



International Space Station Assembly Operations Book

ISS-ULF5

Mission Operations Directorate
Operations Division

29 JUN 10

**This publication replaces
all previous publications.**
These procedures are available
electronically on the SODF Homepage
at <http://mod.jsc.nasa.gov/do3>

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



United Space Alliance

PST CODE: ASSY OPS ULF5 FIN 1

**INTERNATIONAL SPACE STATION
ASSEMBLY OPERATIONS BOOK
ISS-ULF5**

29 JUN 10

APPROVED BY:



Renee' Ross
Book Manager



Manager, Flight Procedures

copy



SODF Coordinator

ACCEPTED BY:



Michael T. Hurt
SODF Manager

This document is under the configuration control of the Systems Operations Data File Control Board (SODFCB).

Incorporates the following:				
CR:	Assy_Ops-02047	Assy_Ops-02071	Assy_Ops-02085	Assy_Ops-02098
	Assy_Ops-02048A	Assy_Ops-02072	Assy_Ops-02086	Assy_Ops-02100
	Assy_Ops-02049A	Assy_Ops-02074	Assy_Ops-02087	Assy_Ops-02110
	Assy_Ops-02050A	Assy_Ops-02075	Assy_Ops-02088	Assy_Ops-02111
	Assy_Ops-02051	Assy_Ops-02077	Assy_Ops-02092B	Assy_Ops-02114
	Assy_Ops-02052A	Assy_Ops-02078	Assy_Ops-02093B	Assy_Ops-02115
	Assy_Ops-02053	Assy_Ops-02080	Assy_Ops-02094C	Assy_Ops-02116
	Assy_Ops-02054A	Assy_Ops-02081	Assy_Ops-02095	Assy_Ops-02117
	Assy_Ops-02055A	Assy_Ops-02082	Assy_Ops-02096	
	Assy_Ops-02070A	Assy_Ops-02083	Assy_Ops-02097	

Uplinked Messages (or Approved Flight Notes) replaced by this revision,
remove from Book:

None

**INTERNATIONAL SPACE STATION
ASSEMBLY OPERATIONS
ISS-ULF5**

LIST OF EFFECTIVE PAGES

29 JUN 10

Sign Off	* 29 JUN 10	31.....	25 JUN 10
ii.....	* 29 JUN 10	32.....	25 JUN 10
iii.....	* 29 JUN 10	33.....	25 JUN 10
iv.....	* 29 JUN 10	34.....	25 JUN 10
v.....	* 29 JUN 10	35.....	25 JUN 10
vi.....	* 29 JUN 10	36.....	25 JUN 10
vii.....	* 29 JUN 10	37.....	25 JUN 10
viii.....	* 29 JUN 10	38.....	25 JUN 10
ix.....	29 JUN 10	39.....	25 JUN 10
x.....	29 JUN 10	40.....	25 JUN 10
xi.....	29 JUN 10	41.....	25 JUN 10
xii.....	29 JUN 10	42.....	25 JUN 10
1.....	29 JUN 10	43.....	25 JUN 10
2.....	29 JUN 10	44.....	TPIB
3.....	25 JUN 10	45.....	25 JUN 10
4.....	25 JUN 10	46.....	25 JUN 10
5.....	25 JUN 10	47.....	25 JUN 10
6.....	25 JUN 10	48.....	25 JUN 10
7.....	25 JUN 10	49.....	25 JUN 10
8.....	25 JUN 10	50.....	25 JUN 10
9.....	25 JUN 10	51.....	25 JUN 10
10.....	TPIB	52.....	25 JUN 10
11.....	19 MAY 10	53.....	25 JUN 10
12.....	19 MAY 10	54.....	TPIB
13.....	19 MAY 10	55.....	19 MAY 10
14.....	19 MAY 10	56.....	19 MAY 10
15.....	19 MAY 10	57.....	19 MAY 10
16.....	19 MAY 10	58.....	19 MAY 10
17.....	19 MAY 10	59.....	29 JUN 10
18.....	19 MAY 10	60.....	29 JUN 10
19.....	24 JUN 10	61.....	25 JUN 10
20.....	24 JUN 10	62.....	25 JUN 10
21.....	25 JUN 10	63.....	25 JUN 10
22.....	25 JUN 10	64.....	25 JUN 10
23.....	25 JUN 10	65.....	25 JUN 10
24.....	25 JUN 10	66.....	25 JUN 10
25.....	25 JUN 10	67.....	25 JUN 10
26.....	25 JUN 10	68.....	25 JUN 10
27.....	25 JUN 10	69.....	29 JUN 10
28.....	25 JUN 10	70.....	29 JUN 10
29.....	25 JUN 10	71.....	21 JUN 10
30.....	25 JUN 10	72.....	21 JUN 10

* - Omit from flight book

73.....	21 JUN 10	123.....	21 JUN 10
74.....	TPIB	124.....	21 JUN 10
75.....	23 JUN 10	125.....	18 JUN 10
76.....	TPIB	126.....	18 JUN 10
77.....	21 JUN 10	127.....	17 MAY 10
78.....	TPIB	128.....	17 MAY 10
79.....	22 JUN 10	129.....	24 JUN 10
80.....	TPIB	130.....	24 JUN 10
81.....	10 MAY 10	131.....	24 JUN 10
82.....	TPIB	132.....	24 JUN 10
83.....	11 MAY 10	133.....	24 JUN 10
84.....	11 MAY 10	134.....	24 JUN 10
85.....	11 MAY 10	135.....	24 JUN 10
86.....	11 MAY 10	136.....	24 JUN 10
87.....	11 MAY 10	137.....	24 JUN 10
88.....	11 MAY 10	138.....	24 JUN 10
89.....	11 MAY 10	139.....	24 JUN 10
90.....	11 MAY 10	140.....	24 JUN 10
91.....	10 MAY 10	141.....	24 JUN 10
92.....	TPIB	142.....	24 JUN 10
93.....	07 JUN 10	143.....	11 MAY 10
94.....	07 JUN 10	144.....	11 MAY 10
95.....	07 JUN 10	145.....	11 MAY 10
96.....	07 JUN 10	146.....	11 MAY 10
97.....	07 JUN 10	147.....	11 MAY 10
98.....	07 JUN 10	148.....	11 MAY 10
99.....	07 JUN 10	149.....	11 MAY 10
100.....	07 JUN 10	150.....	11 MAY 10
101.....	07 JUN 10	151.....	11 MAY 10
102.....	07 JUN 10	152.....	11 MAY 10
103.....	07 JUN 10	153.....	11 MAY 10
104.....	07 JUN 10	154.....	11 MAY 10
105.....	07 JUN 10	155.....	11 MAY 10
106.....	TPIB	156.....	11 MAY 10
107.....	11 MAY 10	157.....	11 MAY 10
108.....	11 MAY 10	158.....	11 MAY 10
109.....	10 MAY 10	159.....	11 MAY 10
110.....	10 MAY 10	160.....	11 MAY 10
111.....	11 MAY 10	161.....	11 MAY 10
112.....	TPIB	162.....	11 MAY 10
113.....	21 JUN 10	163.....	11 MAY 10
114.....	21 JUN 10	164.....	TPIB
115.....	21 JUN 10	165.....	11 MAY 10
116.....	21 JUN 10	166.....	11 MAY 10
117.....	21 JUN 10	167.....	11 MAY 10
118.....	21 JUN 10	168.....	11 MAY 10
119.....	21 JUN 10	169.....	11 MAY 10
120.....	21 JUN 10	170.....	11 MAY 10
121.....	21 JUN 10	171.....	17 MAY 10
122.....	21 JUN 10	172.....	17 MAY 10

* - Omit from flight book

173.....	17 MAY 10	223.....	10 MAY 10
174.....	17 MAY 10	224.....	10 MAY 10
175.....	17 MAY 10	225.....	10 MAY 10
176.....	17 MAY 10	226.....	TPIB
177.....	17 MAY 10	227.....	21 JUN 10
178.....	17 MAY 10	228.....	21 JUN 10
179.....	17 MAY 10	229.....	21 JUN 10
180.....	17 MAY 10	230.....	TPIB
181.....	17 MAY 10	231.....	29 JUN 10
182.....	17 MAY 10	232.....	29 JUN 10
183.....	17 MAY 10	233.....	02 JUN 10
184.....	17 MAY 10	234.....	TPIB
185.....	17 MAY 10	235.....	02 JUN 10
186.....	17 MAY 10	236.....	TPIB
187.....	17 MAY 10	237.....	29 JUN 10
188.....	TPIB	238.....	29 JUN 10
189.....	11 MAY 10	239.....	10 MAY 10
190.....	11 MAY 10	240.....	TPIB
191.....	11 MAY 10	241.....	10 MAY 10
192.....	11 MAY 10	242.....	10 MAY 10
193.....	11 MAY 10	243.....	10 MAY 10
194.....	11 MAY 10	244.....	10 MAY 10
195.....	11 MAY 10	245.....	10 MAY 10
196.....	11 MAY 10	246.....	TPIB
197.....	11 MAY 10	247.....	10 MAY 10
198.....	TPIB	248.....	TPIB
199.....	11 MAY 10	249.....	10 MAY 10
200.....	11 MAY 10	250.....	10 MAY 10
201.....	11 MAY 10	251.....	10 MAY 10
202.....	TPIB	252.....	TPIB
203.....	17 MAY 10	253.....	10 MAY 10
204.....	17 MAY 10	254.....	10 MAY 10
205.....	17 MAY 10	255.....	10 MAY 10
206.....	17 MAY 10	256.....	TPIB
207.....	17 MAY 10	257.....	10 MAY 10
208.....	17 MAY 10	258.....	10 MAY 10
209.....	17 MAY 10	259.....	10 MAY 10
210.....	17 MAY 10	260.....	10 MAY 10
211.....	11 MAY 10	261.....	10 MAY 10
212.....	11 MAY 10	262.....	10 MAY 10
213.....	17 MAY 10	263.....	29 JUN 10
214.....	17 MAY 10	264.....	29 JUN 10
215.....	17 MAY 10	265.....	19 MAY 10
216.....	17 MAY 10	266.....	TPIB
217.....	10 MAY 10	267.....	19 MAY 10
218.....	10 MAY 10	268.....	TPIB
219.....	10 MAY 10	269.....	24 MAY 10
220.....	TPIB	270.....	24 MAY 10
221.....	10 MAY 10	271.....	29 JUN 10
222.....	10 MAY 10	272.....	29 JUN 10

* - Omit from flight book

273	21 MAY 10
274	TPIB
275	21 MAY 10
276	TPIB
277	10 MAY 10
278	10 MAY 10
279	29 JUN 10
280	29 JUN 10
281	21 MAY 10
282	21 MAY 10
283	21 MAY 10
284	21 MAY 10
285	10 MAY 10
286	10 MAY 10
287	10 MAY 10
288	10 MAY 10
289	10 MAY 10
290	10 MAY 10
291	10 MAY 10
292	10 MAY 10

* - Omit from flight book

**INTERNATIONAL SPACE STATION
ASSEMBLY OPERATIONS
ISS-ULF5**

CUE CARD LIST OF EFFECTIVE PAGES

29 JUN 10

<u>Title</u>	<u>Page</u>	<u>Card Number</u>	<u>Date</u>	<u>Fab Notes</u>
CGBA STATUS CHECK				
(Front)	281	ASSY OPS-1a/ULF5/A	21 MAY 10	
(Back)	282	ASSY OPS-1b/ULF5/A	21 MAY 10	
GLACIER STATUS CHECK				
(Front)	283	ASSY OPS-2a/ULF5/A	21 MAY 10	
(Back)	284	ASSY OPS-2b/ULF5/A	21 MAY 10	
SPINAL ELONGATION STANDING HEIGHT LOG				
(Front)	285	ASSY OPS-3a/17A - ALL/A	10 MAY 10	
(Back)	286	ASSY OPS-3b/17A - ALL/A	10 MAY 10	
(Front - Bottom)	287	ASSY OPS-3aa/17A - ALL/A	10 MAY 10	
(Back - Bottom)	288	ASSY OPS-3bb/17A - ALL/A	10 MAY 10	
AEM UNIT #1 CHECK				
(Front)	289	ASSY OPS-4a/ULF5/A	10 MAY 10	
(Back)	290	ASSY OPS-4b/ULF5/A	10 MAY 10	
AEM UNIT #2 CHECK				
(Front)	291	ASSY OPS-5a/ULF5/A	10 MAY 10	
(Back)	292	ASSY OPS-5b/ULF5/A	10 MAY 10	

This Page Intentionally Blank

CONTENTS

ACTIVATION AND CHECKOUT	1
1.100 CBCS Installation - PMM Install to Node 1 Nadir	3
1.105 Node 1/PMM Vestibule Pressurization and Leak Check	11
1.110 PMM Vestibule - Equipment Setup	19
1.115 PMM Vestibule - Configure for Ingress	21
1.120 PMM Activation	45
1.125 PMM Ingress	55
TRANSFER.....	59
2.100 EXPRESS Rack 8 Transfer from PMM to LAB	61
PAYLOADS	69
AEM	
AEM Check	71
AEM Light Timer Cycle Reset	73
AEM Any Pwr Indicator Off.....	75
AEM Fan(s) Failure	77
AEM Light Cycle Incorrect (Off) During Operations	79
Water Leaking in AEM.....	81
MYCO	
MYCO Body Sample Collection	83
SPINAL	
Spinal Elongation Log	91
Spinal Elongation Operator Procedure.....	93
CGBA	
CGBA Set GMT	107
CGBA Incorrect (No) Display	109
CGBA Adjust Set Temp.....	111
NLP	
NLP Activation.....	113
NLP Termination	119
GLACIER - NOMINAL	
Glacier Configuration for Descent	125
Glacier Cold Head Check.....	127
Glacier Swap - ISS	129
Glacier Swap - Shuttle.....	137

GLACIER - CONTINGENCY	
Glacier Manual Reconfigure	143
Glacier Power Cycle	165
Glacier Reboot	167
Glacier Shutdown	169
 GLACIER - MALFUNCTION	
Glacier Error Message	171
Glacier Fail to Hold Set Point	189
Glacier Fail to Repower	199
Glacier LCD Blank	203
Glacier Record Cryogenic Diagnostic Data	209
Glacier Record Quick Diagnostic Data	211
Glacier Record Resources Diagnostic Data	213
Glacier Record System Diagnostic Data	215
 GLACIER - TABLES	
Table 1 Glacier Error Message Log	217
Table 2 Glacier Reset Log File	221
Table 3 Glacier Diagnostic Log File	227
 CONTINGENCY EVA PL CONFIGURATION	
Pre-EVA PL Configuration	233
Post-EVA PL Configuration	235
 MALFUNCTION	
 COMM	
Comm Malfunction Points	239
Loss of PMM Telemetry	241
OIU Fail to Command	243
OIU Temp (Up Arrow)	247
S212 OIU AD 1 NOLK/Loss of ISS or SSOR Telemetry	249
S62 PDI DECOM Fail	253
 PAYLOAD DPS RECONFIG	
PL/DPS Reconfig	257
 CRITICAL EQUIPMENT LOSS	
Orbiter Electrical Bus Loss Matrix	259
Orbiter MDM Loss Impacts	261
 DEORBIT PREP	
Payload Deactivation	265
Payload Reactivation	267
Payload Entry Switch List/Verification	269

REFERENCE	271
Standard Switch Panel 1	273
Standard Switch Panel 2	275
MYCO Kit	277
CUE CARD	279
CGBA Status Check.....	281
Glacier Status Check.....	283
Spinal Elongation Standing Height Log.....	285
AEM Unit #1 Check.....	289
AEM Unit #2 Check.....	291

This Page Intentionally Blank

ACTIVATION AND CHECKOUT

This Page Intentionally Blank

1.100 CBCS INSTALLATION - PMM INSTALL TO NODE 1 NADIR

(ASSY OPS/ULF5/FIN)

Page 1 of 7 pages

OBJECTIVE:

Install Centerline Berthing Camera System (CBCS) and all related avionics in Node 1 to support PMM install at Node 1 Nadir.

Perform a Video System Checkout by routing CBCS to RWS and Ground.

LOCATION

Node 1

DURATION:

Install/Checkout - 1 hour (steps 1 - 10)

Power-up for PMM Mate - 5 minutes (steps 8 - 9)

Removal - 30 minutes (steps 10 - 12)

CREW:

One

PARTS:

NOTE

There are three full sets of CBCS hardware (String 1, String 2, and String 3). They contain identical hardware distinguished by Serial Number (S/N).

Table 1. Parts List

Part	P/N	S/Ns (in String Order)	Notes
Camera Bag	SEG33112759-301	1001 1002 1003	Blue bag that holds the camera
CBCS Camera Assembly	SEG33112576-301	1001 1002 1003	Stored in Camera Bag
Ku-Band Power Supply	SEG46116711-302	1004 1008 1012	Marked "For CBCS Use Only"
LED Control Unit	SEG33112643-301	1001 1002 1003	
Video Interface Unit	SEG33112646-301	1003 1002 1001	
CBCS Camera Cable	SEG33112641-301	1002 1001 1003	13 ft cable; Violet, gold, orange connectors
CBCS Electronics Cable	SEG33112638-301	1002 1001 1003	20 ft cable; Pink, red, yellow, blue connectors

Continuation of Table ...

Part	P/N	S/Ns (in String Order)	Notes
UOP Power PSA Cable, 120VDC	SEG46116745-301	1008 1007 1002	21 ft cable

MATERIALS:

Velcro Straps (as required for securing cabling)

TOOLS:

Digital Camera

REFERENCED PROCEDURE:

6.114 LAB (CUP) RWS UOP BYPASS CABLE RECONFIGURATION

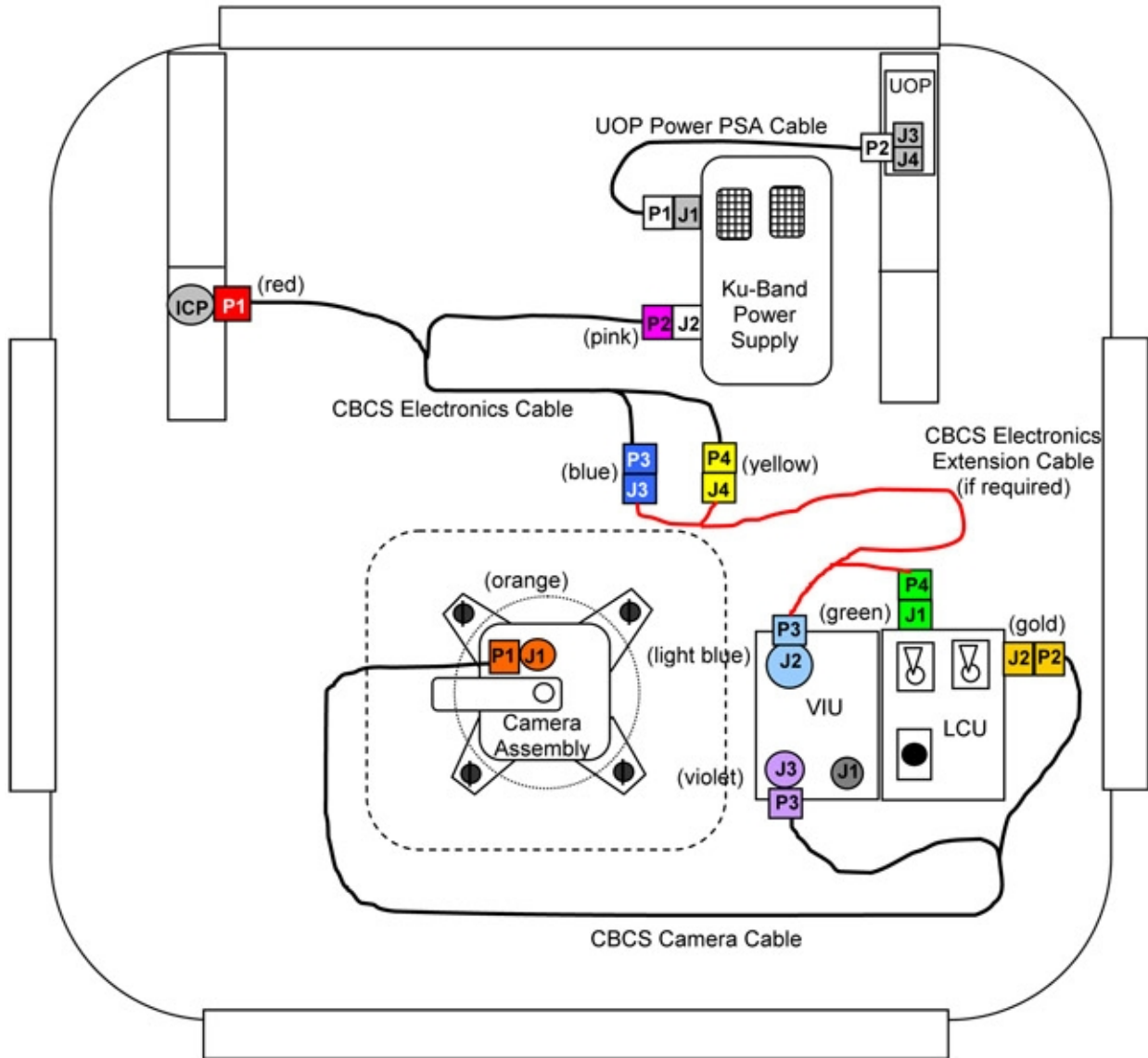


Figure 1. Example CBCS Installation Diagram.

NOTE

Figure 1 shows an example CBCS installation. For PMM install, the N1 Internal Camera Port (ICP) will be used, along with Node 1 UOP 1.

1. SAFING

NOD1SD4

1.1 Verifying No Power Applied to Node 1 UOP 1 J3

- ✓POWER OUT – (blue RESET)
- ✓Fault/Test – dark

2. INSTALLING KU-BAND POWER SUPPLY

2.1 ✓Ku-Band Power Supply OUTPUT 28V – OFF

2.2 UOP Power PSA Cable, 120VDC P2 →← J3 on Node 1 UOP 1

1.100 CBCS INSTALLATION - PMM INSTALL TO NODE 1 NADIR

(ASSY OPS/ULF5/FIN)

Page 4 of 7 pages

- 2.3 UOP Power PSA Cable, 120VDC P1 →|← J1 INPUT on Ku-Band Power Supply
Restrain Ku-Band Power Supply.

3. INSTALLING CBCS ELECTRONICS CABLE

Refer to Figure 1.

- 3.1 CBCS Electronics Cable P2 (pink) →|← J2 OUTPUT on Ku-Band Power Supply

NOD1S3

- 3.2 CBCS Electronics cable P1 (red) →|← Node 1 Internal Camera Port (ICP)

4. INSTALLING LED CONTROL UNIT, VIDEO INTERFACE UNIT

NOTE

- 1. Handrail Clamp and/or Multi-use Bracket may be used to secure LED Control Unit, Video Interface Unit if desired.
- 2. CBCS Extension Cable is not required.

- 4.1 Secure LED Control Unit, Video Interface Unit near N1 Nadir hatch.
- 4.2 CBCS Electronics Cable P4 (yellow) →|← J1 of LED Control Unit (green)
CBCS Electronics Cable P3 (blue) →|← J2 of Video Interface Unit (light blue)

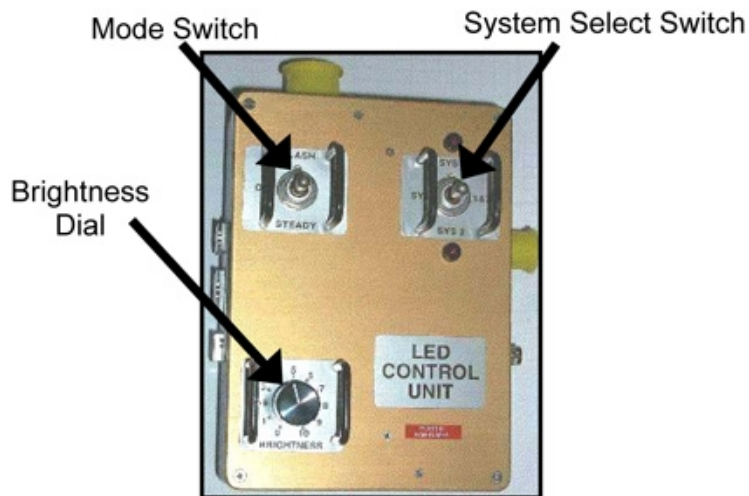


Figure 2. LED Control Unit.

5. CONFIGURING LED CONTROL UNIT SETTINGS

- Brightness Dial → 10
 - sw Mode Switch → STEADY
 - sw System Select Switch → SYS 1&2
- Refer to Figure 2.

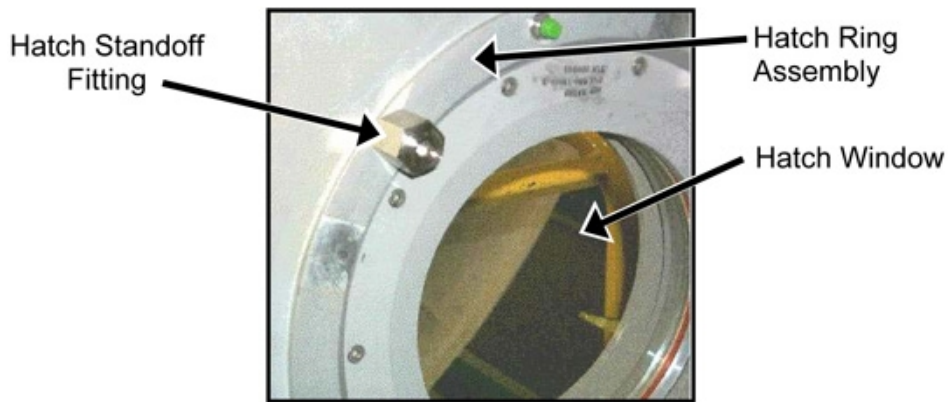


Figure 3. Hatch Standoff Fitting Installed.

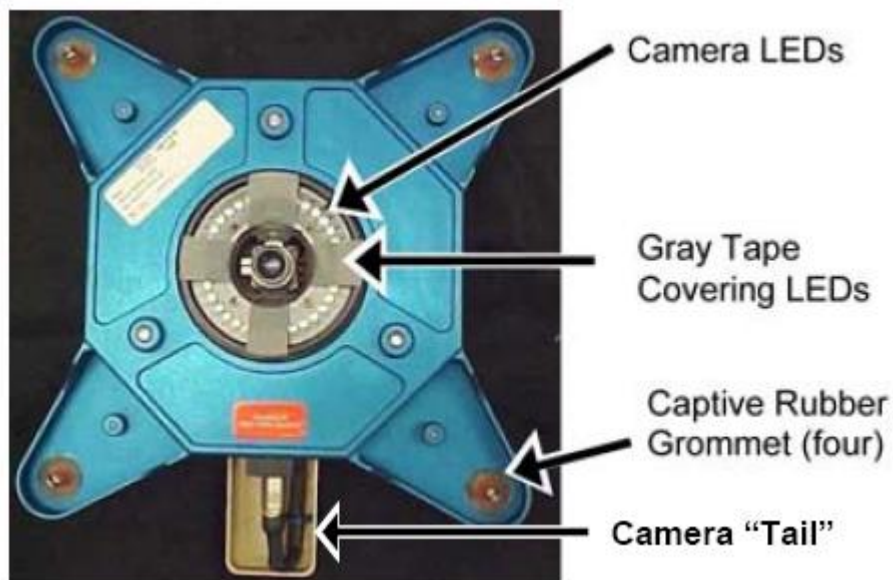


Figure 4. LEDs Covered with Gray Tape.

6. INSTALLING CAMERA ASSEMBLY

NOTE

Outer Hatch Window Cover Assembly installed on Hatch causes Camera LED reflection to interfere with Passive Target cues. Gray Tape should be installed from previous use.

- 6.1 ✓ Gray Tape (four pieces) over Camera LEDs to prevent LED glare interference with Passive Target cues
Refer to Figure 4.

CAUTION

Ensure that all 1/4 Turn Fasteners are fully seated in Hatch Standoff Fittings before engaging. Improper alignment could cause captive rubber grommet to disengage from CBCS Camera Assembly and affect centerline alignment.

1.100 CBCS INSTALLATION - PMM INSTALL TO NODE 1 NADIR

(ASSY OPS/ULF5/FIN)

Page 6 of 7 pages

6.2 If N1 Nadir Inner Hatch Window Shield is installed on hatch window, remove (Velcro).
Temporarily stow.

6.3 Mount CBCS Camera Assembly to Hatch Standoff Fittings with Camera tail oriented tail pointing ISS Forward, 1/4 Turn Fasteners (four).

Refer to Figures 3 and 4.

7. INSTALLING CBCS CAMERA CABLE

Refer to Figure 1.

7.1 CBCS Camera Cable P2 (gold) →|← J2 of LED Control Unit (gold)

7.2 CBCS Camera Cable P3 (violet) →|← J3 of Video Interface Unit (violet)

7.3 CBCS Camera Cable P1 (orange) →|← J1 of CBCS Camera Assembly (orange)

7.4 Photo document CBCS Camera orientation, showing complete hatch in camera view (Digital Camera).

8. APPLYING POWER TO CBCS

8.1 ✓All CBCS cables mated per Figure 1.

NOD1SD4

8.2 Enabling Node 1 UOP 1

✓POWER OUT – √ (green ENABLE)

✓Fault/Test – OK illuminated (green)

8.3 Ku-Band Power Supply OUTPUT 28V → ON

8.4 ✓Ku-Band Power Supply Input/Output LEDs (two) – illuminated (green)

9. CHECKING OUT CBCS VIDEO ON RWS MONITOR

9.1 If required, perform Display Control Panel (DCP) Cable Mate [6.114 LAB\(CUP\) RWS UOP BYPASS CABLE RECONFIGURATION](#), step 2 (SODF: ROBOTICS GENERIC: 6. NOMINAL: 6.11 RWS HARDWARE OPERATIONS), then:

9.2 ✓**MCC-H** - Ground complete with video routing to RWS

9.3 Routing CBCS Video From ICP

DCP

Configure RWS monitor as specified below:

Monitor 2
72: CBCS

9.4 Verify CBCS video displayed on RWS.

9.5 Verify **MCC-H** complete with ground video check.

10. POWERING DOWN

25 JUN 10

- 10.1 Ku-Band Power Supply OUTPUT 28 → OFF
✓Ku-Band Power Supply Output LED – dark
- NOD1SD4 10.2 Removing Power From Node 1 UOP 1
✓POWER OUT – √ (blue RESET)
✓Fault/Test – dark

11. REMOVING CBCS

NOTE

Once CBCS is powered off, cables can be removed in any order.

- 11.1 Remove, separate all CBCS Avionics Cables and stow in original CBCS Kit.
Refer to Table 2.
- 11.2 Remove CBCS Camera Assembly from Hatch Standoff Fittings (1/4 Turn Fasteners).
Leave Gray Tape (four pieces) on LEDs.
Leave Hatch Standoff Fittings installed on hatch.
Place CBCS Camera Assembly in Camera Bag face down, then stow in CBCS Kit.
- 11.3 If Inner Hatch Window Shield was installed on hatch window, replace Inner Hatch Window Shield, Velcro.
- 11.4 Remove, separate Video Interface Unit and LED Control Unit.
Stow in CBCS Kit.
- 11.5 Stow Ku-Band Power Supply in CBCS Kit.
12. POST MAINTENANCE
- 12.1 Notify **MCC-H** of task completion.
- 12.2 Update IMS with stowage location of CBCS Kit.

This Page Intentionally Blank

1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK

(ASSY OPS/ULF5/FIN/MULTI J/HC) Page 1 of 8 pages

OBJECTIVE:

Utilize Internal Sampling Adapter (ISA), Vacuum Access Jumper (VAJ), Multimeter, and ISA Scopemeter Pressure Probe to pressurize and verify integrity of pressure in Node 1/PMM vestibule. Perform an overnight fine leak check of the vestibule.

LOCATION:

Node 1 Deck

DURATION:

1 hour, 55 minutes Total Crew Time
25 minutes for Multimeter, ISA, VAJ Setup
70 minutes for Equalization and Leak Check Wait Times
20 minutes for Leak Check Term, Multimeter, ISA, VAJ Teardown

CREW:

One

MATERIALS:

9V Alkaline Battery (if Battery changeout required)
Earplugs

TOOLS:

MPEV Internal Sampling Adapter (ISA) P/N 97M55830-1
VAJ-78-1 5ft P/N 683-17111-1
ISA Scopemeter Pressure Probe P/N 1525,760MMHGA/30PSIA
Digital Multimeter Kit: P/N 10118-10018-04
Multimeter

ISS IVA Toolbox:

Drawer 3
#0 Phillips Screwdriver (if Battery changeout required)

1. SETTING UP ISA

NOTE

ISA has two identical ISA VAJ Ports. To ensure proper ISA Scopemeter Pressure Probe accuracy verification, one ISA VAJ Port must be uncapped.

1.1 Gamah Cap ←|→ ISA VAJ Port

Gamah Cap →|← remaining ISA VAJ Port (√Connection)
Hand tighten.

1.2 ISA Scopemeter Pressure Probe →|← ISA (√Connection)

1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK
 (ASSY OPS/ULF5/FIN/MULTI J/HC) Page 2 of 8 pages

2. SETTING UP MULTIMETER

NOTE

Plug marked "COM" must be inserted in COM jack on Multimeter. ISA Scopemeter Pressure Probe slide switch will face toward Multimeter Rotary Switch.

2.1 ISA Scopemeter Pressure Probe V plug →|← VΩ jack (right side, red)
 COM plug →|← COM jack

2.2 √ISA Scopemeter Pressure Probe – OFF

2.3 Rotary Switch ↻ $\overline{\text{mV}}$

2.4 Verify voltage reading > 100 mVDC (good ISA Scopemeter Pressure Probe Battery indication).

If voltage reading < 100 mVDC
 | ISA Scopemeter Pressure Probe Battery must be replaced.
 | The 9V Battery is replaced by removing noncaptive screw on
 | back of probe (#0 Phillips Screwdriver).

2.5 ISA Scopemeter Pressure Probe → mmHgA

3. VERIFYING ISA SCOPEMETER PRESSURE PROBE ACCURACY

NOTE

ISA Scopemeter Pressure Probe outputs 1 mV per pressure unit measured.
 Example: 0.760 V = 760 mV = 760 mmHgA

Multimeter 3.1 Rotary Switch ↻ $\overline{\text{V}}$

3.2 Record ISA Scopemeter Pressure Probe P₁: _____ mmHg

PCS 3.3 US Lab: ECLSS
 Lab: ECLSS

Record Cab Press P₂: _____ mmHgA

 * If $\Delta P |P_2 - P_1| > 20 \text{ mmHgA}$
 * | ISS ↓ **MCC-H**, "ISA Scopemeter Pressure Probe inaccurate."
 * |
 * | √**MCC-H** for further instructions

1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK
(ASSY OPS/ULF5/FIN/MULTI J/HC) Page 3 of 8 pages

4. CONNECTING VAJ, ISA, NODE 1 PORT MANUAL PRESSURIZATION EQUALIZATION VALVE (MPEV)

Node 1 Deck Hatch 4.1 MPEV – CLOSE
Refer to Figure 3.

4.2 Gamah cap ←|→ ISA Sampling Port

ISA Sampling Port Valve → CLOSED
Refer to Figure 1.

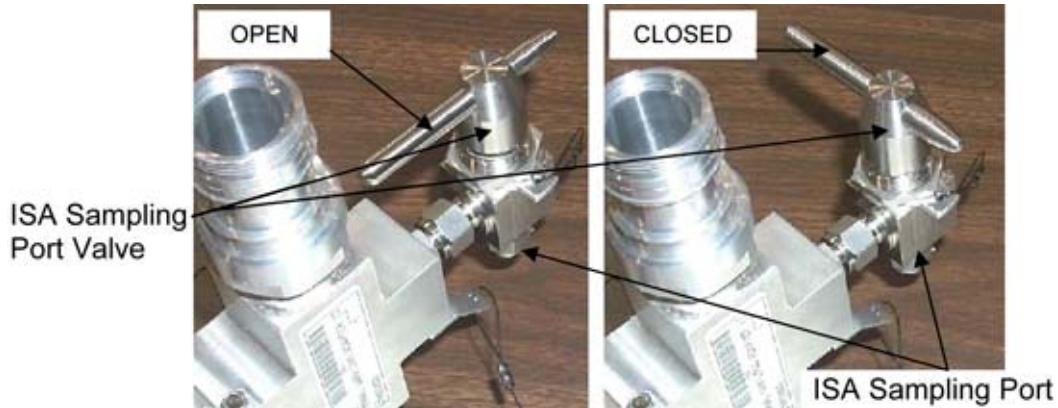


Figure 1.- ISA Sampling Port Valve.

4.3 Gamah Cap ←|→ VAJ-78-1 5ft (both ends)
Verify seals have no visible damage.

4.4 VAJ-78-1 5ft (straight end) →|← ISA VAJ Port
Hand tighten.
Refer to Figure 2.

4.5 Gamah Cap ←|→ MPEV
VAJ-78-1 5ft (bent end) →|← MPEV
Hand tighten.
Refer to Figure 2.

WARNING

VAJ will move when pressurized or evacuated. Failure to secure ISA/VAJ Assembly may result in injury to crew or damage to equipment.

4.6 Secure ISA/VAJ Assembly.

1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK
 (ASSY OPS/ULF5/FIN/MULTI J/H/C) Page 4 of 8 pages

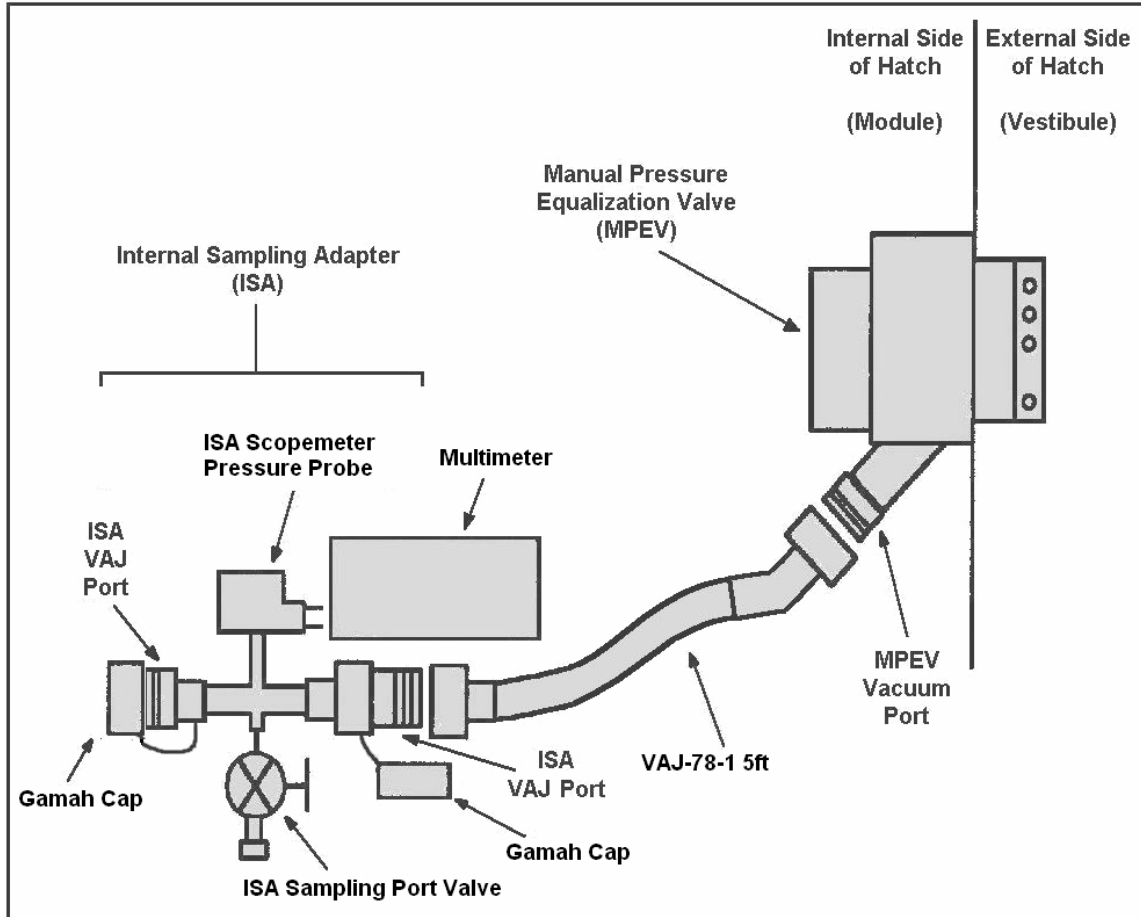


Figure 2.- ISA/VAJ/MPEV/Multimeter Connection.

5. LEAK CHECKING ISA/VAJ CONNECTION

WARNING
Opening the MPEV will start the depressurization of the ISA/VAJ setup and may cause a loud hissing noise. Crew in the vicinity should don Earplugs.

5.1 Don Earplugs.

Node 1 Deck Hatch 5.2 MPEV → OPEN

5.3 Wait 5 minutes to depressurize ISA/VAJ setup.

Multimeter 5.4 Rotary Switch ↻ \overline{mV}

5.5 Record ISA Scopemeter Pressure Probe P₃: _____ mmHg
 Record GMT: _____ GMT

1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK

(ASSY OPS/ULF5/FIN/MULTI J/HC) Page 5 of 8 pages

5.6 MPEV → CLOSE

5.7 Doff Earplugs.

5.8 Wait 3 minutes for thermal stabilization.

5.9 Record ISA Scopemeter Pressure Probe P₄: _____ mmHg
Record GMT: _____ GMT

5.10 Wait 5 minutes for ISA/VAJ leak check.

5.11 Record ISA Scopemeter Pressure Probe P₅: _____ mmHg
Record GMT: _____ GMT

* If $\Delta P |P_5 - P_4| > 5$ mmHgA during monitoring period
* | ISS ↓ **MCC-H**, "Suspected ISA/VAJ leak."
* | √**MCC-H** for further instructions

6. PARTIALLY PRESSURIZING VESTIBULE

WARNING

Opening the ISA Sampling Port Valve, Node 1 Port MPEV will equalize ISS with the ISA/VAJ, Vestibule and may cause a loud hissing noise. Crew in the vicinity should don Earplugs. Keep clear of inlet of ISA Sampling Port Valve when opened.

6.1 Don Earplugs.

Node 1 Deck Hatch 6.2 MPEV → OPEN

NOTE

1. To obtain accurate measurements, pressure readings should be taken only when ISA Sampling Port Valve is closed.
2. Pressure readings should be noted every 2 minutes, but do not need to be recorded or reported to **MCC-H**.
3. Vestibule should pressurize to 260 mmHgA in approximately 4 minutes.

6.3 ISA Sampling Port Valve → OPEN
Refer to Figure 1.

6.4 Wait 2 minutes to begin incremental pressurization of vestibule.

6.5 ISA Sampling Port Valve → CLOSED
Note ISA Scopemeter Pressure Probe reading.

1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK

(ASSY OPS/ULF5/FIN/MULTI J/HC) Page 6 of 8 pages

6.6 Repeat steps 6.3 to 6.5 until ISA Scopemeter Pressure Probe P ~260 mmHgA (~4 minutes).

6.7 Doff Earplugs.

7. PERFORMING GROSS LEAK CHECK OF VESTIBULE

7.1 Record ISA Scopemeter Pressure Probe P₆: _____ mmHgA
Record GMT: _____ GMT

7.2 Wait 10 minutes for thermal stabilization.

7.3 Record ISA Scopemeter Pressure Probe P₇: _____ mmHgA
Record GMT: _____ GMT

Notify **MCC-H** of pressure reading.

Node 1 Deck Hatch 7.4 MPEV → CLOSE

7.5 Wait 30 minutes for vestibule gross leak check.

7.6 MPEV → OPEN

7.7 Record ISA Scopemeter Pressure Probe P₈: _____ mmHgA
Record GMT: _____ GMT

Notify **MCC-H** of pressure reading.

7.8 MPEV → CLOSE

* If $\Delta P |P_8 - P_7| > 5$ mmHgA during monitoring period
* | ISS ↓ **MCC-H**, "Suspected Vestibule leak."
* | √**MCC-H** for further instructions

8. COMPLETING VESTIBULE PRESSURIZATION

WARNING

Opening the ISA Sampling Port Valve and Node 1 MPEV will equalize ISS with the vestibule and may cause a loud hissing noise. Crew in the vicinity should don Earplugs. Keep clear of inlet of ISA Sampling Port Valve when opened.

8.1 Don Earplugs.

Multimeter 8.2 Rotary Switch ↶ 

1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK

(ASSY OPS/ULF5/FIN/MULTI J/HC) Page 7 of 8 pages

8.3 ISA Sampling Port Valve → OPEN

Node 1 Deck 8.4 MPEV → OPEN
Hatch

PCS 8.5 US Lab: ECLSS
Lab: ECLSS

Monitor LAB Cab Press for 10 minutes.

If LAB Cab Press decreases by more than 4 mmHgA

ISA Sample Port Valve → CLOSED

MPEV → CLOSE

√**MCC-H** for instructions, >>

8.6 When $dP/dt = \sim 0$, proceed.

8.7 ISA Sampling Port Valve → CLOSED

8.8 MPEV → CLOSE

8.9 Doff Earplugs.

9. INITIALIZING VESTIBULE FINE LEAK CHECK

Node 1 Deck 9.1 MPEV → OPEN
Hatch

9.2 Record ISA Scopemeter Pressure Probe P_9 : _____ mmHgA
Record GMT: _____ GMT

Notify **MCC-H** of pressure reading.

9.3 MPEV → CLOSE

9.4 ISA Scopemeter Pressure Probe → OFF

9.5 Rotary Switch ↻ OFF

9.6 Wait overnight.

10. PERFORMING VESTIBULE FINE LEAK CHECK

Multimeter 10.1 Rotary Switch ↻ \bar{V}

10.2 ISA Scopemeter Pressure Probe → mmHgA

10.3 MPEV → OPEN

1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK

(ASSY OPS/ULF5/FIN/MULTI J/HC) Page 8 of 8 pages

10.4 Record ISA Scopemeter Pressure Probe P₁₀: _____ mmHgA
Record GMT: _____ GMT

Notify **MCC-H** of pressure reading.

10.5 MPEV → CLOSE

```
*****
* If  $\Delta P |P_{10} - P_9| > 20$  mmHgA during monitoring period
* | ISS ↓ MCC-H, "Suspected Vestibule fine leak."
* |
* | √MCC-H for further instructions
*****
```

11. DISASSEMBLING AND STOWING EQUIPMENT

11.1 ISA Scopemeter Pressure Probe → OFF

11.2 Rotary Switch ↺ OFF

11.3 Multimeter ←|→ ISA Scopemeter Pressure Probe

11.4 VAJ-78-1 5ft (bent end) ←|→ MPEV
Gamah Cap →|← MPEV
Gamah Cap →|← VAJ-78-1 5ft (bent end)
Hand tighten.

11.5 VAJ-78-1 5ft (straight end) ←|→ ISA VAJ Port
Gamah Cap →|← VAJ-78-1 5ft (straight end)
Hand tighten.

Gamah Cap →|← ISA VAJ Port
Hand tighten.

11.6 ISA Sampling Port Valve → OPEN

Cap →|← ISA Sampling Port
Refer to Figure 1.

11.7 Check for FOD within 1 m.

11.8 Notify **MCC-H**, "Vestibule pressurization and leak check completed."

11.9 Stow tools and materials.

1.110 PMM VESTIBULE - EQUIPMENT SETUP

(ASSY OPS/ULF5/FIN)

Page 1 of 2 pages

OBJECTIVE:

Gather and set up equipment essential to PMM Vestibule Activities.

LOCATION:

Installed: Node 1 Nadir Hatch

DURATION:

30 minutes

CREW:

One

NOTE

Two CTBs and Dividers will be used to stow removed CBM Controller Panel Assemblies (CPAs).

PARTS:

1.0 CTB (two) P/N SEG33111838-301

CTB Shelf Divider (two) P/N SEG33111841-309

IMV Return Duct Jumper P/N 683-13870-17

Node 1 MPLM Power Jumper W6006 P/N 1F89749-1

From ULF5 Middeck: PMM Vestibule Outfitting Kit (VOK):

Radial Port Closeout P/N 683-60461-11

Element Ground Strap Assy (two) P/N 683-13477-7

Node 1 - PMM 1553B LB-A (W6001) P/N 1F46380-1

Node 1 - PMM 1553B LB-B (W6002) P/N 1F46382-1

IMV Jumper O-Ring (two) P/N 2-161S0604-70

12" x 12" Ziplock Bag (four) P/N 528-50000-5

Each 12" x 12" Ziplock Bag contains:

24" x 24" Ziplock Bag P/N 528-50000-8

Protective Cap P/N NATC-RPC-N-15-0

Protective Cap P/N NATC-PPC-N-15-0

Protective Cap (two) P/N NATC-RPC-N-11-0

Protective Cap (two) P/N NATC-PPC-N-11-0

Protective Cap (six) P/N NATC-RPC-N-13-0

Protective Cap (six) P/N NATC-PPC-N-13-0

NOTE

Spare CTB can be used to stow loose tools and materials.

MATERIALS:

Place materials in Spare CTB:

Gray Tape

24 JUN 10

1.110 PMM VESTIBULE - EQUIPMENT SETUP

(ASSY OPS/ULF5/FIN)

Page 2 of 2 pages

Velcro Straps

Sharpie

Braycote

Towel

Earplugs

TOOLS:

Place tools in Spare CTB:

Mini Maglite

Adjustable Bungees (three)

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

4" Ext, 1/4" Drive

5/32" Hex Head, 1/4" Drive

1/4" Socket, 1/4" Drive

7/16" Socket, 1/4" Drive

7/16" Deep Socket, 1/4" Drive

(10-50 in-lbs) Trq Wrench, 1/4" Drive

1/4" to 3/8" Adapter

Drawer 3:

#6 Long Torq Driver, 3/8" Drive

Drawer 4:

Wire Cutters

Drawer 5:

Static Wrist Tether

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 1 of 23 pages

OBJECTIVE:

Remove hardware and install utility jumpers. This procedure follows the PMM Vestibule pressurization and leak check procedures. PMM ingress is made possible by completing this procedure.

NOTE

Portions of this procedure can be performed in parallel with the PMM ACTIVATION procedure. Once the PMM power (one) and 1553 data (two) jumpers are installed and the associated C&DH buses have been reconfigured, PMM ACTIVATION may be performed in parallel up through completion of AUTO (MANUAL) ACTIVATION PART 1. Once the IMV supply (aft) jumper is installed, PMM AUTO (MANUAL) ACTIVATION PART 2 may be completed in parallel. Notes within each procedure will direct the coordination between the two.

LOCATION:

Installed: Node 1, PMM Vestibule

CREW:

Two

DURATION:

3.5 hours

20 minutes - Removal of CBM Center Disk Cover

10 minutes - Removal of MPLM Thermal Blanket

45 minutes - Install Power and 1553 Jumpers

1 hour 30 minutes - Removal of Controller Panel Assemblies

25 minutes - IMV Equalization and Duct Install

20 minutes - Port Closeout Install

NOTE

1. If procedure 1.110 PMM VESTIBULE - EQUIPMENT SETUP is completed, the following PARTS, MATERIALS, and TOOLS have already been gathered.
2. Two Cargo Transfer Bags (CTBs) and Dividers will be used to stow removed CBM Controller Panel Assemblies (CPAs).

PARTS:

Radial Port Closeout P/N 683-60461-11

1.0 CTB (two) P/N SEG33111838-301

CTB Shelf Divider (two) P/N SEG33111841-309

IMV Return Duct Jumper P/N 683-13870-17

Node 1 MPLM Power Jumper W6006 P/N 1F89749-1

From ULF5 Middeck: PMM Vestibule Outfitting Kit (VOK):

Radial Port Closeout P/N 683-60461-11

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 2 of 23 pages

Element Ground Strap Assy (two) P/N 683-13477-7
Node 1 - PMM 1553B LB-A (W6001) P/N 1F46380-1
Node 1 - PMM 1553B LB-B (W6002) P/N 1F46382-1
IMV Jumper O-Ring (two) P/N 2-161S0604-70
12" x 12" Ziplock Bag (four) P/N 528-50000-5
Each 12" x 12" Ziplock Bag contains:
24" x 24" Ziplock Bag P/N 528-50000-8
Protective Cap P/N NATC-RPC-N-15-0
Protective Cap P/N NATC-PPC-N-15-0
Protective Cap (two) P/N NATC-RPC-N-11-0
Protective Cap (two) P/N NATC-PPC-N-11-0
Protective Cap (six) P/N NATC-RPC-N-13-0
Protective Cap (six) P/N NATC-PPC-N-13-0

MATERIALS:

Gray Tape

Velcro Straps

Sharpie

Braycote

Towel

Earplugs

TOOLS:

Mini Maglite

Adjustable Bungees (three)

Digital Camera

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

4" Ext, 1/4" Drive

5/32" Hex Head, 1/4" Drive

3/16" Hex Head, 1/4" Drive

1/4" Socket, 1/4" Drive

7/16" Socket, 1/4" Drive

7/16" Deep Socket, 1/4" Drive

(10-50 in-lbs) Trq Wrench, 1/4" Drive

(40-200 in-lbs) Trq Wrench, 1/4" Drive

1/4" to 3/8" Adapter

25 JUN 10

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 3 of 23 pages

Drawer 3:

#6 Long Torq Driver, 3/8" Drive

Drawer 4:

Wire Cutters

Drawer 5:

Static Wrist Tether

REFERENCED PROCEDURE(S):

1.105 CBM CENTER DISK COVER REMOVAL

1.101 CBM CONTROLLER PANEL ASSEMBLY REMOVAL - GENERIC

1. OPENING HATCH

- 1.1 Open Node 1 Nadir Hatch per decal.

CAUTION

Care must be taken while working in the vicinity of hatch seal to avoid rubbing, scratching, or placing any type of direct pressure upon seal. Damaging hatch seal could prevent hatch from maintaining pressure when closed.

- 1.2 Inspect vestibule for condensation.
If required, wipe condensate from vestibule (Towel).
If condensate found, notify **MCC-H**.

2. REMOVING CBM CENTER DISK COVER

- 2.1 Perform [1.105 CBM CENTER DISK COVER REMOVAL](#), all (SODF: S&M: NOMINAL: VESTIBULE), then:

3. REMOVING PTCS PMM THERMAL BLANKET

NOTE

1. Due to the orientation of the IMV Supply and Return Ducts, when the PMM is mated to the Node 1 Nadir Port, the Node and PMM Hatches open in opposite directions.
2. Node 1 Nadir Hatch opens toward STBD and PMM Hatch opens toward PORT.
3. Writing on the blankets is upwards-oriented toward PORT. Crew orientation for removal of the Passive Thermal Control System (PTCS) PMM Thermal Blankets is such that UP is towards PORT.
4. Figures 1 to 5 are references for the Passive Thermal Control System (PTCS) PMM Thermal Blanket Removal.

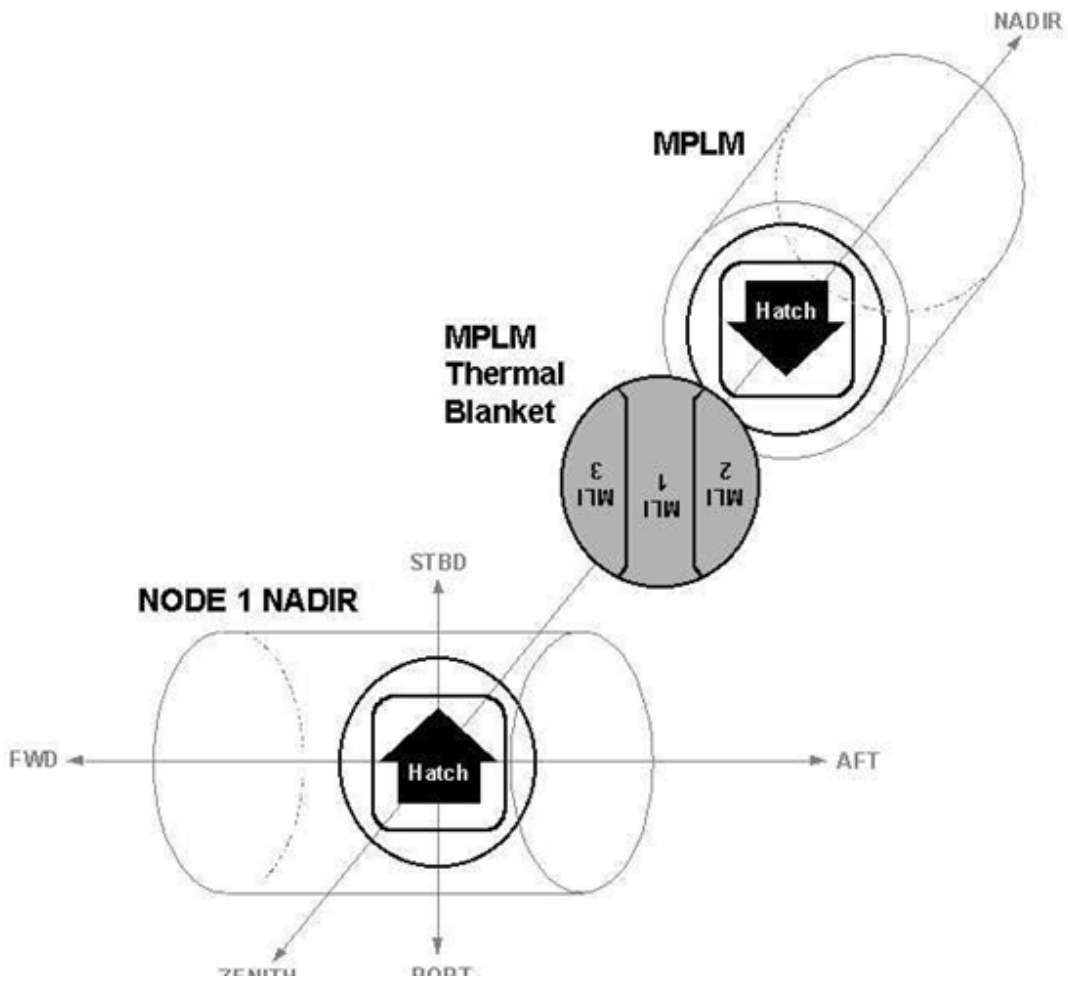


Figure 1. Orientation of PTCS PMM Thermal Blanket Relative to Opening Direction of Hatches.

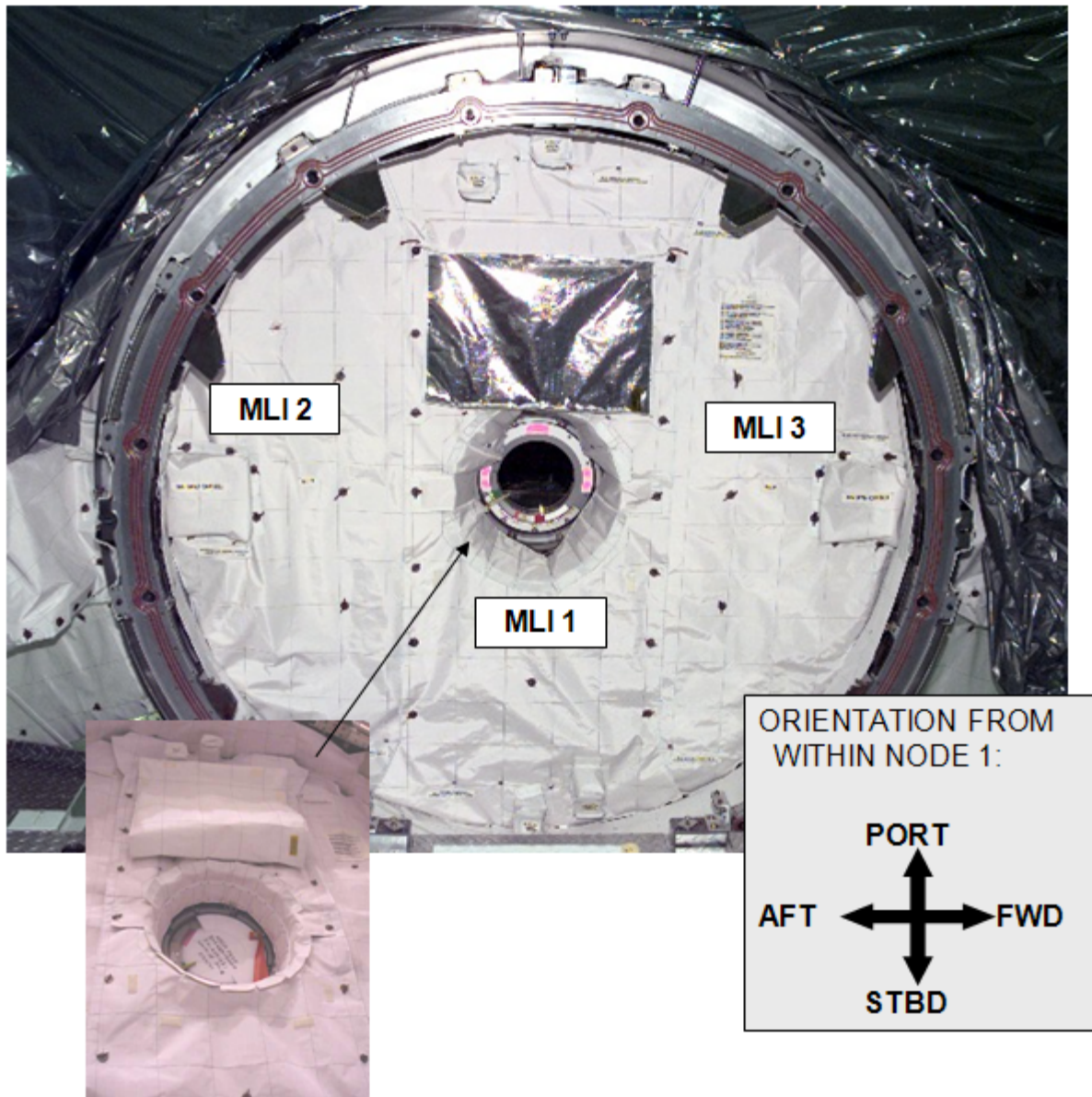


Figure 2. PMM Thermal Blanket Installed on PMM Bulkhead and Hatch (small picture shows current appearance of opened CBCS flap).

