



# International Space Station Assembly Operations Book

## ISS-ULF5

Mission Operations Directorate  
Operations Division

12 OCT 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 2



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

12 OCT 10

APPROVED BY:



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Renee' Ross  
Book Manager



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Manager, Flight Procedures

*CRS*

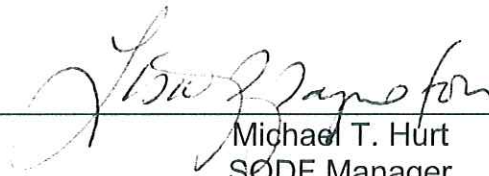


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SODF Coordinator

10/12/10

ACCEPTED BY:



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

Incorporates the following:			
CR:	Assy_Ops-02118	Assy_Ops-02130	Assy_Ops-02142
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	Assy_Ops-02120A	Assy_Ops-02132	Assy_Ops-02144
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			Assy_Ops-02169(S)
			Assy_Ops-02170

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

None



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

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**INTERNATIONAL SPACE STATION  
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ACTIVATION AND CHECKOUT

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# 1.100 CBCS INSTALLATION - PMM INSTALL TO NODE 1 NADIR

(ASSY OPS/ULF5/FIN 1)

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## 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**

<b>Part</b>	<b>P/N</b>	<b>S/Ns (in String Order)</b>	<b>Notes</b>
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 RWS UOP BYPASS CABLE RECONFIGURATION

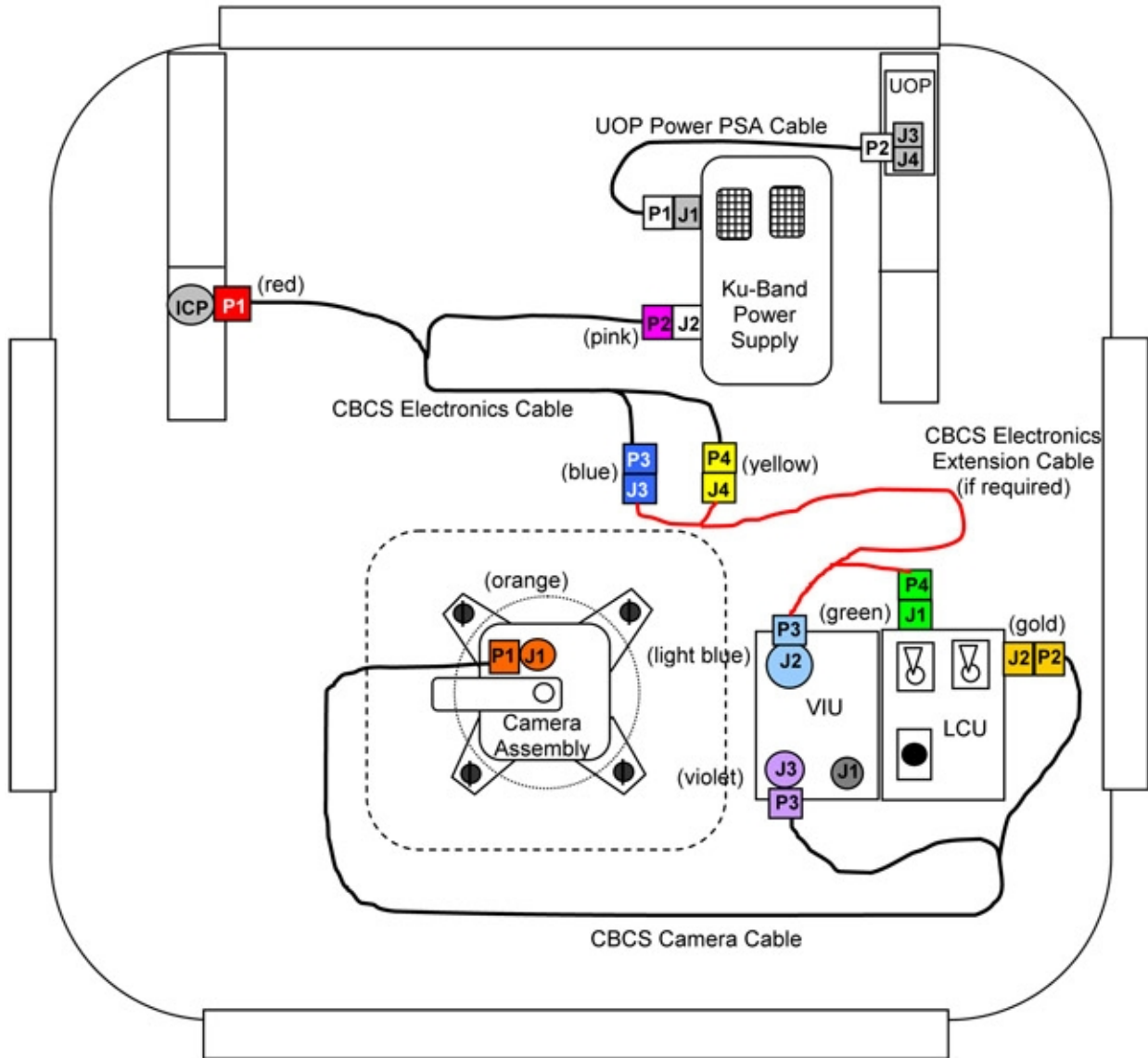


Figure 1. Example CBCS Installation Diagram.

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 1)

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- 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)

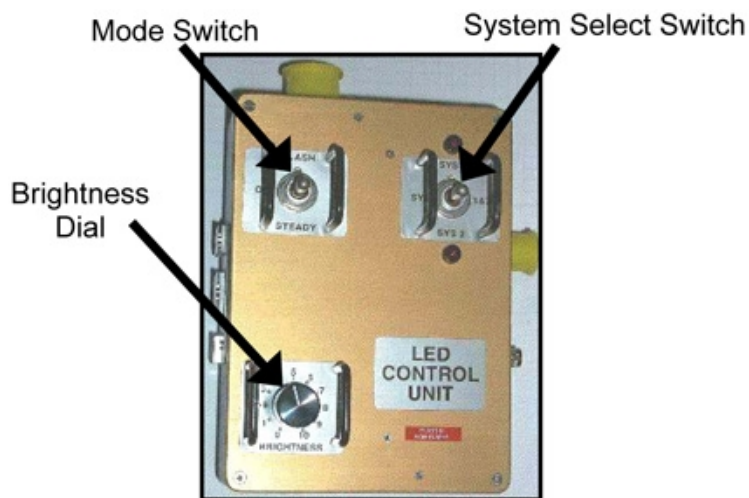


Figure 2. LED Control Unit.

### 5. CONFIGURING LED CONTROL UNIT SETTINGS

Brightness Dial → 10

sw Mode Switch → STEADY

sw System Select Switch → SYS 1&2

Refer to Figure 2.



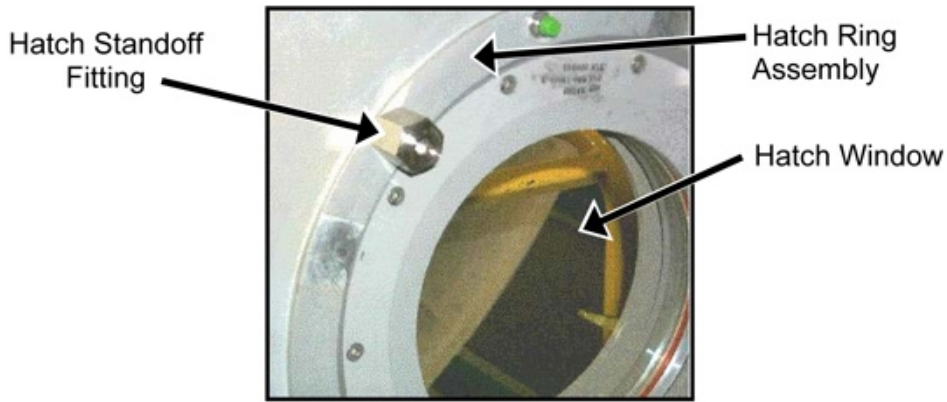


Figure 3. Hatch Standoff Fitting Installed.

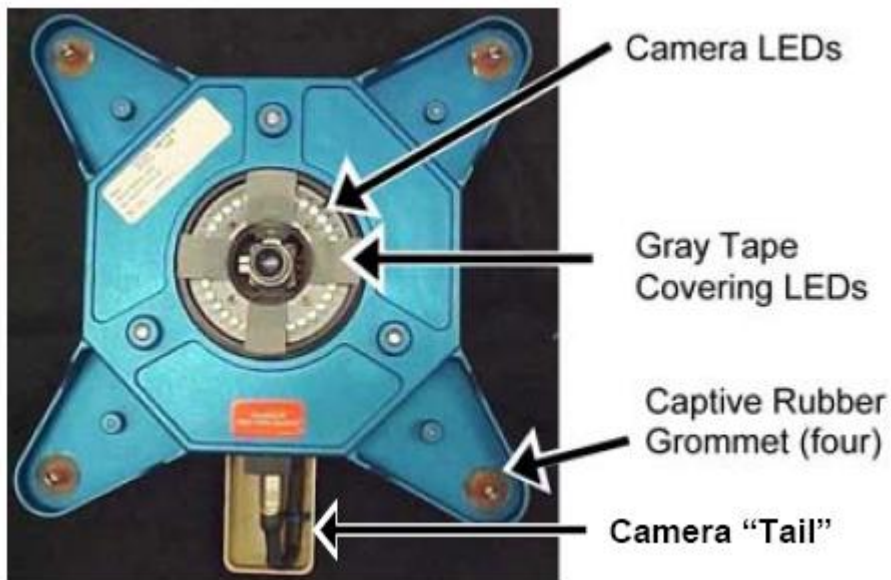


Figure 4. LEDs Covered with Gray Tape.

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 1)

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- 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 Aft, 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.
- 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)

NOD1SD4

## 9. CHECKING OUT CBCS VIDEO ON RWS MONITOR

- 9.1 If required, perform Display Control Panel (DCP) Cable Mate [6.114 LAB RWS UOP BYPASS CABLE RECONFIGURATION](#), step 2 (SODF: RBT GEN: NOMINAL: 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.

04 OCT 10

10. POWERING DOWN

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.

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## 1.101 PMM PASSIVE CBM INSPECTION

(ASSY OPS/ULF5/FIN)

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### OBJECTIVE:

Provides criteria and support data for use during inspection of the PMM Passive Common Berthing Mechanism (PCBM). This includes elaborating on specific pass/fail criteria and providing examples of debris or damage that has been seen in the past. Foreign Object Debris (FOD) on the PCBM Sealing Surface could result in a leak path to vacuum. Any FOD must be photo documented for ground assessment.

### LOCATION:

Shuttle Airlock

### DURATION:

15 minutes

### PARTS:

8 X 20 Binoculars P/N SED33105457-301

Digital Camera (if required)

### REFERENCED PROCEDURE(S):

P/TV11 PMM INSPECTION (FDF: P/TV FS, SCENES)

#### 1. PERFORMING PMM PCBM INSPECTION

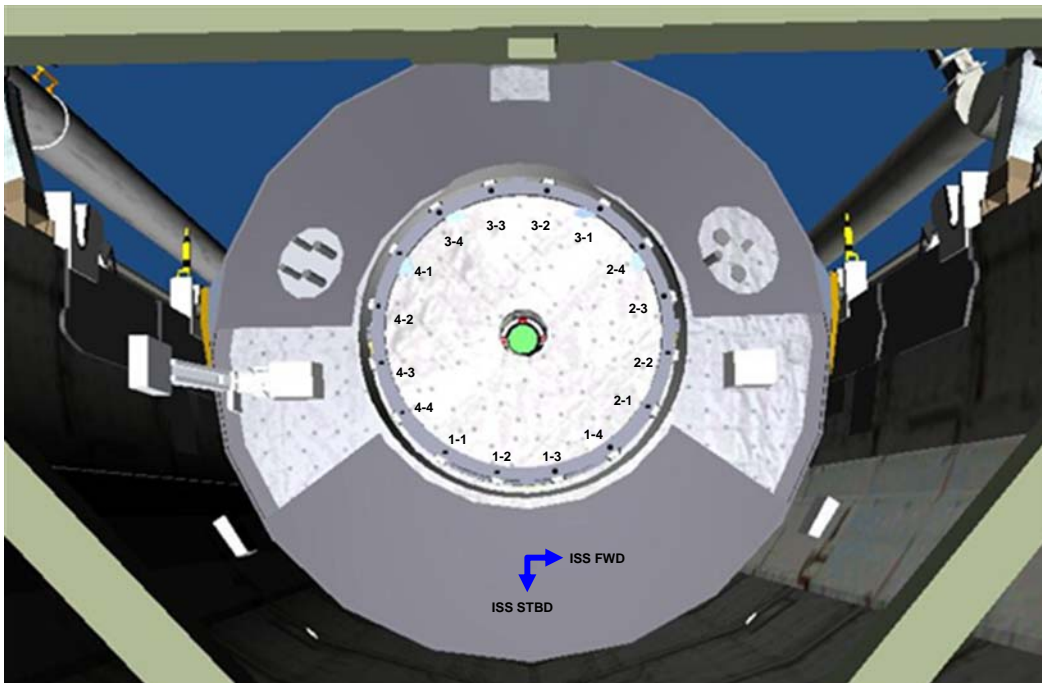


Figure 1.- PMM PCBM Nuts and Sealing Surface with Corresponding ACBM Bolt Number. ISS Coordinate Frame is with Respect to Node 1 Nadir ACBM.

## 1.101 PMM PASSIVE CBM INSPECTION

(ASSY OPS/ULF5/FIN)

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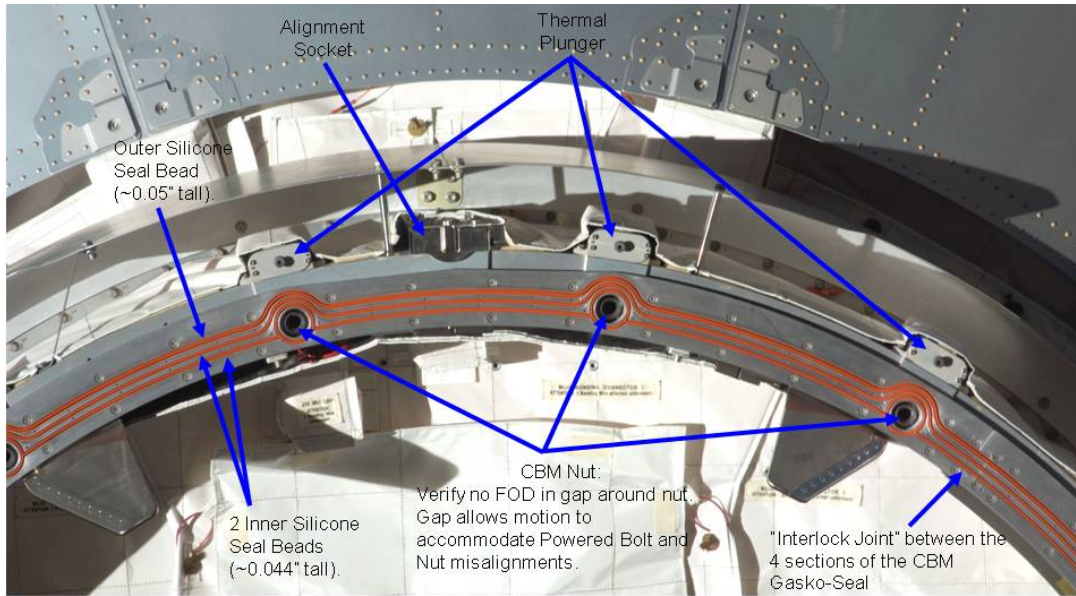


Figure 2.- PCBM Hardware and Seal.

### NOTE

1. In general, there should be no debris on the seals or seal interface and no damage (dings into metal, etc.).
2. Metallic or "hard" FOD can cause damage to the ACBM which will jeopardize the ability to pressurize.
3. Each seal has a thin coat of Braycote-601 lubricant which may look white when light is reflected on it. This lubricant is a nominal feature.

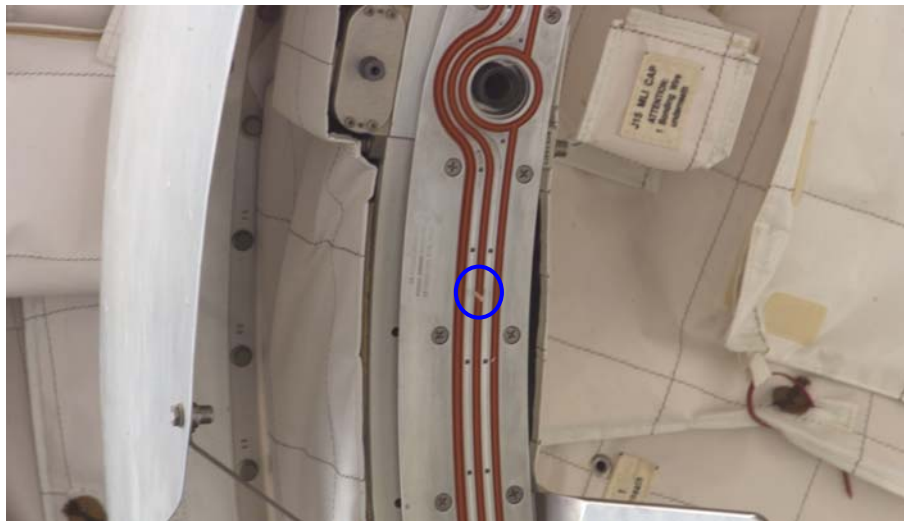


Figure 3.- FOD Observed and Accepted During ULF1.1 MPLM PCBM Inspection.



# 1.101 PMM PASSIVE CBM INSPECTION

(ASSY OPS/ULF5/FIN)

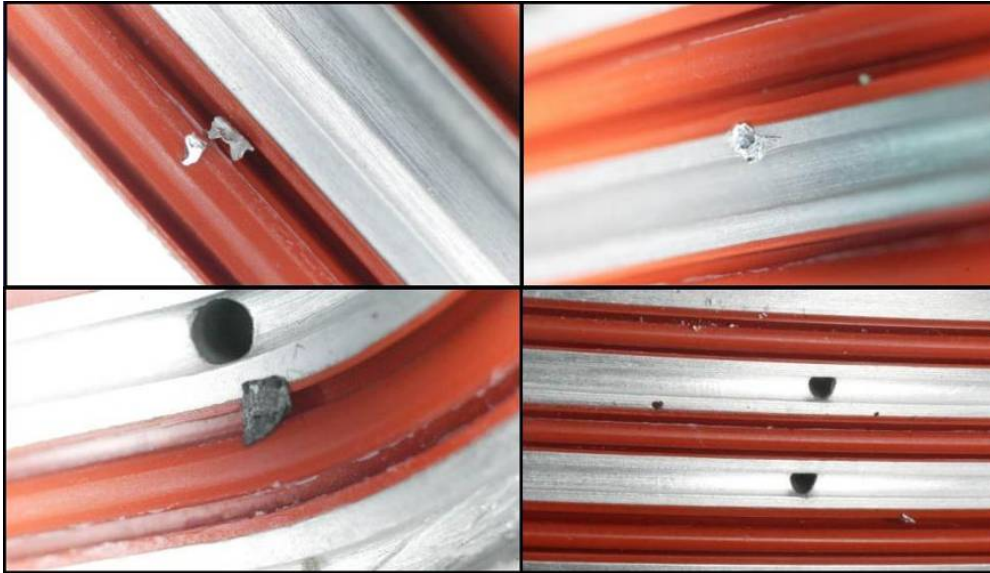


Figure 4.- Hard FOD Found During LF1 Post-Flight Ground Inspection.



Figure 5.- FOD (Left) and Resulting Damage (Right) on MPLM PCBM Seals and Seal Substrate - FOD Occurred on Flight UF-2.

## 1.101 PMM PASSIVE CBM INSPECTION

(ASSY OPS/ULF5/FIN)

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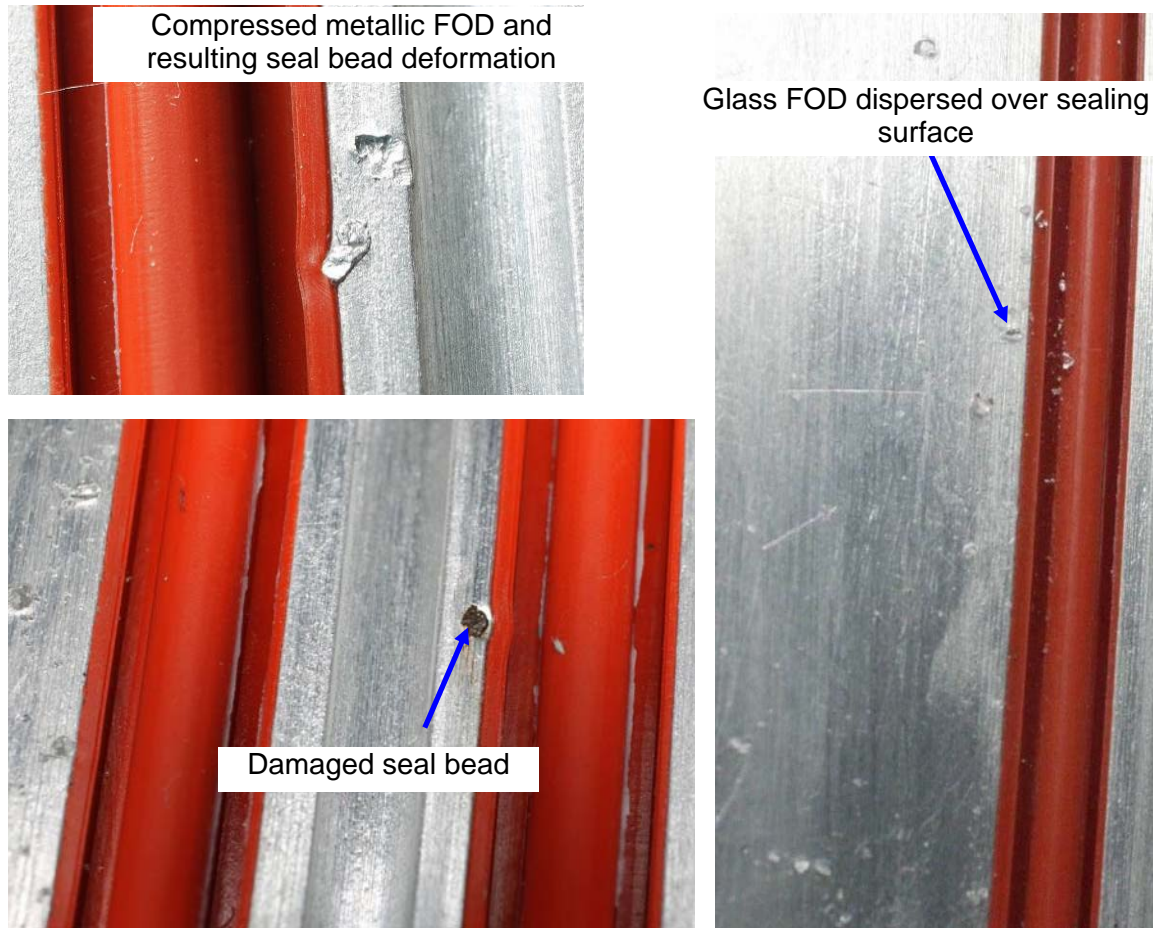


Figure 6.- FOD found on MPLM PCBM Seals and Seal Substrate following Flight LF-1.

- 1.1 Familiarize self with orientation.  
Refer to Figures 1 and 2.  
Familiarize self with historical photos of FOD.  
Refer to Figures 3, 4, 5 and 6.
- 1.2 Using 8 X 20 Binoculars and the Shuttle Airlock window, inspect PCBM Sealing Surface for FOD.  
If no FOD found, go to step 3.
- 1.3 Perform P/TV11 PMM INSPECTION, all (FDF: P/TV FS, SCENES), then:

### 2. ASSESSING PCBM SEALING SURFACE

#### NOTE

PMM PCBM acceptance criteria requires a very high degree of confidence in the ability of at least two PCBM seals to completely seal against the ACBM interface.



## 1.101 PMM PASSIVE CBM INSPECTION

(ASSY OPS/ULF5/FIN)

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- 2.1 Verify any irregularities are not outside of acceptance criteria.
- 2.2 If FOD found in step 1, verify two seals available to seal against the ACBM interface.  
Refer to Figures 1 and 2 to determine relationship between FOD, seals, and nut location.

### 3. POST INSPECTION

- 3.1 Notify **MCC-H** of task completion and inspection results.
- 3.2 Stow parts.

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## 1.102 PMM INSTALL: NODE 1 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/ULF5/FIN/HC)

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### OBJECTIVE:

Perform capture and initial bolting of the PMM following translation into ready-to-latch (RTL) position by the SSRMS. Common Berthing Mechanism (CBM) capture latches are driven through an incremental capture sequence, then all 16 bolts are engaged into their respective nut assemblies. Procedure limits CBM torque, drive time, and capture latch shaft positions to reduce loads on the grapple fixture and SSRMS in case of SSRMS Brakes-On failure.

### LOCATION:

PCS

### DURATION:

1 hour

#### NOTE

1. Notation "(AOS/M)" indicates that AOS during execution of step is mandatory. If currently LOS, or expecting LOS prior to completion of an AOS/M step, wait for next AOS to perform. If LOS is more than 20 minutes, consideration may be given to proceeding to safe the system.
2. For any failures or attention symbols that appear after RTLs are achieved, [2.201 CBM MATE MALFUNCTION](#) (SODF: S&M: MALFUNCTION: CBM/MATE) can be referenced.
3. For failures prior to RTL (completion of step 1), [2.101 CBM PREP FOR MATE MALFUNCTION](#) (SODF: S&M: MALFUNCTION: CBM/PREP FOR MATE) can be referenced to verify CBM is still in a good configuration for initiating capture.
4. Four confirmed RTLs, either by telemetry or direct view, are required for capture initiation.
5. Preflight analysis has shown that a CBM latch can be masked due to a latch failure, and CBM capture completed with only three latches operating, without exceeding load limits.

#### 1. [VERIFYING READY-TO-LATCH \(RTL\) INDICATORS CLOSED](#)

SSRMS operator ⇒ CBM operator, "Maneuver to RTL complete, go for first stage capture."

PCS

Node 1: S&M: Node 1 Nadir CBM

Node 1 Nadir CBM

'Functional CBM Representation (External View)'

Verify RTL indications (four) – green

# 1.102 PMM INSTALL: NODE 1 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/ULF5/FIN/HC)

```
*****
* If any RTL is not green after repeated attempts to gain
* ready-to-latch indication
*   ✓MCC-H for GO or NO-GO (verifies CBM configuration and
*   SSRMS are nominal)
*
*   Perform 2.501 CBM CREW RTL VISUAL VERIFICATION, all
*   (SODF: S&M: MALFUNCTION: CBM/CONTINGENCY), then:
*****
```

```
*****
* If any latch is not nominal
*   ✓MCC-H for GO or NO-GO (verifies CBM configuration and
*   SSRMS are acceptable)
*
*   If directed by MCC-H to mask any latch
*   'Functional CBM Representation (External View)'
*
*   sel Latch [X] where [X] =    
*
*   
*
*   sel Commands
*
*   
*
*   cmd Mask Latch [X] Execute
*
*   
*   'Functional CBM Representation (External View)'
*
*   Verify Latch [X] – Ø
*****
```

## 2. [ENABLING MECHANISM AUTOSAFING SOFTWARE](#)

**WARNING**

To prevent structural failure of SSRMS and pressurized elements in case of SSRMS Brakes-On, the Mechanism Autosafing software in CCS must be enabled prior to initiating capture commands.

'CBM Status'

sel Mechanism Autosafing

'Autosafing PPL Version IDs – Safing Cmds'

## 1.102 PMM INSTALL: NODE 1 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/ULF5/FIN/HC)

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Verify Primary C&C: 9009

Verify Backup C&C: 9009

'Autosafing PPL Version IDs – Safing Default'

Verify Backup C&C: 9003

'Enable'

**cmd Enable Execute**

Verify Mechanism Autosafing – Enabled

### 3. VERIFYING STRUCTURAL CONSTRAINTS

Verify all exercise is halted.

If using shuttle attitude control, coordinate with shuttle crewmembers.

| Verify DAP: FREE

√**MCC-H** for stable attitude control configuration

MCG: MCS Safing

MCS Safing

'Station Configuration'

Verify Auto Att Control Handover US to RS – Inh

'Auto Mode to CMG TA'

Verify Desat Request – Inh

### 4. PERFORMING FIRST STAGE CAPTURE (AOS/M)

#### CAUTION

To prevent damage to CBM or other hardware, CMG control (with Desat Request and Auto Att Handover to RS inhibited) and/or Free Drift (DAP: FREE for shuttle control) is required from initiation of CBM capture until at least twelve bolts have completed the ABOLTS command and at least four bolts still indicate load greater than zero. SSRMS shall remain grappled to the MPLM until such time. Also, any crew exercise (isolated and unisolated) must be halted until completion of ABOLTS.

Node 1 Nadir CBM

'Commands by Task'

sel Mate

Node 1 Nadir CBM Mate - SSRMS

## 1.102 PMM INSTALL: NODE 1 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/ULF5/FIN/HC)

Page 4 of 10 pages

'Capture Passive CBM'

**cmd** Capture First Stage **Execute**

Execution time expected to be < 15 seconds.

Node 1 Nadir CBM

'CBM Status'

Verify Master Cmd Status – Complete

'Capture Latch Status'

Verify Cmd Code (four) – Capture

Verify Cmd Status (four) – Complete

Verify Posn (four): 185 to 187 deg

'Functional CBM Representation (External View)'

sel RTL Details

Node 1 Nadir CBM RTL Details

Verify Latch [X] Capture Switch – Open where [X] =  1  2  3  4  
Repeat

CBM operator ⇒ SSRMS operator, "Go for SSRMS mode to Limp."

### 5. PERFORMING SECOND STAGE INCREMENTAL CAPTURE WITH LOW TORQUE (AOS/M)

#### 5.1 Incremental Capture to 130° with Low Torque (AOS/M)

#### **WARNING**

Continuation of Second Stage Capture if SSRMS modes to Brakes-On may cause structural failure of SSRMS or primary structure.

## 1.102 PMM INSTALL: NODE 1 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/ULF5/FIN/HC)

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### NOTE

1. Following SSRMS Mode to Limp, closed RTLs may open due to RTL spring forces. RTL closed indication is not required prior to execution of second stage capture (used for latches during first stage capture).
2. This procedure incorporates an incremental approach to CBM Second Stage Capture based on EBIT loads analysis of the robotics configuration. Second Stage Capture will be incrementally commanded down to 12° with the use of four Template Commands to: 130°, 90°, 50° and 12°. The torque bias for each template command will be entered as a negative value. The template command window can be left open between steps and modified for each incremental capture command.

SSRMS operator ⇒ CBM operator: "SSRMS Mode to Limp complete, Go for Second-Stage Capture."

Node 1 Nadir CBM

'Commands By Type'

sel Template

Node 1 CBM Template Commands

'Latch Actuation Templates'

sel Capture (Three Variables)

Node 1 CBM Capture 3 Variables Template

input Torque Bias – -1 4 2.7 4

input Shaft Position – 1 3 0

input Time Limit 1 – 2

**cmd Actuate Execute**

'Confirmation Request'

Verify Override \_\_\_\_\_ Command? – Capture

**cmd Yes Execute**

Expected execution time < 35 seconds.

Node 1 Nadir CBM

'CBM Status'

## 1.102 PMM INSTALL: NODE 1 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/ULF5/FIN/HC)

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Verify Master Cmd Status – Complete

'Capture Latch Status'

Verify Cmd Code (four) – Capture

Verify Cmd Status (four) – Complete

Verify Posn (four): 129 to 131 deg (monitor for backdrive)

\*\*\*\*\*

\* If any latch Position > 131 degrees due to either latch Cmd Status

\* | – Jammed or Master Cmd Status – Timeout

\* | **cmd Stop Execute** (from any CBM command window) to

\* | clear error

\* |

\* Go to step 5.5.

\*\*\*\*\*

### 5.2 Incremental Capture to 90° with Low Torque (AOS/M)

**Node 1 CBM Capture 3 Variables Template**

input Torque Bias – -1 4 2.7 4

input Shaft Position – 9 0

input Time Limit 1 – 2

**cmd Actuate Execute**

'Confirmation Request'

Verify Override \_\_\_\_\_ Command? – Capture

**cmd Yes Execute**

Expected execution time < 25 seconds.

**Node 1 Nadir CBM**

'CBM Status'

Verify Master Cmd Status – Complete

'Capture Latch Status'

Verify Cmd Code (four) – Capture

Verify Cmd Status (four) – Complete

Verify Posn (four): 89 to 91 deg (monitor for backdrive)



# 1.102 PMM INSTALL: NODE 1 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/ULF5/FIN/HC)

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\*\*\*\*\*  
\* If any latch Position > 91 degrees due to either latch Cmd Status  
\* | – Jammed or Master Cmd Status – Timeout  
\* | **cmd Stop Execute** (from any CBM command window) to  
\* | clear error  
\* |  
\* Go to step 5.5.  
\*\*\*\*\*

## 5.3 Incremental Capture to 50° with Low Torque (AOS/M)

**Node 1 CBM Capture 3 Variables Template**

input Torque Bias – -1 4 2.7 4  
input Shaft Position – 5 0  
input Time Limit 1 – 2

**cmd Actuate Execute**

'Confirmation Request'

Verify Override \_\_\_\_\_ Command? – Capture

**cmd Yes Execute**

Expected execution time < 23 seconds.

**Node 1 Nadir CBM**

'CBM Status'

Verify Master Cmd Status – Complete

'Capture Latch Status'

Verify Cmd Code (four) – Capture

Verify Cmd Status (four) – Complete

Verify Posn (four): 49 to 51 deg (monitor for backdrive)

\*\*\*\*\*  
\* If any latch Position > 51 degrees due to either latch Cmd Status  
\* | – Jammed or Master Cmd Status – Timeout  
\* | **cmd Stop Execute** (from any CBM command window) to  
\* | clear error  
\* |  
\* Go to step 5.5.  
\*\*\*\*\*

# 1.102 PMM INSTALL: NODE 1 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/ULF5/FIN/HC)

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## 5.4 Incremental Capture to 12° with Low Torque (AOS/M)

Node 1 CBM Capture 3 Variables Template

input Torque Bias – -1 4 2.7 4  
input Shaft Position – 1 2  
input Time Limit 1 – 2

**cmd Actuate Execute**

'Confirmation Request'

Verify Override \_\_\_\_\_ Command? – Capture

**cmd Yes Execute**

Expected execution time < 23 seconds.

Node 1 Nadir CBM

'CBM Status'

Verify Master Cmd Status – Complete

'Capture Latch Status'

Verify Cmd Code (four) – Capture

Verify Cmd Status (four) – Complete

Verify Posn (four): 11 to 12 deg (monitor for backdrive)

If all latch positions are 11 or 12 degrees, go to step 6.

\*\*\*\*\*

\* If any latch Position > 12 degrees due to either latch Cmd Status  
\* | – Jammed or Master Cmd Status – Timeout  
\* | **cmd Stop Execute** (from any CBM command window) to  
\* | clear error  
\* |  
\*

\* Proceed to step 5.5.

\*\*\*\*\*

# 1.102 PMM INSTALL: NODE 1 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/ULF5/FIN/HC)

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## 5.5 Performing SSRMS -X Translation (AOS/M), If Required

### NOTE

1. In step 5.5, SSRMS is commanded in the -X direction (Robotics coordinates: pulling CBM halves together) in an attempt to redistribute the forces built up in the CBM or SSRMS system. While all forces will not be relieved, the resultant force vector will change its affect on the system, enabling the previous CBM command to be reissued.
2. Step 5.5 will be executed up to four times in an attempt to achieve the commanded shaft position on all four latches. If repeating step 5.5 after two or three attempts and little or no progress is made (less than 5 degrees), **MCC-H** will likely direct the crew to procedure [2.210 CBM MATE - INCREMENTAL CAPTURE - SSRMS](#) (SODF: S&M: MALFUNCTION: CBM/MATE), unless other problems are recognized.

\*\*\*\*\*  
\* If step 5.5 has already been executed four times  
\* | **√MCC-H** for GO to repeat step 5.5 additional times or  
\* | possibly to proceed to [2.210 CBM MATE -](#)  
\* | [INCREMENTAL CAPTURE - SSRMS](#) (SODF: S&M:  
\* | MALFUNCTION: CBM/MATE), then:  
\*\*\*\*\*

RWS

CBM operator ⇒ SSRMS operator, “Go to perform [2.666 CBM LATCH STALL RECOVERY](#), all (SODF: RBT FS: CONTINGENCY) to pull CBM halves together,” then:

SSRMS operator ⇒ CBM operator, “Go to reattempt Second Stage Capture, SSRMS Mode to Limp complete.”

PCS

If any latch position is > 131 deg  
Go to step 5.1.

If any latch position is > 91 deg  
Go to step 5.2.

If any latch position is > 51 deg  
Go to step 5.3.

If any latch position is > 12 deg  
Go to step 5.4.

## 1.102 PMM INSTALL: NODE 1 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/ULF5/FIN/HC)

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### 6. PERFORMING BOLTS ACQUISITION (AOS/M)

**Node 1 Nadir CBM Mate - SSRMS**

'Engage Passive CBM Nuts'

**cmd Acquire Bolts Execute**

Execution time expected to be < 7 minutes.

**Node 1 Nadir CBM**

'CBM Status'

Verify Master Cmd Status – Complete

'Powered Bolt Status'

Verify Cmd Code (sixteen) – ABolts

Verify Cmd Status (sixteen) – Complete

Verify at least four bolts indicate load > 0.00 kN

### 7. INHIBITING MECHANISM AUTOSAFING SOFTWARE

**Node 1 Nadir CBM**

'CBM Status'

sel Mechanism Autosafing

**Mechanism Autosafing**

'Inhibit'

**cmd Arm Execute**

Verify Arm – √

**cmd Inhibit Execute**

Verify Mechanism Autosafing – Inhibited

#### NOTE

MPLM is now ready for ungrapple. Station can return to desired attitude control configuration, as required. Crew exercise can resume as required.

CBM operator ⇒ SSRMS operator, "Go for SSRMS Release."

## 1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK

(ASSY OPS/ULF5/FIN 1/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 1/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 P<sub>1</sub>: \_\_\_\_\_ mmHgA

PCS 3.3 US Lab: ECLSS  
Lab: ECLSS

Record Cab Press P<sub>2</sub>: \_\_\_\_\_ mmHg

\*\*\*\*\*  
\* If  $\Delta P |P_2 - P_1| > 2 \text{ mmHgA}$   
\* | 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 1/HC) Page 3 of 8 pages

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

Node 1 Deck 4.1 ✓MPEV – CLOSE

Hatch

- ✓Ratchet → LATCH position
- Crank Handle → engaged position
- Crank Handle → turn in LATCH direction until fully latched
- Crank Handle → stowed position

4.2 Gamah cap ←|→ ISA Sampling Port

ISA Sampling Port Valve → CLOSED  
Refer to Figure 1.

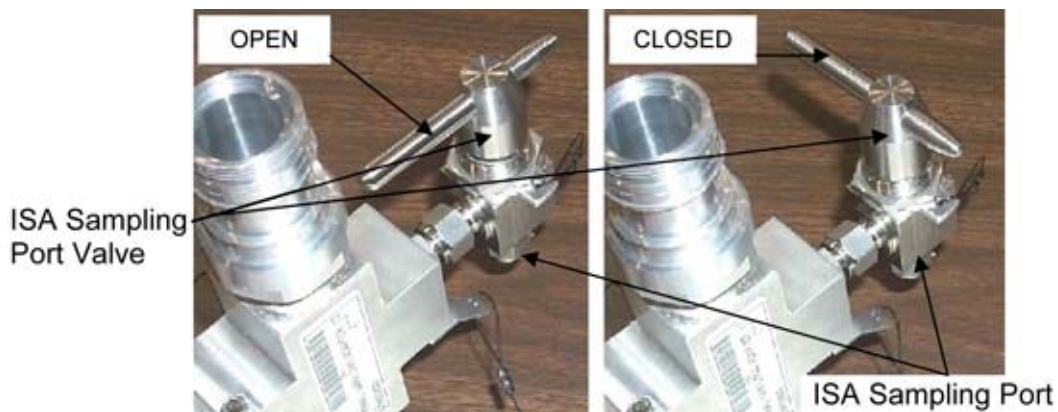


Figure 1.- ISA Sampling Port Valve.

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 1/HC) Page 4 of 8 pages

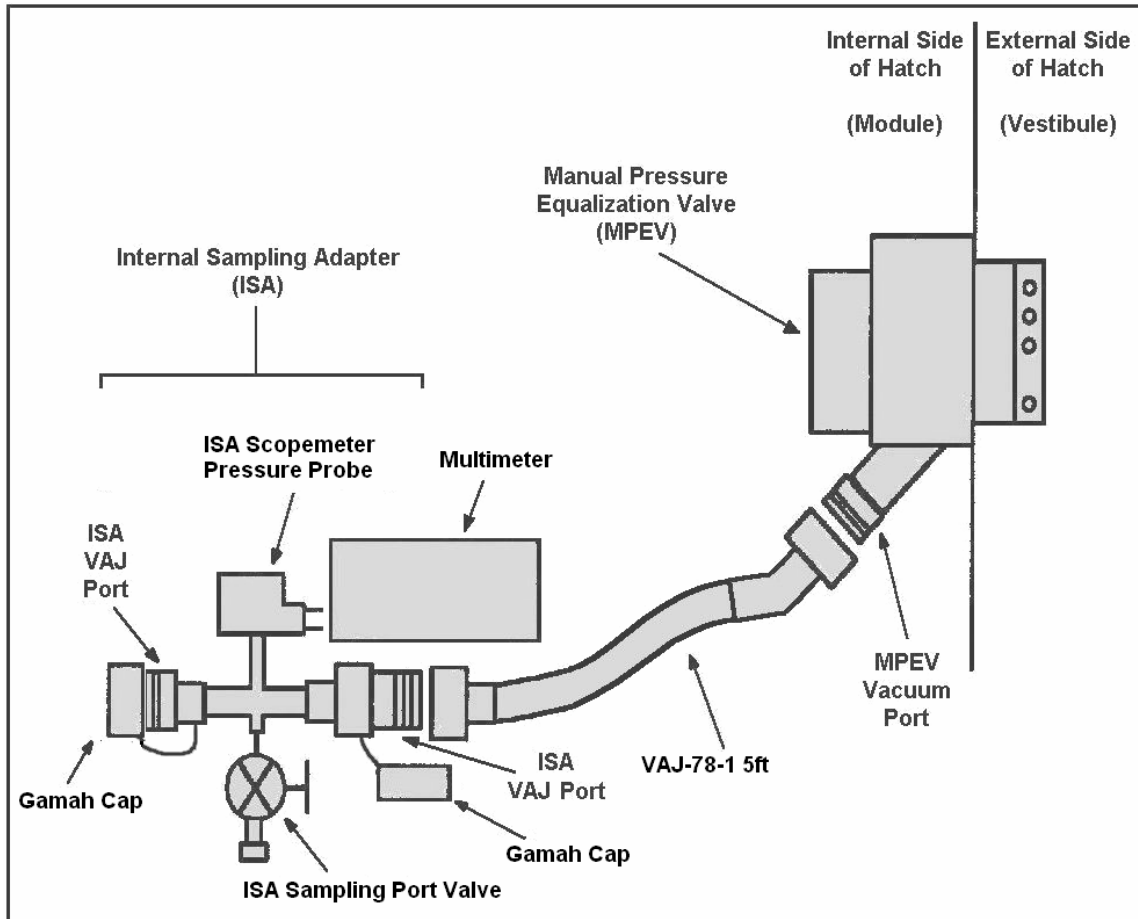


Figure 2.- ISA/VAJ/MPEV/Multimeter Connection.

## 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 Verify **MCC-H** complete with CBM Bolt Loading, then:  
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  $\curvearrowright$   $\overline{mV}$

5.5 Record ISA Scopemeter Pressure Probe P<sub>3</sub>: \_\_\_\_\_ mmHgA  
Record GMT: \_\_\_\_\_ GMT



## 1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK

(ASSY OPS/ULF5/FIN 1/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 P<sub>4</sub>: \_\_\_\_\_ mmHgA  
Record GMT: \_\_\_\_\_ GMT

5.10 Wait 5 minutes for ISA/VAJ leak check.

5.11 Record ISA Scopemeter Pressure Probe P<sub>5</sub>: \_\_\_\_\_ mmHgA  
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 1/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 P<sub>6</sub>: \_\_\_\_\_ mmHgA  
Record GMT: \_\_\_\_\_ GMT

7.2 Wait 10 minutes for thermal stabilization.

7.3 Record ISA Scopemeter Pressure Probe P<sub>7</sub>: \_\_\_\_\_ 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 P<sub>8</sub>: \_\_\_\_\_ 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

<b>WARNING</b>
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 1/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 1 mmHg

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 8 hours.

### 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 1/HC) Page 8 of 8 pages

10.4 Record ISA Scopemeter Pressure Probe P<sub>10</sub>: \_\_\_\_\_ 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 1)

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 w/o Window (two) P/N SEG33111838-301

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

IMV Return Duct Jumper P/N 683-13870-17 (will be used as PMM IMV Supply Jumper)

MPLM Power Cable (W6006) P/N 1F89749-1

NOD1 1553 CH A Cable (W8992) P/N 683-98992-1 (Node 1 Upstream Y-Jumper)

NOD1 1553 CH B Cable (W8993) P/N 683-98993-1 (Node 1 Upstream Y-Jumper)

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

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

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

Ziplock Bag labeled "NODE 1 NADIR CPA PROTECTIVE CAPS"

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

Ziplock containing Protective Cap (four) P/N NATC-RPC-N-15-0

Ziplock containing Protective Cap (four) P/N NATC-PPC-N-15-0

Ziplock containing Protective Cap (eight) P/N NATC-RPC-N-11-0

Ziplock containing Protective Cap (eight) P/N NATC-PPC-N-11-0

Ziplock containing Protective Cap (twenty-four) P/N NATC-RPC-N-13-0

Ziplock containing Protective Cap (twenty-four) 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:

01 OCT 10

## 1.110 PMM VESTIBULE - EQUIPMENT SETUP

(ASSY OPS/ULF5/FIN 1)

Page 2 of 2 pages

Gray Tape

Velcro Straps (will be used as required to restrain cabling)

Sharpie

Braycote

Towel

Earplugs

Ziplock Bags (four) (for stowing connector caps, IMV caps, and CBM alignment guides)

### TOOLS:

Place tools in Spare CTB:

Mini Maglite/LED Headlamp (per crew preference)

Adjustable Bungee

### ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

Driver Handle, 1/4" Drive

4" Ext, 1/4" Drive

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

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

1/8" Hex Head, 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

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 1) Page 1 of 41 pages

### OBJECTIVE:

To remove CBM 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

1. Once the three vestibule jumpers and two upstream data jumpers are installed (through 1.115 step 8), [1.120 PMM ACTIVATION \(GROUND ONLY\)](#) (SODF: ASSY OPS: ACTIVATION AND CHECKOUT) may be performed in parallel up through completion of AUTO/MANUAL ACTIVATION PART 1 (step 8).
2. Once the IMV Supply jumper is installed (through 1.115 step 11), [1.120 PMM ACTIVATION \(GROUND ONLY\)](#) (SODF: ASSY OPS: ACTIVATION AND CHECKOUT) may be completed in parallel (AUTO/MANUAL ACTIVATION PART 2 steps 9 and 10).
3. Notes within each procedure will direct the coordination between the two. Refer to [1.130 PMM VESTIBULE – CONFIG FOR INGRESS AND PMM ACTIVATION FLOWCHART](#) (SODF: ASSY OPS: ACTIVATION AND CHECKOUT).

### LOCATION:

Installed: Node 1, PMM Vestibule

### CREW:

Two

### DURATION:

5 hours 5 minutes Total Crew Time

(MCC-H - Data Safing for 1553 Upstream Y-Jumper Install, step 1)

20 minutes - Removal of CBM Center Disk Cover (steps 2 and 3)

10 minutes - Removal of PMM Thermal Blanket (step 4)

45 minutes - Install Power/1553 Vestibule Jumpers (steps 5 to 7)

30 minutes - Install Node 1 1553 Mod Kit Y jumpers (step 8)

1 hour 30 minutes - Removal of Controller Panel Assemblies (step 9)

1 hour 25 minutes - IMV Equalization and Duct Install (steps 10 and 11)

25 minutes - Ground Strap Install, Port Closeout Install (steps 12 to 15)

(MCC-H - Data Reconfigurations, step 16)

### NOTE

1. If procedure [1.110 PMM VESTIBULE - EQUIPMENT SETUP](#) (SODF: ASSY OPS: ACTIVATION AND CHECKOUT) 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:

1.0 CTB w/o Window (two) P/N SEG33111838-301

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

IMV Return Duct Jumper P/N 683-13870-17 (will be used as PMM IMV Supply Jumper)

## 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 2 of 41 pages

MPLM Power Cable (W6006) P/N 1F89749-1

NOD1 1553 CH A Cable (W8992) P/N 683-98992-1 (Node 1 Upstream Y-Jumper)

NOD1 1553 CH B Cable (W8993) P/N 683-98993-1 (Node 1 Upstream Y-Jumper)

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

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

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

Ziplock Bag labeled "NODE 1 NADIR CPA PROTECTIVE CAPS"

Each Ziplock Bag contains:

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

Ziplock containing Protective Cap (four) P/N NATC-RPC-N-15-0

Ziplock containing Protective Cap (four) P/N NATC-PPC-N-15-0

Ziplock containing Protective Cap (eight) P/N NATC-RPC-N-11-0

Ziplock containing Protective Cap (eight) P/N NATC-PPC-N-11-0

Ziplock containing Protective Cap (twenty-four) P/N NATC-RPC-N-13-0

Ziplock containing Protective Cap (twenty-four) P/N NATC-PPC-N-13-0

### MATERIALS:

Gray Tape

Velcro Straps (as required)

Sharpie

Braycote (as required)

Towels (as required)

Earplugs

Ziplock Bags (four)

### TOOLS:

CSA-O2 (two)

Mini-Maglite/LED Headlamp (per crew preference)

Adjustable Bungee

Digital Camera

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

Driver Handle, 1/4" Drive

4" Ext, 1/4" Drive

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

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

1/8" Hex Head, 1/4" Drive (if required in steps 8.2 and 8.20)

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

Drawer 3:

#6 Long Torq Driver, 3/8" Drive

Drawer 5:

Static Wrist Tether

### REFERENCED PROCEDURE(S):

1.120 PMM ACTIVATION (GROUND ONLY)



## 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 3 of 41 pages

### 1.130 PMM VESTIBULE - CONFIG FOR INGRESS AND PMM ACTIVATION FLOWCHART

#### 1. SAFING FOR INSTALLATION OF 1553 UPSTREAM Y-JUMPERS (MCC-H) (GROUND-ONLY)

Table 1. 1553 Buses in W0205 P106 and W0202 P118 Connectors

Bus Name [XX]	Controlling MDM
LB ORB HAB 1	Prime GNC
LB ORB HAB 2	Prime GNC
LB EPS HAB 23	Prime PMCU
LB EPS HAB 14	Prime PMCU
LB SYS HAB 1	Prime INT
LB SYS HAB 2	Prime INT
LB SEPS HAB 23	Prime INT
LB SEPS HAB 14	Prime INT
CB CT BIA 23	Prime C&C
CB CT 4	Prime C&C
LB CheCS HAB 1	Prime PL
CB INT 2	Prime C&C

Table 2. Robotics 1553 Buses in W0205 P106 and W0202 P118 Connectors

Bus Name [YY]	Controlling Device
MSS PDGF LB	Prime CEU
MSS BUD LB	Prime BCU

#### **MCC-H**

##### 1.1 Inhibiting C&C MDM BC Comm Failure

CDH: Primary C&C MDM: Recovery Retry: CCS MDM

CCS Recovery Retry

'BC Comm Fail'

**cmd** Inhibit **Execute** (Verify – Inh)

##### 1.2 Inhibiting Auto Transition to Diagnostics in PMCU MDM

CDH: Primary PMCU: MDM FDIR

Primary PMCU MDM FDIR

**cmd** Auto Transition Diag – Inhibit **Execute** (Verify - Inh)

##### 1.3 Inhibiting Comm Safing Response in INT MDM

CDH: Primary INT: MDM FDIR

Primary INT MDM FDIR

**cmd** Comm Safing Response – Inhibit **Execute** (Verify - Inh)

## 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 4 of 41 pages

- 1.4 Inhibiting Channel Switching and Verifying CDH Buses on Channel A  
sel [XX] where [XX] = Bus Name from Table 1

[XX] Bus Status

Verify Channel Selected – A

'Auto Channel Switch Status'

**cmd** Inhibit **Execute** (Verify - Inh)

Repeat

Table 3. Robotics Buses in W0205 P106 and W0202 P118

OPS NAME	CIPUI
CUP_RWS_Bus_Ch_Select_PDGF_LB_Ch_A	CMRM96IM0169K
LAB_RWS_Bus_Ch_Select_PDGF_LB_Ch_A	CMRM96IM0066K

- 1.5 Verifying Robotics Buses on Channel A

MSS: LAS5(LAP5) Bus Config

LAS5(LAP5) CEU Bus Configuration

**cmd** 'Local Bus' 'PDGF' A (Verify – A)

- 1.6 **MCC-H** ↑ ISS, "Go for Channel B jumper mate in step 8.7."

## 2. OPENING HATCH

- 2.1 **On MCC-H GO**, 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.

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

# 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 5 of 41 pages

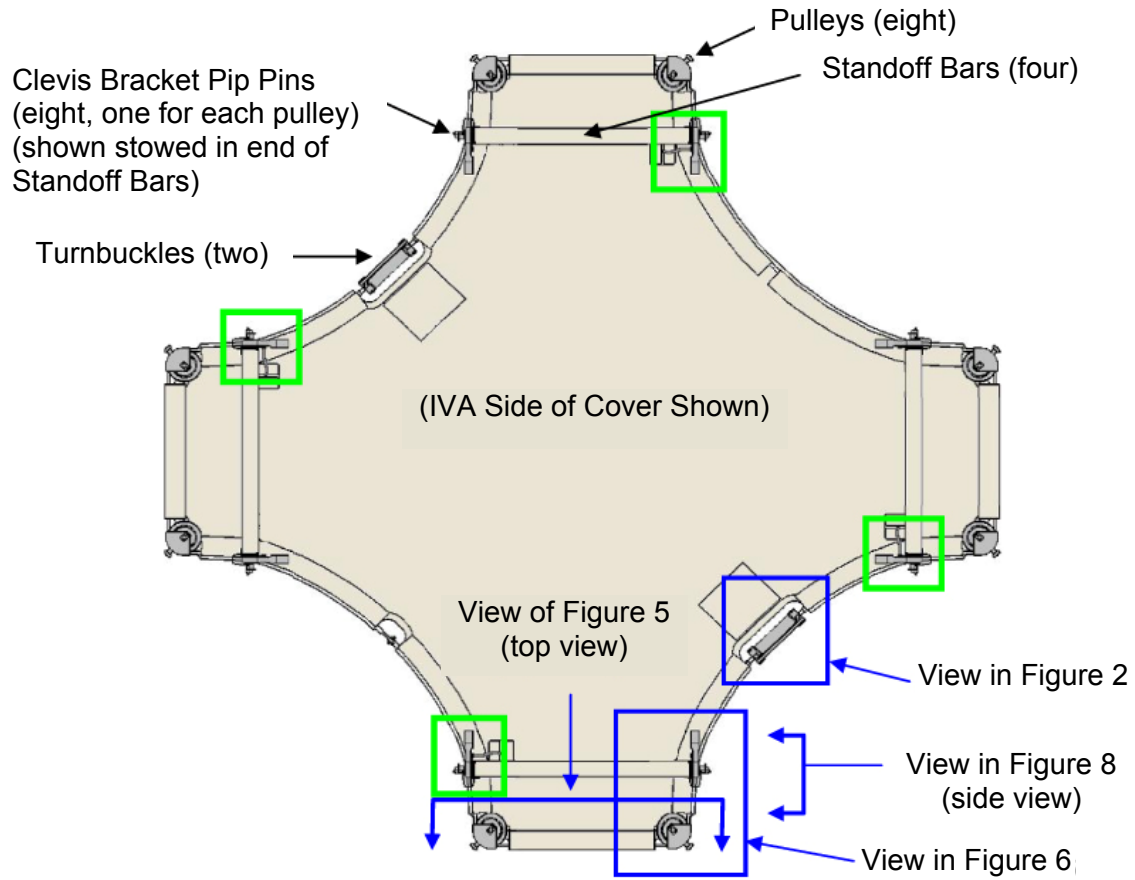


Figure 1.- CBM Center Disk Cover.

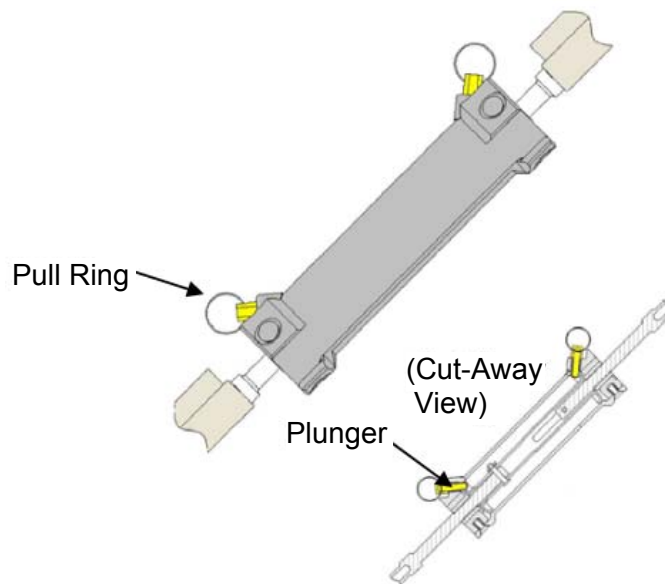


Figure 2.- Turnbuckle.

## 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 6 of 41 pages

### 3. REMOVING CBM CENTER DISK COVER

#### 3.1 Removing Tension From Center Disk Cover

##### 3.1.1 Unlocking Turnbuckles

Pull out pull rings (two each turnbuckle), then turn 90 degrees and release so that pull rings slide into the plungers.

Refer to Figures 1 and 2.

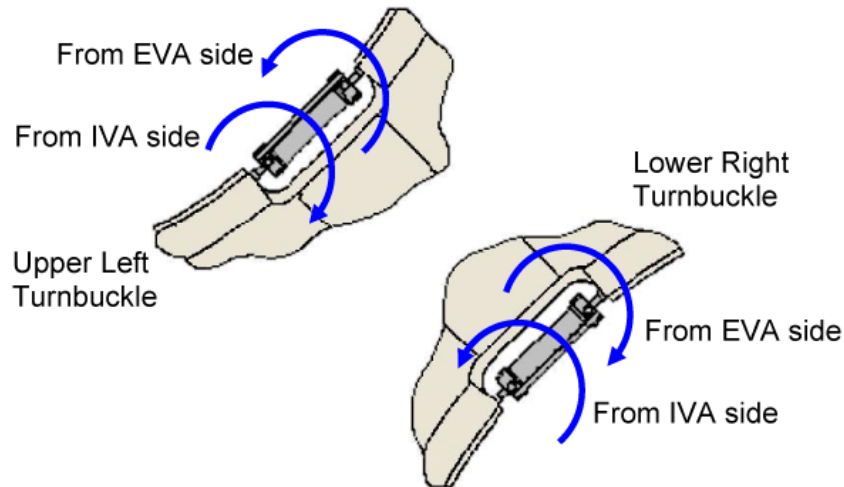


Figure 3.- Loosening Turnbuckles.

#### NOTE

From Node 1, the IVA side of the PMM Center Disk Cover is accessible.

3.1.2 Loosen turnbuckles (two) by rotating toward center of Center Disk Cover (until there is enough slack to remove pulleys from Clevis Brackets).

Refer to Figure 3 (IVA side).

#### 3.2. Demating Interfering CPA Connectors

3.2.1 **√MCC-H** that Controller Panel Assembly (CPA) safing complete:  
RPCM N13B B RPCs 3, 4, 5, and 6 are open and close cmd inhibited  
RPCM N14B B RPCs 11, 12, 13, and 14 are open and close cmd inhibited

3.2.2 Don Static Wrist Tether.

Secure to unpainted, unanodized metal surface.

## 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 7 of 41 pages

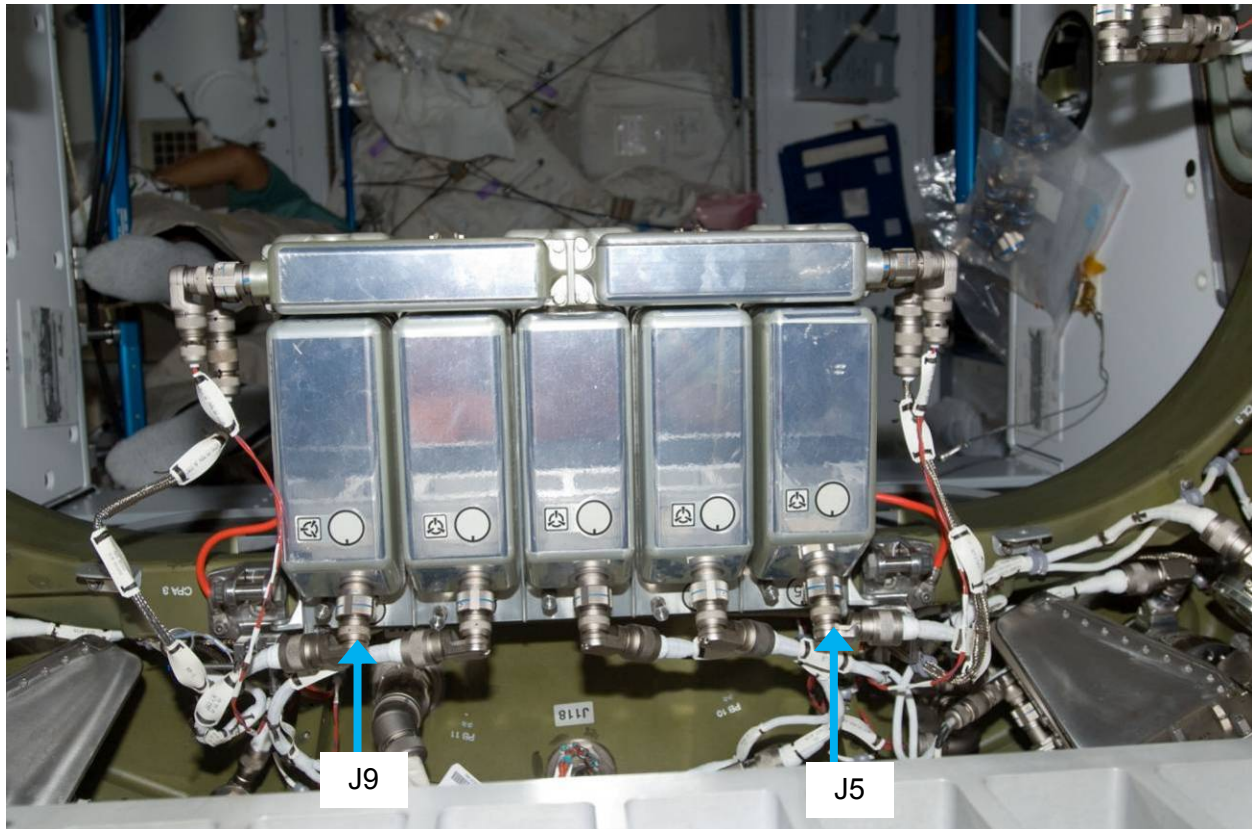


Figure 4.- Example View of CBM CPA Connectors (View Looking from Vestibule into Node).

