International Space Station
Maintenance & Repair Group (MRG)
In-Flight Maintenance Book
Expedition 1 Flights

Mission Operations Directorate
Systems Division

December 21, 2000

These procedures are available electronically on the SODF Homepage at http://fitproc.jsc.nasa.gov

National Aeronautics and Space Administration
Lyndon B. Johnson Space Center
Houston, Texas

United Space Alliance

NASA

USA
INTERNATIONAL SPACE STATION
MAINTENANCE & REPAIR GROUP (MRG)
IN-FLIGHT MAINTENANCE BOOK
EXPEDITION 1 FLIGHTS

December 21 2000

APPROVED BY:

___________________________________________
Ryan Kagey
Book Manager

___________________________________________
Linda P. Patterson
Lead, DF53/Mechanisms & Maintenance Group

___________________________________________
Jeffery L. Wilson
SODF Coordinator

ACCEPTED BY:

___________________________________________
Michael T. Hurt
SODF Manager

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### INTERNATIONAL SPACE STATION
### MAINTENANCE & REPAIR GROUP (MRG)
### IN-FLIGHT MAINTENANCE BOOK
### EXPEDITION 1 FLIGHTS
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OBJECTIVE:
Power Tool battery charging with PEEK H/W in Functional Cargo Block (FGB)

LOCATION:
Installed: FGB (Power Panels)
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
15 minutes

PARTS:
N/A

MATERIALS:
N/A

TOOLS REQUIRED:
SMPA/Battery Charger Kit (P/N SJG 33111349)
SMPA/Battery Charger (P/N SEG 33110643 - 303)
Battery Charger Cup (P/N SEG 39134723 - 301)
28V Y Cable (P/N SEZ 39134173-303) (PEEK Cable)
PEEK Russian Source Adapter Cable (SJG33112597 - 301)

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. √Power Panel switch OFF position
Figure 1.- Typical View of Battery Charging Setup.

Figure 2.- Top View of SMPA/Battery Charger.
1.1.401 POWER TOOL BATTERY CHARGING WITH PEEK H/W IN FUNCTIONAL CARGO BLOCK (FGB)

ACCESSING

2. Obtain SMPA/Battery Charger, Battery Charger Cup.

3. Obtain PEEK Russian Source Adapter Cable, 28V Y Cable. Refer to Figure 3.

Figure 3.- Russian Source Adapter Kit for Russian 20A Connector to Shuttle 20A Connector.
### Table 1. SMPA/Battery Charger Annunciations

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<tr>
<td>Charging (Yellow) Power</td>
<td>![LEDs Diagram]</td>
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<tr>
<td>Ready (Green)</td>
<td>![LEDs Diagram]</td>
</tr>
<tr>
<td>Temp. Fault (Red)</td>
<td>![LEDs Diagram]</td>
</tr>
<tr>
<td><strong>NOTE</strong></td>
<td>When power is applied to the charger without a battery connected, the LEDs on the charger are as shown above. If the battery is connected, the battery might be failed open.</td>
</tr>
</tbody>
</table>

| **2. Battery Polling Condition** | ![LEDs Diagram] |
| No Battery (Blue) | ![LEDs Diagram] |
| Charging (Yellow) Power | ![LEDs Diagram] |
| Ready (Green) | ![LEDs Diagram] |
| Temp. Fault (Red) | ![LEDs Diagram] |
| **NOTE** | When a battery pack is first connected there will be a 2 to 3 minute period required for the temperature measuring circuitry to detect the battery pack temperature. If the above LEDs stay on longer than 5 minutes, remove the battery from the charger and reinstall to reset the charger. |

| **3. Charging Condition** | ![LEDs Diagram] |
| No Battery (Blue) | ![LEDs Diagram] |
| Charging (Yellow) Power | ![LEDs Diagram] |
| Ready (Green) | ![LEDs Diagram] |
| Temp. Fault (Red) | ![LEDs Diagram] |
| **NOTE** | The LEDs will be illuminated as above if nominal charging condition parameters are acceptable. If there is a battery Temp. Fault (over temp) in the battery while charging, the Temp. Fault LED will be illuminated. |

| **4. Ready Condition** | ![LEDs Diagram] |
| No Battery (Blue) | ![LEDs Diagram] |
| Charging (Yellow) Power | ![LEDs Diagram] |
| Ready (Green) | ![LEDs Diagram] |
| Temp. Fault (Red) | ![LEDs Diagram] |
| **NOTE** | The battery is fully charged when the LEDs are illuminated as indicated. The charger enters a trickle (slow) charge mode. The battery can remain in this mode if desired. |
**INSTALLATION**

FGB Assembly Connection with Peek Cables

4. Battery Charger Cup Cable → | ← 12V Battery input on SMPA/Battery Charger  
   Refer to Figure 1.

5. SMPA/Battery Charger 28V Shuttle Connector → | ← 10A Shuttle Connector on 28V Y Cable

6. 20A Shuttle Connector on 28V Y Cable → | ← Shuttle 20A Connector on Russian Source Adapter

7. Russian Source Adapter → | ← Power Panel 10A or 20A

8. Attach Ground Terminal Plugs to secondary structure.

9. Power Panel switch to ON position.  
   Verify annunciation lights on SMPA/Battery Charger.  
   Refer to Table 1.

   **NOTE**  
   One hour required to fully charge battery.

10. Approximately after an hour, verify annunciation light on SMPA/Battery Charger, green (READY).  
    Refer to Table 1.

**CLOSEOUT**

11. Power Panel power switch position to Off.

12. Russian Source Adapter ← | → Power Panel 10A (#1)

13. Shuttle 20A Connector on Russian Source Adapter ← | → 10A Shuttle Connector on 28V Y Cable

14. SMPA/Battery Charger 28V Shuttle Connector ← | → 10A Shuttle Connector on 28V Y Cable

**POST MAINTENANCE**

15. Inform **MCC-H** of task completion.

16. √MATS for stowage locations for tools, equipment
OBJECTIVE:
Power Tool battery charging with PEEK H/W in Service Module (SM)

LOCATION:
Installed: SM (Power Panels)
Stowed: Maintenance and Assembly Task Supplement (MATS)

DURATION:
15 minutes

PARTS:
N/A

MATERIALS:
N/A

TOOLS REQUIRED:
SMPA/Battery Charger Kit (P/N SJG 33111349)
SMPA/Battery Charger (P/N SEG 33110643 - 303)
Battery Charger Cup (P/N SEG 39134723 - 301)
28V Y Cable (Peek Cable) (P/N SEZ 39134173-303)
PEEK Russian Source Adapter Cable (SJG33112597 - 301)

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. Power Panel switch OFF position
Figure 1.- Typical View of Battery Charging Setup.

Figure 2.- Top View of SMPA/Battery Charger.
Figure 3.- Russian Source Adapter Kit for Russian 20A Connector to Shuttle 20A Connector.

ACCESSING

2. Obtain SMPA/Battery Charger, Battery Charger Cup.

3. Obtain PEEK Russian Source Adapter Cable, 28V Y Cable. Refer to Figure 3.
1.1.402 POWER TOOL BATTERY CHARGING WITH PEEK H/W IN SERVICE MODULE (SM)  
(ISS IFM/5A - ALL/FN)  
Page 4 of 5 pages

Table 1. SMPA/Battery Charger Annunciations

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• No Battery (Blue)</td>
<td>• No Battery (Blue)</td>
<td>• No Battery (Blue)</td>
<td>• No Battery (Blue)</td>
</tr>
<tr>
<td>• Charging (Yellow)</td>
<td>• Charging (Yellow)</td>
<td>• Charging (Yellow)</td>
<td>• Charging (Yellow)</td>
</tr>
<tr>
<td>Power</td>
<td>Power</td>
<td>Power</td>
<td>Power</td>
</tr>
<tr>
<td>• Ready (Green)</td>
<td>• Ready (Green)</td>
<td>• Ready (Green)</td>
<td>• Ready (Green)</td>
</tr>
<tr>
<td>(Green)</td>
<td>(Green)</td>
<td>(Green)</td>
<td>(Green)</td>
</tr>
<tr>
<td>• Temp. Fault (Red)</td>
<td>• Temp. Fault (Red)</td>
<td>• Temp. Fault (Red)</td>
<td>• Temp. Fault (Red)</td>
</tr>
</tbody>
</table>

**NOTE**  
When power is applied to the charger without a battery connected, the LEDs on the charger are as shown above. If the battery is connected, the battery might be failed open.

**NOTE**  
The LEDs will be illuminated as above if nominal charging condition parameters are acceptable. If there is a battery Temp. Fault (over temp) in the battery while charging, the Temp. Fault LED will be illuminated.

**NOTE**  
When a battery pack is first connected there will be a 2 to 3 minute period required for the temperature measuring circuitry to detect the battery pack temperature. If the above LEDs stay on longer than 5 minutes, remove the battery from the charger and reinstall to reset the charger.

**NOTE**  
The battery is fully charged when the LEDs are illuminated as indicated. The charger enters a trickle (slow) charge mode. The battery can remain in this mode if desired.
INSTALLATION

SM Assembly Connection with PEEK Cables

4. Battery Charger Cup Cable →|← 12V Battery input on SMPA/Battery Charger
   Refer to Figure 1.

5. SMPA/Battery Charger 28V Shuttle Connector →|← 10A Shuttle Connector on 28V Y Cable

6. 20A Shuttle Connector on 28V Y Cable →|← Shuttle 20A Connector on Russian Source Adapter

7. Russian Source Adapter →|← Power Panel 10A or 20A

8. Attach Ground Terminal Plugs to secondary structure (SM has lug on panels for ground).

9. Power Panel switch to ON position.
   Verify annunciation lights on SMPA/Battery Charger.
   Refer to Table 1.

   **NOTE**
   One hour required to fully charge battery.

10. Verify green annunciation light, charging complete on SMPA/Battery Charger.
    Refer to Table 1.

CLOSEOUT

11. Power Panel power switch position to Off.

12. Russian Source Adapter ←|→ Power Panel 10A (#1)

13. Shuttle 20A Connector on Russian Source Adapter ←|→ 10A Shuttle Connector on 28V Y Cable

14. SMPA/Battery Charger 28V Shuttle Connector ←|→ 10A Shuttle Connector on 28V Y Cable

POST MAINTENANCE

15. Inform **MCC-H** of task completion.

16. √MATS for stowage locations for tools, equipment
OBJECTIVE:
Power Tool battery charging with PEEK H/W in Node 1

LOCATION:
Installed: RF Power Distribution Box (RFPDB) NOD1S4
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
15 minutes

PARTS:
N/A

MATERIALS:
N/A

TOOLS REQUIRED:
SMPA/Battery Charger Kit  (P/N SJG 33111349)
SMPA/Battery Charger  (P/N SEG 33110643 - 303)
Battery Charger Cup  (P/N SEG 39134723 - 301)
28VDC Power Ext Cable 10’  (P/N SEG33112266-301) (PEEK Cable)

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. Remove power from RFPDB J8.

PC S

NODE 1: EPS

sel RPCM_N1RS2_A

RPCM_N1RS2_A

sel RPC 11

cmd RPC position – Open (Verify – Op)

2. Toggle PGSC/RF switch to Off position.
1.1.403 POWER TOOL BATTERY CHARGING WITH PEEK H/W IN NODE 1

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Figure 1.- Typical View of Battery Charging Setup.

Figure 2.- Top View of SMPA/Battery Charger.
1.1.403 POWER TOOL BATTERY CHARGING WITH PEEK H/W IN NODE 1

ACCESSING

NOD1D4 3. Obtain SMPA/Battery Charger, Battery Charger Cup.
 _G2 Refer to Figure 1.

4. Obtain PEEK 28VDC Power Ext Cable 10’.

INSTALLATION

5. Battery Charger Cup Cable →|← 12V Battery input on SMPA/Battery Charger
 Refer to Figure 1.

6. SMPA/Battery Charger 28V Shuttle Connector →|← 28VDC Power Ext Cable 10’

NOTE
One hour required to fully charge battery.

7. 28VDC Power Ext Cable 10’ →|← J8 on RFPDB
 Refer to Figures 3 and 4.

Figure 3.- Typical View of Early Comm Assembly.
8. Restore power to RFPDB J8.

   Node 1: EPS
   NODE 1: EPS

   sel RPCM_N1RS2_A

   RPCM_N1RS2_A

   sel RPC 11
   cmd RPC position – Close (Verify – Cl)

9. RFPDB, toggle PGSC/RF switch to On position.
<table>
<thead>
<tr>
<th>1. No Battery Condition</th>
<th>3. Charging Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>• No Battery (Blue)</td>
<td>• No Battery (Blue)</td>
</tr>
<tr>
<td>◦ Charging (Yellow)</td>
<td>◦ Charging (Yellow)</td>
</tr>
<tr>
<td>Power</td>
<td>Power</td>
</tr>
<tr>
<td>◦ Ready (Green) (Green)</td>
<td>◦ Ready (Green) (Green)</td>
</tr>
<tr>
<td>• Temp. Fault (Red)</td>
<td>◦ Temp. Fault (Red)</td>
</tr>
</tbody>
</table>

**NOTE**
When power is applied to the charger without a battery connected, the LEDs on the charger are as shown above. If the battery is connected, the battery might be failed open.

<table>
<thead>
<tr>
<th>2. Battery Polling Condition</th>
<th>4. Ready Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>◦ No Battery (Blue)</td>
<td>◦ No Battery (Blue)</td>
</tr>
<tr>
<td>◦ Charging (Yellow)</td>
<td>◦ Charging (Yellow)</td>
</tr>
<tr>
<td>Power</td>
<td>Power</td>
</tr>
<tr>
<td>◦ Ready (Green) (Green)</td>
<td>◦ Ready (Green) (Green)</td>
</tr>
<tr>
<td>• Temp. Fault (Red)</td>
<td>◦ Temp. Fault (Red)</td>
</tr>
</tbody>
</table>

**NOTE**
When a battery pack is first connected there will be a 2 to 3 minute period required for the temperature measuring circuitry to detect the battery pack temperature. If the above LEDs stay on longer than 5 minutes, remove the battery from the charger and reinstall to reset the charger.

<table>
<thead>
<tr>
<th>2. Battery Polling Condition</th>
<th>4. Ready Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>◦ No Battery (Blue)</td>
<td>◦ No Battery (Blue)</td>
</tr>
<tr>
<td>◦ Charging (Yellow)</td>
<td>◦ Charging (Yellow)</td>
</tr>
<tr>
<td>Power</td>
<td>Power</td>
</tr>
<tr>
<td>◦ Ready (Green) (Green)</td>
<td>◦ Ready (Green) (Green)</td>
</tr>
<tr>
<td>• Temp. Fault (Red)</td>
<td>◦ Temp. Fault (Red)</td>
</tr>
</tbody>
</table>

**NOTE**
The battery is fully charged when the LEDs are illuminated as indicated. The charger enters a trickle (slow) charge mode. The battery can remain in this mode if desired.
10. Verify yellow annunciation light (Charging), on SMPA/Battery Charger. Refer to Table 1.

**NOTE**
One hour required to fully charge battery.

**CLOSEOUT**

11. Remove power from RFPDB.

**POST MAINTENANCE**

15. Inform **MCC-H** of task completion.

16. √MATS for stowage locations for tools, equipment
OBJECTIVE:  
Scopemeter battery charging with PEEK H/W in Functional Cargo Block (FGB)

LOCATION:  
Installed: FGB (Power Panels)  
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:  
15 minutes

PARTS:  
N/A

MATERIALS:  
N/A

TOOLS REQUIRED:  
SMPA/Battery Charger Kit (P/N SJG 3311349)  
SMPA/Battery Charger (P/N SEG 33110643 - 303)  
SMPA Adapter Cable (P/N SEG 33113009 - 301)  
28V Y Cable (P/N SEZ 39134173-303) (PEEK Cable)  
PEEK Russian Source Adapter Cable (SJG33112597 - 301)

SAFING

WARNING  
Failure to remove power can result in electrical shock hazard.

1. √Power Panel switch OFF position
1.1.404 SCOPEMETER BATTERY CHARGING WITH PEEK H/W IN FUNCTIONAL CARGO BLOCK (FGB)

Figure 1.- Typical View of SMPA/Battery Charger.

Figure 2.- Top View of SMPA/Battery Charger.
ACCESSING

2. Obtain SMPA/Battery Charger, SMPA Adapter Cable.

3. Obtain PEEK Russian Source Adapter Cable, 28V Y Cable. Refer to Figure 3.
<table>
<thead>
<tr>
<th><strong>Table 1. SMPA/Battery Charger Annunciations</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. No Battery Condition</strong></td>
</tr>
<tr>
<td>- No Battery (Blue)</td>
</tr>
<tr>
<td>- Charging Power (Yellow)</td>
</tr>
<tr>
<td>- Ready (Green)</td>
</tr>
<tr>
<td>- Temp. Fault (Red)</td>
</tr>
<tr>
<td><strong>NOTE</strong></td>
</tr>
<tr>
<td>When power is applied to the charger without a battery connected, the LEDs on the charger are as shown above. If the battery is connected, the battery might be failed open.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>2. Battery Polling Condition</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- No Battery (Blue)</td>
</tr>
<tr>
<td>- Charging Power (Yellow)</td>
</tr>
<tr>
<td>- Ready (Green)</td>
</tr>
<tr>
<td>- Temp. Fault (Red)</td>
</tr>
<tr>
<td><strong>NOTE</strong></td>
</tr>
<tr>
<td>When a battery pack is first connected there will be a 2 to 3 minute period required for the temperature measuring circuitry to detect the battery pack temperature. If the above LEDs stay on longer than 5 minutes, remove the battery from the charger and reinstall to reset the charger.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>3. Charging Condition</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- No Battery (Blue)</td>
</tr>
<tr>
<td>- Charging Power (Yellow)</td>
</tr>
<tr>
<td>- Ready (Green)</td>
</tr>
<tr>
<td>- Temp. Fault (Red)</td>
</tr>
<tr>
<td><strong>NOTE</strong></td>
</tr>
<tr>
<td>The LEDs will be illuminated as above if nominal charging condition parameters are acceptable. If there is a battery Temp. Fault (over temp) in the battery while charging, the Temp. Fault LED will be illuminated.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>4. Ready Condition</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- No Battery (Blue)</td>
</tr>
<tr>
<td>- Charging Power (Yellow)</td>
</tr>
<tr>
<td>- Ready (Green)</td>
</tr>
<tr>
<td>- Temp. Fault (Red)</td>
</tr>
<tr>
<td><strong>NOTE</strong></td>
</tr>
<tr>
<td>The battery is fully charged when the LEDs are illuminated as indicated. The charger enters a trickle (slow) charge mode. The battery can remain in this mode if desired.</td>
</tr>
</tbody>
</table>
INSTALLATION

4. SMPA Adapter Cable $\rightarrow|$ Scopemeter Cable on SMPA/Battery Charger

5. SMPA/Battery Charger 28V Shuttle Connector $\rightarrow|$ 10A Shuttle Connector on 28V Y Cable

6. 20A Shuttle Connector on 28V Y Cable $\rightarrow|$ Shuttle 20A Connector on Russian Source Adapter

7. Russian Source Adapter $\rightarrow|$ Power Panel 10A or 20A

8. Attach Ground Terminal Plugs to secondary structure.

9. Power Panel switch to ON position.
   Verify yellow annunciation light for charging mode on SMPA/Battery Charger.
   Refer to Table 1.

   NOTE
   Twenty-one hours required to fully charge battery.

10. After 21 hours charging, verify green annunciation light, charging complete.
    Refer to Table 1.

CLOSEOUT

11. Power Panel power switch position to Off.

12. Russian Source Adapter $\leftarrow|\rightarrow$ Power Panel 10A (#1)

13. Shuttle 20A Connector on Russian Source Adapter $\leftarrow|\rightarrow$ 10A Shuttle Connector on 28V Y Cable

14. SMPA/Battery Charger 28V Shuttle Connector $\leftarrow|\rightarrow$ 10A Shuttle Connector on 28V Y Cable

POST MAINTENANCE

15. Inform MCC-H of task completion.

16. MATS for stowage locations for tools, equipment
START_IMS

OBJECTIVE:
Scopemeter battery charging with PEEK H/W in Service Module (SM)

LOCATION:
Installed: SM (Power Panels)
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
15 minutes

PARTS:
N/A

MATERIALS:
N/A

TOOLS REQUIRED:
SMPA/Battery Charger Kit (P/N SJG 33111349)
SMPA/Battery Charger (P/N SEG 33110643 - 303)
SMPA Adapter Cable (P/N SEG 33113009 - 301)
28V Y Cable (P/N SEZ 39134173-303) (PEEK Cable)
PEEK Russian Source Adapter Cable (SJG33112597 - 301)

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. √Power Panel switch OFF position
Figure 1.- Typical View of SMPA/Battery Charger.

Figure 2.- Top View of SMPA/Battery Charger.
1.1.405 SCOPEMETER BATTERY CHARGING WITH PEEK H/W IN SERVICE MODULE (SM)

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Figure 3.- Russian Source Adapter Kit for Russian 20A Connector to Shuttle 20A Connector.

ACCESSING

NOD1D4 _G2

2. Obtain SMPA/Battery Charger, SMPA Adapter Cup.

3. Obtain PEEK Russian Source Adapter Cable, 28V Y Cable. Refer to Figure 3.
Table 1. SMPA/Battery Charger Annunciations

<table>
<thead>
<tr>
<th>Condition</th>
<th>Blue</th>
<th>Yellow</th>
<th>Green</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No Battery Condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No Battery</td>
<td>Blue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Charging</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ready</td>
<td>Green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Green)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Temp. Fault</td>
<td>Red</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**
When power is applied to the charger without a battery connected, the LEDs on the charger are as shown above. If the battery is connected, the battery might be failed open.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Blue</th>
<th>Yellow</th>
<th>Green</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Charging Condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No Battery</td>
<td>Blue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Charging</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ready</td>
<td>Green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Green)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Temp. Fault</td>
<td>Red</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**
The LEDs will be illuminated as above if nominal charging condition parameters are acceptable. If there is a battery Temp. Fault (over temp) in the battery while charging, the Temp. Fault LED will be illuminated.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Blue</th>
<th>Yellow</th>
<th>Green</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Battery Polling Condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No Battery</td>
<td>Blue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Charging</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ready</td>
<td>Green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Green)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Temp. Fault</td>
<td>Red</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**
When a battery pack is first connected there will be a 2 to 3 minute period required for the temperature measuring circuitry to detect the battery pack temperature. If the above LEDs stay on longer than 5 minutes, remove the battery from the charger and reinstall to reset the charger.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Blue</th>
<th>Yellow</th>
<th>Green</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Ready Condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No Battery</td>
<td>Blue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Charging</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ready</td>
<td>Green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Green)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Temp. Fault</td>
<td>Red</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**
The battery is fully charged when the LEDs are illuminated as indicated. The charger enters a trickle (slow) charge mode. The battery can remain in this mode if desired.
1.1.405 SCOPEMETER BATTERY CHARGING WITH PEEK H/W IN SERVICE MODULE (SM)
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INSTALLATION
4. SMPA Adapter Cable \(\rightarrow\) Scopemeter Cable on SMPA/Battery Charger

5. SMPA/Battery Charger 28V Shuttle Connector \(\rightarrow\) 10A Shuttle Connector on 28V Y Cable

6. 20A Shuttle Connector on 28V Y Cable \(\rightarrow\) Shuttle 20A Connector on Russian Source Adapter

7. Russian Source Adapter \(\rightarrow\) Power Panel 10A or 20A

8. Attach Ground Terminal Plugs to secondary structure (SM has lug on panels for ground).

9. Power Panel switch to ON position.
   Verify yellow annunciation light for charging mode on SMPA/Battery Charger.
   Refer to Table 1.

   **NOTE**
   Twenty-one hours required to fully charge battery.

10. After twenty-one hours charging, verify green annunciation light, charging complete.
    Refer to Table 1.

CLOSEOUT
11. Power Panel power switch position to Off.

12. Russian Source Adapter \(\leftarrow\) Power Panel 10A (#1)

13. Shuttle 20A Connector on Russian Source Adapter \(\leftarrow\) 10A Shuttle Connector on 28V Y Cable

14. SMPA/Battery Charger 28V Shuttle Connector \(\leftarrow\) 10A Shuttle Connector on 28V Y Cable

POST MAINTENANCE
15. Inform **MCC-H** of task completion.

16. √MATS for stowage locations for tools, equipment
OBJECTIVE:
Scopemeter battery charging with PEEK H/W in Node 1

LOCATION:
Installed: RF Power Distribution Box (RFPDB) NOD1S4
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
15 minutes

PARTS:
N/A

MATERIALS:
N/A

TOOLS REQUIRED:
SMPA/Battery Charger (P/N SEG 33110643 - 303)
Battery Charger Cup (P/N SEG 39134723 - 301)
28VDC Power Ext Cable 10’ (P/N SEG33112266-301)

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. Remove power from RFPDB J8.

   Node 1: EPS
   sel RPCM_N1RS2_A

   RPCM_N1RS2_A

   sel RPC 11
   cmd RPC Position – Open (Verify – Op)

2. Toggle PGSC/RF switch to Off position.
Figure 1.- Typical View of Battery Charging Setup.

Figure 2.- Top View of SMPA/Battery Charger.
1.1.406 SCOPEMETER BATTERY CHARGING WITH PEEK H/W IN NODE 1
(ISS IFM/5A - ALL/FIN) Page 3 of 6 pages

ACCESSING

3. Obtain SMPA/Battery Charger. Refer to Figure1.

4. Obtain PEEK 28VDC Power Ext Cable 10’.

INSTALLATION

5. SMPA Adapter Cable $\rightarrow$ Scopemeter Cable on SMPA/Battery Charger

6. SMPA/Battery Charger 28V Shuttle Connector $\rightarrow$ 28VDC Power Ext Cable 10’

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hour required to fully charge battery.</td>
</tr>
</tbody>
</table>

7. 28VDC Power Ext Cable 10’ $\rightarrow$ J8 on RFPDB
Refer to Figures 3 and 4.

![Diagram of overhead beam, deck beam, RFPDB, Portcom, CTP, Overhead, Rack Panel Position, Deck]
8. Restore power to RFPDB J8.

```plaintext
Node 1: EPS
NODE 1: EPS
sel RPCM_N1RS2_A
RPCM_N1RS2_A
sel RPC 11
cmd RPC Position – Close (Verify – Cl)
```

9. RFPDB, toggle PGSC/RF switch to On position.
### Table 1. SMPA/Battery Charger Annunciations

<table>
<thead>
<tr>
<th>Condition</th>
<th>No Battery Condition</th>
<th>Charging Condition</th>
<th>Ready Condition</th>
<th>Battery Polling Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>• No Battery (Blue)</td>
<td>• No Battery (Blue)</td>
<td>• No Battery (Blue)</td>
<td>• No Battery (Blue)</td>
<td>• No Battery (Blue)</td>
</tr>
<tr>
<td>° Charging (Yellow)</td>
<td>° Charging (Yellow)</td>
<td>° Charging (Yellow)</td>
<td>° Charging (Yellow)</td>
<td>° Charging (Yellow)</td>
</tr>
<tr>
<td>Power</td>
<td>Power</td>
<td>Power</td>
<td>Power</td>
<td>Power</td>
</tr>
<tr>
<td>° Ready (Green)</td>
<td>° Ready (Green)</td>
<td>° Ready (Green)</td>
<td>° Ready (Green)</td>
<td>° Ready (Green)</td>
</tr>
<tr>
<td>(Green)</td>
<td>(Green)</td>
<td>(Green)</td>
<td>(Green)</td>
<td>(Green)</td>
</tr>
<tr>
<td>• Temp. Fault (Red)</td>
<td>• Temp. Fault (Red)</td>
<td>• Temp. Fault (Red)</td>
<td>• Temp. Fault (Red)</td>
<td>• Temp. Fault (Red)</td>
</tr>
</tbody>
</table>

**NOTE**

When power is applied to the charger without a battery connected, the LEDs on the charger are as shown above. If the battery is connected, the battery might be failed open.

When a battery pack is first connected there will be a 2 to 3 minute period required for the temperature measuring circuitry to detect the battery pack temperature. If the above LEDs stay on longer than 5 minutes, remove the battery from the charger and reinstall to reset the charger.

The battery is fully charged when the LEDs are illuminated as indicated. The charger enters a trickle (slow) charge mode. The battery can remain in this mode if desired.

The LEDs will be illuminated as above if nominal charging condition parameters are acceptable. If there is a battery Temp. Fault (over temp) in the battery while charging, the Temp. Fault LED will be illuminated.
1. Verify annunciation lights on SMPA/Battery Charger.
   Refer to Table 1.

   NOTE
   One hour required to fully charge battery.

CLOSEOUT
11. Remove power from RFPDB.

   Node 1: EPS
   PCS
   sel RPCM_N1RS2_A

   RPCM_N1RS2_A

   sel RPC 11
   cmd RPC position – Open (Verify – Op)

12. RFPDB, PGSC/RF switch to Off position.

13. 28VDC Power Ext Cable 10’ ←|→ J8 on RFPDB

14. Close RPC to restore power to RFPDB, Early Comm Antennas.

   Node 1: EPS
   PCS
   sel RPCM_N1RS2_A

   RPCM_N1RS2_A

   sel RPC 11
   cmd RPC position – Close (Verify – Cl)

POST MAINTENANCE
15. Inform MCC-H of task completion.

16. √MATS for stowage locations for tools, equipment
OBJECTIVE:
Ensure proper MDM keying, install/remove MDM from MDM EVA Cover.

LOCATION:
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
45 minutes

PARTS:
MDM EVA Cover  (PN 1J00100-1)

MATERIALS:
NA

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit E:
   Ratchet, 1/4" Drive
   1/4" to 3/8" Adapter
Kit I:
   Phillips Screwdriver #0
   Jewelers Phillips Screwdriver 000
   #4 Long Torq Tip, 3/8 Drive

ENSURING PROPER MDM KEYING

Figure 1.- N1-1 and N1-2 Keying.
Black is open portion of Key.

1. √For proper MDM keying
Refer to Figure 1.

NOTE
Connector Polarization Keying Plate, fasteners are non-captive, very small.
2. If rekeying is required
   2.1 Remove Connector Polarization Keying Plate at back of MDM
       (Ratchet, 1/4" Drive; 1/4" to 3/8" Adapter; #4 Long Torq Tip,
       3/8" Drive).
       Refer to Figure 1.

       **NOTE**
       Keys are non-captive, very small.

       2.2 Rekey Connector Polarization Keying using screwdriver.
           Insert screwdriver in through Key.
           Work Key loose with screwdriver while keeping tip of screwdriver
           inside Key slot on MDM.
           Rotate Key to proper position and reinstall (Jewelers Phillips
           Screwdriver 000).
           Refer to Figure 1.

       2.3 Reinstall Connector Polarization Keying Plate (Ratchet, 1/4" Drive;
           1/4" to 3/8" Adapter; #4 Long Torq Tip, 3/8" Drive).

**PRE-EVA MDM EVA COVER INSTALLATION**

3. Open MDM EVA Cover to 90° position.

   **NOTE**
   The two MDM EVA Cover Latches are not identical. There are separate left and right
   handed latches.
4. Remove Latch Assemblies (two) from base of MDM EVA Cover and install in slots on side of cover with "release" engraving facing out, release rings towards phenolic strip. Depress retention ball on bottom of latch assembly with screwdriver to get past first detent. Slide latches towards center of base to second detent (Phillips Screwdriver #0). Refer to Figure 2.

5. Remove connector covers (six) from rear of spare MDM. Temporarily stow for installation onto failed MDM.

6. Center MDM over MDM EVA Cover, insert lip on front edge of MDM into slot in phenolic strip on front of MDM EVA Cover. Press pins at rear of MDM into slots at rear of Latch Assemblies. Ensure latches are closed. Wrap MDM EVA Cover Blanket around MDM. Connect to Velcro on side of base. Refer to Figure 3.

**POST EVA MDM EVA COVER REMOVAL**

7. Unwrap MDM EVA Cover Blanket from around MDM. Fold. Reconnect Blanket to bottom of base.

8. Move latches (two) to release position and remove MDM.

9. Install connector covers (six) to rear of failed MDM.
10. Remove Latch Assemblies from MDM EVA Cover by depressing retention balls on bottom of latch assemblies with screwdriver, sliding outwards past detents. Stow on base (Phillips Screwdriver #0).

11. Fold MDM EVA Cover to closed position.

**POST MAINTENANCE**

12. Inform **MCC-H** of task completion.

13. √MATS for stowage location. Stow equipment and materials.
OBJECTIVE:
Remove and replace Hatch Inner Window Assembly.

LOCATION:
Installed: U.S. Common Hatch IVA side
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
30 minutes

PARTS:
Hatch Inner Window Assembly (P/N 683-13076-5)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
   7/16” Socket, 3/8” Drive
Kit D:
   3/16” Hex Head, 3/8” Drive
Kit E:
   Ratchet, 3/8” Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8” Drive
Lid #1:
   Magnifying Glass (7x)

REFERENCED PROCEDURE(S):
None
Figure 1. - Common Hatch Window.

Torquing order for window captive fasteners

Place tape under Test so ring can be aligned properly on reinstallation

IVA Side

EVA Side

Window Assembly (683-13030-5)

Window Pane (683-13033-1)

Plate Assembly (683-13050-15)

Bumper (683-13035-1)

Window Pane Seal (683-13032-1) (2 Places)

Blind Gland

Nut

View B
WARNING

1. Crewmembers should not be isolated from their emergency return vehicle. Hatch should not be latched with crewmembers on isolated side. Procedure must be performed with shuttle crew on shuttle side of the Hatch, and the station crew on the Soyuz side of the Hatch.

2. Failure to equalize pressure between inner and outer windows may prevent removal of failed inner pane.

NOTE

Hatch Plate Assembly contains two blind glands. Only one Blind Gland needs to be removed to equalize pressure.

REMOVAL

1. Remove nut securing Blind Gland to Hatch Plate Assembly (Ratchet, 3/8" Drive; 7/16" Socket).
Refer to Figure 1.
Temporarily stow.

2. Place piece of tape on Hatch under “TEST” to mark alignment for replacement window.
Refer to Figure 1.

NOTE

1. 30 seconds must pass for pressure to equalize between inner and outer hatch windows.

2. Failed Inner Window ORU Kit contains lubricated seals. Avoid smearing lubricant on hands, glass, or hardware.

3. Loosen fasteners (ten) securing failed Hatch Inner Window ORU Kit to Hatch Plate Assembly (Ratchet, 3/8" Drive; 3/16" Hex head).
Temporarily stow.

NOTE

Hatch Inner Window ORU Kit consists of Inner Window Assembly (one), Window Pane (one), Window Pane Seal (two), and Bumper (one). All parts of failed Hatch Inner Window ORU Kit are removed from Hatch Plate Assembly together.

4. Clean hatch plate window sealing surface (Dry Wipes).

5. Inspect Hatch Plate Assembly window area for foreign material on surface (Magnifying Glass (7x)).
6. If there is no foreign material or visible scratches on surface
   Continue procedure.
   
   If there is foreign material or visible scratches on surface
   Reclean hatch plate window sealing surface.

REPLACEMENT

**NOTE**

Replacement Hatch Inner Window ORU Kit contains lubricated seals. Avoid smearing lubricant on hands, glass, or hardware.

7. Position replacement Hatch Inner Window ORU Kit Hatch Plate Assembly by ensuring “TEST” is aligned with tape marker.
   Refer to Figure 1.

8. Align replacement Hatch Inner Window ORU Kit fasteners (ten) with holes (ten) in Hatch Plate Assembly.

9. Visually inspect replacement Hatch Inner Window ORU Kit to ensure it is level.

10. If Hatch Inner Window ORU Kit is level
    Continue procedure.
    
    If Hatch Inner Window ORU Kit is not level
    Reposition window and continue.

    **NOTE**

    Sequence for fastening captive fasteners (ten) will start at top center right, moving to bottom center left, and continuing in star pattern until all captive fasteners (ten) are started.

