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## American Hakko Products, Inc.

### Calibration of hot air tools.

Note: 'Calibrating' hot air SMD rework tools is really a matter of measuring free-stream air flow. So to do properly requires more extensive and expensive test equipment than is readily available in most shops. The equipment and procedures cited below will give satisfactory results with a minimum of expense and time, once the operators become familiar with them. The ten percent error tolerance is an estimate and is based upon practice in the Hakko repair facility.

The large selection of nozzles, with differing sizes of expansion chamber, number of orifices, and configurations of orifices make 'calibration' in the classical sense meaningless. Hot air soldering is non-contact. The distance from the nozzle opening to the soldering area will have as much, or more, of an affect on the solder temperature as any temperature calibration of the exit air temperature. One can, however, measure the temperature of the air exiting the nozzle for different settings of the heat and airflow controls to verify proper operation.

#### Equipment required:

Hakko FG-100 thermometer or equivalent

Thermocouple probe for Hakko FG-100 (Hakko part number A1310)

Mounting frame as shown in Figure 1, or bench vises and a caliper accurate to 0.001 mm (digital preferred, e. g. Mitutoyo 500 series) may be substituted

Nozzle: A1130 (4.4 mm) for FR-801, FR-802, FR-802 or 850/852 series; A1066 (2 mm.) for 851.

1. Set up as shown in the calibration setup drawing. You will find it on the next page. The FR-802 hand piece is shown, but that is of no consequence - you do the same for any unit. This procedure assumes the use of the mounting frame.

1. Set the frame on the bench or board and clamp down.
2. Place the probe into its holder. Do not over tighten.
3. Place the hand piece into its holder.
4. Set the gauge in the vertical position.
5. Slide the hand piece to the left until the nozzle just touches the gauge.
6. Now slide the probe to the right until it just touches the gauge. Secure.
7. Set the gauge in the horizontal position. You are now ready to measure temperature.

2. Turn on the unit.

- FR-801, 850, 850B:
  - i. FR-801 - Set the temperature control to 4 and the air control to 10L.
  - ii. 850- Set the temperature control to 3 3/4 and the air control to 2.
  - iii. 850B - Set the temperature control to 4 and the air control to 2.
  - iv. Allow three minutes for the temperature to stabilize.
- FR-803, FR-802, 852, 850D:
  - i. Set the temperature control to 750°F, air setting is not critical.
  - ii. Allow three minutes for the temperature to stabilize.
- 851:
  - i. Set the blow selector switch to High.
  - ii. Set the temperature control to 8 and the air control to 5.
  - iii. Allow the nozzle to heat for two minutes.

3. Read temperature on the FG-100.

- FR-803, FR-802, FR-801, 852, 850D, 850B, 850: Should read  $750^{\circ}\text{F.} \pm 10\%$  ( $400^{\circ}\text{C.} \pm 10\%$ ).
- 851: Should read  $1004^{\circ}\text{F.} \pm 10\%$  ( $540^{\circ}\text{C.} \pm 10\%$ ).

4. Evaluating the results.

- i. If the peak reading is within limits given above, the unit is within acceptable tolerance.
- ii. (FR-803, FR-802, FR-801) If the temperature is not within the limits given above, verify that the nozzle and probe are vertically and horizontally aligned. If they are, slowly move the hand piece back and forth until the temperature reading peaks. Do not move it closer to the probe than 1.5 mm. Should it remain out of tolerance, The FR-801 has a CAL adjustment. Use a small screwdriver to adjust the CAL pot. Clockwise will increase the temperature and counter-clockwise will reduce the temperature. Allow the temperature to stabilize after each adjustment. The FR-803 and FR-802 stations can be offset manually with the internal software controls. Refer to the Instruction Manual for directions on offsetting the temperature. Should it remain out of tolerance, contact American Hakko Customer Service.
- iii. (850, 852) If the temperature is not within the limits given above, verify the nozzle and probe are vertically and horizontally aligned. If they are, slowly move the hand piece back and forth until the temperature reading peaks. Do not move it closer to the probe than 1.5 mm. Should it remain out of tolerance, contact American Hakko Customer Service.
- iv. (851) If the peak reading is not within the limits given above, adjust the calibration potentiometer as required. If the unit cannot be brought within tolerance by adjusting the calibration potentiometer, or consistently reads out of tolerance, contact American Hakko Customer Service.

**Note**  
Verification of nozzle data given for the hot air station may be done in the same manner. Check data against published values for the nozzle being used. The same procedure is followed.

