Flameworks™ Gas Valves Installation Manual

Millivolt

3 Volt

The Flameworks™ gas valves are designed and engineered for a wide variety of low capacity and limited space applications. All Flameworks™ gas valves include, depending on model specifications; a gas cock, pilot outlet, pilot safety valve, pilot gas filter and pilot adjustment screw.

The Flameworks™ gas valves are multi-positional and can be mounted in any position except upside-down. The valves can also be converted from natural to L.P. gas by using the replacement regulators, available separately.

Gas Specification	L.P. Gas		Natural Gas	
BTU Capacity	Min. 5,000	Max. 110,000	Min. 5,000	Max. 70,000
Capacity (1.0" W.C. Pressure Drop)	65,000 BTU/Hr		40,000 BTU/Hr	

WARNING

ALL GAS VALVE INSTALLATIONS AND CONVERSIONS MUST BE PERFORMED BY A LICENSED GAS TECHNICIAN. INSTALLATIONS AND CONVERSIONS WITHOUT A PROFESSIONAL LICENSED GAS TECHNICIAN WILL VOID ALL WARRANTIES AND COULD RESULT IN HAZARDOUS CONDITIONS.

INSTALLATION INSTRUCTIONS

Turn off gas supply and electrical power to equipment before servicing.

Piping & Regulation

1. Remove defective control.
2. Check if the Flameworks™ replacement gas valve has multiple outlets (side outlets). Determine which outlet suits your application best. Be sure to plug all unused outlets using the socket plugs.
3. All pipe and/or tubing must be clean and free of dirt or fouling.
4. Make sure gas piping has been pressure-tested before the control is connected. High pressure can damage controls causing risk hazards. Do not subject control to more than 1/2 psi (14" W.C.) inlet pressure.
5. A sediment trap (drip leg) must be added to the gas supply line to the control if it is not already installed. All piping must comply with local ordinances and codes and with the National Fuel Gas Code (ANSI Z223.1/NFPA, No. 54).
6. Using pipe thread compound suitable for gas, apply a small amount on the male pipe threads. Leave the first two threads clean. Never use compound on female threads as it might be pushed into the control body.
7. The gas valve is multi-positional and can be mounted in any position (except upside-down) without affecting its operation.
8. Install the gas valve so gas flow conforms with the inlet and outlet of the control.
9. **DO NOT** insert any object other than pipe or tubing suitable for the inlet or outlet of this gas valve. Internal damage may occur and cause hazards and will void the warranty. **NOTE**: Do not over tighten any pipe connections as this could crack the valve body. Valve bodies that are cracked will not be warranted.

INSTALLATION INSTRUCTIONS (Cont'd)

PILOT TUBING

1. Verify pilot tubing doesn't have any burrs, dirt and fouling.
2. Check the pilot orifice at this time and clean it if needed.
3. Connect pilot tubing to the gas valve using fitting provided and tighten for a gas tight seal.

PRESSURE REGULATOR VENT

The Flameworks™ with a pressure regulator has a built-in vent limiter. The regulator vent is tapped for 1/8" tubing.
CAUTION: If bleed tubing is used, do not allow main burner or pilot flame impingement on the tubing as this will eventually cause clogging of the tubing resulting in improper regulator operation. If bleed tubing is not used, the regulator vent must be properly shielded from moisture.

THERMOCOUPLE CONNECTION

The thermocouple nut should be started and turned all the way in by hand. An additional quarter turn with a small wrench will be sufficient.
CAUTION: Over tightening is unnecessary and may cause damage to the thermocouple or magnet.

OPERATING INSTRUCTIONS

WARNING

L.P. GAS APPLICATIONS

To avoid possible injury, fire and explosion, please read and follow all instructions on appliance before lighting the pilot. L.P. (propane) gas is heavier than air and will remain at ***floor level*** if there is a leak. Sniff at ***floor level*** before lighting.
If you smell gas, follow the rules below:

1. Get all people out of the building.
2. **DO NOT** light matches. **DO NOT** turn on/off electrical lights or switches in the area. **DO NOT** use an electric fan to remove gas from the area.
3. Shut off gas at L.P. tank outside of building.
4. Call the gas supplier and fire department. Ask for instructions.

Provide your name, address, and telephone number before hanging up. Stay **OUTSIDE** of the building. If help is coming, please wait for them patiently.
If L.P. tank runs out of fuel, turn off gas at appliance. After L.P. tank is refilled, appliance must be relit according to manufacturer's instructions. The gas control must be replaced if it has been exposed to **WATER**. **DO NOT** attempt repair on gas control or appliance.
Tampering is **DANGEROUS** and voids all warranties.

