4. If the desired outlet gas pressure or gas flow rate cannot be achieved by adjusting the gas control, check the gas control inlet pressure by using a manometer at the inlet pressure tap. If the inlet pressure is in the normal range (refer to Table 5), replace the gas control. Otherwise, take the necessary steps to provide proper gas pressure to the gas control.

TABLE 5—PRESSURE REGULATOR SPECIFICATION PRESSURES FOR STANDARD-OPENING NATURAL GAS.

Unit of Measure	Nominal Inlet Pressure Range	Outlet Pressure (Full Rate)	
		Nominal Factory Outlet Setting	Adjustment Setting Range
in. wc	5.0 - 7.0	3.5	3.0 - 5.0
kPa	1.2 - 1.7	0.9	0.7 - 1.2

CHECK SAFETY SHUTDOWN PERFORMANCE

WARNING

FIRE OR EXPLOSION HAZARD CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY, OR DEATH

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

NOTE: Read steps 1 through 7 below before starting and compare to the safety shutdown or safety lockout tests recommended for the intermittent pilot (IP), hot surface (HSI) or direct spark (DSI) module. When different, use the procedure recommended for the module.

1. Turn off gas supply.
2. Set the thermostat or controller above room temperature to call for heat.
3. • *Intermittent Pilot Ignition*—Watch for an ignition spark at pilot burner either immediately or following prepurge. See ignition module specifications.
   • *Hot Surface or Direct Spark Ignition*—Watch for an ignition spark or glow at hot surface igniter either immediately or following prepurge. See ignition module specifications.
4. If module has timed ignition, time the length of the igniter operation. See ignition module specifications.
5. • *Intermittent Pilot Ignition*—After the module locks out, turn on gas supply and make sure there is no gas flow to the pilot or main burner.

NOTE: With modules that continue spark until pilot lights or system is shut down manually, pilot should light when gas supply is turned on.

   • *Hot Surface or Direct Spark Ignition*—After the module locks out, turn on gas supply and assure there is no gas flow to main burner.
6. Set the thermostat below room temperature and wait at least 45 seconds to reset system.
7. Operate system through one complete cycle to make sure all controls operate properly.

Maintenance

WARNING

FIRE OR EXPLOSION HAZARD CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY, OR DEATH

Improper cleaning or reassembly can cause gas leakage. When cleaning, be sure that the 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 commercial cooking, agricultural and industrial operations because:

- In many such applications, particularly commercial cooking, the equipment operates 100,000 to 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; see Startup and Checkout section. To check out the control system, see the appliance manufacturer literature. Maintenance frequency must be determined individually for each application. Some considerations are:

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

NOTE: If the gas control will be exposed to high ammonia conditions; e.g., those used in greenhouses or animal barns, contact your Honeywell sales representative to request a gas control with corrosion resistant construction.

The gas control should be replaced if:

- It does not perform properly during checkout or troubleshooting.
- The gas control knob is hard to turn or push down.
- The gas control is likely to have operated for more than 200,000 cycles.

Operation

The VR8345 gas controls provide ON-OFF manual control of gas flow. In the OFF position, pilot and/or main burner gas flow is prevented. In the ON position, pilot and/or main burner gas flow is under control of the thermostat, the direct spark ignition (DSI) module, hot surface ignition (HSI) module/intermittent pilot module, and the gas valve.

DIRECT SPARK IGNITION/HOT SURFACE IGNITION APPLICATIONS

System Operation

When the thermostat calls for heat, the DSI OR HSI module is energized. The module activates the first and second automatic valves of the gas control, which allows main burner gas flow. At the same time, the DSI/HSI module generates a spark at the igniter-sensor to light the main burner.

The second automatic valve diaphragm, controlled by the servo pressure regulator, opens and adjusts gas flow as long as the system is powered. The servo pressure regulator monitors outlet pressure to provide an even main burner gas flow. Loss of power (thermostat satisfied) de-energizes the DSI/HSI module and closes the automatic valves. The system is ready to return to normal service when power is restored through the thermostat.

If the igniter-sensor stops detecting a flame at the main burner, the trial for ignition is restarted. On DSI/HSI modules with lockout timers, the automatic valves are de-energized and ignition stops after the lockout period. On modules without lockout timers, the trial for ignition continues indefinitely and the first automatic valves remain open.

