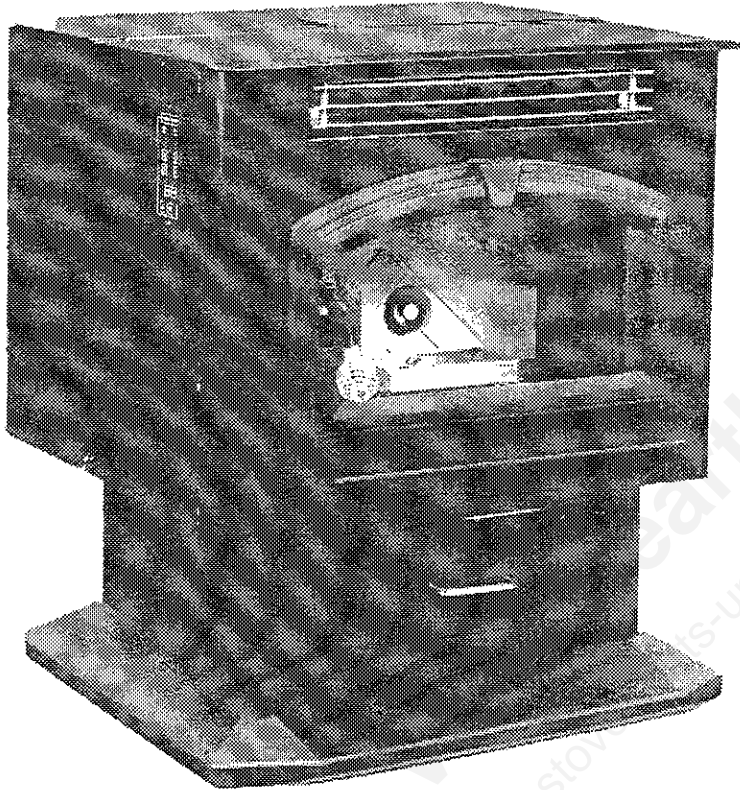


United States Stove Company
Service Manual
For models 6039/6039T



Model 6039 shown

United States Stove Company
227 Industrial Park Dr
South Pittsburg, TN 37380
800-750-2723

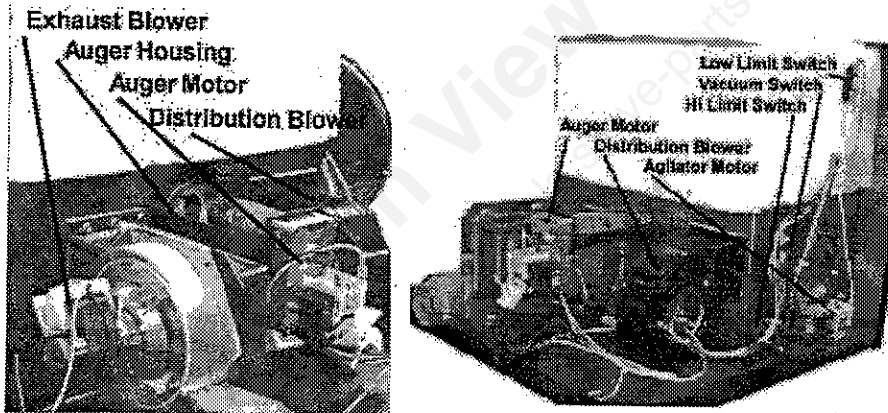
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**United States Stove Company
Service Manual for the 6039/6039T**

Overview

The American Harvest corn/pellet stove is a hopper-fueled device that operates with a single auger design, coupled with a combustion fan and agitator. These three key components work together to provide the proper air/fuel mixture. How, they work together, is controlled by the Digital Control Board (DCB). Once power is supplied to the unit and the "ON" button is depressed, the DCB will monitor the operation and control of all components, with the input provided by the user (Selecting what Heat Range and Blower Speed) and sensors mounted on the stove. Should the DCB receive any input from the user or any sensor, it will alter its output to the corrected operation. Along with the previously mentioned key components, the DCB also operates a distribution blower for greater heat output. While the distribution blower does not directly effect the normal operation or adjust the air/fuel mixture, it does provide cooling for internal components and an increased efficiency in the overall design.

