

4.2 Temperature Verification

After the machine pressure and flow have been verified, the next step is to verify heater temperature accuracy.

IMPORTANT!!!

DISCONNECT THE BLUE FLOW METER HOSE FROM THE FLOW CALIBRATION FITTING AND RECONNECT THE BLUE UPPER HEATER HOSE. FAILURE TO RECONNECT THE UPPER HEATER HOSE PRIOR TO RUNNING THE TOP HEATER WILL CAUSE THE TOP HEATER ELEMENT TO FAIL.

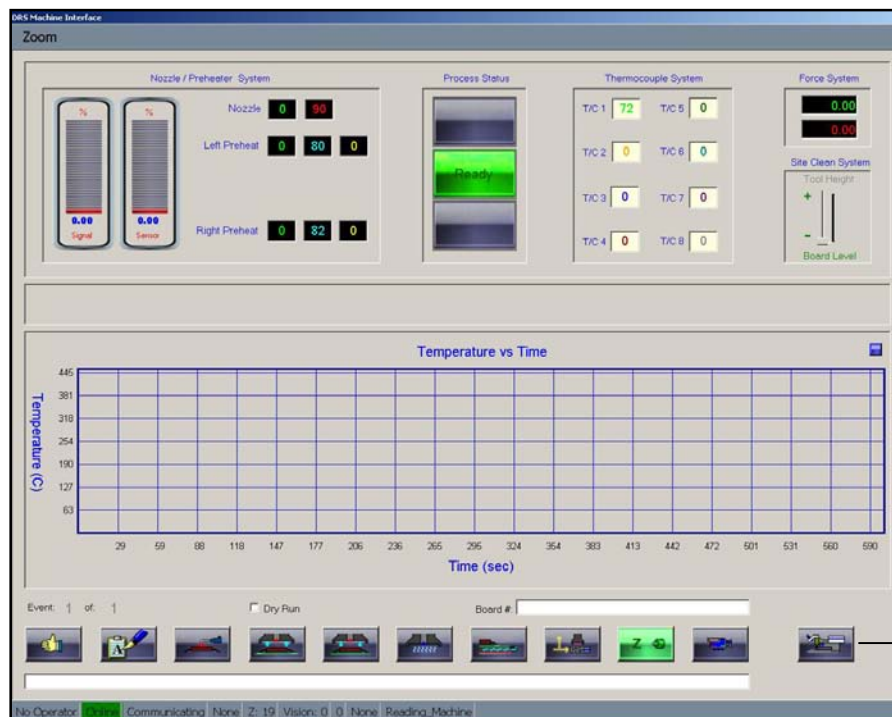
4.2.1 Upper Heater Verification

1. Perform Temperature Scale Test, select Options from the menu bar.
2. Select Open (File Group: System/System/System).
3. Select the Temperature Scale Testing profile and click on the Thumbs Up icon.
4. Click Thumbs Up again. The Run screen for the Temperature Scale Testing profile will appear.

Note:

