HESSI SPACECRAFT
SPECTROMETER PUMP REMOVAL

HSI_MIT_023B.DOC

2001-JAN-11

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DRAFT

As Run on: _____ (Date/Time)

By _____ (Test Conductor)

DOCUMENT REVISION RECORD

Rev.	Date	Description of Change
A	1/11/01	Correct purge gas procedure (7.9 and 7.12) Add diff pump lever open/close(7.1, 7.4) Move Seal Pump Shutdown two steps earlier.

Western Range/NASA Safety:_____ _____
Date

Project Manager: _____ _____
Peter Harvey Date

System Engineer: _____ _____
David Curtis Date

QA: _____ _____
Ron Jackson Date

1.0 INTRODUCTION

This procedure provides the necessary instructions for attaching the Spectrometer Vacuum pump to the HESSI Spectrometer. This pump must always be attached to the spacecraft except during transport. The document describes the equipment, personnel, and steps necessary to safely connect the pump.

1.1 Reference Documents

1. NHB5300.4(3L) Requirements for Electrostatic Discharge Control
2. FED-STD-209 Airborne Particulate Cleanliness Classes in Clean Rooms and Clean Zones.

2.0 APPLICATION

The HESSI payload will be transported several times while at VAFB and KSC. Each time, the pump will require removal and installation. Pump installations will occur after:
[1] Spacecraft delivery to VAFB 836;
[2] Spacecraft rotation for Spectrometer Warmup;
[3] Spacecraft delivery to VAFB 1555;
[4] Spacecraft rotation for PAF integration;
[5] Spacecraft integration to LV;
[6] Fairing installation;
[7] LV mate to OCA;
[8] Delivery to KSC;
[9] Any Return-to-Base Operations.

3.0 CLEANLINESS AND ENVIRONMENT

The HESSI payload should be treated as ESD sensitive, and handled per MIL-STD-1686 Class 1, and NHB5300.4(3L) Requirements for Electrostatic Discharge Control.

The HESSI payload is contamination sensitive, and must be handled with appropriate care. At all times, the payload will be handled per FED-STD-209 Airborne Particulate Cleanliness Classes in Clean Rooms and Clean Zones.

The payload will be handled only by personnel wearing attire appropriate for a FED-STD-209 Class 100,000 cleanroom, including gloves. Gloves and wrist straps will be required.

4.0 REQUIRED PERSONNEL

Only the Project Manager, System Engineer or Quality Assurance have the authority to make changes in this procedure if the need arises.

Whenever the spectrometer pump is to be connected or disconnected, the Spectrometer Engineer must be present.

5.0 SAFETY

There are no safety issues in this procedure.

6.0 PRECAUTIONS

The pump cart shall be grounded with a heavy braid prior to connection to the spectrometer.

7.0 PROCEDURE

1. Start the Differential Seal Pump
   Do not move the actuator shaft when the system is under vacuum without the differential pump running. *Open the ballast gas valve* (small knurled brass knob on top of the pump – not the fill port) on the differential seal pump (the pump mounted above the turbo pump) about one turn. *Turn the pump on* via the switch on its rear. *Close the gas ballast valve*. *Lift black lever on rear of pump* intake to open vacuum path. Verify the gauge reads 29" of mercury.

2. Lower the Valve Plug
   Remove the valve retainer tube from the actuator shaft. *Push the black knob* marked MDC slowly while slightly twisting it back and forth. If the detectors are warm, the pressure at the ion gauge will probably drop as the cryostat is sealed off. Push until the valve plug contacts the valve body. Turn the knob counterclockwise while pushing it in gently until the valve plug drops and clicks into the thread start.

3. Close the Cryostat Valve
   Close the valve by turning the knob clockwise about 12 turns. Tighten the valve plug only until it is metal-to-metal snug – over tightening it will not improve the seal, it will only gall the metal parts.

4. Shut down Differential Seal Pump
   Lower black lever on rear of pump intake to close vacuum path. *Open the ballast gas valve* (small knurled brass knob on top of the pump – not the fill port) on the differential seal pump one turn. Wait 3 seconds *Turn the pump off* via the switch on its rear. *Close the gas ballast valve*.

5. Shut off the Ion Gauge
   If the ion gauge is on (top display on the gauge controller), *turn it off* by pushing the "emission" button.

6. Close the Gate Valve
   Verify that there is 60 to 80 psi on the valve gas supply regulator. *Press the red "close" button* on the controller. The valve will make a loud clank when it closes and should close in under one second.

7. Shut down the Turbo Pump
   Push the "start/stop/reset" button to turn off the pump. It takes a few seconds for the motors to shut off.

8. Turn Off the Chiller
   Turn off the power switch on the front panel.

9. Purge the Hose
   Set the purge regulator to 6 psi and open the green purge valve at the base of the hose.

10. Detaching the Actuator
    Rotate the MDC knob about 30 degrees counterclockwise while pulling out lightly until the brass valve-core remover disengages from the valve plug. DO NOT UNSCREW THE VALVE! Pull the knob out at least one inch. While holding the actuator at the top of the body (under the black knob), unscrew the brass hand nut to disengage the actuator from the valve. If the nut binds at all, tilt the actuator a little until the nut turns freely. Be very careful that the nut does not bind – don't force it! Hold the actuator body firmly while unscrewing so it doesn't drop into the spacecraft when the nut comes loose. Slide the turbopump and hose back into the cart.

11. Plug the Hose

Remove the red actuator plug from it's SS cover. Check that the seal is clean, and screw the hand nut onto it to seal the hose..

12. Turn off Purge
    Close the green purge valve. Do not over tighten.

13. Cap the Valve
    Clean the inside of the green valve cover with a clean wipe and screw onto the valve.

14. Shut off the Gate Valve Gas Supply
    If using the on-board N2 bottle, shut off the tank valve.