If main burner flame is restarted successfully, operation continues as described above. Gas control operation is described in more detail below.

Valve Position During Thermostat OFF Cycle

The valve is positioned as shown in Fig. 13 when the:

- gas control knob is in the ON position.
- thermostat is not calling for heat.

The first automatic valve is closed. The second automatic valve operator is de-energized, closing the channel to the pressure regulator, and opening a channel to the underside of the second automatic valve diaphragm. The combination of spring pressure under the second automatic valve diaphragm and lack of outlet pressure hold the diaphragm firmly closed. Main burner gas flow is blocked by both valves.

When Thermostat Calls for Heat

When the thermostat calls for heat, the DI module generates a spark at the main burner and the first automatic valve and second automatic valve operators are energized, Fig. 14. The first automatic valve opens, and the second automatic valve operator valve disk is lifted off its seat. This diverts gas flow from the second automatic valve diaphragm, and causes a reduction of pressure on the underside of this diaphragm. The reduced pressure on the bottom of the automatic valve diaphragm repositions the diaphragm downward, away from the valve seat, allowing main burner gas flow.

INTERMITTENT PILOT APPLICATIONS

System Operation

When the thermostat calls for heat, the S8600 Intermittent Pilot Module is energized, The S8600, in turn, activates the first automatic valve of the gas control, allowing pilot gas flow. Simultaneously, the S8600 module generates a spark at the igniter-sensor and lights the pilot. The pilot flame is then sensed by the igniter-sensor, and spark generation ends.

After the pilot is lit, the S8600 module energizes the solenoid for the second automatic valve operator. (The first automatic valve remains energized.)

The second automatic valve diaphragm, controlled by servo pressure regulator, opens and adjusts main gas flow as long as the system is powered and the pilot is burning. The servo pressure regulator monitors outlet pressure to provide an even main burner gas flow. Loss of power (thermostat satisfied) de-energizes the S8600 module and closes both automatic valves. The system is then ready for the next cycle.

Loss of pilot flame, or when flame is too small to reliably light the main burner, closes the second automatic valve operator. The S8600 module then attempts to restart the pilot. On S8600 modules with lockout timers, the first automatic valve closes after the lockout period. On S8600 modules without lockout timers, the trial for ignition continues indefinitely and the first automatic valve remains open.

If pilot flame is restarted successfully, main burner is reopened, and gas flows to the main burner as described above. Gas control operation is described in more detail below.

Valve Position During Thermostat Off Cycle

The valve is poistioned as shown in Fig. 15 when the:

- manual gas control know is in the ON position.
- thermostat is not calling for heat.

The first automatic valve is closed. The second automatic valve operator is de-energized, closing the channel to the pressure regulator, and opening a channel to the under-

side of thesecond automatic valve diaphragm. The combination of spring pressure under the second automatic valve diaphragm andd alck of outlet pressure hold the diaphragm firmly closed. (Gas pilot burner gas flow is prevented by the first automatic vlave and main burner by both valves.)

When Thermostat Calls for Heat

When the thermostat calls for heat, the trial for pilot ignition begins. The first automatic valve solenoid is energized by trhe module and opens, allowing pilot burner gas flow. Gas also flows to the second automatic valve operator, but is mechanically blocked at the operator. See Fig. 13.

After the pilot lights and the pilot flame is sensed by the igniter-sensor, the second automatic valve solenoid is energized by the module, and the second automatic operator valve is lifted off its seat. See Fig. 14. This diverts gas flow from the second automatic vlave diaphragm and causes a reduction of pressure on the underside of this diaphragm. The reduced pressure on the bottom of the automatic valve diaphragm repositions the diaphragm downward, away from the valve seat, allowing main burner gas flow.

ALL APPLICATIONS

During the ON cycle, the servo pressure regulator provides close control of outlet pressure, even if inlet pressure and flow rate vary widely. Any outlet pressure change is immediately reflected back to the pressure regulator diaphragm, which repositions to change the flow rate through the regulator and, thus, through the automatic valve.

If outlet pressure begins to rise, the pressure regulator diaphragm moves slightly higher, allowing less gas flow to the gas control outlet. This increases gas pressure under the automatic valve diaphragm and repositions the valve disk closer to the seat. Thus, flow of gas through the second automatic valve is reduced, and outlet pressure falls to the desired level.