Operation of the American Harvest 6039 and 6039T is controlled by one of four programs of the Digital Control Board. These four programs are "Start-Up", "Normal Operation", "Shut Down" and "Diagnostic". *The Diagnostic set of commands is for testing and determining proper operation of the appliance. This program is not used during normal operation and must be started by the user. Starting the diagnostic, see Pre-Start Test Sequence.* Once the stove is started, the DCB operates on a series of "Start-Up" commands until an input is received. This input will then direct the DCB to the next program. The usual input will be from the "Low Limit" switch, signifying the stove is warm and operating normally. Therefore, switching the DCB to the "Normal Operating" program. This series of commands will continue until another specified input is received, resulting in the DCB changing to the "Shut Down" program. The "Shut Down" program will continue until the stove safely shuts off, or until a change in the input signifies "Normal Operation".



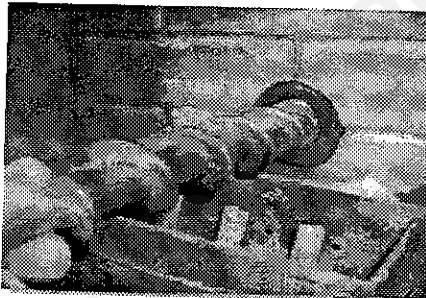
Fuel

The American Harvest has been designed to burn straight shelled corn with a moisture content of 14% or less. Higher moisture content can be used, but significant heat output will be lost along with increased maintenance. For corn with elevated moisture, you can mix in a few pellets to increase combustion and reduce maintenance. As an example, we have successfully tested corn with 16% moisture and mixed with pellets at a ratio of 2.5/1 (100 lbs of corn with 40 lbs of pellets). For corn that has the tendency to create the troublesome "clinkers" in the burn pot and on the agitator fingers, add a little oyster shell. We have found one cup to 50 lbs of corn works well. Depending on your corn, this amount may vary.

As for pellets, we have tried almost all brands with very good success. You will find some pellets burn hotter and create less ash. We recommend, sampling fuels that are available in your area. Once you have selected your choice, continue with that brand. You will find, different fuels require different air/fuel mixtures and may require adjustments made to your American Harvest to manage that fuel. Other than pellets and corn almost any pelletized fuel that meets the Pellet Fuel Industry standards will work.

Pre-Start Test Sequence (Diagnostic Tool)

Once unboxed and legs attached (6039T only), install the auger into the auger tube (see illustration). The auger simply slides into the auger tube and interlocks with the auger motor coupler. Once pushed all the way back, rotate the auger to assure the auger has meshed with the coupler. Once together, you should not be able to rotate the auger. *Note: The auger will remain capable of being pulled straight out for removal. Due to the auger always pushing fuel out, it is always pushing itself in. That is why no retainers are used.*



Now, remove the remaining items from the hopper and install the power cord. *Note: When power is supplied to the American Harvest a version number and program code will be displayed on the digital control board for 2 seconds.*

Testing/Troubleshooting

1. After power is supplied to the control board, press and hold switches A and B until the control displays "o 1". The control will then turn on the exhaust blower (combustion) blower. You should be able to verify that the combustion fan is running by placing your hand over the exhaust pipe. The LED over switch "A" will be turned on if the vacuum switch contacts are closed. If it is not, make sure ash dumps located inside

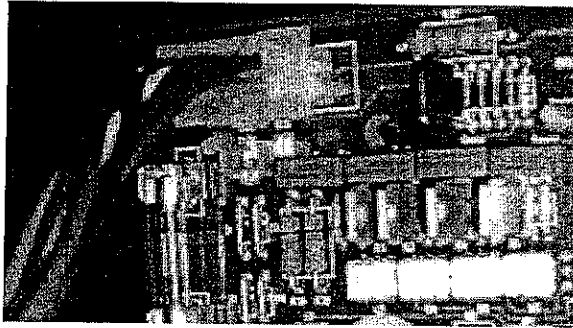
firebox are in place and glass door is closed. The combustion fan pulls a vacuum through the firebox when running and the DCB monitors the vacuum switch to assure proper operation. During normal operation, if the switch does not close, signifying vacuum, the DCB will begin a shut down of the stove. During the test procedure, you should verify the operation of the vacuum switch by opening and closing the door. The LED should blink ON/OFF. Press any switch to continue to step 2.

