

Maintenance

WARNING

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

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

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

- The equipment operates 100,000-200,000 cycles per year in many such applications, particularly commercial cooking. 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 check-out of the gas control, see Start-Up and Checkout, page 8, 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 gas control is likely to have operated for more than 200,000 cycles.

Operation

The VR8305 Gas Controls provide ON-OFF manual control of gas flow. In the OFF position, main burner gas flow is prevented. In the ON position, main burner gas flow is under control of the thermostat, the direct ignition (DI) module, and the two automatic main valves.

SYSTEM OPERATION WITH MODULE

When the thermostat calls for heat, the DI 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 DI 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 DI 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 DI 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.

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. 10 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 operator 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. 11. The first automatic valve opens, and the second automatic valve operator valve disc 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.

Standard-Opening Pressure Regulation (VR8305M)

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 valve 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 disc 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 disc further from the seat. Thus, flow of gas through the second automatic valve is increased, and outlet pressure rises to the desired level.

Slow-Opening Pressure Regulation (VR8305H)

Slow-opening gas controls function the same as standard models except that when the thermostat calls for heat, the second automatic valve opens gradually. Opening is slowed because a flow restrictor in the passage from the second automatic operator slows the rate at which gas pressure is reduced under the second automatic valve diaphragm after the second automatic operator opens. Outlet pressure to the

main burner increases gradually from 0 inches wc [0 kPa] to rated output pressure within 3-6 seconds (for an 80,000 Btuh furnace at 7 inches wc [1.8 kPa] inlet pressure and 3.5 inches wc [0.9 kPa] outlet pressure).

Step-Opening Pressure Regulation (VR8305P)

Step-opening gas controls actually combine two pressure regulators, one for the low pressure and one for the full-rate pressure. When the thermostat calls for heat, the automatic operator valve disc opens. The low pressure regulator maintains outlet pressure at the preset step rate for several seconds. Then the regulator valve is forced fully open by the timing diaphragm, which is operated by bleed gas. When the low pressure regulator is fully open, the high pressure regulator maintains the desired full-rate outlet pressure as described for the standard regulator.

The step model requires approximately 60 seconds to reset once the main burner goes off. If it is re-energized within 60 seconds, it may bypass or shorten the length of the low pressure step. The burner may relight at the full flow rate.

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. As pressure inside the gas control and beneath the automatic valve diaphragm equalizes, spring pressure closes the second automatic valve to provide a second barrier to gas flow.

Fig. 10—Position of gas control components during thermostat off cycle.

