Installation Instructions

Gas Conversion Kit
Propane-to-Natural for
Standing Pilot and HSI
Fixed-Speed Furnaces

KGAPN1601ALL

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 Codes NFPA No. 54-1992/ANSI Z223.1-1992 (NFGC). In Canada, refer to the National Standard of Canada Natural Gas and Propane Gases Installation Codes, CAN/CGA-B149.1 and .2-M95 (NSCNGPIC).

Wear safety glasses and work gloves. Have a fire extinguisher available during start-up operation, 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 word DANGER, WARNING, CAUTION, or 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.

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 performing this work assumes responsibility for the proper conversion of this furnace with this kit.
In Canada, the conversion shall be carried out in accordance with the requirements of the provincial authorities having jurisdiction and the National Standard of Canada Natural Gas and Propane Installation Code (NSCNGPIC).

AVISSEMENT: Cet ensemble de conversion ne doit être installé que par le représentant d’un organisme qualifié et conformément aux instructions du fabricant et à tous les codes et exigences applicables de l’autorité compétente. Quiconque ne respecte pas à la lettre les instructions dans le présent manuel risque de déclencher un incendie ou une explosion entrainant des dommages matériels, des lésions corporelles ou la perte de vies humaines. L’organisme qualifié qui effectue les travaux est responsable de la conversion correcte de ce générateur d’air chaud à l’aide de cet ensemble.
INTRODUCTION

This instruction covers the installation of gas conversion kit Part No. KGAPN1601ALL to convert the following furnaces from propane gas usage to natural gas usage. See the appropriate section for your furnace type.

- **Section 1**—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 63,000 through 147,000 Btuh nominal capacity. The gas valve will be either a Honeywell VR8200H or VR8300H.

- **Section 2**—Models 58DHC, 58PAV, 58RAV, 58SSC, 58WAV, 58ZAV, 373LAV, 376CAV, 383KAV, 395CAV, 480BAV, 481BAV, GB1AAV, and GB3AAV 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 nominal capacity. The gas valve will be a White-Rodgers 36E.

- **Section 3**—58MCA, 58MXA, 340MAV, 350MAV, and 490AAV Multipoise, Hot Surface Ignition, Fixed-Speed, Condensing Furnaces. This kit is designed for use in furnaces with 40,000 through 120,000 Btuh nominal capacity. The gas valve will be a White-Rodgers 36E.

**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, your distributor or branch for information or assistance. The qualified installer or agency must use only factory-authorized kits and accessories when modifying this product. Failure to follow these instructions could result in serious injury or property damage.

**CAUTION:** Gas supply MUST be shut off before disconnecting electrical power and proceeding with conversion.

DESCRIPTION AND USAGE

This kit is designed for use in the furnaces listed above. See Table 1 for kit contents. More parts are shipped in the kit than will be needed to complete conversion. When installation is complete, discard extra parts.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
<th>Quantity</th>
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<tr>
<td>Regulator Spring Kit (Natural, Silver) for White-Rodgers Gas Valve 36E</td>
<td>EF39ZW037</td>
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<td>Regulator Spring Kit for Honeywell Gas Valve VR8200</td>
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SECTION 1—MODELS 58DFA, 58GFA, 58PAP, 58RAP, 373LAD, 383KAD, 394HAD, 396HAD, GA1AAD, AND GA2AAD INDUCED-COMBUSTION, STANDING PILOT, FIXED-SPEED, NON-CONDENSING FURNACES

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

**PROCEDURE 1—INSTALL PILOT ORIFICE**

1. Turn off gas and electrical supplies to furnace.
2. Remove 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 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.

**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 by using Table 2 (for upflow models) or Table 3 (for downflow or downflow/horizontal models).

The U.S.A. full input ratings for natural and propane gases are approved for altitudes up to 2000 ft. The input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level. Refer to the NFGC, Part 8.1, and Appendix F, Table F-4 for proper orifice sizing at high altitudes.

