

## 396221, 396222 Gas Conversion Kits for VR8200/VR8300/SV9500/SV9600 Combination Gas Controls

### INSTALLATION INSTRUCTIONS

#### APPLICATION

The 396221 LP Conversion Kit changes VR8200/VR8300/SV9500/SV9600 family combination gas controls from regulated natural gas to regulated LP gas. The 396222 Natural Gas Conversion Kit changes VR8200/VR8300/SV9500/SV9600 family combination gas controls from regulated LP gas to regulated natural gas. Kits include a pressure regulator adjustment screw, spring and conversion label.

To use this kit, assure gas control is equipped with a standard or slow opening pressure regulator.

NOTE: Step regulator and two-stage valves cannot be converted with this kit.

#### INSTALLATION

##### When Installing this Product...

1. Read these instructions carefully. Failure to follow instructions can damage product or cause a hazardous condition.
2. Check ratings given in instructions and on product to make sure product is suitable for your application.
3. The installer must be a trained, experienced service technician.
4. After installation is complete, use these instructions to check out product operation.

#### ⚠ WARNING

##### Fire or Explosion Hazard.

Can cause property damage, serious injury or death.

Follow these warnings exactly:

1. Disconnect power supply before wiring to prevent electrical shock or equipment damage.
2. To avoid dangerous accumulation of fuel gas, turn off gas supply at appliance service valve before starting installation and perform Gas Leak Test after completion of installation.
3. Use only your hand to turn gas control knob. Never use any tools. If gas control knob will not operate by hand, then a qualified technician should replace the gas control. Force or attempted repair may result in fire or explosion.
4. Change main and pilot burner orifices to meet appliance manufacturer specifications.

To convert from one gas to another:

1. Turn off gas supply at the appliance service valve.
2. Remove regulator cap screw and pressure regulator adjusting screw. Refer to Fig. 1.
3. Remove the existing spring.
4. Insert the replacement spring. Refer to Fig. 2.

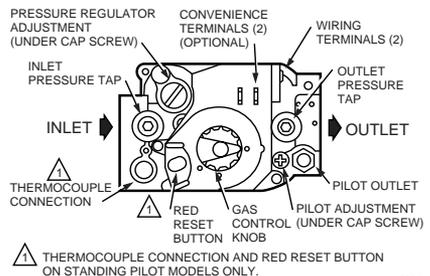
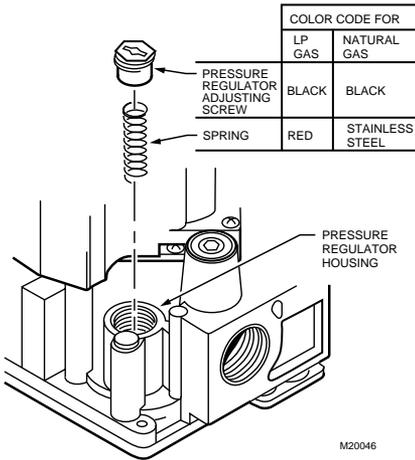


Fig. 1. Top view of VR8200 combination gas control.





**Fig. 2. Conversion kit installation in regulator.**

5. Install the new plastic pressure regulator adjustment screw.
6. Check and adjust the regulator setting using a manometer or by clocking the gas meter. See Check and Adjust Gas Input and Burner Ignition section.
7. Replace regulator cap.
8. Mount conversion label on the gas control.
9. Install the gas control and appliance according to appliance manufacturer instructions.

## START-UP

### Gas Control Knob Settings

**OFF:** Prevents pilot and main burner gas flow.

**PILOT (On standing pilot controls only):** Permits pilot burner gas flow when red knob is held down or thermocouple current is above power unit dropout value.

**ON:** Permits gas flow into gas control. Pilot burner gas is controlled as in the PILOT position for standing pilot and intermittent pilot systems. Main burner gas flow is controlled by thermostat and automatic valve operators.

### Perform Gas Leak Test

#### **⚠ WARNING**

**Fire or Explosion Hazard.**  
Can cause property damage, serious injury or death.

Check for gas leaks with soap and water solution any time work is done on a gas system.

### Gas Leak Test

1. Paint pipe connections upstream of gas control with rich soap and water solution. Bubbles indicate gas leak.
2. If gas leak is detected, tighten all pipe connections.
3. Stand clear of main burner while lighting to prevent injury caused from hidden leaks that could cause flashback in the appliance vestibule. Light main burner.
4. With main burner operating, paint pipe joints (including adapters) and control inlet and outlet with rich soap and water solution.
5. If another gas leak is detected, tighten adapter screws, joints, and pipe connections.
6. Replace part if gas leak can not be stopped.

