

Heater Assembly Procedure

Document Revision Record

Rev	Date	ECO#	Pages Affected	Description
-	1/15/98	NA	NA	New procedure

Authorized Personal

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Authority to Redline Procedure

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Materials & Supplies

1. Ph Bronze .005" CDA 510-A H-Formvar Fine Wire
2. Chip resistor, Value = 1 K Ω
3. Teflon Sleeving #SMT-18-36, .060" thickness
4. Stycast epoxy # 1266
5. Teflon sheet (block) 12" x 1.5" x 3/8"
6. Kapton tape # 3M Scotch 5413
7. Makita hand drill # 6012 HD 1100/400 RPM
8. Nokorode solder paste
9. Solder # 60/40 Rosin Core
10. Acetone # 9006-01
11. Alcohol #2-Propanol
12. Drill bit # 31= .1200
13. Reamer bit # .1250
14. Liquid Helium
15. Fluke 77 hand meter
16. Bausch & Lomb Microscope # 200M Range 0.7 x- 3.0x
17. Clean room wipes # Durx 670
18. 5' long low thermal conductivity rod
19. Ceramic blade
20. Test leads

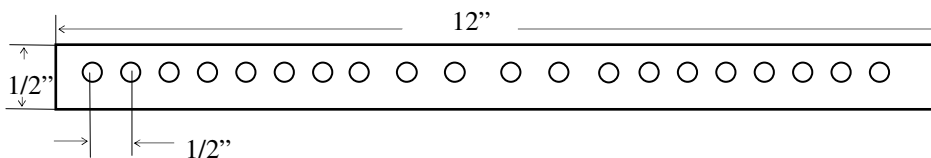
Notes:

1. The ohmmeter (the Fluke 77) shall be in calibration at the time it is used to measure resistances.
2. This part is not ESD sensitive.
3. No special environments are required to carry out this procedure.

Procedure

1. Preparation

1.1 Drill holes on a Teflon block using drill bit # 31= .1200. Then drill over it with a reamer set . Holes are 1/2" apart in 20 places. Diameter of the holes should be .1230 — .1240. The thickness of the block is 3/8".



1.2 Clean Teflon block with acetone first then with #2-alcohol.

1.3 Cut 6' long .005" Ph Bronze wire. Fold in half. Use the hand drill to twist it into a twist pair.

2. Twisted Pair Cutting

2.1 Cut 1/8" of the folded end off the twisted pair wire.

2.2 Visually inspect the wire carefully under the Microscope. Look for any deep scratches, breaks and kinks in insulation.

2.3 Untwist the wires approximately .5"

2.4 Strip .5" of wire insulation from one end of the wire. Clean the wires with alcohol using clean room wipes # Durx 670

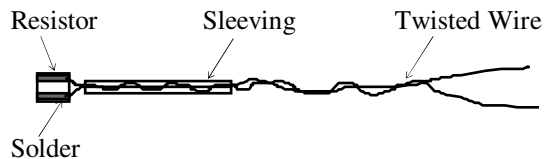
2.5 Take resistance check from end to end of heater wire. Write down the resistance readings in table P0120-Table.

3. Wire Tinning, Solder Operations

3.1 Tin the exposed wire on the stripped end of the twisted pairs with Nokorode solder paste.

3.2 Remove all residual flux from the tin end with a Q-tip and Alcohol.

3.3 Solder twisted pair wire to the 1 k Ω resistor (#23530-101) as shown below. Cut the heat shrink tubing to about 1". Slide the sleeving over wires until it is against the resistor.



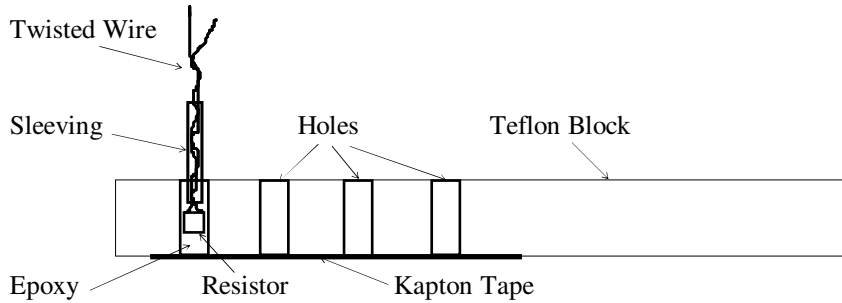
3.4 Take resistance from the resistor and the end of PH bronze wire. Write down the resistance reading in table P0120-1. These reading are room temperature resistance.

4. Epoxy Coating and Bonding

4.1 Use Procedure P0157 for the Stycast 1266 mix ratio and curing.

4.2 Coat heater resistor with a thin layer of Stycast epoxy. Inspect resistor and make sure the resistor is well coated with epoxy.

4.3 Cover the bottom of the Teflon block with Kapton tape. Insert resistor in the hole of Teflon block. Fill hole with Stycast epoxy to cover over resistor.



4.4 Make sure not to insert resistor all the way down in hole. Leave it about half way down. Try to center the resistor in the middle of the hole as well as possible.

4.5 Let cure over night or 24 hours.

4.6 After curing poke coupon out of hole from the bottom of Teflon block. Cut off the end with ceramic blade to make the epoxy coupon .340" long.

4.7 Verify the size of the coupon to make sure the diameter is within .123" - .124".

4.8 Strip the lose ends of the Heater wires 1/4". Check resistance using the Fluke 77 hand meter. Write down the resistance readings in table P0120-Table.

5. Liquid Helium Resistance Test

* NOTE: Safety Precautions

**Skin contact with cryogen and cold surfaces must be avoided. Always wear protective gloves .
A face shield shall also be worn when the possibility of splashing exists.**

5.1 Use Kapton tape to tape down the resistor at the end of a copper rod. Move dewar into position under the copper rod which will be used to hold and lower the part. Immerse the heater resistor in liquid helium and leave until the vigorous boiling ceases.

5.2 Make a 4' long test lead using copper wire (Belden wire and cable, red insulation .05 mm².) Use banana plugs on one end and clips (mini probe-it # 923835-RD-C) on the other end.

5.3 Clip the mini probes on the end of the Heater wires and slowly lower the rod with the heater resistor tape to it in the liquid Helium. Hold the assembly in this position for about 10 minutes.

5.4 Use the fluke 77 meter to take resistance at liquid helium temperature. Write down the resistance readings in table P0120-1.

5.5 ID each heater resistor with a serial number.

5.6 Wipe heaters with clean room wipes and alcohol.

5.7 Bag each heater in a plastic bag and label it.

5.8 Send heaters for magnetic test.

5.9 Completion

P0120-Table

Date Complete: _____

Operator: _____

Heater Serial Number: _____

Table P0120-1. Resistance Check of Heater

Step	Resistance		
	Wire #1	Wire #2	Heater (Resistor)
2.4			
3.4			
3.9			
4.8			
5.4			

Note:

The acceptable ranges of measurement are:

Table P0155-2 Acceptable Measurement Range

Step	Resistance		
	Wire #1	Wire #2	Heater (Resistor)
2.4	8-10 Ω	8-10 Ω	
3.3			950-1050 Ω
3.9			970-1070 Ω
4.9			970-1070 Ω
5.4			1250-1350 Ω

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