



International Space Station Assembly Operations Book

ISS-2J/A

Mission Operations Directorate
Operations Division

20 MAY 09

This publication replaces
all previous publications.
These procedures are available
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National Aeronautics and
Space Administration

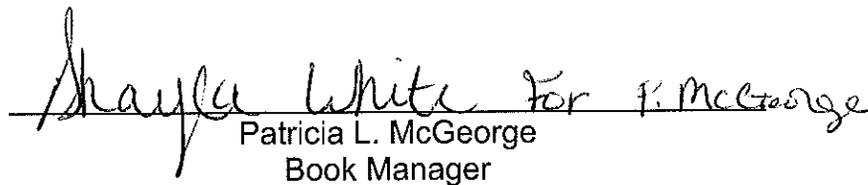
Lyndon B. Johnson Space Center
Houston, Texas



**INTERNATIONAL SPACE STATION
ASSEMBLY OPERATIONS BOOK
ISS-2J/A**

20 MAY 09

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

None

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ASSEMBLY OPERATIONS
ISS-2J/A**

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ACTIVATION AND CHECKOUT

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1.101 EFBM CURRENT MONITOR FOR JEF BERTHING

(ASSY OPS/2JA/FIN/HC)

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OBJECTIVE:

Monitor input current to Berthing Mechanism Electronics Package (BEP) to assess the bolting torque on the ground. The preparation task (steps 1 to 4) will be performed twice in parallel with BCDU ops in [1.102 ACTIVE EFBM OPS FOR JEF BERTHING](#). The setup and current monitor task requires coordination working with EFBM operator.

LOCATIONS:

JPM1D7

DURATION:

60 minutes

10 minutes for preparation

10 minutes for setup

30 minutes for current monitor (in parallel with 1.102 ACTIVE EFBM OPS FOR JEF BERTHING)

10 minutes for closeout

CREW:

One

MATERIALS:

9V Alkaline Battery (if Battery change out required)

Telatemp temperature recorder decal

TOOLS:

Mini-Maglite (if required)

DCS 760 Camera

Scopemeter Power Adapter (SMPA)

Scopemeter and Accessories Kit:

Scopemeter P/N SEG39129678-303

Scopemeter Current Probe Kit:

Scopemeter Current Probe P/N SEG39130242-301

ISS IVA Toolbox:

Drawer 2:

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

Ratchet, 1/4" Drive

(5-35 in-lbs) Trq Driver, 1/4" Drive

Drawer 3:

4" Common Tip Screwdriver (if Battery change out required)

REFERENCE PROCEDURE(S):

1.102 ACTIVE EFBM OPS FOR JEF BERTHING

1. ACCESS

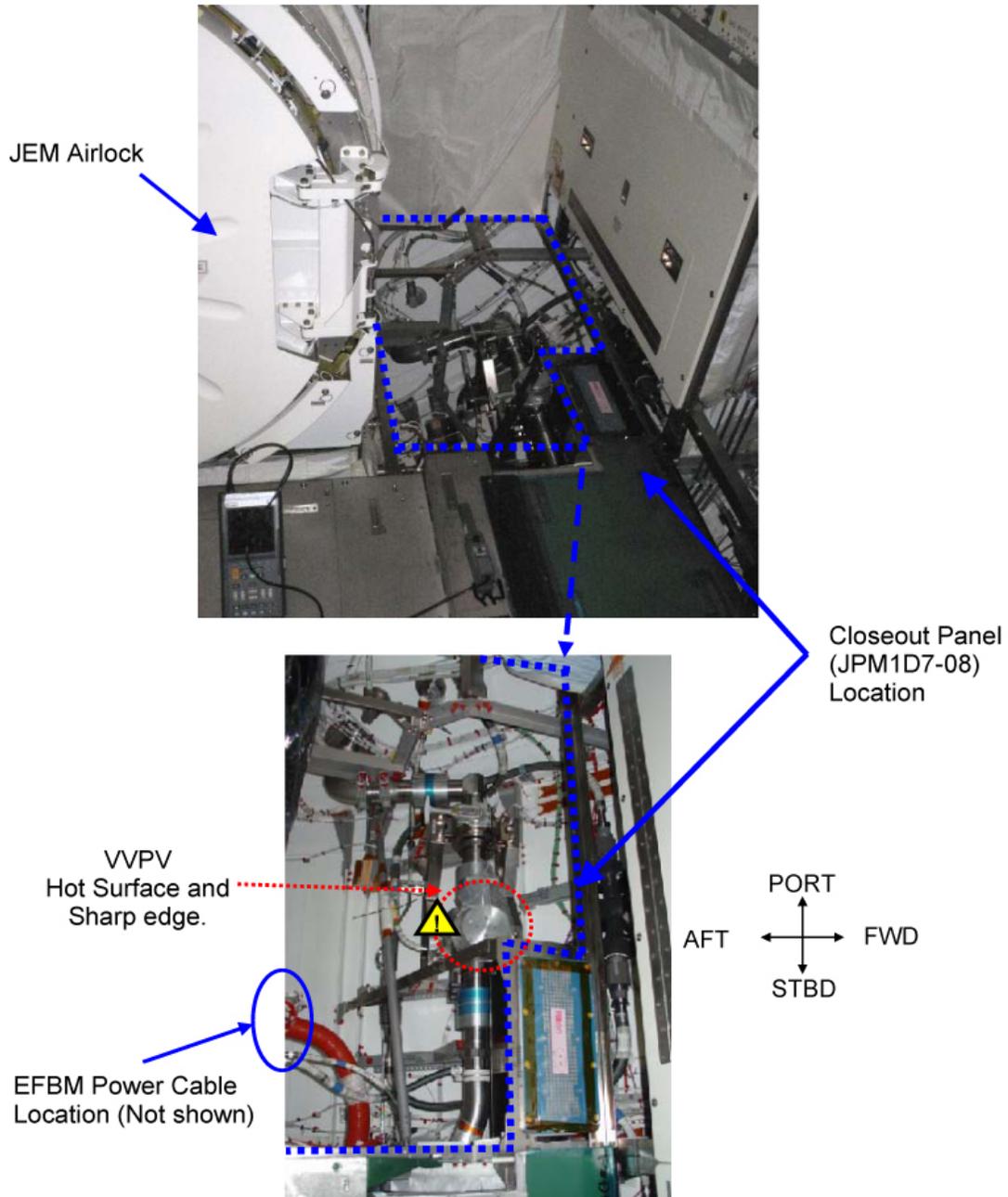


Figure 1. JPM1D7-08 Area Hazardous Equipment Location.

WARNING	
1. Vacuum Vent Pneumatic Valve (VVPV) may have hot surface. Care must be taken when accessing EFBM Power cable to prevent injury.	
2. Metal flexible hose for VVPV may have sharp edges. Care must be taken when accessing EFBM Power cable to prevent injury.	

1.101 EFBM CURRENT MONITOR FOR JEF BERTHING
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- JPM1D7 1.1 Remove Closeout Panel JPM1D7-08, fasteners (nineteen) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Temporarily stow. Refer to Figure 1.

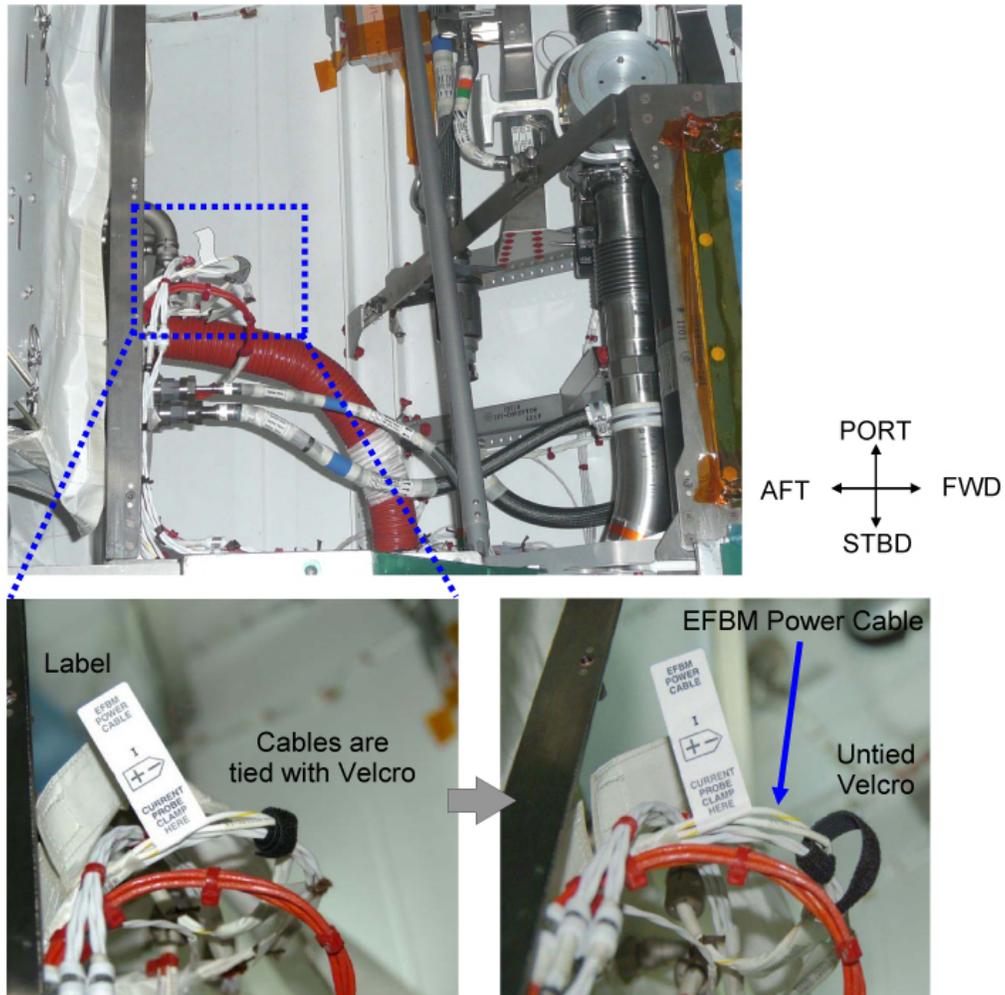


Figure 2. EFBM Power Cable Location (with Velcro).

- 1.2 Untie Velcro from cables. Refer to Figure 2.

2. SETUP SCOPEMETER AND CURRENT PROBE



Acceptable Telatemp Decal



Telatemp Decal after exposure to 49 degree C

Figure 3. Telatemp Temperature Recorder Decal (before, after exposure to 49 degrees C).

- 2.1 Locate Telatemp decal on Scopemeter and Scopemeter Current Probe.
If decal indicates exposure to 49 degrees C (120 degrees F) or more, do not use scopemeter and inform **SSIPC**.
Refer to Figure 3.



Figure 4. Scopemeter Current Probe Connected to Scopemeter INPUT A.

- 2.2 Scopemeter Current Probe →|← INPUT A (red) on Scopemeter
Refer to Figure 4.

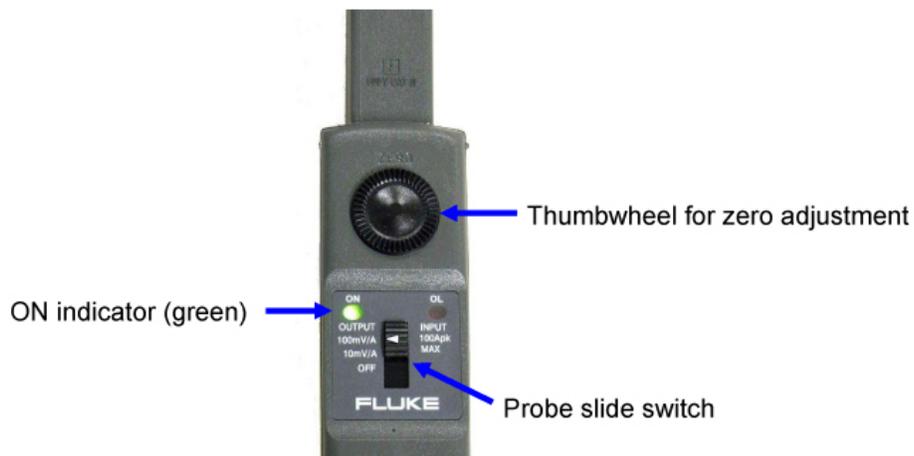


Figure 5. Top Surface of Current Probe.

- 2.3 Select 100mV/A on Scopemeter Current Probe using probe slide switch.
Refer to Figure 5.
- 2.4 Verify Scopemeter Current Probe ON indicator – illuminated (good Current Probe Battery indication).

If no light ON or dim,

Replace Scopemeter Current Probe Battery (9V Battery) by removing captive screw on back of probe (4" Common Tip Screwdriver).

3. CURRENT MONITOR PREPARATION

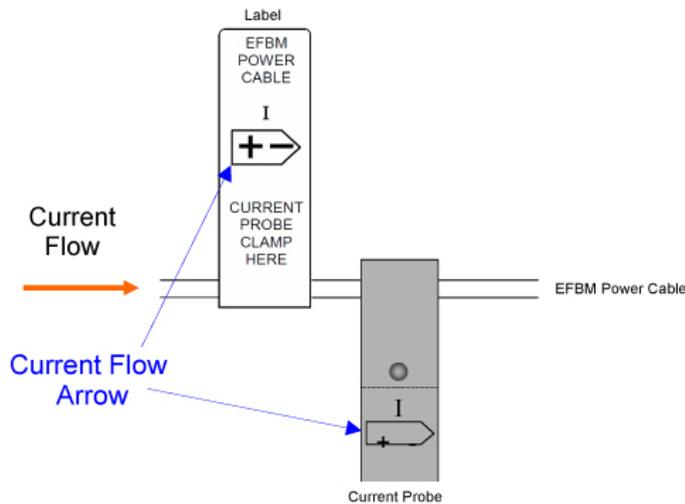
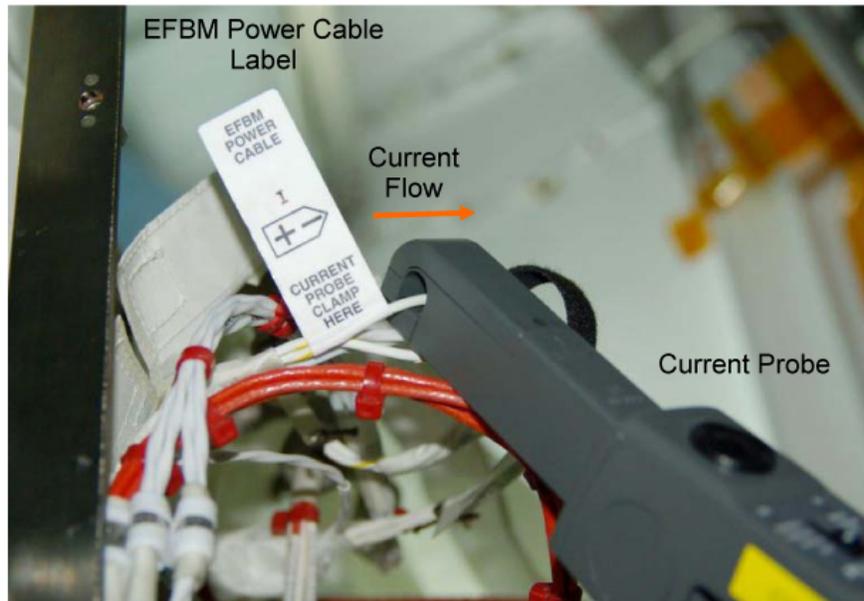


Figure 6. Current Monitor Configuration.

- 3.1 Grip Scopemeter Current Probe, open jaws.
Place wire EFBM Power Cable in notch of Scopemeter Current Probe,
close jaws.
Verify Current Flow Arrow orientation is as shown in Figure 6.

4. CONFIGURING SCOPEMETER

- 4.1 Powering On Scopemeter
While holding down F5
Press and release ON/OFF.

Listen for two beeps, release F5.

4.2 Configuring Scopemeter Input A

Press INPUT A.
Press F5 (PROBE A MENU).
Press F5 (SELECT ITEM).
Use blue arrow keys to scroll down and highlight "100 mV/A."
Press F5 (SELECT ITEM).
Press F1 (CLOSE).
Press SCOPEMETER (to return to main menu).

NOTE

Probe should not be used to measure current on more than one wire at a time.

4.3 Zeroing Scopemeter Current Probe

Leave jaws closed.
Use thumbwheel on top of probe to zero probe.
Verify on Scopemeter Display (± 0.005) on "A DC" scale.

4.4 Turning Off INPUT B

Press F1 (SCOPE).
Press INPUT B.
Press F2 (deselect DISPLAY INPUT B).
Press SCOPEMETER (to return to main menu).

Notify EFBM operator, "Current Probe zeroing complete, Go for powering on BEP."

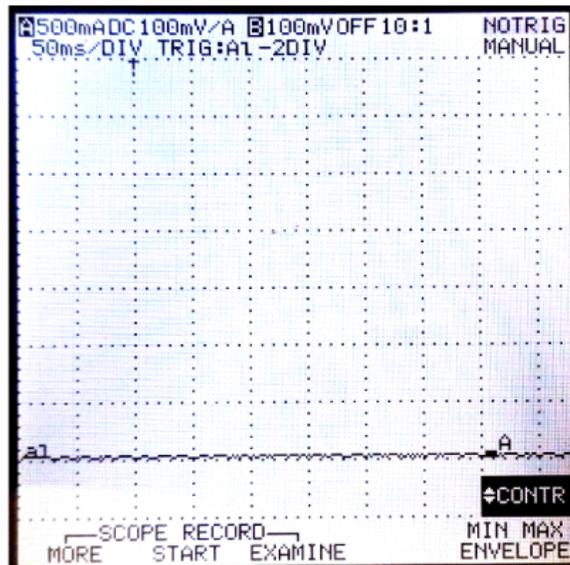


Figure 7. Display of Scope Record Mode (after pressing MIN MAX RECORD).

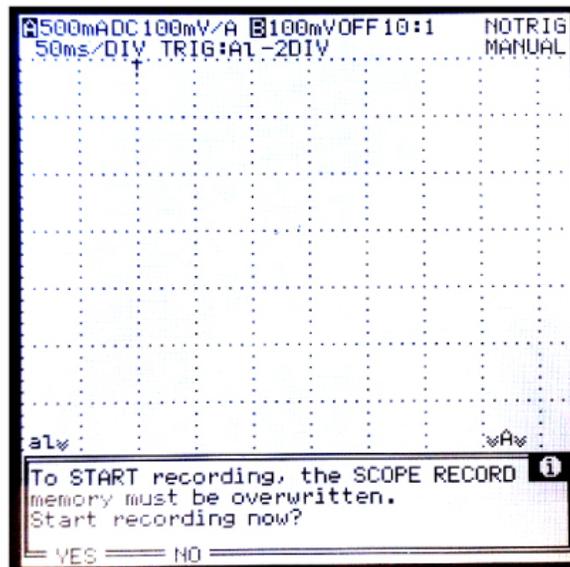


Figure 8. Display of Scope Record Mode (overwrite confirmation message).

4.5 Checking Out Scope Recording Function

Press MIN MAX RECORD.
Refer to Figure 7.
Press F2 (START).

If necessary

Press F1 (YES) to overwrite previous recording.
Refer to Figure 8.

Verify live waveform is displayed and RUN is on the top right corner.

Wait 20 seconds for sample recording.

Press HOLD RUN (to stop the recording).
Verify RUN changes to HOLD.

4.6 Powering Off Current Probe And Scopemeter

If EFBM operator is already performing

[1.102 ACTIVE EFBM OPS FOR JEF BERTHING](#) (SODF: ASSY OPS: ACTIVATION AND CHECKOUT) after step 4.5, then:
Go to [step 4.7](#).

Notify EFBM operator, "Scopemeter checkout complete, Go for powering off BEP."

Select OFF on Scopemeter Current Probe using slide switch.
Press ON/OFF (to powerdown Scopemeter).
Disconnect Scopemeter, Scopemeter Current Probe.

If powering off Current Probe and Scopemeter complete
Notify **SSIPC** of task completion. >>

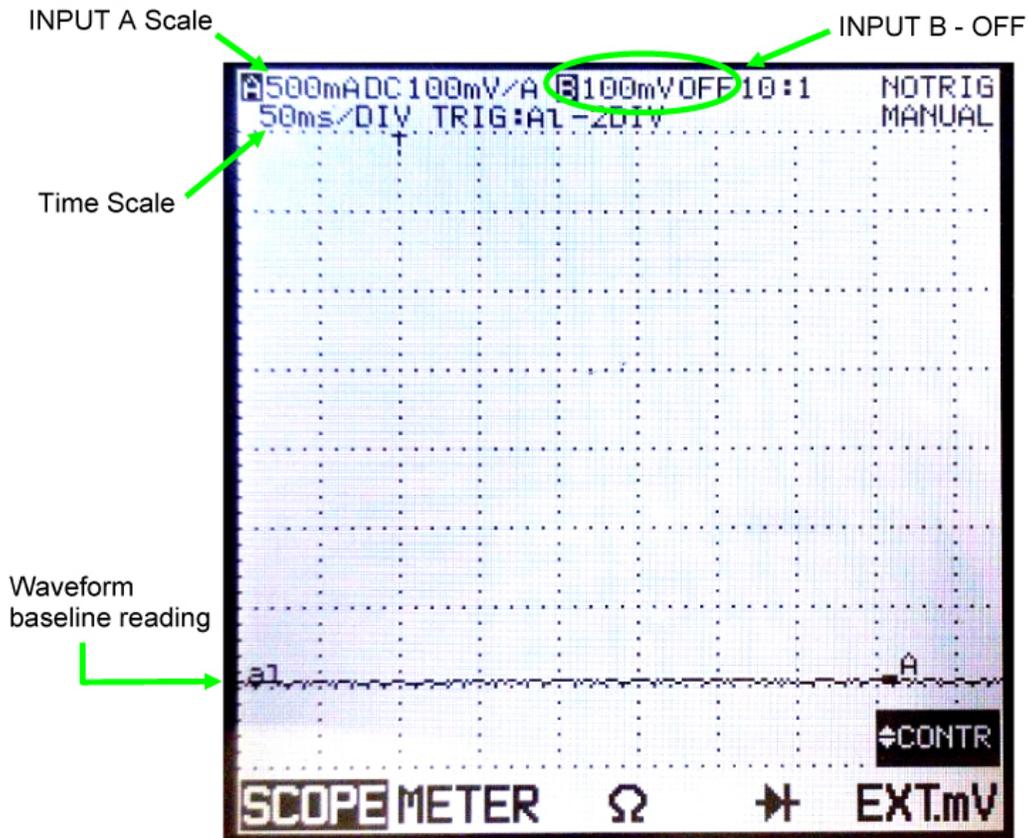


Figure 9. Display of Scopemeter Mode.

4.7 Configuring Oscilloscope Display

Press "S" on TIME button until Time Scale reads "50ms/DIV."
Press "V" on RANGE button of INPUT A until INPUT A Scale reads "500mADC 100mV/A."
Press INPUT A MOVE (up or down) button until baseline reading is located at first division of cell.
Refer to Figure 9.

5. RECORDING CURRENT ON EFBM STRUCTURAL LATCH OPS

CAUTION

BEP primary current can be measured using FLUKE current probe and scopemeter, then crewmember and/or ground support members can check if BEP primary current profiles have one(two) peaks and/or sudden falling pattern as shown in Figure 10(11). If they cannot confirm these peaks, this indicates that the torque detection circuit has failed.

NOTE

1. It takes ~3:15 until the structural latch drive stops and current peaks are detected.
2. When the time base range is 50 ms/DIV, scopemeter memory can store 60 seconds of data for a single channel waveform. If the recording time is greater than 60 seconds, then the memory is overwritten to store the latest 60 seconds of data.
3. Data recording must be stopped within 20 seconds after the completion of the structural latch drive, since the expected time for the waveform of interest is approximately 15 seconds prior to the completion of the structural latch drive.
4. Steps 5 through 7(8) must be repeated for Structural Latch B and A (SL B and A) ops.
5. The success of the structural latch motion will be determined by **SSIPC** based on current peaks and deltas measured in step 7(8).

- 5.1 On EFBM operator, "Ready for Structural Latch B(A) extension, start the current recording."

Press F2 (START).

If necessary

Press F1 (YES) to overwrite previous recording.

Verify RUN is displayed.

- 5.2 On EFBM operator, "Structural Latch extension complete, stop the current recording."

Within 20 seconds of completion of EFBM operations

Press HOLD RUN (to stop the recording).

Verify RUN changes to HOLD.

6. VERIFYING CURRENT PEAKS

NOTE

1. The following cursor settings will measure the maximum current value for the reading points (two or four). The goal is to determine the delta between Reading Points 1 and 2 (or Reading Points 3 and 4). Refer to Figure 10(11).
2. During SL B(SL A) operations, two structural latch bolts are simultaneously driven by independent actuating motors.

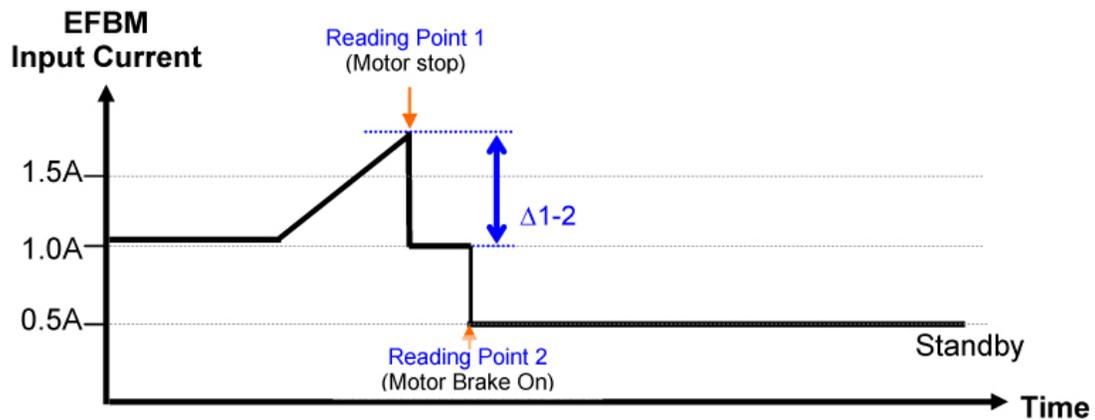


Figure 10. One Peak Waveform Image of EFBM Input Current.

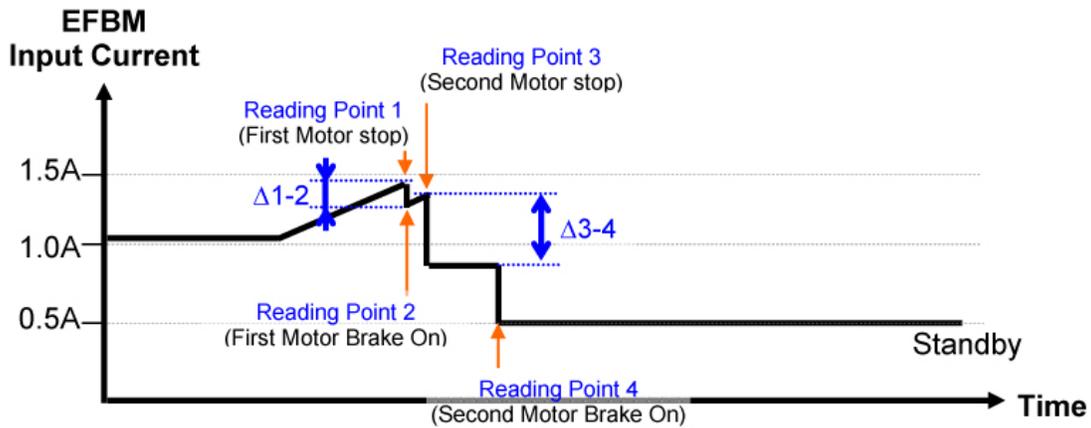


Figure 11. Two Peaks Waveform Image of EFBM Input Current.

- 6.1 If waveform has 2 current peaks
 - Go to step 8.
 - Refer to Figures 10 and 11.

7. MEASURING CURRENT PEAKS FOR ONE PEAK

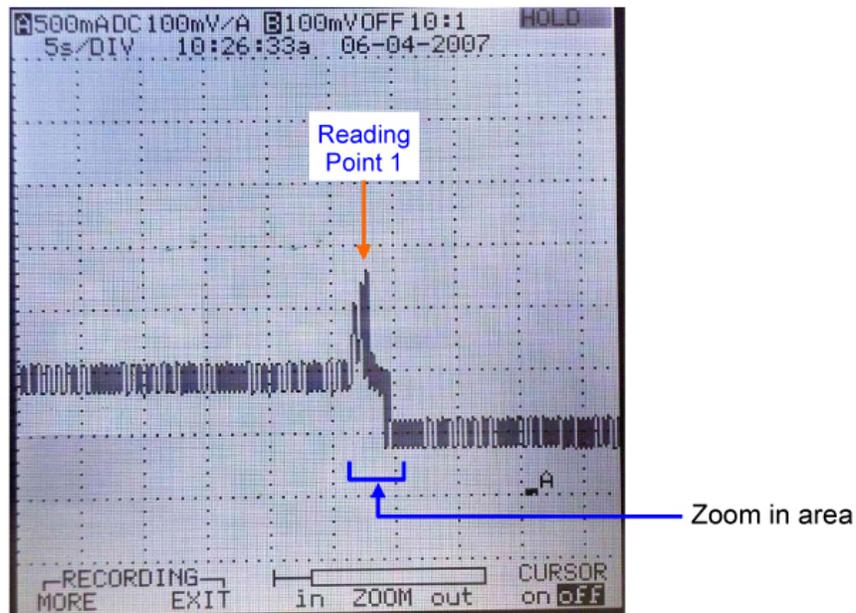


Figure 12. Waveform of One Current Peak.

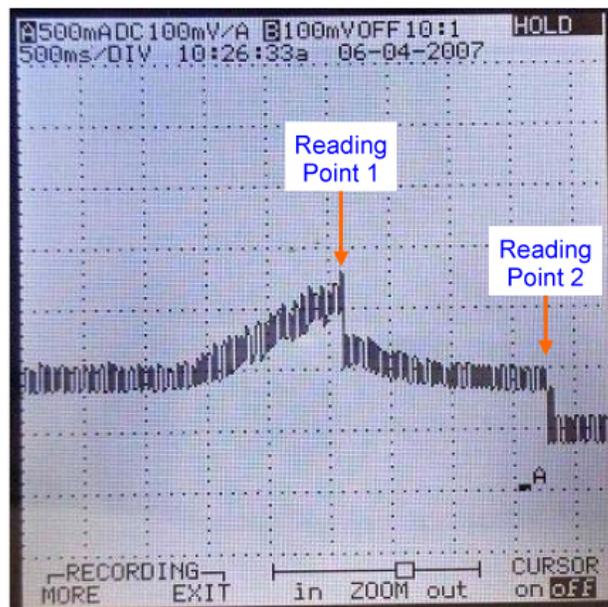


Figure 13. Waveform Around Reading Point 1 (Zoomed in).

7.1 Press F4 (ZOOM out) twice.
Use MOVE (left or right) button to center area of interest in display.
Refer to Figure 12.

Press F3 (ZOOM in) to provide better resolution around Reading Point 1.
Refer to Figure 13.

7.2 Press F5 (select CURSOR on).

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Press F1 (MORE).
Press F4 (NEXT PAGE).
Use blue arrow keys to highlight "READINGS ON DISPLAY."
Press F5 (SELECT ITEM).
Use blue arrow keys to highlight "1."
Press F5 (SELECT ITEM).
Use blue arrow keys to highlight "ADD MAIN READING."
Press F5 (SELECT ITEM).
Use blue arrow keys to scroll down and highlight "Amax peak."
Press F5 (SELECT ITEM).
Press F1 (CLOSE).

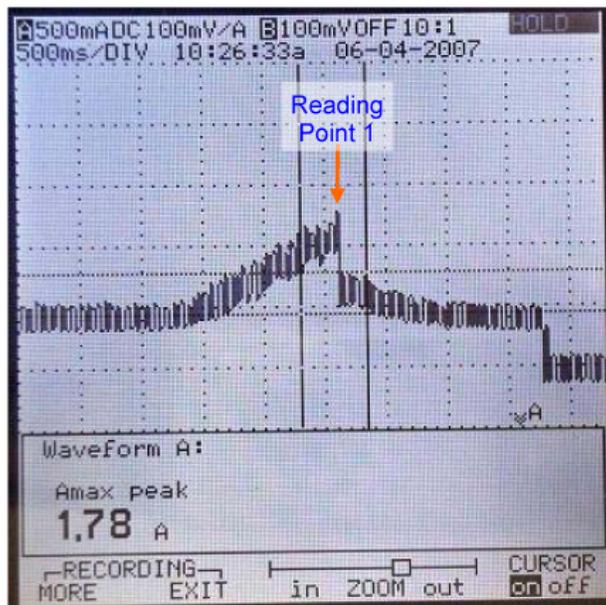


Figure 14. Maximum Current Value of Reading Point 1.

7.3 Use LEFT CURSOR and RIGHT CURSOR buttons to position cursors as shown in Figure 14.

Record Amax peak: _____ A [Reading Point 1] for SL B

Record Amax peak: _____ A [Reading Point 1] for SL A

7.4 Photo document Scopemeter display (DCS 760 Camera).

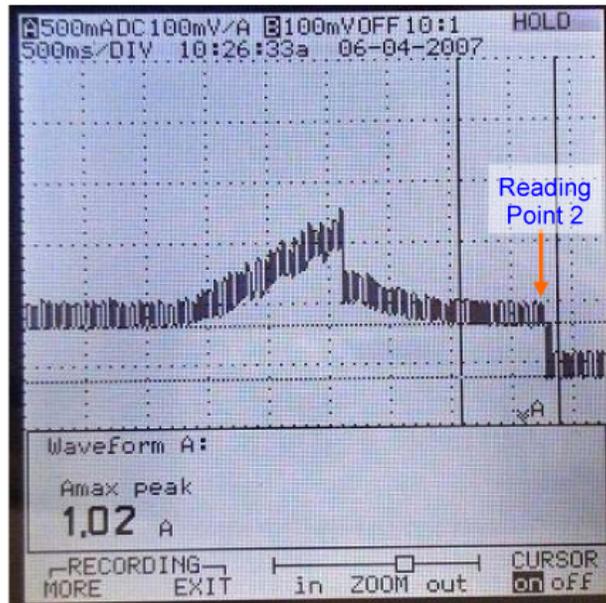


Figure 15. Maximum Current Value of Reading Point 2.

- 7.5 Use LEFT CURSOR and RIGHT CURSOR buttons to position cursors as shown in Figure 14.

Record Amax peak: _____ A [Reading Point 2] for SL B
Record Amax peak: _____ A [Reading Point 2] for SL A

- 7.6 Photo document Scopemeter display (DCS 760 Camera).

NOTE

Refer to step 7.3 for [Reading Point 1] and refer to step 7.5 for [Reading Point 2].

- 7.7 Inform **SSIPC** of the recorded current peaks ([Reading Point 1], [Reading Point 2]).
- 7.8 Repeat steps 5 through 7(8) for Structural Latch A.
- 7.9 Go to step 9.

8. MEASURING CURRENT PEAKS FOR TWO PEAKS

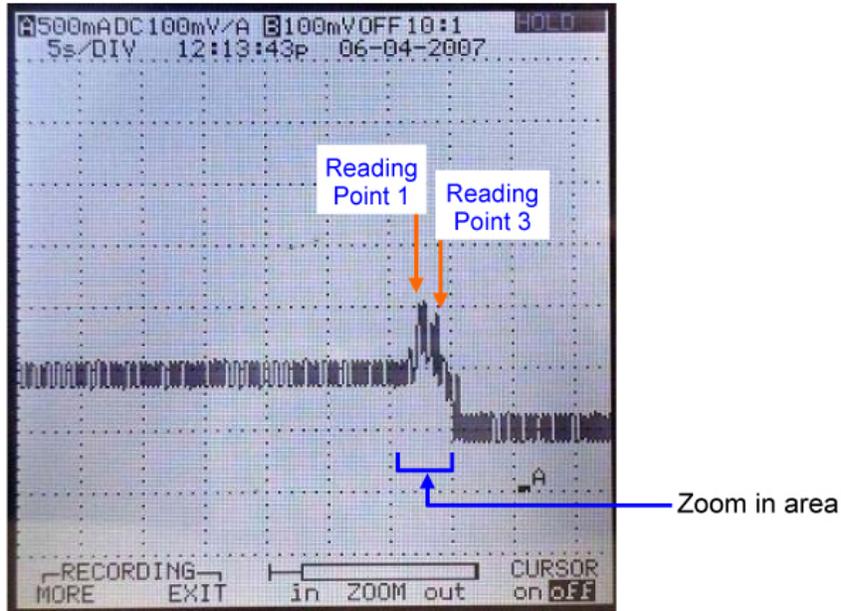


Figure 16. Waveform of Two Current Peaks.

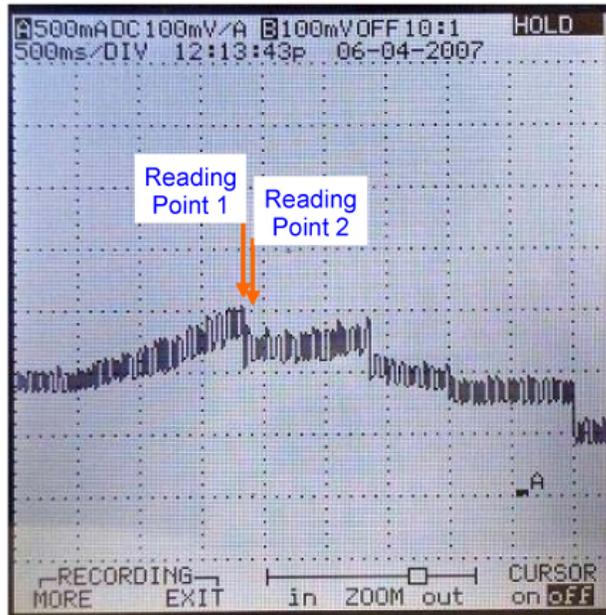


Figure 17. Waveform Around Reading Point 1 (Zoomed in).

8.1 Press F4 (ZOOM out) twice.
Use MOVE (left or right) button to center area of interest in display.
Refer to Figure 16.

Press F3 (ZOOM in) to provide better resolution around Reading Point 1.
Refer to Figure 17.

8.2 Press F5 (select CURSOR on).

1.101 EFBM CURRENT MONITOR FOR JEF BERTHING

(ASSY OPS/2JA/FIN/HC)

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- Press F1 (MORE).
- Press F4 (NEXT PAGE).
- Use blue arrow keys to highlight "READINGS ON DISPLAY."
- Press F5 (SELECT ITEM).
- Use blue arrow keys to highlight "1."
- Press F5 (SELECT ITEM).
- Use blue arrow keys to highlight "ADD MAIN READING."
- Press F5 (SELECT ITEM).
- Use blue arrow keys to scroll down and highlight "Amax peak."
- Press F5 (SELECT ITEM).
- Press F1 (CLOSE).

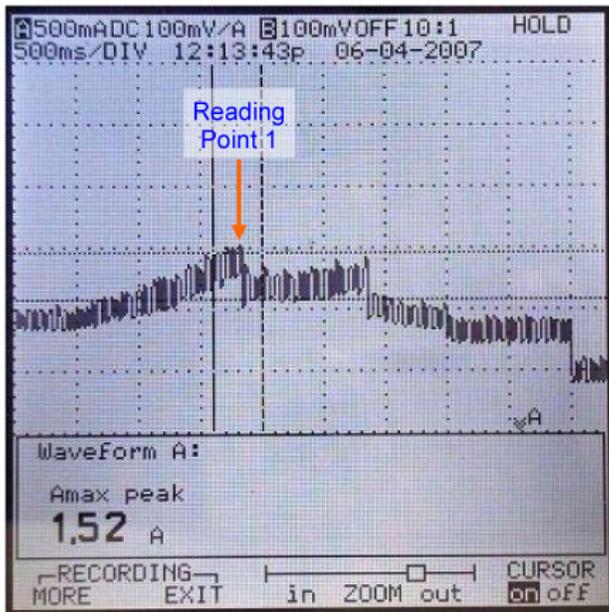


Figure 18. Maximum Current Value of Reading Point 1.

- 8.3 Use LEFT CURSOR and RIGHT CURSOR buttons to position cursors as shown in Figure 18.

Record Amax peak: _____ A [Reading Point 1] for SL B
Record Amax peak: _____ A [Reading Point 1] for SL A

- 8.4 Photo document Scopemeter display (DCS 760 Camera).

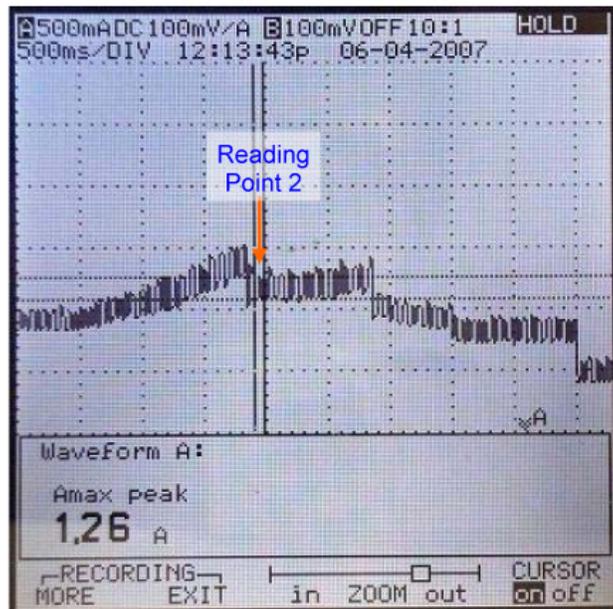


Figure 19. Maximum Current Value of Reading Point 2.

- 8.5 Use LEFT CURSOR and RIGHT CURSOR buttons to position cursors as shown in Figure 19.

Record Amax peak: _____ A [Reading Point 2] for SL B
Record Amax peak: _____ A [Reading Point 2] for SL A

- 8.6 Photo document Scopemeter display (DCS 760 Camera).

NOTE

Refer to [step 8.3](#) for [Reading Point 1] and refer to [step 8.5](#) for [Reading Point 2].

- 8.7 Inform **SSIPC** of the recorded current peaks ([Reading Point 1], [Reading Point 2]).

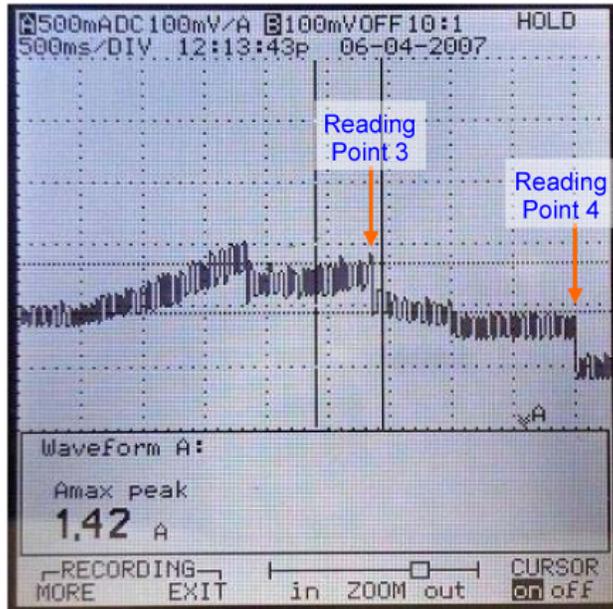


Figure 20. Waveform of Reading Points 3 and 4.

- 8.8 Use MOVE (left or right) button to show the waveform of Reading Points 3 and 4.
 Use LEFT CURSOR and RIGHT CURSOR buttons to position cursors as shown in Figure 20.

Record Amax peak: _____ A [Reading Point 3] for SL B
 Record Amax peak: _____ A [Reading Point 3] for SL A

- 8.9 Photo document Scopemeter display (DCS 760 Camera).

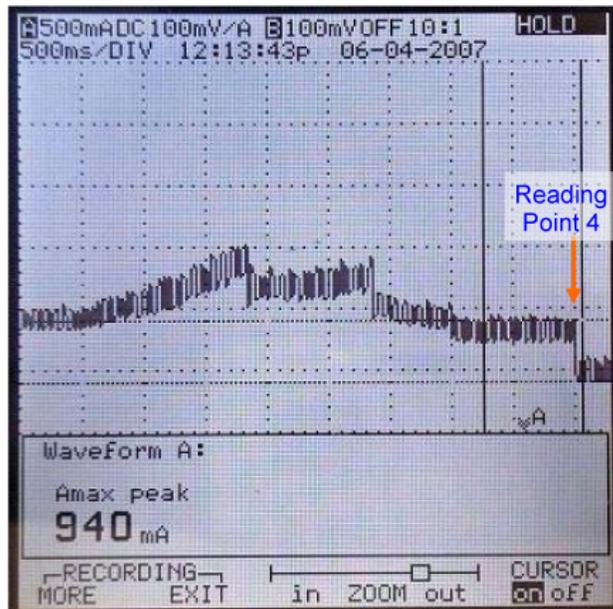


Figure 21. Maximum Current Value of Reading Point 4.

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- 8.10 Use LEFT CURSOR and RIGHT CURSOR buttons to position cursors as shown in Figure 21.

Record Amax peak: _____ A [Reading Point 4] for SL B

Record Amax peak: _____ A [Reading Point 4] for SL A

- 8.11 Photo document Scopemeter display (DCS 760 Camera).

NOTE

Refer to [step 8.8](#) for [Reading Point 3] and refer to [step 8.10](#) for [Reading Point 4].

- 8.12 Inform **SSIPC** of the recorded current peaks ([Reading Point 3], [Reading Point 4]).

Repeat [steps 5](#) through [7\(8\)](#) for Structural Latch A.

9. CLEANUP

- 9.1 Select OFF on Scopemeter Current Probe using slide switch.
- 9.2 Press ON/OFF (to powerdown Scopemeter).
- 9.3 Disconnect Scopemeter, Scopemeter Current Probe.
- 9.4 Remove Scopemeter Current Probe from EFBM Power Cable.
- 9.5 Tie cables include EFBM Power Cable with Velcro.
Refer to Figure 2.

10. CLOSEOUT

- 10.1 Tighten, torque fasteners (one per corner, total four) at each corner of Closeout Panel (JPM1D7-08), to 27 in-lbs [Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive; (5-35 in-lbs) Trq Driver, 1/4" Drive].
- 10.2 Notify **SSIPC** of task completion.
Stow tools, equipment.

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1.102 ACTIVE EFBM OPS FOR JEF BERTHING

(ASSY OPS/2JA/FIN/HC)

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OBJECTIVE:

Perform the Active Exposed Facility Berthing Mechanism (EFBM) operation for JEM Exposed Facility (JEF) berthing. Perform capture, bolting and connect umbilicals of the JEM Exposed Facility (JEF) following translation into Ready to Latch (RTL) position by the SSRMS. EFBM capture latches are driven through a multistage capture sequence, then all four structural latches are engaged into their respective nut mechanism, then all eighteen umbilicals are connected into their connectors.

LOCATION:

JPM1F4 (WS Rack)

JPM1D7 (JEM AL)

DURATION:

1 hour 30 minutes (not including steps 7 and 8).

20 minutes for Preparation (steps 1 to 5)

5 minutes for Capture Latch deploy (step 6)

5 minutes for Deactivating as required (step 7)

5 minutes for Activating as required (step 8)

10 minutes for Capture (steps 9 to 10)

30 minutes for Structural Latch extension (steps 11 to 14)

5 minutes for Umbilicals extension (step 15)

20 minutes for closing (steps 16 to 20)

CREW:

One

REFERENCE PROCEDURE:

2.610 PICKLIST ROUTING

MATERIALS:

6" x 6" Ziplock Bag, "BCDU Caps"

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

5/16" Socket, 1/4" Drive

Drawer 5:

Static Wrist Tether

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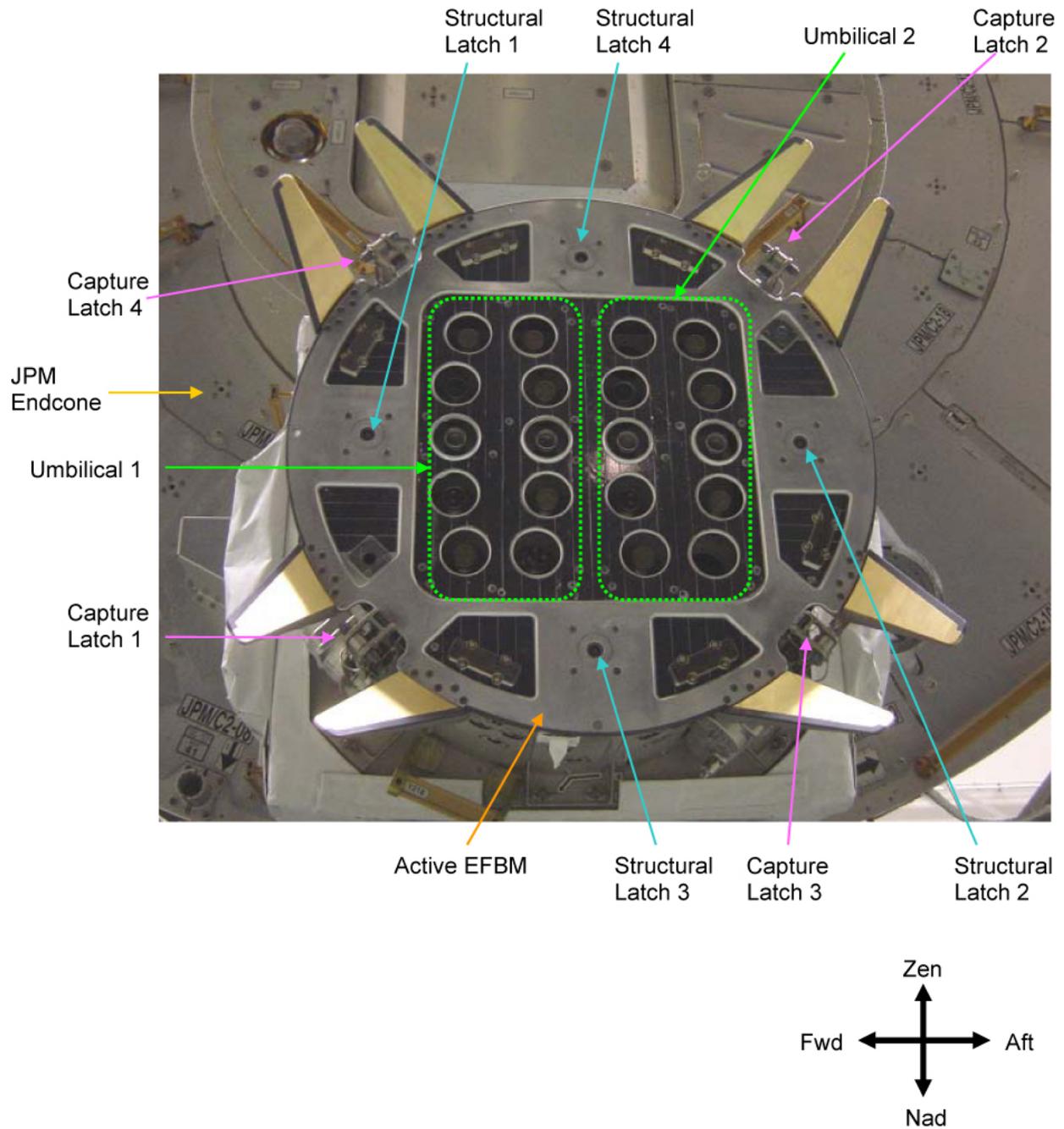


Figure 1. Active EFBM Configuration (Initial Configuration).

