

Check Safety Shutdown Performance

WARNING

Fire or Explosion Hazard.

Can cause property damage, severe injury or death.

Perform the safety shutdown test every time work is done on a gas system.

1. Place gas control knob in PILOT position. Main burner should go off and pilot should remain lit.
2. Extinguish pilot flame. Pilot gas flow should stop within 2-1/2 minutes. Safety shutoff of pilot gas proves complete shutdown because safety shutoff valve prohibits main burner and pilot gas flow.
3. Relight pilot burner and operate system through one complete cycle to ensure all controls operate properly.

MAINTENANCE

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Improper cleaning or reassembly may cause gas leakage. When cleaning, ensure that control is reassembled properly and perform gas leak test.

Regular preventive maintenance is important in applications that place a heavy load on system controls, such as in the commercial cooking and agricultural and industrial industries because:

- In many such applications, particularly commercial cooking, the equipment operates 100,000-200,000 cycles per year. Such heavy cycling can wear out the gas control in one to two years.
- Exposure to water, dirt, chemicals and heat can damage the gas control and shut down the control system.

The maintenance program should include regular checkout of the gas control as outlined under STARTUP AND CHECKOUT and the control system as described in the appliance manufacturer's literature.

Maintenance frequency must be determined individually for each application. Some considerations are:

- *Cycling frequency.* Appliances that may cycle 100,000 times annually should be checked monthly.
- *Intermittent use.* Appliances that are used seasonally should be checked before shutdown and again before the next use.
- *Consequence of unexpected shutdown.* Where the cost of an unexpected shutdown would be high, the system should be checked more often.
- *Dusty, wet or corrosive environment.* Since these environments can cause the gas control to deteriorate more rapidly, the system should be checked more often.

The gas control should be replaced if:

- It does not perform properly on checkout or troubleshooting.
- The gas control knob is hard to turn or push down, or it fails to pop back up when released.
- The control is likely to have operated for more than 200,000 cycles.

OPERATION

The V800 combination gas control family provides 3-position (OFF-PILOT-ON) manual control of gas flow. In Fig. 14, the gas control knob is in the ON position, the pilot is proven by the thermocouple/generator, and the thermostat is calling for heat.

Gas Control Knob at Off

The manual safety shutoff valve and main valve are closed. No gas flows into the control.

Gas Control Knob at Pilot

The manual safety shutoff valve and main valve are closed until the gas control knob is manually depressed. When depressed, the manual safety shutoff valve is opened, allowing pilot gas flow so the pilot can be lit. After about one minute, the thermocouple/generator current is enough, so that power unit holds the manual shutoff valve open. The main valve remains closed and prevents main burner gas flow until the thermostat calls for heat.

Gas Control Knob at On; No Call for Heat

This is the standby position. The safety shutoff valve is open, but the main valve is closed. Gas flow is restricted to the pilot only.

Gas Control Knob at On; Thermostat Calls for Heat

On a call for heat, the valve operator opens the left-hand port and closes the right-hand port. Gas flows through the working gas channel, increasing the working gas pressure. The increased pressure pushes against the main valve diaphragm, opening the main valve and permitting gas flow through the control to the main burner. The servo pressure regulator controls outlet gas pressure to the main burner.

Gas Control Knob at Off; Thermostat Ends Call for Heat

When a call for heat ends, the valve operator closes the left-hand port and opens the right-hand port. Gas flow through the working gas channel is reversed, decreasing the working gas pressure. The decreased pressure allows the main valve diaphragm to retract and close the main valve. The working gas flows through the evacuation channel to the gas outlet to the main burner. The safety valve remains open, allowing pilot gas flow.

Loss of Pilot Flame

The Pilotstat safety shutoff mechanism shuts down the combination gas control if the pilot flame becomes extinguished or too small for satisfactory burner ignition.