The Canadian full input ratings for natural and propane gases are approved for altitudes up to 2000 ft above sea level. Adjustments for input ratings at altitudes above 2000 ft must be made in accordance with NSCNGPIC. Derate the furnace input 10 percent for high altitudes of 2000 ft to 4500 ft above sea level.

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

b. Obtain average yearly specific gravity for local gas supply.

c. Find natural gas heat value and specific gravity in Table 2 (for upflow models) or Table 3 (for downflow or downflow/horizontal models).
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 2)
Heat value 1070 Btu/cu ft
Specific gravity 0.62
Therefore, Orifice No. 44 is required.

5. 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.

6. Reinstall main burners on manifold. Burners should be installed left to right to ensure proper alignment of the burner cross over 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. 4.)

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- 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. 4.)

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.

4. Turn on furnace power supply.

5. Turn gas supply manual shutoff valve to ON position.
PROCEDURE 5—CHECK FURNACE OPERATION AND MAKE NECESSARY ADJUSTMENTS

1. Make 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. 4.)
3. Attach manometer to manifold pressure tap on gas valve.
4. Turn gas supply manual shutoff valve to OFF position.
5. Turn on furnace power supply.
6. Turn furnace gas valve control knob to ON position.

### Table 2—Upflow, Standing Pilot, Fixed-Speed, Non-Condensing Furnace Orifice Size and Manifold Pressure for Correct Input Rate
(Tabulated Data Based on Altitude Up to 2000 ft and 21,000 Btuh Per Burner)

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<tr>
<td>1100</td>
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<td>42.3</td>
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</table>

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

6. Turn furnace gas valve control knob to PILOT position and depress.
7. Check pilot tube connections for gas leaks.
8. Turn furnace gas valve control knob to OFF position and wait 5 minutes.
9. Light pilot in accordance with furnace lighting instructions on furnace.
10. Turn furnace gas valve control knob to ON position.

12. When main burners ignite, confirm that inlet gas pressure is between 4.5- 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.
7. Check all threaded pipe connections for gas leaks.

⚠️ WARNING: NEVER use a match or other open flame to check for leaks. Use a soap-and-water solution. Failure to follow this warning could result in personal injury or death.

8. Light pilot in accordance with furnace lighting instructions on furnace.

9. Turn furnace gas valve control knob to ON position.


11. Check manifold orifices for gas leaks when main burners ignite.

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

12. If the pilot flame requires adjustment:
   a. Locate adjustment screw on top of the gas valve. (See Fig. 4.)
   b. Remove cap and turn adjustment screw clockwise (in) to decrease pilot gas flow and counterclockwise (out) to increase pilot gas flow.
   c. When proper adjustment is obtained, replace screw cap.

**PROCEDURE 6—SET GAS INPUT RATE.**

There are 2 methods of adjusting the gas input rate. The preferred method is by using Table 2 (for upflow models) or Table 3 (for downflow or downflow/horizontal models) and item 1. The second method is by clocking the gas meter and using item 2.

The gas valve regulator should be nominally set at 3.5-in. wc for natural gas. When adjusting input rate, DO NOT set manifold pressure above 3.8-in. wc maximum or below 3.2-in. wc minimum.

1. Check gas input rate using Table 2 (for upflow models) or Table 3 (for downflow or downflow/horizontal models).

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### Table 3—Downflow and Downflow/Horizontal, Standing Pilot, Fixed-Speed, Non-Condensing Furnace Orifice Size and Manifold Pressure for Correct Input Rate

(Tabulated Data Based on Altitude Up to 2000 ft and 22,000 Btuh Per Burner)

<table>
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<tr>
<th>GAS HEAT VALUE (BTU/CU FT)</th>
<th>SPECIFIC GRAVITY OF NATURAL GAS</th>
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<td>1100</td>
<td>45</td>
</tr>
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</table>
Fig. 4—Honeywell Gas Valve