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.
2. Crewmember can use RMS Mon1(2) for secondary view as needed.
3. Crewmember may not use two CCPs simultaneously because the VCU does not have a capability to receive two Camera-control commands at the same time.
4. When configuring Video System on SLT(RLT), Monitor should be selected first, then Camera.
5. For all non-JEM related Cameras, the pan, tilt and zoom must be checked on PCS. **MCC-H** can direct you to the appropriate PCS Camera status Reader display to obtain telemetry. These displays can be found at:
C&T: Video Status Reader Video Status Reader
6. For all JEM related Cameras, the pan, tilt and zoom values must be checked on RLT or RMS monitors. These values are not displayed on WS monitors or SLT.
7. Structural Latches 1(3) and 2(4) are operated when SL A(SL B) switch is selected.
8. In order to route USOS Cameras, [2.610 PICKLIST ROUTING](#), steps 1 to 4 (SODF: C&T: NOMINAL: 2.6 VIDEO) can be referenced.

1. CONNECTING BCDU TO BERTHING MECHANISM ELECTRONICS PACKAGE (BEP)

- | | | |
|--------|-----|---|
| | 1.1 | If EVA is in progress

Notify EVA crew not to enter the keep-out zone around Active EFBM. |
| SLT | 1.2 | JEM: JPM: EPS: Main: PDB a2
JPM EPS PDB a2
Verify RPC1 (BEP) – Open |
| JPM1D7 | 1.3 | Don Static Wrist Tether.
Attach clip to unpainted, unanodized metal surface. |

WARNING

The following Active EFBM operation from step 1.4 to 18.2 may cause shearing/pinching hazard to EVA crew if the crew is around Active EFBM.

- | | | |
|--|-----|---|
| | 1.4 | P011B on Jumper Cable (80AS51500-213) ← → Tethered Protective Cap
BCDU I/F FOR BM(J011B) on JPM 1/P7-106 ← → Tethered Protective Cap |
|--|-----|---|

1.102 ACTIVE EFBM OPS FOR JEF BERTHING

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P011B on Jumper Cable (80AS51500-213) →|← BCDU I/F FOR BM
(J011B) on JPM 1/P7-106

1.5 Doff Static Wrist Tether.

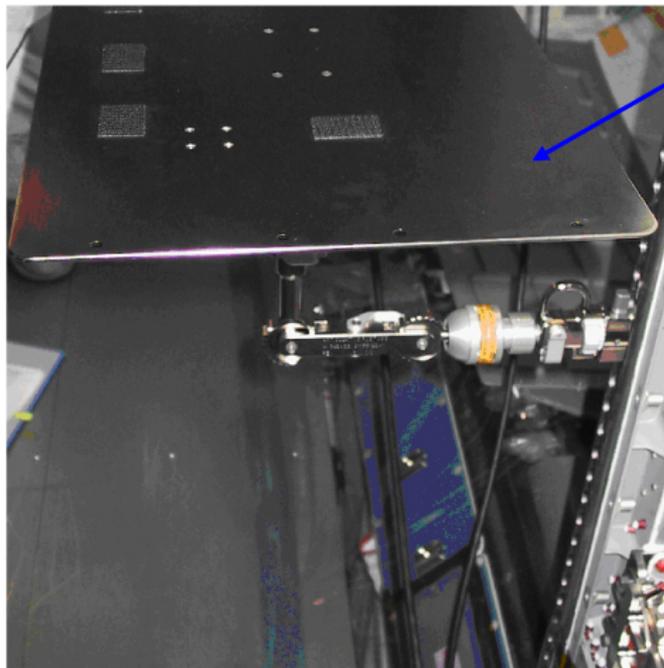


Figure 2. JEM Laptop Table Configuration.

1.6 Detach SLT from JEM Laptop Table.

1.7 Temporarily attach SLT for use in steps 4 and 16.

1.8 Transfer and attach JEM Laptop Table to Seat Track on the left lower side of WS Rack. Refer to Figure 2.

1.9 Attach BCDU on JEM Laptop Table, Velcro.

2. ACTIVATING WS CCP AND WS MON1

WS Mon sw POWER → ON (Verify Lt - Illuminated Green)

WS CCP pb PANEL POWER → ON (Verify Lt - Illuminated Green)

Verify VCU a, b ENABLE Lt - Illuminated Green

3. CONFIGURING VIDEO SYSTEM

WARNING

Entering the keep-out zone of TVC/PTU moving envelope would lead to pinching and shearing of EVA crews.

3.1 If EVA is in progress

Notify EVA crew not to enter the keep-out zone around TVC/PTU
EXT A and F.

1.102 ACTIVE EFBM OPS FOR JEF BERTHING

(ASSY OPS/2JA/FIN/HC)

3.2 Configure Cameras as required.

WS Mon1	RMS Mon1	RMS Mon2
09: P1 Lower Outboard (+150, +11; Z = 4.9 cm)	EXT F (-73, -40.5; Z = 1.9)	EXT A (73, -40.5; Z = 1.9)

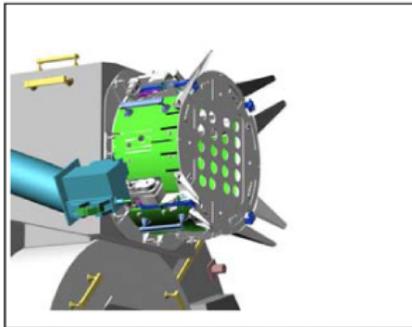


Figure 3 - EFBM Init Config 09: P1 Lower Outboard (+150, +11; Z = 4.9 cm).

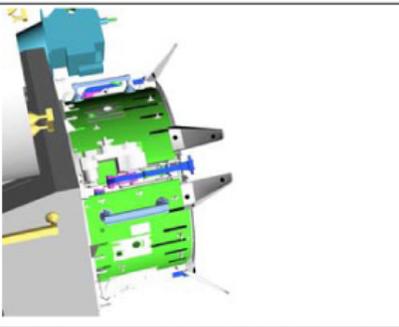


Figure 4 - EFBM Init Config EXT F (-73, -40.5; Z = 1.9).

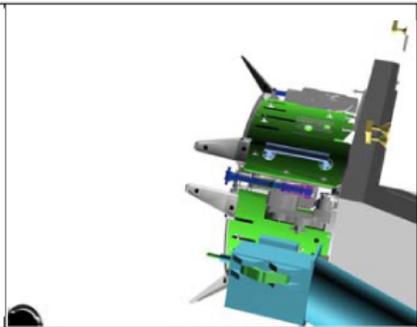


Figure 5 - EFBM Init Config EXT A (73, -40.5; Z = 1.9).

CAUTION

Active EFBM operations with a large MLI cover installed would lead to Active EFBM failure.

3.3 Verify Active EFBM large MLI cover (one) is removed.

4. POWERING ON BEP TO ACTIVATE EFBM

CAUTION

BEP shall be deactivated before continuous activation time of BEP reaches three hours to avoid reaching the high temperature limit.

SLT

4.1 On Scopemeter operator, "Go for Powering On BEP.":

4.2

Verify JEM MODE – Robotics_operation(Standard)

4.3 JEM: JPM: EPS: Main: PDB a2: RPC1

cmd RPC Close Ovr Execute

4.4 JEM: JPM: EPS: Main: PDB a2

Verify RPC1 (BEP) – Close

Record RPC1 Close Time: GMT _____ : _____ : _____

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BCDU

4.5 Verify the following status:

PWR - On
INTLK - On

'STRUCTURAL LATCH'

DISCONNECT 1 - On
DISCONNECT 2 - On
DISCONNECT 3 - On
DISCONNECT 4 - On

'MODE'

CONNECT - On

'ACTUATOR STATUS'

READY - On

5. TESTING LEDS

Toggle LED TEST switch.

Verify All LEDs - On

6. PERFORMING CAPTURE LATCHES DEPLOY

6.1 'ACTUATOR SELECT'

Toggle CAPT switch.

Verify CAPT - On

6.2 'ACTUATOR STATUS'

Verify READY - On

NOTE

It takes ~67 seconds to complete the Capture Latches motion in step 6.4.

6.3 Record the duration using stopwatch between RUN - On (step 6.4) and READY - On (step 6.5): _____ seconds

6.4 'ACTUATOR STATUS'

Toggle START switch.

Verify RUN - On

WS Mon

Verify Capture Latches begin deploying.

BCDU

6.5 'ACTUATOR STATUS'

Verify READY - On
Verify RUN - Off

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- 6.6 'ACTUATOR SELECT"
Verify CAPT – Off
- 6.7 'CAPTURE LATCH'
Verify OPEN 1 – On
Verify OPEN 2 – On
Verify OPEN 3 – On
Verify OPEN 4 – On
- 6.8 Give SSRMS operator GO, "Capture Latches open has been completed, Go for JEF unberth."

7. DEACTIVATING BEP AS REQUIRED

CAUTION

BEP shall be deactivated before continuous activation time of BEP reaches three hours to avoid reaching the high temperature limit.

If the Berthing operation is expected to be complete within three hours, go to step 9.

- SLT 7.1 JEM: JPM: EPS: Main: PDB a2: RPC1

cmd RPC Open Execute
- 7.2 JEM: JPM: EPS: Main: PDB a2

Verify RPC1 (BEP) – Open
- BCDU 7.3 Verify PWR – Off
Record RPC1 Open Time: GMT _____ : _____ : _____

8. POWERING ON BEP TO ACTIVATE EFBM AS REQUIRED

- 8.1 On SSRMS operator GO for EFBM activation.
- SLT 8.2
Verify JEM MODE – Robotics_operation(Standard)
- 8.3 JEM: JPM: EPS: Main: PDB a2: RPC1

cmd RPC Close Ovrđ Execute
- 8.4 JEM: JPM: EPS: Main: PDB a2

Verify RPC1 (BEP) – Close
Record RPC1 Close Time: GMT _____ : _____ : _____

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BCDU

8.5 Verify the following status:

PWR – On
INTLK – On

'CAPTURE LATCH'

Verify OPEN 1 – On
Verify OPEN 2 – On
Verify OPEN 3 – On
Verify OPEN 4 – On

'MODE'

CONNECT – On

'ACTUATOR STATUS'

READY – On

Give SSRMS operator GO for maneuver to Ready To Latch (RTL).

9. PERFORMING FIRST STAGE CAPTURE (AOS/M)

9.1 On SSRMS operator GO, "Maneuver to RTL complete, SSRMS is limped, Carriage of SSRMS LEE is partially derigidized, Go for capture latch closing."

9.2 If BEP is reactivated in step 7 and 8

Toggle INTLK switch.

Verify INTLK – Off

'MODE'

Verify CONNECT – On

9.3 'ACTUATOR SELECT'

Toggle CAPT switch.

Verify CAPT – On

9.4 'ACTUATOR STATUS'

Verify READY – On

NOTE

It takes ~8 seconds to complete the Capture Latches motion in step 9.6.

9.5 Record the duration using stopwatch between RUN – On (step 9.6) and READY – On (step 9.7): _____ seconds

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- 9.6 'ACTUATOR STATUS'
Toggle START switch.

Verify RUN – On
Verify Capture Latches begin retracting to soft capture position.
- WS Mon
- BDCU
- 9.7 'ACTUATOR STATUS'
Verify READY – On
Verify RUN – Off
- 9.8 'ACTUATOR SELECT'
Verify CAPT – Off
- 9.9 'CAPTURE LATCH'
Verify SOFT CAPTURE 1 – On
Verify SOFT CAPTURE 2 – On
Verify SOFT CAPTURE 3 – On
Verify SOFT CAPTURE 4 – On

10. PERFORMING SECOND STAGE CAPTURE (AOS/M)

- 10.1 'ACTUATOR SELECT'
Toggle CAPT switch.

Verify CAPT – On
- 10.2 'ACTUATOR STATUS'
Verify READY – On

NOTE

It takes ~60 seconds to complete the Capture Latches motion in step 10.4.

- 10.3 Record the duration using stopwatch between RUN – On (step 10.4) and READY – On (step 10.5): _____ seconds
- 10.4 'ACTUATOR STATUS'
Toggle START switch.

Verify RUN – On
Verify Capture Latches begin retracting to close position.
- WS Mon
- BDCU
- 10.5 'ACTUATOR STATUS'
Verify READY – On
Verify RUN – Off
- 10.6 'ACTUATOR SELECT'
Verify CAPT – Off
- 10.7 'CAPTURE LATCH'

- Verify CLOSE 1 – On
- Verify CLOSE 2 – On
- Verify CLOSE 3 – On
- Verify CLOSE 4 – On

11. PERFORMING STRUCTURAL LATCH 1, 2 EXTENSION

11.1 'ACTUATOR SELECT'

Toggle SL A switch.

Verify SL A – On

11.2 'ACTUATOR STATUS'

Verify READY – On

NOTE

1. It takes ~3:35 to complete the Structural Latches motion in step 11.4.
2. The timing on which CONNECT 1 or 2 turns on first is unknown due to the initial misalignment between the passive half and the active half of EFBM.

11.3 Record the duration using stopwatch between RUN – On (step 11.4) and CONNECT – On (step 11.5)

CONNECT 1: _____ seconds

CONNECT 2: _____ seconds

11.4 'ACTUATOR STATUS'

Toggle START switch.

Verify RUN – On

11.5 'STRUCTURAL LATCH'

Verify CONNECT 1 – On

Verify CONNECT 2 – On

11.6 'ACTUATOR STATUS'

Verify READY – On

Verify RUN – Off

11.7 'ACTUATOR SELECT'

Verify SL A – Off

11.8 Notify **SSIPC** of the recorded duration (CONNECT 1, 2). Refer to step 11.3.

12. PERFORMING STRUCTURAL LATCH 3, 4 EXTENSION

NOTE

Current measurement with scopemeter is performed in parallel with this step.

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- 12.1 'ACTUATOR SELECT'
Toggle SL B switch.

Verify SL B – On
- 12.2 'ACTUATOR STATUS'
Verify READY – On
- 12.3 Notify Scopemeter operator, "Ready for Structural Latch B extension, start the current recording."

NOTE

1. It takes ~3:10 to complete the Structural Latches motion in the step 12.5.
2. In step 12.4, the timing of LED indication is that CONNECT 4 turns on first and then after 6 seconds (nominal) CONNECT 3 turns on.
3. In step 12.6, Scopemeter operator needs "Stop recording" call just after LED verification because the memory of Scopemeter can only store the data for one minute.

- 12.4 Record the duration using stopwatch between RUN – On (step 12.5) and CONNECT – On (step 12.6)
CONNECT 4: _____ seconds [T4]
CONNECT 3: _____ seconds [T3]
- 12.5 'ACTUATOR STATUS'
Toggle START switch.

Verify RUN – On
- 12.6 'STRUCTURAL LATCH'
Verify CONNECT 4 – On
Verify CONNECT 3 – On

Notify Scopemeter operator, "Structural Latch B extension complete, stop the current recording."
- 12.7 'ACTUATOR STATUS'
Verify READY – On
Verify RUN – Off
- 12.8 'ACTUATOR SELECT'
Verify SL B – Off
- 12.9 Verify LED On timing [T4] within 186.5 ± 4 seconds.
Verify LED On timing [T3] within 192.5 ± 4 seconds.
Verify LED On timing ([T3] - [T4]) within 6 ± 2 seconds.
- 12.10 Notify **SSIPC** of the recorded duration (CONNECT 3 [T3], 4 [T4]). Refer to step 12.4.

13. PERFORMING STRUCTURAL LATCH 1, 2 RETRACTION

13.1 If BEP is reactivated in step 7 and 8
| Verify INTLK – Off
| Go to step 13.3.

13.2 Toggle INTLK switch.
Verify INTLK – Off

13.3 'MODE'
Toggle MODE switch.
Verify DISCONNECT – On

13.4 'ACTUATOR SELECT'
Toggle SL A switch.
Verify SL A – On

13.5 'ACTUATOR STATUS'
Verify READY – On

NOTE

1. It takes ~3:15 to complete the Structural Latches motion in the step 13.7.
2. In step 13.6, the timing of LED indication is that DISCONNECT 1 turns on first and then after 2 seconds (nominal) DISCONNECT 2 turns on.
3. If unexpected indication of Disconnect LEDs is encountered, crew should perform the star block in step 13.8.

13.6 Record the duration using stopwatch between RUN – On (step 13.7) and DISCONNECTs – On (step 13.8).
DISCONNECT 1: _____ seconds
DISCONNECT 2: _____ seconds

13.7 'ACTUATOR STATUS'
Toggle START switch.
Verify RUN – On

13.8 'STRUCTURAL LATCH'
Verify DISCONNECT 1 – On
Verify DISCONNECT 2 – On

```

*****
*
* If DISCONNECT 2 turns on first
* | Toggle STOP switch.
* |
* | Verify STOP – On
* |
* | ✓SSIPC
* |
*
* If DISCONNECT 2 remains off for 4 seconds after DISCONNECT
* 1 turns on
* | Toggle STOP switch.
* |
* | Verify STOP – On
* |
* | ✓SSIPC
* |
*****

```

13.9 'ACTUATOR STATUS'

Verify READY – On
Verify RUN – Off

13.10 'ACTUATOR SELECT'

Verify SL A – Off

14. PERFORMING STRUCTURAL LATCH 1, 2 RE-EXTENSION

NOTE

Current measurement with scopemeter is performed in parallel with this step.

14.1 'MODE'

Toggle MODE switch.

Verify CONNECT – On

14.2 'ACTUATOR SELECT'

Toggle SL A switch.

Verify SL A – On

14.3 'ACTUATOR STATUS'

Verify READY – On

14.4 Notify Scopemeter operator, "Ready for Structural Latch A Re-extension, start the current recording."

NOTE

1. It takes ~3:15 to complete the Structural Latches motion in step 14.6.
2. In step 14.5, the timing of LED indication is that CONNECT 1 turns on first and then after 2 seconds (nominal) CONNECT 2 turns on.
3. In step 14.7, Scopemeter Operator needs "Stop recording" call just after LED verification because the memory of Scopemeter can only store the data for one minute.

- 14.5 Record the duration using stopwatch between RUN – On (step 14.6) and CONNECT – On (step 14.7)
 CONNECT 1: _____ seconds [T1]
 CONNECT 2: _____ seconds [T2]

- 14.6 'ACTUATOR STATUS'
 Toggle START switch.

Verify RUN – On

- 14.7 'STRUCTURAL LATCH'
 Verify CONNECT 1 – On
 Verify CONNECT 2 – On

Notify Scopemeter operator, "Structural Latch A extension completed, stop the current recording."

- 14.8 'ACTUATOR STATUS'
 Verify READY – On
 Verify RUN – Off

- 14.9 'ACTUATOR SELECT'
 Verify SL A – Off

- 14.10 Verify LED On timing [T1] within 194 ± 4 seconds.
 Verify LED On timing [T2] within 196 ± 4 seconds.
 Verify LED On timing ([T2] - [T1]) within 2 ± 2 seconds.

- 14.11 Notify **SSIPC** of the recorded duration (CONNECT 1 [T1], 2 [T2]). Refer to step 14.5.

15. PERFORMING UMBILICALS EXTENSION

- 15.1 'ACTUATOR SELECT'
 Toggle UMB switch.

Verify UMB – On

- 15.2 'ACTUATOR STATUS'
 Verify READY – On

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NOTE

It takes ~61 seconds to complete the umbilicals motion in step 15.4.

- 15.3 Record the duration using stopwatch between RUN – On (step 15.4) and READY – On (step 15.5): _____ seconds
- 15.4 'ACTUATOR STATUS'
Toggle START switch.

Verify RUN – On
- 15.5 'ACTUATOR STATUS'
Verify READY – On
Verify RUN – Off
- 15.6 'ACTUATOR SELECT'
Verify UMB – Off
- 15.7 'UMBILICAL'
Verify CONNECT 1 – On
Verify CONNECT 2 – On

16. DEACTIVATING BEP

WARNING

The following steps 16 and 17.2 must be performed in order to prevent inadvertent release of the JEF and shearing/pinching hazard to EVA crew due to inadvertent motion of Active EFBM.

- SLT 16.1 JEM: JPM: EPS: Main: PDB a2: RPC1

cmd RPC Open **Execute**
- 16.2 JEM: JPM: EPS: Main: PDB a2

Verify RPC1 (BEP) – Open

Record RPC1 Open Time: GMT _____ : _____ : _____

- BCDU 16.3 Verify PWR – Off

17. SAFING

- JPM1D7 17.1 Don Static Wrist Tether.
Attach clip to unpainted, unanodized metal surface.
- 17.2 P011B on Jumper Cable (80AS51500-213) ←|→ BCDU I/F FOR BM (J011B) on JPM 1/P7-106

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- 17.3 P011B on Jumper Cable (80AS51500-213) →|← Protective Cap BCDU I/F FOR BM (J011B) on JPM 1/P7-106 →|← Protective Cap
- 17.4 Doff Static Wrist Tether.
- 17.5 If EVA in progress
| Notify EVA crew that Keep-out zone around Active EFBM is removed.
- 17.6 Give SSRMS operator GO, "Active EFBM berthing operations complete, Go for ungrapple JEF."

18. BCDU STORAGE

JPM1F4

- 18.1 Don Static Wrist Tether.
Attach clip to unpainted, unanodized metal surface.
- 18.2 P006B on Jumper Cable (80AS51500-213) ←|→ J1 on BCDU
- 18.3 P006B on Jumper Cable (80AS51500-213) →|← Protective cover J1 on BCDU →|← Protective Cap
- 18.4 Detach the BCDU bonding jumper from bonding point on WS Rack (Ratchet, 1/4" Drive; 5/16" Socket, 1/4" Drive).
- 18.5 Doff Static Wrist Tether.
- 18.6 Detach BCDU from WS Rack.
- 18.7 Temporarily stow.

WS CCP

19. DEACTIVATING WS CCP AND WS MON1 sw CAMERA COMMAND → OFF

pb PANEL POWER → OFF (Verify Lt - Not Illuminated)

WS Mon

sw POWER → OFF (Verify Lt - Not Illuminated)

20. CLOSEOUT

- 20.1 Notify **SSIPC**, "Active EFBM operations complete."
- 20.2 Stow all tools, equipment and hardware.

1.103 MPC AND G1 CAMCORDER SETUP FOR EFBM OPERATIONS

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 1 of 5 pages

OBJECTIVE:

This procedure is used to setup G1 Camcorder near JEM Airlock and Work Station rack for taking video of the Scopemeter during EFBM Current Monitor, and for taking video of the BCDU during Active EFBM Ops for JEF Berthing.

LOCATION:

JPM1D7, JPM1F7 (Around JEM Airlock) for G1 Camcorder

JPM1D5 (EPS2 Rack) for MPC and MPC DC Power Supply

DURATION

25 minutes

5 minutes for preparation

10 minutes for G1 Camcorder and MPC setting (Step 1)

5 minutes for G1 Camcorder setup, operation (Step 2)

5 minutes for G1 Camcorder and MPC Deactivation (Step 3)

CREW:

One

MATERIALS:

Ziplock Bag

TOOLS:

G1 Camcorder P/N XH G1

G1 Camcorder Fixture P/N MPC-011

ISS IVA Toolbox:

Drawer 2:

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

Driver Handle, 1/4" Drive

1.103 MPC AND G1 CAMCORDER SETUP FOR EFBM OPERATIONS
 (ASSY OPS/2JA/FIN/MULTI J/HC) Page 2 of 5 pages

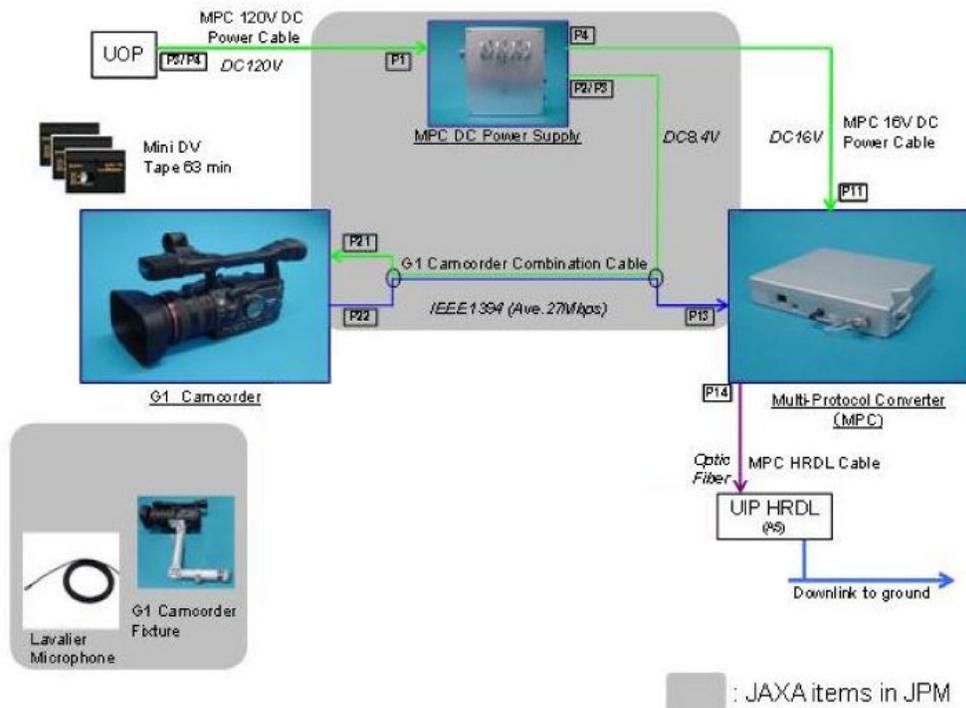


Figure 1. MPC, Multi-Protocol DC Power Supply, IPU and G1 Camcorder Configuration.

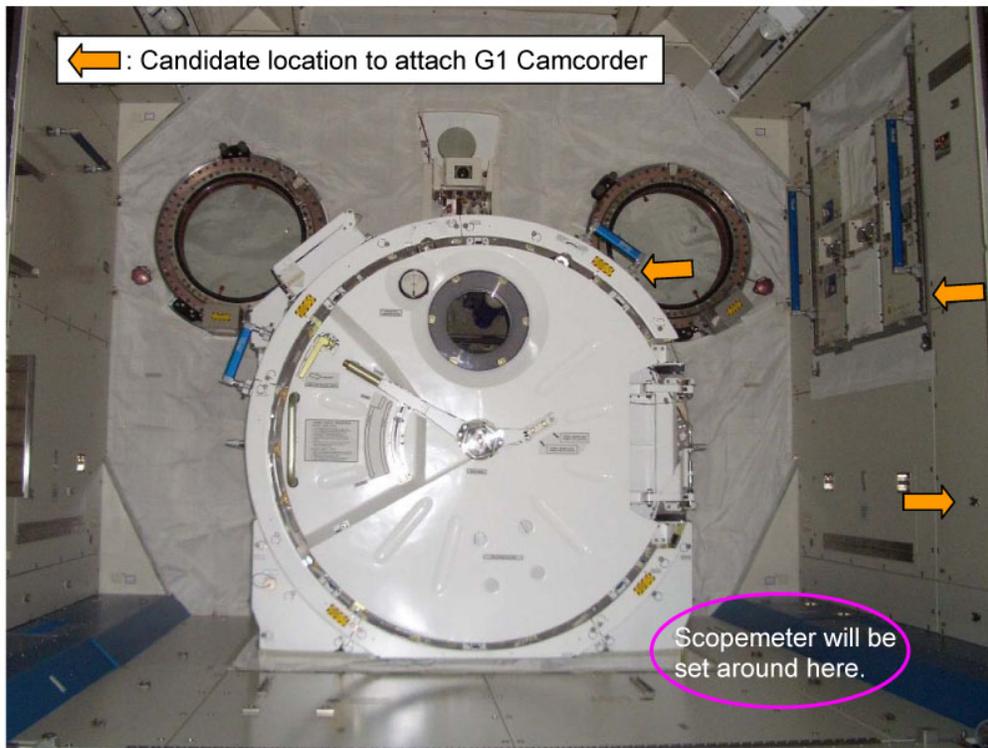


Figure 2. G1 Camcorder Installation Location (Candidate).

1. G1 CAMCORDER AND MPC SETTING

1.103 MPC AND G1 CAMCORDER SETUP FOR EFBM OPERATIONS

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 3 of 5 pages

1.1 G1 Camcorder Placement

NOTE

1. Equipment configuration is shown in Figure 1.
2. MPC and MPC DC Power Supply are set on JPM1D5 EPS2 Rack.

JPM1D7

- 1.1.1 Attach G1 Camcorder Fixture to seat tracks around JEM Airlock to face Scopemeter referring to Figure 2.
- 1.1.2 If Multi-use Bracket Adapter 1/4-20 is attached to G1 Camcorder,
 - Remove Multi-use Bracket Adapter 1/4-20 (Driver Handle, 1/4" Drive; 3/16" Hex Head, 1/4" Drive).
 - Stow Multi-use Bracket Adapter 1/4-20 in Ziplock Bag.
- 1.1.3 Attach G1 Camcorder onto G1 Camcorder Fixture.

MPC DC
Power
Supply

- 1.1.4 ✓sw 8.4V PWR 1 – OFF

G1
Camcorder

- ✓POWER Dial – OFF

- 1.1.5 G1 Camcorder Combination Cable Connection
 - P22 →|← HDV/DV terminal on G1 Camcorder
 - P21 →|← G1 Camcorder (the Battery installation portion on G1 Camcorder back side)

1.2 MPC Powering On

UOP

- 1.2.1 If POWER OUT – RESET illuminated
 - pb POWER OUT → Press
 - ✓POWER OUT – ENABLE illuminated
 - ✓FAULT/TEST – OK illuminated

WARNING

Do not touch the back surface (Velcro side) of Multi-Protocol Converter DC Power Supply to prevent touch temperature hazard due to fan failure. Front side and switches can be touched.

MPC DC
Power
Supply

- 1.2.2 sw 16V PWR → ON

- ✓16V PWR LED – illuminated (green)

- 1.2.3 sw 8.4V PWR 1 → ON

1.103 MPC AND G1 CAMCORDER SETUP FOR EFBM OPERATIONS

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 4 of 5 pages

✓8.4V PWR 1 LED – illuminated (green)

MPC

1.2.4 sw Power → ON

✓3V LED – illuminated (green)

✓5V LED – illuminated (green)

NOTE

Once MPC downlink has been initiated, downlink cannot be terminated without **SSIPC GO** due to system limitations.

2. G1 CAMCORDER SETUP AND OPERATION

2.1 Camcorder Body Settings

G1
Camcorder

2.1.1 Remove Lens Cap.

2.1.2 POWER Dial → 

✓Viewfinder (LCD) –  (Pause)

2.1.3 ✓Standby Lever – STANDBY

2.1.4 ✓"XLR" is not displayed in Viewfinder

2.2 ✓Viewfinder (LCD) – HDV 60i displayed

If HDV 60i is not displayed, then

pb MENU → Press

sel SELECT/SET ► SIGNAL SETUP – press

sel SELECT/SET ► SIGNAL STD – press

sel SELECT/SET ► HD – press

sel SELECT/SET ► YES – press

pb MENU → Press

sel SELECT/SET ► SIGNAL SETUP – press

sel SELECT/SET ► FRAME RATE – press

sel SELECT/SET ► 60i – press

sel SELECT/SET ► YES – press

pb MENU → Press

MPC

2.3 MPC LED Check

✓TAXI LED – illuminated (green)

1.103 MPC AND G1 CAMCORDER SETUP FOR EFBM OPERATIONS

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 5 of 5 pages

✓HDV LED – illuminated (green)

2.4 Lens Settings

G1
Camcorder

2.4.1 ✓ND FILTER – OFF

2.4.2 ✓POSITION PRESET – OFF

2.4.3 Notify **SSIPC** that MPC and G1 Camcorder are ready for downlink.

3. G1 CAMCORDER AND MPC DEACTIVATION

NOTE

SSIPC gives go after video data is successfully downlinked and transferred to **SSIPC**, which takes about 5 minutes.

3.1 **On SSIPC GO**

Attach Lens Cap.

POWER Dial → OFF

MPC

3.2 sw POWER → OFF

✓All LEDs are not illuminated

MPC DC
Power
Supply

3.3 sw 8.4V PWR 1 → OFF

✓8.4V PWR 1 LED – not illuminated

3.4 sw 16V PWR → OFF

✓16V PWR LED – not illuminated

UOP

3.5 If other equipment is not used on the same UOP

pb POWER OUT → Press

✓POWER OUT – RESET (illuminated)

✓FAULT/TEST – not illuminated

4. CLOSE OUT

Notify **SSIPC** that Deactivation is complete.
Stow tools.

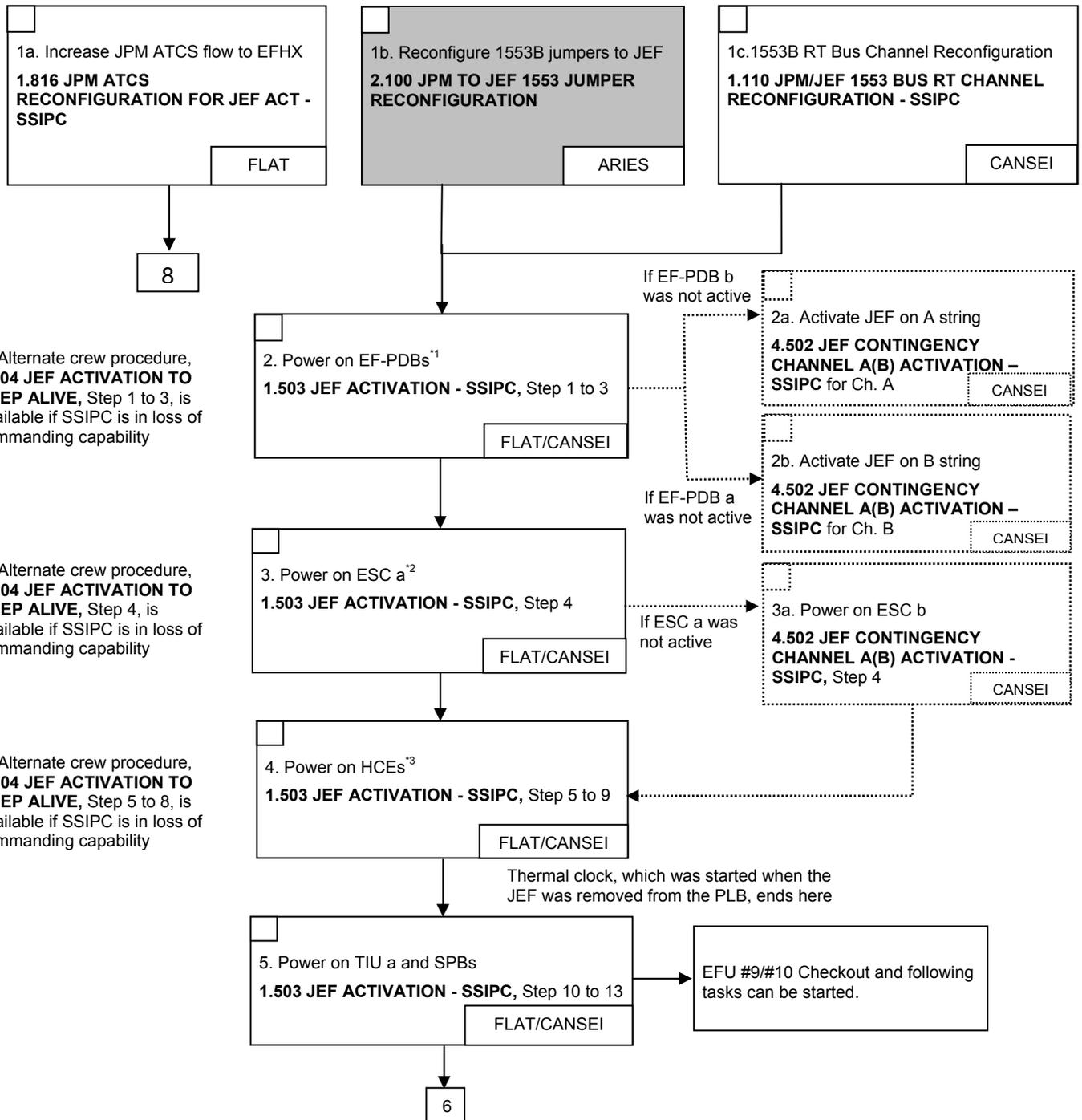
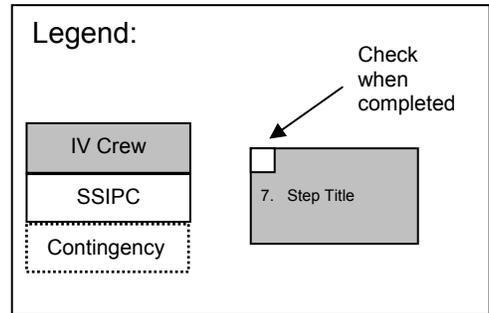
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1.201 JEF ACTIVATION FLOW CHART

(ASSY OPS/2JA/FIN 1/MULTI J)

Initial Conditions:

1. JEF is berthed to JPM.



*1 Alternate crew procedure, 3.104 JEF ACTIVATION TO KEEP ALIVE, Step 1 to 3, is available if SSIPC is in loss of commanding capability

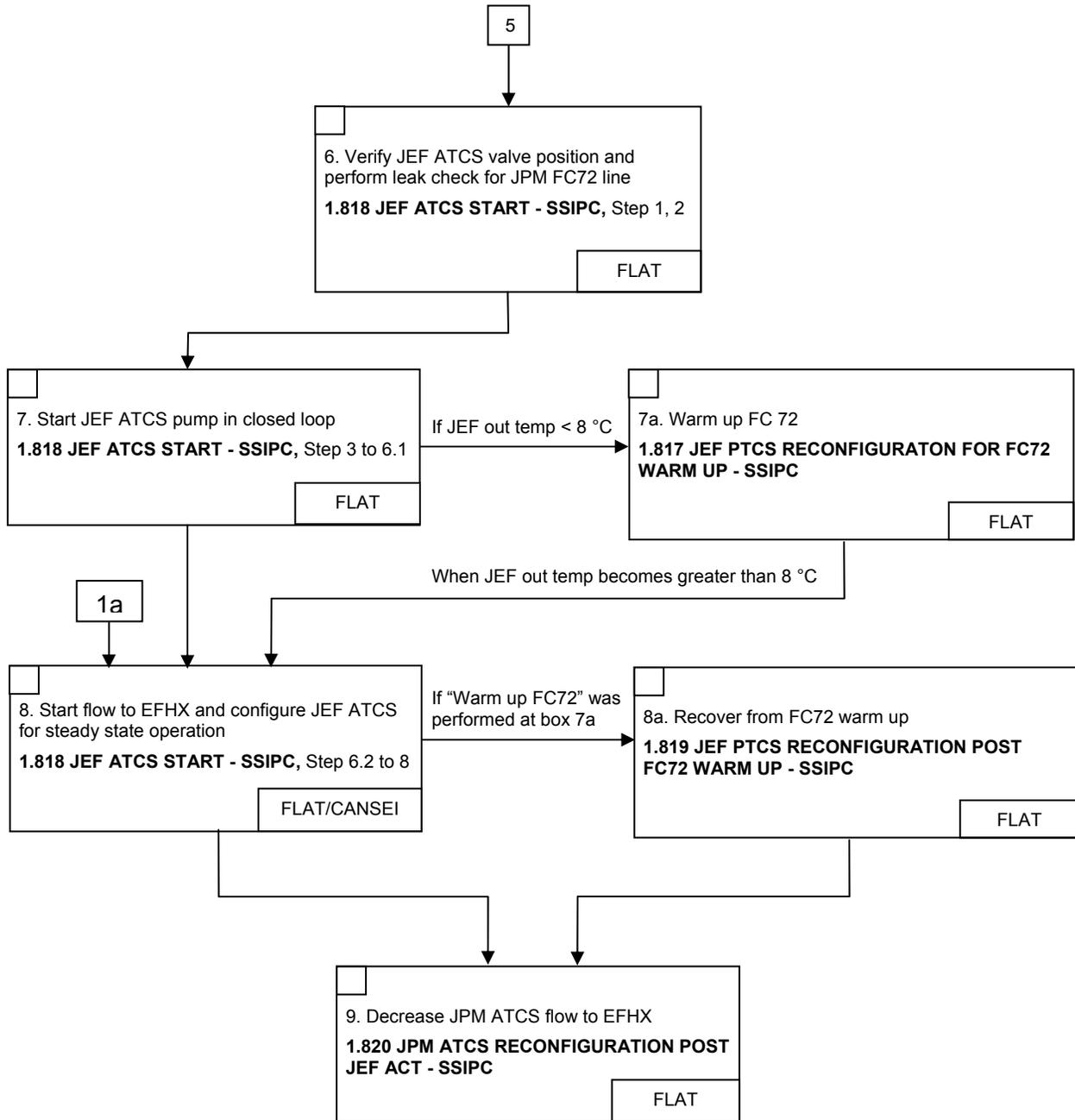
*2 Alternate crew procedure, 3.104 JEF ACTIVATION TO KEEP ALIVE, Step 4, is available if SSIPC is in loss of commanding capability

*3 Alternate crew procedure, 3.104 JEF ACTIVATION TO KEEP ALIVE, Step 5 to 8, is available if SSIPC is in loss of commanding capability

1.201 JEF ACTIVATION FLOW CHART

(ASSY OPS/2JA/FIN 1/MULTI J)

Page 2 of 2 pages



Parameters 1. EDUs

[Y]	[Z]
EDU a	PDB a RPC3
EDU b	PDB b RPC20

OBJECTIVE:

Perform JEF EFU Capture Latch Ops for JLE berthing to EFU10(9). This procedure can be used for JEF EFU10 and EFU9 by replacing parameters with the EFU to be operated. Steps 7 to 10 are normally performed by crew and the others by **SSIPC**.

LOCATION:

JPM1A6

DURATION:

50 minutes

10 minutes for EFU Ops preparation (steps 1 to 3)

5 minutes for EDU activation and EFU select (step 4)

15 minutes for EFU Capture Latch open (steps 5 to 6)

15 minutes for EFU Capture Latch close (steps 7 to 10)

5 minutes for EFU deactivation and JEF Ops mode transition (steps 11 to 12)

CREW:

One

NOTE

1. EDU activation, EFU Capture Latch open and EDU deactivation are normally performed by **SSIPC**.
2. 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.
3. This procedure can be used for EFU10 and EFU9 by replacing the name of the port being operated.

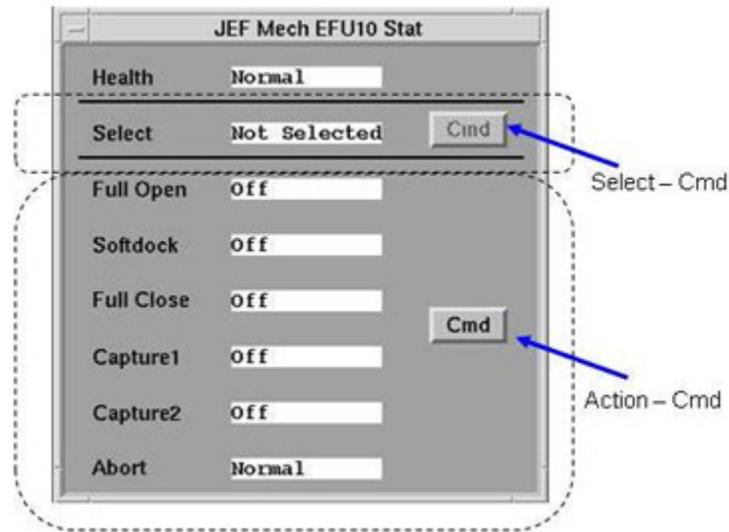


Figure 1. EFU Cmd Buttons.

NOTE

1. When Select - Cmd is selected in Figure 1, JEF Mech EFU10(9) Select Cmd window opens for EFU selection.
2. When Action - Cmd is selected in Figure 1, JEF Mech EFU10(9) Action Cmd window opens for execution of Softdock, Release, or Capture Command.
3. When Action - Cmd is executed, JEF Mech EFU10(9) Action Cmd window will be automatically closed. Therefore re-open of this window is required to issue the Stop command for EFU unexpected motion.
4. If EFU arms have unexpected motion (Example, latching arm motion in the unexpected direction), the following star block will be performed to terminate EFU motion.

SLT

```

*****
*
* If unexpected motion of EFU arms is observed,
*
* Perform the following steps to terminate EFU motion:
*
* JEF: Mech: PLX: EFU10(9) (Refer to Table 1)
*
* 
*
* sel Action - Cmd (Refer to Figure 1)
*
* 
*
* cmd Stop Execute
*
* 
*
* Verify Abort - Aborted
*
*****
  
```

1. VERIFYING EDU AND EFU MOTOR TEMP
 ✓**SSIPC** that the temperature of the EDU and the designated EFU Motor is in normal range
2. CONFIGURING VIDEO SYSTEM
 Use best available view (JPM, JEMRMS, ISS Truss, SSRMS, etc.).
 Pan/tilt/zoom Camera, as required, to observe the EFU.
3. JEF OPS MODE TRANSITION BEFORE EFU CLOSE

SLT

- 3.1 Verifying JEM Mode

 Verify JEM Mode – Robotics Operation
- 3.2 Transitioning JEF Ops Mode To PL Exchange
 JEF: EPS

 Verify JEF Ops Mode – PL_Ops_Enable
 sel JEF Ops Mode

cmd P/L Exchange Execute

 Verify JEF Ops Mode – P/L Exchange

WARNING

ESC, HCE, EDU health status must be Normal to detect the inadvertent PL release.

4. POWERING ON EDU

4.1 Verifying ESC and HCE Health Status

JEF: CDH

JEF CDH

If ESC a(b) is Blue,

sel ESC a(b)

JEF CDH ESC a(b) Stat

Verify Health Status – Normal

JEF: TCS: PTCS a

JEF TCS

If HCE a is Blue,

JEF: TCS: PTCS a: HCE a: FWC

JEF TCS HCE a FWC Stat

Verify Health Status – Normal

JEF: TCS: PTCS b

JEF TCS

If HCE b is Blue,

JEF: TCS: PTCS b: HCE b: FWC

JEF TCS HCE b FWC Stat

Verify Health Status – Normal

4.2 Closing PDB RPC

Remind EVA crew of the keep-out zone around the EFU.

WARNING

If EVA crew needs to get inside the designated EFU keep-out zone, the EFU must be deactivated to avoid shearing/pinching.

<u>NOTE</u>
SSIPC designates which EDU is used.

Table 1. Parameters for EDUs

EDUs [Y]	EDU RPCs [Z]
EDU a	PDB a RPC3
EDU b	PDB b RPC20

JEF: Mech: PLX: EDU

JEF Mech EDU Stat

'Y' (Refer to Table 2)

sel PDB RPC Posn - Cmd

JEF EPS [Z] Cmd

cmd RPC Close Execute

JEF Mech EDU Stat

'Y'

Verify PDB RPC Posn - Closed

4.3 Verifying EDU Status

Verify Health Status - Normal

Verify BIT Status - Valid

Verify BIT Result - Normal

4.4 Selecting EFU

JEF: Mech: PLX: EFU 10(9)

JEF Mech EFU 10(9) Stat

sel Select - Cmd (Refer to Figure 1)

JEF Mech EFU 10(9) Select Cmd

cmd Select Execute

JEF Mech EFU 10(9) Stat

Verify Health - Normal

Verify Select - Selected

5. VERIFYING BERTHING STAT FOR EFU OPEN OPS (AS REQUIRED)

WARNING

Capture1 and 2 must be Off to verify that P/L is not berthed at the selected EFU.

Verify Full Open – Off
Verify Softdock – Off
Verify Full Close – On
Verify Capture1 – Off
Verify Capture2 – Off

6. PERFORMING EFU CAPTURE LATCH OPEN (AS REQUIRED)

6.1 Performing Softdock From Close

NOTE

EFU motion from close to softdock takes ~5:35 to complete.

JEF Mech EFU10(9) Stat

sel Action – Cmd (Refer to Figure 1)

JEF Mech EFU10(9) Action Cmd

cmd Softdock Execute

JEF Mech EFU10(9) Stat

Verify Full Open – Off
Verify Softdock – On
Verify Full Close – Off

6.2 Performing Open

NOTE

EFU motion from softdock to open takes ~2:56 to complete.

JEF Mech EFU10(9) Stat

sel Action – Cmd (Refer to Figure 1)

JEF Mech EFU10(9) Action Cmd

cmd Release Execute

JEF Mech EFU10(9) Stat

Verify Full Open – On
Verify Softdock – Off

7. VERIFYING BERTHING STAT FOR EFU CLOSE OPS

JEF: Mech: PLX: EFU10(9)

JEF Mech EFU10(9) Stat

Verify Full Open – On
Verify Softdock – Off
Verify Full Close – Off
Verify Capture1 – Off
Verify Capture2 – Off

8. ENABLING MECHANISM AUTOSAFING SOFTWARE

On SSRMS operator GO, "Mnvr to RTL complete. SSRMS is Limped and carriage of LEE is partially derigidized. GO for EFU 10(9) Capture Latch Close".

