GRAVITY PROBE-B

TEST PROCEDURE

STATION 200 THERMAL TEST

June 1, 1998

Originator
D. Murray

Approval:

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REVISION RECORD

REVISION	ECO	PAGES	DATE

Abreviations used in P0133 abd P0134 as of 4/232/98

ABBREVIATIONS

xxP	Kit number xx of P type kits (ref. SU GP-B P0141)
ALSP	Airlock Support Plate
ALSPV	Airlock Support Plate Valve
ATC	Advanced Technology Center (at LMSS)
AVxx	Gas Module valve number xx
BPS	Bellville Pre-load System
CNT	Composit Neck Tube of Probe
ESD	ElectroStatic Discharge
EVxx	Gas Module Valve number xx
AWG	American Wire Gauge
Cryoperm	Trade name for cryogenic magnetic shielding
CT	Cooling Tube
CTE	Cryogenic Test Engineer
DAS	Data Acquisition System
DEV-xx	Dewar Exhaust Valve number xx
DVM	Digital Volt Meter
EEBA	Emergency Evauation Breathing Apparatus
EG-xx	Gas Module Exhaust Gauge number xx
ESD	ElectroStatic Discharge
EVRx	Gas Module Relief Valve number x
FIST	Final Integrated System Test
GHe	Gaseous Helium
GP-B	Gravity Probe-B program (also, Relativity Mission)
GRT	Germanium Resistance Thermometer
GSE	Ground Support Equipment
GTU-2	Ground Test Unit number 2
HEPA	High Efficiency Particulate Assembly
ISO	International Standards Organization
LD	Leak Detector
LDT	Linear Displacement Transducer
LGS	Leakage Gas System
LLS	Liquid Level Sensor
LMSS	Lockheed Martin Space Systems
LN_2	Liquid Nitrogen
mG	milli Gauss
MHz	Megahertz
NPB	Normal Boiling Point
Ozsi	Ounces per square inch
PPS	Programable Power Supply
PWx	Well Pressure gauge x
QD	Quick Disconnect - O-ring seal under screw down cap
RCM	Rotating Coil Magnetometer
RGA	Residual Gas Analyzer
RSE	Responsible Saftey Engineer
RQE	Responsible Quality Engineer
sccs	Standard cubic centimeters per second
SMD	Science Mission Dewar (of GP-B , Relativity Mission program)
SU	Stanford University
TAO	Thermal Acoustic Oscillation
TGxx	UTS Gauge xx
TM xx	Task Module number xx.
TVxx	UTS Valve xx
VMA	Valve of Mini-Airlock
UTS	Utility Turbo pumping Station
VFV	Vatterfly Valve
VSx	Valve number x on Shutter
VW-1	Valve on Dewar Adapter connecting Well to outside

Table of Contents

Operations Number
Date Initiated
Time Initiated

1 SCOPE

1.1 The purpose of this procedure is to determine the thermal resistance between and Probe Station 200 and SMD Station 200 and determine the parasitic heat load into the Probe Station 200.

2 REFERENCE DOCUMENTS

2.1 Procedures:

2.2 The procedures listed are those required to insert a Probe into the SMD. S0317 presents an overview of the process and is for information only. The material of S0318 is used as a reference document with all the other procedures to identify the various attachment, lifting, etc. hardware that have been assembled into kits.

2.3	Procedure No.	Title
2.4	P0140	Prepare Probe-C for Testing

2.5 Supporting documentation

GP-B Magnetic Control Plan, LMMS-5835031

4.1.1 SMD Safety Compliance Assessment, LMMS GPB-100153C 100153C

4.1.2 SM Dewar FMECA, LMMS GPB-100333

4.1.3 FIST Emergency Procedures SU/GP-B P0141

4.1.4 Probe/Dewar Hardware Kit List, SU/GP-B P0144

4.1.5 SMD Final Assembly, LMMS 5833500

4.1.6 GP-B Contamination Control Plan SU/GP-B P059

4 SAFETY

4.1 In case of any injuries obtain medical treatment: at:

LMMS **Call 117** Stanford University **Call 9-911**

4.1 Safety

The GP-B (FIST) Safety Plan, LMSC-F314447, discusses safety design, operating and maintenance requirements which the ACT/LMMSprogram office has adhered to. These requirements should be reviewed for applicability at any facility outside of ACT (e.g. Stanford University) where FIST hardware is operated.

4.1 Hazards Analysis

The GP-B (FIST) Preliminary Hazards Analysis, LMSC-F314446, discusses hazards inherent in ACT/LMMS-developed FIST hardware in greater detail.

4 CONFIGURATION REQUIREMENTS:

4.1	Probe installed into SMD
4.2	Facility Das Connected to I6 and I5 of Probe-C

4 HARDWARE REQUIRED:

No special hardware is required.

Operation No._____

Date _____.

Time _____.

10 **OPERATIONS**:

10.1 Set up DAS with configuration 3i “Station 200 Thermal Response”.

10.2 Set Tank Heater to 1.5 watts. This increases the boil-off from the tank and will tend to stabilize the temperature of Staition 200 during this test.

10.3 Activate power supply for QBS heater circuits:

10.3.1 Verify HP 6627 power supplies of Facility DAS, units P.S. B #3 and P.S. B#4 are connected to inputs H05P and H06P respectively.

