



EasyFire B Model Pellet Heater Quick Troubleshoot and Technical Guide

SPI's EasyFire pellet heaters are designed to operate as a seasonal zone heater burning 1/4" wood pellet fuel. Utilizing a 12VDC control and drive system allows for extended battery operation when AC power fails. The following outlines the general operating parameters and trouble shooting encountered during installation and seasonal operation. Basic operation is controlled combustion of wood pellets metered by the feed drive system into a burn pot and a combustion/convection fan motor providing separate air for combustion and heat exchange. This process is controlled by a digital main controller which monitors all function through two sensors and incoming outgoing operating voltages. Additionally, starting functions are provided by an industrial style cartridge heater located in the burn pot and both internal and optional thermostat.

Standard operation: With both 120VAC and 12VDC battery power attached and a functional pellet flue system the heater is designed to operate continuously during the heating season. On a daily bases the heater requires fuel to be added to the storage hopper and depending on the fuel quality, burn pot area cleaned. Starting and operating sequences are controlled by an operating software program contained on a EPROM memory chip. Fuel rate is controlled by mode setting and trim position (standard trim knob setting is 9:00 and is located on control panel next to operation buttons). Normal start up and operation summary follows:

Condition - Heater is cold, power connected, button to "OFF" position. Hopper door closed (safety switch closed). External thermostat jumped (factory standard) or optional thermostat closed to call for heat.

- 1) Select a run button (Low, Medium, High) and press. The LED light will shift from OFF to run button.
 - A) Feed motor starts initial fuel shot (approx. 40 seconds) and ignitor ON. Ignitor will begin to start heating and pass 300 degrees in 30 seconds.
 - B) Fan motor starts in 60 seconds @ 3 volts providing combustion and convection air. Feed will cycle OFF completing the start up fuel shot. Smoke will be visible normally visible through the door glass with in 2 minutes.
 - C) Feed will cycle ON for short periods during the start cycle add small amounts of fuel. Heater continue in START UP mode until temperature rise is confirmed by sensors or for a total of 10 minutes.

If temperature does not increase by 15C during this STARTUP phase the heater will begin the SHUTDOWN (for further information read SHUTDOWN in several paragraphs).

- 2) RUN mode begins when temperature rise is achieved (normally within 5-7 minutes).
 - A) Fan increases based on run button selected. Feed pulses increase based on temperature and TRIM setting. Feed trim adjustment allows for a lower or higher average fuel delivery. Initial flame is high based on a cool heater and fuel shots provided for start up. As operating temperature is reached the feed pulse will decrease and flame will drop.
 - B) Feed rate will vary up and down as the heater adjusts for operating temperature. Temperature measured at T-2 sensor mounted on fan housing manifold.
 - C) Heater will continue to operate as long as fuel, thermostat setting, and operating button remains.

Condition - Shutting down operating heater. Selecting the OFF button or external thermostat no longer calls for heat.

- A) Feed motor immediately stops. No fuel is added to the burn pot and the coals remaining began the burn out.
- B) Fan is reduced to shut off voltage of 5 volts and maintained until sensor T-2 records a 20C reduction of temperature or 20 minutes time elapses.

Other related operating parameters

Three basic functions are constantly monitored during operation including flue drafting, operating temperatures, and AC power input. Blocked flue will cause an unsafe condition and will cause the unit to shut down with a steady RED fault indication noted on the control panel. Continued high temperature may cause a unsafe condition. The heater will

stop the feed during high temperatures to allow the heater to cool. A flashing RED will indicate high operating temperature. AC power outage will stop external thermostat function if the optional battery is connected allowing the heater to run continuously while AC is out.

Common operating problems:

(Refer to installation manual and repair manual for additional information regarding specific component replacement and testing).

Basic tools required for troubleshooting - Multi Volt/Ohm Meter, standard and phillips screw drivers, standard jewelers screw driver (fan speed adjustments on main control board).

No power - Power is provided by both AC and DC supplies. There are two replaceable fuses located near the power connections. They are identified as Main (1 amp) and Ignitor (5 amp). If AC power is present to the main control system a LED will be lit on the OFF button. If DC power is present a GREEN LED will be lit on the control panel.