- Obtain average yearly heat value for local gas supply.
- Obtain average yearly specific gravity for local gas supply.
- Verify furnace model (upflow, downflow, or downflow/horizontal) and select appropriate table.
- Check and verify orifice size in furnace. NEVER ASSUME THE ORIFICE SIZE. ALWAYS CHECK AND VERIFY.
- Find natural gas heat value and specific gravity in Table 2 (for upflow models) or Table 3 (for downflow or downflow/horizontal models).
- Follow heat value and specific gravity lines to point of intersection. Find orifice size and manifold pressure settings for proper operation at given natural gas conditions.

EXAMPLE: (Using Table 2)
Heat value 1070 Btu/cu ft
Specific gravity 0.62
Therefore, Orifice No. 44 with manifold pressure 3.2-in. wc

Fig. 5—Burner Flame

NOTE: The furnace is shipped with a No. 45 main burner orifice, so the orifices will need to be changed.

- Proceed to item 3 to adjust manifold pressure.

2. Check gas input rate by clocking gas meter.
   - Obtain average yearly heat value for local gas supply.
   - Turn off all gas appliances and pilots.
   - Start furnace and let run for 3 minutes.
   - Measure time (in sec) for gas meter to complete 1 revolution.
   - Refer to Table 4 for cubic ft of gas per hr.
   - Multiply gas rate (cu ft/hr) by heating value (Btu/cu ft).

EXAMPLE:
Btu heating input = gas heat value (Btu/cu ft) X measured rate from Table 4 (cu ft/hr)
Heating value of gas = 1070 Btu/cu ft
Time for 1 revolution of 2-cu ft dial = 72 sec
Gas rate = 100 cu ft/hr (from Table 4)
Btu heating input = 100 X 1070 = 107,000 Btuh

NOTE: The measured gas input must be within ± 2 percent of the rating plate input.

- Proceed to item 3 to adjust manifold pressure.
3. Adjust gas input rate.
   a. Remove regulator seal cap. (See Fig. 4.)

### Table 4—Gas Rate (Cu Ft/Hr)

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<th>SECONDS FOR 1 REVOLUTION</th>
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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.
b. Adjust manifold pressure to between 3.2-in. wc minimum and 3.8-in. wc maximum for natural gas. Turn adjusting screw counterclockwise (out) to decrease input and clockwise (in) to increase input. Make any major adjustments by changing main burner orifices.

c. When correct input is obtained, replace regulator seal cap. Main burner flame should be clear blue, almost transparent. (See Fig. 5.)

**NOTE:** Approved input ratings:

The U.S.A. ratings are approved for altitudes up to 2000 ft for natural and propane gases. Refer to National Fuel Gas Code Appendix F, Table F-4 for proper orifice sizing at high altitudes.

The Canadian ratings are approved for altitudes up to 2000 ft for natural and propane gases. High altitude ratings are from 2000 ft to 4500 ft above sea level.

→ 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. 4.)

**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. 5.)

→ 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.

1. Fill in Conversion Responsibility Label (321201-102) and apply to front of blower door as shown. Date, name, and address of organization making this conversion are required.

2. Attach Gas Control Conversion Label (310148-302) to gas valve as shown.

3. Attach Furnace Conversion Rating Plate (310168-391) near existing furnace rating plate.

4. Replace furnace control access door.

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

**NOTE:** See Fig. 6 and 7 for component location.

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→ Fig. 6—Downflow/Horizontal, Hot Surface Ignition, Fixed-Speed, Non-Condensing Furnace Component and Conversion Label Location

→ Fig. 7—Upflow, Hot Surface Ignition, Fixed-Speed, Non-Condensing Furnace Component and Conversion Label Location
PROCEDURE 1—INSTALL MAIN BURNER ORIFICES

1. Turn gas and electrical supplies to furnace off.
2. Remove control access door.
3. Turn furnace gas valve control 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 by using Table 5 or 6. Use Table 5 for upflow furnaces and Table 6 for downflow/horizontal furnaces.