WARNING

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

NOTE

Node 2 Nadir CBM PCS display is being utilized to navigate to the Mechanism Autosafing Displays.

PCS

sel Node 2: S&M

Node 2:S&M

'Nadir CBM'

sel Node 2 Nadir CBM

Node 2 Nadir CBM

'CBM Status'

sel Mechanism Autosafing

Mechanism Autosafing

'Autosafing PPL Version IDs – Safing Cmds'

Verify Primary C&C: 7018(7019)

Verify Backup C&C: 7018(7019)

'Autosafing PPL Version IDs – Safing Default'

Verify Backup C&C: 7002

'Enable'

cmd Enable Execute

Verify Mechanism Autosafing – Enabled

9. PERFORMING EFU CAPTURE LATCH CLOSE

9.1 Performing Softdock From Open (AOS/M)

NOTE

EFU motion from open to softdock takes ~2:37 to complete.

SLT

JEF: Mech: PLX: EFU10(9)

JEF Mech EFU10(9) Stat

sel Action – Cmd (Refer to Figure 1)

JEF Mech EFU10(9) Action Cmd

cmd Softdock Execute

JEF Mech EFU10(9) Stat

Verify Full Open – Off

Verify Softdock – On

Verify Full Close – Off

9.2 Performing Close (AOS/M)

WARNING

1. The following conditions shall be met to ensure the successful payload mating.
 - (1) Full Close – On
 - (2) Capture1 – On
 - (3) Capture2 – On
2. If Full Close is Off, the Full Close status on the redundant EDU shall be confirmed as an additional indication.
3. If Capture 1(2) is off, the timing of Full close-on shall be verified as an additional indication. EFU health status can be used as an alternate status for this timing confirmation because this is a summary status including Time-over error and Under-limit error of Full Close status.

NOTE

EFU motion from softdock to close takes ~5:54 to complete.

JEF Mech EFU10(9) Stat

sel Action – Cmd (Refer to Figure 1)

JEF Mech EFU10(9) Action Cmd

cmd Capture Execute

JEF Mech EFU10(9) Stat

Verify Full Close – On
 Verify Capture1 – On
 Verify Capture2 – On

```

*****
*
*
* If one of Full Close, Capture1 and 2 statuses is not true,
*
*   If Full Close is Off,
*
*     If EDU a is used,
*
*       Perform step 11 for EDU a deactivation, then:
*       Perform step 4.2 for EDU b activation, then:
*
*     If EDU b is used,
*
*       Perform step 11 for EDU b deactivation, then:
*       Perform step 4.2 for EDU a activation, then:
*
*
*     JEF: Mech: PLX: EFU10(9)
*     JEF Mech EFU10(9) Stat
*
*     Verify Full Close – On
*
*     Go to step 10.
*
*   If Capture1(2) is Off,
*
*     JEF Mech EFU10(9) Stat
*
*     Verify Health – Normal
*
*     Go to step 10.
*
*****
  
```

10. INHIBITING MECHANISM AUTOSAFING SOFTWARE

PCS

Mechanism Autosafing

'Inhibit'

cmd Arm Execute

Verify Arm – ✓

cmd Inhibit Execute

Verify Mechanism Autosafing – Inhibited

Notify **SSIPC**, "Go for activating JLE, JLE has been berthed at EFU10(9)."

11. POWERING OFF EDU

On **SSIPC GO**, proceed to powering off EDU.

WARNING

EDU shall be deactivated to prevent inadvertent PL release.

SLT

JEF: Mech: PLX: EDU

JEF Mech EDU Stat

'[Y]' (Refer to Table 2)

sel PDB RPC Posn – Cmd

JEF EPS [Z] Cmd

cmd RPC Open **Execute**

JEF Mech EDU Stat

'[Y]'

Verify PDB RPC Posn – Open

If EVA crew is in the vicinity of designated EFU,

Notify EVA crew the designated EFU has been powered off, so the keep-out zone around the EFU has been removed.

12. JEF OPS MODE TRANSITION AFTER EFU CLOSE

JEF: EPS

JEF EPS

Verify JEF Ops Mode – P/L Exchange

sel JEF Ops Mode

JEF Sel Ops Mode Cmd

cmd PL_Ops_Enable **Execute**

JEF EPS

Verify JEF Ops Mode – PL_Ops_Enable

1.302 EFU10(9) OPS FOR JLE UNBERTHING - SLT/PCS

(ASSY OPS/2JA/FIN/HC)

Parameters 1. Parameters for JEF EFUs

EFU in Use [X1]	SPBs [P1]	SPB RPCs [Q1]	PDBs [R1]	PDB RPCs [S1]
[X1]	[P1]	[Q1]	[R1]	[S1]
EFU10	SPB a	RPC6	PDB b	RPC34
EFU9	SPB b	RPC11	PDB a	RPC17

Parameters 2. Parameters for EDUs

EDUs [Y1]	EDU RPCs [Z1]
[Y1]	[Z1]
EDU a	PDB a RPC3
EDU b	PDB b RPC20

OBJECTIVE:

Perform JEF EFU Capture Latch Open for SSRMS unberthing JLE from EFU10(9). This procedure can be used for JEF EFU10 and EFU9 by replacing parameters with the EFU is operated. Steps 5 to 6 are normally performed by crew and the others by **SSIPC**.

LOCATION:

JPM1A6

DURATION:

55 minutes

- 10 minutes for EFU preparation and activation (steps 1 to 4)
- 5 minutes for Preparation for JLE unberthing (step 5)
- 15 minutes for EFU Capture Latch open (step 6)
- 15 minutes for EFU Capture Latch close (step 7)
- 5 minutes for EFU deactivation (steps 8)
- 5 minutes for JEF Ops mode transition (step 9)

CREW:

One

NOTE

1. EDU activation, EFU Capture Latch close and EDU deactivation are normally performed by **SSIPC**.
2. 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.
3. This procedure can be used for EFU10 and EFU9 by replacing [X1] with the name of the port being operated (example, EFU10). Different RPCs are also operated for different ports. Table 1 is used throughout the procedure to indicate which RPCs and SPBs should be operated to perform various steps.

Table 1. Parameters for JEF EFUs

EFU in Use [X1]	SPBs [P1]	SPB RPCs [Q1]	PDBs [R1]	PDB RPCs [S1]
EFU10	SPB a	RPC6	PDB b	RPC34
EFU9	SPB b	RPC11	PDB a	RPC17

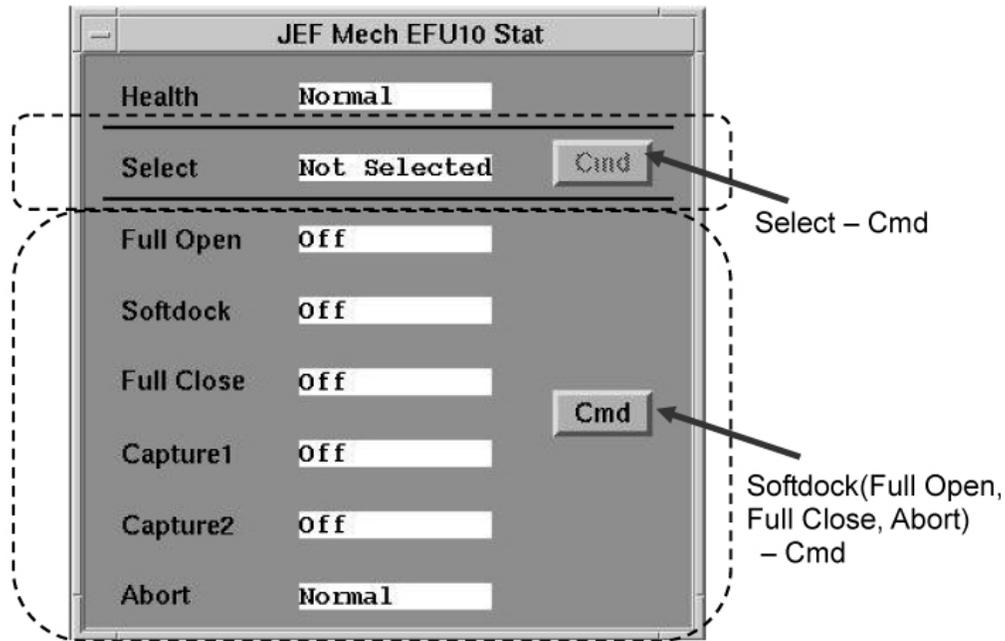


Figure 1. EFU Cmd Buttons.

NOTE

If EFU arms have unexpected motion, the following star block will be performed to terminate EFU motion (example, No arm motion is seen).

SLT

```

*****
*
* If unexpected motion of EFU arms is observed
* Perform the following steps to terminate EFU motion.
*
* JEF: Mech: PLX: [X1] (Refer to Table 1.)
* JEF Mech [X1] Stat
*
* sel Abort - Cmd (Refer to Figure 1.)
* JEF Mech [X1] Action Cmd
*
* cmd Stop Execute
* JEF Mech [X1] Stat
*
* Verify Abort - Aborted
*
*****
    
```

1. VERIFYING EDU AND EFU MOTOR TEMP
 ✓**SSIPC** that the temperature of the EDU and the designated EFU Motor is in nominal range
2. CONFIGURING VIDEO SYSTEM
 Use best available view (JPM, JEMRMS, ISS Truss, SSRMS, etc.).
 Pan/tilt/zoom Camera, as required, to observe the EFU.
3. JEF OPS MODE TRANSITION BEFORE EFU CAPTURE
 - 3.1 Verifying JEM Mode
 JEM

 Verify JEM Mode – Robotics Operation
 - 3.2 Transitioning JEF Ops Mode to PL Exchange
 JEF: EPS
 JEF EPS

 Verify JEF Ops Mode – PL_Ops_Enable

 sel JEF Ops Mode

 JEF Sel Ops Mode Cmd

 cmd P/L Exchange **Execute**

 JEF EPS

 Verify JEF Ops Mode – P/L Exchange
4. POWERING ON EDU

4.1 Closing PDB RPC

Remind EVA crew of the keep-out zone around the EFU.

WARNING
If EVA crew needs to get inside the designated EFU keep-out zone, the EFU must be deactivated to avoid shearing/pinching.

NOTE
SSIPC designates either of EDU a or EDU b is used.

Table 2. Parameters for EDUs

EDUs [Y1]	EDU RPCs [Z1]
EDU a	PDB a RPC3
EDU b	PDB b RPC20

JEF: Mech: PLX: EDU

JEF Mech EDU Stat

'[Y1]' (Refer to Table 2.)

sel PDB RPC Posn - Cmd

JEF EPS [Z1] Cmd

cmd RPC Close **Execute**

JEF Mech EDU Stat

'[Y1]'

Verify PDB RPC Posn - Closed

4.2 Verifying EDU Status

Verify Health Status - Normal

Verify BIT Status - Valid

Verify BIT Result - Normal

4.3 Verifying Berthing Status

JEF: Mech: PLX: [X1]

JEF Mech [X1] Stat

Verify Full Open - Off

Verify Softdock - Off

Verify Full Close - On

Verify Capture1 - On

Verify Capture2 - On

5. VERIFYING SSRMS PREREQUISITES FOR EFU CAPTURE

On SSRMS operator, "GO for [X1] Capture Latch Open, JLE has been grappled."

On **SSIPC** GO for EFU Capture Latch Open:

PCS

MSS: SSRMS

Verify all joints – Limped

MSS: SSRMS: Tip LEE

Verify 'Snare' Close, Capture (two) – blue

Verify 'Carriage' Retract – blue

6. PERFORMING EFU CAPTURE LATCH OPEN

SLT

6.1 Selecting EFU (AOS/M)

JEF: Mech: PLX:

sel Select – Cmd (Refer to Figure 1.)

cmd Select Execute

Verify Health – Normal

Verify Select – Selected

6.2 Performing Softdock from Close (AOS/M)

NOTE

EFU motion from close to softdock takes ~5:35 to complete.

sel Softdock – Cmd (Refer to Figure 1.)

cmd Softdock Ovr Execute

Verify Full Open – Off

Verify Softdock – On

Verify Full Close – Off
Verify Capture1 – Off
Verify Capture2 – Off

6.3 Performing Open (AOS/M)

NOTE EFU motion from softdock to open takes ~2:56 to complete.
--

JEF Mech [X1] Stat

sel Full Open – Cmd (Refer to Figure 1.)

JEF Mech [X1] Action Cmd

cmd Release Ovrđ Execute

JEF Mech [X1] Stat

Verify Full Open – On
Verify Softdock – Off

Notify SSRMS operator, "Go to unberth JLE, EFU arms have been opened."

7. PERFORMING EFU CAPTURE LATCH CLOSE

On SSIPC GO, proceed to step 7.1.

7.1 Performing Softdock from Open

NOTE EFU motion from open to softdock takes ~2:37 to complete.
--

JEF Mech [X1] Stat

sel Softdock – Cmd (Refer to Figure 1.)

JEF Mech [X1] Action Cmd

cmd Softdock Execute

JEF Mech [X1] Stat

Verify Full Open – Off
Verify Softdock – On
Verify Full Close – Off

7.2 Performing Close

NOTE EFU motion from softdock to close takes ~5:54 to complete.

JEF Mech [X1] Stat

sel Full Close - Cmd (Refer to Figure 1.)

JEF Mech [X1] Action Cmd

cmd Capture **Execute**

JEF Mech [X1] Stat

Verify Full Close - On

8. POWERING OFF EDU

JEF: Mech: PLX: EDU

JEF Mech EDU Stat

'[Y1]' (Refer to Table 2.)

sel PDB RPC Posn - Cmd

JEF EPS [Z1] Cmd

cmd RPC Open **Execute**

JEF Mech EDU Stat

'[Y1]'

Verify PDB RPC Posn - Open

If EVA crew is in the vicinity of designated EFU

Notify EVA crew the designated EFU has been powered off, so the keep-out zone around the EFU has been removed.

9. JEF OPS MODE TRANSITION AFTER EFU CAPTURE

JEF: EPS

JEF EPS

Verify JEF Ops Mode - P/L Exchange

sel JEF Ops Mode

JEF Sel Ops Mode Cmd

cmd PL_Ops_Enable **Execute**

JEF EPS

Verify JEF Ops Mode - PL_Ops_Enable

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2.100 JPM TO JEF 1553 JUMPER RECONFIGURATION

(ASSY OPS/2J/A/FIN)

Page 1 of 5 pages

OBJECTIVE:

After JEF is berthed to JPM, JEM SLBus 2, PLBus 2, and Local Bus JEM are connected to JEF.

LOCATION:

JPM1F7

JPM1A7

DURATION:

60 minutes

10 minutes for Preparation

15 minutes for JEM SLBus 2 Ch b, PLBus 2 Ch a and Local Bus JEM Ch a jumper

20 minutes for JEM SLBus 2 Ch a, PLBus 2 Ch b and Local Bus JEM Ch b jumper

15 minutes for Closeout

CREW:

One

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

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

Ratchet, 1/4" Drive

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

Drawer 3:

Inspection Mirror

Drawer 5:

Static Wrist Tether

2.100 JPM TO JEF 1553 JUMPER RECONFIGURATION
 (ASSY OPS/2J/A/FIN) Page 2 of 5 pages

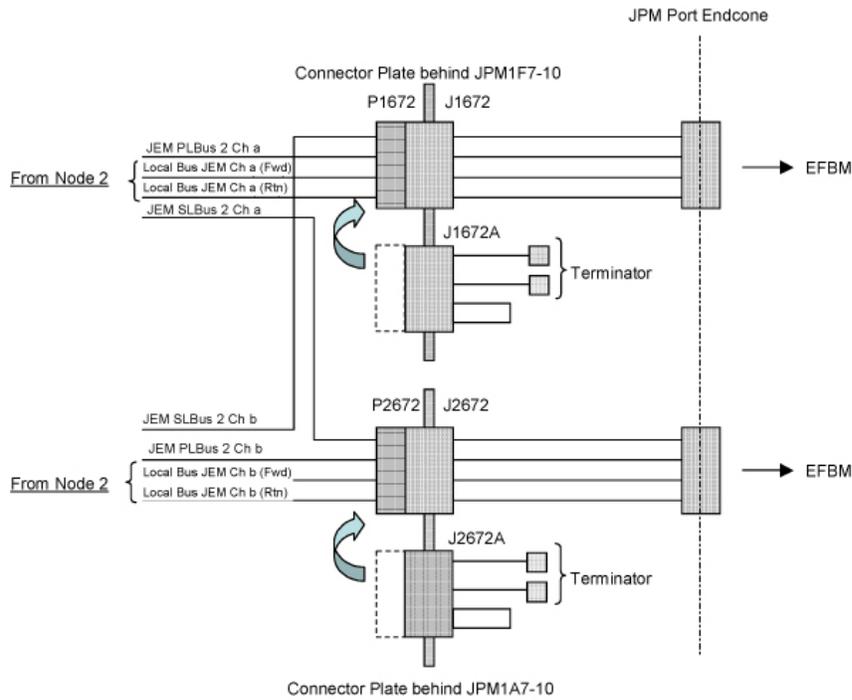


Figure 1. JEM SLBus 2, PLBus 2 and Local Bus JEM Jumpers Connection.

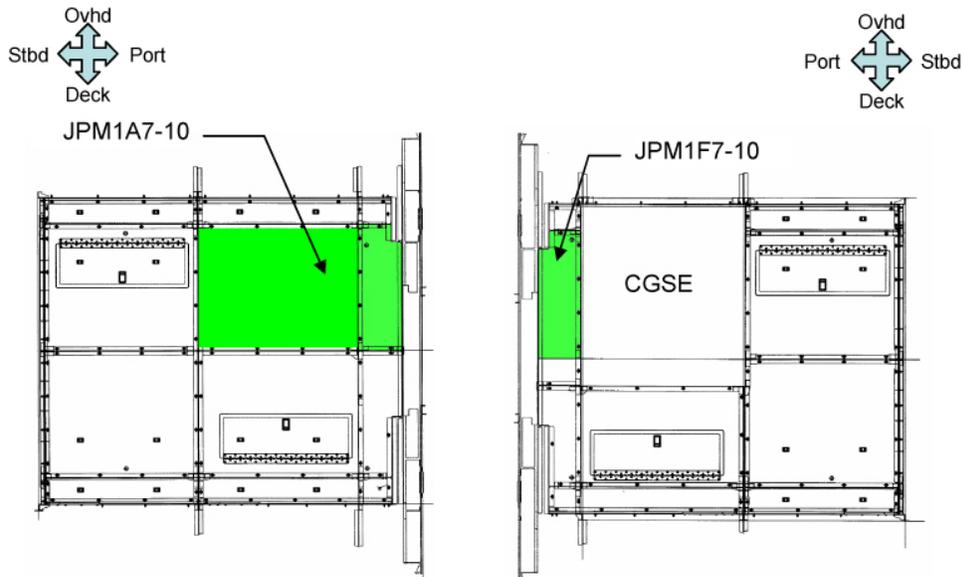


Figure 2. JPM1A7-10 and JPM1F7-10 Closeout Panel.

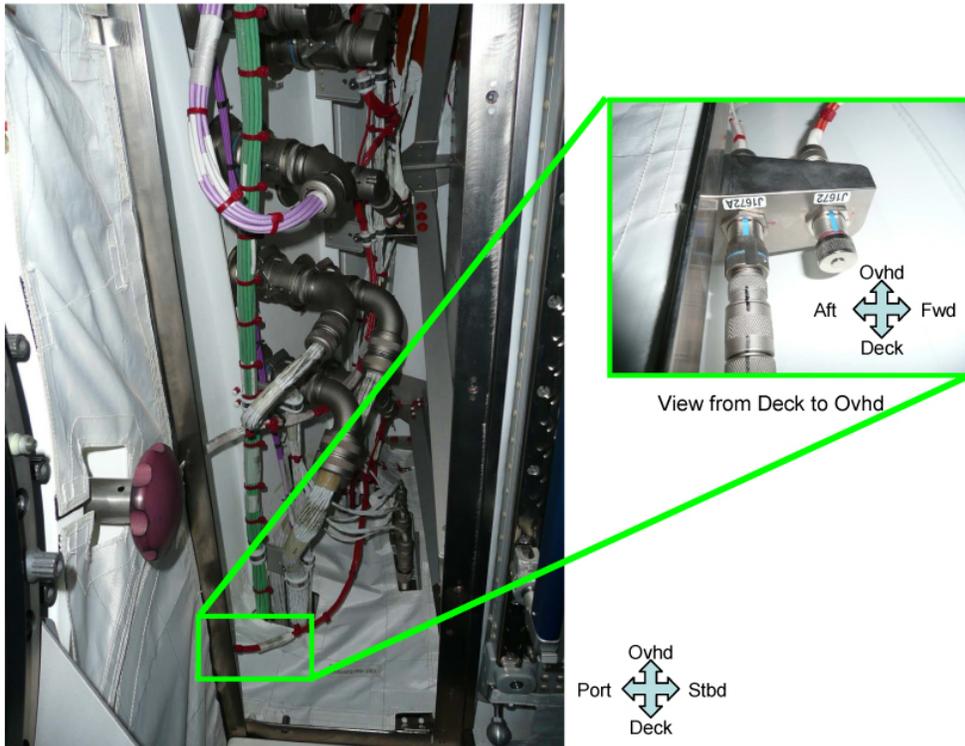


Figure 3. Connector Plate behind JPM1F7-10.

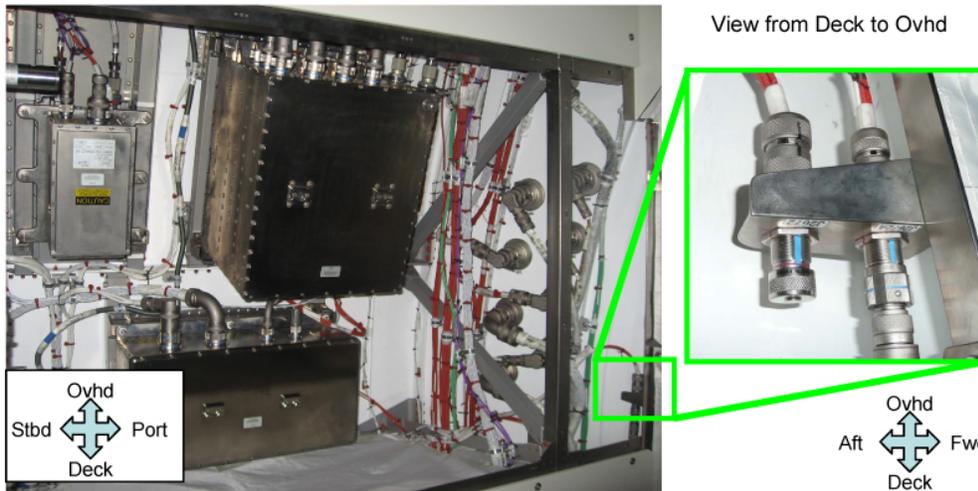


Figure 4. Connectors Plate behind JPM1A7-10.

NOTE

1. **SSIPC** and **MCC-H** switch 1553B bus channel (a or b) to avoid 1553B bus FDIR initiation prior to each jumper reconfiguration.
2. **SSIPC** and **MCC-H** checkout JEM SLBus 2, PLBus 2 and Local Bus JEM communication status after each jumper reconfiguration.
3. Inspection Mirror may be needed to confirm connector labels.

2.100 JPM TO JEF 1553 JUMPER RECONFIGURATION

(ASSY OPS/2J/A/FIN)

Page 4 of 5 pages

1. RECONFIGURING JEM SLBUS 2 CH B, PLBUS 2 CH A AND LOCAL BUS JEM CH A JUMPER (P1672)

JPM1F7

- 1.1 Remove Closeout Panel (JPM1F7-10), fasteners (seven) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Temporarily stow.
Refer to Figure 2.
- 1.2 Don Static Wrist Tether.
Secure to an unpainted, unanodized metal surface.
- 1.3 On **SSIPC GO**
P1672 ←|→ J1672A
Protective Cap ←|→ J1672
Protective Cap →|← J1672A
P1672 →|← J1672
Refer to Figure 3.
- 1.4 Doff Static Wrist Tether.
- 1.5 Notify **SSIPC** of JEM SLBus 2 Ch b, PLBus 2 Ch a and Local Bus JEM Ch a jumper reconfiguration completion.

2. RECONFIGURING JEM SLBUS 2 CH A, PLBUS 2 CH B AND LOCAL BUS JEM CH B JUMPER (P2672)

JPM1A7

- 2.1 Remove Closeout Panel (JPM1A7-10), fasteners (eighteen) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Temporarily stow.
Refer to Figure 2.
- 2.2 Don Static Wrist Tether.
Secure to an unpainted, unanodized metal surface.
- 2.3 On **SSIPC GO**
P2672 ←|→ J2672A
Protective Cap ←|→ J2672
Protective Cap →|← J2672A
P2672 →|← J2672
Refer to Figure 4.
- 2.4 Doff Static Wrist Tether.
- 2.5 Notify **SSIPC** of JEM SLBus 2 Ch a, PLBus 2 Ch b and Local Bus JEM Ch b jumper reconfiguration completion.

3. CLOSEOUT

- 3.1 On **SSIPC GO**
Check for FOD within 1 m.
- 3.2 Photo document all newly configured hardware (Digital Camera).
- 3.3 Install Closeout Panel (JPM1A7-10).

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2.100 JPM TO JEF 1553 JUMPER RECONFIGURATION

(ASSY OPS/2J/A/FIN)

Page 5 of 5 pages

Tighten, torque fasteners at each corner of Closeout Panel (one per corner, total four) to 27 in-lbs [Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].

- JPM1F7
- 3.4 Check for FOD within 1 m.
 - 3.5 Photo document all newly configured hardware (Digital Camera).
 - 3.6 Install Closeout Panel (JPM1F7-10).
Tighten, torque fasteners at each corner of Closeout Panel (one per corner, total four) to 27 in-lbs [Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].
 - 3.7 Notify **SSIPC** of task completion.
Stow tools.

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A&C CONTINGENCY

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3.101 EFBM CONTINGENCY SENSOR CABLE INSTALL AND CHECKOUT

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 1 of 7 pages

OBJECTIVE:

Install EFBM Contingency Sensor Cable between Exposed Facility Berthing Mechanism (EFBM) and Berthing Mechanism Electronics Package (BEP) in order to intentionally open the circuit for a failed limit switch by cutting the corresponding signal line.

LOCATIONS:

JPM1D7

DURATION:

1 hour 25 minutes

10 minutes for Preparation

20 minutes for Cutting limit switch line (step 1)

25 minutes for Installing EFBM Contingency Sensor Cable (steps 2 and 3)

15 minutes for Checkout (steps 4 and 5)

15 minutes for Closeout (step 6)

CREW:

One

PARTS:

EFBM Contingency Sensor Cable P/N USE0923-101

MATERIALS:

Kapton Tape

TOOLS:

Digital Camera

Pocket Knife

Mini-Maglite (if required)

ISS IVA Toolbox:

Drawer 2:

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

Ratchet, 1/4" Drive

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

Drawer 4:

Wire Cutters

Drawer 5:

Static Wrist Tether

3.101 EFBM CONTINGENCY SENSOR CABLE INSTALL AND CHECKOUT

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 2 of 7 pages

1. CUTTING LIMIT SWITCH SIGNAL LINE ON EFBM CONTINGENCY SENSOR CABLE

NOTE

Signal lines are marked both “BLU RF” and “WHT RF” on each line such as “CL1 BLU RF” and “CL1 WHT RF”. “BLU RF” and “WHT RF” are left out in this procedure.

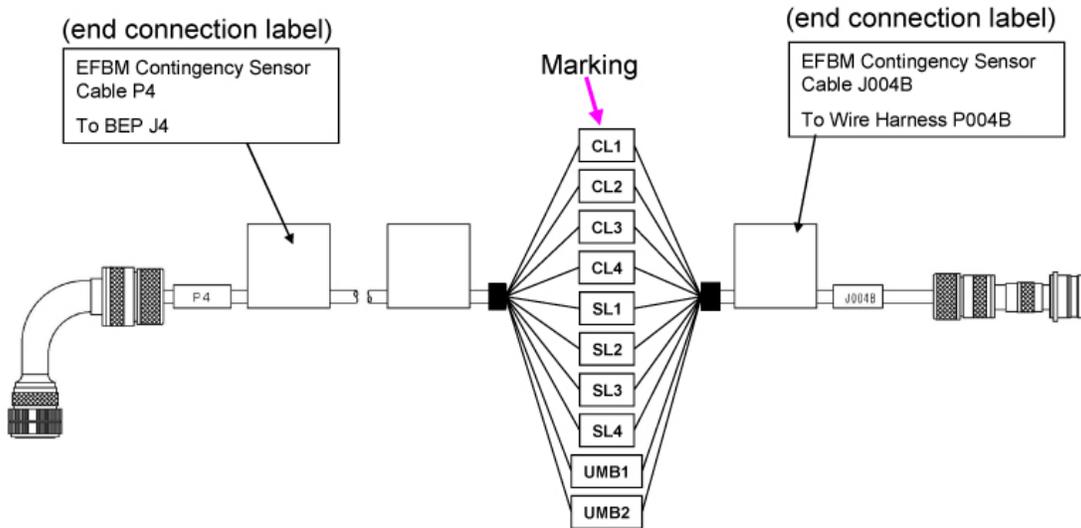


Figure 1. Marking on Limit Switch Signal Lines.

Table 1. Limit Switch Lines Information

Label (Marking)	Function (Limit Switch Signal Line for)	Check
CL1	Capture Latch 1	
CL2	Capture Latch 2	
CL3	Capture Latch 3	
CL4	Capture Latch 4	
SL1	Structure Latch 1	
SL2	Structure Latch 2	
SL3	Structure Latch 3	
SL4	Structure Latch 4	
UMB1	Umbilical Latch 1	
UMB2	Umbilical Latch 2	

- 1.1 ✓**SSIPC** which limit switch signal line on Table 1 should be cut
Record in Table 1.
- 1.2 Cut the selected line (Wire Cutters).

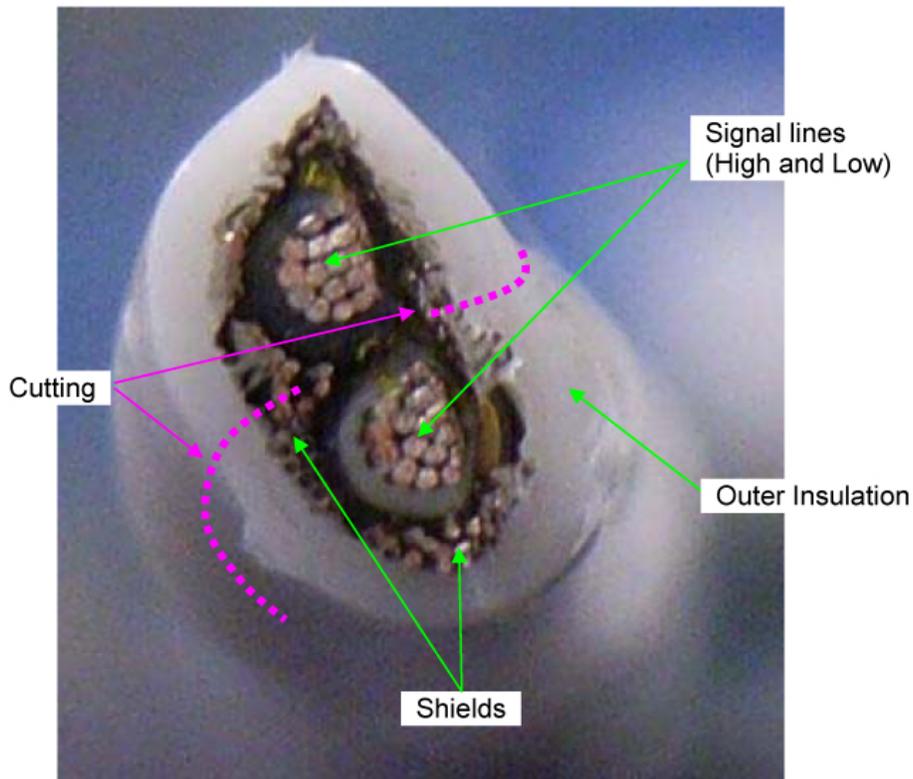


Figure 2. Cross Section of the Cut Line.

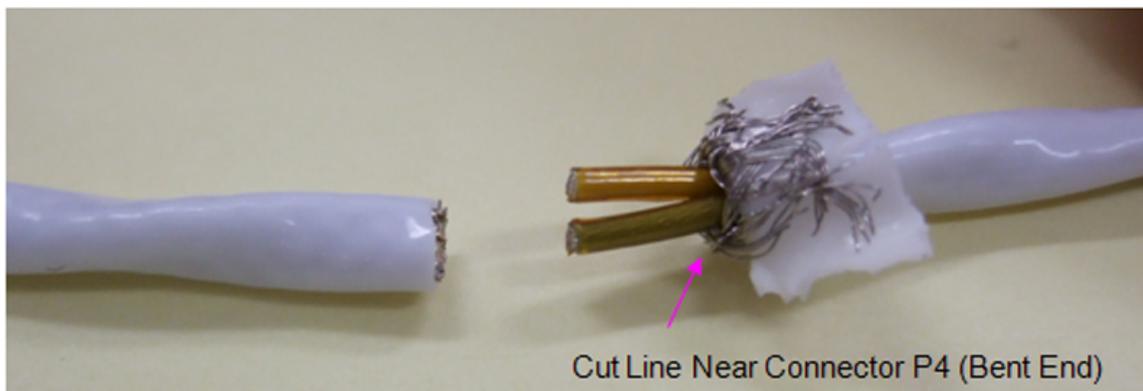


Figure 3. Peeled Outer Insulation and Shields.

NOTE

Step 1.3 will be performed to avoid contact between Signal lines and Shields.

1.3 Treatment for Cut Line Near Connector P4 (Bent End)

1.3.1 Cut Outer Insulation and Shields 10 mm (0.5 inch) along the dotted lines (pink colored) shown in Figures 2 and 3 (Wire Cutters, Pocket Knife).

Peel back Outer Insulation and Shields.

3.101 EFBM CONTINGENCY SENSOR CABLE INSTALL AND CHECKOUT

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 4 of 7 pages

Wrap around the peeled Outer Insulation and Shields (Kapton Tape).

1.3.2 Cover the ends of signal line (metal wires) (two) separately, isolating each from any other metal wires (Kapton Tape).

1.4 Treatment for Cut Line Near Connector J004B (Straight End)
Cover the end of the cut line (Kapton Tape).

1.5 Repeat steps 1.3 and 1.4 for the remaining cut lines.

1.6 Photo document the EFBM Contingency Sensor Cable (Digital Camera).

2. ACCESS TO BEP UNDER JEM AIRLOCK

2.1 Safing for Access to BEP

✓SSIPC, BEP is deactivated and allow BEP to cool for 80 minutes

CAUTION

Care must be taken not to damage thin harnesses routed on JPM structure. Examples of thin harnesses are shown in Figures 2 and 3.

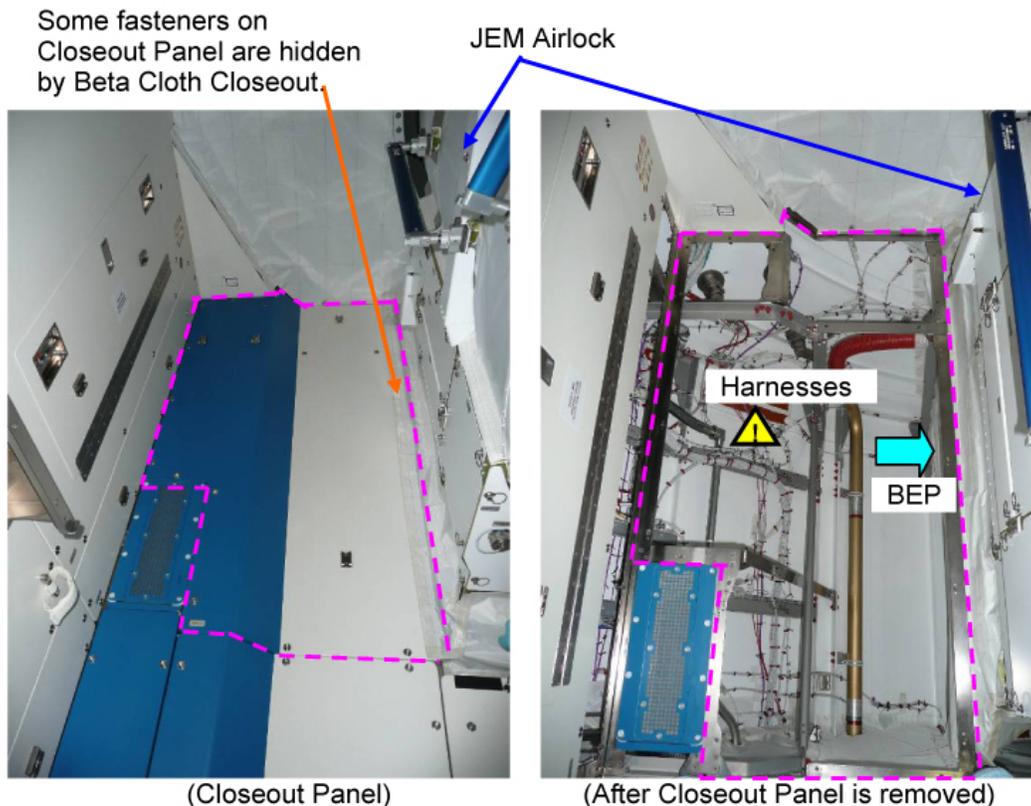


Figure 4. Closeout Panel JPM1D7-07 to Access BEP.

JPM1D7

2.2 Partially remove Beta Cloth Closeout attached to Closeout Panel JPM1D7-07 at side of JEM Airlock, Velcro. Refer to Figure 4.

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3.101 EFBM CONTINGENCY SENSOR CABLE INSTALL AND CHECKOUT (ASSY OPS/2JA/FIN/MULTI J/HC) Page 5 of 7 pages

- 2.3 Remove Closeout Panel JPM1D7-07, fasteners (nineteen) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Temporarily stow. Refer to Figure 4.
- 2.4 Partially remove FDS Partition, Velcro.
3. INSTALLING EFBM CONTINGENCY SENSOR CABLE

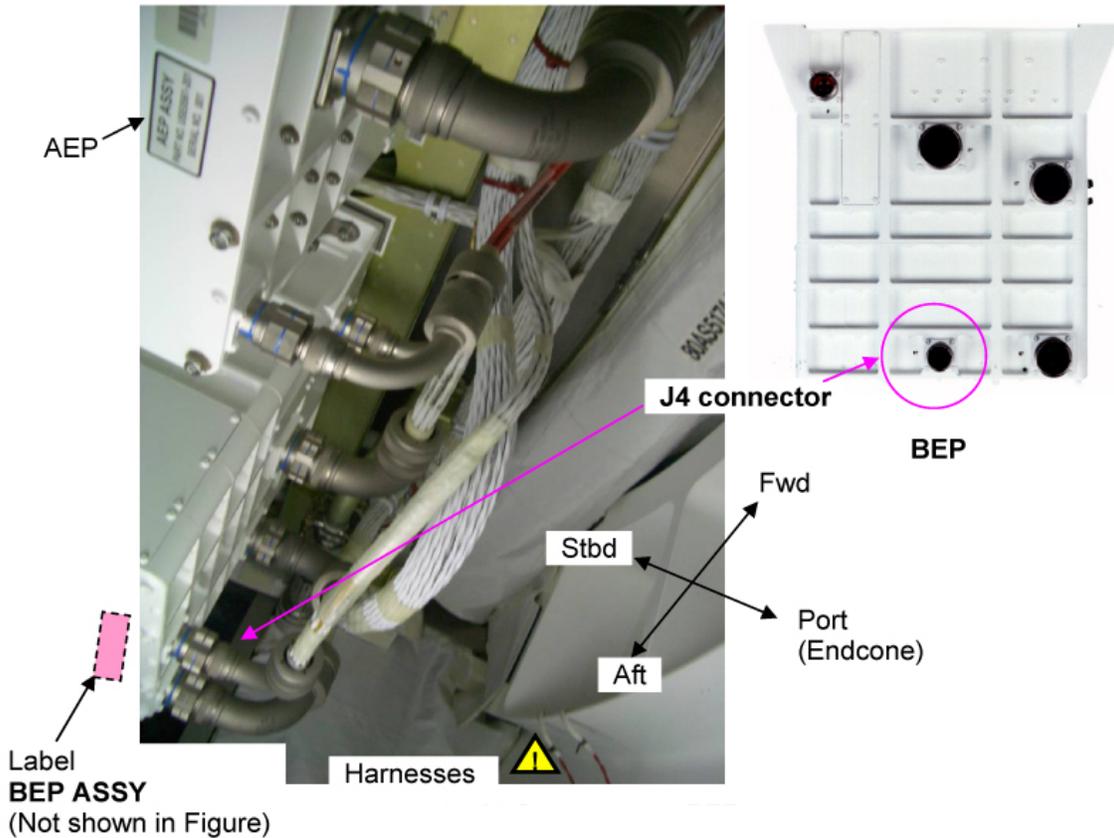


Figure 5. J4 Connector on BEP.

3.101 EFBM CONTINGENCY SENSOR CABLE INSTALL AND CHECKOUT
 (ASSY OPS/2JA/FIN/MULTI J/HC) Page 6 of 7 pages

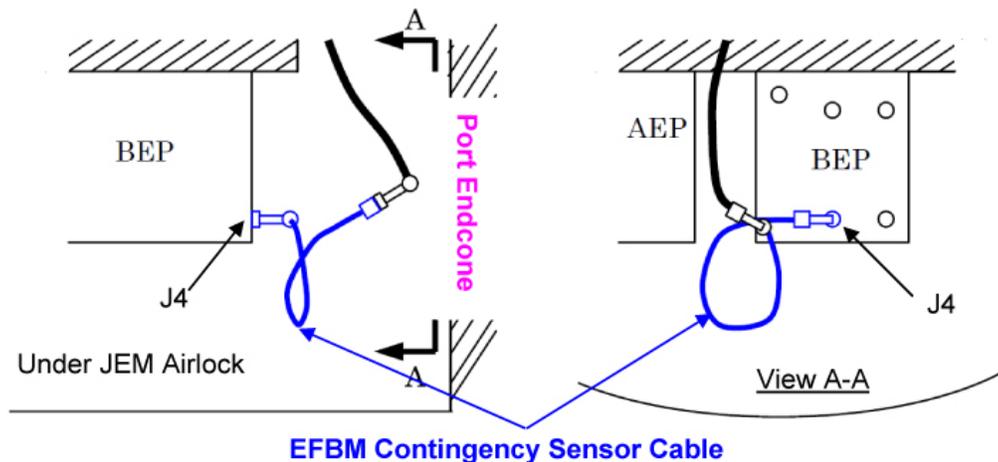


Figure 6. Image of EFBM Contingency Sensor Cable Insertion.

- 3.1 Don Static Wrist Tether.
Attach clip to unpainted, unanodized metal structure.
- 3.2 Wire harness (P004B) ←|→ J4 on BEP
Refer to Figures 5 and 6.
- 3.3 EFBM Contingency Sensor Cable J004B to Wire harness P004B
(straight end) →|← Wire harness (P004B)
- 3.4 EFBM Contingency Sensor Cable P4 to BEP J4 (bent end) →|← J4 on BEP
- 3.5 Doff Static Wrist Tether.
- 3.6 Photo document the connection of EFBM Contingency Sensor Cable (Digital Camera).
- 3.7 ISS ↓ **SSIPC** EFBM Contingency Sensor Cable connection is completed.

4. VERIFYING BCDU STATUS

- | | |
|------|--|
| SLT | <ol style="list-style-type: none"> 4.1 <u>Powering On BEP</u>
 JPM: EPS: Main: PDB a2: RPC1
 <div style="border: 1px solid black; padding: 2px; display: inline-block;">JPM EPS PDB a2 RPC1 Cmd</div>

 cmd RPC Close Ovr Execute
 <div style="border: 1px solid black; padding: 2px; display: inline-block;">JPM EPS PDB a2</div>

 Verify RPC1 (BEP) – Close |
| BCDU | <ol style="list-style-type: none"> 4.2 <u>Verifying BCDU LED</u>
 Verify the following status:

 PWR – On |

3.101 EFBM CONTINGENCY SENSOR CABLE INSTALL AND CHECKOUT

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 7 of 7 pages

INTLK – On

'MODE'

CONNECT – On

'ACTUATOR STATUS'

READY – On

4.3 ISS ↓ **SSIPC** LED status

4.4 ✓**SSIPC** the expected other LED status after failed limit switch recovery.

4.5 Photo document BCDU overview and LED status (Digital Camera).

4.6 ✓**SSIPC**, BEP deactivation is required

SLT

If BEP deactivation is required,

JEM: JPM: EPS: Main: PDB a2: RPC1

JPM EPS PDB a2 RPC1 Cmd

cmd RPC Open **Execute**

JEM: JPM: EPS: Main: PDB a2

JPM EPS PDB a2

Verify RPC1 (BEP) – Open

5. CLOSE OUT

5.1 Check for FOD within 1m around BEP.

5.2 Attach FDS Partition, Velcro.

JPM1D7

5.3 Tighten, torque fasteners (four) at each corner of Closeout Panel JPM1D7-07, to 27 in-lbs [Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive]. Refer to Figure 4.

5.4 Attach Beta Cloth Closeout onto Closeout Panel JPM1D7-07, Velcro. Refer to Figure 4.

5.5 Notify **SSIPC** of task completion.
Stow all tools.
Update IMS.

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3.102 EFBM BEP CONTINGENCY POWER SUPPLY FROM UOP

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 1 of 9 pages

OBJECTIVE:

Connect power cables from UOP to Exposed Facility Berthing Mechanism (EFBM) Berthing Mechanism Electronics Package (BEP) to provide contingency power.

LOCATIONS:

JPM

DURATION:

40 minutes for Contingency Power Supply

10 minutes for Preparation

10 minutes for Cable assembly and connection to UOP (steps 1 and 2)

5 minutes for Removing Closeout Panel (step 3)

5 minutes for Connecting cable to BEP Interface Panel (step 4)

5 minutes for EFBM Checkout (step 5)

5 minutes for Current Probe Relocation (step 6)

35 minutes for Closeout after completion of EFBM Ops (step 7)

5 minutes for Preparation

20 minutes for Cable disconnections

10 minutes for Closeout

CREW:

One

PARTS:

MKAK Power Cable 1 P/N 80A89021-101

EFBM Contingency Power Cable P/N 80A89028-101

Protective Cap P/N 660-024M17N

TOOLS:

Digital Camera

Mini-Maglite (if required)

ISS IVA Toolbox:

Drawer 2:

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

Ratchet, 1/4" Drive

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

Drawer 5:

Static Wrist Tether

3.102 EFBM BEP CONTINGENCY POWER SUPPLY FROM UOP

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 2 of 9 pages

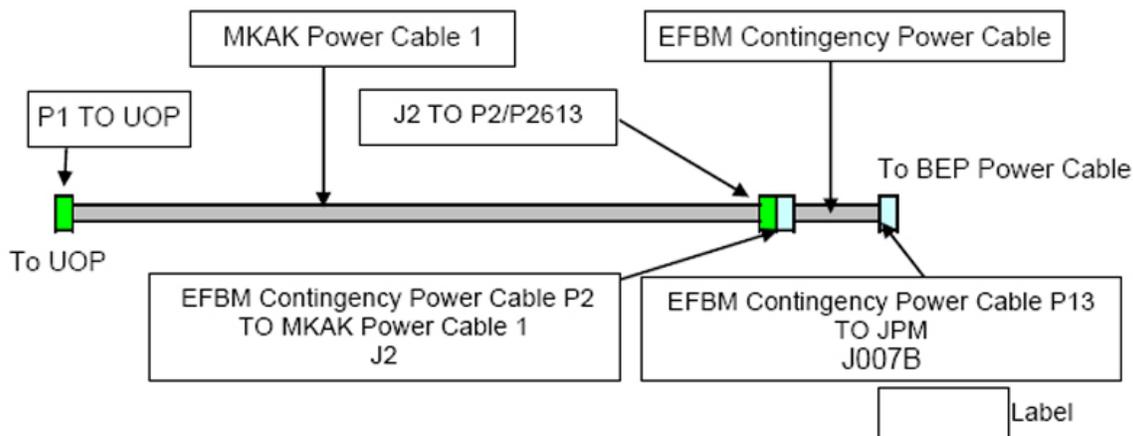


Figure 1. EFBM Contingency Power Supply Configuration.

1. CONNECTING MKAK POWER CABLE 1 TO EFBM POWER CABLE

- 1.1 Don Static Wrist Tether.
Attach clip to unpainted, unanodized metal structure.
- 1.2 Tethered Protective Cap ←|→ EFBM Contingency Power Cable P2 TO MKAK Power Cable 1 J2
Tethered Protective Cap ←|→ J2 TO P2/P2613 on MKAK Power Cable 1
- 1.3 J2 TO P2/P2613 on MKAK Power Cable 1 →|← EFBM Contingency Power Cable P2 TO MKAK Power Cable 1 J2
Refer to Figure 1.

2. CONNECTING MKAK POWER CABLE 1 TO UOP

UOP

- 2.1 ✓**SSIPC** which UOP is used for Contingency Power supply
- 2.2 Checking No Power Applied to J3, J4 Of UOP
✓POWER OUT – RESET illuminated
✓FAULT/TEST not illuminated
- 2.3 Tethered Protective Cap ←|→ P1 TO UOP on MKAK Power Cable 1
P1 TO UOP on MKAK Power Cable 1 →|← UOP
- 2.4 Doff Static Wrist Tether.