- 3.2.3 Relocating Static Wrist Tether as required,  
Wire Harness ←|→ J5 on CPAs (four connections total, one per CPA)  
Wire Harness ←|→ J9 on CPAs (four connections total, one per CPA)  
Place Protective Caps (sixteen) on all connectors (from Ziplock Bags).  
Refer to Figure 4.

- 3.2.4 Doff Static Wrist Tether.

### 3.3 Removing Center Disk Cover From Mounting Brackets

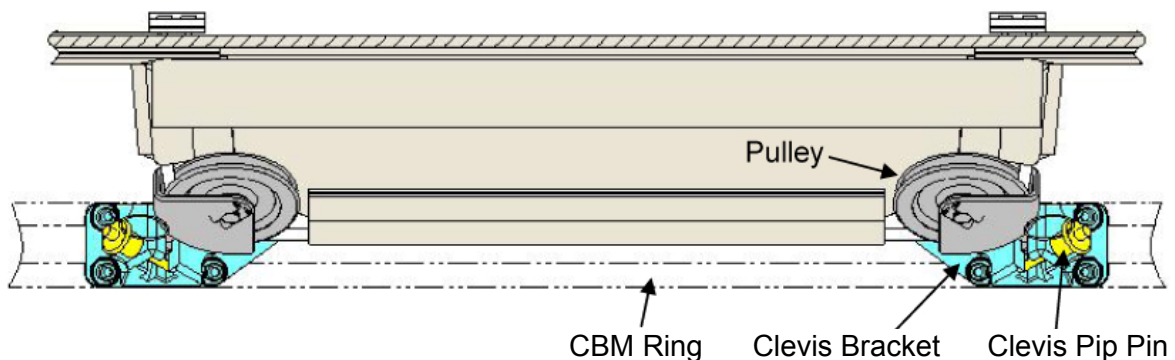


Figure 5.- Pulley Restrained by Clevis Pip Pin (View from IVA Side).

## 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 8 of 41 pages

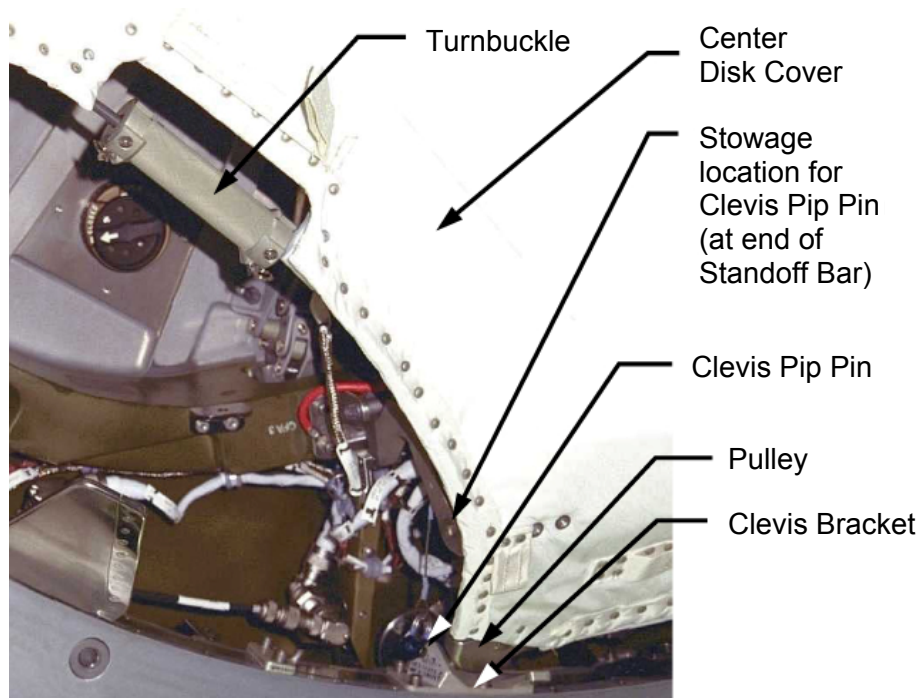


Figure 6.- Pulley Restrained by Clevis Pip Pin (View from EVA Side).

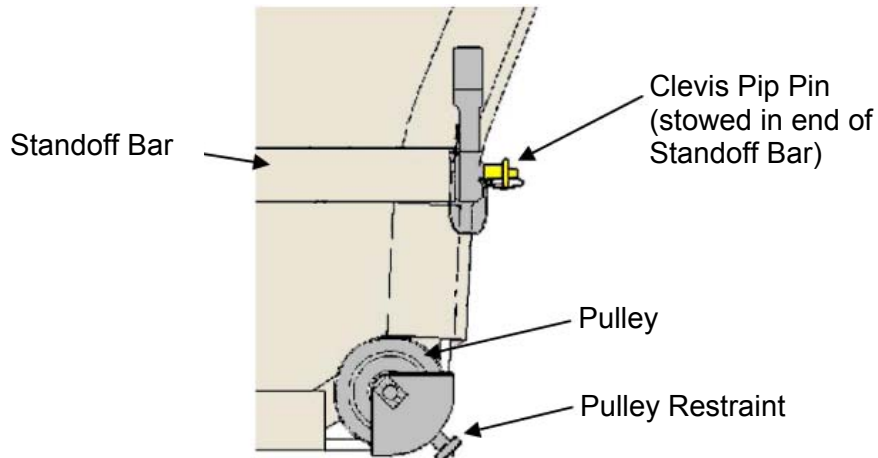


Figure 7.- Clevis Pip Pin Stowed in End of Standoff Bar (View from IVA Side).

3.3.1 Remove Pip Pins from Clevis Brackets (eight).  
Stow in end of Standoff Bars.  
Refer to Figures 5 to 7.

3.3.2 Push pulleys (eight) into base of Clevis Brackets to release restraints,  
then slide out of Clevis (sliding towards IVA side).  
Refer to Figures 5 to 7.



## 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

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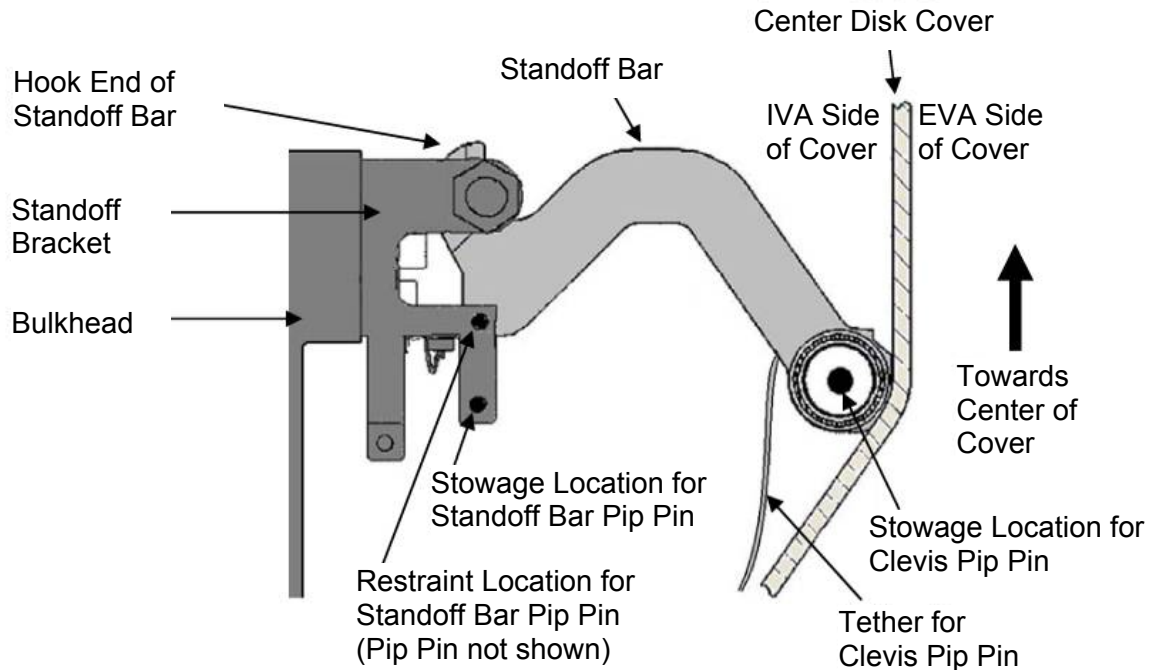


Figure 8.- Side View of Standoff Bar Installed in Standoff Bracket.

- 3.3.3 Remove Standoff Bar Pip Pins (two each Standoff Bar) from restraint location on Standoff Brackets.  
Insert Pip Pins in stowage location on Standoff Brackets.  
Refer to Figure 8.

### CAUTION

Due to tight tolerances between CBM Wire Harnesses and the Standoff Bar, use care to avoid Wire Harness damage during Standoff Bar removal.

- 3.3.4 Rotate Standoff Bar towards center of Center Disk Cover.  
Remove Standoff Bar Hooks (two) from Standoff Bracket.  
Refer to Figure 8.
- 3.4. Closing Out Center Disk Cover Removal Task
  - 3.4.1 Fold cover diagonally so turnbuckles meet.  
Fold as small as possible for stowage.  
Secure cover with Adjustable Bungee.
  - 3.4.2 Stow Center Disk Cover.

## 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 10 of 41 pages

### 4. REMOVING PTCS PMM THERMAL BLANKET

#### NOTE

1. Due to the orientation of the vestibule connections, 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 9 to 13 are references for the Passive Thermal Control System (PTCS) PMM Thermal Blanket Removal.

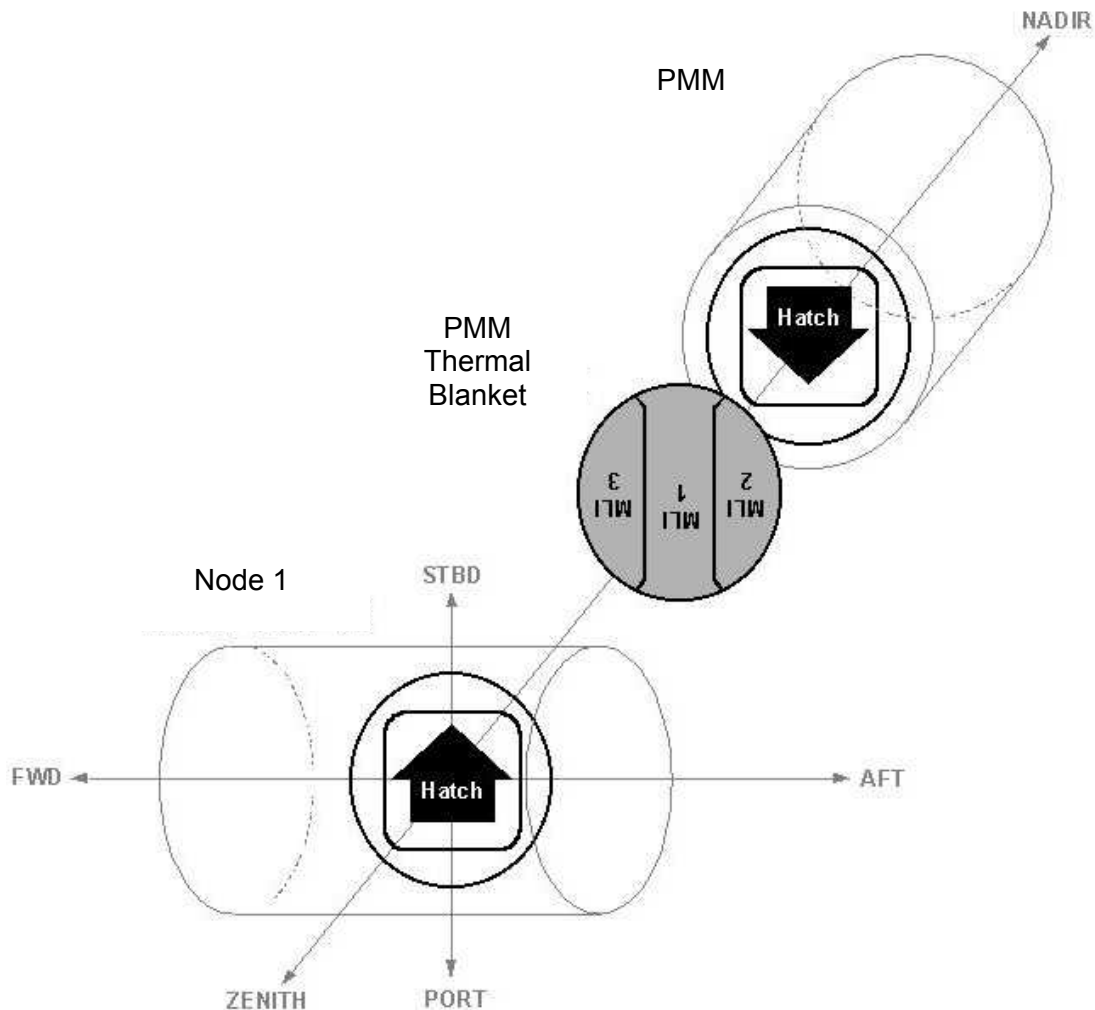


Figure 9.- Orientation of PTCS PMM Thermal Blanket Relative to Opening Direction of Hatches.



**1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS**  
(ASSY OPS/ULF5/FIN 1) Page 11 of 41 pages

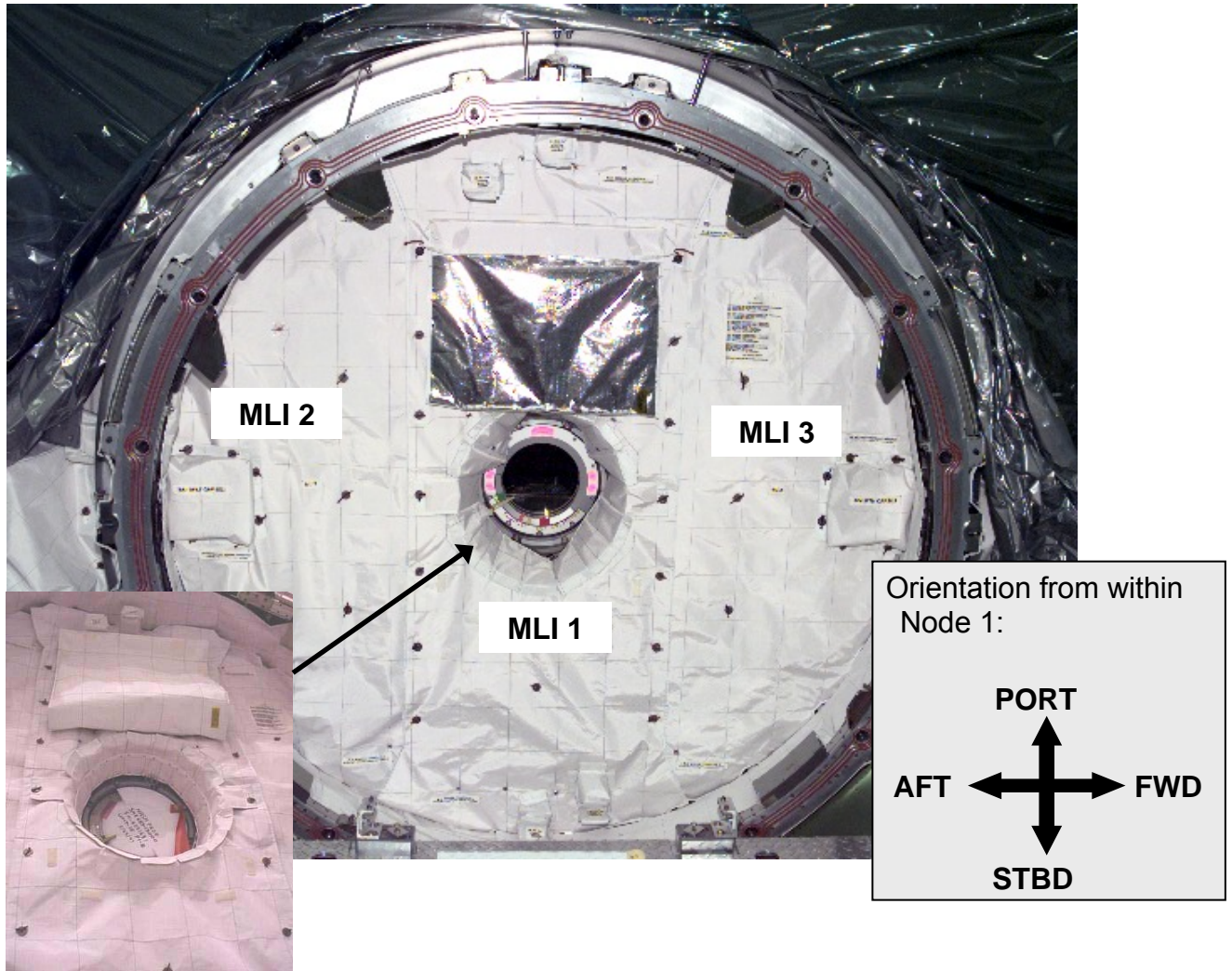


Figure 10.- PMM Thermal Blanket Installed on PMM Bulkhead and Hatch  
(small picture shows opened CBCS flap).

# 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 12 of 41 pages

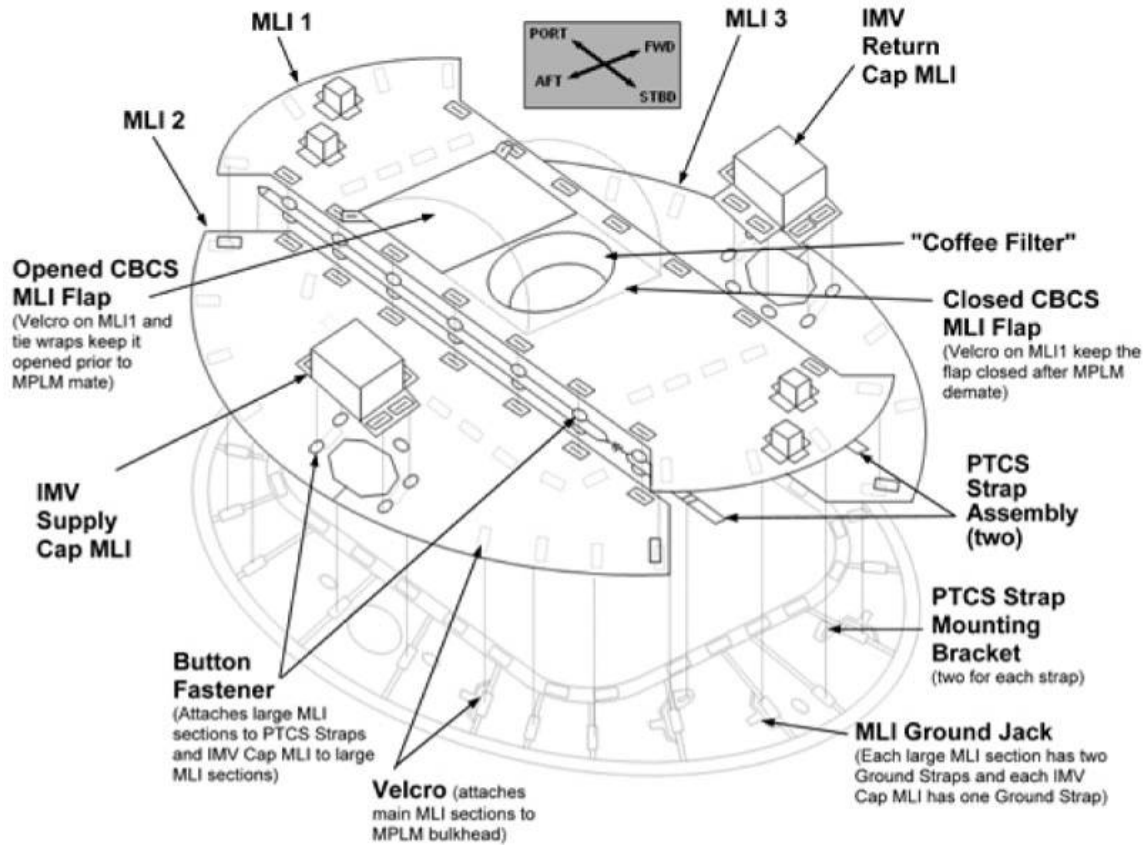


Figure 11.- Isometric View of PTCS PMM Thermal Blanket and PTCS Strap Assemblies Installed on PMM Bulkhead and Hatch.

# 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 13 of 41 pages

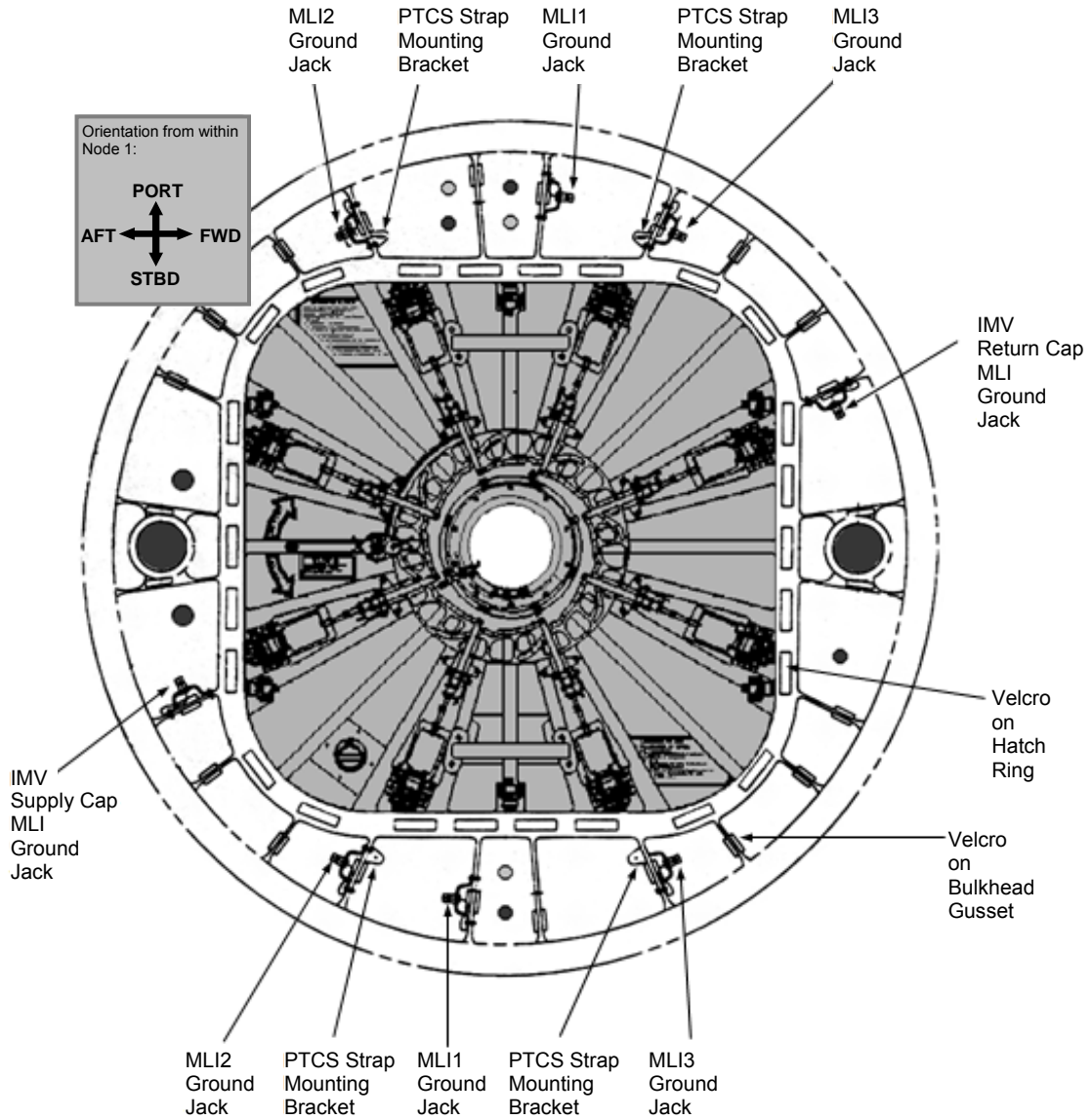


Figure 12.- Bulkhead Interfaces for the PTCS PMM Thermal Blanket and PTCS Strap Assemblies.

## 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 14 of 41 pages

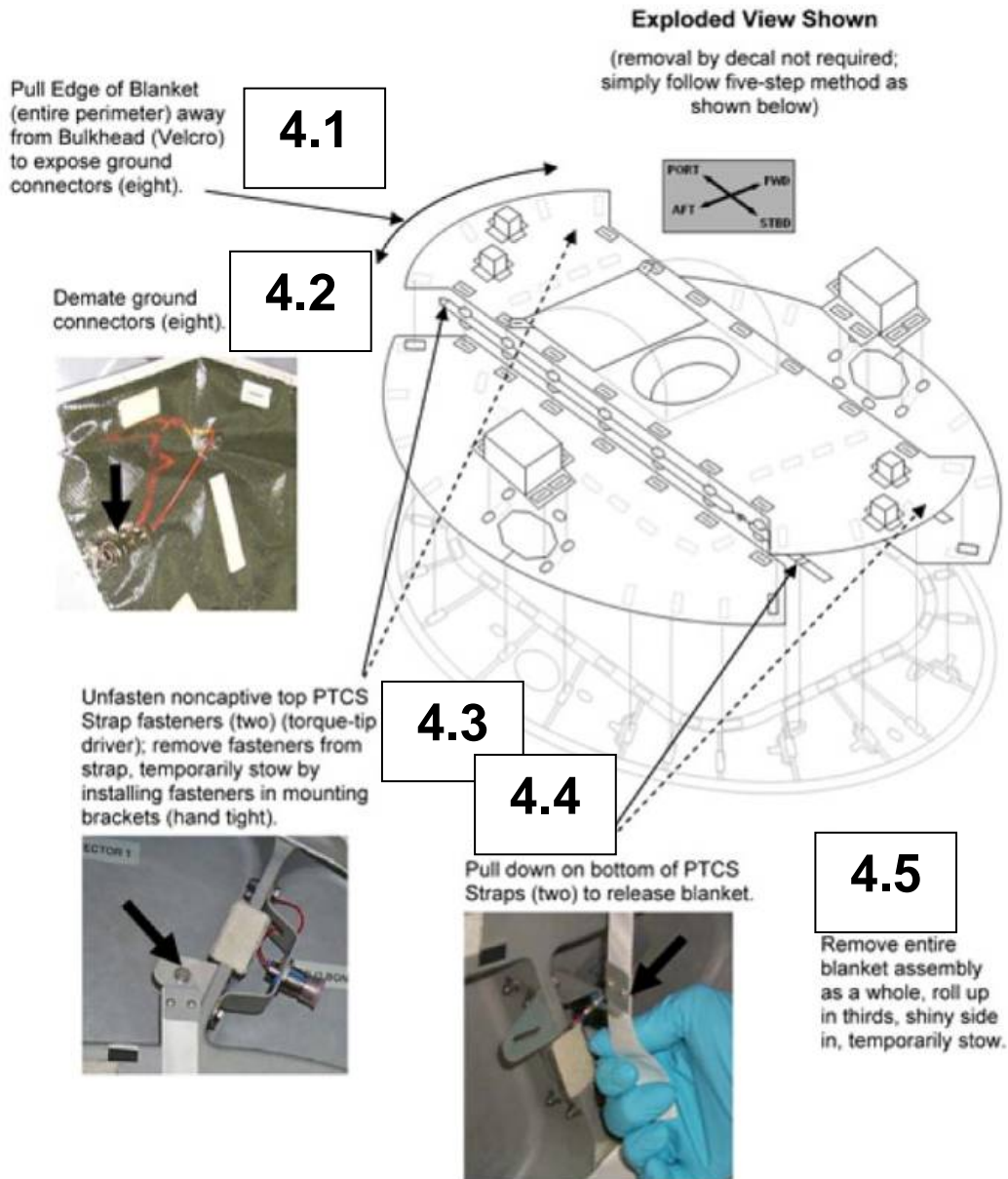


Figure 13.- Simplified Method of PTCS PMM Thermal Blanket Removal.

- 4.1 Pull edge of Blanket (entire perimeter) away from Bulkhead (Velcro) to expose ground connectors (eight).  
Refer to Figure 13.
- 4.2 Demate ground connectors by hand (eight).  
Refer to Figure 13.
- 4.3 Unfasten top PTCS Strap noncaptive Fasteners (two) (#6 Long Trq 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 13.

### 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 15 of 41 pages

- 4.4 Pull down on bottom of PTCS Straps (two) to release Blanket. Refer to Figure 13.

**CAUTION**

PTCS PMM Thermal Blanket is rolled instead of folded to prevent damage to the Multilayer Insulation of the Blanket.

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

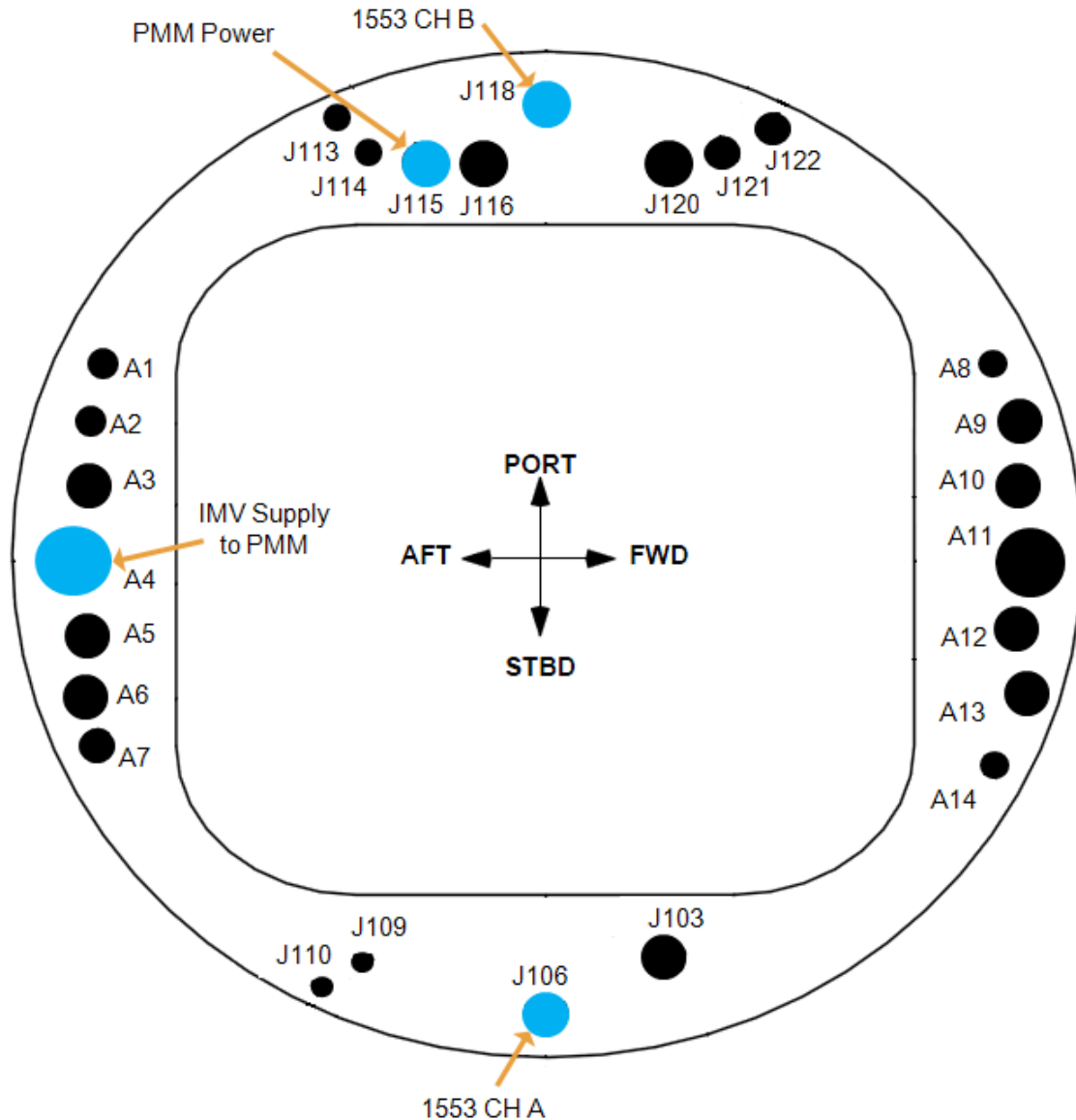


Figure 14.- Node 1 Nadir Bulkhead Feedthroughs (View from Inside Node 1 Looking Nadir).



# 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 16 of 41 pages

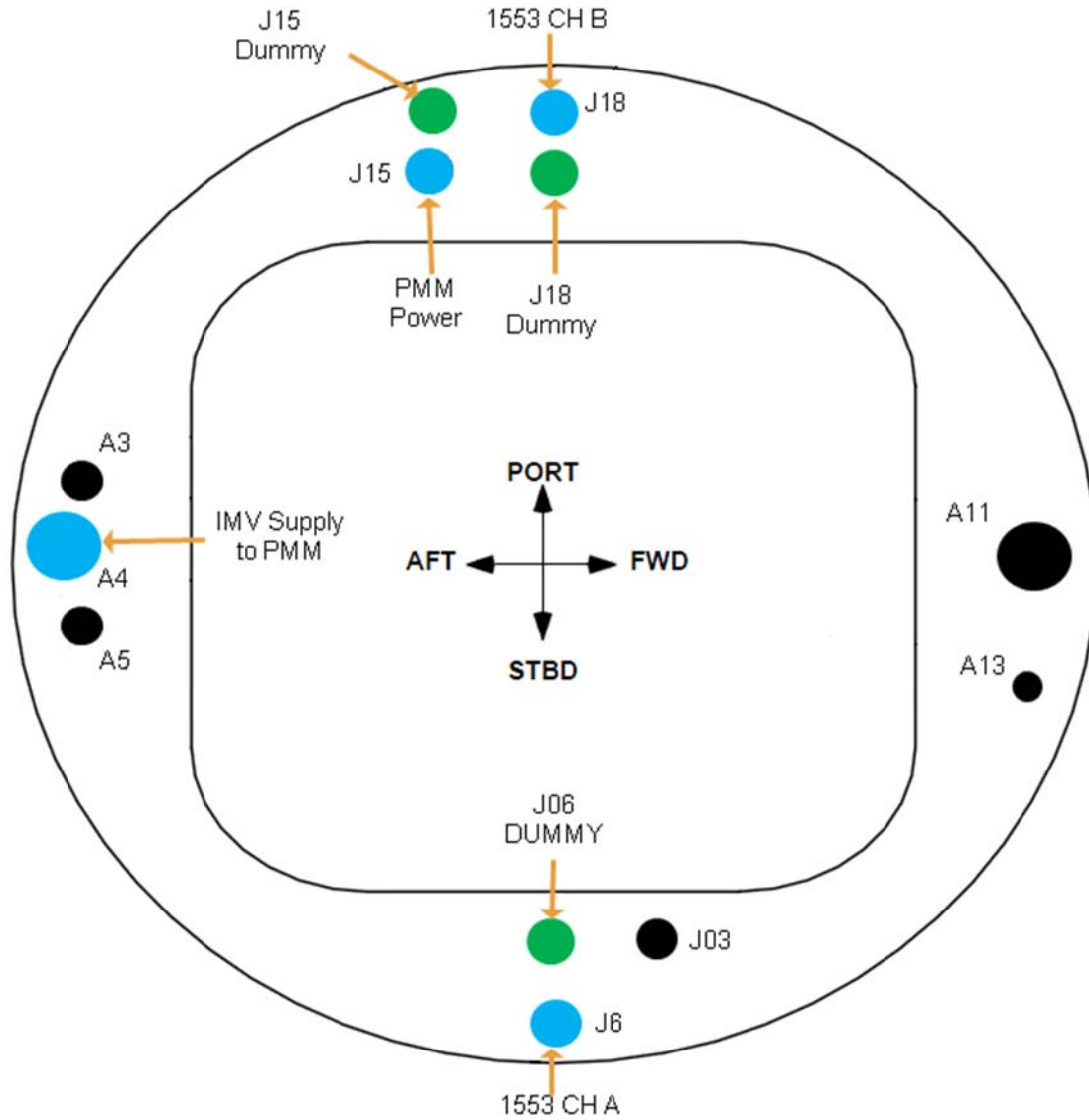


Figure 15.- PMM Bulkhead Feedthroughs (View of PMM Zenith Bulkhead Looking Nadir from N1/PMM Vestibule ).

## 1.115 PMM VESTIBULE - CONFIGURE FOR INGRESS

(ASSY OPS/ULF5/FIN 1) Page 17 of 41 pages

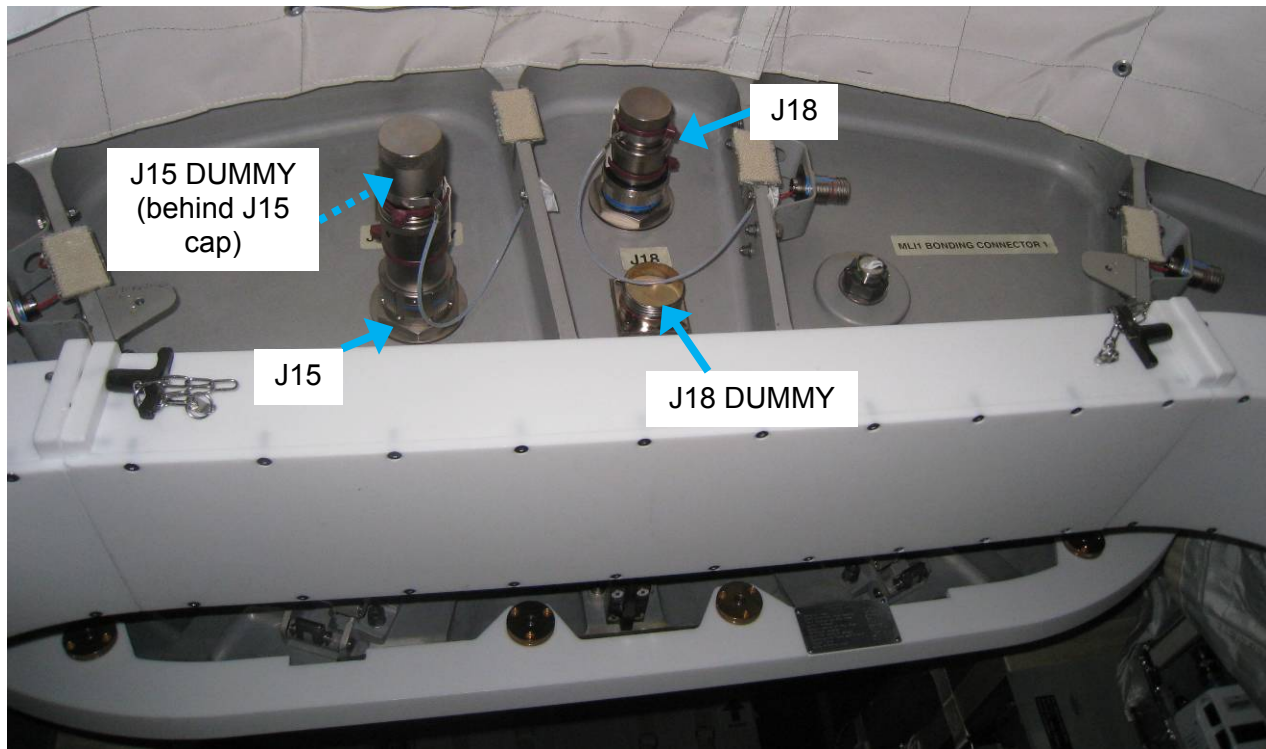


Figure 16.- PMM Bulkhead Feedthroughs - Port Quadrant (Ground Photo)

### 5. CONNECTING PMM VESTIBULE POWER JUMPER

Table 4. PMM/N1 Vestibule Power Jumper

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

#### 5.1 Verifying Safing

√**MCC-H** to verify safing for PMM power connection:  
 RPCM LA1B\_D RPC 1 is open and close command inhibited

#### 5.2 Label Ziplock Bag “PMM - N1N Vestibule Caps.”

Temporarily stow Ziplock Bag near vestibule.

#### 5.3 Don Static Wrist Tether.

Secure to unpainted, unanodized metal surface.

#### 5.4 Tethered Protective Cap ←|→ PMM (J15) feedthrough

Tethered Protective Cap (PMM side) →|← J15 Dummy Receptacle

Protective Cap ←|→ Node 1 (J115) feedthrough

Place untethered cap (Node 1 side) in Ziplock Bag labeled “PMM - N1N Vestibule Caps.”

Refer to Figures 14 to 16 and Table 4.

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- 5.5 Protective Caps (two) ←|→ MPLM Power Cable (W6006)  
Place Protective Caps (two) in Ziplock Bag labeled “PMM - N1N Vestibule Caps.”
- 5.6 Connecting MPLM Power Cable (W6006) to PMM (J15)  
W6006 P15 →|← J15 (PMM side)
- 5.7 Connecting MPLM Power Cable (W6006) to Node 1 (J115)  
W6006 P115 →|← J115 (Node side)
- 5.8 Photo document installed jumper (Digital Camera).
- 5.9 ISS ↓ **MCC-H**: “PMM power jumper installed.”

### 6. INSTALLING 1553 CH B DATA VESTIBULE JUMPER

#### NOTE

No 1553 safing is required for the mating of the two vestibule data jumpers (steps 6 to 7) because the upstream 1553 lines in Node 1 are not mated until step 8.

Table 5. Node - MPLM/PMM 1553B LB-B (W6002) Jumper

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

- 6.1 Verify Static Wrist Tether still secured to unpainted, unanodized metal surface.
- 6.2 Terminator ←|→ Node 1 (J118) feedthrough  
Place untethered terminator (Node 1 side) in Ziplock Bag labeled “PMM - N1N Vestibule Caps.”  
Terminator ←|→ PMM (J18) feedthrough  
Tethered terminator (PMM side) →|← J18 Dummy Receptacle  
Refer to Figures 14 to 16 and Table 5.
- 6.3 Protective Caps (two) ←|→ Node - MPLM/PMM 1553B LB-B (W6002)  
Place Protective Caps (two) in Ziplock Bag labeled “PMM - N1N Vestibule Caps.”
- 6.4 Installing Node - MPLM/PMM 1553B LB-B (W6002)  
W6002 P118 →|← J118 (Node 1 side)  
W6002 P18 →|← J18 (PMM side)
- 6.5 Unclip Static Wrist Tether.



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### 7. INSTALLING 1553 CH A DATA VESTIBULE JUMPER

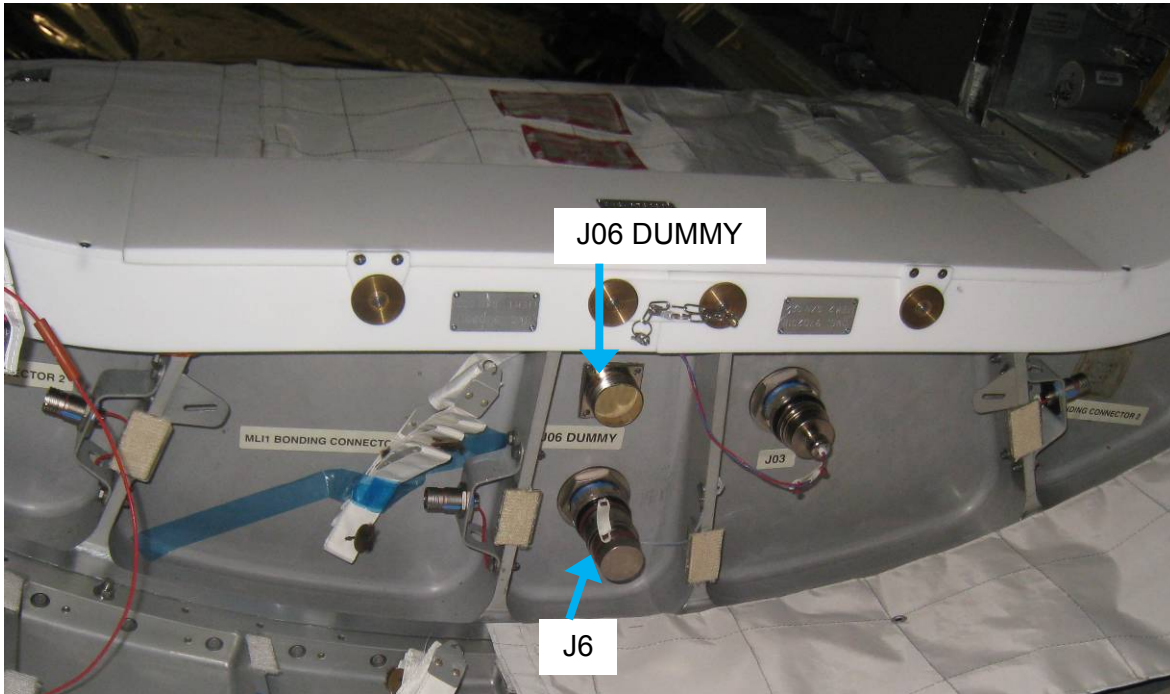


Figure 17.- PMM Bulkhead Feedthroughs - Stbd Quadrant (Ground Photo)

Table 6. Node 1 - PMM 1553B LB-A (W6001) Jumper

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

- 7.1 Secure Static Wrist Tether to unpainted, unanodized metal surface.
- 7.2 Terminator  $\leftarrow| \rightarrow$  Node 1 (J106) feedthrough  
Place untethered terminator (Node side) in Ziplock Bag labeled "PMM - N1N Vestibule Caps."  
Terminator  $\leftarrow| \rightarrow$  PMM (J6) feedthrough  
Tethered terminator (PMM side)  $\rightarrow| \leftarrow$  J06 Dummy Receptacle  
Refer to Figures 14, 15, and 17 and Table 6.
- 7.3 Protective Caps (two)  $\leftarrow| \rightarrow$  Node - MPLM/PMM 1553B LB-A (W6001)  
Place Protective Caps (two) in Ziplock Bag labeled "PMM - N1N Vestibule Caps."
- 7.4 Installing Node - MPLM/PMM 1553B LB-A (W6001)  
W6001 P106  $\rightarrow| \leftarrow$  J106 (Node 1 side)

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W6001 P6 →|← J6 (PMM side)

7.5 Unclip Static Wrist Tether.

7.6 Photo document installed jumpers (two) (Digital Camera).

7.7 ISS ↓ **MCC-H**: "Both PMM vestibule 1553 jumpers installed."

### 8. INSTALLING 1553 NODE 1 UPSTREAM Y-JUMPERS

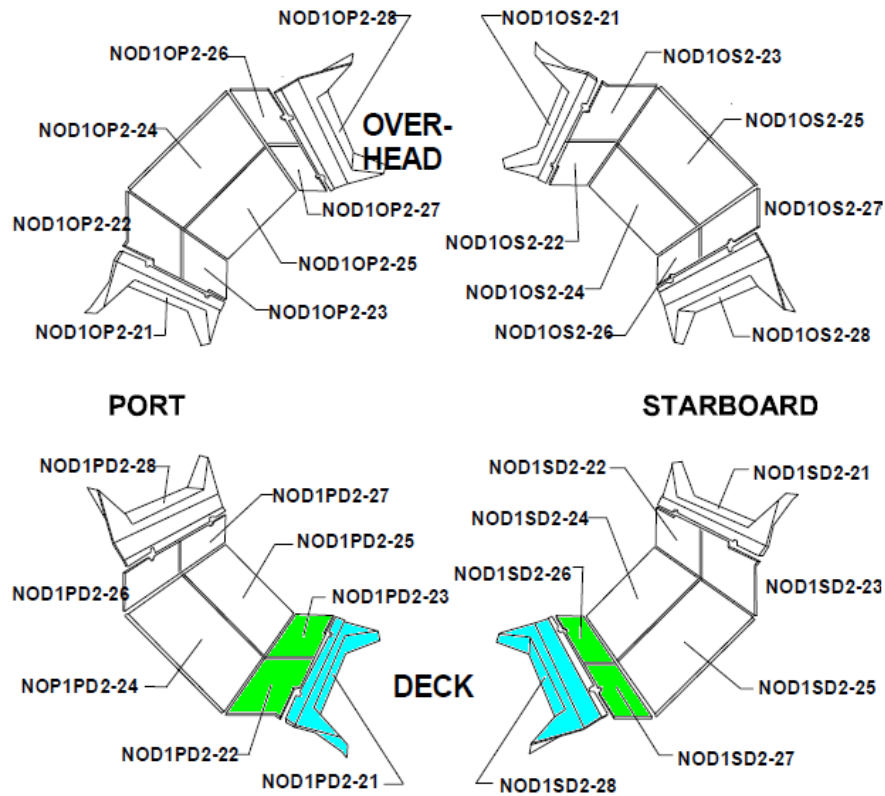


Figure 18. - Node 1 Radial Bay Closeout Panels(Green - Removal required, Blue - Remove at crew discretion).

NOD1D2 8.1 Relocate any items from front of affected Closeout Panels.  
Refer to Figure 18.

8.2 Remove the following Closeout Panels (5/32" Hex Head, 1/4" Drive;  
Driver Handle):

NOD1PD2-22 and NOD1PD2-23 (together, three fasteners each)

NOD1SD2-26 and NOD1SD2-27 (together, three fasteners each)

Temporarily stow Closeout Panels.

When removing Stbd-Deck Closeout Panels, close Node 1 Nadir hatch as  
required for access.

Refer to Figure 18.

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- \*\*\*\*\*
- \* If required for removal of NOD1PD2-22, NOD1PD2-23,
- \* NOD1SD2-26, or NOD1SD2-27
- \* Remove T-shaped Closeout Seam Support, fasteners (eight)
- \* (Ratchet, 1/4" Drive; 1/8" Hex Head).
- \* Remove L-shaped Closeout Seam Supports (two), fasteners
- \* (four each) (Ratchet, 1/4" Drive; 1/8" Hex Head).
- \*\*\*\*\*

8.3 Perform CSA-O2 sampling in open cabin and behind removed Closeout Panels.

Verify O2 % within Nominal Range specified on CSA-O2 Decal.

NOTE

NOD1PD2-21 and NOD1SD2-28 Closeout Panels can be difficult to reinstall due to numerous fastener alignments required. These panels should only be removed if crew determines access is insufficient from adjacent closeouts.

8.4 If required during subsequent steps

Remove following Closeout Panels (5/32" Hex Head, 1/4" Drive; Driver Handle):

NOD1PD2-21 (fifteen fasteners)

NOD1SD2-28 (fifteen fasteners)

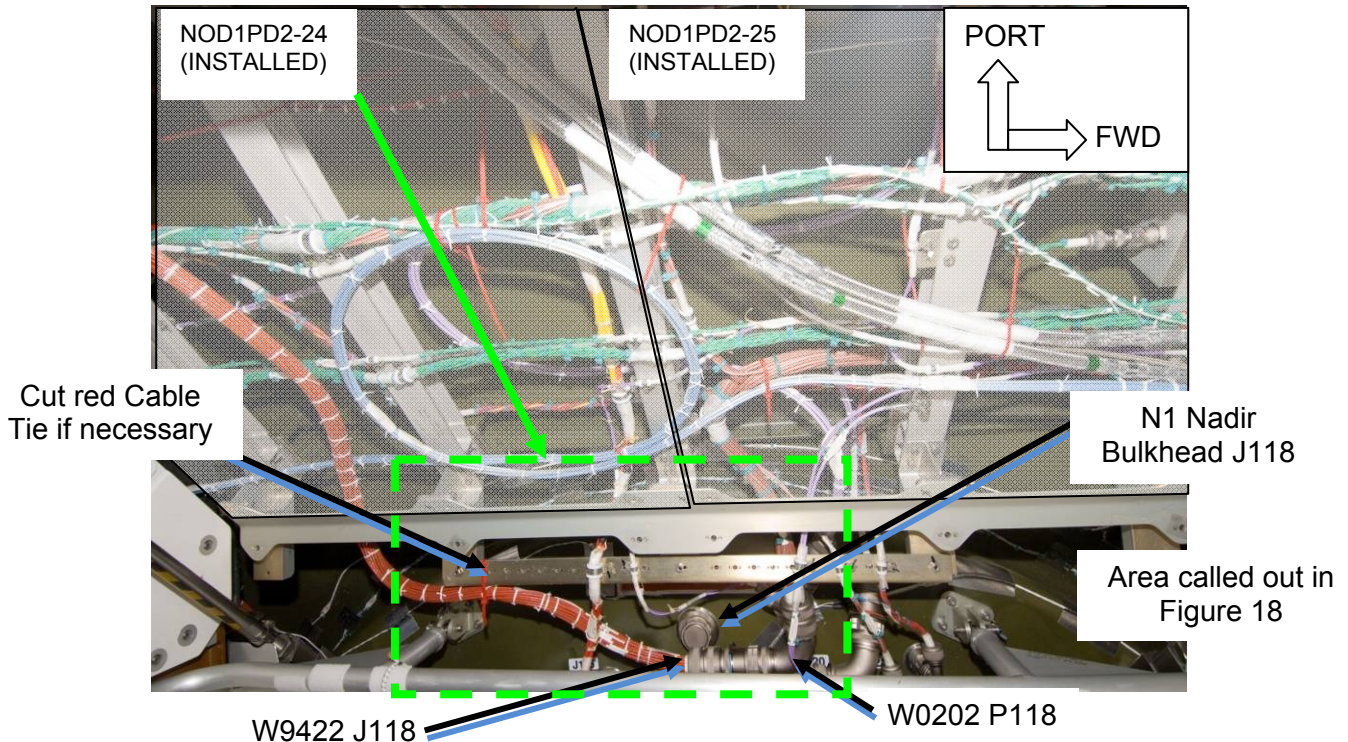


Figure 19.- NOD1PD2 Radial Area Before NOD1 1553 CH B Cable (W8993) Installed.



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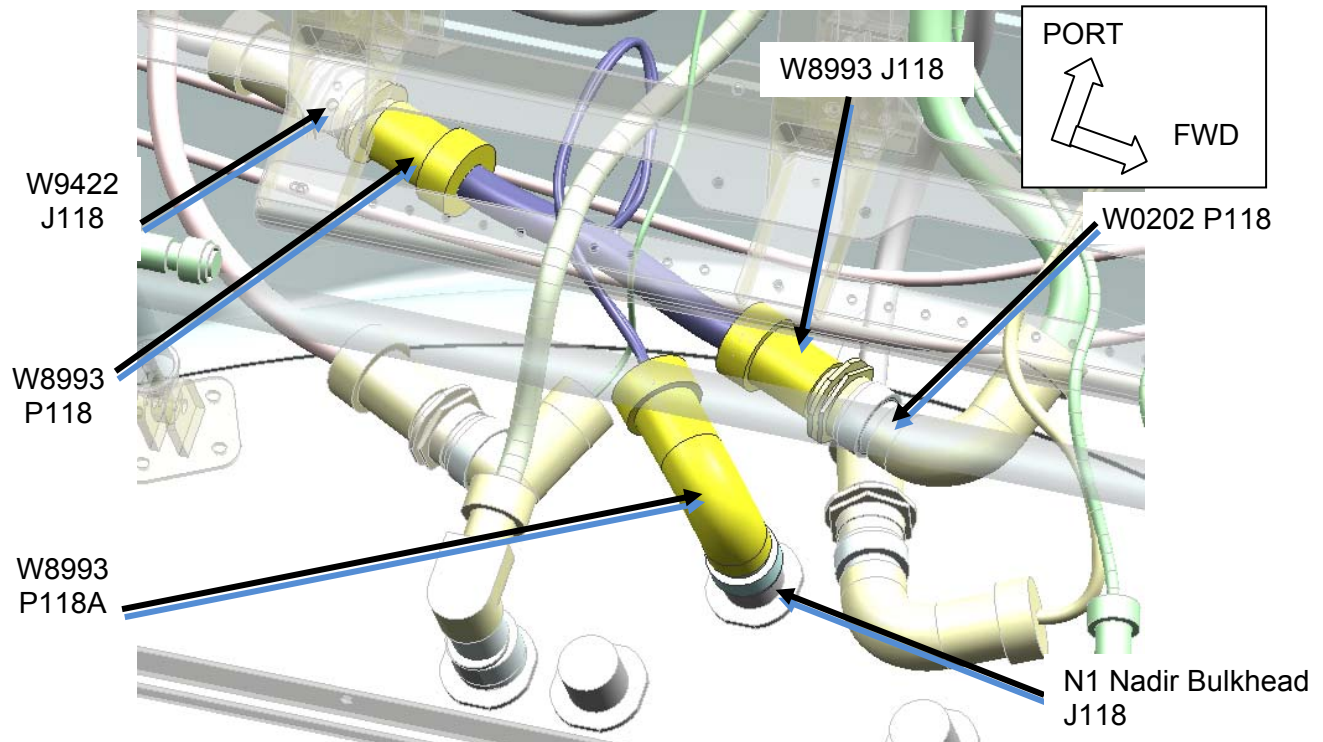


Figure 20. - NOD1PD2 Radial Area After NOD1 1553 CH B Cable (W8993) Installed.

8.5 Secure Static Wrist Tether to unpainted, unanodized metal surface.

- NOD1PD2 8.6 Protective Cap ←|→ J118 on Node 1 Nadir Bulkhead  
Protective Cap ←|→ P118A on NOD1 1553 CH B Cable (W8993)  
Protective Cap ←|→ P118 on NOD1 1553 CH B Cable (W8993)  
Protective Cap ←|→ J118 on NOD1 1553 CH B Cable (W8993)  
Place Protective Caps in Ziplock Bag labeled "PMM - N1N Vestibule Caps."  
Refer to Figures 19 and 20.

### NOTE

Safing in step 1 must be performed before W9422 J118/W0202 P118 connection is demated as this connection contains several active buses.

8.7 Installing NOD1 1553 CH B Cable (W8993)

#### On MCC-H GO

Wire Harness W9422 J118 ←|→ P118 on Wire Harness W0202  
NOD1 1553 CH B Cable (W8993) P118 →|← J118 on Wire Harness W9422  
NOD1 1553 CH B Cable (W8993) J118 →|← P118 on Wire Harness W0202  
NOD1 1553 CH B Cable (W8993) P118A →|← J118 on Node 1 Bulkhead  
Unclip Static Wrist Tether.  
Route, secure W8993 as required (Velcro Straps).  
Refer to Figures 19 and 20.

8.8 ISS ↓ **MCC-H:** "Channel B jumper is installed. Go for 1553 Channel Swaps."

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8.9 Photo document installed NOD1 1553 CH B Cable (W8993) (Digital Camera).

## MCC-H 8.10 Swapping CDH Buses to Channel B (ground-only)

sel [XX] where [XX] = Bus Name from Table 1

[XX] Bus Status  
'Channel Selected'

cmd Select Ch B **Execute** (Verify - B)

Repeat

Table 7. Robotics Buses in W0205 P106 and W0202 P118

OPS NAME	CIPUI
CUP_RWS_Bus_Ch_Select_PDGF_LB_Ch_B	CMRM96IM0171K
LAB_RWS_Bus_Ch_Select_PDGF_LB_Ch_B	CMRM96IM0068K

## 8.11 Swapping Robotics Buses to Channel B (ground-only)

MSS: LAS5(LAP5) Bus Config

LAS5(LAP5) CEU Bus Configuration

cmd 'Local Bus' 'PDGF' B (Verify - B)

8.12 **MCC-H** ↑ ISS: "Go for Channel A jumper mate in step 8.15."

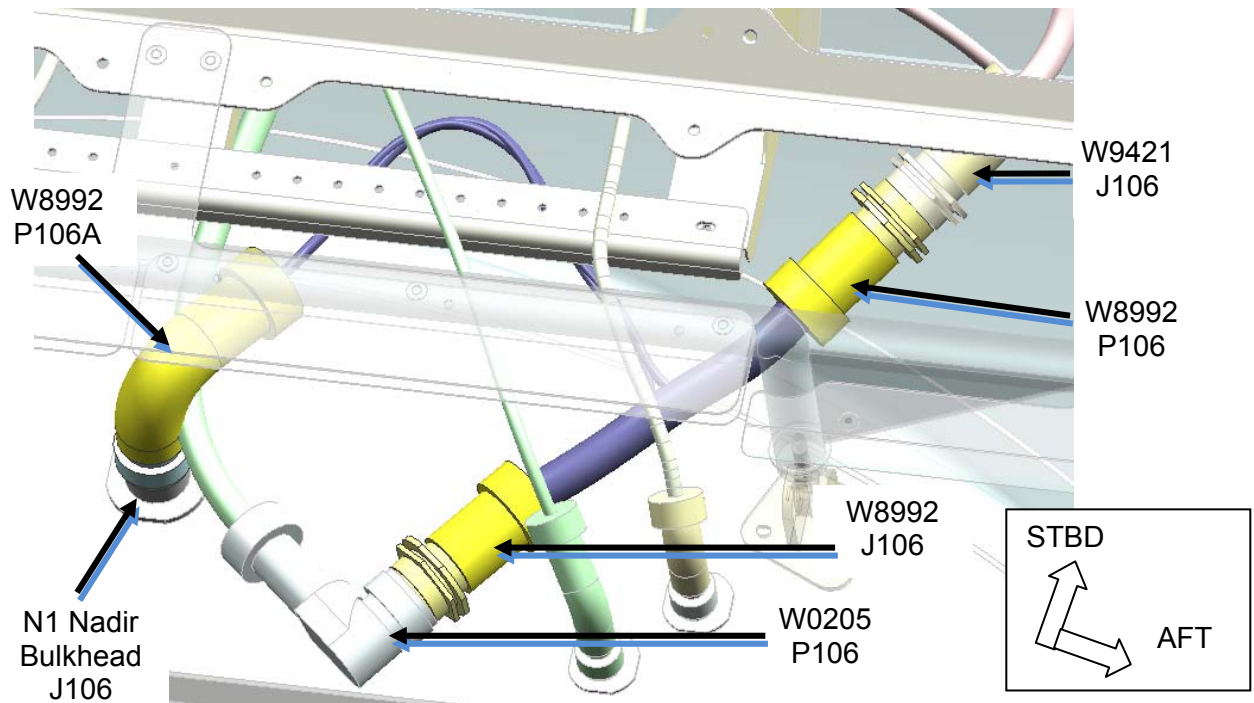


Figure 21.- NOD1SD2 Radial Area After NOD1 1553 CH A Cable (W8992) Installed.

8.13 Secure Static Wrist Tether to unpainted, unanodized metal surface.

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- NOD1SD2 8.14 Protective Cap ←|→ J106 on Node 1 Nadir Bulkhead  
Protective Cap ←|→ P106A on NOD1 1553 CH A Cable (W8992)  
Protective Cap ←|→ J106 on NOD1 1553 CH A Cable (W8992)  
Protective Cap ←|→ P106 on NOD1 1553 CH A Cable (W8992)  
Place Protective Caps in Ziplock Bag labeled "PMM - N1N Vestibule Caps."  
Refer to Figure 21.

### NOTE

Channel swaps in steps 8.10 and 8.11 must be performed before W9421 J106/W0205 P106 connection is demated as this connection contains several active buses.

### 8.15 Installing NOD1 1553 CH A Cable (W8992)

#### On MCC-H GO

Wire Harness W9421 J106 ←|→ P106 on Wire Harness W0205  
NOD1 1553 CH A Cable (W8992) P106 →|← J106 on Wire Harness W9421  
NOD1 1553 CH A Cable (W8992) J106 →|← P106 on Wire Harness W0205  
NOD1 1553 CH A Cable (W8992) P106A →|← J106 on Node 1 Bulkhead  
Route, secure W8992 as required (Velcro Straps).  
Refer to Figure 21.

- 8.16 ISS ↓ **MCC-H**: "Channel A jumper is installed. Go for PMM Activation."