11. Tighten fasteners (ten) securing replacement Hatch Inner Window ORU Kit to Hatch Plate Assembly (Ratchet, 3/8” Drive; 3/16” Hex Head).
    Refer to Figure 1.

12. Visually inspect replacement Hatch Inner Window ORU Kit to ensure it is properly seated.

13. If Hatch Inner Window ORU Kit properly seated
    Go to step 16.
    
    If Hatch Inner Window ORU Kit not properly seated
    Continue procedure.

14. Loosen captive fasteners (ten) securing Hatch Inner Window ORU Kit to Hatch Plate Assembly (Ratchet, 3/8” Drive; 3/16” Hex Head).

15. Adjust Hatch Inner Window ORU Kit until it is fully seated.
16. Torque captive fasteners (ten) securing replacement Hatch Inner Window ORU Kit to Hatch Plate Assembly 112 in-lbs ((30-200 in-lbs) Trq Wrench; 3/16" Hex Head).
Refer to Figure 1.

17. Visually inspect replacement Hatch Inner Window ORU Kit to ensure it is properly seated.

18. If Hatch Inner Window ORU Kit not properly seated
   Go to step 14.
   If Hatch Inner Window ORU Kit properly seated
   Continue procedure.

19. Tighten nut over Blind Gland until Blind Gland is seated with no free movement (Ratchet, 3/8" Drive; 7/16" Socket).

20. Tighten nut over Blind Gland an additional eighth of a turn (Ratchet, 3/8" Drive; 7/16" Socket).

**POST MAINTENANCE**
21. √ MCC-H for appropriate leak checkout procedure

22. Inform MCC-H of task completion.

23. √ MATS for stowage location of failed Inner Window
    Stow tools and equipment.
OBJECTIVE:
Remove and replace Hatch Outer Window Assembly (P/N 683-13030-1).

LOCATION:
Installed: U.S. Common Hatch
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
30 minutes

PARTS:
Hatch Outer Window Assembly (P/N 683-13030-1)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
  7/16” Socket, 3/8” Drive
Kit D:
  3/16” Hex Head, 3/8” Drive
  5/32” Hex Head, 3/8” Drive
Kit E:
  Ratchet, 3/8” Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8” Drive
Lid #1:
  Magnifying Glass (7x)

REFERENCED PROCEDURE(S):
None
Figure 1.- Common Hatch Window.
WARNING

1. Crewmembers should not be isolated from their emergency return vehicle. Hatch should not be latched with crewmembers on isolated side. Procedure must be performed with shuttle crew on shuttle side of the Hatch, and the station crew on the Soyuz side of the Hatch.

2. Failure to equalize pressure between inner and outer windows may prevent removal of failed inner pane.

NOTE

Hatch Plate Assembly contains two Blind Glands. Only one Blind Gland needs to be removed to equalize pressure.

REMOVAL

1. Remove nut securing Blind Gland to Hatch Plate Assembly (dome side) (Ratchet, 3/8" Drive; 7/16" Socket).
   Temporarily stow.

2. Translate to rib side.

3. Place piece of tape on Hatch under “TEST” to mark alignment for replacement window.

4. Remove fasteners (two) securing indicator assembly (Ratchet, 3/8" Drive; 5/32" Hex Head).
   Temporarily stow.

   NOTE

   1. Thirty (30) seconds must pass for pressure to equalize between inner and outer hatch windows.

   2. Failed Outer Window Assembly contains lubricated seals. Avoid smearing lubricant on hands, glass, or hardware.

5. Loosen fasteners (ten) securing failed Hatch Outer Window Assembly to Hatch Plate Assembly (Ratchet, 3/8" Drive; 3/16" Hex Head).
   Temporarily stow.

6. Clean hatch plate window sealing surface (Dry Wipes).

7. Dry hatch plate window sealing surface (Dry Wipes).

8. Inspect Hatch Plate Assembly window area for foreign material on surface (Magnifying Glass 7x).

9. If there is no foreign material or visible scratches on surface, continue.

   If there is foreign material or visible scratches on surface, reclean hatch plate window sealing surface.
10. Position replacement Hatch Outer Window ORU Kit Hatch Plate Assembly by ensuring “TEST” is aligned with tape marker.

11. Align replacement Hatch Outer Window ORU Kit fasteners (ten) with holes (ten) in Hatch Plate Assembly.

12. Visually inspect replacement Hatch Outer Window Assembly to ensure it is level.

13. If Hatch Outer Window Assembly is level, continue.

   If Hatch Outer Window Assembly is not level, reposition window and continue.

   Sequence for fastening captive fasteners (ten) will start at top center right, moving to bottom center left, and continuing in star pattern until all captive fasteners (ten) are started.

14. Tighten fasteners (ten) securing replacement Hatch Outer Window Assembly to Hatch Plate Assembly (Ratchet, 3/8" Drive; 3/16" Hex Head).

15. Visually inspect replacement Hatch Outer Window Assembly to ensure it is properly seated.

16. If Hatch Outer Window Assembly properly seated, go to step 19.

   If Hatch Outer Window Assembly not properly seated, continue.

17. Loosen captive fasteners (ten) securing Hatch Outer Window Assembly to Hatch Plate Assembly (Ratchet, 3/8" Drive; 3/16" Hex Head).

18. Adjust Outer Window Assembly until it is fully seated.

19. Torque captive fasteners (ten) securing Replacement Hatch Outer Window Assembly to Hatch Plate Assembly 112 in-lbs ((30-200 in-lbs) Trq Wrench; 3/16" Hex Head).

20. Visually inspect replacement Hatch Outer Window Assembly to ensure it is properly seated.

21. If Hatch Outer Window Assembly not properly seated, go to step 17.

   If Hatch Outer Window Assembly properly seated, continue.
22. Tighten nut over Blind Gland until Blind Gland is seated with no free movement (Ratchet, 3/8" Drive; 7/16" Socket).

23. Tighten nut over Blind Gland an additional eighth of a turn (Ratchet, 3/8" Drive; 7/16" Socket).

**POST MAINTENANCE**

24. Inform **MCC-H** of task completion.

25. √MATS for stowage location of failed Outer Window
Stow tools, equipment.
OBJECTIVE:
Remove and replace a defective Hatch.

LOCATION:
Installed: U.S. Common Hatch
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
2 hours

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit A:
11/16" Combination Wrench
11/16" Crowfoot, 3/8" Drive
Kit D:
1/8" Hex Head Driver, 3/8" Drive
5/16" Hex Head, 3/8" Drive
Kit E:
Ratchet, 3/8" Drive
Driver Handle, 3/8" Drive
Kit G:
(30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #1:
Plastic Feeler Gauges
Magnifying Glass (7x)

REFERENCED PROCEDURE(S):
None

Figure 1.- Hatch Dome/Rib.
REMOVAL
Have one crewmember translate to rib side of Hatch.

WARNING
Crewmembers cannot be isolated from their emergency return vehicle, so the Hatch should not be closed and latched. Procedure must be performed with shuttle crew on the shuttle side of Hatch, and the station crew on the soyuz side of the Hatch.

2. Lower Hatch until there is a 25" opening.
   Turn crank handle until pointer is at “EQUALIZE” position.

3. Loosen hatch latch set screws (eight) one full turn (Driver Handle, 3/8" Drive; 1/8" Hex Head).
   Refer to Figure 2.

4. Translate to dome side of Hatch.

   NOTE
   Six quick release pins are released from each radial track to allow for rotation of the track to a stowage position. Four quick release pins are released from each axial track to allow for rotation of the track to a stowage position.
5. Release disconnect grounding cables connecting tracks to bulkhead by using quick disconnect feature. Refer to Figure 3.

6. Release tethered quick release pins from Hatch track. Refer to Figure 3. Rotate track out of way. Temporarily stow.

**CAUTION**

Two crewmembers are required to translate Hatch from stowed location.

7. Remove Hatch from bulkhead.

**REPLACEMENT**

8. Orient replacement Hatch so that up arrow on Soft Handle Assembly, located on dome side of Hatch, points in the same direction that the Hatch will travel up the tracks. Three arrow decals (near rollers), also on dome side of Hatch, match three arrow decals on bulkhead.

9. Have one crewmember translate to rib side of Hatch.
10. Position and align replacement Hatch on bulkhead using alignment guides as visual cues to center Hatch on bulkhead.

11. Release hatch tracks from temporary restrained position.

12. Rotate tracks onto hatch rollers into installed position.

13. Install quick release pins into track.

14. Reconnect grounding cables on bulkhead to track.

15. For out-of-tolerance guides, loosen jamnuts A and D completely (11/16” Combination Wrench; Ratchet, 3/8” Drive; 11/16” Crowfoot). Refer to Figure 4.

16. Turn jamnuts B and C manually to set alignment guide to bulkhead gap at 0.020” to 0.025” (Feeler Gauge). Refer to Figure 4.

17. Hold jamnut C stationary with Combination Wrench while torquing D against C to 260 in-lbs (11/16” Combination Wrench; 11/16” Crowfoot; (30-200 in-lbs) Trq Wrench).

18. Hold jamnut B stationary with Combination Wrench while torquing jamnut A against B to 260 in-lbs (11/16” Combination Wrench; 11/16” Crowfoot; (30-200 in-lbs) Trq Wrench).

19. Check alignment guide-to-bulkhead gap (Feeler Gauge).
20. If guide-to-bulkhead gap is 0.020" to 0.025"
   Continue with procedure.
   If guide-to-bulkhead gap is not 0.020" to 0.025"
   Repeat alignment guide adjustment.

21. Loosen set screws (two) on Hatch Roller Assembly (Ratchet, 3/8" Drive; 5/32" Hex Head).

22. Push track away from roller to take up slack while sliding head of roller to achieve 0.010" to 0.020" gap between roller and track (Feeler Gauge).

23. Snug set screws (two) on Hatch Roller Assembly.
   Torque to 71 in-lbs (5/32" Hex Head; 30-200 in-lbs) Trq Wrench).

24. Repeat steps 21 --- 23 for remaining three roller assemblies (in a diagonal pattern).

25. Open and close Hatch several times to verify proper travel in tracks.
   If Hatch opens without binding
   Continue with procedure.
   If Hatch binds when opening
   Repeat Hatch Roller Assembly adjustment.

26. Mark, tape approximate location of latches on dome side of Hatch.

    **NOTE**
    Gap between hatch plate and hatch seal metal substrate should be 0.015" to 0.025" at each location. Gap at the corners of Hatch should be 0.030" to 0.035".

27. Measure gap between hatch plate and hatch seal metal substrate at latch locations (eight) (0.015" to 0.025") and hatch corners (four) (0.030" to 0.035") (Feeler Gauge).

   If locations are out of tolerance
   Continue with procedure.
   If locations are within tolerance
   Go to step 41.

28. Open Hatch.

29. Translate to rib side of Hatch.

30. Close Hatch.
CAUTION

Hatch needs to be in “EQUALIZE” position while adjusting latches. If not, damage could occur to mechanism. All measurements need to be taken with Hatch in “LATCHED” position.

31. Turn crank until pointer reaches “EQUALIZE” position to partially engage latches.

32. Rotate vertical adjustment screw one quarter turn clockwise to close gap, counterclockwise to widen gap on each latch that is out of tolerance (Driver Handle, 3/8” Drive; 1/8” Hex Head).

33. Turn crank until pointer reaches “LATCHED” position.

34. Measure gap between hatch plate and hatch seal metal substrate at latch locations (eight) and hatch corners (four) (Feeler Gauge).

If locations are out of tolerance

Repeat steps 33 --- 35 until all latch locations (eight) have gap between 0.015” to 0.025” and all hatch corners (four) have gap between 0.030” to 0.035”.

If locations are within tolerance, continue.

35. Open Hatch.

36. Visually inspect hatch seals with Magnifying Glass (7x) for nicks, burrs, cuts, gouges, etc., that would impair proper seal.

POST MAINTENANCE

37. Inform MCC-H of task completion.

38. √MATS for stowage location of failed Hatch

Stow tools, equipment.
OBJECTIVE:
Remove and replace a defective Hatch Roller Assembly.

LOCATION:
Installed: U.S. Common Hatch IVA side
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
30 minutes

PARTS:
Hatch Roller Assembly (P/N 683-13060-2)

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
   3/8" Socket, 3/8" Drive
Kit E:
   Ratchet, 3/8" Drive
   4" Ext, 3/8" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, (3/8" Drive

REFERENCED PROCEDURE(S):
None

3/8" Fasteners

Figure 1.- Hatch Roller Assembly.
WARNING
To ensure crewmembers have immediate ingress/egress between modules in case of emergency, hatch should be lowered no further than required to access Roller, and a translation corridor sufficient to allow egress should be maintained. Roller Assembly hatch latches cannot be engaged.

REMOVAL
1. Lower but do not latch Hatch.

2. Remove failed Hatch Roller Assembly, fasteners (two) (Ratchet, 3/8” Drive; 4” Ext; 3/8” Socket).
   Label, temporarily stow.

REPLACEMENT
3. Install replacement Hatch Roller Assembly, fasteners (two).
   Torque to 112 in-lbs (Ratchet, 3/8” Drive; 4” Ext; 3/8” Socket; (30-200 in-lbs) Trq Wrench).

POST MAINTENANCE
4. Operate Hatch in tracks to ensure proper operation of roller.

5. Inform MCC-H of task completion.

6. √MATS for stowage location of failed Hatch Roller Assembly
   Stow tools, equipment.
OBJECTIVE:
Remove and replace failed Hatch Seal.

LOCATION:
Installed: Hatch Bulkhead
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
30 minutes

PARTS:
Hatch Seal    (P/N 683-13095-3)

MATERIALS:
Dry Wipes
Tape
Gloves, Disposable
Braycote Lubricant

TOOLS REQUIRED:
Kit D:
   1/8" Hex Head, 1/4" Drive
Kit E:
   Ratchet, 1/4" Drive
   Driver Handle, 1/4" Drive
Kit G:
   (5-35 in-lbs) Trq Driver, 1/4" Drive
Lid #1:
   Nonmetallic Feeler Gauge
   Magnifying Glass (7X)

REFERENCED PROCEDURE(S):
None

REMOVING
1. Inspect replacement hatch seals visually for nicks, burrs, cuts, gouges, etc. that would impair proper seal (Magnifying Glass 7X).

NOTE
1. If defects found use another seal assembly.
2. Hatch seal has four assemblies. Only failed will be replaced.
3. Hatch seal assemblies adjacent to either end of failed hatch seal assembly must be loosened prior to removing failed hatch seal assembly.
2. Loosen fasteners (seventeen) completely on failed Hatch seal.

3. Loosen, but do not release fasteners (thirty-four) on two seals adjacent to failed seal (Ratchet, 1/4" Drive; 1/8" Hex Head, 1/4" Drive).

4. Loosen fasteners (four) completely on end of one adjacent seal (labeled A10, A12, A14, A16 in Figure 1) (Ratchet, 1/4" Drive; 1/8" Hex Head, 1/4" Drive).

5. Loosen fasteners (four) completely on end of other adjacent seal (Labeled C11, C13, C15, C17 in Figure 1) (Ratchet, 1/4" Drive; 1/8" Hex Head, 1/4" Drive).

CAUTION
Do not damage bulkhead or adjacent seals when removing failed seal.
1.2.505 HATCH SEAL R&R

NOTE
Seal assembly contains lubricant. Avoid smearing on hands, glass, or hardware.

6. Remove failed seal segment.
   Temporarily stow.

7. Clean bulkhead sealing surface to visibly clean level (Dry Wipe).

REPLACING
8. Don gloves.

9. Clean replacement hatch seal to visibly clean level prior to installation (Dry Wipes).

![Hatch Seal Beads Diagram]

Figure 2.- Hatch Seal Beads.

10. Apply thin film of Braycote to crowns and ends of both seal beads and seal metal substrate on bulkhead side of seal.
    Refer to Figure 2.

11. Doff gloves.

CAUTION
When placing replacement hatch seal on bulkhead ensure captive fasteners do not scratch bulkhead surface.

12. Position seal on bulkhead, tighten fastener in center of replacement seal two full turns (labeled as B1 in Figure 1) (Ratchet, 1/4” Drive; 1/8” Hex Head).

13. Tighten fasteners (two) on each end of replacement seal two full turns (labeled B15, B17, B14, B16 in Figure 1) (Ratchet, 1/4” Drive; 1/8” Hex Head).
14. Tighten fasteners (two) on end of one adjacent seal two full turns (labeled as A14, A16 in Figure 1) (Ratchet, 1/4” Drive; 1/8” Hex Head).

**CAUTION**

Hatch seal assemblies must be held as close to bulkhead as possible to prevent damage to seals.

Figure 3a.- Replacement Hatch Seal Segment Installation.

Figure 3b.- Replacement Hatch Seal Segment Installation.
15. Seat replacement seal to same adjacent seal in step 14 by sliding joint approximately fifty percent beyond flush, then by returning to flush. Refer to Figures 3a, 3b.

16. Tighten fasteners (two) on end of second adjacent hatch seal two full turns (labeled C15, C17 in Figure 1) (Ratchet, 1/4" Drive; 1/8" Hex Head).

17. Seat replacement seal other end to second adjacent seal in step 16 by sliding joint approximately fifty percent beyond flush, then returning to flush. Refer to Figures 3a, 3b.

NOTE
Tighten fasteners alternating sides (left and right) working from center fastener toward ends.

18. Tighten remaining fasteners (fourteen) on replacement seal two full turns (Ratchet, 1/4" Drive; 1/8" Hex Head).

19. Tighten fasteners (sixteen) on one adjacent seal two full turns (Ratchet, 1/4" Drive; 1/8" Hex Head).

20. Tighten fasteners (sixteen) on remaining adjacent seal two full turns (Ratchet, 1/4" Drive; 1/8" Hex Head).

Figure 4.- Fastener Torque Sequence for Hatch Seal Segment.

21. Torque fasteners (seventeen) on replacement seal to 12 in-lbs ((5-35 in-lbs) Trq Driver; 1/8" Hex Head). Torque fasteners in the order shown in Figure 4.
22. Torque fasteners (seventeen) on one adjacent seal to 12 in-lbs ((5-35 in-lbs) Trq Driver; 1/8" Hex Head).
   Torque fasteners in the order shown in Figure 4.

23. Torque fasteners (seventeen) on remaining adjacent seal to 12 in-lbs ((5-35 in-lbs) Trq Driver; 1/8" Hex Head).
   Torque fasteners in the order shown in Figure 4.

24. Torque fasteners (seventeen) on replacement seal to 35 in-lbs ((5-35 in-lbs) Trq Driver; 1/8" Hex Head).
   Torque fasteners in the order shown in Figure 4.

25. Torque fasteners (seventeen) on one adjacent seal to 35 in-lbs ((5-35 in-lbs) Trq Driver; 1/8" Hex Head).
   Torque fasteners in the order shown in Figure 4.

26. Torque fasteners (seventeen) on remaining adjacent seal to 35 in-lbs ((5-35 in-lbs) Trq Driver; 1/8" Hex Head).
   Torque fasteners in the order shown in Figure 4.

27. Clean all hatch seals to visibly clean level (Dry Wipes).

28. Don gloves.

29. Lubricate hatch-side of all hatch seal crowns (Braycote).
   Wipe off excess.
   Remove any clumps of grease, to include clumps found in grooves on either side of each seal crown

30. Doff gloves.

**POST MAINTENANCE**

31. Inform **MCC-H** of task completion.

32. √MATS for stowage location.
   Stow failed hatch seal, tools, equipment.
OBJECTIVE:
Remove and replace a defective Hatch Soft Handle Assembly.

LOCATION:
Installed: U.S. Common Hatch IVA side
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
30 minutes

PARTS:
Hatch Soft Handle Assembly (P/N 683-13048)

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
    3/8” Socket, 3/8” Drive
Kit E:
    Ratchet, 3/8” Drive
    4” Ext, 3/8” Drive
Kit G:
    (30-200 in-lbs) Trq Wrench, 3/8” Drive

REFERENCED PROCEDURE(S):
None
Figure 1.- Hatch Soft Handle.

**WARNING**
To ensure crewmembers have immediate ingress/egress between modules in case of emergency, hatch latches can not be engaged.

**REMOVAL**
1. Close but do not latch Hatch.

   Label, temporarily stow.

**REPLACEMENT**
3. Install replacement Hatch Soft Handle Assembly, fasteners (four).
   Arrow on handle should be pointing the direction the Hatch opens.
   Torque to 90 in-lbs (Ratchet, 3/8" Drive; 4" Ext; 3/8" Socket; (30-200 in-lbs) Trq Wrench).

**POST MAINTENANCE**
4. Inform **MCC-H** of task completion.

5. √MATS for stowage location of defective Hatch Soft Handle Assembly
   Stow tools, equipment.
OBJECTIVE:
Remove and replace Tension Rod/Latch Assembly.

LOCATION:
Installed: U.S. Common Hatch Rib Side
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
25 minutes

PARTS:
Hatch Tension Rod Assembly (P/N 683-13012-1)

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit A:
  7/16” Combination Wrench
  9/16” Combination Wrench
  9/16” Crowfoot, 3/8” Drive
Kit C:
  1/2” Socket, 3/8” Drive
Kit D:
  1/8” Hex Head, 3/8” Drive
Kit E:
  Ratchet, 3/8” Drive
  1/4” to 3/8” Adapter
  4” Ext, 3/8” Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8” Drive
  (5-35 in-lbs) Trq Driver, 1/4” Drive
Kit J:
  Retaining Ring Tool Straight
Lid #1:
  Nonmetallic Feeler Gauge
  Caliper, Dial Type

REFERENCED PROCEDURE(S):
None

WARNING
Crewmembers should not be isolated from the emergency return vehicle. Hatch should not be latched with crewmembers on isolated side. Procedure must be performed with shuttle crew on the shuttle side of the Hatch, and the station crew on the Soyuz side of the Hatch.
NOTE
Tension Rod Assembly and Latch Assembly remain together and are moved to maintenance work area for separation because of small parts.

REMOVAL
1. Close, do not latch, Hatch.

2. Unfasten Captive Fasteners (four) (Ratchet, 3/8" Drive; 4" Ext; 1/2" Socket).
   Refer to Figure 1.

3. Release Quick Release Pin (one) by securing failed Tension Rod Assembly to slider.

4. Place failed Hatch Tension Rod in maintenance work area.

5. Remove Retaining Ring from pin (Retaining Ring Pliers).

6. Remove pin (one) securing Hatch Tension Rod to latch.

7. Separate Hatch Tension Rod, hatch latch.

REPLACEMENT
8. Replace failed part with new Hatch Tension Rod/latch, depending on which part has failed.
   If failure is unknown, √MCC.

9. Insert pin into aligned Hatch Tension Rod/latch.

10. Install Retaining Ring onto end of pin (Retaining Ring Pliers).
11. Position Latch Assembly onto hatch plate.

12. Hand tighten Captive Fasteners (four).

   Tighten torque fasteners (four) to 188 in-lbs (Ratchet, 3/8" Drive; 4" Ext; 1/2" Socket; (30-200 in-lbs) Trq Wrench).

13. Align Hatch Tension Rod to slider hole, insert Quick Release Pin.

   **NOTE**
   Hatch should be in fully unlatched position before continuing with procedure. Failure to do so may result in improper latch adjustment.

14. Turn crank until pointer reaches UNLATCHED position.

15. Rotate set screw on top of latch clockwise until it stops (Ratchet, 3/8" Drive; 1/8" Hex Head).

16. Loosen jamnut on Hatch Tension Rod (9/16" Combination Wrench).

17. Find dead center point of latch travel by rotating Hatch Tension Rod counterclockwise until vertical movement of latch roller reverses direction (7/16" Combination Wrench).

18. Rotate Hatch Tension Rod clockwise until latch roller begins to move away from hatch plate.

19. Verify that the gap between the latch roller and hatch plate does not exceed 0.0015 inch (Feeler Gauge).

20. If gap is per requirements, continue with maintenance procedure.

21. If not set per requirements, reposition roller by rotating Hatch Tension Rod to gap measurement.

22. Tighten jamnut on Tension Rod.

23. Torque jamnut to 20 in-lbs ((5-35 in-lbs) Trq Driver; 1/4" to 3/8" Adapter; 9/16" Crowfoot).

24. Adjust set screw to achieve 1.100/1.050 inch dimension between hatch plate and nearest point of latch roller (1/8" Hex Head).

25. Verify measurement (Caliper).

26. If gap is per requirements, continue.

   If gap is not per requirements, reposition Latch Assembly to proper gap measurement by adjusting set screw (1/8" Hex Head).
27. Measure length of an adjacent Tension Rod shaft from base of jamnut to edge of latch attach bracket (Caliper).

28. If lengths are not equal ± 0.050 inch, readjust Hatch Tension Rod.  
   If lengths are equal ± 0.050 inch, continue.

29. Turn crank until pointer reaches LATCHED position, checking for proper operation.

30. Measure gap between hatch plate and hatch seal metal substrate at latch location (Feeler Gauge).  
   Refer to Figure 2.  
   If gap is not between 0.015 to 0.025 inches, continue with procedure.  
   If gap is within 0.015 to 0.025 inches, go to step 35.

**CAUTION**

Hatch needs to be in EQUALIZE position while adjusting latches. If not, damage could occur to mechanism. All measurements need to be taken with hatch in LATCHED position.

31. Turn crank until pointer reaches EQUALIZE position to partially engage latches.

---

![Figure 2.- Hatch Plate to Hatch Seal Metal Substrate Measurement.](image-url)
32. Rotate latch set screw one quarter turn to close gap, to widen gap on the latch (Driver Handle, 3/8" Drive; 1/8" Hex Head). Refer to Figure 1.

33. Turn crank until pointer reaches LATCHED position.

34. Measure gap between hatch plate and hatch seal metal substrate at latch location (Feeler Gauge). Refer to Figure 2.

If location is out of tolerance,
Repeat steps 31 --- 34 until latch location has gap between 0.015 to 0.025 inches.

If location is within tolerance, continue procedure.

35. Open Hatch.

POST MAINTENANCE
36. Inform MCC-H of task completion.

37. √MATS for stowage location of failed Hatch Tension Rod/latch Assembly Stow tools, equipment.
OBJECTIVE:
Remove and replace Manual Pressure Equalization Valve (MPEV).

LOCATIONS:
Stowed: Maintenance and Assembly Task Supplement (MATS)
Installed: US Common Hatch, except Airlock Common Hatch

DURATION:
30 minutes

PARTS:
MPEV (P/N 683-10012-5)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
ISS Common IVA Tool Kit:
Kit D: 5/32" Hex Head Driver, 1/4" Drive
Kit E: Ratchet, 1/4" Drive
4" Ext, 1/4" Drive
3/8" to 1/4" Adapter
Kit G: (30-200 in-lb) Trq Wrench, 3/8" Drive

REFERENCED PROCEDURE(S):
None

NOTE
1. Removal/installation both occur on cabin (dome) side of Hatch.

2. Hatch should remain open, stowed throughout procedure.

3. Shipping closures are provided for all openings on replacement MPEV. Remove shipping closures only at time of installation.
**SAFING**

**WARNING**
Pressure between elements must be equalized.

![Figure 1.- Hatch (Dome Side).](image)

1. Remove MPEV cap.
   Temporarily stow.
   MPEV Sample Port → Open
   Reinstall cap.

**MPEV REMOVAL**
2. Remove MPEV, fasteners (six) (Ratchet, 1/4" Drive; 4" Ext; 5/32" Hex Head).

3. Remove shipping closures (two) from MPEV, place on MPEV. Temporarily stow MPEV.

4. Clean Hatch at MPEV removal location (Dry Wipes).
MPEV INSTALLATION
5. √MPEV → Open

CAUTION

Equalization valve must be oriented correctly. Refer to Figure 1 for proper installation orientation (nozzle toward bottom).

Figure 2.- MPEV Shown in Closed Position.

6. Position MPEV in proper installation orientation. Refer to Figures 1, 2.

7. Tighten fasteners (six) in star pattern, torque to 66 in-lbs (Ratchet, 1/4” Drive; 5/32” Hex Head; 4” Ext; 3/8” to 1/4” Adapter; (30-200 in-lbs) Trq Wrench).

WARNING

MPEV must be closed for module pressure equalization to be prepared for emergency Hatch closing.

8. MPEV → Close

POST MAINTENANCE


10. √Maintenance and Assembly Task Supplement (MATS) for stowage location of removed MPEV
    Stow tools, equipment.
OBJECTIVE:
Safe CBM components for maintenance tasks.

LOCATION:
Node 1 or Lab Active CBM Ring

DURATION:
15 minutes

PARTS:
None

MATERIALS:
None

TOOLS REQUIRED:
None

REFERENCED PROCEDURE(S):
None

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.
Table 1. Node 1 CBM Power Distribution

<table>
<thead>
<tr>
<th>CPA</th>
<th>Primary Power RPC [X]</th>
<th>Secondary Power RPC [Y]</th>
</tr>
</thead>
<tbody>
<tr>
<td>NODE1 FORWARD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPA 1</td>
<td>RPCM_N13B_C_RPC_03</td>
<td>RPCM_N14B_A_RPC_02</td>
</tr>
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<td>CPA 2</td>
<td>RPCM_N13B_C_RPC_04</td>
<td>RPCM_N14B_A_RPC_03</td>
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<td>CPA 3</td>
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<td>CPA 4</td>
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<td>NODE1 ZENITH</td>
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<td>RPCM_N14B_B_RPC_03</td>
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<td>NODE1 NADIR</td>
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<td>RPCM_N14B_B_RPC_11</td>
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<td>NODE1 PORT</td>
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<td>RPCM_N1RS1_B_RPC_14</td>
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<tr>
<td>NODE1 STARBOARD</td>
<td></td>
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<tr>
<td>CPA 1</td>
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<td>CPA 2</td>
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<td>CPA 4</td>
<td>RPCM_N1RS2_A_RPC_11</td>
<td>RPCM_N1RS1_C_RPC_13</td>
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</tbody>
</table>

1. If Node 1 CBM
   Verify Node 1 CBM Primary, Secondary RPCs – Open, Close Inhibited
   If not Node 1 CBM
   Go to step 2.

PCS
Node 1: S&M
Node 1: S&M

sel [Z] CBM where [Z] = Zenith, Port, Nadir, Starboard, Forward

Node 1 [Z] CBM Display

√Primary Power for CPAs 1 --- 4 RPC [X] = Op where [X] = Refer to Table 1
√Close Cmd – Inh
√Secondary Power for CPAs 1 --- 4 RPC [Y] = Op where [Y] = Refer to Table 1
√Close Cmd – Inh
Repeat

Go to step 3.
Table 2. Lab Forward CBM Power Distribution

<table>
<thead>
<tr>
<th>CPA</th>
<th>Primary Power RPC [X]</th>
<th>Secondary Power RPC [Y]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPA 1</td>
<td>RPCM_LA1B_B_RPC_04</td>
<td>RPCM_LA2B_B_RPC_04</td>
</tr>
<tr>
<td>CPA 2</td>
<td>RPCM_LA1B_B_RPC_03</td>
<td>RPCM_LA2B_B_RPC_03</td>
</tr>
<tr>
<td>CPA 3</td>
<td>RPCM_LA1B_B_RPC_02</td>
<td>RPCM_LA2B_B_RPC_02</td>
</tr>
<tr>
<td>CPA 4</td>
<td>RPCM_LA1B_B_RPC_01</td>
<td>RPCM_LA2B_B_RPC_01</td>
</tr>
</tbody>
</table>

2. If Lab CBM
Verify Lab CBM Primary,Secondary RPCs – Open, Close Inhibited

PCS
Lab: S&M
Lab: S&M

sel Forward CBM

Lab Forward CBM Display

√Primary Power for CPAs 1 -- 4 RPC [X] = Op where [X] = Refer to Table 2
√Close Cmd – Inh
√Secondary Power for CPAs 1 -- 4 RPC [Y] = Op where [Y] = Refer to Table 2
√Close Cmd – Inh

Repeat

3. Inform **MCC-H** of task completion.
OBJECTIVE:
Remove and replace failed CBM Capture Latch Assembly (CLA).

LOCATION:
Installed: Active CBM Ring
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour (1 hour 40 minutes if required to remove CBM Center Disk Cover)

PARTS:
CBM Capture Latch Assembly (P/N 683-13621-2)

MATERIALS:
Marking Pen

TOOLS REQUIRED:
Scopemeter
ISS Common IVA Tool Kit:
Kit E:
   Ratchet, 3/8" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive
Kit I:
   Phillips Screw #1
Kit R:
   6" x 3/16" Ball Tip Hex Head, 3/8" Drive
Lid #1:
   Static Wrist Tether

REFERENCED PROCEDURE(S):
1.2.509  CBM MAINTENANCE POWERDOWN
1.104  CBM CENTER DISK COVER INSTALLATION
1.105  CBM CENTER DISK COVER REMOVAL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. Perform {1.2.509  CBM MAINTENANCE POWERDOWN}, all (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:
**CAUTION**
This procedure is performed near hatch seals. Care must be taken to avoid seal damage.

**ACCESS**
2. If installed, remove Axial or Radial Closeout, 1/4 turn fasteners (sixteen). Temporarily stow.

3. If required, perform [1.105 CBM CENTER DISK COVER REMOVAL], all (SODF: S&M: NOMINAL: VESTIBULE), then:

**REMOVAL**

Figure 1.- Capture Latch Assembly (CLA). Shown in closed position.

**CAUTION**
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD). Do not touch connector pins, sockets unless wearing Static Wrist Tether.

4. Power connector (P2) \(\leftrightarrow\) (J1) CLA. Refer to Figure 1.
5. If CBM Capture Latch is in extended or deployed position, remove Restraint Clip on Latch, press pin out with screwdriver, disengage Capture Latch followers from Drive Arm (Phillips Screw #1). Refer to Figure 2.

6. Unfasten CLA fasteners (four). Remove CLA (Ratchet, 3/8" Drive; 6" x 3/16" Ball Tip Hex Head). Switch connector P3 ←|→ CLA. Label, temporarily stow. Refer to Figure 1.

**REPLACEMENT**
7. Switch connector P3 →|← switch receptacle on replacement CLA.

8. Install replacement CLA. Secure ground wire to closest fastener, tighten fasteners (four). Torque to 95 in-lbs (Ratchet, 3/8" Drive; 6" x 3/16" Ball Tip Hex Head; (30-200 in-lbs) Trq Wrench).

9. Power connector (P2) →|← (J1) CLA power receptacle.

**CHECKOUT**
10. Check for continuity between CLA and ACBM Ring (Scopemeter).

11. **MCC-H** for CLA checkout procedure

**CLOSEOUT**
12. If required, install Axial or Radial Closeout, 1/4 turn fasteners (sixteen).

13. If required, perform {1.104  CBM CENTER DISK COVER INSTALLATION}, all (SODF: S&M: NOMINAL: VESTIBULE), then:
POST MAINTENANCE

15. √MATS for stowage location of failed CLA
Stow tools, equipment.
OBJECTIVE:
Remove and replace a failed CBM Controller Panel Assembly (CPA).

LOCATION:
Installed: Active CBM Hatch Beam
Stowed: \checkmark Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour (1 hour and 40 minutes if required to remove CBM Center Disk Cover)

PARTS:
As required:
- CBM CPA 1, 3 (P/N 2355260-1)
- CBM CPA 2 (P/N 2355260-2)
- CBM CPA 4 (P/N 2355260-3)

MATERIALS:
Marking Pen

TOOLS REQUIRED:
Scopemeter
Mini Maglite
ISS Common IVA Tool Kit:
Kit D:
  5/32” Hex Head, 1/4” Drive
Kit E:
  Ratchet, 1/4” Drive
  4” Ext, 1/4” Drive
Kit F:
  7/16” Socket, 1/4” Drive
Kit G:
  (40-200 in-lbs) Trq Wrench, 1/4” Drive
Lid #1
  Static Wrist Tether

REFERENCED PROCEDURE(S):
1.2.509 CBM MAINTENANCE POWERDOWN
1.105 CBM CENTER DISK COVER REMOVAL
1.104 CBM CENTER DISK COVER INSTALLATION

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. Perform {1.2.509 CBM MAINTENANCE POWERDOWN}, all (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:
1.2.511 CBM CONTROLLER PANEL ASSEMBLY R&R - GENERIC
(ISS IFM/3A - ALL/FIN) Page 2 of 3 pages

CAUTION
This procedure is performed near Hatch Seals. Care must be taken to avoid seal damage.