3. ACCESSING INTERFACE PANEL

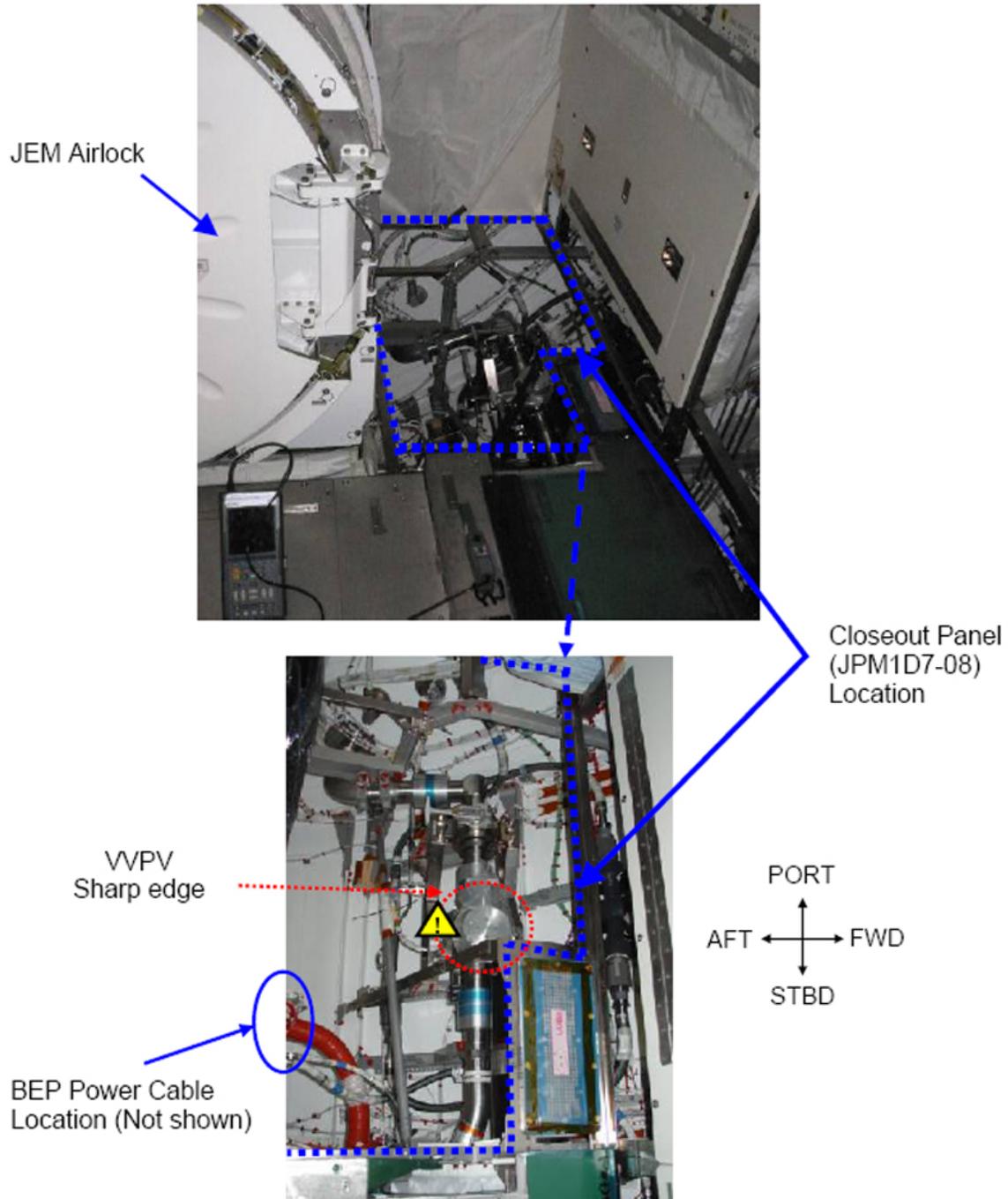


Figure 2. JPM1D7-08 Area Hazardous Equipment Location.

WARNING

Metal flexible hose for VVPV may have sharp edges. When accessing EFBM Power cable to prevent injury, care must be taken.

JPM1D7
 19 MAY 09

3.1 If required,
 |
 ~

3.102 EFBM BEP CONTINGENCY POWER SUPPLY FROM UOP

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 4 of 9 pages

Remove Closeout Panel JPM1D7-08, fasteners (one per a corner, total four) (Ratchet, 1/4" Drive; 5/32" Hex Head).

Secure to nearby rack front.

Refer to Figure 2.

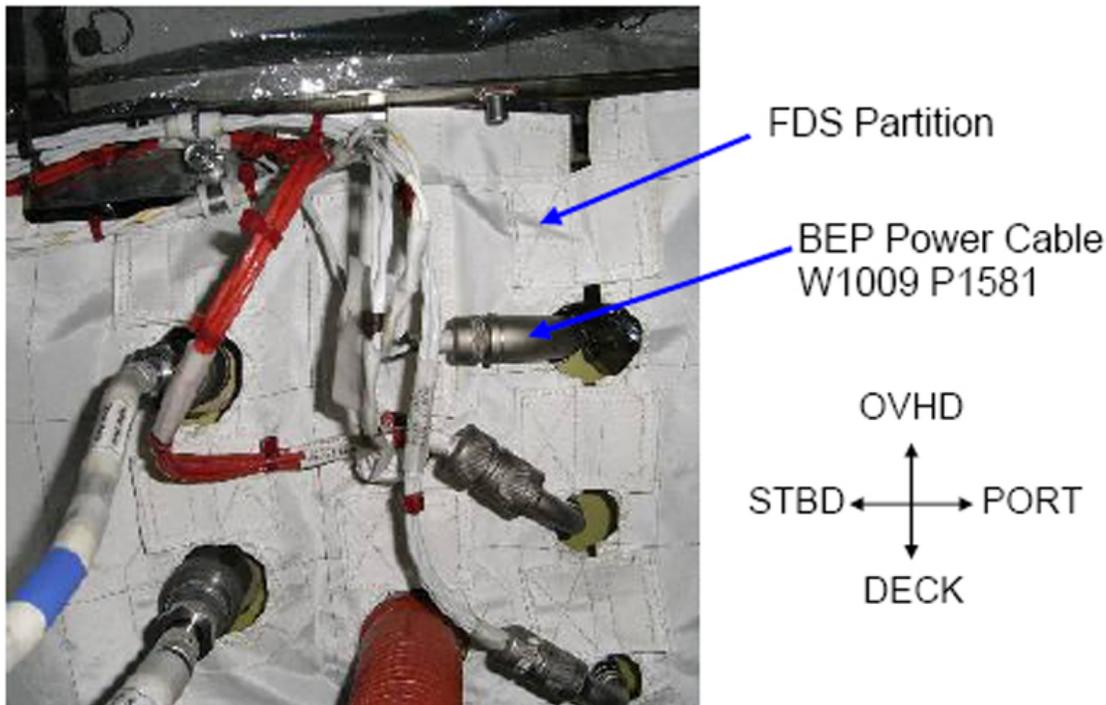


Figure 3. Interface Panel - Looking From Fwd to Aft.

3.2 Partially remove FDS Partition, Velcro.
Refer to Figure 3.

4. CONNECTING EFBM CONTINGENCY POWER CABLE TO BEP POWER CABLE

4.1 Remove Scopemeter and Current Probe from W1009 cable.
Temporarily stow.

4.2 Verifying No Power to BEP
✓SSIPC, PDB a2 RPC 1 (BEP) opened.

4.3 Don Static Wrist Tether.
Attach clip to unpainted, unanodized metal structure.

4.4 W1009 P1581 ←|→ PDB I/F FOR BM (J007B) on Interface Panel
Protective Cap (P/N 660-024M17N) →|← W1009 P1581
Refer to Figure 3.

4.5 Tethered Protective Cap ←|→ EFBM Contingency Power Cable P13
TO JPM J007B

3.102 EFBM BEP CONTINGENCY POWER SUPPLY FROM UOP

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 5 of 9 pages

EFBM Contingency Power Cable P13 TO JPM J007B →|← PDB I/F FOR BM (J007B) on Interface Panel

4.6 Doff Static Wrist Tether.

WARNING

If the crew is around Active EFBM, the following EFBM checkout from step 5 may cause shearing/pinching hazard to EVA crew.

5. EFBM CHECKOUT

JPM1D7

- 5.1 If BCDU is not connected to BEP,
- 5.1.1 If EVA is in progress,
 - Notify EVA crew not to enter the keep-out zone around Active EFBM.
 - 5.1.2 Don Static Wrist Tether.
Attach clip to unpainted, unanodized metal surface.
 - 5.1.3 Tethered Protective Cap ←|→ P011B on Jumper Cable (80AS51500-213)

Tethered Protective Cap ←|→ BCDU I/F FOR BM(J011B) on JPM 1/P7-106

P011B on Jumper Cable (80AS51500-213) →|← BCDU I/F FOR BM (J011B) on JPM 1/P7-106
 - 5.1.4 Doff Static Wrist Tether.

UOP

- 5.2 Powering On BEP
POWER OUT → Press
✓POWER OUT – ENABLE (illuminated green)
✓FAULT/TEST – OK (illuminated green)

BCDU

- 5.3 Verifying BCDU Status
Verify the following status
- PWR – On
INTLK – On
- 'MODE'
- CONNECT – On
- 'ACTUATOR STATUS'
- READY – On

- 5.4 ISS ↓ **SSIPC** BCDU LED status

- 5.5 ✓**SSIPC**, BEP deactivation is required
- UOP If BEP deactivation is required,
- pb POWER OUT → Press (Press pushbutton to release)
 - Verify POWER OUT – RESET (illuminated)
 - Verify FAULT/TEST – not illuminated

6. RELOCATING SCOPEMETER CURRENT PROBE TO EFBM CONTINGENCY POWER CABLE

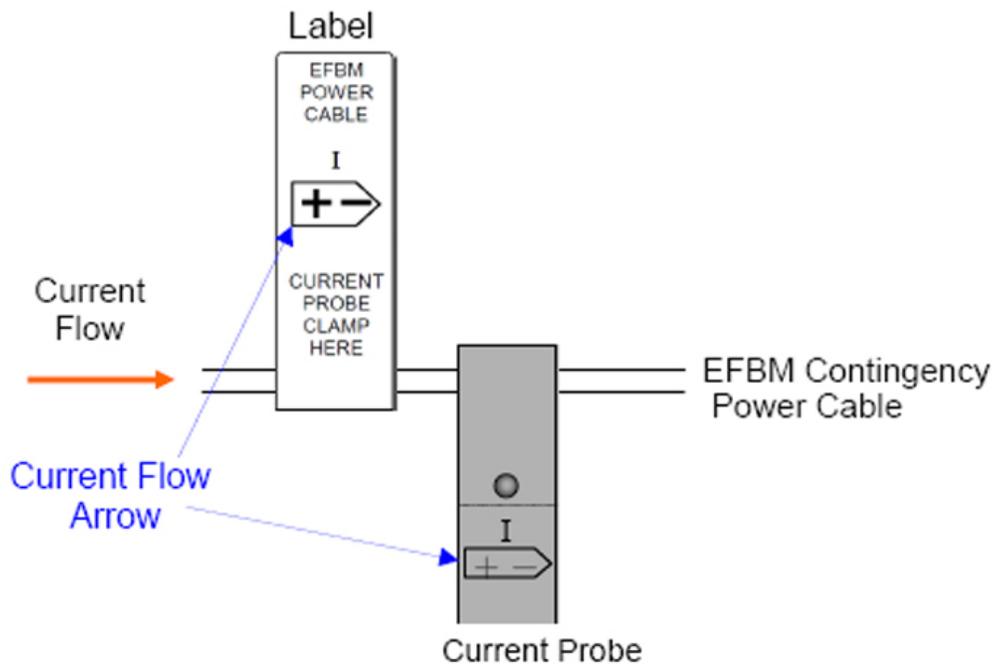
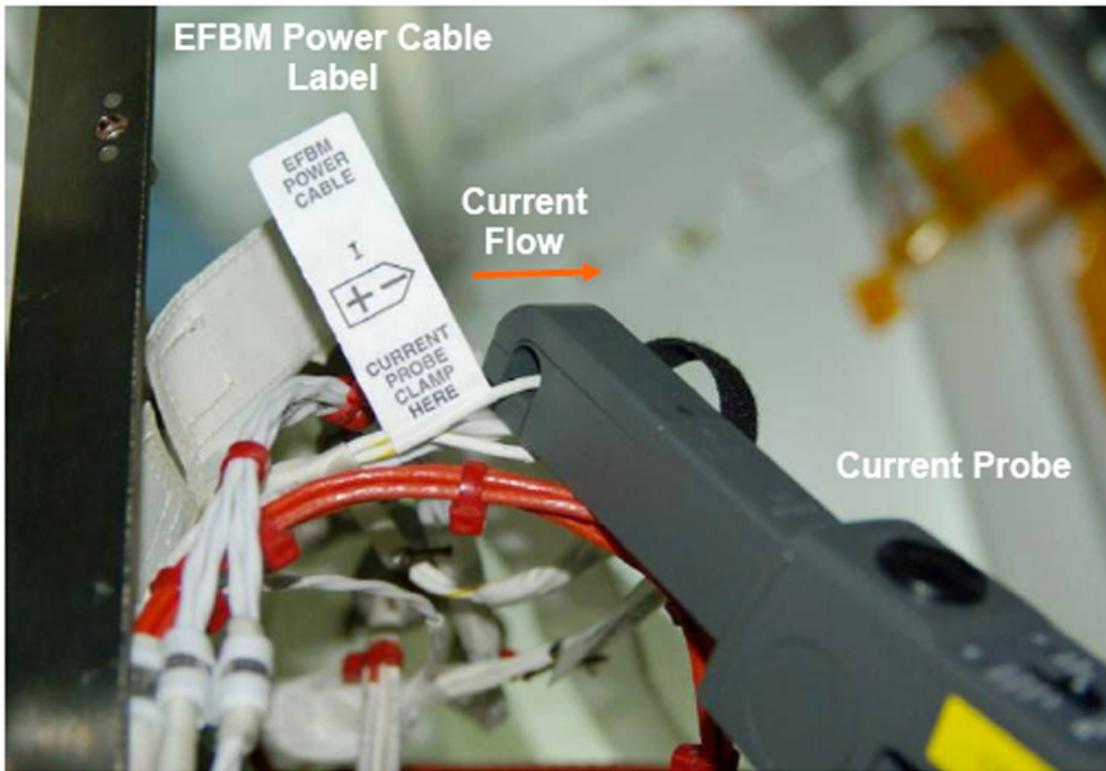


Figure 4. Current Monitor Configuration.

Grip Scopemeter Current Probe, open jaws.

Place wire EFBM Contingency Power Cable in notch of Scopemeter Current Probe, close jaws.

3.102 EFBM BEP CONTINGENCY POWER SUPPLY FROM UOP

(ASSY OPS/2JA/FIN/MULTI J/HC) Page 8 of 9 pages

Verify Current Flow Arrow orientation is as shown in Figure 4.

7. CLOSEOUT AFTER COMPLETION OF EFBM OPS

- UOP
- 7.1 Remove Scopemeter and Current Probe.
Temporarily stow.
 - 7.2 Verifying No Power Applied to Original Power Cable W1009 for BEP
✓SSIPC, PDB a2 RPC 1 (BEP) opened
 - 7.3 Checking No Power Applied to J3, J4 Of UOP
✓POWER OUT – RESET illuminated
✓FAULT/TEST – not illuminated
 - 7.4 Don Static Wrist Tether.
Attach clip to unpainted, unanodized metal structure.
 - 7.5 Disconnecting MKAK Power Cable 1 From UOP
P1 TO UOP ←|→ UOP
Tethered Protective Cap →|← P1 TO UOP
Tethered Protective Cap →|← J3(J4) on UOP
 - JPM1D7 7.6 Disconnecting EFBM Contingency Power Cable
EFBM Contingency Power Cable P13 TO JPM J007B ←|→ PDB I/F
FOR BM (J007B) on Interface Panel
 - 7.7 Reconnecting Original Power Cable W1009 to BEP
Protective Cap ←|→ W1009 P1581
Temporarily stow Protective Cap.

W1009 P1581 →|← PDB I/F FOR BM (J007B) on Interface Panel
 - 7.8 Doff Static Wrist Tether.
 - 7.9 Install FDS Partition, Velcro.
Refer to Figure 3.
 - 7.10 Check for FOD within 1m.
Photo-document all newly installed hardware (Digital Camera).
 - 7.11 Installing Closeout Panel
Tighten, torque fasteners (four) at each corner of Closeout Panel
JPM1D7-08, to 27 in-lbs [Ratchet, 1/4" Drive; 5/32" Hex Head; (10-50
in-lbs) Trq Wrench].

Refer to Figure 2.
 - 7.12 Folding Cables For Stowing
Demate EFBM Contingency Power Cable from MKAK Power Cable 1.

Mate Tethered Protective Caps to EFBM Contingency Power Cable
and MKAK Power Cable 1.

Coil cables about 40 cm diameters, Velcro straps.

3.102 EFBM BEP CONTINGENCY POWER SUPPLY FROM UOP
(ASSY OPS/2JA/FIN/MULTI J/HC) Page 9 of 9 pages

- 7.13 Notify **SSIPC**, closeout is complete.
Stow all tools and equipment.

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3.104 JEF ACTIVATION TO KEEP ALIVE - SLT
 (ASSY OPS/2JA/FIN 1/MULTI J) Page 1 of 7 pages

OBJECTIVE:

Activate JEF PDB a and b, ESC a, HCE a by SLT. This procedure is a backup procedure to be executed by crew in case **SSIPC** is unable to perform [1.503 JEF ACTIVATION - SSIPC](#). The goal of this procedure is to start temp control with HCE a and provide TVC and PTU heater power so that JEF can be kept alive.

DURATION:

60 minutes

CREW:

One

NOTE

1. JEF PDB a, ESC a and HCE a powering on temperature is higher than -35 °C. If temperatures are lower than -35 °C, the JEF activation heater should be activated, and wait until temperatures indicates higher than -35 °C.

2. Temperature above can not be monitored at SLT; therefore, **SSIPC** will determine if activation heater will need to be turned on or not.

1. VERIFYING JEF PDB a, ESC a AND HCE a TEMPERATURES

✓**SSIPC** if JEF activation heater is needed

SLT

```

*****
* If SSIPC request to power on the JEF activation heater,
*
* | JPM: EPS: Main: PDB a1: RPC7
* | 
* |
* | cmd RPC Close Execute
* |
* | 
* |
* | Verify RPC7 – CI
* |
* | Notify SSIPC JEF activation heater power on was completed.
* |
* | Wait until SSIPC GO.
*
*****
  
```

2. VERIFYING JEF MODE STATUS

Verify JEF Mode – Manual

3. POWERING ON JEF PDB a AND JEF PDB b

3.1 Powering On JEF PDB a

JPM: EPS: Main: PDU a1: JEF PDB a: FWC

'PDU RPC Position'

3.104 JEF ACTIVATION TO KEEP ALIVE - SLT

(ASSY OPS/2JA/FIN 1/MULTI J) Page 2 of 7 pages

sel Cmd

JPM EPS PDU a1 RPC1 Cmd

cmd 25A-RPC Close **Execute**

JEF EPS PDB a FWC Stat

Verify PDU RPC Position – 25A Close

If JEF activation heater was activated in step 1, omit step 3.2.

3.2 Powering On JEF PDB b

JPM: EPS: Main: PDU b1: JEF PDB b: FWC

JEF EPS PDB b FWC Stat

'PDU RPC Position'

sel Cmd

JPM EPS PDU b1 RPC1 Cmd

cmd 25A-RPC Close **Execute**

JEF EPS PDB b FWC Stat

Verify RPC Position – 25A Close

4. ACTIVATING ESC a

NOTE

After ESC a power on command is issued, it takes approximately 6 minutes to verify ESC a Power On BIT status in step 4.1, and approximately 9 minutes for JEF PDB a status in step 4.2.

4.1 Powering On ESC a

JEF: CDH: SLBus2: ESC a

JEF CDH ESC a Stat

'PDB RPC Position'

sel Cmd

JEF EPS PDB a RPC1 Cmd

cmd RPC Close **Execute**

JEF CDH ESC a Stat

Verify PDB RPC Position – Close

Verify JCP/ESC Comm Status – OK

Verify BIT Status – Valid

Verify BIT Result – Normal

3.104 JEF ACTIVATION TO KEEP ALIVE - SLT

(ASSY OPS/2JA/FIN 1/MULTI J) Page 3 of 7 pages

Verify Health Status – Normal

JEF: CDH

JEF CDH

Verify JEF Ops Mode – Standby

4.2 Verifying JEF PDB a Status

JEF: EPS: PDB a: FWC

JEF EPS PDB a FWC Stat

Verify BIT Status – Valid

Verify BIT Result – Normal

Verify Health Status – Normal

4.3 Verifying JEF PDB b Status

If JEF PDB b was not activated in step 3.2,

JEF: EPS: PDB b: FWC

JEF EPS PDB b FWC Stat

Verify BIT Status – Valid

Verify BIT Result – Normal

Verify Health Status – Normal

If JEF PDB b was not activated in step 3.2,

JEF: EPS: PDB b: FWC

JEF EPS PDB b FWC Stat

Verify BIT Status – Valid

Verify BIT Result – Failure

Verify Health Status – Failure

5. ACTIVATING HCE a

5.1 Transitioning JEF Ops Mode to Preservation

JEF: TCS: JEF Ops Mode

JEF Sel Ops Mode Cmd

cmd JEF Preservation Execute

JEF TCS

Verify JEF Ops Mode – Preservation

NOTE

After HCE a power on command is issued, HCE a Power On BIT takes approximately 1 minute in step 5.3.

3.104 JEF ACTIVATION TO KEEP ALIVE - SLT

(ASSY OPS/2JA/FIN 1/MULTI J) Page 4 of 7 pages

- 5.2 Powering On HCE a
JEF: TCS: PTCS a: HCE a: FWC

'PDB RPC Position'

sel Cmd

cmd RPC Close Execute

Verify PDB RPC Position – Close
- 5.3 Verifying HCE a Power On BIT Status
Verify BIT Status – Valid
Verify BIT Result – Normal
Verify Health Status – Normal
- 5.4 Starting HCE a Heater Control
JEF: TCS: PTCS a: HCE a: FWC

'Sys Htr Cntl Status'

sel Cmd

cmd Auto Execute

Verify Sys Htr Cntl Status – Auto

JEF: TCS: PTCS a: HCE a

Verify RPC1 – CI
Verify RPC2 – CI
Verify RPC3 – CI
Verify RPC4 – CI
Verify RPC5 – CI
Verify RPC6 – CI
- 5.5 Verifying HCE a Heater Control Status
Verify SW4 – Auto
Verify SW5 – Auto
Verify SW6 – Auto
Verify SW12 – Auto
Verify SW13 – Auto

3.104 JEF ACTIVATION TO KEEP ALIVE - SLT

(ASSY OPS/2JA/FIN 1/MULTI J) Page 5 of 7 pages

Verify SW15 – Auto
Verify SW16 – Auto
Verify SW1 – Auto
Verify SW3 – Auto
Verify SW31 – Control Off
Verify SW2 – Auto
Verify SW7 – Auto
Verify SW8 – Auto
Verify SW9 – Auto
Verify SW10 – Auto
Verify SW11 – Auto
Verify SW14 – Auto

NOTE

HCE a does not provide heater power to the external TVCs and PTUs, which are not yet moved to the on-orbit positions.

6. SHUTTING OFF TVC AND PTU HEATER AT ON-ORBIT LOCATION

6.1 Shutting Off TVC and PTU EF A Heater

JEF: TCS: PTCS a: TVC/PTU A: Cmd

JEF TCS HCE a Sw9 Cmd

cmd Control Off Execute

JEF TCS PTCSa TVCPTU A Htr Stat

Verify Control Status – Off
Verify HCE Switch Position – Open

6.2 Shutting Off TVC and PTU EF F Heater

JEF: TCS: PTCS a: TVC/PTU F: Cmd

JEF TCS HCE a Sw11 Cmd

cmd Control Off Execute

JEF TCS PTCSa TVCPTU F Htr Stat

Verify Control Status – Off
Verify HCE Switch Position – Open

If JEF PDB b was activated in step 3.2, omit step 7, 8.

7. POWERING OFF JEF ACTIVATION HEATER

JPM: EPS: Main: PDB a1: RPC7

JPM EPS PDB a1 RPC7 Cmd

cmd RPC Open Execute

JPM EPS PDB a1

Verify RPC 7 – Op

8. POWERING ON JEF PDB b

NOTE

Wait until JEF PDB b warm up by HCE a heater is completed.

8.1 Powering On JEF PDB b
On SSIPC GO

JPM: EPS: Main: PDU b1: JEF PDB b: FWC

JEF EPS PDB b FWC Stat

'PDU RPC Position'

sel Cmd

JPM EPS PDU b1 RPC1 Cmd

cmd 25A-RPC Close Execute

JEF EPS PDB b FWC Stat

Verify RPC Position – 25A Close

8.2 Start Sampling JEF PDB b

JEF: CDH: SLBus 2: ESC a

JEF CDH ESC a Stat

'ESC/JEF PDB b Comm Status'

sel Cmd

JEF CDH ESC JEF PDB b Comm Cmd

cmd Start Communication Execute

JEF: EPS: PDB b: FWC

JEF EPS PDB b FWC Stat

Verify BIT Status – Valid

Verify BIT Result – Normal

Verify Health Status – Normal

9. ACTIVATING TVC AND PTU EF F, A HEATER IN LAUNCH LOCATION

NOTE

Heater power is supplied through LTAB with ISS2 Mode Plug to the external TVCs and PTUs, which remain in their launch positions.

JEF: EPS: PDB b: RPC26

JEF EPS PDB b RPC26 Cmd

cmd RPC Close Execute

JEF EPS PDB b

Verify RPC26 – CI

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3.105 ICS JUMPERS RECONFIGURATION FOR ICS-EF OPERATION AT EFU 5

(ASSY OPS/2JA - ALL/FIN/MULTI J) Page 1 of 6 pages

OBJECTIVE:

Reconfigure ICS Jumpers for communicating with Inter-orbit Communication System - Exposed Facility (ICS-EF) at backup port, Exposed Facility Unit (EFU) #5.

LOCATION:

JPM104 (ICS Rack)

DURATION:

30 minutes

CREW:

One

PARTS:

Ziplock Bag labeled "ICS 1553 I/F Cable"

ICS 1553 I/F Cable 5A P/N: S4899A B/N: ICS1555AN

ICS 1553 I/F Cable 5B P/N: S4901A B/N: ICS1555BN

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 5:

Static Wrist Tether

1. PREPARATION

- 1.1 ✓**SSIPC** to verify ICS-PM is deactivated
- 1.2 Verify Name and Barcode number on IMS label:
ICS 1553 I/F Cable 5A, B/N: ICS1555AN
ICS 1553 I/F Cable 5B, B/N: ICS1555BN
- 1.3 Removing Rack UIP Closeout

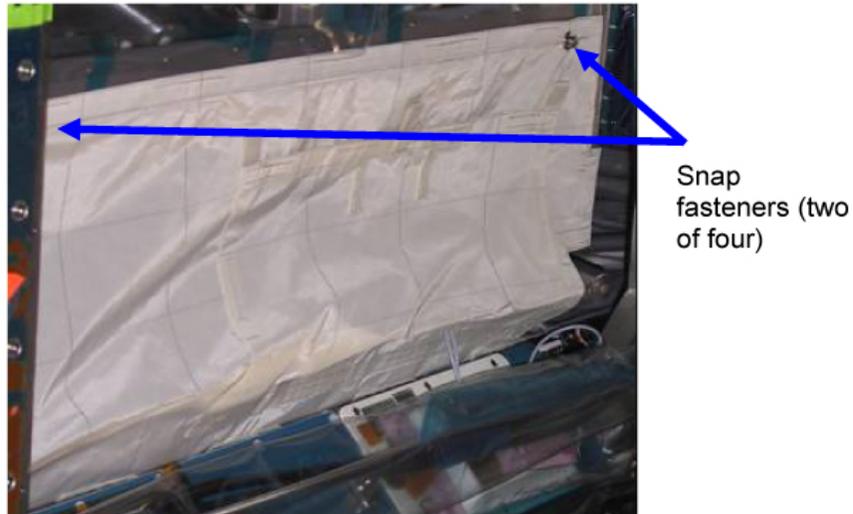


Figure 1. Rack UIP Closeout "ICS Rack Lower Closeout".

JPM104

Open the rack side of ICS Rack Lower Closeout, Snap fasteners (two), Velcro.
Refer to Figure 1.

1.4 Don Static Wrist Tether.
Secure to unpainted, unanodized metal surface.

2. EXCHANGING 1553 I/F CABLE 7A, 7B WITH 5A, 5B

NOTE

Figure 2 and Tables 1, 2 should be referred to in step 2.

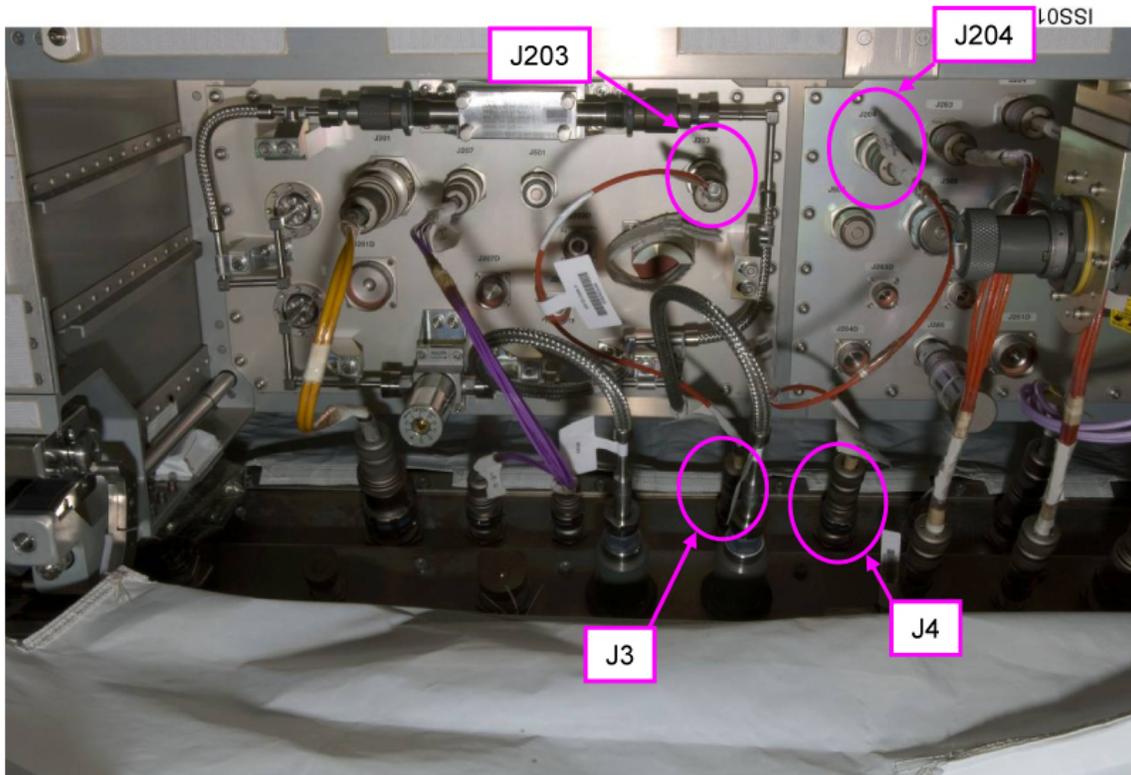


Figure 2. Connection of ICS 1553 Cables on ICS Rack UIP and Z-Panel.

Table 1. 1553B Cables for EFU #7 (to be removed)

Cable Label	Label on Connector to Rack UIP	Label on Connector to Z-Panel
ICS 1553 I/F Cable 7A	P273 TO CONNECTOR PANEL J203	P173 TO UTILITY PANEL J3
ICS 1553 I/F Cable 7B	P274 TO CONNECTOR PANEL J204	P174 TO UTILITY PANEL J4

Table 2. 1553B Cables for EFU #5 (to be installed)

Cable Label	Label on Connector to Rack UIP	Label on Connector to Z-Panel
ICS 1553 I/F Cable 5A	P253 TO CONNECTOR PANEL J203	P153 TO UTILITY PANEL J3
ICS 1553 I/F Cable 5B	P254 TO CONNECTOR PANEL J204	P154 TO UTILITY PANEL J4

- 2.1 Removing ICS 1553 I/F Cable 7A
P273 ←|→ J203 on Rack UIP
P173 ←|→ J3 on Z-Panel
 - 2.2 Installing ICS 1553 I/F Cable 5A
Pink plastic caps (two) ←|→ ICS 1553 I/F Cable 5A
P253 →|← J203 on Rack UIP
P153 →|← J3 on Z-Panel
 - 2.3 Mate pink plastic caps (two) removed from ICS 1553 I/F Cable 5A to ICS 1553 I/F Cable 7A.
Stow ICS 1553 I/F Cable 7A in Ziplock Bag labeled "ICS 1553 I/F Cable".
 - 2.4 Removing ICS 1553 I/F Cable 7B
P274 ←|→ J204 on Rack UIP
P174 ←|→ J4 on Z-Panel
 - 2.5 Installing ICS 1553 I/F Cable 5B
Pink plastic caps (two) ←|→ ICS 1553 I/F Cable 5B
P254 →|← J204 on Rack UIP
P154 →|← J4 on Z-Panel
 - 2.6 Mate pink plastic caps (two) removed from ICS 1553 I/F Cable 5B to ICS 1553 I/F Cable 7B.
Stow ICS 1553 I/F Cable 7B in Ziplock Bag labeled "ICS 1553 I/F Cable".
3. EXCHANGING CONNECTION BETWEEN J251 AND J504

CAUTION

Do not touch coaxial contact pins of P251 and P504 connectors.

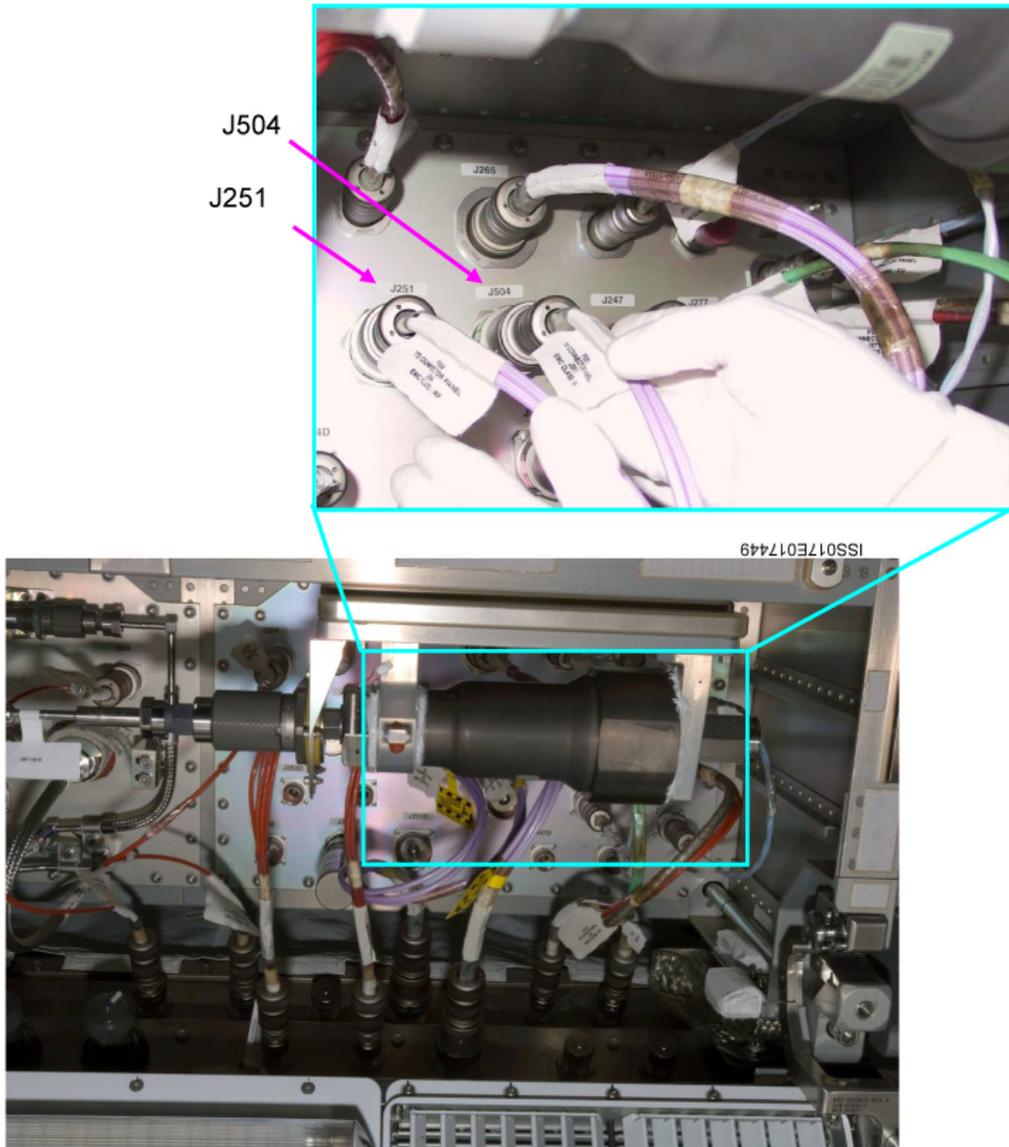


Figure 3. J251 and J504 Connectors on ICS Rack UIP.

Table 3. ICS-PM/ICS-EF Data Cable Connection Exchange

Cable Function	Label on Connector to Rack UIP	From		To
ICS-PM/ICS-EF Data line	P251 TO CONNECTOR PANEL J251	J251	→	J504
	P504 TO CONNECTOR PANEL J504	J504	→	J251

P251 ←|→ J251 on Rack UIP
P504 ←|→ J504 on Rack UIP

P504 →|← J251 on Rack UIP
P251 →|← J504 on Rack UIP
Refer to Figure 3 and Table 3.

4. CLOSE OUT

- 4.1 Doff Static Wrist Tether.
- 4.2 Check for FOD within 1 m radius.
- 4.3 Photo document new jumper connection on Rack UIP and Z-Panel (Digital Camera).
- 4.4 Close ICS Rack Lower Closeout, Snap fasteners (two), Velcro. Refer to Figure 1.
- 4.5 Notify **SSIPC** of task completion.
Update IMS with stowage location of hardware.

PAYLOADS

PAYLOADS

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HOOK
VELCROHOOK
VELCRO**MIDDECK STATUS CHECK**

(ASSY OPS/2JA/FIN) Page 1 of 4 pages

OBJECTIVE:

In step 1, perform a status check on the Glacier System. In step 2 verify the Advanced Biological Research System LED Status on the front panel. In step 3, verify the Protein Crystallization Diagnostics Facility (PCDF) Process Unit LED status on the front panel. In addition, the front fan grid PCDF Process Unit will be checked and cleaned of any debris.

TOOLS

Gray Tape (for cleaning)

MA16J/L 1. GLACIER STATUS CHECK

1.1 √cb POWER – Close (It on)

1.2 √sw BATTERY – ON (It on)

1.3 √Display – ‘HOME’

* If Display – ‘**Error Pending**’

* | Perform **GLACIER ERROR MESSAGE**, all (SODF: ASSY
* | OPS: PAYLOADS), then:

* If ‘HOME’ not shown:

* | pb Right (EXIT) → push until ‘HOME’ appears

NOTE

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

1.4. If ascent Glacier S/N tbd

| √Display – ‘CURR TEMP:’ is $+4.0^{\circ}\text{C} \pm 5.0^{\circ}\text{C}$.

1.5. If descent Glacier S/N tbd

| √Display – ‘CURR TEMP:’ is $-95^{\circ}\text{C} \pm 5.0^{\circ}\text{C}$.

1.6. Log from Glacier front panel ‘GPS’, ‘CURR TEMP’ in Table 1 Glacier Log.

1.7 √MCC-H of data recorded in Table 1 and any off-nominal conditions.

ASSY OPS-1a/2JA/A



HOOK
VELCRO



HOOK
VELCRO

MIDDECK STATUS CHECK

(ASSY OPS/2JA/FIN) Page 3 of 4 pages

MF28E 2. ABRS STATUS CHECK

2.1 √STATUS It – green

```

*****
* If STATUS It – amber
*   On MCC-H GO:
*
*   sw PWR → OFF
*   cb CB1 → Open
*   Wait 30 seconds
*   cb CB1 → Closed
*   sw PWR → ON
*   √STATUS It – green
*****

```

2.2 √MCC-H of status.



HOOK
VELCRO

HOOK
VELCRO

MIDDECK STATUS CHECK

(ASSY OPS/2JA/FIN) Page 4 of 4 pages

MA16F 3. PCDF-PROCESS UNIT STATUS CHECK

3.1 ✓EDR PWR ON It – on

3.2 ✓POWER ON It – on

3.3 ✓CONTR FAILURE It – off

3.4 ✓NOMINAL PROCESS TEMP It – on

3.5 ✓STAND ALONE MODE It – on

 * If any of the above are not in the expected state
 * | Perform **PCDF PROCESS UNIT OFF NOM RECOVERY**
 * | (**MDDK**), all (SODF: ASSY OPS: PAYLOADS), then:

3.6 Verify by inspection that the PUE1 Fan (located on front center of PCDF-PU) is running.

✓Fan inlet and clean if required

3.7 Record MET: ____/____:____ and status in Table 2 PCDF Log.

3.8 ✓**MCC-H** of MET and status.

Table 2. PCDF Log.

MET	STATUS
____/____:____	_____
____/____:____	_____
____/____:____	_____
____/____:____	_____
____/____:____	_____
____/____:____	_____
____/____:____	_____
____/____:____	_____
____/____:____	_____

ASSY OPS-1d/2JA/A

OBJECTIVE:

Transfer Protein Crystallization Diagnostics Facility (PCDF) Process Unit from Columbus to the Shuttle Middeck. This activity prepares the middeck locker to receive the payload. This activity will be performed immediately following the ESA PODF procedure which powers off, demates cables and removes PCDF Process Unit from European Drawer Rack (EDR) Locker. This activity transfers the payload to Shuttle Middeck, installs it into a middeck locker and powers it to a survival state.

LOCATION:

Removed: EDR - COL1F1

Installed: MA16F

TOOLS:

3/32" Hex Head, 1/4" Drive

1/4" Driver Handle

DURATION:

30 minutes

MA16F 1. PREP MIDDECK LOCKER

- 1.1 Verify locker empty.
- 1.2 Verify shim mounted on inside of locker door.
- 1.3 Remove ISS Internal Rear Closeout using thumb latches (two).
- 1.4 Close locker door.
- 1.5 Remove panels (three) from locker door front by rotating stud fasteners 1/4 turn CCW using 3/32" Hex Head, 1/4" Drive and 1/4" Driver Handle.
- 1.6 ✓MCC-H middeck locker ready to receive PCDF-Process Unit.

CAUTION

To prevent loss of science, power interrupt time should not exceed 100 minutes.

COL1F1 2. PCDF PROCESS UNIT TRANSFER AND INSTALLATION INTO MDDK

- 2.1 Transfer PCDF Process Unit to Middeck.
- MA16F 2.2 Open locker door latch (two) and insert into locker.
- 2.3 Stow slings on left and right sides of the PCDF Process Unit per Figure 1.



Figure 1. Stowing Slings

- 2.4 Fold Nomex wings (two) and close the Velcro per Figure 2.

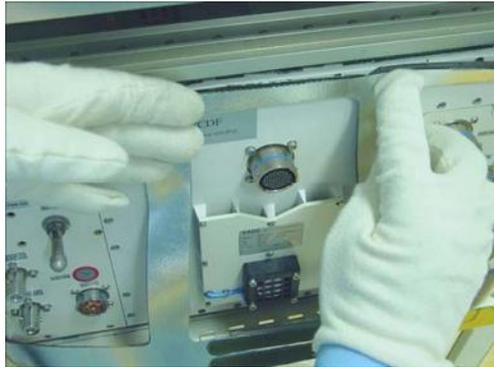


Figure 2. Closing Nomex Wings and Velcro

- 2.5 Close and lock locker door latch (two).

3. PCDF PROCESS UNIT POWER ON

- MO13Q 3.1 ✓sw DC UTIL PWR MNB – OFF
- O15:C 3.2 ✓cb MNB UTIL PWR F1/MO13Q – open
- MA16F 3.3 ✓sw POWER – OFF
- 3.4 DC JUMPER (tbd) → | ← POWER J01
- O15:C 3.5 ✓cb MNB UTIL PWR F1/MO13Q – close
- MO13Q 3.6 sw DC UTIL PWR MNB → ON
- MA16F 3.7 sw POWER → ON
- 3.8 Record Power On time (GMT): _____ (___ / ___ : ___)

4. VERIFY PCDF PROCESS UNIT STATUS

- 4.1 Wait ~ 30 seconds (for system initialization)
- 4.2 ✓EDR POWER ON It – on
- 4.3 ✓POWER ON It – on
- 4.4 ✓CONTR FAILURE It – off

4.5 ✓STAND ALONE MODE It – on

*
* If any of the above are not in the expected state
* | Perform PCDF PROCESS UNIT OFF NOM RECOVERY, all (SODF:
* | ASSY OPS: PAYLOADS), then:
*

4.6 Record status of NOMINAL PROCESS TEMP It: _____ .

4.7 Notify **MCC-H**:
Installation of PCDF Prcess Unit is complete
Provide Power On time from above (step 3.8).
Provide NOMINAL PROCESS TEMP It status (step 4.6).

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PCDF PROCESS UNIT OFF NOM RECOVERY

(ASSY OPS/2JA/FIN)

Page 1 of 1 page

OBJECTIVE:

To correct off-nominal configurations of Protein Crystallization Diagnostics Facility (PCDF) Process Unit while operated in the middeck. These major steps are independent and are not intended to be performed in sequence.

1. If POWER ON LT-OFF or CONTR FAILURE LT-ON
| then CYCLE PROCESS UNIT POWER

- MA16F
- 1.1 sw POWER → OFF
sw POWER → ON
 - 1.2 Wait one minute.
 - 1.3 Perform [MIDDECK STATUS CHECK](#), steps 3.1 to 3.5 (SODF: ASSY OPS: PAYLOADS), then:
 - 1.4 ✓MCC-H with status.

2. If EDR POWER ON LT - OFF, then:

- MO13Q
- 2.1 Verify sw DC UTIL PWR MNB – ON
- O15:C
- 2.2 Verify cb MNB UTIL PWR F1/MO13Q – cl
 - 2.3 Cycle all sources of Process Unit Power
- MA16F
- 2.3.1 sw POWER → OFF
- MO13Q
- sw DC UTIL PWR MNB → OFF
- On MCC-H GO**
- O15:C
- cb MNB UTIL PWR F1/MO13Q → Open
 - 2.3.2 cb MNB UTIL PWR F1/MO13Q → Close
- MO13Q
- sw DC UTIL PWR MNB → ON
- MA16F
- sw POWER → ON
- Wait one minute.
- Perform [MIDDECK STATUS CHECK](#), steps 3.1 to 3.5 (SODF: ASSY OPS: PAYLOADS), then:
- ✓MCC-H with status.

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GLACIER SWAP-SHUTTLE

(ASSY OPS/2JA/FIN 1/MULTI P)

Page 1 of 5 pages

OBJECTIVE:

This procedure removes ISS Locker (two) from the shuttle middeck. The lockers are transferred to the EXPRESS-6 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 with the Glacier Swap-ISS Procedure.

PARTS:

Velcro Strap

Gray Tape

TOOLS:

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

STS IFM Toolbox:

1/4" Socket, 1/4" Drive

Ratchet, 1/4" Drive

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

NOTE

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

1. ✓Transfer path clear between EXPRESS-6 Rack and middeck.
2. REMOVING LOCKERS FROM MIDDECK

MF28E

2.1 Untether DC POWER CABLE 20 AMP from Port Wall above MF28E.

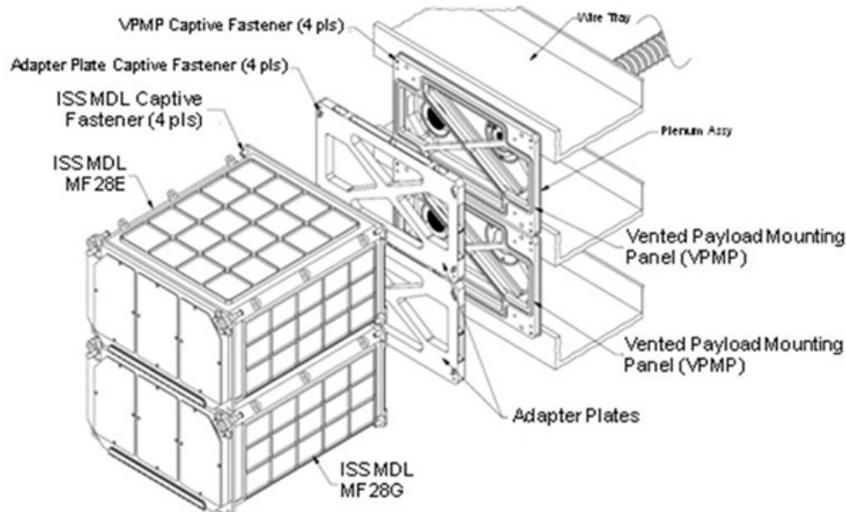


Figure 1. ISS Locker Installation in Middeck.

- 2.2 Unfasten Locker fasteners (four) from Adapter Plate (High Torque Locker Tool; 1/4" Socket, 1/4" Drive; Ratchet, 1/4" Drive).
Remove locker and temporary stow.