### NOTE

1. Once PMM power (one) and 1553 data (two) jumpers are installed, [1.120 PMM ACTIVATION \(GROUND ONLY\)](#) (SODF: ASSY OPS: ACTIVATION AND CHECKOUT) may be performed in parallel up through completion of AUTO (MANUAL) ACTIVATION PART 1 step 8.
2. Data reconfigurations in step 16 of this procedure can be performed at any time after completion of step 8.16.
3. NOD1PD2-21 and NOD1SD2-28 Closeout Panels can be difficult to reinstall (step 8.19) due to numerous fastener alignments required. Recommend engaging fasteners at center of panel and working outwards.

- 8.17 Doff Static Wrist Tether.

- 8.18 Photo document installed NOD1 1553 CH A Cable (W8992) (Digital Camera).

- 8.19 If removed for accessing

Install the following Closeout Panels (5/32" Hex Head, 1/4" Drive; Driver Handle):

NOD1PD2-21 (fifteen fasteners)

NOD1SD2-28 (fifteen fasteners)

Refer to Figure 18.

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- 8.20 Install the following Closeout Panels (5/32" Hex Head, 1/4" Drive; Driver Handle):
  - NOD1PD2-22 and NOD1PD2-23 (together, three fasteners each)
  - NOD1SD2-26 and NOD1SD2-27 (together, three fasteners each)When installing Stbd-Deck Closeout Panels, close Node 1 Nadir hatch as required for access.  
Refer to Figure 18.

\*\*\*\*\*  
\* If removed after step 8.2 to facilitate removal of NOD1PD2-22,  
\* NOD1PD2-23, NOD1SD2-26, or NOD1SD2-27  
\* Install T-shaped Closeout Seam Support, fasteners (eight)  
\* (Ratchet, 1/4" Drive; 1/8" Hex Head).  
\* Install L-shaped Closeout Seam Supports (two), fasteners (four  
\* each) (Ratchet, 1/4" Drive; 1/8" Hex Head).  
\*\*\*\*\*

## 9. REMOVING CBM CONTROLLER PANEL ASSEMBLIES

CAUTION
1. CPAs must be free of moisture before being stowed.
2. This procedure is performed near Hatch Seals. Care must be taken to avoid Seal damage.

NOTE
Controller Panel Assembly (CPA) safing was verified complete in step 3.2.1 of this procedure.

- 9.1 Inspect Controller Panel Assemblies (CPAs) and areas between each controller on each CPA for condensation.  
Dry as required (Towel).  
Report any condensation to **MCC-H**.

- 9.2 Recording CPA Data  
Record P/N of installed CPAs.  
CPA1: \_\_\_\_\_  
CPA2: \_\_\_\_\_  
CPA3: \_\_\_\_\_  
CPA4: \_\_\_\_\_

- Record S/N of installed CPAs.  
CPA1: \_\_\_\_\_  
CPA2: \_\_\_\_\_  
CPA3: \_\_\_\_\_  
CPA4: \_\_\_\_\_

CAUTION
1. CPAs are not interchangeable and must be carefully labeled for replacement in original location.
2. Labeling of CPAs must not be done on critical surfaces such as CPA-to-hatch beam bonding surface, reflective surface.

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Figure 22.- CPA Bulkhead Label Location.

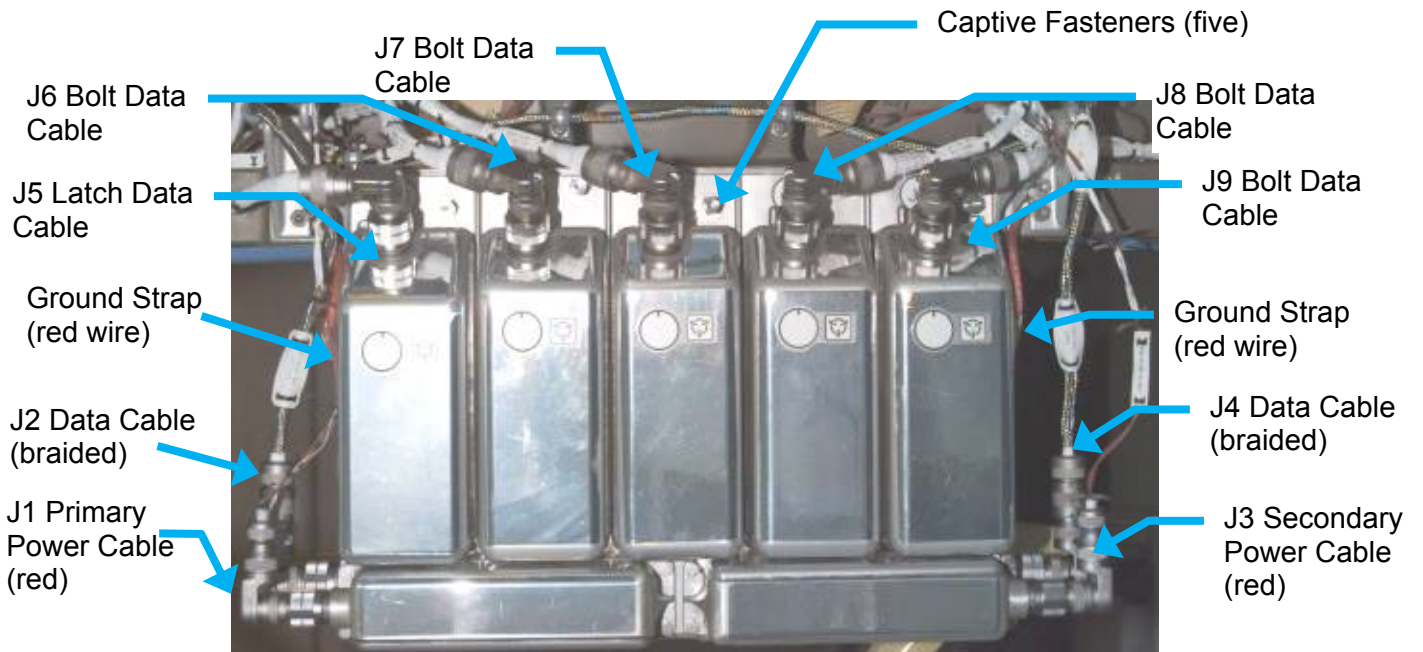


Figure 23.- Typical Installation of CBM CPA (Front View Shown).

9.3 Label back of all four CPAs with module name, location, and CPA Bulkhead label: i.e. "NODE 1 NADIR CPA 1" (Gray Tape, Sharpie).  
Photo document labeled CPAs while still installed (Digital Camera).  
Refer to Figures 22 and 23.

### 9.4 Removing CPAs

9.4.1 Don Static Wrist Tether.

Secure to unpainted, unanodized metal surface.



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- 9.4.2 Power/data cable connectors (seven) ←|→ CPA (one)  
Place Protective Caps (fourteen) on all connectors (from Ziplock Bag).  
Refer to Figure 23.

- 9.4.3 Doff Static Wrist Tether.

### NOTE

Ground Straps should only be removed at CPA side of cable.  
Bulkhead location contains noncaptive fasteners.

- 9.4.4 Unfasten CPA ground strap fasteners (two, one each Ground Strap).  
Remove Ground Straps (two) (Ratchet, 1/4" Drive; 5/32" Hex Head).  
Refer to Figure 23.

- 9.4.5 Place empty connector cap bag into 24"x 24" Ziplock Bag.

### CAUTION

Failure to completely disengage all five CPA captive fasteners  
before pushing or pulling on CPA may damage fasteners.



Figure 24.- Typical CPA Stowage Configuration

- 9.4.6 Unfasten CPA fasteners (five) (Ratchet, 1/4" Drive; 4" Ext; 7/16" Socket).  
Stow CPA in 24"x 24" Ziplock Bag.  
Refer to Figure 23 and 24.

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9.4.7 Stow 24"x 24" Ziplock Bag (with CPA) into CTB (two CPAs per 1.0 CTB).

Insert Divider between CPAs.

Refer to Figure 24.

9.4.8 Tuck cables, Ground Straps into vestibule.

Restrain cables, Ground Straps (Velcro Straps).

9.4.9 Repeat steps 9.4.1 to 9.4.8 for remaining CPAs.

9.5 Notify **MCC-H** of P/Ns, S/Ns of removed CPAs.

9.6 Temporarily stow CTBs containing CPAs.

### 10. EQUALIZING IMV VALVE AND CAP PRESSURE

#### NOTE

1. Prior to IMV Valve and Cap Pressure Equalization, part 1 of [1.120 PMM ACTIVATION \(GROUND ONLY\)](#), steps 1 to 8 (SODF: ASSY OPS: ACTIVATION AND CHECKOUT) must be complete.
2. This step equalizes pressure between the various volumes (PMM, Node 1, and ducting) to facilitate removal of IMV Caps.
3. Steps 10.2 to 10.4 equalize the PMM with Node 1.
4. Post PMM heater activation [step 6 of [1.120 PMM ACTIVATION \(GROUND ONLY\)](#) (SODF: ASSY OPS: ACTIVATION AND CHECKOUT)], there is a potential wait of up to 2.5 hours before the PMM MPEV can be opened due to condensation concerns.

10.1 On **MCC-H** ↑ ISS: "PMM Activation Part 1 complete. Go for Pressure Equalization. Expected equalization time with PMM is: \_\_\_\_\_", proceed with step 10.

#### **WARNING**

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

PMM Hatch 10.2 Don Earplugs.

MPEV → Open

PCS 10.3 US Lab: ECLSS

Lab:ECLSS

When dP/dT ~0 mmHg/min or **On MCC-H GO**, continue with next step.

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### NOTE

1. Steps 10.4 to 10.7 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.

#### 10.4 Enabling Power to PMM IMV Ovhd Aft (Supply) Valve

Task

'Multi-flight Task Displays'

sel MPLM Act-Deact

'PDB Control'

sel PDB Details

**cmd** Converter 02 – On (Verify Posn – On)

**cmd** RPC 15 Close (Verify RPC 15 Posn – Cl)

#### 10.5 Opening PMM IMV Ovhd Aft (Supply) Valve

'IMV and SDS'

sel MPLM IMV Aft

'Position – Open'

**cmd** Open (Verify Position – Open)

#### 10.6 Closing PMM IMV Ovhd Aft (Supply) Valve

'Position – Close'

**cmd** Close (Verify Position – Closed)

#### 10.7 Inhibiting Power to PMM IMV Valves

sel MPLM PDB RPC 15

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**cmd** RPC 15 Open (Verify RPC 15 Posn – Op)

**cmd** Converter 02 – Off (Verify Posn – Off)

### NOTE

1. Steps 10.8 and 10.9 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.

### 10.8 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

### 10.9 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

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## 11. INSTALLING IMV JUMPER



Figure 25.- PMM Bulkhead Feedthroughs - Aft Quadrant (Ground Photo)

### NOTE

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.

Table 8. IMV Supply Jumper

Jumper Name	Node 1 Nadir Bulkhead Interface	PMM Bulkhead Interface	Part Number
IMV Return (will be installed as IMV Supply Jumper)	A4	A4	683-13870-17

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- 11.1 Loosen V-Band Clamp and remove IMV Cap from Node 1 Deck Aft (A4) IMV Flange (Ratchet, 1/4" Drive; 7/16" Deep Socket).  
Place IMV Cap in Ziplock Bag.  
Using Sharpie, label Ziplock Bag "Node 1 Nadir IMV Cap."  
Refer to Figure 14 and Table 8.
- 11.2 Loosen V-Band Clamp, and remove IMV Cap from PMM (A4) IMV Flange (Ratchet, 1/4" Drive; 7/16" Deep Socket).  
Place IMV Cap in Ziplock Bag.  
Using Sharpie, label Ziplock Bag "PMM IMV Cap."  
Refer to Figures 15 and 25.

### CAUTION

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

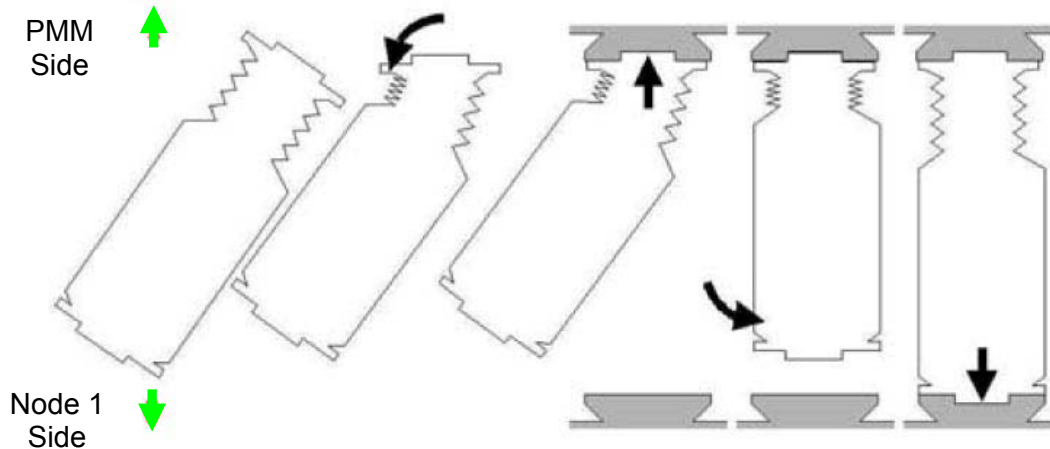


Figure 26.- Recommended Steps for IMV Jumper Installation.

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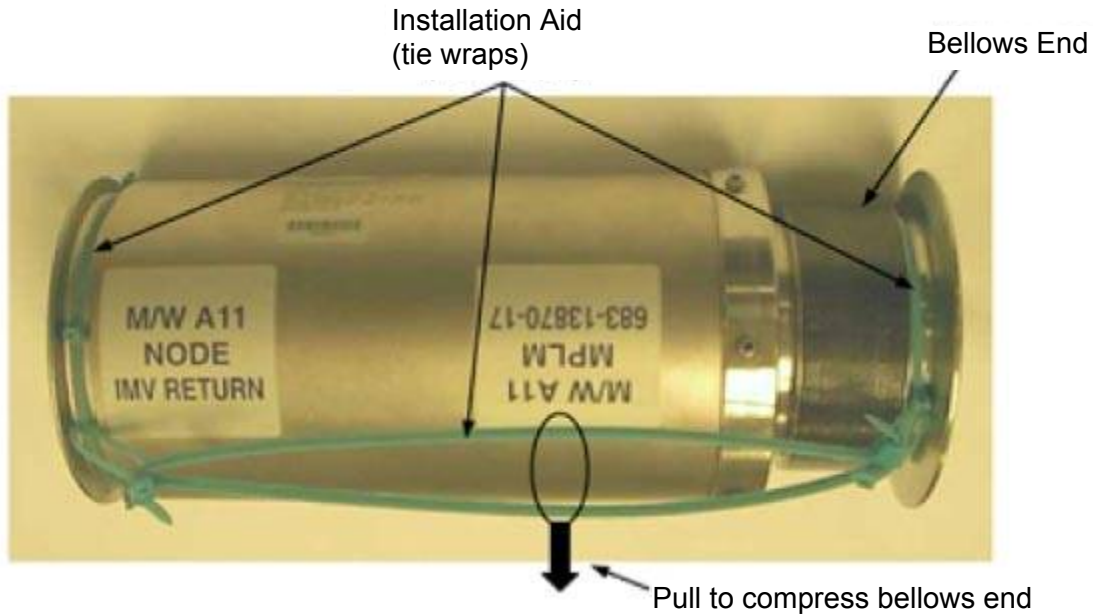


Figure 27.- IMV Jumper Handling Aid (Example Shown).

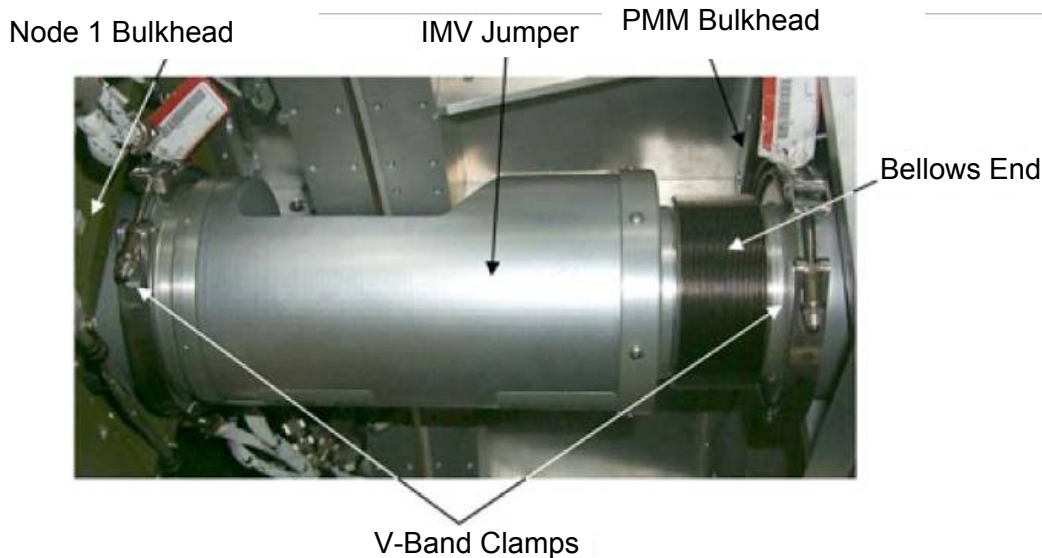


Figure 28.- IMV Jumper Installed (Example Photo).

#### NOTE

1. 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.
2. Braycote may be applied to help secure the IMV Jumper O-Rings into their grooves.



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- 11.3 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 26 to 28.
- 11.4 Install O-Rings on each side of IMV(A4) IMV Jumper by having one crewmember pull back on jumper (compressing it) while a second crewmember installs the O-Ring.
- 11.5 Secure jumper to Node 1 IMV Flange with V-Band Clamp. Torque to 35 in-lbs [Ratchet, 1/4" Drive; 7/16" Deep Socket; (10-50 in-lbs) Trq Wrench].
- 11.6 Secure jumper to PMM IMV Flange with V-Band Clamp. Torque to 35 in-lbs [Ratchet, 1/4" Drive; 7/16" Deep Socket; (10-50 in-lbs) Trq Wrench].

### NOTE

Once the IMV Supply jumper is installed, [1.120 PMM ACTIVATION \(GROUND ONLY\)](#) (SODF: ASSY OPS: ACTIVATION AND CHECKOUT) may be completed in parallel (AUTO/MANUAL ACTIVATION PART 2 steps 9 and 10).

- 11.7 ISS ↓ **MCC-H**: "IMV Supply Jumper installed. Go for PMM Activation Part 2."

## 12. [INSTALLING MODULE GROUND STRAP](#)



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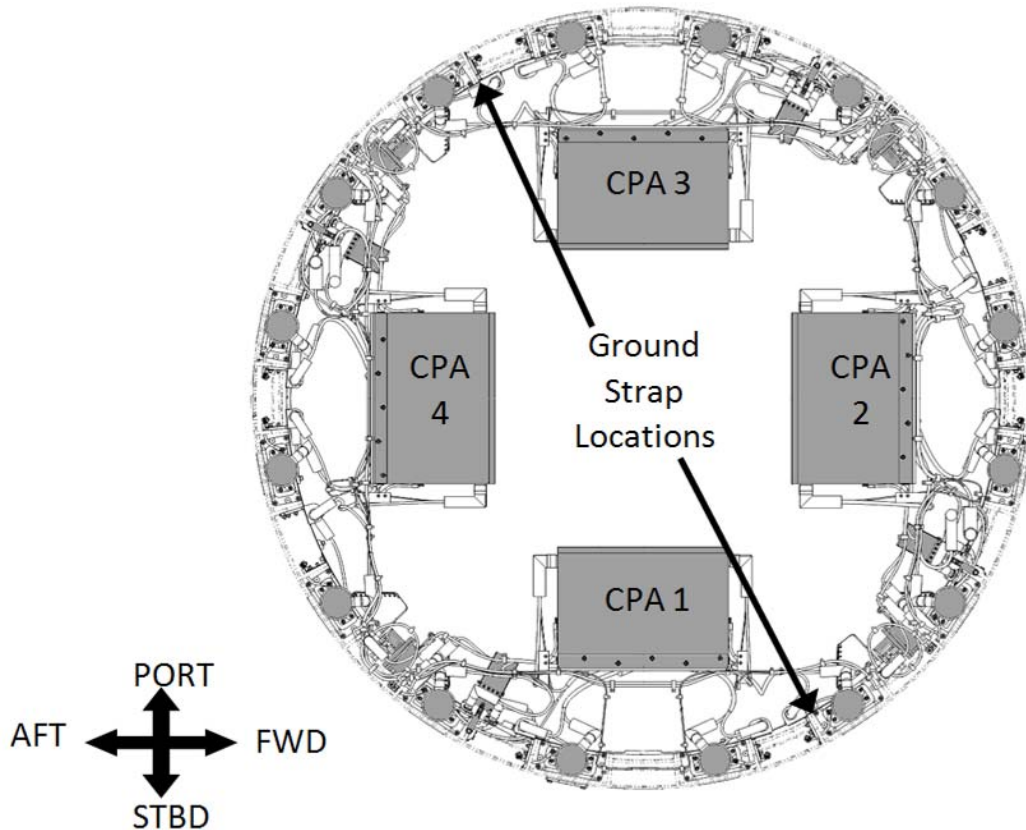


Figure 29.- Ground Strap Locations on ACBM (view from inside PMM looking Zenith towards Node 1, CPAs will not be installed at this point in the procedure).

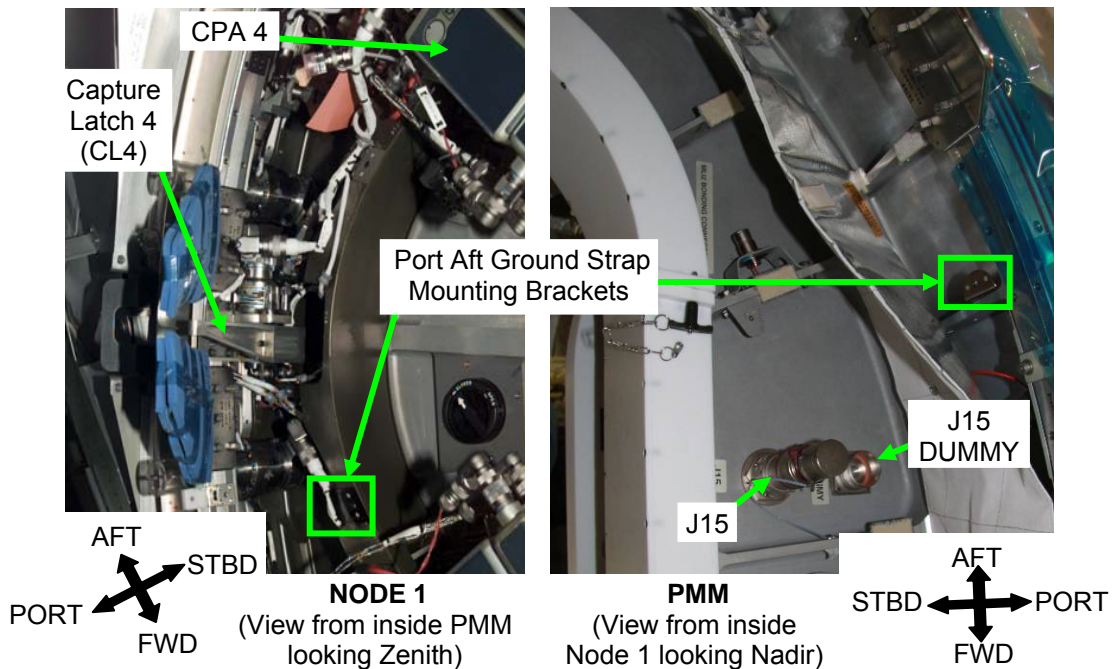


Figure 30.- Port Aft Ground Strap Mounting Brackets (Ground Photos).

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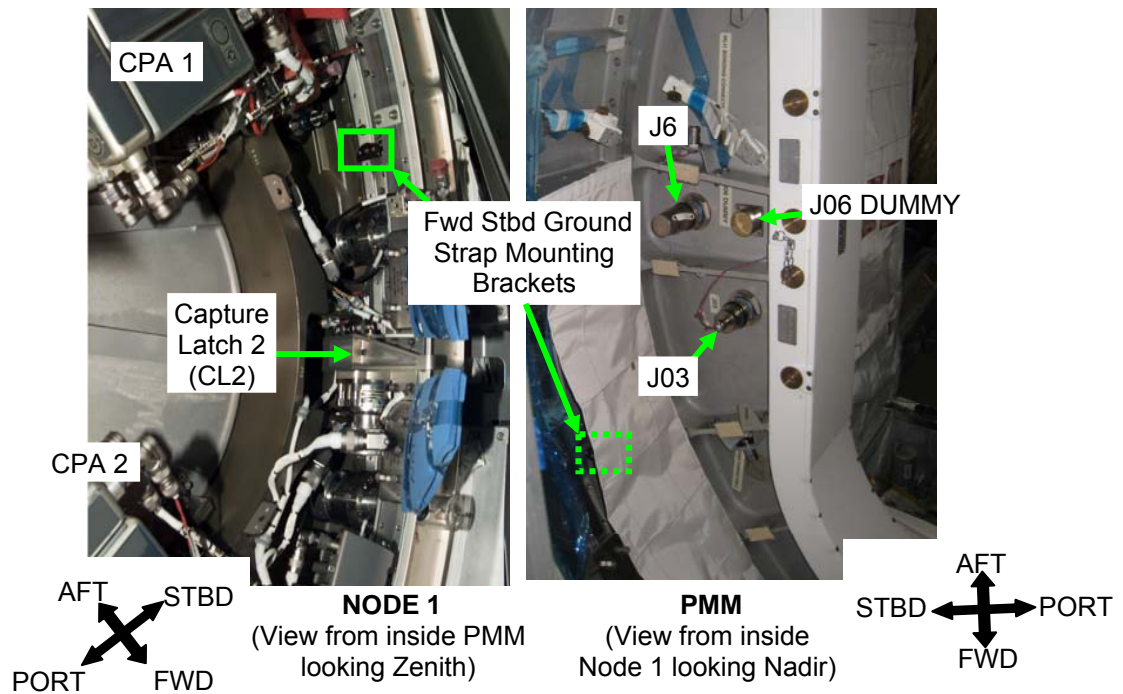


Figure 31.- Fwd Stbd Ground Strap Mounting Brackets (Ground Photos).

- 12.1 Locate four Ground Strap Mounting Brackets (two on Active CBM Ring and two on Passive CBM Ring). Refer to Figures 29 to 31.

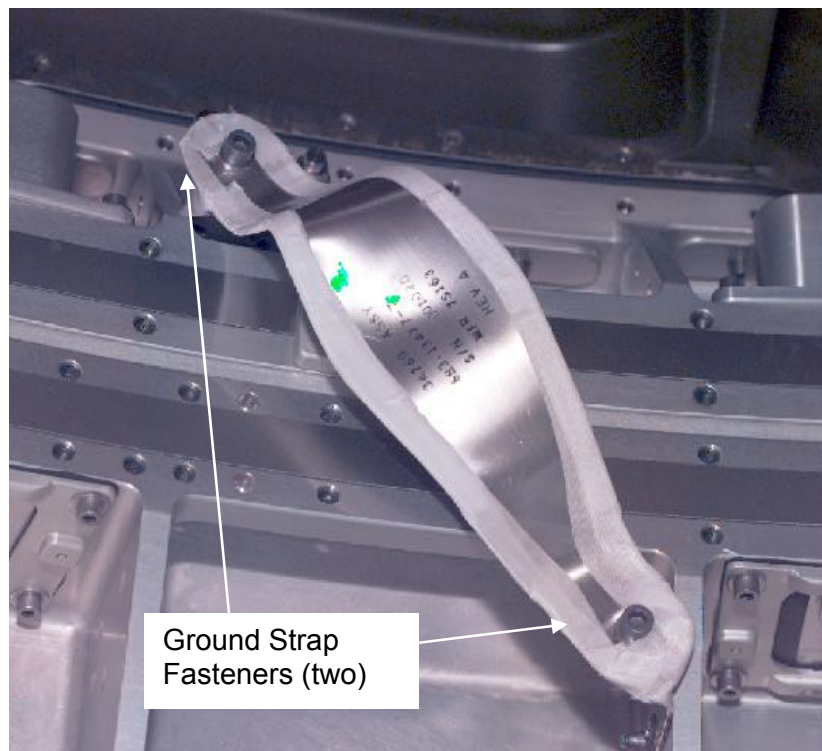


Figure 32.- Ground Strap Installed Across ACBM to PCBM Interface.

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### NOTE

Ground Straps are installed across ACBM to PCBM interface. To be installed, Ground Straps are bent 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.

- 12.2 Install Ground Straps (two) from ACBM bracket to PCBM bracket, bending as necessary.

Refer to Figures 29 to 32.

\*\*\*\*\*

- \* If Ground Strap cannot be installed due to interference with  
\* PCBM Alignment Guide

### NOTE

Alignment Guide may be held in place by tight tolerances on guide pins. Gently rocking Alignment Guide while pulling away from CBM ring may help.

- \* 12.2.1 Remove PCBM Alignment Guides covering Ground Strap  
\* Mounting Brackets, fasteners (five per alignment guide)  
\* (Ratchet, 1/4" Drive; 4" Ext; 3/8" Socket).

- \* 12.2.2 Stow Alignment Guides in Ziplock Bag labeled "NOD1-  
\* PMM CBM Hardware."

\*\*\*\*\*

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

Refer to Figure 32.

- 12.4 Photo document newly installed Ground Straps (Digital Camera).

## 13. INSTALLING RADIAL PORT CLOSEOUT

- 13.1 Remove Radial Port Closeout from stowage.



Figure 33.- Radial and Axial Port Closeouts (Folded Up).

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Figure 34.- Closeout Installed over Vestibule.

### NOTE

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

- 13.2 Unroll Closeout while installing over CBM Vestibule.  
Attach 1/4 Turn Fasteners, insert into mounting brackets, and tighten 1/4 Turn Fasteners.  
Refer to Figures 33 and 34.

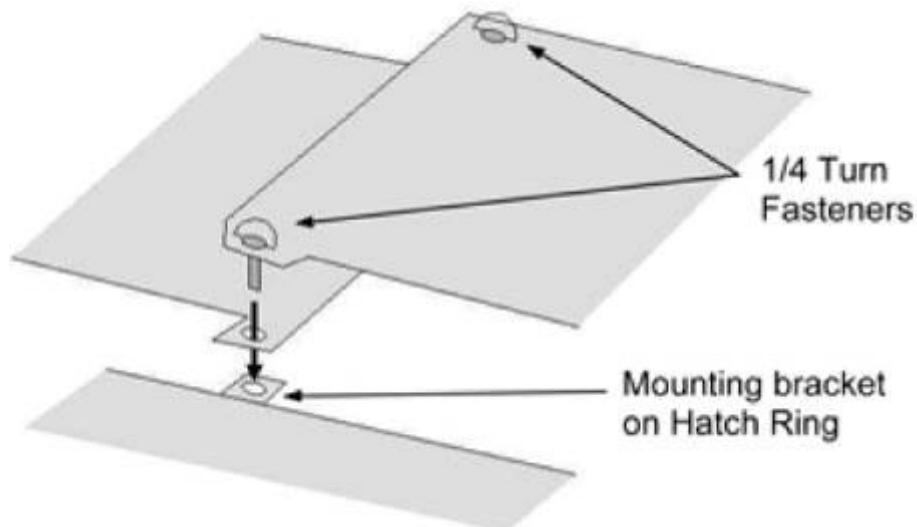


Figure 35.- Overlapping Ends of Closeout for Final Attachment.



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13.3 Overlap ends of Closeout, detaching 1/4 Turn Fasteners at end of Closeout if necessary.

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 35.

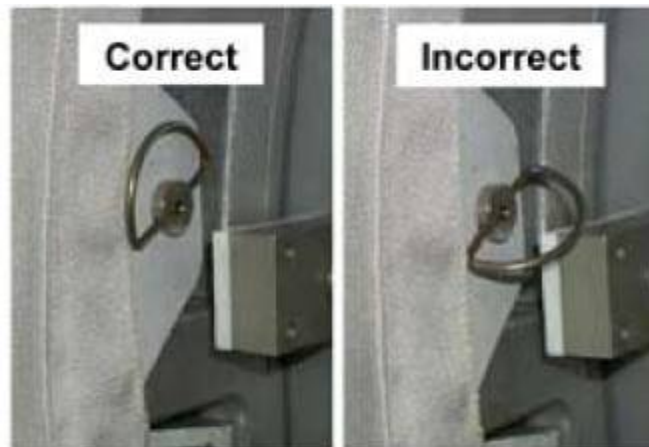


Figure 36.- D-Rings for Closeout.

13.4 Flatten D-Rings flush against Closeout.

√D-Rings are flush against Closeout to prevent damage if Hatch is closed  
Refer to Figure 36.

### 14. REMOVING PMM HATCH LAUNCH RESTRAINT PIP PIN

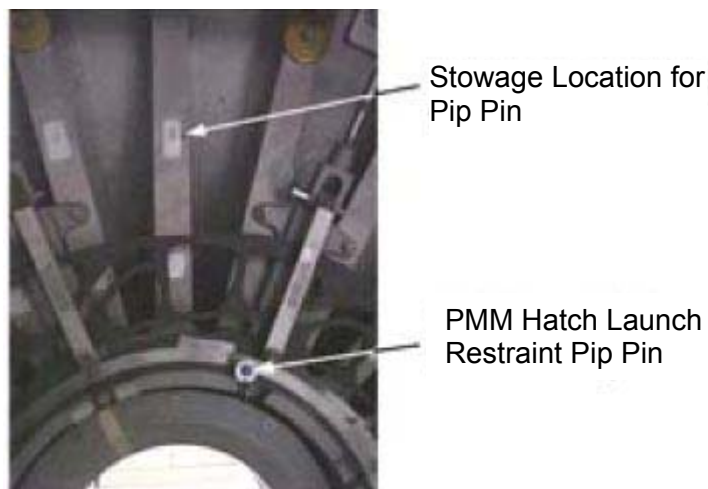


Figure 37.- Removal of PMM Hatch Launch Restraint Pip Pin.

PMM Hatch Remove PMM Hatch launch restraint Pip Pin.  
Install Pip Pin in stowage location on Hatch.  
Refer to Figure 37.

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### 15. POST MAINTENANCE

Table 9. Equipment to be Restowed

Part Name	Notes
Center Disk Cover	P/N 683-14575
PTCS PMM Thermal Blanket	
Protective Caps and Terminators	In Ziplock Bag labeled "PMM - N1N Vestibule Caps." Contains fifteen Protective Caps and two Terminators.
1.0 CTB (two) containing four CPAs	Each 1.0 CTB contains two CPAs and one CTB Shelf Divider.
IMV Caps (two)	In Ziplock Bags labeled "Node 1 Nadir IMV Cap" and "PMM IMV Cap."
PCBM Alignment Guides (if removed in step 12)	In Ziplock Bag labeled "NOD1-PMM CBM Hardware." Contains two Alignment Guides.

Refer to Table 9 for complete list of items to be restowed. Restow items per stowage note.

### 16. RECONFIGURING DATA BUSES (MCC-H) (GROUND-ONLY)

#### MCC-H

#### 16.1 Configuring 1553 Buses Back to Channel A

Use Table 1 to switch channels to A and Enable channel switching.

sel [YY] where [YY] = Bus Name from Table 1

[YY] Bus Status

'Channel Selected'

**cmd Select Ch A Execute** (Verify - A)

'Auto Channel Switch Status'

**cmd Enable Execute** (Verify - Ena)

Repeat

#### 16.2 Enabling BC Comm Fail

CDH: Primary C&C: Recovery Retry: CCS MDM

CCS Recovery Retry

**cmd BC Comm Fail – Enable Execute** (Verify - Ena)

#### 16.3 Enabling Auto Transition to Diagnostics in PMCU MDM

CDH: Primary PMCU: MDM FDIR

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Primary PMCU MDM FDIR

**cmd** Auto Transition Diag – Enable **Execute** (Verify - Ena)

### 16.4 Enabling Comm Safing Response in INT MDM

CDH: Primary INT: MDM FDIR

Primary INT MDM FDIR

**cmd** Comm Safing Response – Enable **Execute** (Verify - Ena)

Table 10. Robotics Buses in W0205 P106 and W0202 P118

OPS NAME	CIPUI
CUP_RWS_Bus_Ch_Select_PDGF_LB_Ch_A	CMRM96IM0169K
LAB_RWS_Bus_Ch_Select_PDGF_LB_Ch_A	CMRM96IM0066K

### 16.5 Configuring Robotics Buses Back to Channel A

MSS: LAS5(LAP5) Bus Config

LAS5(LAP5) CEU Bus Configuration

**cmd** 'Local Bus' 'PDGF' A (Verify – A)

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## 1.120 PMM ACTIVATION (GROUND ONLY)

(ASSY OPS/ULF5/FIN 1)

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### OBJECTIVE:

This procedure is performed by **MCC-H** to activate the PMM in preparation for ingress. It is performed in parallel with PMM Vestibule Config for Ingress and after the Node 1 electrical jumper is installed in the PMM.

### **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.

#### 1. APPLYING POWER TO PMM PDB

##### 1.1 Verifying PMM Power Inhibits No Longer Required

Verify the following:

PMM Power Jumper installed

1553 Vestibule Data Jumpers installed

Upstream 1553 Y-jumpers installed

##### 1.2 Verifying RPCM LA1B D On

US 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

'Close Cmd'

**cmd** Enable (✓ – Ena)

'RPC Position'

**cmd** Close (✓ – Cl)

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

#### 2. LOADING PMM LOCATION PPL

PCS

## 1.120 PMM ACTIVATION (GROUND ONLY)

(ASSY OPS/ULF5/FIN 1)

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### 2.1 Setting PMM Location to 'Attached to Node 1'

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'

CDH: INT PRIMARY: PPL Version IDs

Primary Int PPL Version IDs

'MPLM Location'

Verify PPL Number: 60

Verify Version ID: 2

### 3. SETTING PMM LOCATION IN PRIMARY C&C MDM

**cmd** <Prim\_CCS\_Set\_PMM\_Location\_Tmpl - LADD96IM1138K input Node 2> uplink

### 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

### 5. PDB ACTIVATION AND CHECKOUT

Task: MPLM Act-Deact

MPLM Act-Deact

'PDB Control'

sel PDB Details

PCS

## 1.120 PMM ACTIVATION (GROUND ONLY)

(ASSY OPS/ULF5/FIN 1)

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**PDB Details**

'APS'

**cmd On**

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

**MPLM Act-Deact**

'PDB Control'

Verify RPC 01 MDM Posn – CI

- ✓All other RPCs Posn – Op

### 6. APPLYING POWER TO PMM HCU

#### NOTE

After completion of step 6, launch-to-activation clock is stopped.

Task: MPLM Act-Deact

**MPLM Act-Deact**

'PDB Control'

sel PDB Details

**PDB Details**

'RPC'

**cmd RPC 23 – Close**

Verify RPC 23 Shell Htr (when on Node 1) Posn – CI

Verify RPC 23 Shell Htr (when on Node 1) Voltage, V: 115 to 130V

### 7. VERIFYING PMM CONFIGURATION FOR ACTIVATION

#### 7.1 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 (✓ – Ena)**

'RPC Position'

**cmd** Close (Verify – CI)

**Node 1 IMV Deck Aft Vlv**

'State'

'Enable'

**cmd** Arm (✓Status – Armed)

**cmd** 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

8. AUTO/MANUAL ACTIVATION PART 1

If performing auto activation

8.1 Task: MPLM Act-Deact

**MPLM Act-Deact**

'Automatic Control'

'Auto Activate'

'Part 1'

**cmd** Arm

✓Part 1 Arm Status – No Error

✓Part 1 Activate Status – Armed

**cmd** Activate

## 1.120 PMM ACTIVATION (GROUND ONLY)

(ASSY OPS/ULF5/FIN 1)

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✓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 Fire Status – No Fire

✓Cab Fan Spd: 3056 to 4048 rpm

If performing manual activation

### 8.2 Activating SD

Task: MPLM Act-Deact

'PDB Control'

sel PDB Details

'RPC'

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

'SD, Cab Fan, and Pressure'

sel MPLM SD

'Active Bit'

**cmd** Initiate

Wait 5 seconds.

✓Fire Status – No Fire

### 8.3 Activating Cab Fan

Task: MPLM Act-Deact

'PDB Control'

sel PDB Details

## 1.120 PMM ACTIVATION (GROUND ONLY)

(ASSY OPS/ULF5/FIN 1)

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### PDB Details

'RPC'

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

### MPLM Act-Deact

'SD, Cab Fan, and Pressure'

**sel** MPLM Cab Fan

### MPLM Cabin Fan

'State'

'On'

**cmd** On

✓State – On

✓Speed: 3056 to 4048 rpm

8.4 **MCC-H** ↑ ISS, "PMM Activation Part 1 complete. Go for pressure equalization. Expected equalization time with PMM is: \_\_\_\_\_"

## 9. AUTO/MANUAL ACTIVATION PART 2

ISS ↓ **MCC-H**, "IMV supply jumper installed. Go for PMM Activation Part 2."

If performing auto activation

### 9.1 Task: MPLM Act-Deact

#### MPLM Act-Deact

'Automatic Control'

'Auto Archive'

'Part 2'

**cmd** Arm

✓Part 2 Arm Status – No Error

✓Part 2 Activate Status – Armed

**cmd** 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'

## 1.120 PMM ACTIVATION (GROUND ONLY)

(ASSY OPS/ULF5/FIN 1)

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✓PPRA 1,2,3 Vlv Posn (three) – CI

'PDB Control'

Verify the following items:

RPC 02 Gen Lt 1 Posn – CI

RPC 03 Gen Lt 2 Posn – CI

RPC 04 Gen Lt 3 Posn – CI

RPC 05 Gen Lt 4 Posn – CI

RPC 06 Gen Lt 5 Posn – CI

RPC 07 Gen Lt 6 Posn – CI

RPC 08 Gen Lt 7 Posn – CI

RPC 09 Gen Lt 8 Posn – CI

RPC 10 Emer Lts Posn – CI

✓Converter 1,2 Status (two) – Off

### 9.2 Removing Power to Emergency Egress Lights (Hardware Removed)

'PDB Control'

sel PDB Details

'RPC'

**cmd** RPC 10 – Open (Verify ELPS Posn – Op)

✓RPC 10 ELPS Voltage, V: 0 to 10V

If performing manual activation

### 9.3 Enabling PMM IMV Valve Power

Task: MPLM Act-Deact

'PDB Control'

sel PDB Details

'Converter'

**cmd** Converter 02 – On (✓Posn – On)

'RPC'

**cmd** RPC 15 – Close (Verify ISOV1 Posn – CI)

- 9.4 Opening PMM IMV Valve  
Task: MPLM Act-Deact  
**MPLM Act-Deact**  
'IMV and SDS'  
  
sel MPLM IMV Aft  
**MPLM IMV Ovhd Aft Vlv**  
'Position'  
'Open'  
  
**cmd** Open – (✓Position – Open)
- 9.5 Removing Power from IMV  
Task: MPLM Act-Deact  
**MPLM Act-Deact**  
'PDB Control'  
  
sel PDB Details  
**PDB Details**  
'RPC'  
  
**cmd** RPC 15 – Open (✓ISOV1 Posn – Op)  
'Converter'  
  
**cmd** Converter 02 – Off (✓Posn – Off)
- 9.6 Enabling PPRA Motorized Valve Power  
'Converter'  
  
**cmd** Converter 01 – On (✓Posn – On)  
'RPC'  
  
**cmd** RPC 27 – Close (Verify PPRA All Posn – Cl)
- 9.7 Closing PPRA Motorized Valves  
Task: MPLM Act-Deact  
**MPLM Act-Deact**  
'DA and PPRA'  
  
sel MPLM PPRA  
**MPLM PPR Assemblies**  
'PPRA 1'  
  
**cmd** Close (✓PPRA 1 Valve Position – Closed)



## 1.120 PMM ACTIVATION (GROUND ONLY)

(ASSY OPS/ULF5/FIN 1)

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'PPRA 2'

**cmd** Close (✓PPRA 2 Valve Position – Closed)

'PPRA 3'

**cmd** Close (✓PPRA 3 Valve Position – Closed)

### 9.8 Removing Power from PPRAs

Task: MPLM Act-Deact

'PDB Control'

sel PDB Details

'RPC'

**cmd** RPC 27 – Open (✓PPRA All Posn – Op)

'Converter'

**cmd** Converter 01 – Off (✓Posn – Off)

### 9.9 Configuring General Lighting

'All GLAs'

**cmd** On

Verify the following items:

RPC 02 GLA1 Posn - CI

RPC 03 GLA2 Posn - CI

RPC 04 GLA3 Posn - CI

RPC 05 GLA4 Posn - CI

RPC 06 GLA5 Posn - CI

RPC 07 GLA6 Posn - CI

RPC 08 GLA7 Posn - CI

RPC 09 GLA8 Posn - CI

## 10. ENABLING PMM SAFING RESPONSE

### NOTE

**MCC-H** will Enable safing responses as time permits.

CDH: MPLM MDM: MPLM FDIR

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

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

## 1.120 PMM ACTIVATION (GROUND ONLY)

(ASSY OPS/ULF5/FIN 1)

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**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)

## 1.125 PMM INGRESS

(ASSY OPS/ULF5/FIN 1/HC)

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### OBJECTIVE:

Ingress and configure the PMM for on-orbit operations.

### DURATION:

15 minutes

### EQUIPMENT:

PBA

PFE

Grab Sample Container (GSC)

Surgical Masks (Shuttle supply ONLY)

Safety Goggles (from Regen ECLSS Kit)

### **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.

### 1.1 Closing PMM IMV Valve

#### 1.1.1 Enabling Power to PMM Ovhd Aft IMV Vlv

MPLM: ECLSS: IMV Ovhd Aft

**MPLM IMV Ovhd Aft Vlv**

sel MPLM PDB RPC 15 ISOV1

**PDB Details**

**cmd** Converter 02 – On (✓Posn – On)

**cmd** RPC 15 ISOV1 Close (Verify 15 ISOV1 RPC Posn – Cl)

#### 1.1.2 Closing PMM IMV Aft Vlv

MPLM: ECLSS: IMV Ovhd Aft

**MPLM IMV Ovhd Aft Vlv**

'Position – Close'

**cmd** Close (✓Position – Close)

1.1.3 Inhibiting Power to PMM IMV Vlv

sel MPLM PDB RPC 15 ISOV1

**PDB Details**

**cmd** RPC 15 ISOV1 Open (✓15 ISOV1 RPC Posn – Op)  
**cmd** Converter 02 – Off (✓Posn – Off)

- 1.2 If performing initial ingress of PMM,  
Don Surgical Mask and Safety Goggles.  
✓**MCC-H** Intramodule ventilation activated  
✓No visible particulates present in PMM  
If no particulates present and IMV active for >17 min,  
doff PPE

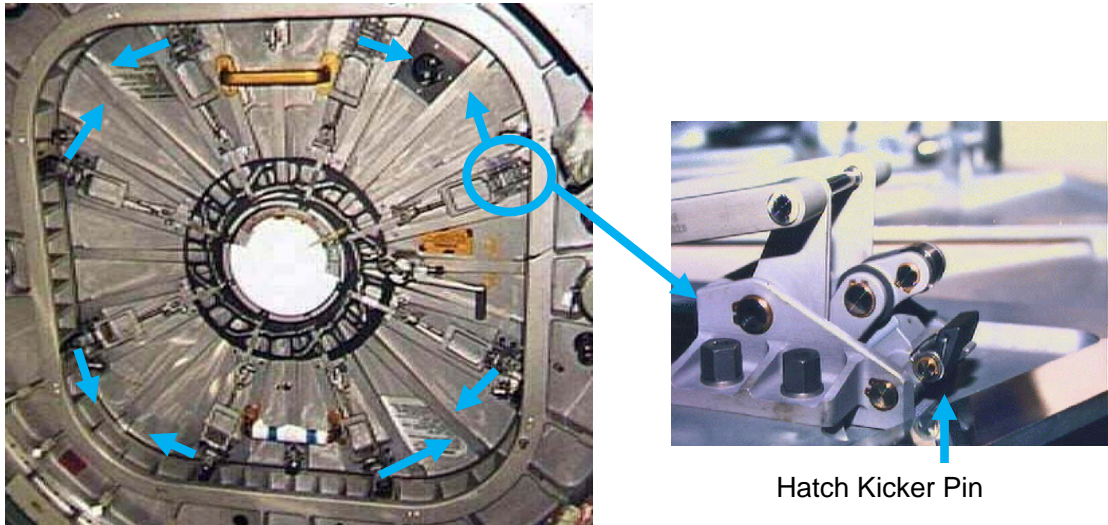


Figure 1.- Hatch Kicker Pin Location.

**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.

PMM  
Hatch

- 1.3 Partially open Hatch per decal steps 1 to 8 to allow access to Hatch Kicker Pins (eight).
- 1.4 Check Hatch kicker pins (eight) slid toward the closest Hatch corner. Refer to Figure 1.  
If required, slide in direction of arrows.
- 1.5 Finish opening Hatch per decal steps 9 to end.
- 1.6 [ACTIVATING PMM IMV](#)

PCS

1.6.1 [Enabling Power to PMM IMV Vlvs](#)

MPLM: ECLSS: IMV Aft  
**MPLM IMV Ovhd Aft Vlv**

sel MPLM PDB RPC 15 ISOV1

**PDB Details**

**cmd** Converter 02 – On (✓Posn – On)

**cmd** RPC 15 ISOV1 Close (Verify 15 ISOV1 RPC Posn – Cl)

1.6.2 [Opening PMM IMV Aft Vlv](#)

MPLM: ECLSS: IMV Aft  
**MPLM IMV Ovhd Aft Vlv**

'Position – Open'

**cmd** Open (✓Position – Open)

1.6.3 [Inhibiting Power to PMM IMV Vlvs](#)

**MPLM IMV Ovhd Aft Vlv**

sel MPLM PDB RPC 15 ISOV1

**PDB Details**

**cmd** RPC 15 ISOV1 Open (✓15 ISOV1 RPC Posn – Op)

**cmd** Converter 02 – Off (✓Posn – Off)

## 1.125 PMM INGRESS

(ASSY OPS/ULF5/FIN 1/HC)

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- PMM Hatch 1.7  $\sqrt$ MPEV – CLOSED
- PMM 1.8 Visually inspect PMM for condensation, atmosphere quality, general condition, etc.  
Report condition to **MCC-H**.
- 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'  
  
 $\sqrt$ RPC Position – Closed  
  
'State'  
  
 $\sqrt$ State – Enabled
- 2.2 Node 1 IMV Deck Aft Vlv  
'Position'  
'Open'  
  
**cmd** Arm ( $\sqrt$ Status – Armed)  
**cmd** Open ( $\sqrt$ Position – In Transit)  
  
Wait 25 seconds.  
  
 $\sqrt$ Position – Open

- NOD1 S4-02 2.3 Node 1 RAMV Temperature Control → Full Warm (↻)

### 3. LIGHTING SETUP

- PMM Manually adjust GLA Intensity dial for comfort.

4. VERIFYING NPRV COVERS CLOSED

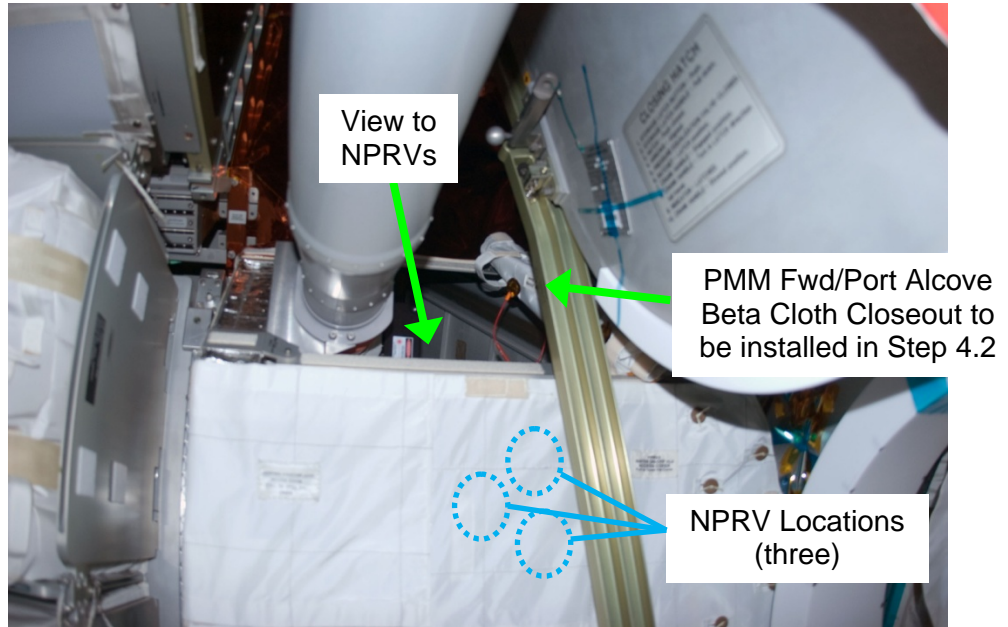


Figure 2.- Ground Photo Showing Access to NPRVs.

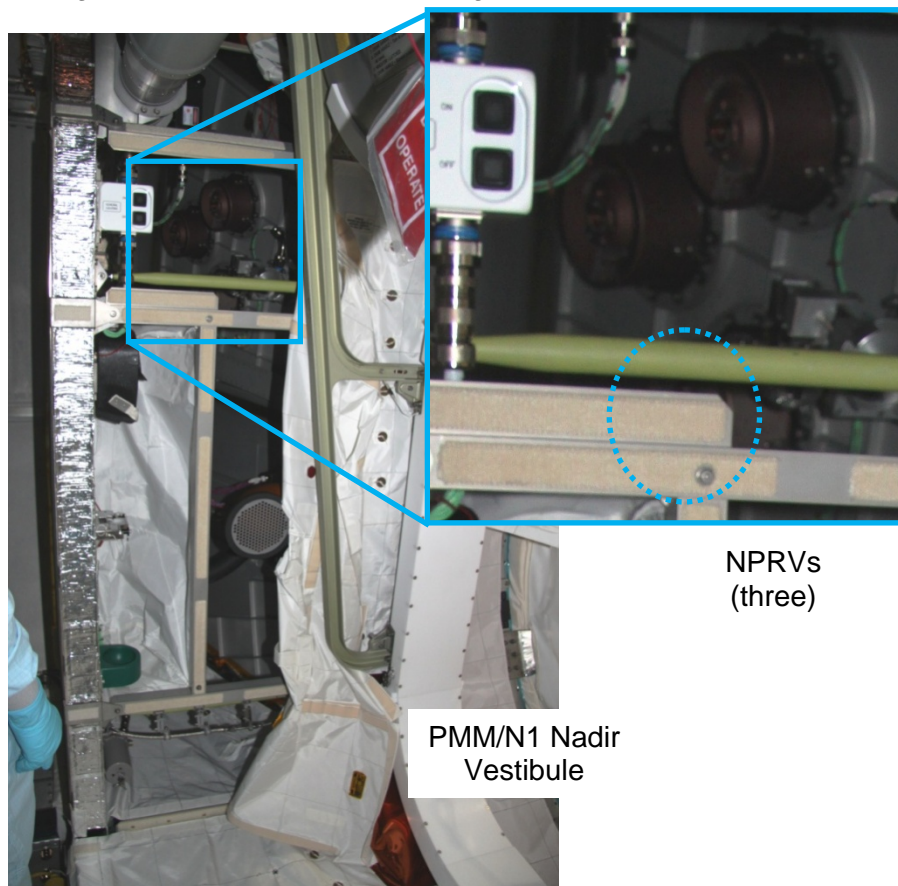


Figure 3.- Ground Photo Showing Alternate Access to NPRVs  
(Beta Cloth Closeout Rolled Back).

## 1.125 PMM INGRESS

(ASSY OPS/ULF5/FIN 1/HC)

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PMM Ovhd

Fwd Alcove 4.1 ✓NPRV Covers (three) – CI  
Refer to Figures 2, 3

4.2 Install PMM Fwd/Port Alcove Beta Cloth Closeout (Velcro).  
Refer to Figure 2.

PMM Nadir 4.3 ✓NPRV Covers (two) – CI  
Endcone

### 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 behind Beta Cloth  
Closeout for PFE storage volume.

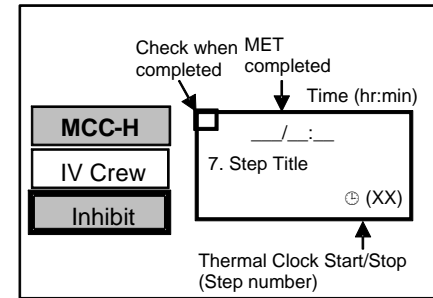
5.2 Retrieve PBA and stow in PMM Fwd Alcove behind Beta Cloth  
Closeout for PBA storage volume.



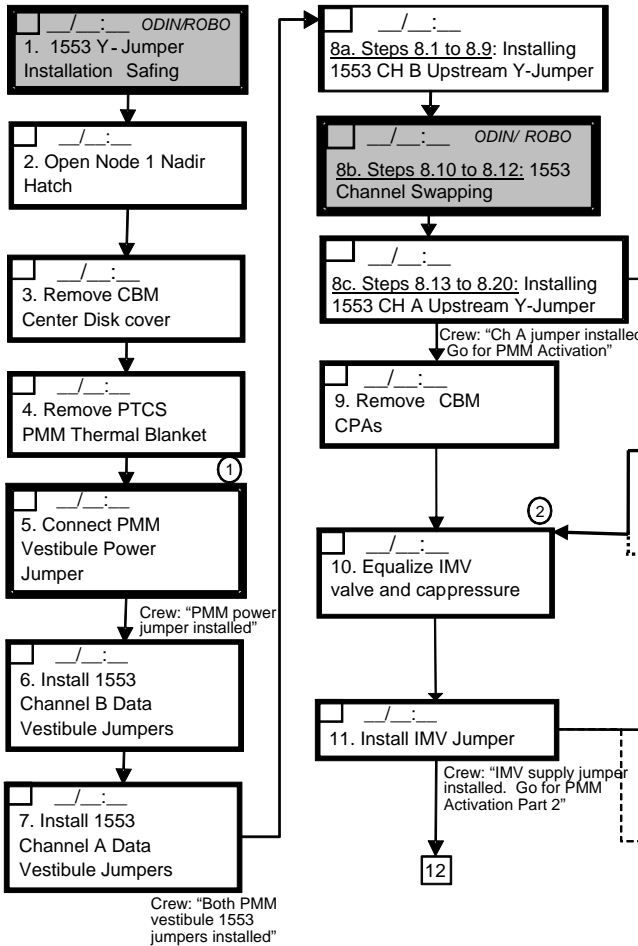
# 1.130 PMM VESTIBULE – CONFIG FOR INGRESS AND PMM ACTIVATION FLOWCHART (ASSY OPS/ULF5/FIN) Page 1 of 2 pages

Completed Tasks

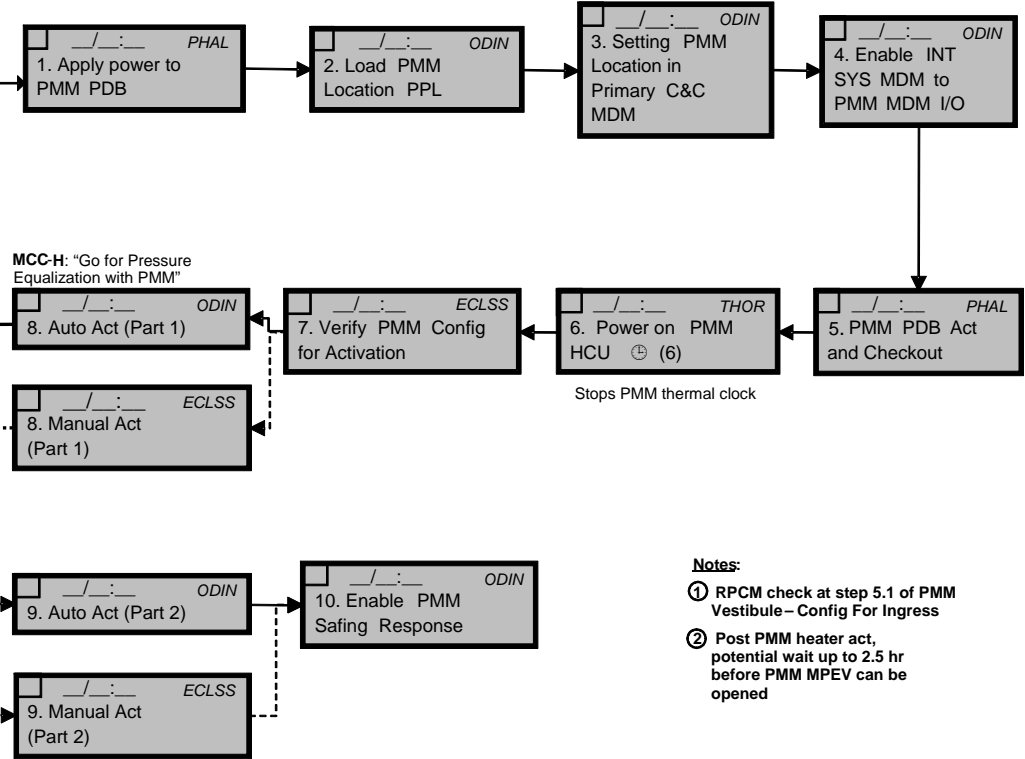
- 1.110 PMM VESTIBULE – EQUIPMENT SETUP (ASSY OPS)
- 1.100 CBCS INSTALLATION– PMM INSTALL TO NODE 1 NADIR (ASSY OPS)
- 1.105 NODE 1/PMM VESTIBULE PRESSURIZATION AND LEAK CHECK (ASSY OPS)
- RPCM LA1B\_D RPC 1 open and close command inhibited (PHALCON)
- Node 1 Nadir CPA safing (OSO)



## 1.115 PMM VESTIBULE– CONFIG FOR INGRESS



## 1.120 PMM ACTIVATION



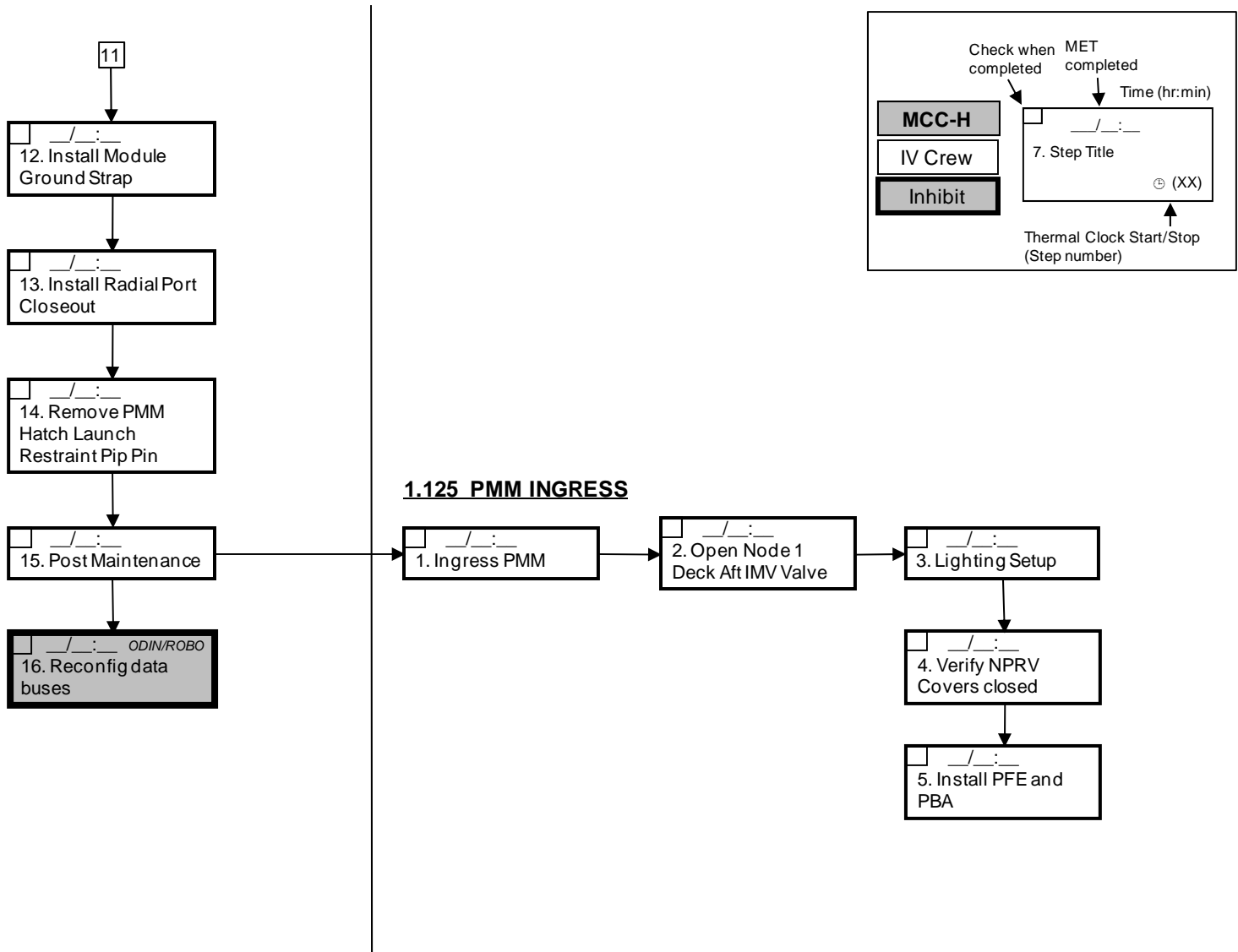
**Notes:**

- ① RPCM check at step 5.1 of PMM Vestibule– Config For Ingress
- ② Post PMM heater act, potential wait up to 2.5 hr before PMM MPEV can be opened

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**1.130 PMM VESTIBULE – CONFIG FOR INGRESS AND PMM ACTIVATION FLOWCHART**  
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**1.135 PMM CONTINGENCY POWER JUMPER INSTALLATION/REMOVAL**  
(ASSY OPS/ULF5/FIN) Page 1 of 7 pages

**OBJECTIVE:**

To recover power to PMM, remove the LAB to NODE 2 EPS Jumper (W2004) in the Node 1/Lab Vestibule, then install the ISS to PMM Contingency EPS Jumper (W2018). This procedure also covers removal of the contingency power cable (W2018) and installation of the nominal cable (W2004). The ISS to PMM Contingency EPS Jumper (W2018) provides power to Node 1 Nadir via RPCM LA2A3B\_D if the nominal feed, RPCM LA1B\_D, is unavailable.

