396087–1 Natural Gas Conversion Kit and 396087–2 LP Gas Conversion Kit for VS8420E/VS8510E/VS8520E Convertible High/Low Combination Gas Controls

INSTALLATION INSTRUCTIONS

APPLICATION

The 396087-1 Natural Gas Conversion Kit changes VS8420E/VS8510E/VS8520E combination gas controls from regulated LP gas to regulated natural gas. The 396087-2 LP Gas Conversion Kit changes VS8420E/VS8510E/VS8520E combination gas controls from regulated natural gas to regulated LP gas. Kits include a conversion screw (blue for natural gas, red for LP gas), regulator cap, and conversion label.

To use this kit, assure gas control is equipped with a convertible High/Low regulator.

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, severe 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 and conversion screw. Refer to figs. 1 and 2.

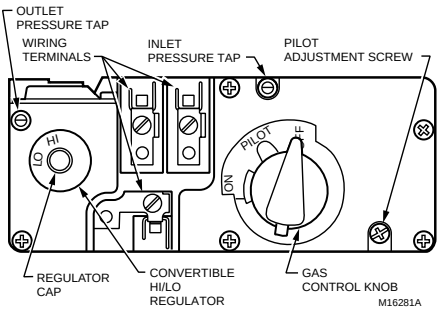

Fig. 1. Top view of a convertible High/Low combination gas control (VS8520E shown here).

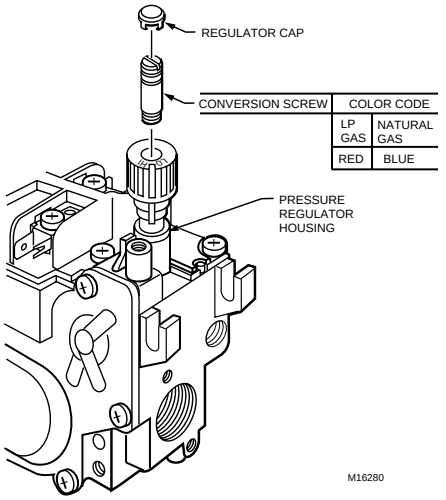

Fig. 2. Conversion screw, and regulator cap installation in a convertible High/Low regulator (for models VS8420E, VS8510E and VS8520E, only).

3. Install the new conversion screw. Assure that the conversion screw is finger tight. See fig. 2.

CAUTION

Fire Hazard.
Can cause property and equipment damage, or personal injury.
Do not overtighten the natural (blue) **or** LP (red) conversion screw. Conversion screw must not be loose or overtightened. Stop tightening the conversion screw when resistance is met (this is finger-tight).

4. Install the new regulator cap.
5. Mount conversion label on the gas control.
6. 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 black 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. Thermostat and automatic valve operators control main burner gas flow.

Perform Gas Leak Test

WARNING

Fire or Explosion Hazard
Can cause property damage, severe 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 a 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 cannot 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.
   - If pilot flame goes out, turn gas control knob clockwise to OFF and repeat steps 1 through 3.
   - If pilot flame remains lit, turn 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.
2. Turn inner adjustment screw clockwise to decrease or counterclockwise to increase pilot flame.
3. Always replace cap screw after adjustment and tighten firmly to safeguard proper operation.

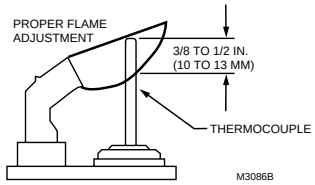

Fig. 3. Proper flame adjustment.

Check and Adjust Gas Input and Burner Ignition

CAUTION

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:
   - Make sure that the only gas flowing through the meter is for the appliance being checked.
   - Make certain that other appliances are turned off with pilot flames extinguished (or deduct that gas consumption from the meter reading).
   - 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:
   - Be sure the gas control knob is in the PILOT position before loosening outlet pressure tap screw to connect manometer (pressure gauge).
   - Turn the gas control knob to PILOT when removing gauge tightening screw.
   - Shut off gas supply at the appliance service valve, or for LP gas, at the gas tank, before loosening the outlet pressure screw and before disconnecting manometer and tightening outlet pressure tap screw.
   - Perform Gas Leak Test at outlet pressure tap screw.

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 setting turn the high/low knob to the "hi" position and cycle the main burner on and off several times to stabilize the pressure regulator diaphragm. Then, turn the high/ low knob to the "low" position and repeat cycling.
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^3/hr), use the following formula:

$$\frac{\text{Input Rating in Btuh (MJ/hr)}}{\text{Btu Content of Gas per ft}^3 \text{ (MJ Content of Gas per m}^3\text{)}} = \text{cfh (m}^3\text{/hr) or gas}$$

7. Nominal high/low outlet pressure of valve is on the label, natural gas tolerance is +/- 0.3" w.c., LP tolerance is +/- 0.5" w.c.
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.
2. Loosen outlet pressure tap screw and connect pressure gauge. Refer to Fig. 1.
3. Turn gas control knob to ON position.
4. To obtain an accurate outlet pressure setting turn the high/low knob to the "hi" position and cycle the main burner on and off several times to stabilize the pressure regulator diaphragm. Than turn the high/ low knob to the "low" position and repeat cycling.
5. Light main burner and read pressure gauge.
6. Nominal high/low outlet pressure of valve is on the label, natural gas tolerance is +/- 0.3" w.c., LP tolerance is +/- 0.5" w.c.
7. Turn gas control knob to PILOT.
8. Remove pressure gauge and tighten outlet pressure tap screw.
9. Proceed to Checkout section.

Use with Meter Clocking Method

- For one ft^3 per revolution gas meter dials, use Table 1 directly.
- For 1/2 ft^3 per revolution gas meter dials:
  1. Determine time for two dial revolutions
  2. Use Table 1 directly.
- For two ft^3 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^3/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

(continued)

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

Time (sec)	Flow (cfh)	Flow (m^3/hr)
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
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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