



Power Direct Vent Sequence of Operations

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. The control constantly monitors the water temperature via the thermistor so that the water temperature is within the user-selected temperature range. Control monitors the inputs for any fault conditions and presence of flammable vapors.

This is a sealed combustion direct vent water heater. It uses a hot surface igniter for main burner and uses two pressure switches in the blower to balance the inlet make up air and the combustion exhaust.

Tank is full of water.

 Gas supply is connected.

 Unit is plugged into a 3-prong plug.

Fill tank.
 Connect gas.

 Socket must be wired polarity correct with an earth ground. Black wire to brass screw; white wire to silver screw; green wire to ground.



Turn rocker switch on the blower to ON position.

 120V is passed to the control on the red #2 wire at the Molex next to the ON/OFF switch.

Rocker switch controls all power inputs to blower motor and control module.

 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 with light indications on the control.



“Wake Up” the control by pressing the red and blue arrow keys. Set the water temperature setting not to exceed 120°F.

Temperature is sensed electronically by the **Thermistor** in the sensing bulb.





Power Direct Vent Sequence of Operations

Call for Heat –

Control checks for three things:

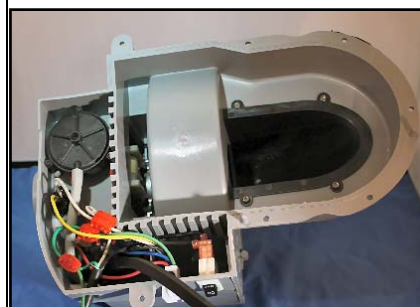
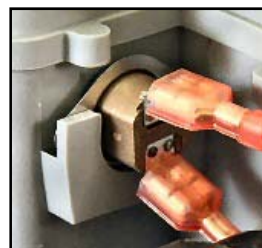
1. a closed blower thermal switch
2. an OPEN EXHAUST pressure switch and
3. a CLOSED INLET switch

You will have 120V at the blue wire going to the thermal switch on the blower Molex.

The normally closed blower thermal switch in is wired in series with the exhaust switch and the inlet switch.

If the vent temp exceeds 155⁰F, then the over-temp switch will activate. IF the thermal switch is OPEN, you will get an error code.

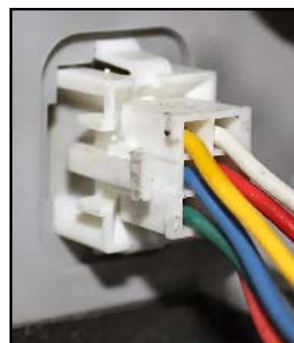
In normal operation, the INLET pressure switch (not accessible) is CLOSED at the start of call for heat.



120V power is passed from the control – to the yellow wire – and to the blower motor.

This yellow wire is the only source of AC power for the blower motor.

You will hear the blower running.



With the blower still running, the EXHAUST switch will close.

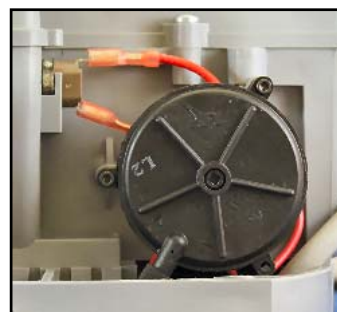
The control logic prevents jumping this pressure switch for main burner.

Powered is sent to the INLET pressure switch on the red wire.

IF the exhaust side of the venting creates too much back pressure due to blockage, the EXHAUST pressure switch will open inducing a fault.

IF the switch is not CLOSED, then you will receive an error code.

Exhaust pressure switch:
 Breaks on pressure fall;
 -.55 ± .06 in w.c.





Power Direct Vent Sequence of Operations

With the blower running and the exhaust vent clear, the blower is drawing in enough make up air to keep the INLET switch closed.

In normal operation, the control checks for a closed INLET switch within 5 seconds after the blower comes on.

If the inlet side of the venting is restricted for any reason, the switch will not stay closed. IF the INLET switch opens for any reason, you will get a fault code.

Inlet pressure switch:
 Breaks on pressure rise;
 $-1.40 \pm .06$ in w.c.



120V power is passed from the pressure switches to the control thru the red #1 wire on the blower Molex.

This is the signal needed to energize the hot surface igniter.

IF there is no 120V at this location, the blower will continue to run – and you will get a fault code.



Ignition attempt

You will have @ 120V at hot surface igniter wiring harness.

Visually verify the hot surface is glowing inside the combustion chamber

After 20 seconds warm up time, the gas valve opens.

Visually verify main burner flame is present.



Flame is rectified.

There is always a flame rectification circuit check while the main burner is operating.

After flame has been recognized (rectified), the hot surface igniter will turn off.

IF the main burner fails during heating, the unit will recycle and attempt ignition.





Power Direct Vent Sequence of Operations

Water heats to thermostat setting.

Blower motor thermal safety switch is monitoring venting temperatures.

Flammable Vapor (FV) sensor is monitoring.

ECO is monitoring water temperature. Trips at 195°F.

Blower motor thermal safety switch trips at 155°F ($\pm 6^\circ\text{F}$) with automatic reset at 125°F ($\pm 8^\circ\text{F}$).

FV Sensor is monitoring local environment for presence of flammable vapors



Water is heated.

Control module shuts off all power to the gas valve.

Blower continues a post purge to vent excess heat and combustion gases.

Unit is in stand-by mode.

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.

Unit monitors control health, other fault conditions and the local environment for flammable vapors.



Sequence of Operations Power Direct Vent (PDV)