Installing the ISS to PMM Contingency EPS Jumper (W2018) takes out a contingency FGB power feed that is used when the ARCU 51/52 Power Jumper is installed and powered by the 2/3 domain.

**LOCATION:**

NOD1/LAB Vestibule

**DURATION:**

30 minutes to remove W2004 and install W2018 (Steps 1 to 4, 7)

30 minutes to remove W2018 and install W2004 (Steps 1 to 2, 5 to 7)

**CREW:**

One

**PARTS:**

ISS to PMM Contingency EPS Jumper (W2018) P/N 1J00375-1

LAB to NODE 2 EPS Jumper (W2004) P/N 1F89691-1

**MATERIALS:**

None

**TOOLS:**

ISS IVA Toolbox:

Drawer 5:

Static Wrist Tether

**REFERENCE PROCEDURE(S):**

None

1. SAFING

- NOTE**
1. Safing for W2004 removal/W2018 install as well as W2018 removal/W2004 install requires powering down half the Airlock (Power Bus AL2A3B). This temporarily removes power from the A/L MDM, UOP, PCA, Smoke Detectors (Cabin and Duct), ATUs, CCAA, METOX, and command capability to the O2/N2 Supply Valves. The O2/N2 valves should be configured to maintain O2/N2 supply to downstream users.
  2. Installing the ISS to PMM Contingency EPS Jumper (W2018) takes out a contingency FGB power feed that is used when the ARCU 51/52 Power Jumper is installed and powered by the 2/3 domain.

- 1.1  $\sqrt{\text{MCC-H}}$  to confirm the following:  
 DDCU LA2A or DDCU LA3B converter off, and  
 RPCM LA2A3B\_D RPC 3 open, close cmd inhibited, and  
 RPCM LA2A3B\_D RPC 4 open, close cmd inhibited, and  
 RPCM LA1B\_D RPC 1 open, close cmd inhibited.

- NOTE**
- Figures 1 and 2 show the big picture for jumper configurations. Figure 1 depicts the nominal power jumper configuration (W2004 installed), and Figure 2 depicts the contingency configuration (W2018 installed).

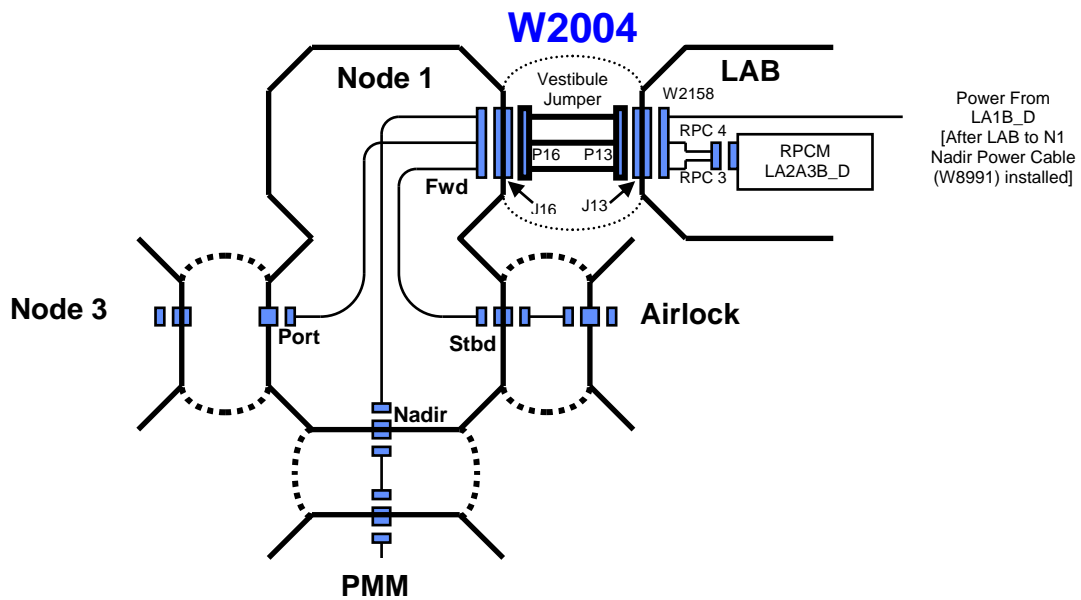


Figure 1.- NOMINAL Config - LAB to NODE 2 EPS Jumper (W2004) Installed  
 (Node 1 Nadir Powered From RPCM LA1B\_D).

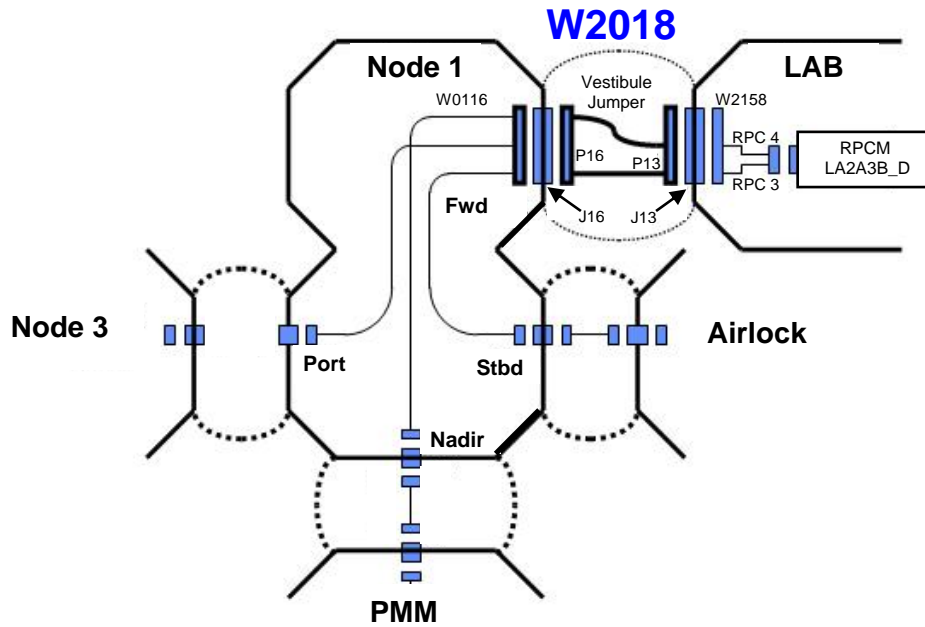


Figure 2.- CONTINGENCY Config - ISS to PMM Contingency EPS Jumper (W2018)  
Installed (Node 1 Nadir Powered From RPCM LA2A3B\_D).

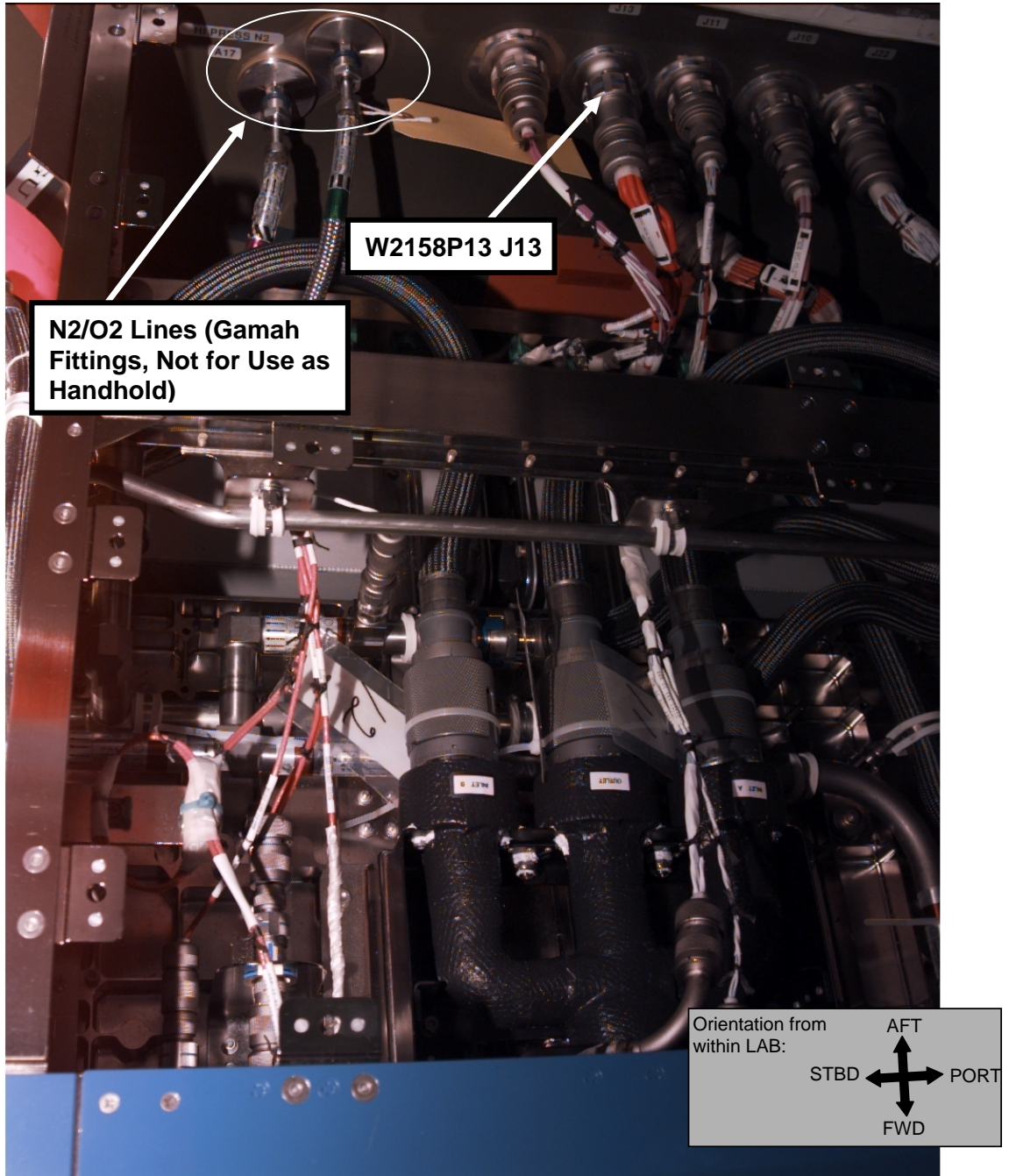


Figure 3.- Lab Aft Internal Vestibule Connections - Nadir Quadrant  
(View in Lab Aft Endcone looking Nadir - LAB1D7-02,-03 Closeouts Removed).

2. DEMATING UPSTREAM WIRE HARNESS FOR SAFING

LAB1D7

- 2.1 Remove Closeout Panel LAB1D7-03 quarter turn fasteners (seven).  
Temporarily stow Closeout Panel.  
Refer to Figure 3.
- 2.2 Don Static Wrist Tether.  
Secure to unpainted, unanodized metal surface.

2.3 Demating Upstream Lab Power Feed from Lab Aft Endcone Vestibule Feedthrough

W2158 P13 ←|→ J13 on Lab Aft Bulkhead  
 Refer to Figure 3.

2.4 Unclip Static Wrist Tether.

3. REMOVING LAB TO NODE 2 EPS JUMPER (W2004) - P/N 1F89691-1

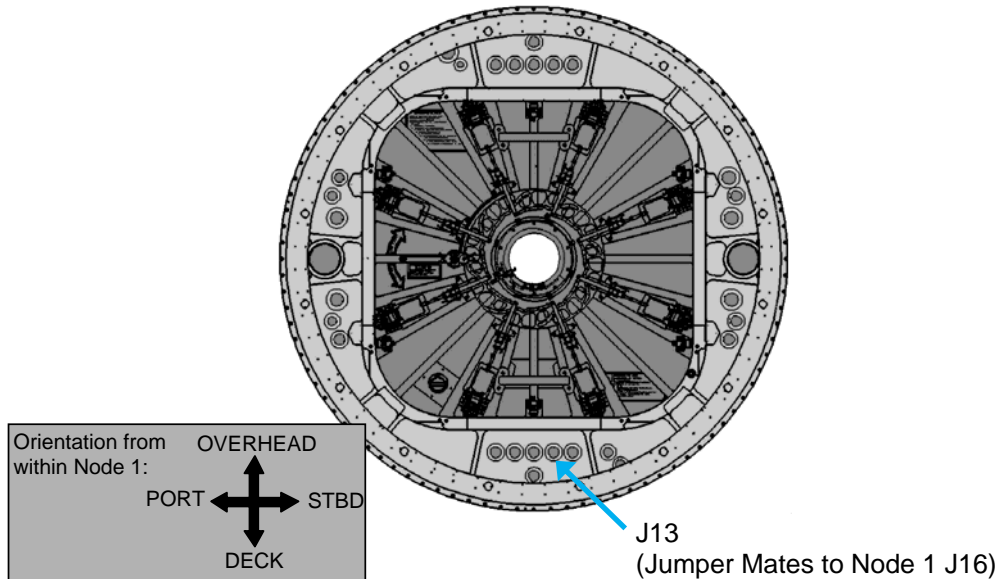


Figure 4.- Lab Aft External Bulkhead  
 (View From Inside Node 1/Lab Vestibule, Looking Forward).

NOD1/LAB  
 Vestibule

3.1 Removing Axial Port Closeout to Gain Vestibule Access

Disengage Vestibule Axial Port Closeout 1/4 Turn Fasteners.  
 Remove, temporarily stow Closeout.

3.2 Secure Static Wrist Tether to unpainted, unanodized metal surface.

3.3 LAB TO NODE 2 EPS JUMPER (W2004) P13 ←|→ J13 on LAB bulkhead  
 LAB TO NODE 2 EPS JUMPER (W2004) P16 ←|→ J16 on Node 1 bulkhead

Temporarily stow cable near worksite (protective caps will be transferred between W2018 and W2004).  
 Refer to Figures 1 and 4.

4. INSTALLING ISS TO PMM CONTINGENCY EPS JUMPER (W2018) - P/N 1J00375-1

4.1 Remove protective caps (two) from ISS to PMM Contingency EPS Jumper (W2018).



**1.135 PMM CONTINGENCY POWER JUMPER INSTALLATION/REMOVAL**  
(ASSY OPS/ULF5/FIN) Page 6 of 7 pages

Install protective caps (two) on LAB TO NODE 2 EPS JUMPER (W2004).

- 4.2 ISS to PMM Contingency EPS Jumper (W2018) P13 →|← J13 on Lab bulkhead  
ISS to PMM Contingency EPS Jumper (W2018) P16 →|← J16 on Node 1 bulkhead  
Refer to Figures 2 and 4.

- 4.3 Unclip Static Wrist Tether.

5. REMOVING ISS TO PMM CONTINGENCY EPS JUMPER (W2018) - P/N 1J00375-1

NOD1/LAB  
Vestibule

- 5.1 Removing Axial Port Closeout to Gain Vestibule Access  
Disengage Vestibule Axial Port Closeout 1/4 Turn Fasteners.  
Remove, temporarily stow Closeout.
- 5.2 Secure Static Wrist Tether to unpainted, unanodized metal surface.
- 5.3 ISS to PMM Contingency EPS Jumper (W2018) P13 ←|→ J13 on Lab bulkhead  
ISS to PMM Contingency EPS Jumper (W2018) P16 ←|→ J16 on Node 1 bulkhead  
Temporarily stow cable near worksite (protective caps will be transferred between W2004 and W2018).  
Refer to Figures 2 and 4.

6. INSTALLING LAB TO NODE 2 EPS JUMPER (W2004) - P/N 1F89691-1

- 6.1 Remove protective caps (two) from LAB TO NODE 2 EPS JUMPER (W2004).  
Install protective caps (two) on ISS to PMM Contingency EPS Jumper (W2018).
- 6.2 LAB TO NODE 2 EPS JUMPER (W2004) P13 →|← J13 on LAB bulkhead  
LAB TO NODE 2 EPS JUMPER (W2004) P16 →|← J16 on Node 1 bulkhead  
Refer to Figures 1 and 4.

- 6.3 Unclip Static Wrist Tether.

7. CLOSEOUT

LAB1D7

- 7.1 Check vestibule area for FOD.
- 7.2 Retrieve, install Vestibule Axial Port Closeout, 1/4 Turn Fasteners.
- 7.3 Secure Static Wrist Tether to unpainted, unanodized metal surface.
- 7.4 W2158 P13 →|← J13 on Lab Aft Bulkhead  
Refer to Figure 3.



7.5 Doff Static Wrist Tether.

NOTE

Once crew verifies jumper installation complete in step 7.6,

**MCC-H** can repower the following:

- DDCU LA2A or DDCU LA3B converter
- RPCM LA2A3B\_D RPC 3
- RPCM LA2A3B\_D RPC 4
- RPCM LA1B\_D RPC 1 (do not repower for W2018 install)

Refer to Figures 1 and 2.

7.6 Notify **MCC-H**: "Jumper install complete. Go for Power Up."

7.7 Install Closeout panel LAB1D7-03, 1/4 Turn Fasteners (seven).

7.8 Stow removed jumper (W2004 or W2018).

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TRANSFER

TRANSFER

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## 2.100 EXPRESS RACK 8 TRANSFER FROM PMM TO LAB

(ASSY OPS/ULF5/FIN 1/HC)

Page 1 of 6 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 LAB1P4.

### LOCATION:

EXPRESS-8 Installed: LAB1P4, 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

Velcro Straps

### 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

5/32" Hex Head, 3/8" Drive (if required after step 7.3)

4" Common Tip Screwdriver

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.

## 2.100 EXPRESS RACK 8 TRANSFER FROM PMM TO LAB

(ASSY OPS/ULF5/FIN 1/HC)

Page 2 of 6 pages

### 1. SETUP

- ✓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.

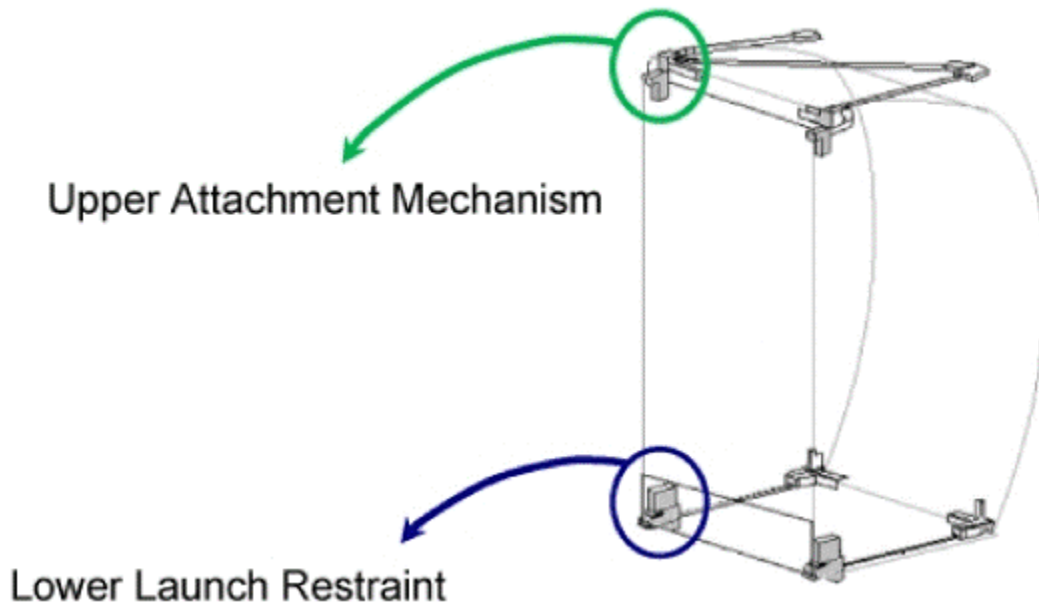


Figure 1. Location of Rack Launch Restraint Hardware.

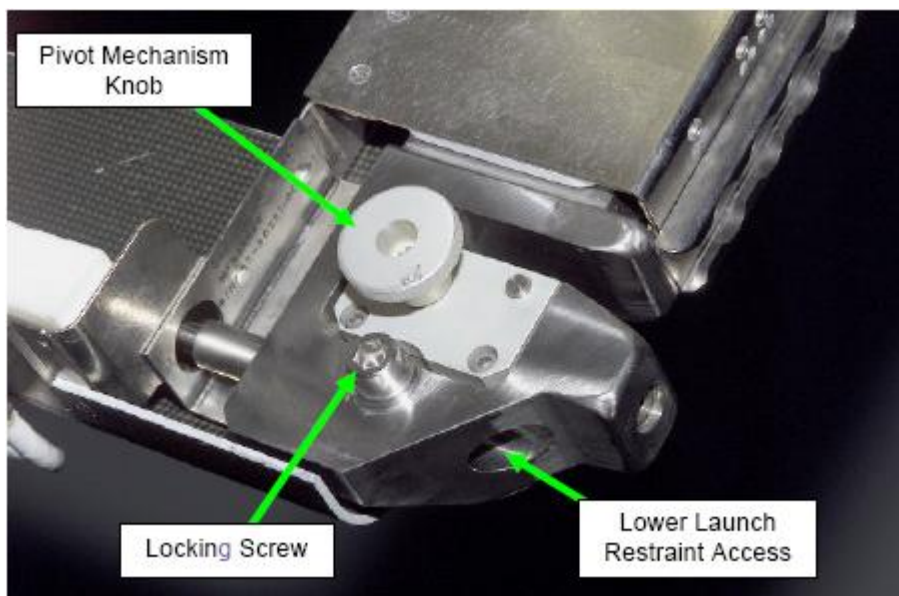


Figure 2. USOS Rack Lower Launch Restraint, Right Side.

## 2.100 EXPRESS RACK 8 TRANSFER FROM PMM TO LAB

(ASSY OPS/ULF5/FIN 1/HC)

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### 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).
  - 2.2 Disengage left Lower Launch restraint 10 to 12 turns until hard stop (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head).
  - 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.

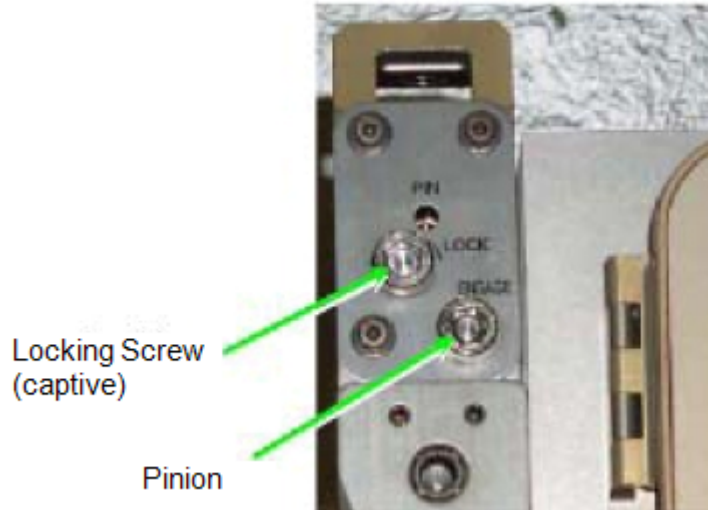


Figure 3. USOS Rack Upper Attach Mechanism, Left Side.

- 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).

### NOTE

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

- 3.2 Disengage left Pinion one turn until hard stop (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head).
  - 3.3 Repeat steps 3.1 and 3.2 for right side.
4. INSTALLING K-BARS  
Refer to Figure 4.

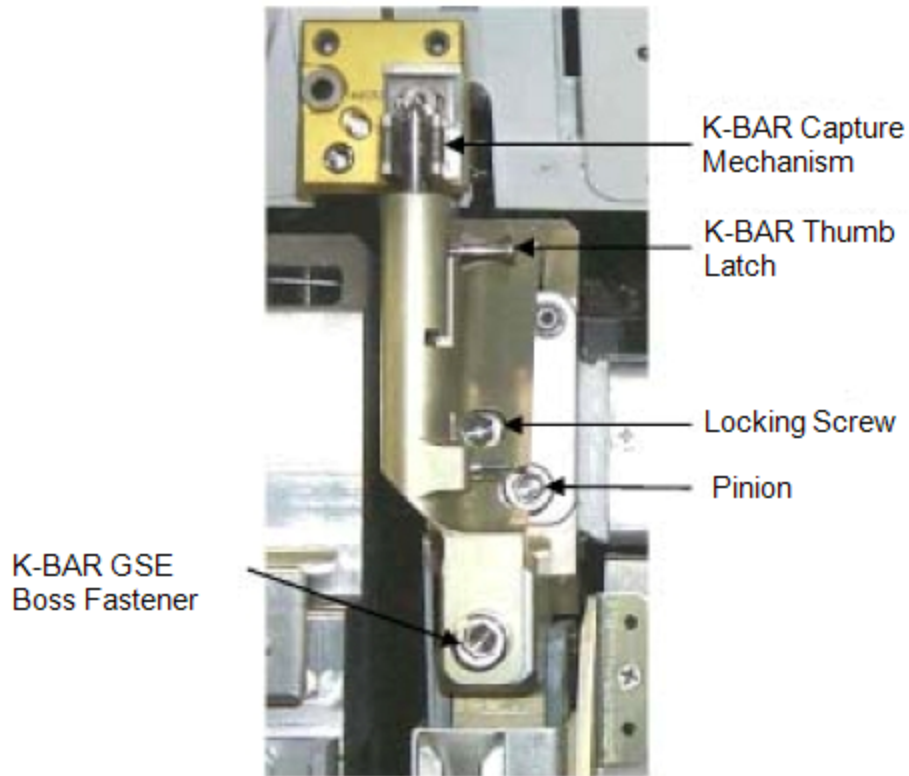


Figure 4. USOS Rack Left K-BAR (Shown Installed).

- 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.

- 4.3 Install K-BAR, Left, in left Upper Attach Mechanism.
- 4.4 Check Locking Screw fully unlocked.

**NOTE**

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

- 4.5 Engage Pinion, one turn, into K-BAR (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head).
- 4.6 Snug Locking Screw and K-BAR GSE Boss Fastener (Ratchet, 3/8" Drive; 5" Long, 3/8" Ball Tip Hex Head).
- 4.7 K-BAR Thumb Latch → down position

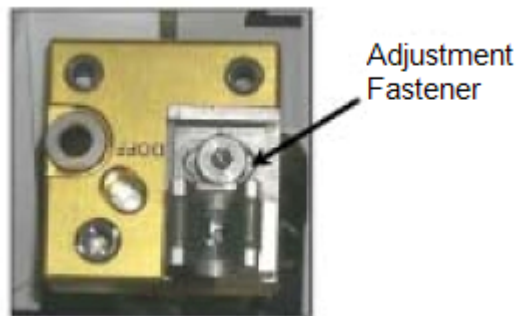


## 2.100 EXPRESS RACK 8 TRANSFER FROM PMM TO LAB

(ASSY OPS/ULF5/FIN 1/HC)

Page 5 of 6 pages

- 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.
  - 5.2 Secure Knee Brace Struts (two) to standoff structure (Velcro Straps).
6. TRANSFERRING RACK TO ISS
  - 6.1 Transfer Express-8 Rack from PMM1S3 to LAB1P4.
  - 6.2 Align Rack onto LAB1P4 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 Thumb Latches (two) → up position  
Refer to Figure 4.



**Figure 5. 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 5.

## 2.100 EXPRESS RACK 8 TRANSFER FROM PMM TO LAB

(ASSY OPS/ULF5/FIN 1/HC)

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*****
*
* If K-BAR does not align with Capture Mechanism
* |   Loosen Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex Head).
* |   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).
*
*
* Refer to Figure 5.
*****
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### 8. INSTALLING ARIS GROUND STRAP ON EXPRESS-8 RACK

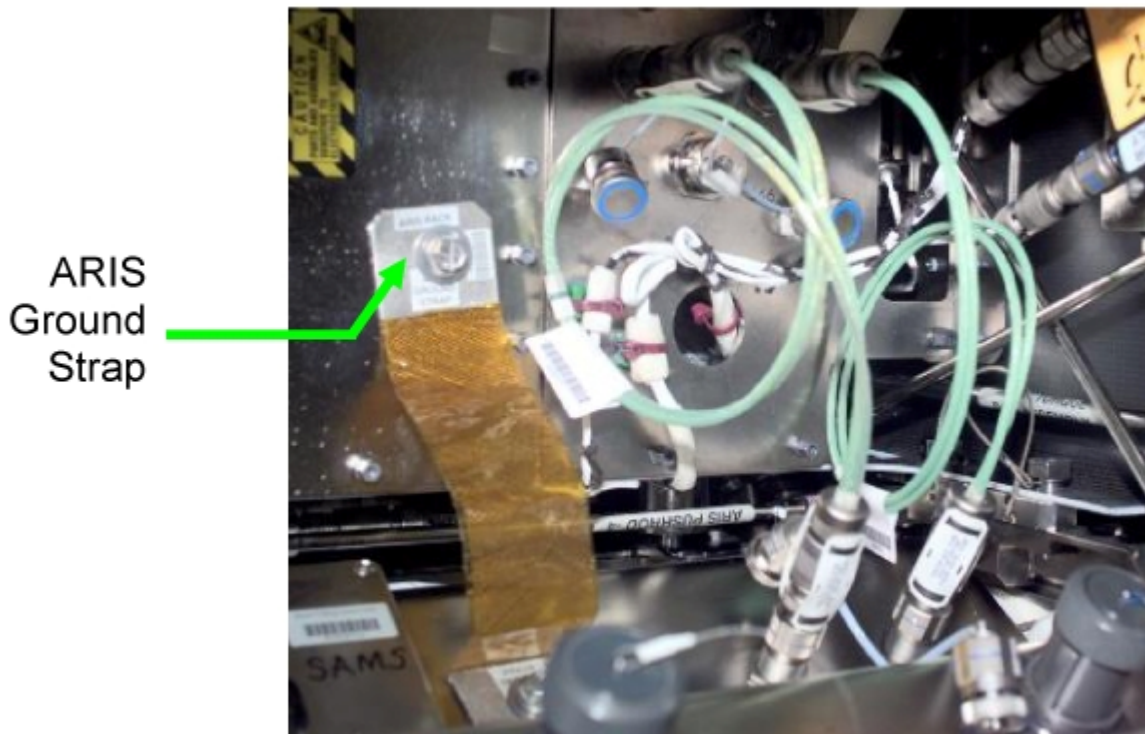


Figure 6. ARIS Ground Strap (Example Location).

- 8.1 Install ARIS Ground Strap on Standoff, Rack Utility Interface Panel, 1/4-Turn Fasteners (two) (4" Common Tip Screwdriver). Refer to Figure 6.

### 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**

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# 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.

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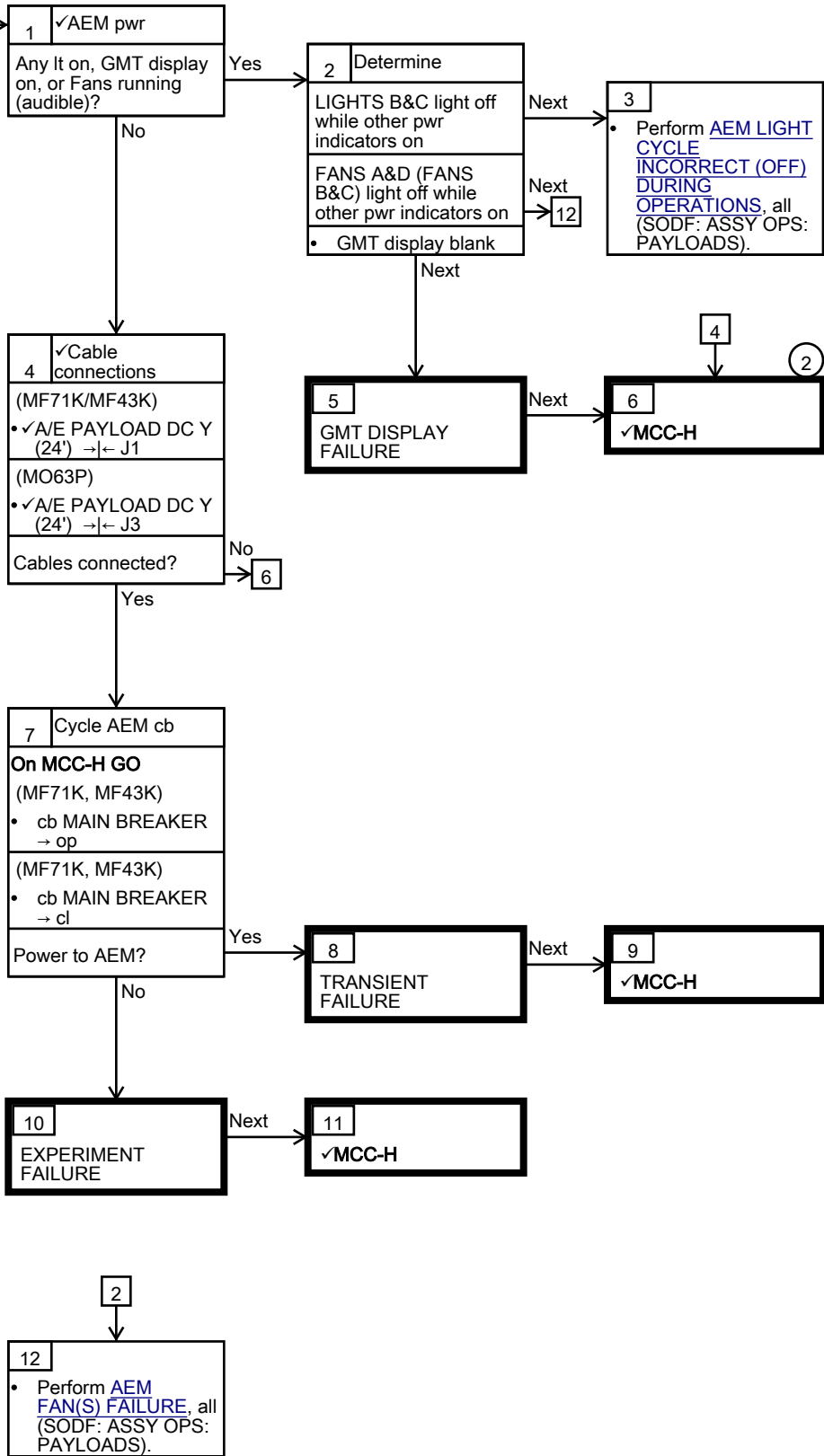
**AEM**

**AEM ANY PWR INDICATOR OFF**

(ASSY OPS/ULF5/FIN 1) 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 sw - ON  
cb LIGHTS A&D - op (It off)  
cb LIGHTS B&C - cl (It on)  
LIGHTS sw - AUTO (MO63P)  
cb CB3/J3 - cl  
10A J3 - ON



1  
This malfunction procedure only supports troubleshooting one Animal Enclosure.

2  
Both AEMs are powered off the same 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.

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# AEM

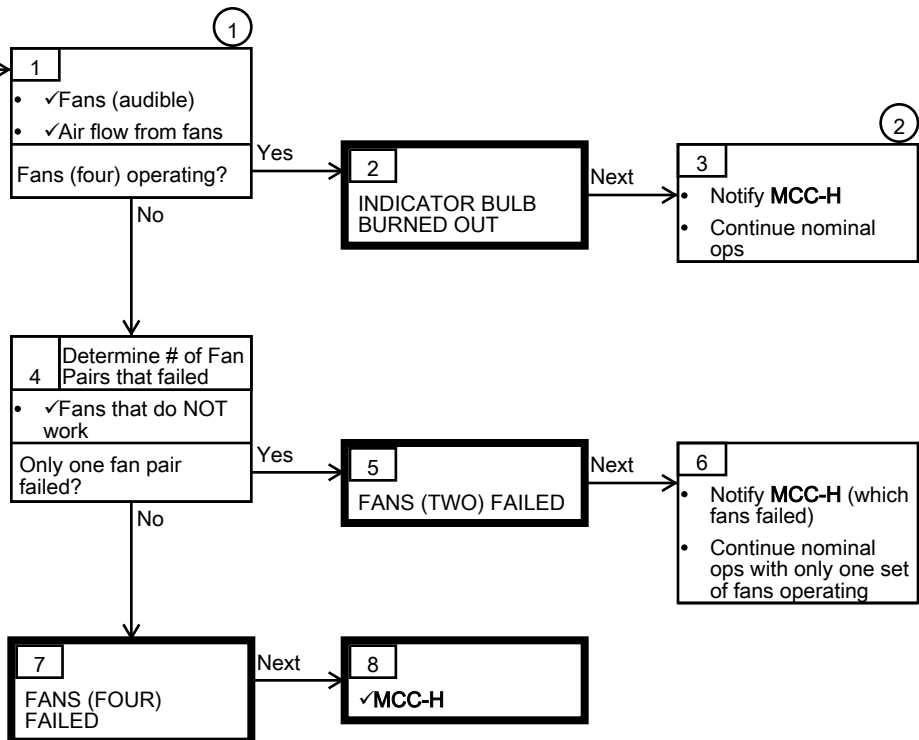
## AEM FAN(S) FAILURE

(ASSY OPS/ULF5/FIN 1)

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 sw - ON  
cb LIGHTS A&D - op (It off)  
cb LIGHTS B&C - cl (It on)  
LIGHTS sw - 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.

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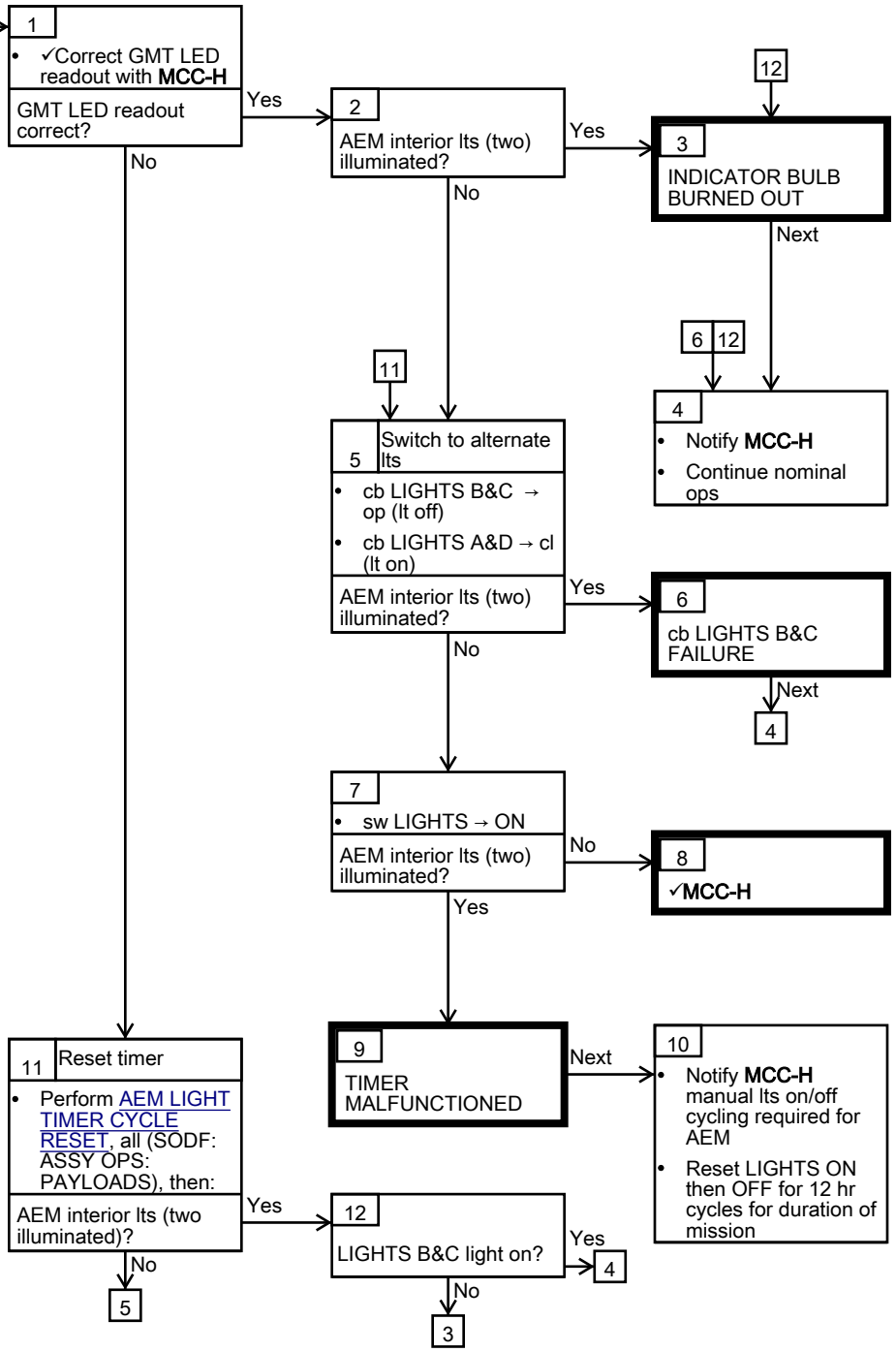
**AEM**

**AEM LIGHT CYCLE INCORRECT (OFF) DURING OPERATIONS**

(ASSY OPS/ULF5/FIN 1) 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 sw – ON  
 cb LIGHTS A&D – op (lt off)  
 cb LIGHTS B&C – cl (lt on)  
 LIGHTS sw – AUTO  
 (MO63P)  
 cb CB3/J3 – cl  
 10A J3 – ON



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**AEM**

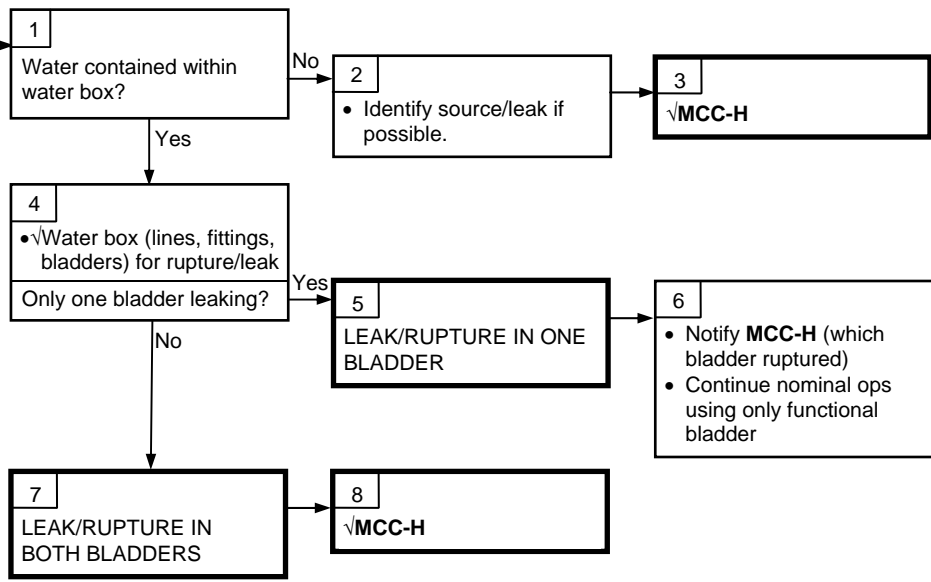
**WATER LEAKING IN AEM**

(ASSY OPS/ULF5/FIN)

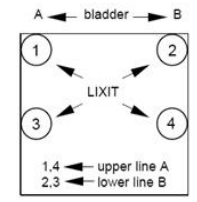
Page 1 of 1 page

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.



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# MYCO BODY SAMPLE COLLECTION

(ASSY OPS/ULF5/FIN 1)

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

### 1. CLEANING HANDS PREPARATION

#### **CAUTION**

Body sample collection must be performed first thing in the morning to prevent possible loss of science.

#### NOTE

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)

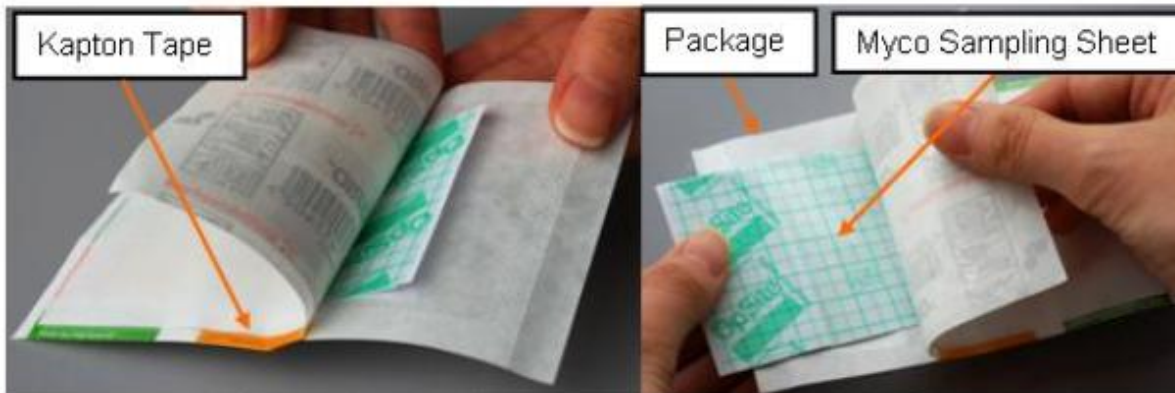


Figure 1. Opening the package of Myco Sampling Sheet.

**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.

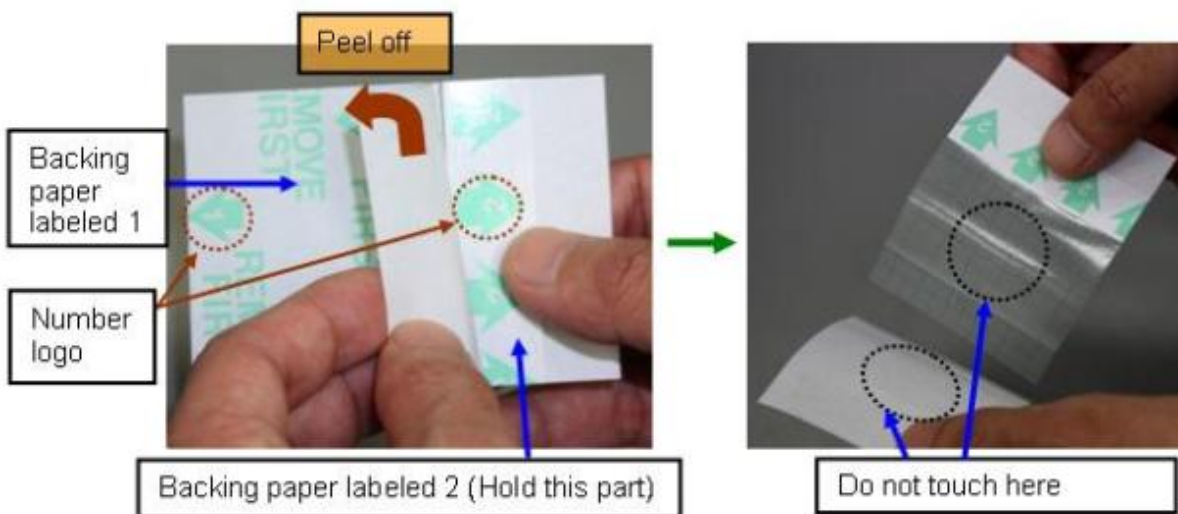


Figure 2. Peeling off backing paper labeled 1.

**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.



# MYCO BODY SAMPLE COLLECTION

(ASSY OPS/ULF5/FIN 1)

Page 3 of 8 pages

- 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.

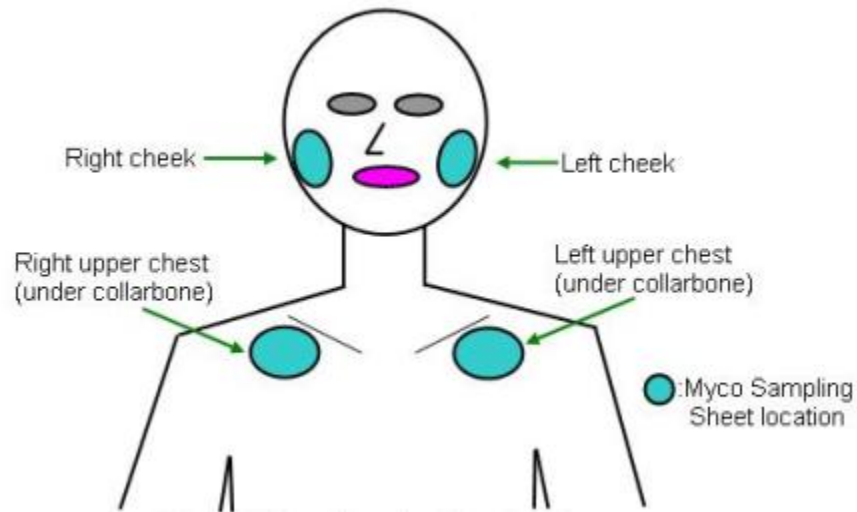


Figure 3. Myco Sampling Sheet location.

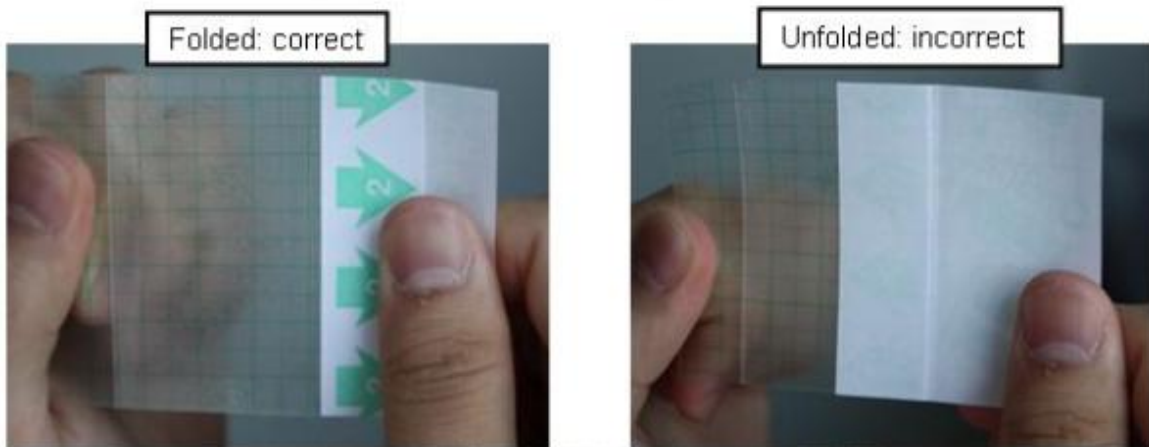


Figure 4. Unfolded and folded backing paper labeled 2.

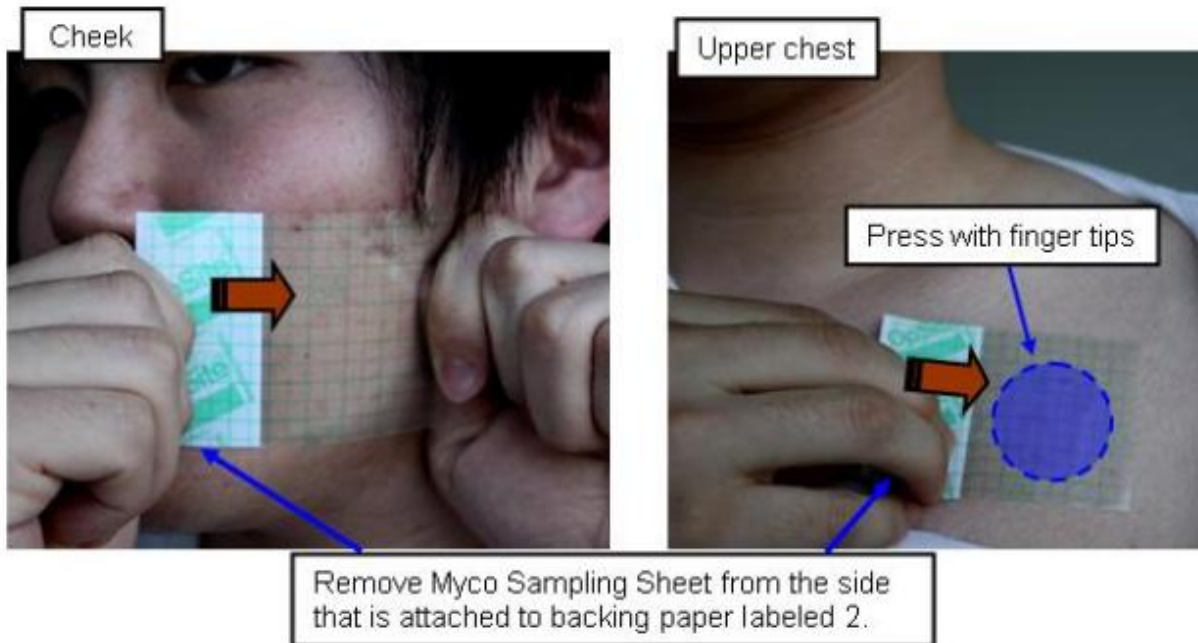


Figure 5. Applying and removing Myco Sampling Sheet.

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.

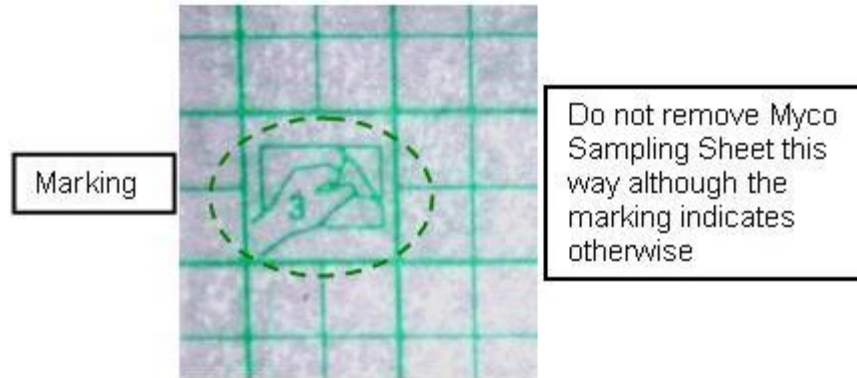


Figure 6. The marking on Myco Sampling Sheet.

**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 Figure 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)

- 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.

- 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)

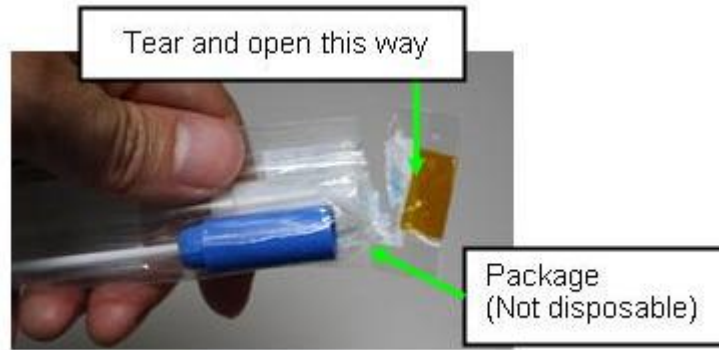


Figure 7. Myco Swab.

**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**

- 1. Keep Swab stick in the package until step 3.4 to avoid contamination of the tip.
- 2. Do not trash package and keep it with tube for return to identify sampling location on ground.

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.

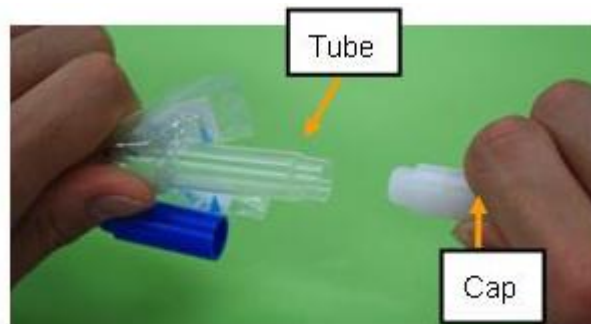


Figure 8. Removing the tube cap.

3.3 Remove and trash cap from tube.

Refer to Figure 8.



Figure 9. Swab stick.

<b>CAUTION</b>
<p>Do NOT touch tip or stick to avoid contamination. Refer to Figure 9.</p>

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

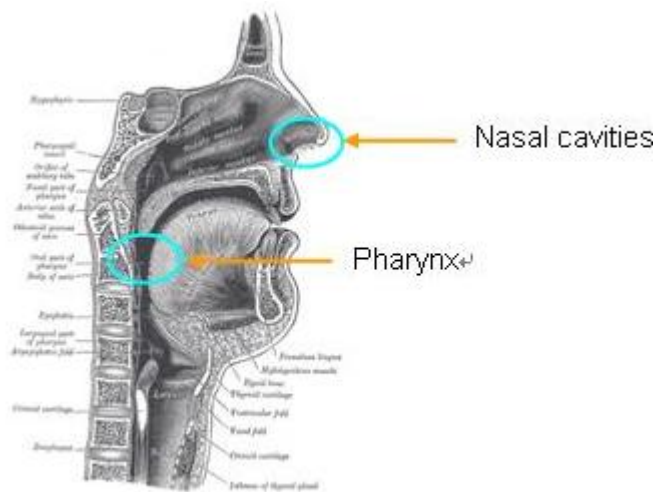


Figure 10. Myco Swab location.

- 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

<b>CAUTION</b>
MELFI insertion of Myco Kit must be performed within four hours after sampling to avoid deterioration of the samples.

- 6.1 Hand Myco Kit to ISS crew member for MELFI insertion.
- 6.2 Stow the following items: except for Trash items.

Stow:

Sharpie

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:	

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# SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF5/FIN 1)

Page 1 of 14 pages

## OBJECTIVE:

This procedure defines the steps needed for an operator to set-up an Anthropometer Base and D2Xs Camera, measure subject data, and then 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 temporary 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 temporarily 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 1)

Page 2 of 14 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 temporarily stow.

Spinal  
Elongation  
Kit

- 2.7 Unstow:

Anthropometer Base  
Slider Post  
Head Bar

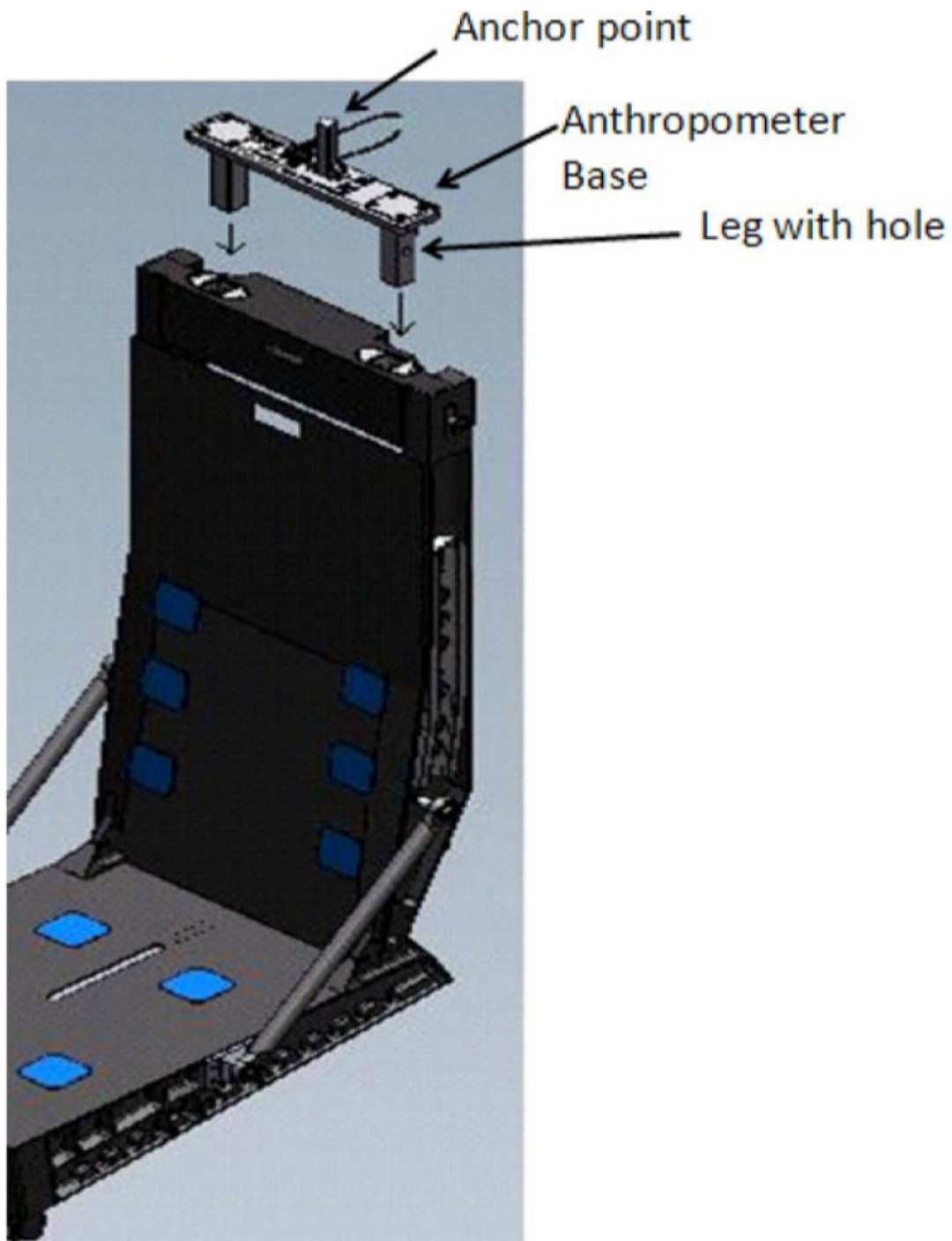
Place hardware in CDR seat for setup.

