

COUNTRY'S TOVES
A LIFETIME OF WARMTH

PELLET STOVES TECHNICIAN'S MANUAL

1ST Edition

*PS40



*PI40



This manual is used for program versions 403-408. See top of Page 14

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HOW TO DISASSEMBLE THE PS40

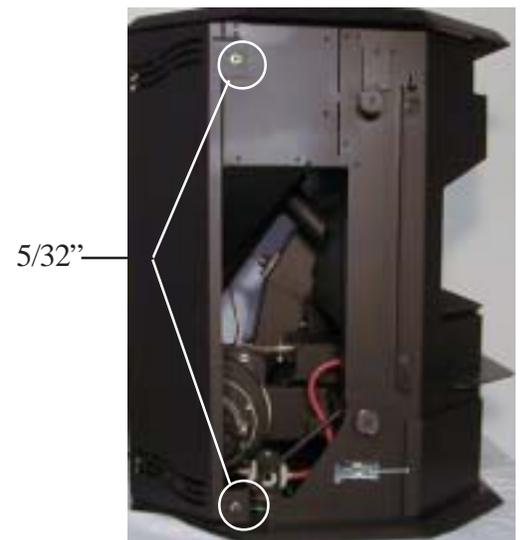
Open both left and right side doors before opening front door. Lift the front door straight up and off the hinge pins. To remove the side doors, lift the door up, and pull the bottom of the door out and down. Make sure to remove the control board from the right door before removal.

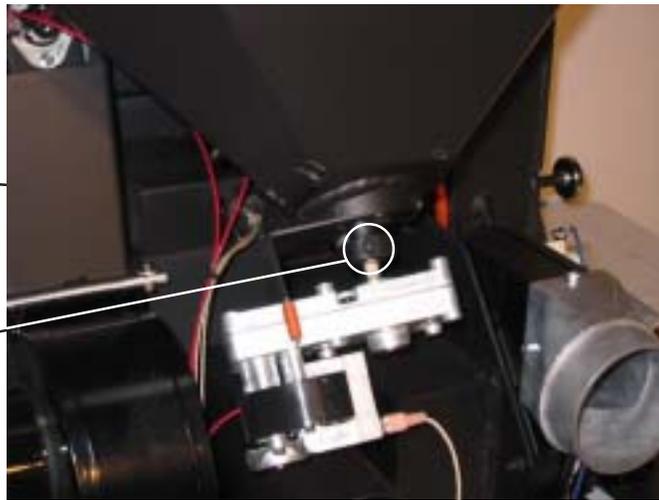
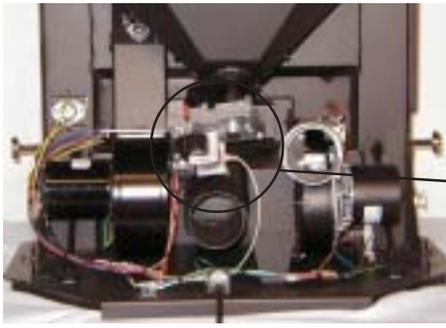


To remove the back of the stove with the vent pipe hooked up, loosen the four 5/32" allen head screws and remove the cover plate.



Loosen the two 5/32" allen head screws on both sides of the unit. The back can now be slid back and lifted straight up and off the unit.





Allen Screw

To remove the auger motor, disconnect power and ground wire. Loosen the 5/32" allen screw and slide the auger motor shaft out of the auger shaft.

PI40 & PS40



7/16" Bolts

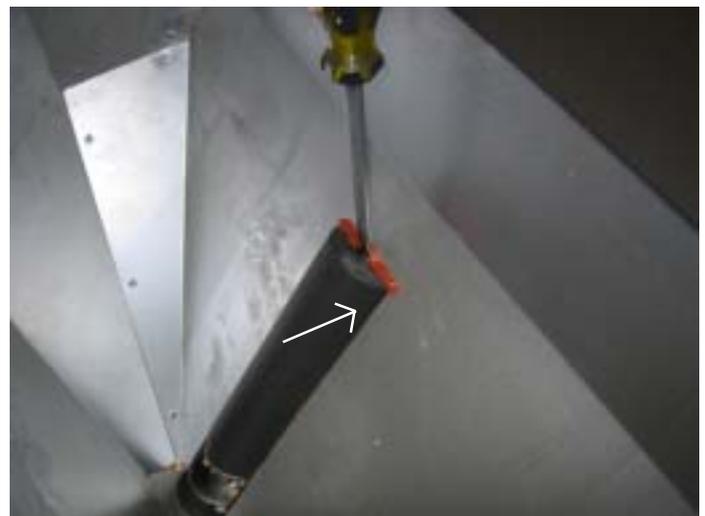
To remove the auger and lower bearing, first remove the two bottom bolts securing the auger motor bracket.



