

PRINCIPLES OF PELLET STOVE OPERATION

Understanding a few basic principles of operation for Harman Pellet Stoves will allow for accurate diagnosis and repair.

When working on any Harman Pellet Stove a **Draft Meter, Volt Meter, Hand Tools** and a few **Spare Parts** are needed to diagnose and repair the stove.

TEST MODE – Multiple functions of the stove can be tested in this mode.

First the feed motor, distribution blower and combustion blower will run for one minute. During the first minute the blower motors will both run on high. After the first minute, the feed motor will turn off. The blowers will alternate every minute between high and low. When one blower is on high the other blower will be on low. The corresponding light on the control burns dim when that blower is on low and burns bright when that blower is on high.

The feeder position micro switch can also be checked in test mode if your stove has one. During the first minute of test mode the feed motor will run. When the pusher arm actuates the feeder position micro switch the power light will be on. When the pusher arm is not actuating the switch, the power light will be off. The feeder position switch can also be actuated manually in test mode and operation verified by the power light.

TEMP KNOB – The temp knob has two dials. The outer dial is used when running in room temp mode.

In room temp the stove will heat to satisfy the room sensing probe to the temperature set on the temp dial.

The inner dial is used when running in stove temp mode. In stove temp mode the stove will heat to maintain a constant temperature at the E.S.P. probe based on the temp dial setting.

MODE SELECTOR KNOB – The mode selector knob allows you to choose between room temp control and stove temp control or off. Turning the pointer between “l” and “h” in room temp or stove temp mode allows you to vary the speed of the distribution blower between low and high.

FEED RATE - Feed rate is widely misunderstood. Think of the feed rate as a 60 second timer. On a call for heat and a feed rate of “2” the maximum the feed motor will run is on for 20 seconds and off for 40 seconds. A feed rate of “3” would produce a maximum feed of on for 30 seconds and off for 30 seconds. A feed rate of “4” would produce a maximum feed of on for 40 seconds and off for 20 seconds. And so forth. As the room sensing probe in room temp mode or the E.S.P. probe in stove temp mode approaches the temp dial setting, the stove will automatically cut back the feed rate so the stove does not over shoot the temp dial setting.

Once the feed rate is set for the quality of pellets you are burning no additional adjustment is needed. A feed rate of 3 to 4 is good for most pellets. Turning the feed rate down to conserve fuel is not effective. The stove will burn at the maximum feed rate for a longer period of time to satisfy the temperature set on the temp knob.

MANUAL / AUTO SWITCH – The auto manual switch can be used to allow for various control options of the pellet stove.

Auto mode allows for automatic ignition and control of the stove.

Manual mode requires manual ignition. The stove will work differently depending if you are in room temp mode or stove temp mode.

AUTO & ROOM TEMP MODE - Setting the auto / manual switch to auto and the mode selector knob to room temp will allow for automatic control. The stove will heat to satisfy the room sensing probe to the temperature set on the temp dial. As the room sensing probe approaches the temperature set on the temp dial the control will automatically cut back the feed rate to keep from over shooting the set point. If the room sensing probe reaches 3 degrees above the temperature set point the stove will go into shut down mode. When the room sensing probe senses 2 degrees below the temperature set point the stove will re-ignite and heat to satisfy the room sensing probe.

AUTO & STOVE TEMP MODE – Setting the auto / manual switch to auto and the mode selector knob to stove temp will allow for initial automatic start up only. The stove will maintain a constant E.S.P. probe temperature based on the setting of the temp dial. The temperature of the room has no effect when running the stove with these settings. The stove will burn a constant amount of pellets to maintain the E.S.P. probe temperature. The stove will not shut down with this setting unless it runs out of pellets or is turned to off.

MANUAL & ROOM TEMP MODE – Setting the auto / manual switch to manual and the mode selector knob to room temp requires the stove to be lighted manually. With these settings the stove will not go into shut down mode when the room sensing probe is 3 degrees above the temp dial set point. The stove will go to a low burn at 3 degrees above the set point and remain in low burn until the room sensing probe senses 2 degrees below set point. When the room sensing probe senses 2 degrees below the set point the feed rate will increase to satisfy the room sensing probe to the temp dial set point.

MANUAL & STOVE TEMP MODE – Setting the auto / manual switch to manual and the mode selector knob to stove temp requires the stove to be lit manually. The advantage of this setting is to allow viewing of the fire without the distribution blower circulating heat into the room. With the temperature dial set at 5 or less the distribution fan will not operate. If the temp dial is increased above 5 the distribution blower will come on when the E.S.P. probe reaches 350° F. The stove will burn a constant amount of pellets to maintain the E.S.P. probe temperature. The stove will not shut down with this setting unless it runs out of pellets or is turned to off.

- The stove can be switched from auto to manual during operation after the stove is out of the ignition cycle. The stove may also be switched between room temp and stove temp mode during operation. It is best to pause at “off” when making the change.

PRESSURE DIFFERENTIAL SWITCH – The pressure differential switch, located by the combustion air intake, monitors the stove for a loss of draft situation. Harman Pellet Stoves operate with a negative pressure in the firebox and a positive pressure in the venting system. The normally open switch closes at **-.17 in. WC**. If the **negative pressure** in the firebox is greater than **-.17 in. WC**, the switch closes and allows power from the control board to the feed motor and igniter. If the **negative pressure** in the firebox drops below **-.17 in. WC**, the switch opens and does not allow voltage from the control board to the feed motor or igniter.

The power travels from the control board through the pressure differential switch and then to the feed motor and igniter. Therefore never assume the feed motor or igniter are defective if the corresponding light on the board is lit and they are not working.

The function of the draft differential switch holds true in test mode also.

ESP PROBE – The E.S.P. probe (exhaust sensing probe) is located in the exhaust tail pipe of the stove. The E.S.P. probe monitors the exhaust temperature. Based on the information the circuit board receives from the E.S.P. probe determines functions such as; when the ignition cycle is complete, when the distribution blower comes on, when the stoves high limit is reached, the feed rate on low burn and others. Also during shut down when to turn the distribution blower, feed motor and combustion blower off.

You can see that the E.S.P. probe is very important to proper stove operation. Keeping the E.S.P. probe clean and taking care not to damage the probe during cleaning is essential to proper stove operation.

ROOM SENSING PROBE- The room sensing probe plugs into an outlet on the back of the stove. It is recommended that the probe be installed even if running the stove in stove temp mode. When burning in room temp mode the stove operates to maintain the temperature at the room sensing probe to the temperature set on the temp dial.

The location of the room sensing probe is important. Do not lay the room sensing probe on a cold surface in the room such as tile or concrete. Keep the room sensing probe out of drafty locations such as next to an outside door. The room sensing probe may be extended using regular 18/2 thermostat wire. It is recommended that the probe not be more than 25 feet from the stove or in another room.

VOLTAGE / POLARITY – The voltage and polarity at the outlet the stove is plugged into is critical. They should be verified at each installation. Voltage should be constant and 115 – 122 VAC. Low voltage can cause increased ignition times. Polarity can be checked with either a plug in polarity tester or a voltmeter. Incorrect polarity will confuse the control board and cause erratic operation.