2. The control will display "o 2" and will turn on the room fan. You should verify that the room fan is operating by placing your hand over the front of the stove. Air should be passing through the front grill. Press any switch to continue to step 3.
3. The control will display "o 3" and will turn on the agitator motor. You should see that the agitator rotating inside the firepot. The rotation will be clockwise from the DCB side of the stove. Press any switch to continue to step 4.
4. The control will display "o 4" and will turn on the auger motor. You should see the auger is operating by looking inside the hopper or looking through the glass door. At this time, the DCB also checks the HI LIMIT switch. A correct reading would be a normally "closed" switch, signified by the LED above "A". If the LED does not light, the HI LIMIT switch circuit is "open" and the DCB would normally shut down. Press any switch to continue to step 5.
5. The control will display "i 1" and will turn on the LED over switch A if the low temperature switch is open (which it should be at room temperature). This switch signifies the DCB as to the operating temperature. If closed, the DCB interprets the stove is hot enough for normal operation. Press any switch to continue to step 6.
6. The control will display "i 2" and will turn on the LED over switch A if the thermostat input is shorted (which it should be if the shorting clip is in place). If this test is performed after stove installation and a thermostat has been installed, check the LED light by operating the thermostat. Depress any switch to continue to step.
7. The unit will then display the temperature measured by the temperature sensor. Both 6039 and 6039T will display "00". Press any switch to continue to step 8.
8. The control will then display the frequency of the A/C input voltage. The displayed frequency should be 59, 60 or 61. Press any switch and the letter "d" will be displayed signifying the test mode is "done". Press the "OFF" button to complete.

Electrical Overview

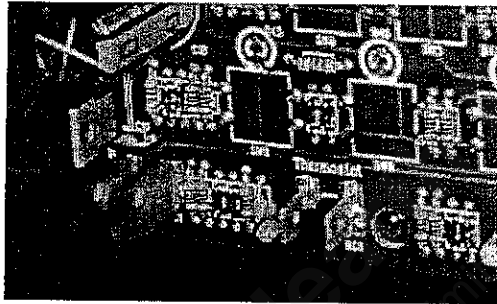
Power is supplied by a 110Vac grounded circuit protected by a 4amp in-line fuse, placed directly on the control board. The wiring harness connects power input, to all AC motors, Hi Limit switch and Low Limit switch to the Digital Control Board (DCB) via an eight wire snap on/off Molex connection (see illustration).

The Vacuum Switch for 2005 is wired directly to the DCB on both 6039 and 6039T. This connection is located on the lower left corner of the control board next to the "Thermostat" connection terminals (see illustration). By



default, the "Thermostat" connection terminals are jumped from the factory for normal operation. Installing the thermostat is not recommended when burning fuels other than pellets.

The eight wire harness connection provides two wires for power input (black, white), two wires for switch input (Low Limit - green, Hi Limit - purple) and four wires for power output (Auger - red, Agitator - brown, Combustion Fan - orange, Distribution Fan - blue).

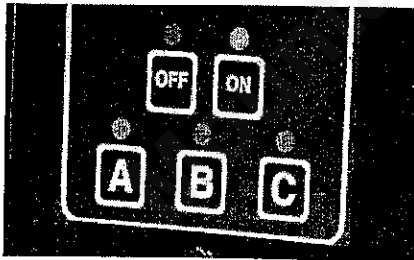


Electrical Input Switches (Low Limit, Hi Limit, Vacuum)

The DCB receives input from one of three operating switches located on the stove other than the control board itself. These are the Low limit, Hi Limit and Vacuum.

Low Limit is a normally open, heat sensitive contact that closes when exposed to 110F. The actual heat range for this switch is 110F-20F. Meaning, the circuit remains closed; once exposed to the closing temperature, until the switch cools down below 110F-20F or 90F. This switch informs the DCB the stove running normally. Test this switch by checking continuity across the terminals. Proper reading would be "Open" at room temperatures.

Hi Limit is a normally closed, heat sensitive contact that opens when exposed to 250F. This switch allows for a safe shut down should temperatures reach elevated levels. Test this switch by checking continuity across the terminals. Proper reading would be "Closed" at room temperatures.



page 5

Vacuum is a normally open, pressure sensitive contact that opens when the vacuum from the exhaust blower is lost through the firebox. Should this vacuum be lost, the DCB would begin a safe shut down by slowing the fuel feed. Test this switch by checking continuity across the terminals. Proper reading would be "Open" when exhaust blower is running and the firebox is sealed.