The U.S.A. full input ratings for natural and propane gases are approved for altitudes up to 2000 ft. The input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level. Refer to the NFGC, Part 8.1, and Appendix F, Table F-4 for proper orifice sizing at high altitudes.

The Canadian full input ratings for natural and propane gases are approved for altitudes up to 2000 ft above sea level. Adjustments for input ratings at altitudes above 2000 ft must be made in accordance with NSCNGPIC. Derate the furnace input 10 percent for high altitudes of 2000 ft to 4500 ft above sea level.

a. Obtain average yearly heat value for local gas supply.
b. Obtain average yearly specific gravity for local gas supply.
c. Verify furnace model. Table 5 can only be used for upflow furnaces. Table 6 can only be used for downflow/horizontal furnaces.
d. Find natural gas heat value and specific gravity in Table 5 or Table 6.
e. Follow heat value and specific gravity lines to point of intersection. Find orifice size for proper operation at given natural gas conditions.

EXAMPLE: (Using Table 5 for upflow furnace)
Heat value 1070 Btu/cu ft
Specific gravity 0.62
Therefore, Orifice No. 44 is required.

8. 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.

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.

9. Reinstall main burners on manifold. Burners should be installed left to right to ensure proper alignment of the burner crossover slot. (See Fig. 8 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. 9.)

3. Remove adjustment screw and propane gas regulator spring (white).

4. Install natural gas regulator spring (silver) into gas valve (10 turns).

**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- and 13.6-in. wc.

1. Be sure gas and electrical supplies to furnace are off.

2. Remove 1/8-in. pipe plug from inlet pressure tap on gas valve. (See Fig. 9.)

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.

4. Turn on furnace power supply.

5. Turn gas supply manual shutoff valve to ON position.

6. Turn furnace gas valve control knob to ON position.


---

Table 5—Upflow, Hot Surface Ignition, Fixed-Speed, Non-Condensing Furnace Orifice Size and Manifold Pressure for Correct Input Rate*

*(Tabulated Data Based on Altitude Up to 2000 ft and 22,000 Btuh Per Burner)*

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*For furnaces with 135,000 Btuh input and a 3/4-hp blower motor, deduct 0.1-in. wc from manifold pressure shown in table due to 22,500 Btu per burner input. If resultant manifold pressure falls below 3.2, change orifice size.*
For furnaces with 135,000 Btuh input and a 3/4-hp blower motor, deduct 0.1-in. wc from manifold pressure shown in table due to 22,500 Btuh per burner input. If resultant

PROCEDURE 4—CHECK FURNACE OPERATION AND MAKE NECESSARY ADJUSTMENTS

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

9. Turn furnace gas valve control 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. 9.)
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 knob to ON position.
6. Check all threaded pipe connections for gas leaks.

⚠️ WARNING: NEVER use a match or other open flame to check for leaks. Use a soap-and-water solution. Failure to follow this warning could result in personal injury or death.

7. Turn on furnace power supply.


9. Check manifold orifices for gas leaks when main burners ignite.

PROCEDURE 5—SET GAS INPUT RATE

There are 2 methods of adjusting the gas input rate. The preferred method is by using Table 5 or 6 and item 1. The second method is by clocking the gas meter and using item 2. Item 2 must be used for altitudes above 2000 ft.

The gas valve regulator should be nominally set at 3.5-in. wc for natural gas. When adjusting input rate, DO NOT set manifold pressure above 3.8-in. wc maximum or below 3.2-in. wc minimum.

