Hot Dawg Troubleshooting Guide

MODINE

Troubleshooting HD Direct Spark Units

IMPORTANT

The use of this manual is specifically intended for a qualified installation and service agency. All installation and service of these units must be performed by a qualified installation and service agency.

FOR YOUR SAFETY

WHAT TO DO IF YOU SMELL GAS:

1. **Open windows.**
2. **Do not try to light any appliance.**
3. **Do not touch any electrical switch; do not use any phone in your building.**
4. **Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you can not reach your gas supplier, call your fire department.**

⚠ WARNING

1. **Improper installation, adjustment, alteration, service, or maintenance can cause property damage, injury, or death, and could cause exposure to substances which have been determined by various state agencies to cause cancer, birth defects, or other reproductive harm. Read the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment.**
2. **Do not locate ANY gas-fired units in areas where chlorinated, halogenated, or acidic vapors are present in the atmosphere. These substances can cause premature heat exchanger failure due to corrosion, which can cause property damage, serious injury, or death.**

Table of Contents

Introduction

The purpose of this handbook is to help you troubleshoot through any problems that might come up when installing/servicing your Modine Hot Dawg.

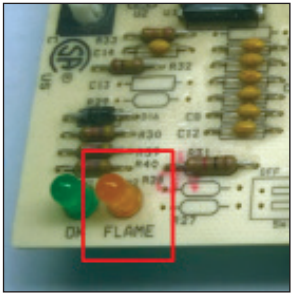
Definitions

Soft Lockout of Control: The control does not initiate a call for continuous fan while in lockout. The control will respond to an open limit and undesired flame. Lockout shall automatically reset after 1 hour. Lockout may be manually reset by removing power from the control for more than 1 second or removing the thermostat call for heat for more than 1 and less than 20 seconds.

Hard Lockout: If the control detects a fault on the control board, the status LED will be de-energized and the control will lockout as long as the fault remains. A hard lockout will automatically reset if the hardware fault clears.

Flame Status – Yellow LED Labeled “Flame”

- **Flame status LED is lit:** Occurs when flame is sensed.
- **Flame LED flashes lowly:** Occurs when flame current is below 1.0uA (+/- 50%), to indicate a “weak” flame.
- **Flame LED flashes fast:** Occurs when flame is present with gas valve off.
  - If flame is sensed longer than four seconds while the gas valve is de-energized, the control shall energize the power exhauster and indoor blower motor.
  - When flame is no longer sensed, the power exhauster will run through post-purge and the blower motor will run through fan off delay time.
  - The control will do a soft lockout, but will still respond to open limit and flame.
  - The Flame LED shall flash rapidly when lockout is due to undesired flame.



Heating Sequence of Operation

Listed below is the sequence of operation that occurs when there is a call for heat:

- Thermostat contact close - Thermostat on terminals R & W of board.
- 24 volts from R to W terminal on board.
- Power exhauster cycles on. 115 VAC at IND and Neutral on board.
- Starts pre-purge cycle.
- 24 volts through limits and pressure switch from board.
- Short delay, then 24 volts to gas valve from board.
- Igniter sparks.
- Flames carry to sensing probe and proves.
- Yellow light turns on, burner stays lit.
- 50 to 60 seconds later, the fan motor cycles on.
- 115 volts at EAC and Neutral terminals.

End of Heating Sequence of Operation

Below is the sequence of operation that occurs when the call for heat is ceased:

- Thermostat contacts open.
- Burner flame turns off.
- Yellow light turns off.
- Post-purge on power exhauster.
- Power exhauster cycles off.
- Fan motor cycles off.
- Green light on board stays on.

Call for Heat – Unit Does Nothing

The below troubleshooting information is related to situations where the green light on the control board is ON:

Step 1: Verify that the thermostat is wired correctly & there is a call for heat.

Step 2: Verify that thermostat is wired between the R & W terminals on the terminal strip.

Step 3: Once you've verified that the thermostat is wired correctly and the unit still does not operate, then:

- Turn power off.
- Remove thermostat wires.
- Carefully install a jumper wire between terminals R & W directly on the control board.
- Turn power on (BE AWARE THAT UNIT MAY START!).

Step 4: If the installation of a jumper wire resolved the issue, then proceed to the next step. If, however, the installation of a jumper wire did NOT solve the issue, please turn to page 8.

Step 5: If unit operates correctly when a jumper wire is installed between terminals R & W on the board, the next step is to check the field wiring to the thermostat (verify the wiring and replace thermostat if needed).

