

STANFORD UNIVERSITY
W.W. HANSEN EXPERIMENTAL PHYSICS LABORATORY
GRAVITY PROBE B, RELATIVITY GYROSCOPE EXPERIMENT
STANFORD, CALIFORNIA 94305-4085

**TRANSFER OF GMA TO FLIGHT MOUNTING PLATE
GP-B ENGINEERING PROCEDURE**

P0762 Rev –
September 26, 2000

PREPARED _____
R. Stephenson, GMA Engineer Date

APPROVED _____
G. Asher, GMA REE Date

APPROVED _____
D. Ross, Quality Assurance Date

APPROVED _____
B. Muhlfelder, Hardware Manager Date

TABLE OF CONTENTS

TABLE OF CONTENTS	2
1. SCOPE.....	3
2. TEST INFORMATION.....	3
2.1 Cleanliness.....	3
2.2 ESD precautions.....	3
2.3 Use of connector savers	3
2.4 Personnel, QA, and Documentation.....	3
2.5 Red-line Authority	4
DOCUMENTS AND EQUIPMENT	5
3.1 Applicable Documents.....	5
3.2 Test Equipment	5
3.3 Flight Parts.....	6
4 FINAL FASTENING	7
5 TRANSFER OF ASSEMBLIES.....	7
6 LOCK WIRING OF FASTENERS	7
7 PROCEDURE COMPLETION	8
8 DATA BASE ENTRY	8

1. SCOPE

This procedure describes the transfer of the GMA from the shipping plate to the flight mounting plate. The final staking and safety wiring of the solenoid valve screws takes place before the transfer starts. This will be the final assembly of the GMA, so all the flight hardware will be used at this time. The GMA connections should either be fitted with end valves or bagged to prevent contaminants from entering the gas pathways.

2. TEST INFORMATION

- Proper care should be taken in handling components, and their cleanliness must be preserved.
- Temperature: Room temperature
- Humidity: not critical

2.1 Cleanliness

2.1.1 Normal lab environment when components are double bagged.

2.1.2 Class 10 clean room, or a clean hood in class 1000 or 10,000 clean room when valves are open to atmosphere.

2.2 ESD precautions

None required.

ONR representative, and QA to be notified prior to beginning this procedure
--

2.3 Use of connector savers

Connector savers will be used on all gas and electrical connections to the GMA.

2.4 Personnel, QA, and Documentation

Personnel Integration and Test Director

The Test Director (TD) shall be Rick Stephenson or an alternate that he shall designate. The TD has overall responsibility for the implementation of this procedure and shall sign off the completed procedure and relevant sections within it. The GMA REE shall also sign off the completed “As-Built” procedure.

Integration Engineers and other personnel. All engineers and technicians participating in this procedure shall work under the direction of the TD who shall determine personnel that are qualified to participate in this procedure. Participants in this procedure are to be R. Stephenson and G. Asher.

The test 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 (if deemed necessary) and shall review any discrepancies noted and approve their disposition. Upon completion of this procedure, the QA Manager, D. Ross or her designate, shall certify their 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. If a re-test of any or all of the hardware is necessary, the TD will determine the appropriate changes in the procedure, with the QA Manager's approval.

2.5 Red-line Authority

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

DOCUMENTS AND EQUIPMENT

3.1 Applicable Documents

Document number	Rev	Description
25110	C	GMA Assembly
25111	A	Caging Component Assembly
25112	B	Spinup Component Assembly
25113	C	Regulator Component Assembly
P0499	–	Probe Fastener Staking

3.2 Test Equipment

Equipment	Model and Serial Number	Calibration
GMA rotating fixture		
Torq-set screwdriver		
Allen Wrenches		
Epoxy	2143D and 2115	
Lock Wire	MS20995C32	
Adhesive	EA9394	

3.3 Flight Parts

Description	Model and Serial Number	Comments
Plate Mounting	25495-101	
Bracket assy, Electronic connector	25120-101	
MLI Support frame	25108-101	
Support assy, tubing clamp	25119-101	
Thermal Cutoff assy	25754-101	
Temperature kit, silicon diode	25754-101	
Seal, Aluminum	S14004A	
Heater Strip	133-7314	
Temperature sensor, silicon diode	23534-101	
Clamp, loop, cushioned	MS21919WCG4	
O-Ring	3-910-B0612-70	
SCREW	NAS9203-34H	
SCREW	NAS1351N3LB8S	
SCREW	NAS1351N3LB10S	
SCREW	NAS1351N3LB12S	
SCREW	NAS1351N3LB13S	
SCREW	NAS1351N4H10S	
WASHER, CUT	NAS1587A3C	
SCREW	NAS1351N3LB20S	
WASHER, REDUCED DIA.	NAS620C10	
WASHER, PLAIN, FLAT	NAS620C416	
GMA pallet harness	26202-501	

4 FINAL FASTENING

Started on: _____

- 4.1 Lock wire Microswitches (if necessary) according to P0499.
- 4.2 Lock wire solenoid collar screws per P0499.

5 TRANSFER OF ASSEMBLIES

Started on: _____

- 5.1 Remove the bottle jumper assembly (dwg. 25114) and bag the end.
- 5.2 Remove regulator jumper assembly (dwg. 25115) and either bag the connections, or use connector savers and VCR plugs.
- 5.3 Remove the electronic connector bracket, if necessary.
- 5.4 Remove all non-flight screws that fixture the caging assembly to the shipping plate.
- 5.5 Carefully lift the caging assembly from the plate and set aside.
- 5.6 Remove the non flight screws from the spinup and regulator assemblies.
- 5.7 Carefully lift the spinup assembly from the shipping plate and set aside.
- 5.8 Carefully lift the regulator assembly from the shipping plate and set aside.
- 5.9 Remove the shipping plate from the rotating fixture.
- 5.10 Install the flight plate on the rotating fixture.
- 5.11 Replace all non flight screws (e.g. metering valve bracket and manual valve bracket.) with flight screws per dwg. 25110. Note: Metering valve locking bracket has flight hardware installed.
- 5.12 Torque and stake these screws per P0499 using 2143D epoxy.
- 5.13 Carefully place the regulator assembly on the flight plate.
- 5.14 Fasten assembly to plate with flight hardware per dwg. 25110 and torque to 18 in-lbs.
- 5.15 Place spinup assembly on flight plate and fasten with flight hardware per dwg. 25110 and torque to 18 in-lbs.
- 5.16 Place caging assembly on flight plate and fasten with flight hardware per dwg. 25110 and torque to 18 in-lbs.
- 5.17 Install electronic connector bracket on flight plate with F/N 28 and 35 on dwg. 25110 and torque to 18 in-lbs.
- 5.18 Install regulator jumper assembly (dwg. 25115) using flight approved gamah seals.
- 5.19 Turn GMA over and install bottle jumper assembly (dwg. 25114) using flight approved gamah seals.
- 5.20 Install pressure bottle assemblies (dwg. 25106) using flight approved hardware.

6 LOCK WIRING OF FASTENERS

Started on: _____

6.1 Lock wire all flight plate fasteners per P0499.

7 PROCEDURE COMPLETION

The results obtained in the performance of this procedure are acceptable:

_____ date: _____
GMA Engineer

Discrepancies if any:

Approved: _____ date: _____
G. Asher, GMA REE

Approved: _____ date: _____
QA Representative

Approved: _____ date: _____
D. Ross, QA

8 DATA BASE ENTRY

The following data shall be entered into the GP-B DataBase:

- Name, number and revision of this procedure
- Date of successful completion of procedure.
- Part numbers and serial numbers of Caging Units and their components