1. Check gas input rate using manifold pressure in Table 5 for upflow furnaces or Table 6 for downflow/horizontal furnaces as follows:
   a. Obtain average yearly heat value for local gas supply.
   b. Obtain average yearly specific gravity for local gas supply.
   c. Verify furnace model (upflow or downflow/horizontal) and select Table 5 or 6.
   d. Find natural gas heat value and specific gravity in Table 5 or 6.
   e. Follow heat value and specific gravity lines to point of intersection. Find orifice size and manifold pressure settings for proper operation at given natural gas conditions.
   f. Check and verify orifice size in furnace. NEVER ASSUME THE ORIFICE SIZE. ALWAYS CHECK AND VERIFY.

→ EXAMPLE: (Using Table 5 for upflow furnace)
Heat value 1070 Btu/cu ft
Specific gravity 0.62
Therefore, Orifice No. 44 is required and manifold pressure is 3.5-in. wc

g. Proceed to item 3 to adjust manifold pressure.

2. Check gas input rate by clocking gas meter.
   a. Obtain average yearly heat value for local gas supply.
b. Turn off all other gas appliances and pilots.
c. Start furnace and let run for 3 minutes.
d. Measure time (in sec) for gas meter to complete 1 revolution.
e. Refer to Table 4 for cubic ft of gas per hr.
f. Multiply gas rate cu ft/hr by heating value (Btu/ cu ft).

EXAMPLE: All models
Btu heating input = gas heat value (Btu/cu ft) X measured rate from Table 4 (cu ft/hr)
Heating value of gas = 1070 Btu/cu ft
Time for 1 revolution of 2-cu ft dial = 72 sec
Gas rate = 100 cu ft/hr (from Table 4)
Btu heating input = 100 X 1070 = 107,000 Btuh

NOTE: Measured gas input must be within ±2 percent of stated gas input on unit rating plate.

g. Proceed to item 3 to adjust manifold pressure.

3. Adjust gas input rate.
   a. Remove regulator seal cap. (See Fig. 9)
   b. Adjust manifold pressure to between 3.2-in. wc minimum and 3.8-in. wc maximum for natural gas. Turn adjusting screw
clockwise (out) to decrease input and clockwise (in) to increase input. Make any major manifold pressure adjustments by
   changing main burner orifices.
   c. When correct input is obtained, replace regulator seal cap. Main burner flame should be clear blue, almost transparent. (See Fig. 10.)

NOTE: Approved input ratings:
The U.S.A. input ratings are approved for altitudes up to 2000 ft for natural and propane gases. Refer to National Fuel Gas Code Appendix
F, Table F-4 for proper orifice sizing at high altitudes.
The Canadian input ratings are approved for altitudes up to 2000 ft for natural and propane gases. High-altitude ratings are from 2000 ft
to 4500 ft above sea level.

→ 4. Remove jumper across R and W thermostat connections to terminate call for heat.

   5. Turn manual gas valve control knob to OFF position.

   6. Remove manometer and reinstall gas valve inlet pressure tap plug. (See Fig. 9.)

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

   7. Turn manual gas valve control 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. 10.)

→ 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.

⚠️ 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.
PROCEDURE 6—LABEL APPLICATION

NOTE: See Fig. 6 or 7 for label location.

1. Fill in Conversion Responsibility Label (321201-102) and apply inside furnace casing as shown. Date, name, and address of organization making this conversion are required.

2. Attach Gas Control Conversion Label (310148-302) to gas valve as shown.

3. Attach Furnace Conversion Rating Plate (310168-391) near existing furnace rating plate.

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

4. Replace furnace control access door.

SECTION 3—MODELS 58MCA, 58MXA, 340MAV, 350MAV, AND 490AAV MULTIPoise, HOT SURFACE IGNITION, FIXED-SPEED, CONDENSING FURNACES

PROCEDURE 1—INSTALL MAIN BURNER ORIFICES

NOTE: See Fig. 11 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 knob to OFF position.
4. Remove burner enclosure.
5. Remove gas supply from gas valve.
6. Remove wires from gas valve. Note location for reassembly.

⚠️ 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.

7. Remove burner enclosure pressure tube from gas valve regulator fitting. (See Fig. 12.)
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. Refer to Table 7 to determine main burner orifice.

