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	
1. Check wall plug power with a table lamp. 2. Check that the unit is plugged in. 3. Verify gas control switch is ON. 4. Verify power to the gas control thru the black wire (pin #1) on the gas valve Molex. Turn up thermostat on gas valve; observe blinking blue light; otherwise replace control. 5. Turn thermostat all the way up. Verify power to the blower at the yellow wire (pin #3) on the gas valve Molex. Replace blower if there is power on the yellow wire, but no blower motor. Replace control if you have power on the black wire and not on the yellow wire.	

Error One (1) Flash

Indications	Display
Low flame signal (control continues to operate)	One Flash, three second pause
Troubleshooting	**Solution**
1. Low gas supply pressure 2. Carbon buildup on electrode 3. Pilot tube restriction	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**
1. Pressure switch is jumped 2. Faulty pressure switch	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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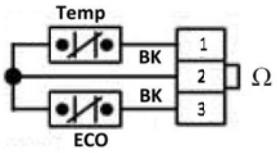
Error 3 Flash

Indications	**Display**
Pressure switch failed open (failed to close) – 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**
1. Vent blockage or restricting flow of exhaust 2. Switch tube blockage 3. Faulty pressure switch 4. Fan motor improper operation	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 (199º) - 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**
1. Thermal well fault 2. Gas control fault	1. The sensed water temperature must be below 120Fº 2. Power must be cycled to remove the control from ECO limit hard lockout.
3. Water temperature sensor fault. Measure the OHMS resistance between pins 1 and 2; then measure the resistance between pins 3 and 2. The two number should be the same. See chart on last page to convert OHMS to temperature.	1. Recycle power to verify error 2. Replace thermal well  

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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**
1. Pilot or main burner valve has failed open	1. Recycle heater to verify error code 2. Replace gas control valve

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**
1. Low gas supply pressure 2. Carbon buildup on pilot hood 3. Igniter Wire damage 4. Combustion air blockage 5. Pilot tube restriction 6. TRD is tripped.	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**
1. Check venting to insure pressure switch is not momentarily opening as the appliance warms. 2. Check vent outlet for wind-gust problems. 1. Check PS wiring. 2. Check PS rubber tube for blockage. 3. Check over temp switch. 4. Faulty pressure switch.	1. Correct any PVC vent issues. 2. Repair wiring or clear tube blockage. 3. Replace pressure switch. 4. 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
Flame lost during RUN: During the heating cycle, the ***pilot flame*** is lost. The control turns off the pilot and main valves, runs Inter-purge, increments the Recycle Count and, if the Recycle count limit has not been reached, begins another Trial for Ignition. If the Recycle Count Limit has been reached, the control enters soft lockout. The control remains in soft lockout for 15 minutes before responding to the Demand for Heat. This clears the Recycle Count to allow for another set of "Recycle Count Limit" recycles. A total of three such sets of ignition trials including the first ignition trial set to be attempted. If the control has entered soft lockout for the total number of ignition trials as specified above the control will enter hard lockout. This lockout can be cleared by manually cycling the control power.	Six-Three Flash, three second pause
Troubleshooting	**Solution**
1. Check pilot flame to insure flame is not lifting away from flame sense hood – when main burner ignites. 2. Check static and dynamic gas supply to insure pressure is maintained when main burner lights. 3. Check for leaking pilot supply tube. 4. Check for carbon/soot buildup on pilot grounding strap. During the months of August thru December 2011; and January 2012, Rheem installed an incorrect burner in the XR90 water heater. See picture on last page of this bulletin.	1. Verify gas pressure with rating plate. 2. Clean pilot supply hood to enhance flame rectification readings. 3. Reposition pilot igniter into proper position. 4. Replace pilot igniter. 5. Inspect top burner plate for proper markings of correct burner plate.

Error 7 Flash

Indications	Display
Flammable vapor sensor lockout because the sensor smelled gasoline (hydrocarbons) - 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**
1. Gasoline or other flammable gas (hydrocarbons) was detected by the flammable vapor sensor. 	1. Check for flammable vapors around water heater 2. Verify FVS sensor resistance ~ 9KΩ -45 KΩ 3. Replace FVS sensor if >45 KΩ 4. 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.