2. If required, perform {1.105 CBM CENTER DISK COVER REMOVAL}, all (SODF: S&M: NOMINAL: VESTIBULE), then:

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

3. Don Static Wrist Tether. Secure clip end to unpainted metal surface.

REMOVAL
Refer to Figure 1.

- Bolt/Latch Data Cables
- Captive Fasteners (five)
- Ground Strap (Red Wire)
- Data Cable (Braided Cable)
- Power Cable (Red Cable)
- Ground Strap (Red Wire)
- Data Cable (Braided Cable)
- Power Cable (Red Cable)

Figure 1.- Typical Installation of CBM CPA.

4. Power/Data Cables labeled with corresponding J receptacle numbers.

5. Demate power/data cable connectors (nine) from CPA. Temporarily restrain.

6. Unfasten ground strap fasteners from CPA (two, one from each ground strap). Remove ground straps (Ratchet, 1/4" Drive; 4" Ext; 5/32" Hex Head).

7. Unfasten fasteners (five). Remove CPA (Ratchet, 1/4" Drive; 4" Ext; 7/16" Socket). Label, temporarily stow.
REPLACEMENT

NOTE
CPA location stamped on Hatch Ring.

8. Install spare CPA, fasten fasteners (five), torque to 125 in-lbs (Ratchet, 1/4" Drive; 4" Ext; 7/16" Socket; (40-200 in-lbs) Trq Wrench).

9. Fasten CPA ground straps (two), torque to 45 in-lbs (Ratchet, 1/4" Drive; 4" Ext; 5/32" Hex Head; (40-200 in-lbs) Trq Wrench).

10. Check for continuity between CPA and ACBM Ring (Scopemeter).

<table>
<thead>
<tr>
<th>Table 2. CBM CPA Power/Data Cables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cable or Bulkhead Label +</strong></td>
</tr>
<tr>
<td>Primary Power</td>
</tr>
<tr>
<td>1553/485 Bus Data</td>
</tr>
<tr>
<td>Secondary Power</td>
</tr>
<tr>
<td>485 Bus Data</td>
</tr>
<tr>
<td>Capture Latch CL(X)</td>
</tr>
<tr>
<td>Powered Bolt (X)-1</td>
</tr>
<tr>
<td>Powered Bolt (X)-2</td>
</tr>
<tr>
<td>Powered Bolt (X)-3</td>
</tr>
<tr>
<td>Powered Bolt (X)-4</td>
</tr>
</tbody>
</table>

* Where for Node 1, Y = 2 (Forward), 4 (Starboard), 5 (Zenith), 6 (Port), 7 (Nadir), and for Lab Forward, Y = 8

+ Where X = CPA Number (1, 2, 3, 4)

11. Mate all CBM CPA power/data cables (nine).
   Refer to Table 2.

POST MAINTENANCE

12. If required, perform {1.104 CBM CENTER DISK COVER INSTALLATION}, all (SODF: S&M: NOMINAL: VESTIBULE), then:

13. Inform MCC-H of task completion.

14. √MATS for stowage location of failed CPA
   Stow tools, equipment.
OBJECTIVE:
This procedure improves access within the Node 1 Forward vestibule volume by removing all four of the CBM Controller Panel Assemblies (CPAs) mounted on the Node 1 Forward hatch beam.

LOCATION:
Installed: Node 1 Forward Active CBM Hatch Beam
Stowed: MCC-H for stowage location

DURATION:
2 hours

PARTS:
- Middeck Axial Barrier Assembly P/N 683-60461-1
- Port Floor Bag
- MA16G CTB, Single (2) P/N SEG33111837-301
- CTB, Divider (2) P/N SEG33111841-309
- 24” x 24” Ziplock Bag (4) P/N 528-50000-8

NOTE
The following quantities are for only one of four CPAs. These items are stowed together in one 24” x 24” Ziploc Bag. Total quantity of Protective Caps required for entire procedure is 72.

- Desiccant Bag Assy (1) P/N SDG39125390-303
- 12” x 12” Ziplock Bag (1) P/N 528-50000-5
- Protective Cap (1) P/N NATC-RPC-N-15-0
- Protective Cap (1) P/N NATC-PPC-N-15-0
- Protective Cap (2) P/N NATC-RPC-N-11-0
- Protective Cap (2) P/N NATC-PPC-N-11-0
- Protective Cap (6) P/N NATC-RPC-N-13-0
- Protective Cap (6) P/N NATC-PPC-N-13-0

MATERIALS:
- MF28O Velcro Straps
- Gray Tape
- FDF Kit Scissors
- Marking Pen
- WCS Towel

TOOLS REQUIRED:
- MF28O IFM Tool Kit
- Drawer 3
  - 4” Ratchet Wrench
  - 4” Ext
  - 7/16” Socket, 1/4” Drive
  - 5/32” Allen Head, 1/4” Drive
- Drawer 1
  - Static Wrist Tether
REFERENCED PROCEDURES:
None

SAFING

WARNING
Failure to remove power can result in electrical shock hazard. If unit is still powered, inform MCC-H.

1. Verify Primary, Secondary RPCs supplying CBM are Open.

PCS S&M
N1 Active CBM Display
‘N1_Fwd_CBM_Data’

‘RPCM_N13B_C (Primary Power)’

sel RPC [X] Cntr Assy [Y] where [X] = 3 4 5 6
where [Y] = 1 2 3 4

RPCM_N13B_C_RPC_[X]
√RPC Position – Op
√RPC Close Cmd – Inh

Repeat

‘RPCM_N14B_A (Secondary Power)’

sel RPC [X] Cntr Assy [Y] where [X] = 2 3 14 15
where [Y] = 1 2 3 4

RPCM_N14B_A_RPC_[X]
√RPC Position – Op
√RPC Close Cmd – Inh

Repeat

CAUTION
CPAs must be free of moisture before being stowed to protect equipment.

2. Inspect each CPA for condensation, dry as required (towel). Report any condensation to MCC-H.
3. Don Static Wrist Tether. Secure clip end to unpainted metal surface.

**REMOVING CPA**
Refer to Figure 1.

- Bolt/Latch Cables (five)
- Captive Fasteners (five)
- Ground Strap (one) (Red Wire)
- Data Cable (one) (Braided Cable)
- Power Cable (one) (Red Cable)

![Diagram of CBM Controller Panel Assembly](image)

Figure 1.- Typical installation of CBM Controller Panel Assembly (CPA).

4. Disconnect Power/Data Cable Connectors (nine) from one CPA.

5. Place Protective Caps (eighteen) on all electrical connectors, receptacles.

**NOTE**
Ground Straps should only be removed at CPA side of cable. Bulkhead location contains non-captive fasteners.

6. Disconnect CPA Ground Straps (two) from CPA (4" Ratchet Wrench; 5/32" Allen Head).

7. Tuck cables, Ground Straps into vestibule, tie down if required (Velcro Strap).
1.2.512  CBM CONTROLLER PANEL ASSEMBLY REMOVAL - GENERIC
(ISS IFM/4A - ALL/FIN)  Page 4 of 5 pages

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

8. Loosen fasteners (five) on CPA, detach from bulkhead (4” Ratchet Wrench; 4” Ext; 7/16” Socket).

9. Remove Static Wrist Tether from bulkhead, if required.

LABELING CPA

![Labeling CPA]

Figure 2.- Typical labeling of CBM Controller Panel Assembly (CPA).

CAUTION
Labeling of CPAs must not be done on critical surfaces. These surfaces include CPA-to-hatch beam bonding surface, front reflective surface.

10. Label back of CPA with its location (overhead, deck, port, starboard), bulkhead position label (CPA 1, 2, 3, 4) (Gray Tape, Marking Pen). Refer to CPA labels painted on bulkhead, Figure 2.

11. Record CPA Part Number, Serial Number for each location:

   Bulkhead label CPA 1: _________________
   Bulkhead label CPA 2: _________________
   Bulkhead label CPA 3: _________________
   Bulkhead label CPA 4: _________________
12. Remove one Desiccant Bag from two-layer Purple-Poly Over-Wrap Bag (Scissors).
   Discard Purple-Poly Over-Wrap Bag.

13. Place the following into one 24" x 24" Ziplock Bag
   CPA (1)
   Desiccant Bag (1)
   Empty 12" x 12" Ziplock Bag (1)

14. Stow 24" x 24" Ziplock Bag (now with CPA) into CTB, per preinstalled
    label.
    Insert divider between each Ziplock Bag containing CPAs, if required.
    Refer to Figure 3.

15. Repeat steps 3 through 14 for remaining CPAs.

CLOSEOUT
16. Install Axial Barrier Assembly, 1/4 turn fastener (sixteen).

POST MAINTENANCE
17. Temporarily stow both CTBs in ISS.

18. Report task completion to MCC-H.

19. Stow tools, equipment.
OBJECTIVE:
Install four CBM Controller Panel Assemblies (CPAs) onto an Active CBM hatch beam.
Two CPAs are stowed together in one Cargo Transfer Bag (CTB).

LOCATION:
Stowed: Maintenance and Assembly Task Supplement (MATS)
Installed: Active CBM Hatch Beam

DURATION:
2 hours 30 minutes

PARTS:
CTB, Single (2) (P/N SEG33111837-301)

NOTE
The following items are stowed together inside the two Cargo Transfer Bags.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBM Controller Panel Assy (2)</td>
<td>2355260-1-1</td>
</tr>
<tr>
<td>CBM Controller Panel Assy (1)</td>
<td>2355260-2-1</td>
</tr>
<tr>
<td>CBM Controller Panel Assy (1)</td>
<td>2355260-3-1</td>
</tr>
<tr>
<td>CTB, Divider (2)</td>
<td>SEG33111841-309</td>
</tr>
<tr>
<td>24” x 24” Ziplock Bag (4)</td>
<td>528-50000-8</td>
</tr>
<tr>
<td>Desiccant Bag Assy (4)</td>
<td>SDG39125390-303</td>
</tr>
<tr>
<td>12” x 12” Ziplock Bag (4)</td>
<td>528-50000-5</td>
</tr>
<tr>
<td>Protective Cap (4)</td>
<td>NATC-RPC-N-15-0</td>
</tr>
<tr>
<td>Protective Cap (4)</td>
<td>NATC-PPC-N-15-0</td>
</tr>
<tr>
<td>Protective Cap (8)</td>
<td>NATC-RPC-N-11-0</td>
</tr>
<tr>
<td>Protective Cap (8)</td>
<td>NATC-PPC-N-11-0</td>
</tr>
<tr>
<td>Protective Cap (24)</td>
<td>NATC-RPC-N-13-0</td>
</tr>
<tr>
<td>Protective Cap (24)</td>
<td>NATC-PPC-N-13-0</td>
</tr>
</tbody>
</table>

MATERIALS:
Towel
Dry Wipes

TOOLS REQUIRED:
F5 Camera
ISS Common IVA Tool Kit:
Scopemeter
Kit D:
  5/32” Hex Head, 1/4” Drive
Kit E:
  Ratchet, 1/4” Drive
  4” Ext, 1/4” Drive
Kit F:
  7/16” Socket, 1/4” Drive
Kit G:
  (40-200 in-lbs) Trq Wrench, 1/4” Drive
Lid #1: Static Wrist Tether

REFERENCED PROCEDURES:
1.2.509 CBM MAINTENANCE POWERDOWN

SAFING

**WARNING**
Failure to remove power can result in electrical shock hazard.

1. Perform [1.2.509 CBM MAINTENANCE POWERDOWN], all (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

2. If installed, remove Axial Port Closeout, 1/4 turn fastener (sixteen). Temporarily stow.

UNSTOW

![Figure 1.- Typical CPA Stowage Configuration.](image)

3. Remove one 24" x 24" Ziplock Bag (containing CPA) from CTB. Temporarily stow CTB. Refer to Figure 1.

4. Remove, temporarily stow the following from 24" x 24" Ziplock Bag:
   - CPA (one)
   - Desiccant Bag (one)
   - Empty 12" x 12" Ziplock Bag (one)
CAUTION

1. CPAs must be free of moisture before being installed (inspect areas between each controller).

2. This procedure is performed near hatch seals. Care must be taken to avoid seal damage.

5. Inspect CPA for condensation, dry as required (towel). Report any condensation to MCC-H.

INSTALLATION

CPA 1:
P/N: 2355260-1-1
S/N: D0012

CPA 2:
P/N: 2355260-2-1
S/N: D0040

CPA 3:
P/N: 2355260-1-1
S/N: D0017

CPA 4:
P/N: 2355260-3-1
S/N: D0046

Figure 2.- CBM CPA Installation Layout.
CAUTION

1. CPAs are not interchangeable and must be replaced in original mounting location.

2. Failure to completely engage all five CPA captive fasteners prior to pushing/pulling on CPA may damage fasteners.

6. Mount CPA in its labeled position (CPA 1, 2, 3, 4), snug fasteners (five) by hand. Refer to Figures 2, 3, 4, CPA labels, bulkhead.

7. Torque fasteners (five) to 125 in-lbs (Ratchet, 1/4" Drive; 7/16" Socket; (40-200 in-lbs) Trq Wrench).

8. Fasten CPA Ground Strap fasteners (two) (Ratchet, 1/4" Drive; 4" Ext; 5/32" Hex Head).

9. Check for continuity between CPA, hatch beam (Multimeter).
CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

10. Don Static Wrist Tether.
Secure clip end to unpainted, non-anodized metal surface.

11. Remove Protective Caps (eighteen), Velcro Straps from cables, CPA.
Stow Protective Caps, Velcro Straps into one 12” x 12” Ziplock Bag.
Temporarily stow Ziplock Bag.

CAUTION
Inspect each connector pin for damage prior to mating each cable.

Table 1. CPA (X) Power/Data Cables  (X= 1, 2, 3, 4)

<table>
<thead>
<tr>
<th>Cable or Bulkhead Label</th>
<th>Wire Harness No.</th>
<th>Harness Plug No.</th>
<th>CPA (X) Jack No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Power</td>
<td>W770</td>
<td>P(X)</td>
<td>J1</td>
</tr>
<tr>
<td>1553/485 Bus Data</td>
<td>W771</td>
<td>P(X)</td>
<td>J2</td>
</tr>
<tr>
<td>Secondary Power</td>
<td>W772</td>
<td>P(X)</td>
<td>J3</td>
</tr>
<tr>
<td>485 Bus Data</td>
<td>W773</td>
<td>P(X)</td>
<td>J4</td>
</tr>
<tr>
<td>Capture Latch CL(X)</td>
<td>P1 TO J5 LCH CONT</td>
<td>P1</td>
<td>J5</td>
</tr>
<tr>
<td>Powered Bolt (X)-1</td>
<td>P1 TO J6 BLT CONT</td>
<td>P1</td>
<td>J6</td>
</tr>
<tr>
<td>Powered Bolt (X)-2</td>
<td>P1 TO J7 BLT CONT</td>
<td>P1</td>
<td>J7</td>
</tr>
<tr>
<td>Powered Bolt (X)-3</td>
<td>P1 TO J8 BLT CONT</td>
<td>P1</td>
<td>J8</td>
</tr>
<tr>
<td>Powered Bolt (X)-4</td>
<td>P1 TO J9 BLT CONT</td>
<td>P1</td>
<td>J9</td>
</tr>
</tbody>
</table>

12. →\leftarrow Power/data cable connectors (nine) for one CPA. Refer to Table 1.

13. Remove Static Wrist Tether from bulkhead.

14. Repeat steps 3 --- 13 for remaining CPAs.

POST MAINTENANCE
15. Photo document each installed CPA, include all connectors (F5 camera).

16. Stow the following into each CTB:
   - 12” x 12” Ziplock Bag (two) each filled with Protective Caps (eighteen)
   - Empty 24” x 24” Ziplock Bag (two)
   - Divider (one)

17. Wipe clean Optical Tape on each CPA (four) (Dry Wipes).

18. Report task completion to MCC-H.

19. MATS for stowage location of Axial Port Closeout, CTBs
    Stow tools, equipment.
OBJECTIVE:
Remove a defective, unbolted CBM Nut Assembly and replace with an operable assembly.

LOCATION:
Installed: Passive CBM Ring
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour (additional 40 minutes required for removal of Vestibule Closeout or CBM Center Disk Cover)

PARTS:
CBM Nut Assembly (P/N 683-13503-001)

MATERIALS:
Marker Pen

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit E:
   Ratchet, 1/4" Drive
   2" Ext, 1/4" Drive
Kit F:
   5/16" Socket, 1/4" Drive
   3/8" Socket, 1/4" Drive
Kit G:
   (40-200 in-lbs) Trq Wrench, 1/4" Drive

REFERENCED PROCEDURE(S):
1.2.509 CBM MAINTENANCE POWERDOWN
1.104 CBM CENTER DISK COVER INSTALLATION
1.105 CBM CENTER DISK COVER REMOVAL
1.2.512 CBM CONTROLLER PANEL ASSEMBLY REMOVAL
1.2.513 CBM CONTROLLER PANEL ASSEMBLY INSTALL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. Perform {1.2.509 CBM MAINTENANCE POWERDOWN}, all (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:
CAUTION
This procedure is performed near Hatch Seals. Care must be taken to avoid seal damage.

ACCESS
2. If installed, remove Axial or Radial Closeout, 1/4-turn fasteners (sixteen). Temporarily stow.

3. If required, perform [1.105 CBM CENTER DISK COVER REMOVAL], all (SODF: S&M: NOMINAL: VESTIBULE), then:

4. If required, perform [1.2.512 CBM CONTROLLER PANEL ASSEMBLY REMOVAL], all (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

NOTE
Removal of Alignment Guide requires slight rocking motion to remove four alignment pins with sockets on CBM Ring.


REMOVAL

6. Unfasten Nut Plate fasteners (two)
Remove Nut Assembly (Ratchet, 1/4" Drive; 2" Ext; 5/16" Socket).
Refer to Figure 1.
Label, temporarily stow.

7. Align Alignment Pins (two) on Nut Plate with alignment holes (two) in passive berthing ring.

8. Slide assembly into alignment holes until there is metal to metal contact.
REPLACEMENT
9. Fasten replacement Nut Assembly fasteners (two) 1/4 turn past snug, torque to 45 in-lbs (Ratchet, 1/4" Drive; 2" Ext; 5/16" Socket; (40-200 in-lbs) Trq Wrench).

10. Ensure there is free movement of Powered Bolt Nut Barrel.

CHECKOUT

NOTE
Prior to reinstallation of PCBM Alignment Guide(s) or closeouts, operation of Powered Bolt Assembly must be verified by complete engagement of CBM Powered Bolt into Nut Assembly.

11. √MCC-H for CBM Nut Assembly checkout procedure.

CLOSEOUT
12. If required, perform {1.2.513 CBM CONTROLLER PANEL ASSEMBLY INSTALL}, all (SODF: S&M: NOMINAL: VESTIBULE), then:

NOTE
There are four Alignment Pins on the Alignment Guide and four Alignment Pin Sockets on PCBM ring to aid guide installation.

13. If required, reinstall Alignment Guides.
    Tighten fasteners (five) 1/4 turn Past Snug, torque to 85 in-lbs (Ratchet, 1/4" Drive; 3/8" Socket; (40-200 in-lbs) Trq Wrench).

14. If required, reinstall Axial or Radial Closeout, 1/4-turn fasteners (sixteen).

15. If required, perform {1.104 CBM CENTER DISK COVER INSTALLATION}, all (SODF: S&M: NOMINAL: VESTIBULE), then:

POST MAINTENANCE
16. Inform MCC-H of task completion.

17. √MATS for defective Nut Assembly stowage location
    Stow tools, equipment.
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OBJECTIVE:
Remove failed CBM Powered Bolt Actuator and replace with an operable assembly.

LOCATION:
Installed: Active CBM Ring
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour (additional 40 minutes required to remove Vestibule Closeout or Center Disk Cover)

PARTS:
CBM Powered Bolt Actuator (P/N 683-13621-004)

MATERIALS:
Marking Pen

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Spanner Wrench
Kit C:
  3/8" Socket, 3/8" Drive
Kit E:
  Ratchet, 3/8" Drive
Kit G:
  (150-1000 in-lbs) Trq Wrench, 3/8" Drive
  (30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #1:
  Static Wrist Tether

REFERENCED PROCEDURE(S):
1.2.509  CBM MAINTENANCE POWERDOWN
1.104  CBM CENTER DISK COVER INSTALLATION
1.105  CBM CENTER DISK COVER REMOVAL
1.2.517  CBM READY-TO-LATCH R&R-GENERIC
1.2.512  CBM CONTROLLER PANEL ASSEMBLY REMOVAL
1.2.513  CBM CONTROLLER PANEL ASSEMBLY INSTALL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.
1. Perform {1.2.509 CBM MAINTENANCE POWERDOWN}, all (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

**CAUTION**

This procedure is performed near Hatch Seals. Care must be taken to avoid seal damage.

**ACCESS**

2. If installed, remove Axial or Radial Closeout, 1/4 turn fasteners (sixteen). Temporarily stow.

3. If required, perform {1.105 CBM CENTER DISK COVER REMOVAL}, all (SODF: S&M: NOMINAL: VESTIBULE), then:

4. If required, perform {1.2.512 CBM CONTROLLER PANEL ASSEMBLY REMOVAL}, all (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

5. If required, perform {1.2.517 CBM READY-TO-LATCH R&R}, REMOVAL steps only (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

**NOTE**

Removal of Alignment Guide requires slight rocking motion to remove four alignment pins with sockets on CBM Ring.


**REMOVAL**

Figure 1.- Power Bolt Assembly.
CAUTION

Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD). Do not touch connector pins, sockets unless wearing a Static Wrist Tether.

7. Power connector P2 ←|→ J1 Actuator power receptacle
   Refer to Figure 1.

8. Break torque on threaded collar (Spanner Wrench; Ratchet, 3/8” Drive).

9. Loosen threaded collar by hand.
   Remove Actuator from Powered Bolt.
   Label “Failed.”
   Temporarily stow.

REPLACEMENT

NOTE

Replace Powered Bolt Actuator Assembly contains an internal thread protector that must be removed prior to installation.

10. Remove internal thread protector from replacement Actuator.
11. With Actuator power/data receptacle pointed in inboard direction, mate output gear of Actuator to input gear of Powered Bolt.

12. Rotate Actuator while pressing it against Powered Bolt until Actuator pins seat in corresponding holes in Powered Bolt.

13. Turn threaded collar on Actuator 1/2 turn past snug (Spanner Wrench; Ratchet, 3/8" Drive).

14. Torque collar of replacement Actuator Assembly to 225 in-lbs ((150-1000 in-lbs) Trq Wrench; Spanner Wrench).

15 Power connector P2 →|← J1 Actuator power receptacle Ref to Figure 1.

CHECKOUT
16. √MCC-H for Powered Bolt Actuator checkout procedure

CLOSEOUT
17. If required, perform {1.2.517  CBM READY-TO-LATCH R&R}, REPLACEMENT steps only (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

18. If required, perform {1.2.513  CBM CONTROLLER PANEL ASSEMBLY INSTALL}, all (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

19. If required, reinstall PCBM Alignment Guides.
   Fasten fasteners (five) 1/4 turn past snug, torque to 85 in-lbs (Ratchet, 1/4" Drive; 3/8" Socket; (30-200 in-lbs) Trq Wrench).

20. If required, reinstall Axial or Radial Closeout, 1/4 turn fasteners (sixteen).

21. If required, perform {1.104  CBM CENTER DISK COVER INSTALLATION}, all (SODF: S&M: NOMINAL: VESTIBULE), then:

POST MAINTENANCE
22. Inform MCC-H of task completion.

23. √MATS for stowage location of failed Powered Bolt Actuator
   Stow tools, maintenance supplies.
**OBJECTIVE:**
Remove a failed CBM Powered Bolt and replace with spare.

**LOCATION:**
Installed: Active CBM Ring
Stowed: √Maintenance and Assembly Task Supplement (MATS)

**DURATION:**
1 hour for removal of Powered Bolt only
1 hour 15 minutes, if Powered Bolt is jammed into Nut
Additional 2 hours to remove Controller Panel Assembly, Ready-To-Latch
Additional 40 minutes to remove Center Disk Cover

**PARTS:**
CBM Powered Bolt  (P/N 683-13450-001)
CBM Nut Assembly  (P/N 683-13503-001) (if jammed)
Protective Caps

**MATERIALS:**
Marking Pen

**TOOLS REQUIRED:**
Mini Maglite
Scopemeter
Spanner Wrench
ISS Common IVA Tool Kit:
Kit A:  
1 5/16” Combination Wrench
Kit C:  
3/8” Socket, 3/8” Drive
Kit E:  
Ratchet, 1/4” Drive
Ratchet, 3/8” Drive
2” Ext, 1/4” Drive
Kit F:  
5/16” Socket, 1/4” Drive
Kit G:  
(150-1000 in-lbs) Trq Wrench, 3/8” Drive
(40-200 in-lbs) Trq Wrench, 1/4” Drive
Kit J:  
Large Needle Nose Pliers

**REFERENCED PROCEDURE(S):**
1.2.515  CBM POWERED BOLT ACTUATOR R&R
WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
This procedure is performed near hatch seals. Care must be taken to avoid seal damage.

NOTE
Safing and Access steps will be performed as part of the CBM POWERED BOLT ACTUATOR R&R, Removal steps (SODF: ISS IFM: COMMON: CORRECTIVE: S&M).

ACCESSING
ACBM
1. Perform (1.2.515 CBM POWERED BOLT ACTUATOR R&R), REMOVAL steps only (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

REMOVAL
2. If Powered Bolt is jammed in Encapsulated Nut
   Remove Powered Bolt and Nut Assembly.
   Go to step 3.

   If Powered Bolt not jammed in Encapsulated Nut
   Go to step 6.
CAUTION
In steps 3 --- 7, loose items may be freed. Refer to Figure 1. Take care to avoid foreign object debris.

PCBM
3. Remove Cotter Pin from Nut Assembly (Needle Nose Pliers). Temporarily stow. Refer to Figure 1.
4. Remove Contingency Release Nut and washers from Nut Assembly (1 5/16" Combination Wrench). Temporarily stow. Refer to Figure 1.
5. Unfasten Nut Assembly fasteners (two). Remove fasteners from PCBM (Ratchet, 1/4" Drive; 2" Ext; 5/16" Socket). Temporarily stow.
Figure 2.- Powered Bolt Assembly and Load Cell Connector.

**NOTE**
Per Figure 2, Powered Bolts adjacent to RTLs on ACBM Ring (four) have Load Cell Connector (P3) Brackets that are integral to RTL Bracket.

6. Load Cell Connector (P3) ←→ connector bracket
Refer to Figure 2.

Figure 3.- Power Bolt - End View (with Actuator removed).

ACBM 7. Remove Powered Bolt Assembly, fasteners (two) (Ratchet, 1/4" Drive; 2" Ext; 5/16" Socket).
Refer to Figure 3.
Label “Failed.”
Temporarily stow.
8. If required, install replacement Nut Assembly.
   Tighten fasteners (two), torque to 45 in-lbs (Ratchet, 1/4" Drive; 2" Ext; 5/16" Socket; (40-200 in-lbs) Trq Wrench).

9. Install replacement Powered Bolt, ground cable.
   Tighten fasteners (two), 1/4 turn past snug, torque to 45 in-lbs (Ratchet, 1/4" Drive; 2" Ext; 5/16" Socket; (40-200 in-lbs) Trq Wrench).
   Refer to Figure 3.

**NOTE**
Closeout steps will be performed as part of the CBM POWERED BOLT ACTUATOR R&R, INSTALL steps.

10. Perform [1.2.515 CBM POWERED BOLT ACTUATOR R&R], Installation steps only (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

**CHECKOUT**
11. √MCC-H for Powered Bolt checkout procedure

**POST MAINTENANCE**
12. Inform MCC-H of task completion.

13. √MATS for stowage of failed Powered Bolt and Nut Assembly
    Stow tools, materials.
OBJECTIVE:
Remove failed CBM Ready-to-Latch (RTL) Assembly and replace with a spare.

LOCATION:
Installed: Active CBM Ring
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour (additional 40 minutes required to remove Center Disk Cover or Vestibule Closeout)

PARTS:
CBM Ready-to-Latch Assembly (P/N 683-13729-001)

MATERIALS:
Marker Pen

TOOLS REQUIRED:
Vestibule Outfitting Kit:
  - RTL PIP Pin
Mini Maglite
Feeler Gage
ISS Common IVA Tool Kit:
  Kit E:
  - Ratchet, 1/4” Drive
Kit F:
  - 3/8” Socket, 1/4” Drive
Kit G:
  - (40-200 in-lbs) Trq Wrench, 1/4” Drive
Lid #1:
  - Static Wrist Tether

REFERENCED PROCEDURE(S):
1.2.509  CBM MAINTENANCE POWERDOWN
1.104  CBM CENTER DISK COVER INSTALLATION
1.105  CBM CENTER DISK COVER REMOVAL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. Perform {1.2.509  CBM MAINTENANCE POWERDOWN}, all (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:
CAUTION
This procedure is performed near Hatch Seals. Care must be taken to avoid seal damage.

ACCESSING
2. If installed, remove Axial or Radial Closeout, 1/4 turn fasteners (sixteen). Temporarily stow.

3. If required, perform \(1.105\) \(CBM\) CENTER DISK COVER REMOVAL, all (SODF: S&M: NOMINAL: VESTIBULE) then:

   Figure 1.- Ready-to-Latch Indicator.

   NOTE
   RTL paddle must be locked in stowed position to remove Alignment Guide.

   ACBM
4. Insert PIP Pin into RTL to lock paddle in stowed position. Refer to Figure 1.

   NOTE
   Removal of Alignment Guide requires slight rocking motion to remove four alignment pins with sockets on CBM Ring.

   PCB
REMOVAL

ACBM  6. Remove PIP Pin from RTL Paddle.
         Temporarily stow.

CAUTION

Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD). Do not touch connector pins, sockets without a Static Wrist Tether.

7. RTL connector (P4) ←→ RTL
   Refer to Figure 2.

8. Unfasten RTL fasteners (two).
   Remove RTL (Ratchet, 1/4" Drive; 3/8" Socket).
   Label, temporarily stow.

REPLACEMENT

9. Install replacement RTL.
   Tighten fasteners (two) 1/4 turn past snug, torque to 85 in-lbs (Ratchet, 1/4" Drive; 3/8" Socket; (40-200 in-lbs) Trq Wrench).

10. RTL connector (P4) →|← RTL receptacle
    Refer to Figure 2.
CHECKOUT
11. √MCC-H for RTL checkout procedure

CLOSEOUT
   Insert PIP Pin.
   Refer to Figure 1.

PCBM 13. Replace Alignment Guide.
   Tighten fasteners (five) 1/4 turn past snug, torque to 85 in-lbs (Ratchet,
   1/4” Drive; 3/8” Socket; (40-200 in-lbs) Trq Wrench).

   Temporarily stow.

15. If required, reinstall Axial or Radial Closeout, 1/4 turn fasteners (sixteen).

16. If required, perform {1.104 CBM CENTER DISK COVER INSTALLATION}, all (SODF: S&M: NOMINAL: VESTIBULE), then:

POST MAINTENANCE
17. Inform MCC-H of task completion.

18. √MATS for stowage location of failed RTL
   Stow tools, equipment.
OBJECTIVE:
To install a secondary seal to reduce leakage between active ring and the element.

LOCATION:
Installed: Module Vestibule
Stowed: √MCC-H for Stowage Location

DURATION:
10 hours

PARTS:
RVCO Node 1 IVA Seal Kit (P/N 683-13660-3)
NOD1P4 Side O-ring Extraction Tool (ASAP-7120100)

MATERIALS:
Dry Wipes
Rubber Gloves
Braycote 601

TOOLS REQUIRED:
Equipment Bag
Station Tools:

NOD1P4 Side Spanner Wrench

Modified 5/32" L-Wrench (stowed IVA seal kit)
Kit C:
3/8" Socket, 3/8" Drive
Kit D:
1/8" Hex Head, 1/4" Drive
5/16" Hex Head, 1/4" Drive
1/8" Hex Head, 3/8" Drive
5/32" Hex Head, 3/8" Drive
3/16" Hex Head, 3/8" Drive
Kit E:
Ratchet, 1/4" Drive
Ratchet, 3/8" Drive
Kit F:
3/8" Socket, 1/4" Drive
Kit G:
(10-50 in-lbs) Trq Wrench, 1/4" Drive
Kit R:
5/32" Stubby Hex Head, 1/4" Drive

REFERENCED PROCEDURE(S):
1.2.516 CBM POWERED BOLT R&R - GENERIC
1.2.517 CBM READY-TO-LATCH R&R - GENERIC
1.2.515 CBM POWERED BOLT ACTUATOR R&R - GENERIC
1.2.510 CBM CAPTURE LATCH R&R - GENERIC
1.2.518 ACBM TO PRESSURIZED ELEMENT SEAL KIT INSTALLATION
(ISS IFM/3A - ALL/FIN) Page 2 of 5 pages

WARNING
Failure to remove power can result in personal injury.

ACTIVE RING TO ELEMENT INTERFACE ACCESS

CAUTION
This procedure is performed near hatch seals. Care must be taken to avoid seal damage.

1. Retrieve tools and maintenance supplies.

2. Remove Ready-to-Latch Indicators (RTL) (four) by performing {1.2.517 CBM READY-TO-LATCH R&R - GENERIC}, REMOVE steps (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

3. Remove PCBM alignment guides (eight), fasteners (five each) (Ratchet, 1/4” Drive; 3/8” Socket). Refer to Figure 1.

4. Remove powered bolt actuators (sixteen) by performing {1.2.515 CBM POWERED BOLT ACTUATOR R&R - GENERIC}, REMOVE steps, (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

5. Remove Capture Latches (four) by performing {1.2.510 CBM CAPTURE LATCH R&R - GENERIC}, REMOVE steps, (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

6. Stow alignment guides, RTLs, bolt actuators, and Capture latches.

Figure 1.- Alignment Guides to be Removed for Access to the ACBM Ring.
7. Remove seal restraints (six), fasteners (two) (Ratchet, 1/4” Drive; 3/16” Hex Head). Refer to Figure 2. Temporarily stow.

NOTE

O-ring could possibly be left in place if time is a constraint. If O-ring is not being replaced, skip to step 9.

8. Remove protective O-ring from groove, being careful not to scratch surface (O-ring Extraction Tool). Temporarily stow.

ACBM TO ELEMENT SEAL INSTALLATION

9. Clean IVA O-ring groove (Dry Wipes). Clean only in the circumferential direction. Wipe until no residue is found on wipe. Dispose of wipes in trash bag.

10. Clean new IVA Seal Kit O-ring (Dry wipes).

11. Spread small amounts of Braycote on index finger. Apply to O-ring groove (Rubber Gloves).

12. Gently press new IVA Seal Kit O-ring into IVA groove at approximately 0 degrees and 180 degrees, then at approximately 90 degrees and 270 degrees. Continue this pattern and verify that entire O-ring is seated in groove.

COMPRESSION PLATE INSTALLATION

13. Ensure that captive fasteners on compression plates have free movement within their holes.
1.2.518 ACBM TO PRESSURIZED ELEMENT SEAL KIT INSTALLATION

Figure 3.- Location of Center Fasteners.

NOTE
Hand tighten two center fasteners on each compression plate to hold plates until all plates are installed.

Figure 4.- ACBM Locations of Powered Bolts and Compression Plate Installations.

NOTE
1. Refer to Figure 4 for compression plate installation locations designated by -#s in steps 14 --- 16.
2. Compression plates are installed clockwise with respect to -4 compression plates.