As the pilot burns, it constantly heats the thermocouple or Powerpile generator, providing current for the Pilotstat power unit in the gas control. A properly burning pilot supplies the power unit with enough current to keep the safety valve open and allow pilot gas flow. If the pilot goes out or decreases current to the power unit, the power unit will "drop out", closing the safety valve and preventing pilot gas flow and main burner gas flow. To restart the system, the pilot flame must be manually relit and the Pilotstat must be manually reset.

The VS820 and VS821 Powerpile models generate current independent of the line voltage and continue regulating pilot and main burner gas flow. Therefore, in a power outage, the gas control continues operating.

Servo Pressure Regulators

When the pilot flame is burning properly and the thermostat calls for heat, the servo pressure regulator senses and varies the outlet pressure to the main burner. When the thermostat

calls for heat, the valve operator ON-OFF lever opens the left-hand gas supply port, lifting the servo regulator valve off its seat and allowing gas flow into the working gas channel and evacuation channel. The working gas channel gas flow increases the pressure in the working gas pressure chamber which raises the main valve diaphragm and lifts the main valve off its seat, allowing main burner gas flow.

Outlet gas pressure variations are instantly reflected through the evacuation channel to reposition the servo regulator diaphragm. Repositioning the diaphragm adjusts the outlet pressure by altering the flow rate through the servo regulator valve.

When the outlet pressure rises, the servo regulator valve opens and allows more evacuation channel gas flow. This decreases the pressure in the working gas pressure chamber and lowers the main valve toward its seat, lowering the outlet pressure.

The opposite occurs when the outlet pressure falls. The servo regulator valve closes and allows less evacuation channel gas flow. This increases the pressure in the working gas pressure chamber and raises the main valve from its seat, raising outlet pressure.