7/16" Bolts

Remove the bolt on either side of the auger tube.

The top of the auger is located inside the hopper. Make sure the auger has been cleaned and is void of any pellets. Place a large standard screwdriver in the center of the auger shaft (push the screwdriver against the silicone and hopper to make sure the screwdriver is in contact with the center of the auger shaft and not the bearing) and tap on the screwdriver with a hammer. The auger shaft will slide out of the top bearing, and the auger and lower bearing will fall out of the auger tube.

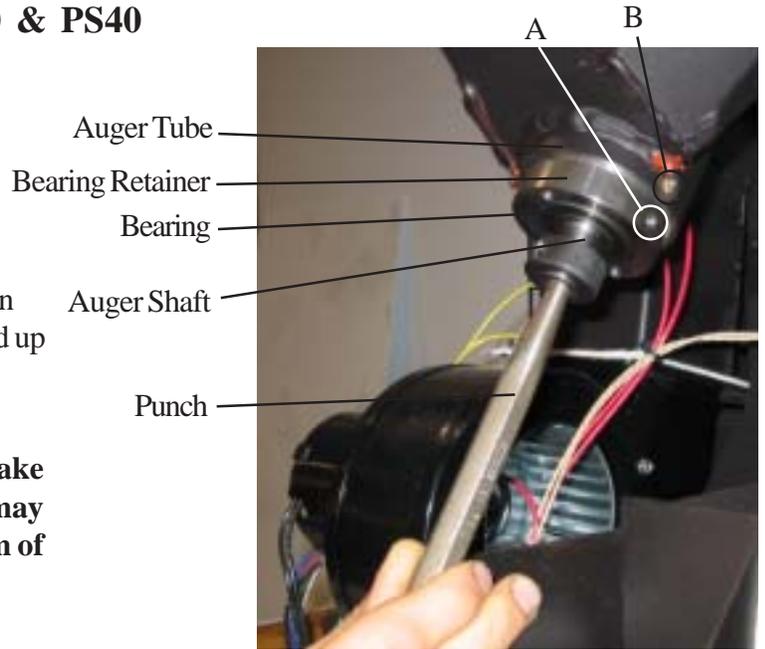


PI40 & PS40

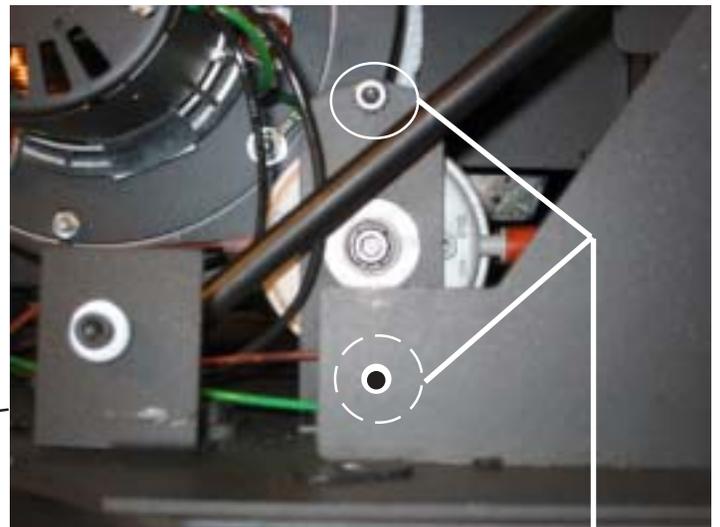
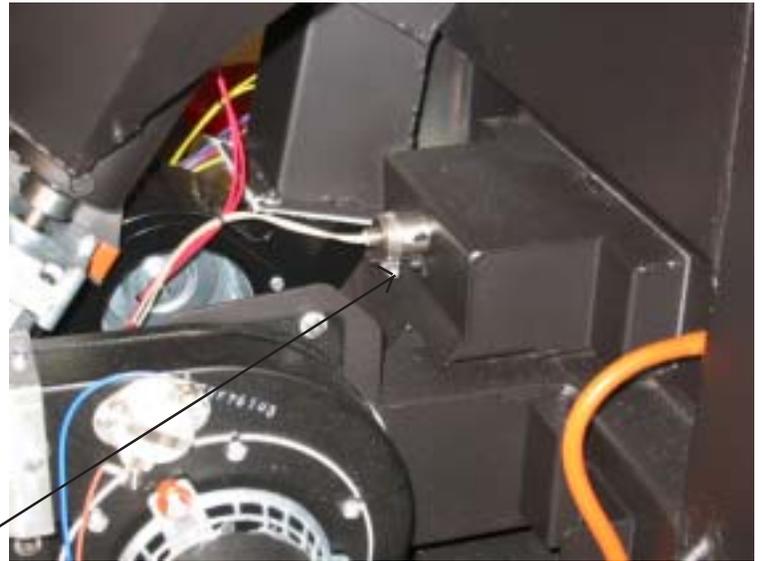
During reinstallation, insert a center punch into the end of the auger shaft and tap on the punch rather than the shaft. Tapping directly on the auger shaft with a hammer will deform the shaft, and not allow the auger motor to be reinstalled.