### Light Pilot (Standing Pilot Models)

1. Turn gas control knob clockwise  to OFF. Wait five minutes to dissipate any unburned gas. Smell for gas around the appliance near the floor. Do not relight pilot flame if you smell gas.
2. Turn gas control knob counterclockwise  to PILOT. Push down and hold the knob while lighting the pilot flame.
3. Hold down the gas control knob about one minute, then release.
  - a. If pilot flame goes out, turn gas control knob clockwise  to OFF and repeat steps 1 through 3.
  - b. If pilot flame remains lit, turn gas control knob counterclockwise  to ON.

### Turn on System (Intermittent and Direct Ignition Systems)

Rotate the gas control knob counterclockwise  to ON.

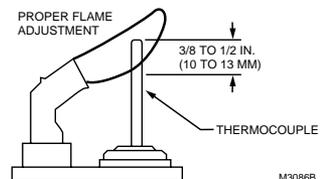
### Turn on Main Burner

Follow appliance manufacturer instructions or adjust thermostat setting to call for heat.

### Adjust Pilot Flame

The pilot flame should envelop 3/8 to 1/2 in. (10 to 13 mm) of the thermocouple or igniter-sensor tip. Refer to Fig. 3. To adjust pilot flame:

1. Remove pilot adjustment cap screw. Refer to Fig. 1. Turn inner adjustment screw clockwise  to decrease or counterclockwise  to increase pilot flame.
2. Always replace cap screw after adjustment and tighten firmly to safeguard proper operation.



**Fig. 3. Proper flame adjustment.**

## Check and Adjust Gas Input and Burner Ignition

### WARNING

#### Fire or Explosion Hazard.

Can cause property damage, serious injury or death.

1. Do not exceed input rating stamped on appliance nameplate, or manufacturer recommended burner orifice pressure for size orifice(s) used. Make certain primary air supply to main burner is properly adjusted for complete combustion. Follow appliance manufacturer instructions.

#### 2. IF CHECKING GAS INPUT BY CLOCKING GAS METER:

- a. Make sure that the only gas flowing through the meter is for the appliance being checked.
- b. Make certain that other appliances are turned off with their pilot flames extinguished (or deduct their gas consumption from the meter reading).
- c. Convert flow rate to Btuh as described in form 70-2602, Gas Controls Handbook, and compare to Btuh input rating on appliance nameplate.

#### 3. IF CHECKING GAS INPUT WITH MANOMETER:

- a. Be sure the gas control knob is in the PILOT position before removing outlet pressure tap plug to connect manometer (pressure gauge).
- b. Turn the gas control knob back to PILOT when removing gauge and replacing plug.
- c. Shut off gas supply at the appliance service valve, or for LP gas, at the gas tank, before removing the outlet pressure tap plug and before disconnecting manometer and replacing outlet pressure tap plug.
- d. Perform Gas Leak Test at outlet pressure tap plug.

## Checking Gas Pressure Using Meter Clocking Method

NOTE: Use this method when manometer is not available or when manifold pressure is not specified in in. wc (kPa) by the burner manufacturer.

1. Make sure that the only gas flowing through the meter is for the appliance being checked.
2. Make certain that other appliances are turned off with their pilot flames extinguished (or deduct their gas consumption from the meter reading).
3. Turn gas control knob to ON position.
4. To obtain an accurate outlet pressure reading, cycle main burner on and off several times to stabilize the pressure regulator diaphragm.
5. Using a watch with a second hand, carefully clock the gas meter to determine the time per revolution. Use Table 1 to determine the exact main burner gas flow rate in cubic feet per hour (cfh).

6. Compare actual input with burner manufacturer recommended input (stamped on burner nameplate). To convert Btuh rating to cfh (m<sup>3</sup>/hr) use the following formula:

Input Rating in Btuh (MJ/hr) = cfm (m<sup>3</sup>/hr) or gas

Btu Content of Gas per ft<sup>3</sup>

(MJ Content of Gas per m<sup>3</sup>)

7. If necessary, adjust pressure regulator to match appliance rating.
  - a. Remove pressure regulator adjustment cap screw.
 