Quick Testing -

- 1) Check AC power with volt meter at wall socket - 115VAC.
- 2) Check DC power at battery - 12VDC.
- 3) Remove fuses and check continuity with OHM meter. Blown fuses can be caused by voltage spikes (lightning, power company). If fuse is found blown, replace only once and retest. If the fuse blows again further troubleshooting is required before further fuse replacement.

Start up:

No fuel - Fuel located in the hopper is fed by an auger from the hopper bottom up to the shoot which directs the pellets into the burn pot. The feed motor is controlled by the main control system and on models EF3801B, 5001B, and 5001U-B a hopper safety switch (EF4001-B auger can not be accessed from the hopper door). The switch will disable the feed system if the hopper lid is open. The switch is located on the upper right hopper vertical panel and is accessed through a small panel. Fuel is only fed in Low to High operating modes and requires "priming" auger. If hopper is out of fuel, cycle from OFF to LOW several times to allow pellets to feed into burn pot.

Quick Testing -

- 1) Confirm hopper lid is sitting on the switch arm and the arm is closing. With hopper lid open, push the switch arm down and listen for click noting switch closure. With heater cold, and lid open, push switch arm down, push Low and the feed motor should start to turn.
- 2) Confirm feed motor is not jammed by emptying hopper and verifying a foreign object has not been caught. Remove top cover from feed tube from inside hopper if there is any question. If the feed motor is mechanically jammed, the control system has a built in circuit breaker. The breaker will require a reset by cycling from OFF to LOW. Do not recycle more than three times so the circuit does not become damaged by overheating.
- 3) Pellets Jammed in feed shoot (above burn pot). Remove all jammed pellets and clean shoot with scraper.

Ignitor does not heat up - The ignitor has a separate 120VAC circuit which includes a fuse, relay, and ignitor. This circuit is activated by the main control board via a 12VDC wire harness lead. When the main control calls for start the 12VDC circuit is closed sending 12VDC to the relay. As the relay closes, the 120VAC circuit is completed and the ignitor begins to heat. As noted in prior section, if 120VAC power is not available the heater will still start the fan and feed if 12VDC is connected allowing a manual start with starter and match light.

Quick Testing -

- 1) Inoperative ignitor most likely has a blown fuse. Remove the 5 amp ignitor fuse and test with OHM meter. Replace if blown. As noted before if fuse blows again then further testing is required.
- 2) Testing ignitor requires access to the relay located near the main board assembly. Access is through the lower right pedestal for the 3801/5001, junction box on the 4001 insert, and lower right cabinet for the 5001U. Remove the power to the unit. Unplug the ignitor lead from the relay and the neutral circuit. Using the OHM meter check for continuity between the two leads. If the circuit is open the ignitor has failed. If the circuit is complete check one lead and then ground the other lead to the ignitor base. If circuit is complete ignitor has failed. A grounded circuit will cause the fuse to blow.
- 3) If ignitor checks out, remove the harness leads to the relay and using the volt meter set to 20VDC, confirm 12VDC

when the power is reapplied a run button is pushed. If 12VDC is found then the relay has failed.

Heater starts then burns out - The start up is controlled by the control system and best results are from a cold start. If a warm heater is immediately restarted it may not be able to confirm the required temperature increase as the heater temperature is already warm and the temperature is actually falling during the initial start up. Allow the heater to cool and shut down before restarting.

Trim settings - Will not change the first portion of the start up however will effect the initial run mode. If the trim is fully counter clockwise (Lowest) the heater may run low on fuel, most likely if the operating conditions are warm. High or Max trim settings may cause the opposite problem as the heater feeds to much fuel and allows the HIGH TEMP control stop the feed to cool the stove. Best starting trim setting is the mid point or 9:00 o'clock.

High temp starts will also occur if the burn pot has additional fuel prior to start up. This additional fuel which is then added too as the start cycle begins pushes the temperatures up as the heater starts. This is considered an temperature overshoot as the temperature climbs quickly.

Heater will not start when run button is pushed - Check external thermostat jumper or remote thermostat as the unit will not attempt a start unless this circuit is closed.