Tap the auger assembly into position and stop when the threaded hole in the bearing retainer (A) is lined up with the hole in the auger tube (B). Install the side bolts and bottom auger motor bracket.

IMPORTANT: Spin the auger by hand and make sure it operates smoothly. Some adjustment may be necessary. Lightly tap on the top or bottom of the auger shaft to make sure it is centered between the top and bottom bearing and the auger is properly seated.



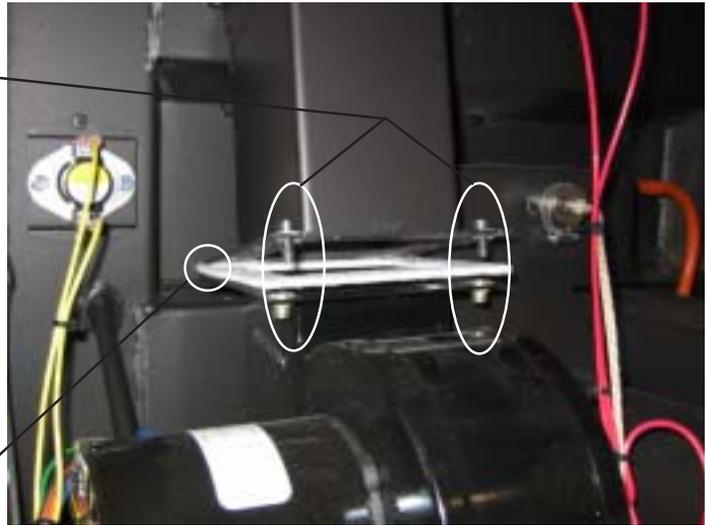
To remove the igniter, loosen the hose clamp and slide the igniter back and out. Disconnect the power wire (using two pairs of needle nose pliers will aid in separating the electrical terminals). Disconnect the ground wire from the neutral buss. To reinstall, slide the igniter in until it is tight against the back of the burn pot. Tighten the hose clamp making sure it stays tight and the clamp is not covering the air intake holes.



To remove the vacuum switch, disconnect the two wires and remove the two nuts securing the switch to the bracket

Allen Screws

To remove the convection blower, loosen and remove the two allen screws. When reinstalling, slide the back of the blower into the “V” channel, making sure the gasket (Part #01-0300-0231) is positioned properly. Start the screws by hand to avoid cross threading.



“V” Channel

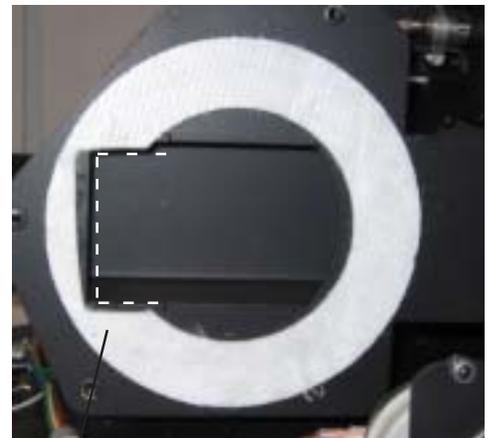
To remove the combustion blower motor, remove the six nuts using a 11/32” wrench. The fan blades and the inside of the blower housing can now be cleaned. During reinstallation, make sure a new gasket is used (Part # 01-0300-0232), and the motor’s green ground wire is secured under one of the nuts.