During operation of the American Harvest, the DCB indicates an open circuit or problem with the Hi Limit and Vacuum switch by illuminating an LED light. A light above the letter "A" will indicate the Vacuum Switch (see illustration). A light above letter "B" will indicate a Hi Limit switch. Should the light above the letter "C" be lit, indicates a pause in the auger. This happens during start-up when the auger is delayed or when the letter "C" is depressed, causing a 1-minute pause in the fuel feed. The Low Limit switch is a normally "open" circuit and closes when heated above 110F, indicating normal operation. *(For the Low Limit switch to reopen, it must cool down 110F-20F or 90F)*

Digital Control Board ver. 5 6039/6039T

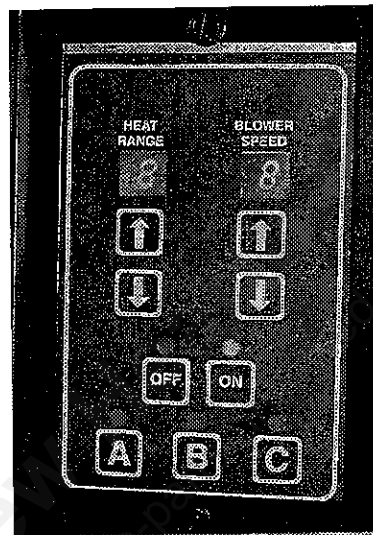
Powering Up Control Board

When power is supplied to the control board a version number and program code will be displayed for 2 seconds. The program code is referenced by A, B, C, or D. At present, program "A" is for a future furnace, program "B" is for the 6039, program "C" is to be determined and program "D" is for the 5700. Due to the current stage of development, the models 5500 and 5500XL have yet to be assigned a default program. It is possible these two models will share the same program as the 5700.

Programmable/Viewable Variables

The 6039 control has 13 programmable operational parameters, 2 viewable real time parameters, a method of returning the control to factory defaults and a method of enabling and disabling the lower 3 switches on the control panel. These 3 switches are labeled "A", "B" and "C". From the factory, "C" will be enabled allowing the user to "Pause" the auger for one minute increments.

The 2 viewable real time parameters are the measured stove temperature (Not available on 6039/6039T) and the measured frequency of the A/C input power. To enter the "View Parameter" mode, depress and hold the "Heat Range Up" and "Blower Speed Down" switches for 3 seconds. The unit will display "U 1". Use the "Heat Range" Up and Down switches to select the desired variable (1 for stove temperature and 2 for frequency). Depress the "On" switch to display the



variable. See the discussion below pertaining to displaying 3 digit numbers on a 2 digit display. Depress the "On" or "Off" switch to return to normal operation.

The control has 13 operational variables that can be modified and an additional function that causes the control to return to factory defaults. To view/modify the variables press and hold switches "B" and "C" on the front panel for 3 seconds. "P1" will be displayed on the display. Use the "Heat Range" up and down switches to select the desired variable (P1 to PE). When the desired variable has been selected, press the "On" switch. The selected variable will be displayed on the numeric display. The control only has 2 numeric displays and several of the variables can be 3 digits in length. For these cases, the 2 numeric displays show the last 2 digits. If the variable is equal to or above 100 and less than 200, the "A" LED will be turned on. If the variable is equal to or above 200 and less than 300, the "B" LED will be turned on. If the variable is equal to or above 300, the "C" LED will be turned on.

Use the "Heat Range" up and down switches to modify the variable. To exit, depress the "On" switch if you want to store the modified variable and return to normal operation. Depress the "Off" switch to exit if you do not want to store the variable. Note: If P9 is selected, the control will store the default variables, exit the variable modify utility and go into the Off Mode.

P1 - The auger period in tenths of seconds. The default is 185 (18.5). See [Auger Worksheet](#)

P2 - Cold Stove temperature. When the off button is depressed, the stove will continue to run the draft fan, room fan and lower auger until this temperature is reached. When reached, all outputs will be turned off. The default setting is 95 degrees for models with a heat sensor. Others will use a 110F – 20F disk causing the control board to read an open circuit at 90F.

P3 - High temperature shutdown. When the stove reaches this temperature, the control will stop the starting auger or reduce the auger cycle. The default value is 350 degrees. For models using a HI limit disk, this temperature will be 250F.