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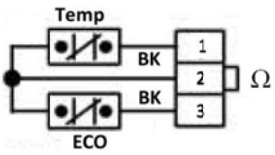
Error 8-3 Flash

Indications	**Display**
Electronics fault detected -	Eight-Three Flash, three second pause
Troubleshooting	**Solution**
1. Gas control fault	1. Recycle heater to verify error code 2. 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**
1. Flammable vapor sensor resistance is out of range (well below or well above parameters) 2. Wiring to FV sensor is faulty (open) 3. Gas control is faulty	1. Verify FVS sensor resistance ~ 9KΩ -45 KΩ 2. Replace sensor and wiring harness. 3. Replace control if new sensor does not work. 4. 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.

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
1. Water temperature sensor fault. Measure the OHMS resistance between pins 1 and 2; then measure the resistance between pins 3 and 2. The two numbers should be within 500 ohms of each other. See chart on last page to convert OHMS to temperature.	1. Recycle power to verify error 2. Replace thermal well  

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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

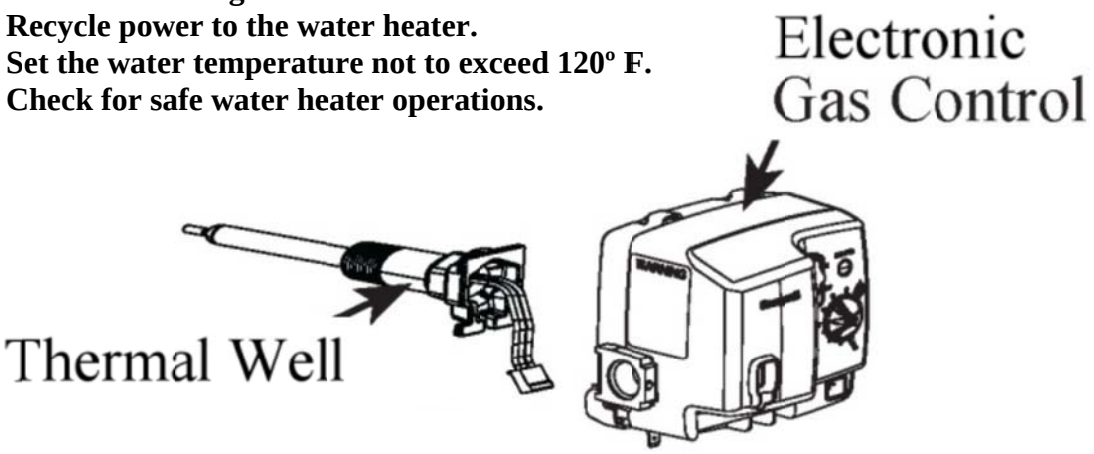
This will clear the current fault and force the unit to recycle for ignition.

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 120º 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 120º F.**
12. **Check for safe water heater operations.**



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Temperature to Resistance Thermistor Chart 10KΩ Resistor

Fº	Resistance
32	32,654
34	34,367
36	32,654
37	31,030
39	29,498
41	28,052
43	26,686
45	25,396
46	24,171
48	23,013
50	21,913
52	20,883
54	19,903
55	18,972
57	18,090
59	17,255
61	16,464
63	15,714
61	15,000
63	14,323
64	13,681
66	13,071
68	12,493
70	11,942
72	11,418
73	10,921
75	10,449
77	10,000
79	9,571
81	9,164
82	8,776
84	8,407
86	8,056
88	7,720
90	7,401

Fº	Resistance
91	7,096
93	6,806
95	6,530
97	6,266
99	6,014
100	5,774
102	5,546
104	5,327
106	5,117
108	4,918
109	4,727
111	4,544
113	4,370
115	4,203
117	4,042
118	3,889
120	3,743
122	3,603
124	3,469
126	3,340
127	3,217
129	3,099
131	2,986
133	2,878
135	2,774
136	2,675
138	2,579
140	2,488
142	2,400
144	2,315
145	2,235
147	2,157
149	2,083
151	2,011

