SERVICE HINTS, DIAGNOSIS, AND CORRECTIVE MEASURES FOR THE IGNITION SYSTEMS OF SUBURBAN 12 VOLT ELECTRONIC IGNITION GAS FURNACES WITH TIME DELAY

CAUTIONS:

1. Never operate the furnace with the electrode wire disconnected or with the electrode assembly removed from the furnace.
2. Never use a screwdriver on any part of the electrode assembly while the furnace is in operation.
3. Be certain that the spark from the electrode never reaches the flame sensor portion of the electrode assembly.
4. Be sure the electrode assembly screws are snug at all times, especially after the electrode has been removed and reinstalled.
5. If the module board is found to be defective, it must be replaced - it is not field repairable. Any attempts to repair the board may alter the board and cause it to operate in an unsatisfactory manner.
6. Insure that the gap between electrode and ground is always 1/8". The gap between the flame sensor should be approximately twice the gap between electrode and ground to insure no sparking to sensor. Sparking to sensor will damage the module board.

The electronic ignition system is made up of three main parts:

A. the module board
B. The electrode assembly
C. The electrode wire

The **module board** is the brain of the electronic ignition system and it has several functions.

1. When the blower reaches approximately 75% of the normal r.p.m. and sufficient air flow is established, the sail switch engages and completes a 12 volt circuit through the limit switch to the module board.
2. After a 12 - 18 second delay, 12 volt current will pass through the module board to the solenoid valve. The current to the valve opens it and allows gas to the main burner; simultaneously, the module board sends high voltage through the electrode wire to the electrode assembly. The voltage seeks a ground between electrode and ground probe and a spark occurs. The spark then ignites the main burner.
3. The module board also performs the lockout function in cases where the spark fails to light the burner. When lockout occurs, the spark stops, the voltage from the module board to the gas valve is discontinued, and the valve closes. The unit will remain in lockout and the blower will continue to run until the thermostat is turned off. Turning the thermostat off disengages the lockout function of the module board. After the blower has stopped, the ignition sequence can be started again. The module will try three times for ignition before lockout.

It is important to determine the type problem being experienced, and then the proper checkout procedure can be made. The following is a list of problems, how to identify in which area the problem is located, and how to correct it.

1. Electrode not sparking - with *blower running* and *micro switch engaged*, check the following:
    a. Check for proper voltage at module board after the blower motor reaches full r.p.m. If no voltage, check continuity through micro switch and limit switch. Also check wiring and wire connections.
    b. Voltage is present but no spark at electrode after 12 - 18 second delay, check electrode wire connections.
    c. Wire connections OK, but electrode wire does not show continuity through it - replace electrode wire.
    d. Electrode wire does show continuity through it - check electrode gap to be sure it is 1/8" maximum between electrode and ground. NOTE: Gap between sensor and ground must be twice electrode gap.
    e. Electrode gap OK - check electrode assembly for possible cracks or carbon on tip of electrode.
    f. Electrode OK - replace module board.
2. Electrode sparking, but gas not coming through burner:
    a. Check to see if voltage is coming out of module board to gas valve after the 12 - 18 second delay. Check the wires in the molex connector to be sure they are intact and making contact with the module board. Check wire from the module board to valve for continuity. Wire and connections check OK – replace module board.
    b. Voltage is coming out of module board to gas valve, but gas valve does not open - replace gas valve.
3. Electrode sparking and gas valve opening, but burner will not light:
    a. Check to see if gas is coming through to the burner. This can be accomplished by using a flow meter in the gas supply line. If no gas is coming through the burner, check for obstruction in gas line, in main burner orifice, or in main burner.
    b. Gas is coming through burner, but spark will still not ignite burner - check gas pressure.
        i. Line Pressure - Min. 11" W.C.*, Max. 14" W.C.
        ii. To properly check pressure, first determine the line pressure, cycle furnace and check pressure drop on demand. The drop in pressure should not be more than ½" W.C. A drop of more than 1/2" would indicate a faulty regulator, a restriction in the gas line, or a pinched gas line. Excessive pressure drop could also be due to moisture contamination.
    c. Gas pressure OK - check for obstruction in main burner; check to be sure electrode is positioned approximately 1/4" above and directly over slots on the main burner – adjust electrode if necessary.
    d. Remove burner and check burner for obstructions. Clean as required.