14. Install two -4 compression plates (683-13670-4) at third powered bolt location and the 11th powered bolt location.
15. Install
   -5 compression plate adjacent to -4
   -6 compression plate adjacent to -5
   -7 compression plate adjacent to -6
   -8 compression adjacent to -7
   -5 plate adjacent to -8
   -6 adjacent to -5
   -9 adjacent to -6

16. Repeat steps 14 and 15 at other installed -4 compression plate.

NOTE
1. Connector brackets for the powered bolts may present interference problems with compression plate fasteners.
2. If access with Trq Wrench and 5/32" Hex is difficult, the modified 5/32" L-Wrench may be used. Refer to Figure 5.

17. Torque all compression plate fasteners (156) to 20 in-lbs, then 40 in-lbs in the order of installation ((10-50 in-lbs) Trq Wrench; 1/8" Hex; 5/32" Hex).

CLOSEOUT
18. Reinstall Powered Bolt Actuators and Alignment Guides.

POST MAINTENANCE
19. Inform MCC-H of task completion.

20. Stow tools, supplies.
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OBJECTIVE:
To install a secondary seal to reduce leakage between the passive ring and the element.

LOCATION:
Installed: Module Vestibule
Stowed: MCC-H for Stowage Location

DURATION:
4 hours

PARTS:
IVA Seal Kit (P/N 683-13660-2)

MATERIALS:
Dry Wipes
Braycote 601
Rubber Gloves

TOOLS REQUIRED:
Equipment Bag
O-ring Extraction Tool (ASAP-7120100)
Modified 5/32" L-Wrench (Stowed IVA Seal Kit)
ISS Common IVA Tool Kit:
Kit E
  Ratchet, 1/4" Drive
Kit F
  3/8" Socket, 1/4" Drive
Kit G:
  (10-50 in-lbs) Trq Wrench, 1/4" Drive
Kit I
  Common Tip Screwdriver 3"
Kit R:
  5/32" Stubby Hex Head, 1/4" Drive

REFERENCED PROCEDURE(S):
None
1. Remove O-ring restraints (six), fasteners (two) (Ratchet, 1/4" Drive; 5/32" Stubby Hex).
   Refer to Figure 1.

   **NOTE**
   If new O-ring is not being installed, skip to step 6.

   **CAUTION**
   Scratching surface may lead to larger leak.

2. Remove old O-ring (O-ring Extraction Tool).

**PCBM TO ELEMENT SEAL INSTALLATION**
3. Clean IVA O-ring groove (Dry Wipes).
   Clean only in circumferential direction.
   Wipe until no residue is found on wipe.
   Dispose of wipes in trash bag.

4. Apply continuous film of Braycote 601 to O-ring groove (Rubber Gloves).

5. Clean new O-ring (Dry Wipes).

6. Gently press new O-ring into IVA groove at approximately 0 degrees and 180 degrees.
   Then press O-ring into groove at approximately 90 degrees and 270 degrees.
   Continue pattern and verify that entire O-ring is seated in groove.

   **NOTE**
   There are three different types of compression plates for PCBM to Element seal kit.
COMPRESSION PLATE INSTALLATION

NOTE

1. Hand tighten one fastener on each end to hold plates until all plates are installed.

2. Both -3 compression plates are located on opposite sides of ring. This is the same for each type of compression plate.

Figure 2.- Location of Compression Plates Looking from Active to Passive.
1.2.519 PCBM TO ELEMENT SEAL KIT INSTALLATION

Figure 3.- Location of First Installed -2 Compression Plates (PMA2 and PMA3).

Figure 4.- Location of the Second Installed -2 Compression Plate (PMA2 and PMA3).
7. Ensure that captive fasteners on compression plates have free movement within their holes.

![Figure 5.- Shows IMV Duct and Band Clamp.](image)

8. If required, remove upper band clamp that holds IMV ducting (Common Tip Screwdriver 3”).
   Reroute IMV ducting to allow access to all compression plate fasteners.
   Refer to Figure 5.

   Align each plate with corresponding alignment pin in CBM flange.
   Refer to Figures 2, 3, and 4.
Figure 6.- Location of First Installed -1 Compression Plate (PMA2 and PMA3).
10. Remove Nitrogen line saddle clamp (PMA2 and PMA3) fasteners (two) (Ratchet, 1/4" Drive; 3/8" Socket).
Refer to Figure 7.

NOTE
Second installed -1 compression plate must be slid in from the side to get behind Nitrogen line bracket.

11. Install two -1 compression plates at PCBM-PE leak Blind Glands. Align with alignment pins. Refer to Figures 2, 6, and 7.
12. Install two -3 compression plates at remaining locations. Refer to Figures 2, 8, and 9.

13. Tighten all fasteners (126) by hand.
14. In order compression plates were installed, torque all fasteners to 20 and then 40 in-lbs, starting in the center and working outwards in a star pattern for each compression plate. For fasteners with access problems use Modified 5/32" L-Wrench ((10-50 in-lbs) Trq Wrench; 5/32" Hex; 5/32" Modified L-Wrench).

**POST MAINTENANCE**
15. Inform **MCC-H** of task completion.

16. Stow tools, supplies.
OBJECTIVE:
To install a secondary seal to reduce leakage through the CBM interface.

LOCATION:
Installed: Module Vestibule
Stowed: √MCC-H for Stowage Location

DURATION:
16 hours

PARTS:
IVA Seal Kit (RVCO NOD1S4) (P/N 683-13660-1)

MATERIALS:
Braycote 601 Lubricant Per BMS 3-25, Type II
Dry Wipes
Trash Bag
Rubber Gloves

TOOLS REQUIRED:
Equipment Bag
Spanner Wrench
ISS Common IVA Tool Kit:
Kit C:
   3/8" Socket, 3/8" Drive
Kit D:
   1/8" Hex Head, 1/4" Drive
   5/16" Hex Head, 1/4" Drive
   1/8" Hex Head, 3/8" Drive
   5/32" Hex Head, 3/8" Drive
   3/16" Hex Head, 3/8" Drive
Kit E:
   Ratchet, 1/4" Drive
   Ratchet, 3/8" Drive
Kit F:
   3/8" Socket, 1/4" Drive
Kit G:
   (40-200 in-lbs) Trq Wrench, 1/4" Drive
   (10-50 in-lbs) Trq Driver, 1/4" Drive
Kit R:
   5/32" Stubby Hex Head, 1/4" Drive

REFERENCED PROCEDURE(S):
1.2.515 CBM POWERED BOLT ACTUATOR R&R - GENERIC
1.2.510 CBM CAPTURE LATCH R&R - GENERIC
1.2.517 CBM READY-TO-LATCH R&R - GENERIC
WARNING

Failure to remove power can result in personal injury.

CAUTION

This procedure is performed near hatch seals. Care must be taken to avoid seal damage.

ACBM BOLT SEAL ACCESS

NOTE

CBM hardware is not installed for the Node 1 Aft.

1. Retrieve tools, maintenance supplies, and bolt spline lock (sixteen) and bolt/nut seal covers (thirty-two) from IVA Seal Kit.

![Image of alignment guides and fasteners](image.png)

Figure 1.- Four of the Sixteen Alignment Guides in Installed Location.

2. Remove Alignment Guides (sixteen), fasteners (five per alignment guide) (Ratchet, 1/4" Drive; 3/8" Socket). Refer to Figure 1.

3. For all four RTJs, perform \{1.2.517 CBM READY-TO-LATCH R&R - GENERIC\}, REMOVE steps (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:

4. For all sixteen bolt actuators, perform \{1.2.515 CBM POWERED BOLT ACTUATOR R&R - GENERIC\}, REMOVE steps (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:
5. Remove powered bolt upper housing, bolts (two).
   Repeat for each powered bolt location (Ratchet, 1/4" Drive; 5/32" Stubby Hex).
   Refer to Figures 2 and 3.

6. Remove powered bolt drive sleeves by hand.
   Refer to Figure 3.

7. Temporarily stow bolt actuators, alignment guides, upper housing, and drive sleeve.
8. Install bolt spline lock assembly over exposed external powered bolt spline.
   Align Load Pin with corresponding hole in CBM ring.
   Refer to Figure 4.

9. Tighten jam nut on spline lock assembly until it bottoms out with the load pin (Ratchet, 1/4" Drive; 3/8" Socket).
   Refer to Figure 4.

CBM TO CBM SEAL ACCESS

**NOTE**

1. Steps 8 --- 11 not required for Node 1 Aft since CBM hardware is not installed.

2. Step 11 is not required for Axial ports.

10. Remove capture latches (four).
    Perform **{1.2.510 CBM CAPTURE LATCH R&R - GENERIC}**, REMOVE steps (SODF: ISS IFM: COMMON: CORRECTIVE/S&M), then:
11. Remove capture fittings (four) on PCBM, fasteners (four) (Ratchet, 1/4" Drive; 1/8" Hex).
   Refer to Figure 5.

![Figure 5.- Installed Location of Capture Fitting.](image1)

![Figure 6.- Seal Cover Retainer and Cover Pulley Mount.](image2)
12. Remove cover pulley mount (eight), fasteners (four) (Ratchet, 1/4" Drive; 3/16" Hex).
   Refer to Figure 6.

13. Remove seal cover retainers (four on active side and eight on passive side), fasteners (two) (Ratchet, 1/4" Drive; 3/16" Hex).
   Refer to Figure 6.

ACBM BUTTER DISH INSTALLATION

14. Remove ACBM bolt sealing surface cover by removing fasteners (four) (Ratchet, 1/4" Drive; 5/32" Stubby Hex).
   Refer to Figure 7.

15. Clean ACBM butter dish sealing surface (Dry Wipes).
   Continue cleaning surface until no residue is found on wipe.
   Dispose of used wipes in trash bag.
16. Remove protective plastic seal cover from butter dish (683-13683-1) by loosening fasteners (four). Dispose of protective cover in trash bag (Ratchet, 1/4" Drive; 5/32" Stubby Hex). Refer to Figure 8.

17. Wipe butter dish sealing surface (Dry Wipes). Change to a clean location on wipe. Continue cleaning surface until no residue is found on the wipe. Dispose of wipes in trash bag.

18. Coil powered bolt load cell cable within butter dish prior to fitting over powered bolt assembly.

19. Install butter dish making sure to align alignment pins into ring (two).

20. Tighten, torque captive fasteners (four) to 45 in-lbs (Ratchet, 1/4" Drive; 5/32" Stubby Hex; (10-50 in-lbs) Trq Wrench).

21. Repeat steps 15 --- 21 for remaining powered bolt locations (fifteen) on ACBM.
PCBM BUTTER DISH INSTALLATION

22. Translate to PCBM side of vestibule.

Figure 9.- PCBM Bolt Sealing Surface Cover.

23. Remove PCBM bolt sealing surface cover by removing fasteners (four) (Ratchet, 1/4" Drive; 5/32" Stubby Hex). Refer to Figure 9.

24. Remove protective plastic seal cover from butter dish (683-13683-1) by loosening fasteners (four) (Ratchet, 1/4" Drive; 5/32" Stubby Hex). Dispose of protective cover in trash bag. Refer to Figure 8.

25. Wipe butter dish sealing surface (Dry Wipes). Change to a clean location on wipe. Continue cleaning surface until no residue is found on the wipe. Dispose of wipes in trash bag.

26. Wipe butter dish sealing surface on PCBM ring (Dry Wipes). Change to a clean location on wipe. Continue cleaning surface until no residue is found on the wipe. Dispose of wipes in trash bag.

27. Install butter dish making sure to align alignment pins (two) into ring.

28. Tighten, torque captive fasteners (four) to 45 in-lbs (Ratchet, 1/4" Drive; 5/32" Stubby Hex; (10-50 in-lbs) Trq Wrench).

29. Repeat steps 24 --- 28 for remaining nut locations (fifteen).
NOTE
The seal land cover is made up of four pieces. Each segment of the cover has two mounts.

Figure 10.- Seal Land Cover Mounts.

30. Partially loosen fasteners (thirty-two) for seal land covers on the ACBM and PCBM (Ratchet, 1/4" Drive; 5/16" Hex). Refer to Figure 10.

NOTE
During testing it was found that Viton from the back of the seal cover stuck to the sealing surface.

31. Remove one seal land cover at a time by totally loosening fasteners (two per end). Stow. Refer to Figure 10.

32. Wipe sealing surface (Dry Wipes). Wipe only in the circumferential direction. Clean approximately 45 degree section and then change to a clean location on the wipe. Continue cleaning surface until no residue is found on the wipe. Dispose of used wipe in the trash.
33. Clean seal segments (four) wiping in circumferential direction (Dry Wipes).

34. Place one seal on inside diameter of ACBM and PCBM interface. Orient female interlock end of seal segment (683-13665-1) with one of the hatch corners and align ring gusset visual cues with ring gusset locations. Refer to Figure 12.
Figure 13.- Compression Plates Installed Over Seal Segment.

35. Align compression plates (four) with seal segment.

**NOTE**
Numbers one and eight correspond with same numbers on compression plates.

Refer to Figure 13.

36. Partially screw in two center fasteners on each compression plate to hold the seal segment and compression plate in place.

37. Apply a continuous thin film of Braycote 601 grease to the male interlock area of next seal. Remove any residual grease. Dispose of wipe in trash.
38. Engage the two interlocks. Install compression plates and partially screw in two center fasteners on each compression plate to secure installed plates and seal as done in step 37 for previous seal segment. Refer to Figures 13 and 14.

39. Verify that gusset cue at female end lines up with gusset on CBM. Refer to Figure 12.

40. Install third seal segment per steps 36 --- 39.

41. Apply a continuous thin film of Braycote 601 grease to both male and female interlocks on fourth seal.

42. Slide male end of seal into female end of third seal segment. Slide the female end of fourth seal into place using a motion perpendicular to the CBM ring. Install compression plates and partially screw in two center fasteners on each compression plate to secure installed plates and seals as done in step 36.
43. Remove Capton Tape from back of splice plates. Dispose of tape in trash bag. Refer to Figure 15.
44. Align splice plates at seal interlock locations (four).
Loosely install splice plates (683-13665-2) at ends of seal segments,
aligning #11's on splice plates with #11's on seal segments (683-13665-1).
Refer to Figures 14 and 16.

![Diagram of splice plates](image)

ACBM Side

<table>
<thead>
<tr>
<th>2</th>
<th></th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

PCBM Side

![Diagram of compression plates](image)

Compression plates (four)

45. Torque compression plate fasteners (ten) in four increments, 40, 80, 120, 124 in-lbs.
ACBM compression plates followed by PCBM compression plates per Figure 17.
Torque compression plate fasteners on opposing side of CBM ring ((40-200 in-lbs) Trq Wrench; 3/8" Socket).
Refer to Figures 13 and 17.

10 NOV 00
46. Repeat step 45 for remaining seal segment compression plates starting with the seal segment compression plates adjacent to the first installed in step 45.

![Figure 18.- Order of Splice Plate Fastener Torquing.](image)

47. Torque splice plate fasteners (eighty) in four increments, 40, 80, 120, 124 in-lbs, per Figure 18 ((40-200 in-lbs) Trq Wrench; 3/8" Socket). Torque fasteners on opposing splice plate in the same manner.

48. Repeat step 47 for remaining splice plates.

**POST MAINTENANCE**

49. Inform **MCC-H** of task completion.

50. Stow tools, supplies.
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TOOLS REQUIRED:
Shuttle Midbay
  PGSC or SSC
  Databus Analyzer Tool (DAT) PASS 1000 Card/Cable Assembly
  SEG33111767
  Databus Analyzer Tool (DAT) PASS 1000 Hard Drive SEG33111767
  PDIP Cable

SAFING
1. √PGSC Power – OFF

HARDWARE CONFIGURATION AND INITIALIZATION
2. Install Databus Analyzer Tool (DAT) Hard Disk into PGSC.

3. Remove any other PCMCIA Cards.
   Insert DAT PASS 1000 PCMCIA Card with Cable Assembly into PGSC
   bottom slot.

4. Disconnect EPCS from PDIP Cable L-12.

5. √MCC for databus to be analyzed

6. If required, mate PDIP cable →|← J103 for N1-1 or J107 for N1-2 (L-12).
   Refer to Figure 1.

7. Remove A, B pre-connected terminators from Bus Tee A, B.
   Temporarily stow.

8. Connect
   PDIP cable Channel A →|← Bus A on SBS Cable Assembly Bus Tee
   PDIP cable Channel B →|← Bus B on SBS Cable Assembly Bus Tee

9. PGSC → ON
10. \textbackslash Windows95 boots

If login dialog appears: user = DAT, no password (hit return).

\begin{center}
\textbf{CAUTION}
\end{center}

\begin{quote}
Follow operational procedures carefully. Never execute functions not described, particularly playback. Severe H/W damage to ISS would occur.
\end{quote}


(PASS 1000 application initializes.)

\textbf{MONITORING FILE SETUP}

PGSC 12. Protocol Analysis and Simulation System (PASS1000)

\begin{itemize}
\item \texttt{sel Monitor}
\item \texttt{sel Data Logging Mode}
\item \texttt{File Open}
\item \texttt{sel [...] (double click)}
\item \texttt{sel [...] (double click)}
\item \texttt{sel [datdata] (double click)}
\end{itemize}

\texttt{\sqrt{Directory: c:\datdata}}

\begin{center}
\textbf{NOTE}
\end{center}

\begin{quote}
For subsequent monitoring runs, use incrementing numbers in name; Datmon2, Datmon3….
\end{quote}

input Filename: ‘datmon1.arc’

\texttt{sel OK}

\begin{center}
\textbf{NOTE}
\end{center}

\begin{quote}
File sizes may change depending upon monitoring purpose, specified by MCC.
\end{quote}
1.3.101 TROUBLESHOOTING WITH 1553 DATABUS ANALYZER TOOL

SETTING FILE SIZE

PGSC 13. Monitor Control Panel: Data Logging Mode

input File size: 3 8 0 0 0 0

Table 1. Activity Button Description

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<thead>
<tr>
<th>This activity button:</th>
<th>Means that:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Gray)</td>
<td>There is no bus activity.</td>
</tr>
<tr>
<td>(Gray with a red box)</td>
<td>The bus is currently quiet but an error has been detected in the past.</td>
</tr>
<tr>
<td>(Red)</td>
<td>The bus is active and errors are present.</td>
</tr>
<tr>
<td>(Yellow)</td>
<td>The bus is active and only “no response” errors are present.</td>
</tr>
<tr>
<td>(Green with a yellow box)</td>
<td>The bus is active with no errors but a “no response” error has been detected since the program began monitoring the bus or since the bus activity button was last cleared.</td>
</tr>
<tr>
<td>(Green with a red box)</td>
<td>The bus active with no errors but an error has been detected since the program began monitoring the bus or since the bus activity button was last cleared.</td>
</tr>
<tr>
<td>(Green)</td>
<td>The bus is active and no errors are present.</td>
</tr>
</tbody>
</table>

BEGINNING LOGGING DATA

PGSC 14. Monitor Control Panel: Data Logging Mode

‘Monitor Control’

sel Run
NOTE
Expect 5% per minute nominal rate. Percent complete refers to percentage of specified file size that has been collected. Monitoring ends when file size limit is reached or “Stop” is pushed. If > five minutes ‘Monitor Control’, sel Stop.

Protocol Analysis and Simulation System (PASS1000)
Verify bus status box is green (no errors). Refer to Table 1 to determine bus state and percent activity.

NOTE
Past bus errors may be cleared by clicking the ‘% ACT’ button.

Monitor Control Panel: Data Logging Mode
Verify display indicates ‘Waiting for trigger’ then ‘Logging data...... percent complete n%’.

15. Transfer Time
√ File transfer: Completed
√ Transfer Time: approximately 000:00:05:00

sel OK

Data Logging Results
√ Interrupts Generated = Buffers Filled = Buffers Written (± 1 acceptable)

Example:
Interrupts Generated 123 ± 1
Buffers Filled 123 ± 1
Buffers Written 123 ± 1

sel OK
Figure 2.- Monitor Control Panel: Data Logging Mode.
VERIFYING DATA ACQUISITION

16. **View File**

sel Yes

Monitor Control Panel: Data Logging Mode

Verify data was acquired.
Refer to Figure 2.

Display

Click on 'Find' button to find any errors.

Figure 3.- Find Specification Pop-Up Menu.

Refer to Figure 3 Pop-Up Menu to select the 'Find any error' command.

Notify **MCC-H** of status, error MSGs, or alphanumeric characters highlighted in red.
Protocol Analysis and Simulation System (PASS1000)

‘Bus Activity’

sel Percent Display

MCIMON--Bus Activity by RT

Right-click on any RT field to see SA fields.
Right-click again to return to RT fields.
Left-click on any RT or SA fields for more detailed information, close ‘MCIMON--Bus Activity by RT’ display when analysis complete.

NOTE
If Comm is lost, RT and SA Fields will turn red.
Errors logged can be cleared by clicking on the BUS % ACT. Click on clear to remove any other errors in RT and SA Fields.

EXITING PASS
17. Protocol Analysis and Simulation System (PASS1000)

sel File
sel Exit

Warning

sel Yes

NOTE
File has been automatically saved during monitoring, no need to perform save.

COMPLETING DATA LOGGING
18. Prepare file for downlink.
Notify MCC-H.

CLOSEOUT
PGSC Power → Off

20. PDIP cable ←→ SBS Cable Assembly Bus Tee
Replace A, B terminators on SBS Cable Assembly Bus Tee.

WARNING
PCMCIA card may be hot immediately following run.
Allow card to cool 5 minutes before removing from PGSC.

21. Remove, stow DAT PASS 1000 PCMCIA Card with Cable Assembly from PGSC or SSC.
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These tools are needed for removing the latch in an emergency.

Egress path required so crewmembers are not isolated from escape vehicle.

1. WARNING
   If crew will be isolated from their return vehicle, they must have a 1/4" racket, 4" ext, and 1/2" socket.

2. Is there access to the Ribbed (EVA) side of Hatch?
   Yes
   No

3. If on domed (IVA) side, translate through hatch to EVA side.
   Is translation possible?
   Yes
   No

4. Is hatch closure possible without isolating crew from return vehicle?
   Yes
   No

5. Visually check Hatch for debris which may prevent actuation.
   • Tension Rods
   • Latches
   • Sliders
   • Pinion Gear
   • Drive Mechanism
   • PIP Pins
   • Rotating ring
   • Refer to Figure 3.

6. Are there any debris or contamination present on the Hatch?
   Yes
   No

7. Clear the mechanisms of debris.

8. Yes
   No
8
- Visually check Hatch for bent or broken parts.
- Tension Rods
- Latches
- Sliders
- Pinion Gear
- Drive Mechanism
- PIP Pins
- Refer to Figure 1.

Are there any broken or bent parts?

No

9
- Attempt to cycle Hatch.

Does Hatch cycle freely?

Yes

10
- MCC

No

11
- Tape & Disconnect Tension Rod by removing PIP Pin Wrap.
- Restrain the disconnected tension rod with Gray Tape.
- Refer to Figure 2.

12
- Cycle latch by hand looking for jams in mechanism.

Was the jam found?

Yes

13
- MCC

No

14
- Attempt to cycle the Hatch Crank.

Does Hatch Crank cycle freely?

Yes

15
- MCC

No

16
- Are all eight tension rods disconnected?

Yes

17
- Open Hatch Prep

- Reinstall non-failed tension rods.

No

18
- MCC

19
- Inform MCC of completion and failed ORU.
- Return to nominal operations.
Figure 1.- Duct tape.

Figure 2.- Tension Rod restrained.

Figure 3.- Hatch overview.

Tension Rods (8)
Latches (8)
Sliders (8)
Ratchet Pawl & Pinion Gear
Drive Mechanism
PIP Pins (8)
NOTE
This procedure will only be used in the event that a leak is detected in PMA1 and follows the ISS RAPID DEPRESSURIZATION (SODF: EMER: EMERGENCY CLASS 0: RAPID DEPRESS) procedure in which all Hatches are closed and each module is isolated to allow determination of the leaking module.

OBJECTIVE:
Pinpoint and repair pressure leaks in PMA1. Crewmembers will work simultaneously using crew senses to check penetration points.

LOCATION:
PMA1, Node 1

DURATION:
Situation dependent

PARTS:
None

MATERIALS:
Gray Tape

TOOLS REQUIRED:
- Docking Mechanism Accessory Kit (33Y 9962.003)
- APAS Hatch Tool
- Cleaning Pads
- Flashlight (two)
- Shuttle Patch Kit

ISS Common IVA Tool Kit:
- Kit D: 5/32” Hex Head, 1/4” Drive
- Kit E: Ratchet, 1/4” Drive
- Driver Handle, 1/4” Drive
- Kit F: 7/16” Deep Socket, 1/4” Drive
- 1/4” Socket, 1/4” Drive
- Kit G: (5-35 in-lbs) Trq Driver, 1/4” Drive

REFERENCED PROCEDURE(S):
None
PMA1/NODE 1 INGRESS

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hatch leaks can occur at seal interfaces and/or penetration points.</td>
</tr>
<tr>
<td>2. Crew visual, aural, and tactile senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).</td>
</tr>
<tr>
<td>3. Pressure equalization between PMA1/Node 1 and Russian Segment is performed as a standalone event.</td>
</tr>
</tbody>
</table>

Figure 1.- FGB ΓA Hatch Penetration Points. Viewed From Interior of FGB ΓA toward Hatch with Hatch Slightly Open. Ref. Photograph 98E08678.

FGB ΓA 1. Perform a visual search for leaks around all sealing surfaces and hatch penetration points for FGB ΓA-PMA1 Hatch. Refer to Figure 1.

2. MCC-H, “Go for PMA 1 Ingress.”
3. Open FGB ГА-ПМА1 Hatch using APAS hatch tool.
   Select ‘РАБОЧЕЕ ПОЛОЖЕНИЕ’ (Working Position) torque setting on Hatch APAS hatch tool.

   3.1 Insert tool in hatch socket (ensure fully seated).
       Rotate tool 3 to 4 turns in direction of ‘ОТКРЫТЬ’ (Open) arrow until it clicks.

   3.2 Remove tool.
       Allow hatch seals to relax for 3 minutes.

   **CAUTION**
   APAS hatch seals require 3 minutes to relax before opening Hatch.

   3.3 Open and secure ГА-ПМА1 Hatch.

   3.4 Stow Tool in Docking Mechanism Accessory Kit.
       Tether kit to hatch handle.

   **NOTE**
   Additional Portable Fans may be required for local ventilation.
   Portable Fans should be reorientated in PMA1 as needed.

4. Open Node 1 Aft Hatch per decal to gain access to ISS IVA Tool Kit.

**PMA1 LEAK ISOLATION**

**NOTE**
1. Crew visual, aural, and tactile senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).

2. Once leak is pinpointed, proceed to step 6.

**Figure 2.- Module and CBM Seals.**
5. Search for leaks in PMA1, paying particular attention to the vestibule area and any passthroughs between PMA1 and Node 1, including any seal interfaces and penetration points of the Node 1 Aft Hatch. Refer to Figures 2 and 3.

5.1 If leak is found, proceed to step 6.

5.2 Remove Avionics Closeout, hex fasteners (twelve) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

5.3 Search for leaks at instrumentation cable passthroughs J3, J4, and J5. Refer to Figure 4.

5.4 If leak not found, go to step 8.
Figure 4.- PMA1 Instrumentation Cable Passthroughs.
PMA1 (Closeout removed) Viewed with Node 1 Hatch to the Right of the Photo.
Ref. Photograph 98E01129.

LEAK REPAIR
6. If leak found
   If time permits, √MCC-H before initiating repair.

   If leak through Aft Stbd or Aft Port IMV Flange
   Retighten V-Band Coupling to 35 in-lbs (7/16" Deep Socket, 1/4" Drive; (5-35 in-lbs) Trq Driver, 1/4" Drive).

   If leak through Aft Port IMV ducting connections or hard duct cap
   Retighten V-Band Clamp(s) (Ratchet, 1/4" Drive; 1/4" Socket, 1/4" Drive).

   If leak due to puncture in surface area
   Patch hole with Dux Seal from Shuttle Patch Kit.
   Cover patch with All-Purpose Tape.

   If leak through connector or seal
   Use Valve Foam Applicator from Shuttle Patch Kit, following decal instructions.

7. Replace Avionics Closeout and tighten fasteners (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
1.3.502 PMA1 ISS LEAK PINPOINT AND REPAIR
(ISS IFM/3A - ALL/FIN) Page 6 of 6 pages

PMA1 EGRESS (IF LEAK NOT FOUND OR UNREPAIRABLE)

8. Report to MCC-H, “Leak not found” or “Leak unrepairable.”

9. Close Node 1 Aft Hatch per decal.

10. √Node 1 Aft MPEV – Closed (capped)

11. √No foreign objects in hatch area

ГА-
PMA1
Hatch

11.1 Clean FGB ГА-PMA1 hatch frame seal with Cleaning Pads from Docking Mechanism Accessory Kit.

11.2 Close FGB ГА-PMA1 Hatch, ensure Hatch is fully seated. Select ‘РАБОЧЕЕ ПОЛОЖЕНИЕ’ (Working Position) torque setting on APAS hatch tool.

11.3 Insert hatch tool in hatch socket (ensure fully seated). Rotate hatch tool 3 to 4 turns in direction of ‘ЗАКРЫТЬ’ (Close) arrow until tool clicks.
NOTE

This procedure will only be used in the event that a leak is detected in PMA2 and follows the ISS RAPID DEPRESSURIZATION (SODF: EMER: EMERGENCY CLASS 0: RAPID DEPRESS) procedure in which all Hatches are closed and each module is isolated to allow determination of the leaking module.

OBJECTIVE:
Pinpoint and repair pressure leaks in PMA2. Crewmembers will work simultaneously, using crew senses to check penetration points.

LOCATION:
PMA2

DURATION:
Situation dependent

PARTS:
None

MATERIALS:
Gray Tape

TOOLS REQUIRED:
Flashlight (two)
Shuttle Patch Kit
ISS Common IVA Tool Kit:
Kit D:
  5/32" Hex Head, 1/4" Drive
Kit E:
  Ratchet, 1/4" Drive
Kit F:
  7/16" Deep Socket, 1/4" Drive
Kit G:
  (5-35 in-lbs) Trq Driver, 1/4" Drive

REFERENCEDPROCEDURE(S):
2.3.501 NODE 1 ISS LEAK PINPOINT AND REPAIR

1. To allow access to Node 1 to gather tools in preparation to ingress PMA2, perform {2.3.501 NODE 1 ISS LEAK PINPOINT AND REPAIR}, steps 1 --- 7 (SODF: ISS IFM: NODE 1: MALFUNCTION FAULT ISOLATION AND RECOVERY/S&M), then:
NOTE

1. Hatch leaks can occur at seal interfaces and/or penetration points.

2. Crew sight, sound, and touch senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).

Figure 1.- Node 1 Fwd Hatch Penetration Points.

Node 1 2. Perform a visual search for leaks around all sealing surfaces and hatch penetration points for Node 1 Fwd Hatch. Refer to Figure 1.

3. If leak is found around hatch seal √MCC-H before opening Hatch to inspect seals

4. √MCC-H, “Go for PMA2 Ingress.”

5. MCC-H report maximum duration for PMA2 Ingress and Equalization.

   Ingress Time: ________________

   Equalization Time: ________________
1.3.503 PMA2 ISS LEAK PINPOINT AND REPAIR

Node 1
Fwd Hatch

6. MPEV Cap ←→ MPEV

7. Node 1 Fwd Hatch MPEV → Open

8. Node 1 Fwd Hatch MPEV → Closed (capped)

**NOTE**

Hatch may be difficult to open if leakage causes ΔP across Hatch.

9. Open Node 1 Fwd Hatch per decal.

**NOTE**

Additional Portable Fans may be required for local ventilation. These should be set up and moved around the cabin as needed.

**PMA2 LEAK ISOLATION**

**NOTE**

1. Crew sight, sound, and touch senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).

2. Once leak is pinpointed, proceed to step 11 (Leak Repair).

---

![Diagram](image.png)

**Figure 2:** Module and CBM Seals, Cross Section.
10. Search for leaks in PMA2, paying particular attention to the vestibule area and any passthroughs between PMA2 and Node 1, as well as any seal interfaces and penetration points of the PMA2 APAS Hatch. Refer to Figures 2 and 3.
If leak is found, proceed to step 11 (Leak Repair).

Remove Avionics Closeout, hex fasteners (twelve) (Ratchet, 1/4" Drive; 5/32" Hex Head).

Search for leaks at instrumentation cable passthroughs J20, J21, J22. Refer to Figure 4.

If leak not found, go to step 13.

**LEAK REPAIR**

11. If leak found
   
   If time permits, √MCC-H before initiating repair.

   If leak through IMV Valve flange
   Retighten V-band coupling to 35 in-lbs (7/16" Deep Socket, 1/4" Drive; (5-35 in-lbs) Trq Driver).

   If leak due to puncture in surface area
   Patch hole with Dux Seal from Shuttle Patch Kit.
   Cover patch with All-Purpose Tape.

   If leak through connector or seal
   Use Valve Foam Applicator from Shuttle Patch Kit, following decal instructions.

12. Replace Avionics Closeout and tighten fasteners to 28 in-lbs (5/32" Hex Head, 1/4" Drive; (5-35 in-lbs) Trq Driver).

**PMA2 EGRESS (LEAK NOT FOUND OR UNREPAIRABLE)**

13. Report to MCC-H, “Leak not found” or “Leak unrepairable.”

14. Remove tools and equipment from PMA2.

15. Close Node 1 Fwd Hatch per decal.

16. √Node 1 Fwd MPEV – Closed (capped)
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NOTE
This procedure will only be used in the event that a leak is detected in PMA3 and follows the (ISS RAPID DEPRESSURIZATION) (SODF: EMER: EMERGENCY CLASS 0: RAPID DEPRESS) procedure in which all Hatches are closed and each module is isolated to allow determination of the leaking module.

OBJECTIVE:
Pinpoint and repair pressure leaks in PMA3. Crewmembers will work simultaneously, using crew senses to check penetration points.

LOCATION:
PMA3

DURATION:
Situation dependent

PARTS:
None

MATERIALS:
Gray Tape

TOOLS REQUIRED:
Flashlight (two)
Shuttle Patch Kit
ISS Common IVA Tool Kit:
Kit D:
  5/32" Hex Head, 1/4" Drive
Kit E:
  Ratchet, 1/4" Drive
Kit F:
  7/16" Deep Socket, 1/4" Drive
Kit G:
  (5-35 in-lbs) Trq Driver, 1/4" Drive

REFERENCED PROCEDURES:
2.3.501 NODE 1 ISS LEAK PINPOINT AND REPAIR
1.105 CBM CENTER DISK COVER REMOVAL

1. To allow access to Node 1 to gather tools in preparation to ingress PMA3, perform (2.3.501 NODE 1 ISS LEAK PINPOINT AND REPAIR), steps 1 --- 7 (SODF: ISS IFM: NODE 1: MALFUNCTION FAULT ISOLATION AND RECOVERY/S&M), then:
PMA3 INGRESS

NOTE

1. Hatch leaks can occur at seal interfaces and/or penetration points.

2. Crew sight, sound, and touch senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).

Figure 1.- Node 1 Nadir Hatch Penetration Points.

Node 1

2. Perform a visual search for leaks around all sealing surfaces, and hatch penetration points for Node 1 Nadir Hatch. Refer to Figure 1.

3. If leak is found around hatch seal √MCC-H before opening Hatch to inspect seals.

4. √MCC-H, “Go for PMA3 Ingress.”

5. MCC-H report maximum duration for PMA3 Ingress and Equalization.

   Ingress Time: ________________
   Equalization Time: ________________
6. MPEV Cap $\leftarrow$ MPEV
7. Node 1 Nadir Hatch MPEV $\rightarrow$ Open
8. Node 1 Nadir Hatch MPEV $\rightarrow$ Closed (capped)

NOTE
Hatch may be difficult to open if leakage causes $\Delta P$ across Hatch.

