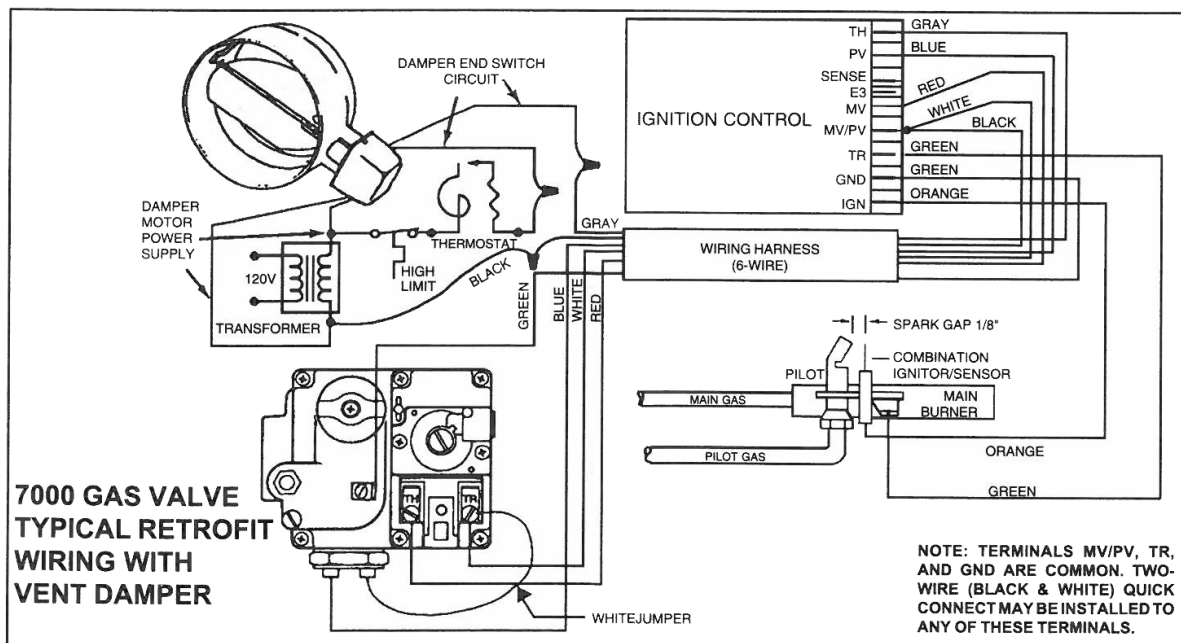
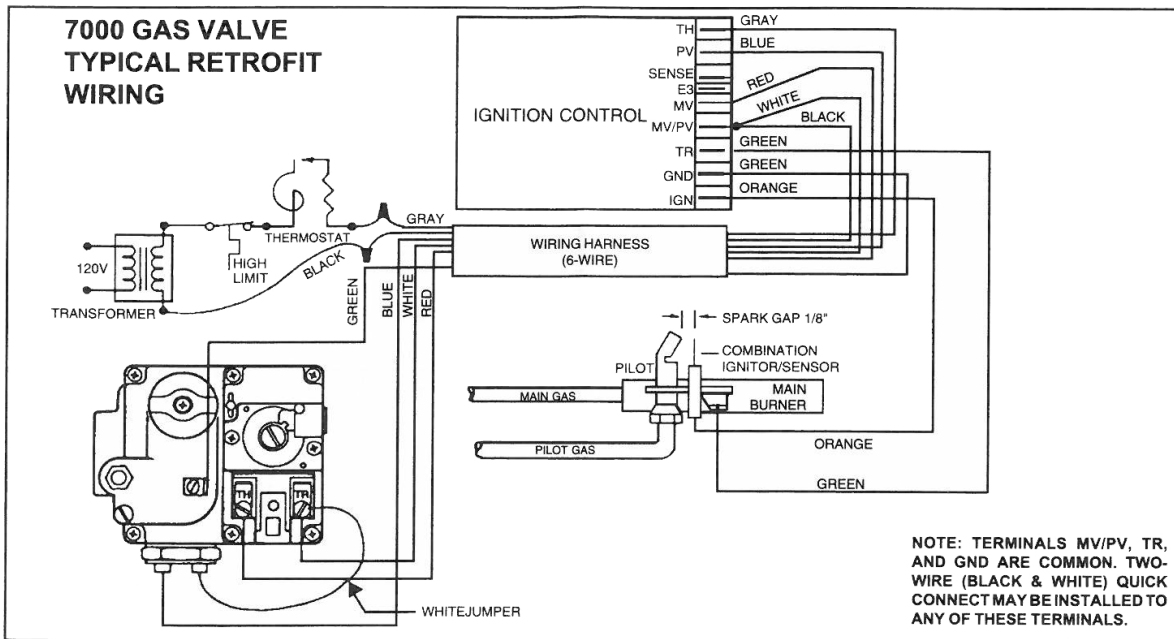


