



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



Induced Draft Fan Assist
60k BTU Gas Water Heater

Control Settings

| SETTING | VALUE |
|-----------------|-----------------------------|
| Set point Range | 90°F (32°C) to 160°F (71°C) |
| “HOT” Set point | 120°F (49°C) |
| Differential | 15°F (9°C) |
| ECO Limit | 199°F (93°C) |



Notice the BLUE temperature adjustment knob. That is how you identify the proper gas control for this product.

Timings

| IGNITION STATE | TIMING |
|--|---|
| Soft Lockout | 5 minutes; then retries for main burner |
| ECO Limit Lockout | Indefinite |
| Flammable Vapor Sensor Lockout | Indefinite |
| Hardware Error Lockout / Hard lockout | Indefinite |
| Pre-purge | 2 seconds |
| Trial For Ignition | 90 seconds |
| Flame Stabilization Period | 3 seconds |
| Inter-purge | 90 seconds |
| Flame Failure Response Time | 1.5 seconds |
| Post-purge | 30 seconds |
| Pressure Switch Fault Delay (failed open/closed) | 2 minutes |

Error Code Flash Display

| Gas Valve “Status” Flash Code | Control Status |
|---------------------------------------|--|
| Short flash once every four seconds | IDLE (no call for heat, no fault conditions) |
| “Heartbeat”, alternates bright/dim | Call For Heat (no fault conditions) |
| One Flash, three second pause | Low flame signal (control continues to operate) |
| Two Flash, three second pause | Pressure switch failed closed |
| Three Flash, three second pause | Pressure switch failed open |
| Four Flash, three second pause | Thermal Cut Off limit lockout |
| Five Flash, three second pause | Flame out of sequence |
| Six-One Flash, three second pause | Failed trial for ignition; Max ignition attempts |
| Six-Two Flash, three second pause | Recycle limit - PS/limit opened |
| Six-Three Flash, three second pause | Recycle limit - flame lost |
| Six-Five Flash, three second pause | Failed Ignition Lockout |
| Seven Flash, three second pause | Flammable vapor sensor lockout |
| Eight-One Flash, three second pause | FVS fault detected |
| Eight-Two Flash, three second pause | Temperature sensor fault detected |
| Eight-Three Flash, three second pause | Electronics fault detected |
| Eight-Four Flash, three second pause | Valve fault detected |



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No Power or No Fan Motor

| Indications | Display |
|--|---|
| Nothing happens at all. No fan motor; no sounds. | There is not a display code for this problem. |
| Troubleshooting | |
| <ol style="list-style-type: none"> 1. Check wall plug power with a table lamp. 2. Check that the unit is plugged in. 3. Verify fan motor switch and gas control switch is ON. 4. Verify the remote control is working and displaying something. 5. Verify power to the gas control thru the black wire on the gas valve Molex. 6. Verify power to the fan motor at the yellow wire on the gas valve Molex. Replace fan motor if there is power on the yellow wire, but no fan motor. | |

Error One (1) Flash

| Indications | Display |
|---|---|
| Low flame signal (control continues to operate) | One Flash, three second pause |
| Troubleshooting | Solution |
| <ol style="list-style-type: none"> 1. Low gas supply pressure 2. Carbon buildup on electrode 3. Pilot tube restriction | <ol style="list-style-type: none"> 1. Verify gas pressure with rating plate on water heater. 2. Clean spark electrode and pilot hood with steel wool. 3. Inspect pilot tube for obstructions |

Error 2 Flash

| Indications | Display |
|---|---|
| PS Failed Closed at start of Call for Heat - the control waits four seconds then begins to flash error code (44). The control waits 2 minutes, and then turns on the inducer for 30 seconds. The inducer shuts off after 30 seconds and the control returns to waiting for the pressure switch to open. The control will attempt this sequence 5 times before entering into a hard lockout. | Two Flash, three second pause |
| Troubleshooting | Solution |
| <ol style="list-style-type: none"> 1. Pressure switch rubber tube blockage 2. Faulty pressure switch | <ol style="list-style-type: none"> 1. Inspect pressure switch tube for blockage 2. Do continuity test on pressure switch. If there is continuity, replace pressure switch. 3. The hard lockout will require a manual power cycle of the control to clear the hard lockout. |