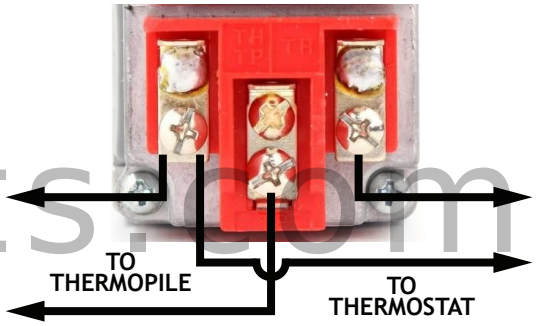
WIRING GUIDELINES

The Flameworks™ millivolt gas valves are designed to operate with a two-lead thermopile having an output of 250mV to 750mV.

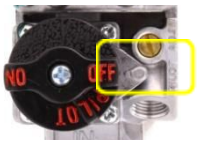
For proper operation of a millivolt system, the lead wires from the valve to the wall thermostat should not exceed the maximum recommended lengths shown in the table below:

Wire Size	Max. Length
14 gauge	100 feet
16 gauge	64 feet
18 gauge	40 feet
20 gauge	25 feet
22 gauge	16 feet

TWO-LEAD THERMOPILE WIRING (TYPICAL)



LIGHTING / RELIGHTING PROCEDURE



NOTE

The gas cock knob must be operated by hand. **DO NOT** use pliers, wrenches or other tools to turn the knob.

The gas cock knob has two functions:
A) On-Off control of gas flow to the pilot and the main burners.
B) It is the reset mechanism for locking up the safety magnet (automatic pilot) when in the pilot position.

OPERATING INSTRUCTIONS(Cont'd)

MAIN BURNER OPERATION

Millivolt models –turn gas cock knob to the "ON" position and turn on switch or set thermostat to desired temperature.

CAUTION: DO NOT store combustible material near the gas appliance. Keep main burner and pilot burner areas clean and free of dust and lint.

LEAK TEST

Test for gas leaks after valve installation with main burner on. Use a rich soapy water solution, and cover all piping and tubing joints liberally. Bubbles are indicative of a leak.

LIGHTING THE PILOT

The gas cock knob cannot be turned to the "OFF" position without first pushing the knob down while in the "PILOT" position and then turning the knob to the "OFF" position.

1. Put the gas cock knob into the "OFF" position.
2. Turn wall switch or thermostat to "OFF" or its lowest setting.
3. Allow 5 minutes (10 minutes if L.P. gas) for gas which may be present in burner compartment to dissipate.
4. Turn gas cock knob to the "PILOT" position.
5. Depress and hold the gas cock knob, then light the pilot burner. Allow pilot to burn for 2 minutes before releasing the gas cock knob. If pilot burner does not remain lit, repeat operation, allowing any air in the pilot line to escape. Adjust pilot if necessary as instructed under "PILOT BURNER ADJUSTMENT".

NOTE: The thermopile or thermocouple may also be defective and should be checked out – see "**SERVICE INSTRUCTIONS**".

CAUTION: If pilot lights without depressing the gas cock knob – replace gas valve.

SERVICE INSTRUCTIONS

CAUTION: If control has been exposed to water in any way, it must be replaced. If gas valve fails to shut off, do not turn off electrical power. Turn off gas supply allowing fan or circulating pump (if so equipped) to continue running until system has cooled. Replace control.

PILOT SAFETY SYSTEM

To perform the following tests we recommend using a millivolt meter with a 0-50 millivolt range and a thermocouple adapter.

There are three major causes of pilot outage in the pilot system:

1. Improper pilot operation.
2. Low output from thermocouple or thermopile.
3. Inoperative automatic pilot magnet.

Test procedures and steps to follow in checking each component are listed below.

Thermocouple Check (except millivolt)

A closed-circuit millivolt check is used to check thermocouple output. This check is performed as follows:

1. Check for proper pilot operation.
2. Use a millivolt meter with a 0-50 millivolt range.
3. Connect thermocouple adapter to safety magnet and meter as instructed in meter instructions.
4. Follow standard lighting procedure.
5. Check closed-circuit thermocouple output. If it is less than eight millivolts, replace thermocouple.
6. Repeat standard lighting procedure after replacing the thermocouple.

Automatic Pilot Magnet Check (Thermocouples)

If the closed-circuit check shows thermocouple output greater than eight millivolts and pilot will not remain lit when reset button is released after initial lighting procedure, check operation of pilot magnet as follows:

1. The adapter should remain connected to system.
2. Follow standard lighting procedure and continue holding reset button down.
3. Allow thermocouple output to stabilize and observe meter reading.
4. Extinguish pilot by releasing reset button and turning gas cock knob to "OFF" position.
5. A good magnet should remain locked up for a drop of at least 5 millivolts from the original stabilized reading obtained in step 3 (above).
6. If magnet does not operate properly, replace the gas valve.
7. Repeat standard lighting procedure.