GLACIER SWAP-SHUTTLE

(ASSY OPS/2JA/FIN 1/MULTI P)

Page 2 of 5 pages

- MF28G 2.3 Unfasten Locker fasteners (four) from Adapter Plate (High Torque Locker Tool; 1/4" Socket, 1/4" Drive; Ratchet, 1/4" Drive).
Remove locker and temporary stow.
- MF28E 2.4 Unfasten Adapter Plate fasteners (four) from VPMP (High Torque Locker Tool; 1/4" Socket, 1/4" Drive; Ratchet, 1/4" Drive).
Temporary stow Adapter Plate.
- MF28G 2.5 Unfasten Adapter Plate fasteners (four) from VPMP (High Torque Locker Tool; 1/4" Socket, 1/4" Drive; Ratchet, 1/4" Drive).
Temporary stow Adapter Plate.
- 2.6 Notify ISS crew that middeck location is ready.
- LAB1O4 3. Transfer ISS Locker (two) and Adapter Plate (two) to EXPRESS-6 Rack.
4. Exchange Glacier unit for ISS Locker (two) and Adapter Plate (two) with ISS crewmember.
- MF28E/G 5. Transfer Descent Glacier to Middeck location and slide into position.
6. GLACIER POWER ON IN ORBITER MIDDECK
- ML86B 6.1 ✓cb MNB MAR 1 → Open
- MF28E/G 6.2 ✓cb POWER – Open
✓sw BATTERY – ON
- 6.3 Verify and complete DC POWER CABLE 20AMP connections:
ENT PAYLOAD DC PWR →|← POWER (J1)
- ML86B 6.4 cb MNB MAR 1 → Close
- NOTE

Glacier initialization could take up to 3 minutes. Initialization is complete once Line 1 reads '**HOME**'.
- MF28E/G 6.5 cb POWER → Close (It on)
Record Power On Time: _____ (GMT)
✓sw BATTERY – ON (It on)

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

WARNING

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

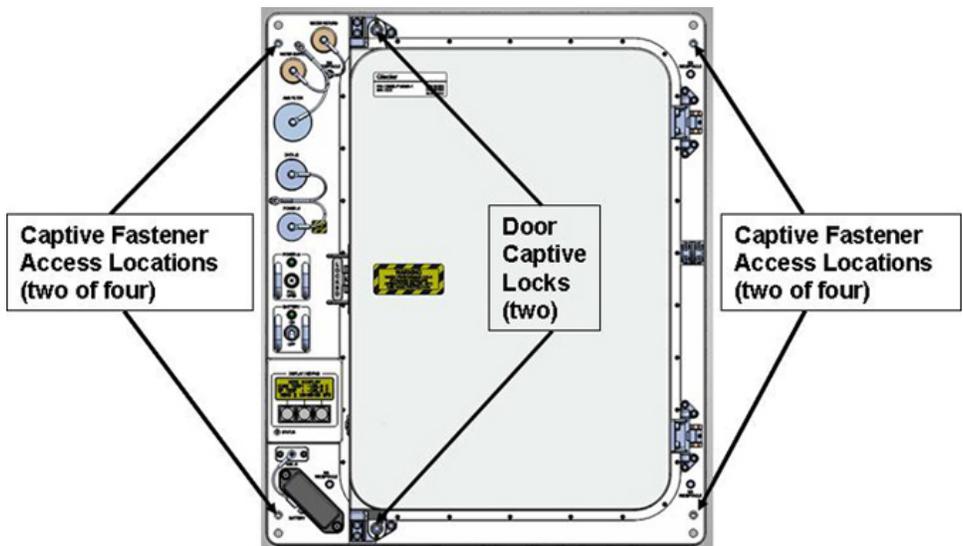


Figure 2. Glacier Configuration.

7. GLACIER SETUP OR INSTALLATION IN ORBITER MIDDECK

- 7.1 Fasten Glacier fasteners (four) into Middeck locker VPMP mounted on wire tray using following pattern: upper left, lower right, upper right, lower left and torque to 75 in-lbs [High Torque Locker Tool; 1/4" Socket, 1/4" Drive; (40-200 in-lbs) Trq Wrench, 1/4" Drive].
- 7.2 Tether DC POWER CABLE 20 AMP to top of Glacier using Velcro Strap and Gray Tape.

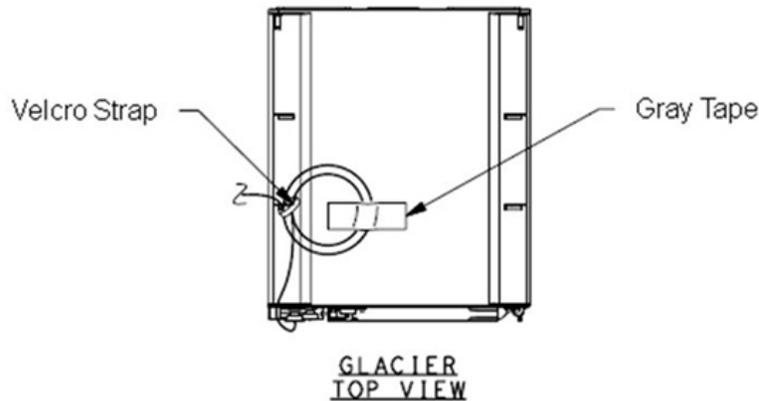


Figure 3. Glacier Power Cable Tether.

7.3 Disconnect Glacier IVA Handle from Glacier and temporarily stow.

7.4 Verify front door is closed.

7.5 ✓Display (Line 1) 'HOME'

```

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

7.6 From front panel display
 Record CURR TEMP: _____
 Record SET POINT: _____
 Record GPS time: _____

7.7 Stow IVA Handle per Stow Note
 If all powered transfers are complete
 | Stow tools.

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

7.8 Notify **MCC-H** of Glacier transfer to middeck completion.

GLACIER SWAP-SHUTTLE

(ASSY OPS/2JA/FIN 1/MULTI P)

Page 5 of 5 pages

Report time from step 6.5 and temperature, set point and GPS from step 7.6.

Ground should update IMS for the following parts:

ISS Locker (MF28E) TO: LAB1O4_G1

ISS Locker (MF28G) TO: LAB1O4_J1

Adapter Plate (two) TO: per Transfer List

Glacier TO: Middeck

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GLACIER SWAP-ISS

(ASSY OPS/2JA/FIN 1/MULTI P) Page 1 of 6 pages

OBJECTIVE:

This procedure configures the Glacier in EXPRESS-6 Rack for descent by removing the 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 ISS Lockers (two). The ISS Lockers are installed in EXPRESS -6 Rack. This procedure is performed in parallel with the Glacier Swap-STS Procedure.

MATERIALS:

Dry Wipes

Gray Tape

PARTS:

Glacier IVA Handle B/C CBSE-F10075-1 (reference Stow Note)

Volume Compensators B/C GLCR1000J, GLCR1001J (reference Stow Note)

TOOLS:

High Torque Locker Tool

ISS IVA Toolbox:

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

Driver Handle, 1/4" Drive

1/4" Socket, 1/4" Drive

Ratchet, 1/4" Drive

1/4" Drive; (5-35 in-lbs) Trq Driver, 1/4" Drive

NOTE

Shuttle crew will simultaneously remove lockers in middeck to expedite powered transfer activity to ensure Glacier power interrupt time does not exceed the 120 minute limit.

- LAB104
(Glacier)
1. Verify front door locking flap is in LOCKED position.
 2. Connect Glacier IVA Handle diagonally to front face of Descent Glacier at locations marked IVA Receptacle (two of four).

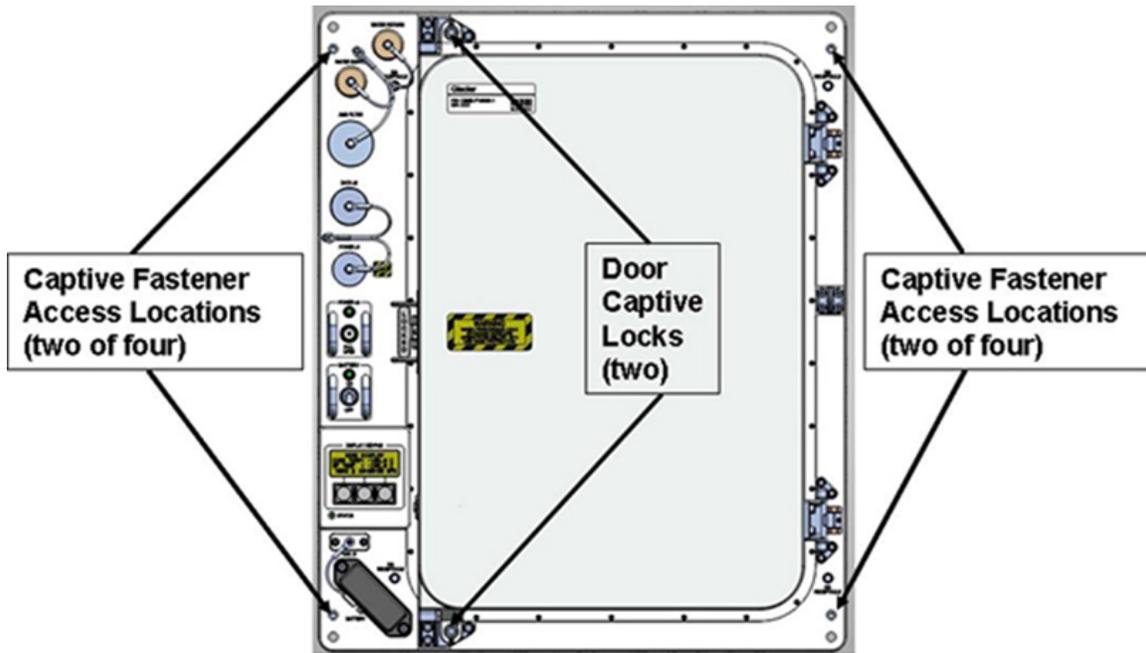


Figure 1. Glacier Configuration.

3. Unfasten Glacier from EXPRESS Rack Backplate (four) (High Torque Locker Tool; 1/4" Socket, 1/4" Drive; Ratchet, 1/4" Drive).
4. Notify shuttle crew that ISS Glacier is ready for shutdown.
5. GLACIER SHUTDOWN

LAB1O4
(Glacier)

5.1 ✓Display (Line 1) – 'HOME'

```
*****
*
* If display -***Error Pending**
* |   Perform 3.003 GLACIER MANUAL ERROR MESSAGE, all
* |   (PODF: GLACIER: MALFUNCTION), then:
*
*
* If 'HOME' not shown
* |   pb Right (EXIT) → Press until 'HOME' appears
*
*****
```

5.2 Record front panel display GPS time: _____

5.3 pb Left (MENU) → Press (one time)

The following messages appear:

'MAIN MENU'

'QUICK STATUS 1/5'

5.4 pb Left (NEXT) → Press (four times)

The following messages appear:

'MAIN MENU'

'SHUTDOWN 5/5'

5.5 pb Center (SELECT) → Press (one time)

The following messages appear:

'SHUTDOWN'

'SHUTDOWN 1/2'

5.6 pb Center (SELECT) → Press (one time)

The following messages appear:

'Confirm Shutdown'

'SHUTDOWN'

5.7 pb Left (APPLY) → Press (one time)

The following messages appear:

'Glacier'

'System'

'Shutting Down'

'Please wait...'

5.8 ✓Display shows the following messages

'Glacier'

'Shutdown Complete'

'TURN POWER OFF'

5.9 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.

5.10 cb POWER → Open
 Record Power Off Time: _____ (GMT)

LAB104_F1 5.11 sw LOCKER-3 POWER → OFF
 ✓LOCKER-3 POWER Lt – Off

6. RESOURCE DISCONNECTS FROM GLACIER UNIT

Glacier 6.1 EXPRESS Rack Power Cable (24")←|→ POWER J1
 6.2 EXPRESS Rack Data Cable (24")←|→ DATA J2
 6.3 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.
*
*****

```

6.4 Tether cables and water lines out of the way.

7. Carefully slide the Glacier unit out of the locker position to access the rear of the unit.
8. Photo document the rear intake and exhaust vents (Digital Camera).
9. Clean the Glacier rear intake and exhaust vents with Gray Tape. Refer to Figure 2.

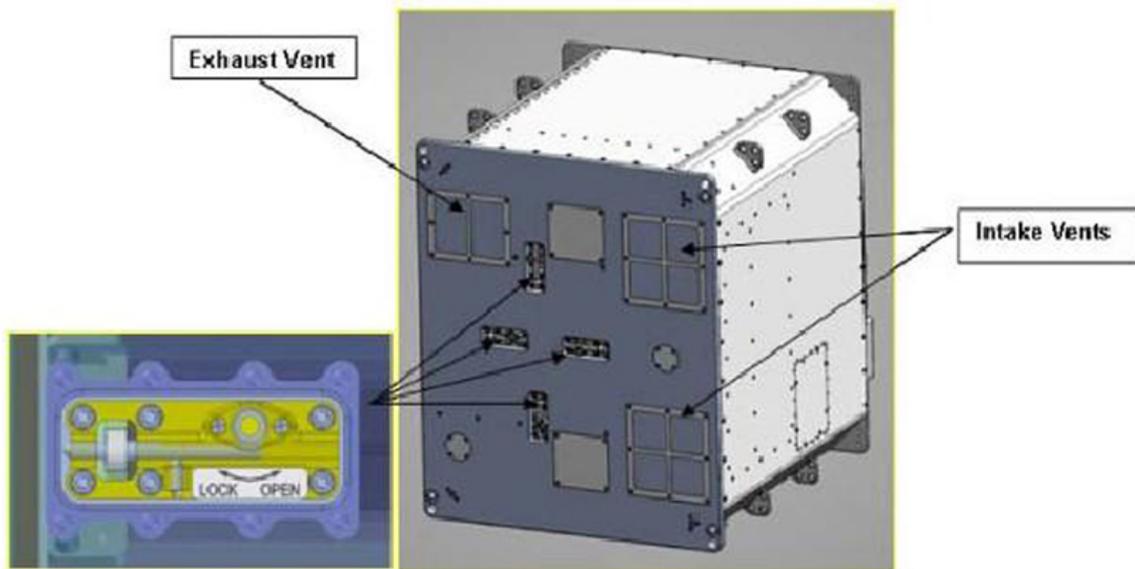


Figure 2. Cryocooler Launch Locks and Vents on Rear of Glacier.

10. Push in and rotate clockwise cryocooler launch locks (four) at rear of Glacier until locking pin is engaged (LOCK) (3/16" Hex Head, 1/4" Drive; Driver Handle, 1/4" Drive). Refer to Figure 2.
11. Exchange Glacier unit for ISS Locker (two) and Adapter Plate (two) with shuttle crewmember. Temporary stow Adapter Plates (two).
12. INSTALLING LOCKERS

LAB104_G
1

- 12.1 Slide MF28E locker into EXPRESS-6 Rack Locker 3 location.

Tighten, torque fasteners (four) on each Locker to 30 in-lbs [High Torque Locker Tool; 1/4" Socket, 1/4" Drive; (5-35 in-lbs) Trq Driver, 1/4" Drive] in a diagonal pattern.

LAB104_J1

- 12.2 Slide MF28G locker into EXPRESS-6 Rack Locker 4 location.

Tighten, torque fasteners (four) on each Locker to 30 in-lbs [High Torque Locker Tool; 1/4" Socket, 1/4" Drive; (5-35 in-lbs) Trq Driver, 1/4" Drive] in a diagonal pattern.

13. REMOVING RESOURCE CONNECTIONS

LAB104_F1

- 13.1 EXPRESS Rack Power Cable (24") ←|→ LOCKER-3 POWER J1
- 13.2 EXPRESS Rack Data Cable (24") ←|→ LOCKER-3 DATA J2
- 13.3 Glacier Water Return Line ←|→ COOLANT WATER RETURN
Glacier Water Supply Line ←|→ COOLANT WATER SUPPLY
- 13.4 Connect Volume Compensator to each Water Line

Glacier Water Return Line (small connector, Preece)→|← Volume Compensator

Glacier Water Supply Line (small connector, Preece)→|← Volume Compensator

Verify no leakage at connectors.

```

*****
*
* If leakage is present
* | Clean up with Dry Wipes.
*
*****

```

- 14. Stow:
 - Power and Data cables per Stow Note
 - Water Lines with Volume Compensators per Stow Note
 - Adapter Plate (two) per Transfer List
 - All IVA Tools if payload transfers are complete.

- 15. Notify **MCC-H** Glacier Swap-ISS is complete.
Report power-off time from step 5.10.

Ground should update IMS for the following parts:

ISS Locker TO: LAB104_G1

ISS Locker TO: LAB104_J1

EXPRESS Rack Power Cable (24") TO: per Stow Note

EXPRESS Rack Data Cable (24") TO: per Stow Note

Glacier Water Return Line with Volume Compensator TO: per Stow Note

Glacier Water Supply Line with Volume Compensator TO: per Stow Note

Adapter Plate (two) TO: per Transfer List

Glacier TO: Middeck

GLACIER CONFIGURATION FOR DESCENT

(ASSY OPS/2JA/FIN)

Page 1 of 2 pages

OBJECTIVE:

The following steps will perform a configuration for descent of Glacier Systems.

TOOLS

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

4" Ext, 1/4" Drive

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

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

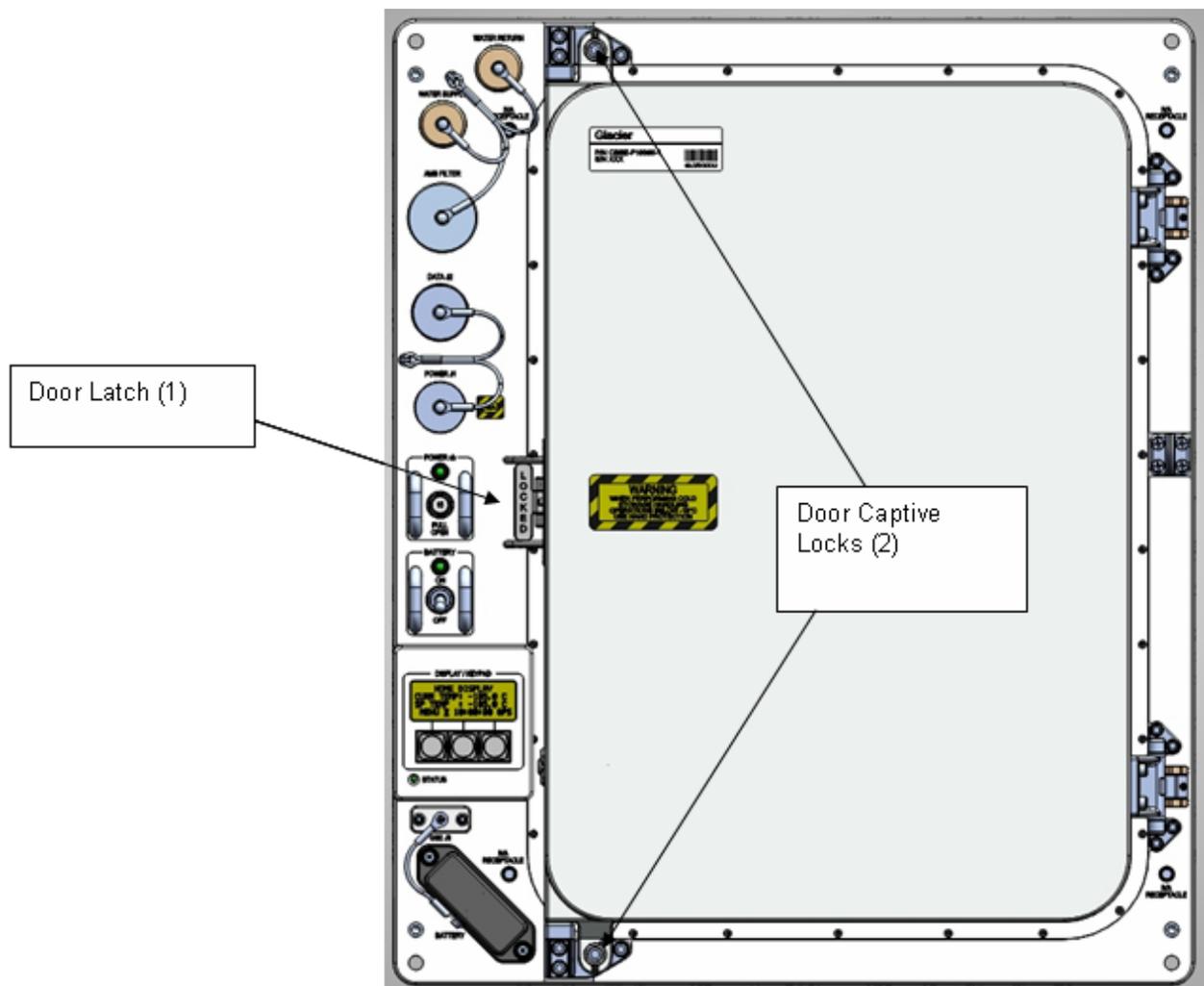


Figure 1. Glacier Configuration

3. ✓Glacier door is closed.

GLACIER CONFIGURATION FOR DESCENT

(ASSY OPS/2JA/FIN)

Page 2 of 2 pages

```
*****
*
* If Outer Door does not close
*
* | Press on top left corner or 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.)

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

5. Fasten Glacier Door Captive Locks (two), torque to 75 in-lbs using 3/16" Hex Head, 1/4" Drive, 4" Ext, 1/4" Drive, (40 to 200 in.-lbs.) Trq Wrench 1/4" Drive. See Figure 1 Glacier Configuration.

6. Notify **MCC-H** Glacier Config for Descent is complete.

STOW tools as required, to original locations:

GLACIER PREPARATION FOR SAMPLE TRANSFER

(ASSY OPS/2JA/FIN)

Page 1 of 2 pages

OBJECTIVE:

The following steps will perform a status check on the Glacier System and prepare the hardware for sample transfer.

TOOLS

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

4" Extension, 3/8" Drive

Ratchet, 3/8" Drive

MA16F/G (Glacier) 1. ✓cb POWER – Close (It on)

2. ✓sw BATTERY – ON (It on)

3. ✓Display – 'HOME'

```

*****
*
* If Display - '**Error Pending**'
* |
* | Perform GLACIER ERROR MESSAGE, then:
* |
*****
*
* If 'HOME' not shown:
* |
* | pb Right (EXIT) → push until 'HOME' appears
* |
*****
    
```

4. ✓Display – 'CURR TEMP:' is -95.0°C ± 5.0°C.

5. Log from Glacier front panel 'GPS', 'CURR TEMP' in Glacier Log Table 1.

Table 1. Glacier Log

GPS	CURR TEMP	GPS	CURR TEMP
____:____:____	____.____°C	____:____:____	____.____°C
____:____:____	____.____°C	____:____:____	____.____°C
____:____:____	____.____°C	____:____:____	____.____°C
____:____:____	____.____°C	____:____:____	____.____°C
____:____:____	____.____°C	____:____:____	____.____°C

6. If first time opening Glacier door since launch,

Unlock Glacier Door Captive Locks (two) using 3/16" Hex Head, 3/8" Drive; 4" Extension, 3/8" Drive; Ratchet, 3/8" Drive. See Figure 1 Glacier Configuration.

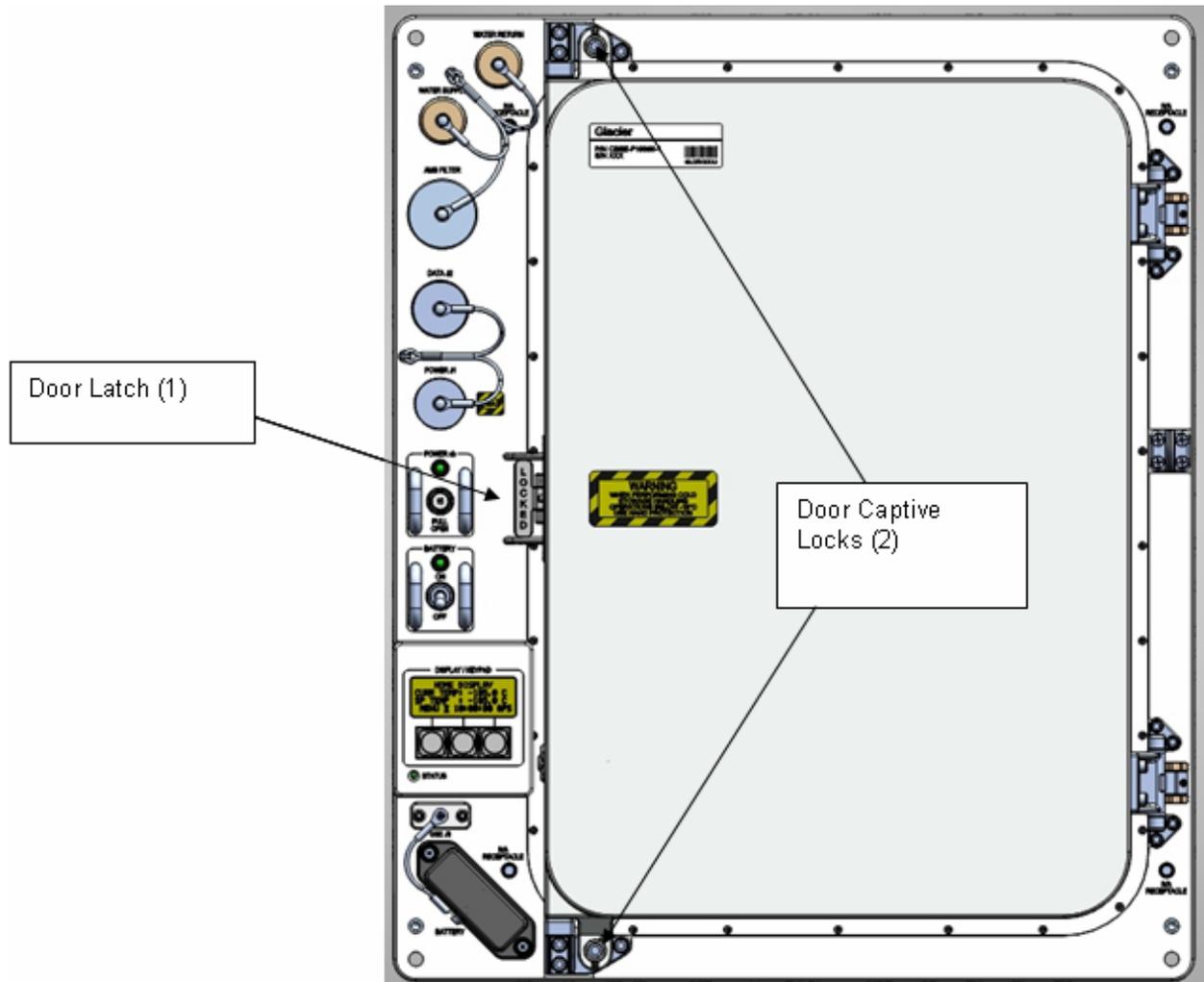


Figure 1. Glacier Configuration

7. Notify MCC-H of data recorded in Table 1 and any off-nominal conditions.

OBJECTIVE:

The following steps will activate Glacier Systems.

On MCC-H GO

- ML86B 1. cb MNB MAR 1 → Open
- Glacier 2. ✓cb POWER – Open (It off)
- 3. ✓sw BATTERY – OFF (It off)
- 4. ✓SHUTTLE PAYLOAD DC PWR CABLE →|← POWER J1
- ML85E 5. ✓SHUTTLE PAYLOAD DC PWR CABLE →|← DC 20 AMP J11
- ML86B 6. cb MNB MAR 1 → Close

NOTE

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

- Glacier 7. cb POWER → Close (It on)
- 8. sw BATTERY → ON (It on)

NOTE

The **HOME** menu will be slightly different based upon the current Temperature Control Mode (**SET POINT**, **IDLE**, or **MANUAL**) of the Glacier.

- 9. ✓Display 'HOME'
- ```

*
* If 'HOME' not shown,
* |
* | Perform GLACIER FAIL TO REPOWER then:
* |

*
* If Display - '**Error Pending**'
* |
* | Perform GLACIER ERROR MESSAGE, then:
* |

```

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

11. Notify **MCC-H** of Power Up complete and data recorded in Step 10.

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, then:
*

```

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

# GLACIER SHUTDOWN

## 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 120 minutes, unless necessary for Orbiter contingency operations. |

Glacier

1. ✓Display 'HOME'  
\*\*\*\*\*  
\*  
\* If Display - '\*\*Error Pending\*\*'  
\* |  
\* Perform GLACIER ERROR MESSAGE, 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 SHUTDOWN

(ASSY OPS/2JA/FIN 1/MULTI P)

Page 2 of 2 pages

'Glacier'  
'System'  
'Shutting Down'  
'Please wait...'

8. Verify—  
'Glacier'  
'Shutdown Complete'  
'TURN POWER OFF'
9. Wait 5 seconds before proceeding.
10. sw BATTERY → OFF (It off)

### NOTE

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

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

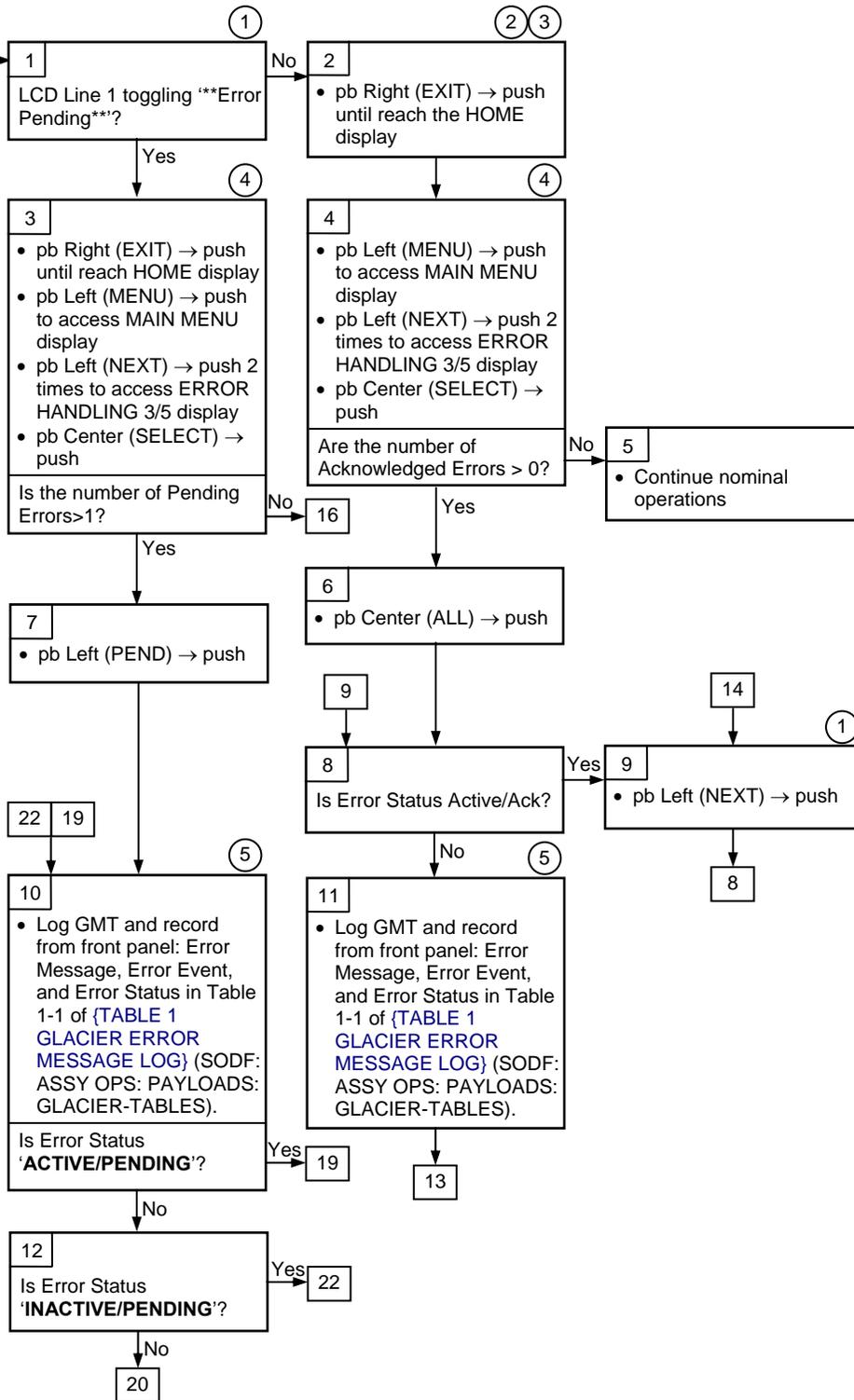
# GLACIER

## GLACIER ERROR MESSAGE

(ASSY OPS/2JA/FIN 1/MULTI P) Page 1 of 17 pages

Glacier System Error

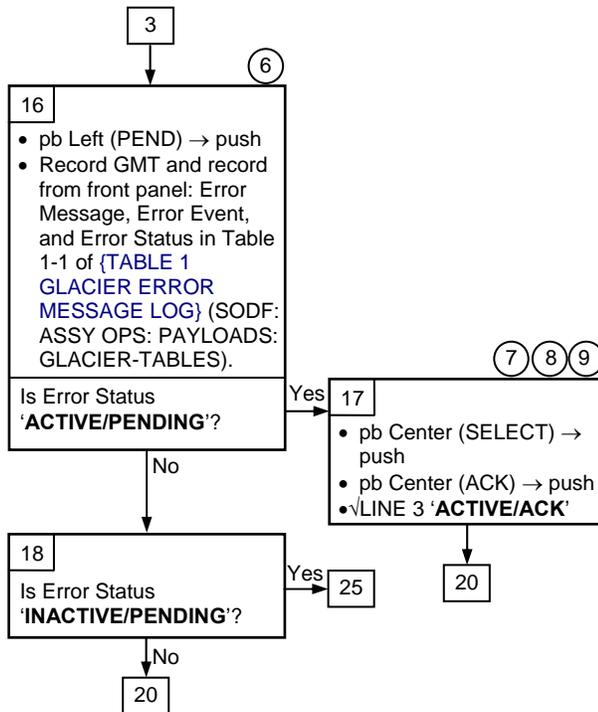
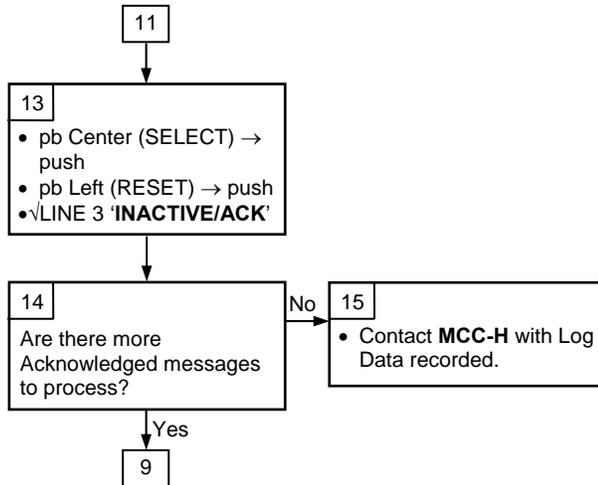
**Nominal Config:**  
(Glacier)  
cb POWER – Close (It on)  
sw BATTERY – ON (It on)  
(ML86B)  
cb MNB MAR 1 – Close



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

GLACIER ERROR MESSAGE

(ASSY OPS/2JA/FIN 1/MULTI P) Page 2 of 17 pages



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

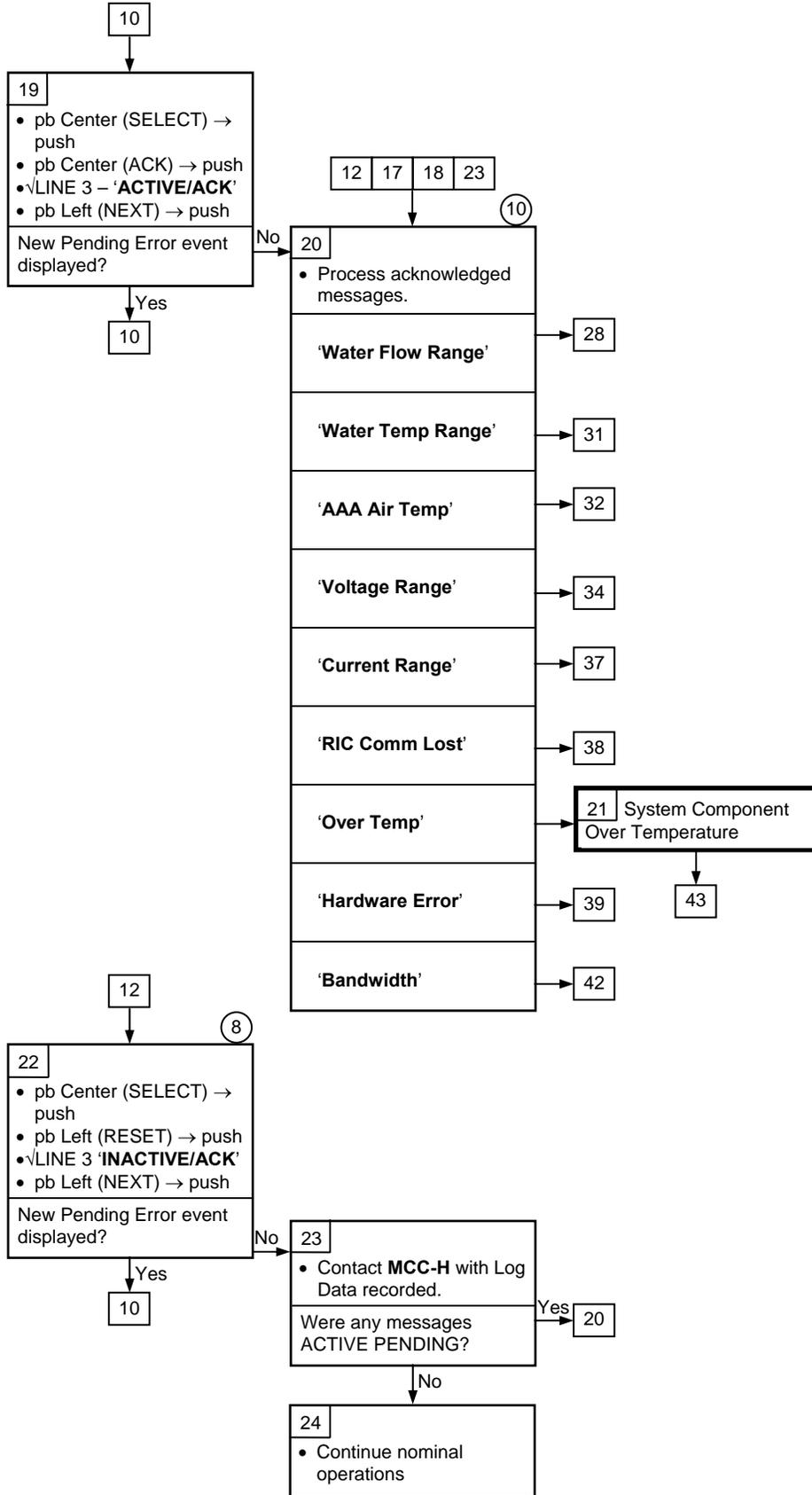
⑦  
Power cycle requires **MCC-H** approval. Note: Set Point temperature control mode will require initialization upon restart

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

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

**GLACIER ERROR MESSAGE**

(ASSY OPS/2JA/FIN 1/MULTI P) Page 3 of 17 pages

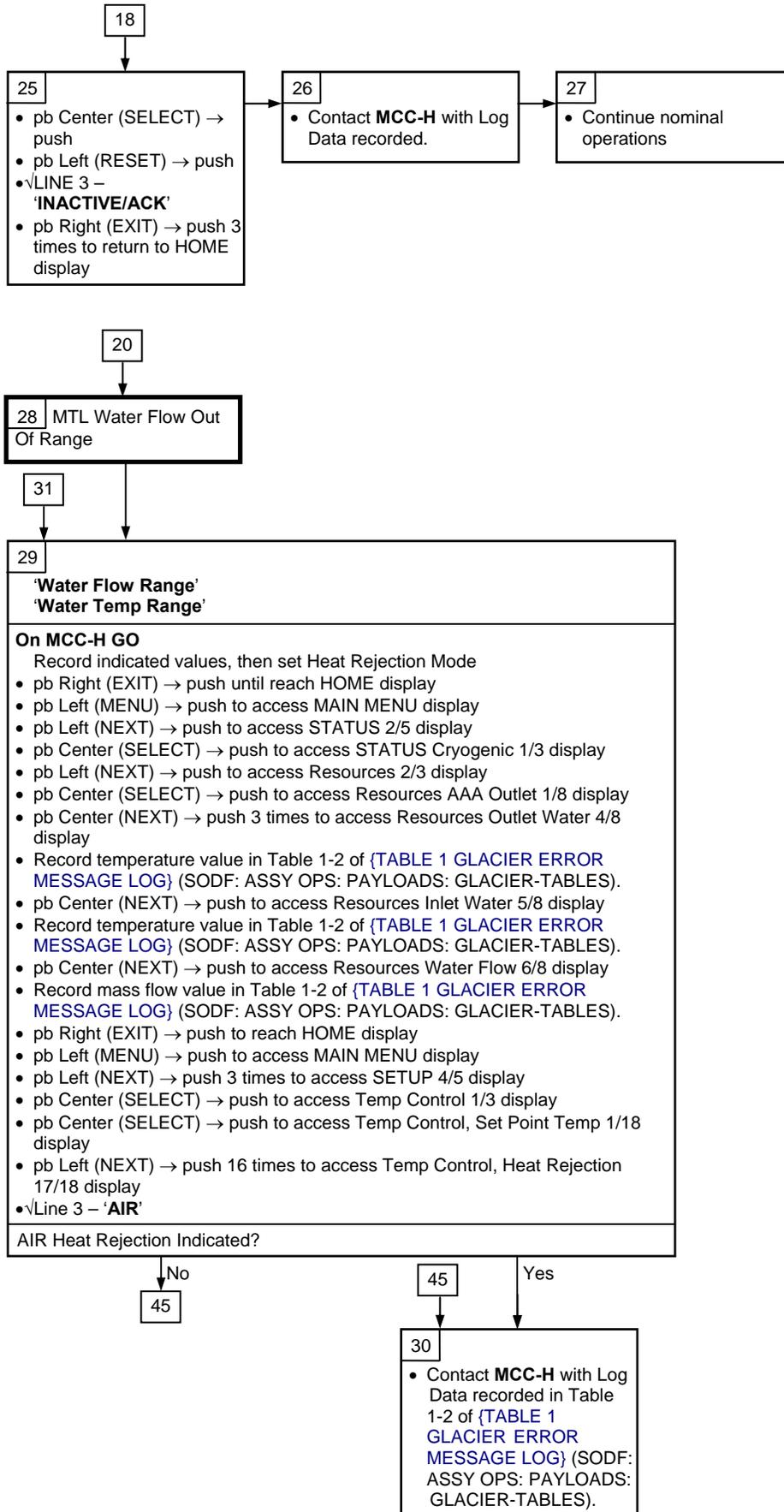


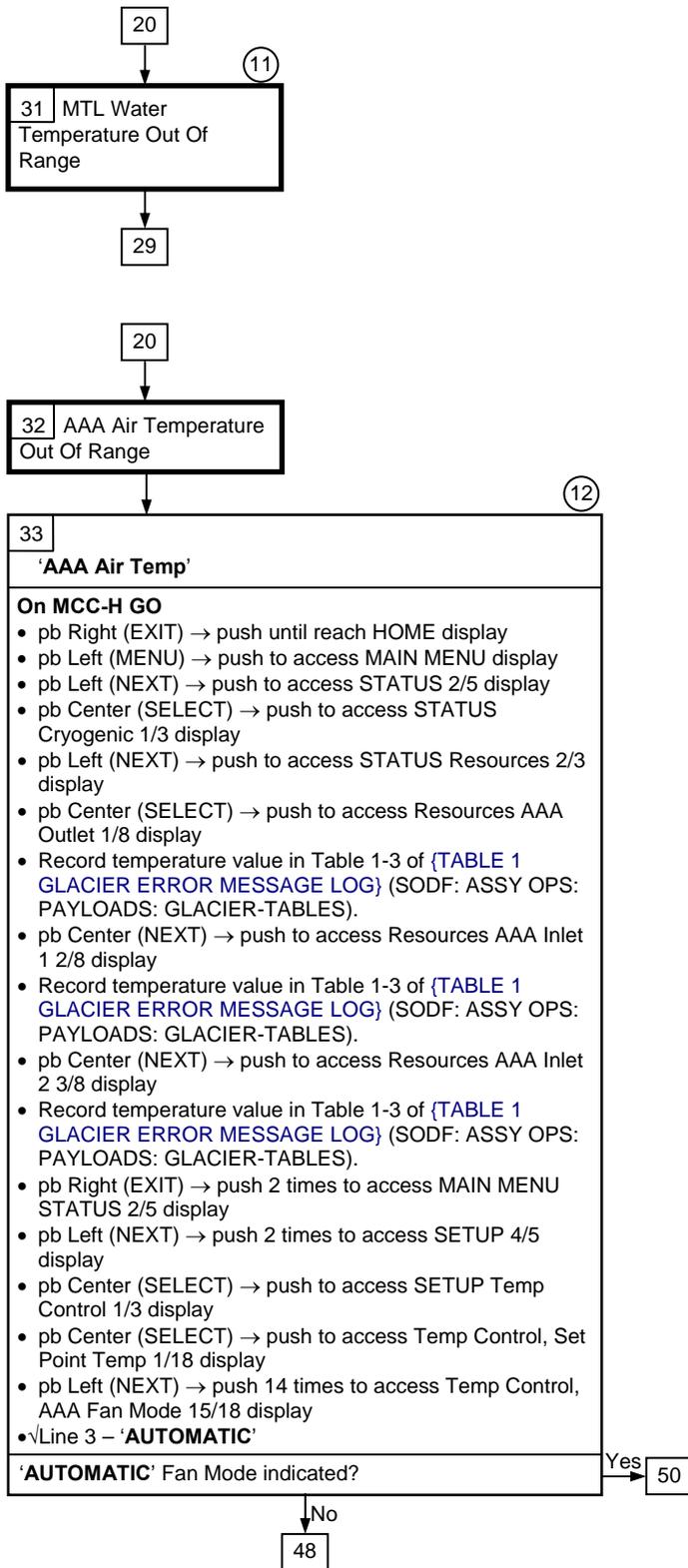
⑧ Software Errors may not reset or may be persistent due to: Frequent intermittent power failure. Single Event Upset. Electromagnetic interference

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

**GLACIER ERROR MESSAGE**

(ASSY OPS/2JA/FIN 1/MULTI P) Page 4 of 17 pages



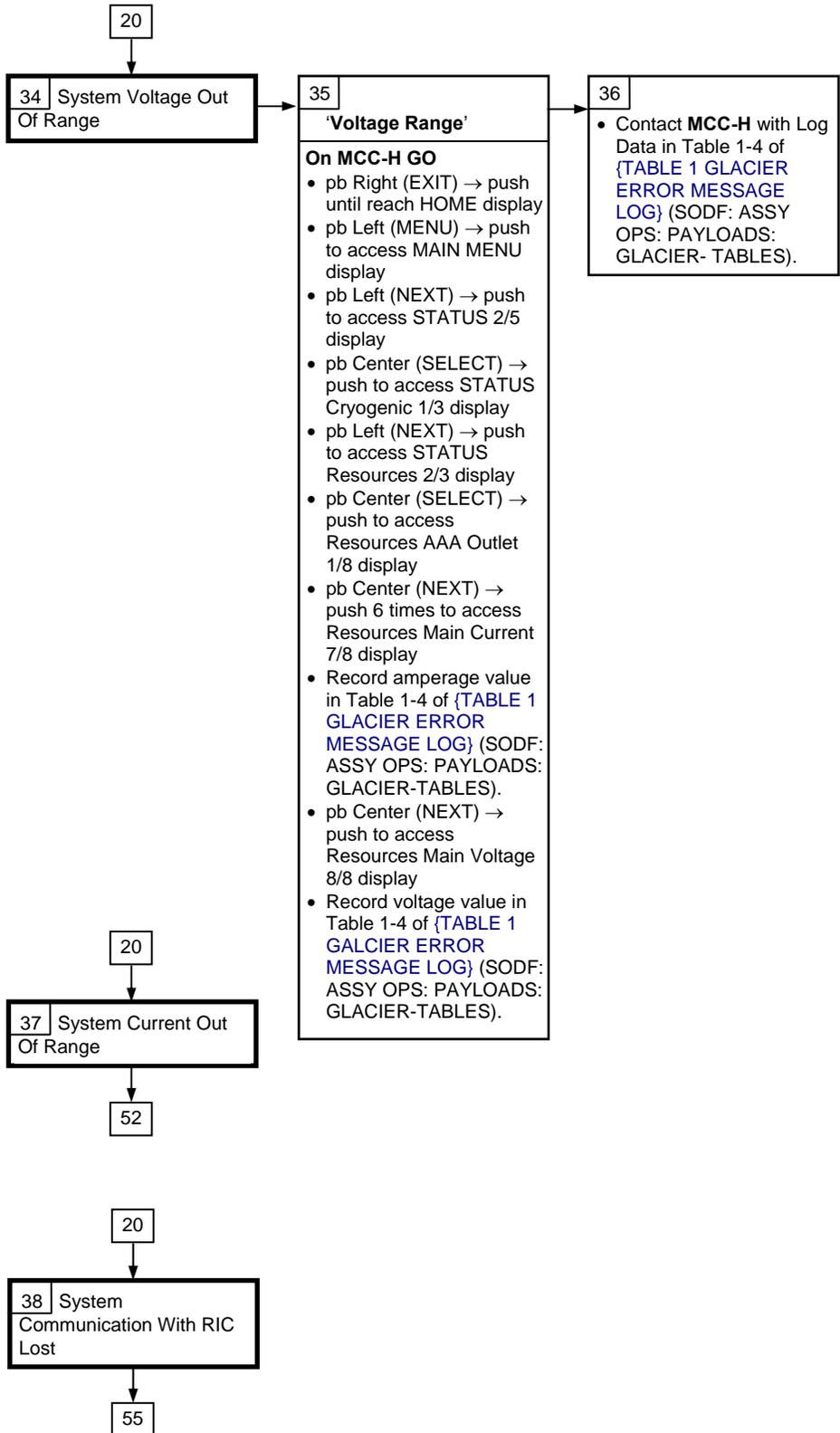


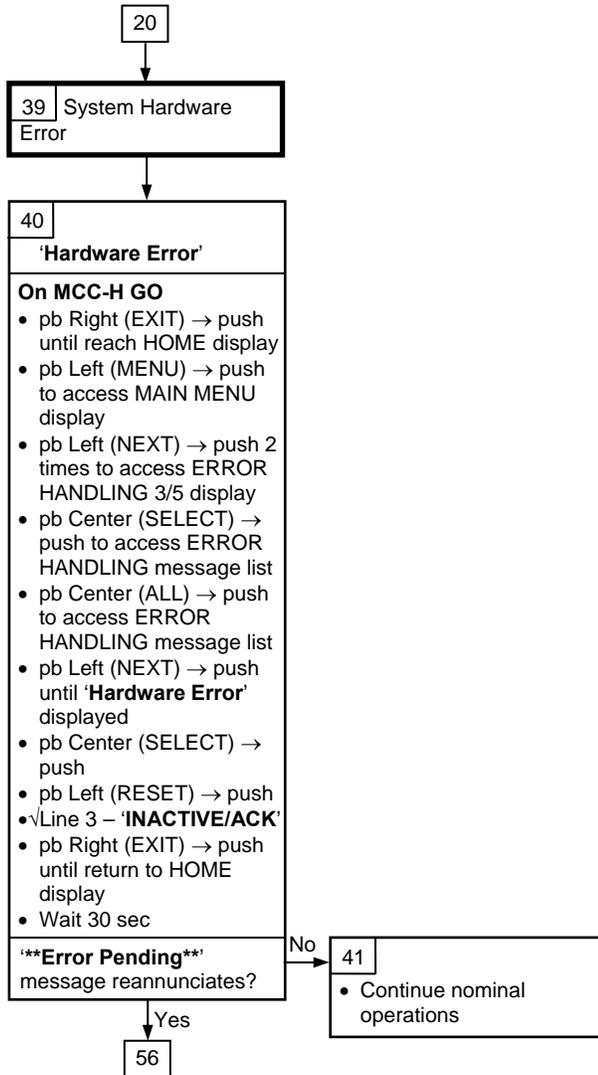
(11) AAA Air Temp value may take a long time to reflect change in fan mode.

