

## Gas Valves:

### A. Thermocouple Only

### B. Valves with Thermocouples and Thermopiles

### C. ODS (Oxygen Depletion Sensor) Systems

**Gas valves are not serviceable; the following are simple troubleshooting and description of how gas valves operate.**

#### A. Thermocouple-Only:

##### Found in:

Most gas log sets with standard safety pilot knob control. Also found in certain gas space heaters and construction-site portable heaters.

This type of gas valve used a single thermocouple. A thermocouple is a device made of two different metals which creates a small electrical charge when heated at one end by the gas pilot. This small charge causes an electromagnet inside the gas valve to open and allow gas to flow to the main burners. Since the thermocouple must be heated before the burner will start, gas appliances often have a startup mode, during which a knob must be depressed and held for 30 seconds or so after lighting the pilot. At the end of the 30 seconds, the pilot should be generating enough electricity for the valve to operate correctly. At this time, the startup knob can be released and the valve turned to an “on” position for appliance operation.

##### Troubleshooting:

Most problems with this type of valve are due to thermocouple problems. Check the following:

1. Connection from the thermocouple to the valve. Clean the threads of the connecting nut with a pencil eraser and re-tighten.
2. Pilot hood and flame direction. The pilot should heat the top 7/8” of the thermocouple with a clean (blue) flame. If the flame hits the thermocouple too low, it can cause the unit to go out or not generate enough millivolts for valve operation. The pilot hood and orifice should also be clean from soot which could block the pilot flame.
3. Many of these valves have an adjustment screw to adjust the pilot flame. A pilot that is too short may allow the pilot to stay lit after ignition, but may not create enough heat to allow the burner to ignite.

#### B. Thermocouple & Thermopile valve:

##### Found in:

Most modern **VENTED** gas stoves, fireplaces and vented gas log sets with thermostat or remote control.

This valve is similar to the thermocouple only valve, however has a pilot which heats up **BOTH** a thermocouple and a thermopile. The thermocouple still acts to prove that the pilot flame is on and allows this flame to continue after startup. The thermopile is used to power a second circuit which is used to open the main valve. This second circuit is powerful enough to allow the use of a thermostat, wall switch or control switch to operate the main valve. Control of the valve is obtained simply by hooking a pair of wires to two terminals located on the valve.

This information is intended for use by individuals with an adequate knowledge of electrical and mechanical skills. Attempts to repair by individuals without those skills can result in injury, as well as property damage.

Contact your local Heating Contractor for service.

Startup is similar to the thermocouple-only valve. Once the pilot is lit, the knob is held in for 30 seconds to “prove” the heat and then released and turned from the “pilot” to the “on” position. The main burner will then respond to the switch, thermostat or remote control.

### **Troubleshooting:**

Since there is both a thermocouple and thermopile in this valve type, it is important to find where the potential problem may be. If the pilot can be lit and stays on after the knob is released, then the problem is probably with the thermopile side of the valve.

#### **Some most common problems and solutions:**

1. Pilot does not light or stay lit after knob is released - Check carefully that gas to appliance is on and that the valve is in the correct (pilot) position and fully depressed when lighting.

If pilot ignites but does not stay lit after knob is released, then the problem is with the thermocouple not generating enough voltage to the valve. It may be that the thermocouple needs replacing. Another possibility is that the thermocouple may not be heated fully by the pilot flame. It is also possible that there is soot or other blockage in the pilot tube, orifice or hood which is reducing the size of the pilot.

2. Pilot stays lit, but appliance will not turn on - There are two common causes. It is possible that the thermopile is not producing enough millivolts to power the control circuit. The millivolts can be checked with a simple voltmeter and adjusted with the pilot adjustment screw. Improper millivolts will also cause the appliance to shut down in the middle of operation.

Another common problem is loose or poor connections or circuits to your appliance switch, thermostat or remote transceiver. This can be isolated by simply using a small piece of wire to jump the “TP” and “TH” terminals located on these valves. If the appliance turns on when these terminals are jumped, then you can be sure that your problem is not in the appliance itself, but further down the switch circuit.

If all the above checks out, and the valve is still not working properly then you may have a defective gas valve in the appliance.

Problems with LP (propane) units can also be due to a tank that is nearly empty or a bad regulator at the tank.

### **C. ODS System:**

#### **Found in:**

Vent free gas logs, fireplaces and stoves. These systems are available in manual or remote control.

#### **ODS Systems are not convertible from one type of gas to another!**

ODS “Oxygen Depletion Sensor” the valve itself is similar in many ways to the two valve types above, however there is one exception. The pilot tube is a precision mechanism that creates a very stable flame as long as the room air contains the proper amount of oxygen. If the oxygen level in the room air drops even slightly, the pilot becomes unstable and lifts off of the thermocouple causing the gas valve and appliance to cease operation.