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

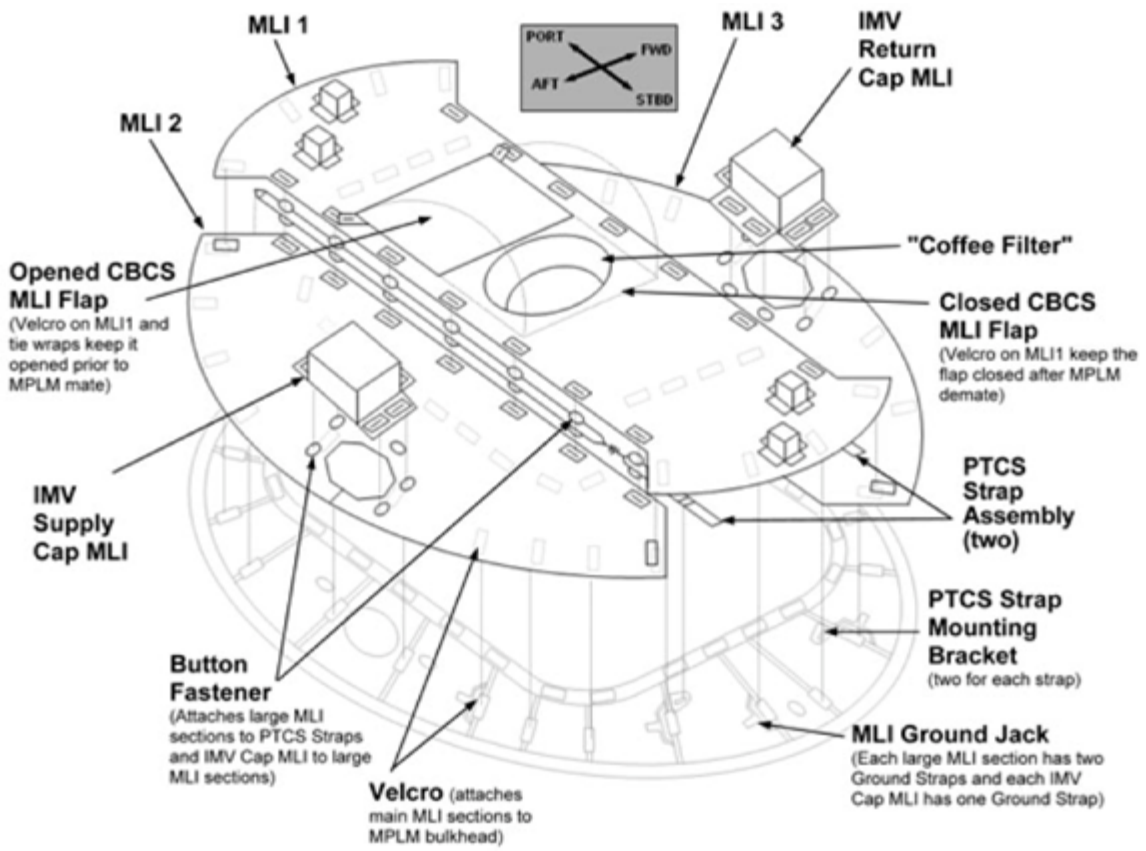


Figure 3. Isometric View of PTCS PMM Thermal Blanket and PTCS Strap Assemblies Installed on PMM Bulkhead and Hatch.

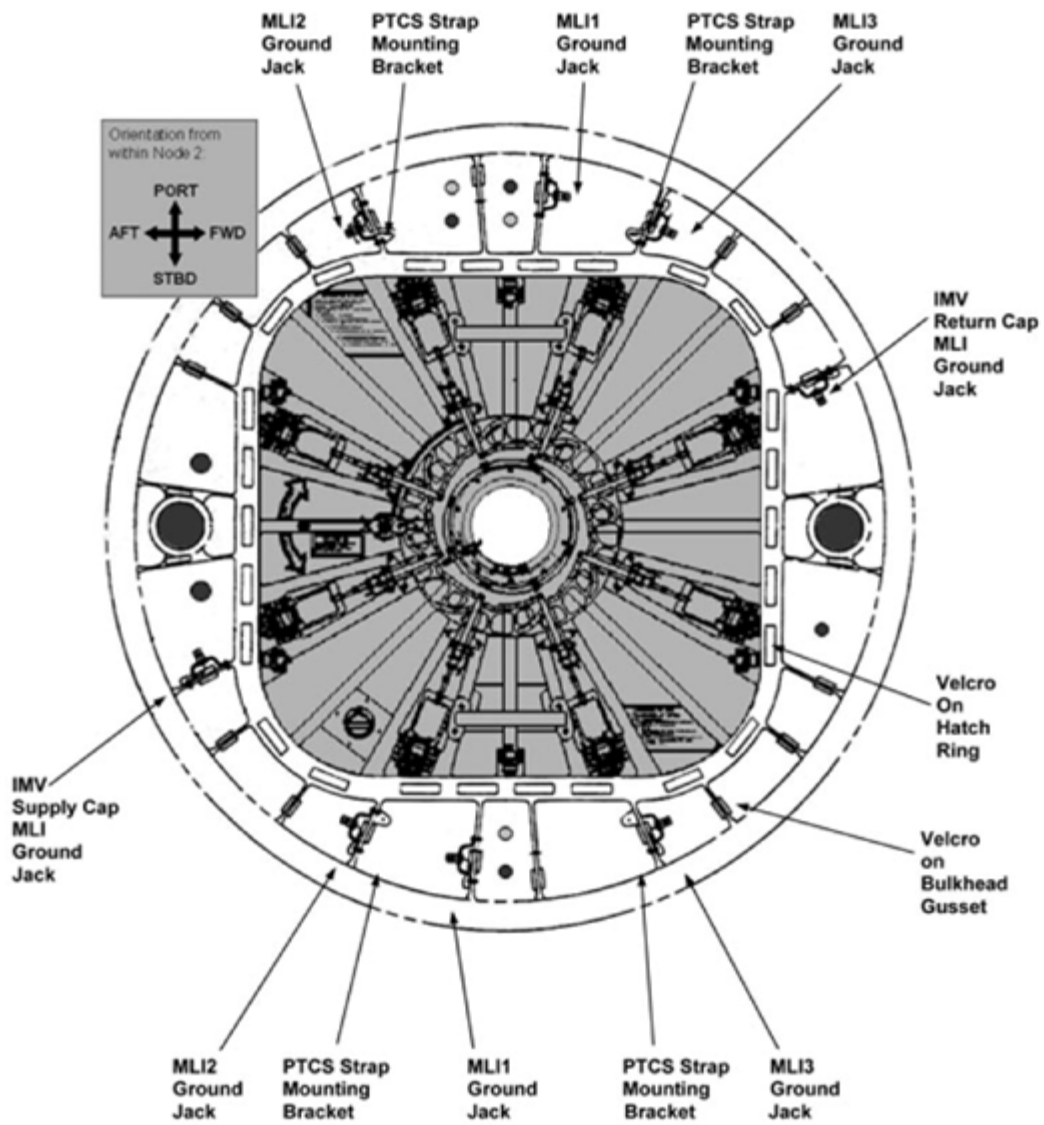


Figure 4. Bulkhead Interfaces for the PTCS PMM Thermal Blanket and PTCS Strap Assemblies.

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 8 of 23 pages

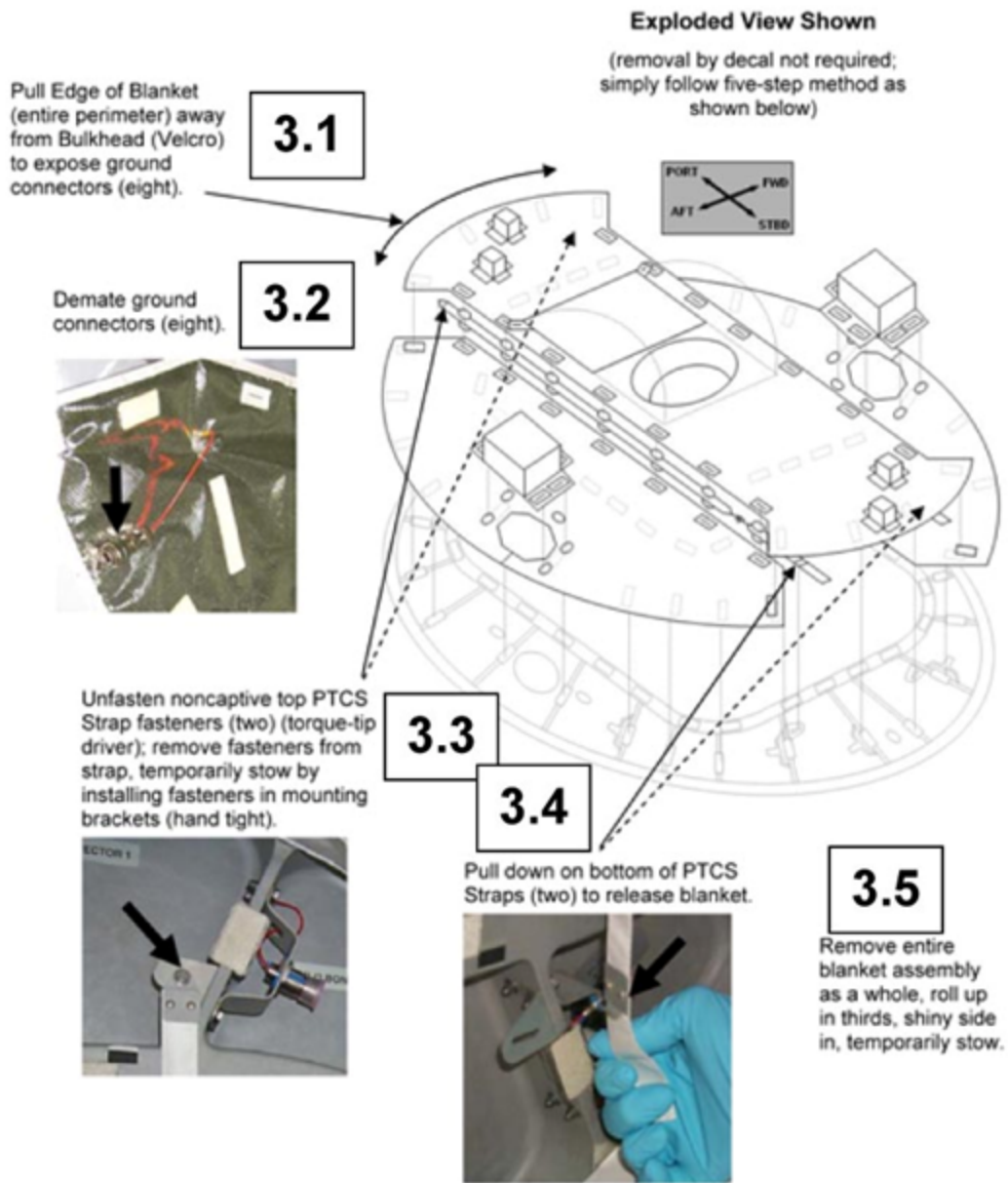


Figure 5. Simplified Method of PTCS PMM Thermal Blanket Removal.

- 3.1 Pull edge of Blanket (entire perimeter) away from Bulkhead (Velcro) to expose ground connectors (eight). Refer to Figure 5.
- 3.2 Demate ground connectors by hand (eight). Refer to Figure 5.
- 3.3 Unfasten top PTCS Strap noncaptive Fasteners (two) (#6 Long Torq Driver, 3/8" Drive; 1/4" to 3/8" Adapter; Ratchet, 1/4" Drive). Temporarily stow by installing Fasteners in mounting brackets (hand tight). Refer to Figure 5.

- 3.4 Pull down on bottom of PTCS Straps (two) to release Blanket. Refer to Figure 5.

CAUTION

PTCS PMM Thermal Blanket is rolled instead of folded to prevent damage to the multilayer insulation of the Blanket.

- 3.5 Remove entire Thermal Blanket Assembly as a whole. Fold in thirds along buttons with shiny side in, and roll up.

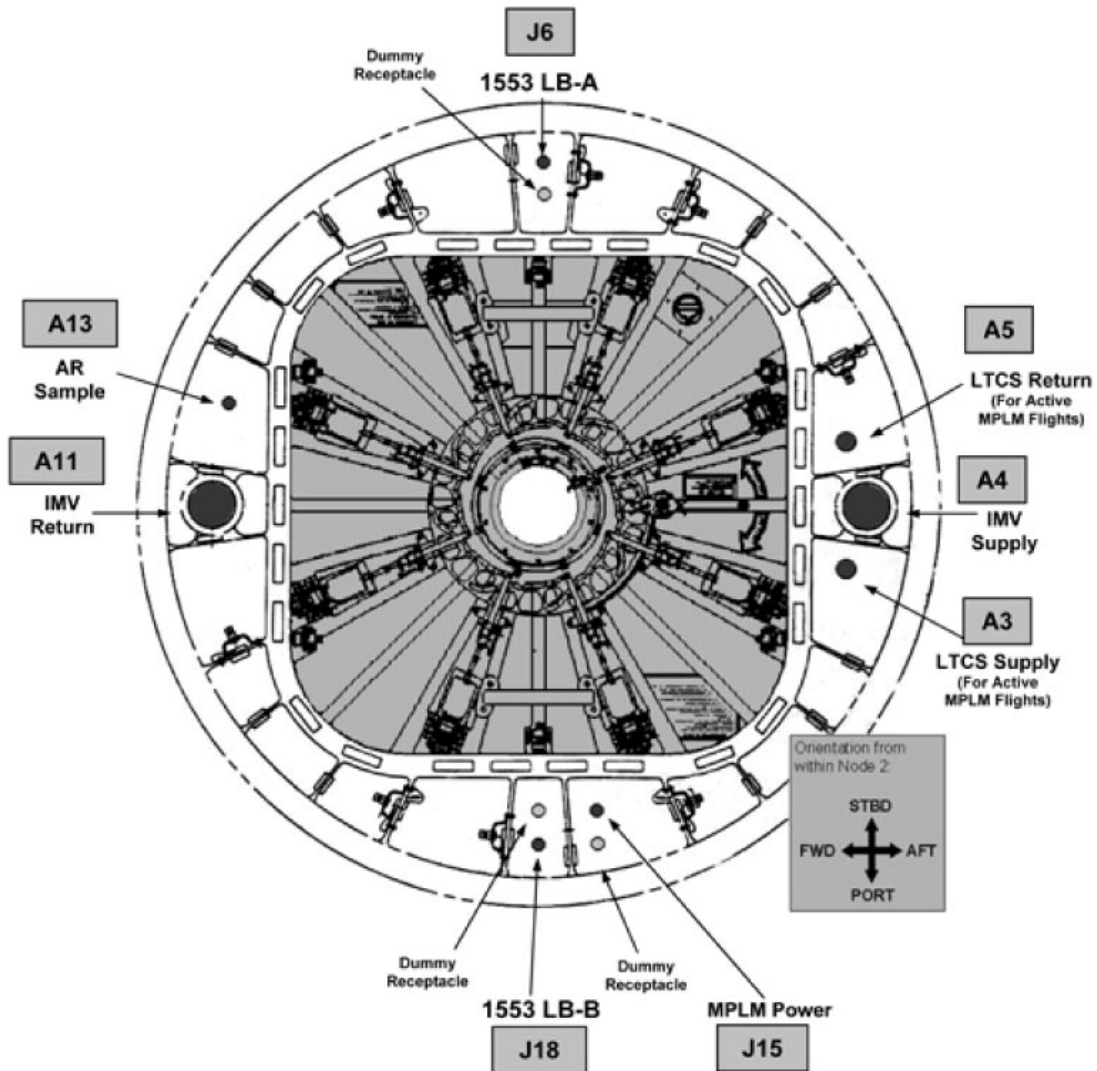


Figure 6. PMM Bulkhead Feedthroughs.

4. CONNECTING MPLM POWER JUMPER

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 10 of 23 pages

Table 1. MPLM Power Jumper

Jumper Name or Function	Node 1 Nadir Bulkhead Interface	PMM Bulkhead Interface	Wire Harness Reference Designator	Wire Harness Assembly Part Number
Node 1 - MPLM POWER	J115	J15	W6006	1F89749-1

4.1 Verifying Safing

✓**MCC-H** to verify safing for PMM power connection
 RPCM LA1B_D RPC 1 is open and close command inhibited.

4.2 Protective Cap ←|→ PMM (J15) feedthrough
 Tethered cap (PMM side) →|← J15 dummy receptacle
 Protective Cap ←|→ Node 1 (J115) feedthrough
 Place untethered cap (Node side) in 12" x 12" Ziplock Bag.
 Stow in VOK.
 Refer to Figure 6 and Table 1.

4.3 Protective Caps ←|→ Node 1 - MPLM Pwr Jumper (W6006)
 Place Protective Cap in 12" x 12" Ziplock Bag.
 Stow in VOK.

4.4 Connecting Node 1 MPLM Pwr Jumper (W6006) to PMM (J15)
 P15 →|← J15 (PMM side)

4.5 Connecting Node 1 MPLM Pwr Jumper (W6006) to Node 1 (J115)
 P115 →|← J115 (Node side)

5. INSTALLING 1553 DATA JUMPERS

NOTE

The next step reconfigures the C&DH Bus to install Node 1 - PMM 1553B LB-B Jumper (W6002) by inhibiting LB SYS HAB-1 Auto Channel Switching.

PCS

5.1 Inhibiting Comm Safing Response in INT MDM

CDH: Primary INT: MDM FDIR

Primary INT MDM FDIR

cmd Comm Safing Response – Inhibit **Execute** (✓ – Inh)

5.2 CDH: Primary INT MDM

Primary Int MDM

sel LB SYS HAB 1

LB SYS HAB 1

sel Bus Status

LB SYS HAB 1 Bus Status

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 11 of 23 pages

Verify Channel Selected – A

'Auto Channel Switch Status'

cmd Inhibit Execute

Verify Auto Channel Switch Status – Inh

Table 2. Node 2 - PMM 1553B LB-B Data Jumper

Jumper Name or Function	Node 1 Nadir Bulkhead Interface	PMM Bulkhead Interface	Wire Harness Reference Designator	Wire Harness Assembly Part Number
Node 1 - MPLM 1553B LB-B	J118	J18	W6002	1F46382-1

5.3 Terminator ←|→ Node 1 (J118) feedthrough
 Terminator ←|→ PMM (J18) feedthrough
 Tethered terminator (PMM side) →|← J18 dummy receptacle
 Place untethered terminator (Node side) in 12" x 12" Ziplock Bag.
 Stow in VOK.
 Refer to Figure 6 and Table 2.

5.4 Protective Caps ←|→ Node 1 - MPLM 1553B LB-B Jumper (W6002)
 Place caps in 12" x 12" Ziplock Bag.
 Stow in VOK.

5.5 Installing Node 1 - MPLM 1553B LB-B Jumper Assembly (W6002)
 P118 →|← J118 (Node 1 side)
 P18 →|← J18 (PMM side)

NOTE

The next step reconfigures the C&DH Bus to install Node 1 - MPLM 1553B LB-A Jumper (W6001) by switching LB SYS HAB 1 to Channel B.

5.6 CDH: Primary INT MDM

sel LB SYS HAB 1

sel Bus Status

'Channel Selected'

cmd Select Ch B Execute

Verify Channel Selected – B

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 12 of 23 pages

Table 3. Node 1 - PMM 1553B LB-A Data Jumper

Jumper Name or Function	Node 1 Nadir Bulkhead Interface	PMM Bulkhead Interface	Wire Harness Reference Designator	Wire Harness Assembly Part Number
Node 1 - MPLM 1553B LB-A	J106	J6	W6001	1F46380-1

- 5.7 Terminator ←|→ Node 1 (J106) feedthrough
 Terminator ←|→ PMM (J6) feedthrough
 Tethered terminator (PMM side) →|← J6 dummy receptacle
 Place untethered terminator (Node side) in 12" x 12" Ziplock Bag.
 Stow in VOK.
 Refer to Figure 6 and Table 3.
- 5.8 Protective Caps ←|→ Node 1 - MPLM 1553B LB-A Jumper (W6001)
 Place Protective Caps in 12" x 12" Ziplock Bag.
 Stow in VOK.
- 5.9 Installing Node 1 – MPLM 1553B LB-A Jumper Assembly (W6001)
 P106 →|← J106 (Node 1 side)
 P6 →|← J6 (PMM side)

NOTE

The next step reconfigures the C&DH Bus to normal configuration by switching LB SYS HAB 1 to Channel A and enabling Channel Switching.

- 5.10 CDH: Primary INT MDM
Primary Int MDM
 sel LB SYS HAB 1
LB SYS HAB 1

 sel Bus Status
LB SYS HAB 1 Bus Status
 'Channel Selected'

cmd Select Ch A Execute
 Verify Channel Selected – A
 'Auto Channel Switch Status'

cmd Enable Execute
 Verify Auto Channel Switch Status – Ena

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 13 of 23 pages

5.11 Enabling Comm Safing Response in INT MDM

CDH: Primary INT: MDM FDIR

Primary INT MDM FDIR

cmd Comm Safing Response – Enable **Execute** (✓ – Ena)

NOTE

Once PMM power (one) and 1553 data (two) jumpers are installed, and the associated C&DH buses have been reconfigured, PMM ACTIVATION may be performed in parallel up through completion of AUTO (MANUAL) ACTIVATION PART 1.

6. REMOVING CBM CONTROLLER PANEL ASSEMBLIES

6.1 ✓**MCC-H** that CPA safing complete.

6.2 For all four CPAs

Perform [1.101 CBM CONTROLLER PANEL ASSEMBLY REMOVAL - GENERIC](#), steps 2.2 to 4.10 (SODF: S&M: NOMINAL: VESTIBULE), then:

NOTE

Prior to IMV Valve and Cap Pressure Equalization, Part 1 of the PMM Activation procedure must be complete.

6.3 Verify that Part 1 of PMM Activation is complete.

7. EQUALIZING IMV VALVE AND CAP PRESSURE

NOTE

This step equalizes pressure between the various volumes (PMM, Node 1, and ducting) to facilitate removal of IMV Caps.

7.1 ✓**MCC-H** for a "Go for pressure equalization"

7.2 ✓**MCC-H** for expected equalization time with PMM

WARNING

Opening the MPEV will start PMM equalization and may cause a loud hissing noise. Crew in the vicinity should don Earplugs.

NOTE

Steps 7.3 to 7.4 equalize the PMM with Node 1.

PMM Hatch

7.3 Don Earplugs.

MPEV → Open

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 14 of 23 pages

PCS

7.4 US Lab: ECLSS

Lab:ECLSS

When dP/dT ~0 mmHg/min, continue with next step.

NOTE

1. Steps 7.5 to 7.8 equalize the PMM and the volume between the PMM IMV valve and IMV Cap.
2. The IMV Valve must be reclosed prior to cap removal to prevent introduction of FOD into the ventilation system.

7.5 Enabling Power to PMM IMV Ovhd Aft (Supply) Valve
Task

Task Nav

'Multi-flight Task Displays'

sel MPLM Act-Deact

MPLM Act-Deact

'PDB Control'

sel PDB Details

PDB Details

cmd Converter 02 – On (✓Posn – On)

cmd RPC 15 Close (Verify RPC 15 Posn – CI)

7.6 Opening PMM IMV Ovhd Aft (Supply) Valve

MPLM Act-Deact

'IMV and SDS'

sel MPLM IMV Aft

MPLM IMV Ovhd Aft Vlv

'Position – Open'

cmd Open (✓Position – Open)

7.7 Closing PMM IMV Ovhd Aft (Supply) Valve

MPLM IMV Ovhd Aft Vlv

'Position – Close'

cmd Close (✓Position – Closed)

7.8 Inhibiting Power to PMM IMV Valves

MPLM IMV Ovhd Aft Vlv

sel MPLM PDB RPC 15

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 15 of 23 pages

PDB Details

cmd RPC 15 Open (✓RPC 15 Posn – Op)

cmd Converter 02 – Off (✓Posn – Off)

NOTE

1. Steps 7.9 and 7.10 equalize Node 1 and the volume between the Node 1 IMV valve and IMV Cap. All volumes should then be equalized.
2. The IMV valve must be reclosed prior to cap removal to prevent introduction of FOD into the ventilation system.

7.9 Opening Node 1 IMV Deck Aft Valve

MPLM Act-Deact

'IMV and SDS'

'Node 1 (IMV)'

sel Deck Aft

Node 1 IMV Deck Aft Vlv

✓State – Enabled

'Position'

'Open'

cmd Arm (Verify – Armed)

cmd Open

Verify Position – In Transit

Wait 25 seconds.

Verify Position – Open

7.10 Closing Node 1 IMV Deck Aft Valve

Node 1 IMV Deck Aft Vlv

'Position'

'Close'

cmd Arm (Verify – Armed)

cmd Close

Verify Position – In Transit

Wait 25 seconds.

Verify Position – Closed

8. INSTALLING IMV JUMPER

CAUTION
Prior to IMV Cap removal, the IMV Valve must be closed to avoid introducing foreign objects into the ventilation system.

<u>NOTE</u>
Only one IMV jumper will be installed during PMM - Node 1 vestibule outfitting. The IMV Return Jumper (originally used for MPLM outfitting) will be used as a Node 1 - PMM Supply Jumper. IMV return will go through hatchway. For other matings to Node 2 Nadir (HTV, COTS), the IMV return will go through hatchway.

Table 4. IMV Jumpers

Jumper Name	Node 1 Nadir Bulkhead Interface	PMM Bulkhead Interface	Part Number
IMV Return	A4	A4	683-13870-17

- 8.1 Loosen V-Band Clamp and remove IMV Cap from Node 1 Deck Aft (A4) IMV Flange (Ratchet, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive). Place IMV Cap in 12" x 12" Ziplock Bag. Using Sharpie, label Ziplock Bag "Node 1 IMV Cap". Stow in VOK. Refer to Figure 6 and Table 4.
- 8.2 Loosen V-Band Clamp and remove IMV Cap from PMM (A4) IMV Flange (Ratchet, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive). Place IMV Cap in 12" x 12" Ziplock Bag. Using Sharpie, label Ziplock Bag "PMM IMV Cap". Stow in VOK.

CAUTION
Care must be taken while installing the IMV Jumper between the IMV Flanges. Damaging the sealing surfaces of the IMV Flanges could prevent the IMV Cap, once reinstalled, from maintaining pressure.

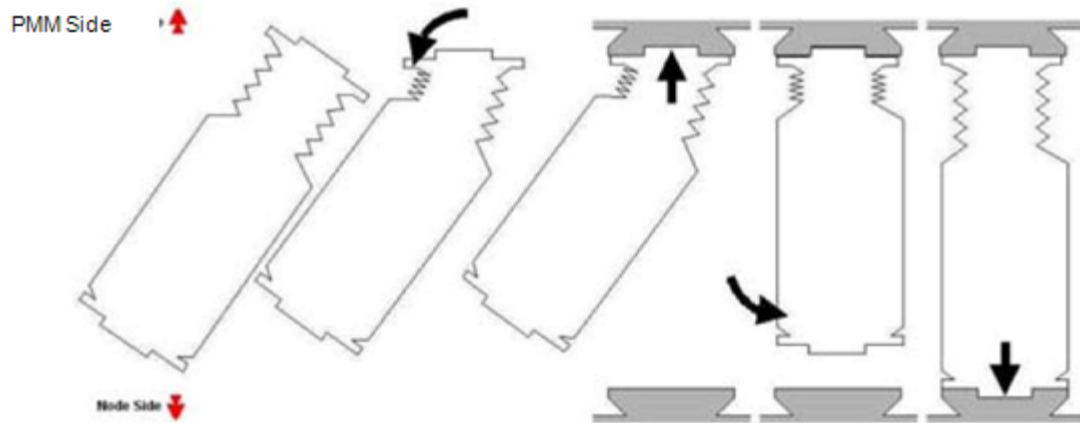


Figure 7. Recommended Steps for IMV Jumper Installation.

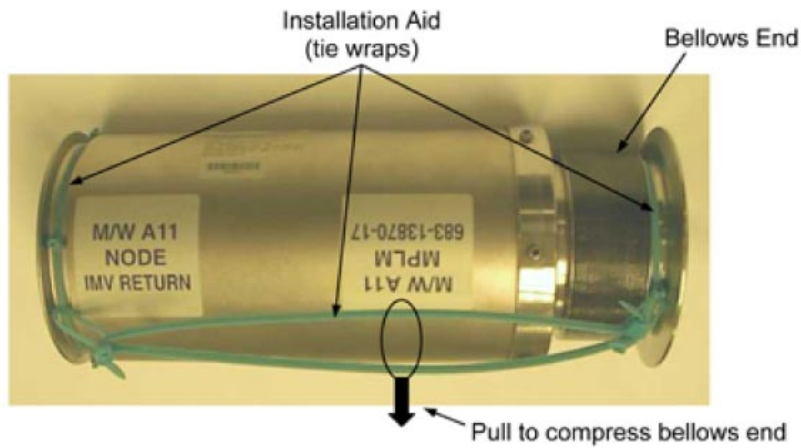


Figure 8. IMV Jumper Handling Aid.

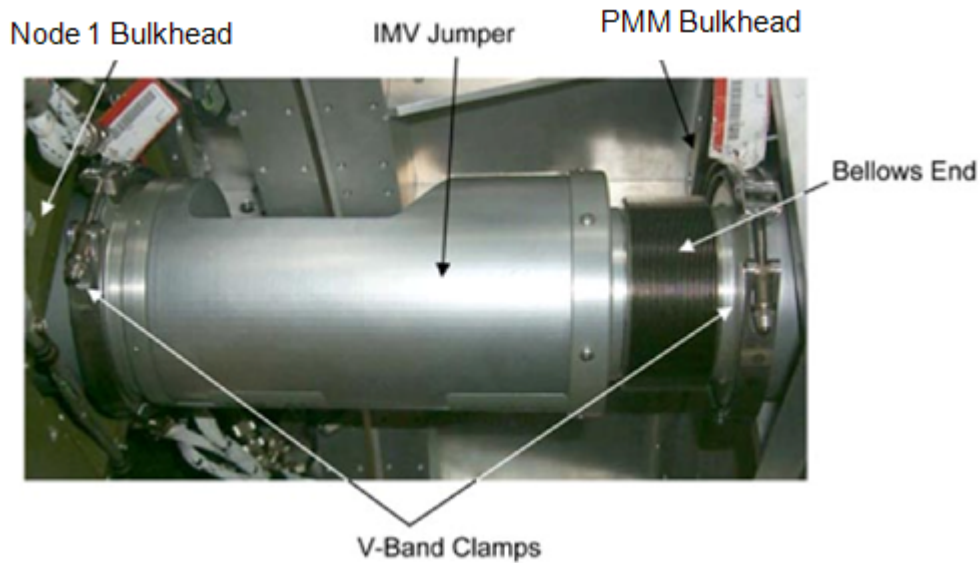


Figure 9. IMV Jumper Installed.

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 18 of 23 pages

NOTE

Previous crews have noted that the IMV Jumper O-Rings float out of their grooves during IMV Jumper installation and have recommended installing O-Rings after the IMV Jumper is installed. O-Ring installation requires two crew.

- 8.3 Without IMV Jumper O-Rings (two), install (A4) IMV Jumper by using handling aid to compress jumper and sliding bellows end of jumper in first. Orient flat side of jumper toward the CBM rings. Refer to Figures 7, 8, and 9.
- 8.4 Install O-Rings on each side of (A4) IMV Jumper by having one crewmember pull back on jumper (compressing it) while a second crewmember installs the O-Ring.
- 8.5 Secure jumper to Node 1 IMV Flange with V-Band Clamp. Torque to 35 in-lbs [Ratchet, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].
- 8.6 Secure jumper to PMM IMV Flange with V-Band Clamp. Torque to 35 in-lbs [Ratchet, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].

NOTE

Once IMV Supply (Aft) Jumper is installed, PMM AUTO (MANUAL) ACTIVATION PART 2 may be completed in parallel.

9. MODULE GROUND STRAP INSTALL

Grounding Strap Mounting Bracket (may be covered by MLI) Passive CBM Alignment Guide

Grounding Strap Mounting Bracket

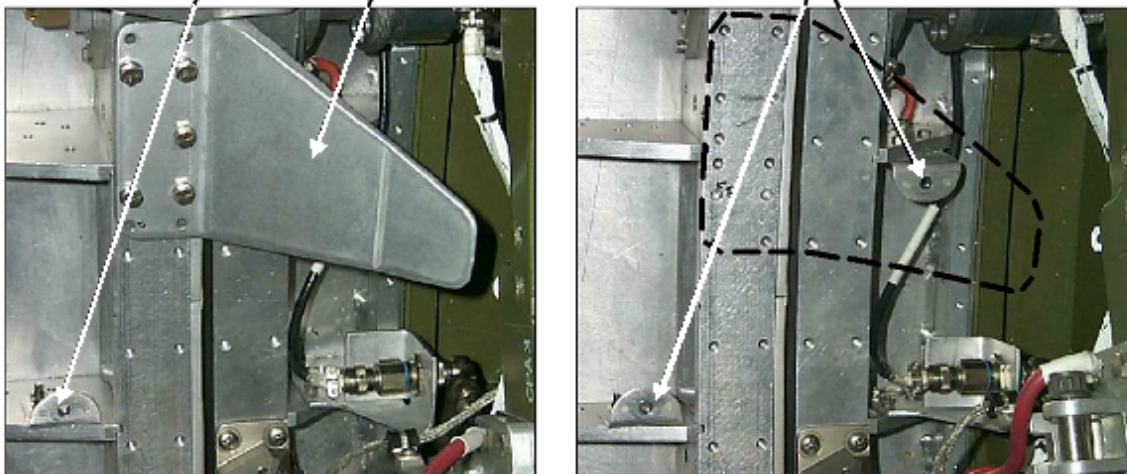


Figure 10. Ground Strap Mounting Brackets on CBM Rings.

- 9.1 Locate four Ground Strap Mounting Brackets (two on Active CBM Ring and two on Passive CBM Ring).

Refer to Figure 10.

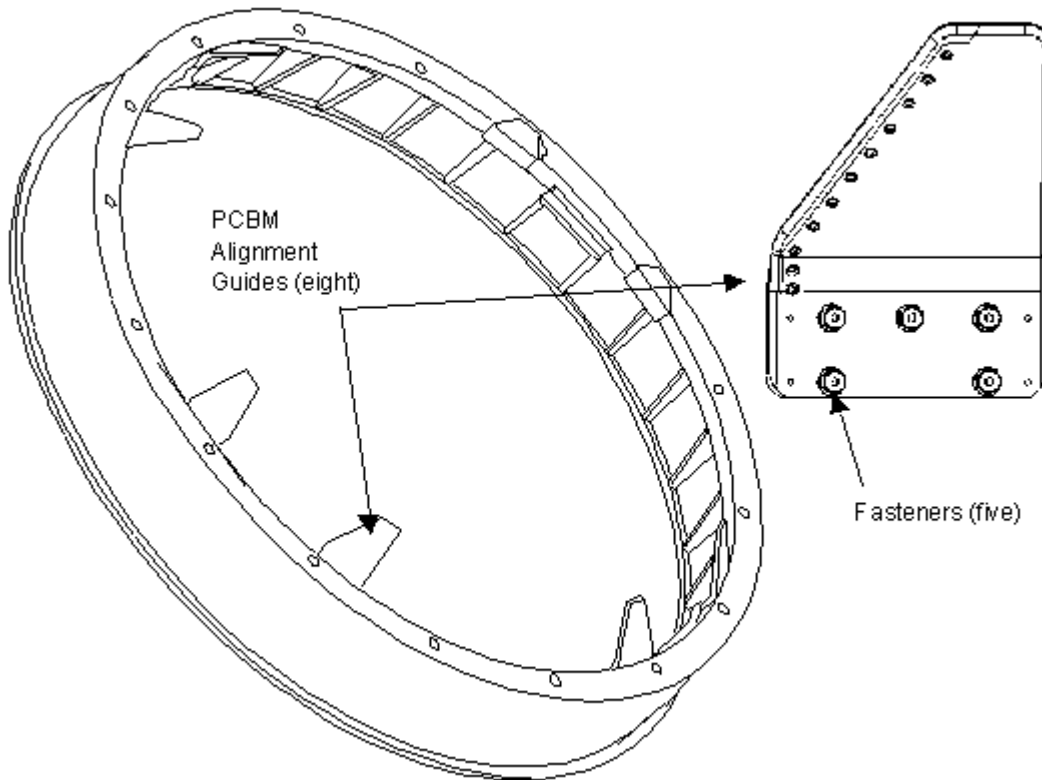


Figure 11. PCB Alignment Guides.

NOTE

After removal of five fasteners, CBM Alignment Guide may be held in place by tight tolerances on guide pins. Gently rocking CBM Alignment Guide while pulling away from CBM Ring may help.

- 9.2 Remove PCB Alignment Guides covering Ground Strap Mounting Brackets, loosen Fasteners (five per alignment guide) (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 3/8" Socket, 1/4" Drive). Stow Alignment Guide in 12" x 12" Ziplock, labeled "NOD1-PMM CBM Hardware". Refer to Figure 11.

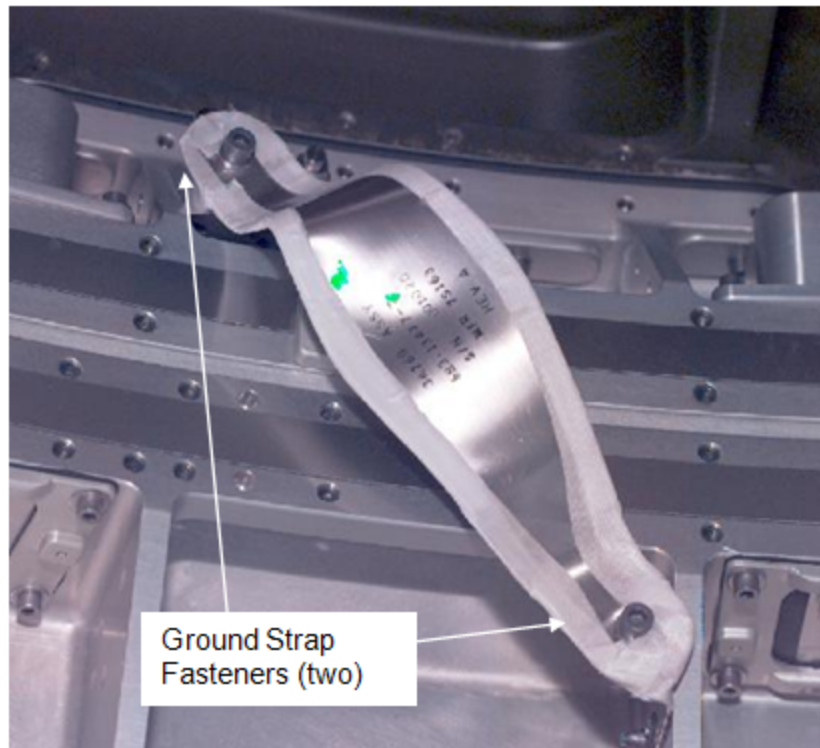


Figure 12. Ground Strap Installed Across ACBM to PCBM Interface.

NOTE

Ground Straps are installed across ACBM to PCBM interface. To do so, bend Ground Straps to distance required for proper fit, creating area under strap to allow installation of CBM to CBM IVA Seal Kit at later date. Bend should be made as close to ends of straps as possible while maintaining proper fit.

9.3 Install Ground Straps (two) from ACBM bracket to PCBM bracket, bending as necessary.
Refer to Figure 12.

9.4 Tighten fasteners (two per Ground Strap).
Torque to 90 in-lbs [Ratchet, 1/4" Drive; 3/16" Hex Head, 1/4" Drive; (40-200 in-lbs) Trq Wrench, 1/4" Drive].
Refer to Figure 12.

10. INSTALLING RADIAL PORT CLOSEOUT

10.1 Remove Radial Port Closeout from stowage.

1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN)

Page 21 of 23 pages



Figure 13. Radial and Axial Port Closeouts (Folded Up).

NOTE

The flexible bands in the sleeves of the Closeout are placed along the curved portion of the Hatch opening.

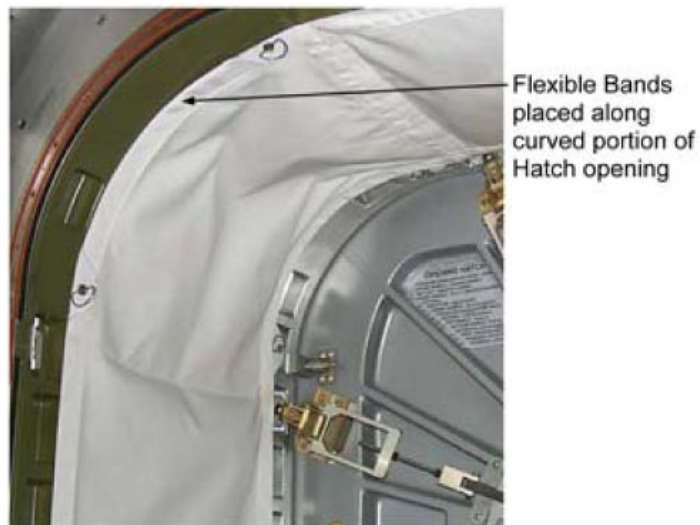


Figure 14. Closeout Installed over Vestibule.

- 10.2 Unroll Closeout while installing over CBM Vestibule. Attach 1/4 Turn Fasteners; insert into mounting brackets; tighten 1/4 Turn Fasteners. Refer to Figure 14.

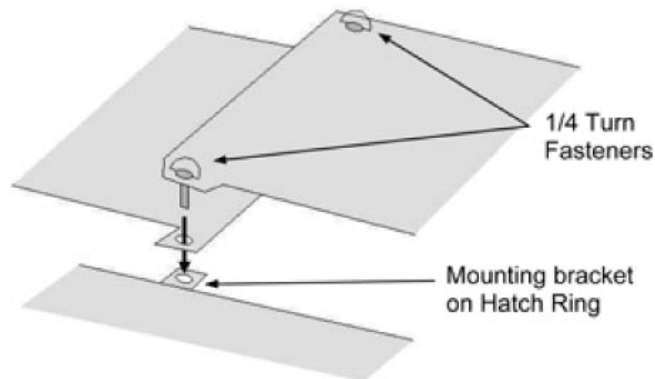


Figure 15. Overlapping Ends of Closeout for Final Attachment.

- 10.3 Overlap ends of Closeout, if necessary detaching 1/4 Turn Fasteners at end of Closeout. Reattach 1/4 Turn Fasteners at end of Closeout by inserting through tabs on other end of Closeout. Press Velcro at Closeout ends together. Refer to Figure 15.

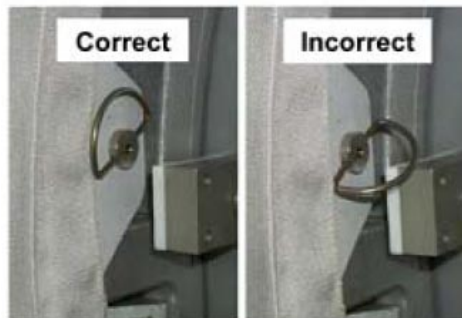


Figure 16. D-Rings for Closeout.

- 10.4 Flatten D-Rings flush against Closeout.
✓D-Rings are flush against Closeout to prevent damage if Hatch is closed
Refer to Figure 16.

11. REMOVING PMM HATCH LAUNCH RESTRAINT PIP PIN



Figure 17. Removal of PMM Hatch Launch Restraint Pip Pin.

PMM Hatch Remove PMM Hatch launch restraint Pip Pin.
Install Pip Pin in stowage location on Hatch.
Refer to Figure 17.

12. POST MAINTENANCE

- 12.1 Notify **MCC** of task completion.
- 12.2 Stow parts, materials and tools.
Update IMS.

This Page Intentionally Blank

1.120 PMM ACTIVATION

(ASSY OPS/ULF5/FIN)

Page 1 of 9 pages

OBJECTIVE:

Activate the PMM in preparation for ingress. This procedure is performed in parallel with PMM Vestibule Config for Ingress, and applies when Node 1 electrical jumper is installed in the PMM.

✓MCC-H for PMM manual or automatic activation preference

WARNING

PMM power umbilical mating operations must be complete prior to performing PMM activation to avoid electrical shock hazard.

NOTE

MCC-H Expect 'I/O Card BIT Status Fail' due to smoke detector being powered off.

PCS

1. APPLYING POWER TO PMM PDB

1.1 Verifying PMM Power Inhibits No Longer Required

Verify with IS IV crew that PMM power and data jumper installation is complete per PMM Vestibule Config for Ingress (safe to apply PMM power).

1.2 Verifying RPCM LA1B D On

Lab: EPS: DDCU LA1B Dist

sel RPCM LA1B D

- ✓Integ Counter – incrementing
- ✓Bus Voltage, V: 120.2 to 128.8V

1.3 Closing RPC to Apply Power to PMM PDB

sel RPC 1

cmd Close Cmd – Enable (✓ – Ena)

cmd RPC Position – Close (✓ – Cl)

Wait 5 minutes after power is applied to PMM before enabling the INT SYS MDM to PMM MDM I/O.

MCC-H

2. LOADING PMM LOCATION PPL (GROUND-ONLY)

2.1 Setting PMM Location to 'Attached to Node 1' (Ground-Only)

To build and uplink data load command to the Primary INT SYS MDM PPL 60 version 2, to DRAM, perform [1.231 CCS BUILD DATA LOAD COMMAND](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

2.2 Verifying PMM Location is 'Attached to Node 1' (Ground-Only)

PCS

CDH: INT PRIMARY: PPL Version IDs

Primary Int PPL Version IDs

'MPLM Location'

Verify PPL Number: 60

Verify Version ID: 2

MCC-H

3. SETTING PMM LOCATION IN PRIMARY C&C MDM (GROUND-ONLY)

cmd <Prim_CCS_Set_PMM_Location_Tmpl - LADD96IM1138K input Node 1> uplink

MCC-H

4. ENABLING INT SYS MDM TO PMM MDM I/O

NOTE

If PMM air temperature is estimated to be < 64.4° F, expect 'Cabin Air Temp Low - MPLM' Caution.

CDH: Primary Int MDM: LB Sys HAB 1: RT Status

LB Sys HAB 1 RT Status

cmd <Prim_INT_Ena_RT_Tmpl - LADD96IM0808K input RT Address 17 and Bus ID 3> Uplink

Verify 17 MDM MPLM RT Status - Enable

cmd <Prim_INT_Ena_RT_FDIR_Tmpl - LADD96IM0630K input Bus ID 3 and RT Address 17> Uplink

Verify 17 MDM MPLM RT FDIR Status - Enable FDIR

CDH: MPLM MDM

MPLM MDM

✓Frame Count – incrementing

✓Sync Status – In Sync

✓I/F Scenario – USOS

PCS

5. PDB ACTIVATION AND CHECKOUT

Task: MPLM Act-Deact

MPLM Act-Deact

'PDB Control'

sel PDB Details

PDB Details**cmd** APS – On

- ✓APS Posn – On
- ✓PDB Input Voltage (USOS) ≥ 116V
- ✓PDB Current: 0.5 to 1.0A

MPLM Act-Deact

'PDB Control'

Verify RPC 01 MDM Posn – Cl

- ✓All other RPCs Posn – Op

6. APPLYING POWER TO PMM HCU

- ✓**MCC-H** for estimated PMM air temperature

If PMM air temperature is estimated to be < 10° F above the calculated ISS dew point

Task: MPLM Act-Deact

MPLM Act-Deact

'PDB Control'

sel PDB Details

PDB Details**cmd** RPC 23 – Close

Verify RPC 23 Shell Htr Posn – Cl

Verify RPC 23 Shell Htr Voltage, V : 115 to 130V

7. VERIFYING PMM CONFIGURATION FOR ACTIVATION7.1 Powering and Enabling Node 1 IMV Valve

Task: MPLM Act-Deact

MPLM Act-Deact

'IMV and SDS'

sel Node 1 (IMV) Deck Aft

Node 1 IMV Deck Aft Vlv

sel RPCM N13B B RPC 15

RPCM N13B B RPC 15

'Close Cmd'

cmd Enable – Enable (✓ – Ena)**cmd** RPC Position – Close (Verify – Cl)

Node 1 IMV Deck Aft Vlv

'State'

cmd Enable – Arm (✓Status – Armed)

cmd Enable – Enable (✓State – Enabled)

7.2 Verifying PMM Configuration

Task: MPLM Act-Deact

MPLM Act-Deact

'IMV and SDS'

✓Node 1 (IMV) Deck Aft Vlv Posn – CI

✓MPLM IMV Aft, Fwd Vlv Posn (two) – CI

✓MPLM SDS Isov Vlv Posn – CI

'DA and PPRA'

✓DA1 Inbd,Outbd Vlv Posn (two) – CI

✓DA2 Inbd,Outbd Vlv Posn (two) – CI

✓PPRA 1,2,3 Vlv Posn (three) – Op

'Automatic Control'

'Auto Activate'

✓Part 1 Activate Status – Idle

✓Part 2 Activate Status – Idle

'Auto Deactivate'

✓Deactivate Status – Idle

If **MCC-H** directs MANUAL ACTIVATION PART 1

| Proceed to step 10.

8. AUTO ACTIVATION PART 1

Task: MPLM Act-Deact

MPLM Act-Deact

'Automatic Control'

'Auto Activate'

cmd Part 1 – Arm

✓Part 1 Arm Status – No Error

✓Part 1 Activate Status – Armed

cmd Part 1 – Activate

✓Part 1 Activate Status – Activating

When Part 1 Activate Status – Idle (75 seconds from Activate command)

| Continue.

'PDB Control'

- ✓RPC 11 Cab Fan Posn – CI
- ✓RPC 13 SD Posn – CI

'SD, Cab Fan, and Pressure'

- ✓SD Status – No Fire
- ✓Cab Fan Spd: 3056 to 4048 rpm

If **MCC-H** directs MANUAL ACTIVATION PART 2
 | Proceed to step 11.

9. AUTO ACTIVATION PART 2

Verify with ISS IV crew that the Node 1 to PMM IMV Supply Jumper (Aft) is installed (ready for PMM ACTIVATION PART 2).

Task: MPLM Act-Deact

MPLM Act-Deact

'Automatic Control - Auto Activate'

cmd Part 2 – Arm

- ✓Part 2 Arm Status – No Error
- ✓Part 2 Activate Status – Armed

cmd Part 2 – Activate

- ✓Part 2 Activate Status – Activating

When Part 2 Activate Status – Idle (2 minutes from Activate command)
 | Continue.

'IMV and SDS'

- ✓MPLM IMV Aft, Fwd Vlv Posn (two) – Op

'DA and PPRA'

- ✓MPLM 1,2,3 Vlv Posn (three) – CI

'PDB Control'

Verify RPC 02 Gen Lt 1 Posn – CI
 Verify RPC 03 Gen Lt 2 Posn – CI
 Verify RPC 04 Gen Lt 3 Posn – CI
 Verify RPC 05 Gen Lt 4 Posn – CI
 Verify RPC 06 Gen Lt 5 Posn – CI
 Verify RPC 07 Gen Lt 6 Posn – CI
 Verify RPC 08 Gen Lt 7 Posn – CI
 Verify RPC 09 Gen Lt 8 Posn – CI
 Verify RPC 10 Emer Lts Posn – CI

✓Converter 1,2 Status (two) – Off

ISS ↓ **MCC-H**, "PMM AUTO ACTIVATION is complete." >>

10. MANUAL ACTIVATION PART 1

NOTE

This step is required only if PMM ACTIVATION PART 1 is not performed using automatic macro command.

10.1 Activating SD

Task: MPLM Act-Deact

'PDB Control'

sel PDB Details

cmd RPC 13 – Close (Verify DSD RPC Posn – CI)

'SD, Cab Fan, and Pressure'

sel MPLM SD

'Active Bit'

cmd Initiate

Wait 5 seconds.

✓Fire Status – No Fire

10.2 Activating Cab Fan

Task: MPLM Act-Deact

'PDB Control'

sel PDB Details

cmd RPC 11 – Close (Verify CFA RPC Posn – CI)

'SD, Cab Fan, and Pressure'

sel MPLM Cab Fan

MPLM Cabin Fan

'State'

cmd On – On

✓State – On

✓Speed: 3056 to 4048 rpm

11. MANUAL ACTIVATION PART 2

NOTE

This step is required only if PMM ACTIVATION PART 2 is not performed using automatic macro command.

- 11.1 Verifying PMM Vestibule Configured for PMM Activation Part 2
Verify with ISS IV crew that the Node 1 to PMM IMV Supply Jumper (Aft) is installed (ready for PMM ACTIVATION PART 2).
- 11.2 Enabling PMM IMV Valve Power
Task: MPLM Act-Deact
MPLM Act-Deact
'PDB Control'

sel PDB Details

PDB Details

cmd Converter 02 – On (✓Posn – On)
cmd RPC 15 – Close (Verify ISOV1 RPC Posn – Cl)
- 11.3 Opening PMM IMV Valve
Task: MPLM Act-Deact
MPLM Act-Deact
'IMV and SDS'

sel MPLM IMV Aft

MPLM IMV Ovhd Aft Vlv
'Position'

cmd Open – Open (✓Position – Open)
- 11.4 Removing Power from IMV
Task: MPLM Act-Deact
MPLM Act-Deact
'PDB Control'

sel PDB Details

PDB Details

- cmd** RPC 15 – Open (✓ISOV1 RPC Posn – Op)
cmd Converter 02 – Off (✓Posn – Off)
- 11.5 Enabling PPRA Motorized Valve Power
cmd Converter 01 – On (✓Posn – On)
cmd RPC 27 – Close (Verify PPRA All RPC Posn – Cl)
- 11.6 Closing PPRA Motorized Valves
 Task: MPLM Act-Deact

 'DA and PPRA'
- sel MPLM PPRA
- cmd** PPRA 1 – Close (✓PPRA 1 Valve Position – Closed)
cmd PPRA 2 – Close (✓PPRA 2 Valve Position – Closed)
cmd PPRA 3 – Close (✓PPRA 3 Valve Position – Closed)
- 11.7 Removing Power from PPRAs
 Task: MPLM Act-Deact

 'PDB Control'
- sel PDB Details
- cmd** RPC 27 – Open (✓PPRA All RPC Posn – Op)
cmd Converter 01 – Off (✓Posn – Off)
- 11.8 Configuring General Lighting

 'All GLAs'
- cmd** All GLAs – On
- Verify RPC 02 GLA1 Posn – Cl
 Verify RPC 03 GLA2 Posn – Cl
 Verify RPC 04 GLA3 Posn – Cl
 Verify RPC 05 GLA4 Posn – Cl
 Verify RPC 06 GLA5 Posn – Cl
 Verify RPC 07 GLA6 Posn – Cl
 Verify RPC 08 GLA7 Posn – Cl
 Verify RPC 09 GLA8 Posn – Cl
- 11.9 Enabling Power to Emergency Egress Lights
cmd RPC 10 – Close (Verify ELPS RPC Posn – Cl)
- ✓RPC 10 ELPS Voltage, V: 116 to 130V

ISS ↓ **MCC-H**, "PMM MANUAL ACTIVATION is complete."

MCC-H 12. ENABLING PMM SAFING RESPONSE

NOTE

MCC-H will Enable safing responses as time permits.

CDH: MPLM MDM: MPLM FDIR

MPLM MDM FDIR

cmd ADA Exception Safing Response – Enable **Execute** (✓ – Ena)

cmd Checksum Safing Response – Enable **Execute** (✓ – Ena)

cmd UAS HDF Safing Response – Enable **Execute** (✓ – Ena)

cmd DRAM Diagnostic Checksum Safing Response – Enable **Execute** (✓ – Ena)

cmd Task Overrun Safing Response – Enable **Execute** (✓ – Ena)

This Page Intentionally Blank

1.125 PMM INGRESS

(ASSY OPS/ULF5/FIN)

Page 1 of 4 pages

OBJECTIVE:

Ingress and configure the PMM for on-orbit operations.

DURATION:

15 minutes

EQUIPMENT:

PBA

PFE

Grab Sample Container (GSC)

Surgical Masks

Safety Goggles

WARNING

If initial PMM ingress, wear Surgical Masks and Safety Goggles.

1. INGRESSING PMM

NOTE

If the IMV jumper does not seal tightly prior to Hatch opening, vestibule air may be drawn into the PMM internal airflow inlet ducting, possibly increasing the internal PMM pressure and causing an excessive delta pressure across the Hatch, so the IMV Valve to PMM is closed.

MCC-H

1.1 To close PMM IMV Ovhd Valves (two)
Perform [2.514 PMM IMV VALVE RECONFIGURATION](#), step 2 (SODF: ECLSS: NOMINAL), then:

1.2 If performing initial ingress of PMM, don Surgical Mask and Safety Goggles.

PMM
Hatch

1.3 Partially open Hatch per decal steps 1 to 8 to allow access to Hatch Kicker Pins (eight).

CAUTION

To prevent possible interference between Hatch Kicker Pin and PMM bulkhead, position of kicker pins (eight) must be verified to be clear of the bulkhead structure prior to hatch closure. Failure to comply could result in hardware damage to pin, bulkhead, and FOD.

NOTE

Hatch Kicker Pins known to be stiff, may be difficult to move.

1.4 Check Hatch kicker pins (eight) slid toward the closest Hatch corner. Refer to Figure 1.
If required, slide in direction of arrows.

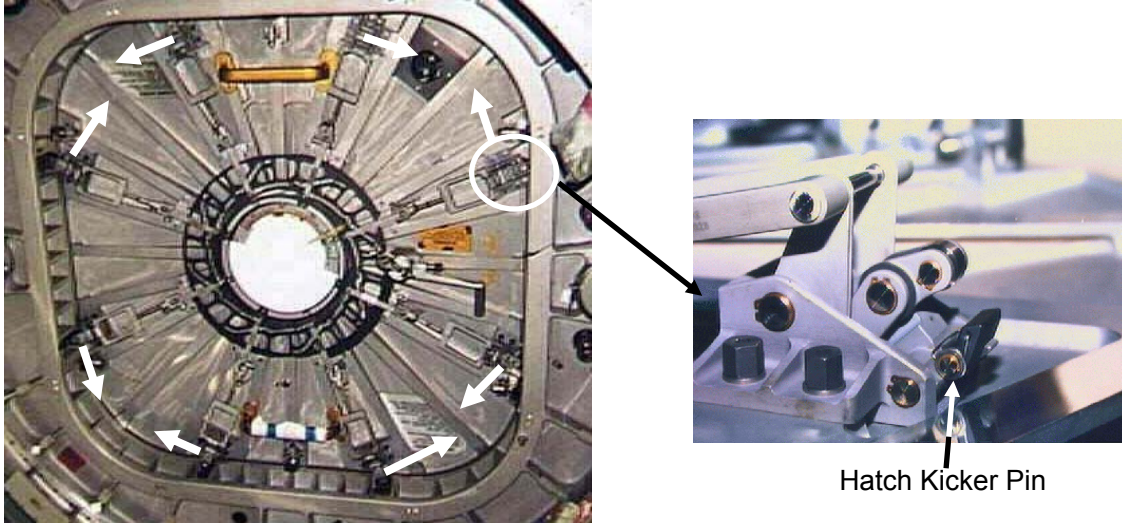


Figure 1.- Hatch Kicker Pin Location.

1.5 Finish opening Hatch per decal steps 9 to end.

MCC-H

1.6 To open PMM IMV Ovhd Aft Valve
Perform [2.514 PMM IMV VALVE RECONFIGURATION](#), step 1
(SODF: ECLSS: NOMINAL), then:

PMM
Hatch

1.7 \surd MPEV – CLOSED

PMM

1.8 Visually inspect PMM for condensation, atmosphere quality, general condition, etc.
Report condition to **MCC-H**.
If no FOD visible, doff PPE.

1.9 Collect one GSC sample inside the PMM.
Label location and GMT of sample per instructions on GSC.

1.10 Stow GSC for return to Houston.

2. OPENING NODE 1 DECK AFT IMV VLV

PCS

2.1 Task: MPLM Act-Deact

MPLM Act-Deact

'IMV and SDS'

'Node 1 (IMV)'

sel Deck Aft

Node 1 IMV Deck Aft Vlv

'RPCM N13B B RPC 15'

√RPC Position – Closed

'State'

√State – Enabled

2.2 Node 1 IMV Deck Aft Vlv

cmd Open – Arm (√Status – Armed)

cmd Open – Open (√Position – In Transit)

Wait 25 seconds.

√Position – Open

NOD1
S4-02

2.3 Node 1 RAMV Temperature Control → Full Warm (↻)

3. LIGHTING SETUP

PMM

3.1 Manually adjust GLA Intensity dial for comfort.

Ovhd Aft
Endcone

3.2 Remove cloth cover labeled, "EMERGENCY LIGHTING POWER SUPPLY ACCESS COVER" (Velcro).

sw ELPS → TEST (hold 3 to 5 seconds)

Verify ELPS LED – illuminated

sw ELPS → ENABLE

Reinstall cloth cover labeled, "EMERGENCY LIGHTING POWER SUPPLY ACCESS COVER" (Velcro).

1.125 PMM INGRESS

(ASSY OPS/ULF5/FIN)

Page 4 of 4 pages

4. VERIFYING NPRV COVERS CLOSED

Ovhd

Fwd

Alcove

4.1 ✓ NPRV Covers (three) – CI

Velcro cloth closeout cover in closed position.

PMM

Deck

Endcone

4.2 ✓ NPRV Covers (two) – CI

5. INSTALLING PFE AND PBA

MCC-H

Report location of PFE and PBA for retrieval.

IV

5.1 Retrieve one PFE and stow in PMM Stbd Alcove.

5.2 Retrieve one PBA and stow in PMM Fwd Alcove.

NOTE

MCC-H will perform step 6 from the ground.

MCC-H

PCS

6. VERIFYING MPLM LOCATION PPL

CDH: INT PRIMARY: PPL Version IDs

Primary Int PPL Version IDs

'MPLM Location'

Verify Version Number: 60

Verify Version ID: 2

TRANSFER

This Page Intentionally Blank

2.100 EXPRESS RACK 8 TRANSFER FROM PMM TO LAB

(ASSY OPS/ULF5/FIN/HC)

Page 1 of 8 pages

OBJECTIVE:

To transfer EXPRESS-8 Rack from the PMM to the LAB. This transfer activity disengages all launch restraints, transfers the Rack from PMM, and then structurally attaches the Rack to LAB1S1.

LOCATION:

EXPRESS-8 Installed: LAB1S1, Stowed: PMM1S3

DURATION:

1 hour

CREW:

Two

PARTS:

K-BAR Assy, Left P/N 683-62201-33

K-BAR Assy, Right P/N 683-62201-34

ARIS Ground Strap P/N 683-61685-16

MATERIALS:

Dry Wipes

TOOLS:

Digital Camera

ARIS Tool Page Case P/N PERS0034

Populate ARIS Tool Page Case with the following tools.

ISS IVA Toolbox:

Drawer 2:

Ratchet, 3/8" Drive

7/16" Socket, 3/8" Drive

5/32" Hex Head, 3/8" Drive

4" Common Tip Screwdriver

(40-200 in-lbs) Trq Wrench, 3/8" Drive

Drawer 3:

6" Long, 3/8" Hex Head, 3/8" Drive

5" Long, 3/8" Ball Tip Hex Head, 3/8" Drive

Drawer 4:

Adjustable Joint Pliers, Straight Jaw

REFERENCED PROCEDURE(S):

None

NOTE

All directional references (up, down, left, right) are with respect to front face of Rack, as you face Rack, with feet oriented towards the pivot point.