Call for Heat – Unit Does Nothing

The below troubleshooting steps refer to situations where the green light on the control board is ON and the unit does NOT operate correctly when a jumper wire is installed between terminals R & W on the control board:

Step 1: Check for loose connection. Disconnect and reconnect all Molex plugs.

Step 2: Check to make sure there are NO troubleshooting codes.

Step 3: Turn the switch to the gas valve off and on. Then leave valve on.

Step 4: If the unit still does not operate correctly, you may have a bad control board.

- If you suspect a bad control board, turn to page 23 and follow the additional troubleshooting steps before replacing the control board.

Call for Heat – Unit Does Nothing

The below troubleshooting information is related to situations where the green light on the control board is OFF:

Step 1: If the green light on the control board is off, verify there is NOT a flash code.

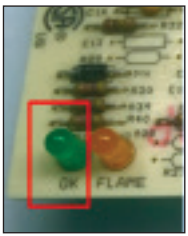
Step 2: Verify that there is 24 VAC between Sec & Com on the control board.

- If 24 VAC is not present between Sec & Com, turn to page 10 for further troubleshooting steps.

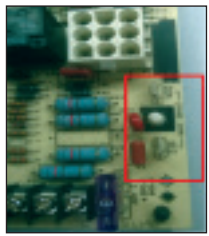
Step 3: Check the fuse for a blown element:

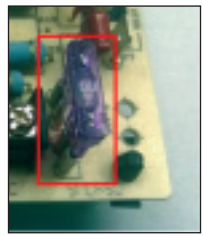
- Remove the fuse.
- Check for continuity.
- If fuse is blown, replace fuse.
- If fuse is NOT blown, then the terminal board is not letting 24 VAC through the board. If this is the case, please refer to page 23 to see troubleshooting steps to take BEFORE replacing the control board.

Step 4: Check for loose connections.



GREEN LIGHT


SEC & COM TERMINALS



Call for Heat – Unit Does Nothing

The below troubleshooting information is related to situations where the green light on the control board is OFF and 24 VAC is NOT present between Sec & Com on board:

To resolve the issue, please follow the steps below:

Step 1: Check for loose connections.

Step 2: Check incoming power (115 VAC).

Step 3: If incoming power is correct, check for 24 VAC at the secondary of the transformer.

- If incoming voltage is correct and there is no voltage at the secondary, then replace transformer.
- For more information on how to replace transformer, please visit www.youtube.com/modineHVAC.

No Flashes – Troubleshooting Codes

The below troubleshooting information is related to situations where there are NO flashes:

- If there is NO flash code, please refer to page 8 and follow the troubleshooting steps.

One Flash – No Power Exhauster

The below troubleshooting information is related to situations where the power exhauster DOES NOT cycle on:

- When there is a ONE flash troubleshooting code, the unit is indicating that the pressure switch is not closing within 30 seconds of the inducer being energized.
- To determine the cause of this issue, see information below.
  - Check to see if the power exhauster is cycling on.
    - If the power exhauster is NOT cycling on, then continue to the possible causes listed below. If, however, the power exhauster IS cycling on, go to page 13.

Possible Causes:

- Defective exhauster motor
  - This occurs when the exhauster motor is receiving 115 volts from IND and NEUTRAL terminals on board, but the exhauster will not run. To solve this problem the exhauster needs to be replaced. Verify and replace if required.
- Defective control board
  - Not sending 115 volts from IND and NEUTRAL terminals to exhauster. To solve this problem, replace board.
    - Before replacing board, go to page 23 to see control board troubleshooting steps.

One Flash – Pressure Switch Won't Close

The below troubleshooting information is related to situations where the power exhauster DOES cycle on:

Unit Sequence: Green light on, call for heat, 24 VAC at R & W, power exhauster cycles on, after approximately 30 seconds, Green light will give one flash.

- When there is a ONE flash troubleshooting code, it is indicating that the pressure switch is not closing within 30 seconds of the inducer being energized.

Possible Causes:

- Blockage in tubing to pressure or venting is not allowing for a proper vacuum to pull pressure switch contacts closed. To solve this problem, troubleshoot the units venting. To find more information, visit www.youtube.com/ModineHVAC and watch the video on venting.
- Wire off pressure switch.
- 24 VAC not coming from board.
- Defective pressure switch
  - If this is the case, verify the switch is defective and replace.