The U.S.A. full input ratings for natural and propane gases are approved for altitudes up to 2000 ft. The input rating for altitudes above 2000 ft must be reduced by 4 percent for each 1000 ft above sea level. Refer to the NFGC, No. 54, ANSI Z223.1, Part 8.1, and Appendix F, Table F-4 for proper orifice sizing at high altitudes.

The Canadian full input ratings for natural and propane gases are approved for altitudes up to 2000 ft above sea level. Adjustments for input ratings at altitudes above 2000 ft must be made in accordance with NSCNGPIC. Derate the furnace input 10 percent for high altitudes of 2000 ft to 4500 ft above sea level.

a. Obtain average yearly heat value for local gas supply.
b. Obtain average yearly specific gravity for local gas supply.
c. Verify the furnace model. Table 7 can only be used for 40-in. tall, multipoise, condensing furnaces equipped with hot surface ignition (HSI).
d. Find natural gas heat value and specific gravity in Table 7.
e. 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 7)
Heat value 1070 Btu/cu ft
Specific gravity 0.62
Therefore, either orifice No. 45 or No. 46 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.

⚠️ 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.
### Table 7—Multipoise Fixed-Speed, Condensing Furnace Orifice Size and Manifold Pressure for Correct Input Rate
(Tabulated Data Based on Altitude Up to 2000 ft and 20,000 Bthu Per Burner)

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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. 12.)

3. Remove adjustment screw and propane gas regulator spring (white).

4. Install natural gas regulator spring (silver) in gas valve (10 turns).

**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- and 13.6-in. wc.

1. Be sure gas and electrical supplies to furnace are off.
2. Remove 1/8-in. pipe plug from inlet pressure tap on gas valve. (See Fig. 9.)
3. Attach manometer to inlet pressure tap on furnace gas valve. (See Fig. 13.)

⚠️ CAUTION: DO NOT operate furnace more than 1 minute to check inlet gas pressure as conversion is not complete at this time.

4. Turn on furnace power supply.
5. Turn gas supply manual shutoff valve to ON position.
6. Turn furnace gas valve control knob to ON position.
8. When main burners ignite, confirm that inlet gas pressure is between 4.5- 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 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. 12)
3. Attach manometer to manifold pressure tap on gas valve. (See Fig. 13.)
4. Turn gas supply manual shutoff valve to ON position.
5. Turn furnace gas valve control knob to ON position.
6. Check all threaded pipe connections for gas leaks.
7. Turn on furnace power supply.
9. Check manifold orifices for gas leaks when main burners ignite.

⚠️ WARNING: NEVER use a match or other open flame to check for leaks. Use a soap-and-water solution. Failure to follow this warning could result in personal injury or death.

7. Turn on furnace power supply.
9. Check manifold orifices for gas leaks when main burners ignite.

PROCEDURE 5—SET GAS INPUT RATE

There are 2 methods of adjusting gas input rate. The preferred method is by using Table 7 and item 1. The second method is by clocking the gas meter and using item 2. Item 2 must be used for altitudes above 2000 ft.

The gas valve regulator should be nominally set at 3.5-in. wc for natural gas. When adjusting input rate, DO NOT set manifold pressure above 3.8-in. wc maximum or below 3.2-in. wc minimum.

1. Check gas input rate using manifold pressure in Table 7.
   a. Obtain average yearly heat value for local gas supply.
   b. Obtain average yearly specific gravity for local gas supply.
   c. Verify furnace model. Table 7 can only be used for 40-in. tall, multipoise, condensing furnaces.
   d. Find natural gas heat value and specific gravity in Table 7.
   e. 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 7)
Heat value 1070 Btu/cu ft
Specific gravity 0.62
Therefore, Orifice No. 45 and manifold pressure 3.6-in. wc or orifice No. 46 and manifold pressure 3.7-in wc.

f. Check and verify orifice size in furnace. NEVER ASSUME THE ORIFICE SIZE. ALWAYS CHECK AND VERIFY.
2. Check gas input rate by clocking gas meter.