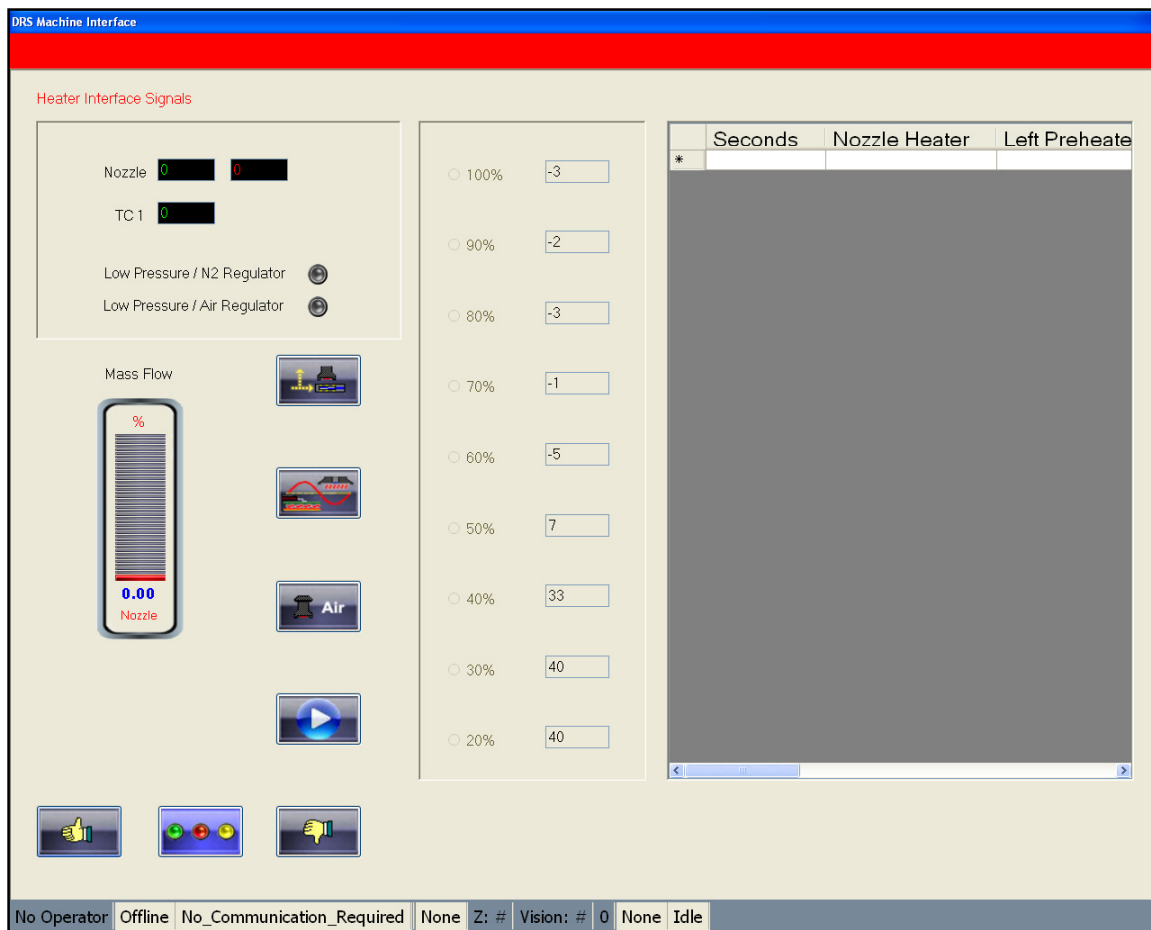
ONLY PERFORM THESE STEPS BELOW WHEN NOZZLE HEATER IS REPLACED OTHERWISE, CONTINUE TO STEP 5.

- At the Main Screen, right click on the Air-Vac logo.
- Go to Set-Up, Communications Screen.
- Zero out all of the Temperature Offset Numbers. Exit Screen.
- Perform a Heater Burn-In Test to break in the heater, then proceed to the steps below. (Heater must run for 15 minutes minimum).