PI40 & PS40



New Gasket (Part # 01-0300-0232)

Allen Screws

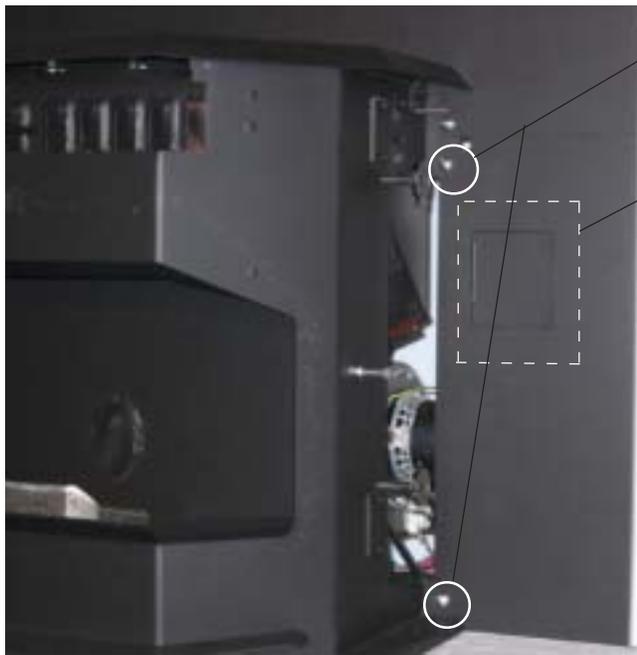


To remove the blower housing from the stove, remove the four allen screws.

To replace the combustion fan housing gasket (Part # 35210), scrape off old gasket material using a putty knife. Using high temp. RTV silicone, stick the new gasket into position. Make sure the square portion of the gasket is lined up with the left, square edge of the exhaust passageway.

HOW TO DISASSEMBLE THE PI40

Open both left and right side doors before opening front door. Lift the front door straight up and off the hinge pins. To remove the side doors, lift the door up, and pull the bottom of the door out and down.



Flange Screws

Control Board

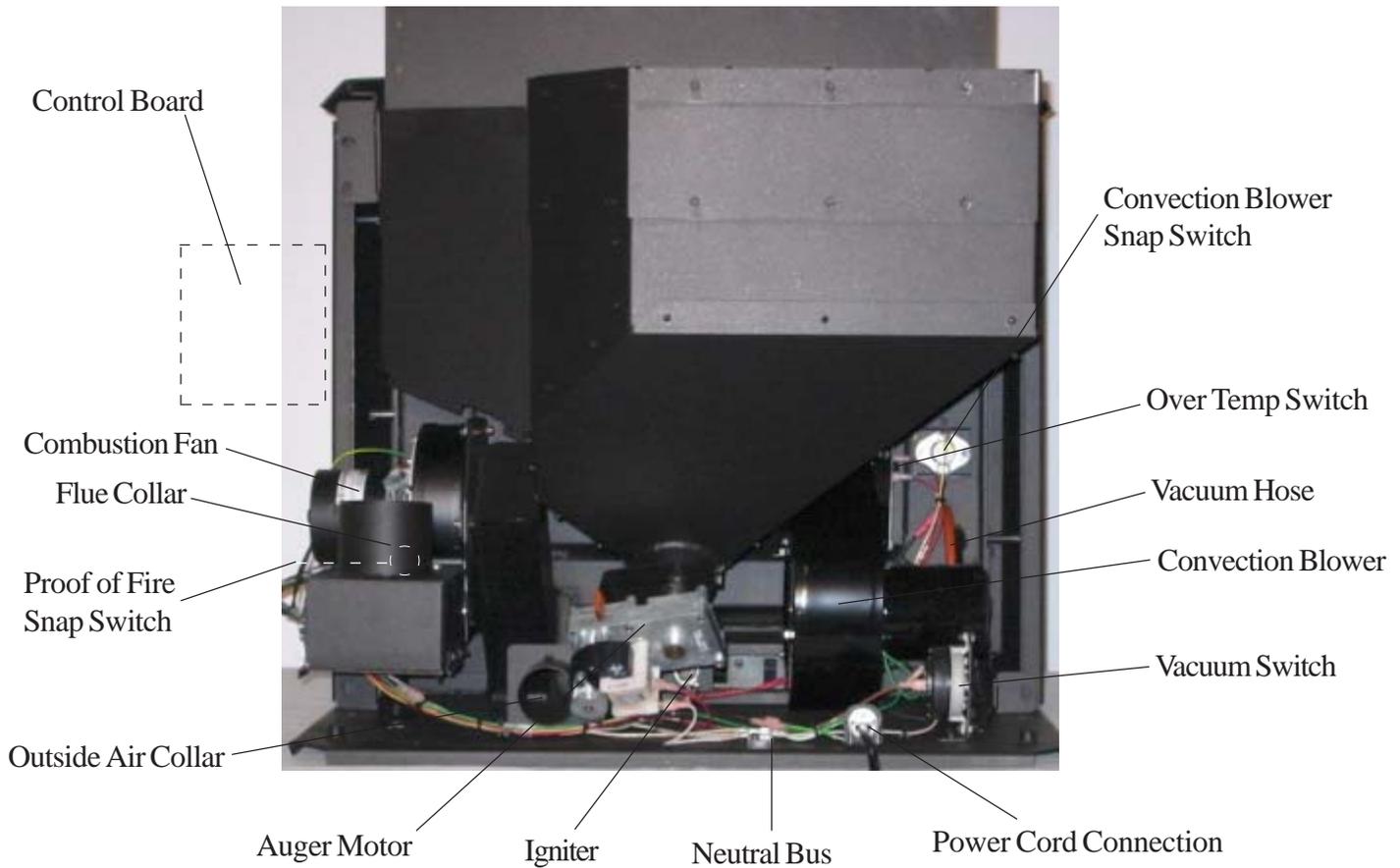
The control board is mounted on the back of the right side flange panel. To remove the control board, lift up and off the retaining brackets. To gain access to the control board, slide the insert out far enough to reach behind, or remove the side flange. To remove the side flange, loosen the screw on the top and bottom and slide the flange out to the right.



