

# TOP SERVICE ITEMS

## **BLOCKED AIR INTAKE**

*The control has sensed an open blocked inlet air pressure switch.*

The circuit board has sensed that the blocked intake air pressure switch is “open.” This pressure switch is a “normally closed” switch. The switch contacts remain in the closed position unless a restriction in the air inlet causes an increase in the vacuum (pressure) when the combustion air blower is running. This error may also occur if the pressure switch is defective or if the wiring is disconnected.

1. Cycle power off and on. If the blower runs and this error message returns, that almost always means a restriction in the inlet pipe, a blocked inlet screen, or the air inlet pipe is too long or has too many elbows (see Installation Manual for maximum inlet length). Check Wiring.
2. If the blower does not run and this error message returns, replace the inlet pressure switch.
3. To check the inlet pressure/switch, remove the wiring harness from the inlet pressure switch.
4. Remove the plastic tube from the pressure switch.
5. With a multimeter set to “continuity,” determine if the pressure switch is open or closed. (The switch is closed if the meter “beeps” during the continuity test.) You can also use the Ohms setting (zero Ohms means the switch is closed; OL means the switch is open).
6. If the meter shows the pressure switch is open when the unit is off, replace the pressure switch. If the meter shows the pressure switch is closed, check the inlet pressure during operation. Connect a manometer set to “inches of water column” to the pressure switch hose. Start the water heater and measure the negative pressure while the blower is running. Compare the pressure reading with the activation point of the switch (refer to the Service Manual). If the switch is activating at a higher pressure than specified, replace the switch. If the pressure is more negative than specified, determine the cause (blocked inlet screen, a blocked termination, or the pipe is too long or has too many elbows).

## **LOW GAS**

*The control has sensed an open low gas pressure switch.*

1. Verify that the spade terminals and wires are connected to the Low Gas Pressure Switch and are not damaged.
2. Determine the minimum gas pressure for the unit from the data plate. Check the gas pressure supplied to the unit in standby and while running (with all other gas appliances operating). If the minimum gas pressure is not being supplied in standby or during operation, the problem is likely caused by inadequate pipe diameter, a faulty regulator (at gas meter or in-line), or some other installation issue.
3. If the minimum gas supply is being delivered under load conditions, then use a multimeter to perform a continuity test on the contacts of the Low Gas Pressure Switch. If the switch is open and the gas pressure is correct, remove the Low Gas Pressure Switch and clear any debris from the orifice inside. Reinstall the switch and wiring. If the Low Gas error message remains, replace the switch.

## **BLOCKED EXHAUST**

*The control has sensed an open blocked outlet air pressure switch.*

The circuit board has sensed that the blocked exhaust air pressure switch is “open.” This pressure switch is a “normally closed” switch. The switch contacts remain in the closed position unless a restriction in the exhaust causes an increase in the positive pressure when the combustion air blower is running. This error may also occur if the pressure switch is defective or if the wiring is disconnected.

1. Cycle power off and on. If the blower runs and this error message returns, that almost always means a restriction in the exhaust, a blocked condensate drain, or the exhaust pipe is too long or has too many elbows (see Installation Manual for maximum exhaust length). Check wiring.
2. If the blower does not run and this error message returns, replace the exhaust pressure switch.
3. To check the exhaust pressure/switch, remove the wiring harness from the exhaust pressure switch.
4. Remove the plastic tube from the pressure switch.

5. With a multimeter set to “continuity,” determine if the pressure switch is open or closed. (The switch is closed if the meter “beeps” during the continuity test.) You can also use the Ohms setting (zero Ohms means the switch is closed; OL means the switch is open).
6. If the meter shows the pressure switch is open when the unit is off, replace the pressure switch.
7. If the meter shows the pressure switch is closed, check the exhaust pressure during operation. Connect a manometer set to “inches of water column” to the pressure switch hose. Start the water heater and measure the positive pressure while the blower is running. Compare the pressure reading with the activation point of the switch (refer to the Service Manual). If the switch is activating at a lower pressure than specified, replace the switch. If the pressure is more positive than specified, determine the cause (blocked condensate drain, a blocked termination, or the pipe is too long or has too many elbows).

## **BLOWER PROVER FAILURE**

*The control has sensed a closed blower prover closed out of sequence.*

Make sure the switch is not bypassed/jumpered and the correct switch is installed this switch is a normally open, positive pressure switch. Check the part number on [www.waterheaterparts.com](http://www.waterheaterparts.com) (Lookup Parts tab).

If correct switch is installed and you get this error, replace the blower prover switch.

## **BLOWER PROVER OPEN**

*The control has sensed an open blower prover air switch.*

1. If the blower does not run during the ignition sequence, verify the blower has power from the circuit board (typically 120VAC for models 120-300 and 200VAC for 400-500 models). If the blower has the specified voltage and doesn't run, replace the blower assembly.
2. Inspect the tube that goes from the blower housing barb fitting to the blower prover switch and verify there are no breaks or kinks and no restrictions in the tube or the barb fitting.