P4 - High temperature hysteresis. If the stove reaches the high temperature shutdown value, this variable determines how many degrees the stove must cool below the shutdown value to resume normal auger operation. The default value is 1 degree.

P5 - Air On Temperature base. If the Air On Temperature setting is 1, this value determines the temperature the stove must attain to be considered "On Temperature". This is the temperature that the stove must attain during the 15 minute start up period to avoid being shut down. It is also the temperature that must be reached to operate the room fan. If the AOT setting is increased, the "On Temperature" temperature is increased by 3 degrees for every increment. The default value is 115 degrees.

P6 – Auger “Bump” Timer. If program B is selected (Corn Stove operation), this variable is the number of minutes that the control will “bump” the auger when shutting down to help prevent burn back. The “On” time for the auger in this mode is .5 seconds during the period. The default setting is 15 minutes.

P7 - Electric Starter On Time. Not available on the 6039/6039T

P8 - Maximum Start Time. Not available on the 6039/6039T

P9 - If this variable is selected, the unit will set all variables to **default values.**

PA – Almost Hot Temperatures- Not available on the 6039/6039T

PB – Auger Operation During Electric Start- Not available on the 6039/6039T

PC - Max Auger Operation- Not available on the 6039/6039T

PD – Agitator Period. This variable is the period of the agitator. The on times for the agitator for the 9 heat ranges (1-9) are 16, 21, 26, 31, 36, 41, 46, 54 and 62 seconds. The off time for a heat range setting is the period minus the off time so if the period is set less than 16, the auger will run constantly. Setting the period of 255 seconds means the agitator will never turn on. The default setting is 61 seconds

PE – Ignore Vacuum Sensor Setting The combustion air fan can be operated at a slow enough speed during normal operation that the vacuum sensor input can open. Setting this value to 2 for example, will cause the control to ignore the vacuum sensor input for heat range settings of 2 and 1. Setting this variable to 9 will cause the control to ignore the vacuum sensor totally. The default setting for this variable is 1. (Set to 0 if programs A, C or D are selected).

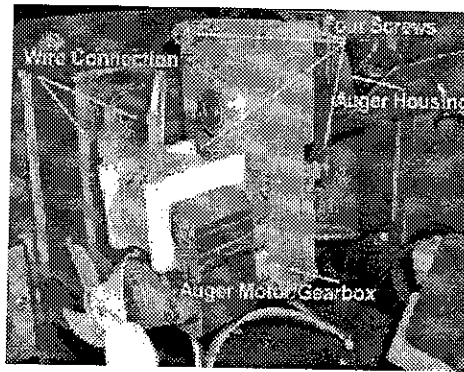
Auger Run Times 6039 (Default: Auger Duty Cycle is 6039/18.5 seconds)

HR= Heat Range (selectable 1-9) Default – 1 LFF= Low Fuel Feed (selectable 1-9) Default - 4

Heat Setting	Est. Feed Rate(lbs)	Auger Run Time %	Auger Run Time(sec.)	Auger Off Time(sec.)
1	2.1	24%	4.4	14.1
2	2.6	29%	5.4	13.1
3	3.2	35%	6.5	12.0
4	3.7	41%	7.5	11.0
5	4.2	46%	8.6	10.0
6	4.7	52%	9.6	8.9
7	5.2	57%	10.6	7.9
8	5.7	63%	11.7	6.8
9	6.2	69%	12.7	5.8

Auger Motor (Testing, Removal & Installation)

The fuel feed delivery system of the American Harvest consists of the auger, auger coupler, auger housing and auger motor. The auger motor is actually a motor gearbox assembly that is connected to the auger coupler by a pin. This complete assembly is then bolted onto the auger housing (see illustration) with four screws. The auger motor is controlled by the DCB, which provides 110Vac at specified durations. (See Auger Run Times)

