



TECHNICAL SERVICE DEPARTMENT
Technical Service Bulletin
1-800-432-8373



2 Inch PowerVent Sequence of Operations

All voltage inputs are 120V.

All electrical connectors are Molex and fit one way.

The word 'control' in this sequence will normally refer to the electronic control module on the gas valve.

Tank is cold and full of water.
Gas supply is connected.
Gas valve is set to ON position.
Unit is plugged into a 3-prong plug. (Unit is neutral polarity sensitive.)

Fill tank
Connect gas.
Turn valve ON.
Must be plugged into a 3-prong wall socket. Socket must be wired polarity correct. Black wire to brass screw; white wire to silver screw.



Turn temperature dial down to LOWER position.

Turn rocker switch to ON position.



Rocker switch controls all power inputs to blower motor, gas valve, and control module in gas valve. You will have 120V at the red (#4-power) wire.

At power on and a demand for heat, the control performs a self-test diagnostic routine. If the self-check fails, the control locks out.





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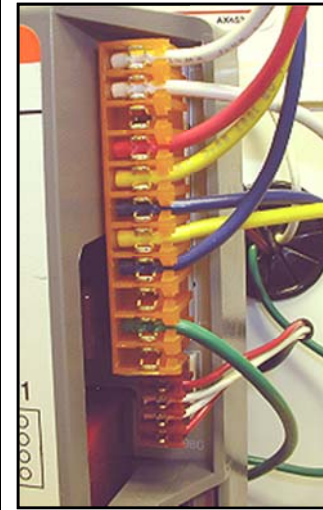
2 Inch PowerVent Sequence of Operations

Turn temperature dial to temperature selection. Initiates a “call for heat”.



120V power is passed from the #4 red wire – thru the control – to the #5 yellow wire and to the blower motor. This is the only source of AC power for the blower motor.

The white triangle next to CAUTION is the 120-degree setting. Temperature is sensed electronically by the Thermistor in the sensing bulb. It is the two white wires at the RED Molex connector. Verify thermistor is good with an OHMS resistance test. At room temperature, resistance is approximately 10.4 k Ω (10,400 OHMS). ECO (200°F) is electronically controlled and has a *one-time use*. Verify ECO is good by doing a continuity check between the two red wires at the red Molex connector.





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(1st Safety)

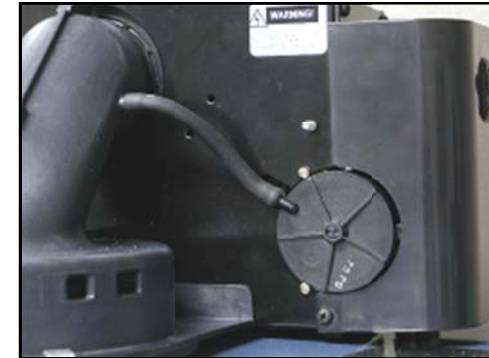
Control checks for OPEN pressure switch.

You will have 120V at the blue (#8-pressure switch) wire.

(Note: The over-temp switch in the blower is wired in series. If the vent temp exceeds 180°F, then the over-temp switch will activate. Once it cools to less than 180°F, it will auto reset and attempt ignition.)

In normal operation, the switch is OPEN at beginning of call for heat. If no blower motor, then check:
120V power at the #5 yellow wire
Pressure switch tubing
Pressure switch
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 blower, then on) the blower motor. After 5 cycles (attempts), the control will lockout. LED Indicator will flash 3 times. (See LED chart).



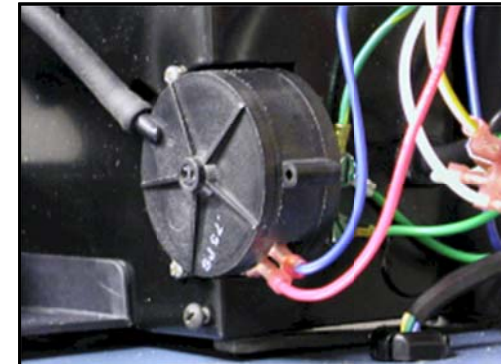
(2nd Safety)

Control turns on blower motor. This creates enough venting to close the vacuum safety switch.

Blower is in pre-purge stage for about 15 seconds.

You will have 120V at the yellow (#5-blower motor) wire. If you hear spark, then there is 120V power at the yellow #5 location.

In normal operation, the control checks 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 blower, then on) the blower motor. After 5 cycles (attempts), the control will lockout. LED Indicator will flash 4 times. (See LED chart).