1. RACK SAFING

- 1.1 ✓All unnecessary equipment protruding into Rack translation path has been removed, stowed (PMM, Node 1, US LAB)

CAUTION
Disengagement sequence must be followed exactly to allow any induced loads to be released safely back into structure.

2. DISENGAGING LOWER LAUNCH RESTRAINTS

Refer to Figures 1 and 2.

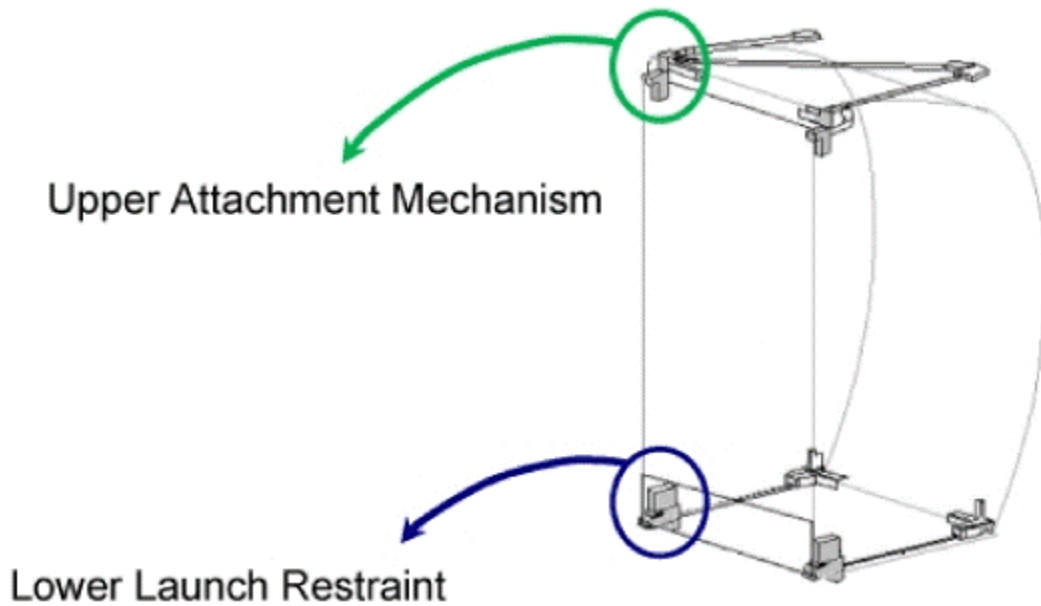


Figure 1. Location of Rack Launch Restraint Hardware.

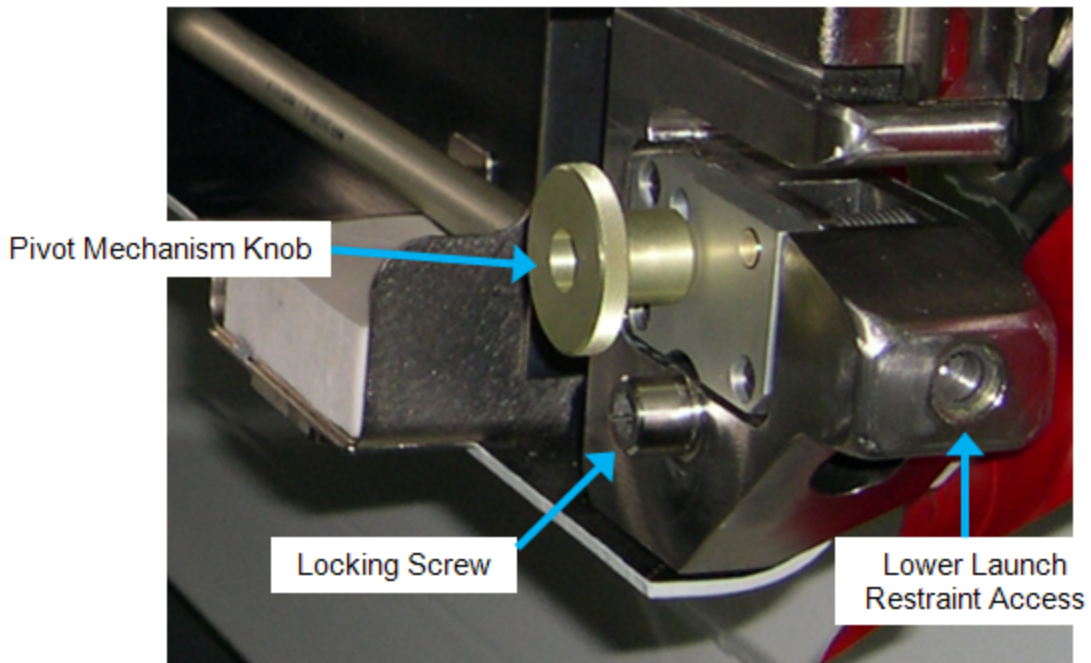


Figure 2. USOS Rack Lower Launch Restraint, Right Side (Ground Photo of WRS2 Rack Shown).

NOTE

Loud "pop" may occur during release of first Lower Launch Restraint.

- 2.1 Remove left Locking Screw (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
 - 2.2 Disengage left Lower Launch restraint 10 to 12 turns until hard stop (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
 - 2.3 Reinstall left Locking Screw, two to three turns.
 - 2.4 Loosen left Pivot Mechanism Knob one turn, so latch is free to move.
 - 2.5 Repeat steps 2.1 to 2.4 for right side.
3. DISENGAGING UPPER ATTACH MECHANISMS
Refer to Figures 1 and 3.

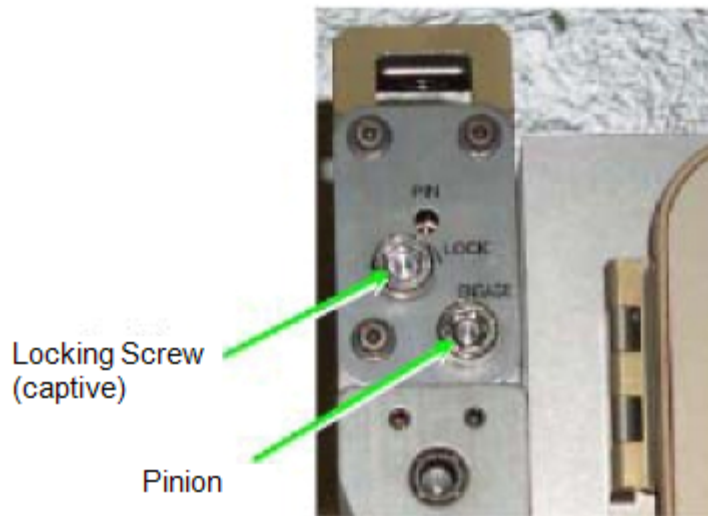


Figure 3. USOS Rack Upper Attach Mechanism, Left Side.

- 3.1 Loosen left Locking Screw 10 to 12 turns or until threads completely disengage (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).

NOTE

1. To disengage left Pinion, turn ↺.
2. To disengage right Pinion, turn ↻.

- 3.2 Disengage left Pinion one full turn until hard stop (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 3.3 Repeat steps 3.1 and 3.2 for right side.

4. K-BAR INSTALLATION
Refer to Figure 4.

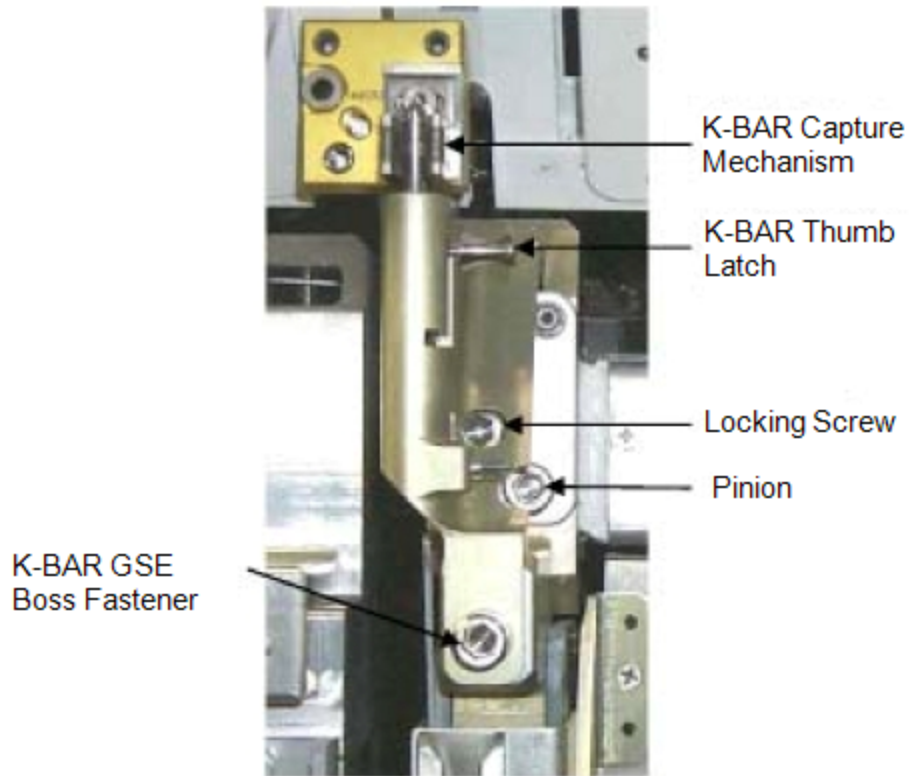


Figure 4. USOS Rack Left K-BAR (Shown Installed).

- 4.1 Record S/N of K-BAR Assy, Left: _____
Record S/N of K-BAR Assy, Right: _____
- 4.2 Rotate Rack down only ~15 cm (~5 in).

CAUTION

Do not force Upper Attach Mechanism Pinions. Mechanism should easily engage K-BAR.

NOTE

1. To engage left Pinion, turn ↺.
2. To engage right Pinion, turn ↻.

- 4.3 Install K-BAR, Left, in left Upper Attach Mechanism.
- 4.4 Check Locking Screw fully unlocked.
- 4.5 Engage Pinion, one full turn, into K-BAR (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 4.6 Snug Locking Screw and K-BAR GSE Boss Fastener (Ratchet, 3/8" Drive; 5" Long, 3/8" Ball Tip Hex Head, 3/8" Drive).
- 4.7 K-BAR Thumb Latch → down position

4.8 Repeat steps 4.2 to 4.7 for K-BAR Assy, Right.

5. RACK TRANSLATION PREPARATION

5.1 Remove any Handrails from the front of the Rack.
Slowly rotate Rack down to a controlled stop.



Figure 5. PMM Knee Brace Retention Devices.

5.2 Install Knee Brace Struts (two) into PMM "KNEE BRACES RETEN DEVICE"
Locking Clips (two).
Snug Adjustment Fasteners (two) (Ratchet, 3/8" Drive; 7/16" Socket, 3/8"
Drive).
Refer to Figure 5.

6. TRANSFERRING RACK TO ISS

6.1 Transfer Express-8 Rack from PMM1S3 to LAB1S1.

6.2 Align Rack onto Standoff until Rack Pivot Latches engage Standoff Pivot
Fittings.
Keep Rack rotated down.

6.3 Tighten both Pivot Mechanism Knobs in latched, up position.

7. FINAL INSTALLATION

7.1 ✓Rack rotation path is unobstructed

7.2 K-BAR Thump Latches (two) → up position
Refer to Figure 4.

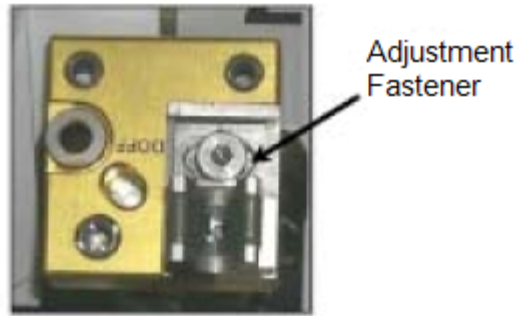


Figure 6. K-BAR Capture Mechanism, Located on LAB Standoff.

7.3 Slowly rotate Rack up to a controlled stop.
 Engage Rack K-BAR Thumb Latches (two) in Capture Mechanism located on Standoff.

Refer to Figure 6.

- *****
 *
 *
 * If K-BAR does not align with Capture Mechanism
 * | Loosen Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex Head,
 * | 3/8" Drive).
 * | Slide capture clip left or right, as required, to engage K-BAR.
 * | Once K-BAR is engaged, re-tighten Adjustment Fastener (Ratchet,
 * | 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
 *
 *
 * Refer to Figure 6.

8. INSTALLING ARIS GROUND STRAP ON EXPRESS-8 RACK

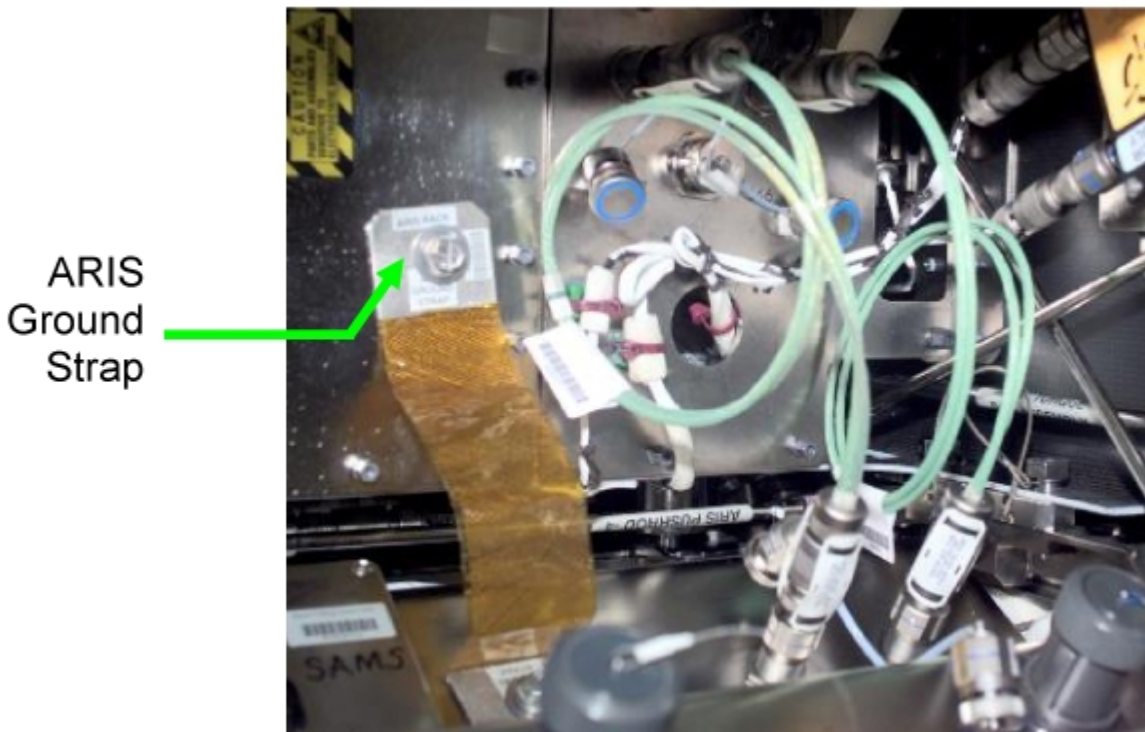


Figure 7. ARIS Ground Strap (Example Location).

2.100 EXPRESS RACK 8 TRANSFER FROM PMM TO LAB

(ASSY OPS/ULF5/FIN/HC)

Page 8 of 8 pages

- 8.1 Install ARIS Ground Strap on Standoff, Rack Utility Interface Panel, 1/4-Turn Fasteners (two) (4" Common Tip Screwdriver).
Refer to Figure 7.

9. CLOSEOUT AND POST TRANSFER

- 9.1 Photo document overview of Rack in installed location, close-ups of new Rack hardware and UIP (Digital Camera).
- 9.2 Notify **MCC-H** transfer activity for Rack is complete, S/Ns of K-BAR Assemblies.
Stow tools, materials, parts.

PAYLOADS

PAYLOADS

This Page Intentionally Blank

OBJECTIVE:

Check the status of the Animal Enclosure Module Unit #1 and Unit #2 and visually monitor mice well-being

TOOLS

Tissues

Gray Tape

- MF71K
1. Log Begin MET and Observer for appropriate Flight Day in Table 2. AEM Unit #1 Check Log.
 2. Remove muffler from locker door, temporarily stow. Unlatch, open locker door.
 3. ✓FANS A&D, FANS B&C lts (two) – on (green)
✓AEM fans operating (audible)
✓Fan airflow with Tissue, temporarily stow Tissue

*
* If lts off or fans not operating,
* | Perform [AEM FAN\(S\) FAILURE](#), all (SODF: ASSY OPS:
* | PAYLOADS), then:
*

 4. ✓AEM air inlet screens (two) free of debris, clean if required (gray tape)
 5. Using straps, pull AEM ~3/4 out of locker
 6. ✓cb LIGHTS B&C – close (lt on)
✓AEM interior lts (two) – illuminated

*
* If lts off
* | Perform [AEM LIGHT CYCLE INCORRECT \(OFF\) DURING OPERATIONS](#), all (SODF: ASSY OPS: PAYLOADS), then:
*

 7. Log water level in Table 2. AEM Unit #1 Check Log.

*
* If water leaking in AEM
* | Perform [WATER LEAKING IN AEM](#), all (SODF: ASSY OPS:
* | PAYLOADS), then
*

 8. Log Rodent Observation in Table 2. AEM Unit #1 Check Log.

*
* If rodents appear distressed,
* | ✓MCC-H, talk to NASA Chief Vet
*

9. Push AEM into locker
 - ✓LIGHTS sw – AUTO
 - ✓cb LIGHTS A&D – open (It off)
 - ✓FANS sw – ON

10. Close, latch locker door
Reattach Muffler to locker door.

- MF43K
11. Repeat steps 1-10, for AEM Unit #2, logging data in Table 3. AEM Unit #2
Check Log.
 12. Discard used Tissue in Trash
Temporarily stow Tissues.
 13. Notify **MCC-H** (AEM CHECK complete, any off-nominal rodent conditions).

AEM LIGHT TIMER CYCLE RESET

(ASSY OPS/ULF5/FIN)

Page 1 of 1 page

OBJECTIVE:

To correct light timer cycle in the event lights are on/off at the incorrect time.

MF71K,
MF43K

1. ✓**MCC-H** for correct Day/Night It cycle

	HH	:MM
ON/D	_____	_____
OF/N	_____	_____

NOTE

1. Pen can be used for Timer pushbuttons. If more than 2 min. pass after the most recent pb press, display reverts to current settings without saving changes.
2. On GMT display, first two characters reflect current timer It status and do not change when MENU pb pressed.

2. MENU pb – push until correct Day/Night indicator ('D' or 'N') appears on GMT display
3. HOURS pb – push to set correct hours

NOTE

Minutes can only be set in 15 min. increments.

4. MIN pb – push to set correct minutes
5. MENU pb – push
6. Repeat steps 3-5 to reset other It cycle.

This Page Intentionally Blank

AEM

AEM ANY PWR INDICATOR OFF
(ASSY OPS/ULF5/FIN) Page 1 of 1 page

1
Any pwr indicator - Off

Nominal Config:
(MF71K, MF43K)
cb PUMP BKR - op
cb MAIN BREAKER - cl
cb FANS A&D - cl (It on)
cb FANS B&C - cl (It on)
FANS - ON
cb LIGHTS A&D - op (It off)
cb LIGHTS B&C - cl (It on)
LIGHTS - AUTO (MO63P)
cb CB3/J3 - cl
10A J3 - ON

1 ✓AEM pwr
Any It on, GMT display on, or Fans running (audible)?

4 ✓Cable connections
(MF71K/MF43K)
• ✓A/E PAYLOAD DC Y (24') → ← J1
(MO63P)
• ✓A/E PAYLOAD DC Y (24') → ← J3
Cables connected?

7 Cycle AEM cb
On MCC-H GO
(MF71K, MF43K)
• cb MAIN BREAKER → op
(MF71K, MF43K)
• cb MAIN BREAKER → cl
Power to AEM?

10 EXPERIMENT FAILURE

12
• Perform **AEM FAN(S) FAILURE**, all (SODF: ASSY OPS: PAYLOADS).

2 Determine
LIGHTS B&C light off while other pwr indicators on
FANS A&D (FANS B&C) light off while other pwr indicators on
• GMT display blank

5 GMT DISPLAY FAILURE

8 TRANSIENT FAILURE

11 ✓MCC-H

3
• Perform **AEM LIGHT CYCLE INCORRECT (OFF) DURING OPERATIONS**, all (SODF: ASSY OPS: PAYLOADS).

6 ✓MCC-H

9 ✓MCC-H

1 This malfunction procedure only supports troubleshooting one Animal Enclosure.

2 Both AEMs are powered off the same MUP power port (J3) via the Y-cable. In order to reconfigure the Y-cable, power will need to be removed from both AEMs. **MCC-H** will direct crew if further action is required.

This Page Intentionally Blank

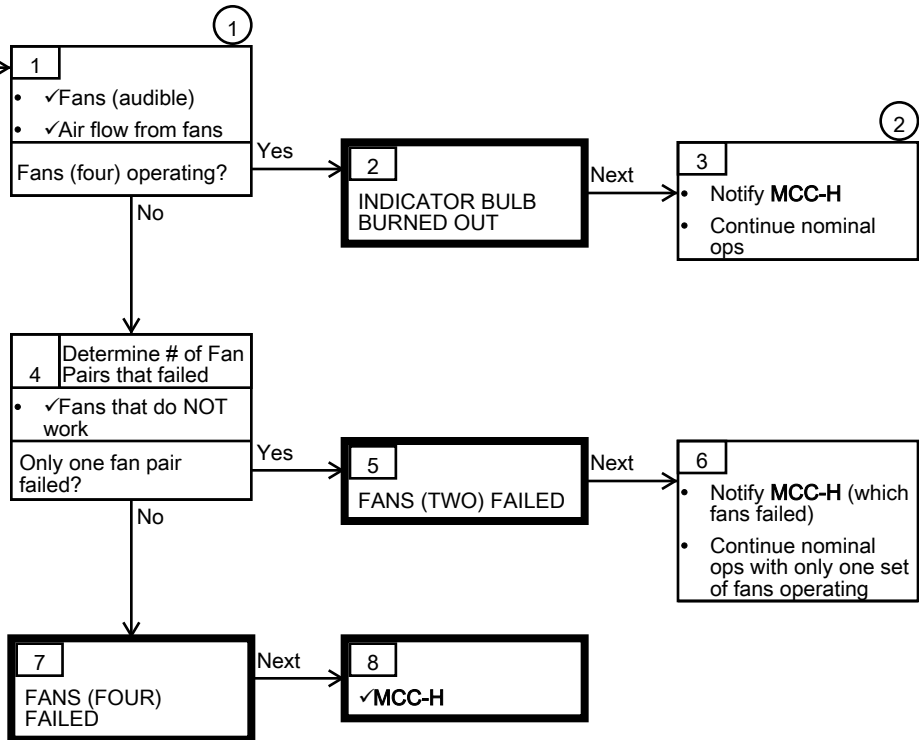
AEM

AEM FAN(S) FAILURE
(ASSY OPS/ULF5/FIN)

Page 1 of 1 page

Inaudible Fan(s)/Indicator Bulb(s) Off

Nominal Config:
(MF71K, MF43K)
cb PUMP BKR - op
cb MAIN BREAKER - cl
cb FANS A&D - cl (It on)
cb FANS B&C - cl (It on)
FANS - ON
cb LIGHTS A&D - op (It off)
cb LIGHTS B&C - cl (It on)
LIGHTS - AUTO
(MO63P)
cb CB3/J3 - cl
10A J3 - ON



① Hold Tissue in front of fan outlet to determine existence of air flow.

② AEM can function with one set of fans operating.

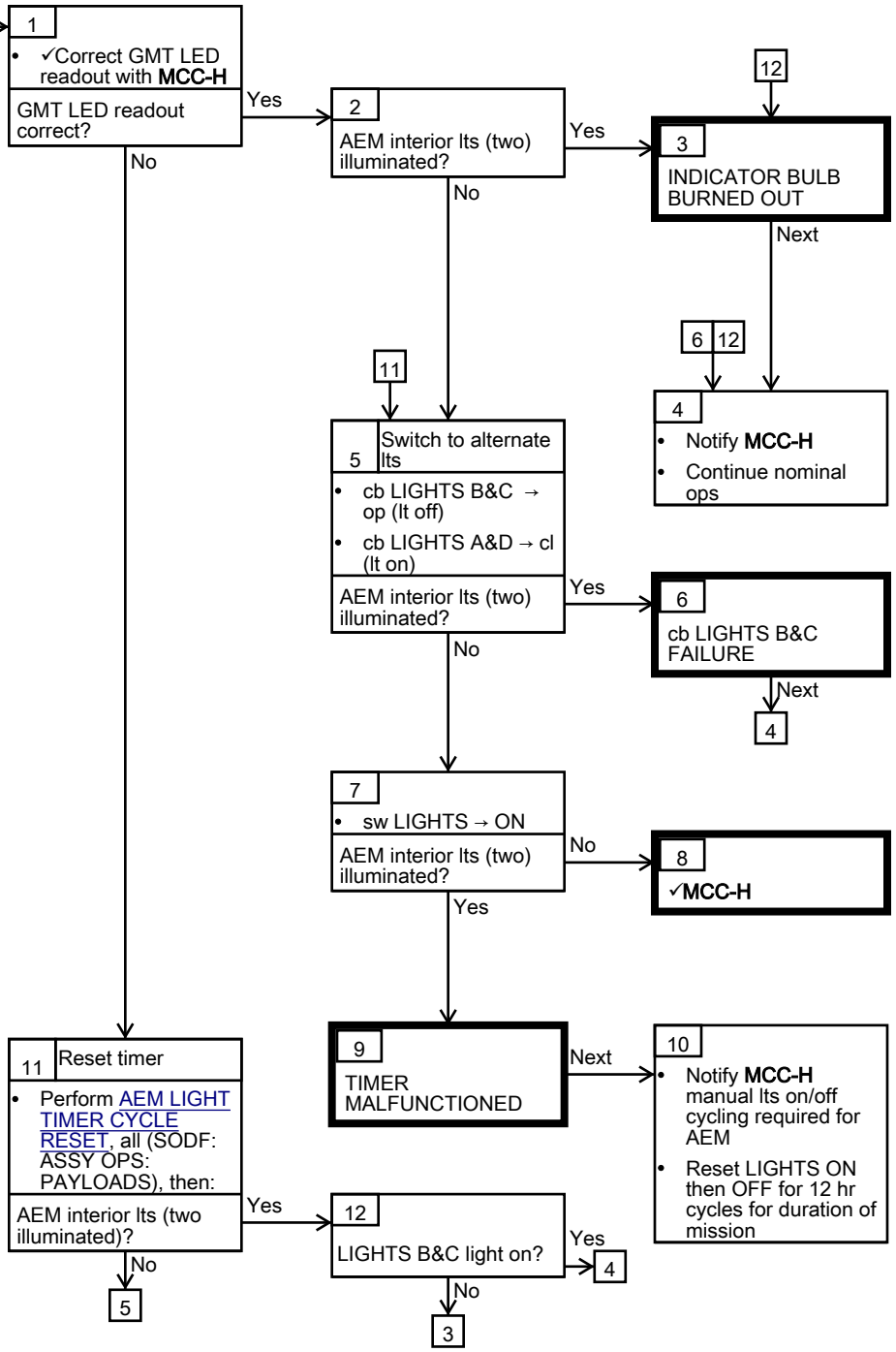
This Page Intentionally Blank

AEM

AEM LIGHT CYCLE INCORRECT (OFF) DURING OPERATIONS
(ASSY OPS/ULF5/FIN) Page 1 of 1 page

AEM light cycle incorrect (off) during operations

Nominal Config:
(MF71K, MF43K)
cb PUMP BKR – op
cb MAIN BREAKER – cl
cb FANS A&D – cl (lt on)
cb FANS B&C – cl (lt on)
FANS – ON
cb LIGHTS A&D – op (lt off)
cb LIGHTS B&C – cl (lt on)
LIGHTS – AUTO (MO63P)
cb CB3/J3 – cl
10A J3 – ON



This Page Intentionally Blank

AEM

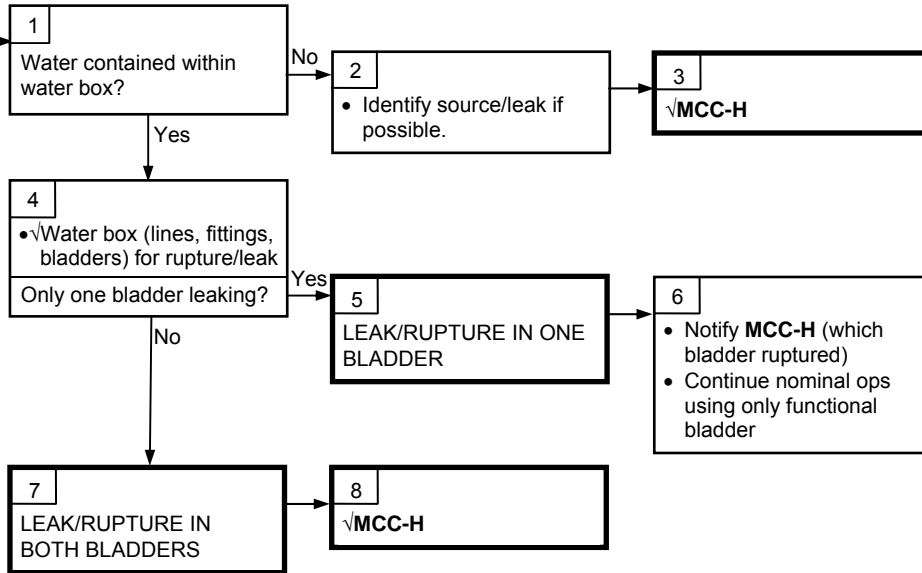
WATER LEAKING IN AEM

(ASSY OPS/ULF5/FIN)

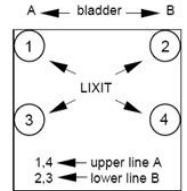
Page 1 of 1 page

①
Water Leaking in AEM

Nominal Config:
(MF71K, MF43K)
Bladder A,B – spring plates 1-4
cb PUMP BKR – op
cb MAIN BREAKER – cl
cb FANS A&D – cl (lt on)
cb FANS B&C – cl (lt on)
FANS sw – ON
cb LIGHTS A&D – op (lt off)
cb LIGHTS B&C – cl (lt on)
LIGHTS sw – AUTO



①
Water box is crossed plumbed. Lixits 1, 4 are fed from bladder A. Lixits 2, 3 are fed from bladder B. Both sides of cage have water as long as one bladder remains.



This Page Intentionally Blank

MYCO BODY SAMPLE COLLECTION

(ASSY OPS/ULF5/FIN)

Page 1 of 8 pages

OBJECTIVE:

This procedure is used to collect body samples for mycological evaluation. The activity must be performed first thing in the morning. In-flight sample collection will be performed during the joint operation period, and within 60 hours before closing the vehicle hatch.

PARTS:

Myco Kit P/N MK-1

Myco Sampling Sheet (5) P/N MK-3 (including 1 spare)

Myco Sampling Sheet Storage Bag P/N MK-6

Myco Swab (3) P/N MK-2

Sputum Tube P/N MK-4

BZK Wipe P/N MK-5

MATERIALS:

Drinking Water Container (filled with water (about 100cc))

Towel (Crew Preference)

Mirror (Crew Preference)

TOOLS:

Sharpie Flight Pen

1. CLEANING HANDS

NOTE

Body sample collection should be performed first thing in the morning.

If needed, refer to pictures of Myco Kit in [MYCO KIT](#) (SODF: ASSY OPS: REFERENCE).

1.1 Do not eat anything (drinking water is OK), wash the face, brush teeth, or gargle (until step 4.1) after waking up.

1.2 Clean hands (especially finger tips) with BZK Wipe.

2. BODY SAMPLE COLLECTIONS 1 (SAMPLING SHEET)



Figure 1. Opening the package of Myco Sampling Sheet

MYCO BODY SAMPLE COLLECTION

(ASSY OPS/ULF5/FIN)

Page 2 of 8 pages

NOTE

Use specified Myco Sampling Sheet for each sampling location (see the label).

- 2.1 Remove Myco Sampling Sheet package for left cheek from Myco Kit. Refer to Figure 1.
- 2.2 Peel and open the package halfway. (Do NOT open the package past the kapton tape since it will be used to stow used Myco Sampling Sheet.)

Remove Myco Sampling Sheet from the package.
Temporarily stow the package.
Refer to Figure 1.

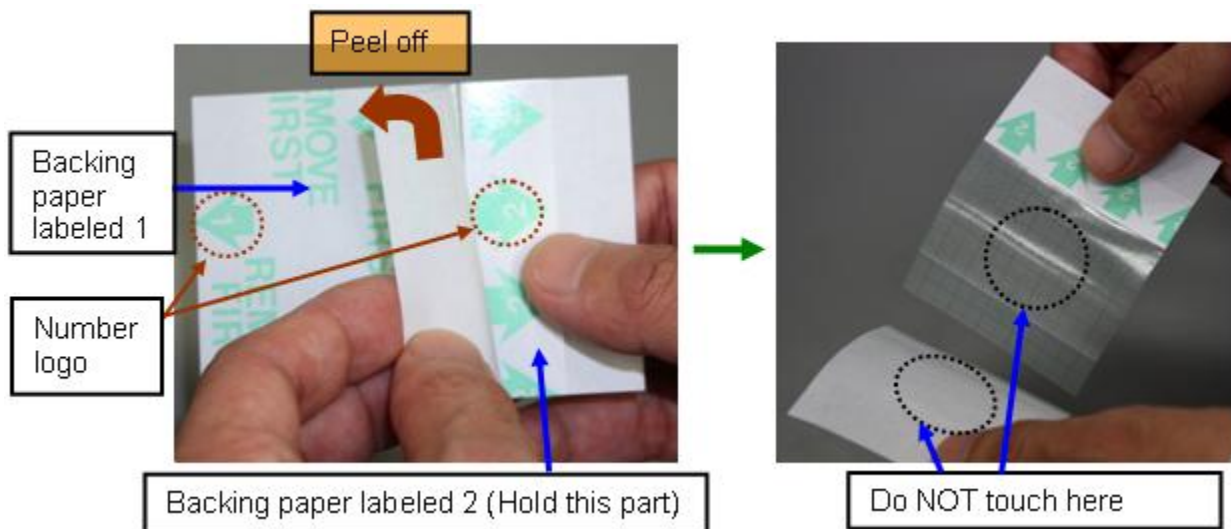


Figure 2. Peeling off backing paper labeled 1

CAUTION

Do NOT touch the center of adhesive face of Myco Sampling Sheet or the white glossy side of the backing paper labeled 1 to avoid contamination. Refer to Figure 2.

- 2.3 Hold the part of Myco Sampling Sheet labeled 2 with the number logo facing up.
Peel off the backing paper labeled 1. (Keep the white glossy side clean to avoid contamination)
Temporarily stow the backing paper labeled 1 in the package. (for use in step 2.7)
Refer to Figure 2.

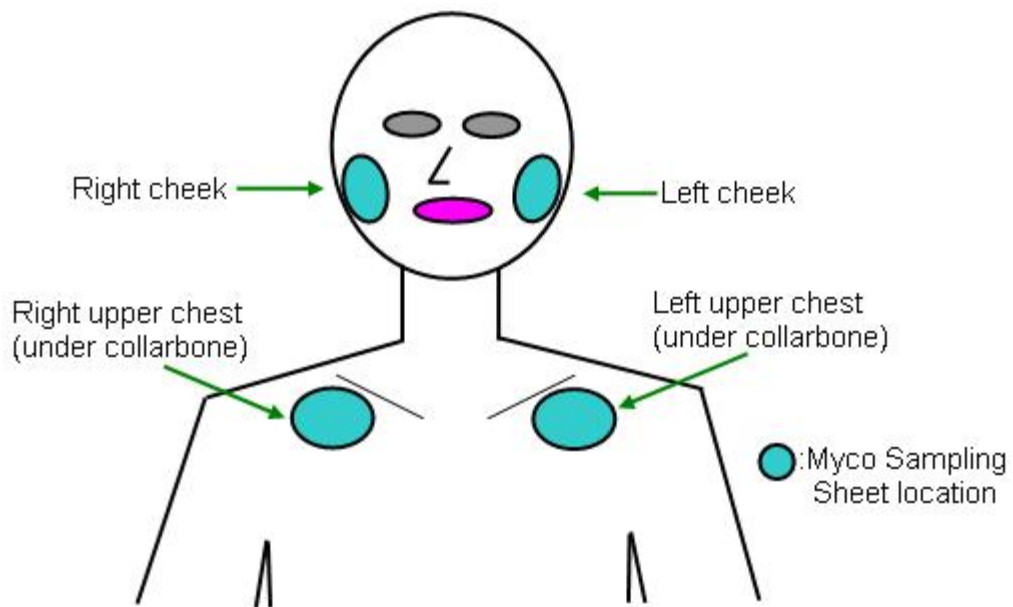


Figure 3. Myco Sampling Sheet location

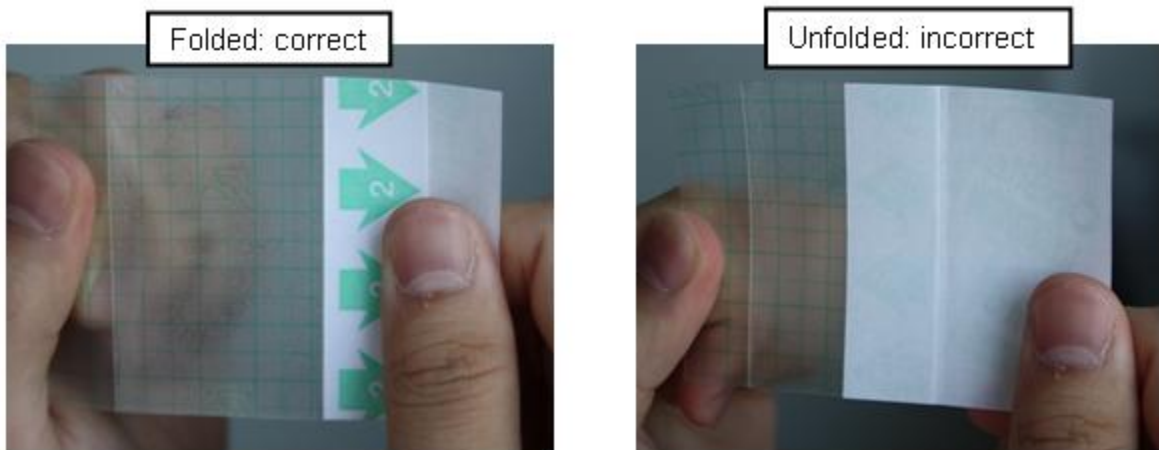
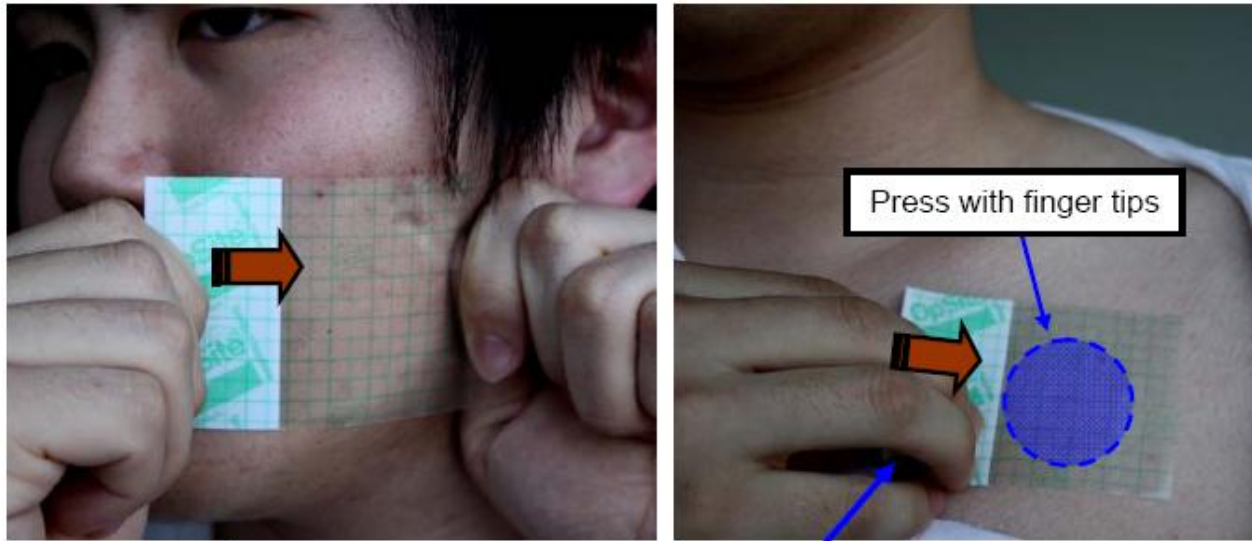


Figure 4. Unfolded and folded backing paper labeled 2



Remove Myco Sampling Sheet from the side that is attached to backing paper labeled 2.

Figure 5. Applying and removing Myco Sampling Sheet

NOTE

Unfolding the backing paper labeled 2 will significantly reduce the adhesive sampling area of Myco Sampling Sheet. Refer to Figure 4.

- 2.4 Apply the transparent part of Myco Sampling Sheet on the left cheek firmly with the adhesive side touching the skin. (Do not remove or unfold the backing paper labeled 2)

Refer to Figures 3, 4 and 5.

If sampling location is cheek,

Pull both ends of Myco Sampling Sheet and apply it firmly with both hands.

Refer to Figure 5.

If sampling location is upper chest,

Apply Myco Sampling Sheet with one hand and press on it thoroughly with finger tips. (apply it right below the collarbone)

Refer to Figure 5.

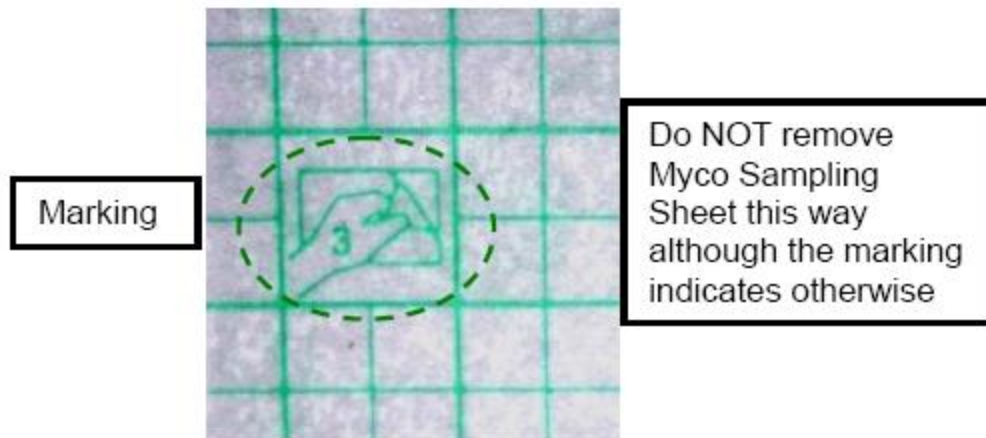


Figure 6. The marking on Myco Sampling Sheet

CAUTION

Removing Myco Sampling Sheet in the direction the marking indicates will separate the upper layer with the grid from the adhesive layer. Refer to Figures 6.

- 2.5 Hold Myco Sampling Sheet's edge that is attached to the backing paper labeled 2 and remove Myco Sampling Sheet from the skin as shown in Figure 5. (Do not remove it in the direction depicted on the backing, shown in Figure 6)

NOTE

Myco Sample sheet must be applied three times to the sampling location to ensure good sampling.

- 2.6 Apply and remove Myco Sampling Sheet two more times on the same place. Refer to Figure 5.

If no touch sample area inadvertently touched with something other than the Myco Sampling Sheet location,

Use spare Myco Sampling Sheet.
Label the white side of the package with the sampling location. (Sharpie Flight Pen)

- 2.7 Put Myco Sampling Sheet back on the white glossy side (no labeling) of the backing paper labeled 1 with the non-adhesive side facing up.

Refer to Figure 2.

- 2.8 Put Myco Sampling Sheet back in the package.

Fold the opening of the package.

- 2.9 Stow the package in Myco Sampling Sheet Storage Bag.

MYCO BODY SAMPLE COLLECTION

(ASSY OPS/ULF5/FIN)

Page 6 of 8 pages

- 2.10 Repeat steps 2.1 to 2.9 for [x] where [x] = right cheek left upper-chest
right upper-chest

Refer to Figure 3.

- 2.11 Stow Myco Sampling Sheet Storage Bag in Myco Kit.

3. BODY SAMPLE COLLECTIONS 2 (NASAL CAVITY SWAB)



Figure 7. Myco Swab

NOTE

Use specified Myco Swab for each sampling location (see the label).

- 3.1 Remove Myco Swab for right nasal cavity from Myco Kit.
Refer to Figure 7.

CAUTION

Keep Swab stick in the package until step 3.4 to avoid contamination of the tip.

- 3.2 Tear and open package of Myco Swab. (Trash the tab. Do not remove Myco Swab from package until Step 3.4.)

Refer to Figure 7.

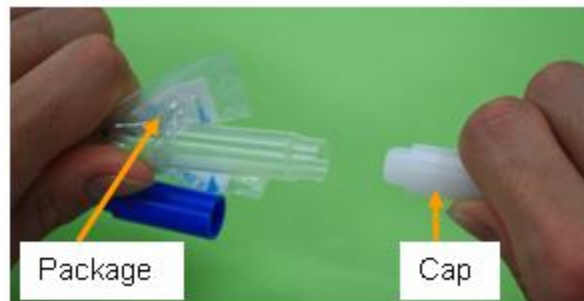


Figure 8. Removing the tube cap

- 3.3 Remove and trash cap from tube.

Refer to Figure 8.



Figure 9. Swab stick

CAUTION

Do NOT touch tip or stick to avoid contamination.
Refer to Figure 9.

- 3.4 Remove Swab stick from the package. (Hold blue finger grip)
Tmpry stow package. (for use in step 3.6)
Refer to Figure 9.

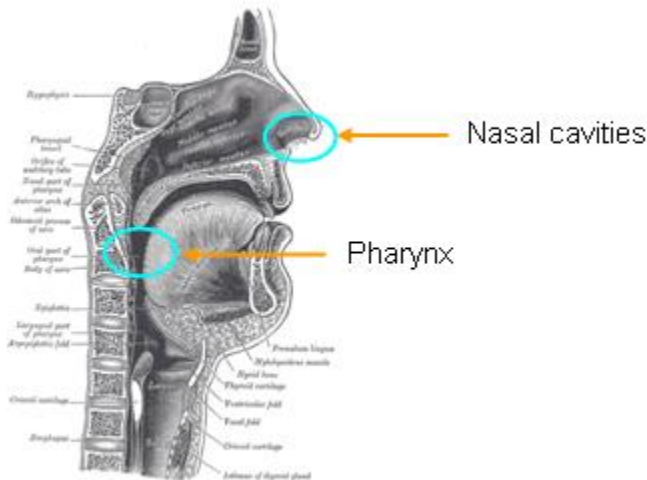


Figure 10. Myco Swab location

- 3.5 Swab the vestibule of the right nasal cavity slowly in circles 5 times with Swab Stick. (Do NOT insert Swab stick deeply into the vestibule.)
Refer to Figure 10.
- 3.6 Fully stow Swab stick into tube (Push the blue finger grip down).
- 3.7 Stow Myco Swab contained in the package in Myco Kit.
- 3.8 If posterior pharynx swab has been completed
| Go to step 5
- 3.9 Repeat steps 3.1 to 3.7 for the left nasal cavity.
- 4. BODY SAMPLE COLLECTIONS 3 (POSTERIOR PHARYNX SWAB)
 - 4.1 Rinse your mouth thoroughly with water, and swallow or spit on towel.

- 4.2 Repeat steps 3.1 to 3.7 for the posterior pharynx. (Use mirror if necessary)
Refer to Figure 10.

5. BODY SAMPLE COLLECTIONS 4 (SPUTUM TUBE)

- 5.1 Remove Sputum Tube from Myco Kit.
- 5.2 Remove cap from Sputum Tube. (rotate ccw).
- 5.3 Expectorate sputum into Sputum Tube.
If crew could not expectorate sputum,
| Expectorate saliva into Sputum Tube.
- 5.4 Close Sputum Tube cap.
- 5.5 Stow Sputum Tube in Myco Kit.

6. CLOSE OUT

- 6.1 Hand Myco Kit to ISS crew member for MELFI insertion.
- 6.2 Trash the following items:
Trash:
BZK Wipe
Myco Sampling Sheet (1)
Myco Swab package tab (3)
Myco Swab cap (3)

SPINAL ELONGATION LOG

(ASSY OPS/ULF5/FIN)

Page 1 of 1 page

	Subject ID	Session #	GMT/MET	Measurement	Notes
1				1st Sitting:	
				2nd Sitting:	
2				1st Sitting:	
				2nd Sitting:	
3				1st Sitting:	
				2nd Sitting:	
4				1st Sitting:	
				2nd Sitting:	
5				1st Sitting:	
				2nd Sitting:	
6				1st Sitting:	
				2nd Sitting:	
7				1st Sitting:	
				2nd Sitting:	
8				1st Sitting:	
				2nd Sitting:	
9				1st Sitting:	
				2nd Sitting:	
10				1st Sitting:	
				2nd Sitting:	
11				1st Sitting:	
				2nd Sitting:	
12				1st Sitting:	
				2nd Sitting:	
13				1st Sitting:	
				2nd Sitting:	
14				1st Sitting:	
				2nd Sitting:	
15				1st Sitting:	
				2nd Sitting:	
16				1st Sitting:	
				2nd Sitting:	

This Page Intentionally Blank

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF5/FIN)

Page 1 of 13 pages

OBJECTIVE:

This procedure defines the steps needed for an operator to correctly set-up an Anthropometer Base and D2Xs Camera, correctly measure subject data, and then correctly take down and stow Anthropometer Base and D2Xs Camera for the Spinal Elongation investigation.

PARTS:

Spinal Elongation Kit

TOOLS:

12-24mm Lens

4GB EVA Flash Card (empty)

CF Card Adapter

D2Xs Camera

Multi-Use Arm (Shuttle)

SB-800 Flash

Shutter Release Cable (labeled Remote Cord Assembly)

1. UNSTOW HARDWARE

- 1.1 If first session for Spinal Elongation,
| Unstow from ISS (consult stowage notes):
| Spinal Elongation Kit
| Retrieve from Shuttle Location:
| Multi-Use Arm

If subsequent session for Spinal Elongation,
| Retrieve from tmpry stow location on Shuttle:
| Spinal Elongation Kit
| Multi-Use Arm

- 1.2 Retrieve from Shuttle:
12-24mm Lens
CF Card Adapter
D2Xs Camera
SB-800 Flash

2. SETUP SPINAL ELONGATION HARDWARE ON CREW SEAT

- 2.1 CDR SEAT PWR BUS SEL - AC 2 (up)
- 2.2 Remove parachute from CDR seat (attached by velcro strap) and tmpry stow.
- 2.3 Configure CDR seat back in entry configuration and move seat all the way forward.
- 2.4 Raise the seat pan so it is slightly above the center console.

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF5/FIN)

Page 2 of 13 pages

- 2.5 Wrap shoulder harness around back of CDR seat and tie. Remove seat pan cushion and place on top of tied shoulder harness to line up with Velcro on back of seat. Refer to Figure 1.



Figure 1. Shoulder Harness Wrapped Around CDR Seat Back

- 2.6 Remove head rest from top of CDR seat and tmpy stow.

Spinal
Elongation
Kit

- 2.7 Unstow:

Anthropometer Base
Slider Post
Head Bar

Place hardware in CDR seat for setup.

- 2.7.1 Remove seat cover enough that Anthropometer Base will lay flat against the top of the seat.

CAUTION

1. The Anthropometer Base should easily slide into the seat and should not be forced. If forced, the hardware may become jammed, preventing the seat to be configured correctly for entry.
2. Spinal hardware should not be used as a hand-hold to move oneself.

- 2.7.2 To setup Anthropometer Base, hold Anthropometer Base by the anchor point, slide the legs of the Anthropometer Base into the head rest holes on top of the seat. Refer to Figure 2.
- 2.7.3 ✓Anthropometer leg with the hole is oriented closest to the headrest release knob.
- 2.7.4 ✓Anthropometer Base label and lanyard face aft.

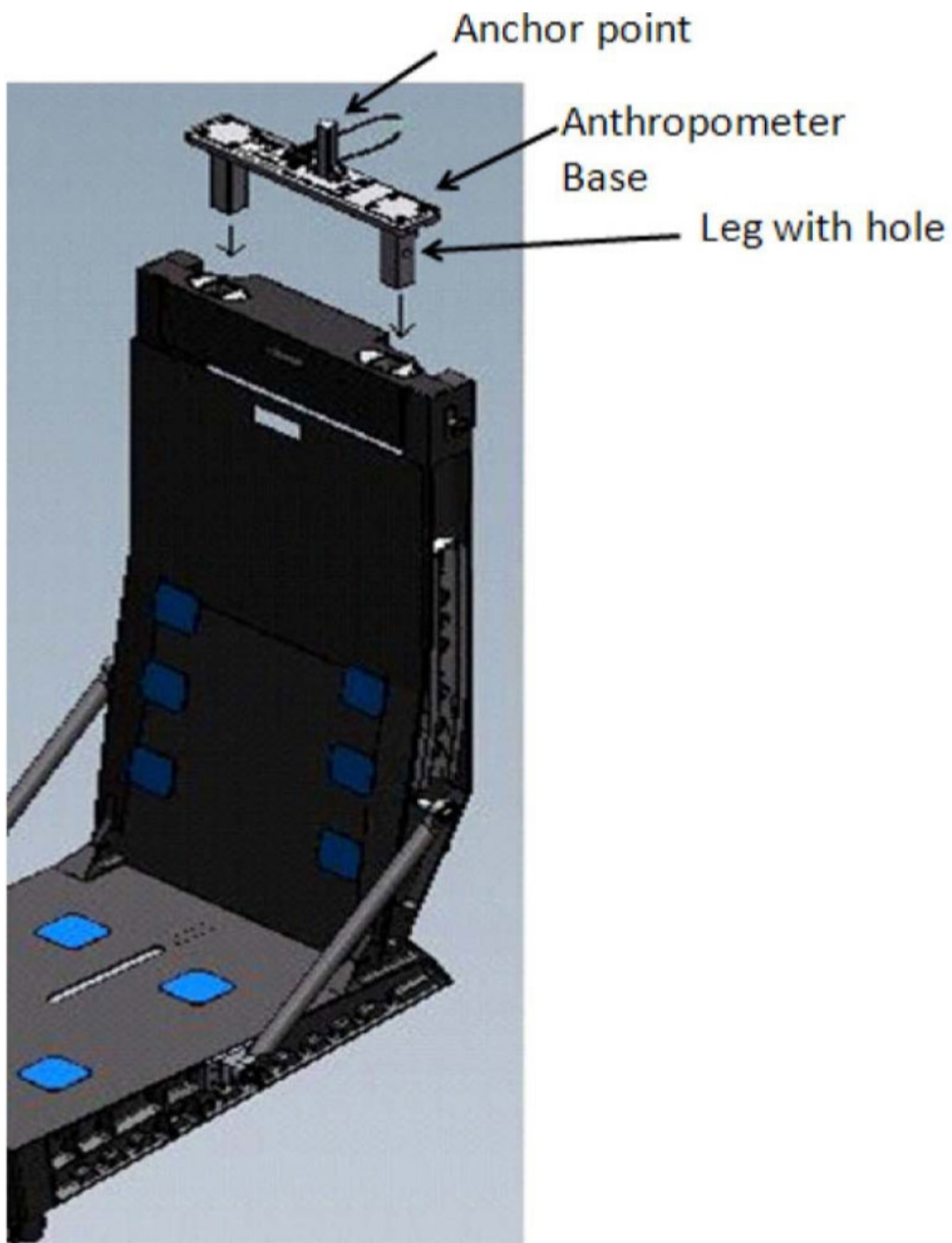


Figure 2. Anthropometer Base on CDR Seat

2.7.5 Remove pin from Anthropometer Base.

2.7.6 Attach Slider Post onto anchor point of Anthropometer Base (ensure numbers face toward PLT seat).

2.7.7 Reinstall pin to secure Slider Post.

- 2.7.8 Insert Head Bar into slot on Slider Post (loosen adjustment screw if necessary to insert Head Bar). Refer to Figure 3.

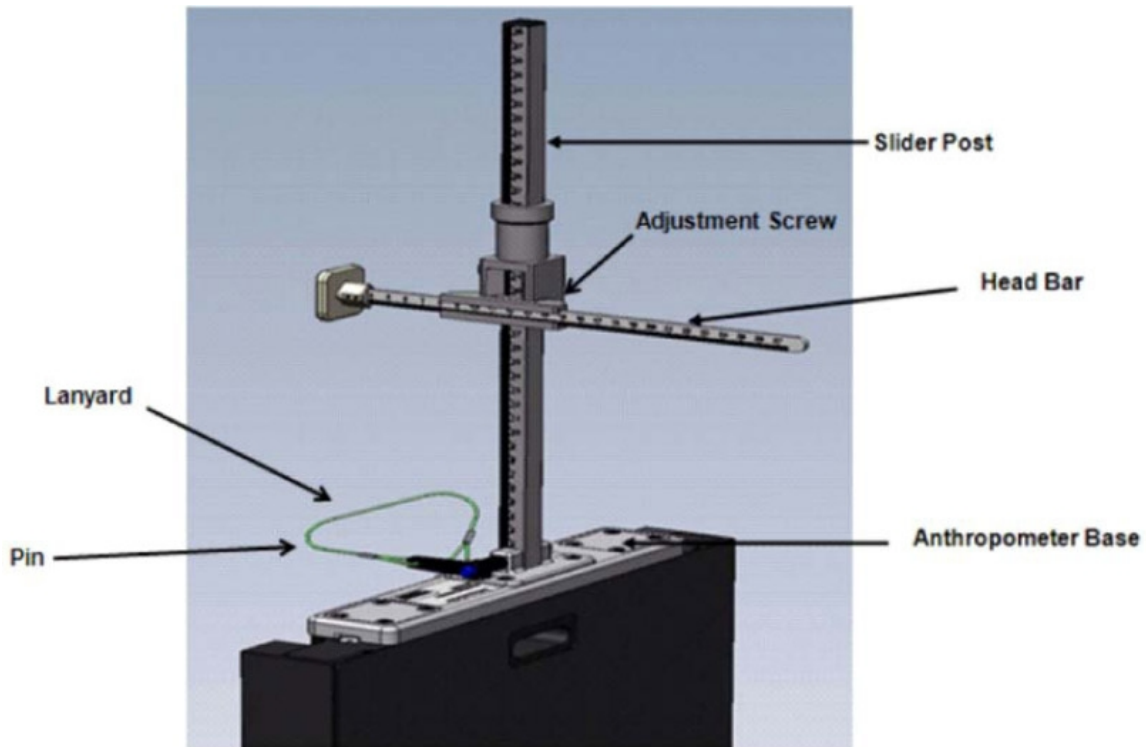


Figure 3. Final Assembly of Anthropometer Base on CDR Seat

3. LAP BELT SETUP

- 3.1 Lengthen lap belt straps and wrap lap belt straps around the joint between the seat and the seat back (black metal frame) by wrapping from the inside of the frame then around the joint (point A to point B in Figure 4).

- 3.1.1 Ensure that lap belt adjustment is accessible and possible. Refer to Figures 4 and 5.

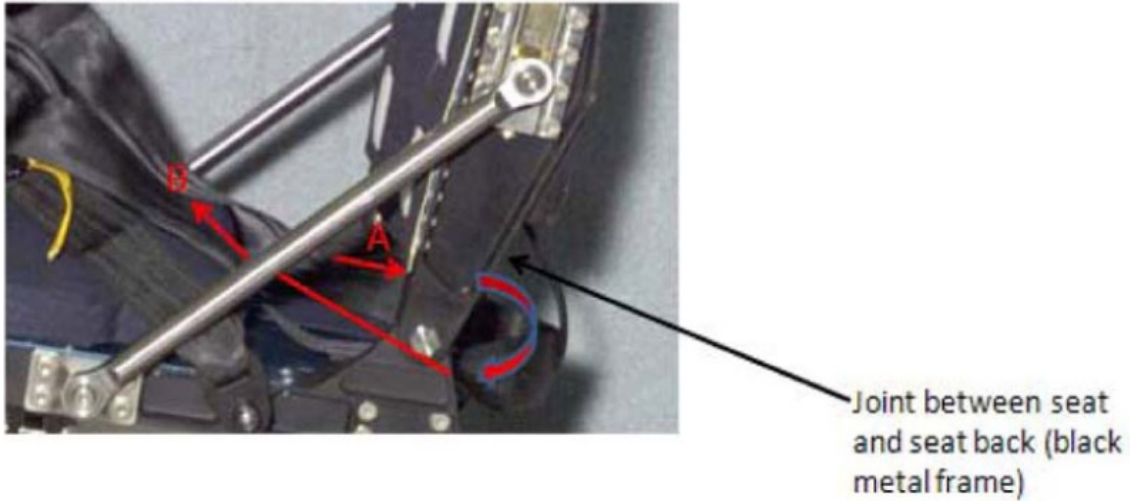


Figure 4. Lap Belt and Seat Back Joint Illustration

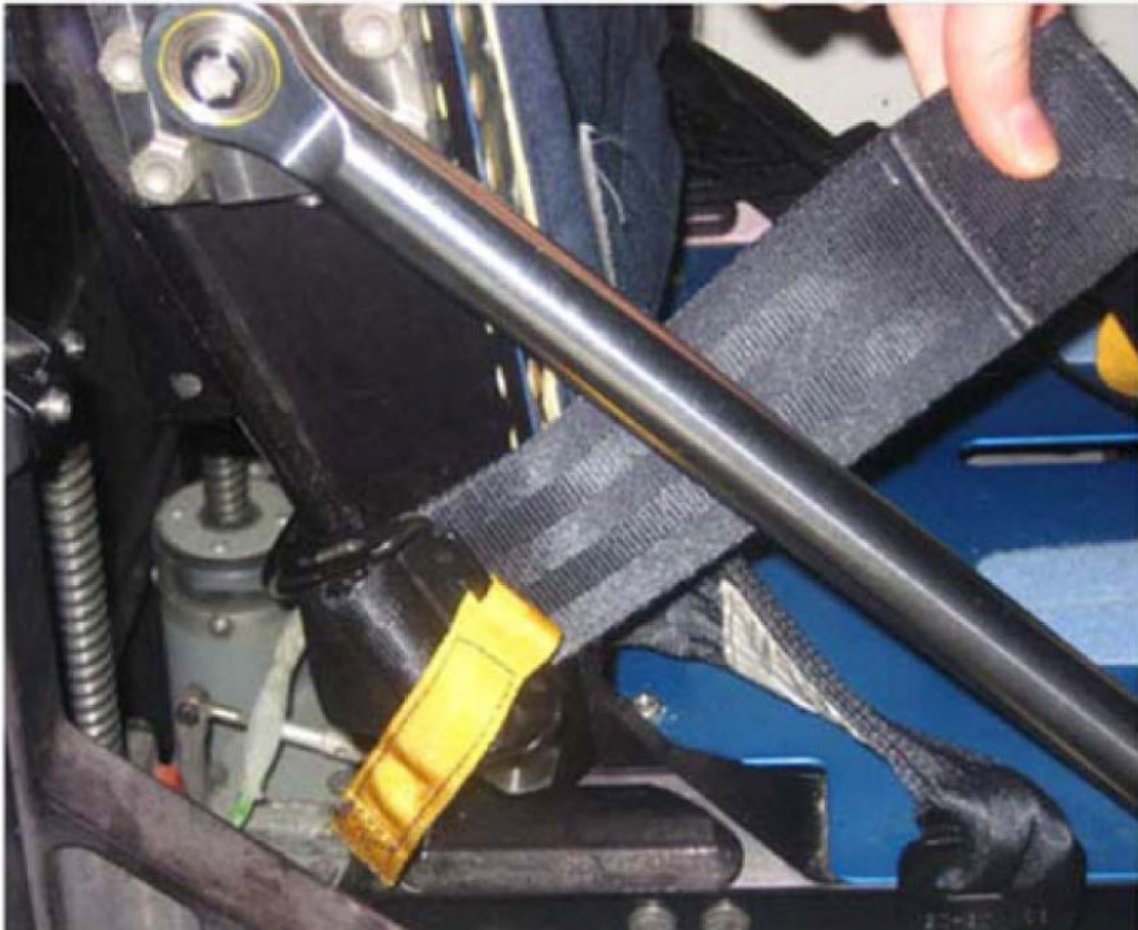


Figure 5. Joint Between Seat and Seat Back (Black Metal Frame)

4. D2XS CAMERA SETUP AND CONFIGURE

- 4.1 Install SB-800 Flash onto D2Xs Camera (if not installed).
Install 12-24mm Lens onto D2Xs Camera (if not installed).