Millivolt System

The millivolt system and individual components may be checked with a meter having a 0-1000mV range. Before checking system, be certain wall thermostat lead wire does not exceed length recommended in the "**INSTALLATION**" section, and all connections are clean and tight. Conducts each test using the meter connections shown below.

Component Check	Connect Meter Test Leads To Terminals	Wall Thermostat Contacts Should Be	Meter Reading Should Be	Check Result On Page 4
Valve Operator System	2 & 3	Closed	Greater Than 100mv	A
Wall Thermostat	1 & 3	Closed	Less Than 80mv	B
Thermopile And Magnet	1 & 2	Open	Greater Than 325mv	C

TEST RESULTS

Test Result A

If the reading exceeds 100mV and the automatic valve does not come on, replace the valve operator. If the closed-circuit reading is less than 100mV, determine the cause by proceeding with steps "B" and "C".

Test Result B

If "B" reading is less than 325mV, clean and tighten all electrical connections and adjust pilot if necessary to increase millivolt output. If unable to adjust to at least the specified minimum, replace the thermopile.
When proper thermopile output is obtained, the magnet may then be checked. With pilot in operation, allow meter reading to stabilize. Extinguish pilot burner and note meter reading at dropout point of magnet. If magnet remains locked up to a reading of 120mV or less, the magnet is good.

Test Result C

If "C" reading exceeds more than that specified for the system being checked, clean and tighten thermostat leads and connections, shorten lead wires if possible or use heavier gauge wire. Rapidly cycle thermostat to clean contacts, or change the thermostat.

PILOT BURNER ADJUSTMENT

Adjust pilot key to provide properly sized flame on the thermocouple or thermopile. The flame should cover the upper 3/8" of the tip.
IMPORTANT: Do not use GAS COCK KNOB to adjust gas output.

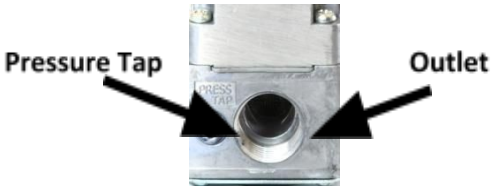
PRESSURE REGULATOR ADJUSTMENT

Models with Pressure Tap next to Outlet

Adjustment of the pressure regulator is not normally necessary since it is preset at the factory. However, field adjustments can be accomplished as follows:

1. Manometer or gauge attachment may be accomplished at pressure tap plug.
2. Remove regulator adjustment screw cap on top of regulator.
3. With a small flat-bladed screwdriver, rotate adjustment screw "clockwise" to increase or "counterclockwise" to decrease pressure.

Replace regulator adjustment screw cap.



Models with Pressure Taps on Top of Valve

See picture below for location of taps.

1. Turn gas cock knob to "OFF" position.
2. Loosen, but do not attempt to remove, the pressure screws. Turn screw counterclockwise.
3. Attach manometer to the inlet or outlet pressure tap boss. **NOTE**: hose should be 5/16" I.D. for best results.
4. Turn gas cock knob to the "PILOT" position and light pilot.
5. With pilot safety stabilized, turn gas cock knob to the "ON" position.
6. Turn wall thermostat to highest setting.
7. Remove regulator adjustment screw cap on top of regulator.
8. With a small flat-bladed screwdriver, rotate adjustment screw "clockwise" to increase or "counterclockwise" to decrease pressure.
9. Replace regulator adjustment screw cap.
10. Turn gas cock knob to "OFF" position. Lower thermostat to comfort temperature.
11. Remove manometer hose from inlet/outlet pressure tap(s). Tighten pressure tap screw.
12. Light pilot and put control into normal operation.

Regulator Cover Plate Kit

REGULATOR CONVERSION or REPLACEMENT

CAUTION: Main burner and pilot orifices must be changed when regulator is converted from one type gas to another. Other conversion parts please see the information below.

1. Depress and turn gas cock knob "OFF".
2. Remove two screws, regulator assembly and gasket.
3. Install new gasket and regulator (this assembly must be positioned correctly). Use new screws supplied with regulator.
4. Relight appliance by following steps 4 and 5 in "**LIGHTING THE PILOT**".

Test for leaks around the regulator using soap solution while the main burner is on.

Conversion Kits Parts	
Use FW2030 to convert to Natural Gas 3.5" W.C.	Use FW2031 to convert to LP Gas 10" W.C.
Use FW2032 to convert to Natural Gas Hi-Low (Adj. Output) 1.7~3.5" W.C	Use FW2033 to convert to LP Gas Hi-Low (Adj. Output) 5.5~10" W.C.