



# **Pellet Stove Test Manual**

## **Stricter Emission Standards**

Adopt stricter emission standards than the EPA.

1. Washington: 4.5 grams per hour for non-catalytic and pellet stoves; 2.5 grams per hour for catalytic and pellet stoves.
2. Montana: The tax code, Subchapter 1, 42.4.104 (2) (d) says a tax credit applies to biomass stoves and furnaces which emit less than six grams per hour.
3. Ten states require that only outdoor hydronic wood boilers qualified by an EPA voluntary program be installed: New England states, New York, Pennsylvania, Maryland and Indiana. In two states - Washington and Oregon they are banned altogether.

### **Forbid Sale of Exempt Stoves**

1. California: Forbids sale or installation of residential indoor wood stoves that are exempt from EPA regulation.
2. Washington: Same as California, above.
3. Oregon requires all stoves sold must meet EPA standards.
4. Colorado requires all new wood stoves sold must meet EPA standards, Pellet stoves must be below 4.1, and masonry stoves must not emit more than 6 grams PM per 6 kilograms of fuel. Wood boilers and furnaces are exempt which does allow outdoor wood boilers to be installed.
5. Utah: Solid Fuel Burning Devices must be EPA certified to be installed in the following Utah counties: Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber Counties.

### **Forbids Sale and/or Installation of Uncertified Stove**

1. Washington: Since 1992, has forbidden sale and installation of wood stoves or inserts that are not certified to the stricter Washington state emission standards.
2. Oregon: Forbids sale and installation of wood stoves or inserts that are not certified. Oregon began certifying stoves in 1986 and the EPA in 1988.
3. Denver-Metro area, Colorado: Prohibits sale and installation of new or used uncertified wood burning appliances
4. Summit County, Colorado: Forbids the installation of a non-certified wood stove in a new home or as a replacement unit for an existing non-certified stove.
5. Idaho: Several counties ban selling second-hand non-certified stoves.

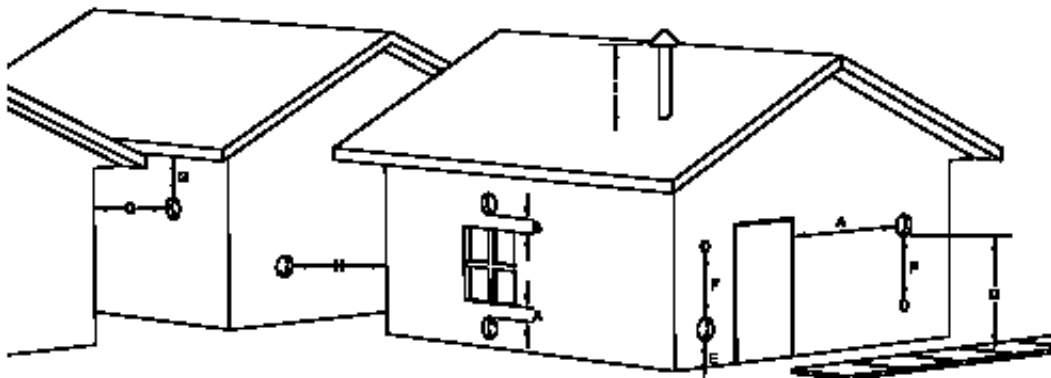
### **Forbids Installation of Fireplaces**

Denver Metro area: Banned unless they are equipped with an EPA Phase II wood or pellet burning insert, or electric or gas log.

## Installation

### VENT TERMINATION CLEARANCES:

- A — Minimum 4-foot clearance below or beside any door or window that opens.
- B — Minimum 1-foot clearance above any door or window that opens.
- C — Minimum 3-foot clearance from any adjacent building.
- D — Minimum 7-foot clearance from any grade when adjacent to public walkways.
- E — Minimum 2-foot clearance above any grass, plants, or other combustible materials.
- F — Minimum 3-foot clearance from a forced air intake of any appliance.
- G — Minimum 2-foot clearance below eaves or overhang.
- H — Minimum 1-foot clearance horizontally from combustible wall.
- I — Must be a minimum of 36-inches above the roof and 24-inches above the highest point of the roof within 10-feet.