**NOTE:** Be sure all pressure tubing, combustion-air and vent pipes, and burner box cover are in place when checking input.

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

b. Turn off all other gas appliances and pilots.

c. Start furnace and let it run for 3 minutes.

**NOTE:** Gas valve regulator seal cap MUST be in place when checking input rate.

d. Measure time (in sec) for gas meter test dial to complete 1 revolution.

e. Refer to Table 4 for cubic ft of gas per hr.

f. Multiply gas rate (cu ft/hr) by heating value (Btu/cu ft).

**EXAMPLE:**

Btu heating input = gas heat value (Btu/cu ft) x measured rate from Table 4 (cu ft/hr)

Heating value of gas = 1070 Btu/cu ft

Time for 1 revolution of 2 cu ft dial = 72 sec

Gas rate = 100 cu ft/hr (from Table 4)

Btu heating input = 100 X 1070 = 107,000 Btu/h

g. Measured gas input must be within ±2 percent of stated gas input on unit rating plate.

h. Proceed to item 3 to adjust manifold pressure.

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3. Adjust gas input rate.

**NOTE:** Manifold pressure must always be measured with the burner box cover removed. The gas meter must always be clocked with the burner box cover installed.

a. Remove burner box cover and gas valve regulator seal cap that conceals adjustment screw. (See Fig. 12.)

b. Adjust manifold pressure to between 3.2-in. wc minimum and 3.8-in. wc maximum for natural gas. Turn adjusting screw either counterclockwise (out) to decrease input rate or clockwise (in) to increase rate. Make any major manifold pressure adjustments by changing main burner orifices.

c. Replace burner box cover and clock input rate using method outlined in item 2.

**NOTE:** Gas valve regulator cap must be in place when clocking input rate.

**⚠️ 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.

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3. Adjust gas input rate.

**NOTE:** Manifold pressure must always be measured with the burner box cover removed. The gas meter must always be clocked with the burner box cover installed.

a. Remove burner box cover and gas valve regulator seal cap that conceals adjustment screw. (See Fig. 12.)

b. Adjust manifold pressure to between 3.2-in. wc minimum and 3.8-in. wc maximum for natural gas. Turn adjusting screw either counterclockwise (out) to decrease input rate or clockwise (in) to increase rate. Make any major manifold pressure adjustments by changing main burner orifices.

c. Replace burner box cover and clock input rate using method outlined in item 2.

**NOTE:** Gas valve regulator cap must be in place when clocking input rate.

**⚠️ CAUTION:** Be sure burner box cover is in place after adjustments have been made.

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d. Look through sight glass in burner box cover and check burner flame. The main burner flame should be clear blue, almost transparent. (See Fig. 10.)

**NOTE:** Approved input ratings:

The U.S.A. input ratings are approved for altitudes up to 2000 ft for natural and propane gases. Refer to National Fuel Gas Code Appendix F, Table F-4 for proper orifice sizing at high altitudes.
The Canadian input ratings are approved for altitudes up to 2000 ft for natural and propane gases. High-altitude ratings are from 2000 ft to 4500 ft above sea level.

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

**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 inlet and manifold pressure tap plugs for gas leaks when main burners ignite.
10. Check for correct burner flame. (See Fig. 10.)
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. 14 for label locations.

1. Fill in Conversion Responsibility Label (321201-102) and apply label to blower access panel as shown. Date, name, and address of organization making this conversion are required.
2. Attach Gas Control Conversion Label (310148-302) to burner enclosure cover as shown.
3. Attach Furnace Conversion Rating Plate (310168-391) on blower shelf as shown.

**NOTE:** Discard labels and instructions packaged with White-Rodgers regulator spring conversion kit.
4. Reinstall main furnace door.