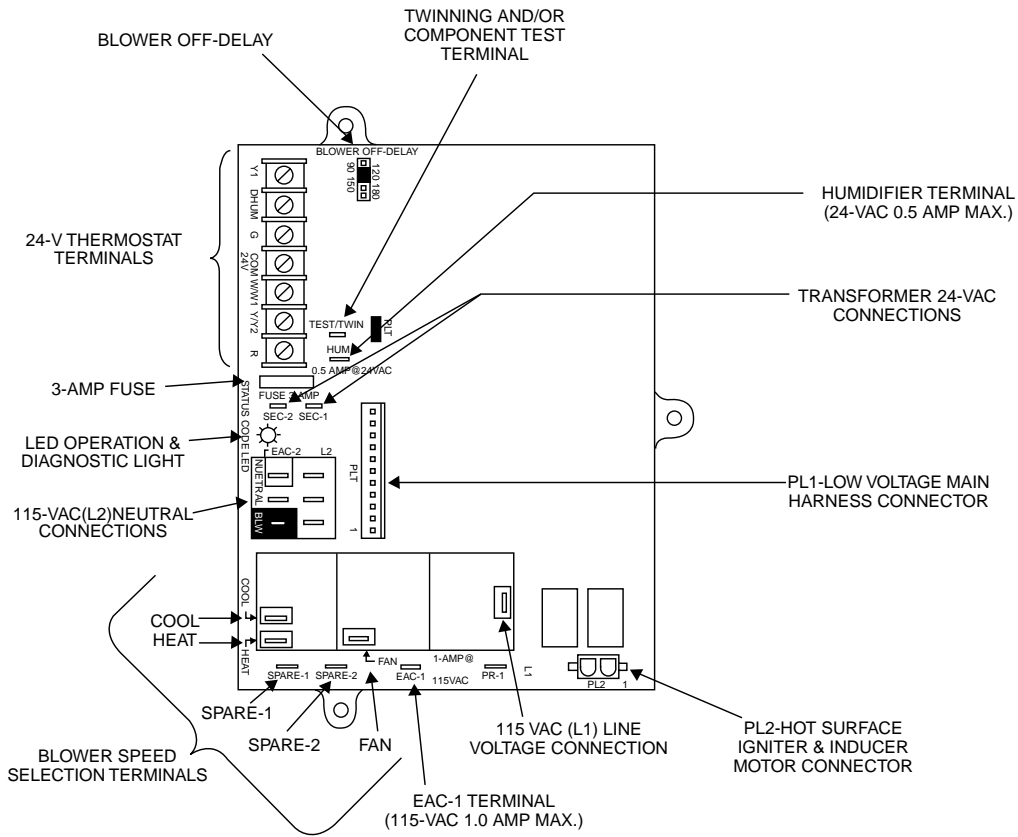
At installation altitudes from 2000 to 4500 ft, this furnace must be derated 10 percent by an authorized Gas Conversion Station or Dealer. To determine correct input rate for altitude, see example and use 0.90 as derate multiplier factor.

EXAMPLE: (For upflow furnace) USA  
 100,000 Btuh input furnace installed at 4300 ft.  
 Furnace Input Rate at Sea Level X Derate Multiplier Factor = Furnace Input Rate at Installation Altitude  
 100,000 X 0.82 = 82,000

- b. Check that gas-valve adjustment caps are in place for proper input to be clocked.
- c. Obtain average yearly heat value for local gas supply.