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF5/FIN)

Page 7 of 13 pages

- 4.2 Install Shutter Release Cable onto D2Xs Camera (if not installed).
- 4.3 Check memory of 4GB EVA Flash Card in D2Xs Camera is empty.
If memory of 4GB EVA Flash Card in D2Xs Camera is not empty,
Remove 4GB EVA Flash Card from D2Xs Camera and tmpy stow.
Retrieve 4GB EVA Flash Card with empty memory and install in D2Xs Camera.
- 4.4 D2Xs Camera settings should be as follows:
Lens - 12-24mm Lens, set at 15mm
Lens Focus Mode - M/A
Body Focus Mode - S
✓Batt installed
✓Flash Card installed
Pwr - ON
Top LCD:
✓Batt
✓Frames remaining sufficient
Exp Comp - 0.0
Exp Mode - A
f/stop - 11
Meter - Matrix
Diopter - Adjust
Frame Rate - S
✓BKT disabled - 0F
Rear LCD:
✓ISO - 100
✓QUAL - RAW
✓WB - 0, A
AF Area Mode - []
✓Focus Area - Center
✓Focus Selector Lock - L
- SB-800 Flash Settings:
✓Diffuser Dome installed
pb ON/OFF → ON
✓MODE - TTL BL
✓Exp Comp - 0 EV

Tilt - Direct

NOTE

Multi-Use Arm may have to be adjusted to achieve the correct angle.

- 4.5 Position D2Xs Camera on Multi-Use Arm in a vertical orientation (SB-800 Flash towards forward) and install Multi-Use Arm to R6 camera shoe (forward towards window as seen in Figure 6).

Mount D2Xs Camera on Multi-Use Arm such that D2Xs Camera is orthogonal to CDR seat. Refer to Figure 6.

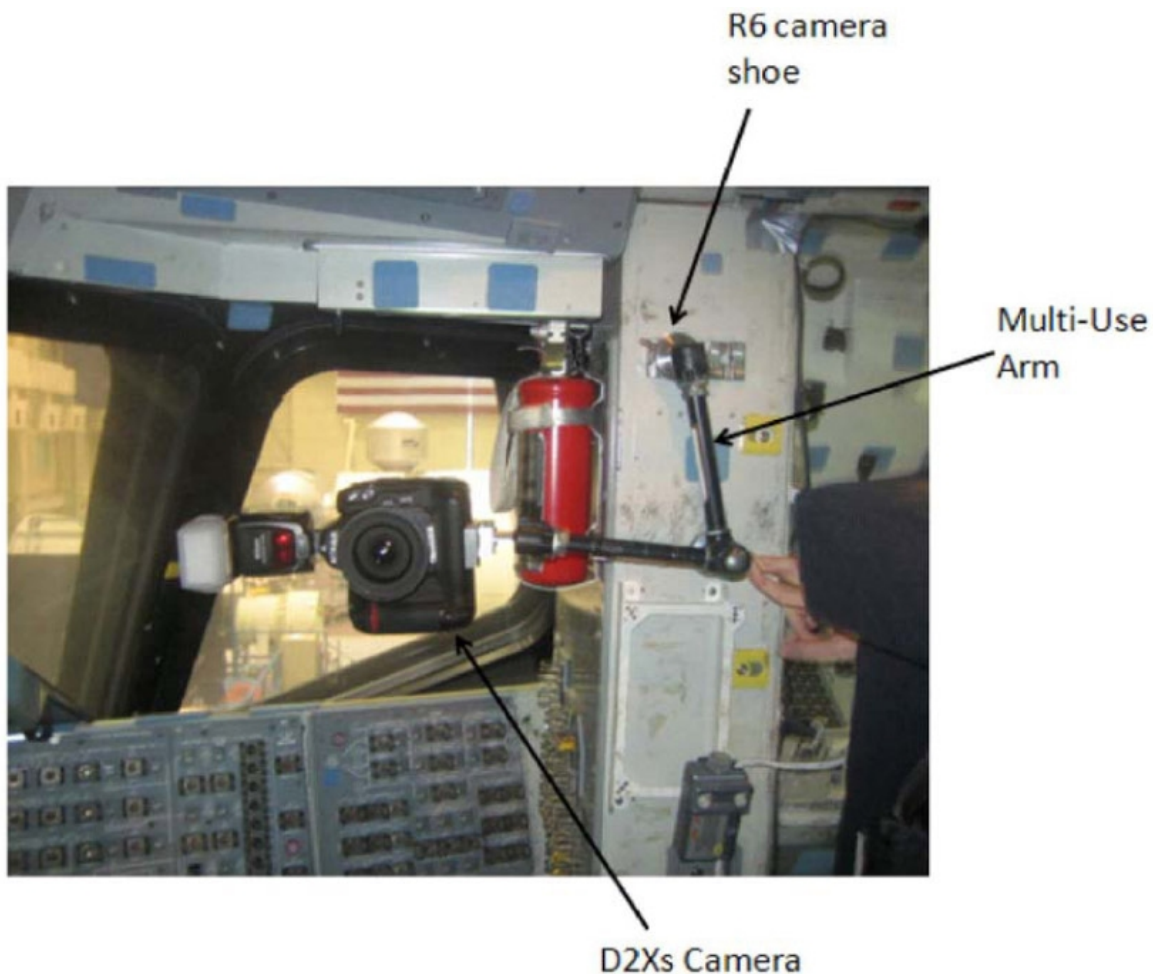


Figure 6. D2Xs Camera Positioned on R6 Camera Shoe

- 4.6 Autofocus on CDR seat (specifically on the side of the seat with the circle as seen in Figure 8).

NOTE

Body Focus Mode - M will eliminate the possibility of the focus shifting to another subject.

- 4.7 After autofocusing on the seat, change Body Focus Mode - M.
- 4.8 Reposition camera to ensure D2Xs Camera is parallel to R6 wall and not pitched to ceiling or deck. Refer to Figure 7.



Figure 7. Views based on different camera positions.

- 4.9 Take a test photograph. Entire profile of the CDR seat should appear in the picture. Refer to Figure 8 for an example. (Picture should have the entire edge of the center console, the edge of the seat pan, the back of the CDR seat, the top of the Slider Post and focus should be centered on the black holes within the area circled).

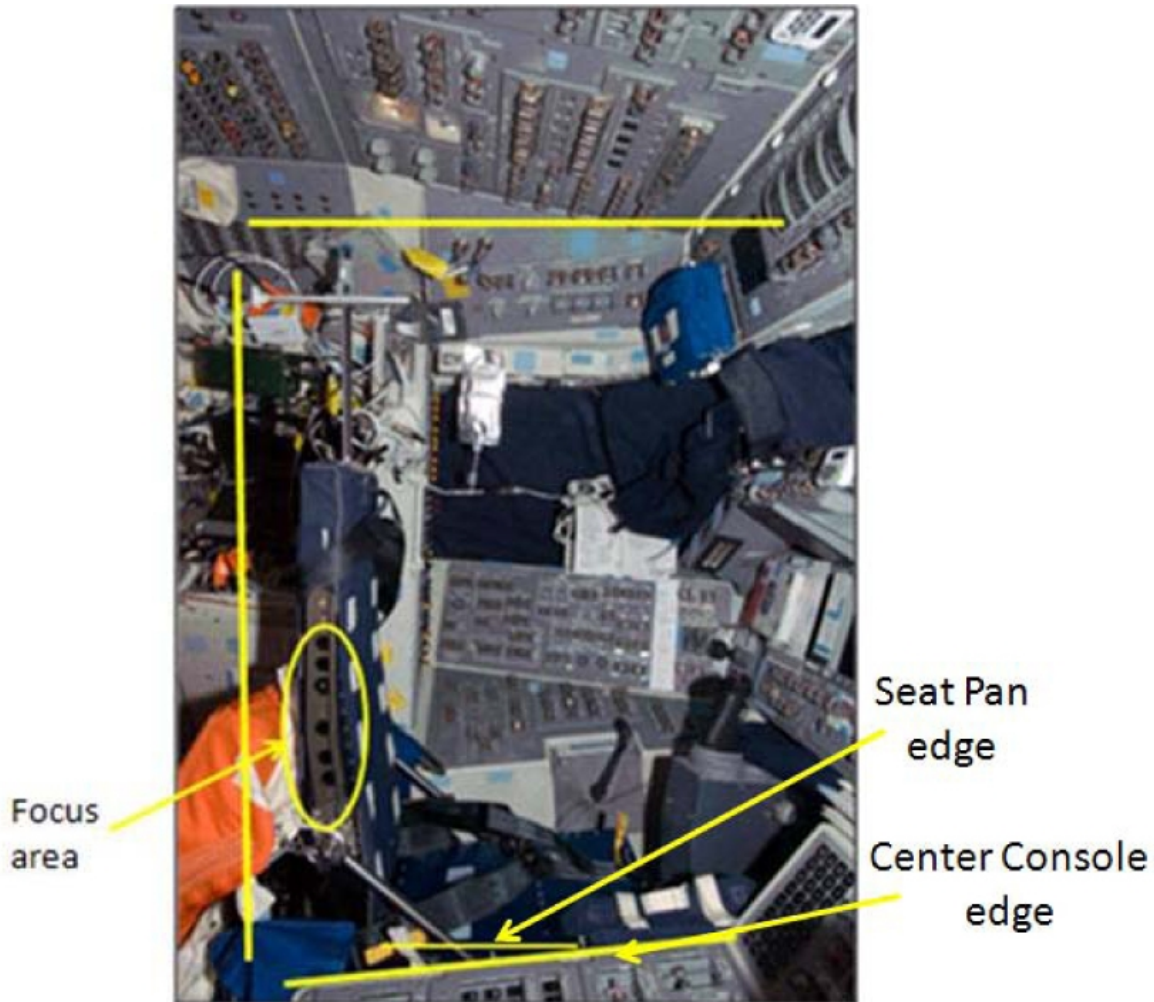


Figure 8. Correct D2Xs Camera Image Capture Area

5. SUBJECT POSITIONING

5.1 Before proceeding with this step,
 | subject should wear light-weight clothing.

5.2 Remove and tmpry stow Head Bar.

CAUTION
When adjusting seat height, it is possible to raise the seat high enough for the Slider Post to inadvertently contact the cabin ceiling. Avoid contact between the Slider Post and ceiling

5.3 Subject should sit in CDR seat and fasten lap belt and crotch strap ensuring a tight fit.

Ensure seat height is high enough that subject's thighs are at a 90 degree angle and that the edge of the seat pan is visible.

Feet should be positioned on the floor of deck (not under rudder pedals), ensuring contact with the seat.

Ignore the sensation of not feeling contact with the seat. As long as the subject is restrained tightly per procedure, subject will be in contact with the seat. If additional subject positions are attempted please record on log and note how the new data point differs from nominal procedures.

- 5.4 Operator will ensure subject sits erect and gazes directly ahead (head lines up, not looking at an angle) at the HUD reference object. Operator should also ensure subject is centered between the left and right sides of the seat.
- 5.5 Retrieve Head Bar from tmpy stow and insert into slot on Slider Post, ensuring that numbers on the Head Bar and slot on the Slider Post are facing the D2Xs Camera. Refer to Figure 9.

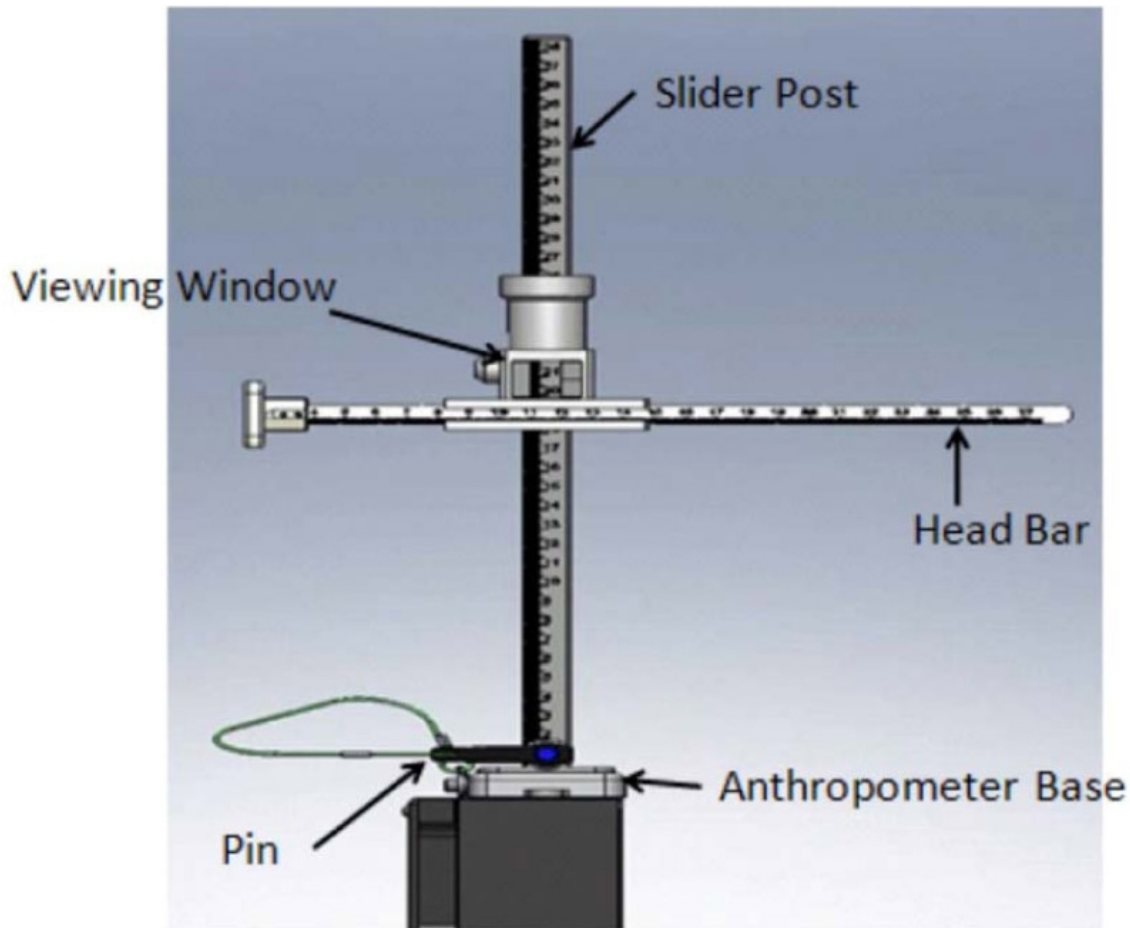


Figure 9. Head Bar Connected to Slider Post

- 5.6 Ensure Head Bar is in firm contact with the top of subject's head.

6. DATA COLLECTION

- 6.1 Record measurement on SPINAL ELONGATION LOG.
Measurements should be taken as the number between the marks on the viewing window of the Slider Post.
- 6.2 Operator should take photograph of subject using D2Xs Camera.
- 6.3 Remove Head Bar and tmpy stow.
- 6.4 Subject should exit CDR seat and stretch. Subject should then return to seat.

NOTE

The measurement number might differ between the two measurements. It is more important to have the subject positioned the same for both trials, even though the numbers might vary.

- 6.5 Repeat step 5.3 through step 6.3 to complete the second measurement (for a total of two measurements per subject).
 - 6.6 Repeat step 5.3 through step 6.5 for each additional subject (ensure new subjects wear light-weight clothing).
7. DISASSEMBLY
- 7.1 Remove D2Xs Camera from Multi-Use Arm.
Remove Multi-Use Arm with D2Xs Camera attached from R6 camera shoe.
Put away Multi-Use Arm to original location.
 - 7.2 Remove 4GB EVA Flash Card from D2Xs Camera.
Retrieve CF Card Adapter.
Insert 4GB EVA Flash Card into CF Card Adapter.
Insert CF Card Adapter into any networked PGSC.
✓**MCC-H** (specify which PGSC file resides on)
 - 7.3 Disassemble Spinal Elongation hardware from CDR seat.
 - 7.3.1 Remove pin from Anthropometer Base and remove Slider Post from anchor point. Install pin back into Anthropometer Base.
 - 7.3.2 Retrieve Head Bar from tmpy stow,
 - 7.3.3 Remove Anthropometer Base from top of the seat. Restore seat cover to original placement on the top of the seat.
 - 7.4 Reconfigure CDR seat to nominal configuration.
 - 7.4.1 Retrieve head rest and seat pan cushion from tmpy stow.
 - 7.4.2 Install head rest on top of CDR seat

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF5/FIN)

Page 13 of 13 pages

7.4.3 Put seat pan cushion back in place. Untie and unwrap shoulder harness from back of CDR seat. Return lap belt to nominal configuration.

7.4.4 Retrieve parachute from tmpy stow and install on back of CDR seat.

7.4.5 CDR SEAT PWR BUS SEL - OFF (ctr)

8. CONCLUDING OPERATIONS

8.1 Remove SPINAL ELONGATION LOG from the Assembly Operations book, place in manilla envelope, and place envelope in AOP.

Spinal
Elongation
Kit

8.2 Stow:

Anthropometer Base
Slider Post
Head Bar

If Spinal Elongation Kit is being tmpy stowed on Shuttle for subsequent sessions,

| Crew should inform ground of tmpy stow location.

8.3 When all sessions for this mission are concluded,

| Spinal Elongation Kit must be restowed on ISS prior to undocking (consult Stowage Notes).

This Page Intentionally Blank

OBJECTIVE

Commercial Generic Bioprocessing Apparatus (CGBA). This procedure resets the internal clock's GMT time.

NOTE
Menu option will time out after 30 seconds and return to status display.

MF71E
(CGBA)

1. On keypad:

pb MENU → Press

pb 3 → Press

pb ENTER → Press
2. Verify display indicates the following:
'Enter GMT month'
'(mm:dd:yy)'

'XX/dd/yy'
3. Enter GMT month.
pb ENTER → Press

Enter GMT day.
pb ENTER → Press

Enter GMT year.
pb ENTER → Press
4. Verify Display indicates the following:
'GMT date is now'

'mm/dd/yy'

'1 = Update GMT date'
'9 = Reenter date'

*
*
* If displayed GMT is incorrect
*
* | pb 9 → Press
* |
* | pb ENTER → Press
* |
* | Repeat steps 3 to 4.
* |
*

5. pb 1 → Press
pb ENTER → Press
6. Verify display indicates the following:

'Enter GMT hour'
'(hh:mm) (24-hour format)'

'XX:mm'

7. Enter GMT hour.
pb ENTER → Press

Enter GMT minute.
pb ENTER → Press

8. Verify display indicates the following:
'GMT time is now'

'hh:mm:00'

'1 = Update Time'

'9 = Reenter Time'

```
*****  
*  
* If displayed time is incorrect  
* |  
* | pb 9 → Press  
* |  
* | pb ENTER → Press  
* |  
* | Repeat steps 6 to 8.  
*  
*****
```

9. pb 1 → Press
pb ENTER → Press

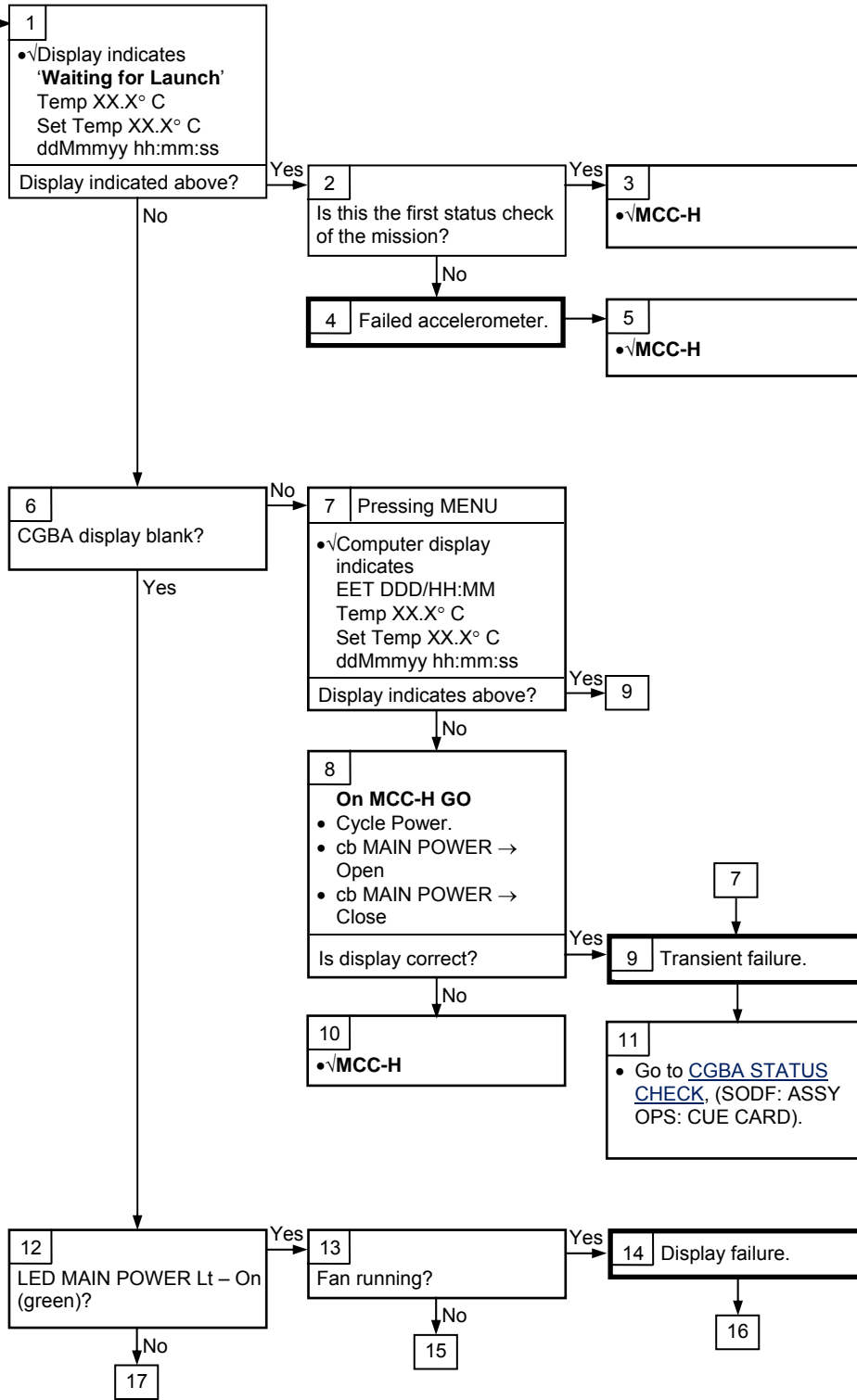
CGBA

CGBA INCORRECT (NO) DISPLAY

(ASSY OPS/ULF5/FIN) Page 1 of 2 pages

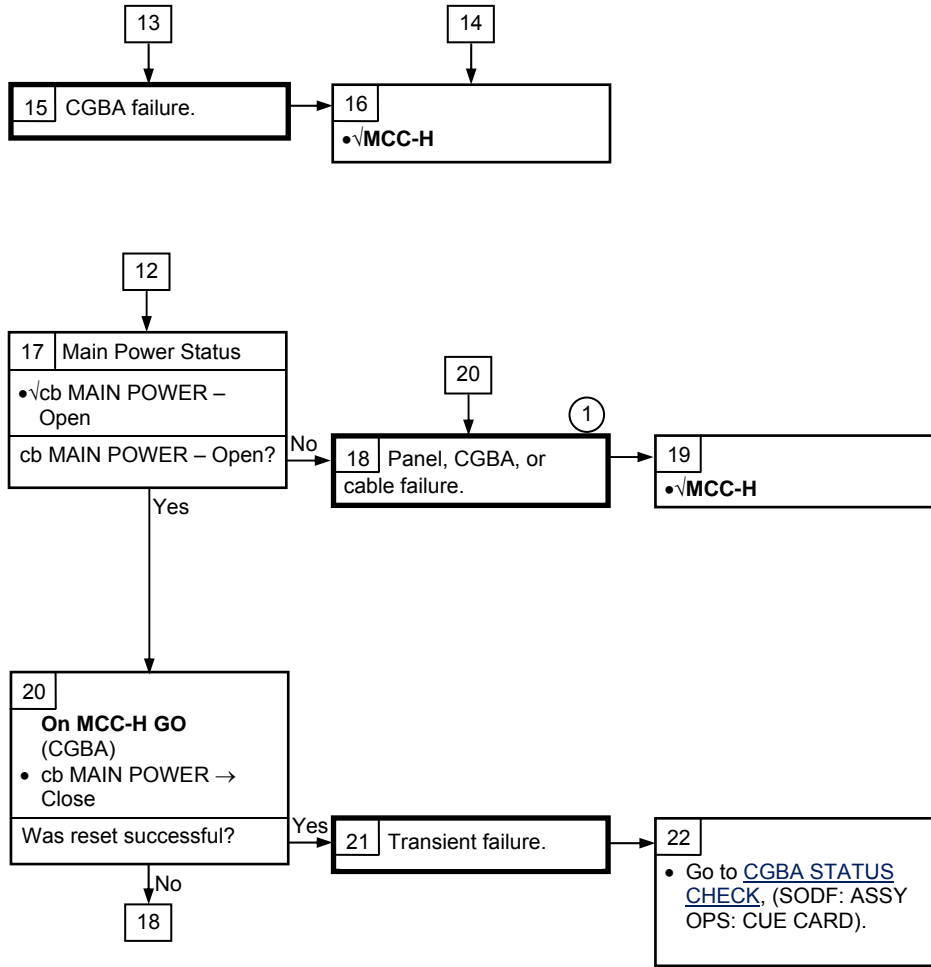
Incorrect or No Computer Display

Nominal Config:
(MO63P)
sw 10 AMP J4 – ON
cb CB4/J4 – Close
(CGBA)
cb MAIN POWER – Close
LED MAIN POWER Lt - On

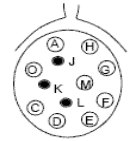


CGBA INCORRECT (NO) DISPLAY

(ASSY OPS/ULF5/FIN) Page 2 of 2 pages



① Cable can be checked via UTIL CABLE/OUTLET PWR CHECK (DC), (FDF: IFM, PROCEDURES S THRU Z)



J = +28 VDC
K = Return
L = GND

CGBA ADJUST SET TEMP

(ASSY OPS/ULF5/FIN)

OBJECTIVE:

Commercial Generic Bioprocessing Apparatus (CGBA). This procedure will direct the crew on the proper steps for adjusting the set temperature.

NOTE

If MENU selection is not made within 30 seconds, computer will time out and return to status display.

- MF71E
1. On keypad
pb MENU → Press

pb 4 → Press

pb ENTER → Press
 2. Verify display indicates
Enter new Set Temp

Temp: nn.n
 3. Enter new Set Temp (nn.n)
pb ENTER → Press
 4. Verify display indicates
New Set Temp

nn.n deg C

1 = Save Temp
9 = Reenter Temp

*
*
* If displayed Set Temp is incorrect
* | pb 9 → Press
* |
* | pb ENTER → Press
* |
* | Repeat steps 3 and 4.
* |
* |

 5. pb 1 → Press

pb ENTER → Press

This Page Intentionally Blank

OBJECTIVE:

This procedure will be used for both National Laboratory Pathfinder (NLP) Cells and Vaccine activities.

For NLP-Cells the entire procedure will be executed to access the Group Activation Pack (GAP) inside Commercial Generic Bioprocessing Apparatus (CGBA). This includes powering down CGBA, accessing the internal volume of CGBA, and retrieving and activating of NLP-Cells GAPs. It also contains the proper steps to close CGBA and restore power.

For NLP-Vaccine, only steps 2, 6 and 11 of this procedure will be executed because these GAPs are stowed at ambient.

PARTS:

NLP-Cells

- Group Activation Packs (GAPs)
- Hand Crank (located in foam on left side of CGBA unit)
- Ziplock Bag (if required)

NLP-Vaccine

- Group Activation Packs (GAPs)
- Hand Crank
- Ziplock Bag (if required)

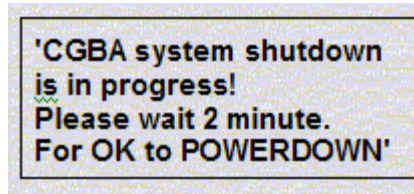
1. If Vaccine activity
| Perform only steps 2, 6, 11.
If Cells activity, perform all.
2. Check Flight Plan Detail Page or OSTPV Execution Notes for which GAPs to activate.
Record information in Table 1 in step 6.1.

MF71E
(CGBA)

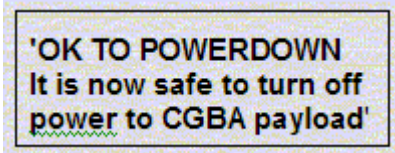
3. CGBA POWEROFF

CAUTION
To protect science, the CGBA power off time should not exceed 30 minutes.

- 3.1 On Keypad:
pb MENU → Press
pb 7 Shutdown → Press
pb ENTER → Press
- 3.2 On Shutdown CGBA screen:
pb 1 Shutdown system → Press
pb ENTER → Press
- 3.3 Verify CGBA display indicates the following:



3.4 Verify CGBA display indicates the following:



```
*****  
*  
*  
* If CGBA Computer display does not indicate above information  
* |  
* | Notify MCC-H and continue.  
*  
*****
```

3.5 cb MAIN POWER → Open

3.6 ✓LED-MAIN POWER – Off

4. CGBA POWER OFF AND DISCONNECTION

MO63P

4.1 sw 10A J4 → OFF
cb CB4/J4 → Open

CGBA

4.2 DC JUMPER CGBA ←|→ POWER-IN 28 VDC J1

4.3 Tether Power Cable out of the way as needed.

5. CGBA REMOVAL FROM MIDDECK LOCKER

5.1 Unlatch, open CGBA locker door.

5.2 Grasp CGBA, pull unit out of locker using side handles.
If needed, pull Velcro tabs to deploy CGBA recessed handles (push recessed handles back into place when done).

5.3 Temporarily stow CGBA in a secure location for access operations.

5.4 Open CGBA lid by lifting Velcro tabs on each side (two) of Nomex Cover.

CGBA or
MA16F

6. ACTIVATING NLP EXPERIMENT

6.1 Record Activation Start MET in Table 1.

Table 1.

GAPs Cells (1-16) Vaccine (A-P)	Activation Start MET	Activation Stop MET
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

WARNING
Do not process GAP if external leakage is evident. Seal GAP in Ziplock bag and stow.

6.2 Remove one GAP listed in Table 1 from Foam.

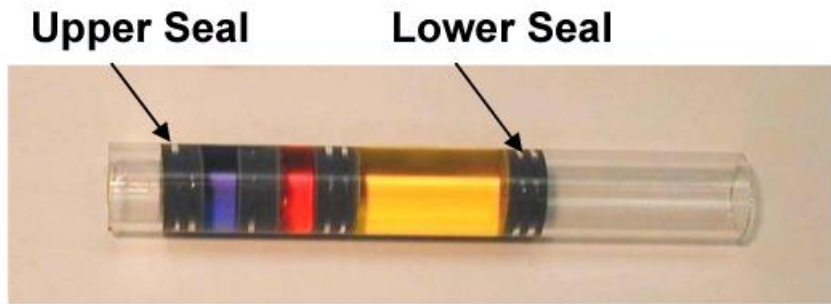


Figure 1. Loaded Glass Barrel.

6.3 Verify visually:
No Leakage from GAP.
No fluid outside of the upper or lower seals within the Glass Barrels
(Figure 1).

*
* If any external leakage is evident
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with GAP number.
*
*
* If any leakage is evident in more than two Glass Barrels
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with Glass Barrel and GAP number(s).
*
*
* If any leakage is evident in two or fewer Glass Barrel(s)
* | Complete step 6, then seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with Glass Barrel and GAP number(s).
*

6.4 Unstow Hand Crank and attach to GAP.
Slowly rotate the Hand Crank ↻ until lower edge of pressure plate aligns with lower edge of the first mark labeled "ACTIVATION" on the side of GAP housing.

6.5 Detach Hand Crank.

6.6 Shake GAP firmly by accelerating in a back and forth motion along the lengthwise axis of the GAP four times.

6.7 Verify visually:
No leakage from GAP.
No fluid outside of the upper or lower seals within the Glass Barrels (Figure 1).

*
* If any leakage from GAP or leakage within the Glass Barrel(s) is evident,
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with GAP number.
*

6.8 Restow GAP in original location.

6.9 Repeat step 6.2 to 6.8 until all GAPs identified in Table 1 are activated.

6.10 Record Activation Stop MET Table 1.

6.11 Restow Hand Crank in original location.

7. INSERTION OF CGBA INTO MIDDECK LOCKER

7.1 Close CGBA lid, attach Velcro tabs.

WARNING
CGBA must be inserted with both latches closed for safe entry.

7.2 Slide CGBA into locker, close locker door, and latch.

8. CONNECTING POWER TO CGBA

8.1 ✓cb MAIN POWER – Open
✓LED-MAIN POWER – Off

MO63P 8.2 ✓cb CB4/J4 – Open
✓sw 10A J4 – OFF

CGBA 8.3 Connect Power cable:
DC JUMPER CGBA →|← POWER-IN 28 VDC J1

9. CGBA POWERON

MO63P 9.1 cb CB4/J4 → Close
sw 10A J4 → ON

CGBA 9.2 cb MAIN POWER → Close
✓LED-MAIN POWER – On

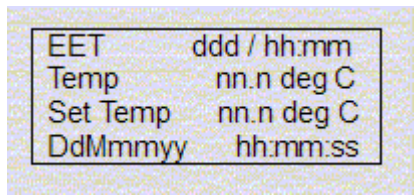
*
* If no LED
* | Perform CGBA INCORRECT (NO) DISPLAY, all (SODF:
* | ASSY OPS: PAYLOADS: CGBA), then:
*

10. CGBA CHECKOUT

10.1 Verify CGBA fan is running (check airflow at EXHAUST)

*
* If CGBA fan is not running
* | ✓MCC-H
*

10.2 Verify CGBA display indicates the following:



```
*
*****
*
* If display is incorrect or no display
*
* | Notify MCC-H.
*
*****
```

11. ✓MCC-H and provide METs recorded in Table 1.

OBJECTIVE:

This procedure will be used for both National Laboratory Pathfinder (NLP) Cells and Vaccine activities.

For NLP-Cells the entire procedure will be executed to access the Group Activation Pack (GAP) inside Commercial Generic Bioprocessing Apparatus (CGBA). This includes powering down CGBA, accessing the internal volume of CGBA, and retrieving and terminating of NLP-Cells GAPs. It also contains the proper steps to close CGBA and restore power.

For NLP-Vaccine, only steps 2, 6 and 11 of this procedure will be executed because these GAPs are stowed at ambient.

PARTS:

NLP-Cells

- Group Activation Packs (GAPs)
- Hand Crank (located in foam on left side of CGBA unit)
- Ziplock Bag (if required)

NLP-Vaccine

- Group Activation Packs (GAPs)
- Hand Crank
- Ziplock Bag (if required)

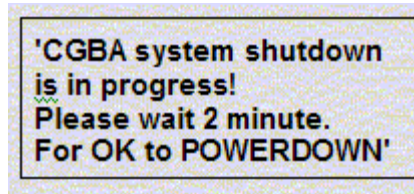
1. If Vaccine activity
| Perform only steps 2, 6, 11.
If Cells activity, perform all.
2. Check Flight Plan Detail Page or OSTVP Execution Notes for which GAPs to terminate.
Record information in Table 1 in step 6.1.

MF71E
(CGBA)

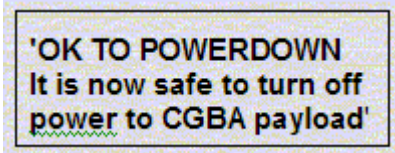
3. CGBA POWEROFF

CAUTION
To protect science, the CGBA power off time should not exceed 30 minutes.

- 3.1 On Keypad:
pb MENU → Press
pb 7 Shutdown → Press
pb ENTER → Press
- 3.2 On Shutdown CGBA screen:
pb 1 Shutdown system → Press
pb ENTER → Press
- 3.3 Verify CGBA display indicates the following:



3.4 Verify CGBA display indicates the following:



```
*****  
*  
*  
* If CGBA Computer display does not indicate above information  
* |  
* | Notify MCC-H and continue.  
*  
*****
```

3.5 cb MAIN POWER → Open

3.6 ✓LED-MAIN POWER – Off

4. CGBA POWER OFF AND DISCONNECTION

MO63P

4.1 sw 10A J4 → OFF
cb CB4/J4 → Open

CGBA

4.2 DC JUMPER CGBA ←|→ POWER-IN 28 VDC J1

4.3 Tether Power Cable out of the way as needed.

5. CGBA REMOVAL FROM MIDDECK LOCKER

5.1 Unlatch, open CGBA locker door.

5.2 Grasp CGBA, pull unit out of locker using side handles.
If needed, pull Velcro tabs to deploy CGBA recessed handles (push recessed handles back into place when done).

5.3 Temporarily stow CGBA in a secure location for access operations.

5.4 Open CGBA lid by lifting Velcro tabs on each side (two) of Nomex Cover.

CGBA or
MA16F

6. TERMINATING NLP EXPERIMENT

6.1 Record Termination Start MET in Table 1.

Table 1.

GAPs Cells (1-16) Vaccine (A-P)	Termination Start MET	Termination Stop MET
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

WARNING
Do not process GAP if external leakage is evident. Seal GAP in Ziplock bag and stow.

6.2 Remove one GAP listed in Table 1 from Foam.

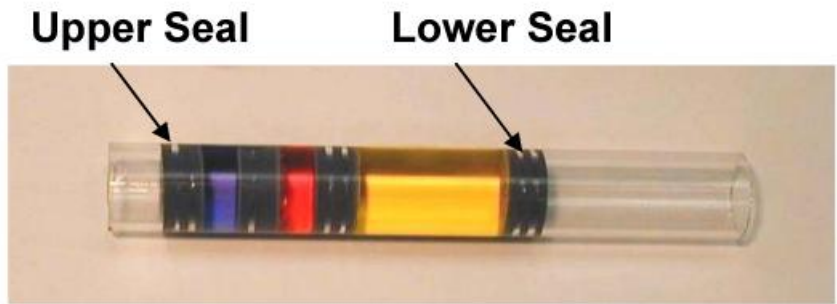


Figure 1. Loaded Glass Barrel.

6.3 Verify visually:
No Leakage from GAP.
No fluid outside of the upper or lower seals within the Glass Barrels
(Figure 1).

*
* If any external leakage is evident
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with GAP number.
*
*
* If any leakage is evident in more than two Glass Barrels
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with Glass Barrel and GAP number(s).
*
*
* If any leakage is evident in two or fewer Glass Barrel(s)
* | Complete step 6, then seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with Glass Barrel and GAP number(s).
*

- 6.4 Unstow Hand Crank and attach to GAP.
Slowly rotate the Hand Crank ↻ until lower edge of pressure plate aligns with lower edge of the first mark labeled "TERMINATION" on the side of GAP housing.
- 6.5 Detach Hand Crank.
- 6.6 Shake GAP firmly by accelerating in a back and forth motion along the lengthwise axis of the GAP four times.
- 6.7 Verify visually:
No leakage from GAP.
No fluid outside of the upper or lower seals within the Glass Barrels (Figure 1).

*
* If any leakage from GAP or leakage within the Glass Barrel(s) is evident
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with GAP number.
*

- 6.8 Restow GAP in original location.
- 6.9 Repeat step 6.2 to 6.8 until all GAPs identified in Table 1 are terminated.
- 6.10 Record Termination Stop MET in Table 1.
- 6.11 Restow Hand Crank in original location.

CGBA 7. INSERTION OF CGBA INTO MIDDECK LOCKER

- 7.1 Close CGBA lid, attach Velcro tabs.

WARNING
CGBA must be inserted with both latches closed for safe entry.

7.2 Slide CGBA into locker, close locker door, and latch.

8. CONNECTING POWER TO CGBA

8.1 ✓cb MAIN POWER – Open
✓LED-MAIN POWER – Off

MO63P 8.2 ✓cb CB4/J4 – Open
✓sw 10A J4 – OFF

CGBA 8.3 Connect Power cable:
DC JUMPER CGBA →|← POWER-IN 28 VDC J1

9. CGBA POWERON

MO63P 9.1 cb CB4/J4 → Close
sw 10A J4 → ON

CGBA 9.2 cb MAIN POWER → Close
✓LED-MAIN POWER – On

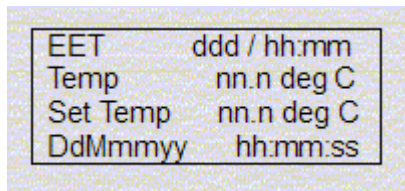
*
* If no LED
* | Perform CGBA INCORRECT (NO) DISPLAY, all (SODF:
* | ASSY OPS: PAYLOADS: CGBA), then:
*

10. CGBA CHECKOUT

10.1 Verify CGBA fan is running (check airflow at EXHAUST).

*
* If CGBA fan is not running
* | ✓MCC-H
*

10.2 Verify CGBA display indicates the following:



```
*
*****
*
* If display is incorrect or no display
*
* | ✓MCC-H.
*
*****
```

11. ✓MCC-H and provide METs recorded in Table 1.

GLACIER CONFIGURATION FOR DESCENT

(ASSY OPS/ULF5/FIN)

Page 1 of 2 pages

OBJECTIVE:

The following steps will secure the Glacier Door fasteners to ensure Glacier is in the proper configuration for descent.

TOOLS

3/16" Hex Head, 3/8" Drive

1/4" to 3/8" Adapter (1/4" Drive)

4" Ext, 1/4" Drive

(40-200 in-lbs) Trq Wrench, 1/4" Drive

- MF28E/G (Glacier) 1. ✓Glacier door is fully closed

```
*****  
*  
* If Outer Door does not close  
* | Press on top left corner or bottom left corner of door to assist with  
* | closure.  
*  
*****
```

2. ✓Door Latch - Locked (Finger latches fully spread apart and locking flap positioned between finger latches.)
3. Fasten Glacier Door Captive Locks (two), torque to 75 in-lbs using 3/16" Hex Head, 3/8" Drive, 1/4" to 3/8" Adapter (1/4" Drive), 4" Ext, 1/4" Drive, (40-200 in-lbs) Trq Wrench, 1/4" Drive.
- Refer to Figure 1.
4. Stow tools as required, to original locations.

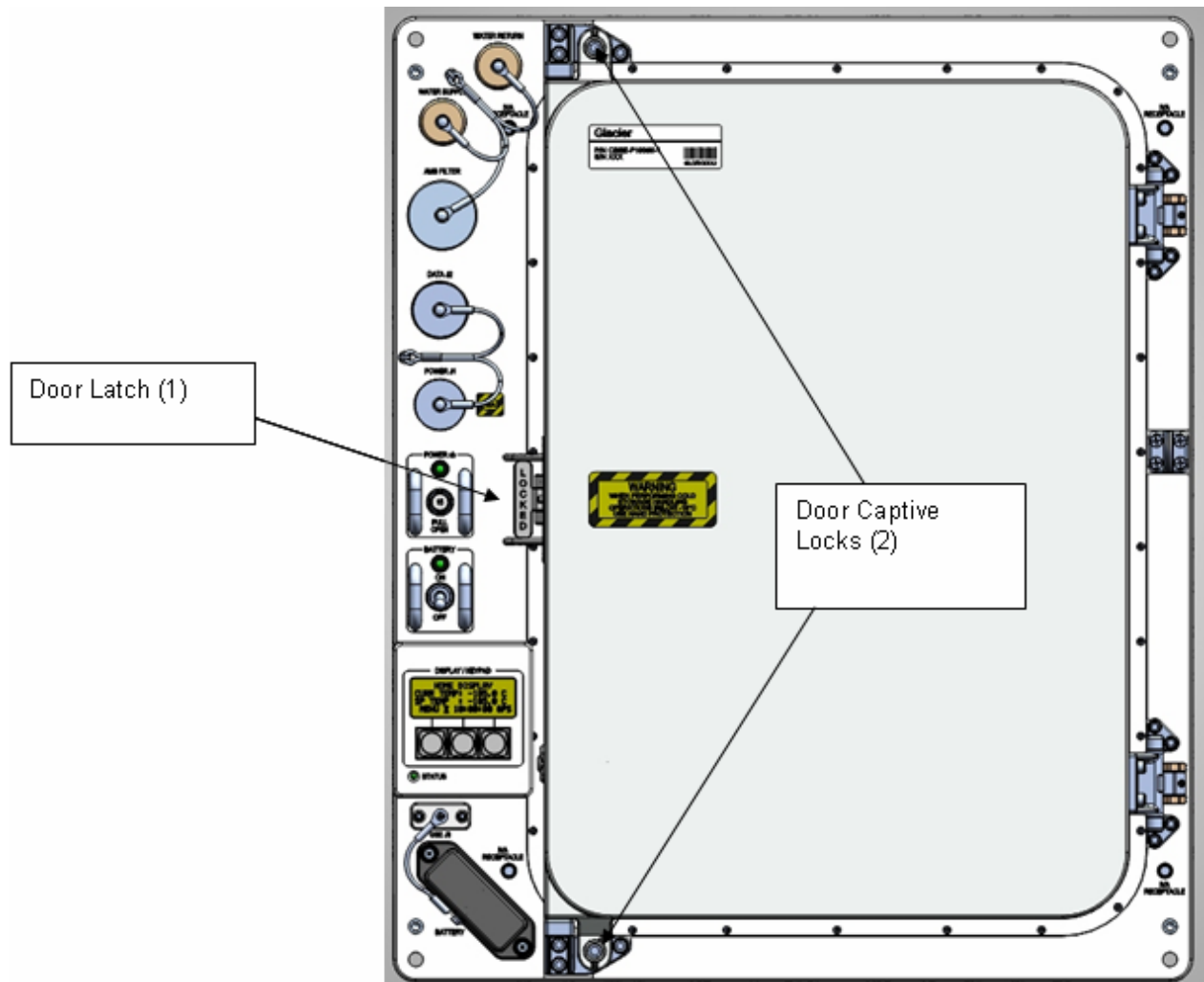


Figure 1. Glacier Configuration

GLACIER COLD HEAD CHECK

(ASSY OPS/ULF5/FIN)

Page 1 of 2 pages

OBJECTIVE:

The following steps allow the recording of some Glacier data for diagnostic purposes.

- Glacier
1. Verify display not indicating "***Error Pending**"

```
*****  
*  
* If Display - ***Error Pending**:  
* | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:  
* | PAYLOADS), then:  
*  
*****
```

2. Verify Display - '**HOME**'
If '**HOME**' not shown:
| pb Right (EXIT) → push until '**HOME**' appears
3. Record from front panel '**CURR TEMP**', '**SET POINT**', and '**GPS**' in Table 1 Glacier Cold Head Log
4. pb Left (MENU) → push (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
5. pb Center (SELECT) → push (one time), following appears:
'QUICK STATUS'
'Cold Head 1A 1/16'

NOTE

1. The center pushbutton (NEXT) moves to next status display.
2. The left pushbutton (PREV) moves to previous status display.

6. Record Quick Status data for parameters 1-7 in Table 1 Glacier Cold Head Log
7. pb Center (NEXT) → push until Quick Status data items 1 through 7 have been recorded.
8. pb Right (EXIT) → push until '**HOME**'
9. Notify **MCC-H** to report log values from Table 1 Glacier Cold Head Log

Table 1. Glacier Cold Head Log

Parameter	Definition	Event 1	Event 2	Event 3
HOME MENU (Front panel)				
1	CURR TEMP	Current Temperature °C		
2	SET POINT	Set Point °C		
3	GPS	Hours: Min: Sec	__ : __ : __	__ : __ : __
QUICK STATUS				
1	Cold Head 1A	Temperature °C		
2	Cold Head 1B	Temperature °C		
3	Cold Head 2A	Temperature °C		
4	Cold Head 2B	Temperature °C		
5	Cold Vol Outlet	Temperature °C		
6	Cold Vol Inlet	Temperature °C		
7	Cold Vol Inner	Temperature °C		

OBJECTIVE:

This procedure configures the Glacier in EXPRESS-2 Rack for descent by removing unit from the EXPRESS Rack, powering off the unit, disconnecting the EXPRESS resources (power, data, and cooling water), and locking the Cryocooler Launch Locks. The Descent Glacier is then exchanged with the Ascent Glacier. The Cryocooler Launch Locks are unlocked on the Ascent Glacier and then the Ascent Glacier is installed in EXPRESS-2 Rack. This procedure is performed in parallel to the GLACIER SWAP - SHUTTLE Transfer Procedure to swap the two units.

MATERIALS:

Dry Wipes

Gray Tape

TOOLS:

High Torque Locker Tool

ISS IVA Toolbox:

3/16" hex head, 3/8" Drive

Driver Handle, 3/8" Drive

4" Ext, 3/8" Drive

1/4" Socket, 3/8" Drive

Ratchet, 3/8" Drive

(40-200 in-lbs) Trq Wrench, 3/8" Drive

NOTE

STS crew will simultaneously prepare Middeck Glacier unit to expedite powered transfer activity to ensure Glacier power interrupt time does not exceed 120 minute limit for ISS unit.

- LAB101_G 1. Verify front door locking flap is positioned between finger latches.
1 (Glacier)

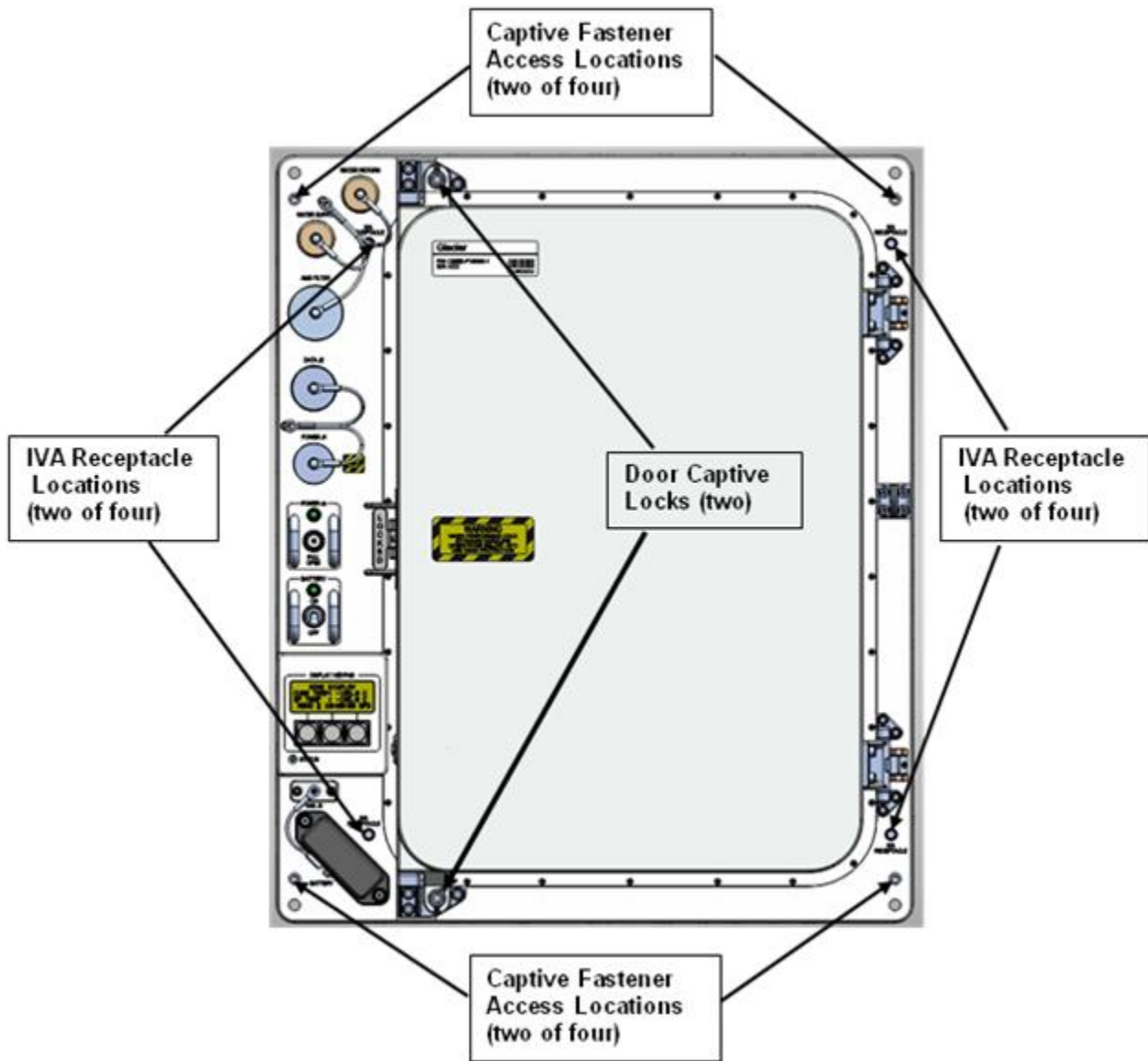


Figure 1. Glacier Fasteners.

2. Unfasten Glacier from EXPRESS Rack Backplate (four) (High Torque Locker Tool; 1/4" Socket, 3/8" Drive; Ratchet, 3/8" Drive).
3. Notify Shuttle crew that ISS Glacier is ready for shutdown and verify transfer path is clear.
4. GLACIER SHUTDOWN

LAB101_G
1 (Glacier)

- 4.1 ✓Display (Line 1) – 'HOME'


```

*****
*
* If display — ***Error Pending***
* | Perform GLACIER ERROR MESSAGE, all then
*
* If 'HOME' not shown:
* | pb Right (EXIT) → Press until 'HOME' appears
*
*****

```

- 4.2 Record front panel display GPS time: _____
- 4.3 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 4.4 pb Left (NEXT) → Press (four times), following appears:
'MAIN MENU'
'SHUTDOWN 5/5'
- 4.5 pb Center (SELECT) → Press (one time), following appears:
'SHUTDOWN'
'SHUTDOWN 1/2'
- 4.6 pb Center (SELECT) → Press (one time), following appears:
'Confirm Shutdown'
'SHUTDOWN'
- 4.7 pb Left (APPLY) → Press (one time), following appears:
'Glacier'
'System'
'Shutting Down'
'Please Wait...'
- 4.8 ✓Display –
'Glacier'
'Shutdown Complete'
'TURN POWER OFF'
- 4.9 Wait 5 seconds.

NOTE

1. Shutdown begins when Glacier POWER cb is open.
2. Power light can take up to 2 minutes to fully extinguish.
3. BATTERY sw is left on to power data logger during transfer.

- 4.10 cb POWER → Open
- LAB101_F1 4.11 sw LOCKER-4 POWER → OFF
✓LOCKER-4 POWER Lt – Off
- 5. RESOURCE DISCONNECTS FROM GLACIER UNIT
- 5.1 EXPRESS Rack Power Cable (24")←|→POWER J1

- 5.2 EXPRESS Rack Data Cable (24")←|→DATA J2
- 5.3 Glacier Water Supply Line ←|→WATER SUPPLY
Glacier Water Return Line ←|→WATER RETURN

Verify no leakage at connectors

If leakage is present
|
clean up with Dry Wipes

- 5.4 Tether cables and water lines out of the way
- 6. Carefully slide the Glacier unit out of the locker position to access the rear of the unit.
- 7. Photo document the rear intake and exhaust vents.
- 8. Clean the Glacier rear intake and exhaust vents with gray tape (see Figure 2).

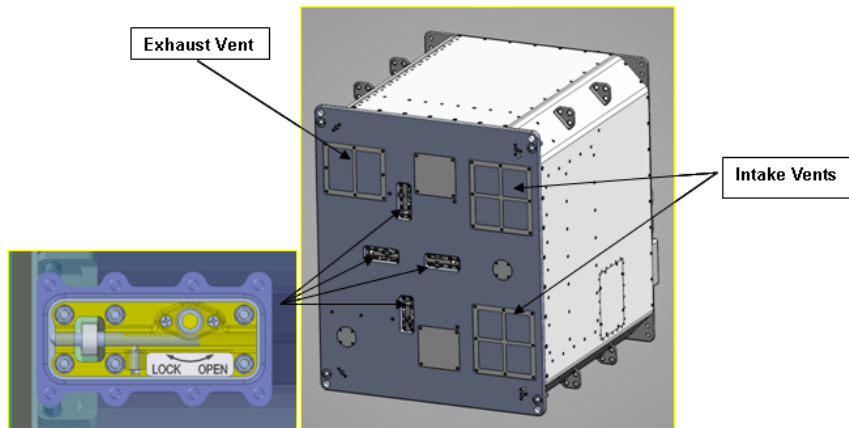


Figure 2. Cryocooler Launch Locks and Vents on Rear of Glacier.

- 9. Push in and rotate clockwise cryocooler launch locks (four) at rear of Glacier until locking pin is engaged (LOCK) (3/16" Hex Head, 3/8" Drive; Driver Handle, 3/8" Drive) (see Figure 2).
- 10. Exchange Glacier units with Shuttle crewmember.
- LAB101_G 11. Push in and rotate counterclockwise cryocooler launch locks (four) at rear of
1 Glacier Ascent Glacier until locking pin is disengaged (OPEN) (3/16" Hex Head, 3/8" Drive; Driver Handle, 3/8" Drive) (See Figure 2).
- 12. CONFIGURE ASCENT GLACIER FOR INSTALLATION
 - 12.1 Photo document the rear intake and exhaust vents.

12.2 Clean the Glacier rear intake and exhaust vents with gray tape (see Figure 2).

12.3 Carefully slide the Glacier unit into the locker position.

13. RESOURCE CONNECTIONS TO GLACIER UNIT

LAB101_F1 13.1 ✓sw LOCKER-4 POWER – OFF
Glacier ✓cb POWER – OPEN

CAUTION	
1.	When routing cables, minimum inside bend radius is: 4.0" for the water (TCS) hoses and .75" for the power cables.
2.	Cables and hoses should not block Glacier Door, fire access holes, smoke detection light, C & W labels, rack power switch and payload controls and display.
3.	When mating cables, verify power source off, cb off, pins straight, inspect both connector halves for debris, mate dust caps if applicable.

13.2 EXPRESS Rack Power Cable (24")→|←POWER J1

13.3 EXPRESS Rack Data Cable (24")→|←DATA J2



Figure 3. Glacier cable routing.

- 13.4 Glacier Water Return Line →|←WATER RETURN
- Glacier Water Supply Line →|←WATER SUPPLY

*
* If green band is not visible
*
* | Pull back on the coupler locking sleeve and de-mate from the
* | Glacier water supply nipple. Reconnect the water supply line
* | by pushing the small female QD coupler onto the water
* | supply nipple until the coupler snaps into place and the
* | green band is shown
*

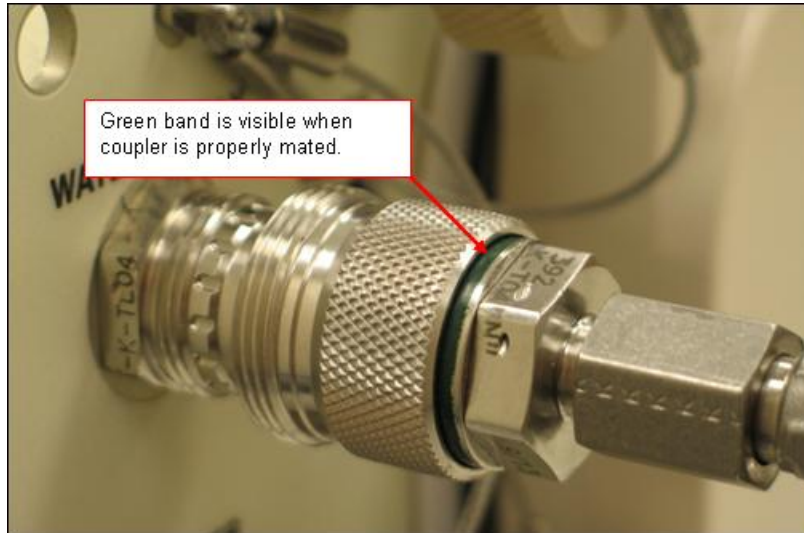


Figure 4. Properly mated small QD connector.