Two Flashes – Pressure Switch Closes Before Inducer Energizes

When there is a TWO flash troubleshooting code, the unit is indicating that the pressure switch has closed before the inducer is energized.

Possible Causes:

- Defective or damaged pressure switch.
- Showing continuity between terminals in non-heat mode.
- The two yellow wires are showing continuity in non-heat mode.
- Defective board (verify and replace if bad)
  - For information on a defective board, see page 23.

Three Flashes – Open in the Safety Switch Circuit

When there is a THREE flash troubleshooting code, the unit is indicating that the limit switch or flame roll out switch is open (open in safety switch circuit).

- **The limit switch is ignored unless a call for heat is present (R to W energized).**
- **If the limit switch is open and a call for heat is present, then:**
  - The control de-energizes the gas valve, runs the blower motor, and runs the power exhauster.
  - The control will flash three times on the LED until the limit switch closes.
  - When the switch re-closes or the call for heat is lost, the control runs the power exhauster through post-purge and runs the blower through the fan off delay.
  - The control will return to normal operation after the blower off delay is completed.

Possible Causes:

- Open or short in safety circuit (flame roll out switches some and some limit switches are manual reset):
  - Check for open contacts on switches in safety circuit. Reset flame roll out switches and manual reset limit switches.
  - Check wiring. Wire off limit or flame rollout switch shorting to unit.
  - Defective limit or flame rollout switch. Verify and replace if required.
  - Defective board, not letting 24 VAC through limits.
    - To see more information on a defective board, see page 23.

Four Flashes – Unit Sparks and Shuts Down After 10 Seconds

The information below relates to situations where the unit DOES SPARK and then SHUTS DOWN within 10 seconds:

Unit Sequence:

- Green light on, call for heat.
- Power exhauster cycles on for 10 seconds, then cycles off, no yellow flame light on board. Fan motor never cycles on.

Possible Causes:

- Reversed Polarity:
  - To check for reversed polarity:
    - Shut down all power to unit.
    - Switch main incoming power lines (black and white) to unit.
    - Carefully turn main power back on to unit.
    - If the issue is not resolved, shut off all power and return white and black wires to original position.
- Wire off sensor. Check for loose wires.
- Dirty or defective flamer sensor, not sending micro-amps to board:
  - Clean sensor with emery cloth
    - If problem is not resolved, verify and replace sensor.
- Defective board:
  - Getting correct micro-amps from sensor, but not allowing unit to ignite.
  - For more information on fixing/replacing a defective board, see page 23.

Four Flashes – Unit in Lockout From Failed Ignition/Flame Loss - Unit Sparks but Doesn't Ignite

The information below is related to situations where the unit is in lockout from failed ignition or flame loss. The unit sparks but DOES NOT IGNITE:

Unit Sequence:

- Green light on, call for heat, 24 VAC at R & W terminals.
- Power exhauster cycles on, start pre-purge, 24 VAC through pressure switch and limits.
- Igniter sparks, no ignition, no yellow flame sense light.
- Unit will cycle FIVE times in this manner, then the green light will flash four times. Power exhauster will cycle off and fan motor will never cycle on.

Possible Causes:

- Gas valve in "off" position.
- No 24 VAC from board to gas valve.
- Loose wires
  - Wire off gas valve.
- Excessive inlet pressure.
- Low or no gas pressure to inlet of valve (purge lines).
- Defective gas valve
  - Verify and replace if required.
- Defective board
  - Not allowing ignition.
  - For more information on fixing/replacing a defective board, see page 23.

Four Flashes – Unit Doesn't Spark

The information below is related to situations where the unit is in lockout from failed ignition or flame loss and the unit DOES NOT SPARK:

Unit Sequence:

- Green light on, call for heat.
- Power exhauster cycles on, starts pre-purge.
- 24 VAC power present through pressure switch, limits and to valve.
- No spark at igniter, RAW gas is going through orifices for approximately six seconds during this cycle, unit then cycles off and there is no yellow flame sense light.
- Will cycle FIVE times in this manner. Then, green light will flash four times, power exhauster will cycle off and the fan motor does not turn on.

Possible Causes:

- Loose wires
  - Wire off igniter.
- Defective or damaged igniter
  - Examine, verify and replace if needed.
- Defective board
  - Not sending voltage to the igniter.
  - For more information on fixing/replacing a defective board, see page 23.