7000 SERIES GAS VALVES

When installing kit numbers 712-006, -009, -016, and -019, refer to the wiring diagrams shown below. This illustrates the wiring method when using a 7000 series gas valve. The wiring connections at the gas valve are as follows:

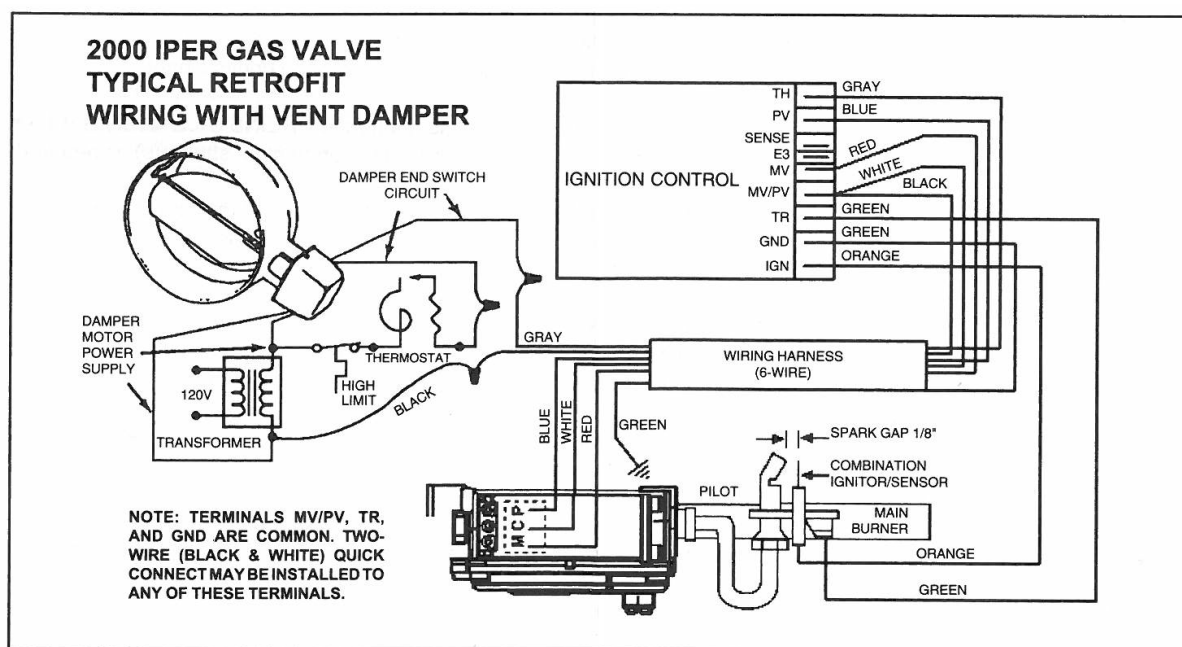
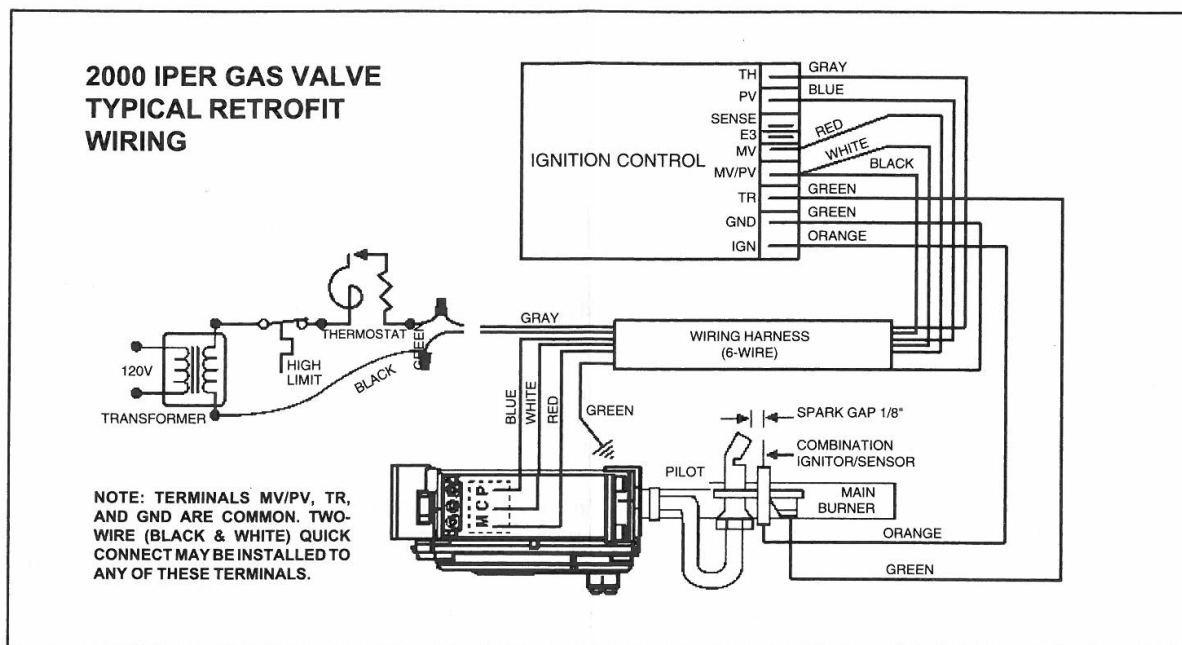
1. Locate the 4" white jumper wire in the kit.
2. Attach one end (quick-connect) to one terminal of the solenoid valve. Attach the other end to the screw terminal "TR" on the gas valve operator.
3. Connect the white wire in the wiring harness to the quick connect terminal at "TR".
4. Connect the red wire to the "TH" terminal on the gas valve.
5. Attach the blue wire which has a non-insulated connector to the solenoid pilot valve.
6. Attach green wire to the ground terminal on the gas valve.
7. Connect the wire from the pilot ignitor/sensor to the "IGN" terminal on the ignition control unit.
8. With all wiring completed to this point, return to step 9 in the WIRING THE IGNITION CONTROL UNIT section and proceed as directed.



2000 SERIES GAS VALVES

When installing kit numbers 712-005 and 712-022, refer to the diagrams shown below. This illustrates the wiring method when using a 2000 series gas valve. The gas valve connections are made by a plug-in terminal.

1. Attach green wire to ground terminal.
2. Connect the wire from the pilot ignitor/sensor to the "IGN" terminal on the ignition control unit.
3. With all wiring completed to this point, return to step 9 in the WIRING THE IGNITION CONTROL UNIT section and proceed as directed.



SYSTEM CHECKOUT PROCEDURES

The initial installation portion is now completed. The checkout procedures listed below must be followed. While there are redundant safety features built into the system, it is imperative that you follow the steps outlined below to ensure proper and safe operation. If you encounter any irregularities, refer to the TROUBLESHOOTING GUIDE.