Verify no leakage at connectors

*
* If leakage is present
*
* | clean up with Dry Wipes
*

LAB1O1_F1 14. sw LOCKER-4 POWER → ON (It on)

Glacier 15. cb POWER → Close (It on)
✓BATTERY sw – ON (It on)

<p><u>NOTE</u></p> <p>1. Glacier power up occurs when POWER cb is closed. 2. System Initialization could take up to 3 minutes. Initialization complete once Line 1 of front panel display reads 'HOME'.</p>
--

16. ✓Display – '**HOME**'

```
*****
*
* If display —***Error Pending***
* | Perform GLACIER ERROR MESSAGE, all (SODF: ASSY OPS:
* | PAYLOADS), then:
*
*
* If 'HOME' not shown,
* | Perform GLACIER FAIL TO REPOWER, all (SODF: ASSY OPS:
* | PAYLOADS), then:
*
*****
```

- LAB101_G 17. Fasten Glacier fasteners (four) in a diagonal pattern into EXPRESS-2 Rack,
1 torque to 75 in-lbs (High Torque Locker Tool; 1/4" Socket, 3/8" Drive; (40-200 in-lbs) Trq Wrench, 3/8" Drive).
- Glacier 18. Unlock Door Captive Locks (two) (3/16" Hex Head, 3/8" Drive; 4" Ext, 3/8" Drive; Ratchet, 3/8" Drive).
19. Record front panel GPS time: _____
20. Record front panel display CURR TEMP: _____
21. Stow:
All IVA Tools
22. Notify **MCC-H** Glacier ISS-STTS TRANSFER is complete and provide power-off time from step 4.2: _____; power-on time from step 18: _____; and CURR TEMP from step 19: _____.

GLACIER SWAP - SHUTTLE

(ASSY OPS/ULF5/FIN)

Page 1 of 6 pages

OBJECTIVE:

This procedure removes the Ascent Glacier from the middeck. The Ascent Glacier is transferred to the EXPRESS-2 Rack and exchanged with the Descent Glacier. The Descent Glacier unit is transferred to the middeck, powered to a survival state and installed. This procedure is performed in parallel to the GLACIER SWAP - ISS Procedure to swap the two units.

PARTS:

Glacier IVA Handle (CBSE-F10075-1)

TOOLS:

High Torque Locker Tool (Volume H, taped to wall)

STS IFM Toolbox (MF28K):

1/4" Socket, 1/4" Drive

Ratchet, 1/4" Drive

(40-200 in-lbs) Trq Wrench, 1/4" Drive

NOTE

ISS crew will simultaneously prepare Descent Glacier unit to expedite powered transfer activity and ensure Glacier power interrupt time does not exceed 120 minute limit for ISS unit.

- MF28E/G
Glacier
1. Verify front door locking flap is positioned between finger latches.
 2. Connect Glacier IVA Handle diagonally to front face of Glacier at locations marked IVA Receptacle (two of four). Refer to Figures 1.

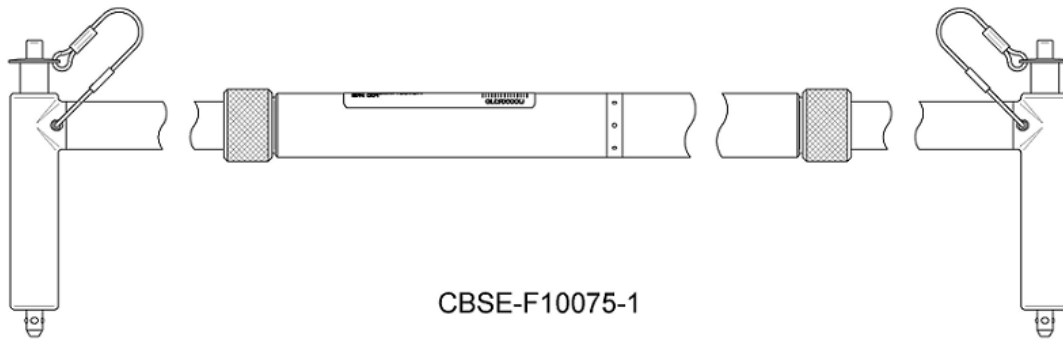


Figure 1. Glacier IVA Handle.

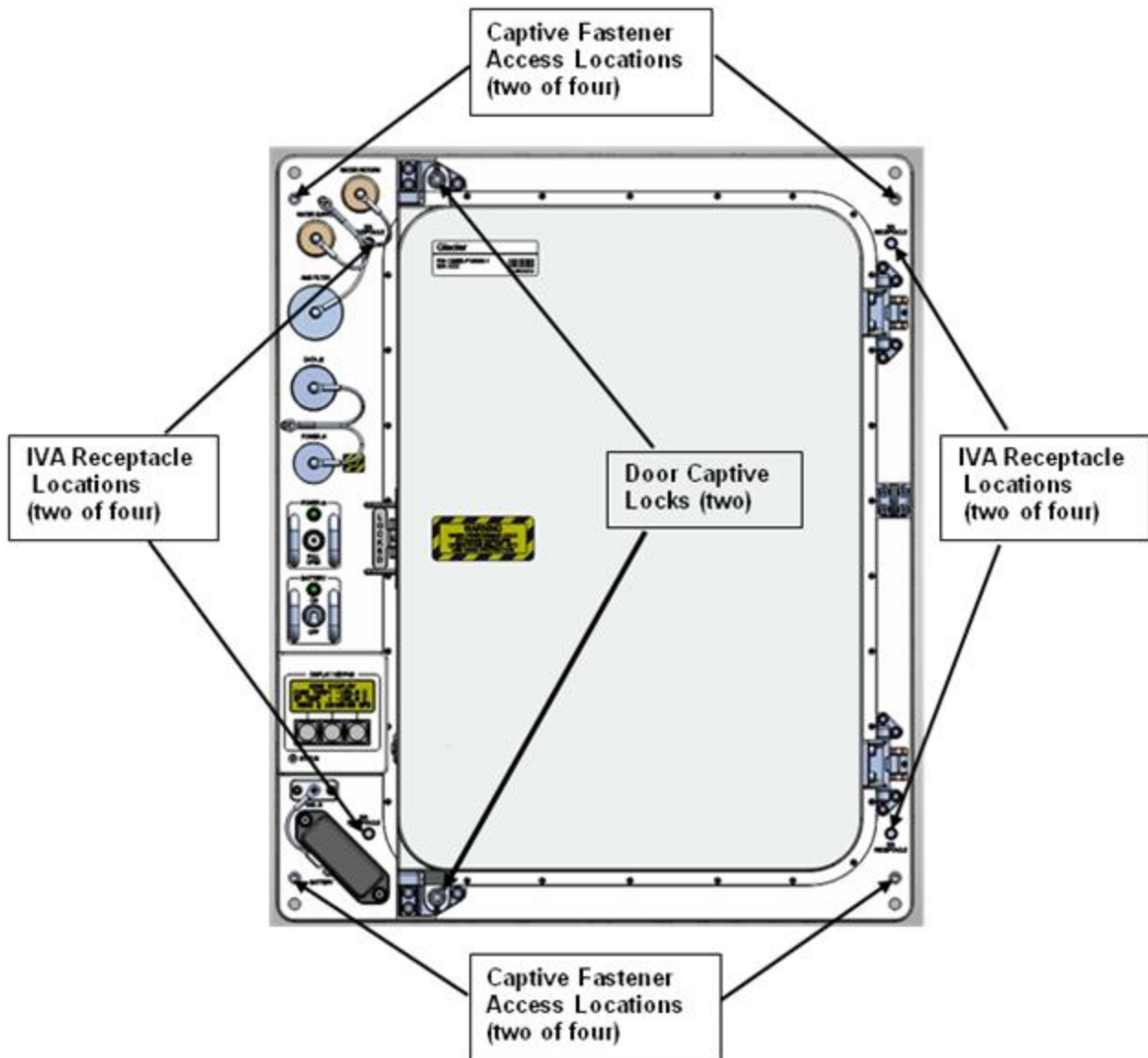


Figure 2. Glacier Configuration.

3. ✓Transfer path clear between EXPRESS-2 Rack and middeck.
4. Unfasten Glacier Captive Fasteners from shuttle VPMP (four) (High Torque Locker Tool; 1/4" Socket, 1/4" Drive; Ratchet, 1/4" Drive).
5. Notify ISS crew that STS Glacier is ready for shutdown.
6. GLACIER SHUTDOWN
 - 6.1 ✓Display (Line 1) – 'HOME'


```
*****  
*  
* If display -***Error Pending**  
* | Perform GLACIER ERROR MESSAGE, all (SODF: ASSY  
* | OPS: PAYLOADS), then:  
*  
*  
* If 'HOME' not shown  
* | pb Right (EXIT) → Press until 'HOME' appears  
*  
*****
```

- 6.2 Record front panel display GPS time: ____:____:____ _____
- 6.3 pb Left (MENU) → Press (one time)
The following messages appear:
'MAIN MENU'
'QUICK STATUS 1/5'
- 6.4 pb Left (NEXT) → Press (four times)
The following messages appear:
'MAIN MENU'
'SHUTDOWN 5/5'
- 6.5 pb Center (SELECT) → Press (one time)
The following messages appear:
'SHUTDOWN'
'SHUTDOWN 1/2'
- 6.6 pb Center (SELECT) → Press (one time)
The following messages appear:
'Confirm Shutdown'
'SHUTDOWN'
- 6.7 pb Left (APPLY) → Press (one time)
The following messages appear:
'Glacier'
'System'
'Shutting Down'
'Please Wait...'
- 6.8 ✓Display shows the following messages
'Glacier'
'Shutdown Complete'
'TURN POWER OFF'
- 6.9 Wait 5 seconds.

NOTE

1. Power down begins when Glacier POWER cb is open.
2. Power light can take up to 2 minutes to fully extinguish.
3. BATTERY sw is left on to power data logger during transfer.

6.10 cb POWER → Open

7. GLACIER POWER OFF IN ORBITER MIDDECK

ML86B:E 7.1 cb MNB MAR 1 →Open

8. REMOVING GLACIER FROM MIDDECK AND TRANSFER

MF28E/G 8.1 SHUTTLE PAYLOAD DC PWR CABLE ←|→ POWER J1

8.2 Tether cables out of the way.

8.3 Carefully slide the Glacier unit out of the locker position.

LAB1O1 8.4 Transfer Ascent Glacier to EXPRESS-2 Rack.

8.5 Disconnect Glacier IVA Handle from front face of Glacier.

8.6 Connect Glacier IVA Handle diagonally to front face of Descent Glacier at locations marked IVA Receptacle (two of four).

MF28E/G 9. Transfer Descent Glacier to Middeck location and slide into position.

10. GLACIER POWER ON IN ORBITER MIDDECK

ML86B:E 10.1 ✓cb MNB MAR 1 – Open

MF28E/G 10.2 ✓cb POWER – Open
✓sw BATTERY – ON

10.3 Verify and Complete Cable Connections:
✓SHUTTLE PAYLOAD DC PWR CABLE →|← POWER (J1)

ML86B:E 10.4 cb MNB MAR 1 → Close

NOTE

Glacier initialization could take up to 3 minutes. Initialization is complete once Line 1 reads 'HOME'.

MF28E/G 10.5 cb POWER → Close (It on)

✓sw BATTERY – ON (It on)

```

*****
*
* If POWER It off
* |   Perform GLACIER FAIL TO REPOWER, all (SODF: ASSY OPS:
* |   PAYLOADS), then:
*
*****

```

WARNING
Glacier requires four fasteners torqued to 75 in-lbs to be properly fastened onto VPMP for structural and safety purposes.

11. GLACIER SETUP OR INSTALLATION IN ORBITER MIDDECK

- 11.1 Fasten Glacier fasteners (four) in a diagonal pattern into Middeck locker VPMP mounted on wire tray, torque to 75 in-lbs [High Torque Locker Tool; 1/4" Socket, 1/4" Drive; (40-200 in-lbs) Trq Wrench, 1/4" Drive].
- 11.2 Disconnect Glacier IVA Handle from Glacier front face and stow per Stowage note
- 11.3 Verify front door is closed.

11.4 ✓Display (Line 1) 'HOME'

```

*****
*
* If display - ***Error Pending***
* |   Perform GLACIER ERROR MESSAGE, all (SODF: ASSY OPS:
* |   PAYLOADS), then:
*
*
* If 'HOME' not shown
* |   Perform GLACIER FAIL TO REPOWER, all (SODF: ASSY OPS:
* |   PAYLOADS), then:
*
*****

```

11.5 Record front panel GPS time: _____:_____:_____
Record front panel display CURR TEMP: _____

- 11.6 If all powered transfers are complete
 - | Stow tools.
- If all powered transfers are not complete
 - | Temporarily stow all tools.

11.7 Notify **MCC-H** of Glacier transfer to middeck completion. Report times from steps 6.2 and 11.5 and temperature from step 11.5.

12. GROUND UPDATES FOR IMS

Ground should update IMS for the following parts:

IVA Handle

OBJECTIVE:

This procedure will perform a manual reconfigure of the Glacier System using the front panel and display buttons.

Glacier

1. ✓Display – 'HOME'

```

*****
*
* If display —'***Error Pending***'
* |   Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* |   PAYLOADS), then:
*
*
* If 'HOME' not shown:
* |   pb Right (EXIT) → Press until 'HOME' appears
*
*****

```

2. Record front panel display 'CURR TEMP', 'SET POINT', and 'GPS' and any ground supplied data in [TABLE 2 GLACIER RESET LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

3. SET CONTROL MODE TO IDLE

- 3.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 3.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 3.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 3.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 3.5 pb Left (NEXT) → Press (one time), following appears:
'Temp Control'
'Control Mode 2/18'
- 3.6 pb Center (SELECT) → Press (one time), following appears:
'Control Mode'
'XXXX'

NOTE

1. There are 3 options for setting the Control Mode (IDLE, SET POINT, and MANUAL).
2. The left pushbutton (NEXT) changes the Mode, the center pushbutton (APPLY) selects the Mode, and the right pushbutton (CANCEL) returns to the previous Mode.

- 3.7 pb Left (NEXT) → Press as required to select desired Temperature Control Mode to Idle
- 3.8 pb Center (APPLY) → Press (one time)
- 3.9 ✓Confirm New Control Mode = Idle
- 3.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Control Mode 2/18'
- 3.11 ✓Control Mode = Idle
- 3.12 pb Right (EXIT) → Press until 'HOME' appears

4. SETPOINT TEMPERATURE

- 4.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 4.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 4.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 4.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 4.5 pb Center (SELECT) → Press (one time), following appears:
'Set Point Temp'
'XXXXX °C'
'-160.0 to +004.0'

NOTE

1. The left pushbutton (CURSOR) moves cursor between New Set Point Temp fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases New Set Point Temp selected digit field value by 1.

- 4.6 Enter desired Set Point Temperature per **MCC-H**
- 4.7 pb Right (DONE) → Press (one time)
- 4.8 ✓Confirm New Set Point = desired Set Point
- 4.9 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'

4.10 ✓Set Point Temp = desired Set Point

4.11 pb Right (EXIT) → Press until '**HOME**' appears

5. TEMPERATURE CONTROL SENSORS

5.1 pb Left (MENU) → Press (one time), following appears:
'**MAIN MENU**'
'**QUICK STATUS 1/5**'

5.2 pb Left (NEXT) → Press (three times), following appears:
'**MAIN MENU**'
'**SETUP 4/5**'

5.3 pb Center (SELECT) → Press (one time), following appears:
'**SETUP**'
'**Temp Control 1/3**'

5.4 pb Center (SELECT) → Press (one time), following appears:
'**Temp Control**'
'**Set Point Temp 1/18**'

5.5 pb Left (NEXT) → Press (two times), following appears:
'**Temp Control**'
'**Control Sensors 3/18**'

5.6 pb Center (SELECT) → Press (one time), following appears:
'**Control Sensors**'
'**INNER OUTLET INLET**'

NOTE

1. The left pushbutton (CURSOR) moves cursor between Control Sensor fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) changes the values of the Control Sensor fields from 0 to 1 or vice versa.

5.7 Enter desired combination of Control Sensors per **MCC-H**

5.8 pb Right (DONE) → Press (one time)

5.9 ✓Confirm New Control Sensors = desired Control Sensors

5.10 pb Left (APPLY) → Press (one time), following appears:
'**Temp Control**'
'**Control Sensors 3/18**'

5.11 ✓Control Sensors = desired Control Sensors

5.12 pb Right (EXIT) → Press until '**HOME**' appears

6. AIR MANAGEMENT PROCEED MESSAGE

6.1 pb Left (MENU) → Press (one time), following appears:
'**MAIN MENU**'

'QUICK STATUS 1/5'

- 6.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 6.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 6.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 6.5 pb Left (NEXT) → Press (three times), following appears:
'Temp Control'
'AirMgmt Proceed 4/18'
- 6.6 pb Center (SELECT) → Press (one time), following appears:
'AirMgmt Proceed'
'PROCEED'
- 6.7 pb Center (APPLY) → Press (one time)
- 6.8 ✓Display line 3 – PROCEED
- 6.9 pb Right (EXIT) → Press until **'HOME'** appears

7. TEMPERATURE CONTROL BANDWIDTH

- 7.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 7.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 7.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 7.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 7.5 pb Left (NEXT) → Press (four times), following appears:
'Temp Control'
'Bandwidth 5/18'
'XX.X °C'
- 7.6 pb Center (SELECT) → Press (one time), following appears:
'Bandwidth'
'XX.X °C'
'00.1 to 25.5'

NOTE

1. The left pushbutton (CURSOR) moves cursor between Bandwidth fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases Bandwidth selected digit field value by 1.

7.7 Enter desired Bandwidth per **MCC-H**

7.8 pb Right (DONE) → Press (one time)

7.9 ✓Confirm New Bandwidth = desired Bandwidth

7.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Bandwidth 5/18'

7.11 ✓Bandwidth = desired Bandwidth

7.12 pb Right (EXIT) → Press until **'HOME'** appears

8. PRIMARY COOLER

8.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'

8.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'

8.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

8.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'

8.5 pb Left (NEXT) → Press (five times), following appears:
'Temp Control'
'Primary Cooler 6/18'

8.6 pb Center (SELECT) → Press (one time), following appears:
'Primary Cooler'
'COOLER X'

NOTE

1. There are 2 options for Primary Cooler (COOLER 1 and COOLER 2).
2. The left pushbutton (NEXT) changes the Primary Cooler, the center pushbutton (APPLY) selects the Primary Cooler, and the right pushbutton (CANCEL) returns to the previous display.

- 8.7 pb Left (NEXT) → Press as required to select desired Primary Cooler per **MCC-H**
- 8.8 pb Center (APPLY) → Press (one time)
- 8.9 ✓Confirm New Primary Cooler = desired Cooler
- 8.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Primary Cooler 6/18'
- 8.11 ✓Primary Cooler = desired Cooler
- 8.12 pb Right (EXIT) → Press until '**HOME**' appears

9. COOLER 1 STROKE

- 9.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 9.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 9.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 9.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 9.5 pb Left (NEXT) → Press (six times), following appears:
'Temp Control'
'Cooler 1 Stroke 7/18'
- 9.6 pb Center (SELECT) → Press (one time), following appears:
'Cooler 1 Stroke'
'XX'
'03 to 63'

NOTE

1. The left pushbutton (CURSOR) moves cursor between Stroke fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases Cooler Stroke selected digit field by 1.

- 9.7 Enter desired Cooler 1 Stroke value per **MCC-H**
- 9.8 pb Right (DONE) → Press (one time)
- 9.9 ✓Confirm New Cooler 1 Stroke = desired Cooler 1 Stroke

- 9.10 pb Left (APPLY) → Press (one time), following appears:
 'Temp Control'
 'Cooler 1 Stroke 7/18'
- 9.11 ✓Cooler 1 Stroke = desired Cooler 1 Stroke
- 9.12 pb Right (EXIT) → Press until '**HOME**' appears
10. COOLER 1 STATE
- 10.1 pb Left (MENU) → Press (one time), following appears:
 'MAIN MENU'
 'QUICK STATUS 1/5'
- 10.2 pb Left (NEXT) → Press (three times), following appears:
 'MAIN MENU'
 'SETUP 4/5'
- 10.3 pb Center (SELECT) → Press (one time), following appears:
 'SETUP'
 'Temp Control 1/3'
- 10.4 pb Center (SELECT) → Press (one time), following appears:
 'Temp Control'
 'Set Point Temp 1/18'
- 10.5 pb Left (NEXT) → Press (seven times), following appears:
 'Temp Control'
 'Cooler 1 State 8/18'
- 10.6 pb Center (SELECT) → Press (one time), following appears:
 'Cooler 1 State'
 'XX'

NOTE

1. There are 2 options for Cooler 1 State (ON and OFF).
2. The left pushbutton (NEXT) changes the Cooler 1 State, the center pushbutton (APPLY) selects the State, and the right pushbutton (CANCEL) returns to the previous display.

- 10.7 pb Left (NEXT) → Press as required to select desired Cooler 1 State per **MCC-H**
- 10.8 pb Center (APPLY) → Press (one time)
- 10.9 ✓Confirm New Cooler 1 State = desired State
- 10.10 pb Left (APPLY) → Press (one time), following appears:
 'Temp Control'
 'Cooler 1 State 8/18'
- 10.11 ✓Cooler 1 State = desired Cooler 1 State
- 10.12 pb Right (EXIT) → Press until '**HOME**' appears

11. COOLER 2 STROKE

- 11.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 11.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 11.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 11.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 11.5 pb Left (NEXT) → Press (eight times), following appears:
'Temp Control'
'Cooler 2 Stroke 9/18'
- 11.6 pb Center (SELECT) → Press (one time), following appears:
'Cooler 2 Stroke'
'XX'
'03 to 63'

NOTE

1. The left pushbutton (CURSOR) moves cursor between Stroke fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases Cooler Stroke selected digit field by 1.

- 11.7 Enter desired Cooler 2 Stroke value per **MCC-H**
- 11.8 pb Right (DONE) → Press (one time)
- 11.9 ✓Confirm New Cooler 2 Stroke = desired Cooler 2 Stroke
- 11.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Cooler 2 Stroke 9/18'
- 11.11 ✓Cooler 2 Stroke = desired Cooler 2 Stroke
- 11.12 pb Right (EXIT) → Press until '**HOME**' appears

12. COOLER 2 STATE

- 12.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 12.2 pb Left (NEXT) → Press (three times), following appears:

'MAIN MENU'
'SETUP 4/5'

- 12.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 12.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 12.5 pb Left (NEXT) → Press (nine times), following appears:
'Temp Control'
'Cooler 2 State 10/18'
- 12.6 pb Center (SELECT) → Press (one time), following appears:
'Cooler 2 State'
'XX'

NOTE

- 1. There are 2 options for Cooler 2 State (ON and OFF).
- 2. The left pushbutton (NEXT) changes the Cooler 2 State, the center pushbutton (APPLY) selects the State, and the right pushbutton (CANCEL) returns to the previous display.

- 12.7 pb Left (NEXT) → Press as required to select desired Cooler 2 State per MCC-H
- 12.8 pb Center (APPLY) → Press (one time)
- 12.9 ✓Confirm New Cooler 2 State = desired State
- 12.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Cooler 2 State 10/18'
- 12.11 ✓Cooler 2 State = desired Cooler 2 State
- 12.12 pb Right (EXIT) → Press until 'HOME' appears
- 13. MAXIMUM POWER DRAW
 - 13.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
 - 13.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
 - 13.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

- 13.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 13.5 pb Left (NEXT) → Press (twelve times), following appears:
'Temp Control'
'Max Power Draw 13/18'
- 13.6 pb Center (SELECT) → Press (one time), following appears:
'Max Power Draw'
'XXX W'
'000 to 420'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases selected digit field by 1.

- 13.7 Enter desired Max Power Draw value per **MCC-H**
- 13.8 pb Right (DONE) → Press (one time)
- 13.9 ✓Confirm New Max Power = desired Max Power Draw
- 13.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Max Power Draw 13/18'
- 13.11 ✓Max Power Draw = desired Max Power Draw
- 13.12 pb Right (EXIT) → Press until '**HOME**' appears
14. OVER CURRENT
- 14.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 14.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 14.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 14.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 14.5 pb Left (NEXT) → Press (thirteen times), following appears:
'Temp Control'
'Over Current 14/18'

- 14.6 pb Center (SELECT) → Press (one time), following appears:
 'Over Current'
 'XX.X A'
 '00.0 to 30.0'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases selected digit field by 1.

- 14.7 Enter desired Over Current value per **MCC-H**
- 14.8 pb Right (DONE) → Press (one time)
- 14.9 ✓Confirm New Over Current = desired Over Current
- 14.10 pb Left (APPLY) → Press (one time), following appears:
 'Temp Control'
 'Over Current 14/18'
- 14.11 ✓Over Current = desired Over Current
- 14.12 pb Right (EXIT) → Press until '**HOME**' appears

15. AIR MANAGEMENT MODE

- 15.1 pb Left (MENU) → Press (one time), following appears:
 'MAIN MENU'
 'QUICK STATUS 1/5'
- 15.2 pb Left (NEXT) → Press (three times), following appears:
 'MAIN MENU'
 'SETUP 4/5'
- 15.3 pb Center (SELECT) → Press (one time), following appears:
 'SETUP'
 'Temp Control 1/3'
- 15.4 pb Left (NEXT) → Press (one time), following appears:
 'SETUP'
 'Air Management 2/3'
- 15.5 pb Center (SELECT) → Press (one time), following appears:
 'Air Management'
 'Air Mgmt Mode 1/6'
- 15.6 pb Center (SELECT) → Press (one time), following appears:
 'Air Mgmt Mode'
 'XXXXX'

NOTE

1. There are 2 options for Air Mgmt Mode (MANUAL and AUTOMATIC).
2. The left pushbutton (NEXT) changes the Mode, the center pushbutton (APPLY) selects the Mode, and the right pushbutton (CANCEL) returns to the previous display.

- 15.7 pb Left (NEXT) → Press as required to select desired Air Mgmt Mode per **MCC-H**
- 15.8 pb Center (APPLY) → Press (one time)
- 15.9 ✓Confirm New Air Mgmt Mode = desired Air Mgmt Mode
- 15.10 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'
- 15.11 ✓Air Mgmt Mode = desired Air Mgmt Mode
- 15.12 pb Right (EXIT) → Press until **'HOME'** appears
16. AIR MANAGEMENT HUMIDITY
- 16.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 16.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 16.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 16.4 pb Left (NEXT) → Press (one time), following appears:
'SETUP'
'Air Management 2/3'
- 16.5 pb Center (SELECT) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'
- 16.6 pb Left (NEXT) → Press (one time), following appears:
'Air Management'
'Humidity Config 2/6'
- 16.7 pb Center (SELECT) → Press (one time), following appears:
'Humidity Config'
'Pump: 12 Valve: 1234'
'XX XXXX'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) toggles the selected Pump (1 or 2) or Valve (1-4) between 0 and 1 (OFF/ON).

16.8 Enter desired Humidity Config per **MCC-H**

16.9 pb Right (DONE) → Press (one time)

16.10 ✓ Confirm New Humidity Config = desired Humidity Config

16.11 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Humidity Config 2/6'

16.12 ✓ Humidity Config = desired Humidity Config

16.13 pb Right (EXIT) → Press until **'HOME'** appears

17. AIR MANAGEMENT PRESSURE CONFIGURATION

17.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'

17.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'

17.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

17.4 pb Left (NEXT) → Press (one time), following appears:
'SETUP'
'Air Management 2/3'

17.5 pb Center (SELECT) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'

17.6 pb Left (NEXT) → Press (two times), following appears:
'Air Management'
'Pressure Config 3/6'

17.7 pb Center (SELECT) → Press (one time), following appears:
'Pressure Config'
'Pump: 12 Valve: 1234'
'XX XXXX'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) toggles the selected Pump (1 or 2) or Valve (1-4) between 0 and 1 (OFF/ON).

17.8 Enter desired Pressure Config per **MCC-H**

17.9 pb Right (DONE) → Press (one time)

17.10 ✓ Confirm New Pressure Config = desired Pressure Config

17.11 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Pressure Config 3/6'

17.12 ✓ Pressure Config = desired Pressure Config

17.13 pb Right (EXIT) → Press until **'HOME'** appears

18. AIR MANAGEMENT MANUAL CONFIGURATION

18.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'

18.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'

18.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

18.4 pb Left (NEXT) → Press (one time), following appears:
'SETUP'
'Air Management 2/3'

18.5 pb Center (SELECT) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'

18.6 pb Left (NEXT) → Press (three times), following appears:
'Air Management'
'Manual Config 4/6'

18.7 pb Center (SELECT) → Press (one time), following appears:
'Manual Config'
'Pump: 12 Valve: 1234'
'XX XXXX'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) toggles the selected Pump (1 or 2) or Valve (1-4) between 0 and 1 (OFF/ON).

18.8 Enter desired Manual Config per **MCC-H**

18.9 pb Right (DONE) → Press (one time)

18.10 ✓ Confirm New Manual Config = desired Manual Config

18.11 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Manual Config 4/6'

18.12 ✓ Manual Config = desired Manual Config

18.13 pb Right (EXIT) → Press until **'HOME'** appears

19. START HUMIDITY MONITORING TIME

19.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'

19.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'

19.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

19.4 pb Left (NEXT) → Press (one time), following appears:
'SETUP'
'Air Management 2/3'

19.5 pb Center (SELECT) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'

19.6 pb Left (NEXT) → Press (four times), following appears:
'Air Management'
'Start Humidity 5/6'

19.7 pb Center (SELECT) → Press (one time), following appears:
'Start Humidity'
'XXXXX seconds'
'00000 to 65535'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases the selected digit field value by 1.

19.8 Enter desired Start Humidity per **MCC-H**

19.9 pb Right (DONE) → Press (one time)

19.10 ✓ Confirm New Start Humidity = desired Start Humidity

19.11 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Start Humidity 5/6'

19.12 ✓ Start Humidity = desired Start Humidity

19.13 pb Right (EXIT) → Press until **'HOME'** appears

20. START PRESSURE MONITORING TIME

20.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'

20.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'

20.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

20.4 pb Left (NEXT) → Press (one time), following appears:
'SETUP'
'Air Management 2/3'

20.5 pb Center (SELECT) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'

20.6 pb Left (NEXT) → Press (five times), following appears:
'Air Management'
'Start Pressure 6/6'

20.7 pb Center (SELECT) → Press (one time), following appears:
'Start Pressure'
'XXXXX seconds'
'00000 to 65535'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases the selected digit field value by 1.

20.8 Enter desired Start Pressure per **MCC-H**

20.9 pb Right (DONE) → Press (one time)

20.10 ✓ Confirm New Start Pressure = desired Start Pressure

20.11 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Start Pressure 6/6'

20.12 ✓ Start Pressure = desired Start Pressure

20.13 pb Right (EXIT) → Press until **'HOME'** appears

21. CIRCULATION FAN MODE

21.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'

21.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'

21.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

21.4 pb Left (NEXT) → Press (two times), following appears:
'SETUP'
'Auxiliary 3/3'

21.5 pb Center (SELECT) → Press (one time), following appears:
'Auxiliary'
'Circ Fan Mode 1/7'

21.6 pb Center (SELECT) → Press (one time), following appears:
'Circ Fan Mode'
'XXXXX'

NOTE

1. There are 2 options for Circ Fan Mode (MANUAL and AUTOMATIC).
2. The left pushbutton (NEXT) changes the Mode, the center pushbutton (APPLY) selects the Mode, and the right pushbutton (CANCEL) returns to the previous display.

- 21.7 pb Left (NEXT) → Press as required to select desired Circ Fan Mode per **MCC-H**
- 21.8 pb Center (APPLY) → Press (one time)
- 21.9 ✓Confirm New Circ Fan Mode = desired Circ Fan Mode
- 21.10 pb Left (APPLY) → Press (one time), following appears:
'Auxiliary'
'Circ Fan Mode 1/7'
- 21.11 ✓Circ Fan Mode = desired Circ Fan Mode
- 21.12 pb Right (EXIT) → Press until '**HOME**' appears

22. CIRCULATION FAN POWER

- 22.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 22.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 22.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 22.4 pb Left (NEXT) → Press (two times), following appears:
'SETUP'
'Auxiliary 3/3'
- 22.5 pb Center (SELECT) → Press (one time), following appears:
'Auxiliary'
'Circ Fan Mode 1/7'
- 22.6 pb Left (NEXT) → Press (one time), following appears:
'Auxiliary'
'Circ Fan Power 2/7'
- 22.7 pb Center (SELECT) → Press (one time), following appears:
'Circ Fan Power'
'XXX %'
'000 to 090'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases the selected digit field value by 1.

- 22.8 Enter desired Circ Fan Power per **MCC-H**

- 22.9 pb Right (DONE) → Press (one time)
- 22.10 ✓ Confirm New Circ Fan Power = desired Circ Fan Power
- 22.11 pb Left (APPLY) → Press (one time), following appears:
'Auxiliary'
'Circ Fan Power 2/7'
- 22.12 ✓ Circ Fan Power = desired Circ Fan Power
- 22.13 pb Right (EXIT) → Press until 'HOME' appears

23. DATA STORAGE INTERVAL

- 23.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 23.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 23.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 23.4 pb Left (NEXT) → Press (two times), following appears:
'SETUP'
'Auxiliary 3/3'
- 23.5 pb Center (SELECT) → Press (one time), following appears:
'Auxiliary'
'Circ Fan Mode 1/7'
- 23.6 pb Left (NEXT) → Press (two times), following appears:
'Auxiliary'
'Data Storage 3/7'
- 23.7 pb Center (SELECT) → Press (one time), following appears:
'Data Storage'
'XXXX seconds'
'0000 to 3600'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases the selected digit field value by 1.

- 23.8 Enter desired Data Storage per **MCC-H**
- 23.9 pb Right (DONE) → Press (one time)
- 23.10 ✓ Confirm New Store Period = desired Store Period

23.11 pb Left (APPLY) → Press (one time), following appears:
 'Auxiliary'
 'Data Storage 3/7'

23.12 ✓Data Storage = desired Data Storage

23.13 pb Right (EXIT) → Press until 'HOME' appears

24. TEMPERATURE CONTROL MODE

24.1 pb Left (MENU) → Press (one time), following appears:
 'MAIN MENU'
 'QUICK STATUS 1/5'

24.2 pb Left (NEXT) → Press (three times), following appears:
 'MAIN MENU'
 'SETUP 4/5'

24.3 pb Center (SELECT) → Press (one time), following appears:
 'SETUP'
 'Temp Control 1/3'

24.4 pb Center (SELECT) → Press (one time), following appears:
 'Temp Control'
 'Set Point Temp 1/18'

24.5 pb Left (NEXT) → Press (one time), following appears:
 'Temp Control'
 'Control Mode 2/18'

24.6 pb Center (SELECT) → Press (one time), following appears:
 'Control Mode'
 'XXXX'

NOTE

1. There are 3 options for setting the Control Mode (IDLE, SET POINT, and MANUAL).
2. The left pushbutton (NEXT) changes the Mode, the center pushbutton (APPLY) selects the Mode, and the right pushbutton (CANCEL) returns to the previous Mode.

24.7 pb Left (NEXT) → Press as required to select desired Temperature Control Mode per **MCC-H**

24.8 pb Center (APPLY) → Press (one time)

24.9 ✓Confirm New Control Mode = desired Control Mode

24.10 pb Left (APPLY) → Press (one time), following appears:
 'Temp Control'
 'Control Mode 2/18'

24.11 ✓Control Mode = desired Control Mode

GLACIER MANUAL RECONFIGURE

(ASSY OPS/ULF5/FIN)

Page 21 of 21 pages

- 24.12 pb Right (EXIT) → Press until '**HOME**' appears
25. Notify **MCC-H** GLACIER MANUAL RECONFIGURATION is complete.

This Page Intentionally Blank

OBJECTIVE:

The following steps will perform a power cycle of the Glacier System.

On MCC-H GO

```
*****  
*  
* If Display - '**Error Pending**'  
* | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:  
* | PAYLOADS), then:  
*  
*****
```

Glacier

1. ✓Display 'HOME'

*
* If 'HOME' not shown:
* | pb Right (EXIT) → Press until 'HOME' appears
*

2. pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
3. pb Left (NEXT) → Press (four times), following appears:
'MAIN MENU'
'SHUTDOWN 5/5'
4. pb Center (SELECT) → Press (one time), following appears
'SHUTDOWN'
'SHUTDOWN 1/2'
5. pb Center (SELECT) → Press (one time), following appears:
'Confirm Shutdown'
'SHUTDOWN'
6. pb Left (APPLY) → Press (one time), following appears:
'Glacier'
'System'
'Shutting Down'
'Please wait...'
7. Verify –
'Glacier'
'Shutdown Complete'
'TURN POWER OFF'
8. Wait 5 seconds.

NOTE

Power light can take up to 2 minutes to fully extinguish. Once main power has been removed, the battery light will start to flash.

- 9. ✓BATTERY – ON (It on)
- 10. cb POWER → Open (It off)
- 11. Wait 1 minute. (No need to wait for POWER light to extinguish)
- 12. cb POWER → Close (It on)

NOTE

System Initialization may take up to 3 minutes. Initialization complete once Line 1 of front panel display reads 'HOME'.

- 13. ✓Display 'HOME'
- ```

*
* If 'HOME' not shown,
* | Perform GLACIER FAIL TO REPOWER (SODF: ASSY OPS:
* | PAYLOADS), then:
*

*
* If Display —'***Error Pending***'
* | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* | PAYLOADS), then:
*

```

- 14. Log from Glacier front panel:  
CURR TEMP: \_\_\_\_\_ °C  
GPS: \_\_\_\_\_/\_\_\_\_\_:\_\_\_\_\_

- 15. Notify MCC-H of Power Cycle completion and data recorded in step 14.

OBJECTIVE:

The following steps will perform a reboot of Glacier Systems.

Glacier

1. ✓Display 'HOME'  
\*\*\*\*\*  
\*  
\* If 'HOME' not shown:  
\* |  
\* | pb Right (EXIT) → Press until 'HOME' appears  
\* |  
\*  
\*\*\*\*\*
2. Log from Glacier front panel:  
GPS: \_\_\_\_\_:\_\_\_\_\_:\_\_\_\_\_  
CURR TEMP: \_\_\_\_\_.\_\_\_\_ °C
3. pb Left (MENU) → Press (one time), following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
4. pb Left (NEXT) → Press (four times), following appears:  
'MAIN MENU'  
'SHUTDOWN 5/5'
5. pb Center (SELECT) → Press (one time), following appears:  
'SHUTDOWN'  
'SHUTDOWN 1/2'
6. pb Left (NEXT) → Press (one time), following appears:  
'SHUTDOWN'  
'REBOOT 2/2'
7. pb Center (SELECT) → Press (one time), following appears:  
'Confirm Shutdown'  
'REBOOT'
8. pb Left (APPLY) → Press (one time), following appears:  
'Glacier'  
'System'  
'Shutting Down'  
'Please wait...'
9. Verify Display—  
'Glacier'  
'System'  
'Rebooting'  
'Please wait...'

NOTE

System initialization may take up to 3 minutes. Initialization is complete once Line 1 of front panel display reads 'HOME'.

10. ✓Display 'HOME'

```

*
*
* If 'HOME' not shown:
* |
* | ✓MCC-H
* |
*

*
* If Display - ***Error Pending***
* | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* | PAYLOADS), then:
* |
*

```

11. Notify **MCC-H** of recorded data in step 2.

OBJECTIVE:

The following steps will perform a shutdown of Glacier Systems. Commanded shutdowns prevent loss of data and system errors and are the desired nominal method of shutdown.

|                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>                                                                                                                                                                                                                          |
| Due to possible loss of experiment payload(s), Glacier should not be shutdown for more than 30 minutes when temp set point = +4 ° C (or 120 minutes when temp set point = -95° C), unless necessary for Orbiter contingency operations. |

Glacier

1. ✓Display 'HOME'
 

```

 *
 * If Display - '**Error Pending**'
 * | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
 * | PAYLOADS), then:
 *

 *
 * If 'HOME' not shown:
 * | pb Right (EXIT) → push until 'HOME' appears
 *

```
2. Log Glacier front panel:
 

GPS: \_\_\_\_\_:\_\_\_\_\_:

CURR TEMP: \_\_\_\_\_.\_\_\_\_ °C
3. pb Left (MENU) → Press (one time), following appears:
 

'MAIN MENU'  
'QUICK STATUS 1/5'
4. pb Left (NEXT) → Press (four times), following appears:
 

'MAIN MENU'  
'SHUTDOWN 5/5'
5. pb Center (SELECT) → Press (one time), following appears:
 

'SHUTDOWN'  
'SHUTDOWN 1/2'
6. pb Center (SELECT) → Press (one time), following appears:
 

'Confirm Shutdown'  
'SHUTDOWN'
7. pb Left (APPLY) → Press (one time), following appears:
 

'Glacier'  
'System'  
'Shutting Down'  
'Please wait...'
8. Verify—

'Glacier'  
'Shutdown Complete'  
'TURN POWER OFF'

9. Wait 5 seconds before proceeding.
10. sw BATTERY → OFF (It off)

NOTE

Power light can take up to 2 minutes to fully extinguish. OK to proceed without waiting.

11. cb POWER → Open (It off)
- ML86B 12. cb MNB MAR 1 → Open
13. Notify **MCC-H** of recorded data and time in step 2.



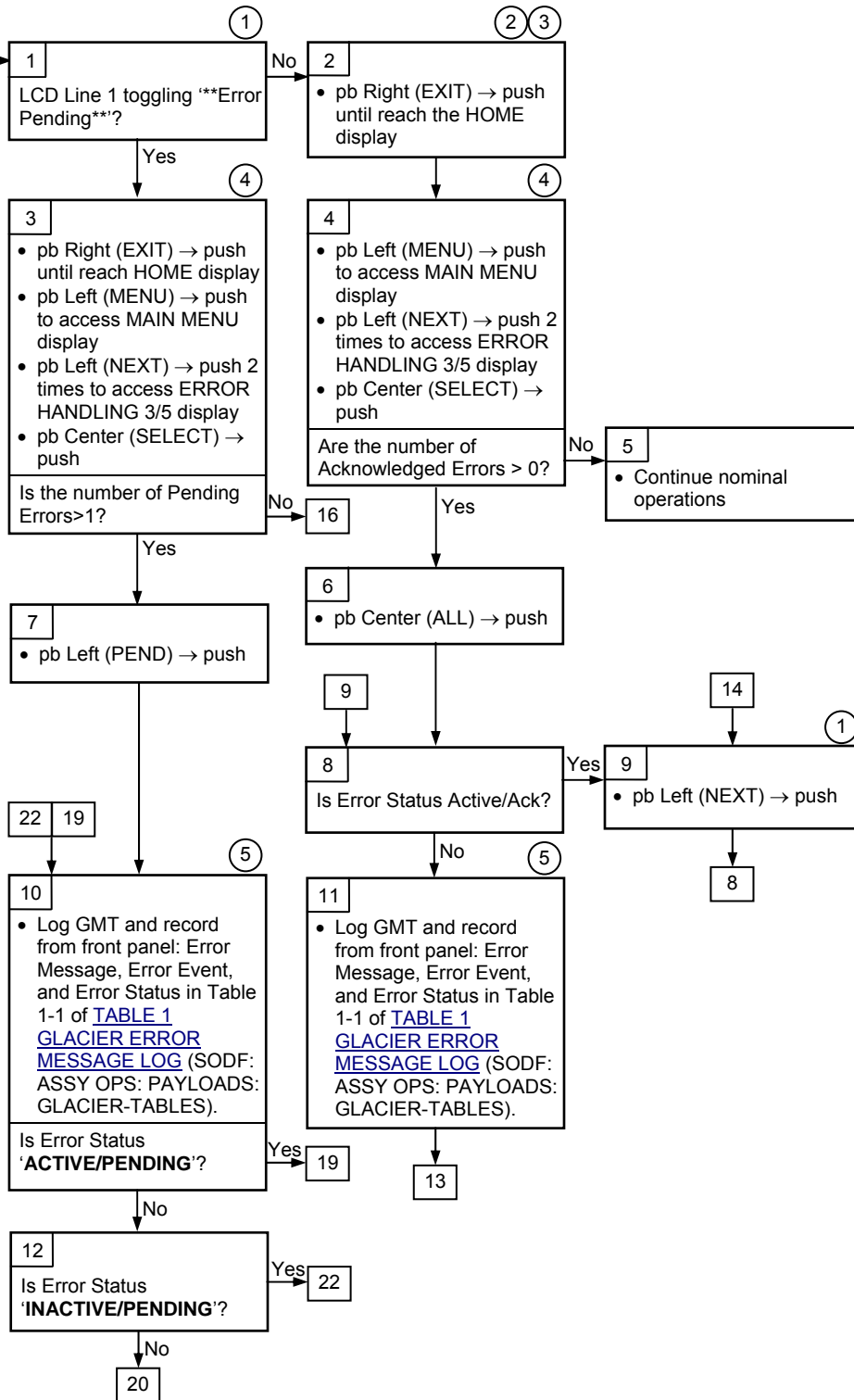
# GLACIER

## GLACIER ERROR MESSAGE

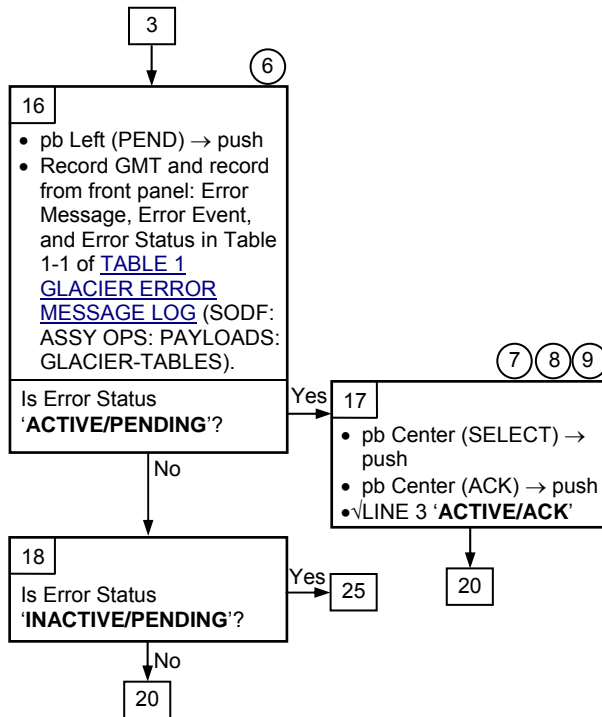
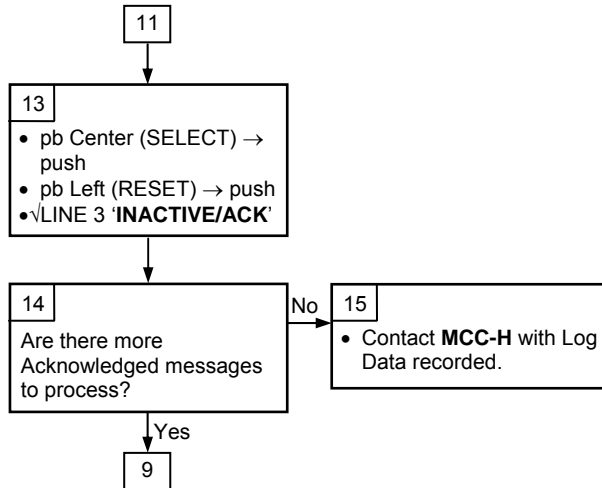
(ASSY OPS/ULF5/FIN) Page 1 of 17 pages

Glacier System Error

**Nominal Config:**  
 cb POWER – Close (It on)  
 sw BATTERY – ON (It on)  
 (ML86B)  
 cb MNB MAR 1 – Close



- ① Contact **MCC-H** before proceeding.
- ② Operator can always exit sub menus by pressing Right (EXIT) pb until 'HOME' display is reached.
- ③ ERROR HANDLING: display will identify Event on Line 2 and Status on Line 3. 'ACTIVE/PENDING' indicates that error is still occurring and should be acknowledged. 'INACTIVE/PENDING' indicates the Error is no longer occurring and can be Reset.
- ④ Menus are circular. If a display is passed, operator can keep pressing the button until desired display is reached.
- ⑤ GPS is only visible in HOME display. Record GMT from wristwatch.

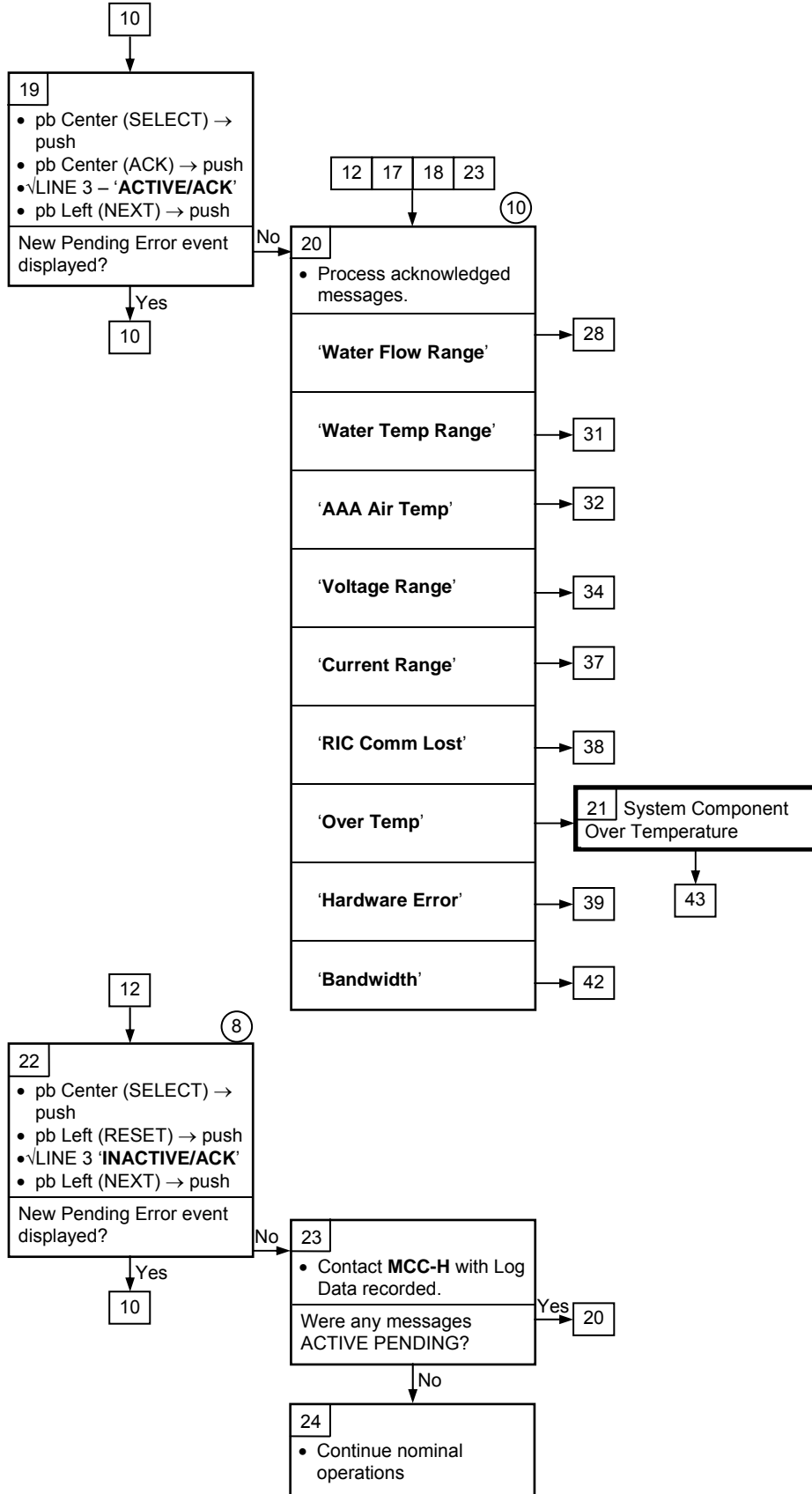


6  
GLACIER RECORD DIAGNOSTIC DATA procedure may be performed to capture states of key data elements per MCC-H direction.

7  
Power cycle requires MCC-H approval. Note: Set Point temperature control mode will require initialization upon restart

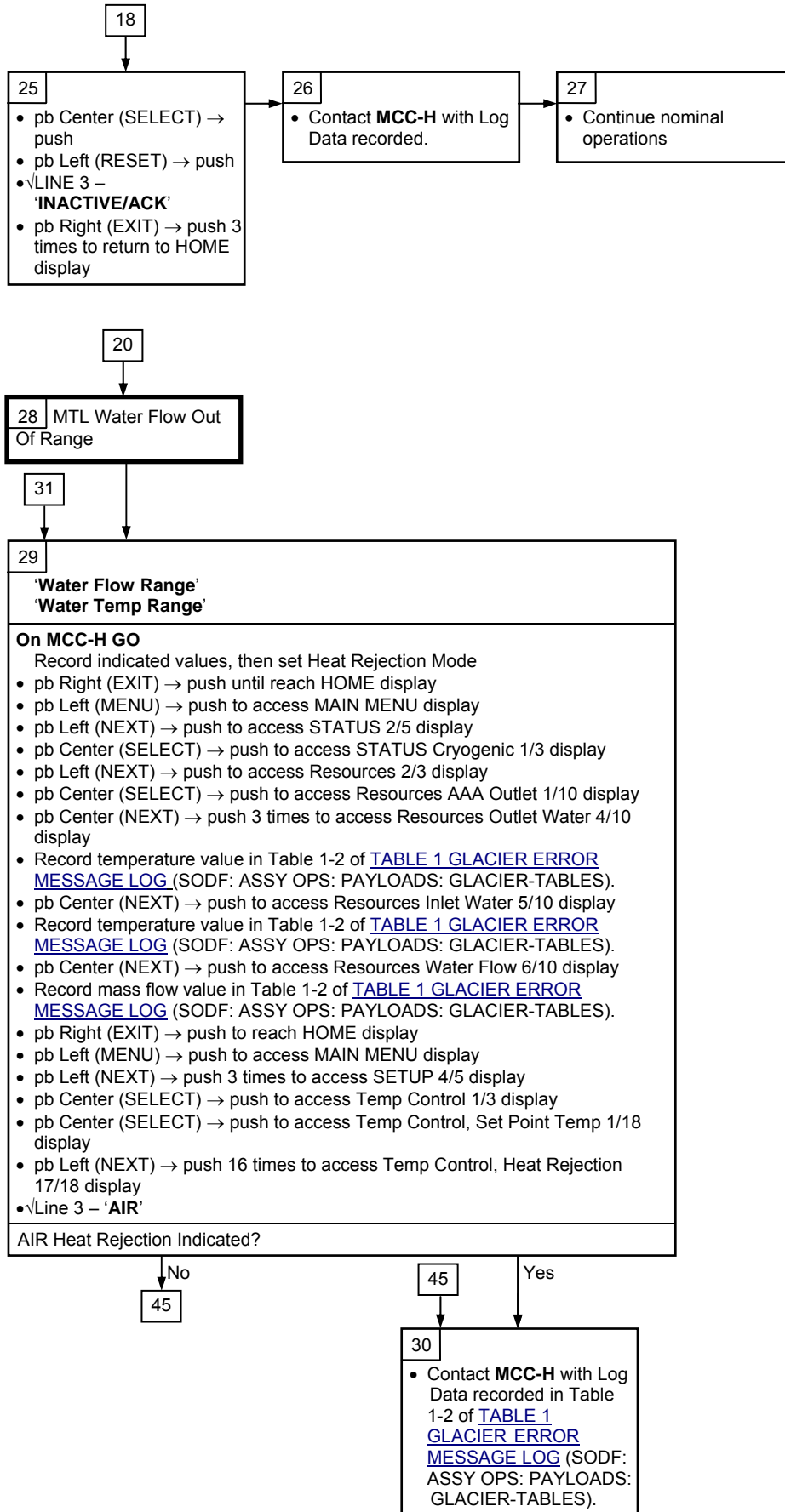
8  
Software Errors may not reset or may be persistent due to: Frequent intermittent power failure. Single Event Upset. Electromagnetic interference

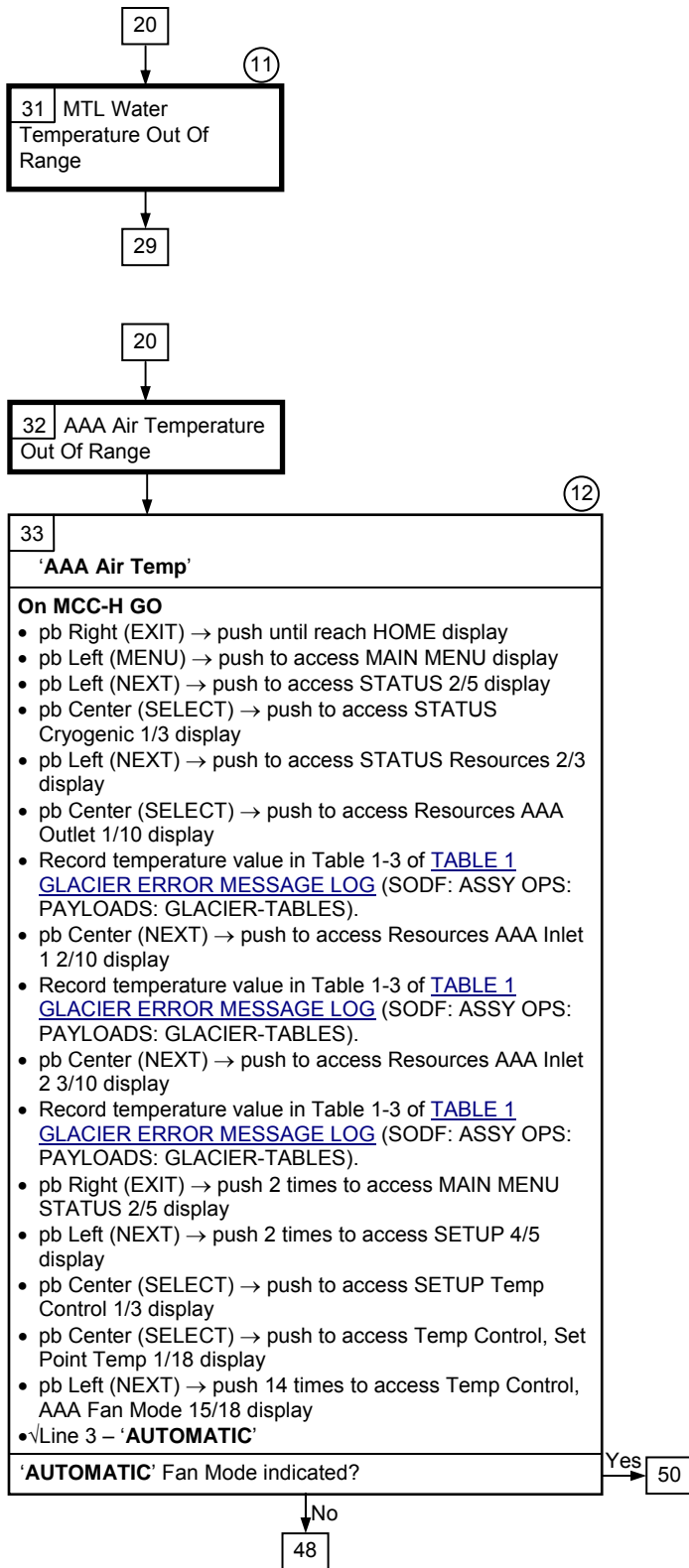
9  
Internal voltage takes approximately 2 min to dissipate. Power LED will remain dimly illuminated



⑧ Software Errors may not reset or may be persistent due to: Frequent intermittent power failure. Single Event Upset. Electromagnetic interference

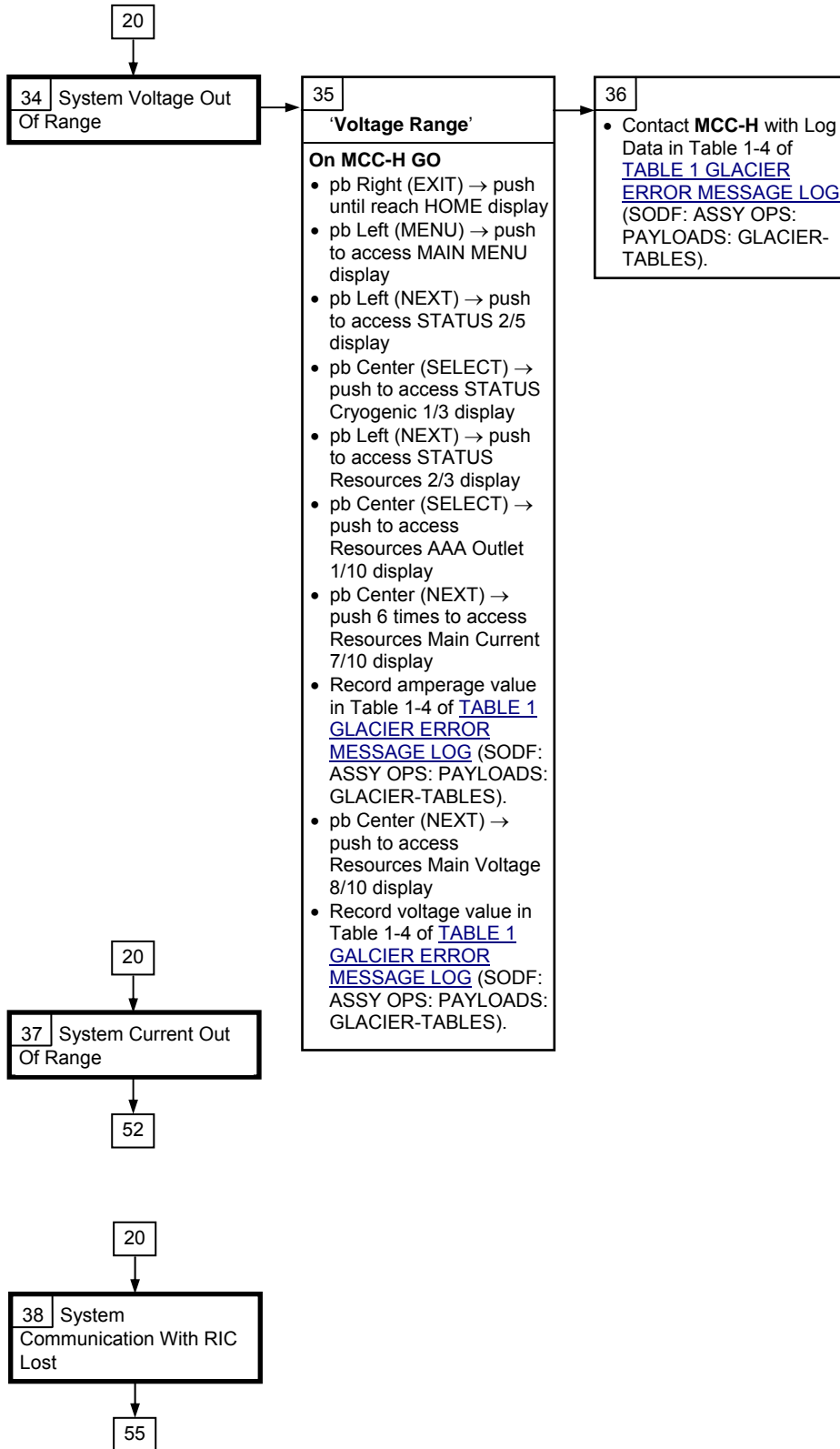
⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'

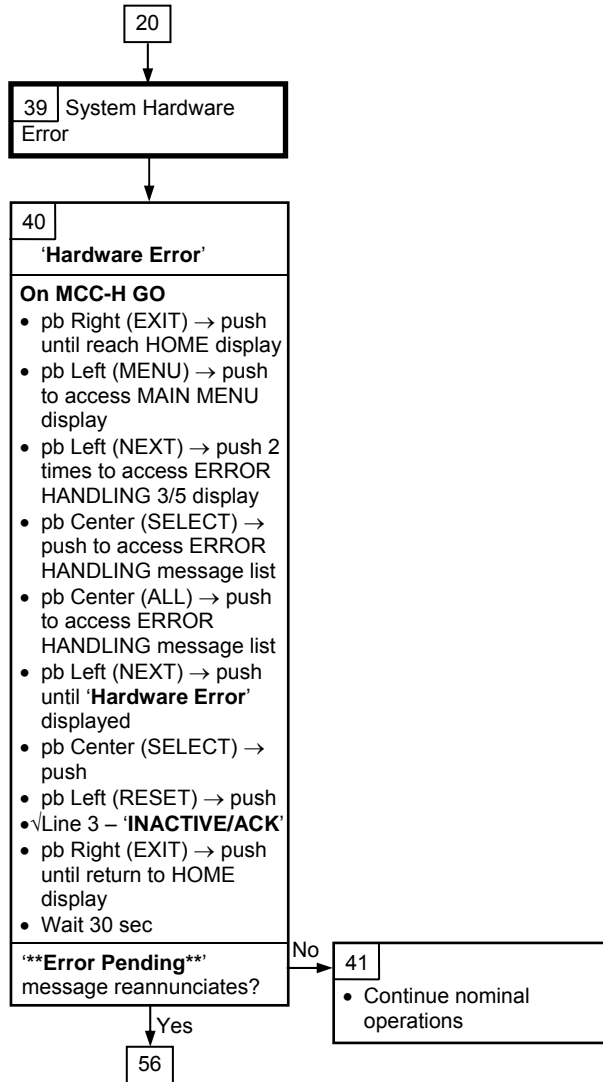




① AAA Air Temp value may take a long time to reflect change in fan mode.

