

HOW TO CHECK THE BLOWER MOTOR

In normal operation, the controls check for a closed pressure switch within 12 seconds before starting the pre-purge time. The pressure switch measures the vacuum created by the blower and verifies the blower is operating at speed. The control attempts to close the switch by cycling (turning off, then on) the blower motor. After 5 cycles (attempts), the control will lock-out. LED Indicator will flash 4 times. This means the pressure switch failed to close. When the blower is turned on, the control insures it that the pressure switch is closed before continuing with the ignition sequence. If it cannot force the switch to close by cycling the blower, it will indicate this failure. (See LED chart). Pressure switch is damaged; replace blower motor. Verify the blower is operating and there is air being forced from the vent connector at the top of the blower motor.

1. Verify unit is plugged in to a 120VAC source.
2. Turn unit on at the on/off switch at the blower motor.
3. Blower motor should operate. Check flash code on the gas valve. The LED should have a constant flash. If flashing 5 times, then the polarity is reversed at the wall plug. Repair wall plug.
4. If the blower motor does not operate, check for 120VAC at the on/off switch. Remove the switch cover and measure for 120VAC at the bottom of the switch. If 120 VAC on the bottom, then turn switch to on and check for 120VAC at top of switch. If 120VAC at top of switch, then verify 120VAC at the red #4 wire on the control vale; then verify 120VAC on the yellow #5 wire. Replace blower motor.

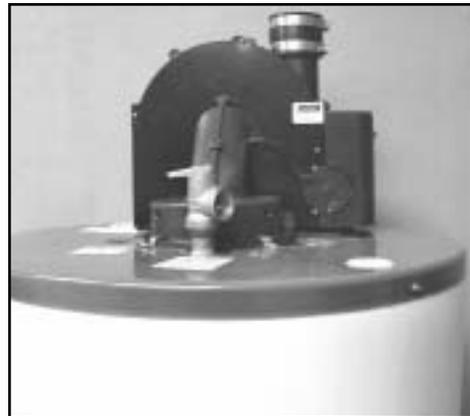


Figure 2 - Blower Motor

HOW TO CHECK THE VACUUM/PRESSURE SWITCH

At beginning of a call for heat, the pressure switch is *OPEN*. If the blower motor is not working, then check:

- Pressure switch tubing is not kinked and connected
- Pressure switch is connected with two wires (red and blue)
- Vent over-temperature switch is not activated

If pressure switch has failed in the closed position, the control attempts to open the switch by cycling (turning off, then on) the blower motor. After 5 cycles (attempts), the control will lock-out. LED Indicator will flash 3 times. This means the pressure switch fails to open. The control insures that the pressure switch is open before it turns on the blower. If the control cannot force the switch to open by cycling the blower, it will indicate this failure.(See LED chart). Pressure switch is damaged; replace blower motor.

Assuming the blower motor is running -

1. Verify 120VAC at the red wire to the bottom of the vacuum safety switch. (There is always 120VAC at this wire, even when the unit is in stand-by mode.)
2. Measure 120VAC at the blue wire on the vacuum safety switch.
3. If there is no power at the blue wire, then verify blower motor draft of 0.75 inches w.c. with a magnahelic gauge. Replace vacuum safety switch.
4. Verify continuity thru the vacuum switch. Remove rubber tube from blower motor housing and both wires. The switch is normally open and should not have continuity. If the switch does show continuity with the blower motor off, then replace the switch. Gently suck on the rubber tube and the switch should close showing continuity; release vacuum and the continuity will be interrupted.

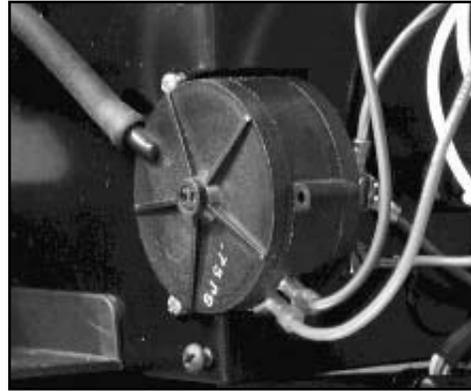


Figure 3 - Vacuum Safety Switch

HOW TO CHECK THE THERMISTOR (THERMOSTAT PROBE)

Verify thermistor is good with an OHMS resistance test. At room temperature, resistance is approximately 10.4 k OHMS (10,400 OHMS).



1. Remove the red molex plug. Measure OHMS resistance between the two white wires on the plug.
2. If there is no resistance at all, then replace the gas control valve.
3. If there is any resistance, then the thermistor is probably OK. The actual resistance during this OHMS check will be determined by the temperature of the water. If you introduce cold water into the tank, you will see a change in the resistance. Thermistor is good.

