



Residential High Efficiency (RHE) 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.



Slide rocker switch on the right hand side of the gas control to ON position.

 120V is passed to the control on the Black wire at the Molex

Slide 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. (See Use and Care for instructions)

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





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Call for Heat –

Control checks for three things:

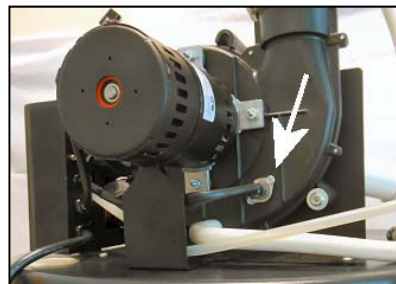
1. a closed blower thermal switch
2. a CLOSED EXHAUST pressure switch and
3. an OPEN INLET DIFFERENTIAL switch

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.

If the vent temp exceeds @ 165⁰F, then the over-temp switch will activate. IF the thermal switch is OPEN, you will get an error code.

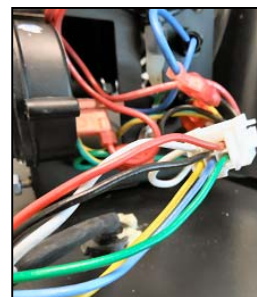
In normal operation, the INLET differential pressure switch is OPEN at the start of call for heat.



120V power is passed from the control – on 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.

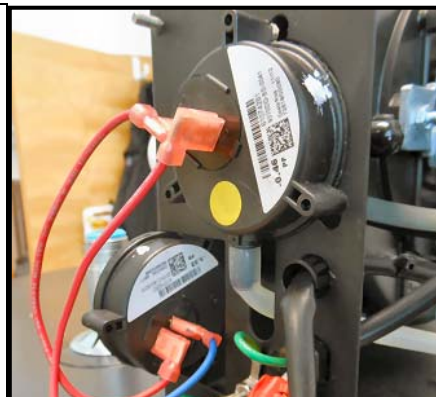


The control logic prevents jumping the NORMALLY OPEN Inlet pressure switch.

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;
-0.46 ± .03in w.c.





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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.

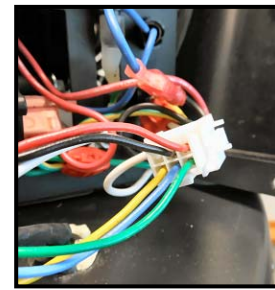
Inlet pressure switch:
Breaks on pressure fall;
 $-0.46 \pm .03$ in w.c.



120V power is passed thru the pressure switches to the control thru the red 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. It means the vent over temp switch or one of the pressure switches have a problem.



Ignition attempt

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

(Need Pix Here)

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.
(Measure this?)

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.





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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 180°F.

FV Sensor is monitoring local environment for presence of flammable vapors.



Condensate Trap pressure switch is monitoring the free flow draining of condensation.

This normally closed switch breaks on pressure rise. $-1.33 \pm .07$



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.