② MCC-H will evaluate Av Bay temps





20

42

**'Bandwidth'**

Record indicated values

- pb Right (EXIT) → push until reach HOME display
- Record from Front Panel CURR TEMP, SET POINT, GPS values in Table 1-6 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Left (MENU) → push once until QUICK STATUS 1/5
- pb Center (CENTER) → push once until QUICK STATUS Cold Head 1A 1/16
- Record value in Table 1-6 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push once until QUICK STATUS Cold Head 1B 2/16
- Record value in Table 1-6 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push once until QUICK STATUS Cold Head 2A 3/16
- Record value in Table 1-6 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push once until QUICK STATUS Cold Head 2B 4/16
- Record value in Table 1-6 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push nine times until QUICK STATUS CircFan Speed 13/16
- Record value in Table 1-6 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Right (EXIT) → push until HOME display
- Notify **MCC-H** to report log values from Table 1-6 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES) and receive further direction.



21

43

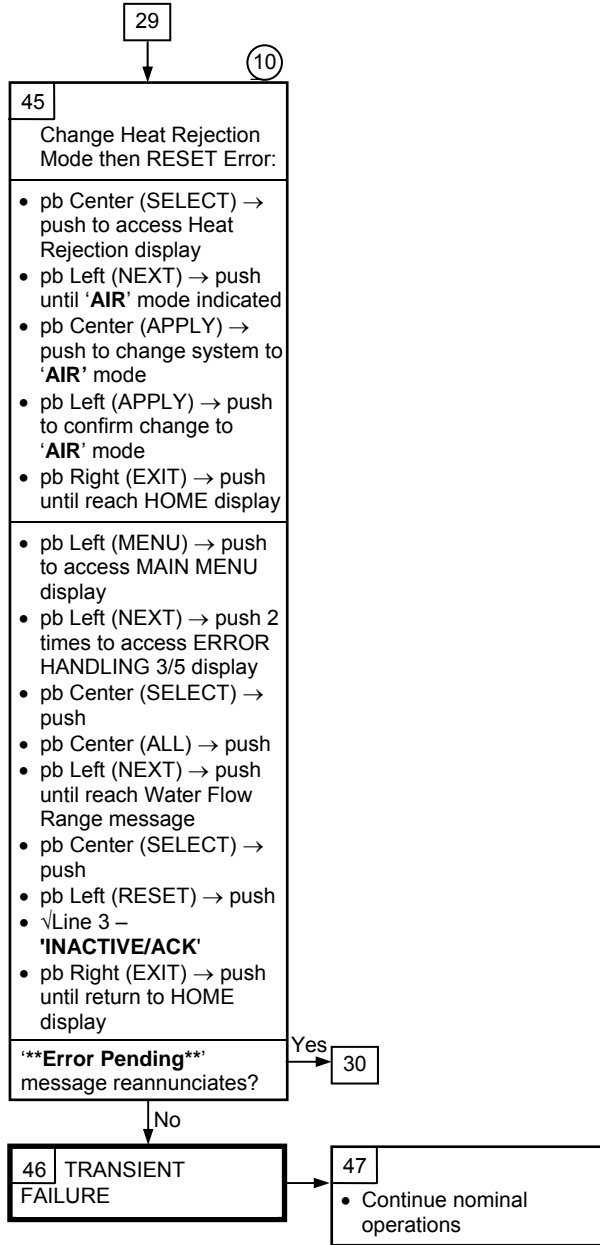
'Over Temp'

**On MCC-H GO**

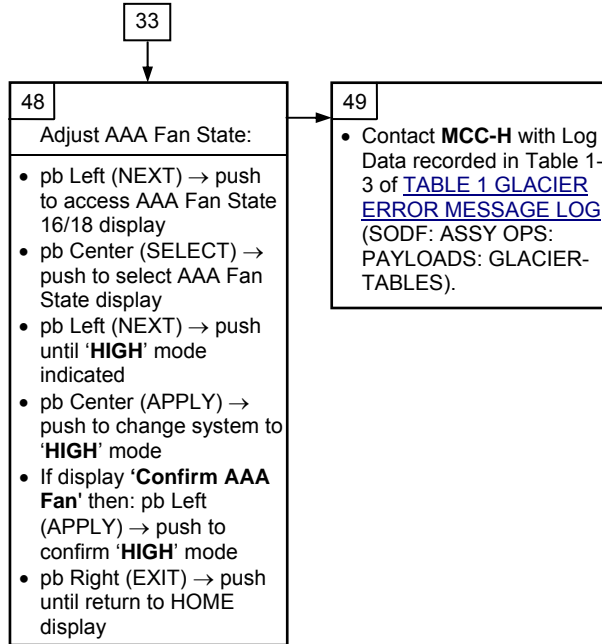
- pb Right (EXIT) → push until reach HOME display
- pb Left (MENU) → push to access MAIN MENU display
- pb Left (NEXT) → push to access STATUS 2/5 display
- pb Center (SELECT) → push to access STATUS Cryogenic 1/3 display
- pb Left (NEXT) → push 2 times to access STATUS System 3/3 display
- pb Center (SELECT) → push to access System CPU 1/13 display
- Record temperature value in Table 1-5 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push to access System Capacitors A 2/13 display
- Record temperature value in Table 1-5 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push to access System Capacitors B 3/13 display
- Record temperature value in Table 1-5 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push to access System Data Logger 4/13 display
- Record temperature value in Table 1-5 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).

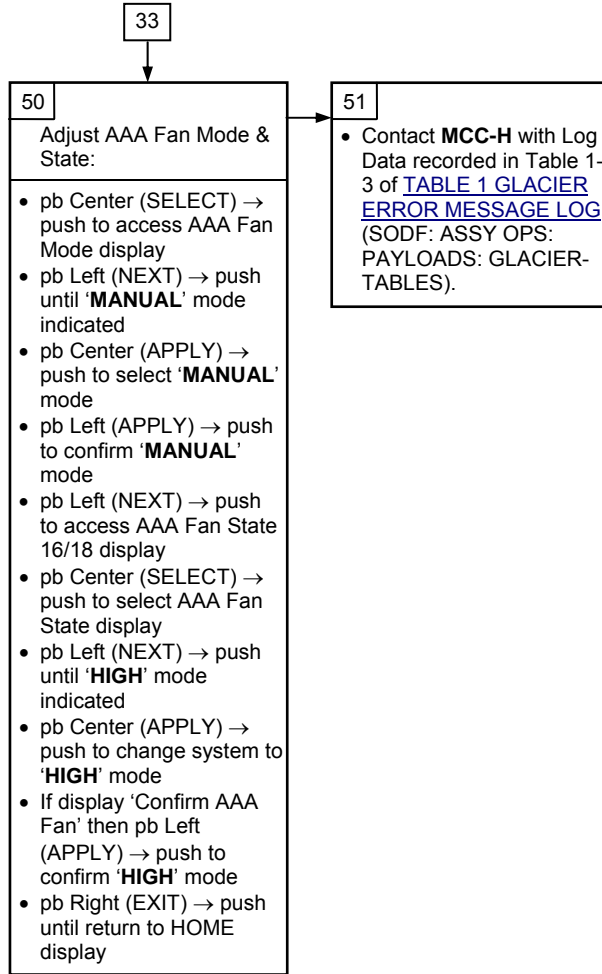
44

- Contact **MCC-H** with Log Data Recorded in Table 1-5 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).



10 Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'





37

52

'Current Range'

**On MCC-H GO**

- pb Right (EXIT) → push until reach HOME display
- pb Left (MENU) → push to access MAIN MENU display
- pb Left (NEXT) → push to access STATUS 2/5 display
- pb Center (SELECT) → push to access STATUS Cryogenic 1/3 display
- pb Left (NEXT) → push to access STATUS Resources 2/3 display
- pb Center (SELECT) → push to access Resources AAA Outlet 1/10 display
- pb Center (NEXT) → push 6 times to access Resources Main Current 7/10 display
- Record amperage value in Table 1-4 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push to access Resources Main Voltage 8/10 display
- Record voltage value in Table 1-4 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Right (EXIT) → push 2 times to reach MAIN MENU STATUS 2/5 display
- pb Left (NEXT) → push 2 times to access SETUP 4/5 display
- pb Center (SELECT) → push to access Temp Control 1/3 display
- pb Center (SELECT) → push to access Temp Control, Set Point Temp 1/18 display
- pb Left (NEXT) → push 13 times to access Temp Control, Over Current 14/18 display
- Record amperage value in Table 1-4 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- √Line 3 – '30.0 A'

'30.0 A' Over Current Limit indicated?

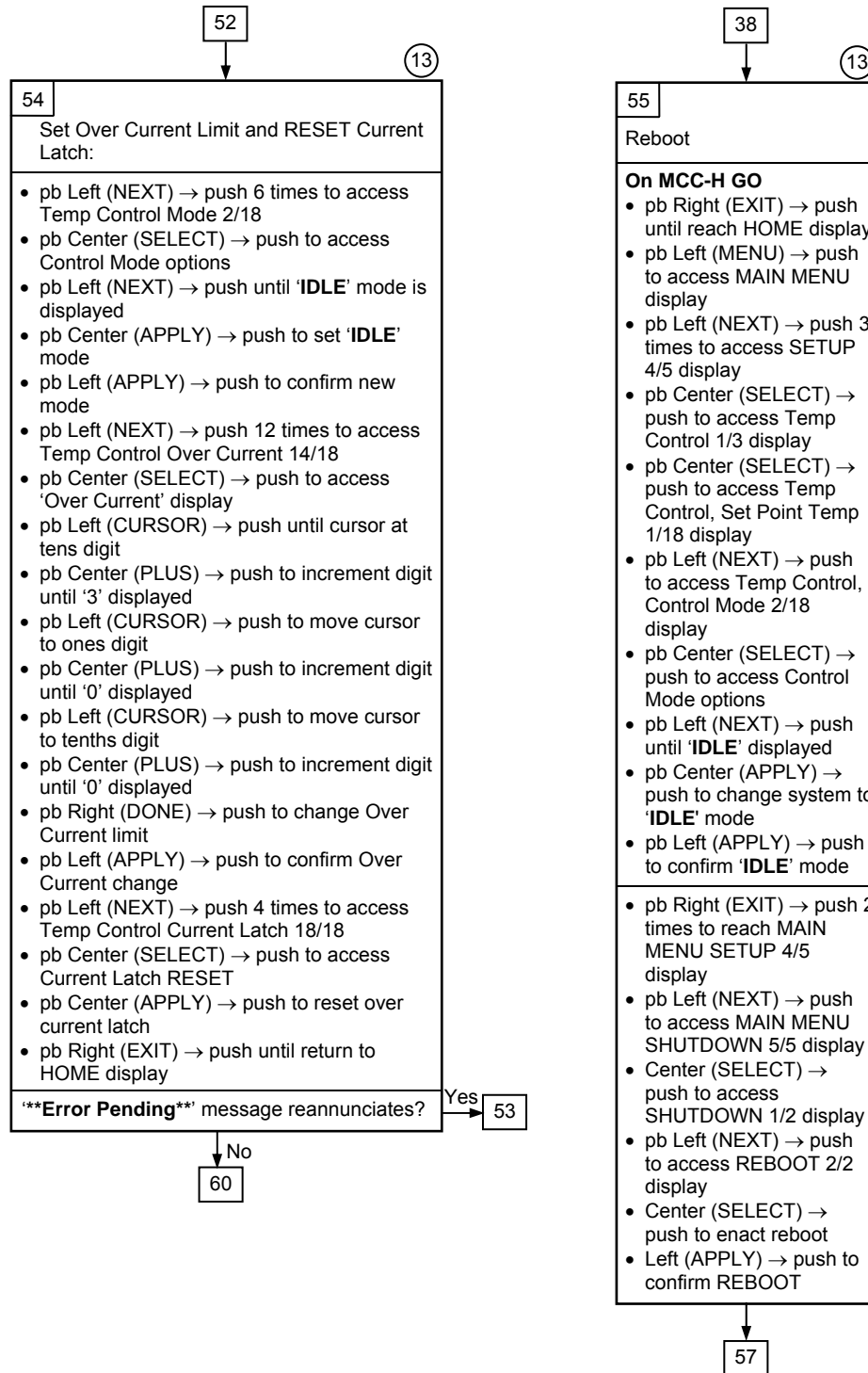
No  
54

Yes

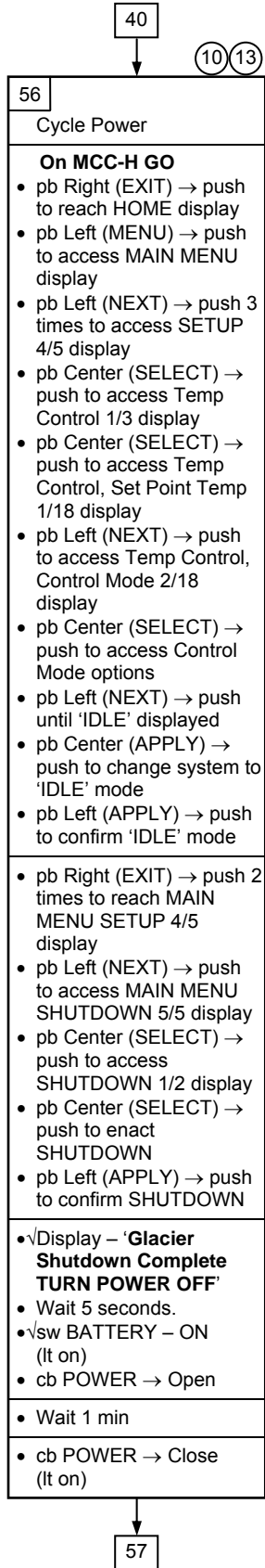
53

- Contact **MCC-H** with Log Data recorded.

54



13 If parameters already set, the confirmation screen will not be displayed.



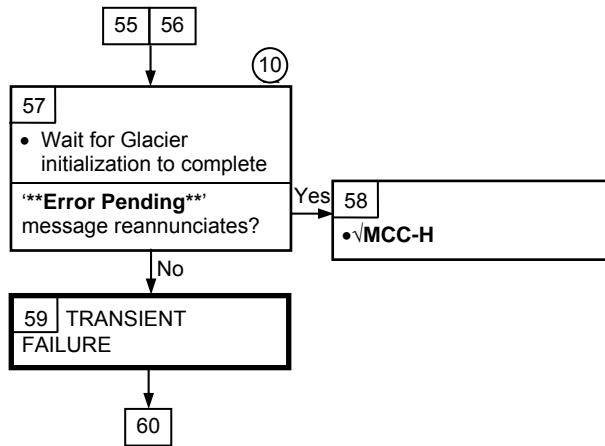
⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'

⑬ If parameters already set, the confirmation screen will not be displayed.

**GLACIER**

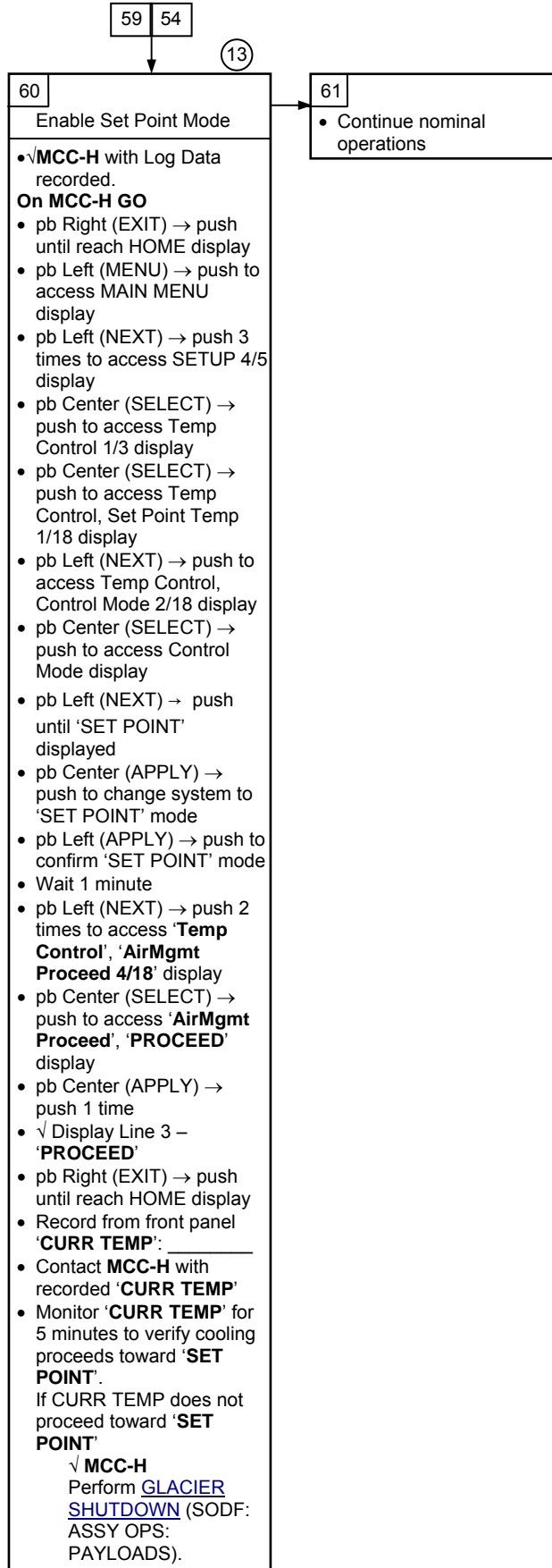
**GLACIER ERROR MESSAGE**

(ASSY OPS/ULF5/FIN) Page 16 of 17 pages



⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'





(13)  
If parameters already set, the confirmation screen will not be displayed.

This Page Intentionally Blank

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF5/FIN)

Page 1 of 9 pages

## OBJECTIVE:

This procedure is required when the Glacier fails to hold set point. It performs a check of some critical parameters then directs the manual reconfiguration of some key controls as required.

Glacier

### 1. RECORD DATA

```

*
* If Display- '**Error Pending**'
*
* | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* | PAYLOADS: GLACIER), then:
*

```

#### 1.1 ✓Display – 'HOME'

```
*
*
* If 'HOME' not shown:
*
* | pb Right (EXIT) → push until 'HOME' appears
*

```

#### 1.2 Record from front panel start 'CURR TEMP', 'SET POINT', 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)

### 2. CHECK STATUS OF KEY PARAMETERS

2.1 pb Left (MENU) → push (one time), following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'

2.2 pb Center (SELECT) → push (one time), following appears:  
'QUICK STATUS'  
'Cold Head 1A 1/16'

#### NOTE

1. The center pushbutton (NEXT) moves to next status display.
2. The left pushbutton (PREV) moves to previous status display.

2.3 Record Cold Head 1A, Cold Head 1B, Cold Head 2A, Cold Head 2B, and CircFan Speed in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)

2.4 pb Center (NEXT) → push until all data has been recorded.

2.5 pb Right (EXIT) → push until 'HOME'

2.6 ✓MCC-H to report log values from Table 3 and get direction.

2.7 Record any ground supplied data in [TABLE 2 GLACIER RESET LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)

3. SET TEMPERATURE CONTROL MODE TO IDLE

- 3.1 pb Left (MENU) → push (one time), following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
- 3.2 pb Left (NEXT) → push (three times), following appears:  
'MAIN MENU'  
'SETUP 4/5'
- 3.3 pb Center (SELECT) → push (one time), following appears:  
'SETUP'  
'Temp Control 1/3'
- 3.4 pb Center (SELECT) → push (one time), following appears:  
'Temp Control'  
'Set Point Temp 1/18'
- 3.5 pb Left (NEXT) → push (one time), following appears:  
'Temp Control'  
'Control Mode 2/18'

**NOTE**

- 1. There are 3 options for setting the Control Mode (IDLE, SET POINT and MANUAL).
- 2. The left pushbutton (NEXT) changes the Mode, the center pushbutton (APPLY) selects the mode and the right pushbutton (CANCEL) returns to the previous mode.

- 3.6 pb Center (SELECT) → Press (one time), following appears:  
'Control Mode'  
'XXXX'
  - 3.7 pb Left (NEXT) → press as required to select desired Temperature Control Mode to **IDLE**
  - 3.8 pb Center (APPLY) → push (one time)
  - 3.9 ✓Confirm New Control Mode = **IDLE**
  - 3.10 pb Left (APPLY) → Press (one time), following appears:  
'Temp Control'  
'Control Mode 2/18'
  - 3.11 ✓Control Mode = IDLE
  - 3.12 pb Right (EXIT) → Press until '**HOME**' appears
4. SET SETPOINT TEMP
- 4.1 pb Left (MENU) → push (one time) following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF5/FIN)

Page 3 of 9 pages

- 4.2 pb Left (NEXT) → push (three times) following appears:  
'MAIN MENU'  
'SETUP 4/5'
- 4.3 pb Center (SELECT) → push (one time) following appears:  
'SETUP'  
'Temp Control 1/3'
- 4.4 pb Center (SELECT) → push (one time) following appears:  
'Temp Control'  
'Set Point Temp 1/18'
- 4.5 pb Center (SELECT) → push (one time) following appears:  
'Set Point Temp'  
  
'XXXX.X °C'  
'-160.0 to +004.0'

## NOTE

1. The left pushbutton (CURSOR) moves cursor between New Set Point Temp fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases New Set Point Temp selected digit field value by 1.

- 4.6 Enter desired Set Point temperature per **MCC-H**.
  - 4.7 pb Right (DONE) → push (one time)
  - 4.8 ✓Confirm New Set Point = desired Set Point
  - 4.9 pb Left (APPLY) → Press (one time), following appears:  
'Temp Control'  
'Set Point Temp 1/18'
  - 4.10 ✓Set Point Temp = desired Set Point
  - 4.11 pb Right (EXIT) → push until '**HOME**' appears
5. SET TEMP CONTROL SENSORS
- 5.1 pb Left (MENU) → push (one time) following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
  - 5.2 pb Left (NEXT) → push (three times) following appears:  
'MAIN MENU'  
'SETUP 4/5'
  - 5.3 pb Center (SELECT) → push (one time) following appears:  
'SETUP'  
'Temp Control 1/3'
  - 5.4 pb Center (SELECT) → push (one time) following appears:  
'Temp Control'

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF5/FIN)

Page 4 of 9 pages

## 'Set Point Temp 1/18'

- 5.5 pb Left (NEXT) → push (two times) following appears:  
'Temp Control'  
'Control Sensors 3/18'
- 5.6 pb Center (SELECT) → push (one time) following appears  
'Control Sensors'  
'INNER OUTLET INLET'

### NOTE

1. The left pushbutton (CURSOR) moves cursor between Control Sensor fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) changes the values of the Control Sensor fields from 0 to 1 or vice versa.

- 5.7 Enter desired combination of Temp Control Sensors per **MCC-H**.
  - 5.8 pb Right (DONE) → push (one time)
  - 5.9 ✓Confirm New Control Sensors = desired Control Sensors
  - 5.10 pb Left (APPLY) → Press (one time), following appears:  
'Temp Control'  
'Control Sensors 3/18'
  - 5.11 ✓Control Sensors = desired Control Sensors
  - 5.12 pb Right (EXIT) → Press until '**HOME**' appears
6. SET TEMPERATURE CONTROL BANDWIDTH

- 6.1 pb Left (MENU) → push (one time) following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
- 6.2 pb Left (NEXT) → push (three times) following appears:  
'MAIN MENU'  
'SETUP 4/5'
- 6.3 pb Center (SELECT) → push (one time) following appears:  
'SETUP'  
'Temp Control 1/3'
- 6.4 pb Center (SELECT) → push (one time) following appears:  
'Temp Control'  
'Set Point Temp 1/18'
- 6.5 pb Left (NEXT) → push (four times) following appears:  
'Temp Control'  
'Bandwidth 5/18'  
'XX.X°C'
- 6.6 pb Center (SELECT) → push (one time) following appears:

'Bandwidth'  
'XX.X°C'  
'00.1 TO 25.5'

NOTE

1. The left pushbutton (CURSOR) moves cursor between Bandwidth fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases Temperature Control Bandwidth selected digit field value by 1.

6.7 Enter desired Temperature Control Bandwidth per **MCC-H**

6.8 pb Right (DONE) → push (one time)

6.9 ✓Confirm New Bandwidth = desired Bandwidth

6.10 pb Left (APPLY) → Press (one time), following appears:

'Temp Control'  
'Bandwidth 5/18'

6.11 ✓Bandwidth = desired Bandwidth

6.12 pb Right (EXIT) → Press until '**HOME**' appears

## 7. SET PRIMARY COOLER

7.1 pb Left (MENU) → push (one time) following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'

7.2 pb Left (NEXT) → push (three times) following appears:  
'MAIN MENU'  
'SETUP 4/5'

7.3 pb Center (SELECT) → push (one time) following appears:  
'SETUP'  
'Temp Control 1/3'

7.4 pb Center (SELECT) → push (one time) following appears:  
'Temp Control'  
'Set Point Temp 1/18'

7.5 pb Left (NEXT) → push (five times) following appears:  
'Temp Control'  
'Primary Cooler 6/18'  
'COOLER X'

7.6 pb Center (SELECT) → push (one time) following appears:  
'Primary Cooler'  
'COOLER X'

NOTE

1. There are 2 options for Primary Cooler (COOLER 1 and COOLER 2).
2. The left pushbutton (NEXT) changes the Primary Cooler to either COOLER 1 or COOLER 2, the center pushbutton (APPLY) selects the presently displayed Primary Cooler and the right pushbutton (CANCEL) returns to the previous display.

- 7.7 pb Left (NEXT) → push as required to select desired Primary Cooler per **MCC-H**
  - 7.8 pb Center (APPLY) → push (one time)
  - 7.9 ✓Confirm New Primary Cooler = desired Cooler
  - 7.10 pb Left (APPLY) → Press (one time), following appears:  
'Temp Control'  
'Primary Cooler 6/18'
  - 7.11 ✓Primary Cooler = desired Cooler
  - 7.12 pb Right (EXIT) → Press until '**HOME**' appears
8. SET MAXIMUM POWER DRAW SETTING
- 8.1 pb Left (MENU) → push (one time) following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
  - 8.2 pb Left (NEXT) → push (three times) following appears:  
'MAIN MENU'  
'SETUP 4/5'
  - 8.3 pb Center (SELECT) → push (one time) following appears:  
'SETUP'  
'Temp Control 1/3'
  - 8.4 pb Center (SELECT) → push (one time) following appears:  
'Temp Control'  
'Set Point Temp 1/18'
  - 8.5 pb Left (NEXT) → push (twelve times) following appears:  
'Temp Control'  
'Max Power Draw 13/18'  
'XXX W'
  - 8.6 pb Center (SELECT) → push (one time) following appears:  
'Max Power Draw'  
'XXX W'  
'000 to 420'



NOTE

1. The left pushbutton (CURSOR) moves the cursor between Maximum Power Draw fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases the Maximum Power Draw selected digit field value by 1.

- 8.7 Enter desired Maximum Power Draw per **MCC-H**.
- 8.8 pb Right (DONE) → push (one time)
- 8.9 ✓Confirm New Max Power = desired Max Power Draw
- 8.10 pb Left (APPLY) → Press (one time), following appears:  
**'Temp Control'**  
**'Max Power Draw 13/18'**
- 8.11 ✓Max Power Draw = desired Max Power Draw
- 8.12 pb Right (EXIT) → push until **'HOME'** appears
9. SET OVER CURRENT
  - 9.1 pb Left (MENU) → push (one time) following appears:  
**'MAIN MENU'**  
**'QUICK STATUS 1/5'**
  - 9.2 pb Left (NEXT) → push (three times) following appears:  
**'MAIN MENU'**  
**'SETUP 4/5'**
  - 9.3 pb Center (SELECT) → push (one time) following appears:  
**'SETUP'**  
**'Temp Control 1/3'**
  - 9.4 pb Center (SELECT) → push (one time) following appears:  
**'Temp Control'**  
**'Set Point Temp 1/18'**
  - 9.5 pb Left (NEXT) → push (thirteen times) following appears:  
**'Temp Control'**  
**'Over Current 14/18'**  
**'XX.X A'**
  - 9.6 pb Center (SELECT) → push (one time) following appears:  
**'Over Current'**  
**'XX.X A'**  
**'00.0 to 30.0'**

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF5/FIN)

Page 8 of 9 pages

## NOTE

1. The left pushbutton (CURSOR) moves the cursor between Over Current fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases the Over Current selected digit field value by 1.

- 9.7 Enter desired Over Current Limit per **MCC-H**.
  - 9.8 pb Right (DONE) → push (one time)
  - 9.9 ✓Confirm New Over Current = desired Over Current
  - 9.10 pb Left (APPLY) → push (one time), following appears:  
**'Temp Control'**  
**'Over Current 14/18'**
  - 9.11 ✓Over Current = desired Over Current
  - 9.12 pb Right (EXIT) → Press until **'HOME'** appears
10. SET TEMPERATURE CONTROL MODE
- 10.1 pb Left (MENU) → push (one time) following appears:  
**'MAIN MENU'**  
**'QUICK STATUS 1/5'**
  - 10.2 pb Left (NEXT) → push (three times) following appears:  
**'MAIN MENU'**  
**'SETUP 4/5'**
  - 10.3 pb Center (SELECT) → push (one time) following appears:  
**'SETUP'**  
**'Temp Control 1/3'**
  - 10.4 pb Center (SELECT) → push (one time) following appears:  
**'Temp Control'**  
**'Set Point Temp 1/18'**
  - 10.5 pb Left (NEXT) → push (one time) following appears:  
**'Temp Control'**  
**'Control Mode 2/18'**
  - 10.6 pb Center (SELECT) → push (one time), following appears:  
**'Control Mode'**  
**'XXXX'**

## NOTE

1. There are 3 options for setting the Control Mode (IDLE, SET POINT and MANUAL).
2. The left pushbutton (NEXT) changes the Mode, the center pushbutton (APPLY) selects the mode and the right pushbutton (CANCEL) returns to the previous mode.

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF5/FIN)

Page 9 of 9 pages

- 10.7 pb Left (NEXT) → push as required to selected desired Temperature Control Mode per **MCC-H**.
- 10.8 pb Center (APPLY) → push one time
- 10.9 ✓Confirm New Control Mode = desired Control Mode
- 10.10 pb Left (APPLY) → push (one time), following appears:  
    Temp Control  
    Control Mode 2/18'
- 10.11 ✓Control Mode = desired Control Mode
- 10.12 pb Right (EXIT) → push until 'HOME' appears.

## 11. CHECK GLACIER STATUS

- 11.1 ✓cb POWER – Close (It on)
- 11.2 ✓sw BATTERY – ON (It on)
- 11.3 ✓Display – 'HOME'

```

*
* If Display-***Error Pending**
*
* | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* | PAYLOADS: GLACIER), then:
*

*
* If 'HOME' not shown:
*
* | pb Right (EXIT) → push until 'HOME' appears
*

```

- 11.4 ✓Display – 'CURR TEMP: XXXX.X °C' ±5.0°C or ramping toward expected temperature.

## 12. RECORD END DATA

- 12.1 Record from front panel end 'CURR TEMP', 'SETPOINT', 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)
- 12.2 Notify **MCC-H** of logged values in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)

This Page Intentionally Blank

**Glacier**

**GLACIER FAIL TO REPOWER**  
(ASSY OPS/ULF5/FIN) Page 1 of 3 pages

- ① Always deadface DC power source when disconnecting/connecting power cable
- ② Verify connectors are properly mated and seated securely when switching to alternate power source
- ③ Glacier will take approximately 2 min to initialize after power on; after initialization is successfully completed, LCD Line 1 will read 'HOME'

Glacier initialization not successfully completed when power applied during Glacier POWER UP procedure

**Nominal Config:**  
cb POWER- Close (It on)  
sw BATTERY-ON (It on)  
(ML86B)  
cb MNB MAR 1- Close

① ②

|   |                                                                                                                                                                                         |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <b>Switch to Alternate Power Source</b> <ul style="list-style-type: none"> <li>Contact <b>MCC-H</b> for alternate power source (fill in data below).</li> <li>_____</li> </ul>          |
|   | (Glacier) <ul style="list-style-type: none"> <li>cb POWER → Open (It off)</li> </ul>                                                                                                    |
|   | (ML86B) <ul style="list-style-type: none"> <li>cb MNB MAR 1 → Open</li> </ul>                                                                                                           |
|   | (ML85E) <ul style="list-style-type: none"> <li>A/E PAYLOAD DC PWR (20') → J11</li> </ul>                                                                                                |
|   | (Alternate Power Source J__) <ul style="list-style-type: none"> <li>✓ cb _____ - Open</li> <li>✓ sw _____ - OFF</li> <li>A/E PAYLOAD DC PWR (20') → Alternate Power Source J</li> </ul> |

Next

|   |                                                                                                                                                       |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | <b>Repower from Alternate Power Source</b> <ul style="list-style-type: none"> <li>(_____)</li> <li>cb _____ - Close</li> <li>sw _____ - ON</li> </ul> |
|   | (Glacier) <ul style="list-style-type: none"> <li>cb POWER → Close (It on)</li> </ul>                                                                  |
|   | After Initialization does display read 'HOME'?                                                                                                        |

No

|   |                                    |
|---|------------------------------------|
| 5 | <b>POSSIBLE DOWNSTREAM FAILURE</b> |
|---|------------------------------------|

Next

Yes

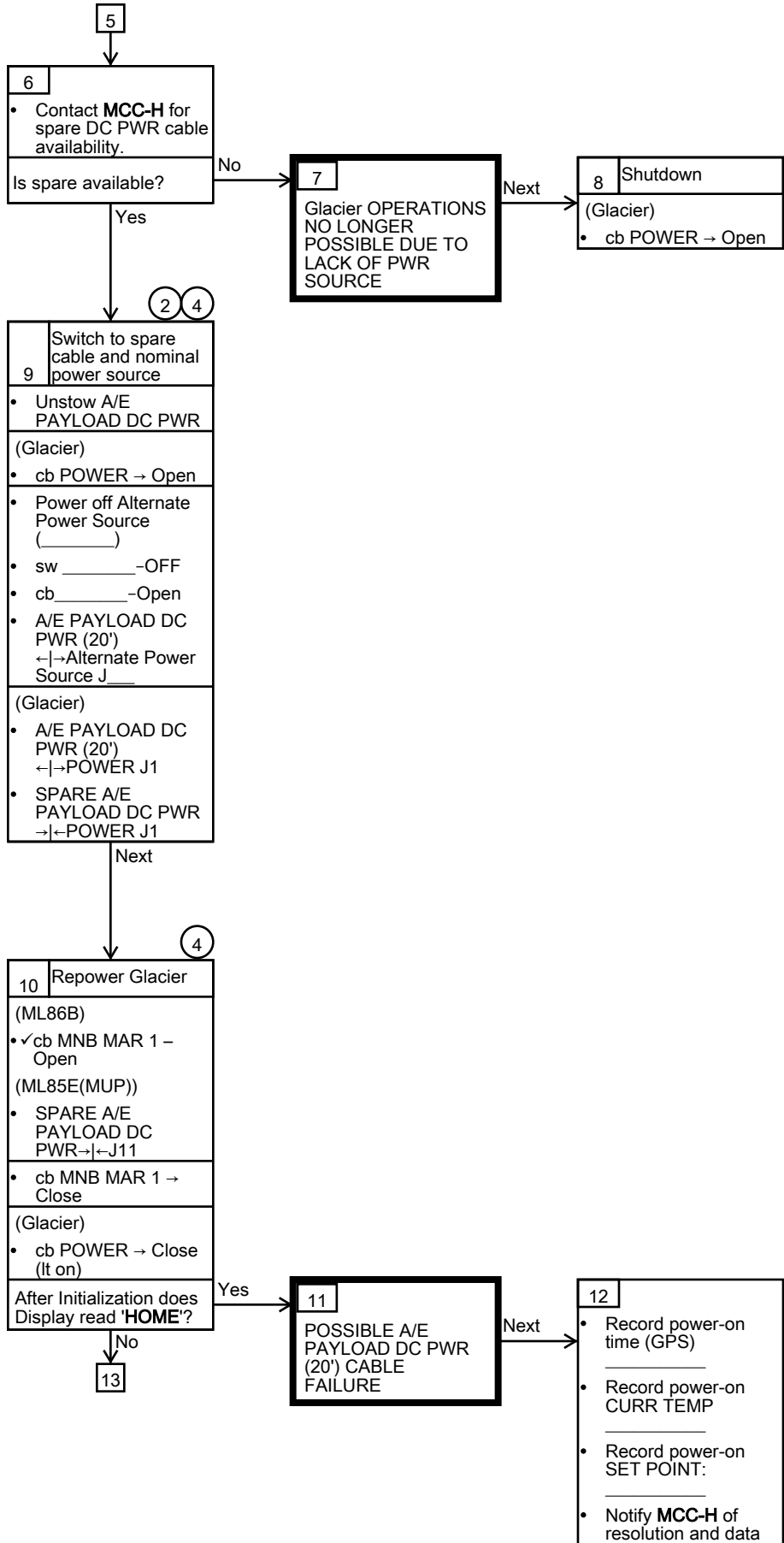
|   |                               |
|---|-------------------------------|
| 3 | <b>PRIMARY OUTLET FAILURE</b> |
|---|-------------------------------|

Next

|   |                                                                                                                                                                                                                             |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | <ul style="list-style-type: none"> <li>Record power-on time (GPS): _____</li> <li>Record power-on CURR TEMP: _____</li> <li>Record power-on SET POINT: _____</li> <li>Notify <b>MCC-H</b> of resolution and data</li> </ul> |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

6

**GLACIER FAIL TO REPOWER**  
(ASSY OPS/ULF5/FIN) Page 2 of 3 pages

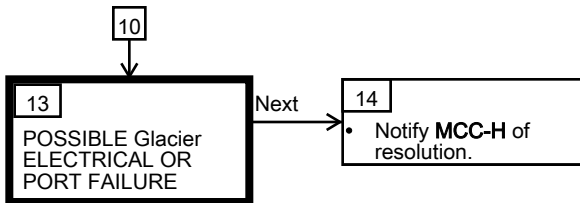


② Verify connectors are properly mated and seated securely when switching to alternate power source

④ Alternate power source is detailed in block 1.

### GLACIER FAIL TO REPOWER

(ASSY OPS/ULF5/FIN) Page 3 of 3 pages

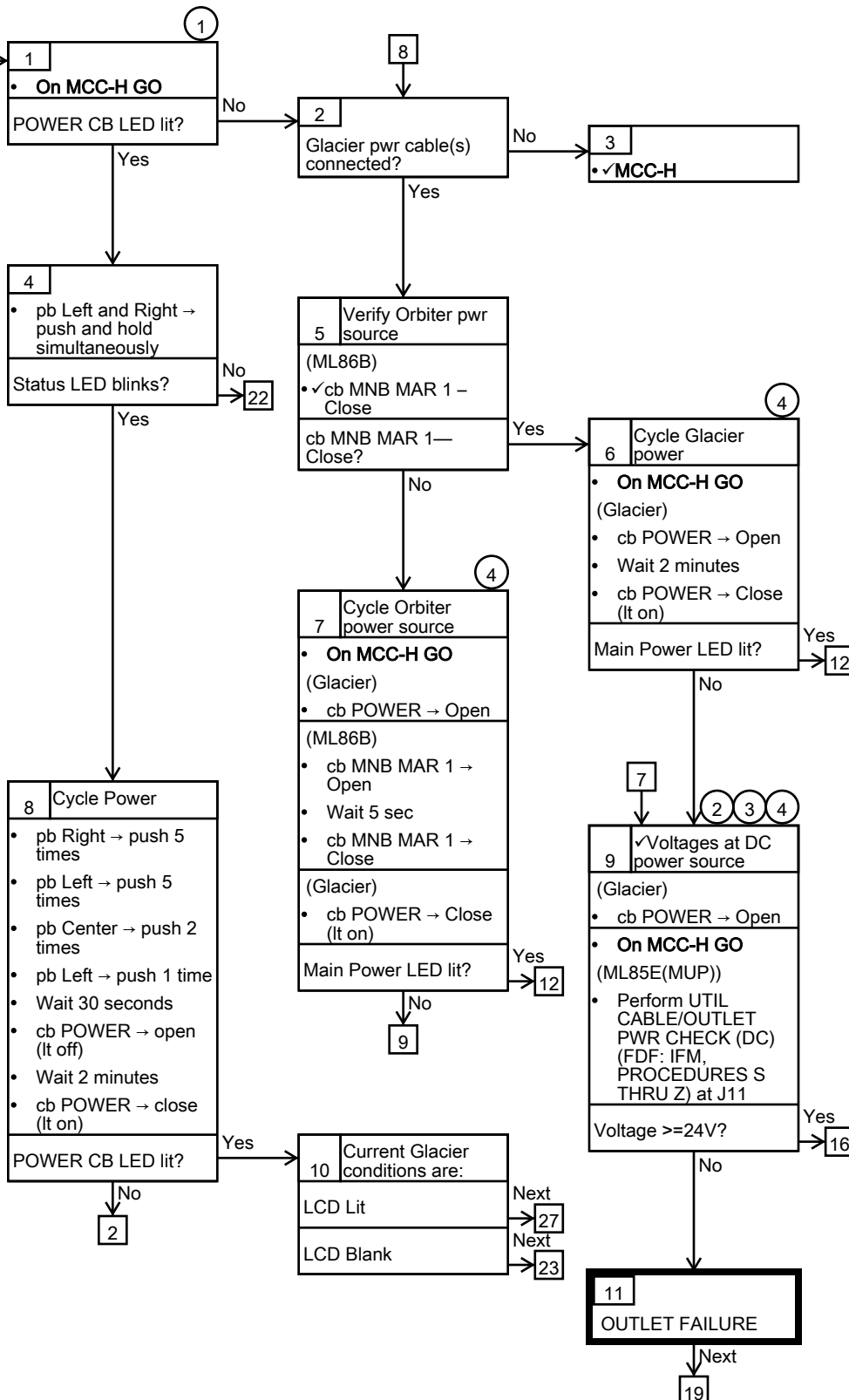


This Page Intentionally Blank

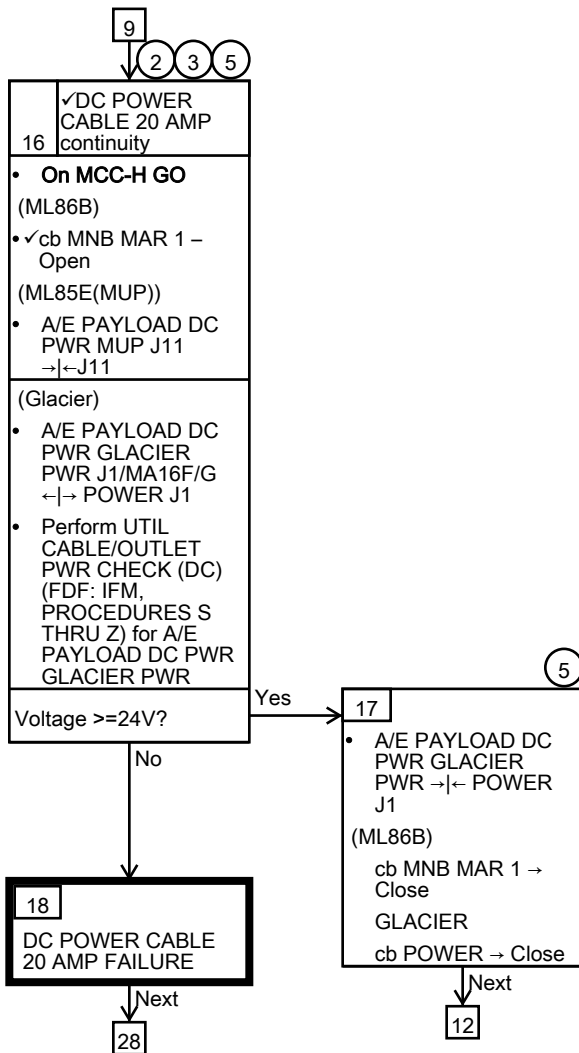
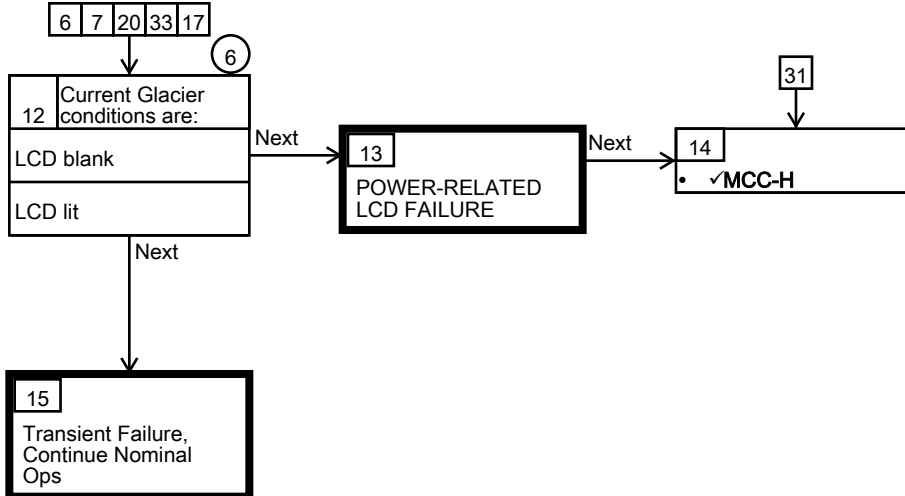


LCD Blank

**Nominal Config:**  
 Glacier  
 cb POWER – Close (It on)  
 sw BATTERY – ON (It on)  
 (ML86B)  
 cb MNB MAR 1 – Close



- ① Fan running indicates Glacier on STS power.
- ② Always deadface DC Power source when disconnecting/connecting power cable.
- ③ Verify connectors are properly mated and seated securely.
- ④ Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.



- ② Always deadface DC Power source when disconnecting/connecting power cable.
- ③ Verify connectors are properly mated and seated securely.
- ⑤ Verify connectors are properly mated and seated securely when reconnecting.
- ⑥ Initialization takes approximately 2 min. Initialization is complete when LCD Line 1 reads 'HOME'.

11  
2 3 4 5

|                                                                                                                                                                      |                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 19                                                                                                                                                                   | Switch to Alternate Power Source |
| <ul style="list-style-type: none"> <li>Contact <b>MCC-H</b> for alternate power source (Fill in data below)</li> </ul>                                               |                                  |
| (Glacier)                                                                                                                                                            |                                  |
| <ul style="list-style-type: none"> <li>cb POWER → Open</li> </ul>                                                                                                    |                                  |
| (ML86B)                                                                                                                                                              |                                  |
| <ul style="list-style-type: none"> <li>✓cb MNB MAR 1 – Open</li> </ul>                                                                                               |                                  |
| (ML85E(MUP))                                                                                                                                                         |                                  |
| <ul style="list-style-type: none"> <li>✓A/E PAYLOAD DC PWR MUP J11<br/>← →J11</li> </ul>                                                                             |                                  |
| <ul style="list-style-type: none"> <li>Alternate Power source (_____) J_</li> <li>✓cb _____</li> <li>Open</li> <li>✓sw _____</li> <li>—OFF</li> </ul>                |                                  |
| <ul style="list-style-type: none"> <li>✓A/E PAYLOAD DC PWR GLACIER PWR → ← POWER J1</li> <li>A/E PAYLOAD DC PWR GLACIER PWR → ← Alternate Power Source J_</li> </ul> |                                  |

Next

2 5

|                                                                                                                          |                                     |
|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 20                                                                                                                       | Repower from Alternate Power Source |
| <ul style="list-style-type: none"> <li>(_____)</li> <li>cb _____</li> <li>Close</li> <li>sw _____</li> <li>ON</li> </ul> |                                     |
| (Glacier)                                                                                                                |                                     |
| <ul style="list-style-type: none"> <li>cb POWER → Close (It on)</li> </ul>                                               |                                     |
| Main Power LED lit?                                                                                                      |                                     |
|                                                                                                                          | Yes → 12                            |

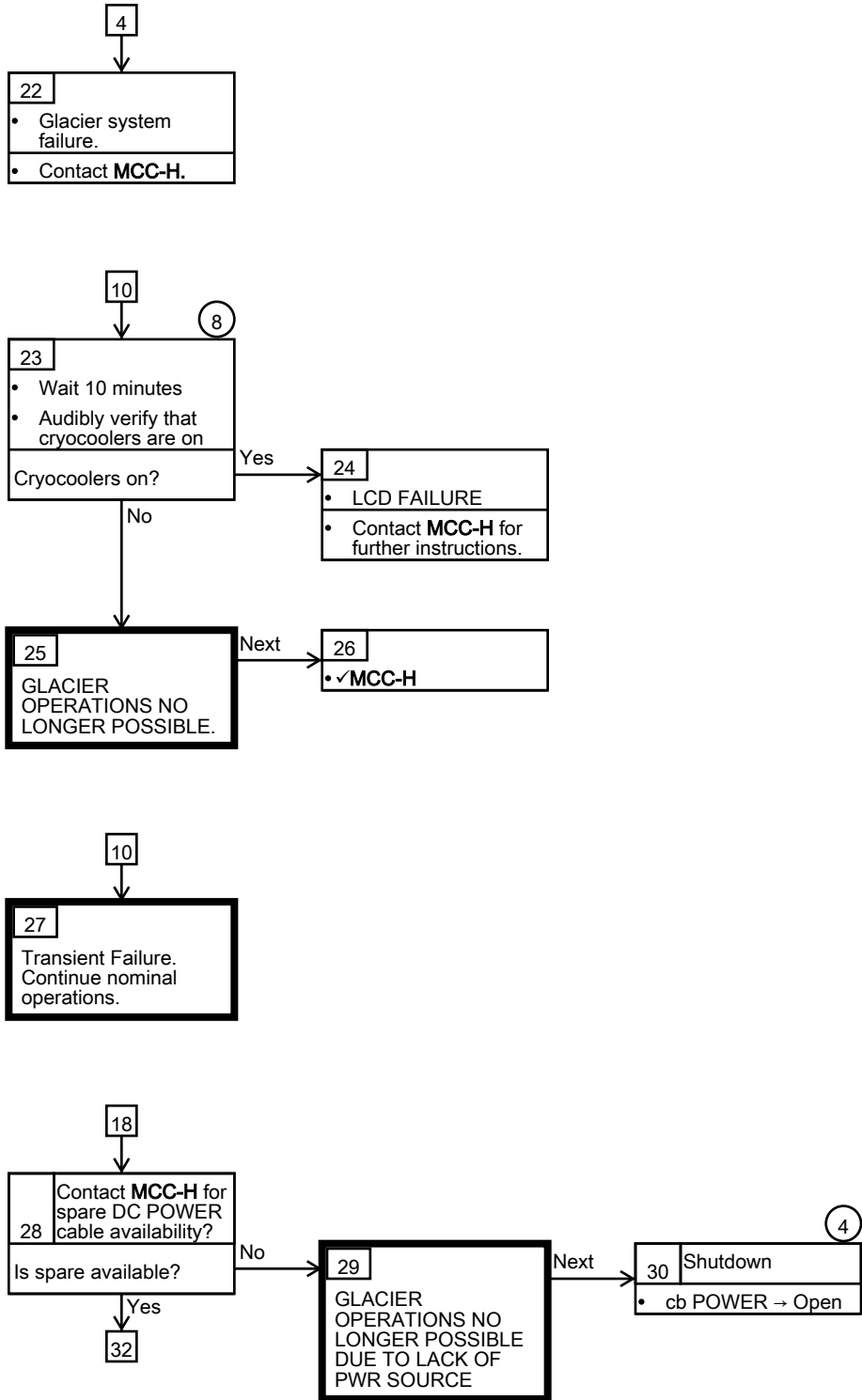
No

|    |                |
|----|----------------|
| 21 | SYSTEM FAILURE |
|----|----------------|

Next

31

- ② Always deadface DC Power source when disconnecting/connecting power cable.
- ③ Verify connectors are properly mated and seated securely.
- ④ Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.
- ⑤ Verify connectors are properly mated and seated securely when reconnecting.



4 Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.

8 Glacier will return to previous state approximately 3 minutes after initialization.

21

|                                                                                                                                                      |                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 31                                                                                                                                                   | Turn off system |
| <ul style="list-style-type: none"> <li>• On MCC-H GO</li> <li>• cb POWER → Open (It off)</li> </ul>                                                  |                 |
| <ul style="list-style-type: none"> <li>• Alternate Power source ( )</li> <li>J_</li> <li>• ✓cb</li> <li>Open</li> <li>• ✓sw</li> <li>—OFF</li> </ul> |                 |

Next

14

28

2 3 4

|                                                                                                                                           |                       |
|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 32                                                                                                                                        | Switch to spare cable |
| <ul style="list-style-type: none"> <li>• Unstow spare DC POWER cable</li> </ul>                                                           |                       |
| (Glacier)                                                                                                                                 |                       |
| <ul style="list-style-type: none"> <li>• cb POWER → Open</li> </ul>                                                                       |                       |
| (ML86B)                                                                                                                                   |                       |
| <ul style="list-style-type: none"> <li>• ✓cb MNB MAR 1 – Open</li> </ul>                                                                  |                       |
| (ML85E(MUP))                                                                                                                              |                       |
| <ul style="list-style-type: none"> <li>• A/E PAYLOAD DC PWR MUP J11 ← →J11</li> <li>• SPARE DC POWER CABLE→ ←J11</li> </ul>               |                       |
| (Glacier)                                                                                                                                 |                       |
| <ul style="list-style-type: none"> <li>• ✓A/E PAYLOAD DC PWR GLACIER PWR ← →POWER J1</li> <li>• SPARE DC PWR CABLE → ←POWER J1</li> </ul> |                       |

Next

|                                                                              |                 |
|------------------------------------------------------------------------------|-----------------|
| 33                                                                           | Repower Glacier |
| (ML86B)                                                                      |                 |
| <ul style="list-style-type: none"> <li>• cb MNB MAR 1 → Close</li> </ul>     |                 |
| (Glacier)                                                                    |                 |
| <ul style="list-style-type: none"> <li>• cb POWER → Close (It on)</li> </ul> |                 |
| Main Power LED lit?                                                          |                 |

Yes

12

No

34

2

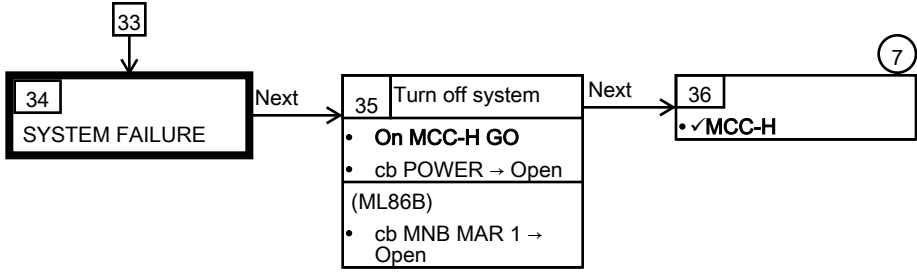
Always deadface DC Power source when disconnecting/ connecting power cable.

3

Verify connectors are properly mated and seated securely.

4

Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.



7  
The Glacier payload may continue to function if LCD fails.

# GLACIER RECORD CRYOGENIC DIAGNOSTIC DATA

(ASSY OPS/ULF5/FIN)

Page 1 of 2 pages

## OBJECTIVE:

The following steps allow the recording of some Glacier data for diagnostic purposes.

```

*
* If Display – ***Error Pending***:
* | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* | PAYLOADS), then:
*

```

### 1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in TABLE 3 GLACIER DIAGNOSTIC LOG FILE (SODF: ASSY OPS: PAYLOADS).

Glacier

- 1.2 ✓DISPLAY – 'HOME'  
\*\*\*\*\*  
\*  
\* If 'HOME' not shown:  
\* | pb Right (EXIT) → push until 'HOME' appears  
\*  
\*\*\*\*\*

### 2. RECORDING CRYOGENIC STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in TABLE 3 GLACIER DIAGNOSTIC LOG FILE (SODF: ASSY OPS: PAYLOADS).
- 2.2 pb Left (MENU) → push (one time), following appears:  
**'MAIN MENU'**  
**'QUICK STATUS 1/5'**
- 2.3 pb Left (NEXT) → push (one time), following appears:  
**'MAIN MENU'**  
**'STATUS 2/5'**
- 2.4 pb Center (SELECT) → push (one time), following appears:  
**'STATUS'**  
**'Cryogenic 1/3'**
- 2.5 pb Center (SELECT) → push (one time), following appears:  
**'Cryogenic'**  
**'Cooler 1 Stroke 1/23'**  
**'XX'**

NOTE

1. The center pushbutton (NEXT) moves to next status display.
2. The left pushbutton (PREV) moves to previous status display.

- 2.6 Record Cryogenic data per **MCC-H** direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.7 pb Center (NEXT) → press until all Cryogenic Status data has been recorded per **MCC-H** direction
- 2.8 pb Right (EXIT) → push until '**HOME**'
- 2.9 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).



# GLACIER RECORD QUICK DIAGNOSTIC DATA

(ASSY OPS/ULF5/FIN)

Page 1 of 2 pages

## OBJECTIVE:

The following steps allow the recording of some Glacier data for diagnostic purposes.

```

*
* If Display – ***Error Pending***:
* | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* | PAYLOADS), then:
*

```

### 1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

Glacier

- 1.2 ✓Display – 'HOME'

```

*
* If 'HOME' not shown:
* | pb Right (EXIT) → push until 'HOME' appears
*

```

### 2. RECORDING QUICK STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.2 pb Left (MENU) → push (one time), following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
- 2.3 pb Center (SELECT) → push (one time), following appears:  
'QUICK STATUS'  
'Cold Head 1A 1/16'

#### NOTE

- 1. The center pushbutton (NEXT) moves to next status display.
- 2. The left pushbutton (PREV) moves to previous status display.

- 2.4 Record Quick Status data per MCC-H direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.5 pb Center (NEXT) → push until all Quick Status data has been recorded per MCC-H direction.

- 2.6 pb Right (EXIT) → push until **'HOME'**
- 2.7 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

OBJECTIVE:

The following steps allow the recording of some Glacier data for diagnostic purposes.

```

*
* If Display – ***Error Pending***:
* | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* | PAYLOADS), then:
*

```

1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

Glacier

- 1.2 ✓DISPLAY – 'HOME'
 

```

*
* If 'HOME' not shown:
* | pb Right (EXIT) → push until 'HOME' appears
*

```

2. RECORDING RESOURCES STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.2 pb Left (MENU) → push (one time), following appears:  
 'MAIN MENU'  
 'QUICK STATUS 1/5'
- 2.3 pb Left (NEXT) → push (one time), following appears:  
 'MAIN MENU'  
 'STATUS 2/5'
- 2.4 pb Center (SELECT) → push (one time), following appears:  
 'STATUS'  
 'Cryogenic 1/3'
- 2.5 pb Left (NEXT) → push (one time), following appears:  
 'STATUS'  
 'Resources 2/3'
- 2.6 pb Center (SELECT) → push (one time), following appears:  
 'Resources'

'AAA Outlet 1/10'  
'XX.X° C'

NOTE

1. The center pushbutton (NEXT) moves to next status display.
2. The left pushbutton (PREV) moves to previous status display.

- 2.7 Record Resource data per **MCC-H** direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.8 pb Center (NEXT) → push until all Resource data has been recorded per **MCC-H** direction.
- 2.9 pb Right (EXIT) → push until '**HOME**'
- 2.10 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

OBJECTIVE:

The following steps allow the recording of some Glacier data for diagnostic purposes.

```

*
* If Display – ***Error Pending***:
*
* | Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* | PAYLOADS), then:
*

```

1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

Glacier

- 1.2 ✓DISPLAY – 'HOME'
 

```

*
* If 'HOME' not shown:
*
* | pb Right (EXIT) → push until 'HOME' appears
*

```

2. RECORDING SYSTEM STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.2 pb Left (MENU) → push (one time), following appears:  
 'MAIN MENU'  
 'QUICK STATUS 1/5'
- 2.3 pb Left (NEXT) → push (one time), following appears:  
 'MAIN MENU'  
 'STATUS 2/5'
- 2.4 pb Center (SELECT) → push (one time), following appears:  
 'STATUS'  
 'Cryogenic 1/3'
- 2.5 pb Left (NEXT) → push (two times), following appears:  
 'STATUS'

'System 3/3'

2.6 pb Center (SELECT) → push (one time), following appears:

'System'

'CPU 1/13'

'XX.X° C'

NOTE

1. The center pushbutton (NEXT) moves to next status display.
2. The left pushbutton (PREV) moves to previous status display.