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Ignition attempt by:

Spark ignitor begins to spark. (Orange wire)

120V voltage opens pilot vein of gas valve.

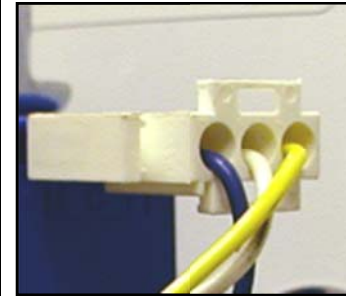
You will have 120V at the yellow (#7-pilot valve) wire.

Listen for spark ignitor. Visually verify spark at the pilot electrode.

Check for voltage to the pilot valve (yellow wire) connection.

Check to make sure the valve is turned ON.

Visually verify pilot flame is present.

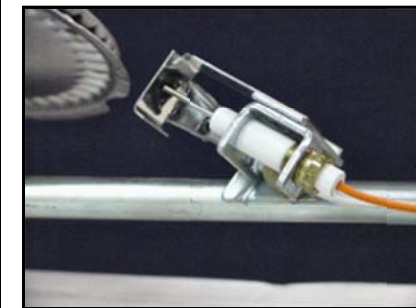


(3rd Safety)
Flame is rectified.

Pilot lights

After pilot flame has been recognized (rectified), the spark will stop; and main valve is energized.

Note: There is always a flame rectification circuit check while the main burner is operating. When the main burner fails, the unit will recycle and reattempt ignition.





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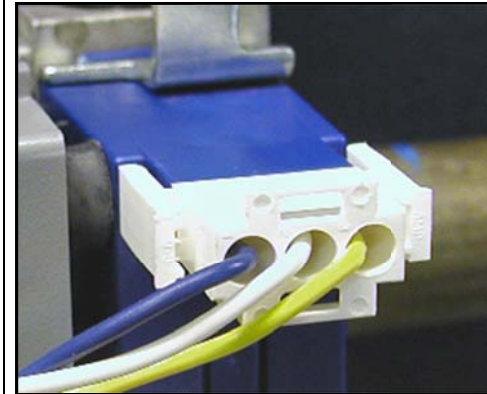


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Main valve on gas valve opens

You will have 120V at the blue (#6-main valve) wire.

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 lockout. LED Indicator will flash 2 times. (See LED chart).



Main burner ignition

The flame rectification circuit is constantly “ON” during pilot and main burner. If the control module thinks flame is suppose to be present, then the circuit constantly ‘looks’ for the presence of flame.

Check for 120V power to the main valve (blue wire) side of the gas valve.

If the unit rectifies flame for at least 10 seconds, the internal counter resets to zero.

If the flame is established and then lost, the control will turn off the main and pilot valve, execute an inter-purge (30 seconds) and then start a new trial for ignition sequence.





2 Inch PowerVent Sequence of Operations

Water heats to thermostat setting.

(4th Safety)

Blower motor thermal safety switch is monitoring venting temperatures.

ECO is monitoring water temperature.

Blower motor thermal safety switch set to 180°F with automatic reset. No blower motor will force a lockout if the sensor does not cool in time.



Water is heated. Thermostat and control module shuts off all power to the unit. Unit is in stand-by mode.

(The electronic control checks to see if the water temp is close to the set point. If so, it will attempt to turn the main burner on. For instance, if the set point is 120⁰, then after 6 hours, the control module will adjust the set point back to 115⁰ to see if it can fire off the main burner.)

In stand-by mode, the control module constantly monitors the water temperature via the thermistor to ensure the water inside the tank is within the user-selected range.

In addition, the control will monitor the inputs to look for any other fault conditions such as a false flame or faulty switches. See *False Sensing* below.





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False sensing
False sensing

<p><i>Flame with gas valve off:</i> The blower will turn on immediately if flame is sensed with the gas valve off. If there is proof of flame for 10 seconds with the gas valve off, the control will go into lockout. The blower motor will run during lockout if there is proof of flame. If there is proof of flame for less than 10 seconds, the unit will post-purge.</p>
<p><i>High Limit:(>200⁰F)</i> The high limit switch opens after flame is established; the pilot valve, main valve, and spark ignition are turned off, but the blower will remain on. When the high limit connection ceases, the control will prove the pressure switch closed and start a pre-purge time before a trail for ignition. The ECO has a one-time use. If this happens, then the unit should show a flash code of 6 flashes.</p>