- 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.

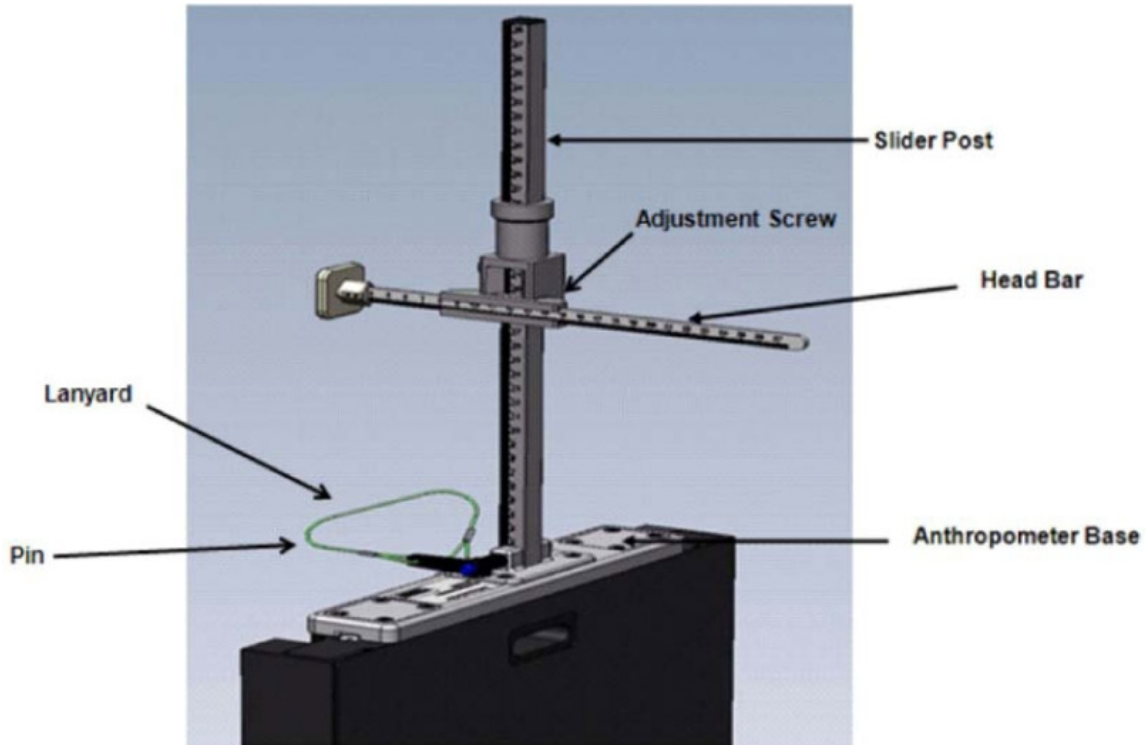
- 2.7.2 To setup Anthropometer Base, hold Anthropometer Base by the anchor point, slide the legs of the Anthropometer Base into the head rest holes on top of the seat. Refer to Figure 2.
- 2.7.3 ✓Anthropometer leg with the hole is oriented closest to the headrest release knob.
- 2.7.4 ✓Anthropometer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

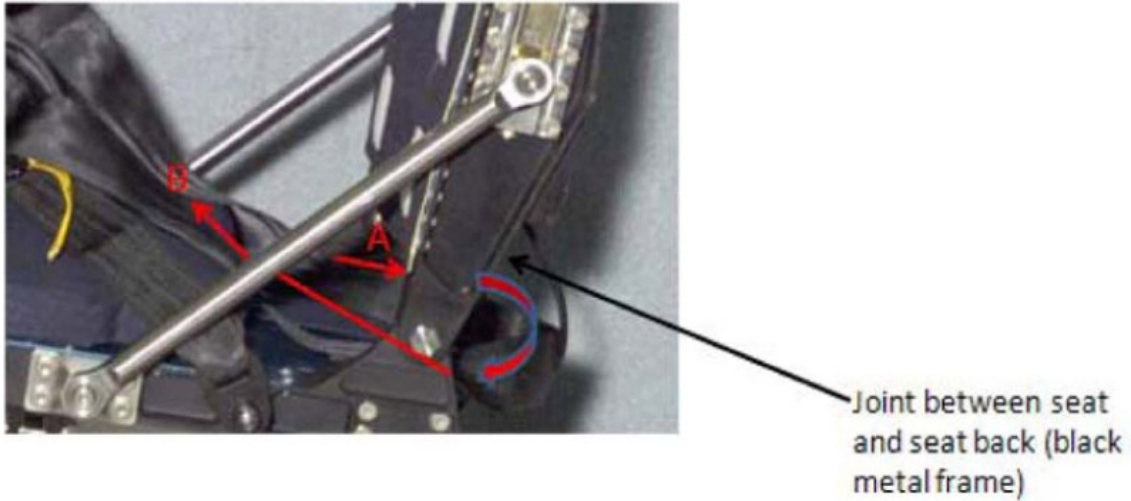


Figure 4. Lap Belt and Seat Back Joint Illustration

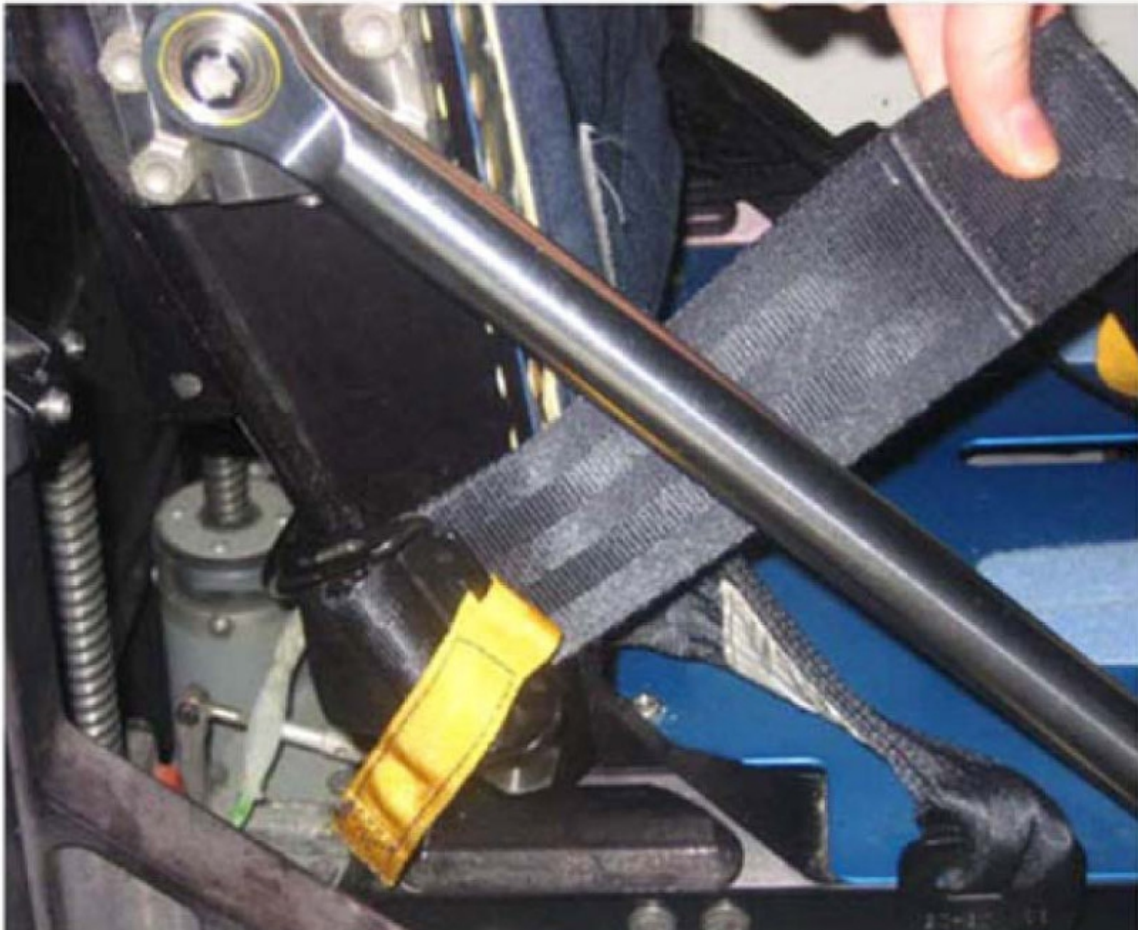


Figure 5. Joint Between Seat and Seat Back (Black Metal Frame)

#### 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 1)

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- 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 temporarily 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.

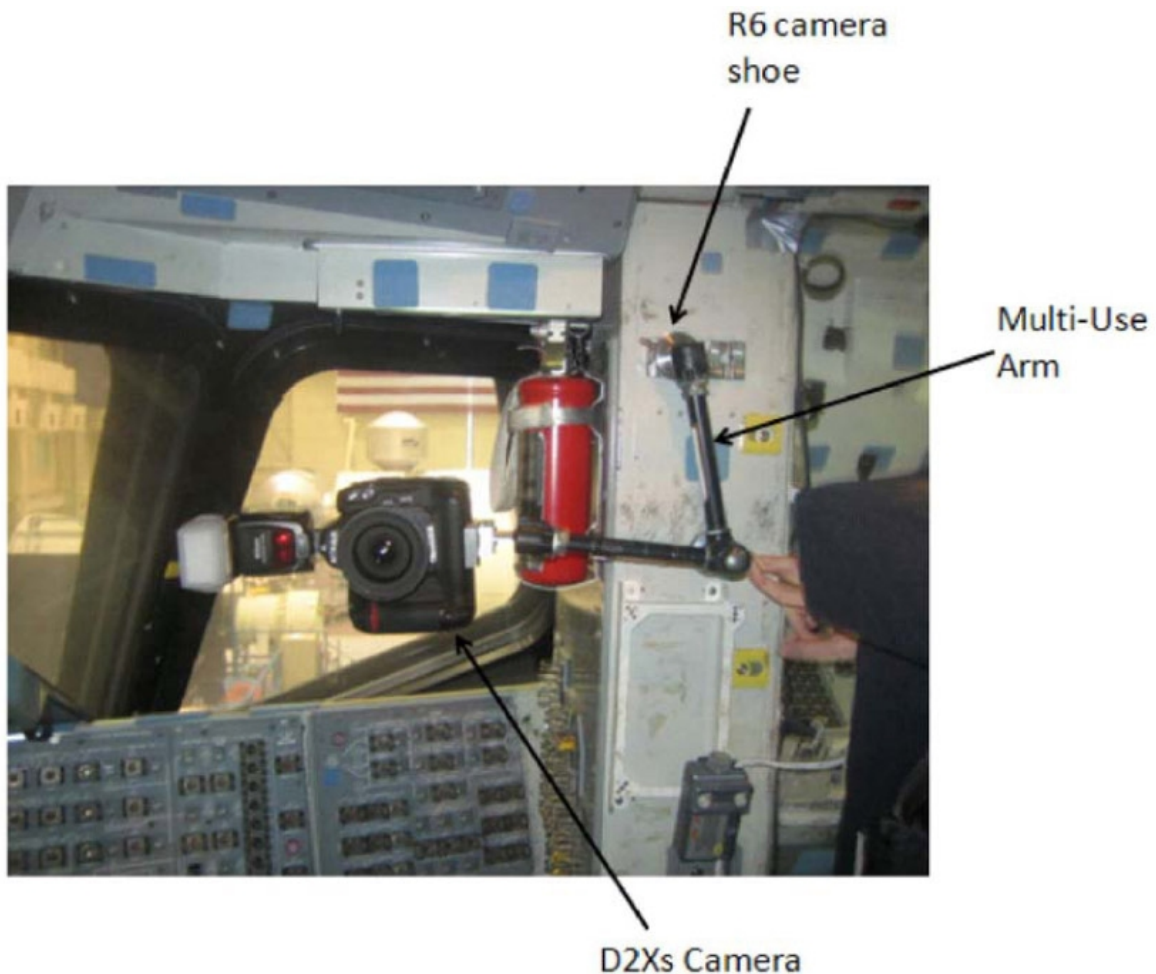


Figure 6. D2Xs Camera Positioned on R6 Camera Shoe

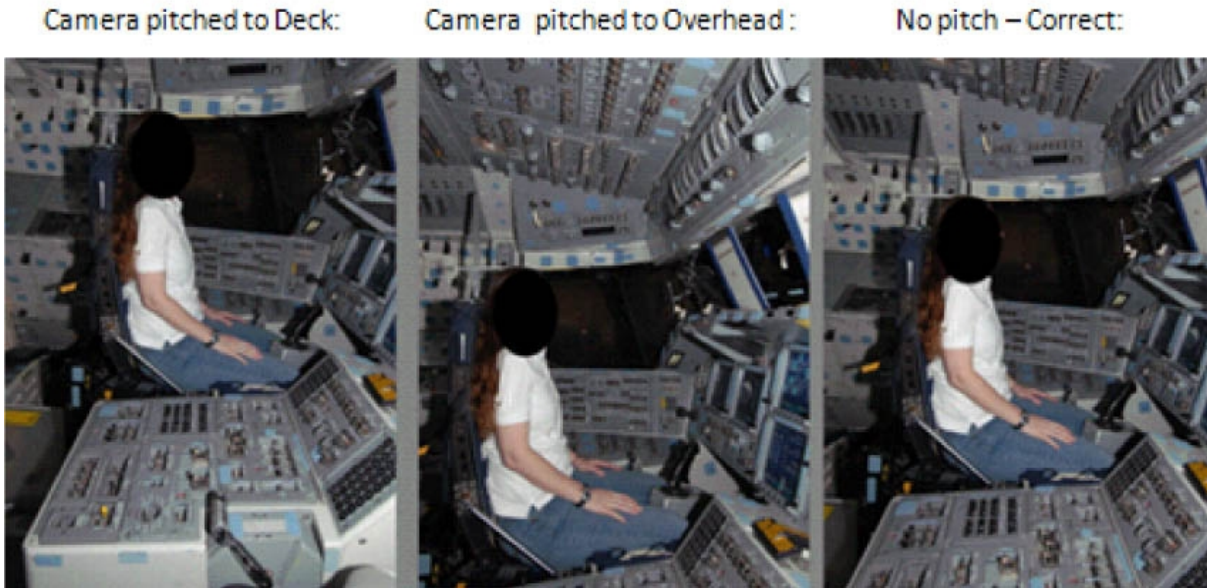
- 4.6 Autofocus on CDR seat (specifically on the side of the seat with the circle as seen in Figure 8).

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).

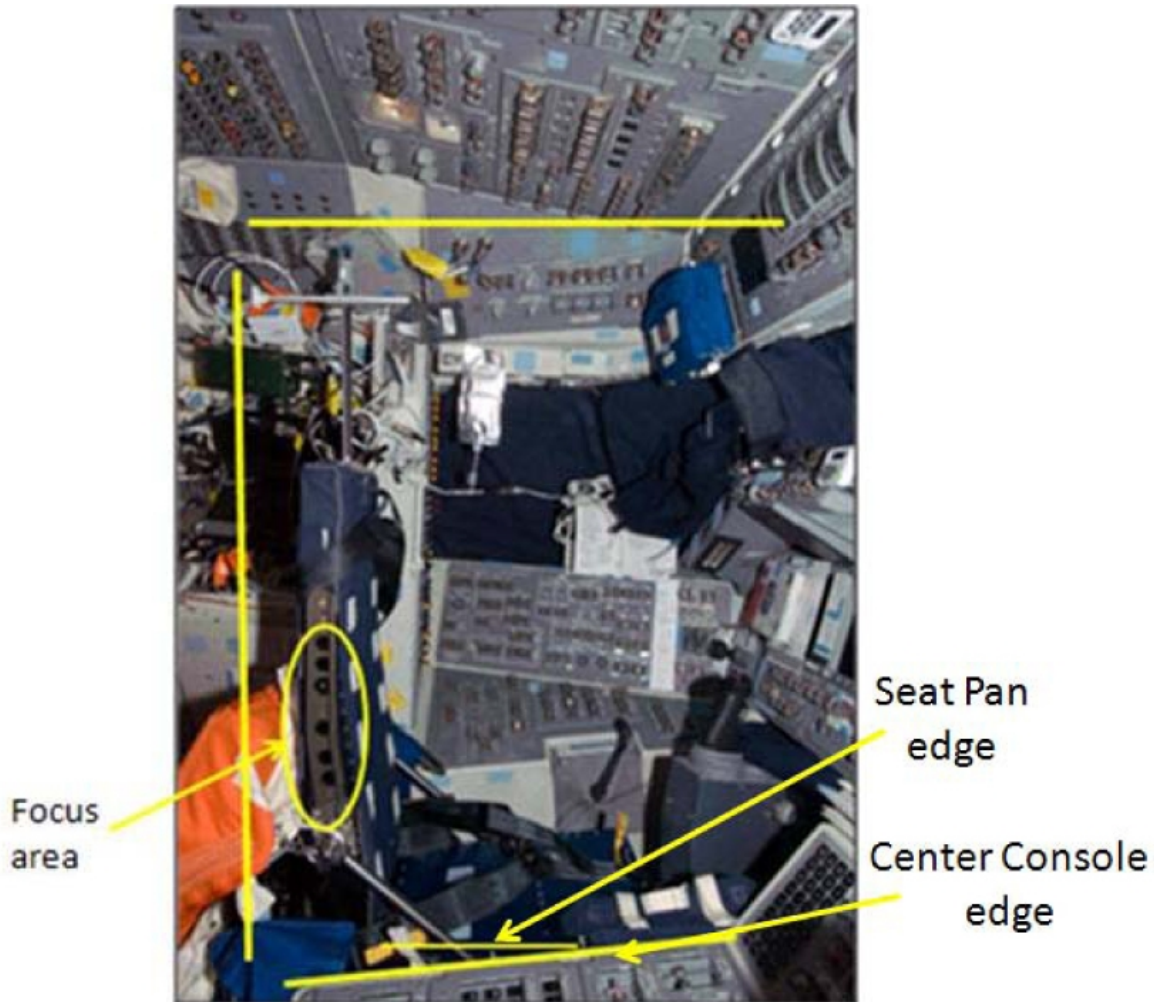


Figure 8. Correct D2Xs Camera Image Capture Area

- 4.10 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.
- 4.11 ✓MCC-H (specify which PGSC file resides on)
- 5. SUBJECT POSITIONING
  - 5.1 **On MCC-H GO**  
Remove CF Card Adapter from PGSC and  
Remove 4GB EVA Flash Card from CF Card Adapter.  
Insert 4GB EVA Flash Card into D2Xs Camera.

**CAUTION**

Do not take nominal Spinal Elongation measurements within one hour of compression exercise or countermeasures (Penguin Suit, EVA, weight exercises, ARED, IRED, etc.) as exercise would adversely affect the measurements being taken in this activity.

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

- 5.3 Remove and temporarily 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

- 5.4 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.

- 5.5 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.
- 5.6 Retrieve Head Bar from temporary stow location 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.

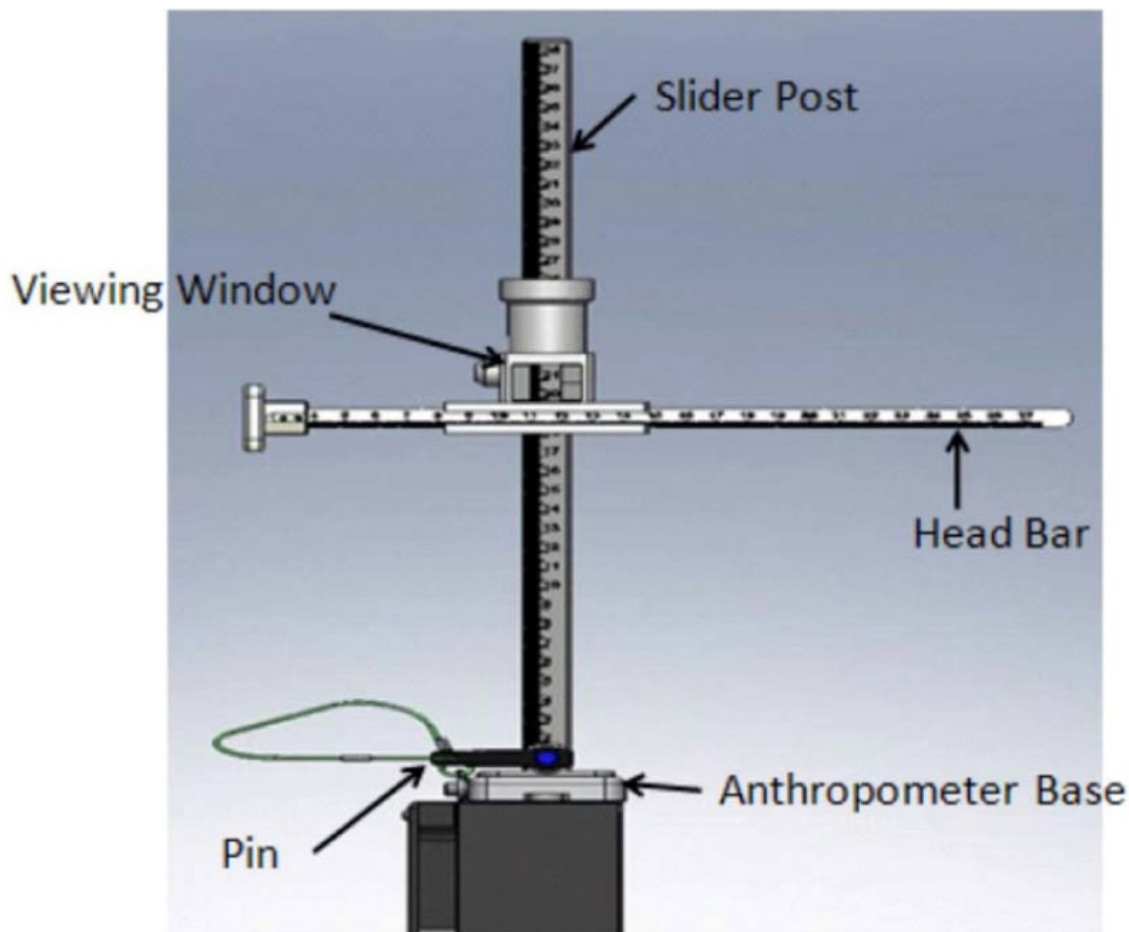


Figure 9. Head Bar Connected to Slider Post

5.7 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](#) (SODF: ASSY OPS: PAYLOADS: SPINAL). 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 temporarily 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.

# SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF5/FIN 1)

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- 6.5 Repeat step 5.4 through step 6.3 to complete the second measurement (for a total of two measurements per subject).
- 6.6 Repeat step 5.4 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 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 temporary stow location.
  - 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 temporary stow location.
  - 7.4.2 Install head rest on top of CDR seat
  - 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 temporary stow location 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.
- 8.2 Stow:

Spinal  
Elongation  
Kit

06 OCT 10

## SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF5/FIN 1)

Page 14 of 14 pages

Anthropometer Base  
Slider Post  
Head Bar

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

    Crew should inform ground of temporary 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).

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

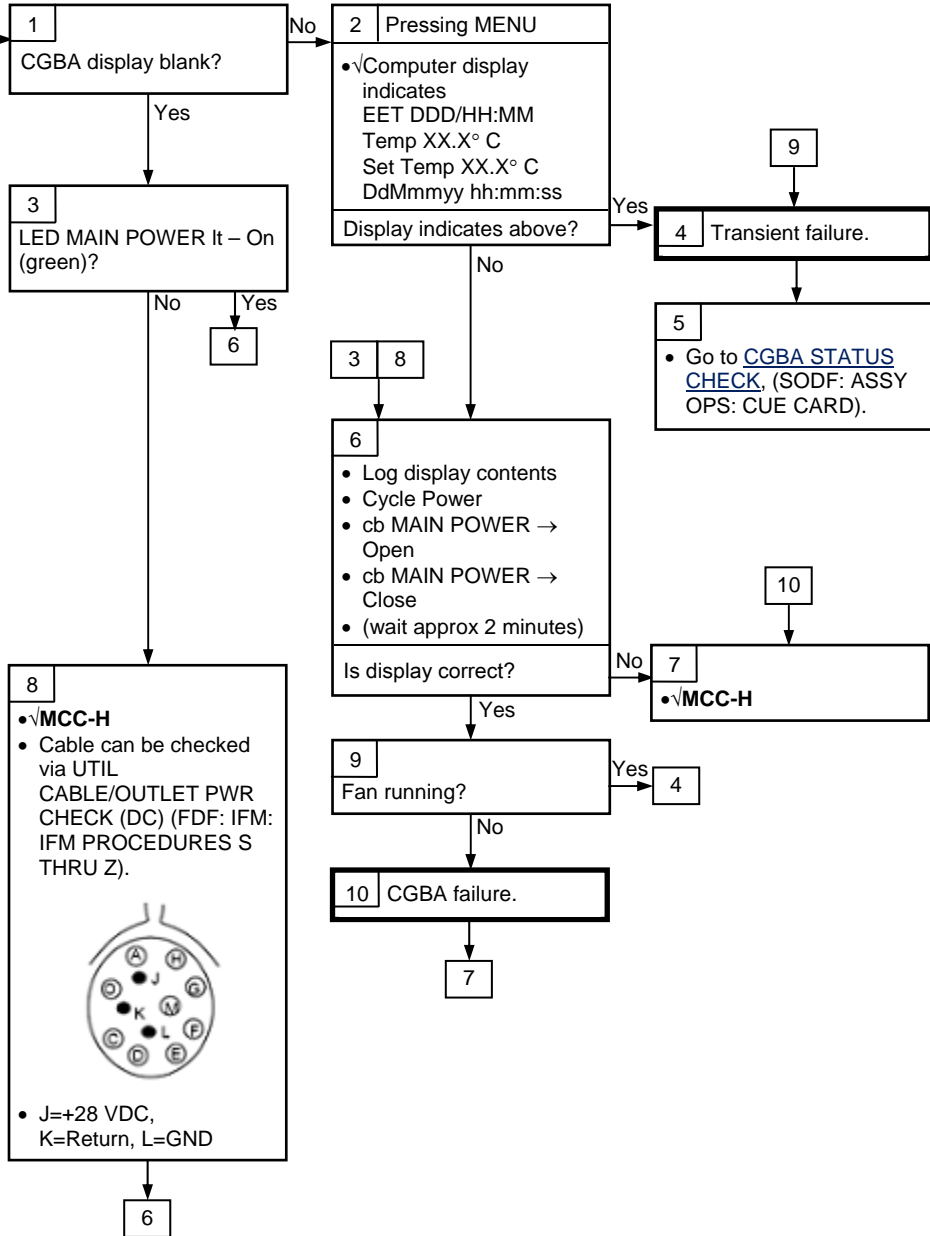


**CGBA**

**CGBA INCORRECT (NO) DISPLAY**  
(ASSY OPS/ULF5/FIN 1) Page 1 of 1 page

Incorrect or No Computer Display

**Nominal Config:**  
(MO63P)  
10A J4 – ON  
cb CB4/J4 – cl  
(CGBA)  
cb MAIN POWER – Close  
LED MAIN POWER Lt – On



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# NLP ACTIVATION

(ASSY OPS/ULF5/FIN 1)

Page 1 of 6 pages

## OBJECTIVE:

This procedure will be used for National Laboratory Pathfinder (NLP) Vaccine to access the Group Activation Pack (GAP) inside Commercial Generic Bioprocessing Apparatus (CGBA). This includes powering down CGBA, accessing the internal volume of CGBA, retrieving and activating the NLP-Vaccine GAPs. It also contains steps to close CGBA and restore power.

## PARTS:

NLP-Vaccine

Group Activation Packs (GAPs)

Hand Crank (located in foam on left side of CGBA unit)

Ziplock Bag (if required)

1. Check Flight Plan Detail Page for which GAPs to activate. Record information in Table 1 in step 5.1.

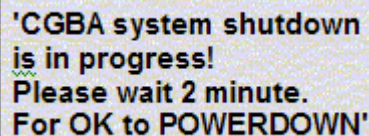
### CAUTION

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

MF71E  
(CGBA)

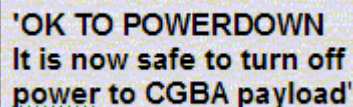
2. CGBA POWEROFF

- 2.1 On Keypad:  
pb MENU → Press  
pb 7 Shutdown → Press  
pb ENTER → Press
- 2.2 On Shutdown CGBA screen:  
pb 1 Shutdown system → Press  
pb ENTER → Press
- 2.3 Verify CGBA display indicates the following:



'CGBA system shutdown  
is in progress!  
Please wait 2 minute.  
For OK to POWERDOWN'

- 2.4 Verify CGBA display indicates the following:



'OK TO POWERDOWN  
It is now safe to turn off  
power to CGBA payload'

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

2.5 cb MAIN POWER → Open

2.6 ✓LED-MAIN POWER – Off

3. CGBA POWER OFF AND DISCONNECTION

MO63P

3.1 sw 10A J4 → OFF  
cb CB4/J4 → Open

CGBA

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

3.3 Tether Power Cable out of the way as needed.

4. CGBA REMOVAL FROM MIDDECK LOCKER

4.1 Unlatch, open CGBA locker door.

4.2 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).

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

NOTE

When removing GAPs from CGBA, condensation may form, due to cabin humidity levels. The inside top and bottom surfaces of CGBA could condense water. It is important to distinguish between condensation and a leak. Moisture due to condensation will be uniform on the surface of the GAP and not associated with the o-ring seals or the upper and lower seals within a glass barrel.

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

5. ACTIVATING NLP EXPERIMENT

5.1 Record Activation Start MET in Table 1.

Table 1.

Vaccine GAPs (A-P)	Group Activation Start MET	Group Activation Stop MET
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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

5.2 Remove one GAP listed in Table 1 from Foam.

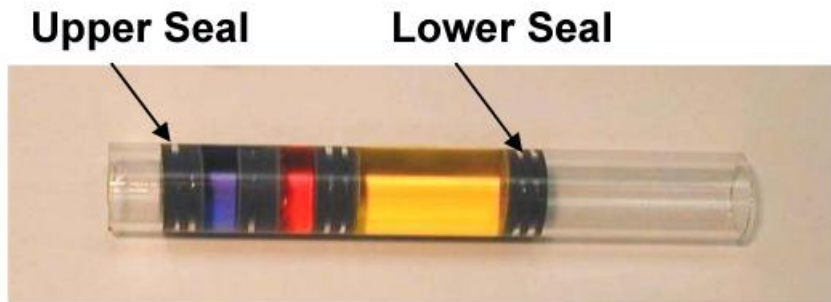


Figure 1. Loaded Glass Barrel.

5.3 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).  
*  
*****
```

Pressure Plate Arrow

Activation Line Arrow

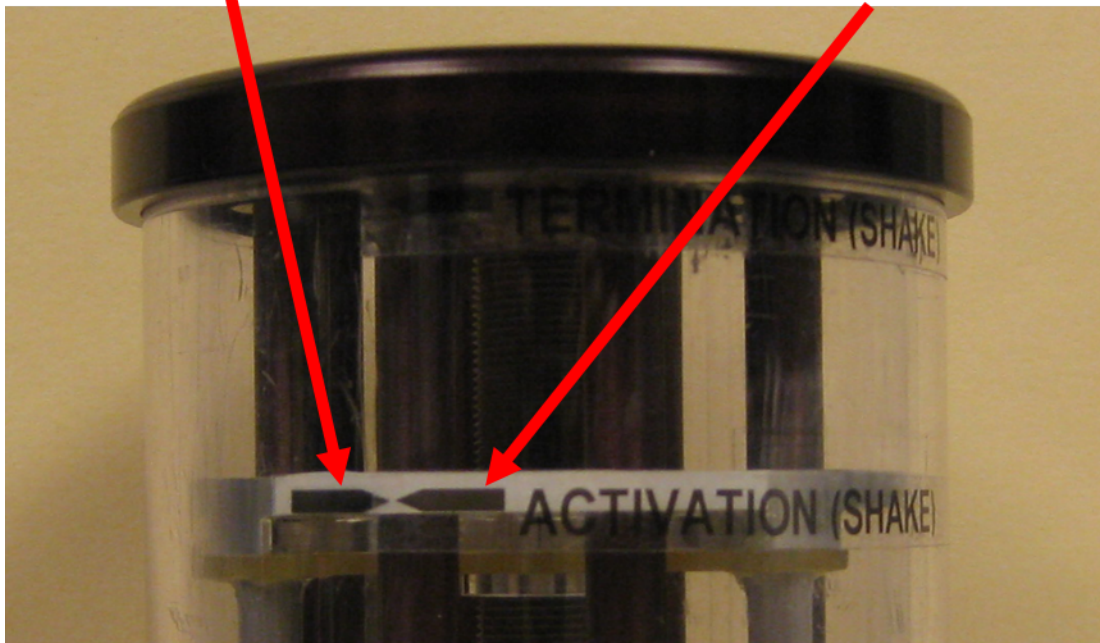


Figure 2. Activation Arrows

- 5.4 Unstow Hand Crank and attach to GAP.  
Slowly rotate the Hand Crank ↻ until arrow on pressure plate aligns with arrow on the first mark labeled "ACTIVATION" on the side of GAP housing (Figure 2).
- 5.5 Detach Hand Crank.
- 5.6 Shake GAP firmly by accelerating in a back and forth motion along the lengthwise axis of the GAP four times.
- 5.7 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.  
\*  
\*\*\*\*\*

- 5.8 Restow GAP in original location.
- 5.9 Repeat step 5.2 to 5.8 until all GAPS identified in Table 1 are activated.
- 5.10 Record Activation Stop MET Table 1.
- 5.11 Restow Hand Crank in original location.
- 6. INSERTION OF CGBA INTO MIDDECK
  - 6.1 Close CGBA lid, attach Velcro tabs.

**WARNING**

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

- 6.2 Slide CGBA into locker, close locker door, and latch.
- 7. CONNECTING POWER TO CGBA
  - 7.1 ✓cb MAIN POWER – Open  
✓LED-MAIN POWER – Off
  - MO63P 7.2 ✓cb CB4/J4 – Open  
✓sw 10A J4 – OFF
  - CGBA 7.3 Connect Power cable:  
DC JUMPER CGBA →|← POWER-IN 28 VDC J1

- 8. CGBA POWERON
  - MO63P 8.1 cb CB4/J4 → Close  
sw 10A J4 → ON
  - CGBA 8.2 cb MAIN POWER → Close  
✓LED-MAIN POWER – On

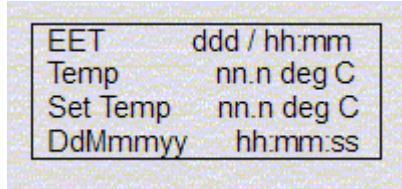
```
*****  
*  
* If no LED  
* | Perform CGBA INCORRECT (NO) DISPLAY, all (SODF:  
* | ASSY OPS: PAYLOADS: CGBA), then:  
*  
*****
```

9. CGBA CHECKOUT

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

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

9.2 Verify CGBA display indicates the following:



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

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



OBJECTIVE:

This procedure will be used for National Laboratory Pathfinder (NLP) Vaccine to access the Group Activation Pack (GAP) inside Commercial Generic Bioprocessing Apparatus (CGBA). This includes powering down CGBA, accessing the internal volume of CGBA, retrieving and terminating the NLP-Vaccine GAPs. It also contains steps to close CGBA and restore power.

PARTS:

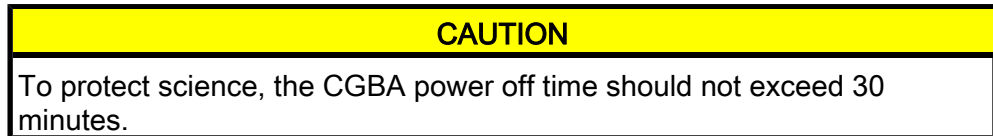
NLP-Vaccine

Group Activation Packs (GAPs)

Hand Crank

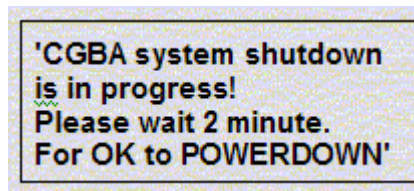
Ziplock Bag (if required)

1. Check Flight Plan Detail Page for which GAPs to terminate. Record information in Table 1 in step 5.1.

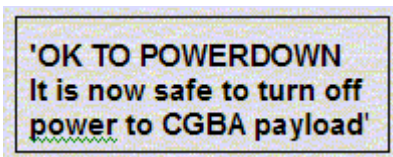


MF71E  
(CGBA)

2. CGBA POWEROFF
  - 2.1 On Keypad:  
pb MENU → Press  
pb 7 Shutdown → Press  
pb ENTER → Press
  - 2.2 On Shutdown CGBA screen:  
pb 1 Shutdown system → Press  
pb ENTER → Press
  - 2.3 Verify CGBA display indicates the following:



- 2.4 Verify CGBA display indicates the following:



```

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

```

2.5   cb MAIN POWER → Open

2.6   ✓LED-MAIN POWER – Off

3.   CGBA POWER OFF AND DISCONNECTION

MO63P

3.1   sw 10A J4 → OFF  
      cb CB4/J4 → Open

CGBA

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

3.3   Tether Power Cable out of the way as needed.

4.   CGBA REMOVAL FROM MIDDECK LOCKER

4.1   Unlatch, open CGBA locker door.

4.2   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).

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

NOTE

When removing GAPs from CGBA, condensation may form due to cabin humidity levels. The inside top and bottom surfaces of CGBA could condense water. It is important to distinguish between condensation and a leak. Moisture due to condensation will be uniform on the surface of the GAP and not associated with the o-ring seals or the upper and lower seals within a glass barrel.

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

CGBA

5.   TERMINATING NLP EXPERIMENT

5.1   Record Termination Start MET in Table 1.

Table 1.

Vaccine GAPs (A-P)	Group Termination Start MET	Group Termination Stop MET
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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

5.2 Remove one GAP listed in Table 1 from Foam.

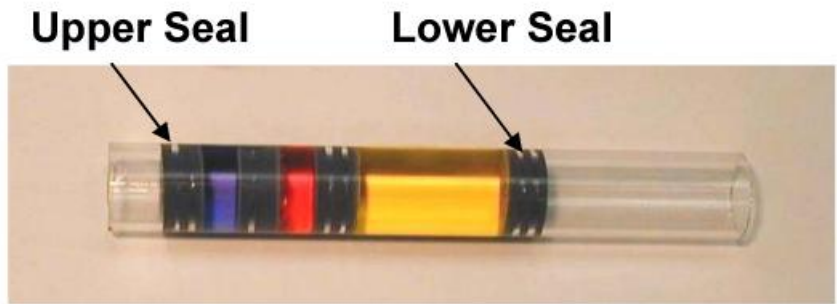


Figure 1. Loaded Glass Barrel

5.3 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).
*
*****
```

Pressure Plate Arrow      Termination Line Arrow

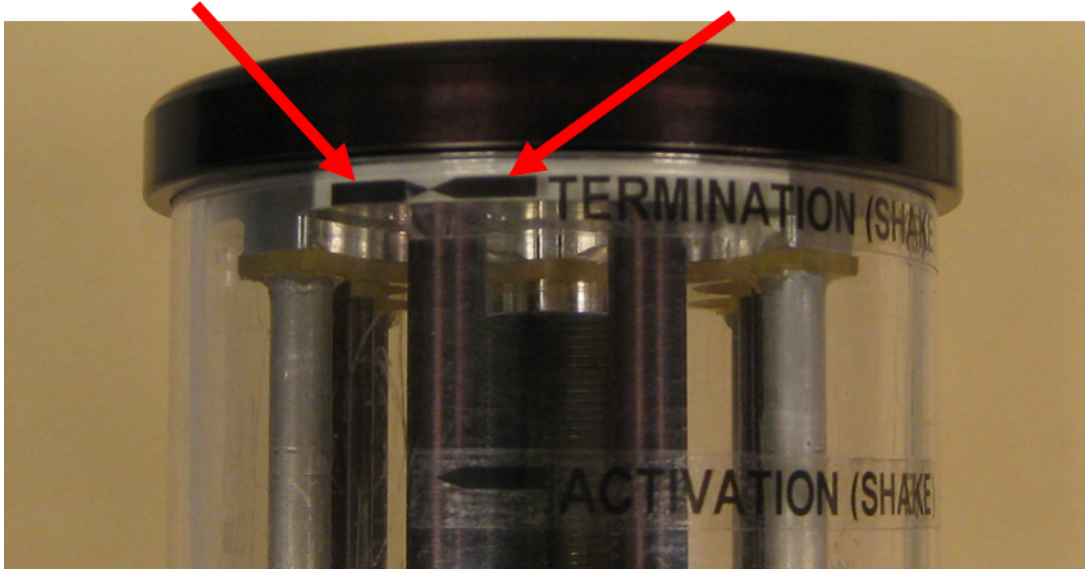


Figure 2. Termination Arrows.

- 5.4 Unstow Hand Crank and attach to GAP.  
Slowly rotate the Hand Crank ↻ until arrow on pressure plate aligns with arrow on the first mark labeled "TERMINATION" on the side of GAP housing (Figure 2)
- 5.5 Detach Hand Crank.
- 5.6 Shake GAP firmly by accelerating in a back and forth motion along the lengthwise axis of the GAP four times.
- 5.7 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.  
\*  
\*\*\*\*\*

- 5.8 Restow GAP in original location.
- 5.9 Repeat step 5.2 to 5.8 until all GAPs identified in Table 1 are terminated.
- 5.10 Record Termination Stop MET in Table 1.
- 5.11 Restow Hand Crank in original location.

CGBA 6. INSERTION OF CGBA INTO MIDDECK

- 6.1 Close CGBA lid, attach Velcro tabs.

<b>WARNING</b>
CGBA must be inserted with both latches closed for safe entry.

- 6.2 Slide CGBA into locker, close locker door, and latch.

7. CONNECTING POWER TO CGBA

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

- MO63P 7.2 ✓cb CB4/J4 – Open  
✓sw 10A J4 – OFF

- CGBA 7.3 Connect Power cable:  
DC JUMPER CGBA →|← POWER-IN 28 VDC J1

8. CGBA POWER ON

- MO63P 8.1 cb CB4/J4 → Close  
sw 10A J4 → ON

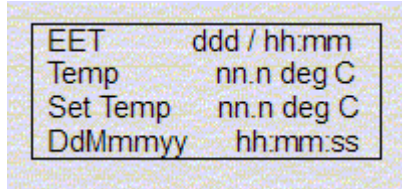
- CGBA 8.2 cb MAIN POWER → Close  
✓LED-MAIN POWER – On

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

9. CGBA CHECKOUT

9.1 Verify CGBA fan is running (check airflow at EXHAUST).  
\*\*\*\*\*  
\*  
\* If CGBA fan is not running  
\* | ✓MCC-H  
\*  
\*\*\*\*\*

9.2 Verify CGBA display indicates the following:



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

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

# CGBA ADJUST SET TEMP

(ASSY OPS/ULF5/FIN 1)

Page 1 of 2 pages

## OBJECTIVE:

To adjust the set temperature on the Commercial Generic Bioprocessing Apparatus (CGBA) front panel.

### NOTE

1. MENU option will time out after 30 seconds and return to status display.
2. Display goes into sleep mode if keypad is not pressed within 10 minutes. Pressing any key will reactivate display.

MF71E  
(CGBA)

1. Check the Detailed Timeline for the new Set Temp.

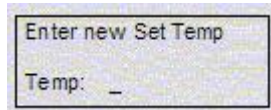
2. On keypad:

pb MENU → Press

pb 4 → Press

pb ENTER → Press

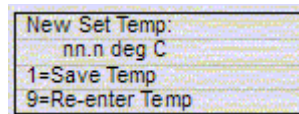
3. Verify CGBA display indicates:



4. Using up and down arrow keys on keypad, scroll to new Set Temp.

5. pb ENTER → Press

6. ✓CGBA display indicates:



```
*****  
*  
* If displayed Set Temp is incorrect,  
* | pb 9 → Press  
* |  
* | pb ENTER → Press  
* |  
* | Go to step 4  
*  
*****
```

7. pb 1 → Press  
pb ENTER → Press



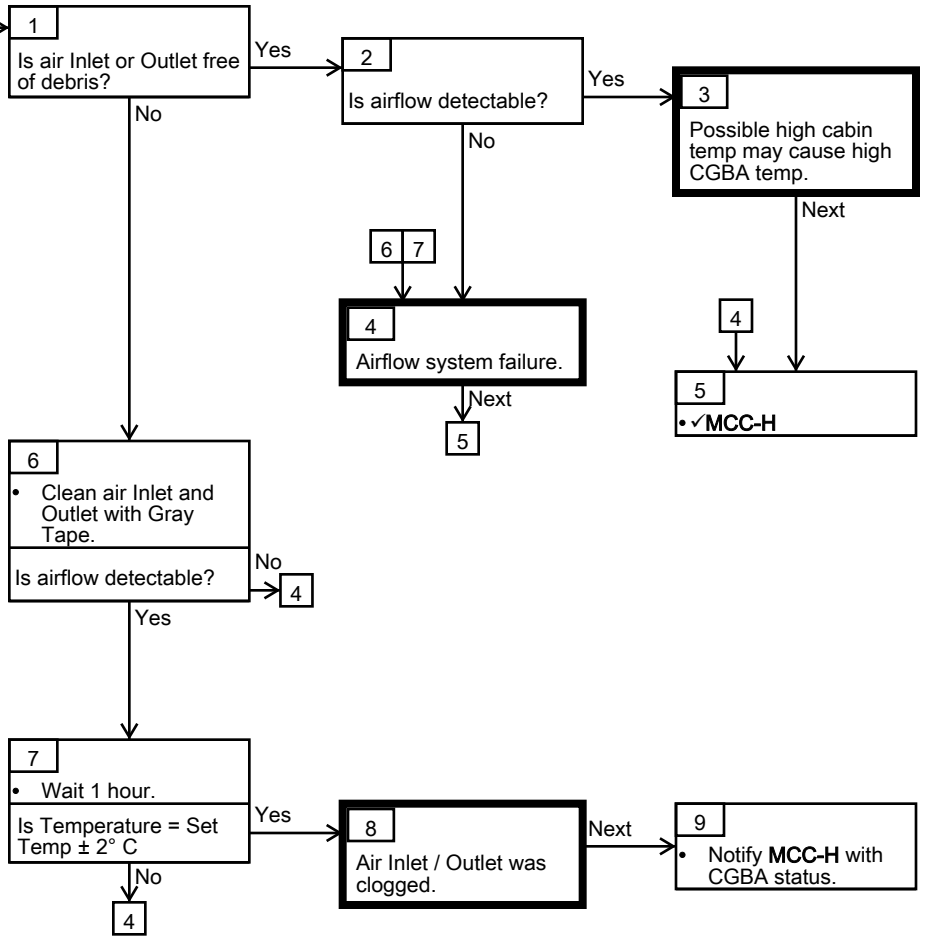
**CGBA**

**CGBA INCORRECT TEMP**

(ASSY OPS/ULF5/FIN) Page 1 of 1 page

Temperature is  $\neq$  to Set TEMP  $\pm 2^{\circ}\text{C}$

**Nominal Config:**  
 (MO63P)  
 sw 10A J4 - ON  
 cb CB4/J4 - cl  
 (CGBA)  
 cb MAIN POWER - cl  
 LED MAIN POWER Lt - On



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# 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'**

<u>NOTE</u>
-------------

- |  |
|--|
| 1. The center pushbutton (NEXT) moves to next status display.<br>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
<b>HOME MENU (Front panel)</b>				
1	CURR TEMP	Current Temperature °C		
2	SET POINT	Set Point °C		
3	GPS	Hours: Min: Sec	__ : __ : __	__ : __ : __
<b>QUICK STATUS</b>				
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		

# GLACIER SET POINT CONTROL MODE

(ASSY OPS/ULF5/FIN)

Page 1 of 3 pages

## OBJECTIVE:

This procedure will remove desiccant packs and perform a manual reconfigure of the Glacier System from Idle to Set Point Control Mode using the front panel and display buttons.

### 1. DESICCANT PACK REMOVAL

MF28E/G  
(Glacier)

#### 1.1 ✓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
* |
*****
```

- 1.2 Open Glacier door and remove dessicant packs from trays A and D. Return trays and close inner and outer doors. Discard desiccant packs in trash.

### 2. TEMPERATURE CONTROL MODE

- 2.1 pb Left (MENU) → Press (one time), following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
- 2.2 pb Left (NEXT) → Press (three times), following appears:  
'MAIN MENU'  
'SETUP 4/5'
- 2.3 pb Center (SELECT) → Press (one time), following appears:  
'SETUP'  
'Temp Control 1/3'
- 2.4 pb Center (SELECT) → Press (one time), following appears:  
'Temp Control'  
'Set Point Temp 1/18'  
'-095.0 °C'
- 2.5 pb Left (NEXT) → Press (one time), following appears:  
'Temp Control'  
'Control Mode 2/18'  
'IDLE'

NOTE

1. There are three 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.

- 2.6 pb Center (SELECT) → Press (one time), following appears:  
'Control Mode'  
'IDLE'
- 2.7 pb Left (NEXT) → Press as required to select the SET POINT Control Mode
- 2.8 pb Center (APPLY) → Press (one time)
- 2.9 ✓Confirm Temp Control  
'Old: IDLE'  
'New: SETPOINT'
- 2.10 pb Left (APPLY) → Press (one time), following appears:  
'Temp Control'  
'Control Mode 2/18'  
'SET POINT'
- 2.11 pb Right (EXIT) → Press until 'HOME' appears
3. AIR MANAGEMENT PROCEED MESSAGE
  - 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'  
'-095.0 °C'
  - 3.5 pb Left (NEXT) → Press (three times), following appears:  
'Temp Control'  
'AirMgmt Proceed 4/18'
  - 3.6 pb Center (SELECT) → Press (one time), following appears:  
'AirMgmt Proceed'  
'PROCEED'

## GLACIER SET POINT CONTROL MODE

(ASSY OPS/ULF5/FIN)

Page 3 of 3 pages

- 3.7 pb Center (APPLY) → Press (one time)
- 3.8 ✓Display line 3 – PROCEED
- 3.9 pb Right (EXIT) → Press until '**HOME**' appears
- 3.10 Verify by listening – the coolers turn on
4. Record the following from the front panel:  
CURR TEMP \_\_\_\_\_ °C  
SET POINT \_\_\_\_\_ °C  
GPS \_\_\_\_\_:\_\_\_\_\_:\_\_\_\_\_
5. Notify **MCC-H** GLACIER SET POINT CONTROL MODE complete and data recorded in step 4.

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# GLACIER UNPACK AND POWER UP

(ASSY OPS/ULF5/FIN)

Page 1 of 4 pages

## OBJECTIVE:

To unlock the Glacier door, unpack the ascent items from the unpowered Glacier, and activate the Glacier unit.

## STS IFM Toolbox:

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

4" Extension, 1/4" Drive

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

Ratchet, 1/4" Drive

## PARTS:

0.5 CTB

White Gloves

## ITEMS TO UNSTOW WITHIN PROCEDURE:

JAXA CsPINs KFTs (ten) (unstow in Step 1)

MELFI Desiccant Kit (eighteen)

### 1. UNLOCK GLACIER DOOR

MF28E/G  
Glacier

- 1.1 Unlock Glacier Door Captive Locks (two) (3/16" Hex Head, 3/8" Drive, 1/4" to 3/8" adapter, 1/4" drive, 4" Extension, 1/4" Drive, Ratchet, 1/4" Drive). Refer to Figure 1.

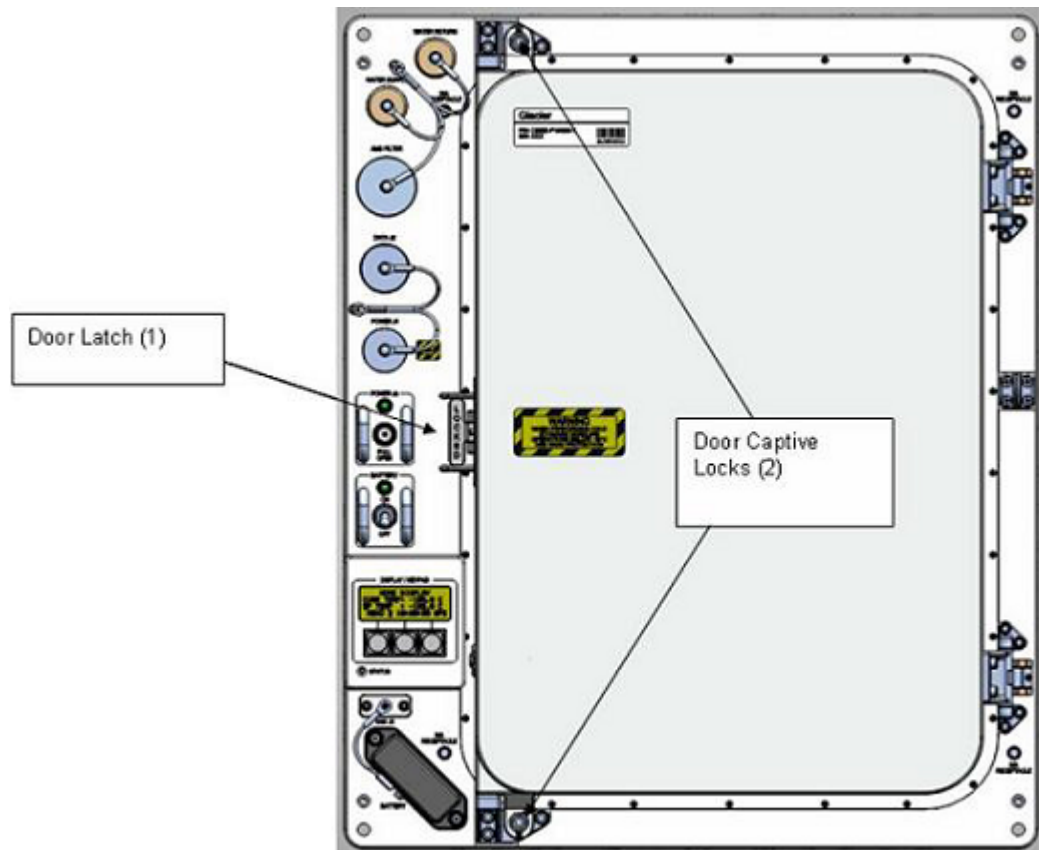


Figure 1. Glacier Configuration.

- 1.2 Open Glacier doors B and C and remove JAXA CsPINs KFTs (ten), and Desiccant Kits (two Foil packages) and place in 0.5 CTB.
- 1.3 Remove Desiccant Kits (sixteen Foil packages) from Tray A and D and place in 0.5 CTB.
- 1.4 Keep loose Desiccant packs (three in each tray) contained in both Trays A and D.
- 1.5 Replace each Glacier tray and close inner and outer doors.

2. POWERING UP GLACIER

MF28E/G  
Glacier

- 2.1 ✓cb POWER Open (It off)
- 2.2 ✓sw BATTERY OFF (It off)
- 2.3 ✓SHUTTLE PAYLOAD DC PWR CABLE →|← POWER J1

ML85E

- 2.4 ✓SHUTTLE PAYLOAD DC PWR CABLE →|← DC 20 AMP J11

ML86B:E  
28 SEP 10

- 2.5 ✓cb MNB MAR 1→ cl

NOTE

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

MF28E/G  
Glacier

- 2.6    cb POWER → Close (It on)
- 2.7    sw BATTERY → ON (It on)
- 2.8    ✓Display 'HOME'

```

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

- 2.9    Record the following from the front panel:

CURR TEMP \_\_\_\_\_. \_\_\_\_ °C

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

✓Display Line 3 – IDLE MODE

3.    TRANSFERRING ASCENT ITEMS

- 3.1    Remove the Desiccant Kits (eighteen Foil packages) from the 0.5 CTB and transfer per Transfer List.

JPM1D4  
(MELFI-1)

- 3.2    Transfer 0.5 CTB containing only the JAXA CsPINs KFTs (ten) and temp stow near MELFI-1.

MELFI-1

4.    MELFI-1 INSERTION

**WARNING**

Protective gloves must be worn when handling frozen samples or manipulating inner doors, cold trays or samples in Glacier to prevent injury to exposed skin.

**CAUTION**

Minimize exposure of MELFI trays, and samples to ambient air to prevent increased sample temperatures.

4.1 Don Gloves

\*\*\*\*\*  
\*  
\*  
\* If MELFI Tray is stuck  
\*  
\* | Insert Small Coldplate/Wireway Cover completely between  
\* | Tray and Dewar wall.  
\* |  
\* | Firmly holding both Small Coldplate/Wireway Cover and  
\* | Tray Handle, remove Tray from Dewar.  
\*  
\*\*\*\*\*

4.2 Insert JAXA CsPINs KFTs (ten) into Dewar 4, Tray D, Section 3 and 4.

5. Notify **MCC-H** GLACIER UNPACK AND POWERUP complete and data recorded in step 2.9.

# ULF5 DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/ULF5/FIN)

Page 1 of 5 pages

## OBJECTIVE:

To unlock the Glacier door and transfer frozen science samples from ISS MELFI to the Shuttle Glacier. One Double Coldbag will be used to transfer samples from MELFI to Glacier. This activity is performed by ISS and Shuttle crewmembers.

## PARTS:

Double Coldbag S/N 1007

Light Duty Cryo Gloves (Mechanix Wear)

Small Coldplate/Wireway Cover

## TOOLS:

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

1/4" - 3/8" Adapter, 1/4" Drive

4" Ext, 1/4" Drive

Ratchet, 1/4" Drive

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

## ITEMS TO UNSTOW WITHIN PROCEDURE:

Ice Brick -32° C (two) (unstow step 2)

HRP blood (four mesh bags) (unstow step 2)

HRP urine (thirty mesh bags) (unstow step 2)

ESA SOLO (two blood mesh bags) (unstow step 2)

ESA CARD (two Ziplocks)

MF28E/G  
Glacier 1. UNLOCKING GLACIER DOOR

- 1.1 Unlock Glacier Door Captive Locks (two) using 3/16" Hex Head, 3/8" Drive; 1/4"-3/8" Adapter; 1/4" Drive; 4" Extension, 1/4" Drive; Ratchet, 1/4" Drive.  
Refer to Figure 1.

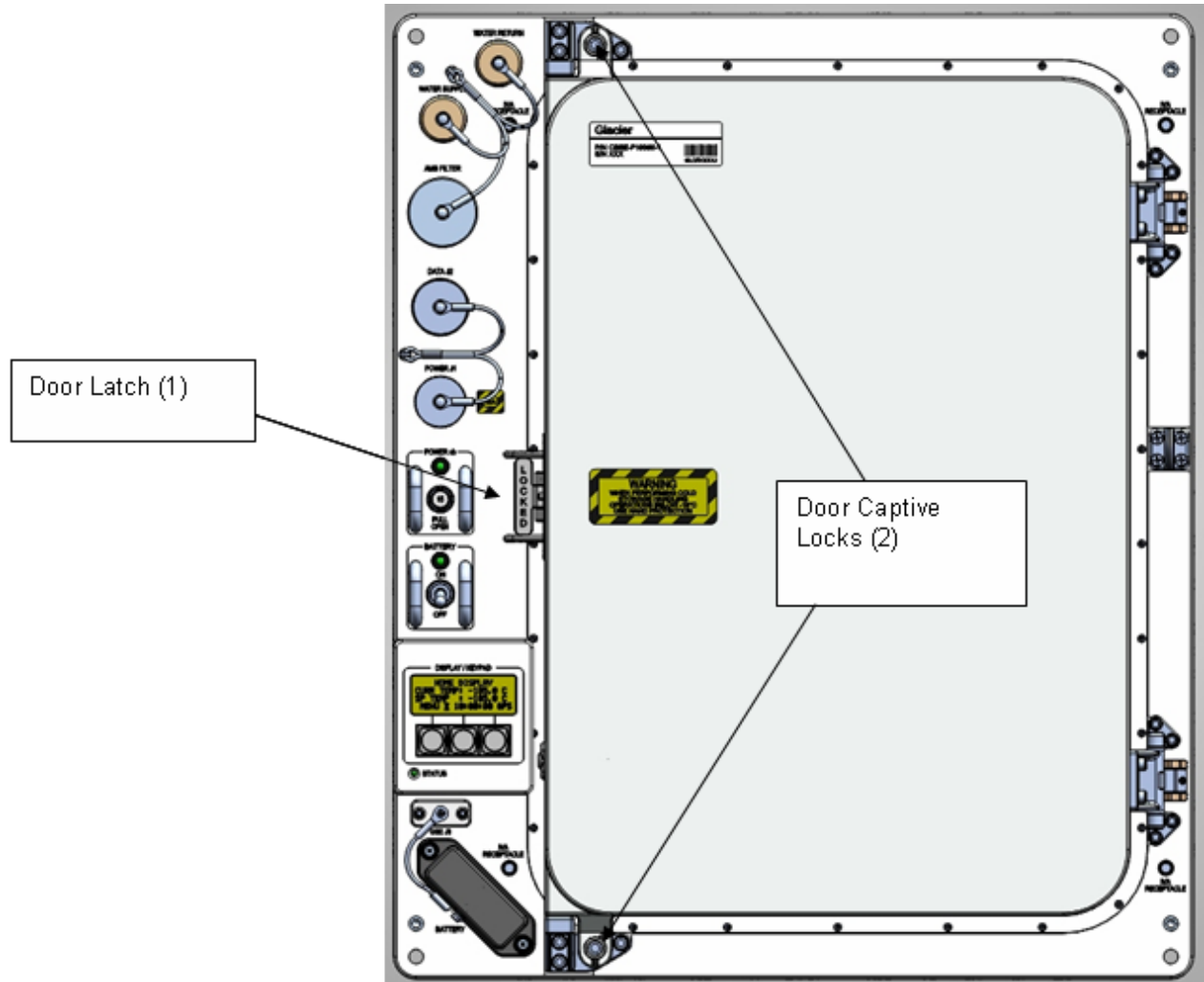


Figure 1. Glacier Configuration

1.2 Temporarily Stow Tools

MELFI 2. PACKING MELFI SAMPLES INTO DOUBLE COLDBAG

**WARNING**

Protective Gloves must be worn when manipulating MELFI trays or samples to prevent injury to exposed skin.

**CAUTION**

1. Minimize exposure of MELFI trays, frozen Ice Bricks, and samples to ambient air to prevent increased sample temperatures.

2. Double Coldbag lid should remain closed when the internal volume is not being accessed.

NOTE

The 60 seconds and 45 minutes MELFI Dewar opening rules do not apply during packing of the Coldbag.

2.1 Don Light Duty Cryo Gloves (Mechanix Wear).

2.2 Pack Double Coldbag in sequence per Table 1.

\*\*\*\*\*  
\*  
\* If MELFI Tray is stuck  
\*  
\* | Insert Small Coldplate/Wireway Cover completely between  
\* | Tray and Dewar wall.  
\*  
\* | Firmly holding both Small Coldplate/Wireway Cover and  
\* | Tray Handle, remove Tray from Dewar.  
\*  
\*\*\*\*\*

Table 1. Double Coldbag Configuration.