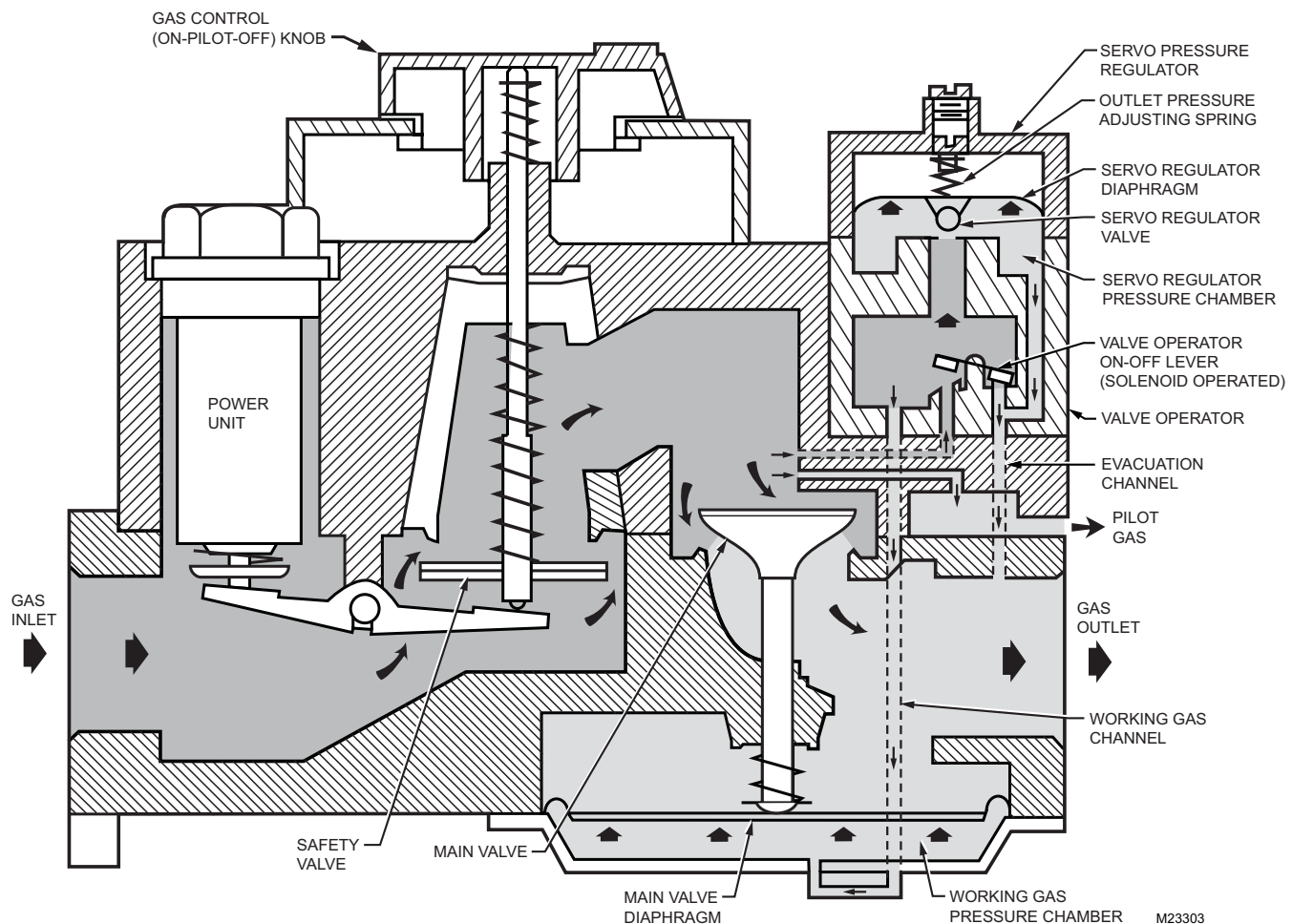


Fig. 14. Gas Flow through the V800 Combination Gas Control Family.

SERVICE

WARNING

Fire or explosion hazard.

Can cause property damage, severe injury or death.

Do not disassemble the gas control; it contains no replaceable components. Attempted disassembly or repair will damage the gas control.

CAUTION

Equipment Damage Hazard.

Can cause property damage.

Do not apply a jumper across or short the valve coil terminals. This may burn out the heat anticipator in the thermostat.

IMPORTANT

Allow 60 seconds after shutdown before re-energizing the step-opening model to ensure lightoff at step pressure.

If the Pilot will not light

1. Ensure the main gas supply valve is open and the pilot gas supply line is purged of air.
2. Attempt to light pilot burner flame following procedures in Light Pilot section. If pilot still will not light:
 - a. Check the pilot gas adjustment screw. If closed, readjust the pilot flame. Refer to Adjust the Pilot Burner Flame section.
 - b. Perform the Gas Leak Test at the compression fitting. If a gas leak is detected, replace the old compression fitting or tighten the newly installed one (Refer to Fig. 8).
 - c. Ensure that the pilot burner tubing or pilot burner orifice is not clogged. If clogged, replace combination gas control.

If the Pilot goes out when the gas control knob is released

1. Ensure the gas control knob is held in at least one minute to allow the thermocouple or generator time to heat.
2. Adjust thermostat several degrees above room temperature.
3. For VS820 and VS821, disconnect leadwires to lower left TH terminal and lower right PP terminal to isolate valve operator coil from balance of circuit. Measure resistance of coil. If coil is not 2 ohms \pm 10 percent, replace VS824A Valve Operator.
4. In Powerpile applications, ensure jumper between valve operator and power unit is secure and connections are clean.
5. In thermocouple applications, ensure connection to power unit is tightened 1/4 turn beyond finger tight.
6. If pilot still goes out, measure the open and closed thermocouple or generator circuit output voltages. Compare it to the acceptable range charts in the thermocouple or generator specifications or in the Gas Controls Handbook. Replace the thermocouple or generator circuit if voltages are outside the acceptable range.