If outlet pressure begins to fall, the pressure regulator diaphragm moves slightly lower, allowing more gas flow to the gas control outlet. This decreases gas pressure under the second automatic valve diaphragm and repositions the valve disk further from the seat. Thus, flow of gas through the second automatic valve is increased, and outlet pressure rises to the desired level.

When the Call for Heat Ends

When the call for heat ends, the first automatic valve and the second automatic valve operator close, bypassing the regulator(s) and shutting off the main burner (and in the intermittent pilot application, the pilot gas flow). As pressure inside the gas control and underneath the automatic valve diaphragm equalizes, spring pressure closes the second automatic valve to provide a second barrier to gas flow.

Fig. 13—Intermittent Pilot Applications: Position of gas control components during trial for pilot ignition.

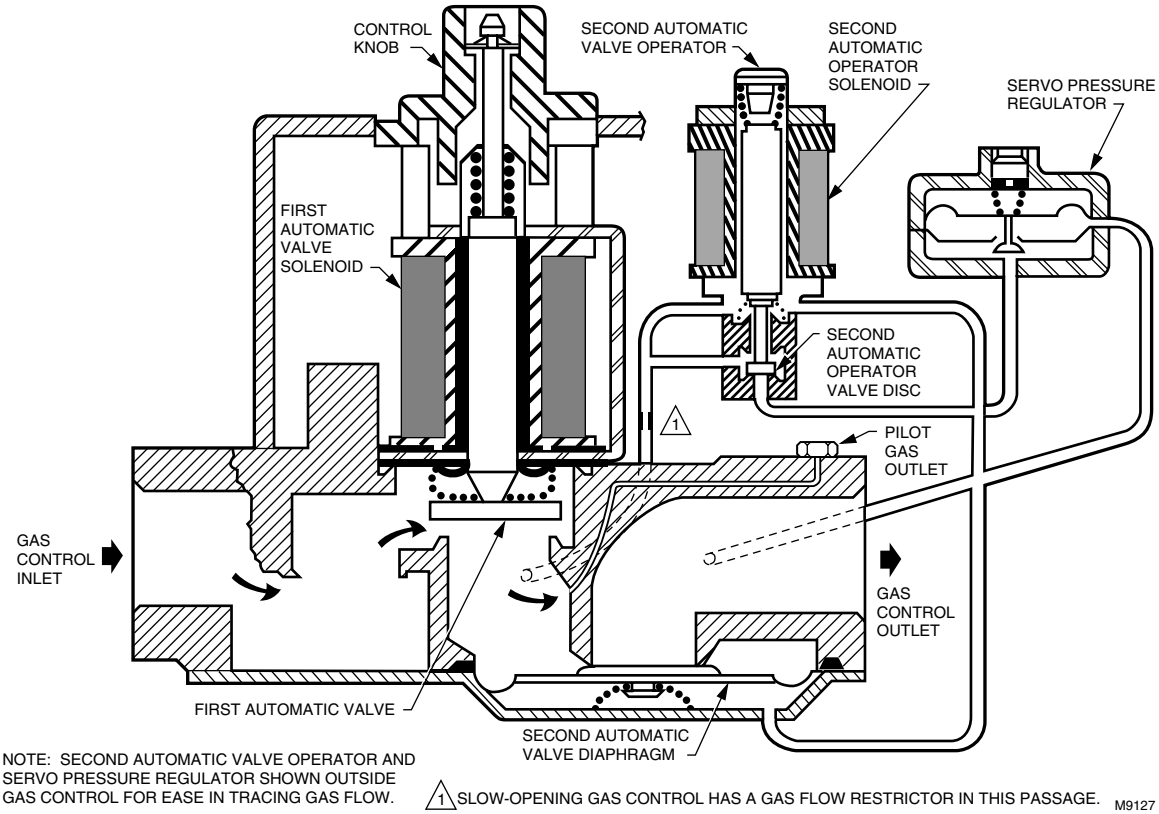


Fig. 14—Direct Ignition/Intermittent Pilot Applications: Position of gas control components during burner on cycle.

