SU/GP-B P0419 rev –

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

OPERATIONS MANUAL

FOR CL 10 CLEANROOM

PRECISION MANIPULATOR

GP-B SCIENCE MISSION PROCEDURE

23 October, 1998

APPROVED	D. Bardas, Integration Manager	Date
APPROVED	J. Stamets, Integration Engineer	Date
APPROVED	J. Janicki, Safety Engineering	Date
APPROVED	B. Taller, Quality Assurance	Date

APPROVED	S. Buchman, Hardware Mgr. (acting)	Date

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1 SCOPE

This operations manual describes the operation of the Precision Manipulator (PM) in the Class 10 cleanroom This includes raising an lowering operations, and tilt of the PM interface plate.

2 REFERENCES

2.1 Plans and Procedures

P0059 GPB Contamination Control Plan

3 GENERAL REQUIREMENTS

3.1 Environmental Requirements

3.1.1. Cleanliness

This operation takes place in the Class 10 Cleanrooms in the HEPL building. Minimum protective garments for personnel working in this clean room shall be certified Class 10 cloth garments.

3.1.2 Particulate Contamination

Ensure that the covers are on the front of the manipulator to seal off the PM's working mechanism from the room. *This also ensures the safety of personnel.*

When in the Class 10 room, to the maximum extent possible, personnel shall keep all parts of their bodies downstream of the Probe, relative to the HEPA wall.

3.1.3 Magnetic Contamination

Not applicable.

3.2 Operations Personnel

People qualified to perform this operation shall be J. Stamets , E. Alcorta, or D. Bardas.

Dr. Doron Bardas or his deputy, Dr. Michael Taber, have overall responsibility for this operation and may designate additional people.

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3.3 Safety

3.3.1 General

All participating personnel shall ensure they are aware of the specific and hardware safety concerns indicated in the safety requirements, cautions and warnings in the procedure. Personnel working in the Class 10 Cleanroom must be cognizant of the base of the Precision Manipulator, and take special care to avoid tripping or bumping into it.

3.3.2. Maximum Number of People in Cleanroom

Under normal operating conditions, there shall be no more than 5 people in the Class 10 Cleanroom. This is to avoid violating legal make-up air requirements, and to provide an efficient workspace. Exceptions must be for short periods only, and approved by Dr. Doron Bardas or his deputy, Dr. Michael Taber.

3.4 Quality Assurance

Any discrepancies during PM operations shall be noted herein and shall be reported to QA.

3.5 Red-line Authority

Authority to red-line (make minor changes during execution) this manual is given solely to the D. Bardas or J. Stamets. Approval by the Hardware Manager shall be required if experiment functionality may be affected. *For procedures in the cleanroom, "redlines" shall be accomplished using **BOLD RED ITALICS** and "signatures" in **BOLD BLACK ITALICS**.*

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4 RAISING AND LOWERING THE PM INTERFACE LIFTING PLATE

Note that for long period of non operation the PM power supplies should be unplugged.

4.1 Initial Setup

4.1.1 Ensure that the power supply switch is off, that the direction switch is centered, and that the voltage control knob is fully counter clockwise, and the current limit control is fully clockwise..

4.2 Raising the PM Lifting Plate

4.2.1 Plug in the 110 V power cord.

4.2.2 Switch on the power supply.

4.2.3 Move the direction control switch up.

4.2.4 Slowly raise the voltage until the current readout begins to fluctuate or you notice vertical motion of the lifting plate, whichever comes first. This should be around 2 to 3 Amperes .

4.2.5 Increase the voltage slowly for increased speed but DO NOT exceed 20 Volts.

4.2.6 When near the point you wish to stop, decrease the voltage slowly, to zero.

EXCEPT IN CASES OF EMERGENCY do not do this rapidly, or move the direction switch into the center position, to stop the motion. This causes a back emf which can blow the power supply fuse, or possibly damage the power supply.

4.1 Lowering the PM Lifting Plate

4.1.1 Plug in the 110 V power cord.

4.1.2 Switch on the power supply.

4.1.3 Move the direction control switch down.

4.1.4 Slowly raise the voltage until the current readout begins to fluctuate or you notice vertical motion of the lifting plate, whichever comes first. This should be around 4 to 6 Amperes .

4.1.5 Increase the voltage slowly for increased speed but DO NOT exceed 20 Volts.

4.1.6 When near the point you wish to stop, decrease the voltage slowly, to zero.

EXCEPT IN CASES OF EMERGENCY do not do this rapidly, or move the direction switch into the center position, to stop the motion. This causes a back emf which can blow the power supply fuse, or possibly damage the power supply.

5 ADJUSTING THE TILT OF THE LIFTING PLATE

Tilt can be accomplished by using a wrench to turn the acme thread bolt at the bottom of the block anodized lifting plate. Turning it clockwise causes the bottom of the plate to move outwards, while turning the bolt counterclockwise has the opposite effect.

6 DATA BASE ENTRY

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

Name, number and revision of this procedure