Step	From MELFI Location*	Description
1	MELFI-1 3-B-1	Install Icepac belt -32°C on bottom
2	MELFI-1 1-D-3,4	Insert JAXA Myco Kits (all) and JAXA Microbe-II (all)
3	MELFI-1 2-A-3,4	Insert CSA Vascular Blood Mesh Bags (two) (BLOOD ONLY, leave Urine mesh bags)
4	MELFI-1 2-B-3,4	Insert HRP Blood mesh bag (all)
5	MELFI-1 2-D-3,4	Insert HRP Blood mesh bag (all), and ESA SOLO (all)
6	MELFI-1 3-B-1	Install Icepac belt -32°C on top
<i>Transfer DCB to MELFI-2 for remaining samples. Place remaining samples removed from MELFI-2 underneath top icepac.</i>		
6	MELFI-2 1-C-3,4	Insert HRP Urine mesh bag (all)
7	MELFI-2 1-D-3,4	Insert HRP Urine mesh bag (all)

\* Dewar-Tray-Tray Section (3-A-1 = Dewar 3, Tray A, Tray Section 1)

3. TRANSFERRING DOUBLE COLDBAG FROM ISS TO SHUTTLE

ISS to Shuttle

3.1 Transfer Double Coldbag to Shuttle middeck.

MF28E/G Glacier

4. UNPACKING DOUBLE COLDBAG AND INSERTING SAMPLES INTO GLACIER

**WARNING**

Protective Gloves must be worn when handling frozen samples or manipulating inner doors, cold trays or samples in Glacier to prevent injury to exposed skin.

<b>CAUTION</b>
1. Minimize exposure of Glacier trays and samples to ambient air to prevent increased sample temperatures.
2. Glacier inner doors should remain closed when the internal volume is not being accessed.

- 4.1 Don Light Duty Cryo Gloves (Mechanix Wear)
- 4.2 Open Glacier
- 4.3 Distribute all of the science removed from the Double Coldbag into Glacier Trays A, B, C, and D.

5. CONFIGURING GLACIER FOR DESCENT

- 5.1 ✓ Glacier door – Closed
  - \*\*\*\*\*
  - \* If Glacier outer door does not close,
  - \* | Press on top left corner and bottom left corner of door to
  - \* | assist with closure.
  - \* |
  - \*\*\*\*\*

- 5.2 ✓ Glacier door latch – Locked (finger latches fully spread apart and locking flap positioned between finger latches)

<b>WARNING</b>
Glacier Door Captive Locks (two) must be torqued to 70 to 75 in-lbs to prevent door from opening during launch and return.

- 5.3 Fasten Glacier Door Captive Locks (two), torque to 70 to 75 in-lbs (3/16" Hex Head, 3/8" Drive, 1/4" - 3/8" Adapter, 1/4" drive, 4" Ext, 1/4" Drive, (40 to 200 in-lbs) Trq Wrench 1/4" Drive). Refer to Figure 1.

6. DRYING OUT ICE BRICKS

<b>WARNING</b>
Protective Gloves must be worn when handling frozen ice bricks to prevent injury to exposed skin.

- 6.1 Don Light Duty Cryo Gloves (Mechanix Wear)
- 6.2 Remove Ice Brick -32° C (two) from Double Coldbag and place in temporary stowage location to air dry. Temporarily stow Double Coldbag in a location protected from kick loads



# ULF5 DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/ULF5/FIN)

Page 5 of 5 pages

6.3 Notify **MCC-H** that transfer activity completed, dry out location for Ice Bricks and Double Coldbag location.

7. Stow:  
Light Duty Cryo Gloves  
Small Coldplate/Wireway Cover

8. GROUND UPDATES FOR IMS

Ground updates IMS for the following parts:

Double Cold Bag S/N 1007 TO: per crew call down (step 6.2)

Ice Brick -32° C (two) TO: per crew call down (step 6.2)

ESA CARD (one Urine Ziplock, one blood mesh bag) TO: Middeck Glacier

ESA SOLO (two Urine Ziplocks, two Blood mesh bag) TO: Middeck Glacier

HRP blood (four mesh bags) TO: Middeck Glacier

HRP urine (thirty mesh) TO: Middeck Glacier

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# GLACIER CONFIGURATION FOR DESCENT

(ASSY OPS/ULF5/FIN 1)

Page 1 of 2 pages

## OBJECTIVE:

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

## TOOLS

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

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

4" Extension, 1/4" Drive

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

1. ✓cb POWER – Close (It on)
2. ✓sw BATTERY – ON (It on)

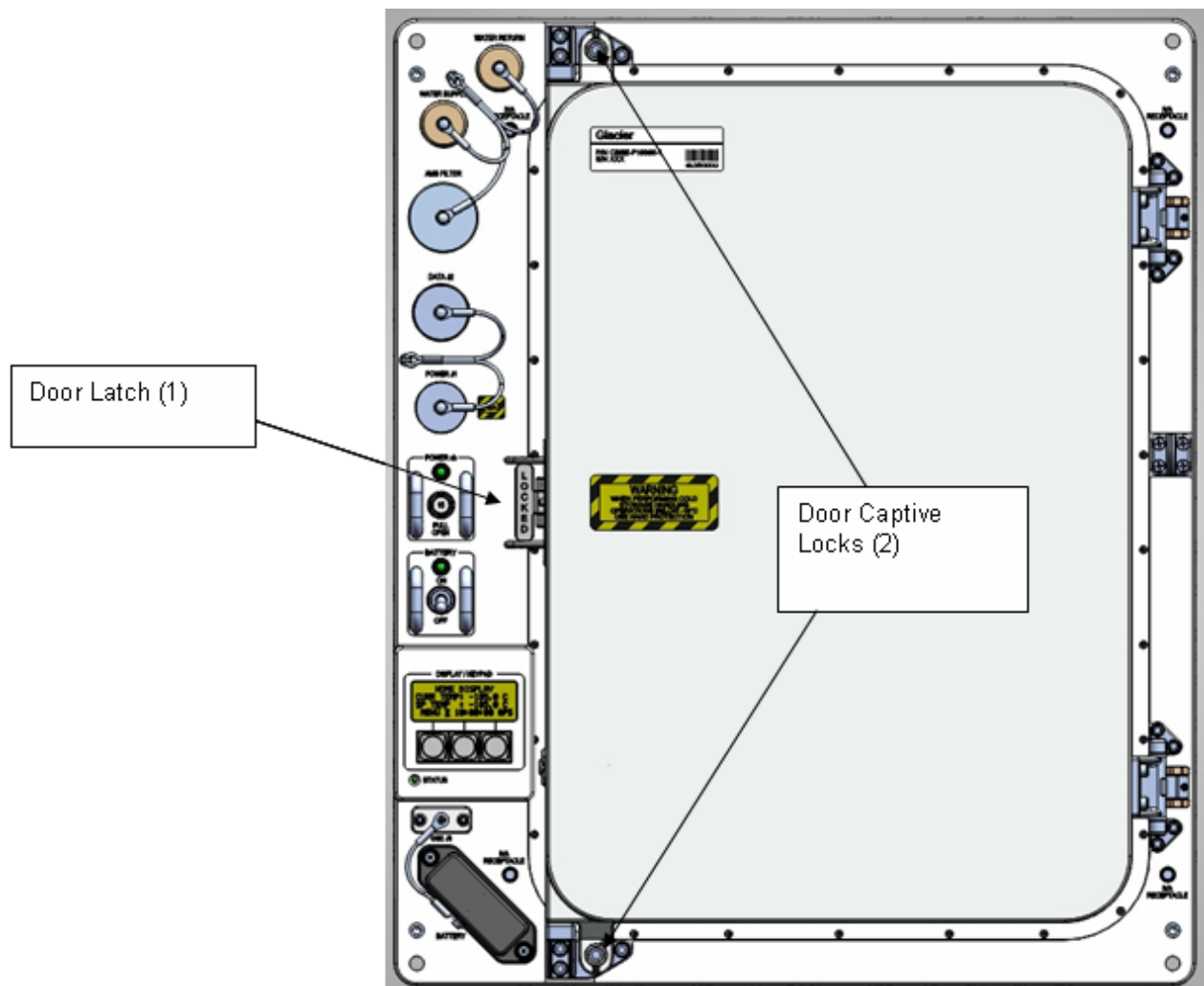


Figure 1. Glacier Configuration

3. ✓Glacier door is fully closed.

# GLACIER CONFIGURATION FOR DESCENT

(ASSY OPS/ULF5/FIN 1)

Page 2 of 2 pages

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

4. ✓Door Latch – Locked (Finger latches fully spread apart and locking flap positioned between finger latches.)

<b>WARNING</b>
Glacier Door Captive Locks (two) must be torqued to 70-75 in-lbs for safety purposes.

5. Fasten Glacier Door Captive Locks (two), torque to 70-75 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 to 200 in.-lbs.) Trq Wrench 1/4" Drive. Refer to Figure 1.
6. Notify **MCC-H** Glacier Config for Descent is complete.
7. Stow tools as required to original locations.

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 30 minute limit for ISS unit when temp set point warmer than -95°C (or 120 minutes when temp set point is -95°C or colder).

- LAB101\_G 1. Verify front door locking flap is positioned between finger latches.  
1 (Glacier)

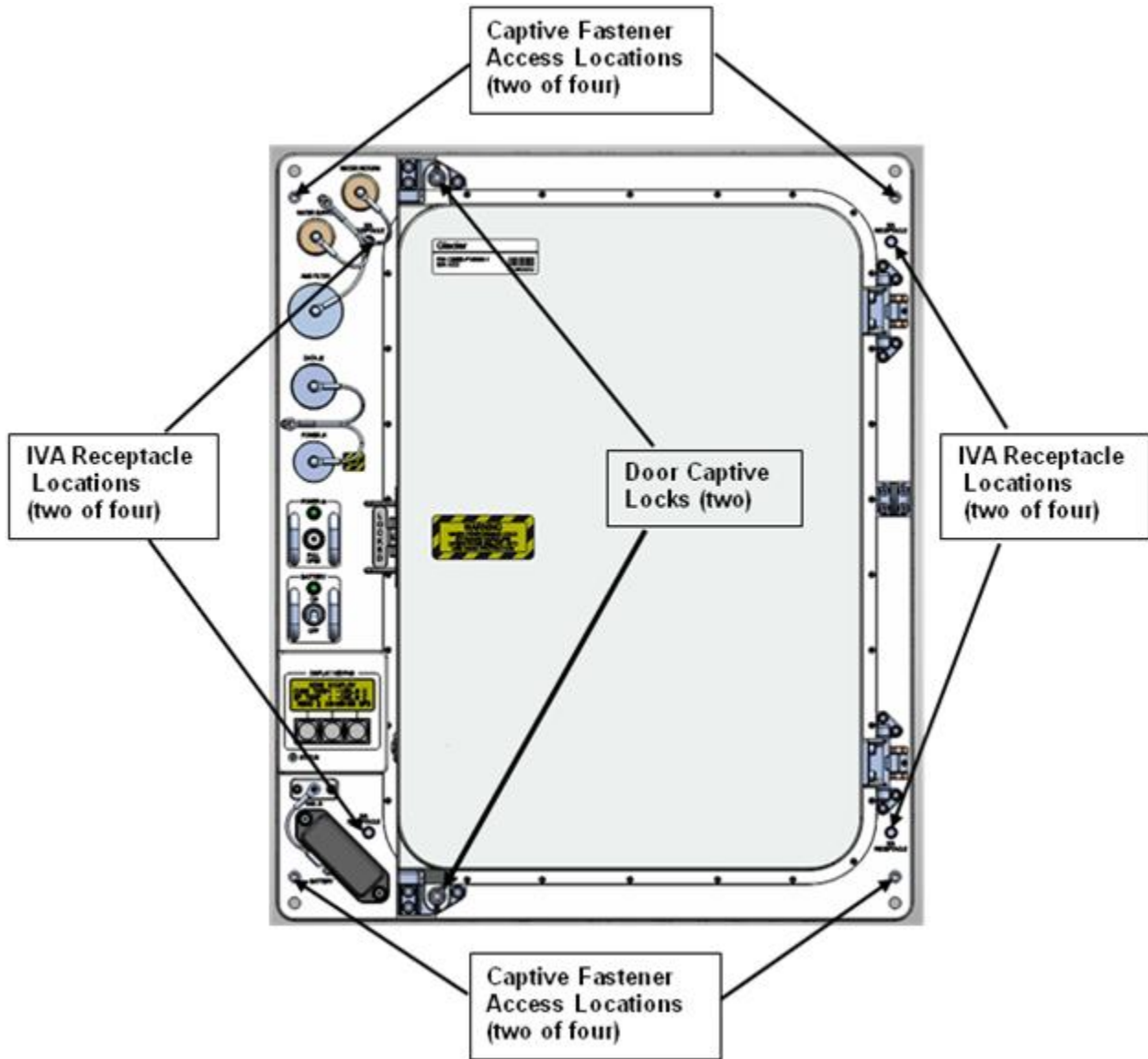


Figure 1. Glacier Fasteners.

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 (SODF: ASSY  
* | OPS: PAYLOADS), 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.

<p><u>NOTE</u></p> <p>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.</p>
---

- 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

- Glacier 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).

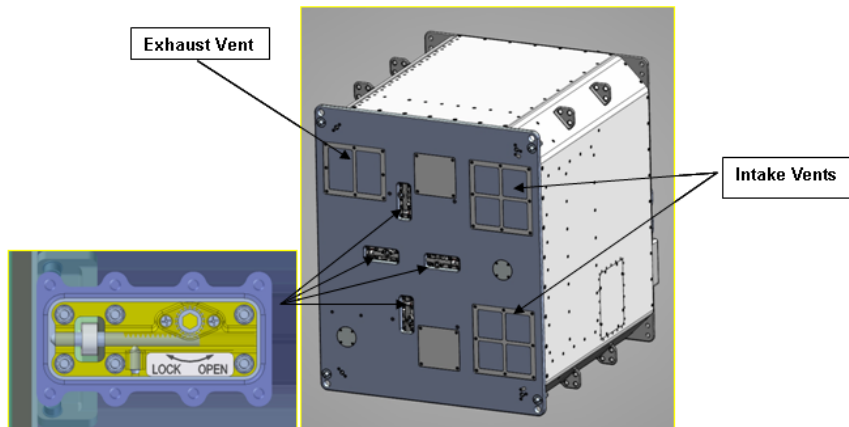


Figure 2. Cryocooler Launch Locks and Vents on Rear of Glacier.

- 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 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  
\*  
\*\*\*\*\*

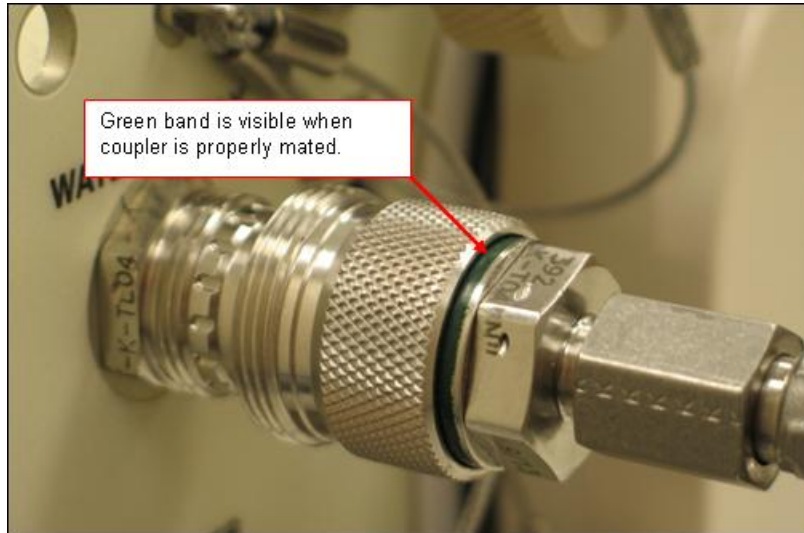


Figure 4. Properly mated small QD connector.

Verify no leakage at connectors

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

LAB101\_F1 14. sw LOCKER-4 POWER → ON (It on)

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

<p><b>NOTE</b></p> <p>1. Glacier power up occurs when POWER cb is closed.</p> <p>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<br>1 | 17. Fasten Glacier fasteners (four) in a diagonal pattern into EXPRESS-2 Rack, 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:<br>All IVA Tools   |
|               | 22. Notify <b>MCC-H</b> Glacier ISS-STTS TRANSFER is complete and provide power-off time from step 4.2: _____; power-on time from step 19: _____; and CURR TEMP from step 20: _____.           |

# GLACIER SWAP - SHUTTLE

(ASSY OPS/ULF5/FIN 1)

Page 1 of 5 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) (Crew preference)

## TOOLS:

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

## STS IFM Toolbox (MF28K):

1/4" Socket, 1/4" Drive

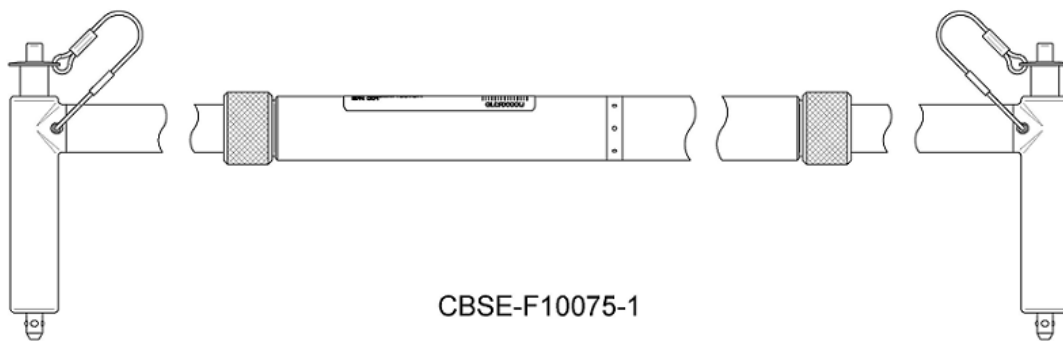
Ratchet, 1/4" Drive

(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 30 minute limit for ISS unit when temp set point warmer than  $-95^{\circ}\text{C}$  (or 120 minutes when temp set point to  $-95^{\circ}\text{C}$  or colder).

- MA16F/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 and 2.



**Figure 1. Glacier IVA Handle.**

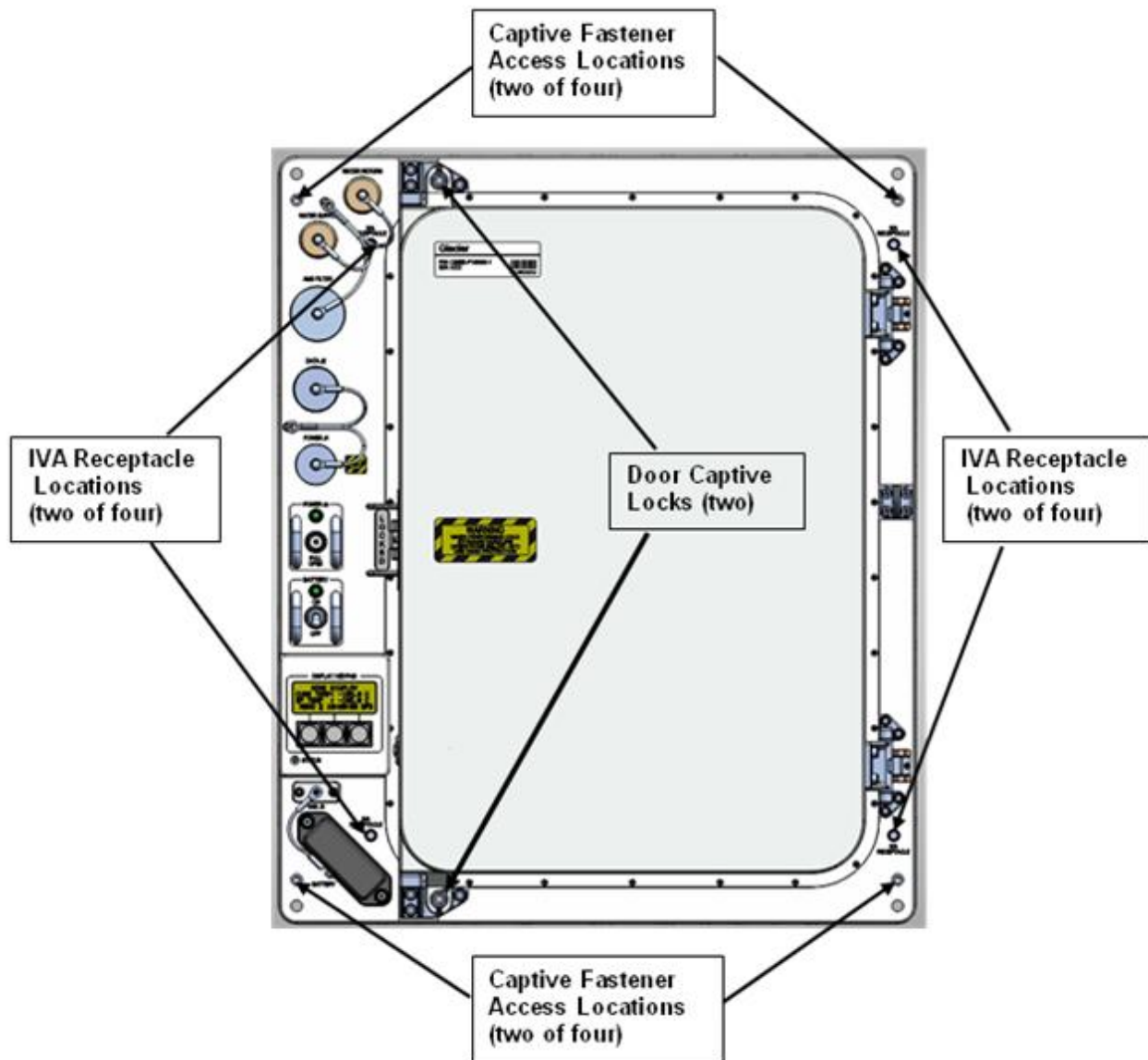


Figure 2. Glacier Configuration.

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 2 →Open

8. REMOVING GLACIER FROM MIDDECK AND TRANSFER

MA16F/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).

MA16F/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 2 – Open

MA16F/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 2 → Close

NOTE

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

MA16F/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:  
\*  
\*\*\*\*\*

<b>WARNING</b>
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.

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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)

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

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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.

CAUTION
Due to possible loss of experiment payload(s), Glacier should not be shutdown for more than 30 minutes when temp set point warmer than -95° C (or 120 minutes when temp set point is -95° C or colder), 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:E 12. If MF28E/G  
|      cb MNB MAR 1 → op  
  
If MA16F/G  
|      cb MNB MAR 2 → op
13. Notify **MCC-H** of recorded data and time in step 2.

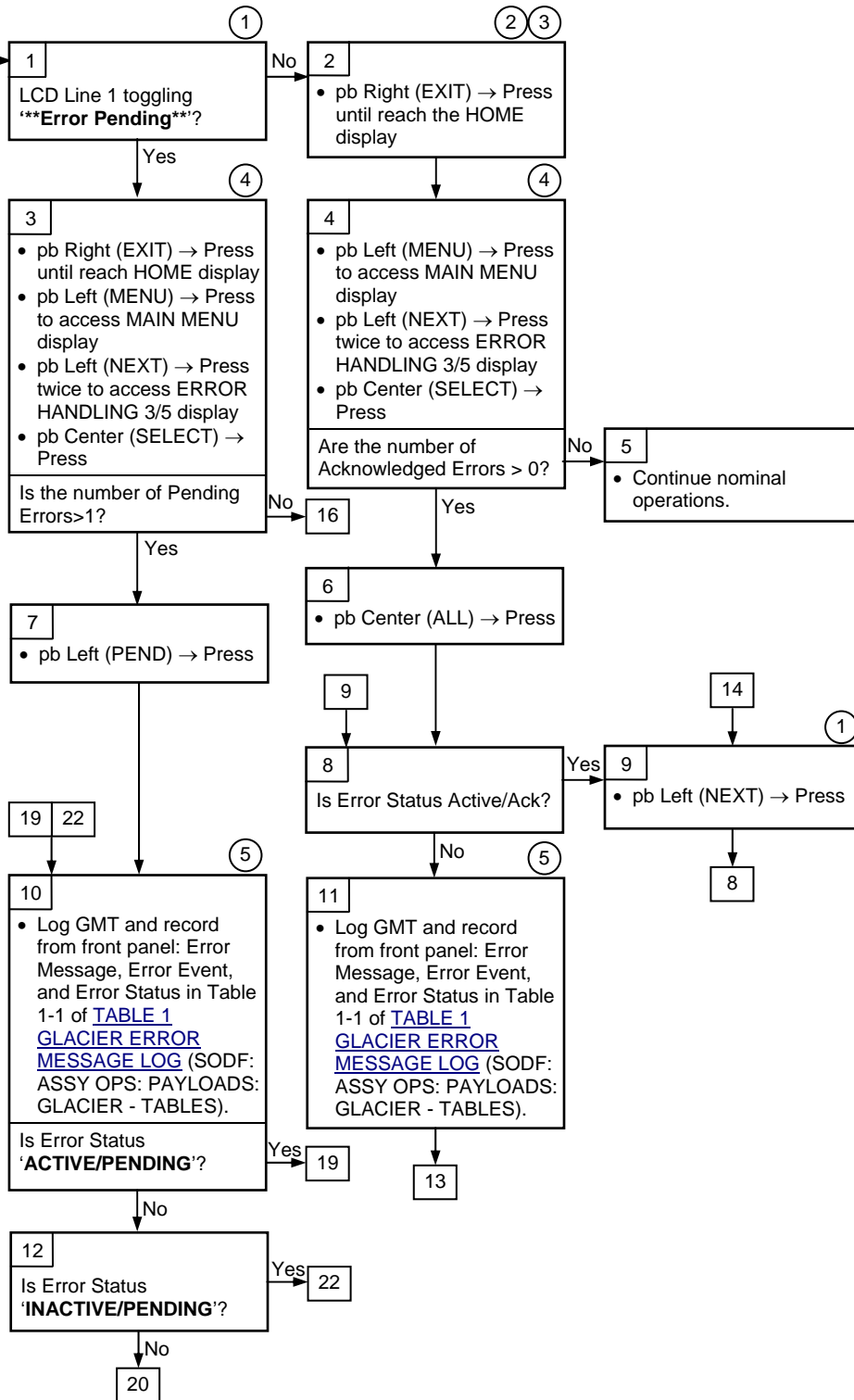
# GLACIER

## GLACIER ERROR MESSAGE

(ASSY OPS/ULF5/FIN 1) Page 1 of 16 pages

Glacier System Error

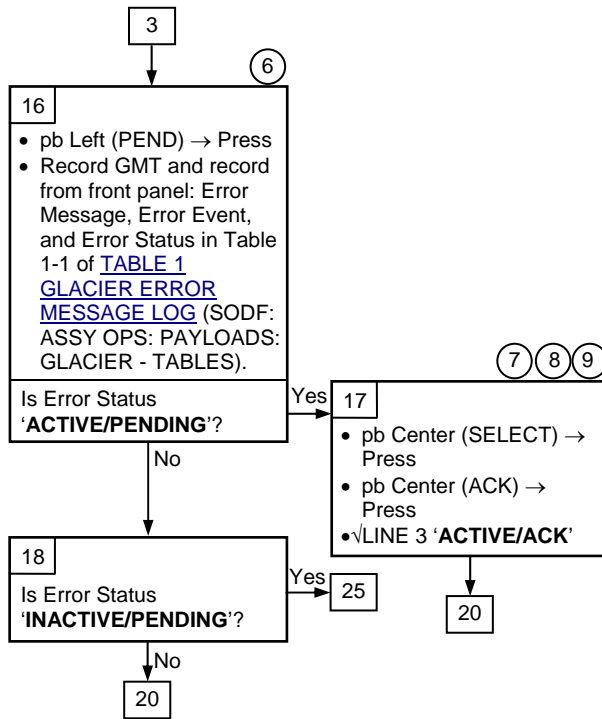
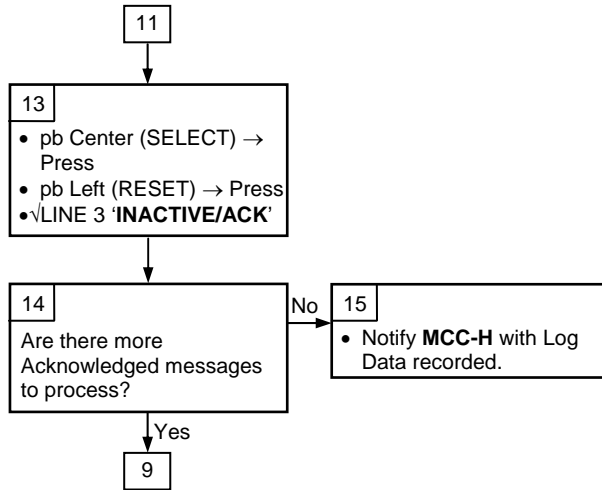
**Nominal Config:**  
 cb POWER – Close (It on)  
 sw BATTERY – ON (It on)  
 (ML86B:E)  
 If MF28E/G  
 cb MNB MAR 1 – cl  
 If MA16F/G  
 cb MNB MAR 2 – cl



- ① Notify **MCC-H** if AOS, otherwise proceed.
- 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 Watch (wrist).

GLACIER ERROR MESSAGE

(ASSY OPS/ULF5/FIN 1) Page 2 of 16 pages



6 A Glacier Record Diagnostic Data (as applicable) procedure may be performed to capture states of key data elements per MCC-H direction.

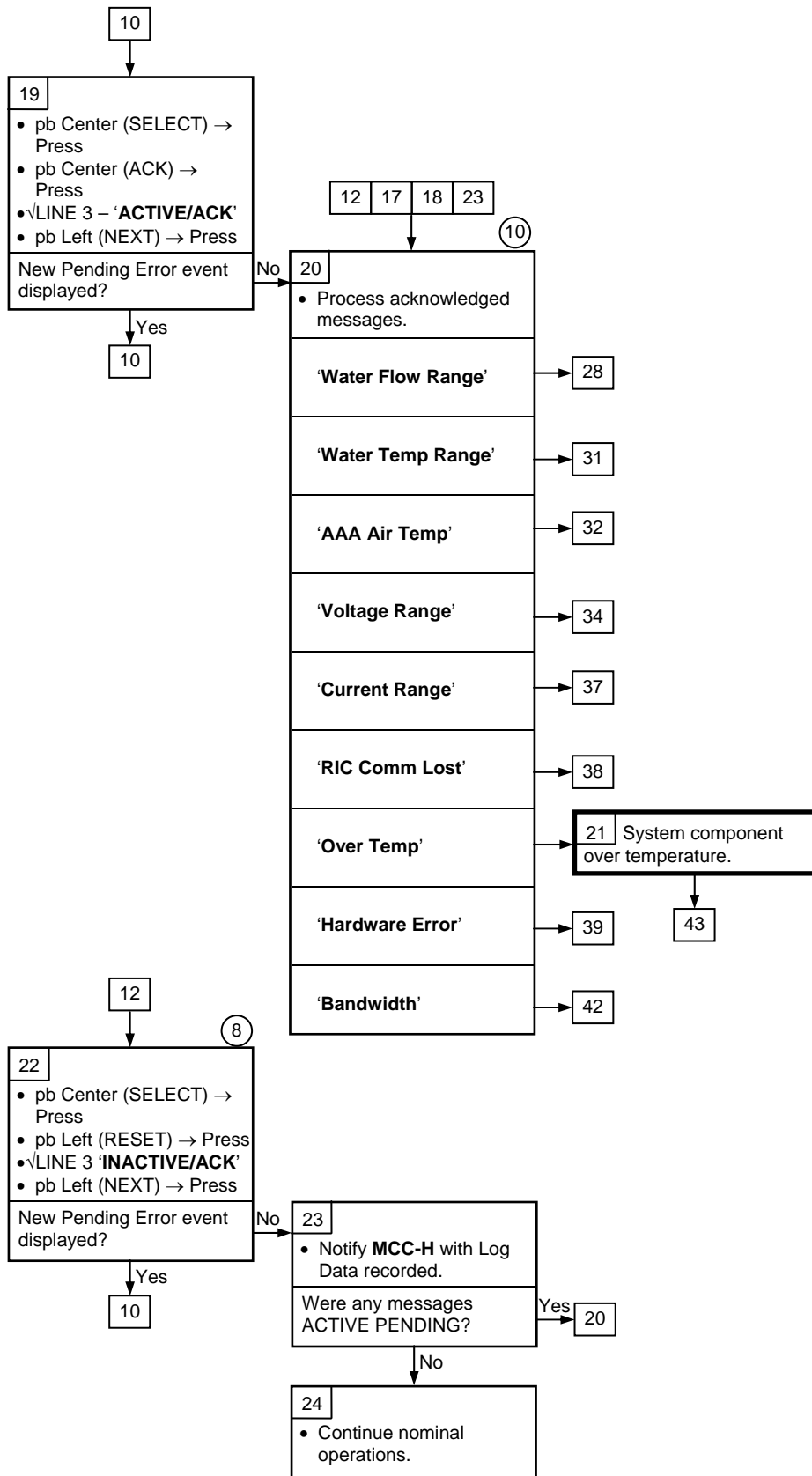
7 Power cycle requires MCC-H approval. Note: Set Point temperature control mode will require initialization upon restart.

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

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



**GLACIER ERROR MESSAGE**

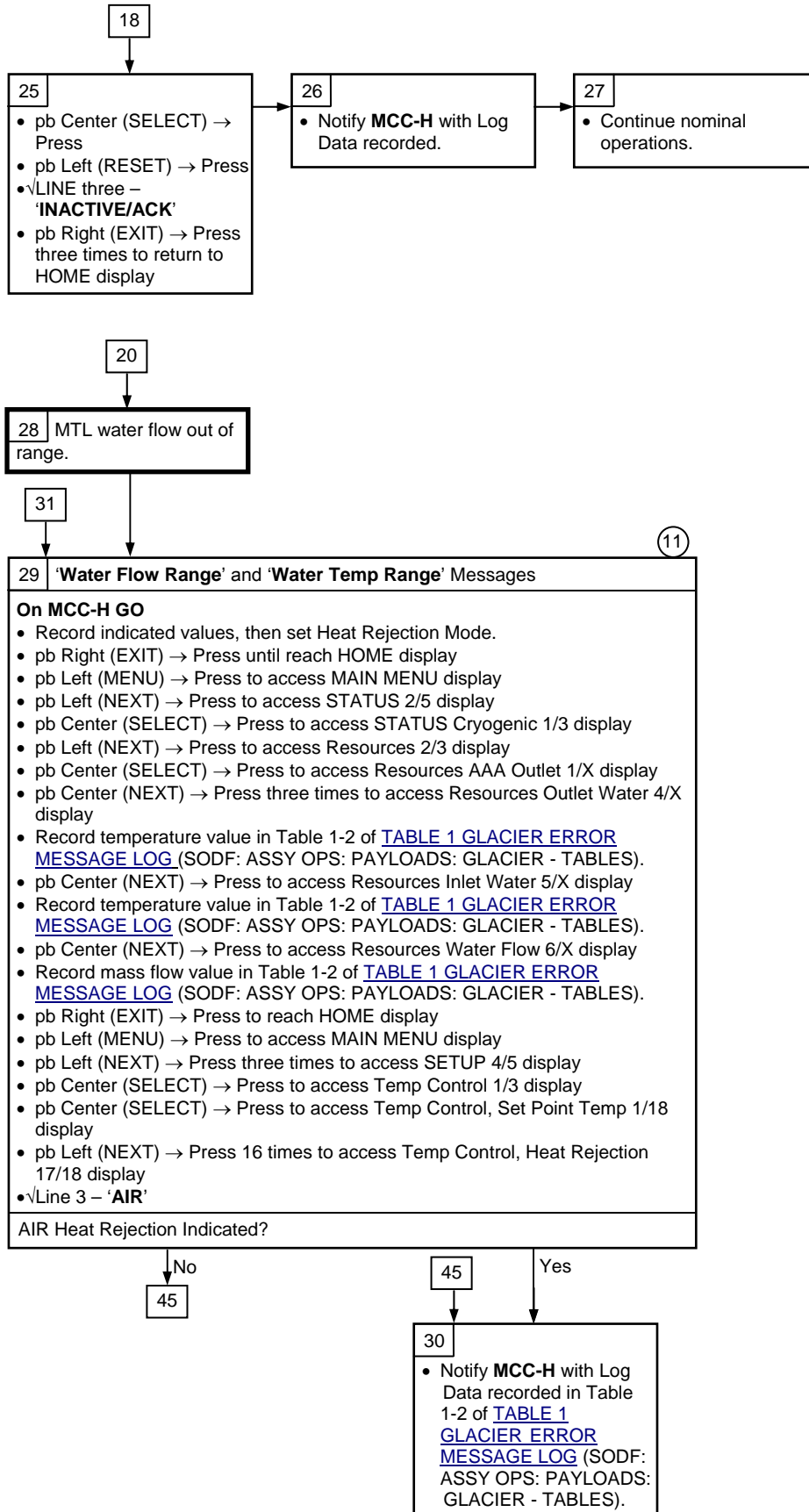


⑧ Software errors may not reset or may be persistent due to the following: Frequent intermittent power failure, Single Event Upset, or Electromagnetic interference.

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

**GLACIER ERROR MESSAGE**

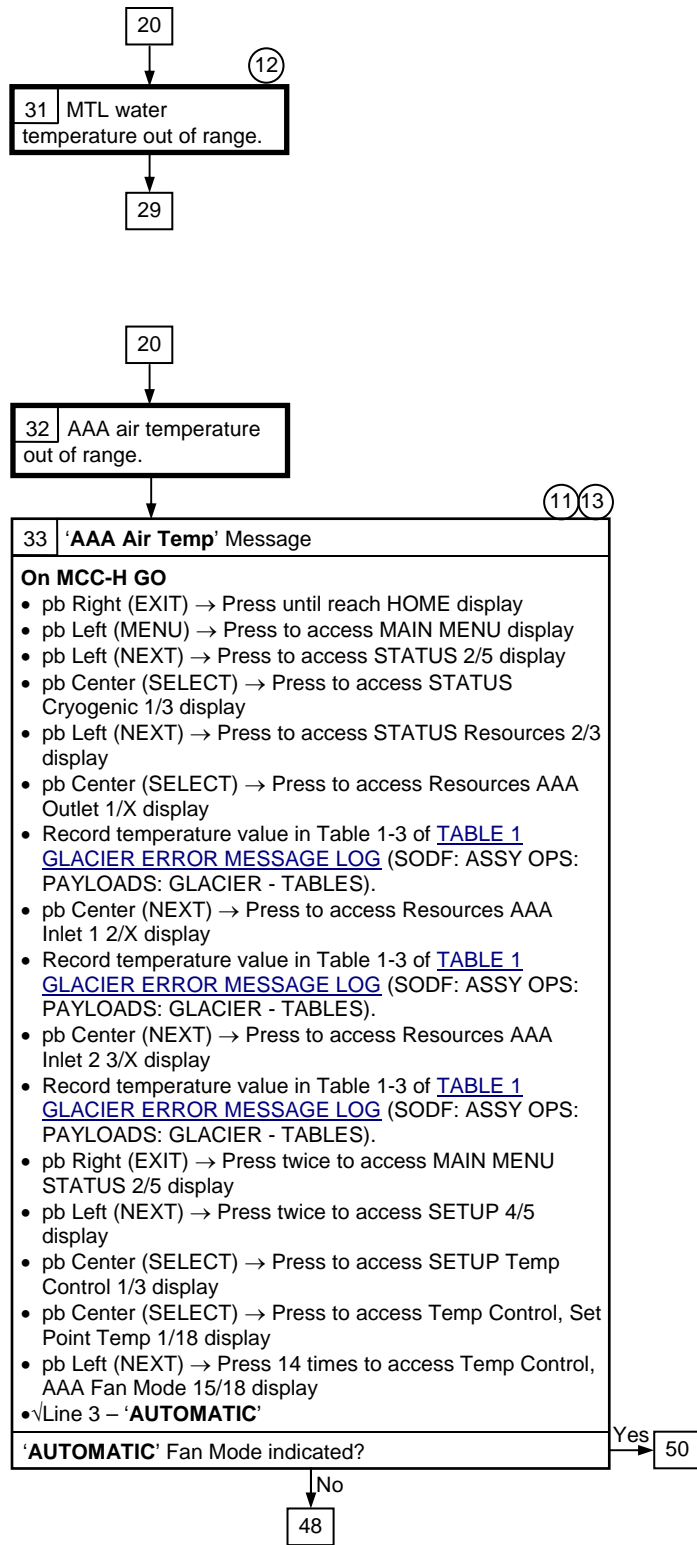
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**11**  
 If Glacier S/N = 003,  
 X = 8; otherwise,  
 X = 10.

**GLACIER ERROR MESSAGE**

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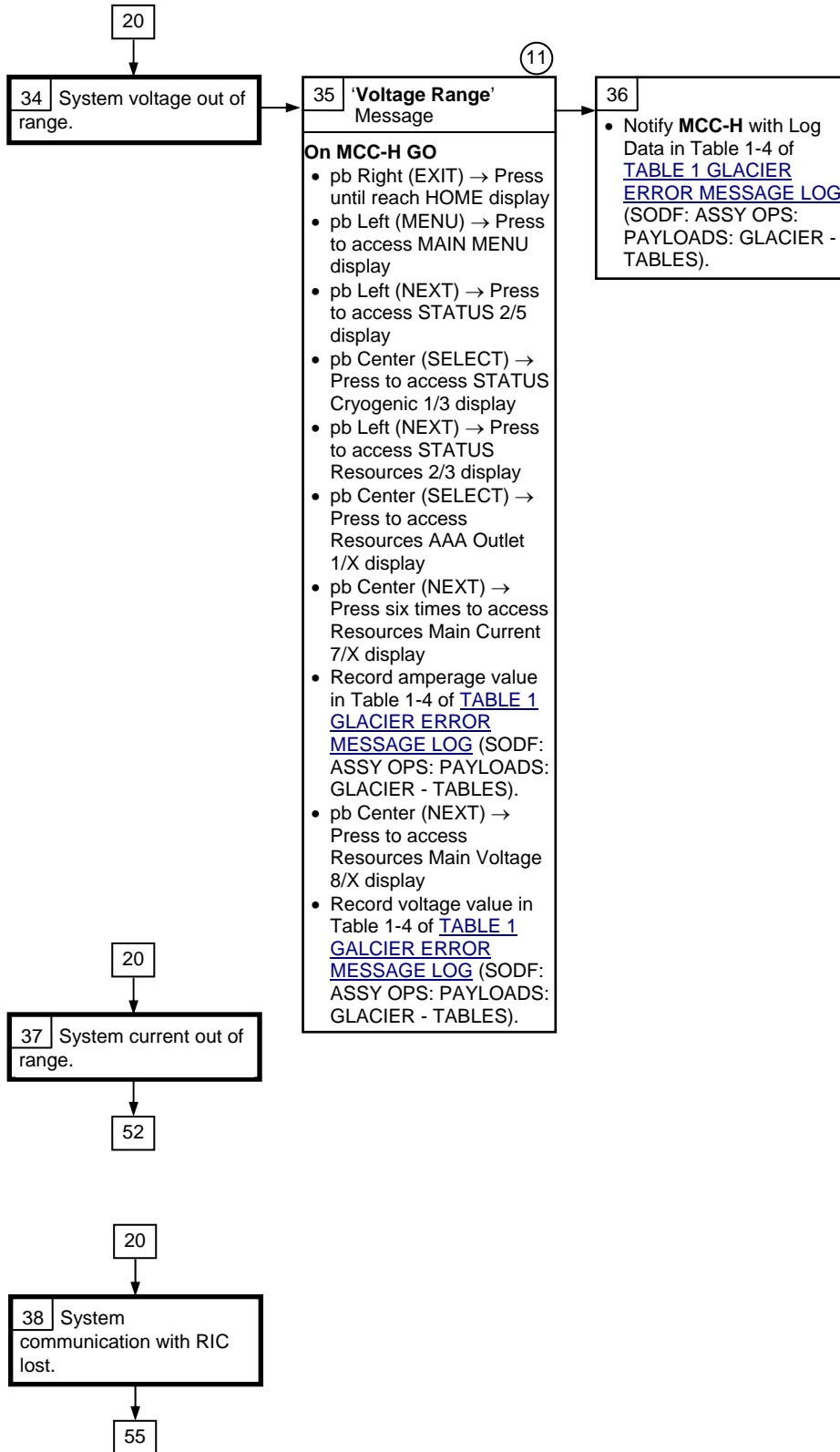
①  
If Glacier S/N = 003, X = 8; otherwise, X = 10.

②  
AAA Air Temp value may take a long time to reflect change in fan mode.

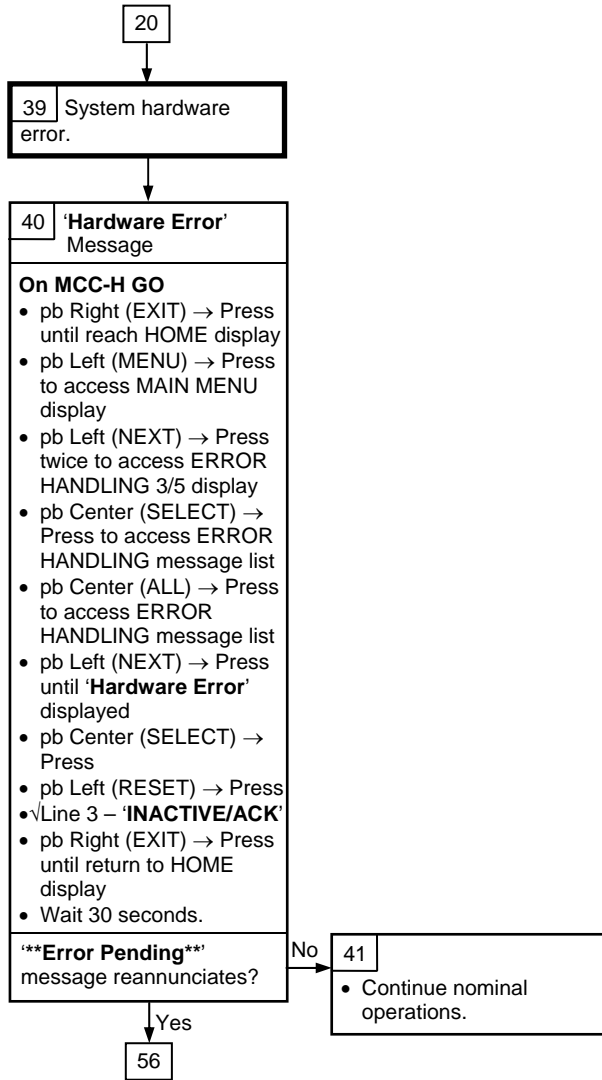
③  
**MCC-H** will evaluate Av Bay temps.

**GLACIER ERROR MESSAGE**

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**11**  
 If Glacier S/N = 003, X = 8; otherwise, X = 10.



**GLACIER ERROR MESSAGE**

(ASSY OPS/ULF5/FIN 1) Page 8 of 16 pages

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42	<b>'Bandwidth' Message</b>
<ul style="list-style-type: none"> <li>• Record indicated values.</li> <li>• pb Right (EXIT) → Press until reach HOME display</li> <li>• Record from Front Panel CURR TEMP, SET POINT, GPS values in Table 1-6 of <a href="#">TABLE 1 GLACIER ERROR MESSAGE LOG</a> (SODF: ASSY OPS: PAYLOADS: GLACIER - TABLES).</li> <li>• pb Left (MENU) → Press once until QUICK STATUS 1/5</li> <li>• pb Center (CENTER) → Press once until QUICK STATUS Cold Head 1A 1/16</li> <li>• Record value in Table 1-6 of <a href="#">TABLE 1 GLACIER ERROR MESSAGE LOG</a> (SODF: ASSY OPS: PAYLOADS: GLACIER - TABLES).</li> <li>• pb Center (NEXT) → Press once until QUICK STATUS Cold Head 1B 2/16</li> <li>• Record value in Table 1-6 of <a href="#">TABLE 1 GLACIER ERROR MESSAGE LOG</a> (SODF: ASSY OPS: PAYLOADS: GLACIER - TABLES).</li> <li>• pb Center (NEXT) → Press once until QUICK STATUS Cold Head 2A 3/16</li> <li>• Record value in Table 1-6 of <a href="#">TABLE 1 GLACIER ERROR MESSAGE LOG</a> (SODF: ASSY OPS: PAYLOADS: GLACIER - TABLES).</li> <li>• pb Center (NEXT) → Press once until QUICK STATUS Cold Head 2B 4/16</li> <li>• Record value in Table 1-6 of <a href="#">TABLE 1 GLACIER ERROR MESSAGE LOG</a> (SODF: ASSY OPS: PAYLOADS: GLACIER - TABLES).</li> <li>• pb Center (NEXT) → Press nine times until QUICK STATUS CircFan Speed 13/16</li> <li>• Record value in Table 1-6 of <a href="#">TABLE 1 GLACIER ERROR MESSAGE LOG</a> (SODF: ASSY OPS: PAYLOADS: GLACIER - TABLES).</li> <li>• pb Right (EXIT) → Press until HOME display</li> <li>• Notify <b>MCC-H</b> to report log values from Table 1-6 of <a href="#">TABLE 1 GLACIER ERROR MESSAGE LOG</a> (SODF: ASSY OPS: PAYLOADS: GLACIER - TABLES) and receive further direction.</li> </ul>	

**GLACIER ERROR MESSAGE**

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14

43 'Over Temp' Message

**On MCC-H GO**

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

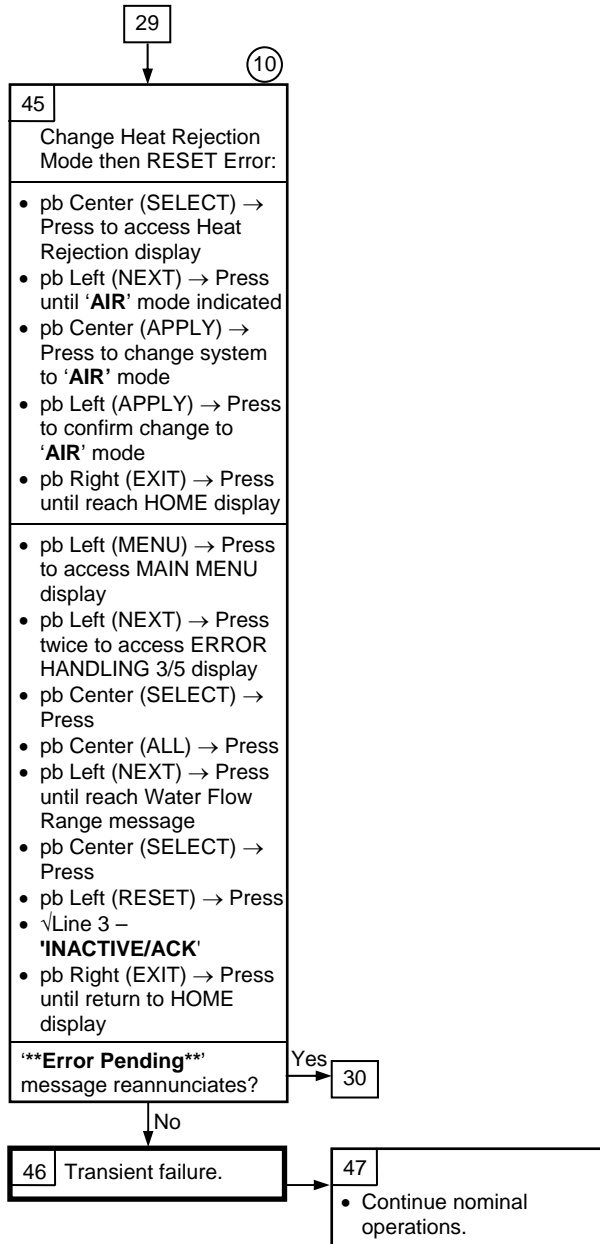
44

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

14

If Glacier S/N = 003, X = 9; otherwise, X = 13.

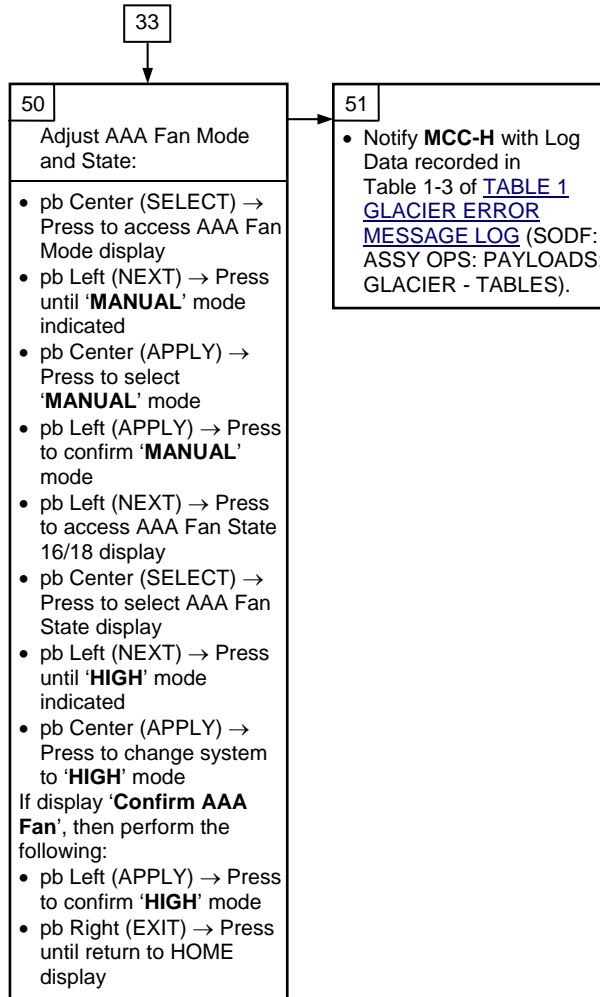
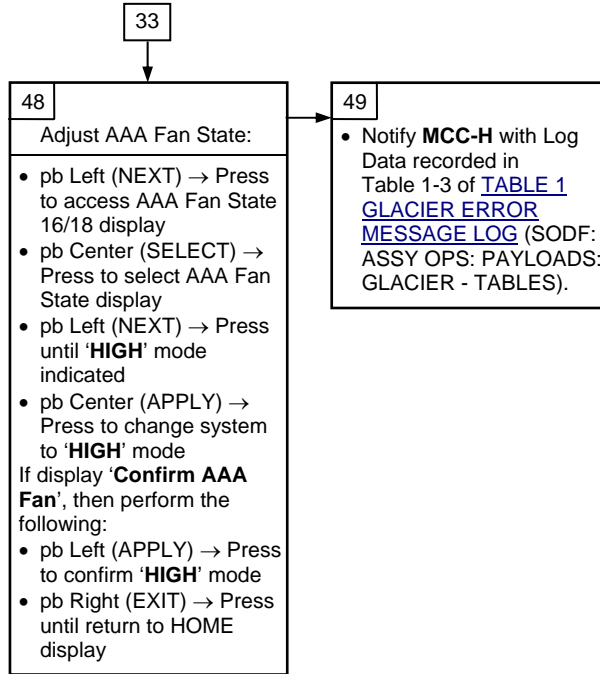
**GLACIER ERROR MESSAGE**



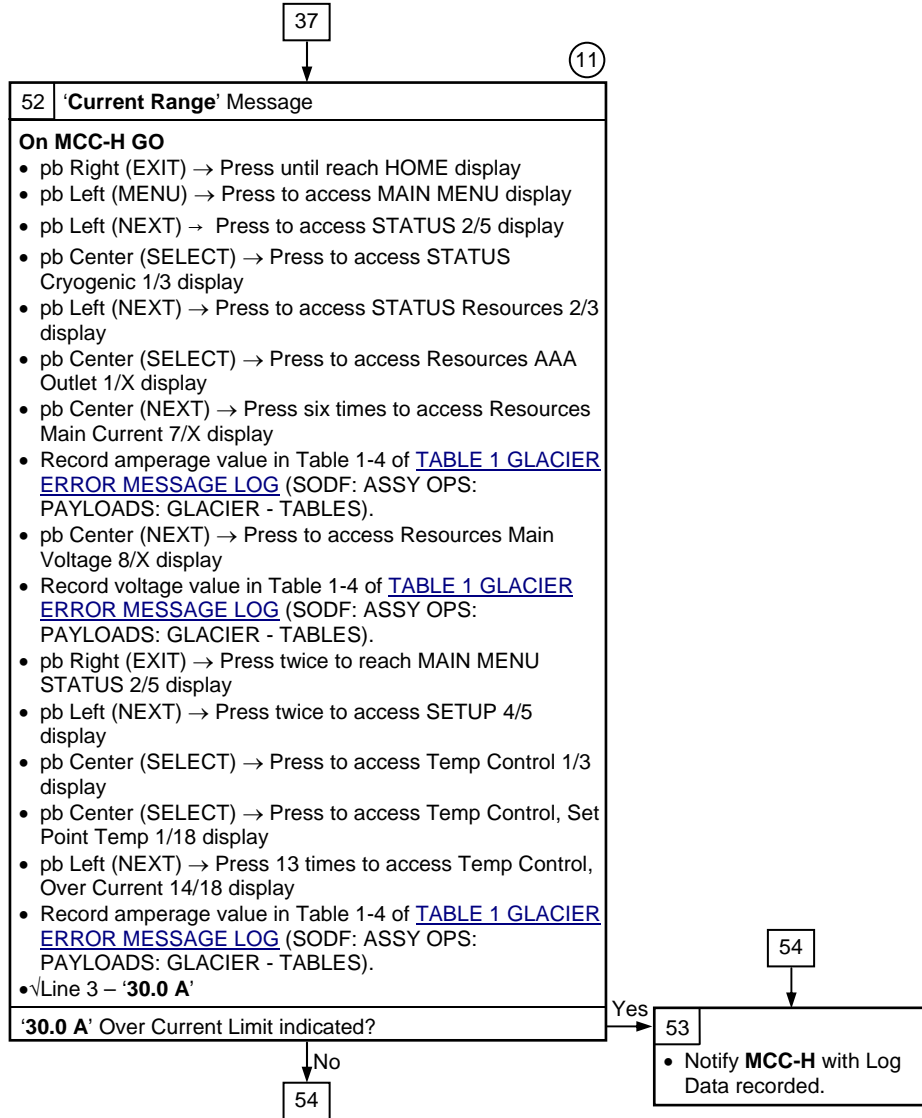
⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'.

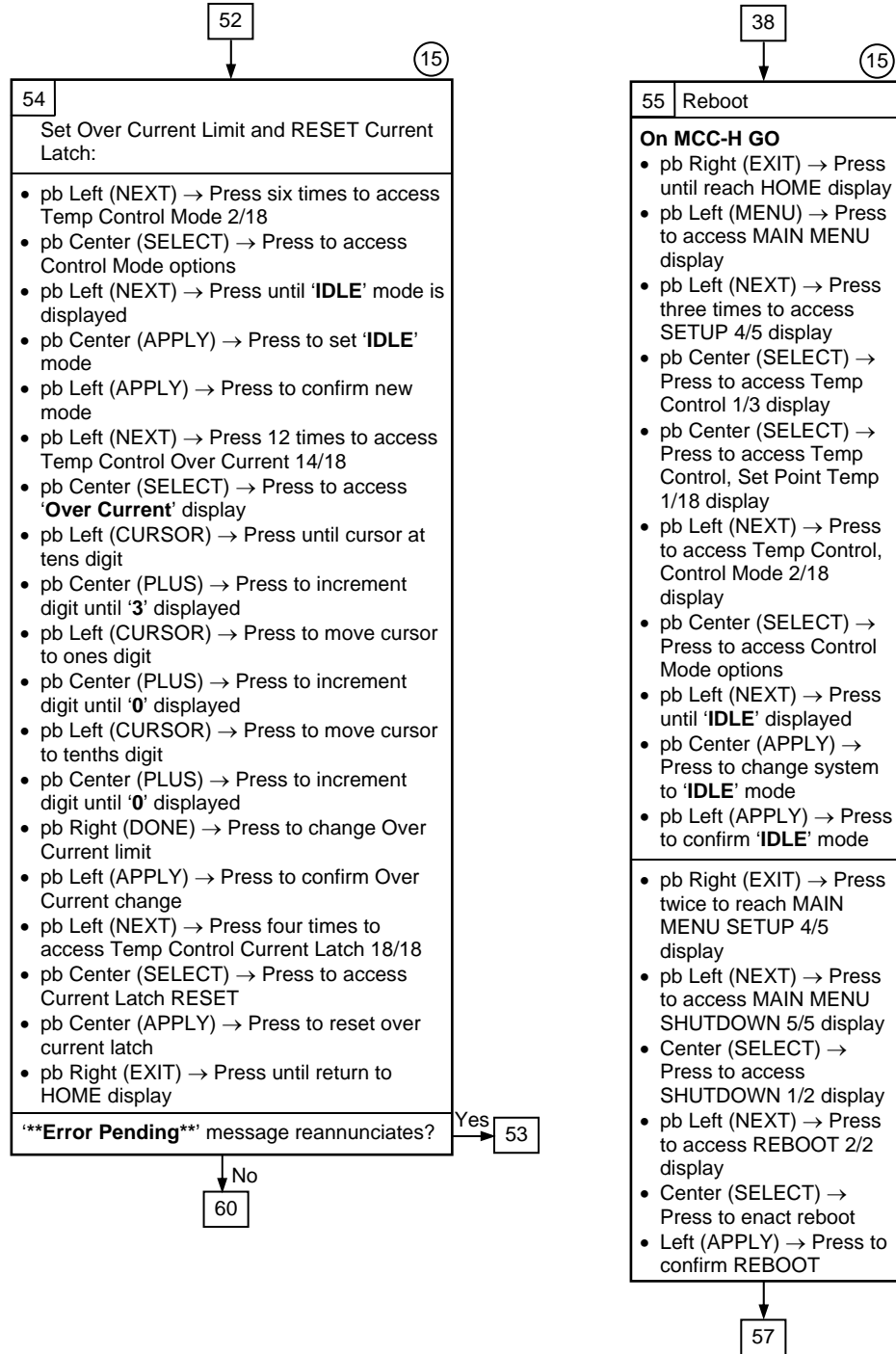


**GLACIER ERROR MESSAGE**



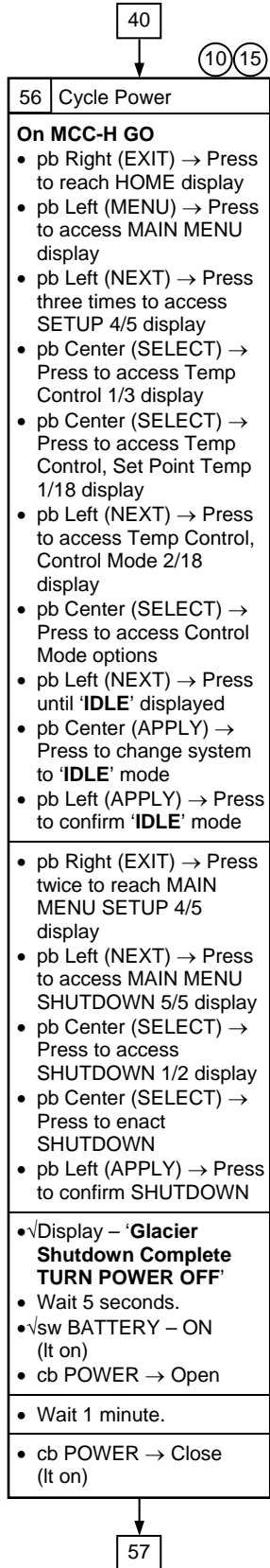
①  
If Glacier S/N = 003,  
X = 8; otherwise,  
X = 10.





**GLACIER ERROR MESSAGE**

(ASSY OPS/ULF5/FIN 1) Page 14 of 16 pages



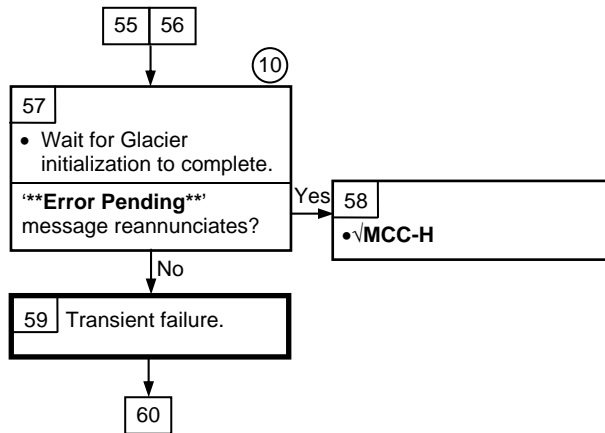
⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'.