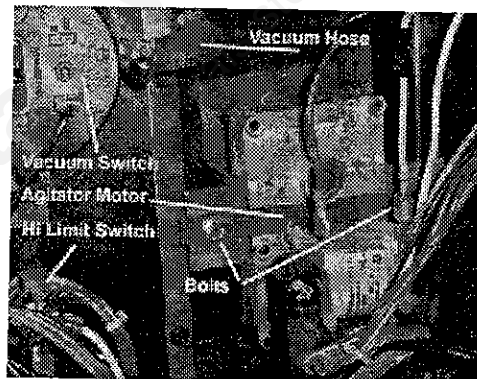


Testing Auger Motor assembly: The DCB has a built in diagnostic tool that allows for testing all electrical components (see Pre-Start Test). Remove a side of the stove and place the DCB in the test program for the auger motor, LED readout should read "0 4". Test wiring connection at the auger motor for 110Vac. If power is supplied and motor is not working, check auger for blockage or jam. If Auger Housing is clear replace motor. If no power is available, check the "RED" wire from the DCB for proper connection through the Hi Limit switch and the ground connection from the wiring harness. From the DCB, the RED wire, when in the test mode for the auger, should read 110Vac. If not, check Molex connection, DCB fuse or replace DCB. (Note: The auger motor is a 4 rpm motor. If the auger does not turn at this rate, remove auger and check for debris in auger housing that could create auger jams)

Removal of the auger motor assembly: 1. Unplug stove from electrical supply. 2. Remove either side from the stove (Note: Also removing the back side will allow the most room and easiest access). 3. Unplug the two wires from the wiring harness. 4. Remove the four screws that attach it to the housing. You will pull the auger motor assembly out of the housing and see the auger coupler attached. Reinstallation is reverse of removal.

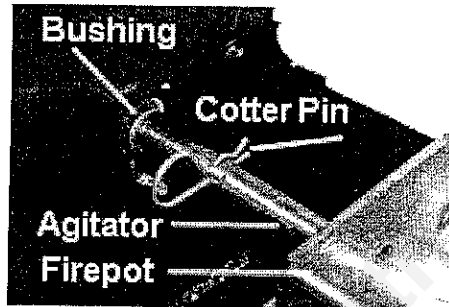
Agitator Motor assembly (Testing, Removal & Installation)

The agitator assembly consists of a motor gearbox assembly, bushing, anti-seize compound, agitator and cotter pin. The 110Vac motor is installed into a bronze bushing, with a ample supply of anti-seize compound,



where it is connected to the agitator with a cotter pin. This free-floating assembly in the firepot allows proper mixing of the fuel. The DCB has a built in diagnostic tool that allows for testing all electrical components (see Pre-Start Test). Remove the left (Control Board side) side of the stove and place the DCB in the test program for the agitator motor, LED readout should read "0 3". If motor does not rotate, test wiring connection at the auger motor for 110Vac. If power is supplied and motor is not working, check if agitator is locked up in the firepot or bushing. If motor is deemed bad, replace motor. If no power is available, check the "BROWN" wire from the DCB for proper connection and the ground connection from the wiring harness. From the DCB, the BROWN wire, when in the test mode for the auger, should read 110Vac. If not, check Molex connection, DCB fuse or replace DCB. (Note: The agitator motor is a 2 rpm motor. If the agitator does not turn at the specified rate, remove the motor and check bushing for wear and proper anti-seize compound)

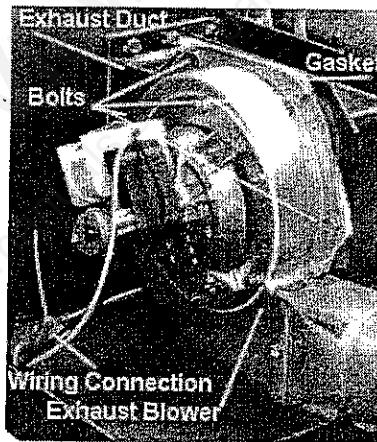
Removal of the Agitator motor assembly: 1. Unplug stove from electrical supply. 2. Remove the cotter pin from the agitator assembly. 3. Remove left side from the stove. 4. Unplug the two wires from the terminals. 5. Remove the two screws that hold the retainer. You will pull the agitator motor assembly straight out of the bushing. (Note: It may require removing the agitator and firepot, to so to allow enough room that you can lightly tap the motor assembly from the inside). Reinstallation is reverse of removal.



Removing the agitator and firepot periodically is required for proper cleaning. If during use, a heavy build up or clinker develops, remove and clean. (Note: adding oyster shell to the corn fuel can reduce Clinkers.)