VENT TERMINATION CLEARANCES



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**8500 4 Digit Board**  
**5 Heat Settings**



## **Error Codes and Display Indicators**

<u><b>Error codes</b></u>	<u><b>Error description</b></u>	<u><b>Possible Causes</b></u>
<b>Err1</b>	<b>High Limit Sensor has Tripped</b>	<ul style="list-style-type: none"> <li>• Inadequate Ventilation</li> <li>• Room Fan Failure</li> <li>• Exhaust Blockage</li> <li>• Electrical Open in Wiring</li> </ul>
<b>Err2</b>	<b>Stove Ran Out of Fuel During Normal Operation or Vacuum Issue</b>	<ul style="list-style-type: none"> <li>• Hopper Empty</li> <li>• Auger Output Failure or Jam</li> <li>• Flame or Fuel Quality Caused Fire to burn to slowly or go out</li> <li>• Electrical Open in Wiring</li> <li>• Vacuum pressure issue</li> </ul>
<b>Err3</b>	<b>The stove was unable to reach temperature to turn on the room fan</b>	<ul style="list-style-type: none"> <li>• Flame or Fuel Quality caused fire to burn to slowly or go out</li> <li>• Auger output failed or jam</li> <li>• Hopper Empty</li> <li>• Thermistor not connected to control board or bad</li> </ul>
<b>Err4</b>	<b>The Power failed while the stove was hot, and when power was restored the fire went out</b>	<ul style="list-style-type: none"> <li>• Electrical Open in Wiring</li> <li>• Power Loss</li> </ul>
<b>Err5</b>	<b>The Auger Output Fuse Has Blown</b>	<ul style="list-style-type: none"> <li>• Auger Motor Jammed or Bad</li> </ul>
<b>Err6</b>	<b>The Igniter Output Fuse has blown</b>	<ul style="list-style-type: none"> <li>• Igniter Shorted out or bad</li> </ul>
<b>Err7</b>	<b>The Draft Fan(Exhaust Fan)Output fuse has blown</b>	<ul style="list-style-type: none"> <li>• Draft fan motor jammed or bad</li> </ul>
<b>Err8</b>	<b>The Room Fan Output Fuse has Blown</b>	<ul style="list-style-type: none"> <li>• Room Fan Motor Jammed or Bad</li> </ul>
<b>Err9</b>	<b>Bad Control Board</b>	<ul style="list-style-type: none"> <li>• Bad board try to reset it</li> </ul>
<b>Err 11</b>	<b>Vacuum Issue</b>	<ul style="list-style-type: none"> <li>• Check to see if stove is clean and exhaust fan is clean</li> <li>• Bypass the pressure switch</li> </ul>

# Display Indicators

Several situations or events are indicated in normal operation by blinking display indicators or segments in the display:

**Flashing On Light:** This means that the stove is in the “Start Up” state waiting for either a 3 minute time-out to begin burning or for the stove to reach the warm temperature whichever comes first.

**Flashing Off Light:** This indicates that the stove is in the shutdown state waiting for the OFF button, or for a 15 minute period after the stove was turned off, or for the stove to cool down, or for the door to be closed.

**Flashing Dash in Heat Range Display:** This indicates that the stove is in normal run mode and is ramping from the current heat range setting to the target heat range setting. Once the ramp is complete the dash will stop flashing. For Ramping from heat range 1 to 5, the default time is 12 minutes (with a 90 second ramp time).

**Flashing Automatic Mode Indicator:** This indicates that the stove is in normal operation and is running in the automatic mode. However either the draft fan or auxiliary setting is manually configured.

**Flashing draft fan:** This indicates that the stove is in normal operation and that the vacuum sensor detects a loss of pressure either because the door is open or because there is a negative pressure in the room with respect to the exhaust.

**Flashing Aux Indicator:** This Indicates that the igniter is on during the lighting stage.

**Quickly Flashing Heat Range Setting Indicator (changes twice per second):** This indicates that the stove is in normal operation and that an over-temperature condition exists causing the fuel to stop.

**Slowly Flashing Heat Range Setting Indicator (changes once per second):** This indicates that the stove is in a cut back condition in an attempt to prevent an over-temperature shutdown

**Factory Defaults:** To return the control to its original factory default settings, Press and hold the AUX UP and AUX DOWN buttons together for three seconds.

## 8500 4 Digit Board Test

To run this test the **UNIT MUST BE COOLED OFF**. Power up the unit by plugging in the power supply cord to the back of the unit. Press the on button and the circuit board then press and hold the **Off and Auger Delay buttons simultaneously for 3 seconds**. To advance through the test press the on key.