9. Open Node 1 Nadir Hatch per decal.

NOTE
Additional portable Fans may be required for local ventilation. These should be setup and moved around the cabin as needed.

PMA3 LEAK ISOLATION

NOTE
1. Crew sight, sound, and touch senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).
2. Once leak is pinpointed, proceed to step 13 (Leak Repair).

10. If required, perform {1.105 CBM CENTER DISK COVER REMOVAL}, all (SODF: S&M: NOMINAL: VESTIBULE), then:
11. If required, remove stowage items to allow access into PMA3.

Internal Side
ACBM to PCBM Seal

Node 1

External Side
PMA to PCBM Seal

Figure 2.- Module and CBM Seals, Cross Section.
Figure 3.- PMA APAS Hatch Penetration Points.
APAS Hatch Viewed From Interior of PMA
Ref. Photograph 98E01021.

Figure 4.- PMA2,3 Instrumentation Cable Passthroughs.
PMA2,3 Looking Toward APAS Hatch (closeout removed).
Ref. Photograph S98-14923.
12. Search for leaks in PMA3, paying particular attention to the vestibule area and any passageways between PMA3 and Node 1, as well as any seal interfaces and penetration points of the PMA3 APAS Hatch. Refer to Figures 2 and 3.

If leak is found, proceed to step 13 (Leak Repair).

- Remove Avionics Closeout, hex fasteners (twelve) (Ratchet, 1/4” Drive; 5/32” Hex Head).
- Search for leaks at instrumentation cable passthroughs J22, J21, J20. Refer to Figure 4.

If leak not found, go to step 15.

**LEAK REPAIR**

13. If leak found

If time permits, √MCC-H before initiating repair.

- If leak through IMV Valve flange
  - Retighten V-band coupling to 35 in-lbs (7/16” Deep Socket, 1/4” Drive; (5-35 in-lbs) Trq Driver).
- If leak due to puncture in surface area
  - Patch hole with Dux Seal from Shuttle Patch Kit.
  - Cover patch with All Purpose Tape.
- If leak through connector or seal
  - Use Valve Foam Applicator from Shuttle Patch Kit, following decal instructions.

14. Replace Avionics Closeout and tighten fasteners to 28 in-lbs (5/32” Hex Head, 1/4” Drive; (5-35 in-lbs) Trq Driver).

**PMA3 EGRESS (LEAK NOT FOUND OR IRREPARABLE)**

15. Report to MCC-H, “Leak not found” or “Leak irreparable.”

16. Remove tools and equipment from PMA3.

17. Close Node 1 Nadir Hatch per decal.

18. √Node 1 Nadir MPEV – Closed (capped)
This procedure will only be used in the event that a leak is detected in Z1 vestibule and follows the ISS RAPID DEPRESSURIZATION (SODF: EMER: EMERGENCY CLASS 0: RAPID DEPRESS) procedure in which all Hatches are closed and each module is isolated to allow determination of the leaking module.

**OBJECTIVE:**
Pinpoint and repair pressure leaks in Z1 Vestibule and Pressure Dome. Crewmembers will work simultaneously, using crew senses to check penetration points.

**LOCATION:**
Node 1, Z1

**DURATION:**
Situation dependent

**PARTS:**
None

**MATERIALS:**
Gray Tape

**TOOLS REQUIRED:**
Flashlight (two)
Shuttle Patch Kit

**REFERENCED PROCEDURE(S):**
2.3.501 NODE 1 ISS LEAK PINPOINT AND REPAIR
1.105 CBM CENTER DISK COVER REMOVAL

1. To allow access to Node 1 to gather tools in preparation to ingress Z1, perform [2.3.501 NODE 1 ISS LEAK PINPOINT AND REPAIR], steps 1 -- 7 (SODF: ISS IFM: NODE 1: MALFUNCTION FAULT ISOLATION AND RECOVERY/S&M), then:

**Z1 INGRESS**

1. Hatch leaks can occur at seal interfaces and/or penetration points.

2. Crew visual, aural, and tactile senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).
Node 1

2. Perform a visual search for leaks around all sealing surfaces and hatch penetration points for Node 1 Ovhd Hatch. Refer to Figure 1.

3. If leak is found around hatch seal √MCC-H before opening Hatch to inspect seals

4. √MCC-H, “Go for Z1 Ingress.”

5. MCC-H report maximum duration for Z1 ingress and equalization.

   Ingress Time: _____________________
   Equalization Time: _____________________

Node 1 Ovhd Hatch

6. MPEV Cap ←|→ MPEV

7. Node 1 Ovhd Hatch MPEV → Open

8. Node 1 Ovhd Hatch MPEV → Closed (capped)

   NOTE
   Hatch may be difficult to open if leakage causes ΔP across Hatch.

9. Open Node 1 Ovhd Hatch per decal.
NOTE
Additional portable Fans may be required for local ventilation. Portable Fans should be setup and moved around the cabin as needed.

Z1 VESTIBULE LEAK ISOLATION

NOTE
1. Crew visual, aural, and tactile senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).

2. Once leak is pinpointed, proceed to step 13.

10. If required, perform [1.105 CBM CENTER DISK COVER REMOVAL], all (SODF: S&M: NOMINAL: VESTIBULE), then:

11. If required, remove stowage items to allow access into Z1 vestibule area and the pressure dome.

Figure 2.- Z1 Dome and CBM Seals, Cross Section Representation.
12. Search for leaks in Z1 with particular attention to the vestibule area and any passthroughs between Z1 and Node 1, including any seal interfaces in the vestibule and pressure dome. Refer to Figure 2.

If leak is found, proceed to step 13.

If leak not found, go to step 14.

**LEAK REPAIR**

13. If leak found
   
   If time permits
   
   √ MCC-H before initiating repair

   If leak due to puncture in surface area
   
   Patch hole with Dux Seal from Shuttle Patch Kit.
   
   Cover patch with All-Purpose Tape.

   If leak through connector or seal
   
   Use Valve Foam Applicator from Shuttle Patch Kit, following decal instructions.

**Z1 EGRESS (LEAK NOT FOUND OR UNREPAIRABLE)**

14. Report to MCC-H, “Leak not found” or “Leak unrepairable.”

15. Remove tools and equipment from Z1.

16. Close Node 1 Ovhd Hatch per decal.

17. √ Node 1 Ovhd MPEV – Closed (capped)
START_IMS

2.1.301 NODE 1 BACTERIA FILTER INSPECT AND CLEAN

OBJECTIVE:
Inspect and clean Node 1 Bacteria Filters.

LOCATION:
Installed: Midbay Nadir NOD1D3-01 and NOD1D3-03

DURATION:
30 minutes

PARTS:
None

MATERIALS:
Gray Tape

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit D: 5/32” Hex Head Driver, 1/4” Drive
Kit E: Driver Handle, 1/4” Drive
Ratchet, 1/4” Drive

REFERENCED PROCEDURE(S):
1.401 SMOKE DETECTOR ACTIVATION
1.402 SMOKE DETECTOR DEACTIVATION

SAFING

WARNING
Failure to remove power from Smoke Detectors can result in electrical shock hazard.

CAUTION
Use caution when opening panels, the Area Smoke Detectors (ASD) are mounted on the backside of Closeout Panels NOD1D3-01 and NOD1D3-03. An adequate length of ASD power cable has been provided to open Closeout Panels and allow access to the maintenance areas. Failure to comply may damage ASD, power cable, and/or Closeout Panels.

1. Perform {1.402 SMOKE DETECTOR DEACTIVATION}, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: FDS), to deactivate Node 1 SD 1 and 2.
2. Remove Closeout Panels NOD1D3-01, fasteners (four) and NOD1D3-03 fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Refer to Figure 1.

3. Remove, temporarily stow Closeout Panels within length of ASD power cables.

**INSPECTING AND CLEANING**

4. Open filter assembly door.
   Inspect for foreign object debris (FOD).
   Refer to Figure 2.

5. If present, remove FOD with Gray Tape.

6. Close filter assembly door.

7. Repeat steps 4 --- 6 for remaining filters (three).

**CLOSEOUT**

8. Install Closeout Panels NOD1D3-01, fasteners (four) and NOD1D3-03, fasteners (four) (Ratchet, 1/4" Drive; 5/32" Hex Head).

CHECKOUT
10. Stow expended materials and tools.
OBJECTIVE: Remove and replace expended Bacteria or Charcoal Filters or replace Charcoal Filter with Bacteria Filter in the Node.

LOCATION: Installed: Midbay Nadir NOD1D3-01 and NOD1D3-03
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION: 45 minutes

PARTS: Charcoal Filters (four) (P/N SV821776) or Bacteria Filters (four) (P/N SV810010)

MATERIALS: Gray Tape

TOOLS REQUIRED: ISS Common IVA Tool Kit: Kit D: 5/32" Hex Head Driver, 1/4" Drive
Kit E: Ratchet, 1/4" Drive
Kit H: Scissors

REFERENCED PROCEDURE(S): 1.505 NODE 1 CABIN FAN ACTIVATION/DEACTIVATION

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Use caution when opening panels, the Area Smoke Detectors (ASD) are mounted on the backside of Closeout Panels NOD1D3-01 and NOD1D3-03. An adequate length of ASD power cable has been provided to open Closeout Panels and allow access to maintenance areas. Failure to comply may damage ASD, power cable, and/or Closeout Panels.

1. Perform [1.505 NODE 1 CABIN FAN ACTIVATION/DEACTIVATION], deactivate steps only (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:
2.1.302 NODE 1 BACTERIA/CHARCOAL FILTER R&R

2. Remove Closeout Panels NOD1D3-01 fasteners (four), NOD1D3-03 fasteners (four) (Ratchet, 1/4" Drive; 5/32" Hex Head). Refer to Figure 1.

3. Remove, temporarily stow Closeout Panels within length of ASD power cables.

REMOVAL

Hinges (3) Mounting Fasteners (8) Filter Element shown through grate.

Figure 2.- Zenith View of Filter Assembly Door (two) Behind Each Closeout.

4. Remove, temporarily stow new Filter from Containment Bag (Scissors).

5. Open filter assembly door.
   Position Containment Bag over expended Filter.
   Collapse bag to pull strap in center of Filter.
   Pull Filter into bag.
   Close bag.
   Temporarily stow.

2.1.302 NODE 1 BACTERIA/CHARCOAL FILTER R&R
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REPLACEMENT
7. Install new Filter.
   Close assembly door.

8. Repeat steps 4 --- 7 for remaining Filters (three).

CLOSEOUT
9. Install Closeout Panels NOD1D3-01 fasteners (four), NOD1D3-03
fasteners (four) (Ratchet, 1/4" Drive; 5/32" Hex Head).

10. Perform {1.505 NODE 1 CABIN FAN ACTIVATION/DEACTIVATION},
    activate steps only (SODF: ECLSS: ACTIVATION AND CHECKOUT:
    THC), then:

CHECKOUT
11. Inform MCC-H of task completion.

12. √MATS for expended filter stowage location
    Stow expended Filters, tools.
OBJECTIVE:
Test the Emergency Light Power Supplies (ELPS) in the Node 1.

LOCATION:
NOD1D1, NOD1P1, NOD1P4.

DURATION:
1 hour

PARTS:
None

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit D:
  5/32" Hex Head, 1/4" Drive
Kit E:
  Ratchet, 1/4" Drive

REFERENCED PROCEDURE(S):
None

NOTE
1. This procedure may be performed for one Node 1 ELPS or repeated for each.
2. Each ELPS has two RPCs supplying power.

Table 1. Node 1 ELPS RPCs

<table>
<thead>
<tr>
<th>ELPS Location</th>
<th>Designator</th>
<th>RPCM</th>
<th>RPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOD1P4</td>
<td>A99 (N1-1)</td>
<td>N14B-C</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N13B-C</td>
<td>2</td>
</tr>
<tr>
<td>NOD1P1</td>
<td>A101 (N1-2)</td>
<td>N14B-B</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N13B-B</td>
<td>2</td>
</tr>
<tr>
<td>NOD1D1</td>
<td>A103 (N1-3)</td>
<td>N14B-A</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N13B-A</td>
<td>1</td>
</tr>
</tbody>
</table>

PCS
1. REMOVING CLOSE INHIBIT AND CLOSE ELPS RPCs
Node 1: EPS: RPCM [X] RPC [Y] where [X,Y] = Refer to Table 1.
RPCM [X] RPC [Y]

  cmd RPC Close Command – Enable (Verify – Ena)
  cmd RPC Position – Close (Verify – Cl)

Repeat
2.1.401 NODE 1 EMERGENCY LIGHT POWER SUPPLY - INSPECTION
(IS FM/4A - ALL/FIN) Page 2 of 2 pages

ACCESS

Table 2. ELPS Closeout Panels

<table>
<thead>
<tr>
<th>Location</th>
<th>Designator</th>
<th>Closeout Panel</th>
<th>No. Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOD1D1</td>
<td>A103</td>
<td>NOD1D1-02</td>
<td>10</td>
</tr>
<tr>
<td>NOD1P1</td>
<td>A101</td>
<td>NOD1P1-01</td>
<td>14</td>
</tr>
<tr>
<td>NOD1P4</td>
<td>A99</td>
<td>NOD1P4-03</td>
<td>20</td>
</tr>
</tbody>
</table>

2. If required, loosen closeout panel fasteners, remove Closeout Panel (Ratchet, 1/4" Drive; 5/32" Hex Head). Refer to Table 2. Temporarily stow.

CHECKOUT

3. ELPS Switch → Test
   Refer to Figure 1.

4. √ELPS LED – illuminated

5. √Emergency Egress Light Strips are illuminated

6. ELPS Switch → Enabled position

CLOSEOUT

7. If required, install Closeout Panel, snug fasteners (Ratchet, 1/4" Drive; 5/32" Hex Head).
   Refer to Table 2.

POST MAINTENANCE

8. Repeat for remaining ELPS.

OBJECTIVE:
Remove and replace failed R/F Power Distribution Box (RFPDB).

LOCATION:
Installed: NOD1S4
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
R/F Power Distribution Box (P/N SEG39130724-301)

MATERIALS:
Dry Wipe

TOOLS REQUIRED:
Scopemeter
ISS Common IVA Tool Kit:
Kit A:
  5/16" Combination Wrench
  7/16" Combination Wrench
Kit E:
  Ratchet, 1/4" Drive
  10" Ext, 1/4" Drive
  3/8" to 1/4" Adapter
Kit F:
  7/16" Socket, 1/4" Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8" Drive
Kit J:
  Connector Pliers
Lid #1:
  Static Wrist Tether

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Ensure electrical power is deactivated prior to continuing task. Failure to comply may cause equipment damage.
**ACCESSING**

1. Rotate Starboard Rack Volume Closeout (RVCO).

**SAFING**

2. Inhibit RPC Close Cmd for N1RS1C RPCs

   PCS Node 1: EPS: RPCM N1RS1 C
   
   [RPCM N1RS1 C]

   sel RPC [X] where [X] = 5 12 6 13

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

   Repeat
3. Inhibit RPC Close Cmd for N1RS2A RPCs
   PCS Node 1: EPS: RPCM N1RS2 A
   [RPCM N1RS2 A]

   sel RPC [X] where [X] = 5 10 11 6

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

   Repeat

4. Open RPCM N1RS1 C RPCs
   PCS Node1: EPS: RPCM N1RS1 C
   [RPCM N1RS1 C]

   sel RPC [X] where [X] = 5 12 6 13

   **cmd** RPC Position – Open  **Execute** (Verify – Op)

   √Close Cmd – Inh

   Repeat

5. Open RPCM N1RS2 A RPCs
   PCS Node1: EPS: RPCM N1RS2 A
   [RPCM N1RS2 A]

   sel RPC [X] where [X] = 5 10 11

   **cmd** RPC Position – Open  **Execute** (Verify – Op)

   √Close Cmd – Inh

   Repeat

   sel RPC 6

   √RPC Position – Op
   √Close Cmd – Inh
6. **Configure Early Comm Switches**
   Refer to Figures 1 and 2.

   - **RFPDB**
     - SPARE → Off
     - PGSC/RF → Off
     - XCVR → Off
     - SBANT → Off
     - PTANT → Off
     - CTP → Off

7. Don Static Wrist Tether and attach to unpainted surface.
8. Demate RFPDB Connectors
   If required, use Connector Pliers and Open End Wrench.
   P1 ←→ J1
   P2 ←→ J2
   P3 ←→ J3
   P4 ←→ J4
   P6 ←→ J6
   P7 ←→ J7
   P8 ←→ VTSPC DC Power (if connected)
   P9 ←→ J9
   P10 ←→ J10
   P11 ←→ J11
   P12 ←→ J12
   P13 ←→ J13
   P14 ←→ J14
   P15 ←→ J15
   P16 ←→ J16
   P17 ←→ J17
   P18 ←→ J18 (if connected)

REMOVAL
9. Loosen RFPDB fasteners (six) (Ratchet, 1/4" Drive; 10" Ext; 7/16" Socket).
10. Label, remove RFPDB from rack.
    Temporarily stow.

INSTALLATION
11. Clean mounting surface and bottom of replacement RFPDB with Dry Wipes.
12. Place new RFPDB on plate, snug fasteners (six) by hand.
13. Torque fasteners (six) to 77 in-lbs ((20-300 in-lbs) Trq Wrench; 3/8" to 1/4" Adapter; 10" Ext; 7/16" Socket).
14. Perform continuity check on replacement RFPDB between J9 and J11, then J9 and J13 (Multimeter).
    Report results to MCC-H.
15. **Mate RFPDB Connectors**

P1 → J1
P2 → J2
P3 → J3
P4 → J4
P6 → J6
P7 → J7
P8 → VTSPC DC Power (if previously disconnected)
P9 → J9
P10 → J10
P11 → J11
P12 → J12
P13 → J13
P14 → J14
P15 → J15
P16 → J16
P17 → J17
P18 → J18 (if previously disconnected)

**CHECKOUT**

16. **Configure Early Comm Switches**

Refer to Figure 2.

- RFPDB
  - SPARE – Off
  - PGSC/RF → On
  - XCVR → On
  - SBANT → On
  - PTANT → On
  - CTP → On

- CTP
  - CTP MODE Switch – Low Rate

17. **Enable RPC Close Cmd for RPCM N1RS1 C**

**PCS**

Node 1: EPS: RPCM N1RS1 C

RPCM N1RS1 C

sel RPC [X] where [X] = 5 12 6 13

RPC Position – Op

**cmd** Close Cmd – Enable **Execute** (Verify – Ena)

Repeat
18. **Enable RPC Close Cmd for RPCM N1RS2A**
   PCS
   Node 1: EPS: RPCM N1RS2 A
   RPCM N1RS2 A

   sel RPC [X] where [X] = 5 10 11 6

   √RPC Position – Op

   **cmd** Close Cmd – Enable **Execute** (Verify – Ena)

   Repeat

19. **Close RPCM N1RS1 C RPCs**
   PCS
   Node1: EPS: RPCM N1RS1 C
   RPCM N1RS1 C

   sel RPC [X] where [X] = 5 12 6 13

   **cmd** RPC Position – Close **Execute** (Verify – Cl)

   Repeat

20. **Close RPCM N1RS2 A RPCs**
   PCS
   Node1: EPS: RPCM N1RS2 A
   RPCM N1RS2 A

   sel RPC [X] where [X] = 5 10 11

   **cmd** RPC Position – Close **Execute** (Verify – Cl)

   Repeat

**CLOSEOUT**

21. **Install RVCO.**

**POST MAINTENANCE**

22. **Inform MCC-H** of task completion.

23. √MATS for stowage location of failed RFPDB
   Stow tools, equipment.
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OBJECTIVE:
Remove and replace failed Command Telemetry Processor (CTP).

LOCATION:
Installed: NOD1S4
Stowed: \Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Command Telemetry Processor (P/N SEG39130534-301)

MATERIALS:
Dry Wipe

TOOLS REQUIRED:
Scopemeter
ISS Common IVA Tool Kit:
Kit A:
    5/16" Combination Wrench
    7/16" Combination Wrench
Kit E:
    Ratchet, 1/4" Drive
    10" Ext, 1/4" Drive
    3/8" to 1/4" Adapter
Kit F:
    7/16" Socket, 1/4" Drive
Kit G:
    (30-200 in-lbs) Trq Wrench, 3/8" Drive
Kit J:
    Connector Pliers
Lid #1:
    Static Wrist Tether

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Ensure electrical power is deactivated prior to continuing task. Failure to comply may cause equipment damage.
Figure 1.- Early Comm System.

**ACCESSING**
1. Rotate Starboard Rack Volume Closeout (RVCO).

**SAFING**
2. Inhibit RPC Close Cmd for N1RS1C RPCs
   
   PCS
   
   Node 1: EPS: RPCM N1RS1 C
   
   RPCM N1RS1 C
   
   sel RPC [X] where [X] = 5 12
   
   cmd Close Cmd – Inhibit **Execute** (Verify – Inh)
   
   Repeat
3. Inhibit RPC Close Cmd for N1RS2A RPCs

   PCS Node 1: EPS: RPCM N1RS2 A
   RPCM N1RS2 A

   sel RPC [X] where [X] = 5 10 11
   cmd Close Cmd – Inhibit **Execute** (Verify – Inh)
   Repeat

4. Open RPCM N1RS1 C RPCs

   PCS Node 1: EPS: RPCM N1RS1 C
   RPCM N1RS1 C

   sel RPC [X] where [X] = 5 12
   cmd RPC Position – Open **Execute** (Verify – Op)
   √Close Cmd – Inh
   Repeat

5. Open RPCM N1RS2 A RPCs

   PCS Node 1: EPS: RPCM N1RS2 A
   RPCM N1RS2 A

   sel RPC [X] where [X] = 5 10 11
   cmd RPC Position – Open **Execute** (Verify – Op)
   √Close Cmd – Inh
   Repeat
6. **Configure Early Comm Switches**
   Refer to Figures 1 and 2.

   - RFPDB CTP → OFF

7. Don Static Wrist Tether and attach to unpainted surface.

8. **Demate CTP Connectors**
   If required, use Connector Pliers or Open End Wrench.
   - P1 ← J1
   - P2 ← J2
   - P3 ← J3
   - P4 ← J4
   - P5 ← J5
   - P6 ← J6

---

**Figure 2.** RFPDB Switches (Pictured Switches in OFF Position).
REMOVAL

NOTE
Visually observe position of Mode Switch.

9. Loosen CTP fasteners (eight) (Ratchet, 1/4" Drive; 10" Ext; 7/16" Socket).

10. Label, remove CTP from rack.
    Temporarily stow.

REPLACEMENT

NOTE
Position Mode Switch to position noted on failed CTP.

11. Clean mounting surface and bottom of replacement CTP with Dry Wipes.

12. Place new CTP on plate, snug fasteners (eight) by hand.

13. Torque fasteners (eight) to 77 in-lbs ((30-200 in-lbs) Trq Wrench; 3/8" to 1/4" Adapter; 10" Ext; 7/16" Socket).

14. Mate CTP Connectors
    P1 →\(\llcorner\)→ J1
    P2 →\(\llcorner\)→ J2
    P3 →\(\llcorner\)→ J3
    P4 →\(\llcorner\)→ J4
    P5 →\(\llcorner\)→ J5
    P6 →\(\llcorner\)→ J6

CHECKOUT

15. Configure Early Comm Switches
    Refer to Figure 2.

RFPDB CTP → On

CTP √CTP MODE Switch – Low Rate

16. Enable RPC Close Cmd for RPCM N1RS1 C
    Node 1: EPS: RPCM N1RS1 C
    RPCM N1RS1 C

\[
\text{sel RPC} \ [X] \ \text{where} \ [X] = 5, 12
\]

√RPC Position – Op

\textbf{cmd} \ Close \ Cmd \ – \ Enable \ \textbf{Execute} \ (Verify – Ena)

Repeat
17. **Enable RPC Close Cmd for RPCM N1RS2A**
   
   PCS
   
   Node 1: EPS: RPCM N1RS2 A
   
   RPCM N1RS2 A
   
   `sel RPC [X] where [X] = 5 10 11`
   
   √RPC Position – Op
   
   **cmd** Close Cmd – Enable **Execute** (Verify – Ena)
   
   Repeat
   
18. **Close RPCM N1RS1 C RPCs**
   
   PCS
   
   Node 1: EPS: RPCM N1RS1 C
   
   RPCM N1RS1 C
   
   `sel RPC [X] where [X] = 5 12`
   
   **cmd** RPC Position – Close **Execute** (Verify – Cl)
   
   Repeat
   
19. **Close RPCM N1RS2 A RPCs**
   
   PCS
   
   Node 1: EPS: RPCM N1RS2 A
   
   RPCM N1RS2 A
   
   `sel RPC [X] where [X] = 5 10 11`
   
   **cmd** RPC Position – Close **Execute** (Verify – Cl)
   
   Repeat

**CLOSEOUT**

20. Install RVCO.

**POST MAINTENANCE**

21. Inform **MCC-H** of task completion.

22. √MATS for stowage location of failed CTP
   
   Stow tools, equipment.
OBJECTIVE:
Remove and replace failed Transceiver.

LOCATION:
Installed: NOD1S4
Stowed: √ Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Transceiver (P/N SEG39134690-301)

MATERIALS:
Dry Wipe

TOOLS REQUIRED:
Scopemeter
ISS Common IVA Tool Kit:
Kit A:
   5/16" Combination Wrench
   7/16" Combination Wrench
Kit E:
   Ratchet, 1/4" Drive
   10" Ext, 1/4" Drive
   3/8" to 1/4" Adapter
Kit F:
   7/16" Socket, 1/4" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #1:
   Static Wrist Tether

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Ensure electrical power is deactivated prior to continuing task. Failure to comply may cause equipment damage.
Figure 1.- Early Comm.

**ACCESSING**

1. Rotate Starboard Rack Volume Closeout (RVCO).

**SAFING**

2. Inhibit RPC Close Cmd for N1RS1C RPCs

PCS

Node 1: EPS: RPCM N1RS1 C

RPCM N1RS1 C

\[
\text{sel RPC [X] where } [X] = 5 \quad 12
\]

\[
\text{cmd Close Cmd – Inhibit Execute (Verify – Inh)}
\]

Repeat
3. Inhibit RPC Close Cmd for N1RS2A RPCs
PCS
Node 1: EPS: RPCM N1RS2 A
RPCM N1RS2 A

 sel RPC [X] where [X] = 5 10 11

 cmd Close Cmd – Inhibit Execute (Verify – Inh)
Repeat

4. Open RPCM N1RS1 C RPCs
PCS
Node 1: EPS: RPCM N1RS1 C
RPCM N1RS1 C

 sel RPC [X] where [X] = 5 12

 cmd RPC Position – Open Execute (Verify – Op)
√Close Cmd – Inh
Repeat

5. Open RPCM N1RS2 A RPCs
PCS
Node 1: EPS: RPCM N1RS2 A
RPCM N1RS2 A

 sel RPC [X] where [X] = 5 10 11

 cmd RPC Position – Open Execute (Verify – Op)
√Close Cmd – Inh
Repeat
6. **Configure Early Comm Switches**
   Refer to Figures 1, 2.

   **RFPDB**
   
   XCVR → OFF

7. Don Static Wrist Tether and attach to unpainted surface.

8. **Demating Transceiver Connectors**
   If required, use Connector Pliers or Open End Wrench.
   
   P1 ←→ J1
   P2 ←→ J2
   P3 ←→ J3
   P4 ←→ J4

**REMOVAL**

9. Label, remove Transceiver, fasteners (eight) (Ratchet, 1/4" Drive; 10" Ext; 7/16" Socket).
   Temporarily stow.
REPLACEMENT
10. Clean mounting surface and bottom of replacement Transceiver with Dry Wipes.

11. Place new Transceiver on plate.

12. Snug fasteners (eight), torque to 77 in-lbs (Ratchet, 1/4” Drive; 10” Ext; 7/16” Socket; 3/8” to 1/4” Adapter; (30-200 in-lbs) Trq Wrench).

13. Mate Transceiver Connectors
   P1 → J1
   P2 → J2
   P3 → J3
   P4 → J4

14. Configure Early Comm Switches
   Refer to Figure 2.

RFPDB
   XCVR → ON

CTP
   √CTP MODE Switch – Low Rate

PCS
15. Enable RPC Close Cmd for RPCM N1RS1 C
   Node 1: EPS: RPCM N1RS1 C
   RPCM N1RS1 C

   sel RPC [X] where [X] = 5 12
   √RPC Position – Op
   cmd Close Cmd – Enable Execute (Verify – Ena)
   Repeat

16. Enable RPC Close Cmd for RPCM N1RS2A
   Node 1: EPS: RPCM N1RS2 A
   RPCM N1RS2 A

   sel RPC [X] where [X] = 5 10 11
   √RPC Position – Op
   cmd Close Cmd – Enable Execute (Verify – Ena)
   Repeat
17. Close RPCM N1RS1 C RPCs
   Node1: EPS: RPCM N1RS1 C
   [RPCM N1RS1 C]
   sel RPC [X] where [X] = 5 12
   cmd RPC Position – Close Execute (Verify – Cl)
   Repeat

18. Close RPCM N1RS2 A RPCs
   Node1: EPS: RPCM N1RS2 A
   [RPCM N1RS2 A]
   sel RPC [X] where [X] = 5 10 11
   cmd RPC Position – Close Execute (Verify – Cl)
   Repeat

CLOSEOUT
19. Install RVCO.

POST MAINTENANCE
20. Inform MCC-H of task completion.

21. MATS for stowage location of failed Transceiver
    Stow tools, equipment.
OBJECTIVE:
Remove functional IMV Fan from NOD1P1 (Port Forward position).
Remove failed IMV Fan from NOD1P5 (Aft Port position) and replace with
functional IMV Fan removed from NOD1P1 (Port Forward position).

DURATION:
3 hours 15 minutes

LOCATION:
Installed: NOD1P1, NOD1P5
Stowed: √ Maintenance and Assembly Task Supplement (MATS)

PARTS:
IMV Fan (P/N SV809111-6)

MATERIALS:
Gray Tape
Dry Wipes
ML 60-E:
   Ziplock Bags, Two, 8” x 8” (P/N 528-50000-3)

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Power Tool
Kit D:
   1/8” Hex Head, 1/4” Drive
   5/32” Hex Head, 1/4” Drive
   3/16” Hex Head, 1/4” Drive
   5/16” Hex Head, 1/4” Drive
   Hex Shank, 1/4” Drive
Kit E:
   1/4” Drive Univ Joint
   10” Ext, 1/4” Drive
   1/4” to 3/8” Adapter
   Driver Handle, 1/4” Drive
   Ratchet, 1/4” Drive
Kit G:
   (5-35 in-lbs) Trq Driver, 1/4” Drive
Kit I:
   Small Flat Tip Driver, 3/8” Drive
   Common Tip Screwdriver 4”

REFERENCED PROCEDURES:
1.504 NODE 1 IMV FAN ACTIVATION/DEACTIVATION
SAFING

1. Open Primary RPCs for IMV Fan
   Node 1: EPS: RPCM N1 4B-C
   RPCM N1 4B-C
   sel   RPC 12
cmd   RPC Position – Open (Verify – Op)

   Node 1: EPS: RPCM N1 3B-C
   RPCM N1 3B-C
   sel   RPC 16
cmd   RPC Position – Open (Verify – Op)

2. Inhibit Close Command for IMV Fan Primary RPCs
   Node 1: EPS: RPCM N1 4B-C
   RPCM N1 4B-C
   sel   RPC 12
cmd   Close Cmd – Inhibit (Verify – Inh)

   Node 1: EPS: RPCM N1 3B-C
   RPCM N1 3B-C
   sel   RPC 16
cmd   Close Cmd – Inhibit (Verify – Inh)

   **WARNING**
   High temperatures may be present around IMV Fan housing. Cooldown time for a nominally deactivated fan is 20 minutes, and 2 hours for a failed fan.

3. Verify IMV Fan has cooled down.

ACCESSING

   **NOTE**
   Captive fasteners on Closeout Panel can be used to tether them away from work area.

4. Remove Closeout Panel NOD1P1-01, fasteners (fourteen) (Power Tool; Hex Shank, 1/4” Drive; 5/32” Hex Head).
   Temporarily stow.
Figure 1.- IMV FAN NOD1P1 Assembly Drawing.

Figure 2.- IMV FAN NOD1P1 with Closeout Panels Removed.
FUNCTIONAL IMV FAN NOD1P1 REMOVAL
Refer to Figures 1 and 2.

5. Power Cable Connector W0136-P413 ←|→ J2.
   Data Cable Connector W0308-P412 ←|→ J1.

6. Secure cables out of way (Gray Tape).

7. Loosen band clamps (two) on duct located between IMV Fan and Upper Silencer, fasteners (one each) (Common Tip Screwdriver 4”).
   Slide band clamps to middle of duct to stow.

   **NOTE**
   Acoustic insulation on IMV Fan does not have to be removed.

8. Remove acoustic insulation, duct, band clamps between IMV Fan and Silencer.
   Temporarily stow.

9. Loosen band clamp on duct on top of Upper Silencer, fastener (one)
   (Common Tip Screwdriver 4”).
   Slide clamp away from Silencer along duct.

10. Disconnect top duct from Silencer.

   **NOTE**
   Outboard fasteners have blind access.

11. Unfasten fasteners (four) holding Upper Silencer mounting bracket to secondary structure (Ratchet, 1/4” Drive; 10” Ext; 5/16” Hex Head).
    Temporarily stow into space outboard from its installed position.

12. Loosen band clamp on duct at bottom of IMV Fan, fastener (Common Tip Screwdriver 4”).
    Temporarily stow.

13. Slide band clamp, acoustic insulation down onto duct at bottom of IMV Fan.

14. Disconnect duct, acoustic insulation at bottom of IMV Fan.

15. Unfasten IMV Fan structural support fasteners (four) (Ratchet, 1/4” Drive;
    1/4” Drive Univ Joint; 10” Ext; 3/16” Hex Head).

16. Label, remove replacement IMV Fan.
    Temporarily stow.

17. Snug Upper Silencer mounting bracket fasteners (four), torque to 32 in-lbs
    (Ratchet, 1/4” Drive; 10” Ext; 5/16” Hex Head; (5-35 in-lbs) Trq Driver).
18. Position band clamp over upper seal bead and duct, at least 1/8" from edge of duct.

19. Secure band clamp fastener, torque to 8 in-lbs (Small Flat Tip Driver, 3/8" Drive; 1/4" to 3/8" Adapter; (5-35 in-lbs) Trq Driver).

20. Install duct, acoustic insulation, band clamp on bottom of Upper Silencer by placing edges of duct, insulation over seal beads.

21. Secure band clamp fastener, torque to 8 in-lbs (Small Flat Tip Driver, 3/8" Drive; 1/4" to 3/8" Adapter; (5-35 in-lbs) Trq Driver).

22. Cover duct openings with Ziplock Bags, seal with Gray Tape.

23. Replace Closeout Panel NOD1P1-01, fasteners (fourteen) (Power Tool; Hex Shank, 1/4" Drive; 5/32" Hex Head).

**FAILED IMV FAN NOD1P5 ACCESS**

### WARNING

High temperatures may be present around IMV Fan housing.Cooldown time for a nominally deactivated fan is 20 minutes, and 2 hours for a failed fan.

24. Verify IMV Fan has cooled down.

**NOTE**
The Seat Track Buttons securing long handrail (HR41) must be removed before Closeout Panel NOD1P4-03 can be removed.

25. Release long handrail from Seat Track Buttons.
Temporarily stow.

26. Remove Seat Track Buttons (two), fasteners (two each) (Driver Handle, 1/4" Drive; 1/8" Hex Head).
Temporarily stow.

**NOTE**
Captive fasteners on Closeout Panels can be used to tether them away from work area.

27. Remove Closeout Panel NOD1P4-03 fasteners (twenty) (Power Tool; Hex Shank, 1/4" Drive; 5/32" Hex Head).
Temporarily stow.