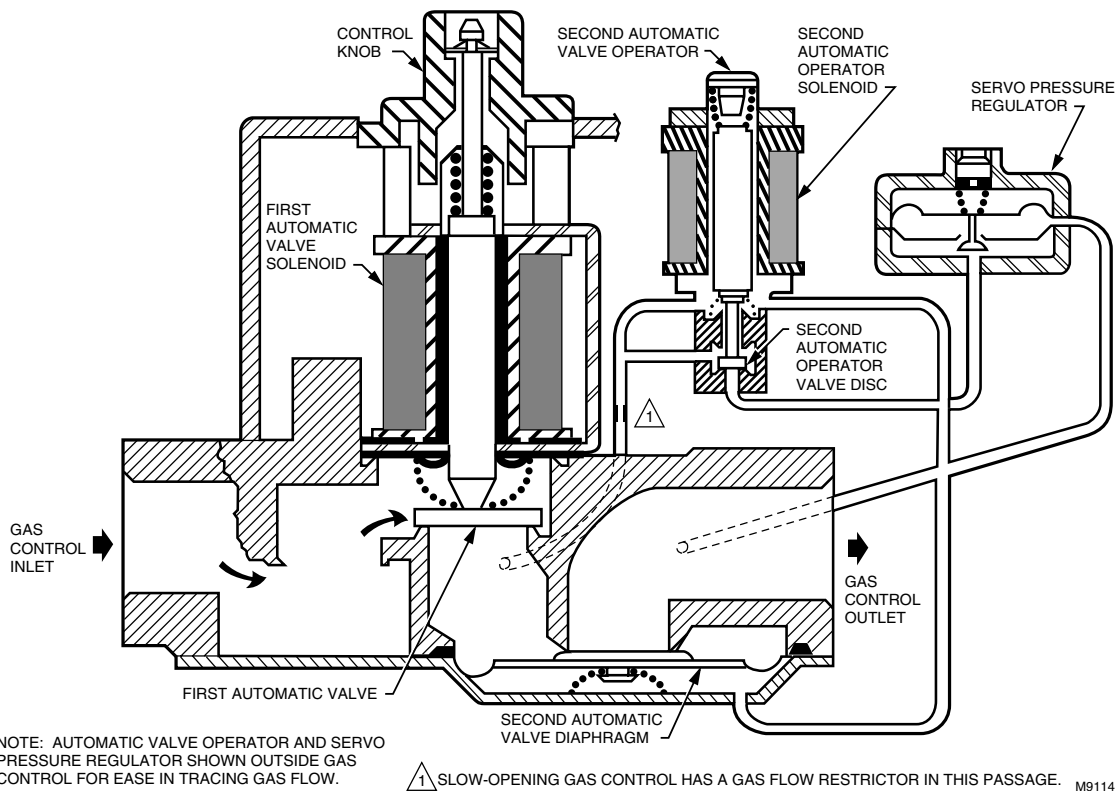
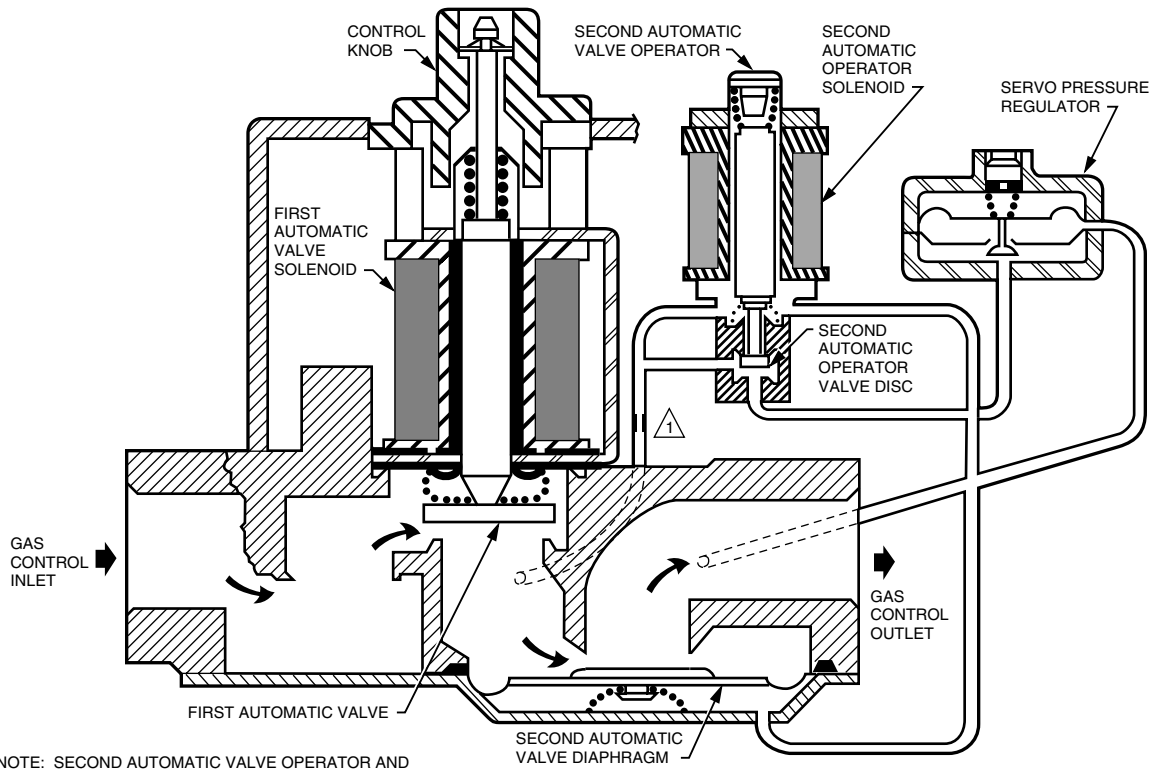



Fig. 11—Position of gas control components during burner on cycle.



NOTE: SECOND AUTOMATIC VALVE OPERATOR AND SERVO PRESSURE REGULATOR SHOWN OUTSIDE GAS CONTROL FOR EASE IN TRACING GAS FLOW.  SLOW-OPENING GAS CONTROL HAS A GAS FLOW RESTRICTOR IN THIS PASSAGE. M9115

Service

WARNING

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

CAUTION

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

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

IF MAIN BURNER WILL NOT COME ON WITH CALL FOR HEAT

1. Ensure gas control knob is in the ON position.
2. Adjust thermostat several degrees above room temperature.
3. Using ac voltmeter, measure voltage across MV terminals at gas control.
4. If no voltage is present, check control circuit for proper operation.
5. If proper control system voltage is present, replace gas control.

INSTRUCTIONS TO THE HOMEOWNER

FOR YOUR SAFETY READ BEFORE OPERATING

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

WARNING


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Follow these warnings exactly:

1. Pilot flame is lit automatically. Do not light the pilot flame manually.
 2. Before lighting pilot burner flame, smell around the appliance for gas. Be sure to smell next to 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 the phone.
 - Leave the building and use a neighbor's phone to call your gas supplier.
 - If you can not 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, the gas control should be replaced by a qualified service technician. Force or attempted repair may result in a fire or explosion.
 5. The gas control must be replaced in case of any physical damage, tampering, bent terminals, missing or broken parts, stripped threads, or evidence of exposure to heat.
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STOP: READ THE WARNINGS ABOVE.

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 in the Warnings above. If you do not smell gas, continue with the next step.