Exhaust (Combustion) Blower (Testing, Removal & Installation)

The exhaust blower provides the combustion air for the American Harvest. This design provides a negative draft flow of combustion air through the firebox. Meaning, it actually pulls the combustion air through the firebox instead of blowing through. By not blowing the combustion air through, this design provides a safer and more controllable air fuel mixture. (Note: If combustion air were blown through, image opening the front door and having sparks fly out. Not Good!) This blower assembly



is bolted onto the exhaust duct and connected to the wiring harness with two terminals. The exhaust motor is controlled by the DCB, which provides a varying voltage depending on the heat setting and combustion air required. In previous models a draft slide damper was used to vary the air/fuel mixture. With the DCB, this setting is done automatically. (Note: some fuels will require tweaking these settings for proper operation. See *Programmable/Viewable Variables for adjusting*.)

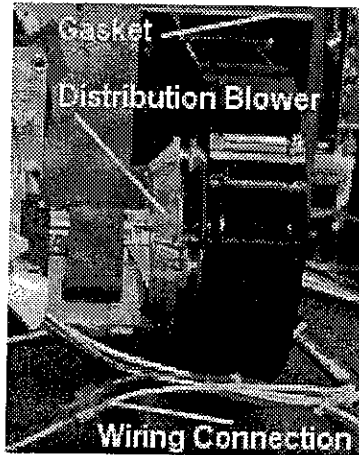
Exhaust Blower assembly: The DCB has a built in diagnostic tool that allows for testing all electrical components (see Pre-Start Test). Remove the right (opposite control board side) side of the stove and place the DCB in the test program for the Exhaust blower, LED readout should read "0 1". At this time, the exhaust blower should be running. If not test the wiring connection at the motor for voltage. During the test, the voltage should read 110Vac. If power is supplied and motor is not working, check exhaust duct for blockage or jam. It is possible the exhaust blower can become contaminated with ash, soot and creosote. If Blower and duct are clear replace blower. If no power is available, check the "ORANGE" wire from the DCB for proper connection and the ground connection from the wiring harness. From the DCB, the ORANGE wire, when in the test mode for the exhaust blower, should read 110Vac. If not, check Molex connection, DCB fuse or replace DCB.

Removal of the Exhaust Blower: 1. Unplug stove from electrical supply. 2. Remove the right (opposite control board side) side from the stove. 3. Disconnect the venting from the exhaust blower 4. Unplug the two wires from the wiring harness. 5. Remove the bolts that attach it to the exhaust duct. 6. The blower is sealed to the exhaust duct with a gasket. When removing the blower, take care to not damage the gasket or it will need to be replaced. Reinstallation is reverse of removal.

Distribution (Circulation) Blower (Testing, Removal & Installation)

The distribution blower provides the circulation air for the American Harvest. The design of the heat exchange area along with the static pressure created with the distribution blower, allows for increased air movement throughout the blower settings. This blower assembly is bolted onto the rear of the heat exchanger and connected to the wiring harness with two terminals. The distribution motor is controlled by the DCB, which provides a varying voltage depending on the blower setting. As the blower setting is increased, so does the voltage. (Note: The DCB will not allow a blower setting lower than the heat setting. You can check this by placing the heat setting on 4 and the blower setting on 4. You will find, you cannot lower the blower setting beyond the heat setting and when you increase the heat setting, the blower setting will automatically increase.)

Distribution Blower assembly: The DCB has a built in diagnostic tool that allows for testing all electrical components (see Pre-Start Test). Remove the left (control board side) side of the stove and place the DCB in the test program for the distribution blower, LED readout should read "0 2". At this time, the distribution blower should be running. If not test the wiring connection at the motor for voltage. During the test, the voltage should read 110Vac. If power is supplied and motor is not working, check blower for blockage or jam. It is possible materials such as insulation and gasket can be sucked into the blower causing a jam. If blower is clear replace blower. If no power is available, check the "BLUE" wire from the DCB for proper connection and the ground connection from the wiring harness. From the DCB, the BLUE wire, when in the test mode for the exhaust blower, should read 110Vac. If not, check Molex connection, DCB fuse or replace DCB.



Removal of the Distribution Blower: 1. Unplug stove from electrical supply. 2. Remove the LEFT (control board side) side from the stove. 3. Unplug the two wires from the wiring harness. 4. Remove the bolts that attach it to the rear heat exchanger. 6. The blower is sealed to the heat exchanger with a gasket. When removing the blower, take care to not damage the gasket or it will need to be replaced. Reinstallation is reverse of removal.