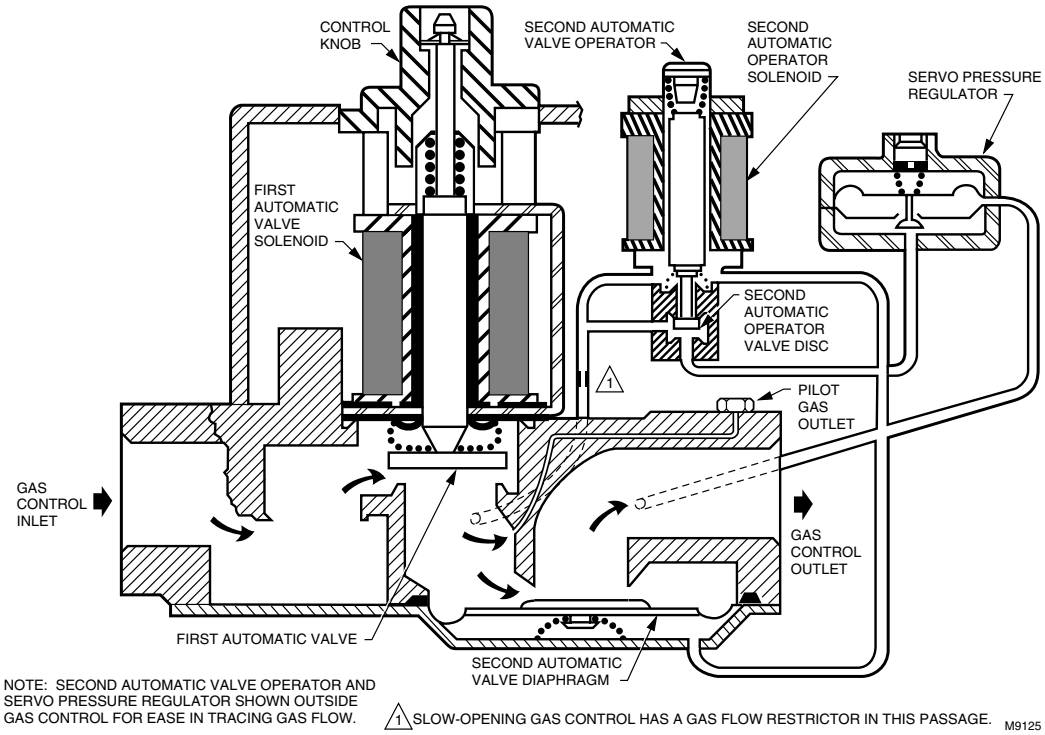
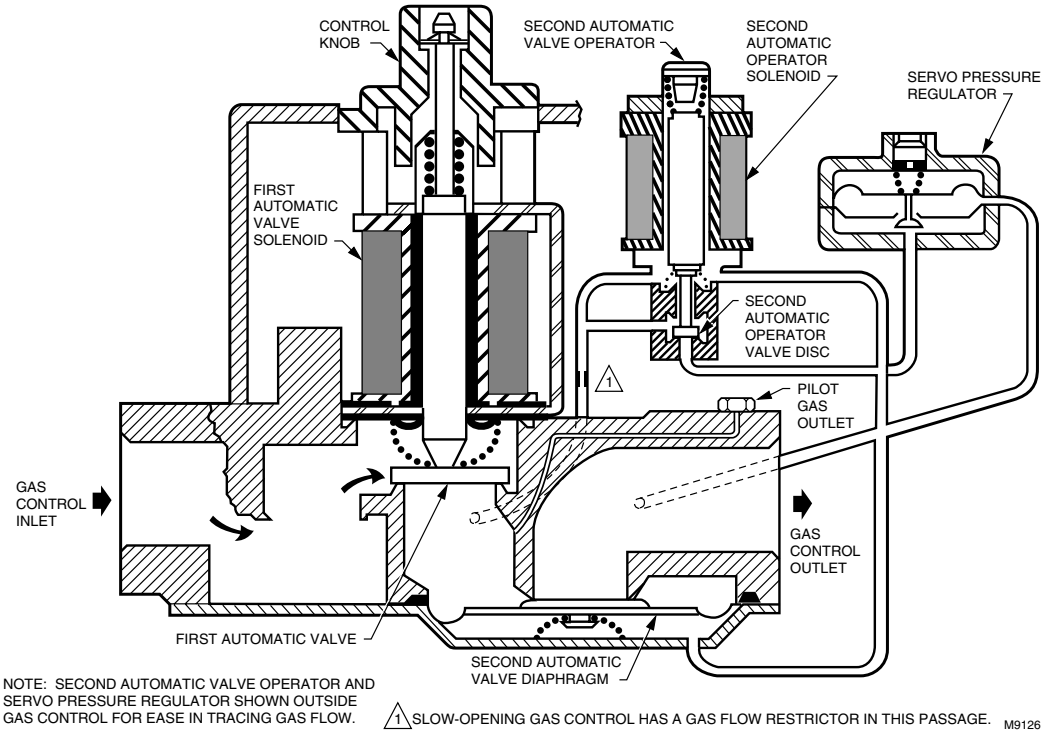


