



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 of 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 pressure 2. Carbon buildup on electrode 3. Igniter Wire damage 4. Combustion air blockage 5. 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 electrode 4. Verify air inlet holes on side of water heater are clean and clear 5. Inspect pilot tube for obstructions 6. 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 blockage 2. Faulty pressure switch 	<ol style="list-style-type: none"> 1. Check pressure switch for proper operation 2. 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 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

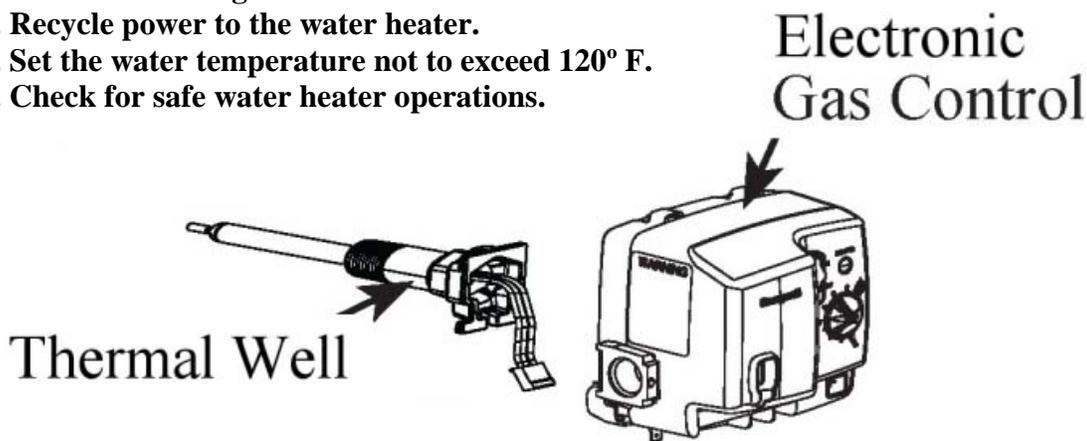
This will clear the current fault and force the unit to recycle for ignition.

- 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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