Control Board

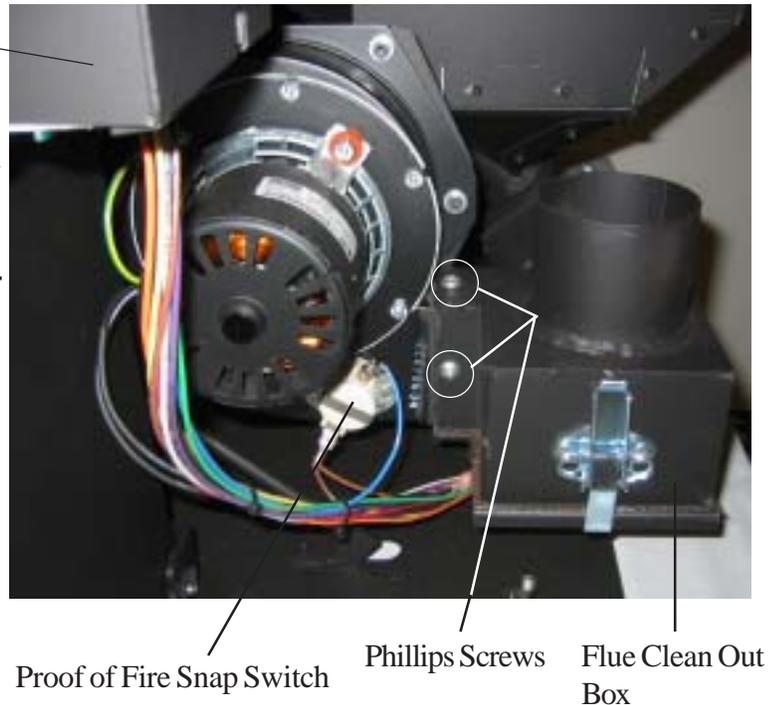
Exhaust Flue
Collar

Looking at the back of the stove, you can clearly see the control board hanging on the side flange panel



Viewing the back of the stove, you can see where the various components are located. The method used for mounting the components is almost identical to the PS40 with the exception of location. **NOTE: The Proof of Fire snap switch is mounted into the combustion fan housing. See picture below.**

The flue clean out box does not need to be removed to achieve a thorough cleaning, but if removal is needed, remove the three screws (one on top and one on each side) securing the box to the combustion fan. **IMPORTANT: Millpack or RTV silicone must be used when reinstalling to ensure a tight seal. Remove any old sealant residue from the combustion fan. Apply a generous amount of new sealant to the combustion fan before installing the box. Reinstall the screws and apply a bead of sealant at the seam where the two components meet.**



EXPLANATION OF STOVE FUNCTIONS

Ready Mode: When the selector knob is turned from “OFF” to a number, the “READY” light will light up solid green, the combustion fan will come on, and the stove will have positive vacuum. The stove is now ready to start the ignition sequence by pushing “START”. If the knob is turned back to “OFF”, the stove will switch to the shut down mode. The only way to stop the shut down mode is to disconnect the stove’s power supply for more than 15 seconds, allowing the control board to reset itself.