Five Flashes – Twin Communication Fault

The information below is related to situations where the troubleshooting code flashes FIVE times:

Twin Communications Fault:

- This occurs if the 24 VAC supply to the twins are not in phase with each other, or power is removed from one of the twins.
- While a twin fault exists, the control does not respond to thermostat commands and the green light will flash five times.
  - Open limit and undesired flame response are still operational.
  - The control continually tries to establish communication and automatically resumes normal operation when communication is re-established.
  - If a twin fault occurs during a heat cycle, both furnaces will terminate the call immediately.
  - The only chance for blower mis-synchronization is if the blower off delays are set differently on the twins.
  - If a twin fault occurs during high speed fan or continuous fan operation, both controls will shut the blowers off immediately.
  - If twin communication terminal is not in use and unit is showing a troubleshooting code of five flashes, the board may be defective.

Six Flashes – Main Air Mover Doesn't Cycle On

The information below is related to situations where the main air mover does NOT cycle on:

This usually occurs as a result of an open in the safety switch circuit:

- Limit switch or flame roll out switch is open.

Unit Sequence:

- Green light on, call for heat, power exhauster cycles on, pre-purge.
- 24 VAC power present through pressure switch, limits and to valve.
- Igniter sparks, burner cycles on, yellow flame light turns on, board is on.
- After three to four minutes, unit goes out on a limit switch, yellow light turns off, green light will then flash six times.

Possible Causes:

- Loose wire
  - Check all wiring for a loose wire.
- Defective motor
  - 115 VAC at EAC & neutral terminals on board, but motor does not turn on.
- Defective board
  - 115 VAC not present at EAC and neutral terminals.
  - For more information on fixing/replacing a defective board, see page 23.

Six Flashes – Main Air Mover DOES Cycle On

The information below is related to situations where the main air mover DOES cycle on:

Unit Sequence:

- Green light on, call for heat, power exhauster cycles on, fan motor cycles on, green light flashes six times.

Possible Causes:

- Open contacts due to over-firing of unit (flame roll out switches and some limit switches are manual reset)
  - Check gas pressure.
  - Check to make sure nothing is blocking the airflow of the unit.
  - Wire off limit or flame rollout switch
    - Limit or flame rollout switch shorting to the unit.
    - Defective limit or flame rollout switch
      - Verify and replace.
- Defective board
  - Not letting 24 VAC through limits.
  - For more information on fixing/replacing a defective board, see page 23.

Seven Flashes – Five Flame Losses During One Heat Cycle

The information below is related to situations where there are five flame losses during one heat cycle. If this occurs, you will see a troubleshooting code of SEVEN flashes:

Ignition re-cycle

- The control will re-cycle up to five flame losses (4 re-cycles) within a single call for heat before the unit goes into lockout.

Before Replacing a Control Board

- Remove thermostat and use a temporary jumper wire to make a call for heat.
- Check the supply power for correct polarity.
- Re-check all wiring to the control board for loose connections:
  - Disconnect and reconnect all Molex plugs.
- Re-check that the wiring to the control board matches the wiring diagram.
- If the control board has a fuse, remove and test continuity of the fuse.
  Important: Do not just do a visual inspection of the fuse – check continuity.
- Make sure the pressure switch is not opening during the call for heat cycle.
- Check limits and rollout switches for an open circuit.
- Turn the switch on the gas valve to off and then to on several times.
- Make sure the power inducer is running when there is a call for heat.
- Check for a proper micro-amp signal from the flame sensor to the control board:
  - A proper signal is 1-5 micro-amps.
- Check for proper supply gas pressure:
  - Excessive gas pressure can/will lock-up the main valve.
- Check for limit and/or flame sensor shorts:
  - Make sure they are not touching metal.
- Check for any moisture on board that may have occurred if checking for gas leaks with a liquid solution.
- Check in-line regulators for BTU sizing, and lock-up point not above a 14” WC.
- Check setting of heat anticipator of thermostat if applicable, and wire size and run.
- Review troubleshooting codes.
- Check for any moisture or moisture marks on the board that may have occurred if check for gas leaks with a liquid solution.
- Check in-line regulators for BTU sizing and lock up point not above a 14" WC.
- Check to make sure external regulator is not right next to the unit so that the regulator “fights” the regulator inside the combination gas valve.
- Check setting of heat anticipator of thermostat if applicable, also check wire size and run length.

For Additional Help

For additional help, visit:

www.ModineHVAC.com

To find installation & service manuals, visit:

www.ModineHVAC.com/publications

In addition, Modine has live operators that can be reached at:

(800)-828-4328

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