28. Remove Closeout Panel NOD1O4-03 fasteners (five) (Power Tool; Hex Shank, 1/4" Drive; 5/32" Hex Head).
Temporarily stow.
2.2.301 IMV FAN SWAPOUT NOD1P5/NOD1P1

(15) NOV 00

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29. Remove Closeout Panel NOD1P5-01 fasteners (four) (Power Tool; Hex Shank, 1/4" Drive; 5/32" Hex Head). Temporarily stow.

FAILED IMV FAN NOD1P5 REMOVAL

    Data Cable Connector W0303-P406 ←|→ J1.

31. Secure cables out of way (Gray Tape).

Figure 3.- IMV FAN NOD1P5 Assembly Drawing.
32. Loosen band clamp on duct at top of IMV Fan, fastener (one each) (Common Tip Screwdriver 4”). Refer to Figures 3 and 4.

33. Slide band clamp and acoustic insulation up onto duct at top of IMV Fan.

34. Disconnect duct, acoustic insulation at top of IMV Fan.

35. Loosen band clamps (two), fasteners (one each), on duct located between IMV Fan and Lower Silencer. Slide band clamps to middle of duct to stow (Common Tip Screwdriver 4”).

36. Remove acoustic insulation, duct, and band clamps between IMV Fan and Silencer. Temporarily stow.

**NOTE**

1. Acoustic insulation on failed IMV Fan does not have to be removed because replacement has its own insulation.

2. Outboard fasteners have blind access. Failed IMV Fan is removed by lowering it from the structural support and toward open side to clear structure.

37. Loosen fasteners (four) on IMV Fan (Ratchet, 1/4” Drive; 10” Ext; 3/16” Hex Head).

38. Label, remove IMV Fan.
39. If IMV Fan can not be removed due to Lower Silencer interference
   Perform steps 40, 41, 42.

   If IMV Fan can be removed
   Go to step 43.

40. Loosen band clamp on lower duct on bottom of Lower Silencer, fastener
    (one).
    Slide clamp away from Silencer along duct (Common Tip Screwdriver 4”).

41. Disconnect bottom duct from Lower Silencer.

42. Remove Lower Silencer from its mounting bracket, fasteners (four)
    (Driver Handle, 1/4” Drive; 5/32” Hex Head).
    Temporarily stow.

SCAVENGED IMV FAN INTO NOD1P5 INSTALLATION
43. Retrieve replacement IMV Fan from Equipment Bag and stow failed IMV
    Fan in bag.

   NOTE
   Mating surfaces should be free of any residue,
   corrosion, or excessive wear.

44. Inspect, clean mating surfaces of replacement IMV Fan, mounting plate
    (Dry Wipes).
    Document any anomalies.

45. Install replacement IMV Fan, tighten fasteners (four) torque to 32 in-lbs
    (Ratchet, 1/4” Drive; 10” Ext, 3/16” Hex Head; (5-35 in-lbs) Trq Driver).

46. Check removed ducts for damage.
    If holes or cracks are present, document, patch with Gray Tape.

47. Install duct, acoustic insulation, band clamp on top of IMV Fan by placing
    edges of duct and insulation over IMV Fan seal bead.

48. Position band clamps over top IMV Fan seal bead and duct, at least 1/8”
    from edge of duct.

49. Secure band clamp fastener, torque to 8 in-lbs (Small Flat Tip Driver, 3/8”
    Drive; 1/4” to 3/8” Adapter; (5-35 in-lbs) Trq Driver).

50. If Lower Silencer was removed
    Perform steps 51 --- 55.

   If Lower Silencer was not removed
   Go to step 56.
51. Install Lower Silencer, tighten fasteners (four), torque to 32 in-lbs (Ratchet, 1/4" Drive; 10" Ext; 3/16" Hex Head; (5-35 in-lbs) Trq Driver).

52. Check removed ducts for damage. If holes or cracks are present, document, patch with Gray Tape.

53. Install duct, band clamp on bottom of Lower Silencer by placing edges of duct over seal bead.

54. Position band clamp over seal bead and duct, at least 1/8" from edge of duct.

55. Secure band clamp fastener, torque to 8 in-lbs (Small Flat Tip Driver, 3/8" Drive; 1/4" to 3/8" Adapter; (5-35 in-lbs) Trq Driver).

56. Install duct, band clamps between IMV Fan and Lower Silencer by placing edges of duct and insulation over seal beads.

57. Position band clamps over seal beads and duct, at least 1/8" from edges of duct.

58. Secure band clamp fasteners (one each), torque to 8 in-lbs (Small Flat Tip Driver, 3/8" Drive; 1/4" to 3/8" Adapter; (5-35 in-lbs) Trq Driver).

59. Remove Gray Tape securing cables.
   Power Cable Connector W0135-P405 →|← J2.
   Data Cable Connector W0303-P406 →|← J1.

CHECKOUT
60. √ MCC-H for repair verification

61. **ENABLING CLOSE COMMAND FOR IMV FAN PRIMARY RPC**
   Node 1: EPS: RPCM N1 4B-C
   RPCM N1 4B-C
   sel  RPC 12
   cmd Close Cmd – Enable (Verify – Ena)

62. To activate Node 1 Aft Port IMV Fan, perform **{1.504 NODE 1 IMV FAN ACTIVATION/DEACTIVATION}**, step 1 (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:

CLOSEOUT
63. Install Closeout Panel NOD1P5-01.
   Secure fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head).

64. Install Closeout Panel NOD1O4-03.
   Secure fasteners (five) (Driver Handle, 1/4" Drive; 5/32" Hex Head).

15 NOV 00  229
65. Install Closeout Panel NOD1P4-03.
   Secure fasteners (twenty) (Power Tool; Hex Shank, 1/4" Drive; 5/32" Hex Head).

66. Fasten Seat Track Buttons (two), fasteners (two each) on Closeout Panel
   NOD1P4-03, torque to 27 in-lbs (Driver Handle, 1/4" Drive; 5/32" Hex Driver; (5-35 in-lbs) Trq Driver).

67. Replace long handrail on Seat Track Buttons.

POST MAINTENANCE
68. Inform **MCC-H** of task completion.

69. \NYMAT{}S for stowage location of failed IMV Fan
   Stow tools, equipment.
OBJECTIVE:
Replace failed Intermodule Ventilation (IMV) Valve with spare.

LOCATION:
Installed: NOD1P5, NOD1S5
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour

PARTS:
V-Band Clamp (P/N MS 27115-21R)
IMV Valve (P/N 2353024-5-1)

MATERIALS:
Rubber Gloves
Braycote Lubricant

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
    7/16" Deep Socket, 3/8" Drive
Kit D:
    5/32" Hex Head, 3/8" Drive
Kit E:
    3/8" to 1/4" Adapter
    1/4" to 3/8" Adapter
    Ratchet, 3/8" Drive
    Driver Handle, 1/4" Drive
    4" Ext, 1/4" Drive
    6" Ext, 1/4" Drive
    10" Ext, 1/4" Drive
Kit F:
    1/4" Deep Socket, 1/4" Drive
Kit G:
    (5-35 in-lbs) Trq Driver, 1/4" Drive
    (30-200 in-lbs) Trq Wrench, 3/8" Drive
Kit I:
    Small Flat Tip Driver, 3/8" Drive
Kit R:
    5/32" Stubby Hex Head, 1/4" Drive
Lid #2:
    Table Cloth
2.2.302 NODE 1 AFT IMV VALVE R&R

REFERENCED PROCEDURE(S):
None

SAFING

**WARNING**
Failure to remove power can result in electrical shock hazard.

Table 1. Node 1 IMV Valve Information

<table>
<thead>
<tr>
<th>X (Location)</th>
<th>Y (RPCM/RPC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aft Port</td>
<td>RPCM N14B-C RPC 05</td>
</tr>
<tr>
<td>Aft Stbd</td>
<td>RPCM N14B-C RPC 04</td>
</tr>
</tbody>
</table>

1. **NODE 1 IMV X VALVE DEACTIVATION**
Refer to Table 1 for X and Y references that follow.

Node 1: ECLSS: Node 1 IMV X Vlv

If Status – Enabled
  **cmd** Inhibit

√Status – Inhibited

sel RPCM/RPC Y

**RPCM/RPC Y**

**cmd** RPC Position – Open (Verify – Op)
**cmd** Close Cmd – Inhibit (Verify – Inh)
Figure 1.- Typical View IMV O-Rings.
Figure 2: Typical IMV Configuration With Clamps and Duct Installed.
Figure 3.- Typical IMV Assembly Configuration.
ACCESSING
Refer to Figure 2.

Table 2. Node 1 AFT Closeout Panels

<table>
<thead>
<tr>
<th>IMV ORU REFDES</th>
<th>Closeout Panel</th>
<th>Captive Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td>A91 (AFT - STBD)</td>
<td>NOD1S5-01</td>
<td>3 each</td>
</tr>
<tr>
<td>A91 (AFT - STBD)</td>
<td>NOD1S5-02</td>
<td>3 each</td>
</tr>
<tr>
<td>A93 (AFT - PORT)</td>
<td>NOD1P5-01</td>
<td>3 each</td>
</tr>
<tr>
<td>A93 (AFT - PORT)</td>
<td>NOD1P5-02</td>
<td>3 each</td>
</tr>
</tbody>
</table>

2. Remove Closeout Panels per table as required (Driver Handle, 1/4" Drive; 5/32" Stubby Hex Head).
Temporarily stow.
Refer to Table 2.
3. Demate IMV Valve power and Data Cables (J1,J2). Refer to Table 3.


5. Loosen Band Clamp, slide clamp over duct coupler, remove pliable duct coupler from IMV Valve (Driver Handle, 1/4" Drive; 1/4" to 3/8" Adapter; Small Flat Tip Head Driver). Refer to Figure 2.

6. Before removing defective IMV Valve, make reference mark on bulkhead for proper orientation of IMV Valve actuator motor. Refer to Figure 3.

7. Remove IMV V-Band Clamp and remove defective IMV Valve (Ratchet, 3/8" Drive; 7/16" Deep Socket). Refer to Figure 4.

8. Remove Protective Caps (two), RMO Protective Cover from replacement IMV Valve. Temporarily stow. Refer to Figure 4.

9. Gaskets (two) are on mating surface of IMV Valve Flange Refer to Figure 1.

**INSTALLATION**

10. Ensure IMV Valve fully closed to mechanical hard stop and RMO in closed position.

11. Apply thin film Braycote Lubricant to O-Rings (Rubber Gloves).


---

**NOTE**

The IMV Valve should be installed at an angle to provide optimum bend radius for mating of manual override cable. Manual override connector can be relocated by loosening, but not removing, actuator bolts on IMV Valve.
13. Manual override flex cable to verify cable has optimum bend radius
   Install fasteners (two).
   Refer to Figure 3.
   If optimum bend radius acquired
     Go to step 16.
   If optimum bend radius is not acquired
     Continue with procedure.

Figure 5.- IMV Actuator Bolt Tightening Pattern.

14. Loosen IMV Valve Actuator Bolts (six) (careful not to remove bolts) on top
    of actuator located on upper end of IMV Valve (Ratchet, 3/8" Drive; 3/8"
    to 1/4" Adapter; 5/32" Stubby Hex Head Driver).
    Refer to Figure 5.

15. Carefully turn actuator left or right and relocate manual override
    connection for optimum cable bend radius.

16. Retighten IMV Valve Actuator Bolts in star pattern to 23 in-lbs (5/32"
    Stubby Hex Head Driver, 1/4" Drive; 3/8" to 1/4" Adapter; (6" Ext
    required for Aft Port); (5-35 in-lbs) Trq Driver).
    Refer to Figure 5.
17. Install RMO Flex Cable Bolts (two) (on side of actuator), tighten to 39 in-lbs (Ratchet, 3/8" Drive; 5/32" Hex Head Driver; (30-200 in-lbs) Trq Wrench).

18. Tighten IMV Valve V-Band Clamp nut, torque to 60 in-lbs (Ratchet, 3/8" Drive; 7/16" Deep Socket; (10" Ext required for aft port); (4" Ext required for aft stbd); (30-200 in-lbs) Trq Wrench).

**CAUTION**
Excessive torque applied to the duct clamp captive fastener will damage duct assembly. Do not apply more than 12 in-lbs of torque on captive fastener.

**NOTE**
Some IMV valve band clamps may require Flat Tip Driver or 1/4" Deep Socket, 1/4" Drive. This is dependent on space between head of fastener and interface tolerances to band clamp.

19. Install duct by siding Band Clamp over edge of coupling duct and beaded flange on IMV Valve so that it lies at least 1/8" from beaded end. Tighten fastener, torque to 11 in-lbs (Driver Handle, 1/4" Drive; Small Flat Tip Head Driver; 1/4" to 3/8" Adapter; (5-35 in-lbs) Trq Driver). Refer to Figure 2.

20. Mate IMV Valve power, Data Cables (J1,J2) to connectors Align main key with main keyway, turn \( \textneg \) until fully seated. Refer to Table 3.

**CLOSEOUT**
21. Reinstall Closeout Panels, tighten 1/4 turn closeout fasteners on Closeout Panels (Driver Handle, 1/4" Drive; 5/32" Stubby Hex Head Driver). Refer to Table 2.

22. Tighten fasteners to 15 in-lbs (Driver Handle, 1/4" Drive; 5/32" Hex Head; (5-35 in-lbs) Trq Driver).

23. Restore power to IMV Valve. Refer to Table 1.

Node 1: ECLSS: Node 1 IMV X Vlv
Node 1 IMV X Vlv
sel RPCM/RPC Y
RPCM/RPC Y

**cmd** RPC Position – Close (Verify – Cl)
Node 1 IMV X Vlv

**cmd** Enable

√Status – Enabled

**POST MAINTENANCE**

24. Inform **MCC-H** of task completion.

25. √MATS for stowage location of failed IMV Valve
    Stow tools, equipment.
OBJECTIVE:
Replace failed Intermodule Ventilation (IMV) Valve with spare.

LOCATION:
Installed: NOD1P0, NOD1S0
Stowed: √/Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour

PARTS:
V-Band Clamp  (P/N MS 27115-21R)
IMV Valve  (P/N 2353024-5-1)

MATERIALS:
Rubber Gloves
Braycote Lubricant

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
  7/16" Deep Socket, 3/8" Drive
Kit D:
  5/32" Hex Head, 3/8" Drive
Kit E:
  3/8" to 1/4" Adapter
  1/4" to 3/8" Adapter
  Ratchet, 3/8" Drive
  Driver Handle, 1/4" Drive
  4" Ext, 1/4" Drive
  6" Ext, 1/4" Drive
  10" Ext, 1/4" Drive
Kit F:
  1/4" Deep Socket, 1/4" Drive
Kit G:
  (5-35 in-lbs) Trq Driver,
  1/4" Drive
  (30-200 in-lbs) Trq Wrench,
  3/8" Drive
Kit I:
  Small Flat Tip Driver, 3/8" Drive
Kit R:
  5/32" Stubby Hex Head, 1/4" Drive
Lid #2:
  Table Cloth
REFERENCED PROCEDURE(S):
None

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

Table 1. Node 1 IMV Valve Information

<table>
<thead>
<tr>
<th>X (Location)</th>
<th>Y (RPCM/RPC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fwd Port</td>
<td>RPCM N13B-C RPC 14</td>
</tr>
<tr>
<td>Fwd Stbd</td>
<td>RPCM N13B-C RPC 13</td>
</tr>
</tbody>
</table>

1. NODE 1 IMV X VALVE DEACTIVATION
Refer to Table 1 for X and Y references that follow.

Node 1: ECLSS: Node 1 IMV X Vlv

If Status – Enabled

\[ \text{cmd} \text{ Inhibit} \]

\[ \sqrt{\text{Status}} \text{ – Inhibited} \]

sel RPCM/RPC Y

\[ \text{RPCM/RPC Y} \]

\[ \text{cmd} \text{ RPC Position – Open (Verify – Op)} \]

\[ \text{cmd} \text{ Close Cmd – Inhibit (Verify – Inh)} \]
Figure 1.- Typical View IMV O-Rings.
Figure 2.- Typical IMV Configuration With Clamps and Duct Installed.
Figure 3.- Typical IMV Assembly Configuration.
2.2.303 NODE 1 FWD IMV VALVE R&R

ACCESSING
Refer to Figure 2.

Table 2. Node 1 FWD Closeout Panels

<table>
<thead>
<tr>
<th>IMV ORU REFDES</th>
<th>Closeout Panel</th>
<th>Captive Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td>A112 (FWD - STBD)</td>
<td>NOD1S0-01</td>
<td>3 each</td>
</tr>
<tr>
<td>A91  (FWD - STBD)</td>
<td>NOD1S0-02</td>
<td>3 each</td>
</tr>
<tr>
<td>A111 (FWD - PORT)</td>
<td>NOD1P0-01</td>
<td>3 each</td>
</tr>
<tr>
<td>A93  (FWD - PORT)</td>
<td>NOD1P0-02</td>
<td>3 each</td>
</tr>
</tbody>
</table>

2. Remove Closeout Panels per table as required (Driver Handle, 1/4" Drive; 5/32" Stubby Hex Head). Temporarily stow. Refer to Table 2.
3. Demate IMV Valve power and Data Cables (J1,J2) Refer to Table 3.


5. Loosen Band clamp, slide clamp over duct coupler (Driver Handle, 1/4" Drive; 1/4" to 3/8" Adapter; Small Flat Tip Head Driver 3/8"). Remove pliable duct coupler from IMV Valve. Refer to Figure 2.

6. Before removing defective IMV Valve, make reference mark on bulkhead for proper orientation of IMV Valve actuator motor. Refer to Figure 3.

7. Remove IMV V-Band Clamp. Remove defective IMV Valve (Ratchet, 3/8" Drive; 7/16" Deep Socket). Refer to Figure 4.

8. Remove Protective Caps (two), RMO Protective Cover from replacement IMV Valve. Temporarily stow. Refer to Figure 4.

9. Gaskets (two) on mating surface of IMV Valve Flange Refer to Figure 1.

**INSTALLATION**

10. Ensure IMV Valve fully closed to mechanical hard stop, RMO in closed position.

**NOTE**
The IMV Valve should be installed at an angle to provide optimum bend radius for mating of manual override cable. Manual override connector can be relocated by loosening, but not removing, Actuator Bolts on IMV Valve.

11. Apply thin film Braycote Lubricant to O-Rings (Rubber Gloves).

13. Manual override flex cable to verify cable has optimum bend radius. Install fasteners (two) (Ratchet, 3/8" Drive; 5/32" Hex Head). Refer to Figure 3.

   If optimum bend radius acquired, go to step 16.
   If optimum bend radius is not acquired, continue.

Figure 5.- IMV Actuator Bolt Tightening Pattern.

14. Loosen IMV Valve Actuator Bolts (six) (careful not to remove bolts) on top of actuator located on upper end of valve (Ratchet, 3/8" Drive; 3/8" to 1/4" Adapter; 5/32" Stubby Hex Head Driver). Refer to Figure 5.

15. Carefully turn Actuator left or right to relocate manual override connection for optimum cable bend radius.
16. Retighten IMV Valve Actuator Bolts in star pattern to 23 in-lbs
((5-35 in-lbs) Trq Driver; 5/32" Stubby Hex Head Driver, 1/4" Drive;
6" Ext required for fwd port).
Refer to Figure 5.

17. Install RMO Flex Cable Bolts (two) (on side of Actuator), torque to 39 in-lbs
(Ratchet, 3/8" Drive; 5/32" Hex Head Driver; (30-200 in-lbs) Trq
Wrench).

18. Tighten IMV Band Clamp Nut, torque to 60 in-lbs (Ratchet, 3/8" Drive;
7/16" Deep Socket; (30-200 in-lbs) Trq Wrench; 10" Ext may be required
for fwd port).

CAUTION
Excessive torque applied to the duct clamp captive
fastener will damage duct assembly. Do not apply
more than 12 in-lbs of torque on captive fastener.

NOTE
Some IMV Band Clamps may require Flat Tip
Driver or 1/4" Deep Socket, 1/4" Drive. This is
dependent on space between head of fastener
and interface tolerances to Band Clamp.

19. Install Duct by sliding Band Clamp over edge of coupling duct and
beaded flange on IMV Valve so that it lies at least 1/8" from beaded end.
Tighten fastener, torque to 11 in-lbs (Driver Handle, 1/4" Drive; Small Flat
Tip Head Driver 3/8" Drive; 1/4" to 3/8" Adapter; (5-35 in-lbs) Trq Driver).

20. Mate→|← IMV Valve power and Data Cables (J1,J2) to connectors
Align main key with main keyway, turn  ↘ until fully seated.
Refer to Table 3.

CLOSEOUT
21. Reinstall Closeout Panels, tighten 1/4 turn closeout fasteners on Closeout
Panels (Driver Handle, 1/4" Drive; 5/32" Stubby Hex Head Driver).
Refer to Table 2.

22. Tighten fasteners to 15 in-lbs (Driver Handle, 1/4" Drive; 5/32" Hex Head;
(5-35 in-lbs) Trq Driver).

23. Restore power to IMV Valve.
Refer to Table 1.

Node 1: ECLSS: Node 1 IMV X Vlv
Node 1 IMV X Vlv
sel RPCM/RPC Y
2.2.303 NODE 1 FWD IMV VALVE R&R

RPCM/RPC Y

**cmd** RPC Position – Close (Verify – Cl)

Node 1 IMV X Vlv

**cmd** Enable

√Status – Enabled

**POST MAINTENANCE**

24. Inform **MCC-H** of task completion.

25. √MATS for stowage location of failed IMV Valve
   Stow tools, equipment.
OBJECTIVE:
Remove and replace failed Cabin Fan.

LOCATION:
Installed: NOD1P3
Stowed: Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Cabin Fan (P/N SV811840-2)

MATERIALS:
Wet Wipes
Tape

TOOLS REQUIRED:
Equipment Bag
Multimeter
Kit C:
  7/16” Deep Socket, 3/8” Drive
  3/8” Deep Socket, 3/8” Drive
  9/16” Socket, 3/8” Drive
Kit D:
  5/32” Hex Head, 3/8” Drive
  5/16” Hex Head, 3/8” Drive
Kit E:
  Driver Handle, 3/8” Drive
  Ratchet, 3/8” Drive
  11” Ext, 3/8” Drive
Kit G:
  (150-1000 in-lbs) Trq Wrench, 3/8” Drive
  (30-200 in-lbs) Trq Wrench, 3/8” Drive

REFERENCED PROCEDURE(S):
1.505  NODE 1 CABIN FAN ACTIVATION/DEACTIVATION
SAFING

WARNING

Failure to remove power can result in electrical shock hazard.

1. Perform {1.505 NODE 1 CABIN FAN ACTIVATION/DEACTIVATION}, deactivation steps only (SODF: ECLSS: ACTIVATION AND CHECKOUT).

ACCESSING

2. Remove NOD1P3-01 Panel, fasteners (six) (Driver Handle; 5/32" Hex Driver).
   Temporarily stow.

REMOVING

Refer to Figure 1.

![Diagram of Node 1 Inlet Fan]

3. Demate cables
   W0307-P407 ←→ J1 (Signal interface)
   W0137-P409 ←→ J2 (Power)
   W0307-P408 ←→ J3 (Pressure interface)
   Temporarily restrain cables.

4. Remove both insulation jackets from Cabin Fan flanges.
   Temporarily stow.
5. Release V-Band clamp at cabin air supply (upper) duct by hand.

6. Release V-Band clamp at cabin air return (lower) duct by hand.

7. Tighten set screws (four) on mounting brackets (Driver Handle, 5/16" Hex Head Driver).
   Refer to Figure 1.

8. Loosen fasteners (four) on Cabin Fan (Ratchet; 11" Ext; 9/16" Socket).

9. Remove failed Cabin Fan from mounting brackets.
   Label, temporarily restrain.

REPLACING

Figure 2.- Cabin Fan Bracket with Contact Strip and Set Screw.

10. Verify that contact strip on aft/nadir side of mounting bracket is visibly clean (Wet Wipes).
    Refer to Figure 2.

11. Remove connector covers from J1, J2, and J3 on replacement Inlet Cabin Fan.
    Install connector covers on failed Inlet Cabin Fan.

12. Position upper insulation around outlet duct.

13. Align replacement Cabin Fan fasteners to bosses on mounting brackets.

14. Only three of the four captive fasteners need to be fastened.
    Do not fasten the fastener located at the zenith/aft side of the ORU.
    Tighten fasteners (three), then torque to 245 in-lbs (Ratchet; 11" Ext; 9/16" Socket; (150-1000 in-lbs) Trq Wrench).
15. Continuity between Cabin Fan and secondary structure (Multimeter)

16. Open upper insulation, maintaining both ends.

17. Position flanges of outlet duct and Cabin Fan together.
   Secure with V-Band clamp.
   Snap over center latch closed.
   Position safety clip in place.

    Secure with V-Band clamp.
    Snap over center latch closed.
    Position safety clip in place.

19. Secure Velcro insulation jackets around upper and lower ducts.

20. Mate cables
    W0307-P407 → J1 (Signal interface)
    W0137-P409 → J2 (Power cable)
    W0307-P408 → J3 (Pressure interface)

CLOSEOUT
21. Install Closeout Panel securing fasteners (six) (Driver Handle, 5/32" Hex Head).

CHECKOUT
22. Inform MCC-H maintenance complete.

23. Perform NODE 1 CABIN FAN ACTIVATION/DEACTIVATION, activation steps only (SODF: ECLSS: ACTIVATION AND CHECKOUT)

POST MAINTENANCE
24. MCC

25. Stow failed ORU, tools, equipment.
OBJECTIVE:
Remove and replace degraded Sample Delivery System (SDS) Valves.

LOCATION:
Installed: NOD1P1, NOD1P3
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour

PARTS:
SDS Valves (four) (P/N Carlton B40204-1)

MATERIALS:
Gray Tape
Ziplock Bag

TOOLS REQUIRED:
Power Driver
ISS Common IVA Tool Kit:
Kit A:
   3/8" Combination Wrench
   3/8" Crowfoot, 3/8" Drive
Kit D:
   5/32" Hex Head, 1/4" Drive
   1/4" Hex Shank
Kit E:
   3/8" to 1/4" Adapter
   4" Ext, 1/4" Drive
   Ratchet, 1/4" Drive
   Driver Handle, 1/4" Drive
Kit F:
   3/8" Socket, 1/4" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive

REFERENCED PROCEDURE(S):
None

NOTE
1. All SDS valve position handles will be in the Auto position regardless of the actual valve position.
2. Fasteners for SDS Valves are loose and taped as a result of Flight 2A.1.
SAFING

WARNING
Do not send commands to these valves during maintenance. Inadvertent power may be placed in power cables.

1. **INHIBITING RPC CLOSE CMD FOR RPCM N1RS1 A**

   PCS
   Node1: EPS: RPCM N1RS1 A
   RPCM N1RS1 A

   sel RPC[X] where [X] = 5 6
   **cmd** Close Cmd – Inhibit (Verify – Inh)
   Repeat

2. **OPENING RPCM N1RS1 A RPCS**

   PCS
   Node1: EPS: RPCM N1RS1 A
   RPCM N1RS1 A

   sel RPC[X] where [X] = 5 6
   **cmd** RPC Position – Open (Verify – Op)
   Close Cmd – Inh
   Repeat

**ACCESSING NOD1P1-01**
3. Remove Closeout Panel NOD1P1-01, fasteners (fourteen) (Power Driver; 1/4” Hex Shank; 5/32” Hex Head, 1/4” Drive). Temporarily stow.

**REMOVING VALVES A115,A116,A117**

<table>
<thead>
<tr>
<th>SDS VALVES</th>
<th>POWER/DATA CABLE AND JACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>A115</td>
<td>W0141-P447 ←→ J1</td>
</tr>
<tr>
<td>A116</td>
<td>W0141-P448 ←→ J1</td>
</tr>
<tr>
<td>A117</td>
<td>W0141-P449 ←→ J1</td>
</tr>
</tbody>
</table>
4. Demate power/data cables from SDS Valves. Refer to Table 1.

5. Disconnect air lines (three) from failed valve (3/8” Combination Wrench).
NOTE
Fasteners are noncaptive. Use extreme care when removing and installing loose parts.

6. Remove fasteners (four), washers (four), and failed valve (Ratchet, 1/4” Drive; 4” Ext, 1/4” Drive; 3/8” Socket, 1/4” Drive).
Stow fasteners and washers in Ziplock Bag.
Temporarily stow failed valve.
Refer to Figure 2.

REPLACING VALVES A115, A116, A117
7. Install replacement valve using alignment pin, install fasteners (four),
washers (four), and torque to 32 in-lbs (Ratchet, 1/4” Drive; 4” Ext, 1/4” Drive; 3/8” to 1/4” Adapter; 3/8” Socket, 1/4” Drive; (30-200 in-lbs) Trq Wrench).
Refer to Figure 2.

8. Connect air lines (three) to valve, finger tight.

NOTE
Position Crowfoot at a 90° angle to Trq Wrench handle to prevent over torquing.

9. Torque air lines (three) to 80 in-lbs (3/8” Crowfoot, 3/8” Drive; (30-200 in-lbs) Trq Wrench, 3/8” Drive).

10. Connect power/data cable according to Table 1.

11. Repeat steps 4 --- 10 for remaining valves in the NOD1P1 location.

ACCESSING NOD1P2-34
12. Remove Closeout Panel NOD1P2-34, fasteners (twenty-four) (Power Driver; 1/4” Hex Shank; 5/32” Hex Head, 1/4” Drive).
Temporarily stow.
REMOVING VALVE A118

13. Demate power/data cable from Valve A118.
   W0143-P450 ←|→ J1

14. Disconnect air lines (three) from failed valve (3/8” Combination Wrench).

   NOTE
   Fasteners are noncaptive. Use extreme care when removing and installing loose parts.

15. Remove fasteners (four), washers (four), and failed valve (Ratchet, 1/4” Drive; 4” Ext; 3/8” Socket).
    Stow fasteners and washers in Ziplock Bag.
    Temporarily stow failed valve.
    Refer to Figure 3.

REPLACING VALVE A118

16. Install replacement valve using alignment pin.
    Install fasteners (four), washers (four) and torque to 32 in-lbs (Ratchet, 1/4” Drive; 4” Ext, 1/4” Drive; 3/8” to 1/4” Adapter; 3/8” Socket, 1/4” Drive; (30-200 in-lbs) Trq Wrench, 3/8” Drive).
    Refer to Figure 3.

17. Connect air lines (three) to valve, finger tight.
18. Torque air lines (three) to 80 in-lbs (3/8" Crowfoot; (30-200 in-lbs) Trq Wrench, 3/8" Drive).

19. Connect power/data cable.
   W0143-P450 →|← J1

CLOSEOUT
20. Replace Closeout Panel NOD1P2-34, fasteners (twenty-four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

21. Replace Closeout Panel NOD1P1-01, fasteners (fourteen) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

22. **ENABLING RPC CLOSE CMD FOR RPCM N1RS1 A**

   Node1: EPS: RPCM N1RS1 A
   
   [RPCM N1RS1 A]

   sel RPC[X] where [X] = 5 6

   √RPC Position – Op

   **cmd** Close Cmd – Enable (Verify – Ena)

   Repeat

23. **CLOSING RPCM N1RS1 A RPCS**

   Node1: EPS: RPCM N1RS1 A
   
   [RPCM N1RS1 A]

   sel RPC[X] where [X] = 5 6

   **cmd** RPC Position – Close (Verify – Cl)

   Repeat

**POST MAINTENANCE**
24. Inform **MCC-H** of task completion.

25. √MATS for stowed location of failed valves

   Stow tools, equipment.
OBJECTIVE:  
Remove failed RPCM.  
Replace failed RPCM with scavenged RPCM after P6 activation.

LOCATION:  
Installed: Node 1

DURATION:  
40 minutes

PARTS:  
N/A

MATERIALS:  
Dry Wipes  
FDF Cover Material  
Gray Tape

TOOLS REQUIRED:  
ISS Common IVA Tool Kit:  
Kit D:  
5/32” Hex Head, 1/4” Drive  
Kit E:  
Ratchet, 3/8” Drive  
Ratchet, 1/4” Drive (RPDA N1RS1 Only)  
6” Ext, 3/8” Drive  
4” Ext, 1/4” Drive (RPDA N1RS1 Only)  
Driver Handle, 1/4” Drive  
Kit F:  
5/16” Socket, 1/4” Drive (RPDA N1RS1 Only)  
Kit G:  
(30-200 in-lbs) Trq Wrench, 3/8” Drive  
Kit H:  
Scissors  
Kit R:  
7/16” EVA Socket, 3/8” Drive  
Lid #1:  
Static Wrist Tether

REFERENCED PROCEDURE(S):  
1.204 RACU 6 DEACTIVATION  
1.203 FGB RACU 5(6) ACTIVATION  
1.220 Z1 DDCU Z13B POWERDOWN  
1.221 Z1 DDCU Z14B POWERDOWN  
1.224 Z1 DDCU Z13B CONTROLLED REPOWER  
1.225 Z1 DDCU Z14B CONTROLLED REPOWER
SAFING

**WARNING**

Failure to remove power can result in electrical shock hazard.

**CAUTION**

Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

### Table 1. Node 1 RPCM Power Sources (Deactivation)

<table>
<thead>
<tr>
<th>RPCM</th>
<th>POWER SOURCE</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1RS1 A, B, C</td>
<td>RACU 6</td>
<td>{1.204 RACU 6 DEACTIVATION} (SODF: EPS: ACTIVATION AND CHECKOUT: SECONDARY POWER SYSTEM)</td>
</tr>
<tr>
<td>N14B A, B,C</td>
<td>DDCU Z14B</td>
<td>{1.221 Z1 DDCU Z14B POWERDOWN} (SODF: EPS: ACTIVATION AND CHECKOUT: SECONDARY POWER SYSTEM)</td>
</tr>
</tbody>
</table>

1. Safe failed, scavenged RPCMs by isolating upstream power source. Refer to Table 1 for correct deactivation procedure.

**ACCESSING**

Table 2. Node 1 RPCM Closeout Panels

<table>
<thead>
<tr>
<th>RPCM</th>
<th>Node 1 Closeout Panel</th>
<th>Procedure Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1RS1 A, B, C</td>
<td>NOD1O1-01</td>
<td>Figure 3</td>
</tr>
<tr>
<td>N14B A, B, C</td>
<td>NOD1O1-01</td>
<td>Figure 3</td>
</tr>
<tr>
<td>N1RS2 A, B, C</td>
<td>NOD1D1-01</td>
<td>Figure 2</td>
</tr>
<tr>
<td>N13B A, B, C</td>
<td>NOD1D1-01</td>
<td>Figure 1</td>
</tr>
</tbody>
</table>

2. Loosen Closeout Panel fasteners (ten) to access failed, scavenged RPCMs (Driver Handle, 1/4” Drive; 5/32” Hex Head, 1/4” Drive). Temporarily stow. Refer to Table 2 for correct Closeout Panel.
Figure 1.- RPDA N13B (Node 1 Alcove Deck - Port Side).

Figure 2.- RPDA N1RS2 (Node 1 Alcove Deck - Stbd Side).
2.2.401 NODE 1 RPCM SWAPOUT

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Figure 3.- RPDA N14B, RPDA N1RS1
(Node 1 Alcove Overhead - Port Side).

FAILED/SCAVENGED RPCM REMOVAL

3. Locate failed RPCM.
   Refer to Figures 1, 2, 3.

   NOTE
   If failed/scavenged RPCM is located on RPDA N1RS1, Cable Wire Harness W0103 must be moved out of path when removing failed RPCM from RPDA.

4. If required, remove cable wire harness W0103 from clamps (two)
   (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 5/16" Socket, 1/4" Drive).
   Refer to Figure 3.

5. Don Static Wrist Tether.
   Attach to unpainted surface near RPCM location.
   Refer to Figures 1, 2, 3.
CAUTION

1. Failure to use 7/16" EVA Socket can result in damage to RPCM Drive Screw Assembly.
2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.
3. Combined linear and rotational motion on Socket while inserting, can result in damage to RPCM Drive Screw Assembly.