Fig. 15—Direct Ignition/Intermittent Pilot Applications: Position of gas control components during thermostat off cycle.



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 can damage the gas control.

CAUTION

Do not apply a jumper across or short the valve coil terminals. Doing so can burn out the heat anticipator in the thermostat or damage the ignition module.

IF MAIN BURNER WILL NOT COME ON WITH CALL FOR HEAT

1. Make sure the gas control knob is in the ON position.
2. Adjust the thermostat several degrees above room temperature.

INSTRUCTIONS TO THE HOMEOWNER (FOR YOUR SAFETY, READ BEFORE OPERATING)

WARNING

**FIRE OR EXPLOSION HAZARD
CAN CAUSE PROPERTY DAMAGE,
SEVERE INJURY, OR DEATH**

Follow these warnings exactly:

1. Pilot/main burner flame is lit automatically. Do not light the pilot/main burner flame manually.
2. Before lighting appliance, smell around the appliance for gas. Be sure to smell next to the floor because LP gas is heavier than air.
3. IF YOU SMELL GAS:
   - Turn off the gas supply at the appliance service valve. On LP gas systems, turn off gas supply at the gas tank.
   - Do not light any appliances in the house.
   - Do not touch electrical switches or use phone.
   - Leave the building and use a neighbor's phone to call your gas supplier.
   - If you cannot reach your gas supplier, call the fire department.
4. Do not force the gas control knob. Use only your hand to push down or turn the gas control knob. Never use any tools. If the gas control knob will not operate by hand, call a qualified service technician to replace the gas control. Force or attempted repair can result in a fire or explosion.
5. Call a qualified service technician to replace the gas control if it has been flooded with water.
6. Replace the gas control in the event of any physical damage, tampering, bent terminals, missing or broken parts, stripped threads, or evidence of exposure to heat.

3. Using an ac voltmeter, check for voltage at the gas control.
   - *Intermittent Pilot Igntion*—If pilot lights, measure voltage across MV/PV and MV. If pilot does not light, measure across MV/PV and PV before safety lockout occurs.
   - *Hot Surface or Direct Spark Ignition*—Measure voltage across MV terminals at gas control.
4. If voltage is not present, check control circuit for proper operation.
5. If proper control circuit voltage is present, replace gas control.

IMPORTANT: *Follow the operating instructions provided by the manufacturer of your heating appliance. The information below will be helpful in a typical gas control application, but the specific controls used and the procedures outlined by the manufacturer or your appliance may differ and require special instructions.*

TO TURN ON THE APPLICANCE

Stop: Read the Warnings on page 11.

The pilot/main burner flame is lit automatically. *Do not attempt to manually light the pilot*. If the appliance does not turn on when the thermostat is set several degrees above room temperature, follow these instructions:

1. Set the thermostat to its lowest setting to reset the safety control.
2. Disconnect all electric power to the appliance.
3. Remove the gas control access panel.
4. Push in the gas control knob slightly and turn clockwise ↷ to OFF.
5. Wait five minutes to clear out any unburned gas. If you then smell gas, STOP! Follow step 3 of the Warning in the Instructions To The Homeowner section. If you do not smell gas, continue with the next step.
6. Turn the gas control knob counterclockwise ↶ to ON.
7. Replace the gas control access panel.
8. Reconnect all electric power to the appliance.
9. Set the thermostat to the desired setting.
10. If the appliance does not turn on, set the gas control knob to OFF and contact a qualified service technician for assistance.

TURNING OFF THE APPLIANCE

VACATION SHUTDOWN—Set the thermostat to the desired room temperature while you are away.

COMPLETE SHUTDOWN—Push in the gas control knob slightly and turn clockwise ↷ to OFF. Do not force. Appliance will completely shut off. Follow the Instructions to the Homeowner above to resume normal operation.