Ignition Mode: The ignition mode is a 20 minute, pre-programmed sequence that cannot be changed. If not using a thermostat, press the ”START” button to start the ignition sequence. If hooked up to a thermostat, you must manually press the “START” button for the initial burn, any time the stove has lost power, has been turned off, or reset. The thermostat will start the ignition sequence automatically the next time it calls for heat. The “IGNITING” light will flash green while in this sequence. This sequence will override the number the selector knob is set to. Once the control board confirms proof of fire, the “IGNITING” light will stop flashing, and will automatically switch out of the ignition mode, and run at the number the selector knob is set to. The following is what each component is doing during the ignition sequence:

IGNITER- Runs for the first 7 minutes

AUGER- Runs on High for 1 minute, off for 1 minute, on High for 3 minutes, on setting 3 for 9 minutes, and off for the remainder of the 20 minutes.

PROOF OF FIRE- The control board sends a coded signal to the Proof of Fire snap switch at the 11 minute mark. Once the snap switch reaches 140 degrees F, the switch closes and the signal makes it back to the control board, confirming proof of fire. If the control board does not confirm proof of fire by the end of the 20 minute sequence, the lights will flash a red ignition failure code, and the **combustion fan will run on high until the selector knob is turned off.**

COMBUSTION FAN- Runs on setting 3 for the first 5 minutes, and on setting 4 for the remainder of the 20 min sequence.

Shut Down Mode: Any time the selector knob is turned to “OFF”, the control board switches to the shut down mode. The “READY” light will be flashing green. The auger will stop feeding and the combustion fan will run on high for 35 minutes. The convection blower will run until the convection blower snap switch cools down to 120 degrees F, breaking the connection.

Shut down mode with the stove hooked up to a thermostat- When the thermostat is satisfied, the stove will switch to setting 1, and continue to burn for one hour. If the thermostat does not call for heat during that hour, the stove will switch into the shut down mode. If the thermostat calls for heat during the shutdown mode, the stove automatically switch into the ignition mode.

READING CODES

The control board has the following three lights:

Igniting- Blinks green when in the ignition sequence, and flashes two short, red blinks when the stove has failed to ignite.

Feeding- Solid green when power is sent to the auger motor, and out when the auger is stopped.

Ready- Solid green when ready for ignition, blinking green when in the shut down mode, and blinking red when something is functioning abnormally.

We will now look at the four possible codes the ready light will flash if something is functioning abnormally.

IGNITION FAILURE - READY light is solid red and IGNITING light blinks two short, red blinks

PROOF OF FIRE - READY light is flashing two short, red blinks

VACUUM FAILURE - READY light is flashing one short and one long, red blink.

OVER TEMPERATURE - READY light is flashing two long, red blinks

TROUBLESHOOTING CODES - CAUSES AND SOLUTIONS

IGNITION FAILURE

SYMPTOMS	POSSIBLE CAUSES	SOLUTION
Fire is seen in the pot, but control board is not confirming proof of fire.	Proof of Fire Switch Defective or dirty.	Clean or replace Proof of Fire snap switch.
	Bad connection on Blue and or brown wire.	Check wiring and repair or replace.
	Control board is defective.	Replace control board.
Sparks and or charred pellets are found, but pellets never fully ignite.	Air holes in burn pot are plugged.	Clean burn pot.
	Igniter is not up tight against the back of the burn pot.	Push igniter up tight against pot, and tighten hose clamp
	Igniter is partially burned out, and not getting as hot as it should	Replace igniter.

IGNITION FAILURE

SYMPTOMS	POSSIBLE CAUSES	SOLUTION
Pellets feed, but do not light	Air holes in burn pot are plugged Igniter fuse is blown. Igniter has shorted out	Clean burn pot Replace igniter fuse. Replace igniter.
Pellets do not feed .	Auger is jammed or clogged. Auger is not primed	Remove auger and clean Start the ignition sequence again.

PROOF OF FIRE

SYMPTOMS	POSSIBLE CAUSES	SOLUTION
Stove goes out at night, or when thermostat is satisfied and switches to the low setting for one hour.	Stove is running out of pellets. Low feed rate is too low.	Make sure hopper is filled at night. Turn up low feed rate using the diagnostic tool.
Loses proof of fire at random.	Loose connection on proof of fire snap switch. Defective proof of fire switch	Tighten connections. Replace switch.
Fire burns extremely brisk, and excessive sparks and or unburned pellets are being ejected out of burn pot	Excessive combustion air is flowing through the firebox caused by an over drafting vent system.	Slow the draft down using the draft adjuster