⑮ If parameters already set, the confirmation screen will not be displayed.

**GLACIER**

**GLACIER ERROR MESSAGE**

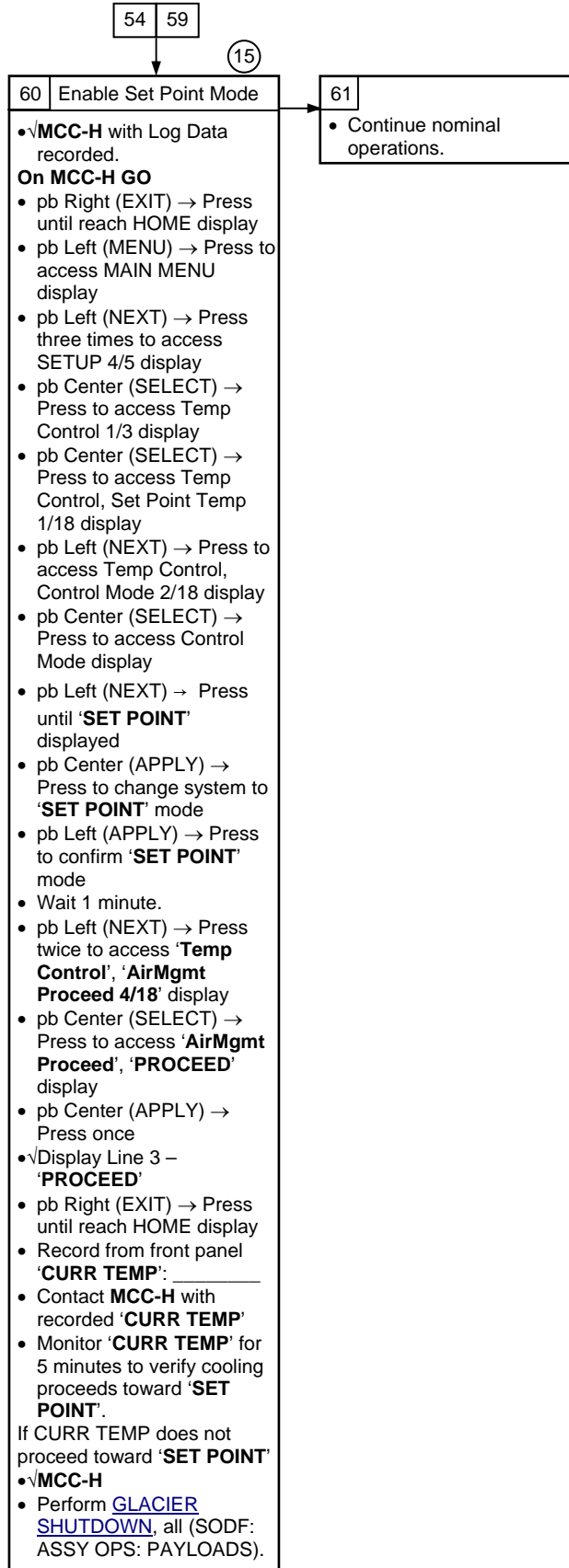
(ASSY OPS/ULF5/FIN 1) Page 15 of 16 pages



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

**GLACIER ERROR MESSAGE**

(ASSY OPS/ULF5/FIN 1) Page 16 of 16 pages



(15)  
If parameters already set, the confirmation screen will not be displayed.

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF5/FIN 1)

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), 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)

### 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)

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)

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 1)

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- 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 1)

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:

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF5/FIN 1)

Page 5 of 9 pages

'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 1)

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 1)

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), 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)
- 12.2 Notify **MCC-H** of logged values in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS)

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**Glacier**

**GLACIER FAIL TO REPOWER**

(ASSY OPS/ULF5/FIN 1) Page 1 of 3 pages

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:E)  
 If MF28E/G  
 cb MNB MAR 1- cl  
 If MA16F/G  
 cb MNB MAR 2- cl

① ②

1 Switch to Alternate Power Source

- Contact **MCC-H** for alternate power source (fill in data below).
- \_\_\_\_\_

(Glacier)

- cb POWER → Open (It off)

(ML86B:E)

- If MF28E/G  
cb MNB MAR 1 → op

(ML85E)

- A/E PAYLOAD DC PWR (8') ← | → J11

- If MA16F/G  
cb MNB MAR 2 → op

(ML85E)

- A/E PAYLOAD DC PWR (24') ← | → J21

(Alternate Power Source J\_\_)

- ✓ cb \_\_\_\_\_ - Open
- ✓ sw \_\_\_\_\_ - OFF
- A/E PAYLOAD DC PWR (20') → | ← Alternate Power Source J

③

2 Repower from Alternate Power Source

- (\_\_\_\_\_)
- cb \_\_\_\_\_ - Close
- sw \_\_\_\_\_ - ON

(Glacier)

- cb POWER → Close (It on)

After Initialization does display read 'HOME'?

3 PRIMARY OUTLET FAILURE

4

- Record power-on time (GPS): \_\_\_\_\_
- Record power-on CURR TEMP: \_\_\_\_\_
- Record power-on SET POINT: \_\_\_\_\_
- Notify **MCC-H** of resolution and data

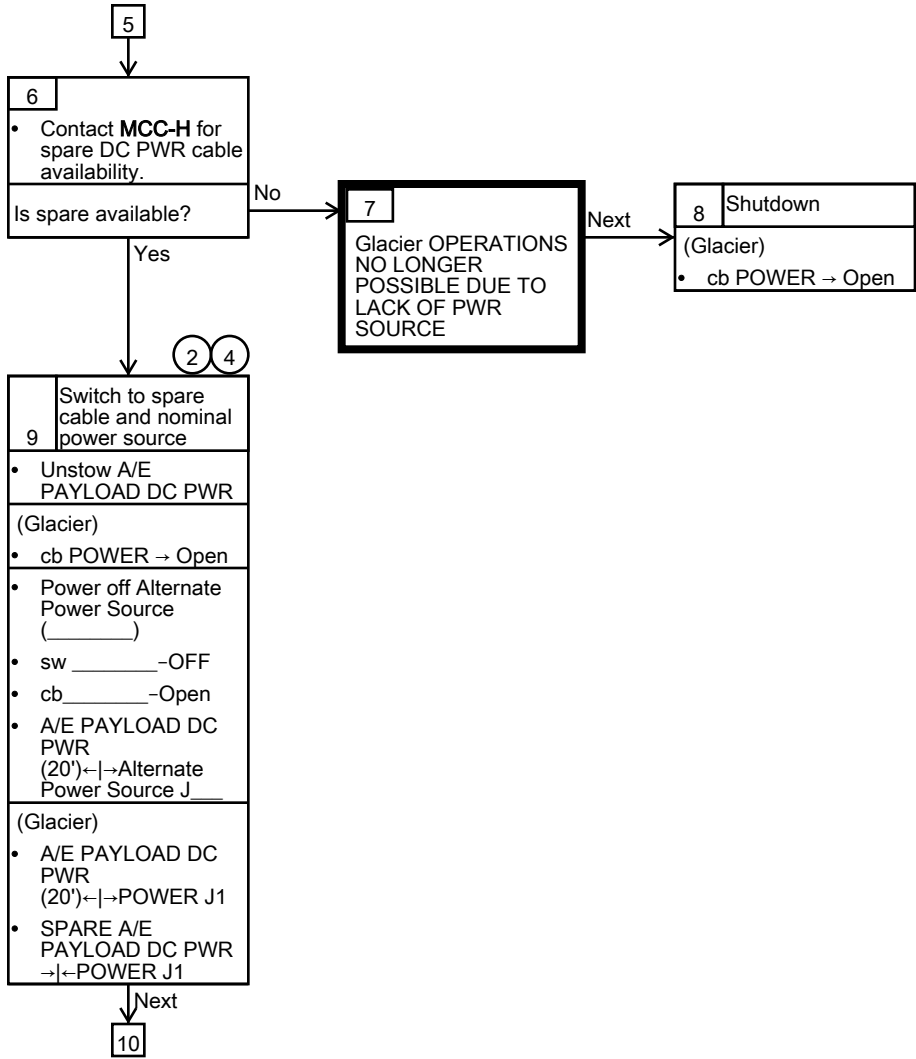
5 POSSIBLE DOWNSTREAM FAILURE

6

- 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 FAIL TO REPOWER**

(ASSY OPS/ULF5/FIN 1) Page 2 of 3 pages



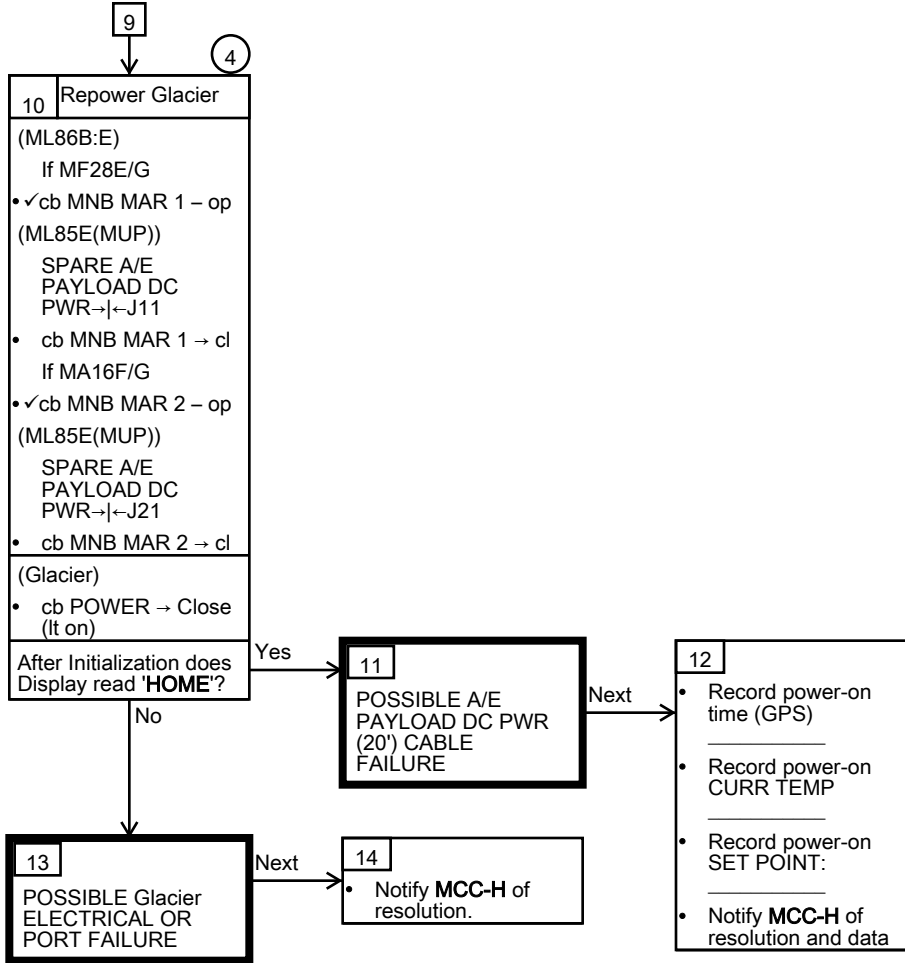
**2** Verify connectors are properly mated and seated securely when switching to alternate power source

**4** Alternate power source is detailed in block 1.

**GLACIER FAIL TO REPOWER**

(ASSY OPS/ULF5/FIN 1) Page 3 of 3 pages

④ Alternate power source is detailed in block 1.



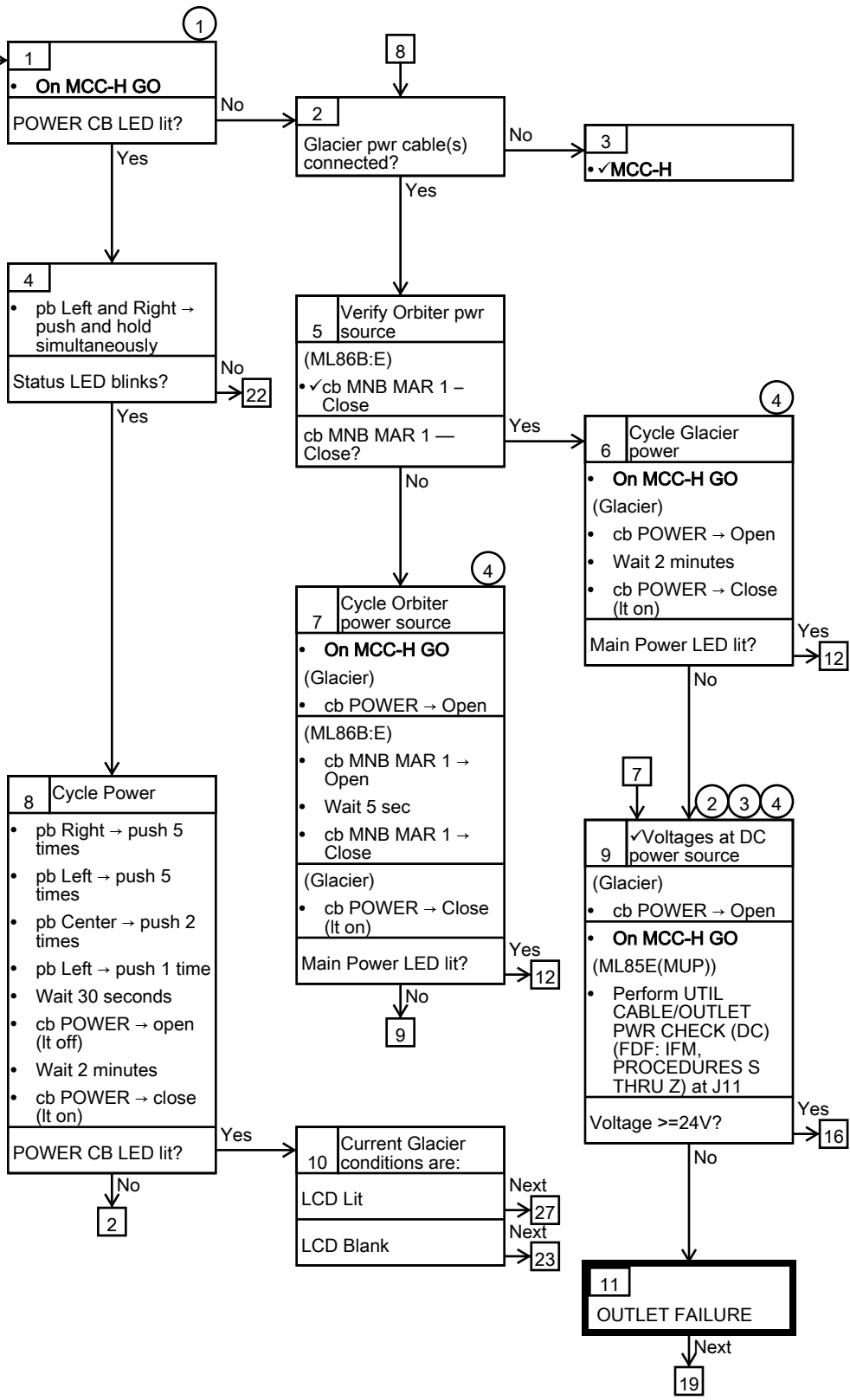
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**Glacier**

**GLACIER LCD BLANK (MF28E/G)**  
(ASSY OPS/ULF5/FIN 1) Page 1 of 6 pages

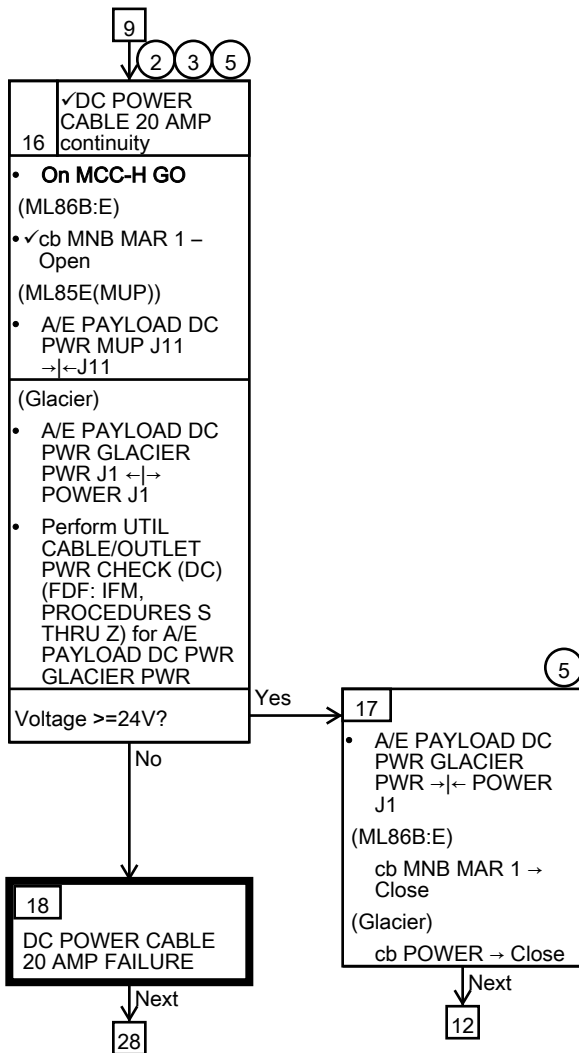
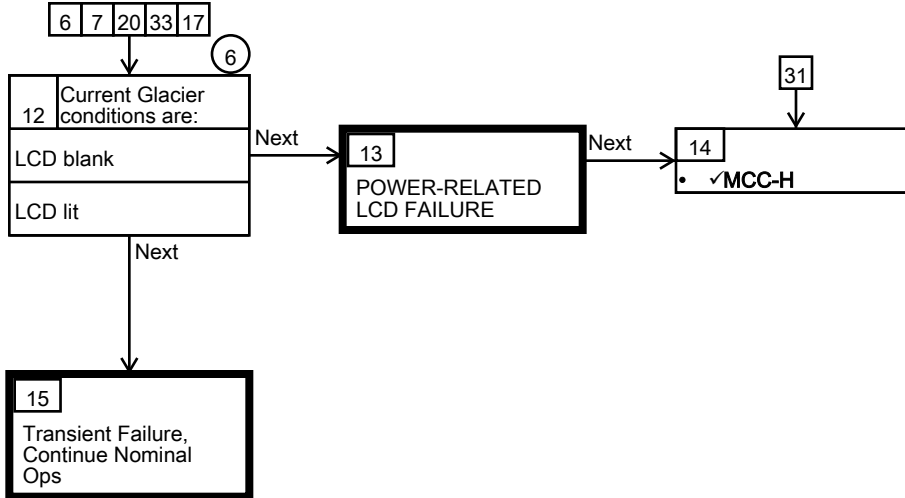
LCD Blank

**Nominal Config:**  
Glacier  
cb POWER – Close (It on)  
sw BATTERY – ON (It on)  
(ML86B:E)  
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.

**GLACIER LCD BLANK (MF28E/G)**  
 (ASSY OPS/ULF5/FIN 1) Page 2 of 6 pages



- 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:E)	
<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> </ul>	
<ul style="list-style-type: none"> <li>Alternate Power source ( _____ ) J _____</li> <li>✓cb _____ — Open</li> <li>✓sw _____ — —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 _____ — Close</li> <li>sw _____ — ON</li> </ul>	
(Glacier)	
<ul style="list-style-type: none"> <li>cb POWER → Close (It on)</li> </ul>	
Main Power LED lit?	
Yes	12

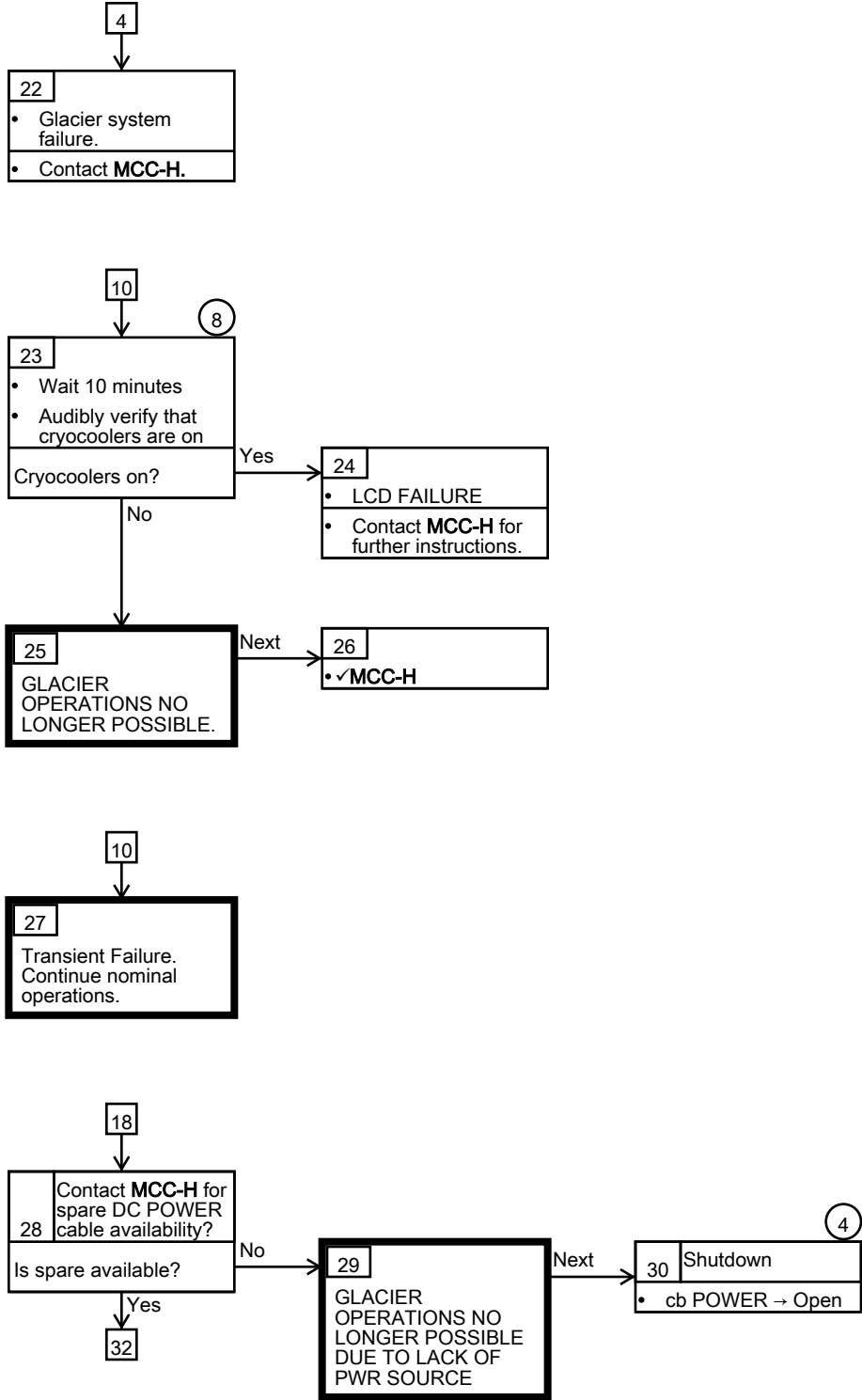
No

21	SYSTEM FAILURE
----	----------------

Next

31

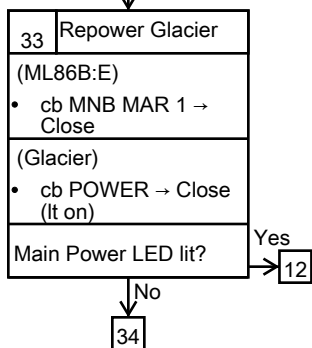
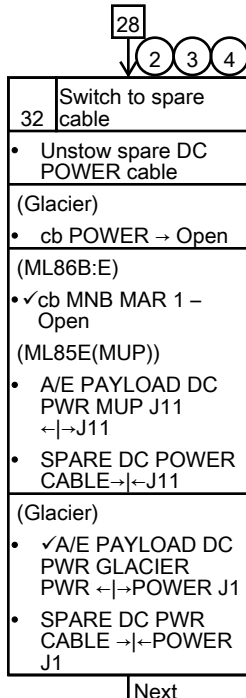
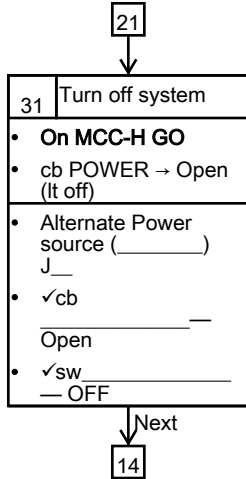
- 2 Always deadface DC Power source when disconnecting/connecting power cable.
- 3 Verify connectors are properly mated and seated securely.
- 4 Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.
- 5 Verify connectors are properly mated and seated securely when reconnecting.



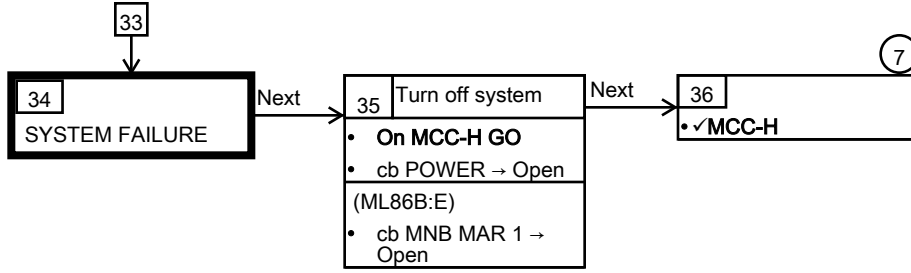
**4**  
 Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.

**8**  
 Glacier will return to previous state approximately 3 minutes after initialization.





- 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.



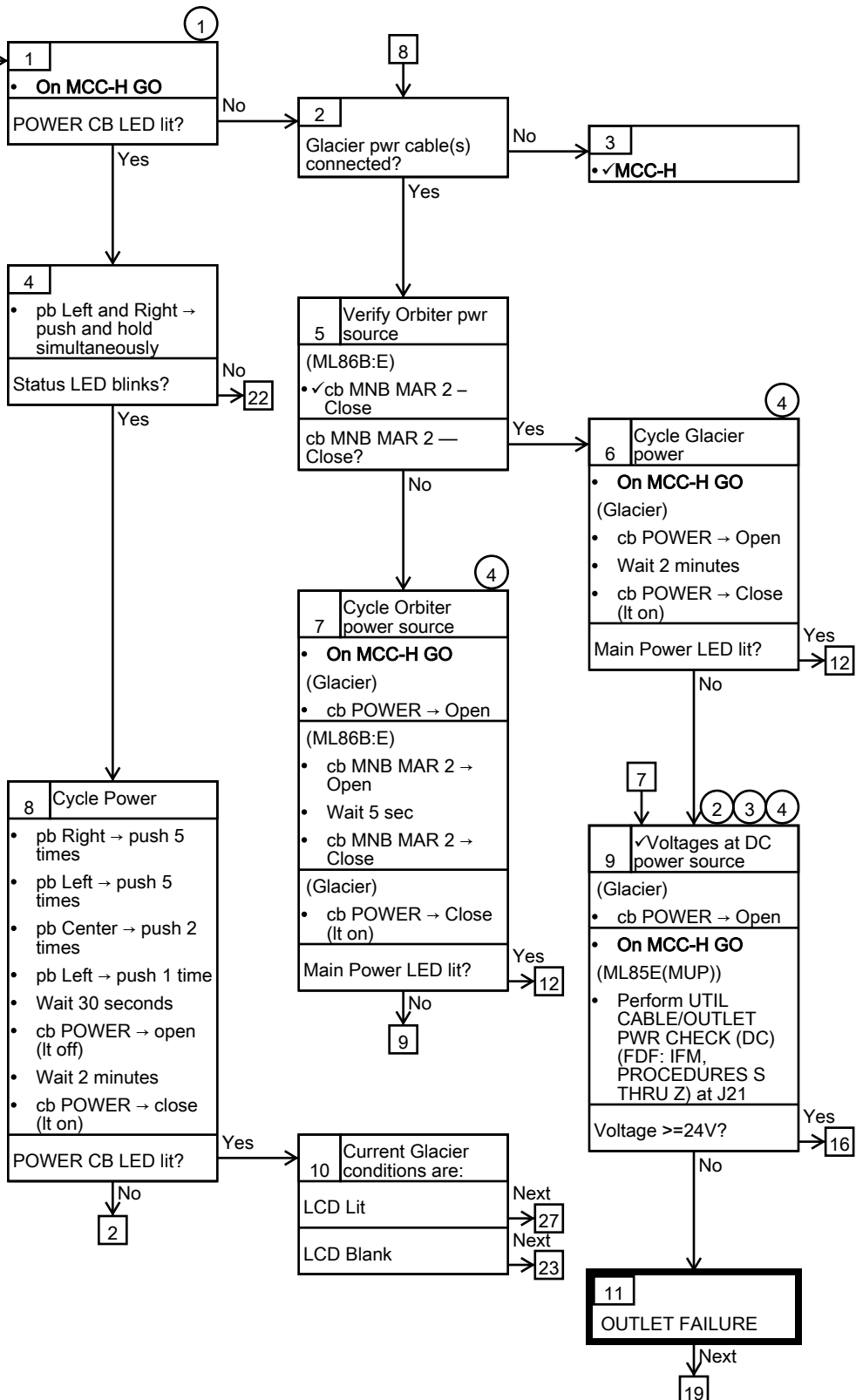
7  
The Glacier payload may continue to function if LCD fails.

# Glacier

## GLACIER LCD BLANK (MA16F/G) (ASSY OPS/ULF5/FIN) Page 1 of 6 pages

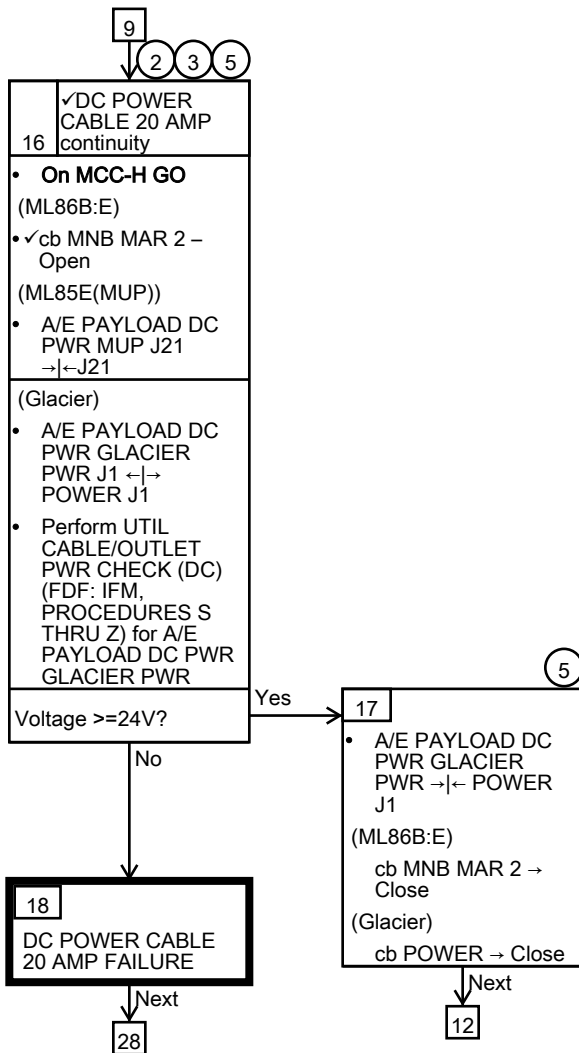
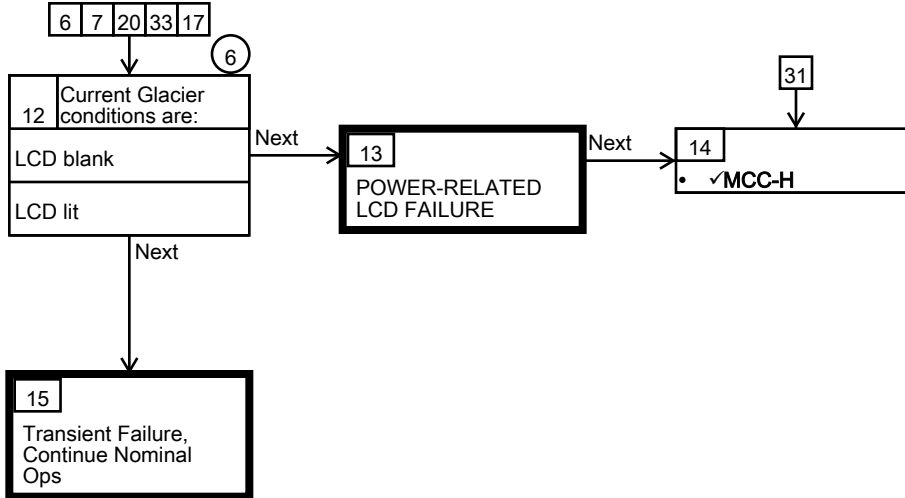
LCD Blank

**Nominal Config:**  
 Glacier  
 cb POWER – Close (It on)  
 sw BATTERY – ON (It on)  
 (ML86B:E)  
 cb MNB MAR 2 – 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.

**GLACIER LCD BLANK (MA16F/G)**  
 (ASSY OPS/ULF5/FIN) Page 2 of 6 pages



- 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:E)	
<ul style="list-style-type: none"> <li>✓cb MNB MAR 2 – Open</li> </ul>	
(ML85E(MUP))	
<ul style="list-style-type: none"> <li>✓A/E PAYLOAD DC PWR MUP J21 ← →J21</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

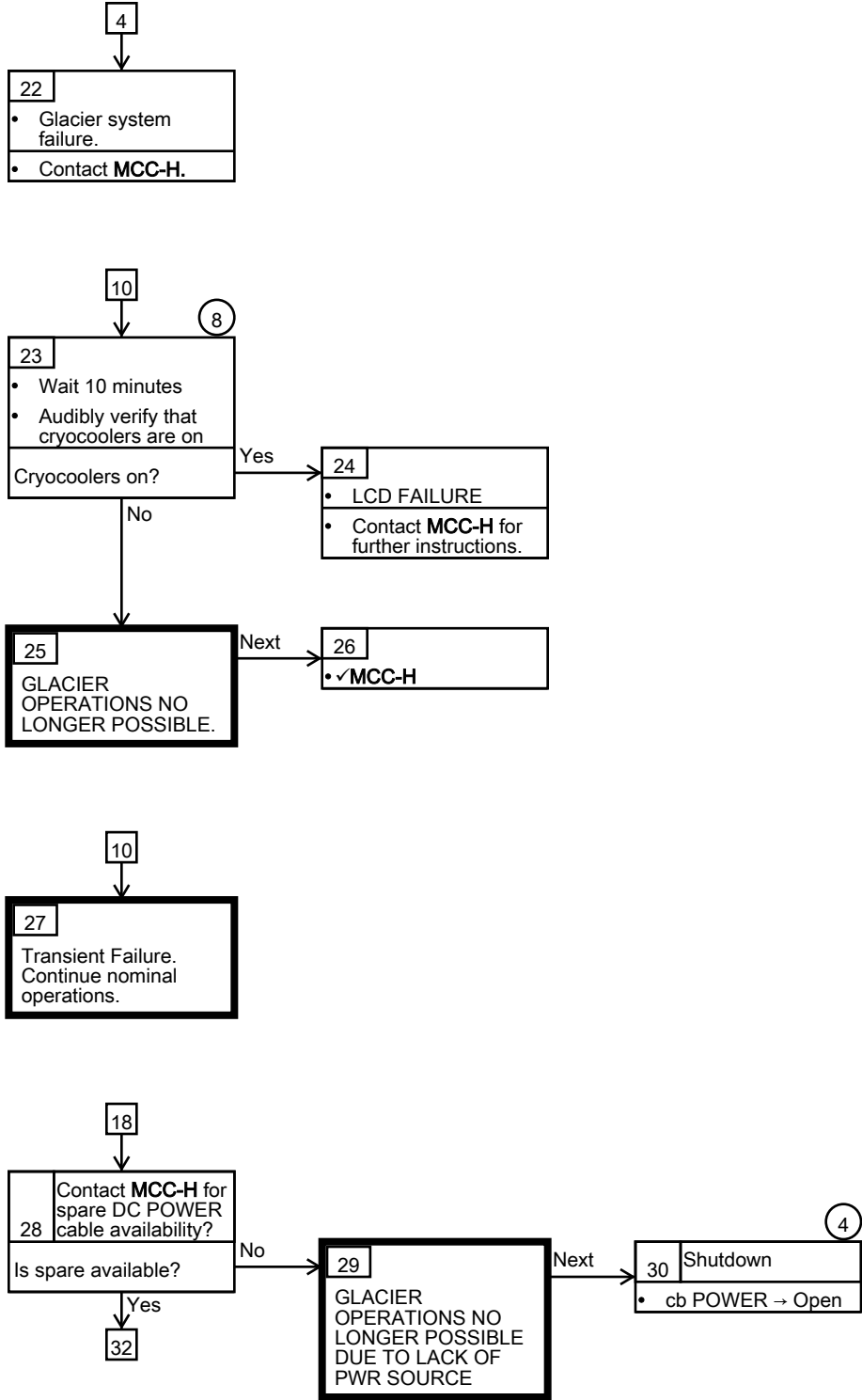
No

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

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:E)	
<ul style="list-style-type: none"> <li>• ✓cb MNB MAR 2 – Open</li> </ul>	
(ML85E(MUP))	
<ul style="list-style-type: none"> <li>• A/E PAYLOAD DC PWR MUP J21 ← →J21</li> <li>• SPARE DC POWER CABLE → ←J21</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:E)	
<ul style="list-style-type: none"> <li>• cb MNB MAR 2 → 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

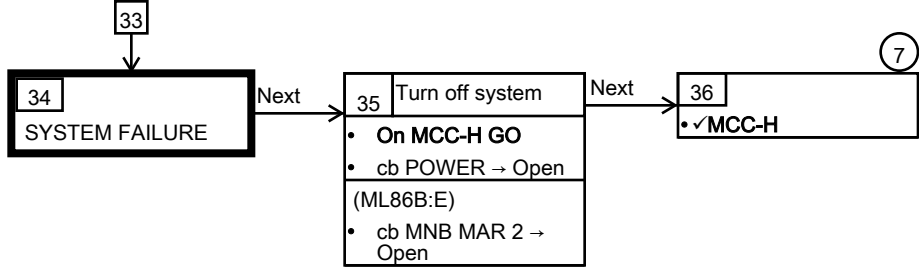
Always deadface DC Power source when disconnecting/connecting power cable.

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 1)

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),

If S/N = 003, following appears:

```
| 'Cryogenic'
| 'Cooler 1 Stroke 1/21'
| 'XX'
```

Else, 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.

## GLACIER RECORD QUICK DIAGNOSTIC DATA

(ASSY OPS/ULF5/FIN)

Page 2 of 2 pages

- 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),

If S/N = 003, following appears:  
~

# GLACIER RECORD RESOURCES DIAGNOSTIC DATA

(ASSY OPS/ULF5/FIN 1)

Page 2 of 2 pages

~  
|  
'Resources'  
'AAA Outlet 1/8'  
'XX.X° C'

Else, 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),  
If S/N = 003, following appears:

'System'  
'CPU 1/9'  
'XX.X° C'

Else, 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: Seconds	Text	X of Total Number	(IP) INACTIVE / PENDING (AP) ACTIVE / PENDING (IA) INACTIVE / ACK (AA) ACTIVE / ACK (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

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**TABLE 2 GLACIER RESET LOG FILE**  
 (ASSY OPS/ULF5/FIN) Page 1 of 5 pages

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Parameter		Event 1	Event 2	Definition or Options
1	CURR TEMP	Start ____ . ____ °C End ____ . ____ °C	Start ____ . ____ °C End ____ . ____ °C	GLACIER Current Temperature XXXX.XX °C
2	SET POINT	Start ____ . ____ °C End ____ . ____ °C	Start ____ . ____ °C End ____ . ____ °C	-160.0 to +4.0° C
3	GPS	Start ____ : ____ : ____ GPS End ____ : ____ : ____ GPS	Start ____ : ____ : ____ GPS 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

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Parameter		Event 1	Event 2	Definition or Options
7	Control Mode	IDLE <input type="checkbox"/> SET POINT <input type="checkbox"/> MANUAL <input type="checkbox"/>	IDLE <input type="checkbox"/> SET POINT <input type="checkbox"/> MANUAL <input type="checkbox"/>	
8	Control Sensors	INNER <input type="checkbox"/> OUTLET <input type="checkbox"/> INLET <input type="checkbox"/>	INNER <input type="checkbox"/> OUTLET <input type="checkbox"/> 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"/> COOLER 2 <input type="checkbox"/>	COOLER 1 <input type="checkbox"/> 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

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Parameter	Event 1	Event 2	Definition or Options
13 Cooler 1 State	ON <input type="checkbox"/> OFF <input type="checkbox"/>	ON <input type="checkbox"/> OFF <input type="checkbox"/>	
14 Cooler 2 Stroke	_____	_____	03 to 63
15 Cooler 2 State	ON <input type="checkbox"/> OFF <input type="checkbox"/>	ON <input type="checkbox"/> OFF <input type="checkbox"/>	
16 Heater 1 Duty	_____ %	_____ %	Percent Duty Cycle
17 Heater 2 Duty	_____ %	_____ %	Percent Duty Cycle
18 Max Power Draw	_____ W	_____ W	Max Watts
19 Over Current	_____ A	_____ A	Over Current Ampere
20 AAA Fan Mode	AUTOMATIC <input type="checkbox"/> MANUAL <input type="checkbox"/>	AUTOMATIC <input type="checkbox"/> MANUAL <input type="checkbox"/>	

**TABLE 2 GLACIER RESET LOG FILE**  
 (ASSY OPS/ULF5/FIN) Page 4 of 5 pages

286

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 <input type="checkbox"/> <input type="checkbox"/> Valve: 1 2 3 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Pump: 1 2 <input type="checkbox"/> <input type="checkbox"/> Valve: 1 2 3 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
25	Pressure Config	Pump: 1 2 <input type="checkbox"/> <input type="checkbox"/> Valve: 1 2 3 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Pump: 1 2 <input type="checkbox"/> <input type="checkbox"/> Valve: 1 2 3 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
26	Manual Config	Pump: 1 2 <input type="checkbox"/> <input type="checkbox"/> Valve: 1 2 3 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Pump: 1 2 <input type="checkbox"/> <input type="checkbox"/> Valve: 1 2 3 4 <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

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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"/> MANUAL <input type="checkbox"/>	AUTOMATIC <input type="checkbox"/> 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"/> INHIBIT <input type="checkbox"/>	ENABLE <input type="checkbox"/> INHIBIT <input type="checkbox"/>	

Note: These items may need to be entered for multiple events.

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**TABLE 3 GLACIER DIAGNOSTIC LOG FILE**

(ASSY OPS/ULF5/FIN) Page 1 of 3 pages

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Parameter		Definition	Event 1	Event 2	Event 3	Event 4
HOME MENU (Front panel)						
1	CURR TEMP	Current Temperature °C	Start: End:	Start: End:	Start: End:	Start: End:
2	SET POINT	Set Point °C	Start: End:	Start: End:	Start: End:	Start: End:
3	GPS	Hours: Minutes: Seconds	Start: __ : __ : __ End: __ : __ : __	Start: __ : __ : __ End: __ : __ : __	Start: __ : __ : __ End: __ : __ : __	Start: __ : __ : __ End: __ : __ : __
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

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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

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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				

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CONTINGENCY EVA PL CONFIGURATION

CONTINGENCY EVA  
PL CONFIGURATION

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N/A

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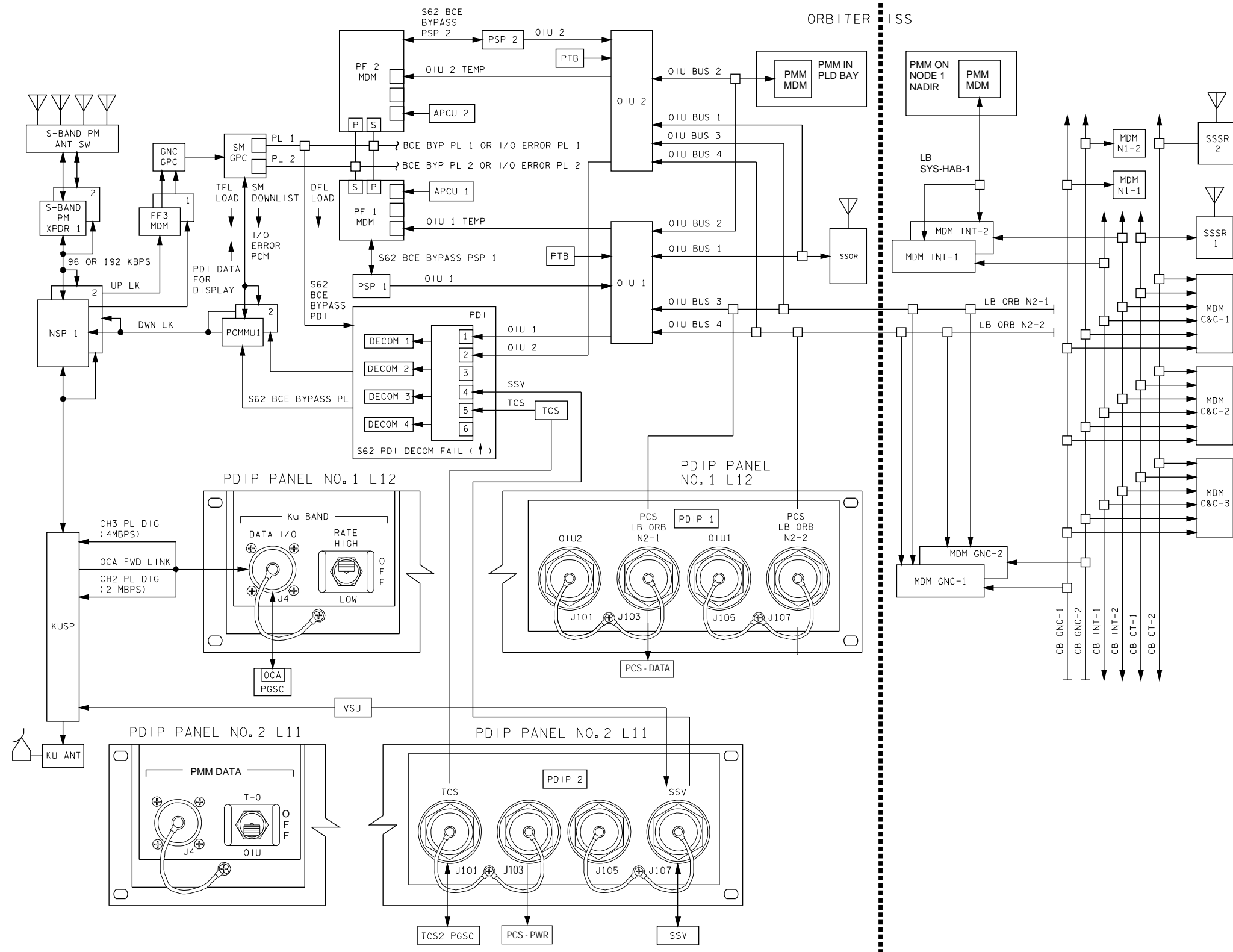
**POST-EVA PL CONFIGURATION**  
(ASSY OPS/ULF5/FIN) Page 1 of 1 pages

N/A

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MALFUNCTION

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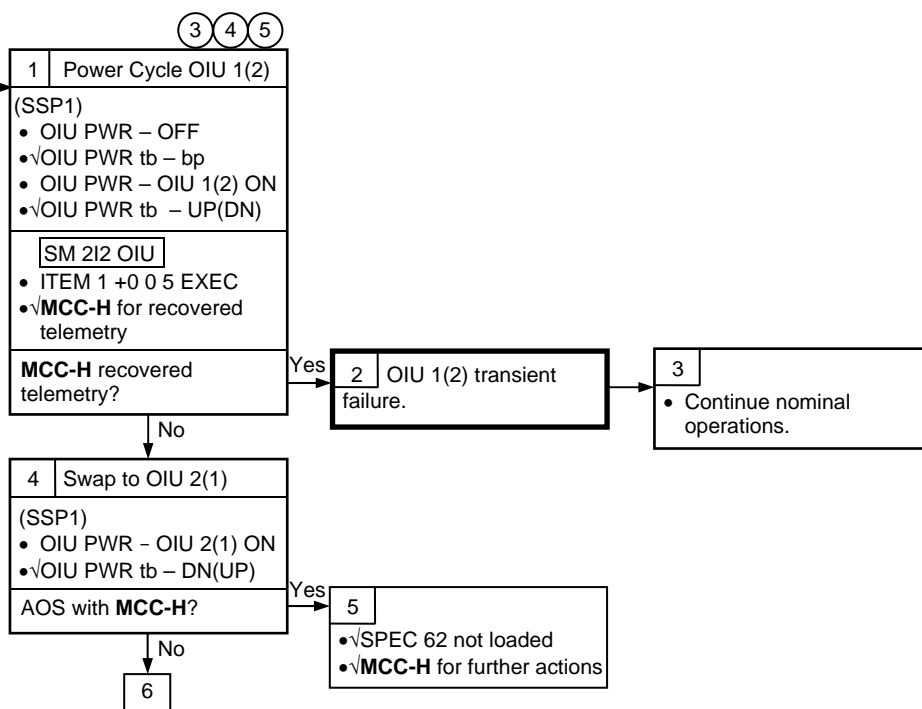


# ASSY OPS

## 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



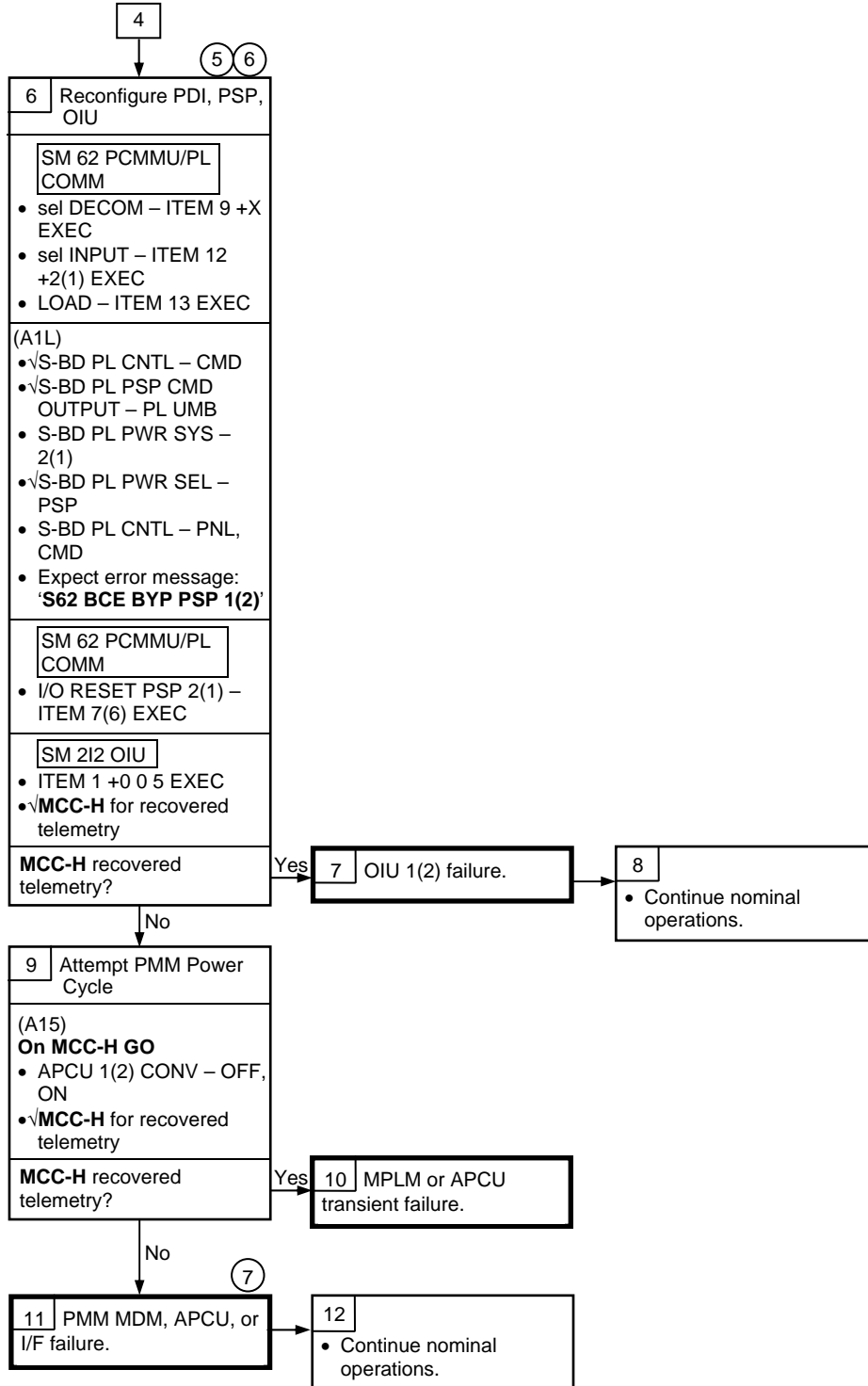
① This malfunction only treats OIU to PMM interface problems and PMM interface problems. OIU to PDI problems would announce an S62 PDI DECOM FAIL message.

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.

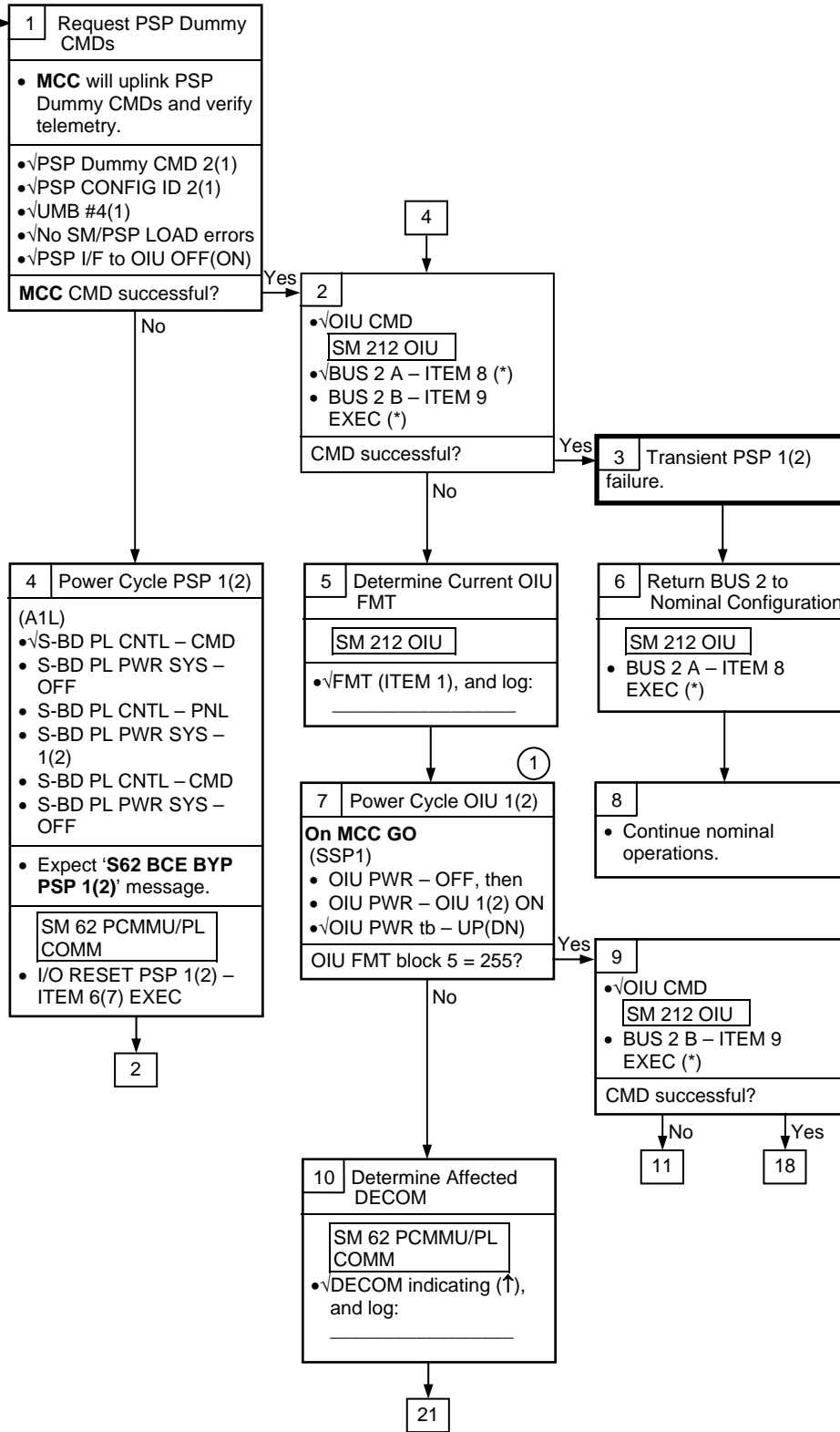
7  
If unable to verify PMM pressure and temperature, PMM is still go for unberthing from payload bay.

**COMM**

**OIU FAIL TO COMMAND**  
(ASSY OPS/ULF5/FIN) Page 1 of 3 pages

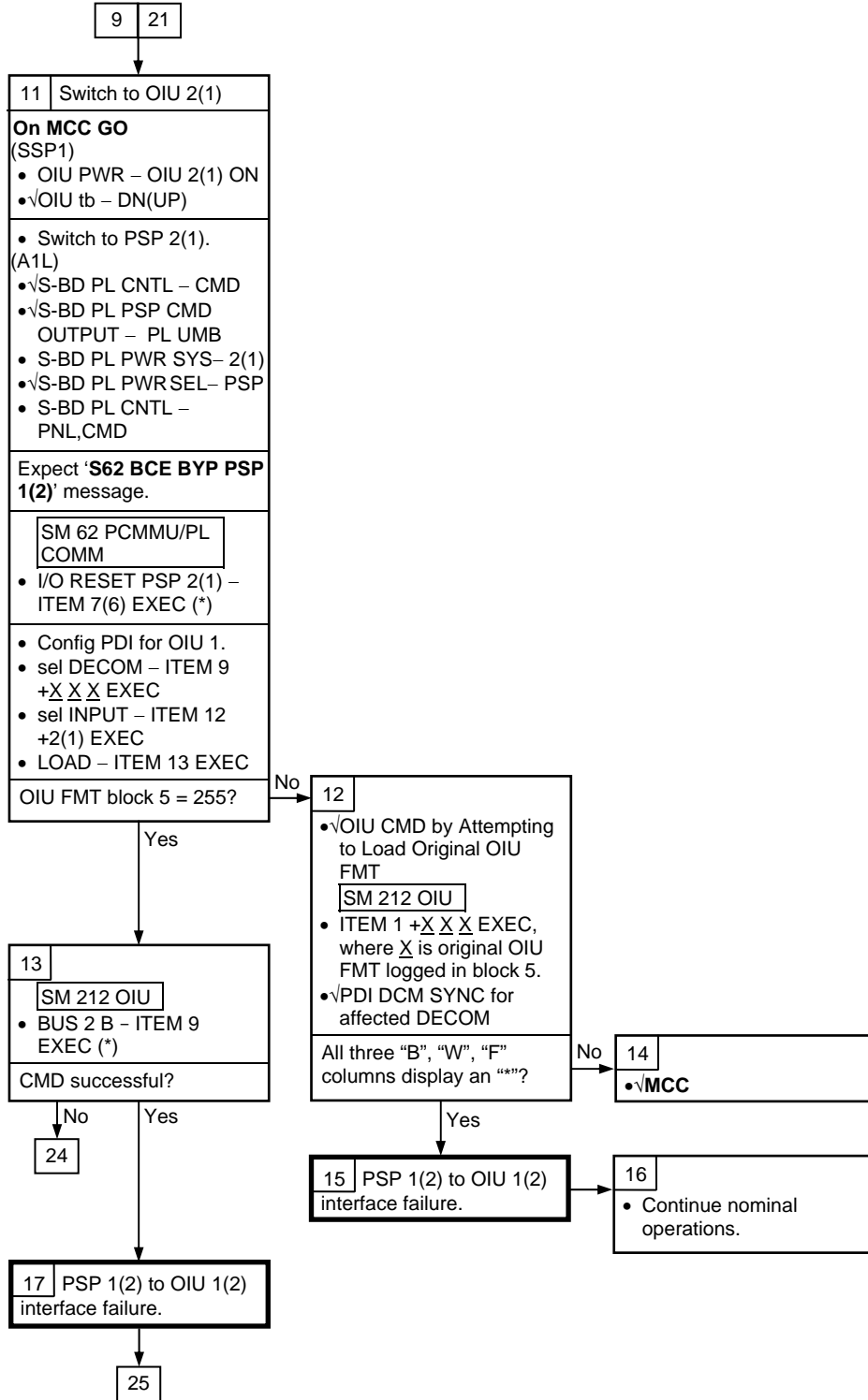
No Response to OIU Configuration or Routed Commands

**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

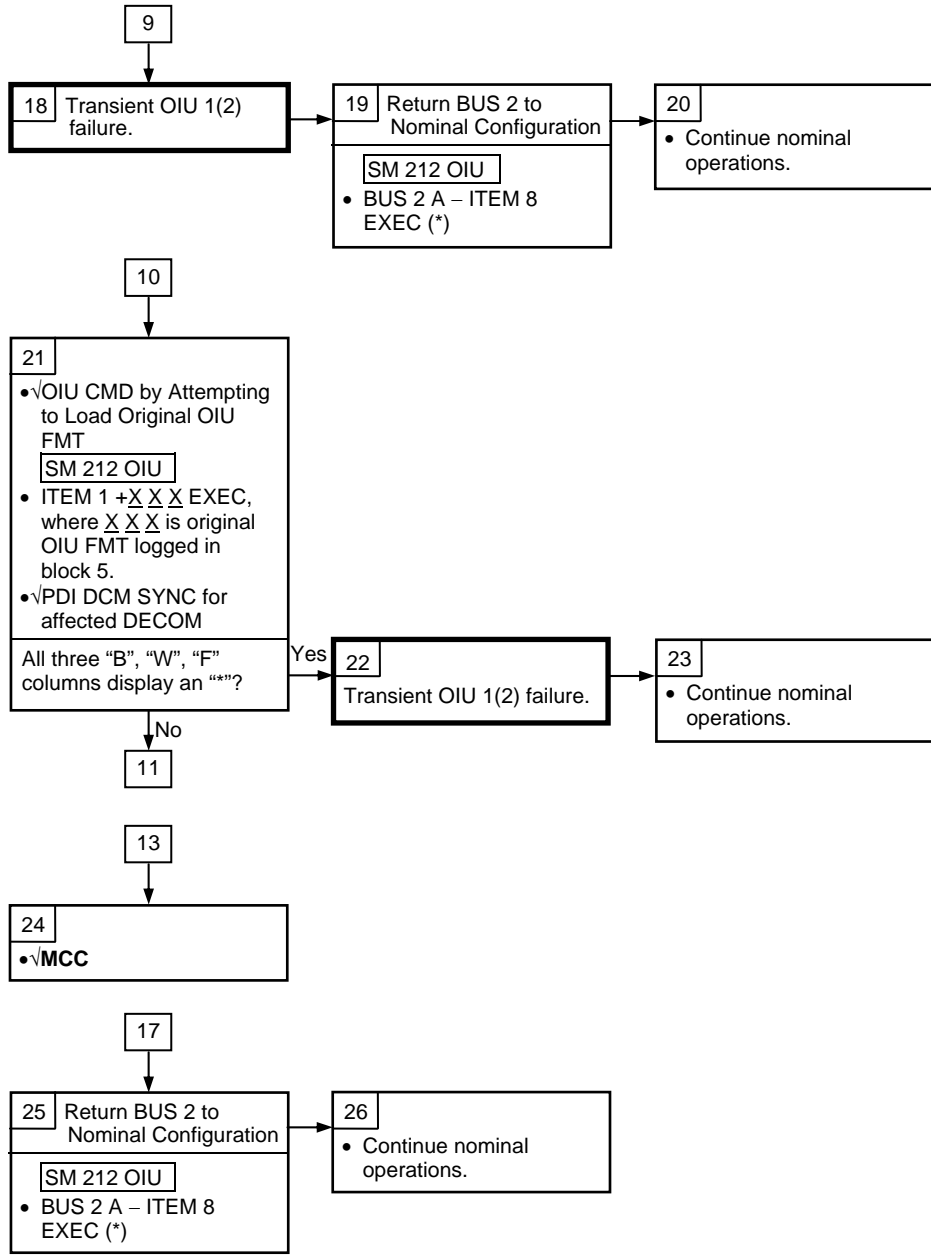


① Power cycle will place OIU in Format 255. OIU Station TLM will be lost until OIU CMD is recovered. OIU H&S TLM will also be lost if PDI is not configured for OIU FMT 255.