- 2.7 Record System Status data per **MCC-H** direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.8 pb Center (NEXT) → push until all System Status data has been recorded per **MCC-H** direction.
- 2.9 pb Right (EXIT) → push until '**HOME**'
- 2.10 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

**TABLE 1 GLACIER ERROR MESSAGE LOG**

(ASSY OPS/ULF5/FIN) Page 1 of 3 pages

Table 1-1 Glacier Error Log File

| GMT                        | Error Message | Error Event          | Error Status                                                                                              |
|----------------------------|---------------|----------------------|-----------------------------------------------------------------------------------------------------------|
| Hours: Minutes:<br>Seconds | Text          | X of Total<br>Number | (IP) INACTIVE / PENDING<br>(AP) ACTIVE / PENDING<br>(IA) INACTIVE / ACK<br>(AA) ACTIVE / ACK<br>(R) RESET |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |

## TABLE 1 GLACIER ERROR MESSAGE LOG

(ASSY OPS/ULF5/FIN) Page 2 of 3 pages

Possible Glacier Error Messages:

- (1) '**N/A**' (Ground Message Only)
- (2) '**Water Flow Range**'
- (3) '**Water Temp Range**'
- (4) '**AAA Air Temp**'
- (5) '**Voltage Range**'
- (6) '**Current Range**'
- (7) '**RIC Comm Loss**'
- (8) '**Over Temp**'
- (9) '**Hardware Error**'
- (10) '**Bandwidth**'

Table 1-2 (002) Water Flow Range/(003) Water Temp Range Error Data

| Sensor       | Value | Units |
|--------------|-------|-------|
| Outlet Water |       | °C    |
| Inlet Water  |       | °C    |
| Flow Rate    |       | kg/h  |

Table 1-3 (004) AAA Air Temp Error Data

| Sensor      | Value | Units |
|-------------|-------|-------|
| AAA Outlet  |       | °C    |
| AAA Inlet 1 |       | °C    |
| AAA Inlet 2 |       | °C    |

Table 1-4 (005) Voltage Range/(006) Current Range Error Data

| Sensor       | Value | Units   |
|--------------|-------|---------|
| Main Current |       | Amperes |
| Main Voltage |       | Volts   |
| Over Current |       | Amperes |



**TABLE 1 GLACIER ERROR MESSAGE LOG**

(ASSY OPS/ULF5/FIN) Page 3 of 3 pages

Table 1-5 (008) Over Temp Error Data

| Sensor       | Value | Units |
|--------------|-------|-------|
| CPU          |       | °C    |
| Capacitors A |       | °C    |
| Capacitors B |       | °C    |
| Data Logger  |       | °C    |

Table 1-6 Bandwidth Error Data

| Parameter      | Value | Units    |
|----------------|-------|----------|
| CURR TEMP      |       | °C       |
| SET POINT      |       | °C       |
| GPS            |       | HH:MM:SS |
| Cold Head 1A   |       | °C       |
| Cold Head 1B   |       | °C       |
| Cold Head 2A   |       | °C       |
| Cold Head 2B   |       | °C       |
| Circ Fan Speed |       | RPM      |

This Page Intentionally Blank

**TABLE 2 GLACIER RESET LOG FILE**  
 (ASSY OPS/ULF5/FIN) Page 1 of 5 pages

221

| Parameter                                                        |                    | Event 1                                            | Event 2                                            | Definition or Options                                                     |
|------------------------------------------------------------------|--------------------|----------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------|
| 1                                                                | CURR TEMP          | Start ____ °C<br>End ____ °C                       | Start ____ °C<br>End ____ °C                       | GLACIER Current Temperature<br>XXXX.XX °C                                 |
| 2                                                                | SET POINT          | Start ____ °C<br>End ____ °C                       | Start ____ °C<br>End ____ °C                       | -160.0 to +4.0° C                                                         |
| 3                                                                | GPS                | Start ____:____:____ GPS<br>End ____:____:____ GPS | Start ____:____:____ GPS<br>End ____:____:____ GPS | Hours: Min: Sec                                                           |
| 4                                                                | Expected CURR TEMP | ____ °C                                            | ____ °C                                            | Expected Glacier Current Temperature per <b>MCC-H</b> (-160.0 to +4.0° C) |
| 5                                                                | Expected SET POINT | ____ °C                                            | ____ °C                                            | Expected Set Point Temperature per <b>MCC-H</b> (-160.0 to +4.0° C)       |
| Values for Reconfiguration of <b>Setup: Temperature Control:</b> |                    |                                                    |                                                    |                                                                           |
| 6                                                                | Set Point Temp     | ____ °C                                            | ____ °C                                            | -160.0 to +4.0° C                                                         |

**TABLE 2 GLACIER RESET LOG FILE**  
 (ASSY OPS/ULF5/FIN) Page 2 of 5 pages

222

| Parameter |                 | Event 1                                                                                                | Event 2                                                                                                | Definition or Options |
|-----------|-----------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------|
| 7         | Control Mode    | IDLE <input type="checkbox"/><br>SET POINT <input type="checkbox"/><br>MANUAL <input type="checkbox"/> | IDLE <input type="checkbox"/><br>SET POINT <input type="checkbox"/><br>MANUAL <input type="checkbox"/> |                       |
| 8         | Control Sensors | INNER <input type="checkbox"/><br>OUTLET <input type="checkbox"/><br>INLET <input type="checkbox"/>    | INNER <input type="checkbox"/><br>OUTLET <input type="checkbox"/><br>INLET <input type="checkbox"/>    |                       |
| 9         | AirMgmt Proceed | PROCEED <input type="checkbox"/>                                                                       | PROCEED <input type="checkbox"/>                                                                       |                       |
| 10        | Bandwidth       | ____. ____ °C                                                                                          | ____. ____ °C                                                                                          | 00.1 to 25.5° C       |
| 11        | Primary Cooler  | COOLER 1 <input type="checkbox"/><br>COOLER 2 <input type="checkbox"/>                                 | COOLER 1 <input type="checkbox"/><br>COOLER 2 <input type="checkbox"/>                                 |                       |
| 12        | Cooler 1 Stroke | ____                                                                                                   | ____                                                                                                   | 03 to 63              |

**TABLE 2 GLACIER RESET LOG FILE**  
 (ASSY OPS/ULF5/FIN) Page 3 of 5 pages

223

| Parameter             | Event 1                                                               | Event 2                                                               | Definition or Options |
|-----------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------|
| 13<br>Cooler 1 State  | ON <input type="checkbox"/><br>OFF <input type="checkbox"/>           | ON <input type="checkbox"/><br>OFF <input type="checkbox"/>           |                       |
| 14<br>Cooler 2 Stroke | _____                                                                 | _____                                                                 | 03 to 63              |
| 15<br>Cooler 2 State  | ON <input type="checkbox"/><br>OFF <input type="checkbox"/>           | ON <input type="checkbox"/><br>OFF <input type="checkbox"/>           |                       |
| 16<br>Heater 1 Duty   | _____ %                                                               | _____ %                                                               | Percent Duty Cycle    |
| 17<br>Heater 2 Duty   | _____ %                                                               | _____ %                                                               | Percent Duty Cycle    |
| 18<br>Max Power Draw  | _____ W                                                               | _____ W                                                               | Max Watts             |
| 19<br>Over Current    | _____ A                                                               | _____ A                                                               | Over Current Ampere   |
| 20<br>AAA Fan Mode    | AUTOMATIC <input type="checkbox"/><br>MANUAL <input type="checkbox"/> | AUTOMATIC <input type="checkbox"/><br>MANUAL <input type="checkbox"/> |                       |

**TABLE 2 GLACIER RESET LOG FILE**  
 (ASSY OPS/ULF5/FIN) Page 4 of 5 pages

224

| Parameter                                                  |                 | Event 1                                           |                                                                                                     | Event 2                                           |                                                                                                     | Definition or Options |
|------------------------------------------------------------|-----------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------|
| 21                                                         | AAA Fan State   | LOW                                               | <input type="checkbox"/>                                                                            | LOW                                               | <input type="checkbox"/>                                                                            |                       |
|                                                            |                 | HIGH                                              | <input type="checkbox"/>                                                                            | HIGH                                              | <input type="checkbox"/>                                                                            |                       |
| 22                                                         | Heat Rejection  | AIR                                               | <input type="checkbox"/>                                                                            | AIR                                               | <input type="checkbox"/>                                                                            |                       |
|                                                            |                 | WATER                                             | <input type="checkbox"/>                                                                            | WATER                                             | <input type="checkbox"/>                                                                            |                       |
| Values for Reconfiguration of <b>Setup: Air Management</b> |                 |                                                   |                                                                                                     |                                                   |                                                                                                     |                       |
| 23                                                         | Air Mgmt Mode   | AUTOMATIC                                         | <input type="checkbox"/>                                                                            | AUTOMATIC                                         | <input type="checkbox"/>                                                                            |                       |
|                                                            |                 | MANUAL                                            | <input type="checkbox"/>                                                                            | MANUAL                                            | <input type="checkbox"/>                                                                            |                       |
| 24                                                         | Humidity Config | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      |                       |
|                                                            |                 | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |                       |
| 25                                                         | Pressure Config | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      |                       |
|                                                            |                 | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |                       |
| 26                                                         | Manual Config   | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      |                       |
|                                                            |                 | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |                       |

**TABLE 2 GLACIER RESET LOG FILE**  
 (ASSY OPS/ULF5/FIN) Page 5 of 5 pages

225

| Parameter |                | Event 1                                                               | Event 2                                                               | Definition or Options      |
|-----------|----------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------|
| 27        | Start Humidity | _____ Seconds                                                         | _____ Seconds                                                         | 00000 to 65535 Seconds     |
| 28        | Start Pressure | _____ Seconds                                                         | _____ Seconds                                                         | 00000 to 65535 Seconds     |
| 29        | Circ Fan Mode  | AUTOMATIC <input type="checkbox"/><br>MANUAL <input type="checkbox"/> | AUTOMATIC <input type="checkbox"/><br>MANUAL <input type="checkbox"/> |                            |
| 30        | Circ Fan Power | _____ %                                                               | _____ %                                                               | 000 to 100 %               |
| 31        | Data Storage   | _____ Seconds                                                         | _____ Seconds                                                         | 0 to 3600 seconds          |
| 32        | Ethernet Addr  | ____ . ____ . ____ . ____                                             | ____ . ____ . ____ . ____                                             | TCP IP Address             |
| 33        | Function Code  | _____ Hex Value                                                       | _____ Hex Value                                                       | 0x000A to 0xFFFE Hex Value |
| 34        | RIC Port       | _____                                                                 | _____                                                                 | 6212 to 6999               |
| 35        | Remote Command | ENABLE <input type="checkbox"/><br>INHIBIT <input type="checkbox"/>   | ENABLE <input type="checkbox"/><br>INHIBIT <input type="checkbox"/>   |                            |

Note: These items may need to be entered for multiple events.

This Page Intentionally Blank



**TABLE 3 GLACIER DIAGNOSTIC LOG FILE**

(ASSY OPS/ULF5/FIN) Page 1 of 3 pages

227

| Parameter               |                 | Definition                | Event 1                                        | Event 2                                        | Event 3                                        | Event 4                                        |
|-------------------------|-----------------|---------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| HOME MENU (Front panel) |                 |                           |                                                |                                                |                                                |                                                |
| 1                       | CURR TEMP       | Current Temperature °C    | Start:<br>End:                                 | Start:<br>End:                                 | Start:<br>End:                                 | Start:<br>End:                                 |
| 2                       | SET POINT       | Set Point °C              | Start:<br>End:                                 | Start:<br>End:                                 | Start:<br>End:                                 | Start:<br>End:                                 |
| 3                       | GPS             | Hours: Minutes: Seconds   | Start:<br>__ : __ : __<br>End:<br>__ : __ : __ | Start:<br>__ : __ : __<br>End:<br>__ : __ : __ | Start:<br>__ : __ : __<br>End:<br>__ : __ : __ | Start:<br>__ : __ : __<br>End:<br>__ : __ : __ |
| QUICK STATUS            |                 |                           |                                                |                                                |                                                |                                                |
| 1                       | Cold Head 1A    | Temperature °C            |                                                |                                                |                                                |                                                |
| 2                       | Cold Head 1B    | Temperature °C            |                                                |                                                |                                                |                                                |
| 3                       | Cold Head 2A    | Temperature °C            |                                                |                                                |                                                |                                                |
| 4                       | Cold Head 2B    | Temperature °C            |                                                |                                                |                                                |                                                |
| 5                       | Cold Vol Outlet | Temperature °C            |                                                |                                                |                                                |                                                |
| 6                       | Cold Vol Inlet  | Temperature °C            |                                                |                                                |                                                |                                                |
| 7                       | Cold Vol Inner  | Temperature °C            |                                                |                                                |                                                |                                                |
| 8                       | Cold Vol DeltaP | psi                       |                                                |                                                |                                                |                                                |
| 9                       | Outlet Water    | Temperature °C            |                                                |                                                |                                                |                                                |
| 10                      | Inlet Water     | Temperature °C            |                                                |                                                |                                                |                                                |
| 11                      | Humidity 1      | % Humidity                |                                                |                                                |                                                |                                                |
| 12                      | Humidity 2      | % Humidity                |                                                |                                                |                                                |                                                |
| 13                      | Circ Fan Speed  | RPM                       |                                                |                                                |                                                |                                                |
| 14                      | Battery         | 0 to greater than 9 Volts |                                                |                                                |                                                |                                                |
| 15                      | Main Current    | 0 to 20 Amps              |                                                |                                                |                                                |                                                |
| 16                      | Total Run Time  | Hours: Minutes: Seconds   |                                                |                                                |                                                |                                                |

**TABLE 3 GLACIER DIAGNOSTIC LOG FILE**

(ASSY OPS/ULF5/FIN) Page 2 of 3 pages

228

| Parameter         | Definition      | Event 1                       | Event 2 | Event 3 | Event 4 |
|-------------------|-----------------|-------------------------------|---------|---------|---------|
| STATUS: Cryogenic |                 |                               |         |         |         |
| 1                 | Cooler 1 Stroke |                               |         |         |         |
| 2                 | Cooler 2 Stroke |                               |         |         |         |
| 3                 | HX 1            | Heat Exchanger Temperature °C |         |         |         |
| 4                 | HX 2            | Heat Exchanger Temperature °C |         |         |         |
| 5                 | Cold Head 1A    | Temperature °C                |         |         |         |
| 6                 | Cold Head 1B    | Temperature °C                |         |         |         |
| 7                 | Cold Head 2A    | Temperature °C                |         |         |         |
| 8                 | Cold Head 2B    | Temperature °C                |         |         |         |
| 9                 | Cold Vol Outlet | Temperature °C                |         |         |         |
| 10                | Cold Vol Inlet  | Temperature °C                |         |         |         |
| 11                | Cold Vol Outer  | Temperature °C                |         |         |         |
| 12                | Cold Vol Inner  | Temperature °C                |         |         |         |
| 13                | Vac Jacket 1    | Torr                          |         |         |         |
| 14                | Vac Jacket 2    | Torr                          |         |         |         |
| 15                | Heat Sink       | Temperature °C                |         |         |         |
| 16                | Col Vol Vac 1   | Torr                          |         |         |         |
| 17                | Col Vol Vac 2   | Torr                          |         |         |         |
| 18                | Circ Fan Speed  | RPM                           |         |         |         |
| 19                | Heater 1 Power  | %                             |         |         |         |
| 20                | Heater 2 Power  | %                             |         |         |         |
| 21                | Circ Fan Power  | %                             |         |         |         |
| 22                | Vacuum Jacket   | Temperature °C                |         |         |         |
| 23                | Circ Fan Temp   | Temperature °C                |         |         |         |

**TABLE 3 GLACIER DIAGNOSTIC LOG FILE**

(ASSY OPS/ULF5/FIN) Page 3 of 3 pages

229

| Parameter         |                  | Definition                         | Event 1 | Event 2 | Event 3 | Event 4 |
|-------------------|------------------|------------------------------------|---------|---------|---------|---------|
| STATUS: Resources |                  |                                    |         |         |         |         |
| 1                 | AAA Outlet       | Temperature °C                     |         |         |         |         |
| 2                 | AAA Inlet 1      | Temperature °C                     |         |         |         |         |
| 3                 | AAA Inlet 2      | Temperature °C                     |         |         |         |         |
| 4                 | Outlet Water     | Temperature °C                     |         |         |         |         |
| 5                 | Inlet Water      | Temperature °C                     |         |         |         |         |
| 6                 | Water Flow       | kg/h                               |         |         |         |         |
| 7                 | Main Current     | Amps                               |         |         |         |         |
| 8                 | Main Voltage     | Volts                              |         |         |         |         |
| 9                 | AAA Fan Speed 1  | RPM                                |         |         |         |         |
| 10                | AAA Fan Speed 2  | RPM                                |         |         |         |         |
| STATUS: System    |                  |                                    |         |         |         |         |
| 1                 | CPU              | Temperature °C                     |         |         |         |         |
| 2                 | Capacitors A     | Temperature °C                     |         |         |         |         |
| 3                 | Capacitors B     | Temperature °C                     |         |         |         |         |
| 4                 | Data Logger      | Temperature °C                     |         |         |         |         |
| 5                 | Battery          | Volts                              |         |         |         |         |
| 6                 | Total Run Time   | Hours: Minutes: Seconds            |         |         |         |         |
| 7                 | Glacier Version  | ##.## Day/Month/Year Hour: Minutes |         |         |         |         |
| 8                 | Logger Version   | ##.## Day/Month/Year Hour: Minutes |         |         |         |         |
| 9                 | Circ Fan Version | ##.## Day/Month/Year Hour: Minutes |         |         |         |         |
| 10                | Front Panel      | Temperature °C                     |         |         |         |         |
| 11                | Pump             | Temperature °C                     |         |         |         |         |
| 12                | Circ Fan Control | Temperature °C                     |         |         |         |         |
| 13                | Boot Count       |                                    |         |         |         |         |

This Page Intentionally Blank

CONTINGENCY EVA PL CONFIGURATION

CONTINGENCY EVA  
PL CONFIGURATION

This Page Intentionally Blank

N/A

This Page Intentionally Blank



**POST-EVA PL CONFIGURATION**  
(ASSY OPS/ULF5/FIN) Page 1 of 1 pages

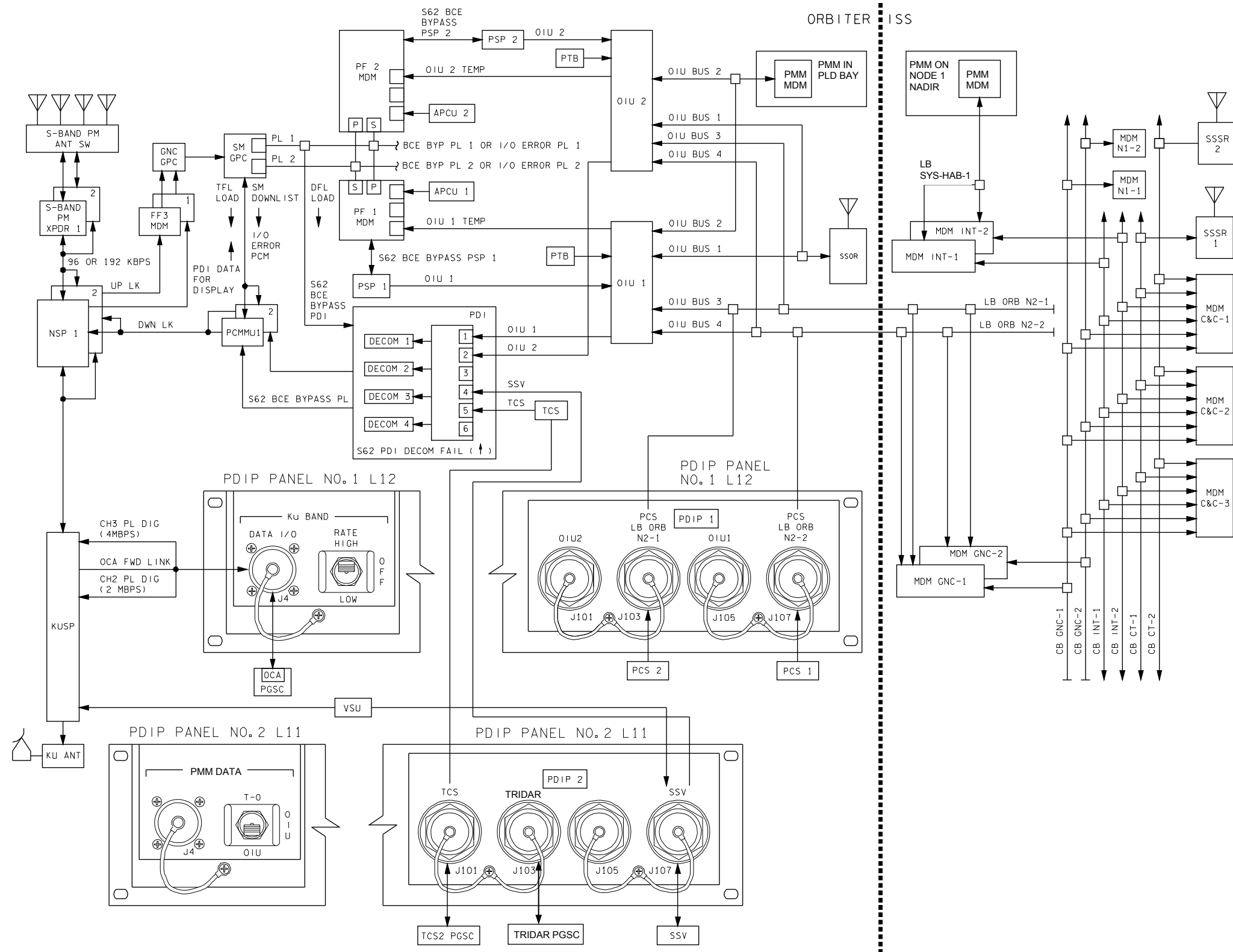
N/A

This Page Intentionally Blank

MALFUNCTION

**MALFUNCTION**

This Page Intentionally Blank



4850201\_121. SCH# 5

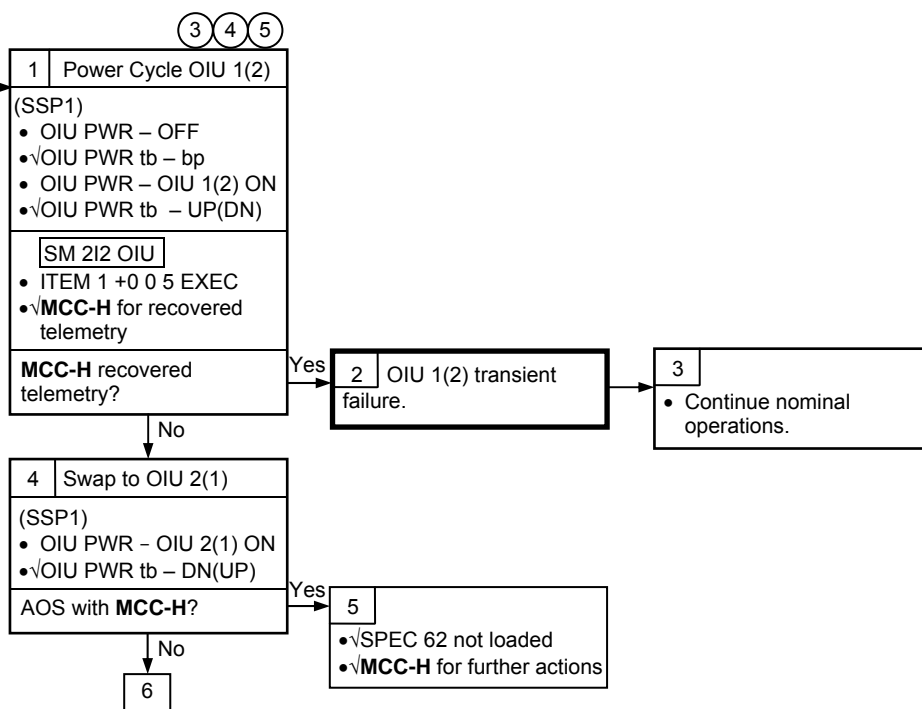
This Page Intentionally Blank

# ASSY OPS

## LOSS OF PMM TELEMETRY (ASSY OPS/ULF5/FIN) Page 1 of 2 pages

① ②  
**MCC-H Reports**  
 No or Loss of PMM Telemetry While PMM in Payload Bay

**Nominal Config:**  
 (R1)  
 PL CAB – MNA(MNB)  
 PL AUX – ON (SSP1)  
 OIU PWR – OIU 1(2) ON  
 OIU PWR tb – UP(DN)  
 (A15)  
 PTU/MAIN BUS A – ON (tb-ON)  
 APCU 1 CONV – ON  
 APCU 1 OUTPUT – ON



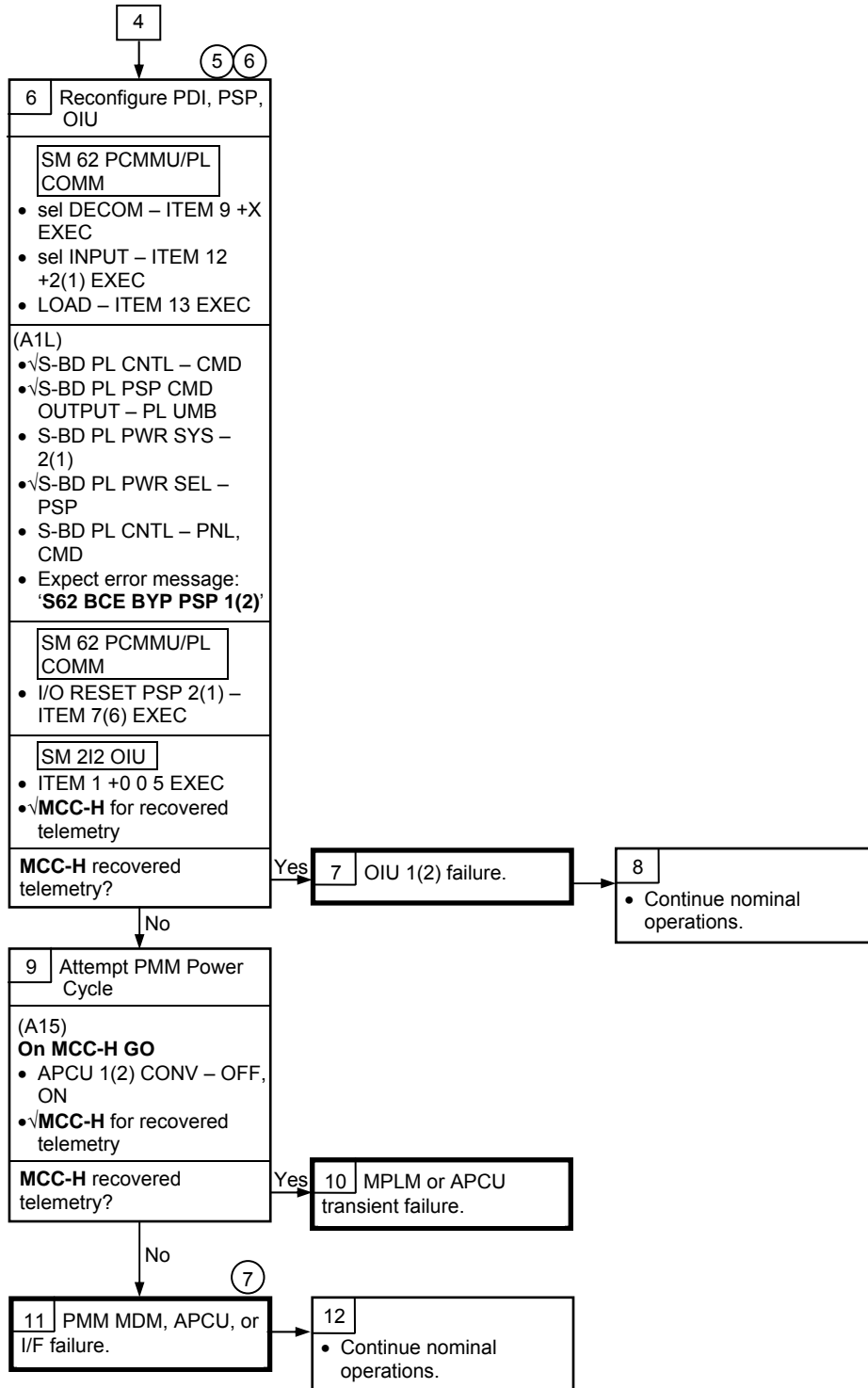
① This malfunction only treats OIU to PMM interface problems and PMM interface problems. OIU to PDI problems would announce an S62 PDI DECOM FAIL message.

② Loss of PMM telemetry does not announce S212 OIU AD NOLK, because OIU is BC.

③ Reloading OIU format does not force a resync when OIU is BC.

④ **MCC-H** may recommend starting in block 4 depending on the error signature.

⑤ OIU powerup config on OIU BUS 2 (PMM via ROEU) is BC on ch A.



5  
OIU powerup config on OIU BUS 2 (PMM via ROEU) is BC on ch A.

6  
PSP swap must be performed prior to sending format command to OIU.

7  
If unable to verify PMM pressure and temperature, PMM is still go for unberthing from payload bay.

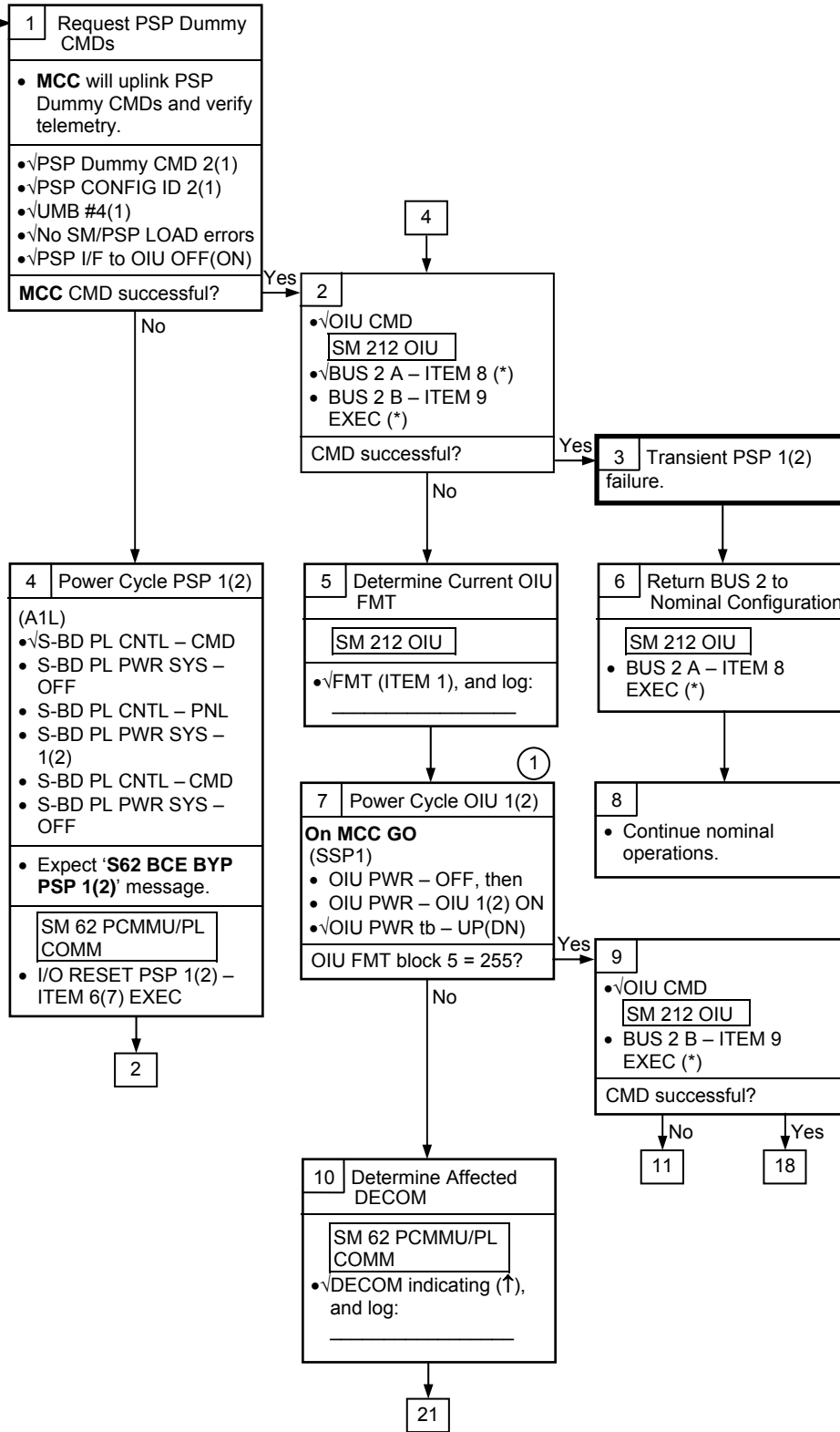


**COMM**

**OIU FAIL TO COMMAND**  
(ASSY OPS/ULF5/FIN) Page 1 of 3 pages

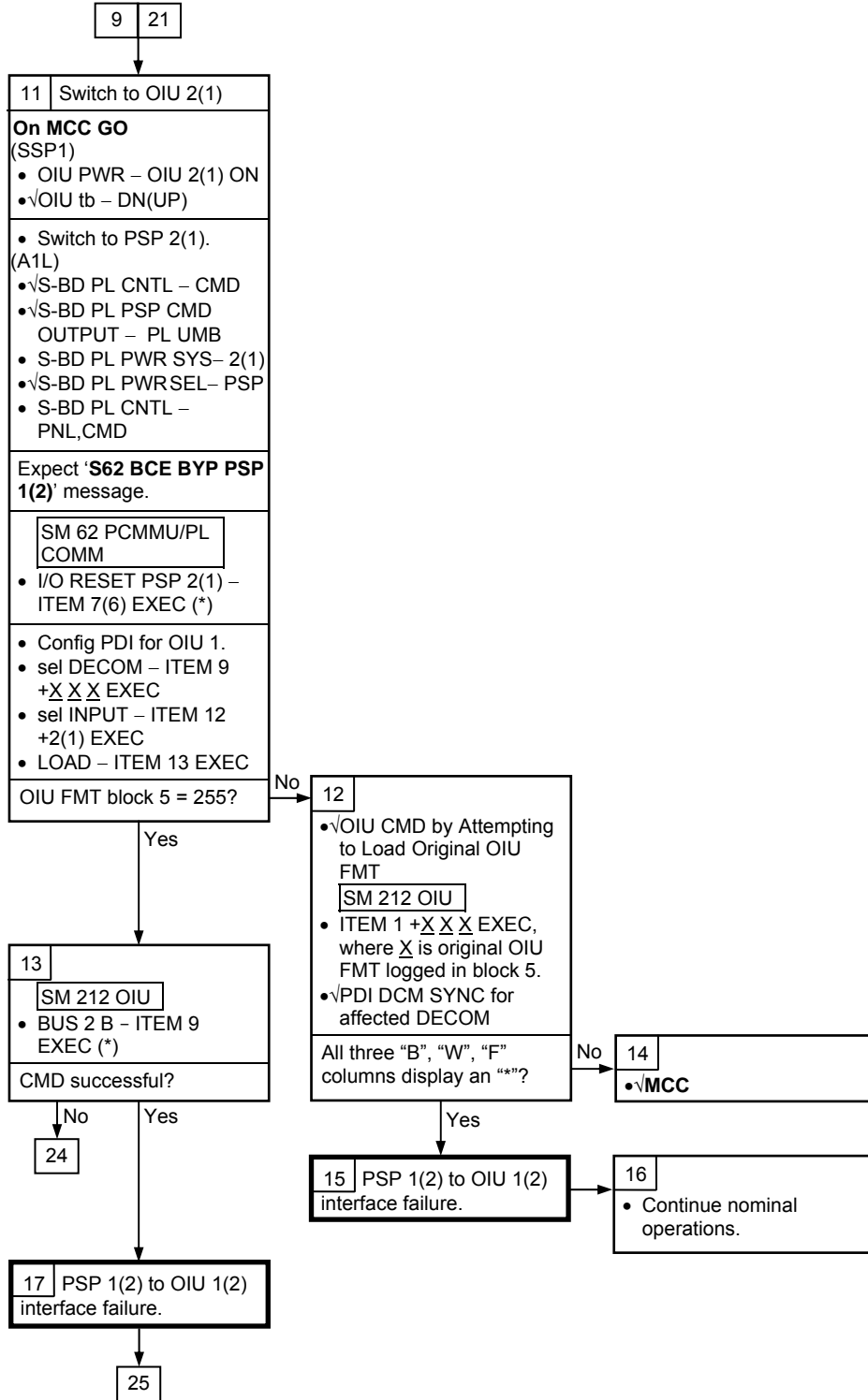
No Response to OIU Configuration or Routed Commands

**Nominal Config:**  
(A1L)  
S-BD PL CNTL – CMD  
S-BD PL PWR SYS – 1  
S-BD PL PWR SEL – PSP  
S-BD PL PSP CMD OUTPUT – PL UMB (SSP1)  
OIU PWR – OIU 1(2) ON  
OIU PWR tb – UP(DN) (R1)  
PL CAB – MNA(MNB)  
PL AUX – ON

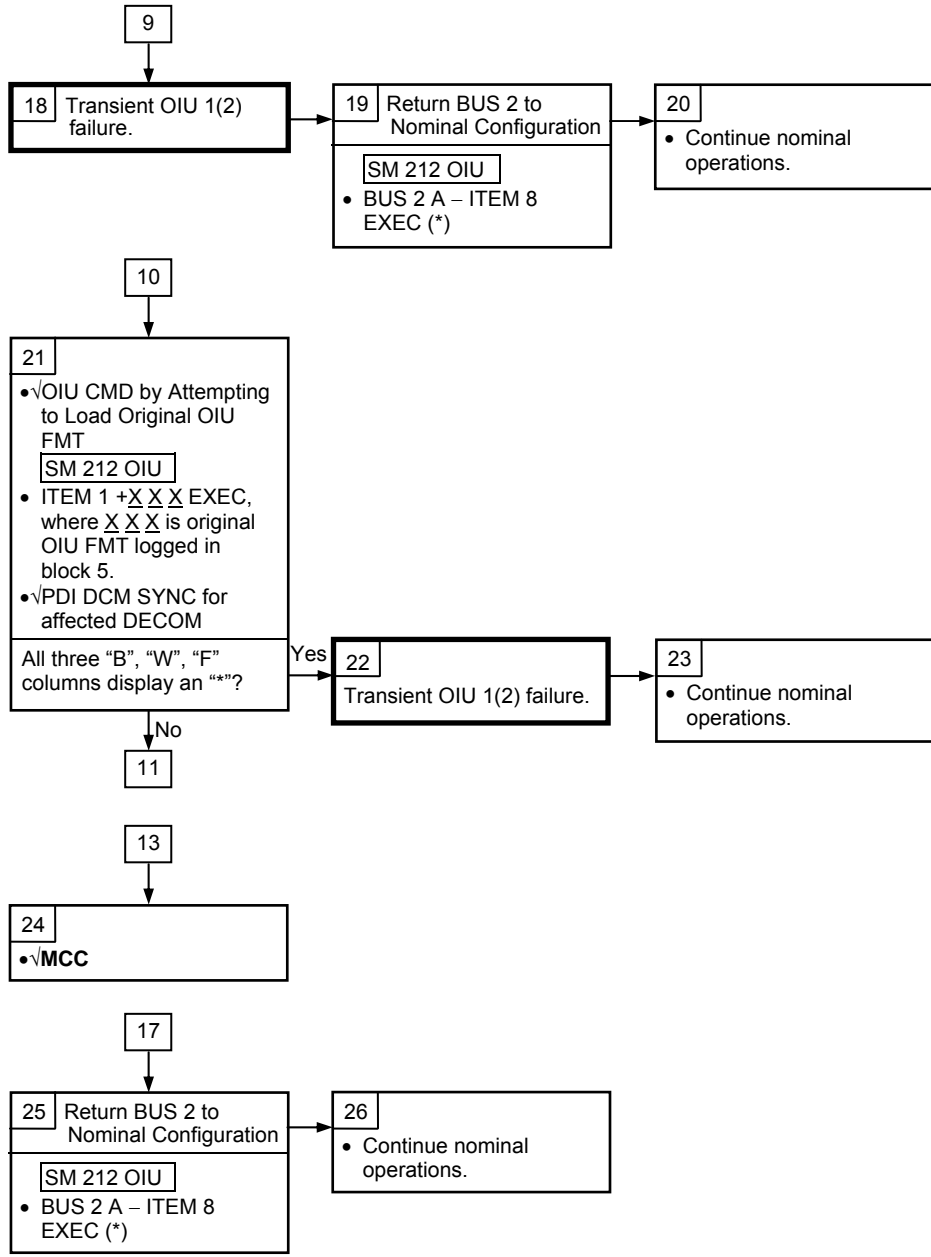


① Power cycle will place OIU in Format 255. OIU Station TLM will be lost until OIU CMD is recovered. OIU H&S TLM will also be lost if PDI is not configured for OIU FMT 255.

**OIU FAIL TO COMMAND**  
(ASSY OPS/ULF5/FIN) Page 2 of 3 pages



**OIU FAIL TO COMMAND**  
(ASSY OPS/ULF5/FIN) Page 3 of 3 pages



This Page Intentionally Blank

**ASSY OPS**

**OIU TEMP (UP ARROW)**

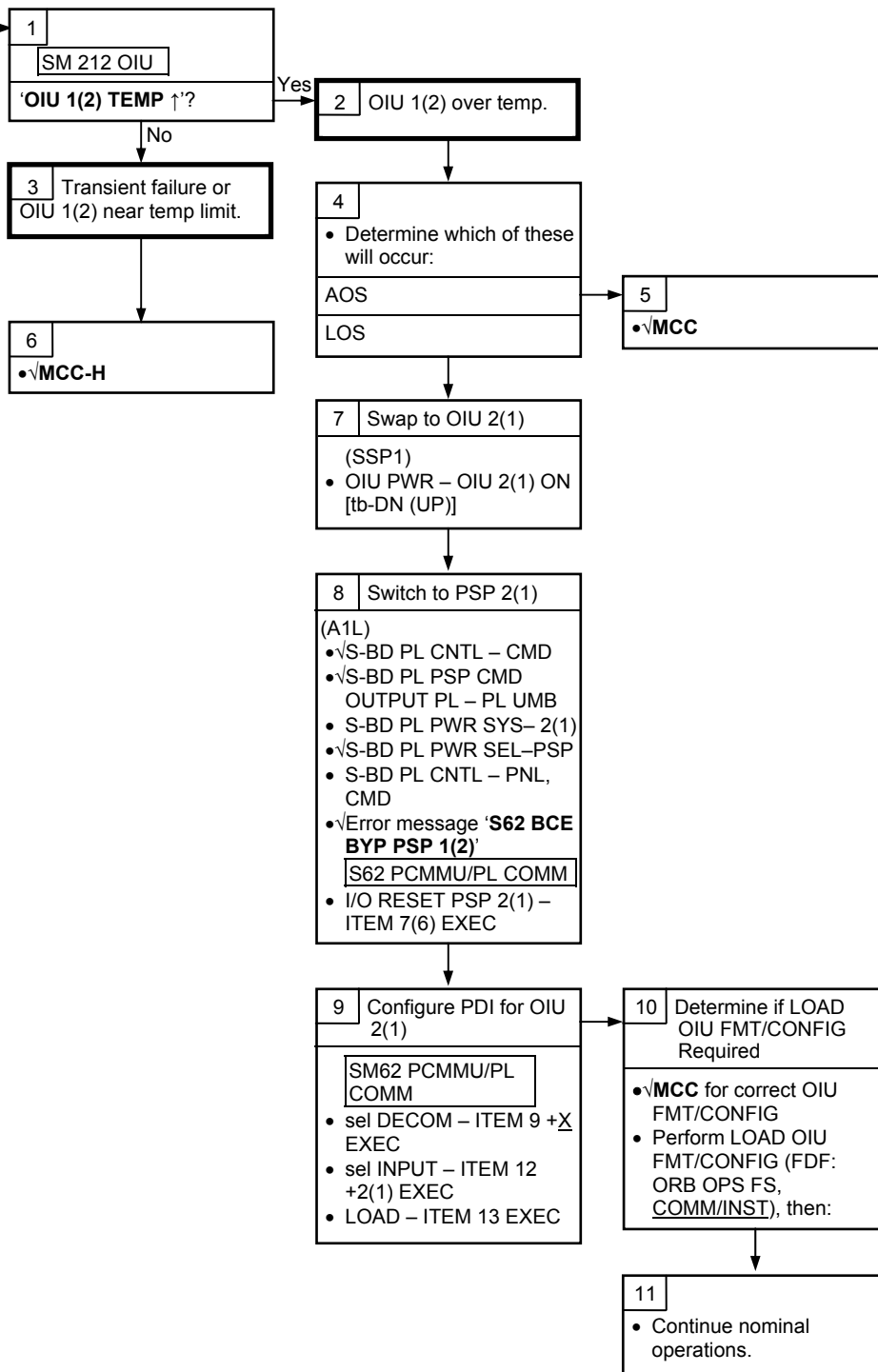
(ASSY OPS/ULF5/FIN)

SM 212 OIU  
TEMP

OIU message: OIU  
TEMP > 212

**Nominal Config:**

(R1)  
PL CAB –  
MNA(MNB)  
PL AUX – ON  
(SSP1)  
OIU PWR – OIU 1(2)  
ON  
OIU PWR tb –  
UP(DN)



This Page Intentionally Blank

**COMM**

**S212 OIU AD 1 NOLK/LOSS OF ISS OR SSOR TELEMETRY**

(ASSY OPS/ULF5/FIN) Page 1 of 3 pages

SM ALERT

S212 OIU AD1 NOLK

Loss of Data On SPEC 205 During Undocking

MCC-H Reports Loss of ISS Data To Ground Via OIU

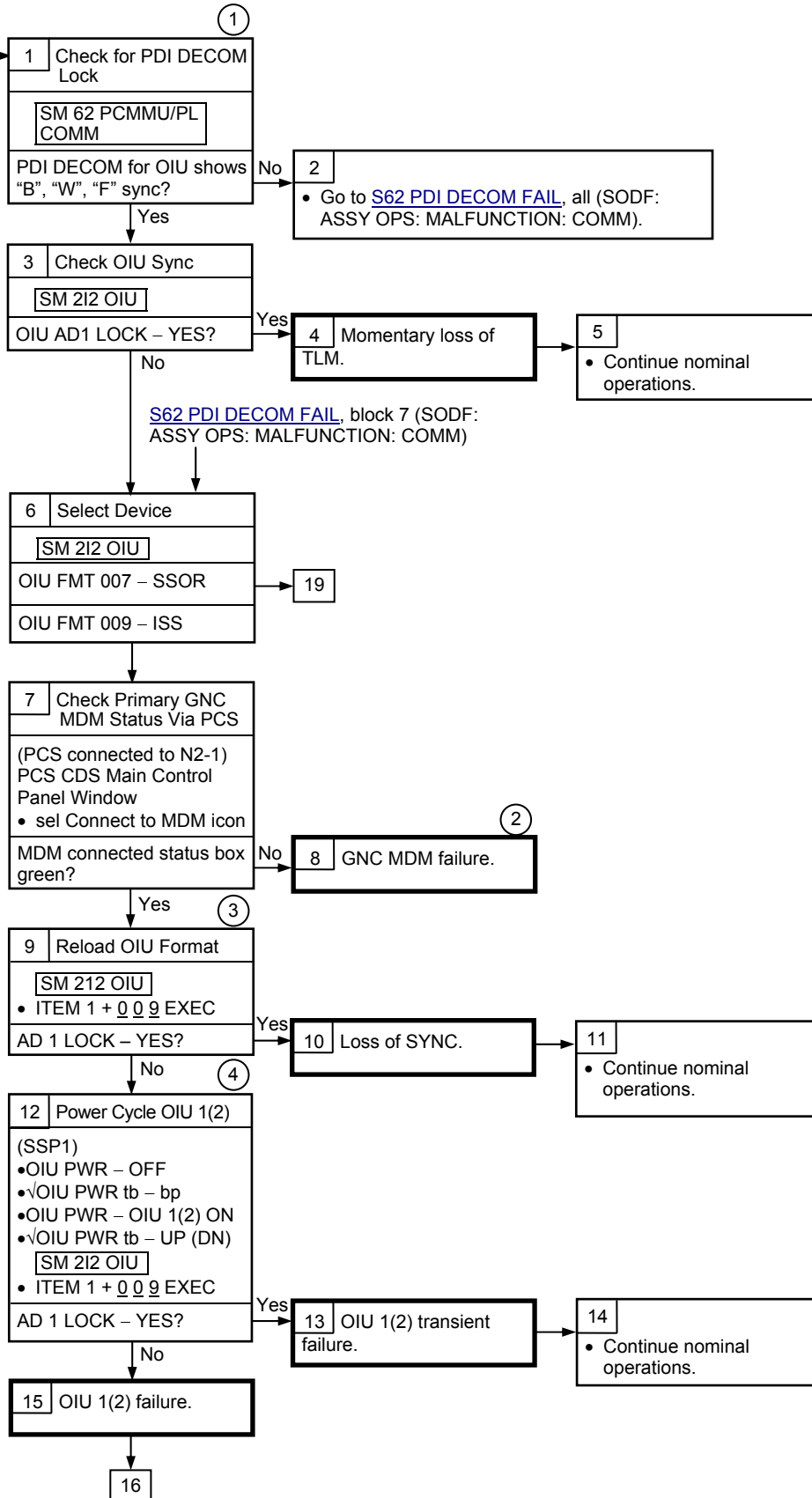
**Nominal Config:**

(R1)  
 PL CAB  
 - MNB(MNA)  
 PL AUX - ON (SSP1)  
 OIU PWR  
 - OIU 1(2) ON  
 OIU PWR tb-UP(DN)

For ISS:  
 One PCS connected to Primary GNC MDM  
 SM 212 OIU  
 OIU FMT: 009

For SSOR:  
 (R14)  
 cb MNA UHF EVA - cl  
 cb MNC UHF EVA - cl  
 (O6)  
 UHF EVA STRING - 1(2)  
 UHF MODE sel - EVA

SM 212 OIU  
 OIU FMT - 007

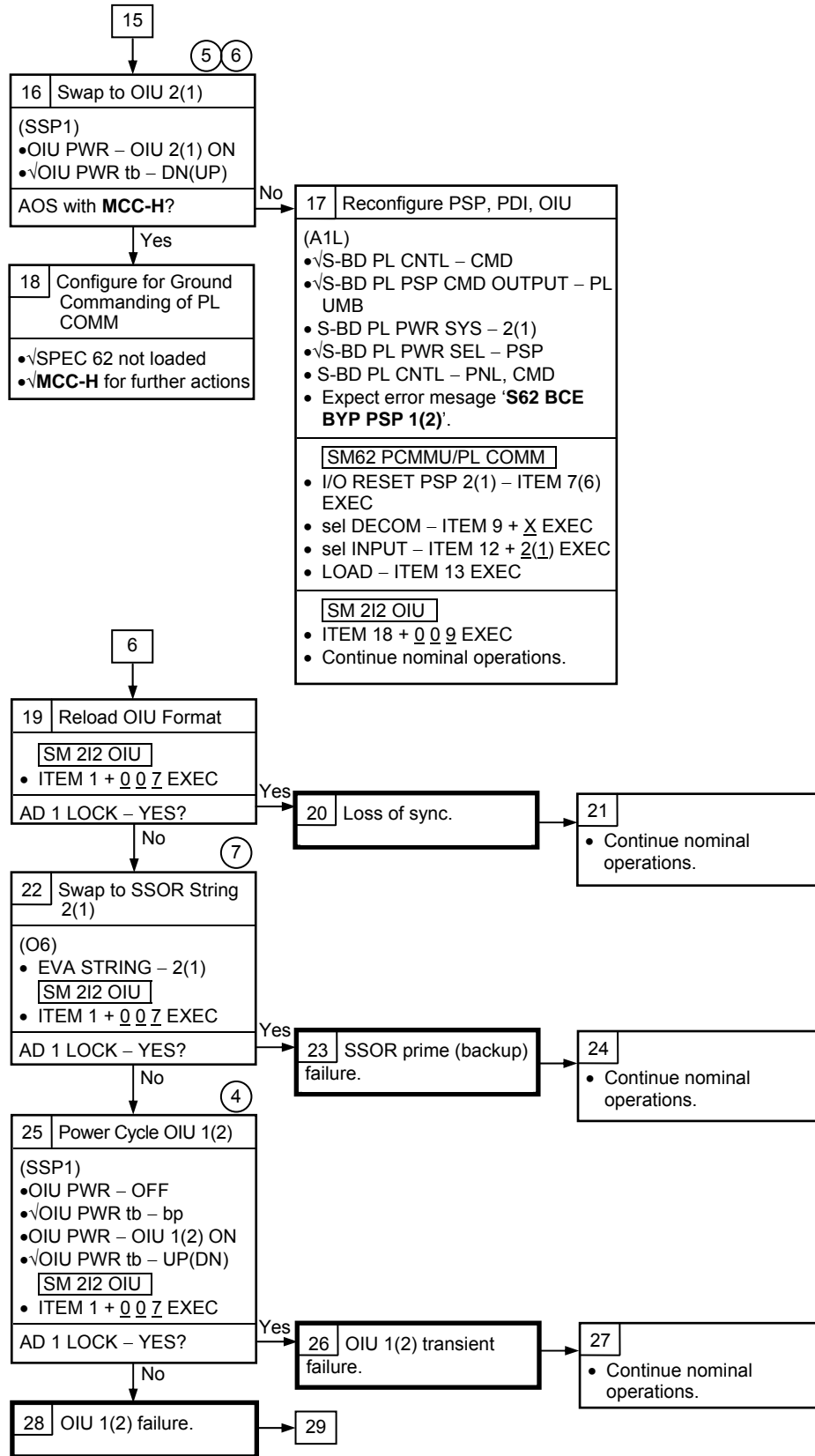


① OIU to PDI problems would announce a 'S62 PDI DECOM FAIL' message if FDA enabled.

② MCC-H will likely direct STS or ISS crew to perform 3.301 LOSS OF PCS TELEMETRY (SODF: POC: MALFUNCTION).

③ Reloading the OIU format forces a resync with the GNC MDM or SSOR.

④ OIU active device mapping occurs with format load.



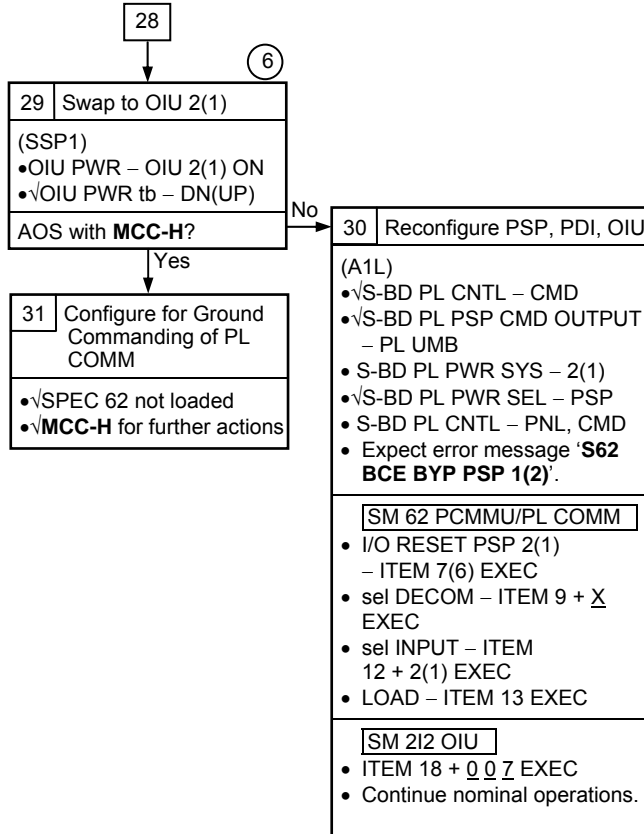
④ OIU active device mapping occurs with format load.

⑤ Malfunction restores operational capability; additional troubleshooting to determine BIA failure may be performed later.

⑥ OIU powerup config on OIU BUS 3 is RT on ch A.

⑦ Reloading the OIU format forces a resync with the SSOR.





⑥  
 OIU powerup config  
 on OIU BUS 3 is RT  
 on ch A.

This Page Intentionally Blank

# S62 PDI DECOM FAIL

(ASSY OPS/ULF5/FIN)

S212 OIU AD 1 NOLK/LOSS OF ISS OR SSOR TELEMETRY,  
block 2 (SODF: ASSY OPS: MALFUNCTION: COMM)

SM  
ALERT

S62 PDI  
DECOM FAIL

**Nominal Config:**

(A1L)  
PL DATA INTLVR  
PWR – ON

(R1)  
PL CAB MNA(MNB)  
PL AUX – ON

(SSP1)  
OIU PWR – OIU 1(2)  
ON  
OIU PWR tb –  
UP(DN)

SM 62 PCMMU/  
PLCOMM

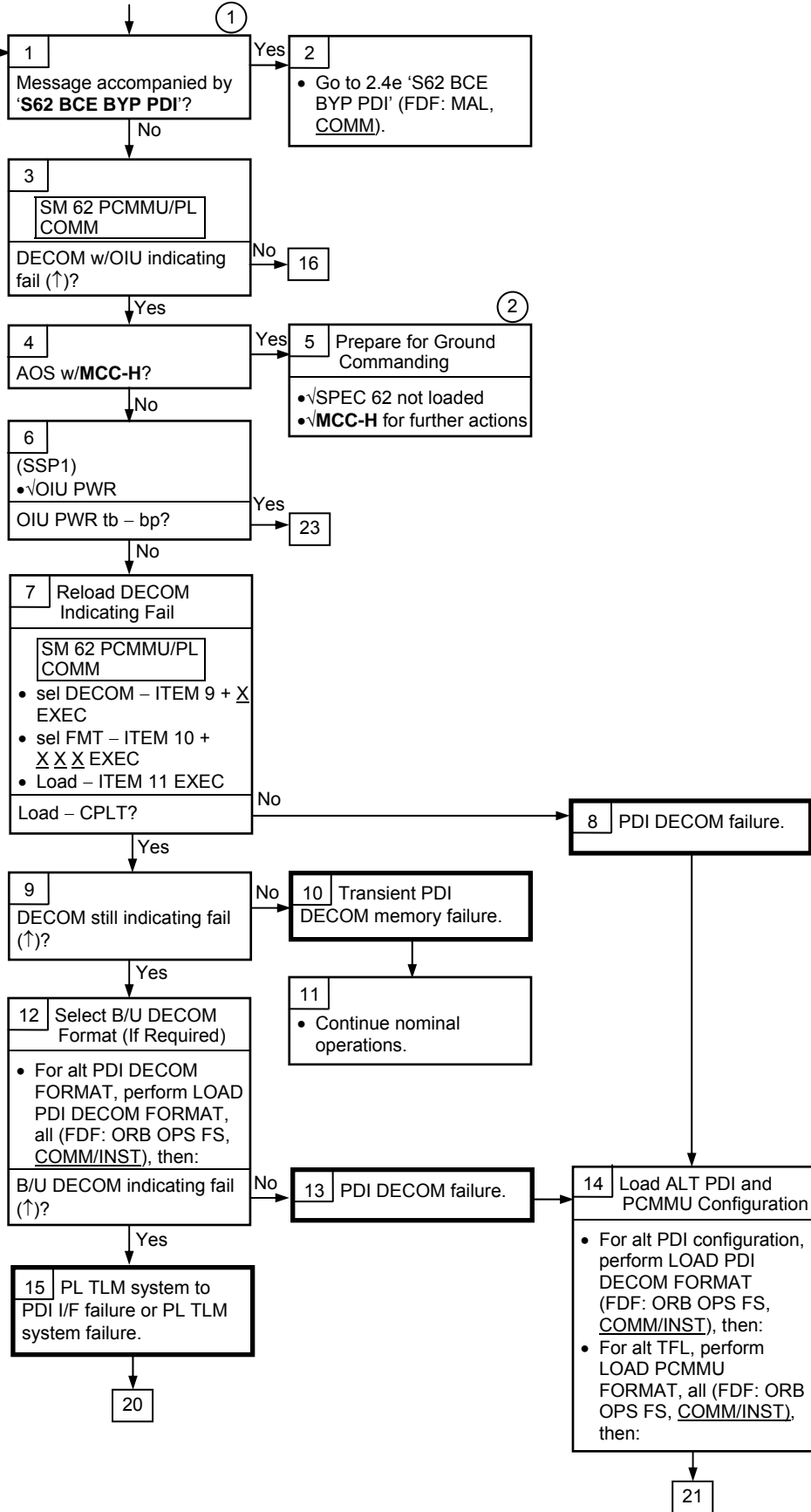
DECOM FDA ENA  
ITEM 14 (15, 16,  
17) = ENA (\*)

SM212 OIU

OIU FMT 5 = MPLM  
OIU FMT 7 = RNDZ  
OIU FMT 9 = ISS

ISS Config:  
GNC – 1 prime on  
LB ORB N2-1.

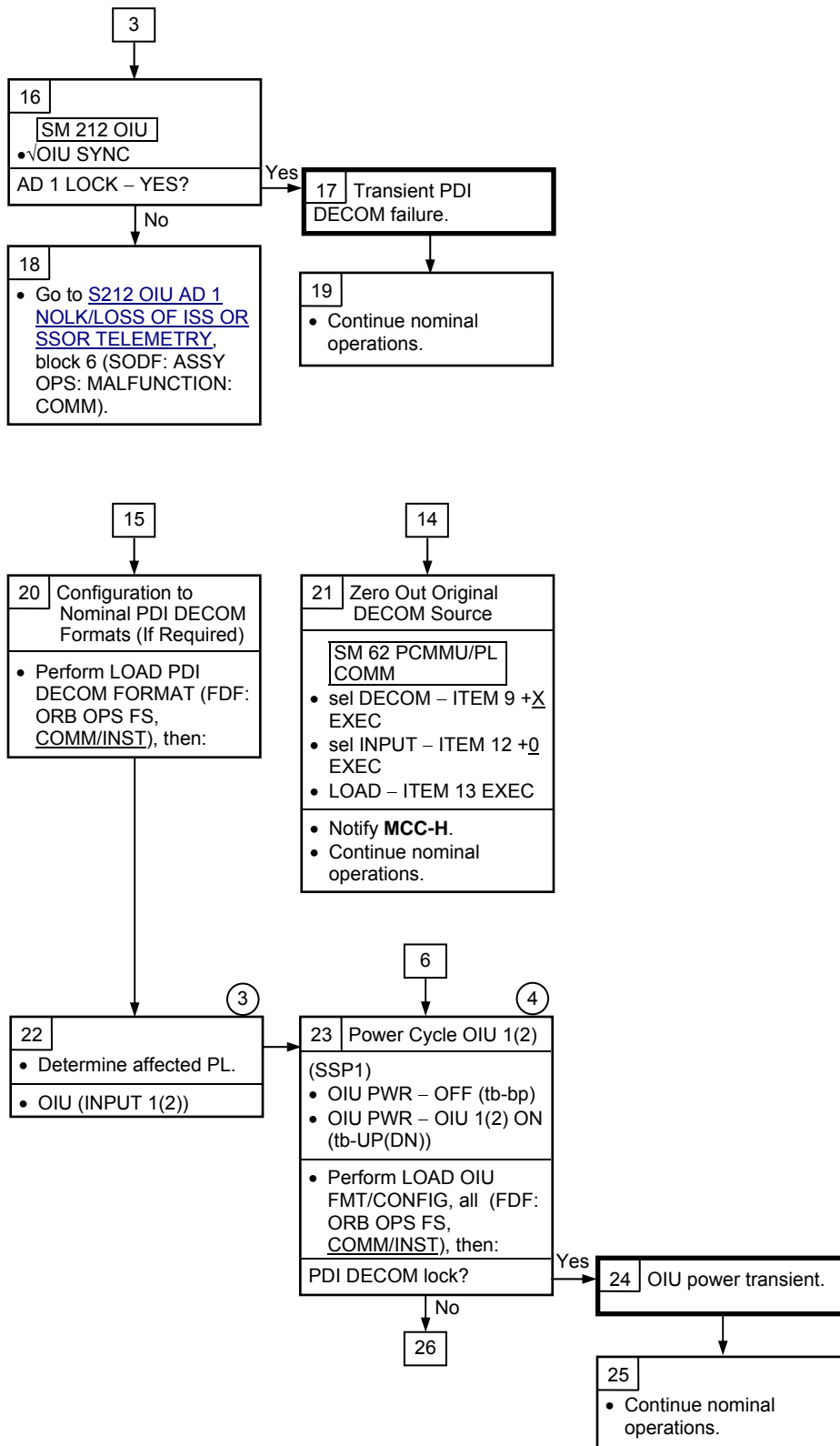
OIU FMT 255 = H&S



①  
**S212 OIU AD 1 NOLK** indicates OIU active device lock = NO.