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Error 3 Flash

| Indications | Display |
|---|---|
| Pressure switch failed open – at the beginning of the heat cycle the control runs the inducer for 30 seconds waiting for the Pressure Switch to close. If the PS does not close in 30 seconds, the inducer turns off and the control flashes PS Failed Open error code. The control waits in this PS Failed Open mode for 2 minutes before turning on the inducer and trying for another 30 seconds to see the PS close. This cycle repeats for a maximum of five times before entering a hard lockout. | Three Flash, three second pause |
| Troubleshooting | Solution |
| <ol style="list-style-type: none"> 1. Vent blockage or improper installation 2. Switch tube blockage 3. Faulty pressure switch 4. Fan motor improper operation | <ol style="list-style-type: none"> 1. Inspect venting run for blockage 2. Inspect pressure switch tube for blockage 3. Check fan motor for proper operation 4. Replace pressure switch 5. The hard lockout will require a manual power cycle of the control to clear the hard lockout. |

Error 4 Flash

| Indications | Display |
|---|---|
| ECO limit lockout - Water temperature sensed in excess of ECO limit (199°) - the control immediately turns off pilot and main valves and enters ECO Limit Lockout. During ECO Limit Lockout, the inducer motor runs continuously. | Four Flash, three second pause |
| Troubleshooting | Solution |
| <ol style="list-style-type: none"> 1. Thermal well fault 2. Gas control fault | <ol style="list-style-type: none"> 1. The sensed water temperature must be below 120F° 2. Power must be cycled to remove the control from ECO limit hard lockout. |

Error 5 Flash

| Indications | Display |
|--|--|
| Flame Sensed Out Of Sequence - the control only looks for pilot flame when the inducer is running. If flame is present when the pilot valve is not open, the control proceeds to Wait Flame Lost and flashes the Flame out Of Sequence error code. Fan motor remains on. | Five Flash, three second pause |
| Troubleshooting | Solution |
| <ol style="list-style-type: none"> 1. Pilot or main burner valve has failed open | <ol style="list-style-type: none"> 1. Recycle heater to verify error code 2. Replace gas control valve |



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Error 6-1 Flash

| Indications | Display |
|--|---|
| Failed trial for ignition; Maximum ignition attempts. If flame is not sensed during the Trial period, the igniter turns off, the pilot valve closes, the control runs the inducer through Post-purge then turns off the inducer and enters Soft Lockout and flashes the Soft Lockout error code. The control remains in Soft Lockout for 5 minutes before responding to the demand for heat. If the control has entered Soft Lockout three times, the control will enter hard lockout. | Six-One Flash, three second pause |
| Troubleshooting | Solution |
| <ol style="list-style-type: none">1. Low gas supply pressure2. Carbon buildup on electrode3. Igniter Wire damage4. Combustion air blockage5. Pilot tube restriction | <ol style="list-style-type: none">1. Verify gas pressure with rating plate on water heater.2. Clean spark electrode and pilot hood with steel wool.3. Verify igniter spark at electrode4. Verify air inlet holes on side of water heater are clean and clear5. Inspect pilot tube for obstructions6. This lockout can only be cleared by manually cycling the control power. |

Error 6-2 Flash

| Indications | Display |
|---|--|
| Recycle limit - PS/limit opened – Maximum number of retries has occurred. Unit is in hard lock-out. | Six-Two Flash, three second pause |
| Troubleshooting | Solution |
| <ol style="list-style-type: none">1. Pressure switch rubber tube blockage2. Faulty pressure switch | <ol style="list-style-type: none">1. Check pressure switch for proper operation2. Replace pressure switch3. The hard lockout will require a manual power cycle of the control to clear the hard lockout. |



