5.5_V2.0 OPEN SMALL VENT VALVE IN EMERGENCY DEPLOYMENT

Last Revised: June 27,1999
Filename: open_svv_emgdep

BRIEF FUNCTIONAL DESCRIPTION:

This procedure is intended to be executed in the case of an emergency deployment of AXAF during which it is still possible to command the spacecraft. This procedure should be implemented as an script with no indefinite waits. Once the first command is sent, the script should only take 8 s to execute since there are 8 commands and 1 s delays between each command. The following text pertains to the opening of the little vent valve in general:

The little vent valve is planned to be opened once on orbit. The current plan would open the valve while *AXAF* is still in the shuttle bay, 40 mins after the payload bay doors have been opened. The valve is opened to allow any residual gas which has leaked into the ACIS detector housing to escape. There are two redundant vent valves located in parallel downstream of a porous plug. Thus, the opening of either of these valves will be sufficient but it is planned to open both. Since the pumping speed is limited by the porous plug, no advantage in time or final pressure can be realized by opening both valves. There is no telemetry verifier that the valves have opened. The only way to verify the opening of the valves is to monitor the reading of the internal pressure monitor. Once opened the little valve should not be closed, since the risk of contaminants reaching the focal plane through this path is negligible. Initialy, the pressure will drop by a factor of two every 30 minutes. Typically in ground operations, 3 hours was the standard waiting time or until the rate of change was less than 1 torr per 30 minutes. The eventual pressure should read 0 ± 2 torr.

The sequence of actions will be:

1. turn on the pressure transducers A & B
2. enable and open the little valve mechanism A & B
3. disable the little vent valve mechanism A & B
4. monitor the pressure as spacecraft telemetry is available

ASSUMED INSTRUMENT STATE:
Assumes that the PSMC has power from the spacecraft.

SPECIAL INITIAL CONDITIONS:
Assumes that the spacecraft has power and connections for commanding and telemetry.

OPERATIONAL CONSTRAINTS/CAUTIONS:
This procedure leaves the ACIS pressure transducers on during deployment.
There is no telemetry verifier and therefore it is crucial that the internal pressure be monitored. Both pressure monitors may be read out, so they are both typically used.
CARD ACIS-002

CHANGE HISTORY:

V1.2

- changed filenames from “open_lvv_emgdep” to “open_svv_emgdep”

V1.3

- deleted step 1 which turned on the DPA side A
- deleted step 2.3 and 2.4 which provided a wait to measure the pressure
- deleted step 5 which turned off the DPA side A
- changed time delay between all commands to 1 s

V2.0

- ACIS Team signed-off version, identical to previous version 1.3

REFERENCES:

ACIS Long Form Functional Test Procedure (36-01301.01)

Table 1: **Open Small Vent Valve in an Emergency Deployment**

Step #	Title (Revision 5.5_V2.0)	Time Req (s)	Command Description	Command Mnemonic	Telemetry Description	Telemetry Mnemonic	Expected Value	Units
1.0	Turn on Pressure XDCRs							
1.1	turn on Pressure Transducer A	1.0	XDCR A on	1PRESAON	Pressure XDCR A	1PRDBAON	ON	
1.2	turn on Pressure Transducer B	1.0	XDCR B on	1PRESBON	Pressure XDCR B	1PRDBBON	ON	
2.0	Open Valves							
2.1	Enable valve A	1.0	Enable valve A	1LVCAEN	Little valve Enabled A	1LVDBAON	ENB	
2.2	Enable valve B	1.0	Enable valve B	1LVCBEN	Little valve enabled B	1LVDBBON	ENB	
2.3	Open valve A	1.0	Open valve A	1LVCOAON	Little valve open A	NONE		
2.4	Open valve B	1.0	Open valve B	1LVCOBON	Little valve open B	NONE		
3.0	Disable Valves							
3.1	Disable valve A	1.0	Disable A	1LVCADS	Disable A	1LVDBAON	DIS	
3.2	Disable valve B	1.0	Disable B	1LVCBDS	Disable B	1LVDBBON	DIS	
4.0	Monitor Pressure as available							
4.1	Measure Pressure A				Differential Housing Pressure A	1HOPRAPR	-12– +2	T
4.2	Measure Pressure B				Differential Housing Pressure B	1HOPRBPR	-12– +2	T
	Total Time	8						

Table 2: (CONT) **Open Small Vent Valve in an Emergency Deployment**

Step #	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
1.0									
1.1						Y	6		
1.2						Y	6		
2.0									
2.1						Y	6		
2.2						Y	6		
2.3						Y	6		
2.4						Y	6		
3.0									
3.1						Y	6		
3.2						Y	6		
4.0									
4.1				If P<-10 T, OBF may be damaged, consult ACIS engineering team.			6		
4.2				Monitor pressure whenever data is available.			6		