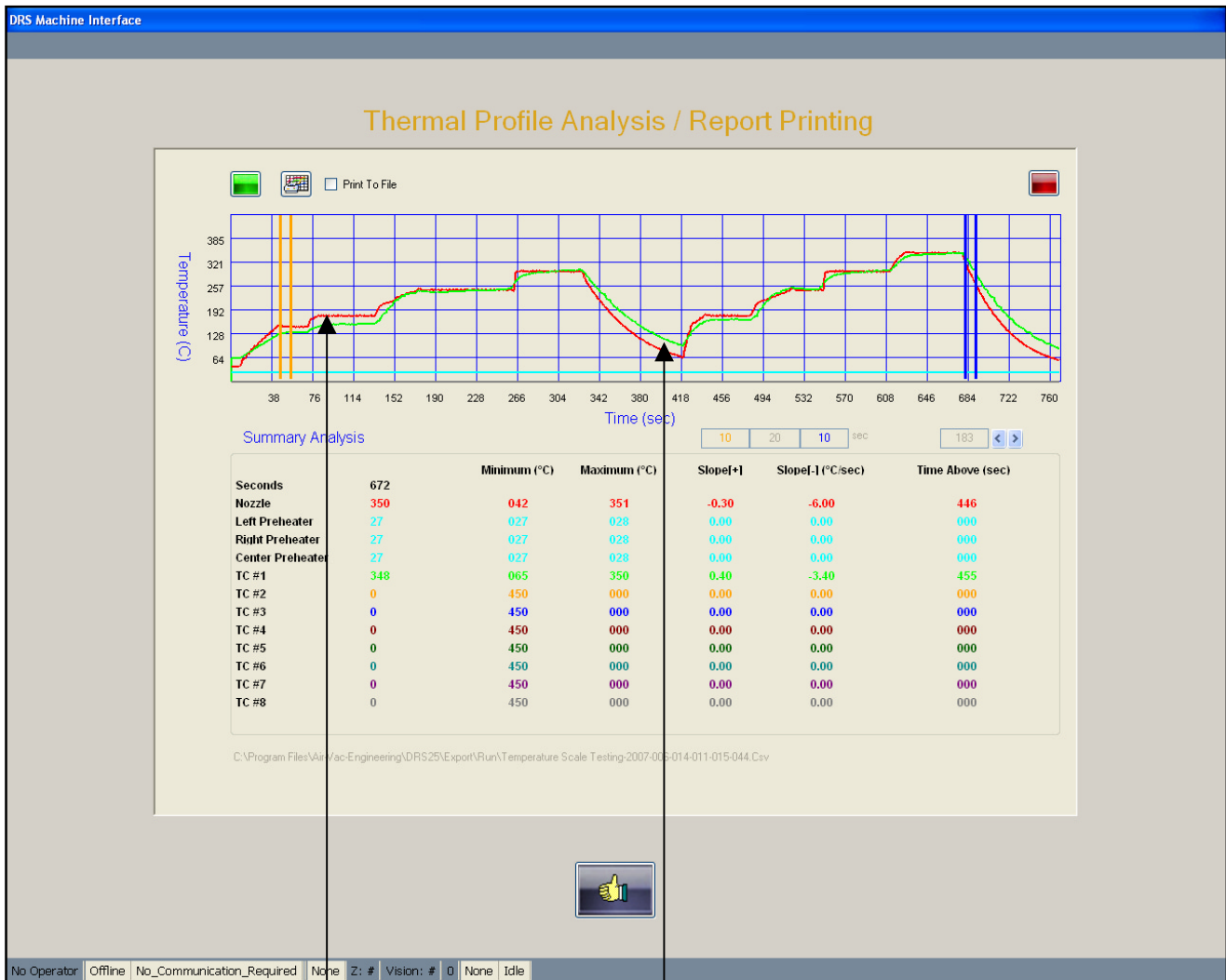


Cycle Start/Stop

5. Install the NCAL-1 Temperature Calibration Nozzle into the machine.
6. Plug the nozzle thermocouple into channel #1.
7. Click on the Cycle/Start icon to start the profile. The profile will run a scaled sequence of various temperatures and flow rates and will plot the Upper Heater temperature (red line) and the NCAL-1 Nozzle Temperature (green line). After the initial scale up sequence, the profile executes a cool down stage and then scales up the temperature and flow rates a second time. This is necessary to insure that the machine has been properly heated prior to verifying the temperature accuracy.
8. Allow profile to run, when complete click on "Export History" button (small, blue), this saves the graph and data points to the Export directory for analysis.
9. Thumbs up out of profile, go to "Control" "Thermal Profile Analysis". Scroll through files in directory folder, located the correct file be date-time stamp (file name will have temperature scale test label). Double click on this file so graph is displayed.
10. Verify that the nozzle heater and NCAL-1 (thermocouple channel #1) chart lines match within a +/- 5-7 degree range (only for the last 2 events of the process profile).
11. If adjustments are necessary, temperature calibration can be performed using the automatic calibration utility available from the "Setup menu / Hidden level". The user does not need to be involved in the calculation of these offset parameters; the software will automatically determine the necessary adjustments during the process cycle.



12. Go back and run "Temp Scale Testing" again, and verify offset between set heater temperature and actual nozzle temperature (only for the last 2 events of the process profile). If temperatures are within +/- 5C, you are finished.



Nozzle Heater (red)

NCAL-1 Nozzle Output (green)