Figure 4.- View of RPCM Status Indicator, Drive Screw Assembly.

6. Align, insert 7/16" EVA Socket into RPCM Lock Assembly until it bottoms out and locking springs have released drive screw. Refer to Figure 4.

NOTE

1. RPCM status indicator will move from “LOCK” line to “UNLOCK” line when Drive Screw Assembly is disengaged.
2. RPCM status indicator may remain at or below “UNLOCK” line when RPCM is removed from RPDA.

7. Applying constant pressure to keep RPCM lock springs released, loosen RPCM drive screw (Ratchet, 3/8" Drive; 7/16" EVA Socket, 3/8" Drive).

8. √Status indicator – UNLOCK
9. Remove, label failed RPCM from RPDA receptacle by sliding it off guide rail. Temporary stow failed RPCM.

10. Inspect failed RPCM mounting location for foreign matter/debris, damage to alignment guide and connector sockets.

11. Locate scavenged RPCM. Refer to Figures 1, 2, 3.

12. Remove scavenged RPCM by repeating steps 4 --- 10.

SCAVENGED RPCM INTO FAILED RPCM LOCATION INSTALLATION

13. Clean coldplate bonding surfaces with Dry Wipes.

**NOTE**

If installing RPCM on RPDA N1RS1, Cable Wire Harness W0103 should be out of path.


15. Insert RPCM into RPDA receptacle until status indicator reaches “UNLOCK” position.

**CAUTION**

1. Failure to use 7/16” EVA Socket can result in damage to RPCM Drive Screw Assembly.

2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.

3. Combined linear and rotational motion on Socket while inserting, can result in damage to RPCM Drive Screw Assembly.

16. Align, insert 7/16” EVA Socket into RPCM Lock Assembly until it bottoms out and locking springs have released drive screw. Refer to Figure 4.

17. Applying constant pressure, tighten RPCM drive screw and torque to 60 in-lbs (Ratchet, 3/8” Drive; 7/16” EVA Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

18. √ Status indicator – LOCK

**NOTE**

If failed/scavenged RPCM is located on RPDA N1RS1, Cable Wire Harness W0103 must be reinstalled.
19. If required, install Cable Wire Harness W0103 clamps (two) (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 5/16" Socket, 1/4" Drive).
   Refer to Figure 3.

SCAVENGED RPCM LOCATION PROTECTION

20. Cut 3” x 8” sections (two) from FDF Protective cover material (Scissors).

   **CAUTION**
   Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

   **NOTE**
   When covering with tape, ensure no tape residue remains on RPDA sockets and RPCM pins.

21. Cover vacant RPCM location, failed RPCM connectors with FDF material, Gray Tape.

CHECKOUT

<table>
<thead>
<tr>
<th>RPCM</th>
<th>POWER SOURCE</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1RS1 A, B, C</td>
<td>RACU 6</td>
<td>{1.203 FGB RACU 5(6) ACTIVATION} (SODF: EPS: ACTIVATION AND CHECKOUT: SECONDARY POWER SYSTEM)</td>
</tr>
<tr>
<td>N1RS2 A, B, C</td>
<td>DDCU Z13B</td>
<td>{1.224 Z1 DDCU Z13B CONTROLLED REPOWER} (SODF: EPS: ACTIVATION AND CHECKOUT: SECONDARY POWER SYSTEM)</td>
</tr>
</tbody>
</table>

22. Apply power to replacement RPCM by activating upstream power source.
   Refer to Table 3 for correct activation procedure.

CLOSEOUT

23. Install Closeout Panel.
   Snug fasteners (ten) (Driver Handle, 1/4” Drive; 5/32” Hex Head, 1/4” Drive).
   Refer to Table 2.

POST MAINTENANCE

24. Inform **MCC-H** of task completion.

25. Maintenance and Assembly Task Supplement (MATS) for stowage location of failed RPCM
    Stow tools, equipment.
OBJECTIVE:
Remove and replace failed RPCM in Node 1.

LOCATION:
Installed: Node 1
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
40 minutes

PARTS:
RPCM-Int Type V (P/N R077419-71)

MATERIALS:
Dry Wipes
Gray Tape

TOOLS REQUIRED:
ISS COMMON IVA Tool Kit:
Kit E:
   Ratchet, 3/8” Drive
   Ratchet, 1/4” Drive (RPDA N1RS1 Only)
   6” Ext, 3/8” Drive
   4” Ext, 1/4” Drive (RPDA N1RS1 Only)
   Driver Handle, 1/4” Drive
Kit F:
   5/16” Socket, 1/4” Drive (RPDA N1RS1 Only)
Kit D:
   5/32” Hex Head Driver, 1/4” Drive
Kit R:
   7/16” EVA Socket, 3/8” Drive
Kit G:
   (30-200 in-lbs) Trq Wrench
Kit H:
   Scissors, 2” Cut, 8-1/4” Long
Lid #1:
   Static Wrist Tether

REFERENCED PROCEDURE(S):
1.204 RACU 6 DEACTIVATION
1.220 Z1 DDCU Z13B POWERDOWN
1.221 Z1 DDCU Z14B POWERDOWN
RACU (5)6 ACTIVATION
1.224 Z1 DDCU Z13B CONTROLLED REPOWER
1.225 Z1 DDCU Z14B CONTROLLED REPOWER
SAFING

WARNING

Failure to remove power can result in electrical shock hazard.

Table 1. Node 1 RPCM Power Sources (Deactivation)

<table>
<thead>
<tr>
<th>RPCM</th>
<th>POWER SOURCE</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1RS1 A, B, C</td>
<td>RACU 6</td>
<td>{1.204 RACU 6 DEACTIVATION} (SODF: EPS: ACTIVATION AND CHECKOUT: SECONDARY POWER SYSTEM)</td>
</tr>
<tr>
<td>N14B A, B, C</td>
<td>DDCU Z14B</td>
<td>{1.221 Z1 DDCU Z14B POWERDOWN} (SODF: EPS: ACTIVATION AND CHECKOUT: SECONDARY POWER SYSTEM)</td>
</tr>
</tbody>
</table>

1. Safe failed RPCMs by isolating upstream power source. For correct deactivation procedure, refer to Table 1.

ACCESSING

Table 2. Node 1 RPCM Closeout Panels

<table>
<thead>
<tr>
<th>RPCM</th>
<th>NODE 1 CLOSEOUT PANEL</th>
<th>PROCEDURE FIGURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1RS1 A, B, C</td>
<td>NOD1O1-01</td>
<td>Figure 3</td>
</tr>
<tr>
<td>N14B A, B, C</td>
<td>NOD1O1-01</td>
<td>Figure 3</td>
</tr>
<tr>
<td>N1RS2 A, B, C</td>
<td>NOD1D1-01</td>
<td>Figure 2</td>
</tr>
<tr>
<td>N13B A, B, C</td>
<td>NOD1D1-01</td>
<td>Figure 1</td>
</tr>
</tbody>
</table>

2. Loosen Closeout Panel fasteners to access failed RPCMs (Handle, 1/4" Drive; 5/32" Hex Head Driver). Temporarily stow. Refer to Table 2 for correct Closeout Panel.
Figure 1.- RPDA N13B (Node 1 Alcove Deck - Port Side).
2.2.402 RPCM R&R NODE 1
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Figure 2.- RPDA N1RS2 (Node 1 Alcove Deck - Stbd Side).

Figure 3.- RPDA N14B, RPDA N1RS1 (Node 1 Alcove Overhead - Port Side).
REMOVAL

3. Don Static Wrist Tether, attach to unpainted surface near RPCM location. Refer to Figures 1, 2, and 3.

4. Locate failed RPCM. Refer to Figures 1, 2, and 3.

NOTE
If failed RPCM is located on RPDA N1RS1, Cable Wire Harness W0103 must be moved out of path when removing failed RPCM from RPDA.

5. If required, remove Cable Wire Harness W0103 from clamps (two), (Ratchet, 1/4" Drive; 4" Ext; 5/16" Socket). Refer to Figure 3.

CAUTION
1. Failure to use 7/16" x 6" Wobble Socket Extension can result in damage to RPCM Drive Screw Assembly.

2. Failure to align, fully seat socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.

3. Combined linear, rotational motion on socket while inserting, can result in damage to RPCM Drive Screw Assembly.
Figure 4.- View of RPCM Status Indicator, Drive Screw Assembly.

6. Align, insert 7/16" x 6" Wobble Socket Ext into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. Refer to Figure 4.

NOTE

1. RPCM Status Indicator will move from LOCK line to UNLOCK line when Drive Screw Assembly is disengaged.

2. RPCM Status Indicator may remain at or below UNLOCK line when RPCM is removed from RPDA.

7. Applying constant pressure to keep RPCM lock springs released, loosen RPCM drive screw (Ratchet, 3/8" Drive; 7/16" x 6" Wobble Socket Ext).

8. √Status indicator – UNLOCK

9. Remove failed RPCM from RPDA receptacle by sliding it off guide rail, label.

10. Remove electrical connector protective caps (two) from the replacement RPCM, attach to failed RPCM. Temporarily stow failed RPCM.

REPLACE

11. Inspect replacement RPCM and mounting location for foreign matter/debris, damage to alignment guide, pins, sockets.

12. Clean coldplate bonding surfaces with Dry Wipes.
CAUTION

All internal RPCMs have the same physical characteristics. Forcing incorrect spare RPCM into receptacle could damage key and bend RPCM Connector pins.

RPCM Type V
Pin Configuration (Power Output)

Figure 5.- RPCM Int Type-V Power Out Connector (Node1).

13. Verify replacement RPCM by part number and Power Out Connector pins.
   Refer to Figure 5.

NOTE
If installing RPCM on RPDA N1RS1, Cable Wire Harness W0103 should be out of path.


15. Insert RPCM into RPDA receptacle until status indicator reaches UNLOCK position.

CAUTION

1. Failure to use 7/16" x 6" Wobble Socket Extension can result in damage to RPCM Drive Screw Assembly.

2. Failure to align, fully seat socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.

3. Combined linear, rotational motion on socket while inserting can result in damage to RPCM Drive Screw Assembly.
16. Align, insert 7/16" x 6" Wobble Socket Ext into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. Refer to Figure 4.

17. Applying constant pressure, tighten RPCM drive screw, torque to 60 in-lbs (Ratchet, 3/8" Drive; 7/16" x 6" Wobble Socket Ext; (30-200 in-lbs) Trq Wrench).

18. Status indicator – LOCK

**NOTE**
If replacement RPCM is located on RPA N1RS1, Cable Wire Harness W0103 must be reinstalled.

19. If required, install Cable Wire Harness W0103 clamps (two), (Ratchet, 1/4" Drive; 4" Ext; 5/16" Socket). Refer to Figure 3.

**CHECKOUT**

Table 3. Node 1 RPCM Power Sources (Activation)

<table>
<thead>
<tr>
<th>RPCM</th>
<th>POWER SOURCE</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1RS1 A, B, C</td>
<td>RACU 6</td>
<td>RACU (5)6 ACTIVATION (EPS/4A - ALL/FIN A/MULTI)</td>
</tr>
</tbody>
</table>

20. Apply power to replacement RPCM by activating upstream power source. For correct activation procedure, refer to Table 3.

**CLOSEOUT**

21. Install Closeout Panel, snug fasteners (Handle, 1/4" Drive; 5/32" Hex Head Driver). Refer to Table 2.

**POST MAINTENANCE**

22. MCC-H for stowage location of failed RPCM
    Stow tools, equipment.
OBJECTIVE:
Remove and replace a failed Utility Outlet Panel (UOP) in Node 1.

LOCATION:
Installed: NODE 1
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
40 minutes

PARTS:
Utility Outlet Panel (P/N 683-277010)

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit D:
   1/8" Hex Head Driver, 1/4" Drive
Kit E:
   Driver Handle, 1/4" Drive
Kit G:
   (5-35 in-lbs) Trq Driver, 1/4" Drive
Lid #1:
   Static Wrist Tether

REFERENCED PROCEDURE(S):
1.215 NODE 1 UOP CHECKOUT

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Prior to removing power to UOP the output power must be disabled to prevent damage to UOP Ground Fault Circuit Interrupt (GFCI) relay.
2.2.403 NODE 1 UTILITY OUTLET PANEL R&R

Table 1. Node 1 UOP Locations

<table>
<thead>
<tr>
<th>Utility Outlet Panel</th>
<th>Location</th>
<th>Power Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>UOP N1-1</td>
<td>NOD1SD4</td>
<td>RPCM N14B-C-RPC-17</td>
</tr>
<tr>
<td>UOP N1-2</td>
<td>NOD1PD4</td>
<td>RPCM N13B-A-RPC-17</td>
</tr>
</tbody>
</table>

1. Remove all portable electrical equipment from failed UOP.
   Install Protective Caps on output power connectors (J3,J4).

2. Failed UOP POWER OUT pb – Non-Depressed

   √ ENABLE – Dark
   √ RESET   – Dark or Green
   √ OK      – Dark or Green

3. OPENING AND CLOSING INHIBIT FAILED UOP RPC

   PCS
   Node 1: EPS: RPCM XXXX X RPC where [X] = Refer to Table 1.
   [RPCM XXXX X RPC [X]]

   cmd RPC Position – Open (Verify – Op)
   cmd RPC Close Command – Inhibit (Verify – Inh)

   Repeat

REMOVAL

CAUTION

Equipment contains parts sensitive to damage by Electronic Discharge (ESD).

4. Don Static Wrist Tether.
   Secure to unpainted metal near failed UOP.

CAUTION

Pulling UOP too far from standoff prior to demating power, and data wire harnesses may result in damage to wire harnesses.

NOTE

All UOPs in Node 1 (two) provide power only. Input connector J2 (1553 Data) is not used.
5. Unfasten fasteners (six) on failed UOP. Remove UOP from Standoff (Driver Handle; 1/8" Hex Head Driver). Refer to Figure 1 and Table 2.

Figure 1.- Utility Outlet Panel Mounted in Standoff.

Table 2. Node 1 UOP Connector/Wire Harnesses

<table>
<thead>
<tr>
<th>Utility Outlet Panel (Ref. Designator)</th>
<th>Input Power Wire Harness To UOP J1</th>
<th>Input Data Wire Harness To UOP J2</th>
</tr>
</thead>
<tbody>
<tr>
<td>UOP N1-1 (A92)</td>
<td>W0137-P398</td>
<td>N/A</td>
</tr>
<tr>
<td>UOP N1-2 (A110)</td>
<td>W0136-P435</td>
<td>N/A</td>
</tr>
</tbody>
</table>
6. Input Power (Wire Harness) $\leftarrow$ J1 of failed UOP. Refer to Table 2 and Figure 2.

7. Label failed UOP. Temporarily stow.

**REPLACEMENT**

8. Remove Protective Caps from replacement UOP connector (J1), place on failed UOP. Temporarily stow.

9. Input Power (Wire Harness) $\rightarrow$ J1 of replacement UOP. Refer to Table 2 and Figure 2.

10. Install replacement UOP in Standoff, tighten fasteners (six). Torque to 30 in-lbs (Driver Handle; 1/8" Hex Head; (5-35 in-lbs) Trq Driver).

**CHECKOUT**

11. Perform {1.215 NODE 1 UOP CHECKOUT}, applicable steps (SODF: EPS: ACTIVATION AND CHECKOUT: SECONDARY POWER SYSTEM), then:
POST MAINTENANCE

12. Inform MCC-H of task completion.

13. √MATS for stowage of failed UOP
    Stow tools, supplies.
OBJECTIVE:
Remove and replace failed Lamp Housing Assembly (LHA) to repair General Luminaire Assembly (GLA).

LOCATION:
Installed: NOD1OP (three locations), NOD1OS (three locations), NOD1DP2, NOD1DS2
Stowed: \ Maintenance and Assembly Task Supplement (MATS)

DURATION:
15 minutes

PARTS:
LHA (P/N 219010)

MATERIALS:
Tape

TOOLS REQUIRED:
Equipment Bag
ISS Common IVA Tool Kit:
Kit D:
  1/8” Hex Head, 1/4” Drive
Kit E:
  Driver Handle, 1/4” Drive

REFERENCED PROCEDURE(S):
None

Figure 1.- General Luminaire Assembly (GLA).
SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. LAMP POWER → Off
   See Figure 1.

2. √LED is not illuminated

Table 1. GLA RPC Power Node 1

<table>
<thead>
<tr>
<th>Location</th>
<th>RPDA [X]</th>
<th>RPCM [Y]</th>
<th>RPC [Z]</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOD1OP2 (F)</td>
<td>N1-4B</td>
<td>N1-4B-C</td>
<td>15</td>
</tr>
<tr>
<td>NOD1OP2 (A)</td>
<td>N1-4B</td>
<td>N1-4B-C</td>
<td>16</td>
</tr>
<tr>
<td>NOD1OS2 (F)</td>
<td>N1-3B</td>
<td>N1-3B-A</td>
<td>5</td>
</tr>
<tr>
<td>NOD1OS2 (A)</td>
<td>N1-3B</td>
<td>N1-3B-A</td>
<td>13</td>
</tr>
<tr>
<td>NOD1DP2</td>
<td>N1-3B</td>
<td>N1-3B-B</td>
<td>1</td>
</tr>
<tr>
<td>NOD1DS2</td>
<td>N1-4B</td>
<td>N1-4B-B</td>
<td>1</td>
</tr>
<tr>
<td>NOD1OP4</td>
<td>N1-4B</td>
<td>N1-4B-C</td>
<td>2</td>
</tr>
<tr>
<td>NOD1OS4</td>
<td>N1-3B</td>
<td>N1-3B-C</td>
<td>1</td>
</tr>
</tbody>
</table>

3. Open RPC.
   Node 1:EPS
   sel RPDA_[X]_RPCM_[Y]  [X] and [Y] = See Table 1
   cmd RPC_[Z]_Op Execute  [Z] = See Table 1
   √RPC_[Z]_Op  [Z] = See Table 1

REMOVING
4. Loosen LHA fasteners (four) from BBA (Driver Handle, 1/4” Drive; 1/8” Hex Head).

5. Grasp LHA in middle, pull straight out from BBA.
   Label, temporarily restrain.

REPLACING
6. Push LHA straight in until LHA (J2) fully engages LHA (P2).

7. Tighten LHA fasteners (four) to BBA (Driver Handle, 1/4” Drive; 1/8” Hex Head, 1/4” Drive).
CHECKOUT
8. Close RPC.

Node 1:EPS

sel RPDA_[X]_RPCM_[Y] [X] and [Y] = See Table 1

cmd RPC_[Z]_Cl Execute [Z] = See Table 1

√RPC_[Z]_Cl [Z] = See Table 1

9. LAMP POWER → On

10. √Lamp is lit, LED is not illuminated

POST MAINTENANCE
11. Inform MCC-H of task completion.

12. √MATS for stowage location
   Stow tools, equipment.
OBJECTIVE:
Remove and replace failed Baseplate Ballast Assembly (BBA) to repair General Luminaire Assembly (GLA).

LOCATION:
Installed: NOD1OP (three locations), NOD1OS (three locations), NOD1DP2, NOD1DS2
Stowed: Maintenance and Assembly Task Supplement (MATS)

DURATION:
30 minutes

PARTS:
BBA (P/N 219011)

MATERIALS:
Tape

TOOLS REQUIRED:
Equipment Bag
ISS Common IVA Tool Kit:
Kit D:
   1/8" Hex Head, 1/4" Drive
Kit E:
   Driver Handle, 1/4" Drive
Kit G:
   (5-35 in-lbs) Trq Driver, 1/4" Drive

REFERENCED PROCEDURE(S):
None

Figure 1.- General Luminaire Assembly (GLA).
SAFING

WARNING

Failure to remove power can result in electrical shock hazard.

1. LAMP POWER → Off
   See Figure 1.

2. √LED is not illuminated

Table 1. GLA RPC Power Node 1

<table>
<thead>
<tr>
<th>Location</th>
<th>RPDA [X]</th>
<th>RPCM [Y]</th>
<th>RPC [Z]</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOD1OP2 (F)</td>
<td>N1-4B</td>
<td>N1-4B-C</td>
<td>15</td>
</tr>
<tr>
<td>NOD1OP2 (A)</td>
<td>N1-4B</td>
<td>N1-4B-C</td>
<td>16</td>
</tr>
<tr>
<td>NOD1OS2 (F)</td>
<td>N1-3B</td>
<td>N1-3B-A</td>
<td>5</td>
</tr>
<tr>
<td>NOD1OS2 (A)</td>
<td>N1-3B</td>
<td>N1-3B-A</td>
<td>13</td>
</tr>
<tr>
<td>NOD1DP2</td>
<td>N1-3B</td>
<td>N1-3B-B</td>
<td>1</td>
</tr>
<tr>
<td>NOD1DS2</td>
<td>N1-4B</td>
<td>N1-4B-B</td>
<td>1</td>
</tr>
<tr>
<td>NOD1OP4</td>
<td>N1-4B</td>
<td>N1-4B-C</td>
<td>2</td>
</tr>
<tr>
<td>NOD1OS4</td>
<td>N1-3B</td>
<td>N1-3B-C</td>
<td>1</td>
</tr>
</tbody>
</table>

3. Open RPC.

   Node 1:EPS

   sel RPDA_[X]_RPCM_[Y]  [X] and [Y] = See Table 1

   cmd RPC_[Z]_Op  Execute  [Z] = See Table 1

   √RPC_[Z]_Op  [Z] = See Table 1

REMOVING

4. Loosen LHA fasteners (four) from BBA (Driver Handle, 1/4” Drive; 1/8” Hex Head).

5. Grasp LHA in middle, pull straight out from BBA.
   Label, temporarily restrain.

6. Loosen BBA fasteners (twelve) from left to right (see sequence listed below) (Driver Handle, 1/4” Drive; 1/8” Hex Head).

   2 3 6 7 10 11
   LEFT

   1 4 5 8 9 12
   RIGHT
Table 2. GLA Connectors - Node 1

<table>
<thead>
<tr>
<th>Location</th>
<th>J1 Connectors</th>
<th>J2 Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOD1OP2 (F)</td>
<td>W0135-P382</td>
<td>W0315-P383</td>
</tr>
<tr>
<td>NOD1OP2 (A)</td>
<td>W0135-P384</td>
<td>W0315-P385</td>
</tr>
<tr>
<td>NOD1OS2 (F)</td>
<td>W0138-P390</td>
<td>W0315-P389</td>
</tr>
<tr>
<td>NOD1OS2 (A)</td>
<td>W0138-P392</td>
<td>W0315-P393</td>
</tr>
<tr>
<td>NOD1DP2</td>
<td>W0136-P388</td>
<td>W0315-P389</td>
</tr>
<tr>
<td>NOD1DS2</td>
<td>W0137-P380</td>
<td>W0315-P381</td>
</tr>
<tr>
<td>NOD1OP4</td>
<td>W0135-P378</td>
<td>W0315-P379</td>
</tr>
<tr>
<td>NOD1OS4</td>
<td>W0138-P386</td>
<td>W0315-P387</td>
</tr>
</tbody>
</table>

7. Pull failed BBA out until adequate connector access. Demate connectors (two) from BBA. See Table 2.

8. Remove failed BBA. Label, temporarily restrain.

9. Remove protective cap from spare BBA (J1, J2). Install on failed BBA (J1, J2). Temporarily stow.

REPLACING
10. Mate connectors (two) to BBA. See Table 2.

11. Install BBA fasteners (twelve) from left to right (see sequence listed below) (Driver Handle, 1/4” Drive; 1/8” Hex Head).

```
2 3 6 7 10 11
LEFT
1 4 5 8 9 12
RIGHT
```

12. Torque fasteners (twelve) to 30 in-lbs ((5-35 in-lbs) Trq Driver, 1/4” Drive; 1/8” Hex Head, 1/4” Drive).

13. Push LHA straight in until LHA (J2) fully engages LHA (P2).

14. Tighten LHA fasteners (four) to BBA (Driver Handle, 1/4” Drive; 1/8” Hex Head, 1/4” Drive).

CHECKOUT
15. Close RPC.

Node 1:EPS

```
sel RPDA_[X]_RPCM_[Y]  [X] and [Y] = See Table 1
```

```
cmd RPC_[Z]_Cl  Execute  [Z] = See Table 1
```

```
√RPC_[Z]_Cl  [Z] = See Table 1
```

14 NOV 00  289
16. LAMP POWER → On

17. ✓Lamp is lit

**POST MAINTENANCE**

18. Inform **MCC-H** of task completion.

19. ✓MATS for stowage location
   Stow tools, equipment.
OBJECTIVE:
Reconfigure the Early Communication System (ECS) Transciever, Command and Telemetry Processor (CTP) and RF Power Distribution Box (RFPDB) to receive power from RPCM N1 4B B instead of RPCM N1 RS2 A.

LOCATION:
Installed: Node 1

DURATION:
1 hour

PARTS:
Velcro Straps

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit D:
  5/32" Hex Head, 1/4" Drive
  1/8" Hex Head, 1/4" Drive
Kit E:
  Ratchet, 1/4" Drive
Lid #1:
  Anti-Static Wrist Tether

REFERENCED PROCEDURE(S):
1.204  EARLY COMM POWERUP PRE-CCS
1.206  EARLY COMM POWERDOWN (PREPOWER RECONFIGURE) - PRE-CCS

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

2.3.201 EARLY COMMUNICATION SYSTEM (ECS) RPCM N14B-B POWER RECONFIGURATION

Figure 1.- Early Communication System (RVCO Rotated).

Figure 2.- RFPDB Switches (Pictured Switches in OFF Position).
NOD1S4 2. Rotate Starboard Rack Volume Closeout (RVCO).
Refer to Figure 1.

3. Configuring Early Comm Switches
Refer to Figures 1 and 2.

RFPDB PGSC/RF → Off
CTP → Off
SPARE → Off
XCVR → Off
SBANT → Off
PTANT → Off

ACCESSING

Figure 3.- Node 1 Closeout Panels to be Removed.

4. Remove Closeout Panels NOD1OS2-28, NOD1SD2-28 (fifteen fasteners each) (Ratchet, 1/4" Drive; 5/32" Hex Head).
Refer to Figure 3.
5. Starboard Radial Bulkhead Reconfiguration
W0144 P97 ←|→ NV97/RPDB-J97
Connector Cap ←|→ J970 (temporarily stow cap)
W0144 P97 →|← J97
Refer to Figure 4.

6. Route NV97/RFPDB-J97, Connector Cap to Deck RadialBulkhead Starboard Side area (Velcro straps).
Refer to Figure 5.
7. Deck Radial Bulkhead Reconfiguration
   W0137P110 ← J110
   W0137P110 → NV97/RFPDB2-J97
   Connector Cap ← J110
   Refer to Figure 5.

CHECKOUT
8. Configuring ECS RFPDB Switches
   Refer to Figures 1 and 2.

         RFPDB
         PGSC/RF → On
         CTP    → On
         SPARE  → On
         XCVR   → On
         SBANT  → On
         PTANT  → On


CLOSEOUT
10. Install Closeout Panels NOD1OS2-28, NOD1SD2-28 (fifteen fasteners each) (Ratchet, 1/4" Drive; 5/32" Hex Head).
     Refer to Figure 3.

11. Install RVCO.

POST MAINTENANCE
12. Inform MCC-H of task completion.

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OBJECTIVE:
Reconfigure the Early Communication System (ECS) Transciever, Command and Telemetry Processor (CTP) and RF Power Distribution Box (RFPDB) to receive power from RPCM N1 RS2 A instead of RPCM N1 4B B.

LOCATION:
Installed: Node 1

DURATION:
1 hour

PARTS:
Velcro Straps

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit D:
   5/32” Hex Head, 1/4” Drive
   1/8” Hex Head, 1/4” Drive
Kit E:
   Ratchet, 1/4” Drive
Lid #1:
   Anti-Static Wrist Tether

REFERENCED PROCEDURE(S):
1.206  EARLY COMM POWERUP (PREPOWER RECONFIGURE) - PRE-CCS
1.204  EARLY COMM POWERDOWN PRE-CCS

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. Perform {1.204 EARLY COMM POWERDOWN PRE-CCS} (SODF: C&T: ACTIVATION AND CHECKOUT: EARLY COMM).
2.3.202 EARLY COMMUNICATION SYSTEM (ECS) RPCM N1 RS2 A POWER RECONFIGURATION

Figure 1.- Early Communication System (RVCO Rotated).

Figure 2.- RFPDB Switches (Pictured Switches in OFF Position).
2.3.202 EARLY COMMUNICATION SYSTEM (ECS) RPCM N1 RS2 A POWER RECONFIGURATION

NOD1S4 2. Rotate Starboard Rack Volume Closeout (RVCO).
Refer to Figure 1.

3. Configure Early Comm Switches
Refer to Figures 1 and 2.

RFPDB  PGSC/RF → Off
CTP     → Off
SPARE   → Off
XCVR    → Off
SBANT   → Off
PTANT   → Off

ACCESSING

Figure 3.- Node 1 Closeout Panels to be Removed.

4. Remove Closeout Panels NOD1OS2-28, NOD1SD2-28 (fifteen fasteners each) (Ratchet, 1/4" Drive; 5/32" Hex Head).
Refer to Figure 3.
Figure 4.- Deck Radial Bulkhead Starboard Side (NOD1SD2-28 Panel Removed).

5. Deck Radial Bulkhead Reconfiguration
   W0137P110 ←|→ NV97/RFPDB2-J97
   Connector Cap ←|→ J110 (temporarily stow cap)
   W0137P110 →|← J110
   Refer to Figure 4.

Figure 5.- Starboard Radial Bulkhead Overhead Side (NOD1OS2 Panel Removed).

6. Route NV97/RFPDB-J97, Connector Cap to Overhead Radial Bulkhead Starboard Side area (Velcro straps).
   Refer to Figure 5.
7. **Starboard Radial Bulkhead Reconfiguration**
   - W0144 P97 ←|→ J97
   - Connector Cap →|← J97
   - W0144 P97 →|← NV97/RPDB-J97
   Refer to Figure 5.

**CHECKOUT**

8. **Configuring ECS RFPDB Switches**
   Refer to Figures 1 and 2.

<table>
<thead>
<tr>
<th>RFPDB</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGSC/RF</td>
<td>On</td>
</tr>
<tr>
<td>CTP</td>
<td>On</td>
</tr>
<tr>
<td>SPARE</td>
<td>On</td>
</tr>
<tr>
<td>XCVR</td>
<td>On</td>
</tr>
<tr>
<td>SBANT</td>
<td>On</td>
</tr>
<tr>
<td>PTANT</td>
<td>On</td>
</tr>
</tbody>
</table>

9. Perform {1.206 EARLY COMM POWERUP (PREPOWER RECONFIGURE - PRE-CCS) (SODF: C&T: ACTIVATION AND CHECKOUT: EARLY COMM)}.

**CLOSEOUT**

10. Install Closeout Panels NOD1OS2-28, NOD1SD2-28 (fifteen fasteners each) (Ratchet, 1/4" Drive; 5/32" Hex Head).
   Refer to Figure 3.

11. Install RVCO.

**POST MAINTENANCE**

12. Inform **MCC-H** of task completion.

OBJECTIVE:
Install Y-Cable to power N13B power bus by RACU 5.

DESCRIPTION:
Procedure outlines steps to power down RACU 5, install the Y-Cable to provide power to N13B, and power up RACU 5.

CREW REQUIRED:
One flight crew

DURATION:
1.5 hours

LOCATION:
Installed: NOD1P01
Stowed: \Maintenance and Assembly Task Supplement (MATS)

PARTS:
Y-Jumper Wire Harness (W0155)

MATERIALS:
Dry Wipes
Gray Tape

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit D:
  5/32” Hex Head, 1/4” Drive
Kit E:
  Ratchet, 1/4” Drive
Kit J:
  Connector Pliers (if required)
Lid #1:
  Static Wrist Tether

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electronic Discharge (ESD).

NOTE
To expedite time, steps 1 and 2 can be performed concurrently.
1. **VERIFYING FGB RACU 5 AND DDCU Z13B OFF**

   **PCS FGB: EPS: RACU**
   
   - FGB_RACUs
   
   Verify RACU 5 Converter – Off
   Verify Input Current < 2.0 A
   Verify Output Voltage ~90 V
   
   **Z1: EPS: DDCU Z13B**
   
   - √ Integration Counter – Incrementing
   - √ Status – 0 (Off)
   - √ Output Current: -4 --- 4 A
   - √ Output Voltage: -3 --- 3 V

2. **CLOSEOUT PANEL REMOVAL**

   **NOD1** Remove Closeout Panel NOD1P1-01 fasteners (ten)
   
   **P1-01** (Ratchet, 1/4” Drive; 5/32” Hex Head, 1/4” Drive).
   
   **MCC-H** ↑ IV, “Go for N13B Y-Cable installation.”

![Figure 1.- Node 1 Connector Patch Panel A2 (Launch Configuration).](image-url)

3. **DEMATING CONNECTORS AT NODE 1 CONNECTOR PATCH PANEL (A2)**

   Don Static Wrist Tether by connecting to Patch Panel A2.
   
   - W0104P307 ←|→ J307
   - Dummy Connector ←|→ J308
   
   Temporarily stow.
4. **INSTALLING Y-CABLE (W0155) AT NODE 1 PATCH PANEL (A2)**
   - W0155P301 → J307
   - W0155P302 → J308
   - W0155J301 → W0104P307

   Clean surface of Connector Patch Panel (A2) with Dry Wipes.

   Secure Dummy Connector from J308 to surface of Connector Patch Panel (A2) with Gray Tape.

5. **CLOSEOUT PANEL INSTALLATION**

   NOD1 P1-01
   - Install Closeout Panel NOD1P1-01, tighten fasteners (ten)
   - (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

   IV ↓ **MCC-H:** “Closeout Panel installation complete. Go for RACU 5 activation.”
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OBJECTIVE:
Install Y-Cable to power N14B power bus by RACU 6.

DESCRIPTION:
Procedure outlines steps to power down RACU 6, install the Y-Cable to provide power to N14B, and power up RACU 6.

CREW REQUIRED:
One flight crew

DURATION:
1.5 hours

LOCATION:
Installed: NOD1P01
Stowed: √Maintenance and Assembly Task Supplement (MATS)

PARTS:
Y-Jumper Wire Harness (W0155)

MATERIALS:
Dry Wipes
Gray Tape

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit D:
  5/32” Hex Head, 1/4” Drive
Kit E:
  Ratchet, 1/4” Drive
Kit J:
  Connector Pliers (if required)
Lid #1:
  Static Wrist Tether

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electronic Discharge (ESD).

NOTE
To expedite time, steps 1 and 2 can be performed concurrently.
1. **VERIFYING FGB RACU 6 AND DDCU Z14B OFF**

<table>
<thead>
<tr>
<th>PCS FGB: EPS: RACU</th>
</tr>
</thead>
<tbody>
<tr>
<td>√ RACU 6 Converter – Off</td>
</tr>
<tr>
<td>√ Input Current &lt; 2.0 A</td>
</tr>
<tr>
<td>√ Output Voltage ~90 V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Z1: EPS: DDCU Z14B</th>
</tr>
</thead>
<tbody>
<tr>
<td>√ Integration Counter incrementing</td>
</tr>
<tr>
<td>√ Status: 0 (Off)</td>
</tr>
<tr>
<td>√ Output Current: -4 --- 4 A</td>
</tr>
<tr>
<td>√ Output Voltage: -3 --- 3 V</td>
</tr>
</tbody>
</table>

2. **REMOVING CLOSEOUT PANEL**

<table>
<thead>
<tr>
<th>NOD1 Remove Closeout Panel NOD1P1-01 fasteners (ten)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1-02 (Ratchet, 1/4&quot; Drive; 5/32&quot; Hex Head, 1/4&quot; Drive).</td>
</tr>
</tbody>
</table>

**MCC-H** ↑ IV, “Go for N14B Y-Cable installation.”

![Diagram](image-url)

Figure 1.- Node 1 Connector Patch Panel A1 (Launch Configuration).
3. DEMATING CONNECTORS AT NODE 1 PATCH PANEL (A1)
   Don Static Wrist Tether by connecting to Patch Panel A1.
   W0103P301 ←→ J301
   Dummy Connector ←→ J302
   Temporarily stow.