Run mode Troubleshooting:

Once the heater reaches the run mode it will continue operation by using the coals in the burn pot to light the pellets continuing to fall. If the coal bed burns down at some point the pellets may not light and then the heater will shut down. This is normally confirmed by finding the burn pot with unburned fuel and shut off. This can also happen if the hopper runs low on fuel or the fuel bridges (hangs on the hopper sides).

Run mode problem generally are either operational or limits exceeded - Blocked Flue (loss of flue draft) or High Temperature is exceeded. Blocked flue indication is a solid RED LED on the control panel and requires a recycle of the heater to clear. This is for the operators protection as a blocked flue could cause a dangerous condition. Block flue most likely is not fully blocked and will occur if the flue pipe is subject to high wind conditions or is blocked by ash. If this happens during initial installation a corrective action to the flue system will be required. Check the installation manual for flue recommendations.

Operational problems are generally related to ash build up in the burn pot or the heat exchange system and can be correct by cleaning.

Over Feeding - Over feeding is a common problem and is related to a lack of combustion air rather than to much fuel. If the heater is clean and seems to feed more fuel adjust the trim down to slow the feed rate. If the heater has been operated for sometime since the last cleaning then shutting it down and cleaning will solve the over feed. Check the door for proper adjustment as a partially closed door will cause reduced combustion air. Operating the heater for an extended time with an open door will cause a shut down with RED LED and require a restart.

HI TEMP/FLUE RED WARNING LIGHT:

When the Hi-Temp/Flue indicator light comes on (red lite beneath control knob) it means a fault has been detected in either the flue system, over temperature, or fan/feed motor.

Slow Flash Red Light - Indicates a blocked flue. Check flue and clean out for built up ash deposits.

Solid Red Light - Indicates an over temperature. Check the air intake at rear of unit. Turn the feed trim down 25% to reduce fuel rate.

Fast Flash Red Light - Requires unit to be unplugged to reset. Indicates a feed motor jam or fan motor fault. Fan motor test would require running unit on "fan and clean" only to determine if red light indication is repeated. If not, feed system is jammed and requires the hopper access cover to be removed and jammed material to be removed.

Shutdown:

Shut down is the simplest mode as the feed is stopped and the fan continues to operate until the heater is cool. If the fan continues to run after it is fully cold then the T-2 sensor and the main control did not register the required temperature reduction. Unplug the heater to reset and run again. If problem persists then the T-2 sensor or the control system will require component replacement.

Battery Operation Troubleshooting -

Battery operation requires a fully charge 12VDC battery capable of sustained 2 amp/hr. loads while maintaining a minimum of 11.2 VDC. This voltage is required for proper system operation. Most battery operation problems can be traced to a battery in poor condition.

Quick Testing

Remove battery from heater and charge overnight with automotive type battery charger. Test battery with automotive load tester. Replace if required. Testing connections from terminals on rear of heater back to the harness. If all connects are secure a main control board will be required.

Additional detailed information is contained in the installation and repair manuals. Please refer to these for in depth troubleshooting guides and harness replacement.

Component Adjustments and Replacement:

Main Control Board - Main control board is located in the lower right pedestal (3801/5001) or lower right rear - 4001 insert and right switch plate for the 5001U. The control board is held in place with several phillips screws.

Fan speed adjustments are accomplished by turning the LOW and HIGH fan pots on the lower right corner. These adjustments are made in the corresponding run mode. Factory settings are based on fan voltage as read across the motor terminals 6.8VDC LOW, and 9.0VDC HIGH.

A GREEN LED light flashes on the control board to confirm AC or DC power is present.

Switch Board - Switch board is attached to access panel with several phillips screws. Harness plugs into bottom of switch.

Sensors - Access for sensors is through the rear panels or T-2 through the switch panel on freestanding units. Both the T-1 and T-2 sensors are the same sensor type mounted differently. T-1 is mounted on the exhaust side of the combustion fan housing. It is held in place with a tie wrap. T-1 sensor allows for cabinet air to drawn through the high temp plastic holder. When door is open or flue blocks the flow reverses. T-2 sensor is attach to a aluminum block and attached to the manifold. Wire harness connections should be secure and not pulled tight.

Additional information is available on line@ www.sierraproductsinc.net/pages/customer_service

Technical Customer Service - 909-399-3355x29

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