1. Check all wiring connections.
2. Turn on main gas supply and put the manual valve or selector arm on the gas valve into the "ON" position.
3. Use a leak test solution to check piping for gas leaks. Repair if needed.
4. Turn on electrical power.
5. Set thermostat to high.

WARNING: Vent damper must be in the fully open position before the ignition system is energized. Failure to verify this may cause a serious health hazard to occupants.

6. Sparking begins, pilot gas ignites.
7. Pilot flame on ignitor/sensor, main burner on.
8. If the ignition control unit is a 780-715, with main burner on, cycle thermostat off then on. System will turn off and immediately on again.
9. With the main burner on, turn the manual gas valve to off position. Wait until all flame is out. Turn manual gas valve on again.
 - A. Sparking will begin as soon as the pilot flame is out.
 - B. Pilot ignition takes place when gas flow is restored.
10. **If the ignition control unit is a 780-845 (lockout):**
With the main burner on, turn the manual gas valve off. Sparking will begin when the pilot flame goes out. After 90 seconds the system will go into time delay (6 minutes) and sparking will cease. The lockout ignition control used provides 90 seconds of spark followed by a six minute time delay (purge) period between ignition attempts. After three tries, if no pilot flame is sensed, a 1-hour lockout period will begin. At the end of the 1-hour lockout period, if the demand for heat is still present, unit repeats the three tries for ignition.

11. Check manifold pressure and compare the reading with those obtained in the PRE-INSTALLATION - SAFETY INSPECTION PROCEDURES. Adjust pressure regulator (if necessary) to match the original input.
12. Visually determine that the main burner is burning properly, as it was during the PRE-INSTALLATION - SAFETY INSPECTION PROCEDURES; i.e., no floating, lifting, or flashback. Adjust the primary air shutter(s) as required.
13. It is absolutely necessary that the system be cycled normally (thermostatically controlled) through at least three complete heating cycles. Set thermostat to a temperature slightly higher (at least 5°) than the existing ambient. Allow the appliance to cycle ON and run through a normal cycle. Do not manually shorten the cycle.
14. **Applicable only to furnaces:** Check both the limit control and the fan control for proper operation. Limit control operation can be checked by blocking the circulating air inlet or temporarily disconnecting the electrical supply to blower motor. Determine that the limit control acts to shut off the main burner gas. Applicable only to boilers: Determine that the circulating water pumps are in operating condition. Test low water cutoffs, automatic feed controls, pressure and temperature limit controls, and relief valves in accordance with the manufacturer's recommendation to determine they are in operating condition.
15. The initial checkout procedures have been completed. If the system has functioned normally, return thermostat setting to its normal setting. The qualified installing agency must completely fill out and apply the yellow appliance conversion sticker to the front of the appliance. Leave these and all other instructions with the homeowner.

TROUBLESHOOTING GUIDE

PILOT IGNITION SYSTEM / FLAME RECTIFICATION / IGNITION CONTROL UNITS 780-715 AND 780-845

There are five potential problem conditions with the thermostat set high.

To perform the following test you will need a volt /ohmmeter. Refer to your appropriate wiring diagrams.

The ignition control can also be tested, using the Robertshaw ignition control tester, part number 900-575.

Problem #1: Thermostat on, no spark, no pilot gas.

Possible Causes:

- A. No main power
- B. Faulty transformer
- C. Faulty thermostat
- D. Faulty limit
- E. Faulty ignition control unit

Solution:

1. With power on and thermostat set high, set your test meter to the 24 volt scale. Probe terminals TH and TR. If you do not read 24 volts, the problem is not the ignition system. Perform normal system checks of main power, transformer, thermostat and the limit control. If you do read 24 volts at TH and TR the problem is in the ignition system. Check for loose or defective wiring. If wiring is good replace the ignition control unit.

Problem #2: Have spark, no pilot gas flow.