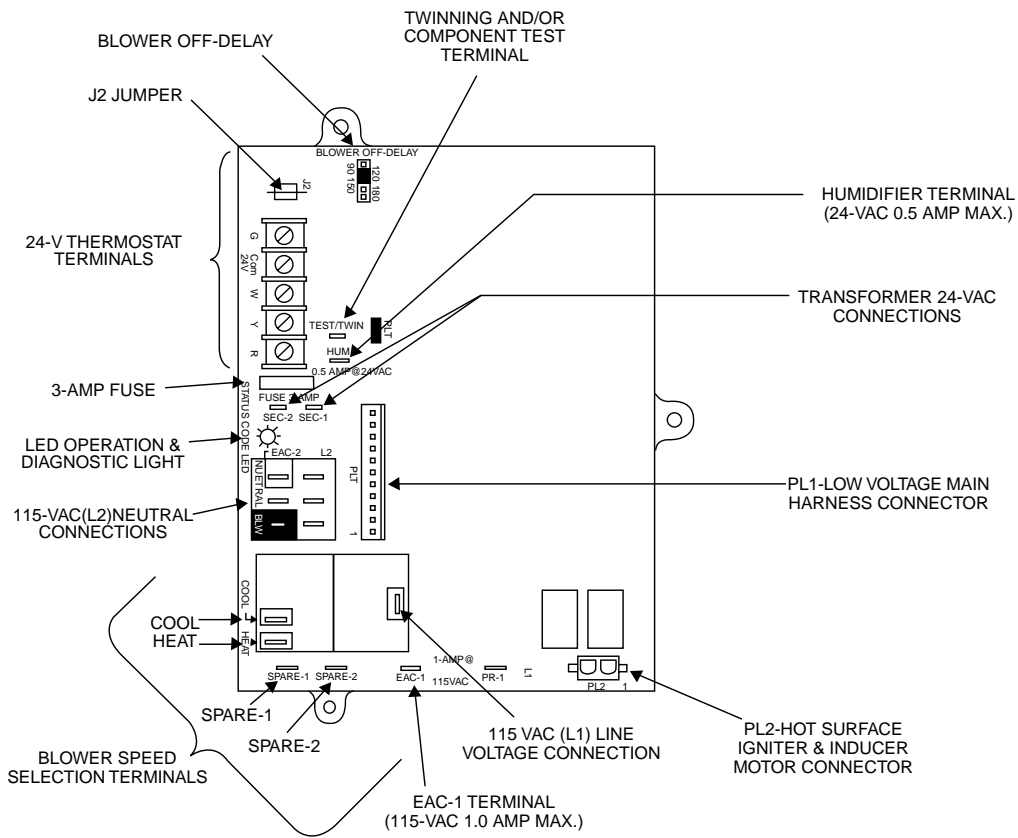
**NOTE:** Be sure heating value of gas used for calculations is correct for your altitude. Consult local gas utility for altitude adjustment of gas heating value.

- d. Check and verify orifice size in furnace. NEVER ASSUME THE ORIFICE SIZE. ALWAYS CHECK AND VERIFY.
- e. Turn off all other gas appliances and pilots.
- f. Jumper R and W thermostat connections. (See Fig. 38 or 39.)
- g. Let furnace run for 3 minutes.
- h. Measure time (in sec) for gas-meter test dial to complete 1 revolution. Note reading.
- i. Refer to Table 15 for cu ft of gas per hr.
- j. Multiply gas rate (cu ft/hr) X heating value (Btu/cu ft).



**Fig. 38—Standard Single Stage Control**

A02142



**Fig. 39—Deluxe Single Stage Control**

A02100

**Table 23—Altitude Derate Multiplier for U.S.A.**

ALTITUDE (FT)	PERCENT OF DERATE	DERATE MULTIPLIER FACTOR FOR U.S.A.*
0–2000	0	1.00
2001–3000	8–12	0.90
3001–4000	12–16	0.86
4001–5000	16–20	0.82
5001–6000	20–24	0.78
6001–7000	24–28	0.74
7001–8000	28–32	0.70
8001–9000	32–36	0.66
9001–10,000	36–40	0.62

EXAMPLE: Operation for all models at 0-2000 ft altitude)  
 Furnace input from rating plate is 66,000 Btuh.  
 Btu heating input = Btu/cu ft X cu ft/hr  
 Heating value of gas = 975 Btu/cu ft  
 Time for 1 revolution of 2-cu ft dial = 108 sec  
 Gas rate = 67 cu ft/hr (from Table 15)  
 Btu heating input = 67 X 975 = 65,325 Btuh  
 In this example, the orifice size and manifold-pressure adjustment is within ±2 percent of the furnace input rate.

**NOTE:** Measured gas input must be within ±2 percent of that stated on furnace-rating plate when installed at sea level or derated per that stated above when installed at higher altitudes.

4. Remove jumper across R, W thermostat connections to terminate call for heat.
5. Turn off furnace power supply.
6. Remove manometer and reinstall manifold-pressure tap plug. (See Fig. 17 and 37.)
7. Turn furnace gas-valve-control switch to ON position.
8. Turn on furnace power supply.
9. Set room thermostat to call for heat.
10. Check pressure-tap plug for gas leaks when main burners ignite.
11. Check for correct burner flame. (See Fig. 7.)
12. Observe unit through 2 complete heating cycles. See sequence of operation in furnace Installation, Start-Up, and Operating Instructions.
13. Set room thermostat to desired temperature.

**PROCEDURE 6—LABEL APPLICATION**

**NOTE:** See Fig. 37 for label location.

1. Fill in Conversion Responsibility Label (327751-205) and apply inside furnace as shown. Date, name, and address of organization making this conversion are required.
2. Attach Furnace Conversion Rating Plate (327751-204) as shown.
3. Apply Gas Control Conversion Label (327751-203) to gas valve.
4. Check for correct normal-operating sequence of ignition system as described in furnace Installation, Start-Up, and Operating Instructions.
5. Reinstall main furnace door.