②  
**MCC-H** can perform all PL COMM reconfig, except OIU PWR cycle and swap steps.

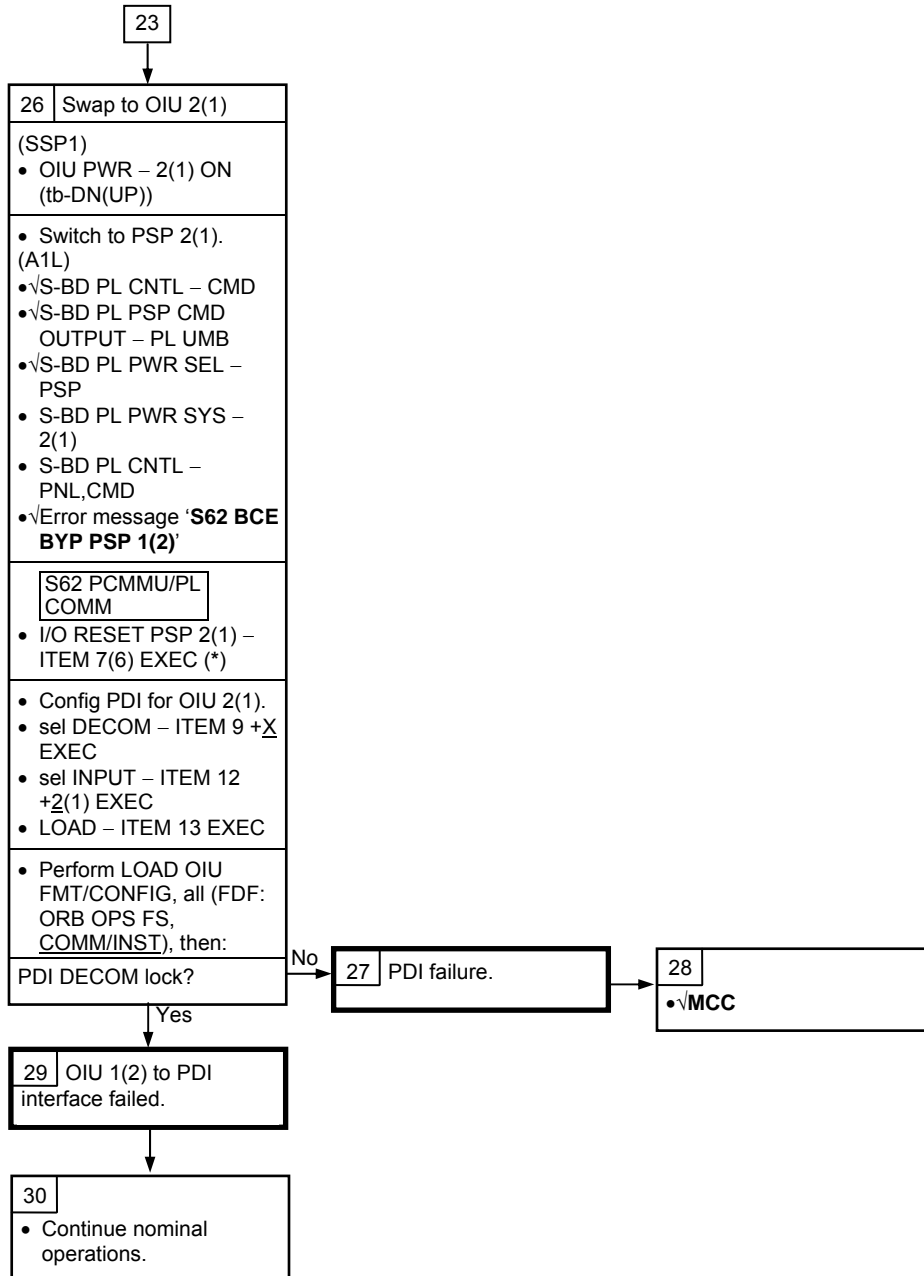
**S62 PDI DECOM FAIL**  
(ASSY OPS/ULF5/FIN)



③  
TCS/SSV is not addressed in malfunction; FDA is not enabled.

④  
If a config other than GNC-1 prime on N2-1 is active, √MCC.

**S62 PDI DECOM FAIL**  
(ASSY OPS/ULF5/FIN)



This Page Intentionally Blank

| Procedure                                                                 | Secure Action | Recovery Action | Info |
|---------------------------------------------------------------------------|---------------|-----------------|------|
| PL1(2) MDM I/O ERROR; PL1(2) MDM OUTPUT (FDF: ORB PKT, <u>DPS</u> )       | N/A           | N/A             | A    |
| 5.3c I/O ERROR PL1(2); MDM OUTPUT PL1(2) (FDF: MAL, <u>DPS</u> )          | N/A*          | N/A             | A    |
| PASS SM GPC FAIL (FDF: ORB PKT, <u>DPS</u> )                              | N/A           | D               | B    |
| 5.1a CS SPLIT (FDF: MAL, <u>DPS</u> )                                     | N/A*          | C,D,E**         | B    |
| GNC RECOVERY VIA G2FD (FDF: ORB PKT, <u>DPS</u> )                         | N/A*          | C,D             | B    |
| 5.3e I/O ERROR FLEX (FDF: MAL, <u>DPS</u> )                               | N/A           | N/A             | N/A  |
| 5.3f BCE BYP FLEX (FDF: MAL, <u>DPS</u> )                                 | N/A           | N/A             | N/A  |
| 5.3g BCE BYP PL1(2) (FDF: MAL, <u>DPS</u> )                               | N/A*          | N/A             | A    |
| GPC FRP-4 PASS RECOVERY AFTER BFS ENGAGE (FDF: MAL, <u>DPS</u> )          | N/A*          | C,D             | B    |
| GPC FRP-7 DPS RECONFIG FOR LOSS OF AV BAY COOLING (FDF: MAL, <u>DPS</u> ) | N/A*          | C,D             | B    |
| DPS SSR-3 GNC REASSIGNMENT (FDF: MAL, <u>DPS</u> )                        | N/A           | N/A             | B    |
| DPS SSR-4 SM REASSIGNMENT (FDF: MAL, <u>DPS</u> )                         | N/A           | C,D             | B    |
| ECLSS SSR-10 H2O PUMP OPS VIA GPC (FDF: MAL, ECLS)                        | N/A           | C,D,E**         | B    |

\* Procedure does not call out PL/DPS RECONFIG, Secure.

\*\* Procedure does not call out PL/DPS RECONFIG, Recovery.

#### INFO A

If '**I/O ERROR PL1**' message

Loss of ground and orbiter MEDS command interface to ISS via PSP 1/OIU 1.

For additional impacts, refer to [ORBITER MDM LOSS IMPACTS](#) (SODF: ASSY OPS: MALFUNCTION: CRITICAL EQUIPMENT LOST).

If '**I/O ERROR PL2**' message

Loss of ground and orbiter MEDS command interface to ISS via PSP 2/OIU 2.

For additional impacts, refer to [ORBITER MDM LOSS IMPACTS](#) (SODF: ASSY OPS: MALFUNCTION: CRITICAL EQUIPMENT LOST).

#### INFO B

If SM GPC affected

Note PL commanding via SM GPC (ground and/or orbiter MEDS) not possible until SM machine is restored and PL 1(2) MDM I/F is restored.

If GNC GPC affected

Ground commanding not possible until GNC machine is restored.

ACTION C

If PSP I/O reset not previously performed

SM 62 PCMMU/PL COMM

I/O RESET PSP 1(2) – ITEM 6(7) EXEC

Notify **MCC-H** when completed.

Resume SPEC 62.

ACTION D

Reload PDI DECOM FORMAT (FDF: ORB OPS FS, COMM/INST).

As required, reenable PDI DECOM FDA.

Resume SPEC 62.

ACTION E

Reload PCMMU TFLs, LOAD PCMMU FORMAT (FDF: ORB OPS FS, COMM/INST).



# ORBITER ELECTRICAL BUS LOSS MATRIX

(ASSY OPS/ULF5/FIN) Page 1 of 2 pages

| ORBITER EPS BUSES                            | ESS 1BC            |                  | ESS 2CA       |                    | ESS 3AB    | CNT<br>AB2 | MNA DA1 |            |        |     |         |            | MNB DA2                    |         |      |      | FC3 | MNC DA3 |     | CNT<br>CA1 |   |            |                |
|----------------------------------------------|--------------------|------------------|---------------|--------------------|------------|------------|---------|------------|--------|-----|---------|------------|----------------------------|---------|------|------|-----|---------|-----|------------|---|------------|----------------|
|                                              | PNL<br>O13,<br>R14 | ESS<br>1BC<br>FD | ESS<br>2CA FD | PNL<br>O13,<br>R14 | PNL<br>O13 |            | PNL O14 | AUX<br>PLA | MPC1   |     |         | AUX<br>PLB | APC5<br>APC2<br>AFT<br>PLB | PNL O15 | MAR2 | MAR1 |     | (R)     | (R) |            | P | PNL<br>O16 | APC 6<br>APC 3 |
|                                              |                    |                  |               |                    |            |            |         |            | P      | (R) |         |            |                            |         |      |      |     |         |     |            |   |            |                |
|                                              |                    |                  |               |                    |            |            |         |            | CAB    |     |         |            |                            |         |      |      |     |         |     |            |   |            |                |
|                                              |                    |                  | PL1           | PL2                | PL3        |            |         |            | PRI PL |     | AFT PLC | MO63P      |                            |         |      |      |     |         |     |            |   |            |                |
| ORBITER EQUIPMENT                            |                    |                  |               |                    |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     |            |   |            |                |
| PTU1                                         | XRC                |                  |               |                    |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     | XRC        |   |            |                |
| APCU1 (PMM)                                  |                    |                  |               |                    |            | XC         | X       |            |        |     |         |            |                            |         |      |      |     |         |     |            |   |            |                |
| OPCU                                         |                    |                  |               |                    |            | XC         | X       |            |        |     |         |            |                            |         |      |      |     |         |     |            |   |            |                |
| PTU2                                         |                    |                  |               | XRC                |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     | XRC        |   |            |                |
| APCU2 (LCS)                                  |                    |                  |               |                    |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     | X          |   |            |                |
| OPCU                                         |                    |                  |               |                    |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     | X          |   |            |                |
| OIU1                                         |                    |                  |               |                    |            |            |         |            |        | X   |         |            |                            |         |      |      |     |         |     |            |   |            |                |
| OIU2                                         |                    |                  |               |                    |            |            |         |            |        |     | X       |            |                            |         |      |      |     |         |     |            |   |            |                |
| TCS                                          |                    |                  | XR            |                    |            |            |         |            |        |     | X       |            |                            |         |      |      |     |         |     |            |   |            |                |
| Video Processing Unit (VPU)                  |                    |                  |               |                    |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     | X          |   |            |                |
| Primary C/L Camera                           |                    |                  |               |                    |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     |            |   |            |                |
| Secondary C/L Camera                         |                    |                  |               |                    |            |            |         |            | X      |     |         |            |                            |         |      |      |     |         |     |            |   |            |                |
| PDIP 1 (Ku-Band relay, PCS-to-OIU interface) |                    |                  |               |                    |            |            |         |            |        |     | X       |            |                            |         |      |      |     |         |     |            |   |            |                |
| PDIP 2 (PMM relay, TCS/SSV)                  |                    |                  |               |                    |            |            |         |            |        | X   |         |            |                            |         |      |      |     |         |     |            |   |            |                |
| Payload Timing Buffer                        |                    |                  |               |                    |            |            |         |            |        |     |         | X          |                            |         |      |      |     |         |     |            |   |            |                |
| Orbiter PCS                                  |                    |                  |               |                    |            |            |         |            |        | X   |         |            |                            |         |      |      |     |         |     |            |   |            |                |
| DragonEye (electronics)                      |                    |                  |               |                    |            |            |         | XC         |        |     |         |            | X                          |         |      |      |     |         |     |            |   |            |                |
| DragonEye (hts)                              |                    |                  |               |                    |            |            |         |            |        |     |         |            | X                          |         |      |      |     |         |     |            |   |            |                |
| MIDDECK PAYLOADS                             |                    |                  |               |                    |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     |            |   |            |                |
| Glacier                                      |                    |                  |               |                    |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     | X          |   |            |                |
| AEM                                          |                    |                  |               |                    |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     | X          |   |            |                |
| CGBA                                         |                    |                  |               |                    |            |            |         |            |        |     |         |            |                            |         |      |      |     |         |     | X          |   |            |                |

(1) Redundant PMM MDM/PDB pwr is available from APCU2 through the interconnect cable (the power still must go through APCU1's output relay).

(2) Redundant LCS pwr is available from APCU1 through the interconnect cable (the power still must go through APCU2's output relay).

X - Total Loss of Operational Power

XR - Loss of Redundant Power

XC - Total Loss of Control Power

XRC - Loss of Redundant Control Power

XRM - Loss of Redundant tb Monitor Power

P - Primary Power Source

(R) - Redundant Power Source (requires crew action to use)

**ORBITER ELECTRICAL BUS LOSS MATRIX**

(ASSY OPS/ULF5/FIN) Page 2 of 2 pages

| ORBITER EPS BUSES                             | ESS 1BC      |            | ESS 2CA    |              | ESS 3AB | CNT AB2 | MNA DA1 |         |     |     |         |      | MNB DA2 |         |      |      | FC3 | MNC DA3 |     | CNT CA1 |         |                |         |         |       |
|-----------------------------------------------|--------------|------------|------------|--------------|---------|---------|---------|---------|-----|-----|---------|------|---------|---------|------|------|-----|---------|-----|---------|---------|----------------|---------|---------|-------|
|                                               | PNL O13, R14 | ESS 1BC FD | ESS 2CA FD | PNL O13, R14 | PNL O13 |         | PNL O14 | MPC1    |     |     | MPC2    |      |         | PNL O15 | MAR2 | MAR1 | (R) | (R)     | P   |         | PNL O16 | APC 6<br>APC 3 |         |         |       |
|                                               |              |            |            |              |         |         |         | AUX PLA | P   | (R) | AUX PLB | APC5 | AFT PLB |         |      |      |     |         |     |         |         |                | PRI PL  | AFT PLC | MO63P |
|                                               |              |            |            |              |         |         |         | CAB     |     |     | AFT PLB |      |         |         |      |      |     |         |     |         |         |                | AFT PLC |         |       |
| PL1                                           |              |            | PL2        |              |         | PL3     |         |         |     |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| ISS EQUIPMENT                                 |              |            |            |              |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| PMM Shell Htr Pwr (+28 VDC)                   |              |            |            |              |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     | X       |         |                |         |         |       |
| PMM MDM/PDB Pwr (+124 VDC via APCU 1) (1)     |              |            |            |              |         |         | XC      | X       |     |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| PMA 2 Hooks - Group 1, 2 - Sys A              | XRC          |            |            |              |         |         | X       |         |     |     |         |      |         |         | XRC  |      |     |         |     |         |         |                |         |         |       |
| PMA 2 Hooks - Group 1, 2 - Sys B              |              |            |            | XRC          |         |         |         |         |     |     |         |      | X       |         |      |      |     |         | XRC |         |         |                |         |         |       |
| OBSS                                          |              |            |            |              |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| LCS (+124 VDC via APCU 2) (2)                 |              |            |            |              |         |         |         |         |     |     |         |      |         |         |      |      |     | X       |     | XC      |         |                |         |         |       |
| LDRI, ITVC, PTU (on SRMS)                     |              |            |            |              |         |         |         |         | X   |     |         |      |         |         |      |      |     |         |     | XC      |         |                |         |         |       |
| LDRI, ITVC, PTU, LCS HTRS (In MPMs)           |              |            |            |              |         |         |         |         | XR  |     |         |      |         |         | XR   |      |     |         |     |         |         |                |         |         |       |
| RSC                                           |              |            |            |              |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     | X       |         |                |         |         |       |
| RSC Illuminator                               |              |            |            |              |         |         |         |         | X   |     |         |      |         |         |      |      |     |         |     | XC      |         |                |         |         |       |
| DTV MUX & VTR                                 |              |            |            |              |         |         |         |         |     | X   |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| PAYLOAD BUS CONTROL POWER                     |              |            |            |              |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| Cabin P/L Bus - MNA Cntl Pwr (nominal source) |              | XC         |            |              |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| Cabin P/L Bus - MNB Cntl Pwr (backup source)  |              |            |            | XC           |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| Aux P/L Bus B - MNB Cntl Pwr                  |              |            |            | XC           |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| Aux P/L Bus A - MNA Cntl Pwr                  |              | XC         |            |              |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| PL AFT - MNB Cntl Pwr                         |              |            |            | XRC          |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     | XRC     |         |                |         |         |       |
| PL AFT - MNC Cntl Pwr                         |              |            |            |              | XRC     |         |         |         | XRC |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| P/L PRI - MNC DA3 Cntl Pwr (nominal source)   |              |            |            |              | XRC     |         |         |         | XRC |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |
| P/L PRI - MNB DA2 Cntl Pwr (backup source)    |              |            |            | XRC          |         |         |         |         |     |     |         |      |         |         |      |      |     |         |     | XRC     |         |                |         |         |       |
| P/L PRI - FC3 Cntl Pwr (backup source)        |              |            |            |              |         | XRC     |         |         | XRC |     |         |      |         |         |      |      |     |         |     |         |         |                |         |         |       |

(1) Redundant PMM MDM/PDB pwr is available from APCU2 through the interconnect cable (the power still must go through APCU1's output relay).  
 (2) Redundant LCS pwr is available from APCU1 through the interconnect cable (the power still must go through APCU2's output relay).  
 X - Total Loss of Operational Power  
 XR - Loss of Redundant Power  
 XC - Total Loss of Control Power  
 XRC - Loss of Redundant Control Power  
 XRM - Loss of Redundant to Monitor Power  
 P - Primary Power Source  
 (R) - Redundant Power Source (requires crew action to use)

## ORBITER MDM LOSS IMPACTS

(ASSY OPS/ULF5/FIN)

Page 1 of 2 pages

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MDM FF1          | Uplink through NSP 1                                                                                                                                                                                                                                                                                                                                                                                                        |
| MDM FF3          | Uplink through NSP 2<br>FRCS Vernier command path (loss of verns)                                                                                                                                                                                                                                                                                                                                                           |
| MDM FA1          | LRCS Vernier command path (loss of verns)                                                                                                                                                                                                                                                                                                                                                                                   |
| MDM FA2          | RRCS Vernier command path (loss of verns)                                                                                                                                                                                                                                                                                                                                                                                   |
| MDM PF1<br>(PL1) | ISS OIU Command Path (via PSP 1 – UMB 1 and OIU 1)<br>OIU 1 telemetry (health and status)                                                                                                                                                                                                                                                                                                                                   |
| MDM PF2<br>(PL2) | ISS OIU Command Path (via PSP 2 – UMB 1 and OIU 2)<br>OIU 2 telemetry (health and status)                                                                                                                                                                                                                                                                                                                                   |
| MDM OF1          | PCMMU 1, 2 – ON/OFF power select, BFS auto TFL<br>PL Bay MECH System 1, 2 power switch telemetry<br>ROEU Latch 2, 3 (MATE/DEMATE, LAT/REL, ELEC CONT) Sys B – telemetry<br>MID MCAs 1, 3 – operational status telemetry for ROEU<br>PL AUX A – RPC ON discrete telemetry                                                                                                                                                    |
| MDM OF2          | PL AUX B – RPC ON discrete telemetry<br>Payload Retention System – System Redundancy Telemetry for LAT/R-F-L/REL<br>(PL SEL 1,2,3)<br>MID MCA 1 OP STATUS 5,6 telemetry<br>MID MCA 3 OP STATUS 5,7,8 telemetry                                                                                                                                                                                                              |
| DSC OF2          | FRCS Vernier Inj Temps (loss of verns)                                                                                                                                                                                                                                                                                                                                                                                      |
| MDM OF3          | Insight into orbiter S-Band command path<br>PL PRI (MNC, MNB, FC3) – ON discrete telemetry                                                                                                                                                                                                                                                                                                                                  |
| MDM OF4          | Ku-Band – loss of insight to RADAR mode and RADAR output power<br>telemetry only<br>S-Band, Ku-Band – PNL/CMD switch – position telemetry only<br>PSP, GCIL – ON/OFF telemetry<br>S-Band P/L control telemetry<br>PDI Power Switch position indication<br>CAB P/L (MNA, MNB), PL AUX – ON discrete telemetry<br>ROEU Latch 2,3 (MATE/DEMATE, LAT/REL, ELEC CONT) System A telemetry<br>APCU-1 telemetry<br>APCU-2 telemetry |
| DSC OM1          | MNC bus voltage telemetry                                                                                                                                                                                                                                                                                                                                                                                                   |
| DSC OM2          | MNA, MNB bus voltage telemetry                                                                                                                                                                                                                                                                                                                                                                                              |

10 MAY 10

22603.doc

## ORBITER MDM LOSS IMPACTS

(ASSY OPS/ULF5/FIN)

Page 2 of 2 pages

|         |                                                                                                                                                                                                                                                                  |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MDM OA1 | ODS X4/PMA2 X3 connector mate telemetry<br>PMA2 Group 1 passive hooks (1,3,5) closed telemetry<br>PMA2 Group 1 passive hooks (7,9,11) closed telemetry<br>DIH ODS X1 CONN MATE (A)<br>DIH ODS X1 CONN MATE (B)                                                   |
| DSC OA1 | ODS X4/PMA2 X3 connector mate power telemetry<br>PMA2 Group 1 passive hooks (1,3,5) closed power telemetry<br>PMA2 Group 1 passive hooks (7,9,11) closed power telemetry                                                                                         |
| MDM OA2 | ODS X3/PMA2 X4 connector mate telemetry<br>PMA2 Group 2 passive hooks (2,4,6) closed telemetry<br>PMA2 Group 2 passive hooks (8,10,12) closed telemetry<br>PL AFT MNB Amps and PWR ON discrete telemetry<br>DIH ODS X2 CONN MATE (A)<br>DIH ODS X2 CONN MATE (B) |
| DSC OA2 | ODS X3/PMA2 X4 connector mate power telemetry<br>PMA2 Group 2 passive hooks (2,4,6) closed power telemetry<br>PMA2 Group 2 passive hooks (8,10,12) closed power telemetry<br>Vernier R5D Inj Temps (loss of verns)                                               |
| MDM OA3 | ROEU Latch 1 (RELAX) System A telemetry<br>P/L SEL 1,2 (latch 1) Primary LAT/R-F-L/REL – latch status telemetry<br>PL AFT MNC Amps and PWR ON telemetry                                                                                                          |
| DSC OL1 | LRCS Vernier Inj Temps (loss of verns)                                                                                                                                                                                                                           |
| DSC OR1 | RRCS Vernier Inj Temps (loss of verns)                                                                                                                                                                                                                           |

10 MAY 10

22603.doc

DEORBIT PREP

This Page Intentionally Blank

## PAYLOAD DEACTIVATION

(ASSY OPS/ULF5/FIN)

Page 1 of 1 page

L12U            1.    cb SW PWR 1                            – op  
(SSP 1)                 PDIP 1 PWR 2/KuBAND RLY   – op  
                              PDIP 1 PWR 1                            – op

L12L            2.    cb SW PWR 2                            – op  
(SSP 2)                 PDIP 2 PWR 2/PMM RLY   – op  
                              PDIP 2 PWR 1                            – op

L12 (PDIP 1)        Ku BAND RATE – OFF

R1                3.    PL CAB – OFF  
                              AFT MN B – OFF

This Page Intentionally Blank



**PAYLOAD REACTIVATION**

(ASSY OPS/ULF5/FIN)

Page 1 of 1 page

R1        1. PL AFT MN B – ON

This Page Intentionally Blank

## PAYLOAD ENTRY SWITCH LIST/VERIFICATION

(ASSY OPS/ULF5/FIN) Page 1 of 2 pages

### OBJECTIVE:

To verify the configuration of payload related switches in the shuttle prior to re-entry to earth.

- R1 1. √PL CAB – OFF  
√PRI MNB – ctr (tb-OFF)  
√FC3 – ctr (tb-OFF)  
√MNC – ctr (tb-OFF)  
√AUX – ON  
√AFT MNB – OFF  
√MNC – OFF
- L12U (SSP1) 2. √cb SW PWR 1 – op  
√cb PDIP 1 PWR 2/KuBAND RLY – op  
√PMM CH 1 HTR – OFF (tb-bp)  
√PMM CH 2 HTR – OFF (tb-bp)  
√TCS PWR – OFF (tb-bp)  
√cb PDIP 1 PWR 1 – op  
√OIU PWR – OFF (tb-bp)
- L12L (SSP2) 3. √cb SW PWR 2 – op  
√cb PDIP 2 PWR 2/PMM RLY – op  
√DRAGNEYE PWR – OFF (tb-bp)  
√C/L CAM PWR – OFF  
√cb PDIP 2 PWR 1 – op
- L12 (PDIP1) 4. √Ku BAND RATE – OFF  
√DC PWR 1 – OFF  
√2 – OFF
- L11 (PDIP2) 5. √PMM DATA – OFF (ctr)  
√DC PWR 1 – OFF  
√2 – OFF
- MF28E/G 6. (GLACIER)  
√cb POWER – cl (lt on)  
√BATTERY sw – ON (lt on)
- MF43K 7. (AEM-2)  
√cb PUMP BKR – op { }  
√MAIN BREAKER – cl { }  
√FANS A&D, B&C (two) – cl { }  
√FANS A&D, B&C (two) – lt on  
√FANS – ON (audible fan operation)  
√LIGHTS – AUTO  
√cb LIGHTS B&C – cl { }  
√A&D – op { }  
√LIGHTS B&C – lt on (off during night cycle)  
√A&D – lt off  
√LED Display – showing GMT time

## PAYLOAD ENTRY SWITCH LIST/VERIFICATION

(ASSY OPS/ULF5/FIN) Page 2 of 2 pages

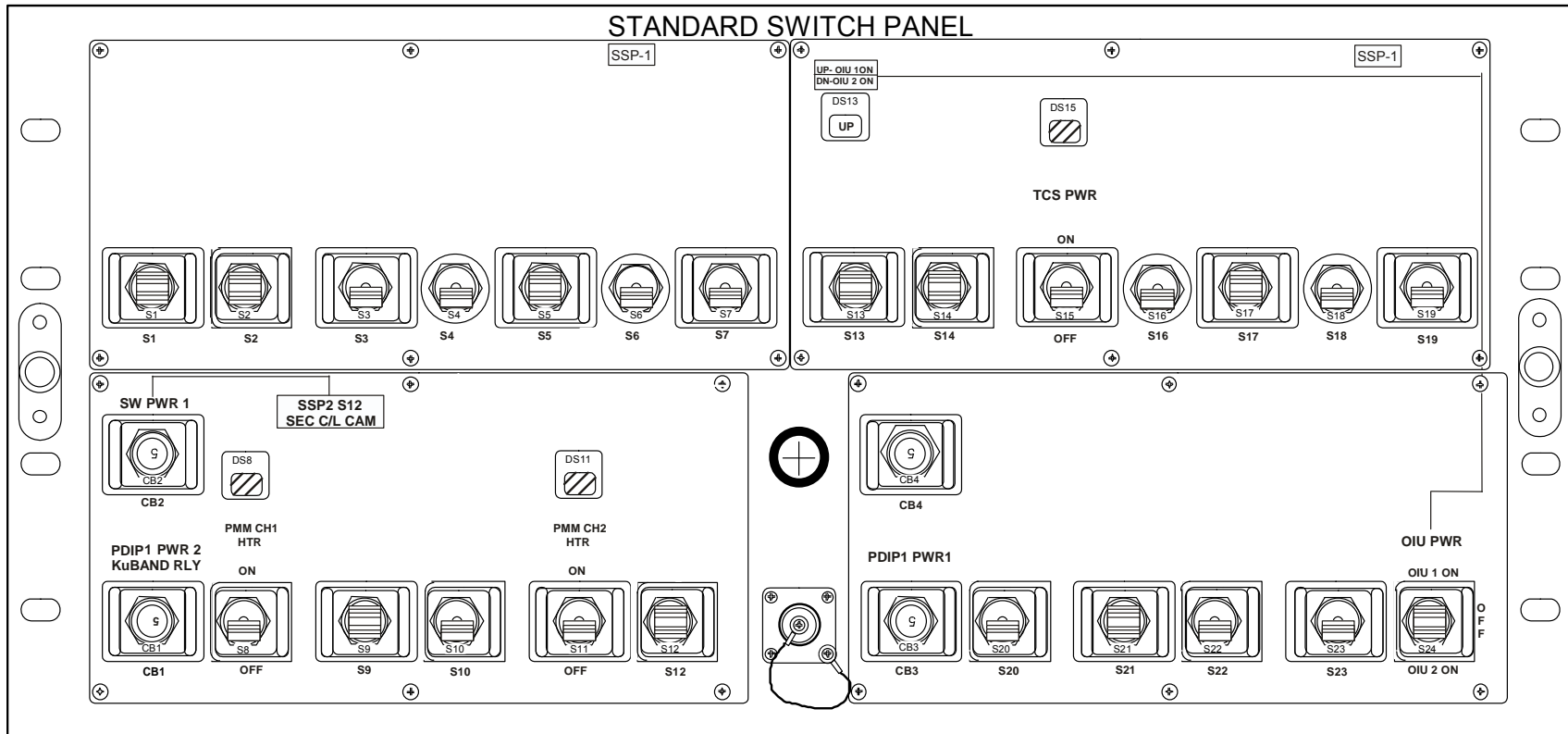
- MF71K      8. (AEM-1)
- √cb PUMP BKR – op { }
  - √MAIN BREAKER – cl { }
  - √FANS A&D, B&C (two) – cl { }
  - √FANS A&D, B&C (two) – It on
  - √FANS – ON (audible fan operation)
  - √LIGHTS – AUTO
  - √cb LIGHTS B&C – cl { }
  - √A&D – op { }
  - √LIGHTS B&C – It on (off during night cycle)
  - √A&D – It off
  - √LED Display – showing GMT time
- MF71E      9. (CGBA/NLP-GAP)
- √cb MAIN POWER – Close
  - √LED-MAIN POWER – On (green)
  - √FANS – ON (audible fan operation)

REFERENCE

This Page Intentionally Blank

**STANDARD SWITCH PANEL 1**  
 (ASSY OPS/ULF5/FIN) Page 1 of 1 page

273

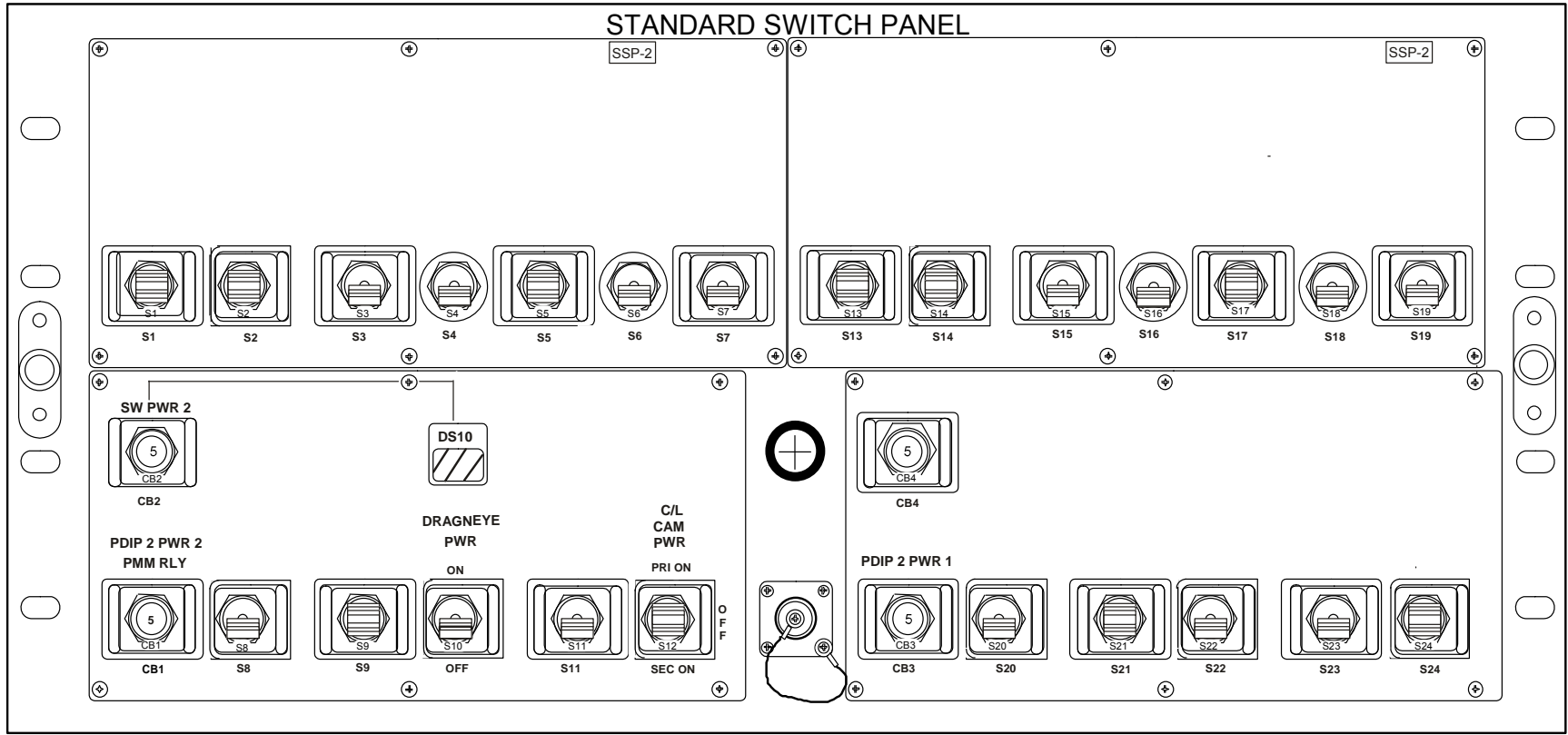


This Page Intentionally Blank



**STANDARD SWITCH PANEL 2**  
 (ASSY OPS/ULF5/FIN) Page 1 of 1 page

275



This Page Intentionally Blank

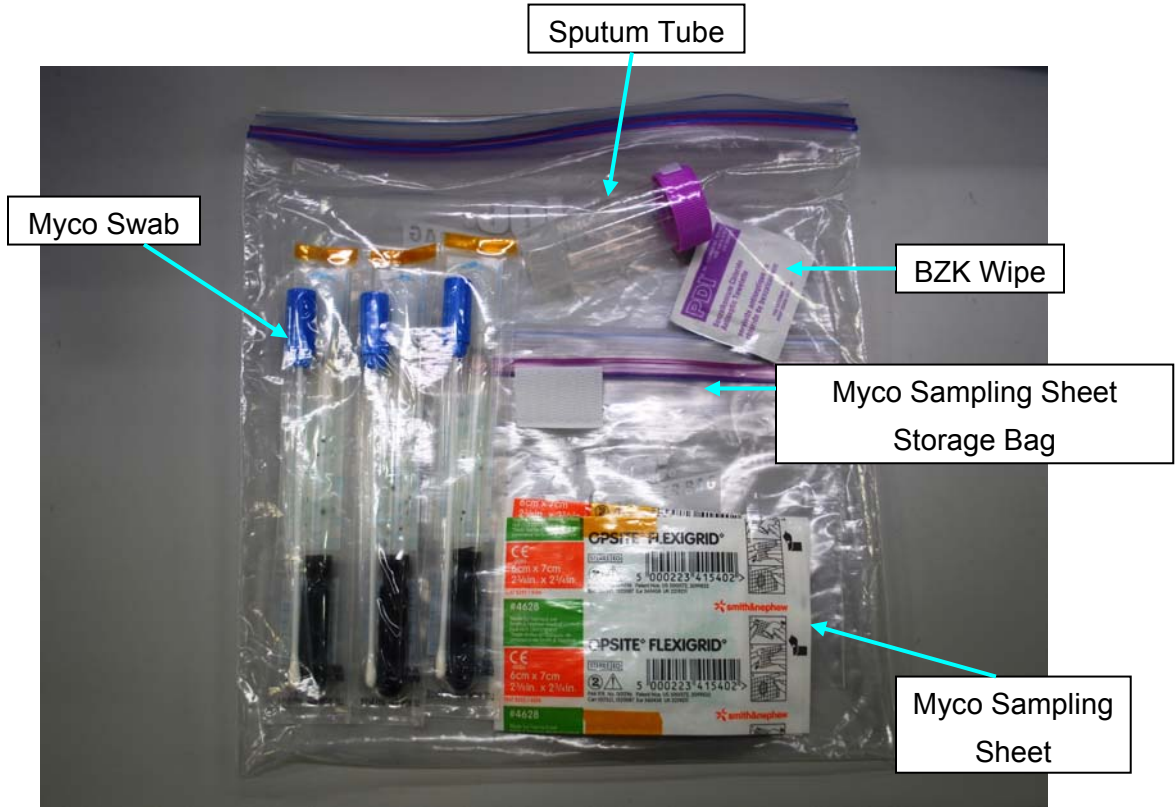


Figure 1.- Myco Kit.

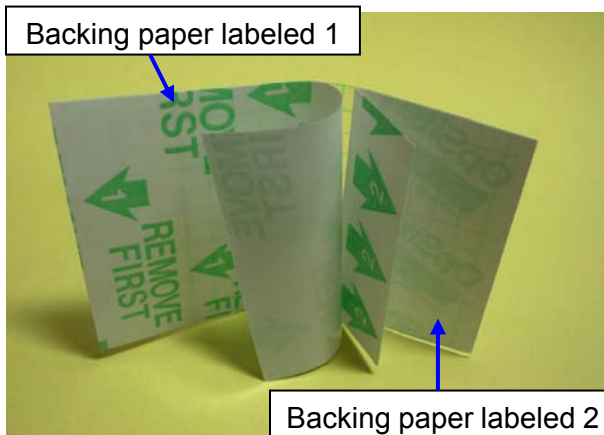


Figure 2.- Myco Sampling Sheet.



Figure 3.- Myco Sampling Sheet Storage Bag.

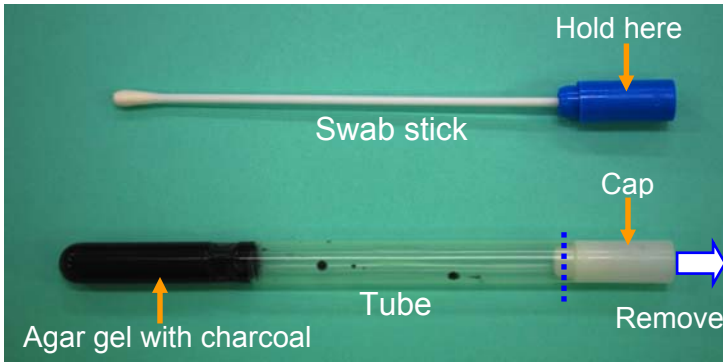


Figure 4.- Myco Swab.



Figure 5.- Sputum Tube.

CUE CARD

CUE CARD

This Page Intentionally Blank

### CGBA STATUS CHECK

(ASSY OPS/ULF5/FIN)

#### OBJECTIVE:

The following steps will perform a status check on the Commercial Generic Bioprocessing Apparatus (CGBA).

#### 1. CGBA STATUS CHECK

**NOTE**

1. MENU Option will time out after 30 seconds and return to status display.
2. Keypad goes into sleep mode if not pressed within 10 minutes. Pressing any key when display is in sleep mode will reactivate keypad to receive input.

MF71E  
(CGBA)

#### 1.1 $\sqrt$ LED-MAIN POWER – On (green)

\*\*\*\*\*  
 \* If no LED  
 \* Perform [CGBA INCORRECT \(NO\) DISPLAY](#), all (SODF:  
 \* ASSY OPS: PAYLOADS: CGBA), then:  
 \*\*\*\*\*

#### 1.2 $\sqrt$ CGBA fan running and airflow at AIR OUTLET

1.3 Clean Air Inlet Screen with Gray Tape, as required.

1.4 pb ENTER → Press (to disable screen saver)

#### 1.5 $\sqrt$ CGBA display indicates the following:

|          |             |
|----------|-------------|
| EET      | ddd / hh:mm |
| Temp     | nn.n deg C  |
| Set Temp | nn.n deg C  |
| DdMmMyy  | hh:mm:ss    |

\*\*\*\*\*  
 \* If data incorrect or no display  
 \* Perform [CGBA INCORRECT \(NO\) DISPLAY](#), all (SODF:  
 \* ASSY OPS: PAYLOADS: CGBA), then:  
 \*\*\*\*\*

#### 1.6 $\sqrt$ Temp = Set Temp $\pm$ 2° C

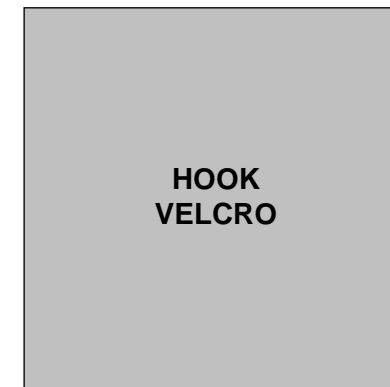
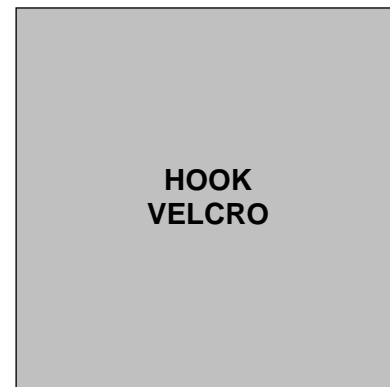
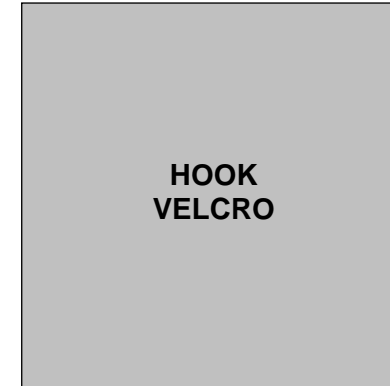
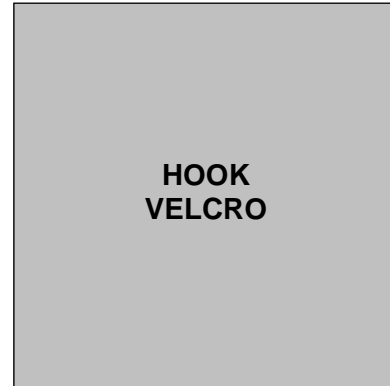
\*\*\*\*\*  
 \* If Temp incorrect, then  
 \* Perform [CGBA INCORRECT TEMP](#), all (SODF: ASSY OPS:  
 \* PAYLOADS: CGBA), then:  
 \*\*\*\*\*

#### 1.7 $\sqrt$ Time is incrementing

#### 1.8 Record MET and Temp in Table 1 (CGBA Log).

#### 1.9 Notify **MCC-H** of data recorded in Table 1 and any off-nominal conditions.

| MET         | Temp | MET         | Temp |
|-------------|------|-------------|------|
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |
| ___/___:___ | ___  | ___/___:___ | ___  |





# GLACIER STATUS CHECK

(ASSY OPS/ULF5/FIN) Page 1 of 2 pages

OBJECTIVE:  
The following steps will perform a status check on the Glacier.

- MF28E/G  
(Glacier)
1. GLACIER STATUS CHECK
    - 1.1 √cb POWER – Close (It on)
    - 1.2 √sw BATTERY – ON (It on)
    - 1.3 √Display – **HOME**

\*\*\*\*\*  
\* If Display – **\*\*Error Pending\*\***  
\* | Perform GLACIER ERROR MESSAGE, all (SODF: ASSY  
\* | OPS: PAYLOADS: GLACIER: MALFUNCTION), then:  
\*  
\* If **HOME** not shown  
\* pb Right (EXIT) → Press until **HOME** appears  
\*\*\*\*\*

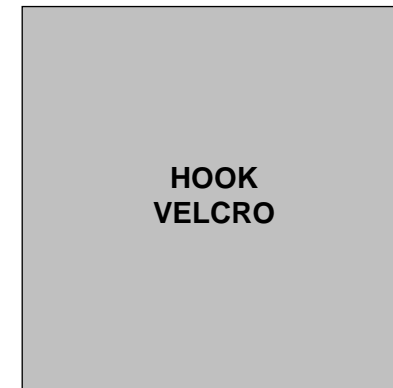
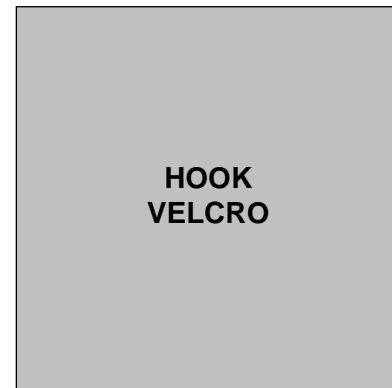
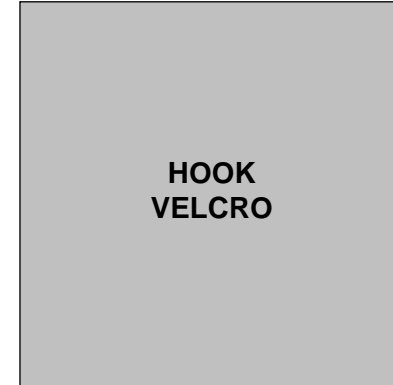
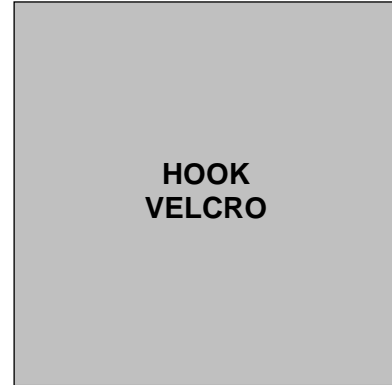
NOTE

After door openings, CURR TEMP may be out of range ramping toward set point.

- 1.4 If ascent Glacier  
√Display – **CURR TEMP:** is +4.0° C ± 5.0° C  
  
If descent Glacier  
√Display – **CURR TEMP:** is -95.0° C ± 5.0° C
- 1.5 Record from Glacier front panel **GPS**, **CURR TEMP** in Table 1 (Glacier Log).
- 1.6 Notify **MCC-H** of data recorded in Table 1 and any off-nominal conditions.

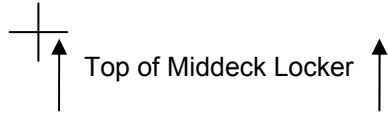
Table 1. Glacier Log

| GPS            | CURR TEMP   | GPS            | CURR TEMP   |
|----------------|-------------|----------------|-------------|
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |
| ____:____:____ | ____.____°C | ____:____:____ | ____.____°C |



**SPINAL ELONGATION STANDING HEIGHT LOG**

(ASSY OPS/ULF5/FIN)

**SPINAL ELONGATION STANDING HEIGHT LOG**

- 1) Velcro cue card to the farthest right column of the middeck lockers ensuring that the top of the page lines up with the top of the middeck locker. (If log is placed somewhere else, please note on the log exactly where it was placed.)
- 2) Subject holds self with his/her back against the middeck lockers and holds self down.
- 3) Operator helps to ensure feet are flush with the ground.
- 4) Operator marks height of subject using a cue card as a flat edge on paper with a pen and labels with Subject ID and date.
- 5) Repeat steps 2-4 for each subject.
- 6) After all subjects have been completed, remove Spinal Elongation Height Log from middeck lockers and place in the Spinal Procedure manila envelope for return.

ASSY OPS-3a/17A - ALL/A



HINGE



**SPINAL ELONGATION STANDING HEIGHT LOG**  
(ASSY OPS/ULF5/FIN)



HINGE

ASSY OPS-3b/17A - ALL/A



TOP  
HINGED AT BOTTOM OF  
'SPINAL ELONGATION STANDING HEIGHT LOG'  
HINGE

**SPINAL ELONGATION STANDING HEIGHT LOG**  
(ASSY OPS/ULF5/FIN)



ASSY OPS-3aa/17A - ALL/A



TOP  
HINGED AT BOTTOM OF  
BACK OF 'SPINAL ELONGATION STANDING HEIGHT LOG'  
HINGE

**SPINAL ELONGATION STANDING HEIGHT LOG**  
(ASSY OPS/ULF5/FIN)



ASSY OPS-3bb/17A - ALL/A



HOOK  
VELCRO

HOOK  
VELCRO

**AEM UNIT #1 CHECK**

(ASSY OPS/ULF5/FIN)

Page 1 of 2 pages

Observe conditions in first column and write code in appropriate Flight Day column.

Table 1. Codes for Daily Status Check

|                                     |                                  |                            |                               |                 |                |                          |
|-------------------------------------|----------------------------------|----------------------------|-------------------------------|-----------------|----------------|--------------------------|
| <b>Water Lft/Rt</b>                 | 1-4                              |                            |                               |                 |                |                          |
| <b>Respiration:</b>                 | (N)ormal<br>(3/sec)              | (R)apid                    | (S)hallow                     | (L)abored       |                | (U)nable to<br>determine |
| <b>Skin: (ears,<br/>toes, tail)</b> | (N)ormal:<br>Dark                | (D)ry/Scaly                | (S)crapes/Cuts                | (S)wollen/Red   |                | (U)nable to<br>determine |
| <b>Coat/Fur:</b>                    | (N)ormal:<br>Smooth/shiny        | (R)ough<br>spiky, clump    | (D)iscolored                  | (D)ull or (W)et | (H)air<br>Loss | (U)nable to<br>determine |
| <b>Nose:</b>                        | (N)ormal:<br>Clear               | (D)ischarge:<br>Red/Brown  | (B)leeding                    | (O)ther         |                | (U)nable to<br>determine |
| <b>Eyes:</b>                        | (N)ormal:<br>Shiny/clear         | (D)ischarge:<br>Red/Brown  | (S)wollen                     | (O)ther         |                | (U)nable to<br>determine |
| <b>Appetite:</b>                    | (N)ormal<br>Intake<br>Food/water | (A)bnormal<br>intake       |                               |                 |                | (U)nable to<br>determine |
| <b>Activity:</b>                    | (N)ormal:<br>Bright/Alert        | (L)istless<br>(decreased)  | Un(R)esponsive                | (D)ead          |                | (U)nable to<br>determine |
| <b>Extremities:</b>                 | (N)ormal                         | (D)eformity<br>or fracture | (A)mputated<br>limb or digits | (B)leeding      |                | (U)nable to<br>determine |
| <b>Comments:</b>                    |                                  |                            |                               |                 |                |                          |

Table 2. AEM Unit #1 Check Log

|                     | FD1 | FD2 | FD3 | FD4 | FD5 | FD6 | FD7 | FD8 |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>MET</b>          |     |     |     |     |     |     |     |     |
| <b>Observer</b>     |     |     |     |     |     |     |     |     |
| <b>Water Lft/Rt</b> |     |     |     |     |     |     |     |     |
| <b>Respiration</b>  |     |     |     |     |     |     |     |     |
| <b>Skin</b>         |     |     |     |     |     |     |     |     |
| <b>Coat/Fur</b>     |     |     |     |     |     |     |     |     |
| <b>Nose</b>         |     |     |     |     |     |     |     |     |
| <b>Eyes</b>         |     |     |     |     |     |     |     |     |
| <b>Appetite</b>     |     |     |     |     |     |     |     |     |
| <b>Activity</b>     |     |     |     |     |     |     |     |     |
| <b>Extremities</b>  |     |     |     |     |     |     |     |     |
| <b>Comments</b>     |     |     |     |     |     |     |     |     |

ASSY OPS-4a/ULF5/A

HOOK  
VELCRO

HOOK  
VELCRO

**AEM UNIT #1 CHECK**  
(ASSY OPS/19A/FIN)

Page 2 of 2 pages

Table 1. Codes for Daily Status Check

|                                 |                                  |                            |                               |                 |                |                       |
|---------------------------------|----------------------------------|----------------------------|-------------------------------|-----------------|----------------|-----------------------|
| <b>Water Lft/Rt</b>             | 1-4                              |                            |                               |                 |                |                       |
| <b>Respiration:</b>             | (N)ormal<br>(3/sec)              | (R)apid                    | (S)hallow                     | (L)abored       |                | (U)nable to determine |
| <b>Skin: (ears, toes, tail)</b> | (N)ormal:<br>Dark                | (D)ry/Scaly                | (S)crapes/Cuts                | (S)wollen/Red   |                | (U)nable to determine |
| <b>Coat/Fur:</b>                | (N)ormal:<br>Smooth/shiny        | (R)ough<br>spiky, clump    | (D)iscolored                  | (D)ull or (W)et | (H)air<br>Loss | (U)nable to determine |
| <b>Nose:</b>                    | (N)ormal:<br>Clear               | (D)ischarge:<br>Red/Brown  | (B)leeding                    | (O)ther         |                | (U)nable to determine |
| <b>Eyes:</b>                    | (N)ormal:<br>Shiny/clear         | (D)ischarge:<br>Red/Brown  | (S)wollen                     | (O)ther         |                | (U)nable to determine |
| <b>Appetite:</b>                | (N)ormal<br>Intake<br>Food/water | (A)bnormal<br>intake       |                               |                 |                | (U)nable to determine |
| <b>Activity:</b>                | (N)ormal:<br>Bright/Alert        | (L)istless<br>(decreased)  | Un(R)esponsive                | (D)ead          |                | (U)nable to determine |
| <b>Extremities:</b>             | (N)ormal                         | (D)eformity<br>or fracture | (A)mputated<br>limb or digits | (B)leeding      |                | (U)nable to determine |
| <b>Comments:</b>                |                                  |                            |                               |                 |                |                       |

Continuation of Table 2. AEM Unit #1 Check Log

|                     | FD9 | FD10 | FD11 | FD12 | FD13 | FD14 | FD15 | FD16 |
|---------------------|-----|------|------|------|------|------|------|------|
| <b>MET</b>          |     |      |      |      |      |      |      |      |
| <b>Observer</b>     |     |      |      |      |      |      |      |      |
| <b>Water Lft/Rt</b> |     |      |      |      |      |      |      |      |
| <b>Respiration</b>  |     |      |      |      |      |      |      |      |
| <b>Skin</b>         |     |      |      |      |      |      |      |      |
| <b>Coat/Fur</b>     |     |      |      |      |      |      |      |      |
| <b>Nose</b>         |     |      |      |      |      |      |      |      |
| <b>Eyes</b>         |     |      |      |      |      |      |      |      |
| <b>Appetite</b>     |     |      |      |      |      |      |      |      |
| <b>Activity</b>     |     |      |      |      |      |      |      |      |
| <b>Extremities</b>  |     |      |      |      |      |      |      |      |
| <b>Comments</b>     |     |      |      |      |      |      |      |      |

ASSY OPS-4b/ULF5/A



HOOK  
VELCRO

HOOK  
VELCRO

**AEM UNIT #2 CHECK**

(ASSY OPS/ULF5/FIN)

Page 1 of 2 pages

Observe conditions in first column and write code in appropriate Flight Day column.

Table 1. Codes for Daily Status Check

|                                     |                                  |                            |                               |                 |                |                          |
|-------------------------------------|----------------------------------|----------------------------|-------------------------------|-----------------|----------------|--------------------------|
| <b>Water Lft/Rt</b>                 | 1-4                              |                            |                               |                 |                |                          |
| <b>Respiration:</b>                 | (N)ormal<br>(3/sec)              | (R)apid                    | (S)hallow                     | (L)abored       |                | (U)nable to<br>determine |
| <b>Skin: (ears,<br/>toes, tail)</b> | (N)ormal:<br>Dark                | (D)ry/Scaly                | (S)crapes/Cuts                | (S)wollen/Red   |                | (U)nable to<br>determine |
| <b>Coat/Fur:</b>                    | (N)ormal:<br>Smooth/shiny        | (R)ough<br>spiky, clump    | (D)iscolored                  | (D)ull or (W)et | (H)air<br>Loss | (U)nable to<br>determine |
| <b>Nose:</b>                        | (N)ormal:<br>Clear               | (D)ischarge:<br>Red/Brown  | (B)leeding                    | (O)ther         |                | (U)nable to<br>determine |
| <b>Eyes:</b>                        | (N)ormal:<br>Shiny/clear         | (D)ischarge:<br>Red/Brown  | (S)wollen                     | (O)ther         |                | (U)nable to<br>determine |
| <b>Appetite:</b>                    | (N)ormal<br>Intake<br>Food/water | (A)bnormal<br>intake       |                               |                 |                | (U)nable to<br>determine |
| <b>Activity:</b>                    | (N)ormal:<br>Bright/Alert        | (L)istless<br>(decreased)  | Un(R)esponsive                | (D)ead          |                | (U)nable to<br>determine |
| <b>Extremities:</b>                 | (N)ormal                         | (D)eformity<br>or fracture | (A)mputated<br>limb or digits | (B)leeding      |                | (U)nable to<br>determine |
| <b>Comments:</b>                    |                                  |                            |                               |                 |                |                          |

Table 3. AEM Unit #2 Check Log

|                     | FD1 | FD2 | FD3 | FD4 | FD5 | FD6 | FD7 | FD8 |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>MET</b>          |     |     |     |     |     |     |     |     |
| <b>Observer</b>     |     |     |     |     |     |     |     |     |
| <b>Water Lft/Rt</b> |     |     |     |     |     |     |     |     |
| <b>Respiration</b>  |     |     |     |     |     |     |     |     |
| <b>Skin</b>         |     |     |     |     |     |     |     |     |
| <b>Coat/Fur</b>     |     |     |     |     |     |     |     |     |
| <b>Nose</b>         |     |     |     |     |     |     |     |     |
| <b>Eyes</b>         |     |     |     |     |     |     |     |     |
| <b>Appetite</b>     |     |     |     |     |     |     |     |     |
| <b>Activity</b>     |     |     |     |     |     |     |     |     |
| <b>Extremities</b>  |     |     |     |     |     |     |     |     |
| <b>Comments</b>     |     |     |     |     |     |     |     |     |

ASSY OPS-5a/ULF5/A

HOOK  
VELCRO

HOOK  
VELCRO

**AEM UNIT#2 CHECK**  
(ASSY OPS/ULF5/FIN)

Page 2 of 2 pages

Table 1. Codes for Daily Status Check

|                                 |                                  |                            |                               |                 |                |                       |
|---------------------------------|----------------------------------|----------------------------|-------------------------------|-----------------|----------------|-----------------------|
| <b>Water Lft/Rt</b>             | 1-4                              |                            |                               |                 |                |                       |
| <b>Respiration:</b>             | (N)ormal<br>(3/sec)              | (R)apid                    | (S)hallow                     | (L)abored       |                | (U)nable to determine |
| <b>Skin: (ears, toes, tail)</b> | (N)ormal:<br>Dark                | (D)ry/Scaly                | (S)crapes/Cuts                | (S)wollen/Red   |                | (U)nable to determine |
| <b>Coat/Fur:</b>                | (N)ormal:<br>Smooth/shiny        | (R)ough<br>spiky, clump    | (D)iscolored                  | (D)ull or (W)et | (H)air<br>Loss | (U)nable to determine |
| <b>Nose:</b>                    | (N)ormal:<br>Clear               | (D)ischarge:<br>Red/Brown  | (B)leeding                    | (O)ther         |                | (U)nable to determine |
| <b>Eyes:</b>                    | (N)ormal:<br>Shiny/clear         | (D)ischarge:<br>Red/Brown  | (S)wollen                     | (O)ther         |                | (U)nable to determine |
| <b>Appetite:</b>                | (N)ormal<br>Intake<br>Food/water | (A)bnormal<br>intake       |                               |                 |                | (U)nable to determine |
| <b>Activity:</b>                | (N)ormal:<br>Bright/Alert        | (L)istless<br>(decreased)  | Un(R)esponsive                | (D)ead          |                | (U)nable to determine |
| <b>Extremities:</b>             | (N)ormal                         | (D)eformity<br>or fracture | (A)mputated<br>limb or digits | (B)leeding      |                | (U)nable to determine |
| <b>Comments:</b>                |                                  |                            |                               |                 |                |                       |

Continuation of Table 3. AEM Unit #2 Check Log

|                     | FD9 | FD10 | FD11 | FD12 | FD13 | FD14 | FD15 | FD16 |
|---------------------|-----|------|------|------|------|------|------|------|
| <b>MET</b>          |     |      |      |      |      |      |      |      |
| <b>Observer</b>     |     |      |      |      |      |      |      |      |
| <b>Water Lft/Rt</b> |     |      |      |      |      |      |      |      |
| <b>Respiration</b>  |     |      |      |      |      |      |      |      |
| <b>Skin</b>         |     |      |      |      |      |      |      |      |
| <b>Coat/Fur</b>     |     |      |      |      |      |      |      |      |
| <b>Nose</b>         |     |      |      |      |      |      |      |      |
| <b>Eyes</b>         |     |      |      |      |      |      |      |      |
| <b>Appetite</b>     |     |      |      |      |      |      |      |      |
| <b>Activity</b>     |     |      |      |      |      |      |      |      |
| <b>Extremities</b>  |     |      |      |      |      |      |      |      |
| <b>Comments</b>     |     |      |      |      |      |      |      |      |

ASSY OPS-5b/ULF5/A