(12) MCC-H will evaluate Av Bay temps

**GLACIER ERROR MESSAGE**

(ASSY OPS/2JA/FIN 1/MULTI P) Page 6 of 17 pages





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**'Bandwidth'**

Record indicated values

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

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**'Over Temp'**

**On MCC-H GO**

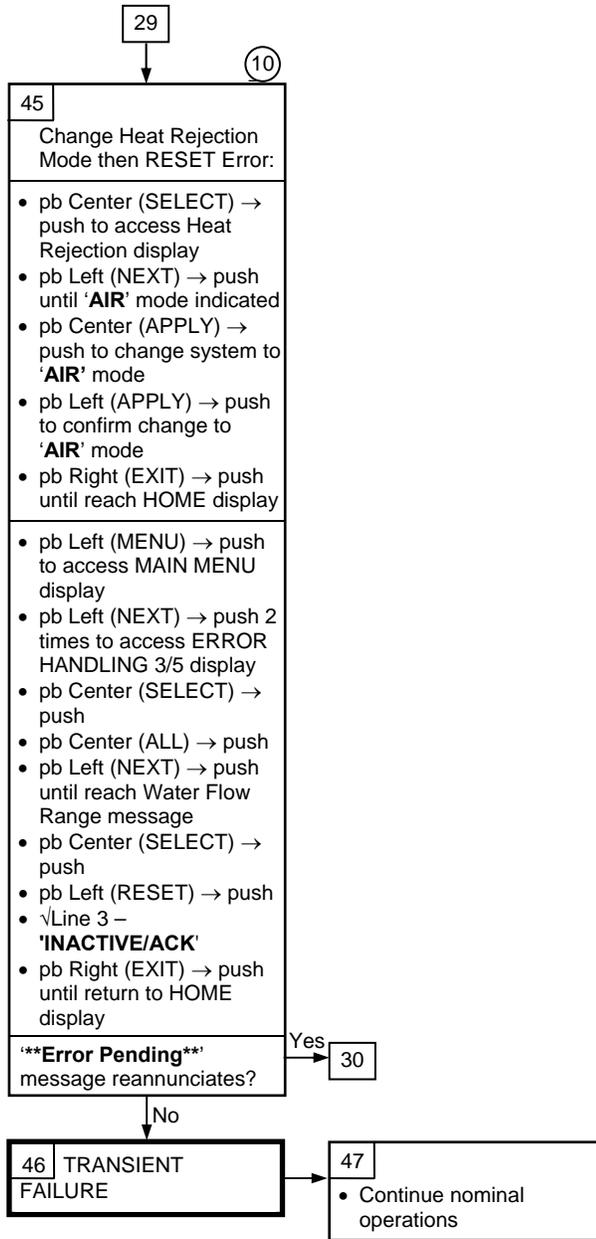
- pb Right (EXIT) → push until reach HOME display
- pb Left (MENU) → push to access MAIN MENU display
- pb Left (NEXT) → push to access STATUS 2/5 display
- pb Center (SELECT) → push to access STATUS Cryogenic 1/3 display
- pb Left (NEXT) → push 2 times to access STATUS System 3/3 display
- pb Center (SELECT) → push to access System CPU 1/9 display
- Record temperature value in Table 1-5 of [{TABLE 1 GLACIER ERROR MESSAGE LOG}](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push to access System Capacitors A 2/9 display
- Record temperature value in Table 1-5 of [{TABLE 1 GLACIER ERROR MESSAGE LOG}](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push to access System Capacitors B 3/9 display
- Record temperature value in Table 1-5 of [{TABLE 1 GLACIER ERROR MESSAGE LOG}](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).
- pb Center (NEXT) → push to access System Data Logger 4/9 display
- Record temperature value in Table 1-5 of [{TABLE 1 GLACIER ERROR MESSAGE LOG}](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).

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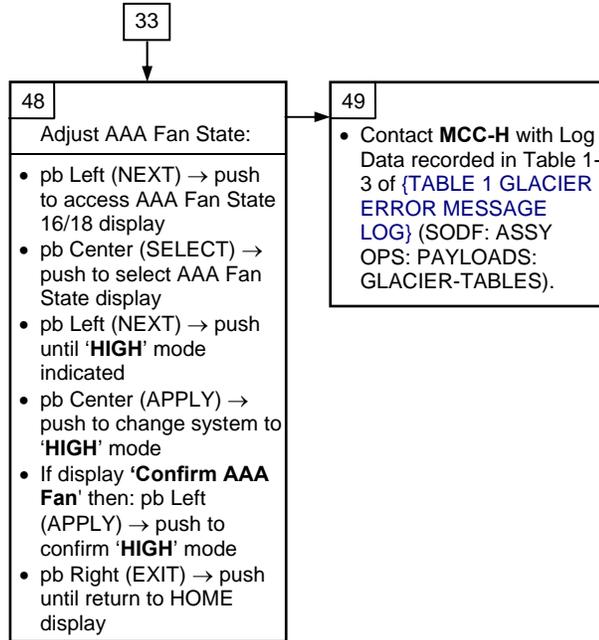
- Contact **MCC-H** with Log Data Recorded in Table 1-5 of [{TABLE 1 GLACIER ERROR MESSAGE LOG}](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).

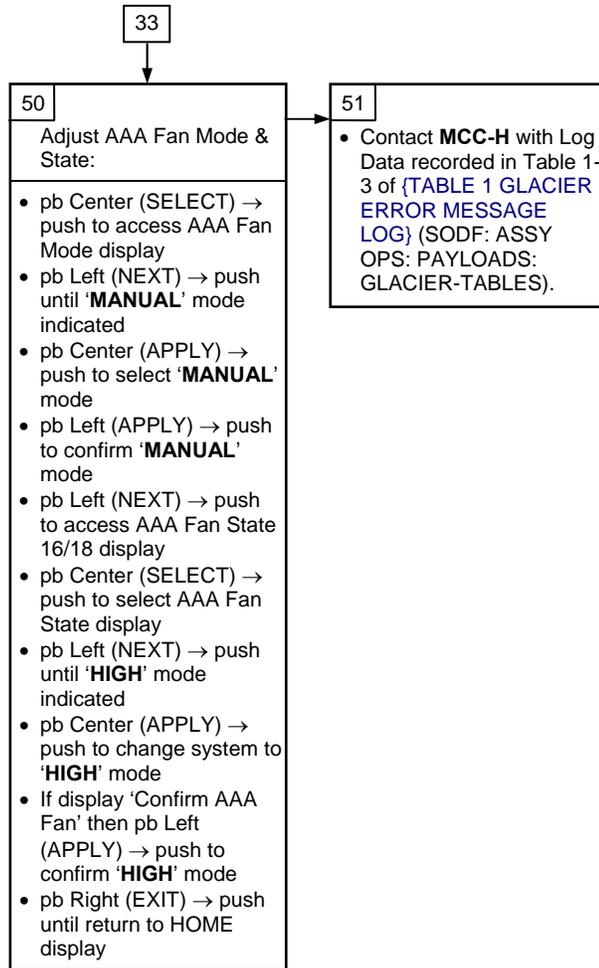
**GLACIER ERROR MESSAGE**

(ASSY OPS/2JA/FIN 1/MULTI P) Page 10 of 17 pages



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





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**'Current Range'**

**On MCC-H GO**

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

'30.0 A' Over Current Limit indicated?

Yes

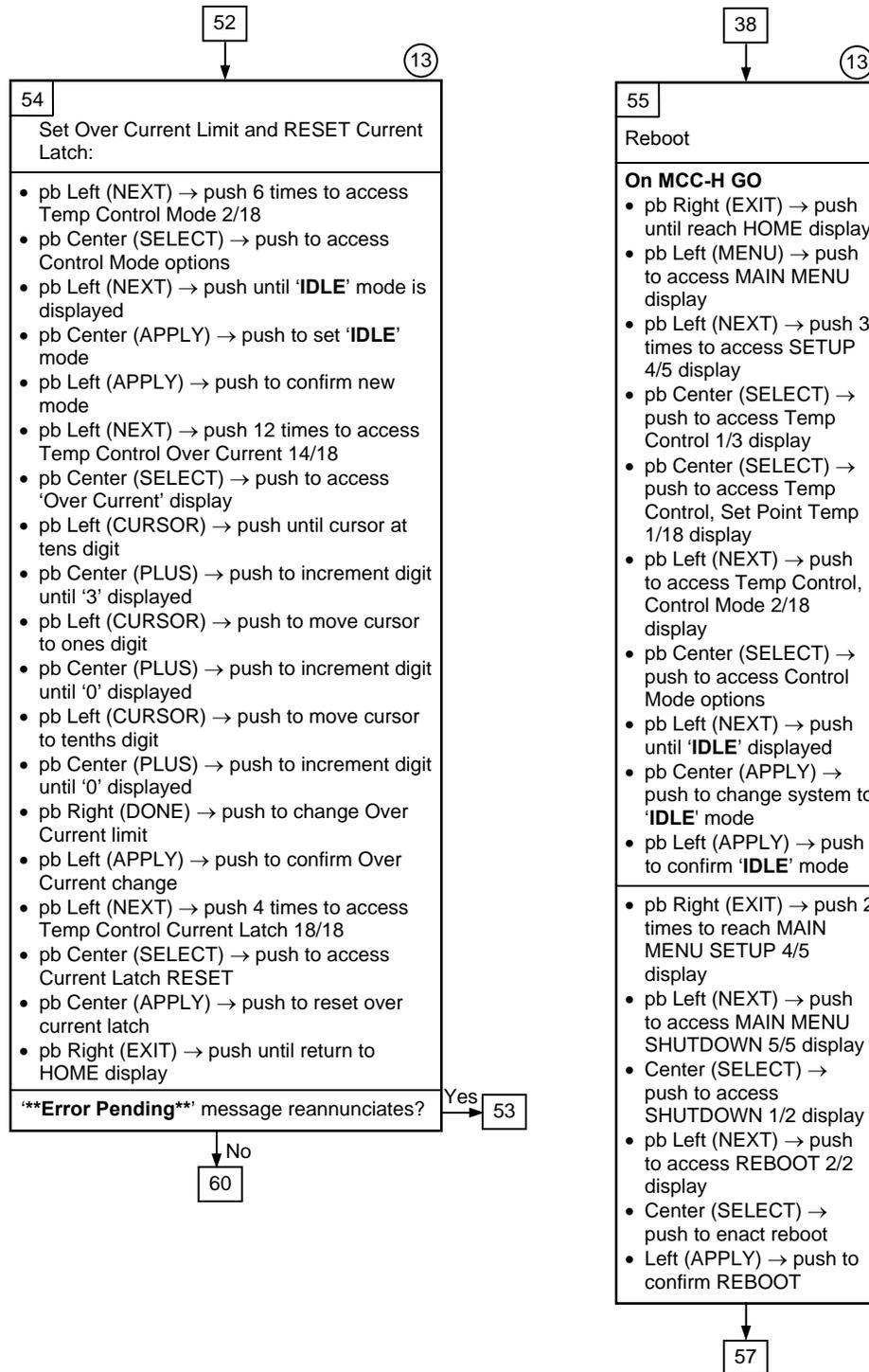
53

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

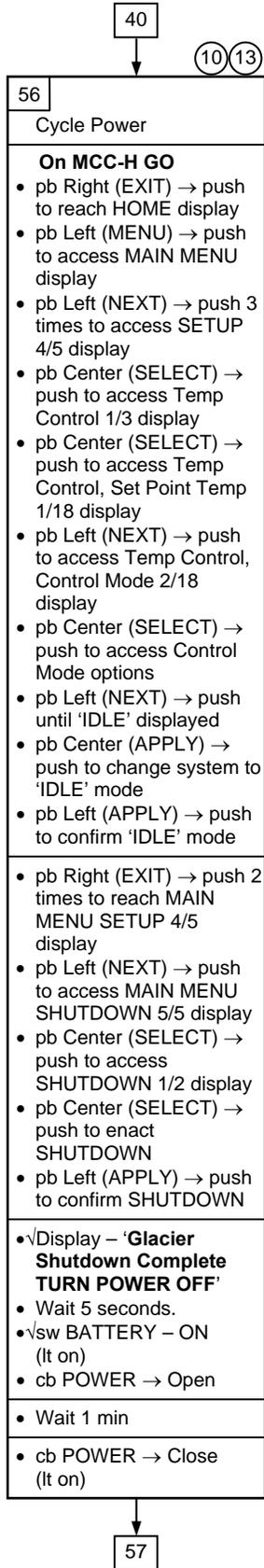
54

No

54



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



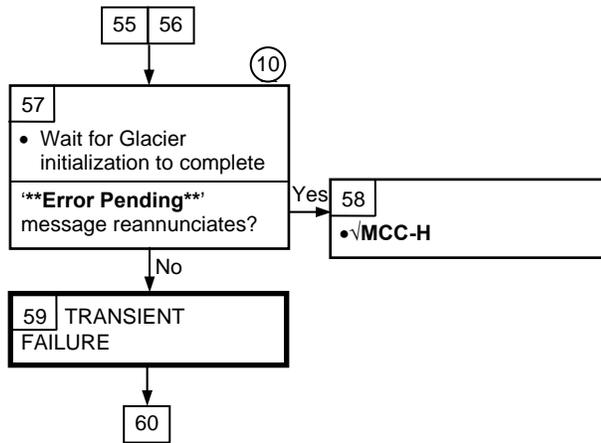
⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads '**HOME**'

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

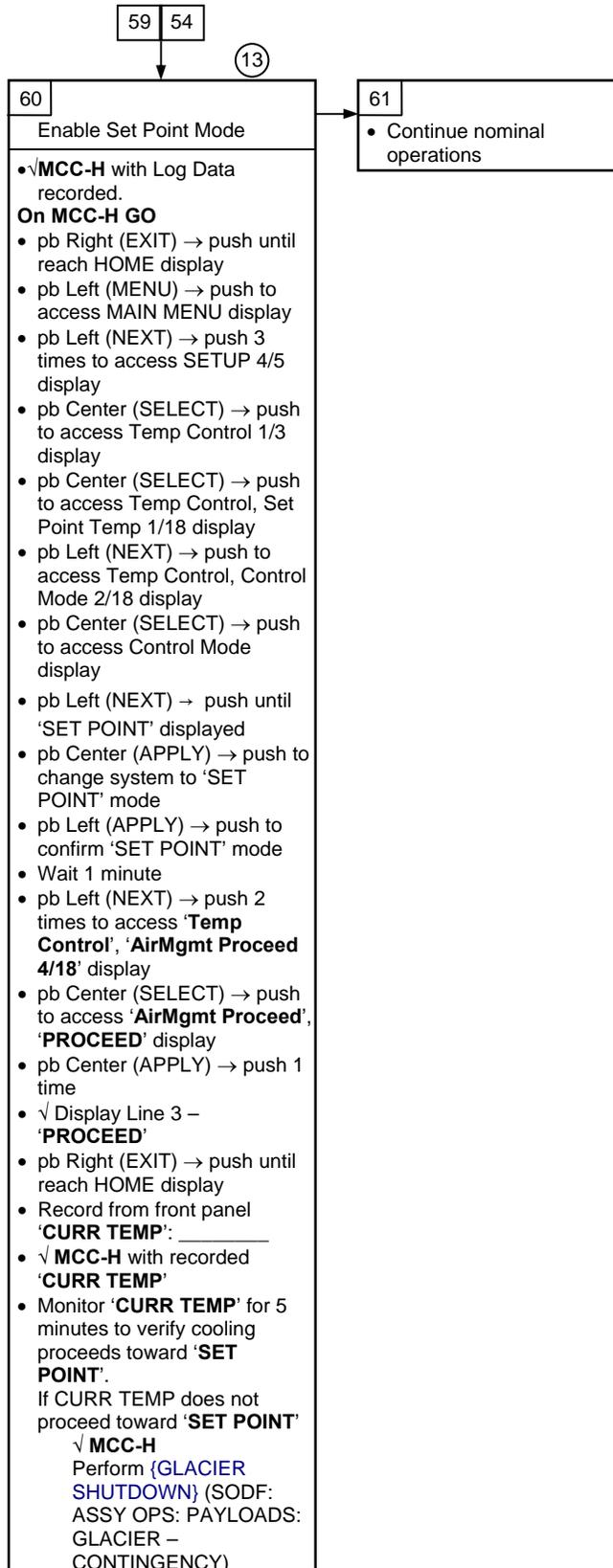
**GLACIER**

**GLACIER ERROR MESSAGE**

(ASSY OPS/2JA/FIN 1/MULTI P) Page 16 of 17 pages



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



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

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# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/2JA/FIN)

Page 1 of 9 pages

## OBJECTIVE:

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

Glacier

### 1. RECORD DATA

```

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

```

#### 1.1 ✓Display – 'HOME'

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

```

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

### 2. CHECK STATUS OF KEY PARAMETERS

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

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

#### NOTE

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

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

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

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

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

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

3. SET TEMPERATURE CONTROL MODE TO IDLE

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

**NOTE**

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

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

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/2JA/FIN)

Page 3 of 9 pages

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

## NOTE

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

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

## 5. SET TEMP CONTROL SENSORS

- 5.1 pb Left (MENU) → push (one time) following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
- 5.2 pb Left (NEXT) → push (three times) following appears:  
'MAIN MENU'  
'SETUP 4/5'
- 5.3 pb Center (SELECT) → push (one time) following appears:  
'SETUP'  
'Temp Control 1/3'
- 5.4 pb Center (SELECT) → push (one time) following appears:  
'Temp Control'

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/2JA/FIN)

Page 4 of 9 pages

## 'Set Point Temp 1/18'

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

### NOTE

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

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

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

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

NOTE

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

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

6.8 pb Right (DONE) → push (one time)

6.9 ✓Confirm New Bandwidth = desired Bandwidth

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

'Temp Control'  
'Bandwidth 5/18'

6.11 ✓Bandwidth = desired Bandwidth

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

7. SET PRIMARY COOLER

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

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

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

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

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

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

NOTE

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

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

NOTE

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

- 8.7 Enter desired Maximum Power Draw per **MCC-H**.
- 8.8 pb Right (DONE) → push (one time)
- 8.9 ✓Confirm New Max Power = desired Max Power Draw
- 8.10 pb Left (APPLY) → Press (one time), following appears:  
**'Temp Control'**  
**'Max Power Draw 13/18'**
- 8.11 ✓Max Power Draw = desired Max Power Draw
- 8.12 pb Right (EXIT) → push until **'HOME'** appears
9. SET OVER CURRENT
  - 9.1 pb Left (MENU) → push (one time) following appears:  
**'MAIN MENU'**  
**'QUICK STATUS 1/5'**
  - 9.2 pb Left (NEXT) → push (three times) following appears:  
**'MAIN MENU'**  
**'SETUP 4/5'**
  - 9.3 pb Center (SELECT) → push (one time) following appears:  
**'SETUP'**  
**'Temp Control 1/3'**
  - 9.4 pb Center (SELECT) → push (one time) following appears:  
**'Temp Control'**  
**'Set Point Temp 1/18'**
  - 9.5 pb Left (NEXT) → push (thirteen times) following appears:  
**'Temp Control'**  
**'Over Current 14/18'**  
**'XX.X A'**
  - 9.6 pb Center (SELECT) → push (one time) following appears:  
**'Over Current'**  
**'XX.X W'**  
**'00.0 to 30.0'**

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/2JA/FIN)

Page 8 of 9 pages

## NOTE

1. The left pushbutton (CURSOR) moves the cursor between Over Current fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases the Maximum Power Draw 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/2JA/FIN)

Page 9 of 9 pages

- 10.7 pb Left (NEXT) → push as required to selected desired Temperature Control Mode per **MCC-H**.
- 10.8 pb Center (APPLY) → push one time
- 10.9 ✓Confirm New Control Mode = desired Control Mode
- 10.10 pb Left (APPLY) → push (one time), following appears:  
    Temp Control  
    Control Mode 2/18'
- 10.11 ✓Control Mode = desired Control Mode
- 10.12 pb Right (EXIT) → push until 'HOME' appears.

## 11. CHECK GLACIER STATUS

- 11.1 ✓cb POWER – Close (It on)
- 11.2 ✓sw BATTERY – ON (It on)
- 11.3 ✓Display – 'HOME'

```

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

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

```

- 11.4 ✓Display – 'CURR TEMP: XXXX.X °C' ±5.0°C or ramping toward expected temperature.

## 12. RECORD END DATA

- 12.1 Record from front panel end 'CURR TEMP', 'SETPOINT', 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)
- 12.2 Notify **MCC-H** of logged values in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)

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- ① Always deadface DC power source when disconnecting/connecting power cable
- ② Verify connectors are properly mated and seated securely when switching to alternate power source
- ③ Glacier will take approximately 2 min to initialize after power on; after initialization is successfully completed, LCD Line 1 will read 'HOME'

Glacier initialization not successfully completed when power applied during Glacier POWER UP procedure

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

① ②

|   |                                                                                                                                                                                       |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <b>Switch to Alternate Power Source</b> <ul style="list-style-type: none"> <li>Contact <b>MCC-H</b> for alternate power source (fill in data below).</li> <li>_____</li> </ul>        |
|   | (Glacier) <ul style="list-style-type: none"> <li>cb POWER → Open (It off)</li> </ul>                                                                                                  |
|   | (ML86B) <ul style="list-style-type: none"> <li>cb MNB MAR 1 → Open</li> </ul>                                                                                                         |
|   | (ML85E(MUP)) <ul style="list-style-type: none"> <li>A/E PAYLOAD DC PWR (20') → J11</li> </ul>                                                                                         |
|   | (Alternate Power Source J__) <ul style="list-style-type: none"> <li>✓cb _____ - Open</li> <li>✓sw _____ - OFF</li> <li>A/E PAYLOAD DC PWR (20') → Alternate Power Source J</li> </ul> |

③

|   |                                                                                                                                                      |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | <b>Repower from Alternate Power Source</b> <ul style="list-style-type: none"> <li>(_____)</li> <li>cb _____ - Close</li> <li>sw _____ -ON</li> </ul> |
|   | (Glacier) <ul style="list-style-type: none"> <li>cb POWER → Close (It on)</li> </ul>                                                                 |
|   | After Initialization does display read 'HOME'?                                                                                                       |

③

|   |                               |
|---|-------------------------------|
| 3 | <b>PRIMARY OUTLET FAILURE</b> |
|---|-------------------------------|

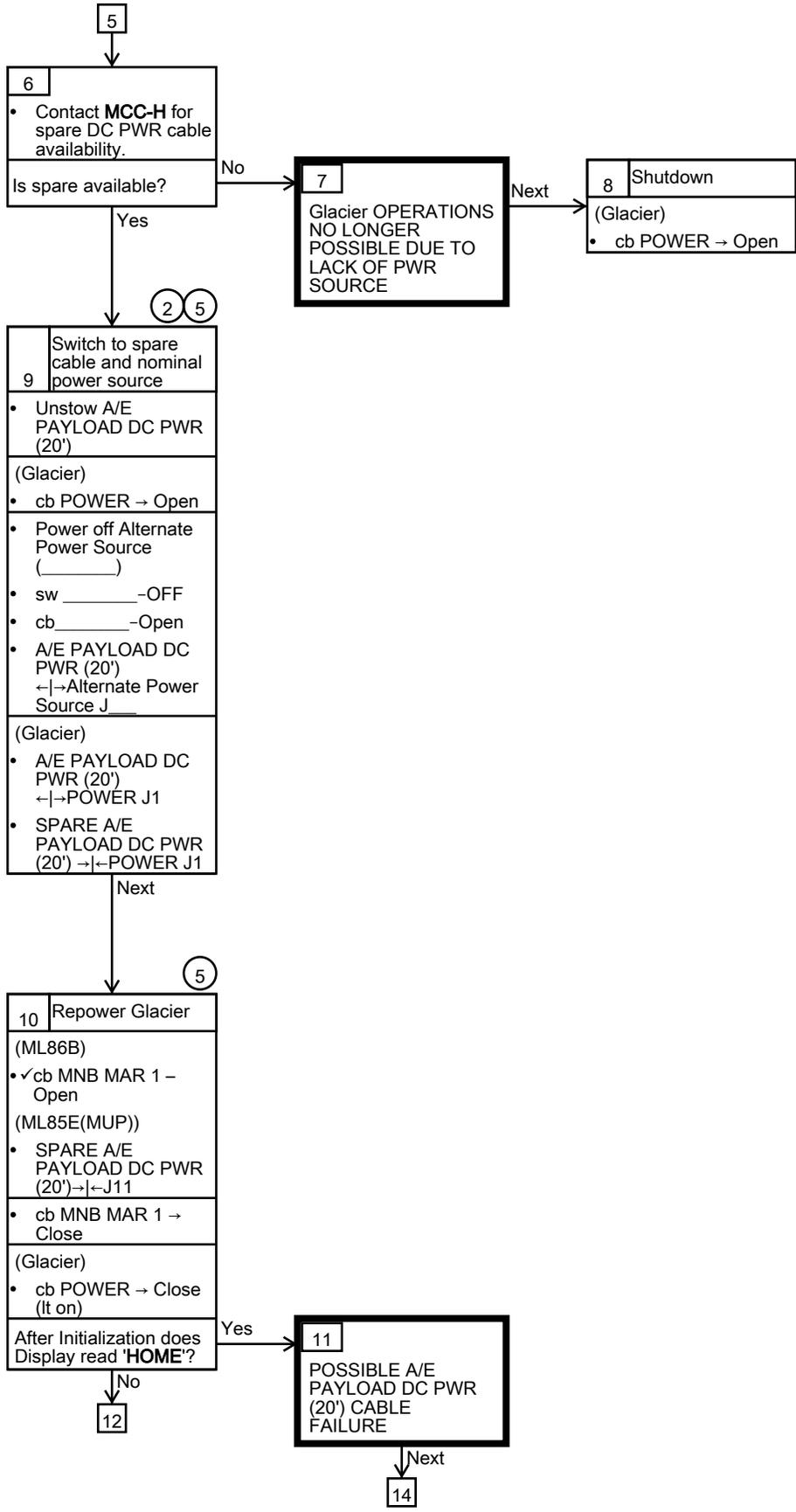
|   |                                                                                                                                                                                                                             |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | <ul style="list-style-type: none"> <li>Record power-on time (GPS): _____</li> <li>Record power-on CURR TEMP: _____</li> <li>Record power-on SET POINT: _____</li> <li>Notify <b>MCC-H</b> of resolution and data</li> </ul> |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|   |                                    |
|---|------------------------------------|
| 5 | <b>POSSIBLE DOWNSTREAM FAILURE</b> |
|---|------------------------------------|

⑥

**GLACIER FAIL TO REPOWER**

(ASSY OPS/2JA/FIN 1/MULTI P)

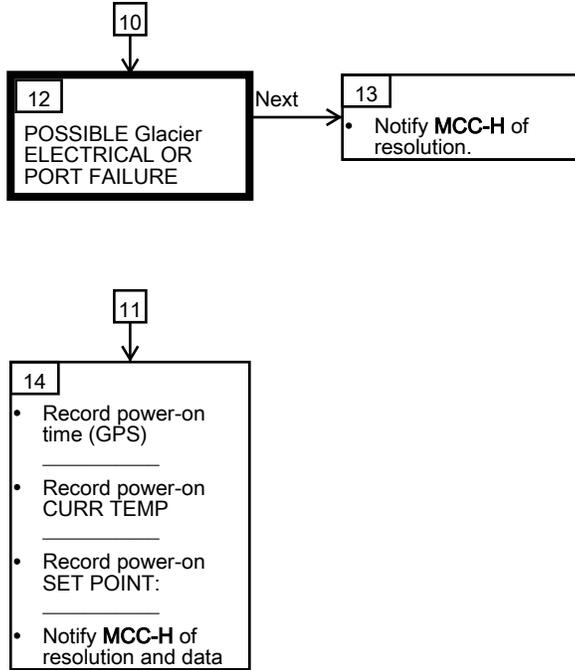


**2**  
Verify connectors are properly mated and seated securely when switching to alternate power source

**5**  
Alternate power source is detailed in block 1.

### GLACIER FAIL TO REPOWER

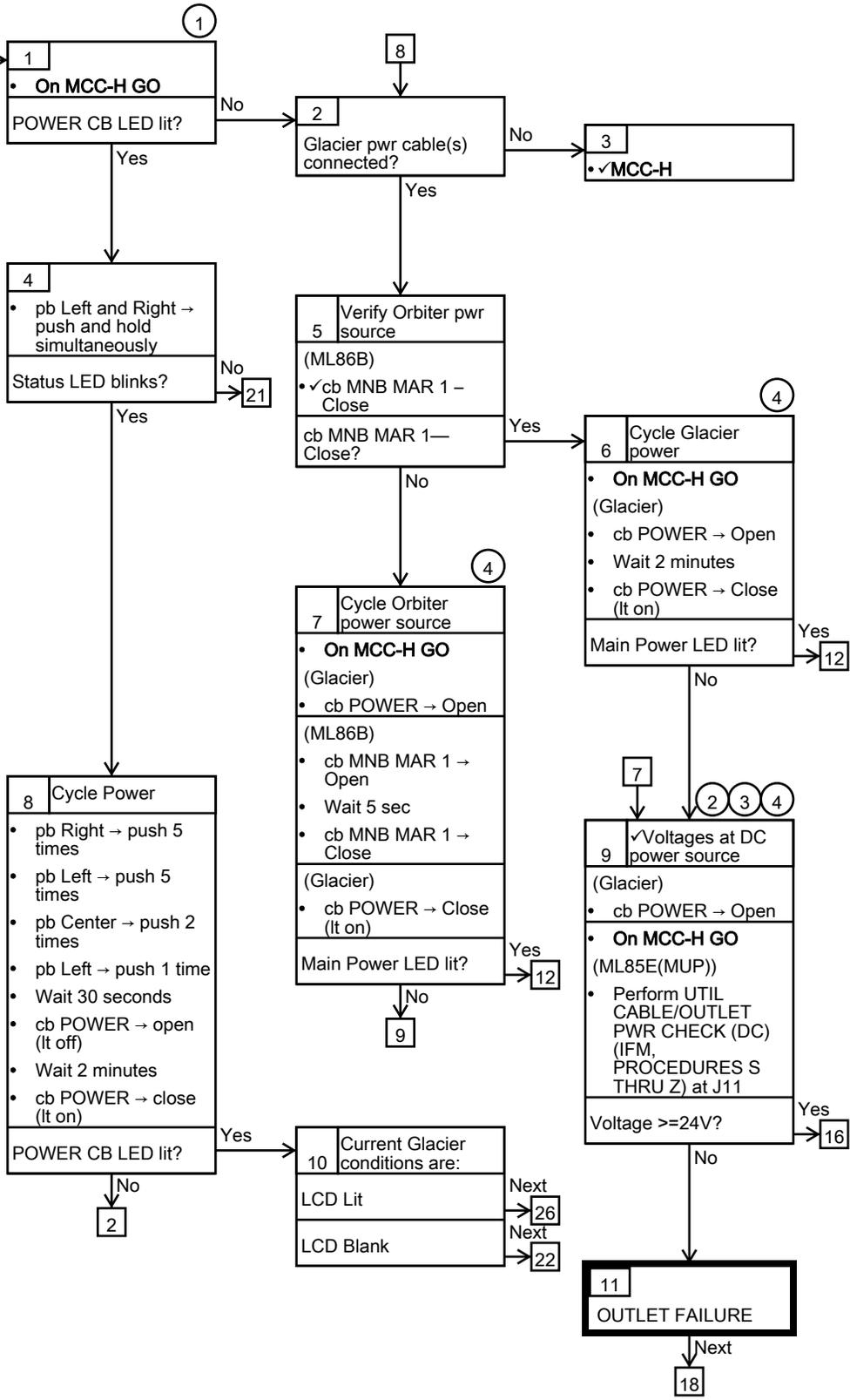
(ASSY OPS/2JA/FIN 1/MULTI P)



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LCD Blank

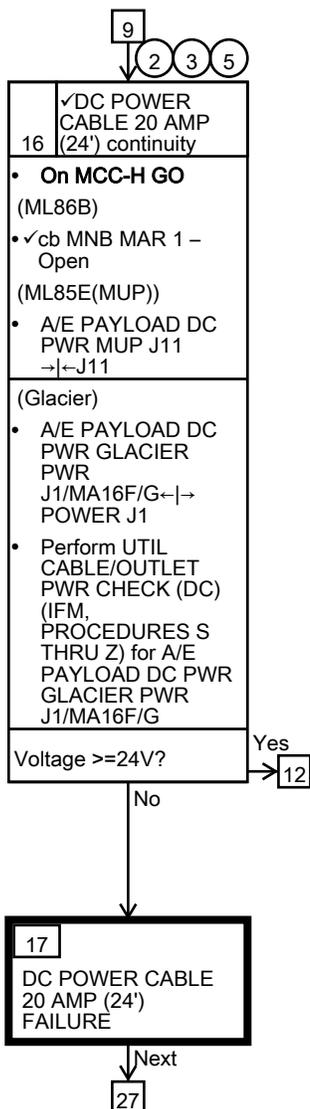
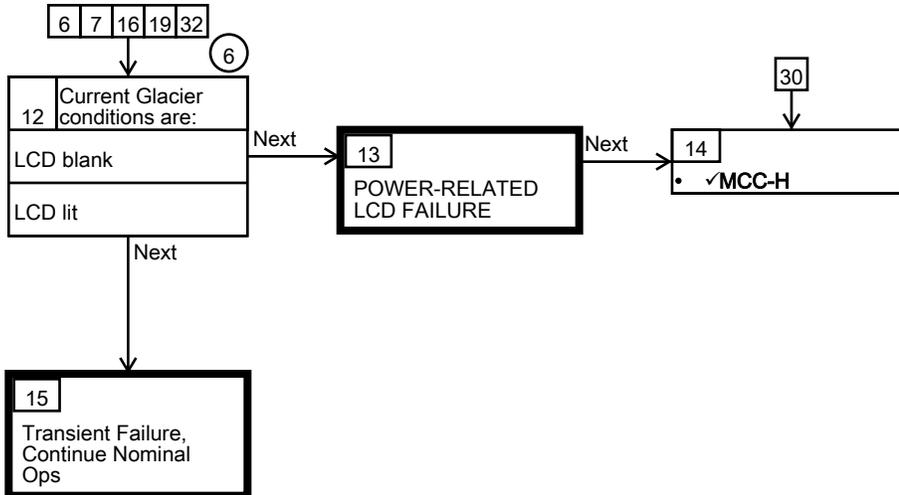
**Nominal Config:**  
(MA16F/G)  
cb POWER – Close (It on)  
sw BATTERY – ON (It on)  
(ML86B)  
cb MNB MAR 1 – Close



- ① Fan running indicates Glacier on STS power.
- ② Always deadface DC Power source when disconnecting/connecting power cable.
- ③ Verify connectors are properly mated and seated securely.
- ④ Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.

**GLACIER LCD BLANK**

(ASSY OPS/2JA/FIN)



- 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

|                                                                                                                                                                   |                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 18                                                                                                                                                                | Switch to Alternate Power Source |
| <ul style="list-style-type: none"> <li>Contact <b>MCC-H</b> for alternate power source (Fill in data below)</li> </ul>                                            |                                  |
| (Glacier)                                                                                                                                                         |                                  |
| <ul style="list-style-type: none"> <li>cb POWER → Open</li> </ul>                                                                                                 |                                  |
| (ML86B)                                                                                                                                                           |                                  |
| <ul style="list-style-type: none"> <li>✓cb MNB MAR 1 – Open</li> </ul>                                                                                            |                                  |
| (ML85E(MUP))                                                                                                                                                      |                                  |
| <ul style="list-style-type: none"> <li>✓A/E PAYLOAD DC PWR MUP J11<br/>← →J11</li> </ul>                                                                          |                                  |
| <ul style="list-style-type: none"> <li>Alternate Power source (_____) J_</li> <li>✓cb _____</li> <li>Open _____</li> <li>✓sw _____</li> <li>—OFF _____</li> </ul> |                                  |
| <ul style="list-style-type: none"> <li>✓A/E PAYLOAD DC PWR GLACIER PWR J1/MA16F/G→ ← POWER J1</li> </ul>                                                          |                                  |
| <ul style="list-style-type: none"> <li>A/E PAYLOAD DC PWR GLACIER PWR J1/MA16F/G → ←Alternate Power Source J_</li> </ul>                                          |                                  |

Next

2 5

|                                                                                                                                      |                                     |
|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 19                                                                                                                                   | 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?                                                                                                                  |                                     |
| No                                                                                                                                   | Yes → 12                            |
| <div style="border: 2px solid black; padding: 5px; display: inline-block;">                 20<br/>SYSTEM FAILURE             </div> |                                     |
| Next                                                                                                                                 |                                     |
| 30                                                                                                                                   |                                     |

2

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

3

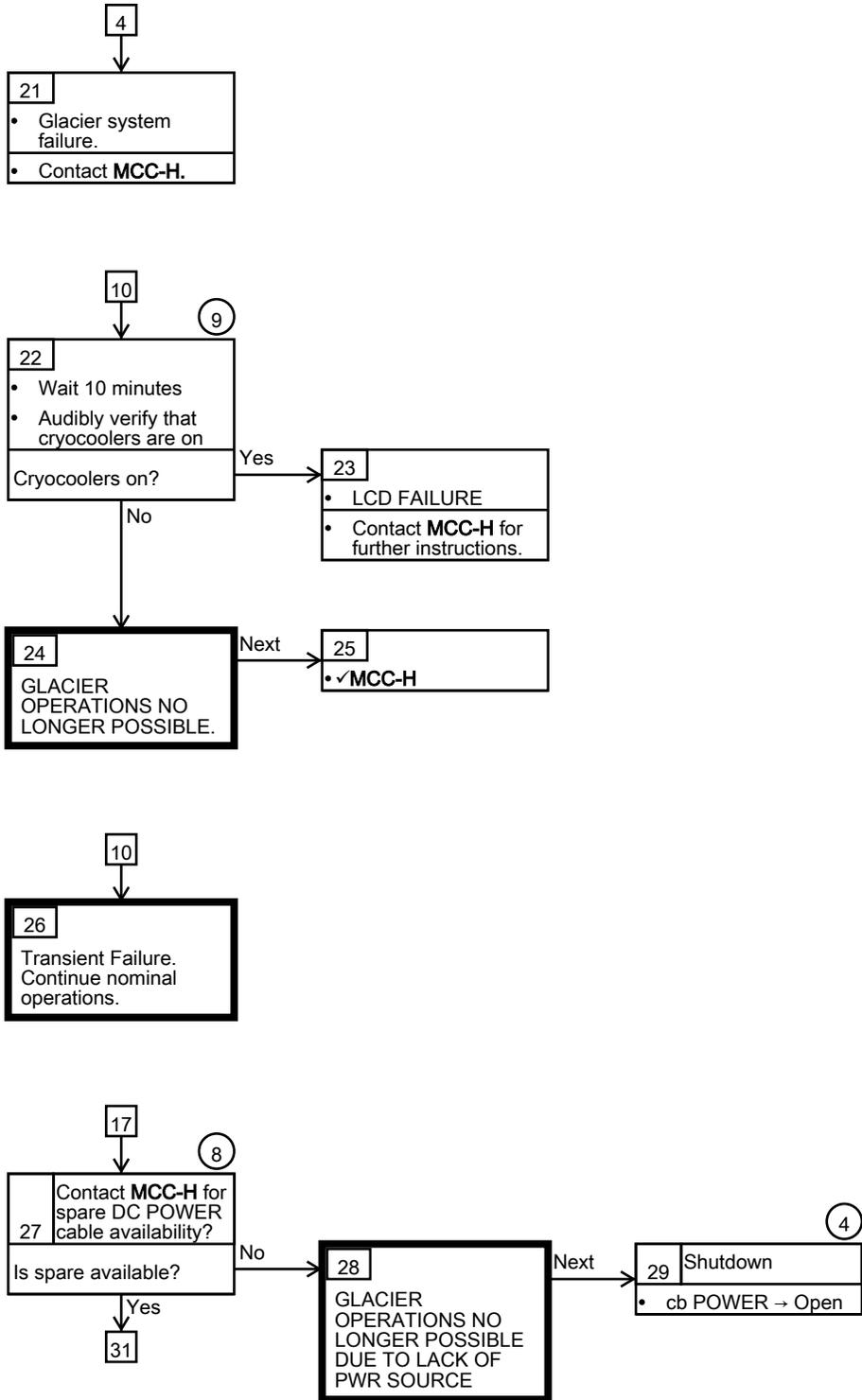
Verify connectors are properly mated and seated securely.

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 Spare Cable stowed in IFM Contingency Hose and Cable Kit (CHCK).

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

20

|                                                                                                                                                |                 |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 30                                                                                                                                             | 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

27

2 3 4

|                                                                                                                                                  |                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 31                                                                                                                                               | Switch to spare cable |
| <ul style="list-style-type: none"> <li>Unstow spare DC POWER cable</li> </ul>                                                                    |                       |
| (Glacier)                                                                                                                                        |                       |
| <ul style="list-style-type: none"> <li>cb POWER → Open</li> </ul>                                                                                |                       |
| (ML86B)                                                                                                                                          |                       |
| <ul style="list-style-type: none"> <li>✓cb MNB MAR 1 – Open</li> </ul>                                                                           |                       |
| (ML85E(MUP))                                                                                                                                     |                       |
| <ul style="list-style-type: none"> <li>A/E PAYLOAD DC PWR MUP J11 → →J11</li> <li>SPARE DC POWER CABLE → ←J11</li> </ul>                         |                       |
| (Glacier)                                                                                                                                        |                       |
| <ul style="list-style-type: none"> <li>✓A/E PAYLOAD DC PWR GLACIER PWR J1/MA16F/G → →POWER J1</li> <li>SPARE DC PWR CABLE → ←POWER J1</li> </ul> |                       |

Next

|                                                                            |                 |
|----------------------------------------------------------------------------|-----------------|
| 32                                                                         | Repower Glacier |
| (ML86B)                                                                    |                 |
| <ul style="list-style-type: none"> <li>cb MNB MAR 1 → Close</li> </ul>     |                 |
| (Glacier)                                                                  |                 |
| <ul style="list-style-type: none"> <li>cb POWER → Close (It on)</li> </ul> |                 |
| Main Power LED lit?                                                        |                 |
| Yes                                                                        | → 12            |
| No                                                                         | ↓ 33            |

33

2

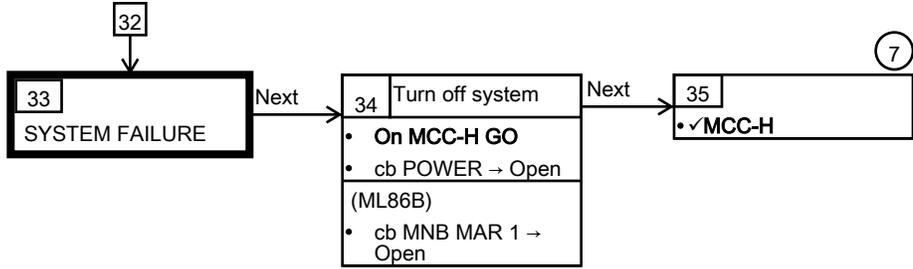
Always deadface DC Power source when disconnecting/connecting power cable.

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.

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, 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.

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/2JA/FIN)

Page 21 of 21 pages

- 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, 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, then;  
\* |  
\*\*\*\*\*  
\*\*\*\*\*  
\*  
\* If Display —'\*\*Error Pending\*\*'  
\* |  
\* | Perform GLACIER ERROR MESSAGE, 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.

# GLACIER RECORD CRYOGENIC DIAGNOSTIC DATA

(ASSY OPS/2JA/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, then:
*

```

### 1. RECORDING DATA

1.1 ✓MCC-H for parameters to record in Table 3, GLACIER DIAGNOSTIC LOG FILE

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.

2.2 pb Left (MENU) → push (one time), following appears:

'MAIN MENU'  
'QUICK STATUS 1/5'

2.3 pb Left (NEXT) → push (one time), following appears:

'MAIN MENU'  
'STATUS 2/5'

2.4 pb Center (SELECT) → push (one time), following appears:

'STATUS'  
'Cryogenic 1/3'

2.5 pb Center (SELECT) → push (one time), following appears:

'Cryogenic'  
'Cooler 1 Stroke 1/21'  
'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
- 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.