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Error 6-3 Flash

| Indications | Display |
|--|---|
| <p>Recycle limit – Pressure switch opens during RUN resulting in loss of flame - Flame and Pressure Switch signals are ignored for 3 seconds after the main valve is energized (Flame Stabilization Period). After 3 seconds if flame rectification is lost, then you will get this error code. <u>This means this fault occurred after the first three seconds of main burner - three times in a row.</u> The control turns off the pilot and main valves and waits for the PS to close. <i>If the PS fails to close upon retry, user will get a 3 flash error code. Therefore this error code cannot result in a damaged pressure switch.</i> If the PS closes the Recycle Counter is incremented and if the Recycle Count (3 times) has not reached its limit, another Trial for Ignition begins. If the Recycle Count Limit has been reached, the control turns off the inducer and enters Hard Lockout.</p> | <p>Six-Three Flash, three second pause (After 3 seconds if flame rectification is lost, then you will get this error code.)</p> |
| Troubleshooting | Solution |
| <ol style="list-style-type: none"> 1. Low gas supply pressure will cause an inadequate amount of fuel to support the pilot flame and flame rectification. 2. High gas supply pressure may not be regulated well by the gas valve and ‘blow out’ the pilot flame – resulting in loss of flame rectification. 3. Carbon buildup on electrode and pilot hood will cause the unit to have poor or erratic flame rectification. 4. Verify pilot igniter is approx 9/16 inch below the top of the top burner plate; and....1/8 inch away from edge of the bottom burner plate. 5. Combustion air blockage. Poor combustion air will cause the pilot and main burner to extinguish before the water reaches set point. 6. Pilot tube restriction or pinching will cause an inadequate amount of fuel to support the pilot flame and flame rectification. | <ol style="list-style-type: none"> 1. Verify gas pressure with rating plate on water heater. 2. Clean spark electrode and pilot hood with steel wool. 3. Verify pilot assembly is properly positioned on burner assembly. See last page of this bulletin for a diagram. 4. Verify air inlet holes on side of water heater are clean and clear; verify the unit has plenty of fresh air for combustion. 5. Inspect pilot tube for obstructions and pinched tubing. 6. The hard lockout will require a manual power cycle of the control to clear the hard lockout. |



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Error 7 Flash

| Indications | Display |
|--|---|
| Flammable vapor sensor lockout because the sensor smelled gasoline - FVS > 100 and < 300KΩ - the control immediately turns off all outputs (valves closed, inducer off, ignition off). Control enters hard lockout and registers Flammable Vapor Present error code. | Seven Flash, three second pause |
| Troubleshooting | Solution |
| <ol style="list-style-type: none"> Gasoline or other flammable gas was detected by the flammable vapor sensor. | <ol style="list-style-type: none"> Check for flammable vapors around water heater Verify FVS sensor resistance ~ 9KΩ -45 KΩ Replace FVS sensor if >45 KΩ Reset gas control valve. Hard lockout to be cleared when the power is manually cycled, the control dial is rotated through the HOT setting 7 times within 30 seconds and the resistance of the sensor is within the normal operation range. |

Error 8-3 Flash

| Indications | Display |
|---|---|
| Electronics fault detected - The electronic control module contains a relay for communicating with the display. | Eight-Three Flash, three second pause |
| Troubleshooting | Solution |
| <ol style="list-style-type: none"> Panel fault Gas control fault | <ol style="list-style-type: none"> Recycle heater to verify error code Replace display panel Replace gas control valve |

Error 8-1 Flash

| Indications | Display |
|--|---|
| FVS fault detected due to wiring/electronics issue - FVS < 7 or > 300 KΩ - the control immediately turns off all outputs (valves closed, inducer off, ignition off) and enters Hardware Error Lockout and registers Flammable Vapor Device Interface/Miswiring error code. | Eight-One Flash, three second pause |
| Troubleshooting | Solution |
| <ol style="list-style-type: none"> Flammable vapor sensor resistance is out of range (well below or well above parameters) Wiring to FV sensor is faulty (open) Gas control is faulty | <ol style="list-style-type: none"> Verify FVS sensor resistance ~ 9KΩ -45 KΩ Replace sensor and wiring harness. Replace control if new sensor does not work. Hard lockout will be cleared when the power is manually cycled, the control dial is rotated through the HOT setting 7 times within 30 seconds and the resistance of the sensor is within the normal operation range. |