3. Inspect the wires that connect to the two pressure switch tabs and verify they are connected and there are no breaks or loose wires.
4. Disconnect pressure switch and connect tube to a digital manometer. Cycle unit off then on to start ignition sequence. When blower starts, measure pressure. If the pressure is above the activation point, replace the switch. Typically for models 120-250 the activation pressure is .75" WC. See Service Manual for switch activation pressures for each model.
5. In rare cases, the pressure will be below the activation pressure and the blower should be replaced.

## **IGNITION FAILURE**

*The water heater has failed to light the burner.*

1. Cycle the unit off and on to restart ignition sequence. Verify ignition by looking through the sight glass on top of the unit. If the burner ignites 2-3 seconds then goes out, pull the flame rod out and clean it with steel wool, sandpaper or by scrapping with a knife.
2. Cycle power to the unit. If error message repeats, use a meter to check the green ground wire from the control board to the burner assembly. Set the meter to "continuity" or Ohms and measure from the circuit board terminal to the burner or tank. You should get an audible tone (continuity) or very low resistance (near zero Ohms). If not, replace ground wire/clean contacts.
3. Cycle power to the unit. If error message repeats, check the flame rod connector for approximately 90VAC (one probe on the flame rod connector and the other to the tank or ground). If no voltage is present, check the terminal on the circuit board for 90 VAC. If present, replace the wire, if not replace the circuit board board as the last option (very seldom is this the issue).
4. If flame is not visible in the sight glass during ignition sequence, check the manifold gas pressure. The correct manifold pressure varies by model and can be found on the data plate. If the correct pressure is not present or if the manifold pressure oscillates severely, check the inlet pressure to make sure the minimum gas pressure is being delivered.
5. If the inlet gas pressure drops below the minimum during ignition, the gas supply (piping/regulator) may be inadequate. See the gas line sizing table in the manual for the 120-250 models. Note that the 300/400 models require a 1.25" gas supply and the 500 model requires a 1.5" supply. The regulator

may be too small or malfunctioning. Check inlet pressure with all gas burning appliances running under a load to ensure gas pressure to the unit is not dropping below the specified pressure on the rating plate.

6. If the inlet pressure is stable and within specifications and the manifold pressure is not correct, replace the gas valve. (Check models that use a gas valve with an on/off switch and make sure the switch is on.)
7. In rare cases, the unit can display Ignition Failure due to a restriction in the heat exchanger (water in heat exchanger or plugged condensate drain). This restriction may or may not show up as a Blocked Exhaust, depending on location of the restriction.

## **CONSTANT CYCLING WITH NO ERROR MESSAGE**

1. Determine the minimum gas pressure listed on the data plate and use a manometer to verify that the supply gas pressure is not oscillating (pressure dropping below the minimum then rebounding). Unstable gas pressure may cause the contacts on the Low Gas Pressure Switch to momentarily open and close but (you may not get a Low Gas error). Check the gas supply regulator(s), ensure the gas pipe size is correct for the model. Check the gas line for restrictions.
2. Constant cycling can also be caused by the inlet or exhaust air pressure switches opening momentarily and then closing (too fast for an error message to be displayed). Check the inlet and exhaust pressures (see Service Handbook for correct pressures). If the operating pressures are close to the listed activation pressures, check the inlet and exhaust for partial restrictions/length. The inlet screen that ships with the intake connector is sometimes left in when inlet piping is used and will plug up. A restriction of the condensate drain will also cause this condition. This is very rarely a component issue and most cases are venting length, too many elbows, restrictions in the inlet or outlet pipe or gas pressure issues (pipe too small, supply regulator at meter or in line too small or defective).

## **LOW IGNITER CURRENT**

*The control has sensed low current to the hot surface igniter.*

1. Check for damaged or broken igniter. Turn off power. Disconnect the igniter from the wiring harness. Remove the two screws holding the igniter and carefully remove the igniter. If it is broken replace it. (Note: a broken igniter with a sooted porcelain insulator may be a sign of a restricted heat exchanger or burner.)
  
2. If the igniter has a small white spot on the surface, replace it. (You can check the ohm value with a multimeter set to the ohms  $\Omega$  scale. The correct value for the ohm reading should be  $40\Omega$  to  $70\Omega$ . If the igniter is out of this range replace it.)
  
3. Check the voltage to the igniter with a multimeter set to AC volts. If there is no voltage on the igniter harness when the igniter icon is displayed on the main menu, replace the main circuit board (very rare).

**SUGGESTED PARTS INVENTORY & TOOLS**

Igniter all Models.....	9006101205
Flame Rod all Models .....	9006106205
Blower Prover Switch Models 120-250 .....	9006280015
Blower Prover BTH 400.....	9004586215
Blower Prover BTH 500.....	9006244015
VFD BTH 400 & 500 .....	9006245005
Emergency Cyclone Repair Kit.....	9006550005
(Includes all items above for the BTH 400 & 500)	
Emergence Cyclone Repair Kit.....	9006801005
(Includes all items above for the BTH 120-250)	
UEI EM151 Digital Manometer	
UEI G2 Phoenix Clamp Style Amp Meter	