# GLACIER RECORD QUICK DIAGNOSTIC DATA

(ASSY OPS/2JA/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, then:
* |
*

```

### 1. RECORDING DATA

1.1 ✓ **MCC-H** for parameters to record in Table 3, GLACIER DIAGNOSTIC LOG FILE

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.

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

2.5 pb Center (NEXT) → push until all Quick Status data has been recorded per **MCC-H** direction.

2.6 pb Right (EXIT) → push until **'HOME'**

- 2.7 Notify **MCC-H** to report log values from Table 3, GLACIER DIAGNOSTIC LOG FILE.

OBJECTIVE:

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

```

*
*
* If Display – ***Error Pending***:
*
* | Perform GLACIER ERROR MESSAGE, then:
*

```

1. RECORDING DATA

1.1 ✓MCC-H for parameters to record in Table 3, GLACIER DIAGNOSTIC LOG FILE

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.

2.2 pb Left (MENU) → push (one time), following appears:

'MAIN MENU'  
'QUICK STATUS 1/5'

2.3 pb Left (NEXT) → push (one time), following appears:

'MAIN MENU'  
'STATUS 2/5'

2.4 pb Center (SELECT) → push (one time), following appears:

'STATUS'  
'Cryogenic 1/3'

2.5 pb Left (NEXT) → push (one time), following appears:

'STATUS'  
' Resources 2/3'

2.6 pb Center (SELECT) → push (one time), following appears:

'Resources'  
'AAA Outlet 1/8'

'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.
- 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, DIAGNOSTIC LOG FILE.

OBJECTIVE:

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