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Error 8-2 Flash

| Indications | Display |
|--|---|
| Thermal well fault - Temperature Sensors not reading the same temperature within ± 5.5 °F (measure when water temperature is changing less than 1 °F/minute) - the control immediately turns off all outputs (valves closed, inducer off, ignition off) and enters Hardware Fault Lockout. Hardware Fault Lockout self clears if the fault clears for at least 15 seconds. | Eight-Two Flash, three second pause |
| Troubleshooting | Solution |
| 1. Thermal well fault | 1. Recycle power to verify error 2. Replace thermal well |

Error 8-3 Flash

| Indications | Display |
|---|--|
| Electronics fault detected | Eight-Three Flash, three second pause |
| Troubleshooting | Solution |
| 1. Gas control valve needs to be reset or has been damaged. | 1. Recycle power to verify error 2. Replace gas control |

Error 8-4 Flash

| Indications | Display |
|---|--|
| Valve fault detected | Eight-Four Flash, three second pause |
| Troubleshooting | Solution |
| 1. Gas control valve needs to be reset or has been damaged. | 1. Recycle power to verify error 2. Replace gas control |



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Reset Gas Control

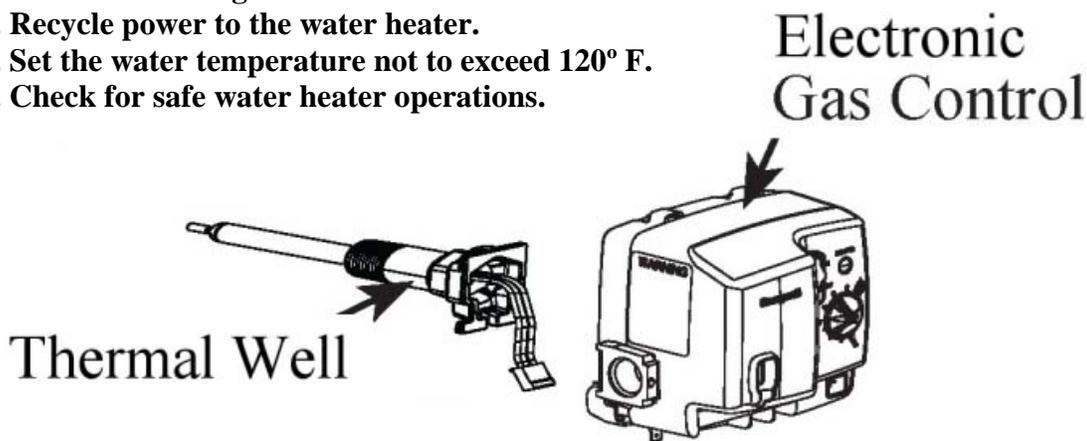
This will clear the current fault and force the unit to recycle for ignition.

- 1. Turn temperature control knob all the way clockwise**
- 2. Recycle power to the heater (both fan motor and gas valve)**
- 3. Rotate the temp knob all the way to the left, then back to the right. You must cross the midline seven (7) times to reset the gas valve.**
- 4. Unit should return to normal operations if all faults have been cleared and repaired. You will hear the fan motor come on.**
- 5. Set water temperature to a safe setting of 120° or less.**

Replacing the Gas Control.

The electronic component for the gas valve is replaceable without draining the water from the tank. To replace just the electronic control portion:

- 1. Turn off the fan motor and the gas valve. Unplug the water heater.**
- 2. Remove wiring harnesses from the gas valve.**
- 3. Remove main burner supply tube and pilot supply tube.**
- 4. Remove / disconnect gas supply line.**
- 5. Grab the bottom of the gas valve (at the main burner supply tube area) and lift up and out at the same time. There are two small plastic locking tabs that will release.**
- 6. The electronic component will slide up and off the thermal well still installed in the tank.**
- 7. Replace the control in reverse order.**
- 8. Reconnect fuel supply lines and tubes.**
- 9. Reconnect wiring harnesses.**
- 10. Recycle power to the water heater.**
- 11. Set the water temperature not to exceed 120° F.**
- 12. Check for safe water heater operations.**





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