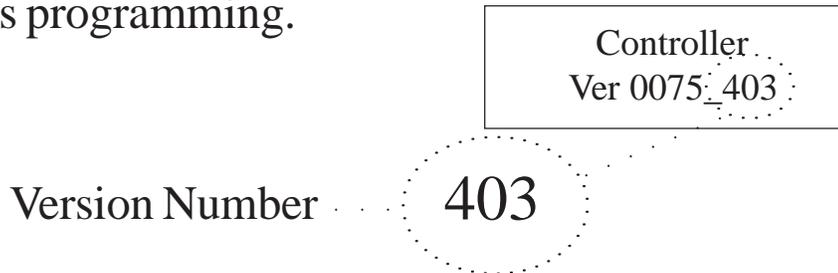
VACUUM FAILURE

SYMPTOMS	POSSIBLE CAUSES	SOLUTION
<p>You cannot hear the combustion fan coming on when the knob is turned from OFF to a number.</p>	<p>Combustion fan has a bad ground</p> <p>Combustion fan does not have power coming to it.</p> <p>Combustion fan is defective</p> <p>Control board is not sending power to the combustion fan</p>	<p>Check ground wire and connections</p> <p>Check power wire with volt meter</p> <p>Replace combustion fan</p> <p>Replace control board</p>
<p>You hear the combustion fan come on, but control board defaults to vacuum failure code.</p>	<p>Vent pipe is restricted</p> <p>Flue gas passageways restricted</p> <p>Front door is leaking</p> <p>Ash drawer is not sealing</p> <p>Vacuum hose and or brass nipple is plugged</p> <p>Bad connection on either brown or green wire</p> <p>Vacuum switch is defective</p> <p>Control board is defective</p>	<p>Disconnect pipe from stove and turn stove to ready mode to test theory. Clean the pipe, or increase vent size on new installations.</p> <p>Clean flue gas passageways</p> <p>Latch or adjust front door or replace door gasket</p> <p>Close latches, adjust latches, or replace drawer gasket</p> <p>Clear or replace hose, clean nipple</p> <p>Connect brown and green wire with a jumper to test theory. Repair or correct as necessary</p> <p>Replace vacuum switch</p> <p>Replace control board.</p>
<p>Stove has vacuum failure only on lower settings, but will work on high</p>	<p>Vent pipe is restricted</p> <p>Flue gas passageways restricted</p> <p>Line voltage is too low causing the combustion fan to run at a lower speed, producing less vacuum</p>	<p>Clean vent pipe or increase vent size on new installations</p> <p>Clean flue gas passageways</p> <p>Check voltage at outlet, should not be lower than 115 volts. Increase combustion fan speed to compensate using diagnostic tool</p>

OVER TEMPERATURE

SYMPTOMS	POSSIBLE CAUSES	SOLUTION
Over temp snap switch is tripped	Convection fan is not working	Correct problem or replace convection fan
	Flue gas passageways restricted	Clean flue gas passageways
Over temperature code flashes as soon as the start button is pushed	Over temp snap switch is tripped	Reset switch by pushing red button
	Auger motor circuit is not complete	The red power wire for the auger motor must be complete down to the motor and the motor must have a good ground. Correct or replace any wiring problems.
	Auger motor has shorted out	Replace auger motor

NOTE: This manual is to be used with models PS40 and PI40 equipped with control board programming version 403 - 408. The Country Stoves Diagnostic Tool is used to identify the control board's programming.



Country Stoves Diagnostic Panel

To use the Country Stoves diagnostic panel, the knob on the control board does not have to be turned to a number, but the stove needs to be plugged in. Plug the jack into the outlet located on the bottom left of the control board. The title "Country Stoves Diagnostic Panel" will appear on the screen.

To scroll through the different screens, press and hold the mode button, and use the up and down arrows to scroll to the desired screen.

Screen 1:

Controller
Ver 0075_408

Control board identification

This screen identifies which version of programming is present in the control board.

Screen 2:

POF + TSTAT +
VAC -- HILIM +

Stove component status

(POF)-PROOF OF FIRE- In the example we see that the stove confirmed proof of fire. This will show negative until the flue temperature reaches 140 degrees F, allowing the proof of fire switch to close, sending the signal back to the control board.

(TSTAT)-THERMOSTAT CONNECTION- In the example we see that the TSTAT connection is positive. This means the jumper wire is in place, or the thermostat is calling for heat. If the thermostat setting is turned down below room temperature, the TSTAT connection should change to negative. This feature allows you to see if the stove is receiving the signal from the thermostat, or to check a suspected faulty thermostat.