1. Exhaust Fan Output Test- The display will show “**drift**”. The exhaust fan is turned on full then reduced to a level just above the typical minimum pressure switch setting. The ON LED indicates whether the pressure sensor is detected. If the pressure switch is not detected, the fan ramps to full on for two seconds then returns to the previously established level if the pressure switch closes. If the Draft Fan Fuse is not blown and the fuse detection circuit is functioning, the Draft Fan LED will be lit and the other three top row LEDs will be off.
2. Room Fan 1 Output Test – The display will show “**rfn1**”. The room fan 1 is turned on full. If the Room Fan 1 Fuse is not blown and the fuse detection circuit is functioning, the Room Fan LED will be lit and the other three top row LEDs will be off.
3. Room Fan 2 Output Test- The display will show “**rfn2**”. The room fan 2 is turned on full. Since there is no blown fuse detection circuit on the daughter board fan, none of the top row LED’s should be lit.
4. Agitator Output Test- The display will shows “**agit**” The agitator is turned on full. If the Agitator fuse is not blown and the fuse detection circuit is functioning, the AUX LED will be lit and the other three row LED’s will be off.
5. Auger Output Test – The display will show “**augr**”. If the Hopper switch is open( lid open) the ON LED will turn on otherwise, it will be OFF fuse.
6. Hopper Switch Test – The display will show “**Hppr**”. The igniter motor is turned on full. If the Igniter (AUX) Fuse is not blown and the fuse detection circuit is functioning, the AUX LED will lit and the other three top row LEDs will be off.
7. Thermostat Input Test – The display will show “**stat**”. If the thermostat input is closed, the ON LED light will be on, otherwise it will be off.
8. Interlock Switch Test – The display will show “**intl**”. If the interlock is made (closed), the On LED will turn on otherwise, it will be off.
9. Flue gas Thermistor Test – The display will show the flue gas temperature in degrees F.
10. Vent Thermistor Test- The display will show the vent temperature in degrees F.
11. Ambient Thermistor Test- The display will show the temperature of the daughter board thermistor in degrees F.
12. AC Frequency Test - Displays the measured AC frequency in hertz followed by the letter “H”.This should read 59, 60, or 61H
13. Watchdog Reset – The Watchdog timer is tested to ensure that the board can be reset. The message “BYE” will be displayed until the Watchdog resets board.



## 8500 C Codes

To adjust the operation constants, press and hold the mode and auger delay buttons simultaneously for 3 seconds. The display will show "C-1". Use the Heat up or Heat down buttons to change the constant number. When the desired constant is displayed, press the on button to toggle between viewing and editing the value. While editing the parameter, use the AUX up and AUX down buttons to adjust the value to the desired point, then press on again to return to the constant number list. Press the off button to exit the adjust operational constant mode.

- **C- 1** - Reset to defaults (hold Mode and Auger Delay buttons for 3 seconds to reset all to defaults)
- **C- 2** - Fuel Lbs. Per Hour HR 1 (0-20.00) - This is the fuel rate in pounds per hour for a heat range setting of 1. **The default is 5.00lbs.**
- **C- 3** - Fuel Lbs. Per Hour HR 9 (0-20.00) - This is the fuel rate in pounds per hour for a heat range setting of 9. **The default is 13.lbs.** The fuel rates used between settings 1 and 9 are linearly interpolated between these two settings.
- **C- 4** - Agitator On Percentage HR 1 (0-100) - This is the Percent On time for the Agitator for a setting of 1. **The default is 25%.**
- **C- 5** - Agitator On Percentage HR 9 (0-100) - This is the Percent On time for the Agitator for a setting of 9. **The default is 50%.** The percent on time for the Agitator used between settings 1 and 9 are linearly interpolated between these two settings.
- **C- 6** - Draft Fan Level HR 1 (0-500) - This is the Draft fan output level for a draft fan setting of 1. **The default is 150.**
- **C- 7** - Draft Fan Level HR 9 (0-500) - This is the Draft fan output level for a draft fan setting of 9. **The default is 400.**
- **C- 8** - Fuel Rate Type Compensation (50%-200%) - This parameter affects how much the auger runs to produce a given fuel rate. The default fuel rates are based on corn. **This is the default setting for this parameter, or 100%.** If the parameter is adjusted up, the auger rate is increased proportionally. If the fuel being used is less dense than corn (wood pellets for instance), it may be necessary to raise this parameter to compensate. This makes the programmed lbs per hour correspond to the particular fuel type. Typically, wood pellets need to be run at 120% to compensate for their lower density and slower travel through the auger system.
- **C- 9** - Ramp Seconds for Increasing Level (0-300) - When the heat range setting is adjusted, the control will ramp from the current setting to the target setting to avoid abrupt changes in the outputs that could cause problems with the flame quality. The Ramp Seconds value sets the amount of time to spend on each heat range setting (1-9 pseudo ranges not 1-5 user ranges) as the current setting is ramping toward the target. If the current setting is ramping down toward a lower target, the ramp value is half this number. **The default value is 120 seconds.**
- **C-10** - Startup Minutes for Detecting Warm Furnace - (10-60) This is the amount of time the control will wait for the furnace to reach the warm temperature (110 Degrees F) after the furnace has been started before shutting down and reporting an Error condition Err3. **The default is 30 minutes.**
- **C-11** - Overtemp Setpoint - (0-700) This is the measured flue gas temperature that will cause an overtemp condition. In this condition, the control will stop