Using a screwdriver, turn inner adjustment screw clockwise  to increase or counterclockwise  to decrease gas pressure to main burner.
  - b. Always replace cap screw and tighten firmly to prevent gas leakage.
8. Turn gas supply back on to other appliances and relight all pilot flames according to appliance manufacturer instructions.
9. Proceed to Checkout section.

## Checking Gas Pressure Using a Manometer (Pressure Gauge)

1. Turn gas control knob to PILOT (standing pilot systems) or OFF (intermittent and direct ignition systems).
2. Remove outlet pressure tap plug from gas control and connect pressure gauge. Refer to Fig. 1.
3. Turn gas control knob to ON position.
4. To obtain an accurate outlet pressure reading, main burner must be cycled on and off several times to stabilize the pressure regulator diaphragm.
5. Light main burner and read pressure gauge.
6. If necessary, adjust pressure regulator to match appliance rating.
  7. Remove pressure regulator adjustment cap screw.
 

Using a screwdriver, turn inner adjustment screw clockwise  to increase or counterclockwise  to decrease gas pressure to main burner.
  - c. Always replace cap screw and tighten firmly to prevent gas leakage.
8. Turn gas control knob to PILOT (standing pilot system) or OFF (intermittent and direct ignition systems).
9. Remove pressure gauge and replace outlet pressure tap plug and pressure regulator cap screw.
10. Proceed to Checkout section.

a. For one ft<sup>3</sup> per revolution gas meter dials, use Table 1 directly.

b. For 1/2 ft<sup>3</sup> per revolution gas meter dials:  
(1) Determine time for two dial revolutions  
(2) Use Table 1 directly.

c. For two ft<sup>3</sup> per revolution gas meter dials:  
(1) Determine time for one complete dial revolution.  
(2) Divide time by two.  
(3) Use Table 1 directly.

**Table 1. Converting Gas Flow Rate .**

| Time (sec) | Flow (cfh) | Flow (m <sup>3</sup> /hr) |
|------------|------------|---------------------------|
| 40         | 90         | 2.55                      |
| 41         | 88         | 2.50                      |
| 42         | 86         | 2.44                      |
| 43         | 84         | 2.38                      |
| 44         | 82         | 2.32                      |
| 45         | 80         | 2.27                      |
| 46         | 78         | 2.21                      |
| 47         | 77         | 2.18                      |
| 48         | 75         | 2.12                      |
| 49         | 73         | 2.07                      |
| 50         | 72         | 2.04                      |
| 51         | 71         | 2.01                      |
| 52         | 69         | 1.95                      |
| 53         | 68         | 1.93                      |
| 54         | 67         | 1.90                      |
| 55         | 65         | 1.84                      |
| 56         | 64         | 1.81                      |
| 57         | 63         | 1.78                      |
| 58         | 62         | 1.76                      |
| 59         | 61         | 1.73                      |
| 60         | 60         | 1.70                      |
| 62         | 58         | 1.64                      |
| 64         | 56         | 1.59                      |
| 66         | 54         | 1.53                      |
| 68         | 53         | 1.50                      |
| 70         | 51         | 1.44                      |
| 72         | 50         | 1.42                      |
| 74         | 49         | 1.39                      |
| 76         | 47         | 1.33                      |

**Table 1. Converting Gas Flow Rate (Continued).**

| Time (sec) | Flow (cfh) | Flow (m <sup>3</sup> /hr) |
|------------|------------|---------------------------|
| 78         | 46         | 1.30                      |
| 80         | 45         | 1.27                      |
| 84         | 43         | 1.22                      |
| 88         | 41         | 1.16                      |
| 92         | 39         | 1.10                      |
| 96         | 38         | 1.08                      |
| 100        | 36         | 1.02                      |
| 105        | 34         | .96                       |
| 110        | 33         | .93                       |
| 115        | 31         | .88                       |
| 120        | 30         | .85                       |
| 130        | 28         | .79                       |
| 135        | 27         | .76                       |
| 140        | 26         | .74                       |
| 150        | 24         | .68                       |
| 160        | 23         | .65                       |
| 170        | 21         | .59                       |
| 180        | 20         | .57                       |

## CHECKOUT

1. Make certain the primary air supply to the main burner is properly adjusted for complete combustion at final pressure regulator setting. Main burner must light reliably under all conditions.
2. Place system in operation and observe through at least one complete cycle to assure all controls are operating properly.
3. If manometer (pressure gauge) method is used, perform Gas Leak Test at outlet pressure tap plug.
4. Apply the conversion label in the conversion kit to the gas control, heating appliance, and any other controls to show conversion to a new type of gas.

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