(VAC)-VACUUM- In the example we see that the vacuum signal is negative. This is because the knob on the control board is in the off position. When the knob is turned to a number the combustion fan will come on and produce positive vacuum. The control board sends a signal out to the vacuum switch, and if there is enough vacuum, the contacts in the vacuum switch are pulled together, sending the signal back to the control board confirming positive vacuum.

(HILIM)-HIGH LIMIT- In the example we see that the high limit circuit is complete. The high limit switch is tied into the red power wire sending power to the auger motor. This circuit needs to be complete all the way down to a good connection on the auger motors ground wire for this to read positive. If this reading is negative, there is a break in the circuit. The most obvious would be the high limit switch itself being tripped. Although the break could be further down the line, like a bad connection on the ground wire or a burned out auger motor. This allows you to easily see if this circuit is complete or broken.

Screen 3: ADJUST MIN. FUEL
+ 2.5 secs **Minimum fuel delivery on low setting**

This screen is used to adjust the number of seconds the auger motor turns on the low burn setting. The factory setting is 2.5 seconds, out of an 8 second auger cycle. This would be adjusted to a higher setting if the fire is burning out on low for the following reasons: low quality pellets being burned, or too much combustion air caused by an installation with a long run of vent pipe.

Screen 4: ALTITUDE
ADJUSTMENT = 0 **High altitude fan adjustment**

This screen is used to increase the speed of the combustion fan to compensate for thin air in a high altitude installation. The setting is zero from the factory. This setting can be adjusted up to 50. When turned up to 25, the fan speed is increased by 10%. If turned up to 50, the fan speed is increased by 20%. Low voltage can also be compensated by adjusting the altitude adjustment. Country pellet stoves need a minimum of 116 volts to operate properly. If the wall outlet voltage is lower than 116 volts, the combustion fan will not run as fast as it should, producing less combustion air, and less vacuum. This could result in poor combustion and possible vacuum failure, shutting the stove down. The following table shows proper altitude adjustment for low line voltage.

LINE VOLTAGE	ALT. ADJ.	LINE VOLTAGE	ALT. ADJ.
115.1	2 TO 4	110	7 TO 9
114	2 TO 4	108.9	8 TO 10
113.3	6 TO 8	106.9	12 TO 14
111.5	6 TO 8	105	15 TO 17

Screen 6:

COOL DOWN TIME = 35 mins

This screen displays the amount of time the combustion fan and room blower run when the stove is in shut down mode. The factory setting is 35 minutes. If the customer would like it changed, it can be reduced down as low as 20 minutes, or increased to as much as 60 minutes. The room blower will always shut down as soon as the snap switch cools down to 120 degrees F. The combustion fan will continue to run for the set amount of time.

Screen 5:

AUTO SHUTDOWN TIME = 60 mins

After the desired temperature on the thermostat has been reached, the stove will automatically switch to the lowest setting and continue to run for the set time. If the thermostat calls for heat during that time, the stove will switch back to the original setting. If the thermostat does not call for heat during the set amount of time, the stove will go into the shut down mode. The factory setting is 60 minutes. This can be adjusted in 30 minute increments from 30 minutes up to 240 minutes this function can also be adjusted to "OFF". When switched to OFF, the timer function will be off and not shut down, it will run on low until the thermostat calls for heat again.

Screen 6:

COOL DOWN TIME = 35 mins

This screen displays the amount of time the combustion fan and room blower run when the stove is in shut down mode. The factory setting is 35 minutes. If the customer would like it changed, it can be reduced down as low as 20 minutes, or increased to as much as 60 minutes. The room blower will always shut down as soon as the snap switch cools down to 120 degrees F. The combustion fan will continue to run for the set amount of time.

Screen 7:	PF	VC	HI	IG	AC	System interruption log
	1	2	0	0	3	

The control board on the stove will record and store all system interruptions, up to 99 for each. This screen displays all system interruptions since the unit was new or the last servicing. The abbreviations are as follows: “PF” proof of fire, “VC” vacuum, “HI” high limit switch, “IG” ignition, “AC” alternating current, or stove power supply. In this example we see that the stove lost proof of fire once. This could have been caused by the stove running out of pellets. The stove has had two vacuum failures. This could have been caused by the firebox door being opened while the stove was running. The stove’s high limit circuit has never been incomplete, or the high limit switch has never been tripped. It has never failed to ignite, and has lost power three times. This could be caused from a power outage, or being unplugged from the wall. After servicing the unit, these records should be written down and cleared to aid the next service call. To clear the screen, press the plus and minus button at the same time.

Screen 8:	RESTORE	DEFAULTS
	PRESS	+ & --

This screen is used to restore the control board to all factory settings. To do this, press the plus and minus button at the same time.