10.3.2 Verify “ISET” current limit of both units is at default (minimum value) of 0.050 amp.

10.3.3 Power on “P.S. B” and with DAS monitoring power at H05P, adjust power supply output of “P.S. #3" to 1.0 volt.

10.3.4 Verify current and power observed are consistent with a nominal 760 ohm element.

10.3.5 Set voltage to zero.

10.3.6 Power on “P.S. B” and with DAS monitoring power at H05P, adjust power supply output to 1.0 volt.

10.3.7 Verify current and power observed are consistent with a nominal 760 ohm element.

10.3.8 Set voltage to zero.

10.4 Data Description:

10.4.1 The nomenclature used are indentified as follows with (xxx) indicating DAS channel number.

T10P (121)	Probe QBS /a	T11P (122)	Probe QBS /b
H05P (25)	Htr QBS /a	H06P (26)	Htr QBS /b
T05P (118)	HEX-0 /a	T28P (119)	HEX-0 /b
T01D (01)	Sta. 200 /a	T02D (02)	Sta. 200 /b

NOTE

In the following, if current above minimum 0.050 amp setting is required adjust power supply current limit to 10 % over the required value.

10 **First Heater Setting:**

10.1 Adjust heaters QBS/a H06P and QBS/b H06P to 0.025 W each .

T10P (121) _____ T11P (122) _____ Date: _____.

H05P (25) _____ H06P (26) _____ Time: _____.

T10P (145) _____ T11P (122) _____

T05P (118) _____ T28P (119) _____

T01 (01) _____ T02 (02) _____

10.1 Once T10P and T11P have reached equilibrium record:

T10P (121) _____ T11P (122) _____ Date: _____.

H05P (25) _____ H06P (26) _____ Time: _____.

T10P (145) _____ T11P (122) _____

T05P (118) _____ T28P (119) _____

T01 (01) _____ T02 (02) _____

10.1 Steady State Data. (Attach DAS printout) Date: _____ Time:

10 **Second Heater Setting:**

10.1 Adjust heaters QBS/a H06P and QBS/b H06P to 0.050 W each.

T10P (121) _____ T11P (122) _____ Date: _____.

H05P (25) _____ H06P (26) _____ Time: _____.

T10P (145) _____ T11P (122) _____

T05P (118) _____ T28P (119) _____

T01 (01) _____ T02 (02) _____

10.1 Once T10P and T11P have reached equilibrium record:

T10P (121) _____ T11P (122) _____ Date: _____.

H05P (25) _____ H06P (26) _____ Time: _____.

T10P (145) _____ T11P (122) _____

T05P (118) _____ T28P (119) _____

T01 (01) _____ T02 (02) _____

10.1 Steady State Data. (Attach DAS printout) Date: _____ Time:

10 **Third Heater Setting:**

10.1 Adjust heaters QBS/a H06P and QBS/b H06P to 0.200 W each.

T10P (121) _____ T11P (122) _____ Date: _____.

H05P (25) _____ H06P (26) _____ Time: _____.

T10P (145) _____ T11P (122) _____

T05P (118) _____ T28P (119) _____

T01 (01) _____ T02 (02) _____

10.1 Once T10P and T11P have reached equilibrium record:

T10P (121) _____ T11P (122) _____ Date: _____.

H05P (25) _____ H06P (26) _____ Time: _____.

T10P (145) _____ T11P (122) _____

T05P (118) _____ T28P (119) _____

T01 (01) _____ T02 (02) _____

10.1 Steady State Data. (Attach DAS printout) Date: _____ Time: _____.

10 **Fourth Heater Setting:**

10.1 Adjust heaters QBS/a H06P and QBS/b H06P to _____ W each.

T10P (121) _____ T11P (122) _____ Date: _____.

H05P (25) _____ H06P (26) _____ Time: _____.

T10P (145) _____ T11P (122) _____

T05P (118) _____ T28P (119) _____

T01 (01) _____ T02 (02) _____

10.1 Once T10P and T11P have reached equilibrium record:

T10P (121) _____ T11P (122) _____ Date: _____.

H05P (25) _____ H06P (26) _____ Time: _____.

T10P (145) _____ T11P (122) _____

T05P (118) _____ T28P (119) _____

T01 (01) _____ T02 (02) _____

10.1 Steady State Data. (Attach DAS printout) Date: _____ Time:

10.2 **Additional Heater Setting (if required):**

10.2.1 Adjust heaters QBS/a H06P and QBS/b H06P to _____ W each.

T10P (121) _____ T11P (122) _____ Date: _____.

H05P (25) _____ H06P (26) _____ Time: _____.

T10P (145) _____ T11P (122) _____

T05P (118) _____ T28P (119) _____

T01 (01) _____ T02 (02) _____

10.1 Once T10P and T11P have reached equilibrium record:

T10P (121) _____ T11P (122) _____ Date: _____.

H05P (25) _____ H06P (26) _____ Time: _____.

T10P (145) _____ T11P (122) _____

T05P (118) _____ T28P (119) _____

T01 (01) _____ T02 (02) _____

10.1 Steady State Data. (Attach DAS printout) Date: _____ Time: _____.

10 Thermal Test of Station 200 Completed.

Completed by: _____.

Witnessed by: _____ .

Date: _____ .

Time: _____ .

RQE Signoff: _____ .