auguring fuel until the temperature returns to a safe operating point. **The default is 575 degrees F.**

- **C-12** – Cutback Setpoint - (0-700) This is the measured flue gas temperature that will cause a cutback condition. In this condition, the control will ramp the heat range down based on the ramp seconds described above divided by 2 until the temperature falls below the cutback setpoint. **The default is 550 degrees F.**
- **C-13** – Room Fan On Setpoint - (0-700) This is the temperature that the measured flue gas can reach before the flue controlled room fan turns on. If the measured temperature is higher than this setpoint, the control will turn on the flue controlled room fan. This variable also serves to indicate to the control that the stove is warm. If the measured temperature is higher than this setpoint, the stove is considered warm and will not create an Err 3. Whether or not the stove is warm also determines if the unit will recover from a power failure. If the stove is warm when power is lost and cold when it returns, it will shut down with an Err 4 error. **The default is 200 degrees F.**
- **C-14** – Cold Stove Setpoint - (0-700) This variable is used to determine when the furnace is cold and ready to be shut down. If during the shutdown sequence the measured temperature is less than this value, the furnace will stop running the fans to cool it off. **The default is 120 degrees.**
- **C-15** – Low Temp Vent Heat range – (0-9) This variable is used to control the vent controlled room fan. If the pseudo heat range (1-9) is greater than this number, the vent controlled room fan will turn on. If the pseudo heat range is less than this number, the vent controlled room fan will turn off. **The default for this parameter is 3.**
- **C-16** – High Temp Vent Setpoint – (70-400) This variable is used to limit the maximum vent temperature. If the measured vent temperature is greater than the High Temp Vent Setpoint, the furnace will reduce the heat range by 1. If the vent Temperature falls below the setpoint – 5, the heat range will ramp back to normal. **The default for this setpoint is 225 degrees.**
- **C-17** – Auger Period in Seconds – (5-20) This is the fixed auger period. The ontime is calculated based on the setpoint fuel rate in lbs. and the full on rate set in C-18. **The default is 10.00 Seconds.**
- **C-18** – Full On Fuel Rate in Lbs. /Hour – (7-40) This is the fuel rate that would be delivered if the auger was turned 100% of the time. This definition is for corn only (see proportional offset parameter Cool. **The default value for this parameter is 36 lbs. of corn per hour.**
- **C-19** – Ignore Sense Errors (0-1) When this parameter is set to 1, the sensor errors including Interlock, and all fuse detection errors are disabled. **The default is 0** (sense errors enabled).
- **C-20** – Ignore Vacuum Switch (0-1) When this parameter is set to 1, the vacuum switch is ignored. **The default is 0** (do not ignore the vacuum switch).
- **C-21** – Bump Rate in Lbs. (0-0.5) When the furnace is in shutdown, this parameter can be used to force a small amount of fuel to be pushed through the auger to keep the fuel in the auger from getting hot. **The default is 0lbs per hour.**
- **C-22** – Purge Seconds (0-120) After shutdown, the auger can be run for a fixed amount of time to dump any fuel that may have become hot in the auger. By default, the auger will run in this purge mode for 30 seconds after shutting down.