JCG's Oil Burner Trouble Shooting Technique – By John Gates

Before we get into this area be sure that we have eliminated any problem that is external to the burner and its safety relay. In the case of multi-use controls such as the R8182 series you must have power both sides of the high limit.

In this area we will discuss finding and solving burner problems. I like to define problems into one of two major groups. We will get into why later. The first group is Ignition related problems and the other is all the rest. My definition of an ignition related problem is anything that will allow unburned oil to enter the flame area.

The major things that can cause an Ignition related problem are;

Dead or weak transformer/igniter (or no power to)

Broken, cracked or misaligned Electrodes

Low pump pressure

Partially plugged nozzle

Pressure drop across retention head is too high

Wrong head setting or wrong head

Air setting is too high

Over-fire draft is too high

Now the reason for the two categories is on a No Heat Call with the burner off on safety and unburned oil in the combustion area the problem is Ignition Related. If there is no oil present in the combustion area you have just eliminated about one third of your potential problems.

Note: The last two items in each group are the same or related.

Some of the problems for Non-Ignition related problems are;

Faulty Relay (watch out as this could be an intermittent problem)

Faulty Cad Cell or not seeing flame (misaligned or dirty)

Faulty motor (watch out as this could be an intermittent problem)

Improper electrical connections

Faulty Pump

Plugged oil line

Faulty solenoid valve

Plugged Nozzle

Pressure drop across retention head is too high

Wrong head setting or wrong head

Air setting is too high

Over-fire draft is too high

If your situation falls into the first category, I simply go down my list and check things out one by one. If your situation falls into the second category, we can further isolate the problem. After ensuring that there is power to the burner relay and there is no oil in the chamber the burner may be reset and one of five things will happen.

The burner will run normally

This can be the most difficult of all problems to locate because it is intermittent. This is usually caused by a defective motor, safety relay or cad cell, but can also be caused by the pressure drop across the head being too high or a loose electrical connection. Eliminate this problem first by checking all burner electrical connections. The pressure drop problem can usually be eliminated with the use of a flame mirror and ensuring that the flame stays on the head. The cad cell can also be eliminated by the use of an ohm meter (readings should be 1000 ohms or less and fairly steady). The other two are not so easy to diagnose and are unfortunately the most common.

This is what I do and the results have been better than any other methods that I've tried. Start the burner and listen for any unusual sounds from the control if none I gently tap the control and watch for any telltale signs. If this doesn't give any indication that it is the control I will change the motor and tag & keep the old motor just in case. There are some test procedures for motors but I have not found any that are both practical and dependable.

The burner will not run at all but you have ignition

Ensure that you have power to the burner motor

If pump is bound up replace it

I pump is not bound replace motor

The burner will not run at all and no ignition

With TT jumped, remove one of the FF wires on the control and try again if the unit starts the second time the problem is in the cad cell or cad cell assembly.

If burner still fails to start the problem is in the control or wiring, ensure that all connections are tight. Check for power on the orange wire from a R8184 type control or from B1 on a R8182 type control. Now power replace control. If there is power and it still doesn't work both the motor and the transformer will have to be replaced **(very unusual)**.

The burner will start but drops out on safety (with flame)

Check cad cell with ohm meter, reading should be fairly steady and 1000 ohms or less. If it is not in this range clean and or replace the cell and re-check. If still bad replace the entire cell assembly and adjust cell until readings fall in line.

If cell is good replace safety control.

The burner will start but drops out on safety (no flame)

Ensure that there is no oil going into the combustion area, if there is, go back to ignition related problems.

Ensure that the oil system is free flowing and not plugged. Change oil filter, pump strainer and blow out oil line as needed. **{We strongly recommend that a hand pump is used any time an oil line is blown out. CO2 guns have been known to blow up oil lines causing injury}**

Check flow at oil line and solenoid operation (ensure that you have flow from pump if a valve is used). Replace solenoid valve or pump if required.

Check for plugged nozzle. Change if needed

This should take care of 99+% of all burner problems providing the burner was properly set up to begin with.

Whenever you leave a customer PLEASE ensure that the area is at least as neat and clean as it was before you arrived.

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