W. W. Hansen Experimental Physics Laboratory

STANFORD UNIVERSITY
STANFORD, CALIFORNIA 94305-4085

Gravity Probe B Relativity Mission

Proton Monitor Inrush Current Test Procedure

GP-B P0638

19 November, 1999

Prepared by: Peter Rusznyak **STI**	**Date**
Approved by: Awele Ndili **Proton Monitor Product Team Leader**	**Date**
Approved by: S. Buchman **Hardware Manager**	**Date**
Approved by: Dorrene Ross **Quality Assurance**	**Date**

Notes:
1. This procedure was originally written by STI as document No.: GPB-GI-430.
2: All redlines must be approved by QA
   Level of QA required during performance of this procedure:
   _x_ Stanford QA Representative
   ____ Government QA Representative

1 Scope

This Document provides information of the testing of the in-built Inrush Current Limiter function to be performed on the Proton Detectors (FM and FS) specified in contract PR 9071.

The PD has a built-in current limiter (power limiter) set to approx. 3.5W (slightly dependent on the input voltage). For a detailed description of this circuit refer to GPB-TR-202.

2 Personnel Requirements

This test to be conducted only by certified personnel: Peter Rusznyak and Awele Ndili.
Notify ONR 24 hours prior to beginning testing.

Person Contacted: _____ Date and Time: _____

Notify QA 24 hours prior to beginning testing.

Person Contacted: _____ Date and Time: _____

3 Quality Assurance

Operations shall be conducted on a formal basis to approved and released procedures. The QA program office shall be notified of the start of this procedure. A Quality Assurance Representative, designated by D. Ross shall be present during the procedure and shall review any discrepancies noted and approve their disposition. Upon completion of this procedure, the QA Program Engineer, D. Ross or her designate, nominally R. Leese, will certify her concurrence that the effort was performed and accomplished in accordance with the prescribed instructions by signing and dating in the designated place(s) in this document. Discrepancies will be recorded in a D-log or as a DR per Quality Plan P0108.

4 Safety Requirements

4.1 Electrical mating and demating of flight hardware connectors

4.1.1 Place cable connector A only into socket A, etc.

4.1.2 Strain relieve all cables

4.1.3 Connection and disconnection shall be performed only when the equipment involved is in a powered-down state.

4.1.4 Connectors shall be inspected for contamination and for bent, damaged, or recessed pins prior to mating.

4.1.5 Connector savers are to be used on the Proton Monitor connectors.

Note: The mating and demating of all flight connectors must be recorded in a log. This procedure does not require removal or replacement of connector savers onto the flight connectors--they should already be in place.

4.2 Electro Static Discharge (ESD)

4.2.1 No special precautions for ESD are required for this device.

5 General Instructions

This section should include general instructions that apply throughout the procedure and are not covered elsewhere.

5.1 Red-line Authority

5.1.1 Authority to red-line (make minor changes during execution) this procedure is given solely to the PTD or his designate and shall be approved by the QA representative. Additionally, approval by the Hardware Manager shall be required, if in the judgement of the PTD or QA Representative, experiment functionality may be affected.

5.1.2 Any nonconformance or test anomaly should be reported by a Discrepancy Report. Refer to the Quality Plan, P0108, for guidance. Do not alter or break test configuration if a test failure occurs; notify quality assurance.

5.1.3 Only the following persons have the authority to exit/terminate this test or perform a retest: Peter Rusznyak and Awele Ndili

6 Cleanliness requirements

The Proton Detector FM and FS should always be kept in a Class 10,000 or better environment. The units must be handled using gloves. Cleaning of the units is possible using ethanol only. Special precaution has to be made to avoid ethanol getting under the titanium shields.

7 Hardware Required:

Flight Proton Monitor, PN _____

Ground Support Equipment: _____

STIL Variable Resistor Box

GPB-HW-150	STIL	Variable Resistor Box

8 Applicable Documents

PR 9071	Stanford	contract to design, fabricate and deliver the High Energy Proton Monitor
GPB-GI-250	STIL	Installation Procedures for the Proton Monitor
GPB-HW-126	STIL	Test Connector Pin-out Diagram
GPB-TR-202	STIL	Functional description and Test Report of the PD Inrush Current Limiter

9 Installing the Proton Detector

RECORD TEST LOCATION:

The PD under test shall be connected to the GSE via the power and interface cables (refer to GPB-GI-250). The Variable Resistor Box shall be connected to the Test Connector (CNT-003, GPB-HW-126, pin 6 and 7) instead of the 'Stimuli Cable'.

Set Up Compete: Test Operator Initial:_____, Date: _____, Time:_____

QA Witness: _____ Date: _____

In order to test the actual current limit threshold STIL provided a Variable Resistor Box (refer to GPB-HW-150). This allows the user to add an adjustable (purely resistive) current to the primary current consumed by the PD. This additional current is limited to 30 mA maximum at nominal voltage (28V).

10 Limiter testing

Test Entry: Test Operator Initial:_____, Date: _____, Time:_____

Step	Action	√ complete
1	Set the multi-turn dial of the Variable Resistor Box to its maximum position (by turning it clockwise).	
2	Power up the PD at nominal voltage (28V).	
3	Gradually reduce the resistance by rotating the dial anti-clockwise while observing the current meter on the GSE.	
4	Note the last reading before the current drops to its 'OFF' value (few mA). This value must be within 125 mA and 145 mA, which is also the adjustment range of the VRB (3.5W – 4W). Nominal Voltage Last Reading: _____	_____
5	Repeat steps 1-4 with extreme voltages (22V and 35V) 22V: Last Reading (from Step 4 above): _____ 35V: Last Reading (from Step 4 above): _____	_____ _____

11 Procedure Completed

Test Complete with acceptable results.

Performed by: _____ Date: _____

QA Witness: _____ Date: _____

Discrepancies if any:

Approval. The information obtained under this assembly and test procedure is as represented and the documentation is complete and correct:

Test Director/ PTD: _____ Date: _____

QA Manager: _____ Date: _____