Possible Causes:

- A. Main gas supply turned off
- B. Manual valve on gas valve turned off
- C. Faulty primary valve in the gas valve
- D. Faulty wire connection
- E. Faulty ignition control unit

Solution: Set test meter to 24 volt scale.

1. Be sure main gas valve (gas cock or selector arm) is turned on.
2. With gas on and the system sparking, probe terminals PV and TR. If 24 volts is read at these terminals and pilot gas does not flow, replace the gas valve.
3. If you do not read 24 volts at terminals PV and MV/PV replace the ignition control unit.

Problem #3: Have pilot gas, no spark.

Possible Causes:

- A. Defective ignitor/sensor and/or its wiring
- B. Faulty ignition control unit

Solution: Set test meter to ohm scale.

1. Disconnect the wire from the IGN terminal on the ignition control unit.

2. Touch one meter probe to the tip of the ignitor/sensor rod in the pilot. Touch the other probe to the quick-connect at the other end of the ignitor/sensor wire.
3. If you have continuity from the tip of the ignitor/sensor rod to the connector and no spark, replace the ignition control unit.
4. If you do not have continuity through the wire and the ignitor/sensor, check for loose wire connection in the wire. Repair as needed.
5. Check to see if spark shorts to furnace through a cut in the ignitor wire.

Problem #4: Have pilot flame, main burner will not turn on.

Possible Causes:

- A. Faulty main valve coil in the gas valve
- B. Faulty ignitor/sensor and/or its wiring
- C. Ground wire not attached to furnace chassis
- D. Flame rectification signal from pilot to ignition control unit weak
- E. Faulty ignition control unit

Solution: Set test meter to 24 volt scale.

1. With pilot flame on ignitor/sensor - probe terminals MV and MV/PV on the ignition control unit. If you read 24 volts here, but not at the gas valve, there is a loose wiring connection. Repair or replace as needed.
2. If you do read 24 volts at MV and MV/PV and the pilot flame is impinging on the ignitor/sensor rod, the problem may be:
 - Faulty ignitor/sensor and/or its wiring
 - Faulty ignition control unit
 - No flame rectification signal to ignition control unit.
3. Set test meter to the ohm scale. Set thermostat low-system off.
4. Check continuity through the green ground wire between the pilot mounting bracket and the ignition control unit. Repair or replace as needed.
5. Check continuity through the green ground wire between the gas valve and the ignition control unit. Repair or replace as needed.
6. Check ignitor/sensor for continuity, through the spark/sensor rod. Also, check ignitor/sensor ceramic for cracks. Repair or replace as needed.
7. Reconnect all wires that were disconnected, including the ignitor/ sensor wire and the ground wire.
8. Set thermostat high. With the pilot burning and the flame on the ignitor/sensor rod, if the main burner does not turn on - replace the ignition control unit.

**Problem #5: Short-cycling of main burner.
Main burner turns off before the thermostat
is satisfied.**

Possible Causes:

- A. Draft condition pulls pilot flame away from ignitor/
sensor rod
- B. Incorrect thermostat anticipator setting
- C. Pilot flame gets smaller when main burner
comes on.
- D. Faulty limit control

Solution:

1. Check the thermostat anticipator setting. Set to .7 amp.
A lower setting will cause short-cycling.
2. Set thermostat high, with main burner on, observe the
pilot flame impingement on the ignitor/sensor rod.
 - If pilot flame is small and draft condition pulls flame
from ignitor/sensor rod the burner will turn off and
then on again.
 - Adjust pilot flame higher or clean pilot orifice.
 - Bend ignitor/sensor rod closer to pilot flame .
3. If flame impingement on the ignitor/sensor is stable and
the system short-cycles, check the limit switch.
4. Set test meter to 110 volt scale.
 - When the system cycles off, probe the switch
terminals of the limit switch.
 - If you read 110V or 24V across the switch terminals
the limit switch is open. Replace the limit switch.
5. A pilot flame set too high will also cause burner to short
cycle. Pilot flame lifts over ignitor/sensor.