**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



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**ASSY OPS**

**OIU TEMP (UP ARROW)**

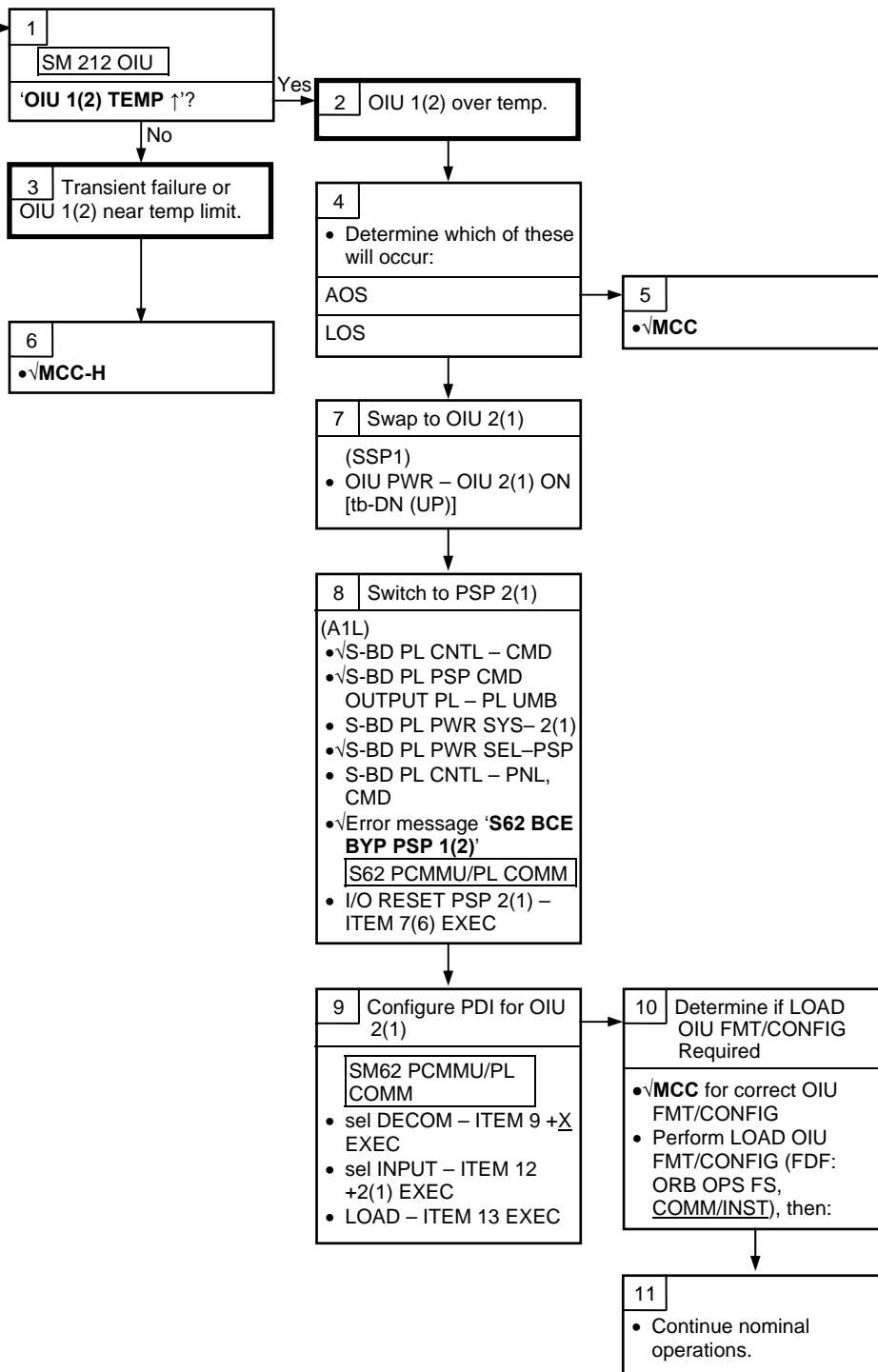
(ASSY OPS/ULF5/FIN)

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)



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**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

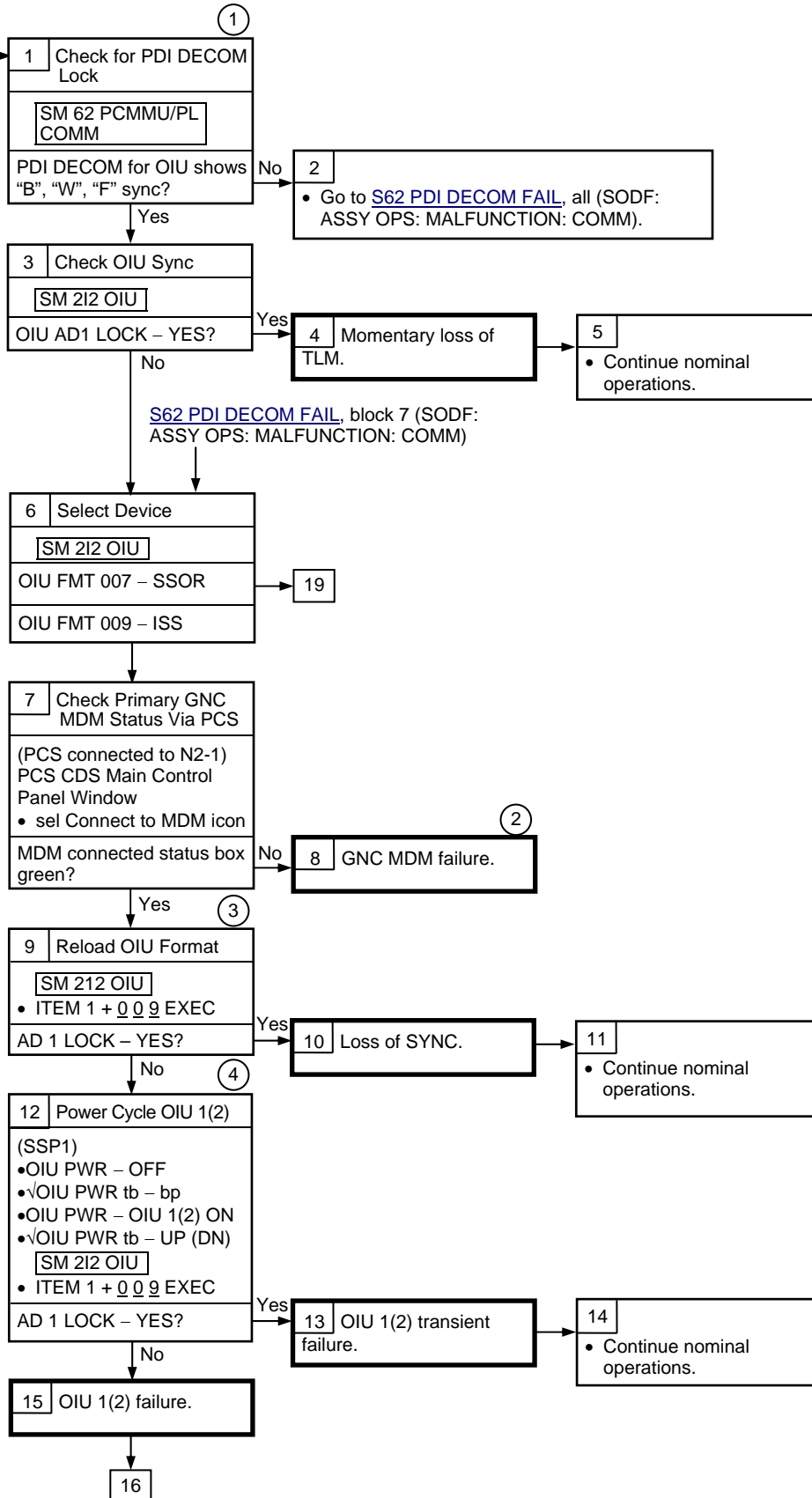
**Nominal Config:**

(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

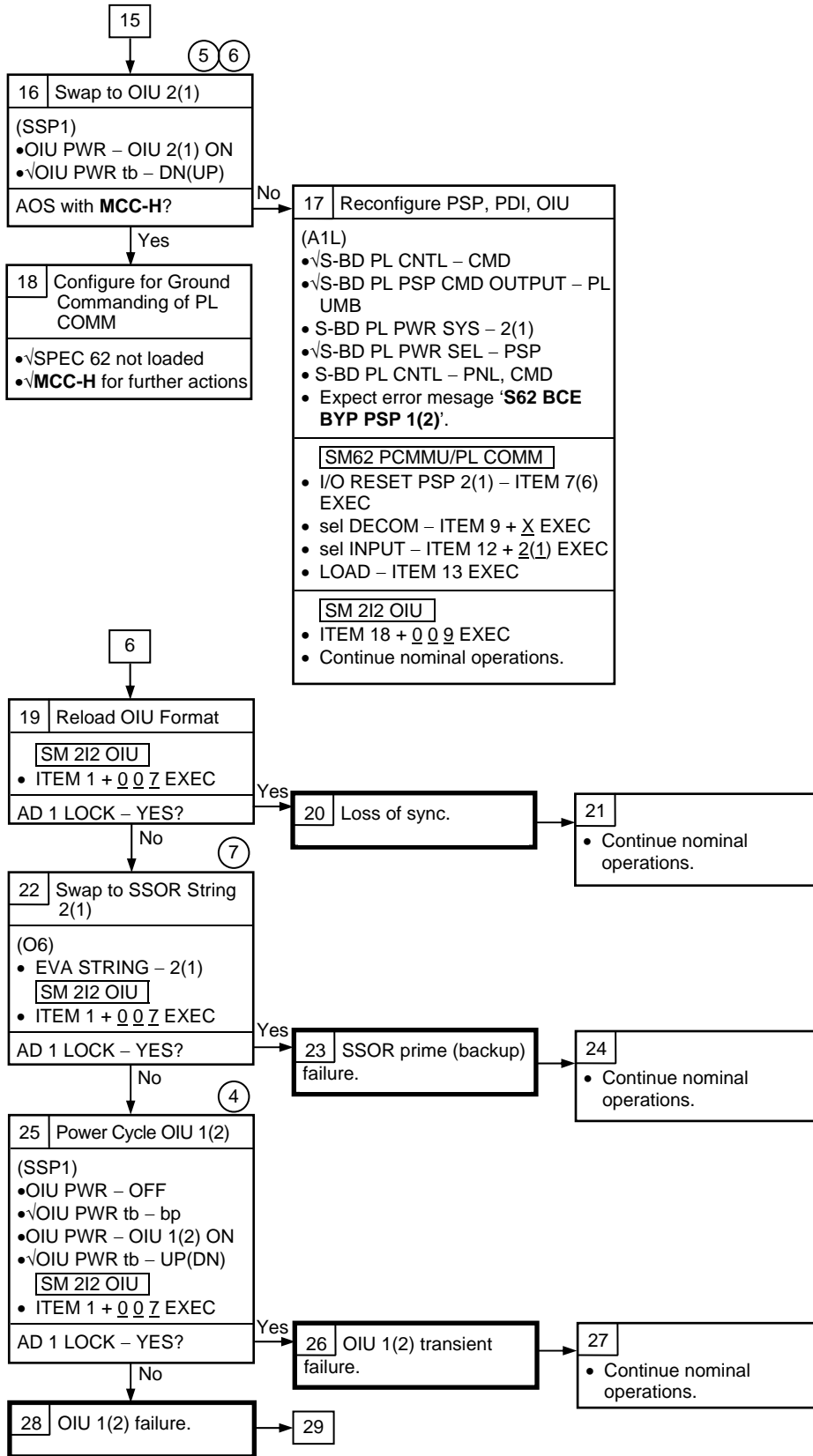


① OIU to PDI problems would announce a 'S62 PDI DECOM FAIL' message if FDA enabled.

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.

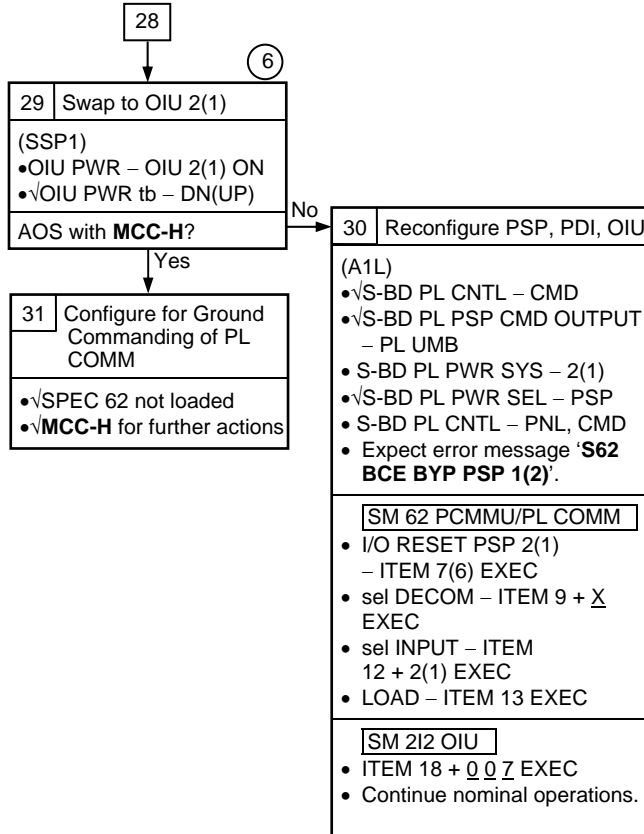


④ OIU active device mapping occurs with format load.

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.

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# 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

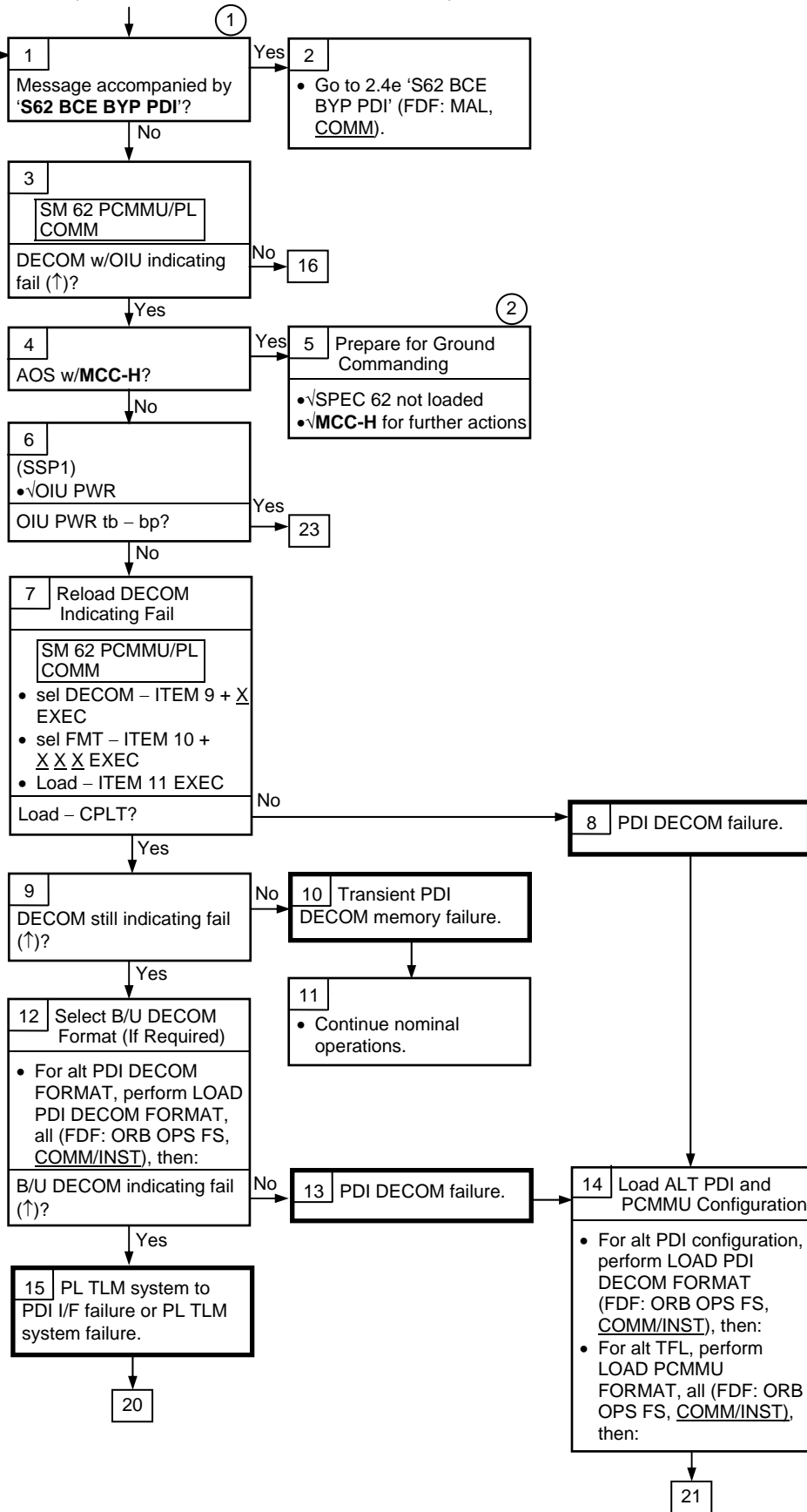
DECOM FDA ENA  
ITEM 14 (15, 16,  
17) = ENA (\*)

SM212 OIU

OIU FMT 5 = MPLM  
OIU FMT 7 = RNDZ  
OIU FMT 9 = ISS

ISS Config:  
GNC – 1 prime on  
LB ORB N2-1.

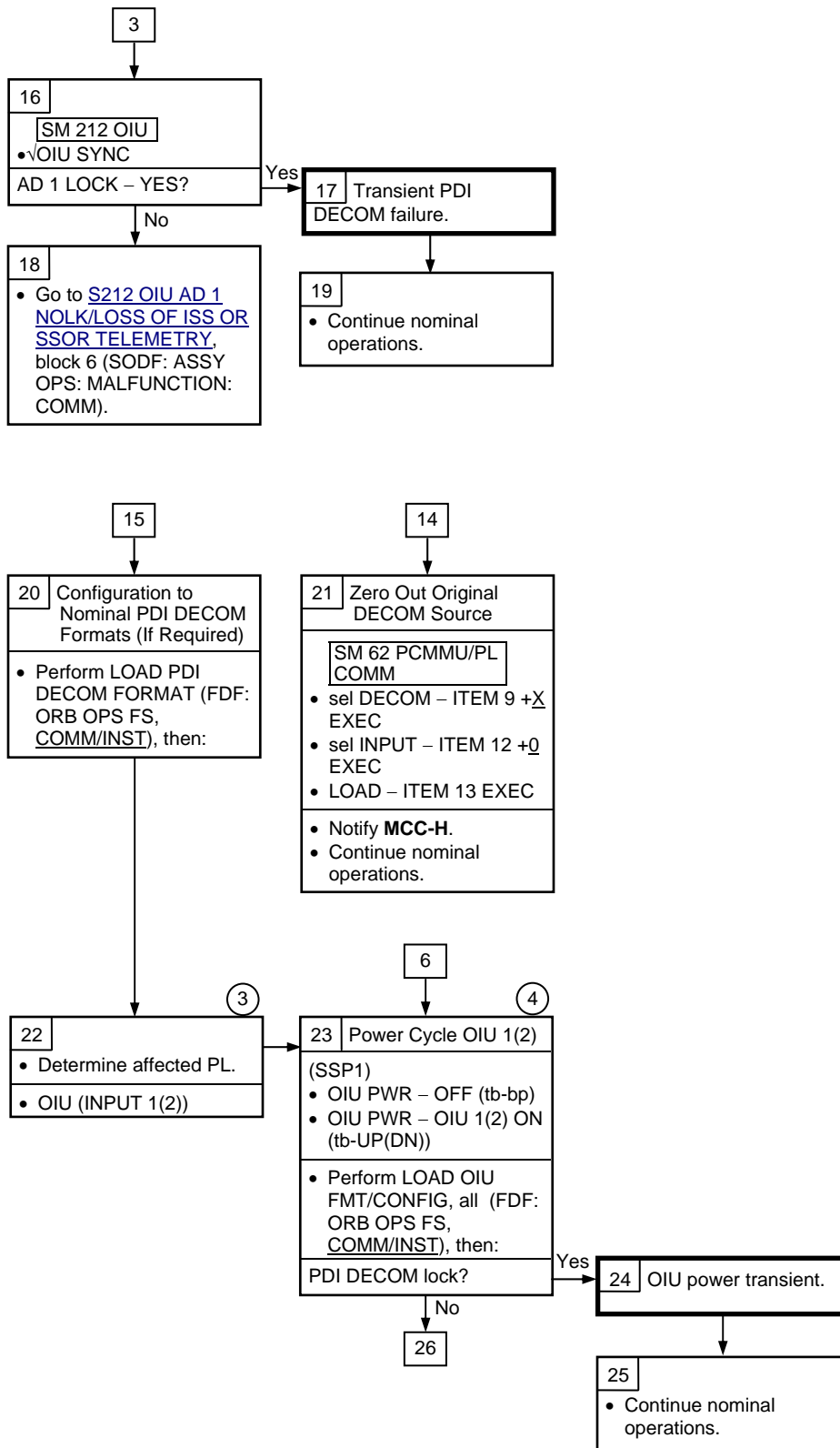
OIU FMT 255 = H&S



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.

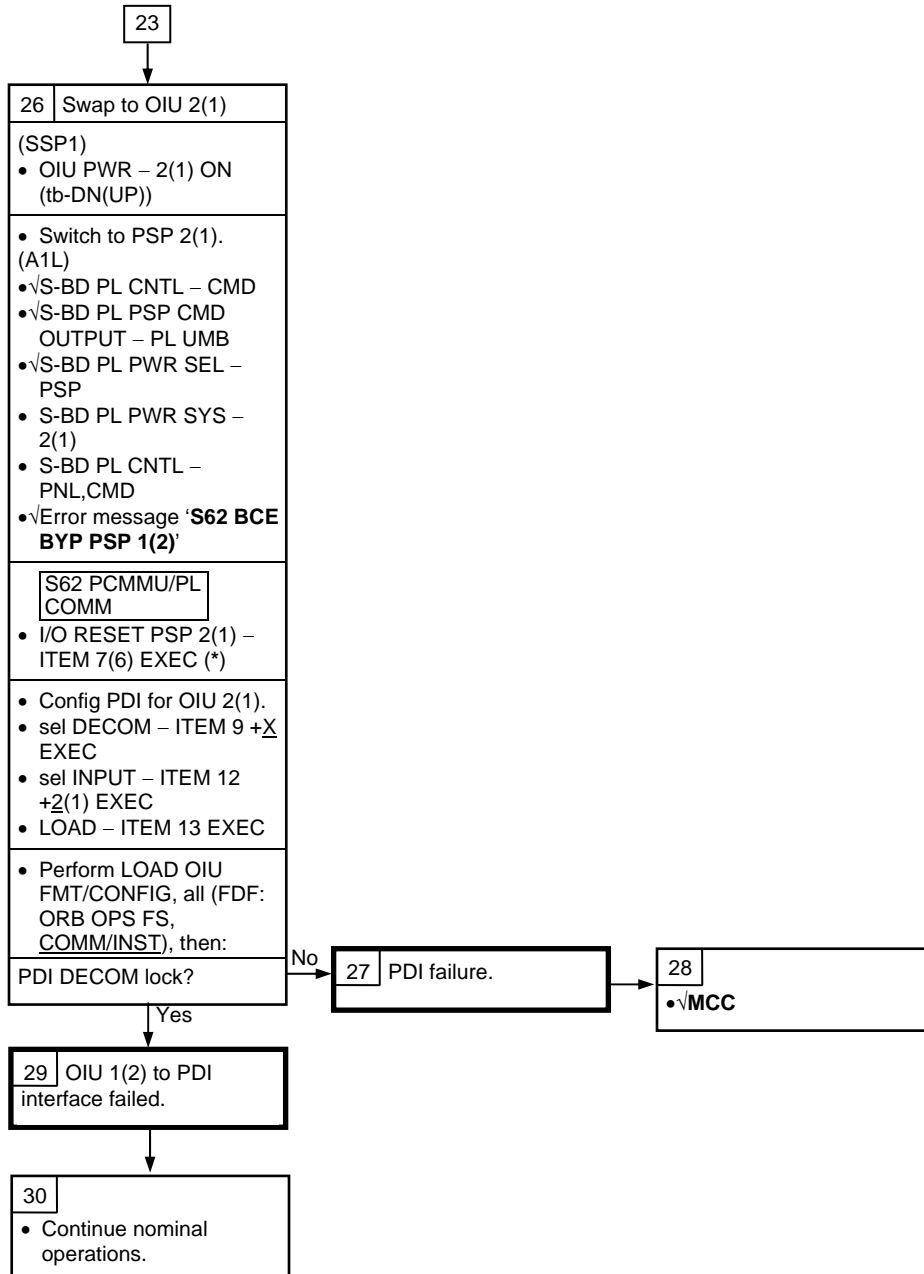
**S62 PDI DECOM FAIL**  
(ASSY OPS/ULF5/FIN)



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)



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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,

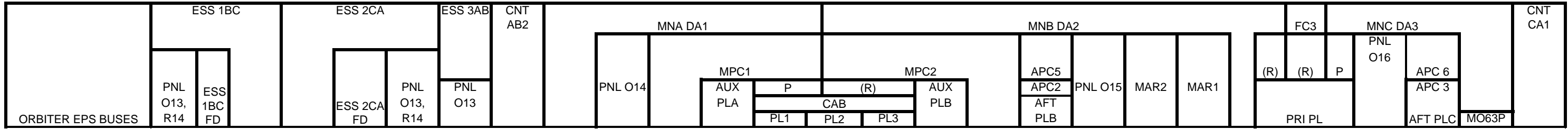
COMM/INST).

# ORBITER ELECTRICAL BUS LOSS MATRIX

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 APC 3		AFT PLC	MO63P
								AUX PLA	P	(R)	AUX PLB	APC5	APC2											
ORBITER EQUIPMENT																								
PTU1	XRC																							
APCU1 (PMM)																								
OPCU																								
PTU2																								
APCU2 (LCS)																								
OPCU																								
OIU1																								
OIU2																								
TCS																								
Video Processing Unit (VPU)																								
Primary C/L Camera																								
Secondary C/L Camera																								
PDIP 1 (Ku-Band relay, PCS-to-OIU interface)																								
PDIP 2 (PMM relay, TCS/SSV)																								
Payload Timing Buffer																								
Orbiter PCS																								
DragonEye (electronics)																								
DragonEye (htsr)																								
MIDDECK PAYLOADS																								
Glacier (MF28E/G)																								
Glacier (MA16F/G)																								
AEM																								
CGBA																								

(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 Monitor Power  
 P - Primary Power Source  
 (R) - Redundant Power Source (requires crew action to use)

**ORBITER ELECTRICAL BUS LOSS MATRIX**



ISS EQUIPMENT	ORBITER EPS BUSES	ESS 1BC	ESS 2CA	ESS 3AB	CNT AB2	MNA DA1	MNB DA2	FC3	MNC DA3	CNT CA1
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 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 (PL1)	ISS OIU Command Path (via PSP 1 – UMB 1 and OIU 1) OIU 1 telemetry (health and status)
MDM PF2 (PL2)	ISS OIU Command Path (via PSP 2 – UMB 1 and OIU 2) OIU 2 telemetry (health and status)
MDM OF1	PCMMU 1, 2 – ON/OFF power select, BFS auto TFL PL Bay MECH System 1, 2 power switch telemetry ROEU Latch 2, 3 (MATE/DEMATE, LAT/REL, ELEC CONT) Sys B – telemetry MID MCAs 1, 3 – operational status telemetry for ROEU PL AUX A – RPC ON discrete telemetry
MDM OF2	PL AUX B – RPC ON discrete telemetry Payload Retention System – System Redundancy Telemetry for LAT/R-F-L/REL (PL SEL 1,2,3) MID MCA 1 OP STATUS 5,6 telemetry 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 PL PRI (MNC, MNB, FC3) – ON discrete telemetry
MDM OF4	Ku-Band – loss of insight to RADAR mode and RADAR output power telemetry only S-Band, Ku-Band – PNL/CMD switch – position telemetry only PSP, GCIL – ON/OFF telemetry S-Band P/L control telemetry PDI Power Switch position indication CAB P/L (MNA, MNB), PL AUX – ON discrete telemetry ROEU Latch 2,3 (MATE/DEMATE, LAT/REL, ELEC CONT) System A telemetry APCU-1 telemetry APCU-2 telemetry
DSC OM1	MNC bus voltage telemetry
DSC OM2	MNA, MNB bus voltage telemetry

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## ORBITER MDM LOSS IMPACTS

(ASSY OPS/ULF5/FIN)

Page 2 of 2 pages

MDM OA1 ODS X4/PMA2 X3 connector mate telemetry  
PMA2 Group 1 passive hooks (1,3,5) closed telemetry  
PMA2 Group 1 passive hooks (7,9,11) closed telemetry  
DIH ODS X1 CONN MATE (A)  
DIH ODS X1 CONN MATE (B)

DSC OA1 ODS X4/PMA2 X3 connector mate power telemetry  
PMA2 Group 1 passive hooks (1,3,5) closed power telemetry  
PMA2 Group 1 passive hooks (7,9,11) closed power telemetry

MDM OA2 ODS X3/PMA2 X4 connector mate telemetry  
PMA2 Group 2 passive hooks (2,4,6) closed telemetry  
PMA2 Group 2 passive hooks (8,10,12) closed telemetry  
PL AFT MNB Amps and PWR ON discrete telemetry  
DIH ODS X2 CONN MATE (A)  
DIH ODS X2 CONN MATE (B)

DSC OA2 ODS X3/PMA2 X4 connector mate power telemetry  
PMA2 Group 2 passive hooks (2,4,6) closed power telemetry  
PMA2 Group 2 passive hooks (8,10,12) closed power telemetry  
Vernier R5D Inj Temps (loss of verns)

MDM OA3 ROEU Latch 1 (RELAX) System A telemetry  
P/L SEL 1,2 (latch 1) Primary LAT/R-F-L/REL – latch status telemetry  
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)

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DEORBIT PREP

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## 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

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**PAYLOAD REACTIVATION**

(ASSY OPS/ULF5/FIN)

Page 1 of 1 page

R1      1. PL AFT MN B – ON

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## PAYLOAD ENTRY SWITCH LIST/VERIFICATION

(ASSY OPS/ULF5/FIN 1) 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  
 DRGNEYE 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) (if powered)  
 cb POWER – cl (lt on)  
 BATTERY sw – ON (lt on)
- MA16F/G 7. (GLACIER)  
 cb POWER – cl (lt on)  
 BATTERY sw – ON (lt on)
- MF43K 8. (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

## PAYLOAD ENTRY SWITCH LIST/VERIFICATION

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

- √A&D – op
  - √LIGHTS B&C – It on (off during night cycle)
  - √A&D – It off
  - √LED Display – showing GMT time
- MF71K 9. (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 10. (CGBA)
- √cb MAIN POWER – cl
  - √LED-MAIN POWER – On (green)
  - √FANS – ON (audible fan operation)

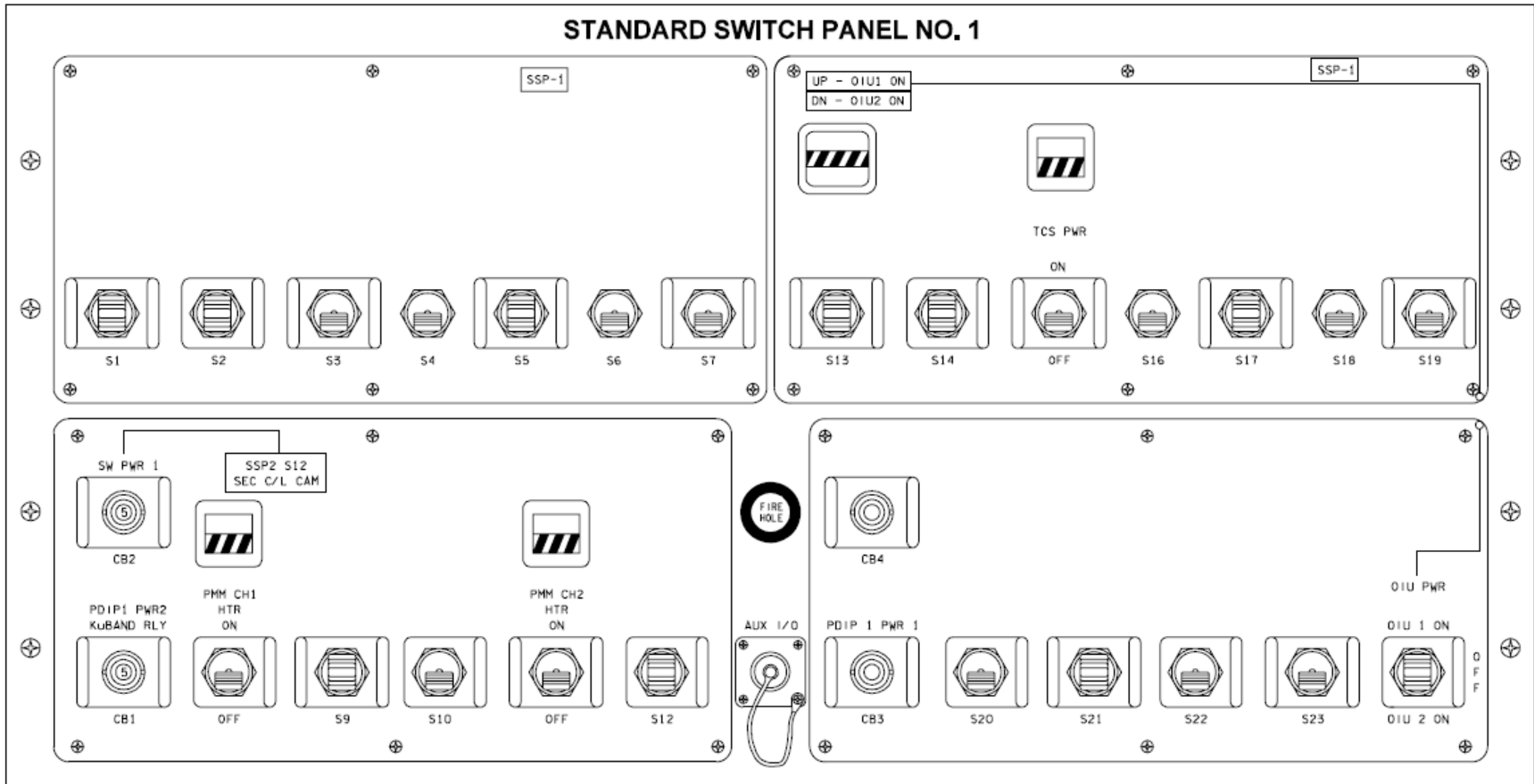
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**STANDARD SWITCH PANEL 1**  
 (ASSY OPS/ULF5/FIN 1) Page 1 of 3 pages

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19409003\_133. PNL: 1

## STANDARD SWITCH PANEL 1

(ASSY OPS/ULF5/FIN 1) Page 2 of 3 pages

	Device Type	Function
CB1 PDIP 1 PWR2 KuBAND RLY	Circuit breaker, 5 amp	closed (in) – Applies orbiter CAB PL2 power to the PDIP1 DC PWR 2 switch/outlet, and KuBAND RATE switch.  open (out) – Removes power from PDIP1 DC PWR 2 outlet and KuBAND RATE switch.
CB2 SW PWR 1	Circuit breaker, 5 amp	closed (in) – Applies orbiter CAB PL1 power to SSP2 S12 SEC C/L CAM.  open (out) – Removes power from SSP2 S12 SEC C/L CAM.
S8 PMM CH1 HTR	Toggle switch, two-position  Maintained- Maintained	ON (up) - Applies PL PRI MNC to PMM Channel 1 Shell Heaters  OFF (dn) - Removes power from PMM Channel 1 Shell Heaters
DS8	Event indicator, two-position	gray - indicates PL PRI MNC power is applied to PMM Channel 1 Shell Heaters  bp - indicates that power is removed from PMM Channel 1 Shell Heaters
S11 PMM CH2 HTR	Toggle switch, two-position  Maintained- Maintained	ON (up) - Applies PL PRI MNC to PMM Channel 2 Shell Heaters  OFF (dn) - Removes power from PMM Channel 2 Shell Heaters
DS11	Event indicator, two-position	gray - indicates PL PRI MNC power is applied to PMM Channel 2 Shell Heaters  bp - indicates that power is removed from PMM Channel 2 Shell Heaters
AUX I/O	Data connector	The AUX I/O connector is used as a port to send or receive data to external payloads. The AUX I/O will not be used for STS-133/ULF5
CB3 PDIP1 PWR1	Circuit breaker, 5 amp	closed (in) – Applies CAB PL2 to PDIP1 DC PWR 1 outlet.  open (out) – Removes power from PDIP1 DC PWR 1 outlet.
S24 OIU PWR	Toggle switch, three-position  Maintained – Maintained – Maintained	OIU 1 ON (up) – Provides CAB PL3 power to OIU 1.  OFF (ctr) – Removes power from OIU 1 and OIU 2.  OIU 2 ON (dn) – Provides PL AUX MNB power to OIU 2.

**STANDARD SWITCH PANEL 1**

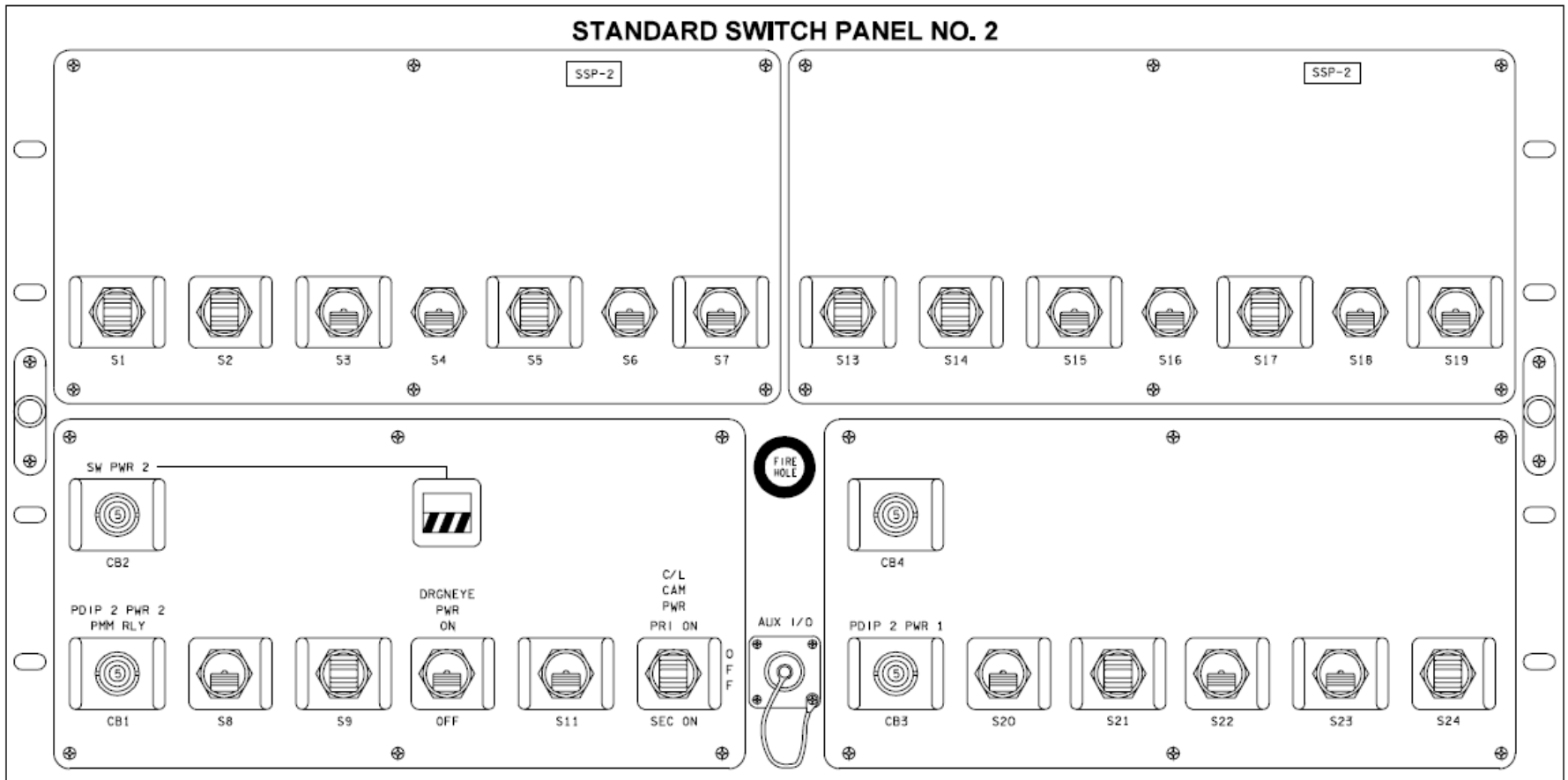
(ASSY OPS/ULF5/FIN 1) Page 3 of 3 pages

	Device Type	Function
DS13	Event indicator, three-position	UP – Indicates that CAB PL3 power is being supplied to OIU 1.  bp – Indicates power is removed from OIU 1 and OIU 2.  DN – Indicates that PL AUX MNB power is being supplied to OIU 2.
S15 TCS PWR	Two-position toggle switch:  Maintained – Maintained	ON (up) – Applies PL AUX MNB power to TCS.  OFF (dn) – Removes power to TCS.
DS15	Event indicator, two-position	gray – Indicates PL AUX MNB power is applied to TCS.  bp – Indicates power is removed from TCS.

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**STANDARD SWITCH PANEL 2**  
 (ASSY OPS/ULF5/FIN 1) Page 1 of 2 pages

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19409004\_133. PNL# 2

**STANDARD SWITCH PANEL 2**

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

	Device Type	Function
CB1  PDIP 2 PWR 2 PMM RLY	Circuit breaker, 5 amp	closed (in) - Applies CAB PL2 power to PDIP2 DC PWR 2 switch/outlet and PMM DATA switch.  open (out) - Removes orbiter power from PDIP2 DC PWR 2 and PMM DATA.
CB2  SW PWR 2	Circuit breaker, 5 amp	closed (in) - Applies CAB PL1 power to SSP2 S10 DRGNEYE PWR.  open (out) - Removes orbiter power from SSP2 S10 DRGNEYE PWR.
S10  DRGNEYE PWR	Toggle switch, two-position  Maintained- Maintained	ON (up) - Applies PL AFT MNB power to DragonEye.  OFF (dn) - Removes orbiter power from DragonEye.
DS10	Event indicator, two- position	gray - Indicates PL AFT MNB power is applied to DragonEye.  bp - Indicates power is removed from DragonEye.
S12  C/L CAM PWR	Toggle switch, three-position  Maintained- Maintained- Maintained	PRI ON (up) – Applies CAB PL3 power to PRI C/L CAM.  OFF (ctr) – Removes power from PRI/SEC C/L CAM.  SEC ON (dn) – Applies CAB PL1 power to SEC C/L CAM.
AUX I/O	Data connector	The AUX I/O connector is used as a port to send or receive data to external payloads. The AUX I/O will not be used for STS-133/ULF5
CB3  PDIP 2 PWR 1	Circuit breaker, 5 amp	closed (in) – Applies CAB PL2 power to PDIP2 DC PWR 1 outlet.  open (out) – Removes orbiter power from PDIP2 DC PWR 1 outlet.

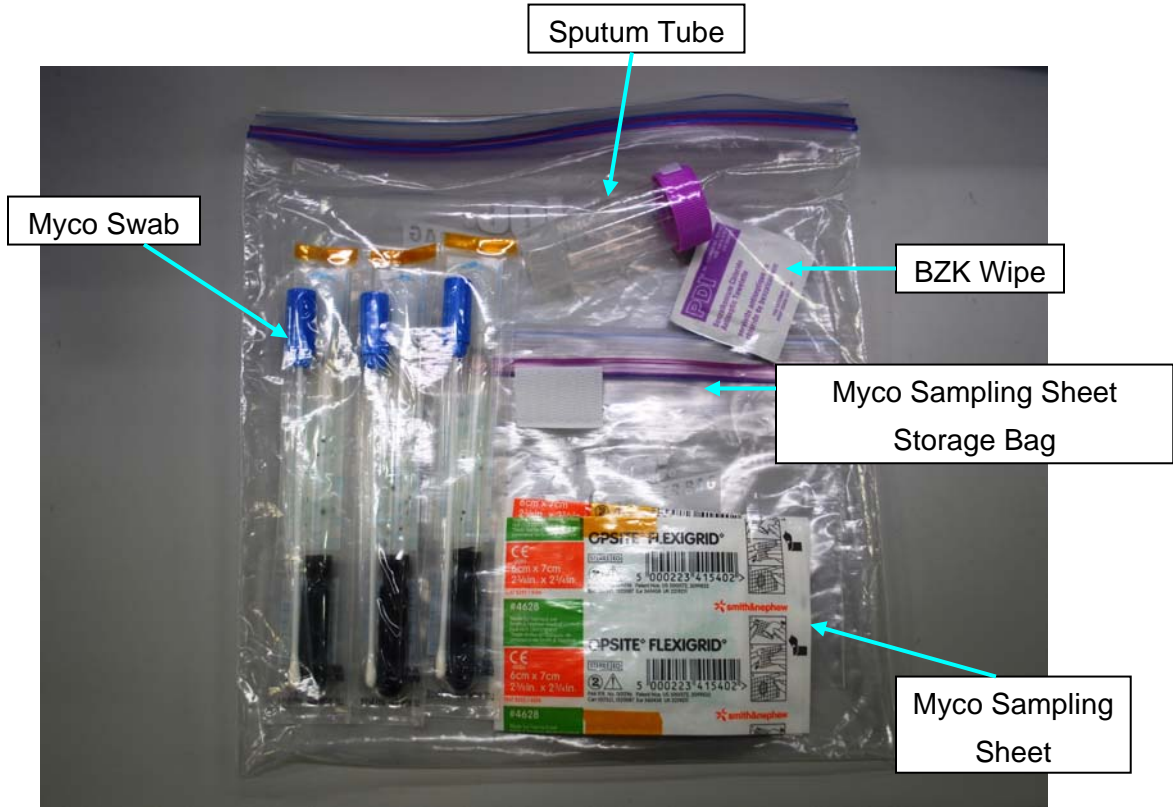


Figure 1.- Myco Kit.

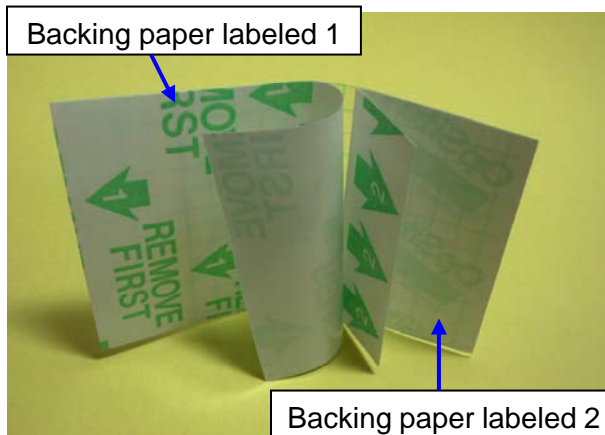


Figure 2.- Myco Sampling Sheet.



Figure 3.- Myco Sampling Sheet Storage Bag.

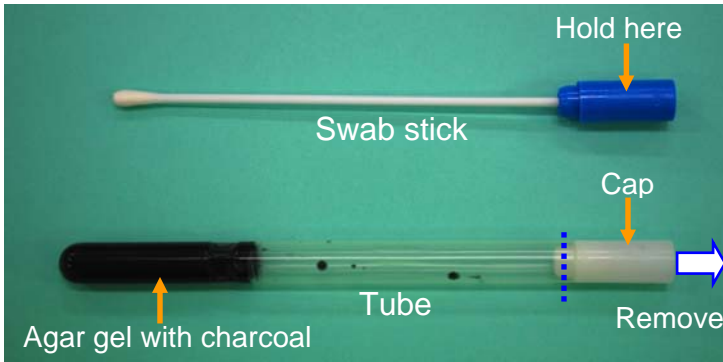


Figure 4.- Myco Swab.



Figure 5.- Sputum Tube.



CUE CARD

CUE CARD

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# CGBA STATUS CHECK

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

## 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 ✓ LED-MAIN POWER – On (green)

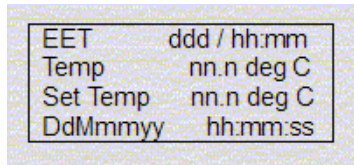
\*\*\*\*\*  
 \* If no LED  
 \* | Perform [CGBA INCORRECT \(NO\) DISPLAY](#), all (SODF:  
 \* | ASSY OPS: PAYLOADS: CGBA), then:  
 \*\*\*\*\*

1.2 ✓ 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 ✓ CGBA display indicates the following:



\*\*\*\*\*  
 \* If data incorrect or no display  
 \* | Perform [CGBA INCORRECT \(NO\) DISPLAY](#), all (SODF:  
 \* | ASSY OPS: PAYLOADS: CGBA), then:  
 \*\*\*\*\*

1.6 ✓ Temp = Set Temp ± 2° C

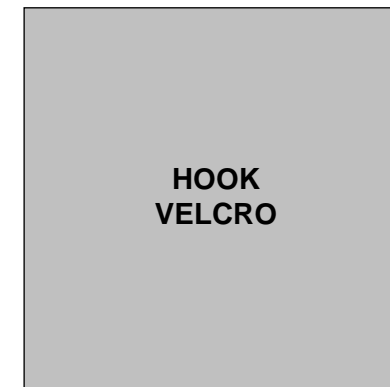
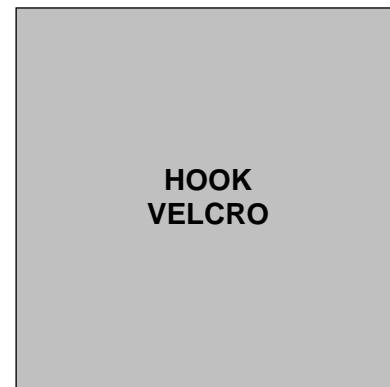
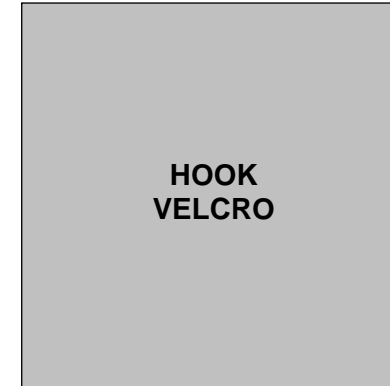
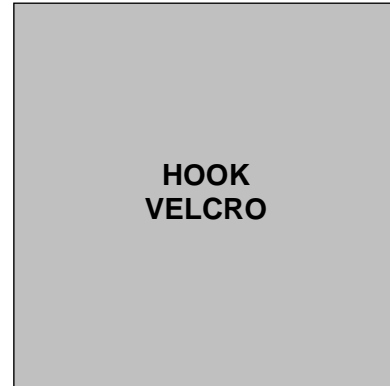
\*\*\*\*\*  
 \* If Temp incorrect, then  
 \* | Perform [CGBA INCORRECT TEMP](#), all (SODF: ASSY OPS:  
 \* | PAYLOADS: CGBA), then:  
 \*\*\*\*\*

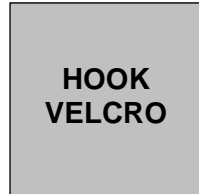
1.7 ✓ Time is incrementing

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 1) Page 1 of 2 pages

FORWARD

OBJECTIVE:

The following steps will perform a status check on the Glacier.

1. GLACIER STATUS CHECK

MF28E/G  
(Glacier)

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), 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 after Setpoint Control Mode activity

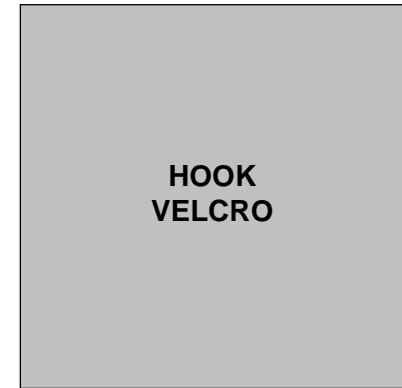
√Display – **‘CURR TEMP:’** is -95.0° C ± 5.0° C

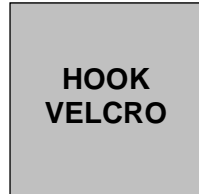
1.5 Record from Glacier front panel **‘GPS’**, **‘CURR TEMP’** in Table 1 (Glacier Log).

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
___:__:__	____.____°C	___:__:__	____.____°C
___:__:__	____.____°C	___:__:__	____.____°C
___:__:__	____.____°C	___:__:__	____.____°C
___:__:__	____.____°C	___:__:__	____.____°C
___:__:__	____.____°C	___:__:__	____.____°C
___:__:__	____.____°C	___:__:__	____.____°C
___:__:__	____.____°C	___:__:__	____.____°C
___:__:__	____.____°C	___:__:__	____.____°C
___:__:__	____.____°C	___:__:__	____.____°C





AFT

OBJECTIVE:

The following steps will perform a status check on the Glacier.

1. GLACIER STATUS CHECK

- MA16F/G (Glacier)
- 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), then:  
\*  
\* If ‘HOME’ not shown  
\* pb Right (EXIT) → Press until ‘HOME’ appears  
\*\*\*\*\*

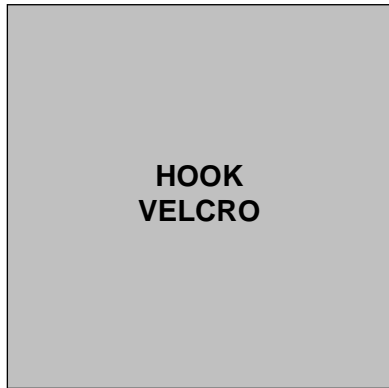
NOTE

After door openings, CURR TEMP may be out of range ramping toward set point.

- 1.4 If ascent Glacier  
√Display – ‘CURR TEMP:’ is -35.0° 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.

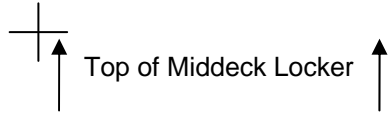
Table 1. Glacier Log

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
____:____:____	____.____°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.

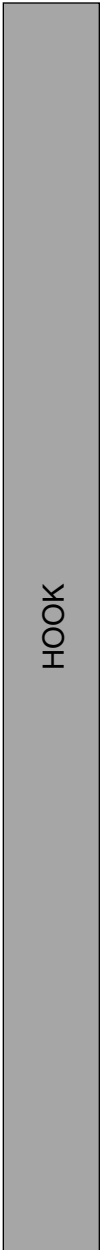


HINGE

ASSY OPS-3a/17A - ALL/A



**SPINAL ELONGATION STANDING HEIGHT LOG**  
(ASSY OPS/ULF5/FIN)



HINGE

ASSY OPS-3b/17A - ALL/A



350



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



**AEM UNIT #1 CHECK**  
(ASSY OPS/ULF5/FIN 1) Page 1 of 2 pages

OBJECTIVE:

To check the status of the Animal Enclosure Module Unit #1, and visually monitor mice well-being.

TOOLS:

Tissues  
Gray Tape

MF71K 1. Log (begin) "GMT" and "Observer" for appropriate Flight Day in Table 2.

2. Remove Muffler from locker door, temporarily stow.  
Unlatch, open locker door.

3. ✓FANS A&D, FANS B&C Its (two) – on (green)  
✓AEM Fans operating (audible)  
✓Fan airflow with Tissue, temporarily stow Tissue

\*\*\*\*\*  
\* If lights 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 (It on)  
✓AEM interior Its (two) – illuminated

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

7. Log water level in Table 2.

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

8. Log rodent observation in Table 2.

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

9. Push AEM into locker.

✓sw LIGHTS – AUTO  
✓cb LIGHTS A&D – open (It off)  
✓sw FANS – ON

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

11. Discard used Tissue in Trash.  
Temporarily stow Tissues.

12. Notify **MCC-H** of AEM UNIT #1 CHECK completion, any off-nominal rodent conditions.

**AEM UNIT #1 CHECK**  
(ASSY OPS/ULF5/FIN 1) Page 2 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 (3/second)	(R)apid	(S)hallow	(L)abored		(U)nable to determine
<b>Skin: (ears, toes, tail)</b>	(N)ormal: Pink	(D)ry/Scaly	(S)crapes/Cuts	(Sw)ollen/Red		(U)nable to determine
<b>Coat/Fur:</b>	(N)ormal: Smooth/shiny	(R)ough spiky, clump	(D)iscolored	(Du)ll or (W)et	(H)air Loss	(U)nable to determine
<b>Nose:</b>	(N)ormal: Clear	(D)ischarge: Red/Brown	(B)leeding	(O)ther		(U)nable to determine
<b>Eyes:</b>	(N)ormal: Shiny/clear	(D)ischarge: Red/Brown	(S)wollen	(O)ther		(U)nable to determine
<b>Appetite:</b>	(N)ormal Intake Food/water	(A)bnormal intake				(U)nable to determine
<b>Activity:</b>	(N)ormal: Bright/Alert	(L)istless (decreased)	Un(R)esponsive	(D)ead		(U)nable to determine
<b>Extremities:</b>	(N)ormal	(D)eformity or fracture	(A)mputated limb or digits	(B)leeding		(U)nable to determine
<b>Comments:</b>						

HOOK  
VELCRO

HOOK  
VELCRO

Table 2. AEM Unit #1 Check Log

	FD1	FD2	FD3	FD4	FD5	FD6	FD7	FD8
<b>GMT</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>								
	FD9	FD10	FD11	FD12	FD13	FD14	FD15	FD16
<b>GMT</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>								

HOOK  
VELCRO

HOOK  
VELCRO

**AEM UNIT #2 CHECK**

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

OBJECTIVE:

To check the status of the Animal Enclosure Module Unit #2, and visually monitor mice well-being.

TOOLS:

- Tissues
- Gray Tape

MF43K 1. Log (begin) "GMT" and "Observer" for appropriate Flight Day in Table 2.

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 lights 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 lights off  
 \* Perform AEM LIGHT CYCLE INCORRECT (OFF) DURING OPERATIONS,  
 \* all (SODF: ASSY OPS: PAYLOADS), then:  
 \*\*\*\*\*

7. Log water level in Table 2.

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

8. Log rodent observation in Table 2.

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

9. Push AEM into locker.

✓sw LIGHTS – AUTO  
 ✓cb LIGHTS A&D – open (lt off)  
 ✓sw FANS – ON

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

11. Discard used Tissue in Trash.  
Temporarily stow Tissues.

12. Notify **MCC-H** of AEM UNIT #2 CHECK completion, any off-nominal rodent conditions.

**AEM UNIT #2 CHECK**  
(ASSY OPS/ULF5/FIN 1) Page 2 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 (3/second)	(R)apid	(S)hallow	(L)abored		(U)nable to determine
<b>Skin: (ears, toes, tail)</b>	(N)ormal: Pink	(D)ry/Scaly	(S)crapes/Cuts	(Sw)ollen/Red		(U)nable to determine
<b>Coat/Fur:</b>	(N)ormal: Smooth/shiny	(R)ough spiky, clump	(D)iscolored	(Du)ll or (W)et	(H)air Loss	(U)nable to determine
<b>Nose:</b>	(N)ormal: Clear	(D)ischarge: Red/Brown	(B)leeding	(O)ther		(U)nable to determine
<b>Eyes:</b>	(N)ormal: Shiny/clear	(D)ischarge: Red/Brown	(S)wollen	(O)ther		(U)nable to determine
<b>Appetite:</b>	(N)ormal Intake Food/water	(A)bnormal intake				(U)nable to determine
<b>Activity:</b>	(N)ormal: Bright/Alert	(L)istless (decreased)	Un(R)esponsive	(D)ead		(U)nable to determine
<b>Extremities:</b>	(N)ormal	(D)eformity or fracture	(A)mputated limb or digits	(B)leeding		(U)nable to determine
<b>Comments:</b>						

HOOK  
VELCRO

HOOK  
VELCRO

Table 2. AEM Unit #2 Check Log

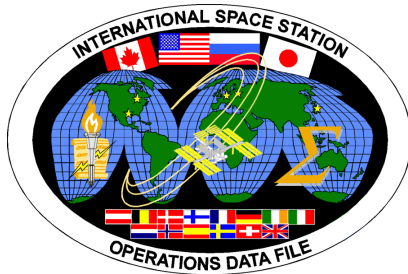
	FD1	FD2	FD3	FD4	FD5	FD6	FD7	FD8
<b>GMT</b>								
<b>Observer</b>								
<b>Water Lft/Rt</b>								
<b>Respiration</b>								
<b>Skin</b>								
<b>Coat/Fur</b>								
<b>Nose</b>								
<b>Eyes</b>								
<b>Appetite</b>								
<b>Activity</b>								
<b>Extremities</b>								
<b>Comments</b>								
	FD9	FD10	FD11	FD12	FD13	FD14	FD15	FD16
<b>GMT</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>								

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VELCRO

HOOK  
VELCRO

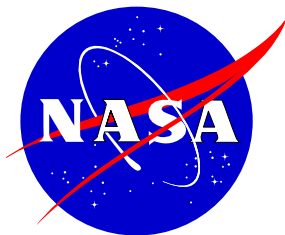
JSC-48502-ULF5  
12 OCT 2010

APPLICABLE FOR ISS-ULF5



# INTERNATIONAL SPACE STATION

## ASSEMBLY OPERATIONS



Return on  
STS-133

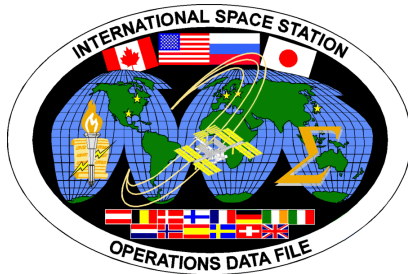






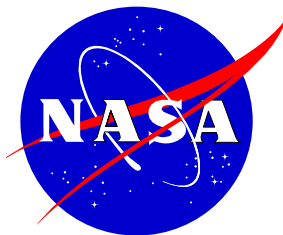
JSC-48502-ULF5  
12 OCT 2010

APPLICABLE FOR ISS-ULF5



# INTERNATIONAL SPACE STATION

## ASSEMBLY OPERATIONS



Return on  
STS-133