4. Burner ignites, but goes off and into lockout
    a. Check to be certain that flame sensor is over slots in the main burner and that the main burner flame is burning against the tip of the flame sensor - adjust by bending sensor probe. NOTE: Sensor probe should be in the inner blue cone of the burner flame (approximately 1/4" to 5/16" above burner).
    b. Burner still goes off and into lockout - check wire connections at flame sensor and at module board.
    c. Wire connections OK - check continuity through flame sensor wire.
    d. Continuity of flame sensor wire OK - check with micro amp meter in series with flame sensor and flame sensor wire to be certain that the flame sensor is generating at least seven micro amps within seven seconds after the burner is ignited.
        i. Connect meter as follows: (+) to sensor wire, (-) to sensor probe. Adjust position of sensor probe, check for carbon deposits on sensor probe if reading is less than seven micro amps.
    e. Flame sensor circuit generating at least seven micro amps, but burner still goes off and into lockout - replace module board.
5. Repeated module board failures:
    a. Check to be certain that the electrode spark is not sparking against the flame sensor portion of the electrode assembly.
    b. Check to be sure module board or high voltage wires are not shorted to the chamber wrapper or other furnace parts.
    c. Be sure insulator covering the electrode wire connection on the coil of the module board is in place and insulator behind module board is in place.
    d. Make certain that the transformer voltage is within 12 – 14 volts A.C.
    e. Be sure duct connections to furnace are airtight. Seal duct collar connections to furnace cabinet with duct tape, if necessary to prevent hot air leakage. No air leakage should exist anywhere in the duct system, especially at connections on furnace cabinet.
    f. Be sure sensor wire terminal is tightly affixed to sensor probe.
    g. Be sure high voltage electrode wire is in good condition and properly positioned onto pierce point electrode.
6. Customer complains of unit going into lockout only once in a while:
    a. Thoroughly check electrode and burner relationship.
    b. Lockout can occur if the gas pressure fluctuates at the time the thermostat calls for heat. Pressure fluctuations can be caused by a malfunctioning gas bottle regulator, an obstruction or a kink in the gas line, or moisture in the gas bottle regulator or in the gas lines. It is difficult to check for these fluctuations that will not noticeably affect any other appliance in the coach. However, isolating the furnace from the coach gas system will determine if the gas system is responsible. This isolation procedure can be done by connecting a separate upright bottle, regulator and gas line directly to the furnace, eliminating the coach gas system. If the occasional lockout still exists, then the furnace should be thoroughly tested to determine the cause; however, if the furnace works properly on this separate system, then the coach gas system should be checked.

c. Check furnace return air and warm air discharge to be certain sufficient air flow is present to engage micro switch every time.
d. Check micro switch to be sure it moves freely.
e. Remove electrode and burner. Clean thoroughly.
f. When moisture in the gas system is suspected as being the problem, especially where the horizontal type gas bottle is being used, the following steps should be taken to prepare the gas system against further moisture problems:
    i. Corrective Measures:
        1. Disconnect gas bottle and drain it completely dry of all gas and all moisture.
        2. Disconnect and blow out all gas lines completely dry.
        3. Check pressure regulator on the gas bottle. Replace if necessary.
        4. Add the drying agent. One half pint of methanol alcohol per 100 pound bottle capacity is recommended.
    ii. Precautions:
        1. Never fill the gas bottle over 80%.
        2. Do not use the gas bottle completely dry to avoid using up the drying agent.
g. We have found the above procedures to be effective in solving most occasional lockout problems, especially where the horizontal type gas bottle is used. All of these steps must be performed as described for the preparation of a contaminated gas system to be 100% effective.

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Over the years of running a mobile RV repair service, having a dedicated place to access service manuals for all the different appliances and components found on RVs was something that I always had a desire to create.

I hope this resource makes your RV repairs easier, as it has mine, but please be careful and follow proper safety practices when attempting to repair your own RV.

If in doubt, please consult with a professional RV technician!

DARREN KOEPP - OWNER, MY RV WORKS, INC.