



AES Technical Bulletin **Control Board Functions**

Product models covered: Magnum Baby Countryside and Winchester AC & DC units

Topic: This technical bulletin will be addressing how the control board operates, what it initiates, the difference between the AC and the DC board, manual mode, T-stat mode, diagnostics, voltages, and how the control board and other electrical parts work together to make the unit operate.

The AC and DC control boards primarily function the same way, except the DC board has to function on 12 volts of power. It is imperative that the voltage power supply is constant and the board has the consistent voltage for each operation. If the voltage is not consistent every time, it will not allow the blowers to operate properly. Throughout this bulletin, information will be listed pertaining to AC or DC. Each function of the circuit board will be explained to give a clear picture of how each operation has to work. When appropriate page numbers will be referred, in the owner's manual, to avoid duplication of effort. The owner's manual gives a good insight on how the board needs to operate. When the power is plugged in to the unit or circuit board, the board goes through a self diagnostic check, which tests all circuits to make sure that everything is operating correctly. If any of the safety features are tripped like: low limit sensor thermostat, high limit sensor thermostat, open circuits or closed circuits that are not supposed to be, a light will blink in the heat level bar to indicate what is wrong. If the #3 heat setting light blinks, it means that the proof of fire (low limit 110 deg. Thermostat located on the exhaust blower) is not operating properly (read page 30 of the owners manual). If the #2 heat setting light blinks, it means that the vacuum switch has tripped and the circuit is open. Once power is plugged in and the board has gone through its self diagnostics, the board is ready for operation. When the ON/OFF button is pushed, it will initiate the startup cycle, (read page 29, circuit board functions), the draft/exhaust blower starts up (full voltage), and the timed cycle begins.

Startup cycle: When the board's ON/OFF button is pushed and the draft blower kicks in, a timed cycle is initiated. The cycle has a minimum time of 8 minutes and a maximum time of 15 minutes. During this time the proof of fire snap disk (110 deg. normally open) has to engage or the board will go into a shut down cycle. Also, the vacuum sensor circuit must be closed or the board will go into a shut down cycle (the auger motor will not turn while the switch is open). The room fan will not run unless the proof of fire snap disk is closed. During the startup cycle the board automatically will run a startup feed rate, (Room fan voltage AC= line voltage, DC= 12 volts) (Draft blower voltage AC= line voltage, DC= 12 volts). This will be the startup feed rate for the auger motor no matter what mode that the board is in. This feed rate will run until the proof of fire snap disk thermostat closes or the board goes past the 15 minute startup cycle and shuts down. If the proof of fire snap disk closes before the 8 minute minimum startup time, the feed rate will stay at the start up feed rate until the 8 minute minimum, then it will go to

whatever feed rate has been selected (1-5) The feed rate is selected by pushing the heat level button once for each heat setting. The heat level button will function 30 seconds after the ON/OFF button is pushed. The ON/OFF light will blink during the start up cycle until the proof of fire snap disk is closed, the 8 minute minimum has passed, or the 15 minute total cycle has passed, then the light will stay lit solid green. After 30 seconds of start up time has passed, the auger button can be pushed and held to bypass the timed auger cycle and the auger will run continuous as long as the button is pushed. When the button is released, the auger will go back to the start up timed cycle. If the board is in the "manual" mode setting, all start up cycle operations will function. If the board is in the "T-stat" mode the board will go through the start up functions even if the wall thermostat is not calling for heat. When the 15 minute cycle is completed the board will go to whatever heat setting the manual or T-stat mode dictates. If the board is in the "auto" mode, the wall thermostat has to be calling for heat for the start up cycle to initiate.

When the ON/OFF button is pushed, the igniter function will initiate. On the DC board, the igniter function will not initiate if the unit is on battery power. When the igniter function initiates there is a 30 second delay before power is applied to the circuit. Then full line voltage is applied to the igniter circuit for 10 minutes. If the vacuum circuit is opened during the first 8 minutes of the start up cycle (someone opens the door and then closes it), and the board ON/OFF button is pressed to re-start, the igniter function will start over. If the igniter shorts out so that there is an open circuit, or the igniter option is not used so the wires are left not plugged into an igniter, the rest of the board functions will still operate. If the proof of fire switch is in the closed position and the vacuum sensor opens (someone has opened the door), causing the operator to reset the board, the igniter will run for only 5 minutes and then shut off. When the proof of fire snap disk closes, the room fan circuit will be initiated with full line voltage on the start up cycle. If the proof of fire circuit closes between the 8 minute minimum and the 15 minute maximum start up time, the room fan will go to whatever voltage that the heat setting dictates. The room fan receives full voltage on all heat settings except #1.

The draft/exhaust blower runs from the time that the ON/OFF button is pushed. It will run on full line voltage all the way through the start up cycle. If the proof of fire fan circuit closes between the 8 minute minimum and the 15 minute maximum start up time, the draft blower will go to whatever voltage that the heat setting dictates. If the proof of fire snap disk does not close during the 15 minute maximum start up cycle, the auger will stop running, the igniter will have stopped running after the 10 minute igniter time, the room fan will not be running because the proof of fire snap disk did not close and the board will shut off. When the 15 minute start up cycle has completed and if the proof of fire snap disk has not closed, the board shuts down, the #3 heat level light will blink until the ON/OFF button is pushed and held for 5 seconds to re-set the board, the draft blower will run for an additional 15 minutes and then shut off. During the start up cycle, if the vacuum switch is tripped (the circuit opens) the board will go into a shut down cycle and the #2 heat level light will blink. During the start up cycle and any time that the vacuum switch circuit is opened, the functions of the board will not be interrupted until after 15 seconds. If the vacuum circuit closes during the 15 seconds, the board ON/OFF button will not have to be pushed to re-set the board. If the vacuum circuit closes after the 15 seconds, the board ON/OFF button will have to be pressed for 5 seconds to re-set the board and resume functions.