```

*
*
* If Display – ***Error Pending***:
*
* | Perform GLACIER ERROR MESSAGE, then:
*

```

1. RECORDING DATA

1.1 ✓MCC-H for parameters to record in Table 3, GLACIER DIAGNOSTIC LOG FILE

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.

2.2 Left (MENU) pb → push (one time), following appears:

'MAIN MENU'  
 'QUICK STATUS 1/5'

2.3 Left (NEXT) pb → push (one time), following appears:

'MAIN MENU'  
 'STATUS 2/5'

2.4 Center (SELECT) pb → push (one time), following appears:

'STATUS'  
 'Cryogenic 1/3'

2.5 Left (NEXT) pb → push (two times), following appears:

'STATUS'  
 'System 3/3'

2.6 Center (SELECT) pb → push (one time), following appears:

'System'

'CPU 1/9'

'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.

2.8 Center (NEXT) pb → push until all System Status data has been recorded per **MCC-H** direction.

2.9 Right (EXIT) pb → push until '**HOME**'

2.10 Notify **MCC-H** to report log values from Table 3, GLACIER DIAGNOSTIC LOG FILE.

**TABLE 1 GLACIER ERROR MESSAGE LOG**

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

Table 1-1 Glacier Error Log File

| GMT                        | Error Message | Error Event          | Error Status                                                                                              |
|----------------------------|---------------|----------------------|-----------------------------------------------------------------------------------------------------------|
| Hours: Minutes:<br>Seconds | Text          | X of Total<br>Number | (IP) INACTIVE / PENDING<br>(AP) ACTIVE / PENDING<br>(IA) INACTIVE / ACK<br>(AA) ACTIVE / ACK<br>(R) RESET |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |
| __ : __ : __               | _____         | __ / __              | _____                                                                                                     |

## TABLE 1 GLACIER ERROR MESSAGE LOG

(ASSY OPS/2JA/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**

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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**

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| Parameter                                                        |                    | Event 1                                            | Event 2                                            | Definition or Options                                                     |
|------------------------------------------------------------------|--------------------|----------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------|
| 1                                                                | CURR TEMP          | Start ____ °C<br>End ____ °C                       | Start ____ °C<br>End ____ °C                       | GLACIER Current Temperature<br>XXXX.XX °C                                 |
| 2                                                                | SET POINT          | Start ____ °C<br>End ____ °C                       | Start ____ °C<br>End ____ °C                       | -160.0 to +4.0° C                                                         |
| 3                                                                | GPS                | Start ____:____:____ GPS<br>End ____:____:____ GPS | Start ____:____:____ GPS<br>End ____:____:____ GPS | Hours: Min: Sec                                                           |
| 4                                                                | Expected CURR TEMP | ____ °C                                            | ____ °C                                            | Expected Glacier Current Temperature per <b>MCC-H</b> (-160.0 to +4.0° C) |
| 5                                                                | Expected SET POINT | ____ °C                                            | ____ °C                                            | Expected Set Point Temperature per <b>MCC-H</b> (-160.0 to +4.0° C)       |
| Values for Reconfiguration of <b>Setup: Temperature Control:</b> |                    |                                                    |                                                    |                                                                           |
| 6                                                                | Set Point Temp     | ____ °C                                            | ____ °C                                            | -160.0 to +4.0° C                                                         |

**TABLE 2 GLACIER RESET LOG FILE**  
 (ASSY OPS/2JA/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"/><br>SET POINT <input type="checkbox"/><br>MANUAL <input type="checkbox"/> | IDLE <input type="checkbox"/><br>SET POINT <input type="checkbox"/><br>MANUAL <input type="checkbox"/> |                       |
| 8         | Control Sensors | INNER <input type="checkbox"/><br>OUTLET <input type="checkbox"/><br>INLET <input type="checkbox"/>    | INNER <input type="checkbox"/><br>OUTLET <input type="checkbox"/><br>INLET <input type="checkbox"/>    |                       |
| 9         | AirMgmt Proceed | PROCEED <input type="checkbox"/>                                                                       | PROCEED <input type="checkbox"/>                                                                       |                       |
| 10        | Bandwidth       | ____. ____ °C                                                                                          | ____. ____ °C                                                                                          | 00.1 to 25.5° C       |
| 11        | Primary Cooler  | COOLER 1 <input type="checkbox"/><br>COOLER 2 <input type="checkbox"/>                                 | COOLER 1 <input type="checkbox"/><br>COOLER 2 <input type="checkbox"/>                                 |                       |
| 12        | Cooler 1 Stroke | ____                                                                                                   | ____                                                                                                   | 03 to 63              |

**TABLE 2 GLACIER RESET LOG FILE**  
 (ASSY OPS/2JA/FIN) Page 3 of 5 pages

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

**TABLE 2 GLACIER RESET LOG FILE**

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| Parameter                                                  |                 | Event 1                                           |                                                                                                     | Event 2                                           |                                                                                                     | Definition or Options |
|------------------------------------------------------------|-----------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------|
| 21                                                         | AAA Fan State   | LOW                                               | <input type="checkbox"/>                                                                            | LOW                                               | <input type="checkbox"/>                                                                            |                       |
|                                                            |                 | HIGH                                              | <input type="checkbox"/>                                                                            | HIGH                                              | <input type="checkbox"/>                                                                            |                       |
| 22                                                         | Heat Rejection  | AIR                                               | <input type="checkbox"/>                                                                            | AIR                                               | <input type="checkbox"/>                                                                            |                       |
|                                                            |                 | WATER                                             | <input type="checkbox"/>                                                                            | WATER                                             | <input type="checkbox"/>                                                                            |                       |
| Values for Reconfiguration of <b>Setup: Air Management</b> |                 |                                                   |                                                                                                     |                                                   |                                                                                                     |                       |
| 23                                                         | Air Mgmt Mode   | AUTOMATIC                                         | <input type="checkbox"/>                                                                            | AUTOMATIC                                         | <input type="checkbox"/>                                                                            |                       |
|                                                            |                 | MANUAL                                            | <input type="checkbox"/>                                                                            | MANUAL                                            | <input type="checkbox"/>                                                                            |                       |
| 24                                                         | Humidity Config | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      |                       |
|                                                            |                 | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |                       |
| 25                                                         | Pressure Config | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      |                       |
|                                                            |                 | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |                       |
| 26                                                         | Manual Config   | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      | Pump: 1 2                                         | Valve: 1 2 3 4                                                                                      |                       |
|                                                            |                 | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |                       |

**TABLE 2 GLACIER RESET LOG FILE**

(ASSY OPS/2JA/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"/><br>MANUAL <input type="checkbox"/> | AUTOMATIC <input type="checkbox"/><br>MANUAL <input type="checkbox"/> |                            |
| 30        | Circ Fan Power | _____ %                                                               | _____ %                                                               | 000 to 100 %               |
| 31        | Data Storage   | _____ Seconds                                                         | _____ Seconds                                                         | 0 to 3600 seconds          |
| 32        | Ethernet Addr  | ____ . ____ . ____ . ____                                             | ____ . ____ . ____ . ____                                             | TCP IP Address             |
| 33        | Function Code  | _____ Hex Value                                                       | _____ Hex Value                                                       | 0x000A to 0xFFFE Hex Value |
| 34        | RIC Port       | _____                                                                 | _____                                                                 | 6212 to 6999               |
| 35        | Remote Command | ENABLE <input type="checkbox"/><br>INHIBIT <input type="checkbox"/>   | ENABLE <input type="checkbox"/><br>INHIBIT <input type="checkbox"/>   |                            |

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

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**TABLE 3 GLACIER DIAGNOSTIC LOG FILE**

(ASSY OPS/2JA/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:<br>End:                                 | Start:<br>End:                                 | Start:<br>End:                                 | Start:<br>End:                                 |
| 2                       | SET POINT       | Set Point °C              | Start:<br>End:                                 | Start:<br>End:                                 | Start:<br>End:                                 | Start:<br>End:                                 |
| 3                       | GPS             | Hours: Minutes: Seconds   | Start:<br>__ : __ : __<br>End:<br>__ : __ : __ | Start:<br>__ : __ : __<br>End:<br>__ : __ : __ | Start:<br>__ : __ : __<br>End:<br>__ : __ : __ | Start:<br>__ : __ : __<br>End:<br>__ : __ : __ |
| QUICK STATUS            |                 |                           |                                                |                                                |                                                |                                                |
| 1                       | Cold Head 1A    | Temperature °C            |                                                |                                                |                                                |                                                |
| 2                       | Cold Head 1B    | Temperature °C            |                                                |                                                |                                                |                                                |
| 3                       | Cold Head 2A    | Temperature °C            |                                                |                                                |                                                |                                                |
| 4                       | Cold Head 2B    | Temperature °C            |                                                |                                                |                                                |                                                |
| 5                       | Cold Vol Outlet | Temperature °C            |                                                |                                                |                                                |                                                |
| 6                       | Cold Vol Inlet  | Temperature °C            |                                                |                                                |                                                |                                                |
| 7                       | Cold Vol Inner  | Temperature °C            |                                                |                                                |                                                |                                                |
| 8                       | Cold Vol DeltaP | psi                       |                                                |                                                |                                                |                                                |
| 9                       | Outlet Water    | Temperature °C            |                                                |                                                |                                                |                                                |
| 10                      | Inlet Water     | Temperature °C            |                                                |                                                |                                                |                                                |
| 11                      | Humidity 1      | % Humidity                |                                                |                                                |                                                |                                                |
| 12                      | Humidity 2      | % Humidity                |                                                |                                                |                                                |                                                |
| 13                      | Circ Fan Speed  | RPM                       |                                                |                                                |                                                |                                                |
| 14                      | Battery         | 0 to greater than 9 Volts |                                                |                                                |                                                |                                                |
| 15                      | Main Current    | 0 to 20 Amps              |                                                |                                                |                                                |                                                |
| 16                      | Total Run Time  | Hours: Minutes: Seconds   |                                                |                                                |                                                |                                                |

**TABLE 3 GLACIER DIAGNOSTIC LOG FILE**

(ASSY OPS/2JA/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  | %                             |         |         |         |         |

**TABLE 3 GLACIER DIAGNOSTIC LOG FILE**

(ASSY OPS/2JA/FIN) Page 3 of 3 pages

| 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                                 |         |         |         |
| 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:<br>Minutes |         |         |         |
| 8                 | Logger Version   | ##.## Day/Month/Year Hour:<br>Minutes |         |         |         |
| 9                 | Circ Fan Version | ##.## Day/Month/Year Hour:<br>Minutes |         |         |         |

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# ICU-ANDE2 DEPLOY

(ASSY OPS/2JA/FIN 1/MULTI P) Page 1 of 3 pages

## 1. DEPLOYING PAD

DEPLOY WINDOW OPEN MET = \_\_\_\_/\_\_\_\_:\_\_\_\_:\_\_\_\_

DEPLOY WINDOW CLOSE MET = \_\_\_\_/\_\_\_\_:\_\_\_\_:\_\_\_\_

(Set up countdown timer if desired)

## 2. CONFIGURING PHOTO/TV

Check complete or in work prior to deploy window open:

Perform P/TV10 DEPLOYABLE PAYLOADS – DRAGONSAT, ANDE2  
(PHOTO/TV, SCENES)

-25:00

## 3. ANDE2 INITIAL CONFIGURATION

|      |               |                |
|------|---------------|----------------|
| R1   | √PL AFT MN B  | – ON           |
| SSP1 | √ANDE2 PWR    | – OFF          |
|      | √PRE-ARM/SAFE | – SAFE (tb-bp) |
|      | √ARM/SAFE     | – SAFE (tb-bp) |
|      | √DEPLOY/SAFE  | – SAFE (ctr)   |
|      | √NEA GOOD tb  | – bp           |

## 4. VERIFYING DEPLOY PATH CLEAR

√OBSS/MPM clear of deploy path

√RMS clear of deploy path

\* √MCC if ANDE2 deploy path not clear \*

-06:00

## 5. START RECORDERS

L10 (VTR) REC pb – push, hold  
PLAY – push simo  
RED DOT displayed

V10's  
(MON 1,2) REC pb's – push  
√RED DOT displayed

FD G1  
(PAO) START/STOP pb – push  
√RED DOT displayed

-05:00

## 6. CONFIGURE FOR DEPLOY

|                            |                                      |
|----------------------------|--------------------------------------|
| O14:F,<br>O15:F,<br>O16:F, | √Pri RJD LOGIC,DRIVER (sixteen) – ON |
| O14:E,<br>O15:E,<br>O16:E  | √cb DDU (six) – cl                   |

**GNC 20 DAP CONFIG**

√DAP: A1/B1 loaded

If VERN available:

√DAP: A/AUTO/VERN  
ITEM 44 + 0.5 EXEC

# ICU-ANDE2 DEPLOY

If using ALT:

- √DAP: A/AUTO/ALT
- ITEM 31 + 1.0 EXEC
- ITEM 38 + 0.1 0 EXEC
- ITEM 40 + 1 EXEC

GNC 201 UNIV PTG

√In Attitude per flight plan

DAP: B/AUTO/VERN(ALT)

√Vehicle Rates

|                          | VERN     | ALT      |
|--------------------------|----------|----------|
| Pitch Rate (deg/sec)     | ≤ Rate ≤ | ≤ Rate ≤ |
| Roll, Yaw Rate (deg/sec) | ≤        | ≤        |

√MCC if deadband collapse complete or wait 60 sec

## 7. DEPLOY PREP

-02:00 A6U  
SSP1

DAP: FREE  
ANDE2 PWR – ON

**CAUTION**

To prevent solenoid overheating, the ANDE2 PRE-ARM/SAFE switch is limited to 120 sec in the PRE-ARM position.

The ANDE2 PRE-ARM/SAFE switch must be in the SAFE position for at least 120 sec before returning to the PRE-ARM position.

## 8. DEPLOY/SAFE

-00:00 SSP1

ANDE2 PRE-ARM/SAFE – PRE-ARM (tb-gray)  
√D/S NEA GOOD tb – gray

- \* If PRE-ARM tb or NEA GOOD tb not gray, \*
- \* continue deploy. \*
- \* If both tb not gray \*
- \* ANDE2 PRE-ARM/SAFE – SAFE \*
- \* PWR – OFF \*
- R1 \* √PL AFT MN B – ON \*
- \* √MCC if available; if not \*
- SSP1 \* ANDE2 PWR – ON \*
- \* Repeat step 8 \*

ANDE2 ARM/SAFE – ARM (tb-gray)

- \* If ARM tb not gray, continue deploy \*

-00:00

DEPLOY/SAFE – DEPLOY

# ICU-ANDE2 DEPLOY

(ASSY OPS/2JA/FIN 1/MULTI P) Page 3 of 3 pages

When deployment visually verified or after 5 sec:

DEPLOY/SAFE – SAFE (ctr)

Record deploy time: MET \_\_\_\_/\_\_\_\_:\_\_\_\_:\_\_\_\_

- SSP1 \* If ANDE2 not deployed: \*
- \* Record ANDE2 D/S NEA GOOD tb status: \_\_\_\_ \*
- \* ANDE2 PRE-ARM/SAFE – SAFE (tb-bp) \*
- \* ARM/SAFE – SAFE (tb-bp) \*
- \* Record D/S NEA GOOD tb status: \_\_\_\_ \*
- \* Report D/S NEA GOOD tb statuses to MCC \*

ANDE2 PRE-ARM/SAFE – SAFE (tb-bp)  
ARM/SAFE – SAFE (tb-bp)  
PWR – OFF

Notify MCC of Deploy MET

Visually track and videotape ICU/ANDE2 for up to 4 min or until out of sight

+02:00 A6U

DAP: A/LVLH

## 9. POWERDOWN

O14:E, cb DDU (six) – op

O15:E,

O16:E,

O14:F,

O15:F,

O16:F

Pri RJD LOGIC, DRIVER (sixteen) – OFF

RJDA 1A L2/R2 MANF DRIVER – ON

## 10. DAP CLEANUP

GNC 20 DAP CONFIG

ITEM 2 + 1 EXEC

A6U

DAP: as reqd

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# DRAGONSAT DEPLOY

(ASSY OPS/2JA/FIN 1/MULTI P) Page 1 of 3 pages

## 1. DEPLOY PAD

DEPLOY WINDOW OPEN MET = \_\_\_\_/\_\_\_\_:\_\_\_\_:\_\_\_\_

DEPLOY WINDOW CLOSE MET = \_\_\_\_/\_\_\_\_:\_\_\_\_:\_\_\_\_

(Set up countdown timer if desired)

## 2. CONFIGURATION FOR PHOTO/TV

Check complete or in work prior to deploy window open:

Perform P/TV10 DEPLOYABLE PAYLOADS – DRAGONSAT, ANDE2  
(PHOTO/TV, SCENES), then:

-25:00

## 3. DRAGONSAT INITIAL CONFIGURATION

|      |                  |               |
|------|------------------|---------------|
| R1   | √PL CAB          | – MNA(MNB)    |
|      | √AFT MN B        | – ON          |
| SSP1 | √cb SW PWR 2     | – op          |
|      | √D/S PRE-ARM     | – SAFE (down) |
|      | √PICO 2 HERE tb  | – bp          |
|      | √D/S NEA GOOD tb | – bp          |
|      | √ARM             | – SAFE (down) |
|      | √DEPLOY          | – SAFE (ctr)  |

### NOTE

SSP2 PDIP 2 PWR1 cb provides power to SSP1 D/S  
DEPLOY sw. This cb is expected to be in the cl position  
prior to DRAGONSAT deploy as it supplies power to the  
PDIP 2 pnl, which may be in use by a PGSC or other item

SSP2      √cb PDIP 2 PWR 1 – cl

## 4. VERIFY DEPLOY PATH CLEAR

√OBSS clear of deploy path

√RMS clear of deploy path

\* √MCC If DRAGONSAT deploy path not clear \*

-06:00

## 5. START RECORDERS

L10 (VTR)    REC pb      – press, hold  
                  PLAY        – press simo

V10's  
(MON 1,2) REC pb's      – press

FD G1  
(PAO)        START/STOP pb – press

-05:00

## 6. CONFIGURE FOR DEPLOY

O14:F      √Pri RJD LOGIC, DRIVER (sixteen) – ON

O15:F

O16:F

O14:E      √cb DDU (six) – cl

O15:E

O16:E

# DRAGONSAT DEPLOY

(ASSY OPS/2JA/FIN 1/MULTI P) Page 2 of 3 pages

## GNC 20 DAP CONFIG

√DAP: A1/B1 loaded

If VERN available:

√DAP: A/VERN  
ITEM 44 + 0.5 EXEC

If using ALT:

√DAP: A/ALT  
ITEM 31 + 1.0 EXEC  
ITEM 38 + 0.1 0 EXEC  
ITEM 40 + 1 EXEC

## GNC 201 UNIV PTG

√In Attitude per flight plan

DAP: B/VERN (ALT)

√Vehicle Rates

|                          | VERN     | ALT      |
|--------------------------|----------|----------|
| Pitch Rate (deg/sec)     | ≤ Rate ≤ | ≤ Rate ≤ |
| Roll, Yaw Rate (deg/sec) | ≤        | ≤        |

√MCC if deadband collapse complete or wait 60 sec

- 02:00 A6U  
SSP1
7. DEPLOY PREP  
DAP: FREE  
cb SW PWR 2 – cl

### CAUTION

To prevent solenoid overheating, the D/S PRE-ARM switch is limited to 120 sec in the PRE-ARM position. The D/S PRE-ARM switch must be in the SAFE position for at least 120 sec before returning to the PRE-ARM position

### NOTE

Two tbs, PICO 2 HERE and D/S NEA GOOD, will transition from bp to gray when the D/S PRE-ARM switch is thrown

- 00:30 SSP1
8. DEPLOY/SAFE  
D/S PRE-ARM – PRE-ARM  
√PICO 2 HERE tb – gray  
√D/S NEA GOOD tb – gray

# DRAGONSAT DEPLOY

(ASSY OPS/2JA/FIN 1/MULTI P) Page 3 of 3 pages

- \* If at least one tb gray, continue deploy \*
- \* \*
- \* If all tbs are bp: \*
- \* D/S PRE-ARM – SAFE \*
- \* Do not deploy \*
- \* √MCC for instructions \*

D/S ARM – ARM

-00:00

D/S DEPLOY – DEPLOY

When deployment visually verified, or after 5 sec:

D/S DEPLOY – SAFE

Record deploy time: MET \_\_\_\_/\_\_\_\_:\_\_\_\_:\_\_\_\_

√PICO 2 HERE tb – bp

√D/S NEA GOOD tb – bp

- \* If DRAGONSAT not deployed: \*
- \* Record D/S NEA GOOD tb status: \_\_\_\_\_ \*
- \* D/S ARM – SAFE \*
- \* PRE-ARM – SAFE \*
- \* √D/S PICO 2 HERE tb – bp \*
- \* Record D/S NEA GOOD tb status: \_\_\_\_\_ \*
- \* Report D/S NEA GOOD tb statuses to MCC \*

D/S PRE-ARM – SAFE

ARM – SAFE

cb SW PWR 2 – op

Notify MCC that deploy and switch reconfig is complete; report MET of deploy.

## 9. VISUAL TRACKING

Visually track DRAGONSAT for up to 4 min or until out of view

+02:00 A6U

DAP: A/AUTO/VERN (ALT)

## 10. DAP CLEANUP

GNC 020 DAP CONFIG

ITEM 2 + 1 EXEC

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CONTINGENCY EVA PL CONFIG

CONTINGENCY EVA  
PL CONFIG

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**PRE-EVA PL CONFIGURATION**

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

N/A

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**POST EVA PL CONFIGURATION**

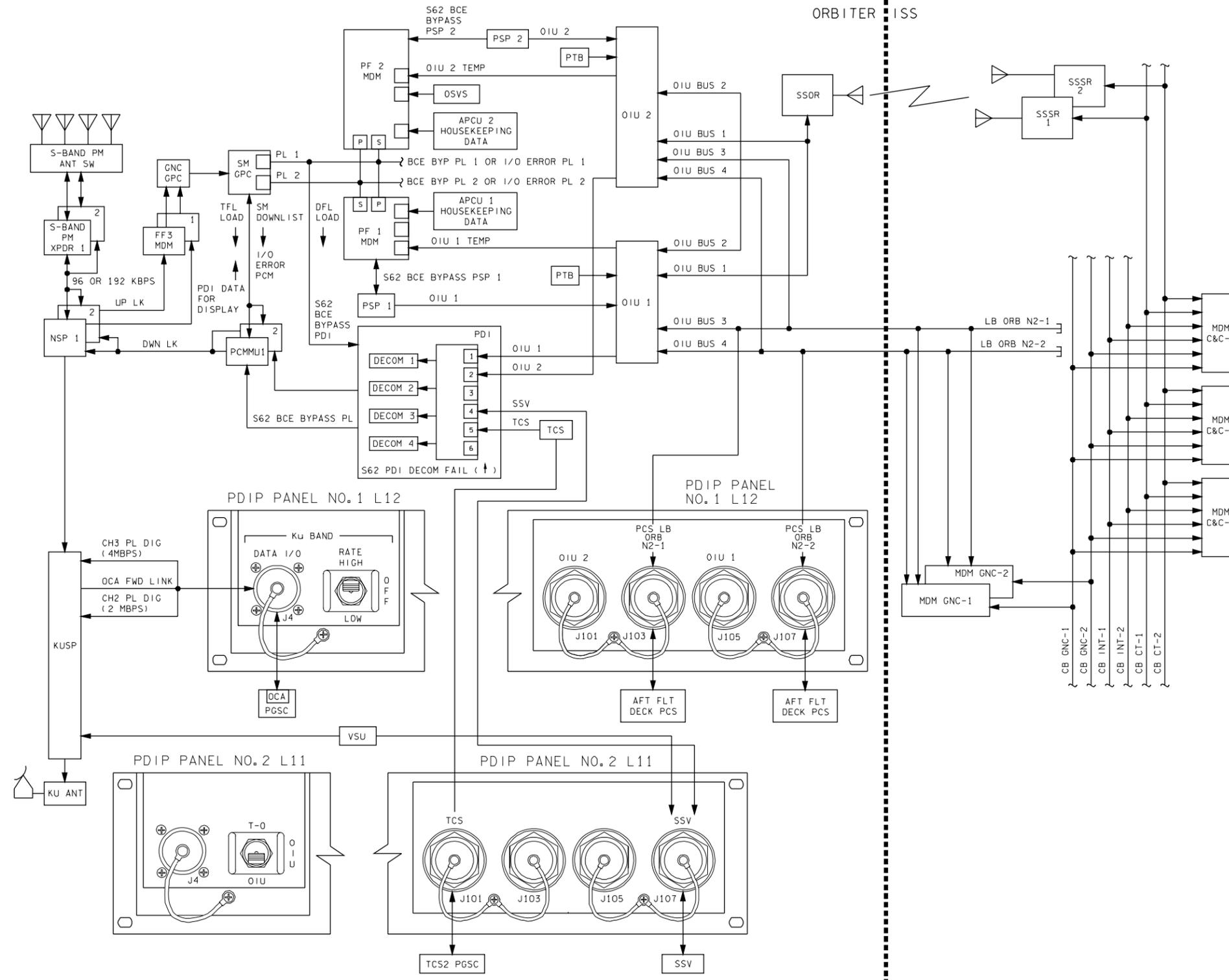
(ASSY OPS/2JA/FIN) Page 1 of 1 pages

N/A

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MALFUNCTION

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4850201\_127, SCH 1

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**COMM**

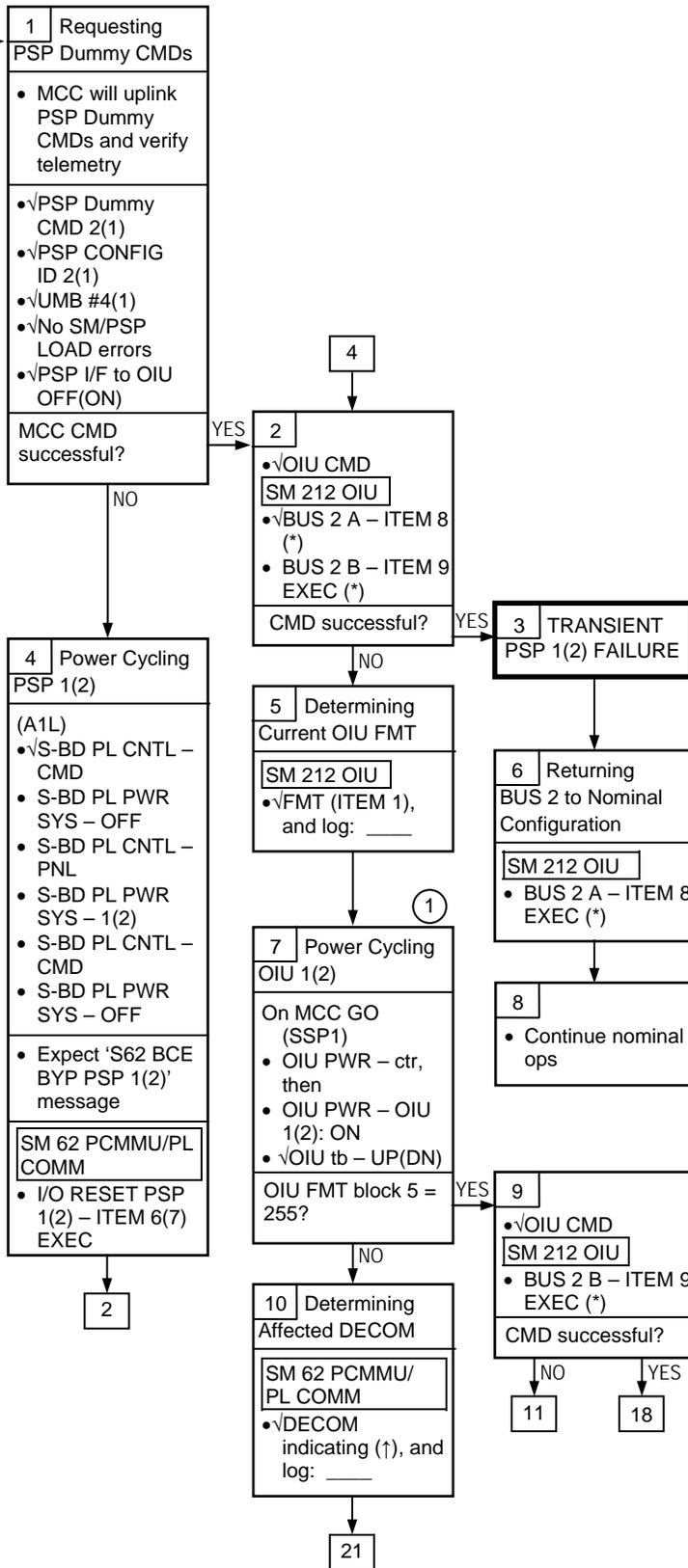
**OIU FAIL TO COMMAND**

(ASSY OPS/2JA/FIN)

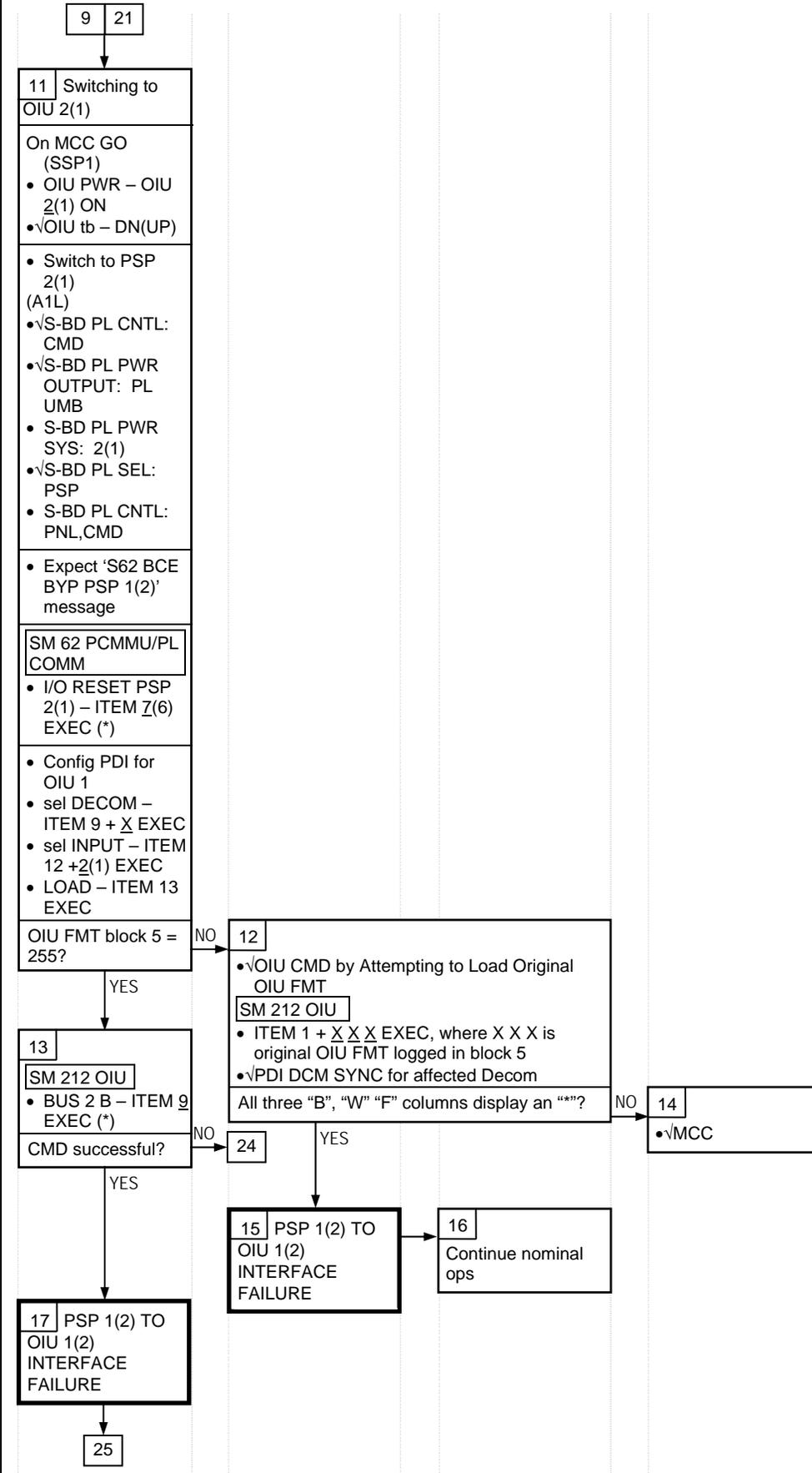
Page 1 of 3 pages

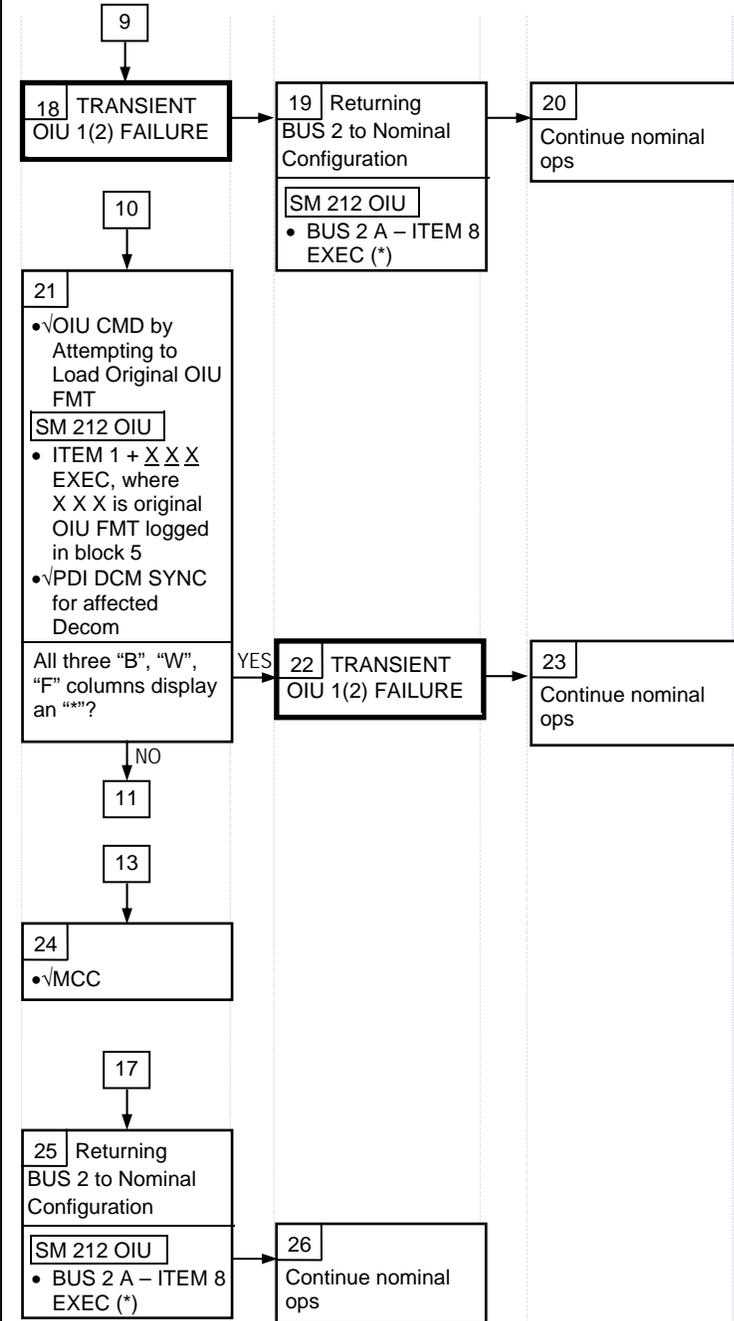
No Response to OIU Configuration or Routed Commands

**Nominal Config:**  
 (A1L)  
 S-BD PL  
 CNTL – CMD  
 PWR SYS – 1  
 PWR SEL – PSP  
 PSP OUTPUT – PL  
 UMB  
 (SSP1)  
 OIU PWR – OIU 1(2)  
 ON  
 tb OIU – 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





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# ASSY OPS

# OIU TEMP HIGH MALFUNCTION

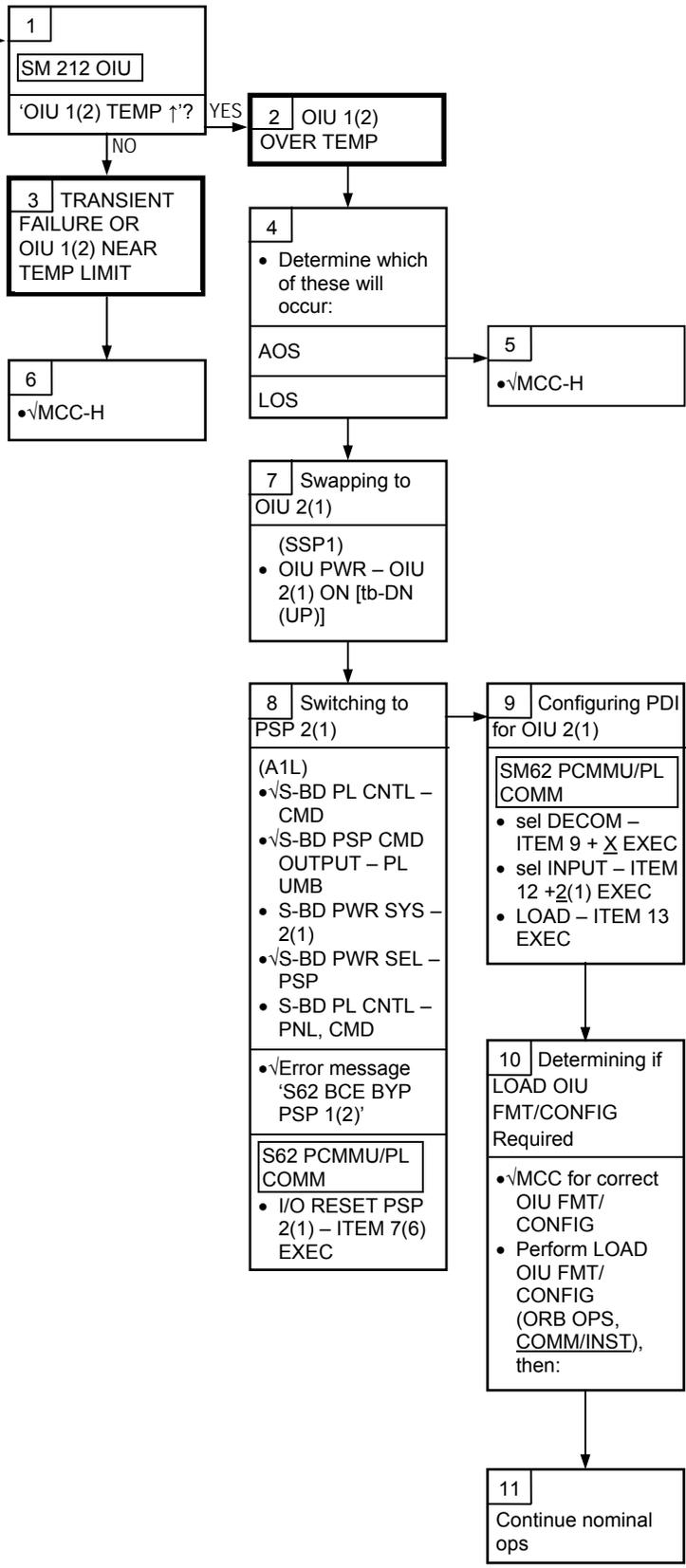
(ASSY OPS/2JA/FIN)

Page 1 of 1 page

SM 212 OIU TEMP

OIU message: OIU TEMP > 212

**Nominal Config:**  
 (R1)  
 PL CAB –  
 MNA(MNB)  
 PL AUX – ON  
 (SSP 1)  
 OIU PWR – OIU 1(2)  
 ON  
 tb OIU – UP(DN)



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**COMM**

**S212 OIU AD 1 NOLK/LOSS OF ISS OR SSOR TELEMETRY**

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

SM ALERT

S212 OIU AD1 NOLK

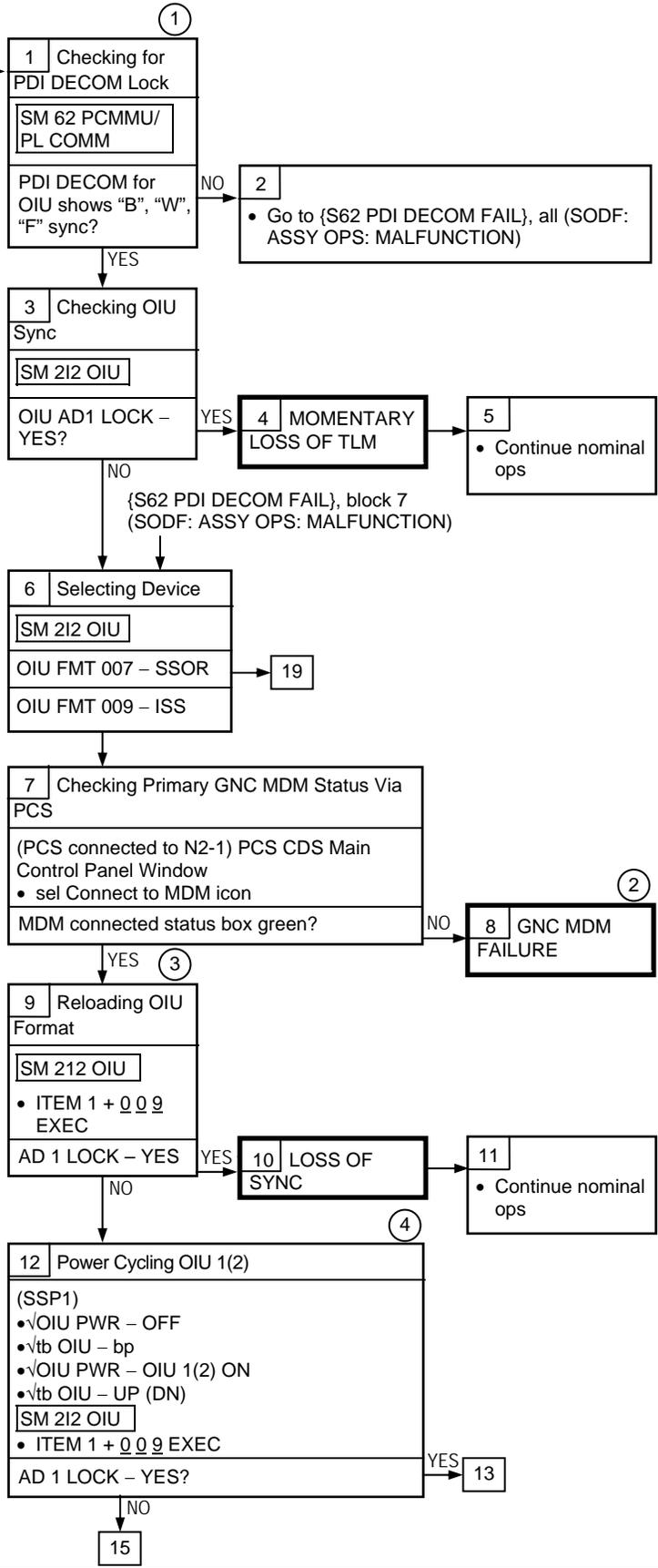
Loss of Data On SPEC 205 During Undocking

MCC-H Reports Loss of ISS Data To Ground Via OIU

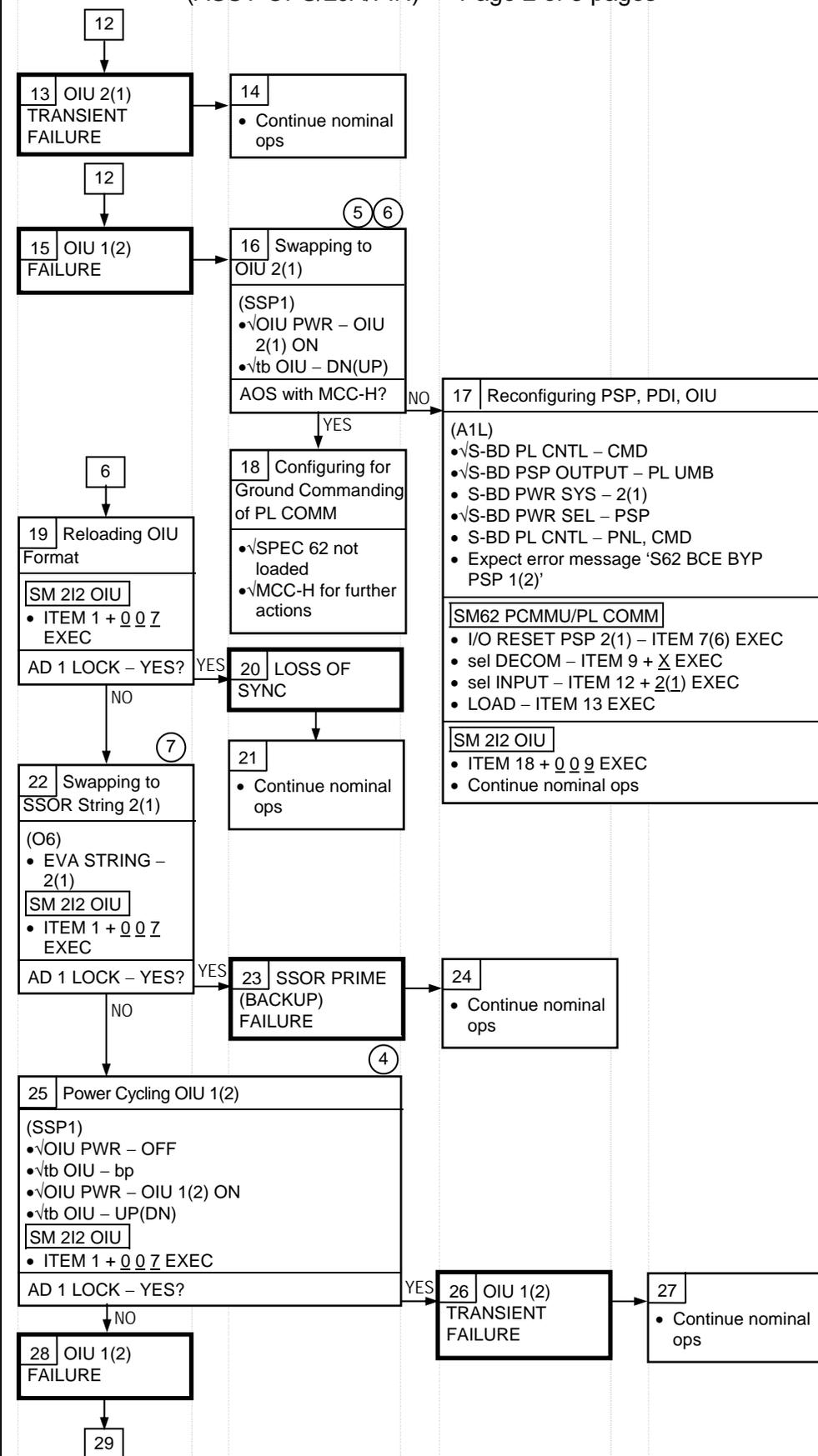
**Nominal Config:**  
 (R1)  
 PL CAB – MNA(MNB)  
 PL AUX – ON (SSP1)  
 OIU PWR – OIU 1(2) ON  
 tb OIU – UP(DN)

For ISS:  
 One PCS connected to Primary GNC MDM  
 MDM  
 SM 212 OIU  
 OIU FMT: 009

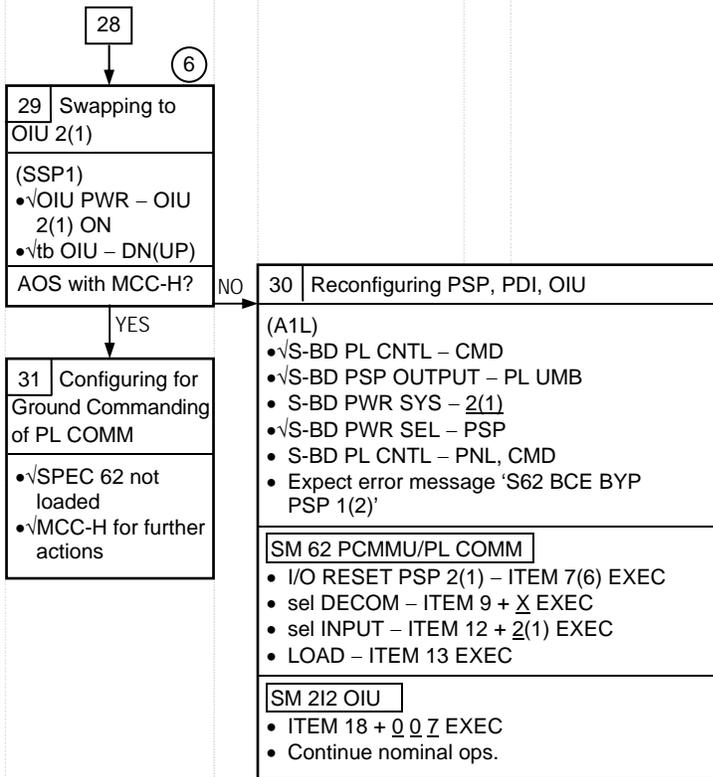
For SSOR:  
 (R14)  
 cb MNA UHF EVA – cl  
 cb MNC UHF EVA – cl  
 (O6)  
 EVA STRING: 1(2)  
 UHF MODE – EVA  
 SM 212 OIU  
 OIU FMT – 007



- 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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**COMM**

SM  
ALERT

**S62 PDI DECOM FAIL**

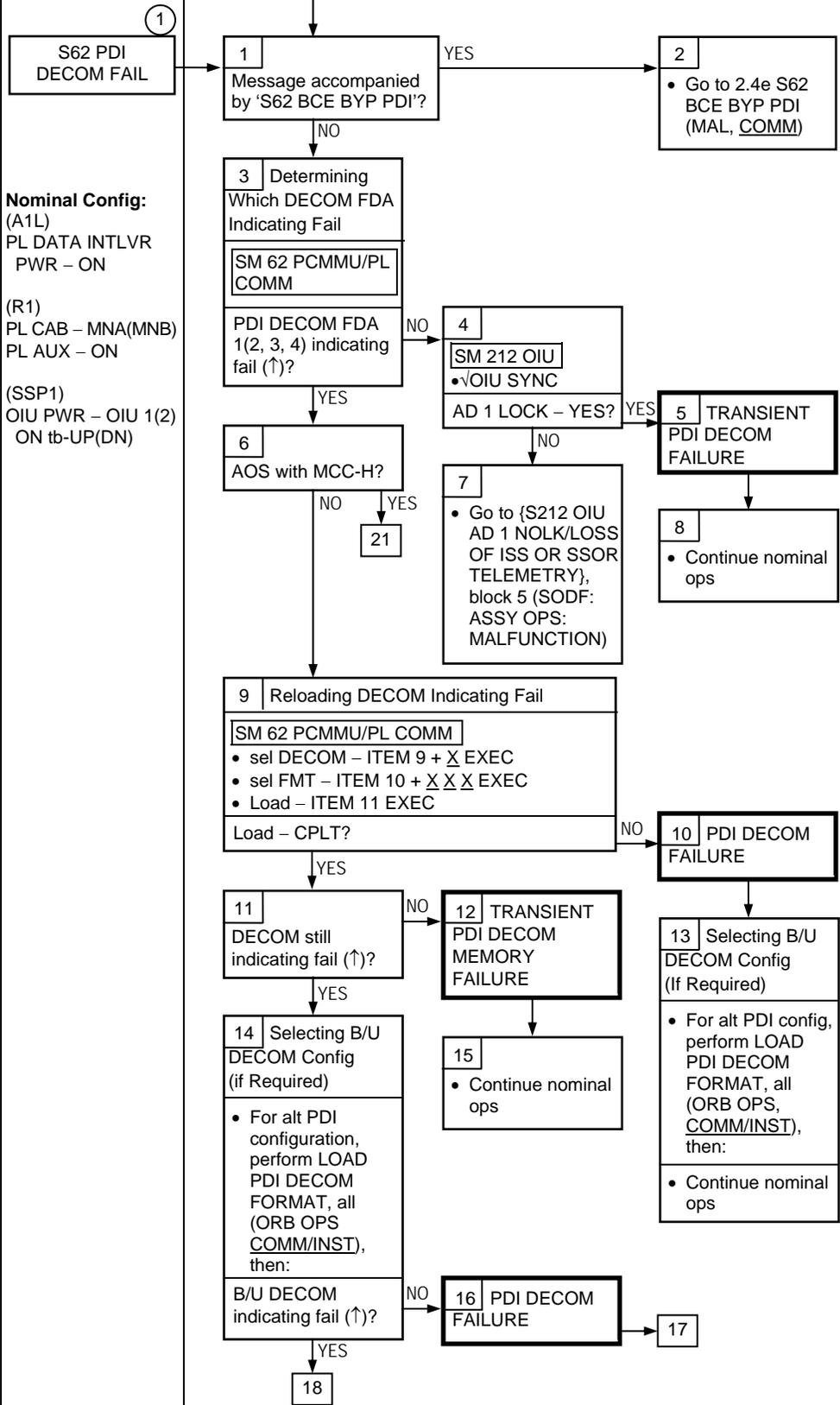
(ASSY OPS/2JA/FIN)

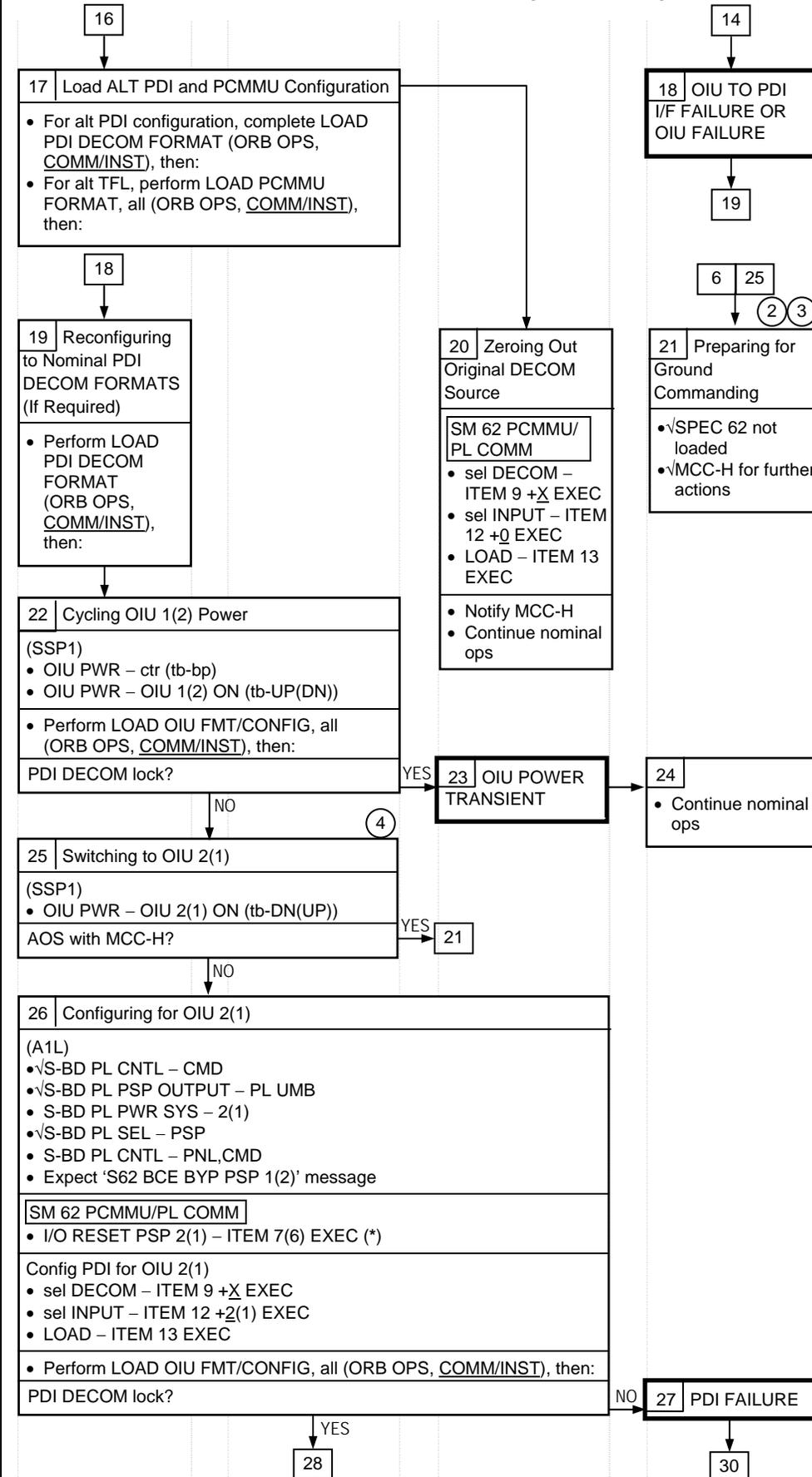
Page 1 of 3 pages

{S212 OIU AD 1 NOLK/LOSS OF ISS or SSOR TELEMETRY}, block 1  
(SODF: ASSY OPS: MALFUNCTION) or 2.4g S62 PDI DECOM FAIL  
(MAL, COMM)

**Nominal Config:**  
(A1L)  
PL DATA INTLVR  
PWR – ON  
  
(R1)  
PL CAB – MNA(MNB)  
PL AUX – ON  
  
(SSP1)  
OIU PWR – OIU 1(2)  
ON tb-UP(DN)

①  
TCS and SSV not  
addressed in MAL;  
FDA not nominally  
enabled

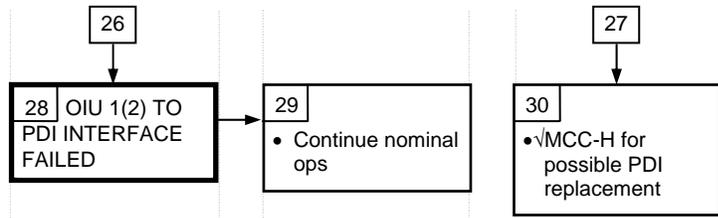




② For ground commanding of PL COMM system, SPEC 62 must not be loaded

③ MCC-H can perform all PL COMM reconfig, except OIU PWR cycle and swap steps

④ Alternate (OIU 1) requires PSP 1



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# PL/DPS RECONFIGURATION

(ASSY OPS/2JA/FIN)

Page 1 of 2 pages

| PROCEDURE                                                                        | SECURE ACTION | RECOVERY ACTION | INFO |
|----------------------------------------------------------------------------------|---------------|-----------------|------|
| PL 1(2) MDM I/O ERROR; PL 1(2) MDM OUTPUT (ORB PKT, <u>DPS</u> )                 | N/A           | N/A             | A    |
| 5.3c I/O ERROR PL 1(2); MDM OUTPUT PL 1(2) (MAL, <u>DPS</u> )                    | N/A*          | N/A             | A    |
| PASS SM GPC FAIL (ORB PKT, <u>DPS</u> )                                          | N/A           | D               | B    |
| GNC RECOVERY VIA G2FD (ORB PKT, <u>DPS</u> )                                     | N/A           | C,D             | B    |
| 5.1a CS SPLIT(MAL, <u>DPS</u> )                                                  | N/A           | C,D,E**         | B    |
| 5.3g BCE BYP PL1(2) (MAL, <u>DPS</u> )                                           | N/A*          | N/A             | A    |
| GPC FRP-4 PASS RECOVERY AFTER BFS ENGAGE (ASCENT/ORBIT/ENTRY) (MAL, <u>DPS</u> ) | N/A*          | C,D             | B    |
| GPC FRP-7 DPS RECONFIG FOR LOSS OF AV BAY COOLING (MAL, <u>DPS</u> )             | N/A*          | C,D             | B    |
| DPS SSR-3 GNC REASSIGNMENT (MAL, <u>DPS</u> )                                    | N/A*          | N/A             | B    |
| DPS SSR-4 SM REASSIGNMENT (MAL, <u>DPS</u> )                                     | N/A           | C,D             | B    |
| ECLSS SSR-10 H2O PUMP OPS VIA GPC (MAL, <u>ECLSS</u> )                           | N/A           | C,D,E**         | B    |

\*NOTE: Procedure does not call out PL/DPS RECONFIG, Secure

\*\*NOTE: Procedure does not call out PL/DPS RECONFIG, Recovery

## ACTION A

If 'I/O ERROR PL1' message:

Loss of ground and orbiter MCDS command interface to ISS via PSP 1/OIU 1  
For additional impacts, refer to ORBITER MDM LOSS IMPACTS  
(SODF: ASSY OPS: MALFUNCTION: CRITICAL EQUIPMENT LOSS)

If failure at IOP XMTR/RCVR at SM GPC:

If PL2 interface with SM GPC failed:

√MCC for SM GPC reassignment

PF1 interface can be recovered by port moding PL 1/2 buses

If 'I/O ERROR PL2' message:

Loss of ground and orbiter MCDS command interface to ISS via PSP 2/OIU 2  
For additional impacts, refer to ORBITER MDM LOSS IMPACTS  
(SODF: ASSY OPS: MALFUNCTION: CRITICAL EQUIPMENT LOSS)

If failure at IOP XMTR/RCVR at SM GPC:

If PL1 interface with SM GPC failed:

√MCC for SM GPC reassignment

PF2 interface can be recovered by port moding PL 1/2 buses

## ACTION B

If SM GPC affected:

Note PL/ISS commanding via SM GPC (ground and orbiter MCDS) 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

## PL/DPS RECONFIGURATION

(ASSY OPS/2JA/FIN)

Page 2 of 2 pages

### **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 when complete

### **ACTION D**

Reload PDI DECOM FORMAT (ORB OPS FS, COMM/INST)

As required, reenable PDI DECOM FDA

Resume SPEC 62

### **ACTION E**

Reload PCMMU TFLs, load PCMMU FORMAT (ORB OPS, COMM/INST)



**ORBITER ELECTRICAL BUS LOSS MATRIX**  
(ASSY OPS/2JA/FIN 1)

| ORBITER EPS BUSES                             | FC1         |            | FC2        |             | FC3     | MNA DA1  |          |          |         |         |      |      |            |        |         | MNB DA2 |      |            |         |      |          |          |         |         |            | FC3        | MNC DA3 |        |   |         |         |            |      |          |          |          |  |  |  |
|-----------------------------------------------|-------------|------------|------------|-------------|---------|----------|----------|----------|---------|---------|------|------|------------|--------|---------|---------|------|------------|---------|------|----------|----------|---------|---------|------------|------------|---------|--------|---|---------|---------|------------|------|----------|----------|----------|--|--|--|
|                                               | ESS 1BC     |            | ESS 2CA    |             | ESS 3AB | CNTL BC1 | CNTL BC2 | CNTL BC3 | PNL R14 | PNL O14 | MCA1 | MCA3 | PNL A6&A14 | FPC1   | MPC1    | MPC2    | MCA3 | PNL A6&A14 | APC5    | FPC2 | CNTL CA1 | CNTL CA2 | PNL O15 | PNL R14 | MAR1 ML86B | MAR2 ML86B | (R)     | (R)    | P | PNL O16 | PNL R14 | APC 6      | FPC3 | CNTL AB1 | CNTL AB2 | CNTL AB3 |  |  |  |
|                                               | PNL O13&R14 | ESS 1BC FD | ESS 2CA FD | PNL O13&R14 | PNL O13 |          |          |          |         |         |      |      |            | AC1 3φ | AUX PLA | AUX PLB |      |            | APC2    | AC2  |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
|                                               |             |            |            |             |         |          |          |          |         |         |      |      |            |        | P       | (R)     |      |            | AFT PLB | 3φ   | φA       |          |         |         |            |            |         | PRI PL |   |         | AFT PLC | PNL A15 φC |      |          |          |          |  |  |  |
| <b>ISS EQUIPMENT</b>                          |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| PMA 2 Hooks - Group 1, 2 - Sys A              | XRC         |            |            |             |         |          |          |          |         |         |      |      | X          | X      |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| PMA 2 Hooks - Group 1, 2 - Sys B              |             |            |            | XRC         |         |          |          |          |         |         |      |      |            |        |         | X       |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| <b>OBSS</b>                                   |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| LCS (+124 VDC via APCU 2) <sup>2</sup>        |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| LDRI / ITVC / PTU / SPEE (on SRMS)            |             |            |            |             |         |          |          |          |         |         |      |      |            | X      |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| LDRI / ITVC / PTU / SPEE / LCS Htrs (in MPMs) |             |            |            |             |         |          |          |          |         |         |      |      |            | XR     |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| RSC Cam                                       |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| DTV MUX / VTR                                 |             |            |            |             |         |          |          |          |         |         |      |      |            | X      |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| <b>PAYLOAD BUS CONTROL POWER</b>              |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| Cabin PL - MNA Cntl Pwr (nom src)             |             | XC         |            |             |         |          |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| Cabin PL - MNB Cntl Pwr (b/u src)             |             |            |            | XC          |         |          |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| Aux PLA Cntl Pwr                              |             | XC         |            |             |         |          |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| Aux PLB Cntl Pwr                              |             |            |            | XC          |         |          |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| PL PRI - MNC DA3 Cntl Pwr (nom src)           |             |            |            |             | XRC     |          |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| PL PRI - MNB DA2 Cntl Pwr (b/u src)           |             |            |            |             |         | XRC      |          |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| PL PRI - FC3 Cntl Pwr (b/u src)               |             |            |            |             |         |          | XRC      |          |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| AFT PLB Cntl Pwr                              |             |            |            |             |         |          |          | XRC      |         |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |
| AFT PLC Cntl Pwr                              |             |            |            |             |         |          |          |          | XRC     |         |      |      |            |        |         |         |      |            |         |      |          |          |         |         |            |            |         |        |   |         |         |            |      |          |          |          |  |  |  |

(1) The heater circuit has been isolated from orbiter bus power by de-pinning the associated connector.  
 (2) Redundant LCS pwr is available from APCU1 through the interconnect cable (the power still must go through APCU2's output relay).  
 X - Total Loss of Operational Power  
 XR - Loss of Redundant Power  
 XC - Total Loss of Control Power  
 XRC - Loss of Redundant Control Power  
 XRM - Loss of Redundant tb Monitor Power  
 P - Primary Power Source  
 (R) - Redundant Power Source (requires crew action to use)

## ORBITER MDM LOSS IMPACTS

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

- FF1 Uplink through NSP 1 (secondary)
- FF3 Uplink through NSP 2 (primary)  
FRCS Vernier RJD command path (loss of verns)
- FA1 LRCS Vernier RJD command path (loss of verns)
- FA2 RRCS Vernier RJD command path (loss of verns)
- PF1 ISS Primary command path (via PSP 1 – UMB 1/OIU 1)  
OIU 1 tlm (PDI TELEMETRY 1)  
Ku-Band command and tlm  
JEM-EF (JEF) LAT 4 RFL tlm (Sys 1)  
3 RFL tlm (Sys 1)  
ELM-ES (JLE) LAT 4 RFL tlm (Sys 1)  
3 RFL tlm (Sys 1)
- PF2 ISS Redundant command path (via PSP 2 – UMB 1/OIU 2)  
OIU 2 tlm (PDI TELEMETRY 2)  
CCTV Command Path from MCC (crew still has control from PNL A7)  
C/W Annunciation (PL Caution, B/U C/W Alarm)  
JEM-EF (JEF) LAT 1 RFL tlm (Sys 2)  
2 RFL tlm (Sys 2)  
ELM-ES (JLE) LAT 1 RFL tlm (Sys 2)  
2 RFL tlm (Sys 2)
- OF1 PCMMU 1 – mode select tlm  
1,2 – ON/OFF power tlm  
– RPC A tlm  
PL AUX A – RPC ON/OFF tlm  
MID MCA 1 OP STATUS 1, 2, 3, 4 tlm  
3 OP STATUS 1, 2, 3, 4 tlm  
PL BAY MECH PWR SYS 1, 2 tlm  
RETEN LOGIC PWR SYS 1, 2 tlm  
ROEU MATE/DEMATE tlm (Sys 2)  
LAT, REL tlm (Sys 2)  
ELM-ES (JLE) KEEL RFL, LAT, REL, tlm (Sys 2)  
ICC-VLD LAT 1 RFL, LAT, REL tlm (Sys 2)  
2 RFL, LAT, REL tlm (Sys 2)  
3 RFL, LAT, REL tlm (Sys 2)  
4 RFL, LAT, REL tlm (Sys 2)  
KEEL RFL, LAT, REL tlm (Sys 2)
- OF2 PSP 1,2 – bit and frame sync  
PCMMU 2 – mode select tlm  
PCMMU 2 RPC B tlm  
PL AUX B – RPC ON/OFF tlm  
MID MCA 1 OP STATUS 5, 6 tlm  
3 OP STATUS 5, 6, 7, 8 tlm

## ORBITER MDM LOSS IMPACTS

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

- JEM-EF (JEF) LAT 4 RFL, LAT, REL tlm (Sys 2)
  - 1 LAT, REL tlm (Sys 2)
  - 3 RFL, LAT, REL tlm (Sys 2)
  - 2 LAT, REL tlm (Sys 2)
  - KEEL RFL, LAT, REL tlm (Sys 2)
- ELM-ES (JLE) LAT 4 RFL, LAT, REL tlm (Sys 2)
  - 1 LAT, REL tlm (Sys 2)
  - 3 RFL, LAT, REL tlm (Sys 2)
  - 2 LAT, REL tlm (Sys 2)
- ROEU RELAX tlm (Sys 2)
- ELM-ES (JLE) KEEL RFL, LAT, REL, tlm (Sys 1)
- ICC-VLD LAT 1 RFL, LAT, REL tlm (Sys 1)
  - 2 RFL, LAT, REL tlm (Sys 1)
  - 3 RFL, LAT, REL tlm (Sys 1)
  - 4 RFL, LAT, REL tlm (Sys 1)
  - KEEL RFL, LAT, REL tlm (Sys 1)
- DSC OF2 FRCS Vernier Inj Temps (loss of verns)
- OF3 Orbiter Comm system tlm (refer to OI MDM/DSC Failure Impacts)  
PL PRI MNC, MNB, FC3 – ON/OFF tlm  
PCMMU 1 RPC B tlm
- OF4 Ku-Band – RADAR mode and output power  
S-Band, Ku-Band – PNL/CMD switch position  
PSP, GCIL – ON/OFF tlm  
Orbiter Comm system tlm (refer to OI MDM/DSC Failure Impacts)  
CAB PL (MNA, MNB), PL AUX – ON/OFF tlm  
APCU 1 and 2 Converters/Outputs switch position tlm  
PTU1 and 2 OPCU Converter switch position tlm  
ROEU MATE/DEMATE tlm (Sys 1)
  - LAT, REL tlm (Sys 1)
- OA1 ODS X4/PMA X3 connector mate tlm  
PMA 2/3 GRP 1 passive hooks (1,3,5,7,9,11), Close tlm  
PTU 1/APCU 1 voltage/trip status/temperature tlm  
ODS X1 Connector mate A/B tlm
- DSC OA1 ODS X4/PMA X3 connector mate tlm  
PMA 2/3 GRP 1 passive hooks (1,3,5,7,9,11), Close tlm
- OA2 AFT PL MNB PWR ON tlm  
amps  
ODS X3/PMA X4 connector mate tlm  
PMA 2/3 GRP 2 passive hooks (2,4,6,8,10,12), Close tlm  
PTU 2/APCU 2 voltage/trip status/temperature tlm  
ODS X2 Connector mate A/B tlm
- DSC OA2 ODS X3/PMA X4 connector mate tlm  
PMA 2/3 GRP 2 passive hooks (2,4,6,8,10,12), Close tlm  
Vernier R5D Inj Temps (loss of verns)

## ORBITER MDM LOSS IMPACTS

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

OA3           AFT PL MNC PWR ON tlm  
                  amps  
                  JEM-EF (JEF) LAT 1 RFL, LAT, REL tlm (Sys 1)  
                          4 LAT, REL tlm (Sys 1)  
                          2 RFL, LAT, REL tlm (Sys 1)  
                          3 LAT, REL tlm (Sys 1)  
                          KEEL RFL, LAT, REL tlm (Sys 1)  
                  ELM-ES (JLE) LAT 1 RFL, LAT, REL tlm (Sys 1)  
                          4 LAT, REL tlm (Sys 1)  
                          2 RFL, LAT, REL tlm (Sys 1)  
                          3 LAT, REL tlm (Sys 1)  
                  ROEU RELAX tlm (Sys 1)

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/2JA/FIN 1) Page 1 of 1

L12U 1. cb SW PWR 1 – op  
(SSP1) PDIP 1 PWR 2/KuBAND RLY – op  
PDIP 1 PWR 1 – op

L12L 2. KEEL 1 ILL PWR (ICC) – OFF  
(SSP2) 2 ILL PWR (JLE) – OFF  
PPSU 1/2 HTR B – DSBL  
cb CB2 – op  
PDIP 2 PWR 2 – op  
  
PPSU 1/2 HTR A – DSBL  
cb CB4 – op  
PDIP 2 PWR 1 – op

L12 3. Ku BAND RATE – OFF  
(PDIP1)

R1 4. PL CAB – OFF  
AFT MNC – OFF

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## PAYLOAD REACTIVATION

(ASSY OPS/2JA/FIN 1) Page 1 of 1

- R1            1. PL CAB            – MNA  
                      AFT MNC – ON
- L12L        2. cb CB2            – cl  
(SSP2)            PDIP 2 PWR 2        – cl  
                      KEEL 1 ILL PWR (ICC) – ON  
                      2 ILL PWR (JLE) – ON  
                      PPSU 1/2 HTR B      – ENA
- cb CB4                – cl  
                      PPSU 1/2 HTR A      – ENA

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# PAYLOAD ENTRY SWITCH LIST/VERIFICATION

(ASSY OPS/2JA/FIN 1) Page 1 of 1 page

TIG-1:55

- |            |     |                             |                 |
|------------|-----|-----------------------------|-----------------|
| L12U       | 1.  | √cb SW PWR 1                | - op            |
| (SSP1)     |     | √cb PDIP 1 PWR 2/KuBAND RLY | - op            |
|            | 2.  | √ANDE2 PWR                  | - OFF           |
|            |     | √PRE-ARM/SAFE               | - SAFE (tb-bp)  |
|            |     | √ARM/SAFE                   | - SAFE (tb-bp)  |
|            |     | √DEPLOY/SAFE                | - SAFE          |
|            |     | √NEA GOOD tb                | - bp            |
|            | 3.  | √cb SW PWR 2                | - op            |
|            |     | √PDIP 1 PWR 1               | - op            |
|            | 4.  | √D/S ARM                    | - SAFE          |
|            |     | √PICO 2 HERE tb             | - bp            |
|            | 5.  | √OIU PWR                    | - OFF (tb-bp)   |
|            | 6.  | √TCS PWR                    | - OFF (tb-bp)   |
|            | 7.  | √D/S DEPLOY                 | - (ctr)         |
|            |     | √PRE-ARM                    | - SAFE          |
|            |     | √D/S NEA GOOD tb            | - bp            |
|            |     | √PICO 1 HERE tb             | - bp            |
| L12L       | 8.  | √KEEL 1 PWR (ICC)           | - OFF           |
| (SSP2)     |     | √ILL PWR (ICC)              | - OFF           |
|            |     | √KEEL 2 PWR (JLE)           | - OFF           |
|            |     | √ILL PWR (JLE)              | - OFF           |
|            | 9.  | √cb CB2                     | - op            |
|            |     | √PDIP 2 PWR 2               | - op            |
|            | 10. | √DRGNEYE PWR                | - OFF (tb-bp)   |
|            | 11. | √C/L CAM PWR                | - OFF           |
|            | 12. | √cb CB4                     | - op            |
|            | 13. | √PDIP 2 PWR 1               | - op            |
|            | 14. | √PPSU 1/2 HTR B             | - DSBL          |
|            |     | √ICC BATT HTRS              | - (ctr) (tb-bp) |
|            |     | √JLE SEDA-AP HTR #3         | - OFF (tb-bp)   |
|            |     | √MAXI HTR #4                | - OFF (tb-bp)   |
|            |     | √JLE HTR 1-2                | - (ctr) (tb-bp) |
|            |     | √3-4                        | - (ctr) (tb-bp) |
|            |     | √#1                         | - OFF (tb-bp)   |
|            |     | √ICS-EF HTR #2              | - OFF (tb-bp)   |
|            |     | √ICC PFRAM HTRS             | - (ctr) (tb-bp) |
|            |     | √PPSU 1/2 HTR A             | - DSBL          |
| L12        | 15. | √Ku BAND RATE               | - OFF           |
| (PDIP1)    |     | √DC POWER 1                 | - OFF           |
|            |     | √2                          | - OFF           |
| L11        | 16. | √DC POWER 1                 | - OFF           |
| (PDIP2)    |     | √2                          | - OFF           |
| MF28E/G17. |     | √cb POWER                   | - cl (lt on)    |
| (GLACIER)  |     | √BATTERY                    | - ON (lt on)    |
| MA16F      | 18. | √sw POWER                   | - ON            |
| (PCDF-PU)  |     | √POWER ON                   | lt - on         |

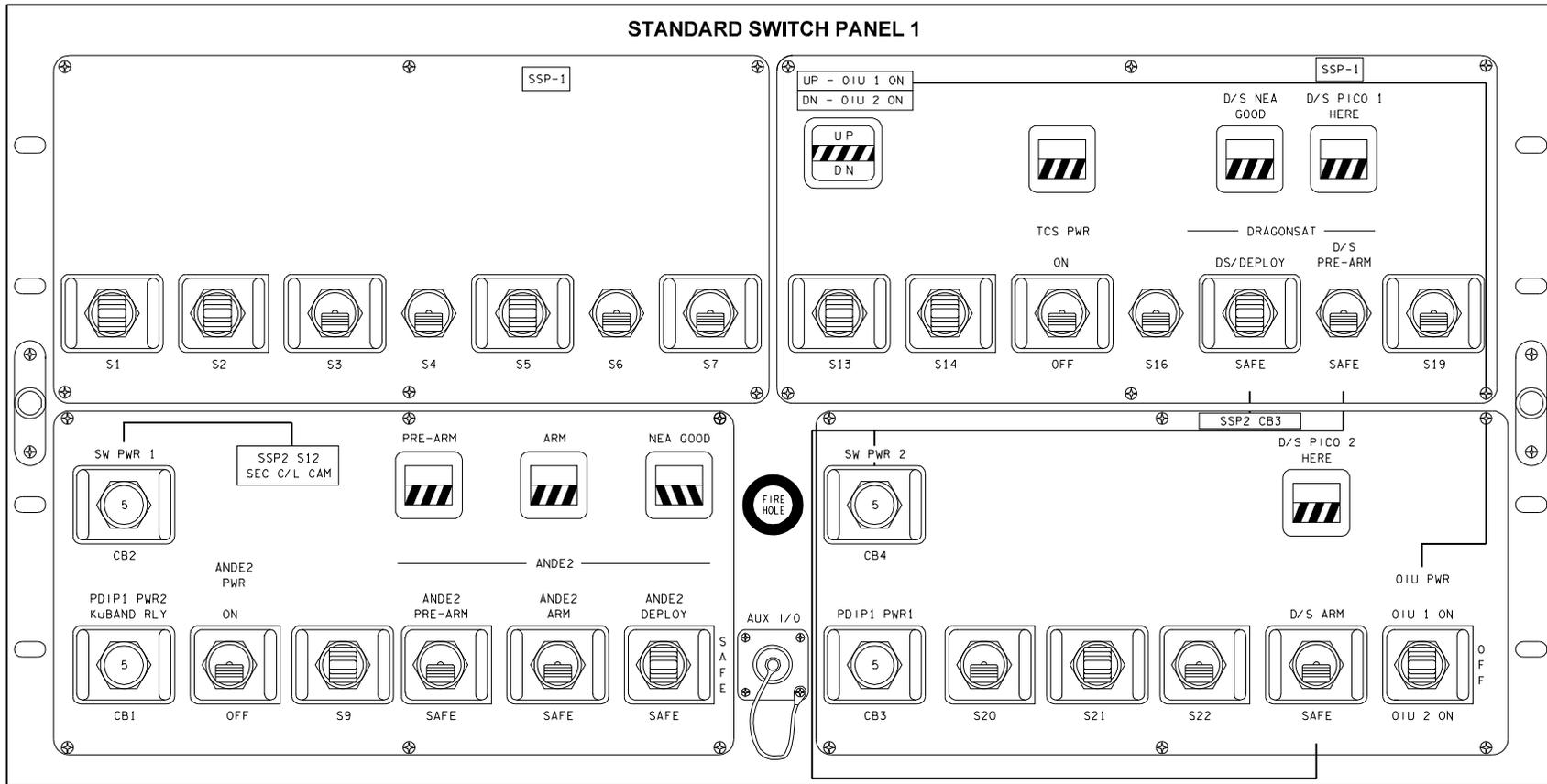
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**STANDARD SWITCH PANEL 1 LAYOUT**  
 (ASSY OPS/2JA/FIN) Page 1 of 4 pages

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## STANDARD SWITCH PANEL 1 LAYOUT

(ASSY OPS/2JA/FIN)

Page 2 of 4 pages

|                                          | Device Type                                                                                   | Function                                                                                                                                                                                                   |
|------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CB1<br><br>PDIP 1<br>PWR2/<br>KuBAND RLY | Circuit breaker,<br>5 amp                                                                     | closed (in) – Applies orbiter CAB PL2 power to the Keel Camera, PDIP DC PWR 2 switch outlet, and KuBAND RATE switch.<br><br>open (out) – Removes power from PDIP DC PWR 2 outlet and KuBAND RATE switch.   |
| CB 2<br><br>SW PWR 1                     | Circuit breaker,<br>5 amp                                                                     | closed (in) – Applies orbiter CAB PL1 power to SSP1 S3 and S4, and SSP2 S12.<br><br>open (out) – Removes power from SSP1 S3 and S4, and SSP2 S12.                                                          |
| S8<br><br>ANDE2 PWR                      | Two-position toggle switch:<br><br>Maintained –<br>Maintained                                 | ON (up) – Closes ANDE 2 PWR relay.<br><br>OFF (dn) – Opens ANDE 2 PWR relay.                                                                                                                               |
| S10<br><br>ANDE2<br>PRE-ARM/<br>SAFE     | Two-position toggle switch:<br><br>Maintained –<br>Maintained                                 | PRE-ARM (up) – Closes PRE-ARM relay in ANDE 2 deploy circuit (enables ground path for high current mode to allow NEA fuse wire ablation).<br><br>SAFE (dn) – Opens PRE-ARM relay in ANDE 2 deploy circuit. |
| DS10<br><br>PRE-ARM                      | Talkback,<br>two-position<br><br>gray<br>bp (barberpole)                                      | gray – Indicates PRE-ARM relay is closed.<br><br>bp (default) – Indicates PRE-ARM relay is open.                                                                                                           |
| S11<br><br>ANDE2 ARM/<br>SAFE            | Two-position toggle switch:<br><br>Maintained –<br>Maintained                                 | ARM (up) – Closes ARM relay in ANDE 2 deploy circuit (enables 2nd ground path for high current mode to allow NEA fuse wire ablation).<br><br>SAFE (down) – Opens ARM relay in ANDE 2 deploy circuit.       |
| DS11<br><br>ARM                          | Talkback,<br>two-position<br><br>gray<br>bp                                                   | gray – Indicates ARM relay is closed.<br><br>bp (default) – Indicates ARM relay is open.                                                                                                                   |
| S12<br><br>ANDE2<br>DEPLOY/<br>SAFE      | Three-position toggle switch:<br><br>Maintained (up)<br>Default (center)<br>Maintained (down) | DEPLOY (up) – Closes DEPLOY relay in ANDE 2 deploy circuit (enables high current mode to NEA).<br><br>SAFE (dn, ctr) – Opens DEPLOY relay in ANDE 2 deploy circuit.                                        |
| DS12<br><br>NEA GOOD                     | Talkback,<br>two-position<br><br>gray<br>bp                                                   | gray – Indicates bus power to NEA.<br><br>bp (default) – Indicates no power to NEA.                                                                                                                        |

## STANDARD SWITCH PANEL 1 LAYOUT

(ASSY OPS/2JA/FIN)

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|                                | Device Type                                                                         | Function                                                                                                                                                                                                                                                               |
|--------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DS13                           | Event indicator,<br>three-position                                                  | UP – Indicates that CAB PL3 power is being supplied to OIU 1.<br><br>bp – Indicates power is removed from OIU 1 and OIU 2.<br><br>DN – Indicates that AUX PLB power is being supplied to OIU 2.                                                                        |
| S15<br><br>TCS<br>PWR          | Toggle switch,<br>two-position<br><br>Maintained –<br>Maintained                    | ON (up) – Applies power to TCS.<br><br>OFF (dn) – Removes power from TCS.                                                                                                                                                                                              |
| DS15<br><br>TCS<br>PWR         | Event indicator,<br>Two-position                                                    | gray – Indicates TCS is powered.<br><br>bp – Indicates TCS is not powered.                                                                                                                                                                                             |
| S17<br><br>D/S Deploy          | Three-position<br>momentary switch:<br><br>Momentary –<br>Maintained –<br>Momentary | DEPLOY (up) – Closes deploy relay in DRAGONSAT deploy circuit (enables high current mode to NEA).<br><br>SAFE (dn, ctr) – Opens deploy relay in the DRAGONSAT deploy circuit.                                                                                          |
| DS17<br><br>D/S NEA<br>GOOD    | Talkback,<br>two-position:<br><br>gray<br>bp                                        | gray – Indicates D/S PREARM relay is closed and current is flowing to NEA device.<br><br>Barberpole – Indicates D/S PREARM is open.                                                                                                                                    |
| S18<br><br>D/S PREARM          | Two-position toggle<br>switch:<br><br>Maintained –<br>Maintained                    | PREARM (up) – Closes PREARM relay in DRAGONSAT deploy circuit. Supplies power to SSPL 5510 safing latch solenoid, rotating to ARM position.<br><br>SAFE (down) – Opens PREARM relay and removes power from SSPL 5510 safing latch solenoid, rotating to safe position. |
| DS18<br><br>D/S PICO 1<br>HERE | Talkback,<br>two-position:<br><br>gray<br>bp                                        | gray – Indicates PREARM relay is closed and Pico-sat 1 is present.<br><br>bp – Indicates PREARM relay is open.                                                                                                                                                         |
| CB4<br><br>SW PWR 2            | Circuit breaker,<br>5 amp                                                           | closed (in) – Applies orbiter CAB PL 3 to SSP1 switches S16-S20, S22, and S23. Only S18 and S23 are wired.<br><br>open (out) – Removes power from SSP1 switches S16-S20, S22, and S23.                                                                                 |

## STANDARD SWITCH PANEL 1 LAYOUT

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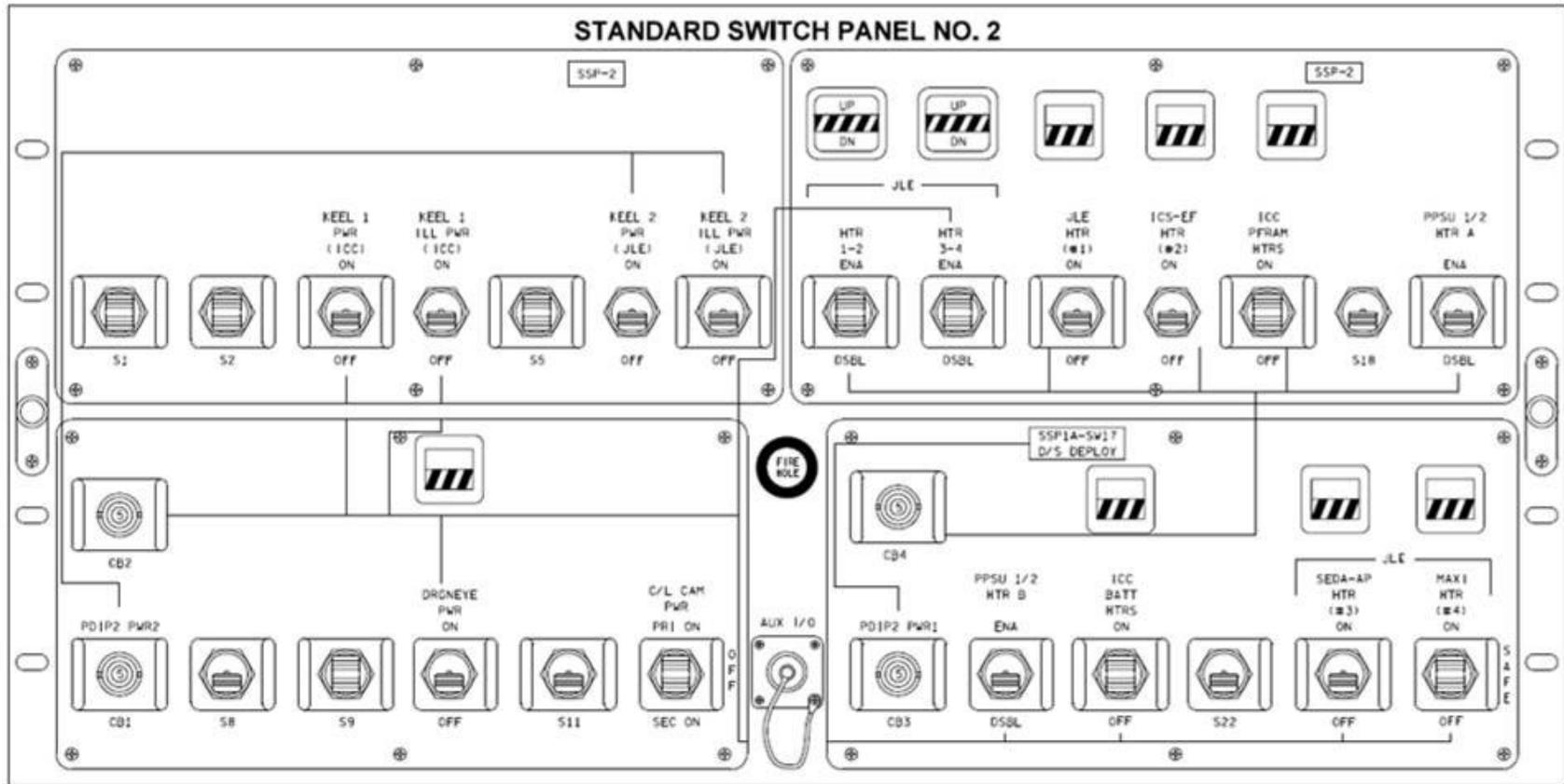
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|                            | Device Type                                                                        | Function                                                                                                                                                                                                      |
|----------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CB 3<br>PDIP1 PWR 1        | Circuit breaker,<br>5 amp                                                          | closed (in) – Applies orbiter CAB PL2 to PDIP DC PWR 1 outlet and redundant power to SSP1 S20 and S22.<br><br>open (out) – Removes power from PDIP DC PWR 1 outlet and redundant power from SSP1 S20 and S22. |
| S23<br>D/S ARM             | Two-position toggle switch:<br><br>Maintained –<br>Maintained                      | ARM (up) – Closes ground leg inhibit of SSPL 5510 firing circuit.<br><br>SAFE (dn) – Opens ground leg inhibit of the firing circuit.                                                                          |
| DS23<br>D/S PICO 2<br>HERE | Talkback,<br>two-position:<br>gray<br>bp                                           | Gray – Indicates PREARM relay is closed and Pico-sat 2 is present.<br><br>bp – Indicates PREARM relay is open.                                                                                                |
| S24<br><br>OIU PWR         | Toggle switch,<br>three-position<br><br>Maintained –<br>Maintained –<br>Maintained | OIU 1 ON (up) – Provides CAB PL3 power to OIU 1.<br><br>OFF (ctr) – Removes power from OIU 1 and OIU 2.<br><br>OIU 2 ON (dn) – Provides AUX PLB power to OIU 2.                                               |

# STANDARD SWITCH PANEL 2 LAYOUT

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## STANDARD SWITCH PANEL 2 LAYOUT

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|                               | Device Type                                                  | Function                                                                                                                                                                                                                                                            |
|-------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CB1<br>PDIP 2 PWR 2           | Circuit breaker,<br>5 amp                                    | closed (in) – Applies orbiter power to PDIP DC PWR 2.<br><br>open (out) – Removes orbiter power from PDIP DC PWR 2.                                                                                                                                                 |
| CB2                           | Circuit breaker,<br>5 amp:                                   | closed (in) – Applies orbiter power to SSP2 switches S10, S14, S20, S21, S23, S24 and talkbacks DS10, DS14, DS21, DS23, DS24.<br><br>open (out) – Removes orbiter power from SSP2 switches S10, S14, S20, S21, S23, S24 and talkbacks DS10, DS14, DS21, DS23, DS24. |
| S3<br>KEEL 1 PWR<br>(ICC)     | Two-position<br>toggle switch:<br>Maintained –<br>Maintained | up (ON) – Indicates power applied to Keel Camera 1.<br><br>down (default) (OFF) – Indicates power removed from Keel Camera 1.                                                                                                                                       |
| S4<br>KEEL 1 ILL<br>PWR (ICC) | Two-position<br>toggle switch:<br>Maintained –<br>Maintained | up (ON) – Indicates power applied to Keel Camera 1 illuminator.<br><br>down (default) (OFF) – Indicates power removed from Keel Camera 1 illuminator.                                                                                                               |
| S6<br>KEEL 2 PWR<br>(JLE)     | Two-position<br>toggle switch:<br>Maintained –<br>Maintained | up (ON) – Indicates power applied to Keel Camera 2.<br><br>down (default) (OFF) – Indicates power removed from Keel Camera 2.                                                                                                                                       |
| S7<br>KEEL 2 ILL<br>PWR (JLE) | Two-position<br>toggle switch:<br>Maintained –<br>Maintained | up (ON) – Indicates power applied to Keel Camera 2 illuminator.<br><br>down (default) (OFF) – Indicates power removed from Keel Camera 2 illuminator.                                                                                                               |
| S10<br>DRGNEYE<br>PWR         | Two-position<br>toggle switch:<br>Maintained –<br>Maintained | up (ON) – Indicates power applied to DRAGONEYE.<br><br>down (default) (OFF) – Indicates power removed from DRAGONEYE.                                                                                                                                               |
| DS10<br>DRGNEYE<br>PWR        | Talkback<br>two-position:<br>gray<br>bp                      | gray – Indicates DRAGONEYE is powered.<br><br>bp (default) – Indicates DRAGONEYE is unpowered.                                                                                                                                                                      |

## STANDARD SWITCH PANEL 2 LAYOUT

(ASSY OPS/2JA/FIN 1)

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|                            | Device Type                                                                 | Function                                                                                                                                                                                                                      |
|----------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S12<br>C/L CAM PWR         | Three-position toggle switch:<br>Maintained –<br>Maintained –<br>Maintained | PRI ON – Applies CAB PL3 power to PRI C/L CAM.<br>center – Removes power from PRI/SEC C/L CAM<br>SEC ON – Applies CAB PL1 power to SEC C/L CAM.                                                                               |
| S13<br>JLE HTR 1-2<br>ENA  | Three-position toggle switch:<br>Momentary –<br>Maintained –<br>Momentary   | ENA (up) – Enables power from PL PRI MN C to PPSU 1 relays for JLE heaters 1 and 2.<br>center – default switch position<br>DSBL (dn) – Removes power from PPSU 1 relays for JLE heaters 1 and 2.                              |
| DS13<br>JLE HTR 1-2<br>ENA | Talkback three-position:<br>UP<br>bp<br>DN                                  | UP – Indicates PPSU 1 K8 (Sys A) relay is closed and power applied to downstream heater relays.<br>bp (default) – Indicates PPSU 1 K8 (Sys A) relay is open and power removed from downstream power relays.<br>DN – not wired |
| S14<br>JLE HTR 3-4<br>ENA  | Three-position toggle switch:<br>Momentary –<br>Maintained –<br>Momentary   | ENA (up) – Enables power from PL PRI MN C to PPSU 1 relays for JLE heaters 3 and 4.<br>center – default switch position<br>DSBL (dn) – Removes power from PPSU 1 relays for JLE heaters 3 and 4.                              |
| DS14<br>JLE HTR 3-4<br>ENA | Talkback three-position:<br>UP<br>bp<br>DN                                  | UP – Indicates PPSU 1 K7 (Sys B) relay is closed and power applied to downstream heater relays.<br>bp (default) – Indicates PPSU 1 K7 (Sys B) relay is open and power removed from downstream power relays.<br>DN – not wired |
| S15<br>JLE HTR (#1)        | Two-position toggle switch:<br>Maintained –<br>Maintained                   | ON (up) – Once heater power enabled, applies PL PRI MN C power to JLE heater 1 (for JLE).<br>OFF (dn) – Default position. Removes power to JLE heater 1 (for JLE).                                                            |
| DS15<br>JLE HTR (#1)       | Talkback two-position:<br>gray<br>bp                                        | gray – Indicates PPSU 1 K1 relay is closed and power applied to JLE heater 1 (for JLE).<br>bp (default) – Indicates PPSU 1 K1 relay is open and power removed from JLE heater 1 (for JLE).                                    |

## STANDARD SWITCH PANEL 2 LAYOUT

(ASSY OPS/2JA/FIN 1)

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|                                | Device Type                                                                      | Function                                                                                                                                                                                                                                                  |
|--------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S16<br><br>ICS-EF HTR<br>(#2)  | Two-position<br>toggle switch:<br><br>Maintained –<br>Maintained                 | ON (up) – Once heater power enabled, applies PL PRI<br>MN C power to JLE heater 2 (for ICS-EF).<br><br>OFF (dn) – Default position. Removes power to JLE<br>heater 2 (for ICS-EF).                                                                        |
| DS16<br><br>ICS-EF HTR<br>(#2) | Talkback<br>two-position:<br><br>gray<br>bp                                      | gray – Indicates PPSU 1 K2 relay is closed and power<br>applied to JLE heater 2 (for ICS-EF).<br><br>bp (default) – Indicates PPSU 1 K2 relay is open and<br>power removed from JLE heater 2 (for ICS-EF).                                                |
| S17<br><br>ICC PFRAM<br>HTRS   | Three-position<br>toggle switch:<br><br>Momentary –<br>Maintained –<br>Momentary | ON (up) – Applies PL PRI MN C power to ICC-VLD<br>PFRAM heaters.<br><br>center (default) – default position<br><br>OFF (dn) – Removes power from ICC-VLD PFRAM<br>heaters.                                                                                |
| DS17<br><br>ICC PFRAM<br>HTRS  | Talkback<br>two-position:<br><br>gray<br>bp                                      | gray – Indicates PPSU 2 K8 (Sys A) relay is closed<br>and power applied to PFRAM heaters.<br><br>bp (default) – Indicates PPSU 2 K8 (Sys A) relay is<br>open and power removed from PFRAM heaters.                                                        |
| S19<br><br>PPSU 1/2<br>HTR A   | Two-position<br>toggle switch:<br><br>Maintained –<br>Maintained                 | ENA (up) – Applies CAB PL 3 power to PPSU 1 and 2<br>A heaters<br><br>DSBL (dn) – Default position. Removes power from<br>PPSU 1 and 2 A heaters.                                                                                                         |
| CB3<br><br>PDIP 2 PWR 1        | Circuit breaker,<br>5 amp:                                                       | closed (in) – Applies orbiter power to PDIP DC PWR 1<br>and powers the DRAGONSAT Deploy switch S17 on<br>panel SSP 1.<br><br>open (out) – Removes orbiter power from PDIP DC<br>PWR 1 and removes power to DRAGONSAT Deploy<br>switch S17 on panel SSP 1. |
| CB4                            | Circuit breaker,<br>5 amp:                                                       | closed (in) – Applies orbiter power to SSP2 switches<br>S13, S15 to S17, S19 and talkbacks DS13, DS15 to<br>DS17.<br><br>open (out) – Removes orbiter power from SSP2<br>switches S13, S15 to S17, S19 and talkbacks DS13,<br>DS15 to DS17.               |
| S20<br><br>PPSU 1/2<br>HTR B   | Two-position<br>toggle switch:<br><br>Maintained –<br>Maintained                 | ENA (up) – Applies CAB PL 1 power to PPSU 1 and 2<br>B heaters.<br><br>DSBL (dn) – Default position. Removes power from<br>PPSU 1 and 2 B heaters.                                                                                                        |

## STANDARD SWITCH PANEL 2 LAYOUT

(ASSY OPS/2JA/FIN 1)

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|                                     | Device Type                                                                        | Function                                                                                                                                                                                                                            |
|-------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S21<br><br>ICC BATT<br>HTRS         | Three-position<br>toggle switch:<br><br>Momentary –<br>Maintained –<br>Momentary   | ON (up) – Applies PL PRI MN C power to ICC-VLD P6<br>Battery heaters.<br><br>center (default) – default position<br><br>OFF (dn) – Removes power from ICC-VLD P6 Battery<br>heaters.                                                |
| DS21<br><br>ICC BATT<br>HTRS        | Talkback<br>two-position:<br><br>gray<br>bp                                        | gray – Indicates PPSU 2 K7 (Sys B) relay is closed<br>and power applied to P6 Battery heaters.<br><br>bp (default) – Indicates PPSU 2 K7 (Sys B) relay is<br>open and power removed from P6 Battery heaters.                        |
| S23<br><br>JLE SEDA-AP<br>HTR (#3)  | Two-position<br>toggle switch:<br><br>Maintained –<br>Maintained                   | ON (up) – Once heater power enabled, applies PL PRI<br>MN C power to JLE heater 3 (for SEDA-AP).<br><br>OFF (dn) – Default position. Removes power to JLE<br>heater 3 (for SEDA-AP).                                                |
| DS23<br><br>JLE SEDA-AP<br>HTR (#3) | Talkback<br>two-position:<br><br>gray<br>bp                                        | gray – Indicates PPSU 1 K4 relay is closed and power<br>applied to JLE heater 3 (for SEDA-AP).<br><br>bp (default) – Indicates PPSU 1 K4 relay is open and<br>power removed from JLE heater 3 (for SEDA-AP).                        |
| S24<br><br>JLE MAXI HTR<br>(#4)     | Three-position<br>toggle switch:<br><br>Maintained –<br>Maintained –<br>Maintained | ON (up) – Once heater power enabled, applies PL PRI<br>MN C power to JLE heater 4 (for MAXI).<br><br>center (default) – Removes power to JLE heater 4<br>(for MAXI).<br><br>OFF (dn) – Removes power to JLE heater 4<br>(for MAXI). |
| DS24<br><br>JLE MAXI HTR<br>(#4)    | Talkback<br>two-position:<br><br>gray<br>bp                                        | gray – Indicates power applied to JLE heater 4 (for<br>MAXI).<br><br>bp (default) – Indicates power removed from JLE<br>heater 4 (for MAXI).                                                                                        |

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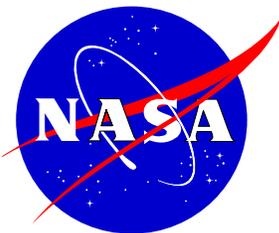
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# INTERNATIONAL SPACE STATION

## ASSEMBLY OPERATIONS

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STS-127







# INTERNATIONAL SPACE STATION

## ASSEMBLY OPERATIONS

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