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General Trouble Shooting Guide
Electric Trim Heaters and Direct to Process Vaporizers

1. Gas Temperature Too Cold
    a. Temperature controller set point too low
        1. Change the temperature setting on the main temperature controller
    b. Power not turned on to the unit
        1. Turn on the power to the unit
    c. Contactor not pulling in
        1. Check the out put from the temperature controller - make sure that 120 vac is being supplied to the contactor
        2. Make sure that the High Temperature Cut Off Switch is not tripped
    d. Heat transfer compound is no longer functioning – occurs after 3 to 5 years of operation
        1. Symptoms of this include the gas exiting the unit too cold.
        2. The heaters running very hot
        3. The unit tripping off on high limit and the gas is exiting the unit too cold
        4. The heaters running very hot when compared to the tube castings which are cool or cold
        5. The fix is to dis-assemble the casting assembly, clean up the heater castings and tube castings, and re-apply the heat transfer compound. – see below.
    d. Heaters not functioning properly
        1. Check the amperage on all the legs - be sure that all the legs are even.
        2. Check the nuts that hold the wires to the buss bars and be sure that they are tight.
        3. Check all the buss bar bolts on top of the heaters and be sure that they are all tight.
        4. Check the continuity of the heaters and be sure that the heaters are not shorted to ground and that they are not open.
    e. Gas flow too high and the unit is being overdrawn
        1. Reduce gas flow through the unit.
    f. Wrong power applied to the unit
        1. Correct the power to the unit.
    g. Thermocouple not properly positioned
        1. Check the thermocouple position on the main temperature controller and be sure that the tip of the thermocouple is touching the end of the well.
        2. Be sure that the thermocouple is not shorted out or broken

2. Gas Temperature too hot
    a. Temperature controller set point too high
        1. Change the temperature setting on the main temperature controller
    b. Contactor stuck

1. Check the out put from the temperature controller - make sure that the output from the controller is cycling on and off.
2. Turn off power immediately and replace the contactor.

d. Thermocouple not properly positioned
1. Check the thermocouple position on the temperature controller and be sure that the tip of the thermocouple is touching the end of the well.
2. Be sure that the thermocouple is not shorted out or broken

3. General

a. Power on and the unit is not responding to changes in flow.
1. Make sure that temperature controller is set properly
2. Make sure that the thermocouple is installed properly - near the outlet connection.

b. The contactor is cycling quickly - every second or less, there is a problem with the temperature controller. Shut the unit off immediately.
1. The thermocouple is shorted or bad
2. Potentiometer is bad - replace the potentiometer
3. The temperature controller is bad.
4. Allow the unit to cool and turn the power back on to the unit. See if the unit continues to cycle rapidly. If the unit continues to cycle rapidly the controller has a problem and should be replaced. If the unit does not cycle rapidly, there is probably a problem with the high temperature cut off switch mounted on top of the casting. This can be checked by jumping the high temperature cut off switch out and observing if the rapid cycling stops. Do not leave the unit jumped out or catastrophic failure may occur.

Heater Casting Check Out
And
Replacement Procedure

To check the heaters, the following should be done. Please note that one of the tests will be performed with the door open and full power in the cabinet. All checks should be done by a qualified electrician.

Power the unit up with the cabinet door open. Check the amperage on each leg going to the heaters. If the unit is still wired as it was from the factory, all legs should be reading equally. If one of the legs is reading low, that leg will have burned out heaters attached to the leg. If more that one leg is low, more that one leg has bad heaters. One caution, make sure that all the heater terminal nuts are tight. If there are any loose nuts, that may be the cause of the problem and heater replacement will not be required.

Turn the power off and lock it out. Sketch the bussing on a piece of paper. Then remove the buss bars from one side of each heater on that leg and check to see which heaters are bad. The heaters when bad will read open. If good they will read in the 12 to 15 ohm range. Also check to make sure that none of the heaters are shorted to ground, as that is also an indication of a bad heater.

The heaters come out as slab - 3 heaters in each slab. The heaters are removed by loosening the assembly up to allow the castings to be gently spread part. To do this the control panel bolts must be removed and the anchor bolts on at least one side of the stand must be removed. Once the stand has been freed from the

anchor bolts and the cabinet bolts, then loosen the draw bolts - 4 each - only two of the draw bolts have to be removed, but all 4 must be loosened. (Note: on large castings - generally 75 kW and above - there are some side supports that must be removed to allow the castings to be withdrawn from the unit. These are held in place by the draw bolts and are about at the mid-point of the elevation of the casting assembly. Only one side must be removed to allow the heaters to be removed.) Remove the buss bars from the heater casting that has to be removed. Gently spread the casting assembly apart. Slide the heater that is bad out and clean the heat transfer compound off the sides of the tube castings that are in the unit (where the heater casting came out). Do not use any hard materials on the sides of the castings to move them apart. The casting sides are precision machined to improve the heat transfer. If the sided or edges of the casting get dinged, this will hold the castings apart and degrade performance.

The installation is the reverse. Put the heat transfer compound on the heater (Make sure that the heat transfer compound is spread evenly over the surface of the casting), install the heater into the casting, Install the draw bolts, and tighten the bolts to approximately 45 foot lbs. Re-install the box. Re-buss the heaters. Turn the power on and check the amperage to the heaters. All legs should be even.