7. Check the power unit resistance. If above 11 ohms, replace the gas control.

If the Main Burner will not come on with a call for heat

1. Ensure the gas control knob is in the ON position.
2. Adjust the thermostat several degrees above room temperature.
3. For VS820 and VS821, disconnect leadwires to lower left the TH terminal and lower right PP terminal to isolate valve operator coil from balance of circuit. Measure resistance of coil. If coil is not 2 ohms \pm 10 percent, replace VS824A Valve Operator.
4. For all other models, use an ac voltmeter to measure the voltage across terminals TH and TR.
 - a. If no voltage is present, check the control circuit for proper operation.
 - b. If proper control system voltage is present, but first operator did not "click" open, check for excessive inlet gas pressure. If inlet gas pressure is correct, replace the gas control.
 - c. If proper control system voltage is present and first valve operator "clicked" open, replace second operator assembly.
5. Measure the open and closed thermocouple or generator output voltages and compare to the acceptable range charts in the thermocouple or generator specifications or in the Gas Controls Handbook. Replace the thermocouple or generator if voltages are outside the acceptable range.

If Burner is overfiring

Adjust the gas control pressure regulator to the correct pressure. If the regulator cannot be adjusted and supply pressure is in the normal range, replace the gas control.

INSTRUCTIONS TO THE APPLIANCE OWNER

For Your Safety, Read Before Lighting

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If you do not exactly follow the warning below and the lighting instructions, a fire or explosion can result in property damage, personal injury or loss of life.

1. Before lighting, smell all around the appliance area for gas. If the appliance uses LP (bottled) gas, also be sure to smell next to the floor because LP gas is heavier than air. If you smell gas, immediately shut off the manual valve in the gas piping to the appliance, or ON LP SYSTEM, AT THE TANK. Do not try to light any appliance. Do not touch any electrical switch or use the phone. LEAVE THE BUILDING and call your gas supplier. If your gas supplier cannot be reached, call the fire department.

2. Do not force the gas control knob on the appliance. Use only your hand to push down the reset button or turn the gas control knob. Never use any tools. If the knob or reset button will not operate by hand, replace the control using a qualified service technician. Force or attempted repair can result in fire or explosion.
3. Replace the gas control if it has been flooded with water. Call a qualified service technician.
4. If the red reset button stays depressed after it is released, replace the gas control.
5. The gas control is a safety device. It must be replaced in event of any physical damage such as bent terminals, missing or broken parts, stripped threads, or evidence of exposure to heat.


IMPORTANT

Follow the operating instructions provided by the manufacturer of your heating appliance. Use the information below for a typical control application; however, the specific controls used and the procedures outlined by the manufacturer of your appliance can differ, requiring special instructions.



To Light the Main Burner

STOP: Read the safety information above.

This appliance has a pilot burner that must be lit by hand. If the pilot flame has gone out, follow these instructions exactly:


1. Set thermostat to lowest setting and shut off electric power to appliance.
2. Remove control access panel if provided on your appliance.
3. Push in gas control knob (Refer to Figures 6 or 7) clockwise  to OFF position.

NOTES: Knob cannot be turned from PILOT to OFF unless knob is pushed in slightly. Do not force.


4. Wait five (5) minutes to clear out any gas. If you smell gas, **STOP!** Follow Item 1 in the Warnings on the previous page. If you don't smell gas, go to next step.
5. Remove the pilot access panel located below and behind the gas control unit.
6. Find the pilot - follow metal tube from gas control. The pilot is between the two burner tubes behind the pilot access panel.
7. Turn knob on gas control counterclockwise  to PILOT.
8. Push in control knob all the way and hold in. Immediately light the pilot with a match. Continue to hold the control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out repeat steps 5-8.
9. Replace pilot access panel.
10. Turn gas control knob counterclockwise  to ON.
11. Replace burner access panel.
12. Turn on electrical power to the appliance.
13. Set thermostat to desired temperature.

To Turn Off Appliance

VACATION SHUTDOWN

Turn gas control knob clockwise  from ON to PILOT. Pilot remains lit, ready for return to normal service without relighting.

COMPLETE SHUTDOWN

Push in gas control knob slightly and turn clockwise  to OFF. Do not force. Both pilot and main burner are shut off. The pilot must be manually relit when normal burner operation is desired. Follow the provided instructions.