Figure 4 - ECO Check

HOW TO CHECK THE ECO SAFETY

The ECO is a *one time use* safety device that trips at 200°F. Verify ECO is good by doing a continuity check between the two red wires at the red Molex connector. Continuity

means the one time use ECO is not tripped. Lack of continuity means the one time use ECO is tripped. Replace the control valve. Remove the red Molex connector before conducting the continuity test.

1. Remove the red Molex plug. Measure continuity between the two red wires on the plug.
2. If there is no continuity at all, then replace the gas control valve.
3. If there is continuity, then the ECO is OK.



HOW TO CHECK THE GAS VALVE

Pilot Side of Gas Valve

Ignition attempt by the control board means you should be hearing the spark ignitor. (Orange wire). Check to make sure the valve is turned ON. At the same time, 120V opens pilot vein of gas valve. You will have 120V at the yellow (#7-pilot valve) wire. If you have 120V and there is gas pressure, then you must have a pilot flame. If not replace the control valve. The "trial for ignition" will last for 75 seconds. If the control is not able to establish a pilot flame, it will initiate the inter-purge. This is a 30 second purge without spark or gas to clear the combustion chamber. Then the unit will retry for ignition. The unit will try 3 times total for ignition, it will initiate a post-purge (30 seconds) to clear the combustion chamber; then go into lock-out. LED Indicator will flash 2 times. (See LED chart).



Figure 5 - 2000 Wiper Gas Control

Main Valve Side of Gas Valve

After pilot flame has been recognized (rectified), the spark will stop; and main valve is energized. Check to make sure the valve is turned ON and you have a pilot flame. You will have 120V at the blue (#6-main valve) wire. If you have 120V and there is gas pressure and a pilot flame, then you must have main burner flame. If not replace the control valve.

HOW TO CHECK THE VENT OVER TEMPERATURE SAFETY SWITCH

Blower motor thermal safety switch (vent over temperature) is set to 180°F with automatic reset. It is wired in series after the vacuum safety, and before the control module. If the sensor does not cool, there will be no power to the blue #8 terminal on the control valve.

Without power at the blue #8, the control module will not forward power to the pilot side of the gas valve. After cycling, there is no flame rectification and will force a lockout (2 flashes). Verify continuity through the thermal safety switch. IF no continuity, then switch is open. Cool the switch to reset.

1. Remove the on/off switch cover panel.
2. Disconnect the blue wire to the vacuum safety switch.
3. Disconnect the moxex plug.
4. Measure continuity along the blue wire from the spade terminal to the moxex plug. The vent over-temperature switch is a normally closed switch. You should have continuity. The switch is good.
4. If you do not have continuity, then cool the over temp switch. You can accelerate this process with a cold rag placed on the switch. Once the switch cools to under 180°F, you will get continuity. If not, replace the switch.



Figure 6 - Vent Over Temperature Safety Switch

HOW TO CHECK THE IGNITOR

Checking the ignitor is accomplished by first listening for the ‘sparking’ sound. It sounds like a rapid ticking. Listen for the spark ignitor. If you do not hear spark, verify 120V at the blue #8 wire on the control. If you have blower motor and power, but do not hear the sparking sound, then check the control module.

1. If you hear spark, then reset heater. Using insulated pliers, remove the orange cable from the control.
2. When you hear spark again, slowly move the orange wire terminal back to the control and verify spark with at least 1/8 inch gap.
3. If there is no spark, then replace the control.
4. If there is spark:
 - Turn heater off and verify continuity of orange wire
 - Check ignitor gap of 1/8 inch between probe and hood.
 - Check ignitor for cracks and other damage
 - Replace ignitor assembly



Figure 7 - Ignitor Assembly

HOW TO CHECK THE ELECTRONIC CONTROL BOARD

Checking the control board is a function of “power in means power out”. If the unit is plugged into an electrical source and turned on at the on/off switch, then there is always power to the control module. Verify 120V at the red wire #4 position. If there is power at this location, then the control module is receiving 120VAC and must work. You should be hearing spark and have pilot and main burner. If you see a steady on LED flash code, then the control has failed its internal self diagnostics. Each time there is a call for heat, the control module performs a self check. If it fails this check, then replace the gas control valve.

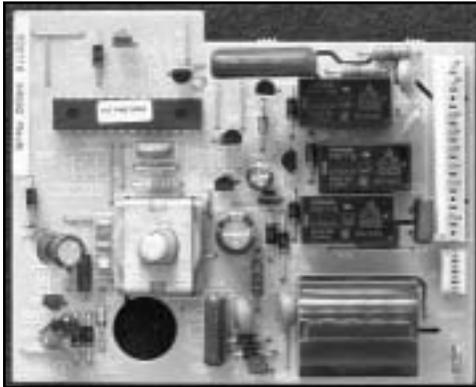


Figure 8 - PowerVent2 Control Board

Figure 9 - Control Board Connections