Fº	Resistance
153	1,943
154	1,876
156	1,813
158	1,752
160	1,693
162	1,637
163	1,582
165	1,530
167	1,480
169	1,431
171	1,385
172	1,340
174	1,297
176	1,255
178	1,215
180	1,177
181	1,140
183	1,104
185	1,070
187	1,037
189	1,005
190	974
192	944
194	915
196	889
198	861
199	836
201	811
203	787
205	764
207	742
208	721
210	700
212	680

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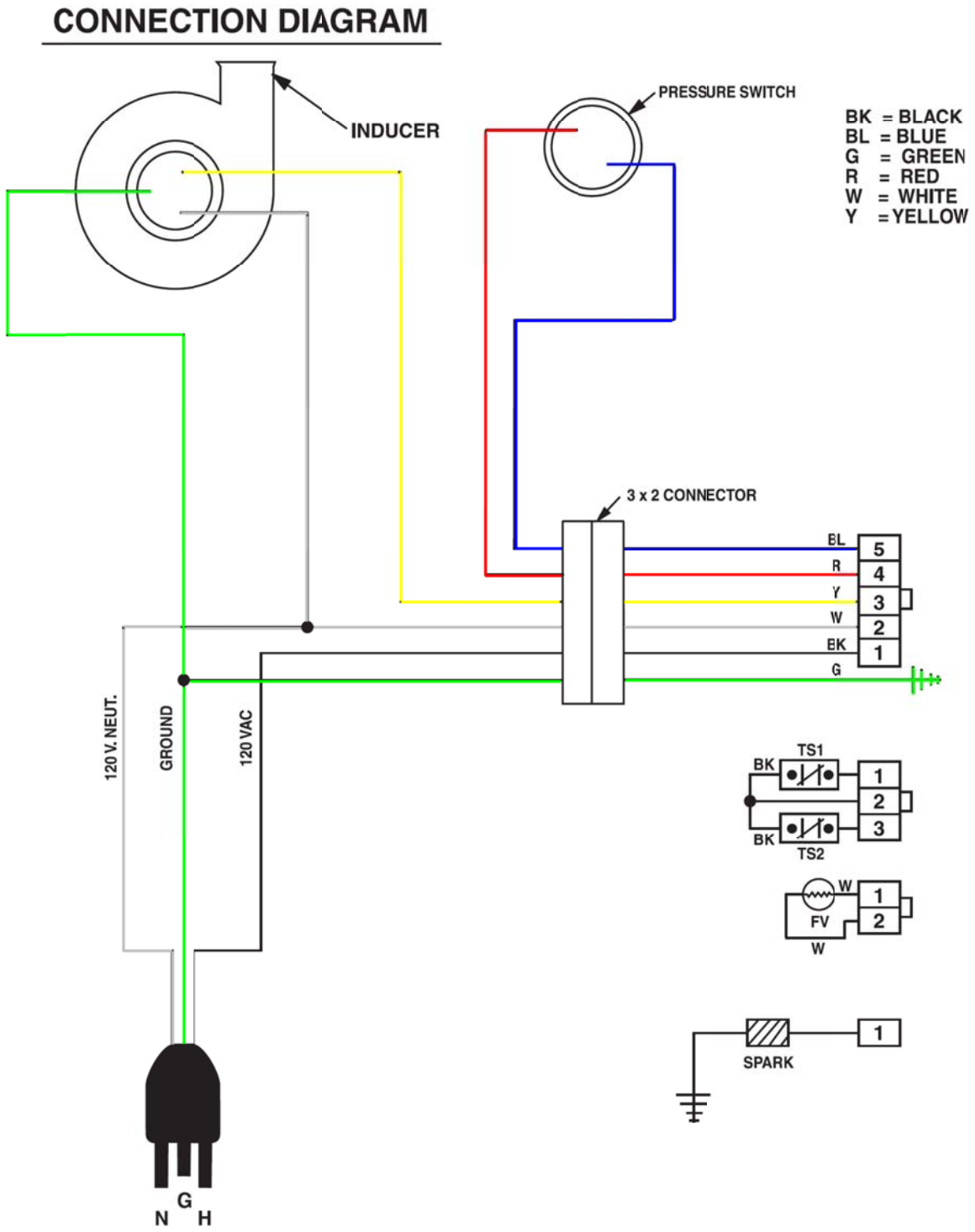

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