4. INSTALLING Y-CABLE (W0155) AT NODE 1 PATCH PANEL (A1)
   W0155P301 → J301
   W0155P302 → J302
   W0155J301 ← W0103P301
   Clean surface of Connector Patch Panel (A1) with Dry Wipes.
   Secure Dummy Connector from J302 to surface of Connector Patch Panel (A1) with Gray Tape.

5. INSTALLING CLOSEOUT PANEL
   NOD1 Install Closeout Panel NOD1P1-01, tighten fasteners (ten)
   P1-02 (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
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OBJECTIVE:
Removal of the Y-Cable from the N13B power bus.

DESCRIPTION:
Verifies the powerdown of RACU 5, removes the Y-Cable to provide power to N13B power bus, and power up of RACU 5.

CREW REQUIRED:
One flight crew

DURATION:
1.5 hours

LOCATION:
NOD1P01

PARTS:
Y-Jumper Wire Harness (W0155)

MATERIALS:
Dry Wipes
Gray Tape

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit D:
   5/32" Hex Head, 1/4" Drive
Kit E:
   Ratchet, 1/4" Drive
Kit J:
   Connector Pliers (if required)
Lid #1:
   Static Wrist Tether

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electronic Discharge (ESD).

NOTE
To expedite time, steps 1 and 2 can be performed concurrently.
2.3.403 N13B Y-CABLE REMOVAL

1. VERIFYING FGB RACU 5 AND DDCU Z13B OFF

PCS

FGB: EPS: RACU

Verify RACU 5 Converter – Off
Verify Input Current < 2.0 A
Verify Output Voltage ~90 V

Z1: EPS: DDCU Z13B

√ Integration Counter – incrementing
√ Status:  0 (Off)
√ Output Current:  -4 --- 4 A
√ Output Voltage:  -3 --- 3 V

2. CLOSEOUT PANEL REMOVAL

NOD1 Remove Closeout Panel NOD1P1-01 fasteners (ten) (Ratchet, 1/4” Drive; 5/32” Hex Head, 1/4” Drive).

MCC-H ↑ IV, “Go for N13B Y-Cable removal.”

3. DEMATING CONNECTORS AT NODE 1 CONNECTOR PATCH PANEL (A2)

Don Static Wrist Tether by connecting to Patch Panel A2.
W0155P301 <-> J307
W0155P302 <-> J308
W0155J301 <-> W0104P307

Figure 1.- Node 1 Connector Patch Panel A2 (Launch Configuration).
4. **INSTALLING W0104P307 TO J307 AT NODE 1 PATCH PANEL (A2)**
   W0104P307 →|← J307
   Dummy Connector →|← J308
   Temporarily stow.

   √MATS for Stowage location of the N13B Y-Cable

5. **CLOSEOUT PANEL INSTALLATION**
   NOD1 P1-01
   Install Closeout Panel NOD1P1-01, tighten fasteners (ten) (Ratchet,
   1/4" Drive; 5/32" Hex Head, 1/4" Drive).

   IV ↓ **MCC-H**: “Closeout Panel installation complete. Go for RACU 5 activation.”
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OBJECTIVE:
Removal of the Y-Cable from the N14B power bus.

DESCRIPTION:
Procedure outlines steps to power down the RACU 6, remove the Y-Cable that provides power to N14B, and power up the RACU 6.

CREW REQUIRED:
One flight crew

DURATION:
1.5 hours

LOCATION:
NOD1P01

PARTS:
Y-Jumper Wire Harness (W0155)

MATERIALS:
Dry Wipes
Gray Tape

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit D:
  5/32” Hex Head, 1/4” Drive
Kit E:
  Ratchet, 1/4” Drive
Kit J:
  Connector Pliers (if required)
Lid #1:
  Static Wrist Tether

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electronic Discharge (ESD).

NOTE
To expedite time, steps 1 and 2 can be performed concurrently.
1. **VERIFYING FGB RACU 6 AND DDCU Z14B OFF**

   PCS  
   FGB: EPS: RACU  
   √ RACU 6 Converter – Off  
   √ Input Current < 2.0 A  
   √ Output Voltage ~90 V  

   Z1: EPS: DDCU Z14B  
   √ Integration Counter incrementing  
   √ Status: 0 (Off)  
   √ Output Current: -4 --- 4 A  
   √ Output Voltage: -3 --- 3 V  

2. **REMOVING CLOSEOUT PANEL**

   NOD1  
   Remove Closeout Panel NOD1P1-01 fasteners (ten)  
   P1-02  
   (Ratchet, 1/4” Drive; 5/32” Hex Head, 1/4” Drive).  

   **MCC-H**  
   → IV, “Go for N14B Y-Cable removal.”

---

**Figure 1.**- Node 1 Connector Patch Panel A1 (Launch Configuration).
3. **DEMATING CONNECTORS AT NODE 1 PATCH PANEL (A1)**
   Don Static Wrist Tether by connecting to Patch Panel A1.
   W0155P301 ←|→ J301
   W0155P302 ←|→ J302
   W0155J301 ←|→ W0103P301

4. **INSTALLING W0103P301 TO J301 AT NODE 1 PATCH PANEL (A1)**
   W0103P301 →|← J301
   Dummy Connector →|← J302
   Temporarily stow.

   √MATS for Stowage location of the N13Y Jumper Cable

5. **INSTALLING CLOSEOUT PANEL**
   NOD1 P1-01
   Install Closeout Panel NOD1P1-01, tighten fasteners (ten)
   P1-02 (Ratchet, 1/4” Drive; 5/32” Hex Head, 1/4” Drive).

   IV ↓ **MCC-H**: “Closeout Panel installation complete. Go for RACU 6 activation.”
NOTE
This procedure will only be used in the event that a leak is detected in Node 1 and follows the ISS RAPID DEPRESSURIZATION (SODF: EMER: EMERGENCY CLASS 0: RAPID DEPRESS) procedure in which all Hatches are closed and each module is isolated to allow determination of the leaking module.

OBJECTIVE:
Pinpoint and repair pressure leaks in Node 1. Crewmembers will work simultaneously, using crew senses to check penetration points.

LOCATION:
Node 1, PMA1

DURATION:
Situation dependent

PARTS:
None

MATERIALS:
Gray Tape

TOOLS REQUIRED:

1. To expedite the detection process, one crewmember uses the 1/4” Drive Ratchet with the 5/32” Hex Head to remove necessary Closeouts.

2. Once the 3/8” Hex Shank can be retrieved from Kit D, another crewmember can use the Power Tool with the Hex Shank and 5/32” Hex Head, 3/8” Drive.

Docking Mechanism Accessory Kit (33У 9962.003)
APDS/APAS Hatch Tool
Cleaning Pads
Flashlight (two)
Module Leak Repair Kit (shuttle)
Power Tool
ISS Common IVA Tool Kit:
Kit D:
5/32” Hex Head, 3/8” Drive
5/32” Hex Head, 1/4” Drive
1/8” Hex Head, 1/4” Drive
Hex Shank, 3/8” Drive
Kit E:
Driver Handle, 1/4” Drive
Kit F:
7/16” Deep Socket, 1/4” Drive
Kit G:
(5-35 in-lbs) Trq Driver, 1/4" Drive

REFERENCED PROCEDURE(S): None

PMA 1 INGRESS

NOTE
1. Hatch leaks can occur at seal interfaces and/or penetration points.
2. Crew sight, sound and touch senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).

FGB ГА 1. Perform a visual search for leaks around all sealing surfaces, and hatch penetration points for FGB ГА-PMA1 Hatch.

2. √MCC, “Go for PMA 1 Ingress.”

ГА- ПМА 1 3. Open FGB ГА-PMA1 Hatch using APAS Hatch Tool.
Select ‘РАБОЧЕЕ ПОЛОЖЕНИЕ’ (Working Position) torque setting on APAS Hatch Tool.

3.1 Insert tool in hatch socket (ensure fully seated).
Rotate tool 3 --- 4 turns in direction of ‘ОТКРЫТЬ’ (Open) arrow until it clicks.

3.2 Remove tool.
Allow hatch seals to relax for 3 minutes.

CAUTION
APAS Hatch Seals require 3 minutes to relax before opening Hatch.

3.3 Open and secure ГА-PMA1 Hatch.

3.4 Stow Tool in Docking Mechanism Accessory Kit.
Tether kit to hatch handle.
**NOTE**

1. Hatch leaks can occur at seal interfaces and/or penetration points.

2. Crew sight, sound, and touch senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).

PMA 1

4. Perform a visual search for leaks around all sealing surfaces, at hatch penetration points, and at vestibule feedthroughs in the aft vestibule between PMA 1 and Node 1. Refer to Figure 1.

5. If leak is found around Hatch Seal

\[\sqrt{\text{MCC-H}}\] before opening Hatch to inspect Seals

6. \[\sqrt{\text{MCC-H}}\], “Go to Open Node1 Aft Hatch.”

**NOTE**

Hatch may be difficult to open if leakage causes $\Delta P$ across Hatch.

Node 1

7. Open Node1 Aft Hatch per decal.

**NOTE**

Additional Portable Fans may be required for local ventilation. These should be set up and moved around the cabin as needed.
NOTE
1. Crew sight, sound, and touch senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).

2. The areas that are easily accessible are checked first (valves and seals) then Closeout Panels are removed to check for leaks at passthroughs in the hatch vestibules and gore panels.

3. To speed detection process, one crewmember should search for leaks port, overhead, forward while another crewmember searches starboard, deck, aft.

4. Closeout Panels can be temporarily stowed during search. Once an area behind a Closeout Panel has been searched, reinstall panel with a minimum number of fasteners before continuing search.

5. Once leak is pinpointed, proceed to step 17.

CAUTION
When reinstalling Closeout Panels in Node 1, care should be taken to use the Driver Handle, 1/4” Drive to snug the fasteners rather than using the power tool, since it is possible to break the fasteners by overtorquing with the power tool.

8. Verify Node 1 IMV Valve, MPEV configuration.

   √ Node 1 Port Fwd IMV Vlv – Closed
   √ Node 1 Deck Fwd, Deck Aft IMV Vlv (two) – Closed
   √ Node 1 Deck MPEV – Closed
     (cap securely tightened)
   √ Node 1 Ovhd MPEV – Closed
     (cap securely tightened)

9. Cap Node 1 PPRVs

   √ Cap Node 1 Port PPRV capped
   √ Cap Node 1 Stbd PPRV capped

NOTE
1. Hatch leaks can occur at seal interfaces and/or penetration points.

2. In starboard and port Hatches, Early Comm plates replace hatch windows. Early Comm data ports are penetration points as well as plate seals.
10. Search around all sealing surfaces, at hatch penetration points (port, stbd, deck, ovhd, aft).
Refer to Figure 2.
11. Search starboard bulkhead.
   Remove Closeout Panel NOD1S2-13, hex fasteners (four).
   Refer to Figure 3.

   √Stbd Fwd NPRV Cover – Cl

   Remove Closeout Panel NOD1S2-33, hex fasteners (five).
   Refer to Figure 3.

   √Stbd Aft NPRV Cover – Cl

   Remove remaining Closeouts, hex fasteners.
   Refer to Figure 3.

   Search for leaks around all vestibule connectors, connector backshells.
2.3.501 NODE 1 ISS LEAK PINPOINT AND REPAIR
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Figure 4.- Node 1 Port Hatch - Looking Port.
Closeouts To Remove For Access To Vestibule Passthroughs.
Number of Fasteners in Parentheses.

12. Search port bulkhead for leaks.
Remove Closeout Panel NOD1P2-13, hex fasteners (four).
Refer to Figure 4.

√Port Aft NPRV Cover – Cl

Remove remaining Closeouts, hex fasteners.
Refer to Figure 4.

Search for leaks around all vestibule connectors, connector backshells.
2.3.501  NODE 1 ISS LEAK PINPOINT AND REPAIR
(ISS IFM/4A - 5A/FIN)

Figure 5.- Node 1 Deck Hatch - Looking Nadir.
Closeouts To Remove For Access To Vestibule Passthroughs.
Number Of Fasteners In Parentheses.

Figure 6.- Node 1 Overhead Hatch - Looking Zenith.
Closeouts To Remove For Access To Vestibule Passthroughs.
Number Of Fasteners In Parentheses.

Search for leaks around all vestibule connectors, connector backshells.

Figure 7.- Node 1 Aft Hatch - Looking Aft. Closeouts To Remove For Access To Vestibule Passthroughs. Number Of Fasteners In Parentheses.
14. Search aft bulkhead, gore panel for leaks. Remove Closeouts, hex fasteners. For Closeout Panels NOD1D4-02, NOD1P4-03, and NOD1S4-03, remove one Handrail Assembly and two Seat Tracks from each panel by loosening captive hex fasteners (four) from the base of the Seat Tracks (Driver Handle, 1/4" Drive; 1/8" Hex Head). Refer to Figures 7 and 8.

Search for leaks around all vestibule connectors, connector backshells.

Rotate NOD1S4 Rack Volume Closeout (PIP Pins).

Search for leaks around gore panel connectors, connector backshells. Refer to Figure 8.

Rotate rack volume Closeout to closed position.

Rotate NOD1P4 Zero-G Soft Rack (PIP Pins).

Search for leaks around gore panel connectors, connector backshells. Refer to Figure 8.

Rotate Zero-G Soft Rack to closed position.
2.3.501 NODE 1 ISS LEAK PINPOINT AND REPAIR
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Figure 9.- Node 1 Forward Hatch - Looking Forward.
Closeouts To Remove For Access To Vestibule Passthroughs.
Number Of Fasteners In Parentheses.

Figure 10.- Node 1 Forward Endcone - Looking Forward.
15. Search forward bulkhead, gore panel.
   Remove Closeouts, hex fasteners.
   For Closeout Panels NOD1D1-02, NOD1P1-02, and NOD1S1-02, remove one Handrail Assembly and two Seat Tracks from each panel by loosening captive hex fasteners (four) from the base of the Seat Tracks (Driver Handle, 1/4” Drive; 1/8” Hex Head).
   Refer to Figures 9 and 10.

   Search for leaks around all vestibule connectors, connector backshells.

   Search for leaks around gore panel connectors, connector backshells.
   Refer to Figure 10.

16. If leak not found, go to step 20.

**REPAIR LEAK**

17. If leak found
   If time permits, √MCC-H before initiating repair.

   If leak through IMV Valve flange
   Retighten V-Band Coupling to 35 in-lbs (7/16” Deep Socket, 1/4” Drive; (5-35 in-lbs) Trq Driver).

   If leak due to puncture in surface area
   Patch hole with Dux Seal from Module Leak Repair Kit.
   Cover patch with All Purpose Tape.

   If leak through connector or seal
   Use Valve Foam Applicator from Module Leak Repair Kit, following decal instructions.

**CAUTION**

When tightening closeout fasteners, care should be taken not to overtorque them. The on-orbit configuration only requires the fasteners to be snugged with the Driver Handle. Excessive torque could result in breakage of the fastener.

18. Tighten remaining closeout fasteners (Driver Handle, 1/4” Drive; 5/32” Hex Head).

19. For reinstallation of Handrail Assemblies and Seat Tracks (if required) on Fwd and Aft Closeouts, torque hex fasteners on base of each Seat Track to 28 in-lbs (1/8” Hex Head, 1/4” Drive; (5-35 in-lbs) Trq Driver).

**NODE AND PMA 1 EGRESS (LEAK NOT FOUND OR UNREPAIRABLE)**

20. Report to MCC-H, “Leak not found” or “Leak unrepairable.”

21. √Aft Stbd IMV Vlv – Open
22. √Aft Port IMV Vlv – Open

23. Close Node1 Aft Hatch per decal.
   √MPEV – CL

24. √No foreign objects in hatch area
   ГА-
   PMA1
   Hatch
   24.1 Clean FGB ГА-РМА1 Hatch with Cleaning Pads from Docking Mechanism Accessory Kit.
   24.2 Close FGB ГА-РМА1 Hatch, ensuring Hatch is fully seated.
   24.3 Select ‘РАБОЧЕЕ ПОЛОЖЕНИЕ’ (Working Position) torque setting on APAS Hatch Tool.
   24.4 Insert tool in hatch socket (ensure fully seated).
   Rotate tool 3 --- 4 turns in direction of ‘ЗАКРЫТЬ’ (Close) arrow until tool clicks.

25. √MCC-H for applicable Node 1 powerdown steps
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START_IMS

OBJECTIVE:
Inspect and clean Bacteria Filters, three each standoff, one standoff at a time.

LOCATION:
Installed: Lab Standoffs LAB1SD1,3,5 and LAB1PD1,3,5
Stowed: MATS (Maintenance and Assembly Task Supplement)

DURATION:
45 minutes

PARTS:
None

MATERIALS:
Gray Tape

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit E:
   6" Ext, 1/4" Drive
   Ratchet, 1/4" Drive
Kit F:
   5/16" Socket, 1/4" Drive

REFERENCED PROCEDURES
1.402 SMOKE DETECTOR DEACTIVATION
1.401 SMOKE DETECTOR ACTIVATION

SAFING

CAUTION
To maintain air circulation in the Lab, execute this procedure one standoff at a time.

WARNING
Only one Smoke Detector may be deactivated at a time.

CAUTION
Before removing LAB1SD5 or LAB1PD1 Smoke Detectors for filter inspection and cleaning, they must be deactivated.

1. For LAB1SD5 or LAB1PD1, perform 1.402 SMOKE DETECTOR DEACTIVATION, all (SODF: ECLS: ACTIVATION AND CHECKOUT: FDS), then:
SMOKE DETECTOR REMOVAL

Figure 1.- Smoke Detector Fasteners and Power/Data Connector.

2. If LAB1SD5: P1-W3219 ←→ J1
   LAB1PD1: P1-W3317 ←→ J1

3. Remove fasteners (four) securing smoke detector bracket to standoff
   (Ratchet, 1/4” Drive; 6” Ext, 1/4” Drive; 5/16” Socket, 1/4” Drive).
   Temporarily stow.

INSPECTING AND CLEANING

Figure 2.- View of Filter Assembly Door.

4. Open filter assembly door.
   Inspect for foreign object debris (FOD).
   Refer to Figure 2.
5. If FOD present, remove FOD with Gray Tape.

6. Close filter assembly door.

7. Repeat steps 1 --- 6 for remaining Filters (two).

**REPLACEMENT**

8. Replace Smoke Detector.
   Secure fasteners (four) (Ratchet, 1/4" Drive; 6" Ext, 1/4" Drive; 5/16" Socket, 1/4" Drive).

9. If LAB1SD5: P1-W3219 →|-- J1
    LAB1PD1: P1-W3317 →|-- J1

10. For LAB1SD5 or LAB1PD1, perform {1.401 SMOKE DETECTOR ACTIVATION}, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: FDS), then:

**CLOSEOUT**

11. Repeat steps 1 --- 10 for opposite standoff.

12. Inform **MCC-H** of task completion.

13. √MATS for stowage location
    Stow expended materials.
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OBJECTIVE:
Remove and replace expended Bacteria or Charcoal Filters (three each standoff) one standoff at a time or replace Charcoal Filter with Bacteria Filter.

LOCATION:
Installed: Lab Standoffs LAB1SD1,3,5 and LAB1PD1,3,5
Stowed: √ Maintenance and Assembly Task Supplement (MATS)

DURATION:
45 minutes

PARTS:
Bacteria Filters (four) (P/N SV810010-1) or Charcoal Filters (four) (P/N SV821776)

MATERIALS:
Gray Tape

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit E:
  Ratchet, 1/4" Drive
  6" Ext, 1/4" Drive
Kit F:
  5/16" Socket, 1/4" Drive
Kit H:
  Scissors
Kit J:
  Connector Pliers

REFERENCED PROCEDURE(S):
1.402 SMOKE DETECTOR DEACTIVATION
1.401 SMOKE DETECTOR ACTIVATION
2.503 CCAA FAN SPEED DECREASE

SAFING

CAUTION
To maintain air circulation in the Lab, execute this procedure one standoff at a time.

CAUTION
Fan speed must be decreased before closing Cabin Air Damper Assembly.

1. For operating CCAA (LAB1S6 or LAB1P6), perform [2.503 CCAA FAN SPEED DECREASE] (SODF: ECLSS: NOMINAL: THC) to 4000 rpm.
2. For LAB1SD5 or LAB1PD1, perform [1.402 SMOKE DETECTOR DEACTIVATION], all (SODF: ECLSS: ACTIVATION AND CHECKOUT: FDS), then:

SMOKE DETECTOR REMOVAL

Figure 1.- Smoke Detector Fasteners and Power/Data Connector.

3. If LAB1SD5: P1-W3219 ←|→ J1
   LAB1PD1: P1-W3317 ←|→ J1 (Connector Pliers)

4. Remove fasteners (four) securing smoke detector bracket to standoff (Ratchet, 1/4” Drive; 6” Ext, 1/4” Drive; 5/6” Socket, 1/4” Drive). Temporarily stow.
REMOVING FILTERS

5. Open filter assembly door.

6. Place Gray Tape over exposed surface of filter leaving access to filter handle.

7. Repeat steps 5 and 6 for other filters in standoff.

WARNING

CCAA Return Manual Damper Valve must be closed during this procedure to prevent circulation of contaminants, to operating CCAA.

Figure 2.- View of Filter Assembly Door.

Figure 3.- CCAA Return Manual Damper Valve Control Knob. One Each Standoff.
8. Manually close CCAA Return Manual Damper Valve (LAB1SD6 or LAB1PD6).
   Refer to Figure 3.

9. Remove, temporarily stow one new filter from Containment Bag (Scissors).

10. Remove one expended bacteria filter and place in Containment Bag, seal with Gray Tape.
    Temporarily stow.

**REPLACEMENT**

11. Install new filter.
    Close assembly door.

12. Repeat steps 9 --- 11 for other filters in standoff.

13. Replace Smoke Detector.
    Secure fasteners (four) (Ratchet, 1/4" Drive; 6" Ext, 1/4" Drive; 5/16" Socket, 1/4" Drive).

14. If LAB1SD5:  P1-W3219 →|← J1
    LAB1PD1:  P1-W3317 →|← J1

15. For LAB1SD5 or LAB1PD1, perform [1.401 SMOKE DETECTOR ACTIVATION], all (SODF: ECLSS: ACTIVATION AND CHECKOUT: FDS), then:

**CLOSEOUT**

16. Manually open CCAA Return Manual Damper Valve LAB1SD6 or LAB1SP6.

17. Repeat steps 1 --- 16 for opposite standoff.

18. For operating CCAA LAB1P6 (LAB1S6), perform [2.503 CCAA FAN SPEED INCREASE] (SODF: ECLSS: NOMINAL: THC) to previous fan speed.
CHECKOUT

19. Inform MCC-H of task completion.

20. ✓MATS for stowage location of spent Bacteria Filter
    Stow expended filters and tools.
OBJECTIVE:
Remove and replace expended Charcoal Bed Assembly (CBA) in the Atmosphere Revitalization System (ARS) Rack.

LOCATION:
Installed: ARS Rack (LAB1D6)
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour

PARTS:
Charcoal Bed Assembly (P/N 5823608-501)

MATERIALS:
Gray Tape
Marking Pen
Rubber Gloves
Silicon Grease

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit E:
  Ratchet, 1/4" Drive
  4" Ext, 1/4" Drive
Kit F:
  3/8" Socket, 1/4" Drive
Kit G:
  (40-200 in-lbs) Trq Wrench, 1/4" Drive
Kit TBD:
  Plastic O-Ring Extractor Tool
Lid #2:
  Tablecloth

REFERENCED PROCEDURE(S):
1.301 ATMOSPHERE REVITALIZATION RACK ACTIVATION

WARNING
High Temperatures are present in Trace Contaminant Control System (TCCS). Verify system has been shut down for minimum of 4 hours prior to performing maintenance. Failure to comply could result in personal injury.

CAUTION
Failure to remove power prior to maintenance may result in equipment damage.
SAFING
1. Verify Atmosphere Revitalization Rack has been deactivated 4 hours prior to maintenance.
2. RACK POWER switch → OFF
3. Verifying LAB1D6 Rack Safed

PCS Lab: EPS: Rack Power: Rack Power 2

Rack Power 2
‘Rack LAB1D6’

Verify Switch Position – Off
Verify Switch Available – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1D6’

Verify RPCM_LA2B_C_RPC_01 Position – OP

ACCESSING
4. Depress latches (two).
Open upper left-hand faceplate of Rack LAB1D6.

Figure 1.- Front View of Trace Contaminant Control System (TCCS).
5. Disconnect, label Major Constituent Analyzer (MCA) Sample Line QDs (two). Tether to side to prevent obstruction. Refer to Figure 1.

6. Disconnect Process Air Return Fluid Connector. Refer to Figure 1.

7. Unfasten TCCS Grounding Strap Bolts (two) (Ratchet, 1/4” Drive; 4” Ext; 3/8” Socket). Refer to Figure 1.

8. Rotate knurled locking rings (two), on stems of T-shaped locking handles. Refer to Figure 1.

9. Rotate left-hand T-shaped locking handle 90°. Rotate right-hand T-shaped locking handle 90°. Refer to Figure 1.

10. Slide TCCS out to fully extended, latched position by pulling on two unlocked T-handles. Verify locking mechanism (one) engaged on right slide assembly.

11. Disconnect air duct connector from rear of Charcoal Bed. Refer to Figure 2.
12. Loosen front (three), rear (three) captive fasteners of Charcoal Bed (Ratchet, 1/4" Drive; 4" Ext; 3/8" Socket). Refer to Figure 1.


**REPLACEMENT**

14. Remove Protective End Caps (two) from replacement Charcoal Bed. Place Protective End Caps on expended Charcoal Bed.

15. Remove O-Ring (one) from rear air duct connector tubing (O-Ring Extractor Tool).

16. Apply thin layer of Silicon Grease on new O-Ring. Install replacement O-Ring on tubing.

**NOTE**

Install Charcoal Bed with MCA QD oriented toward upper left of TCCS. Refer to Figure 1.

17. Lift Charcoal Bed upward into TCCS from bottom. Slide toward rear of TCCS, align with guide pins.

18. Align, snug front (three), rear (three) captive fasteners (Ratchet, 1/4" Drive; 4" Ext; 3/8" Socket). Refer to Figure 1.

19. Torque front/rear (six) captive fasteners to 80 in-lbs ((40-200) in-lbs Trq Wrench, 1/4" Drive; 4" Ext; 3/8" Socket).

20. Reconnect air duct connector at rear of Charcoal Bed.

**CLOSEOUT**

**CAUTION**
Ensure all loose equipment, tools, debris have been removed from behind TCCS.

21. Depress locking mechanism (one) on right slide assembly. Push TCCS back to retracted position.

**NOTE**
Ensure TCCS is in fully retracted position and T-shaped handles locked.

22. Rotate left-hand T-shaped locking handle 90°. Rotate right-hand T-shaped locking handle 90°.

23. Rotate knurled locking rings (two) on stems of T-shaped handles.
24. Connect MCA sample line QDs (two), press on collar, snap into place. Refer to Figure 1.

25. Connect Process Air Return Fluid connector. Refer to Figure 1.

26. Snug TCCS Grounding Strap Bolts (two) (Ratchet, 1/4” Drive; 4” Ext; 3/8” Socket). Refer to Figure 1.

27. Torque TCCS Grounding Strap Bolts (two) to 80 in-lbs ((40-200 in-lbs) Trq Wrench; 4” Ext; 3/8” Socket).


**CHECKOUT**

29. RACK POWER switch → ON

30. Closing LAB1D6 RPCM
   LAB: EPS: Rack Power: Rack Power 2
   [Rack Power 2]
   ‘Rack LAB1D6’

   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power On’

   **cmd** LAB1D6 Pwr On
   ‘Rack Power LAB1D6’

   Verify RPCM_LA2B_C_RPC_01 Position – Cl

31. Perform {1.301 ATMOSPHERE REVITALIZATION RACK ACTIVATION}, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: ARS), then:

**POST MAINTENANCE**

32. Inform **MCC-H** of task completion.

33. √MATS for stowage location of expended Charcoal Bed, tools, maintenance supplies
   Stow tools, equipment.
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OBJECTIVE:
To sample ITCS fluid.

LOCATION:
Any ITCS sampling adapter

DURATION:
30 minutes

PARTS:
None

MATERIALS:
Rubber Gloves
Eye Protection
Dry Wipes

TOOLS REQUIRED:
ITCS Sampling Kit

REFERENCED PROCEDURE(S):
None

WARNING
ITCS grade water may irritate skin or eyes due to 9.5 pH level. Wear gloves and eye protection when handling containers, connecting disconnecting QDs. Failure to comply could result in skin/eye irritation to crew.
ACCESSING
1. Remove Beta Cloth Closeout on rack equipped with an ITCS sample adapter.

2. Don rubber gloves, eye protection.

CAUTION
Rubber gloves must be worn to preclude contamination of the sample.

3. Luer-Lock tethered cap ←|→ Luer-Lock interface

FLUSHING
4. ITCS Sample Port Flush Bag →|← Luer-Lock interface

CAUTION
Overfilling flush or sample bag will result in failure of bag to contain coolant.

NOTE
Metering Valve was set on the ground and locked in place.

5. Slowly open shutoff valve to establish coolant flow into bag.

6. When bag has been filled with coolant, close coolant shutoff valve.

7. ITCS Sample Port Flush Bag ←|→ Luer-Lock interface, discard bag.

NOTE
Ensure proper checkout is being used for sample type taken.

CHECKOUT FOR RETURN TO GROUND SAMPLE
8. ITCS Fluid Sample Bag →|← Luer-Lock interface

9. Pinch end of Sample Bag between fingers, slowly open shutoff valve to establish coolant flow into bag.

10. When bag has been filled with coolant, close coolant shutoff valve.

11. ITCS Fluid Sample Bag ←|→ Luer-Lock interface

12. Package in Ziplock Bag for return to ground.
CHECKOUT FOR AMMONIA TEST SAMPLE
13. Ammonia Test Strip Bag →|← Luer-Lock interface

14. Pinch end of Ammonia Test Strip Bag between fingers, slowly open shutoff valve to establish coolant flow into bag.

15. When Ammonia Test Strip Bag has been filled with coolant, close coolant shutoff valve.

16. Ammonia Test Strip Bag ←|→ Luer-Lock interface

17. Pinch end of Ammonia Test Strip Bag between fingers, remove Fluid Retaining Clip, remove Ammonia Test Strip from Bag, reinstall Fluid Retaining Clip on Bag.

18. After air drying for 20 seconds, compare Ammonia Test Strip with Ammonia color chart in ITCS Sampling Kit.

19. If test strip does not indicate 0 ppm Ammonia, √MCC-H.

20. Discard Ammonia Test Strip Bag, Test Strip.

CHECKOUT FOR pH TEST SAMPLE
21. pH Test Strip Bag →|← Luer-Lock interface

22. Pinch end of pH Test Strip Bag between fingers, slowly open shutoff valve to establish coolant flow into bag.

23. When Bag has been filled with coolant, close coolant shutoff valve.

24. pH Test Strip Bag ←|→ Luer-Lock interface

25. Pinch end of pH Test Strip Bag between fingers, remove Fluid Retaining Clip, remove pH Test Strip from Bag, reinstall Fluid Retaining Clip on Bag.

26. After air drying for 20 seconds, compare pH Test Strip with pH color chart in ITCS Sampling Kit.

27. If test strip does not indicate a pH between 9 and 10, √MCC-H.


CLOSEOUT
29. Luer-Lock tethered cap →|← Luer-Lock interface

30. Install Beta Cloth Closeout.

POST MAINTENANCE
31. Stow ITCS Sampling Kit, materials.
OBJECTIVE:
Test the Emergency Light Power Supplies (ELPS) in the Lab.

LOCATION:
Lab Forward and Aft Endcones.

DURATION:
30 minutes

PARTS:
None

MATERIALS:
None

TOOLS REQUIRED:
None

REFERENCED PROCEDURE(S):
None

NOTE
1. This procedure may be performed for one Lab ELPS or repeated for both.
2. Each ELPS has two RPCs supplying power.

Table 1. LAB ELPS RPCs

<table>
<thead>
<tr>
<th>ELPS Location</th>
<th>Designator</th>
<th>RPCM</th>
<th>RPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Aft</td>
<td>A0120</td>
<td>LA2-2B-G</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LA1-1B-F</td>
<td>14</td>
</tr>
<tr>
<td>Lab Forward</td>
<td>A0119</td>
<td>LA2-2B-B</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LA1-1B-E</td>
<td>1</td>
</tr>
</tbody>
</table>

PCS
1. REMOVING CLOSE INHIBIT AND CLOSE ELPS RPCs
Lab: EPS: RPCM [X] RPC [Y]  where [X,Y] = Refer to Table 1.
RPCM [X] RPC [Y]

  cmd  RPC Close Command – Enable (Verify – Ena)
  cmd  RPC Position – Close (Verify – Cl)

Repeat
3.1.401 LAB EMERGENCY LIGHT POWER SUPPLY - INSPECTION
(ISS IFM/5A - ALL/FIN A) Page 2 of 2 pages

ACCESSING

Table 2. ELPS Closeout Panels

<table>
<thead>
<tr>
<th>Location</th>
<th>Designator</th>
<th>Closeout Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Forward</td>
<td>A0119</td>
<td>LABSD0-09</td>
</tr>
<tr>
<td>Lab Aft</td>
<td>A0120</td>
<td>LABPD7-09</td>
</tr>
</tbody>
</table>

2. If required, loosen closeout panel fasteners (six) by hand, remove Closeout Panel. Refer to Table 2. Temporarily stow.

CHECKOUT

3. √ELPS Switch – Test
   Refer to Figure 1.

4. √ELPS LED – illuminated

5. √Emergency Egress Light Strips (two) in Endcone are illuminated

6. ELPS Switch – original position

CLOSEOUT

7. If required, install Endcone Closeout Panel, snug fasteners (six) by hand. Refer to Table 2.

POST MAINTENANCE

8. Repeat for remaining ELPS.

OBJECTIVE:
Remove and replace failed Guidance, Navigation, and Control MDM 1 (GNC-1).

LOCATION:
Installed: LAB1D0
Stowed: √Maintenance and Assembly Task Supplement (MATS)

PARTS:
GNC-1 MDM (P/N 8259015-906)

DURATION:
60 minutes

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
   7/16” Socket, 3/8” Drive
Kit E:
   Ratchet, 3/8” Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8” Drive
Lid #1:
   Static Wrist Tether

REFERENCED PROCEDURE(S):
1.201 LAB RACK ROTATE
3.2.301 AREA SMOKE DETECTOR R&R LAB1SD5/LAB1PD1
4.403 GNC MDM TRANSITION C: TRANSITIONING BACKUP GNC MDM 2(1) FROM WAIT TO DIAGNOSTIC/OFF WHILE PRIMARY GNC MDM IS OPERATIONAL
4.402 GNC MDM TRANSITION B: TRANSITIONING GNC BACKUP MDM 2(1) FROM OFF TO WAIT WHILE PRIMARY GNC IS OPERATIONAL

SAFING

WARNING
1. Failure to remove power can result in electrical shock hazard.

2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.
1. Perform {4.403 GNC MDM TRANSITION C: TRANSITIONING BACKUP GNC MDM 2(1) FROM WAIT TO DIAGNOSTIC/OFF WHILE PRIMARY GNC MDM IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

ACCESSING

2. Perform {3.2.301 AREA SMOKE DETECTOR R&R LAB1SD5/LAB1PD1}, Removal steps only (SODF: USOS: ISS IFM: CORRECTIVE), then:

3. Perform {1.201 LAB RACK ROTATE}, step 1, appropriate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

Figure 1.- Lab Forward Endcone.
REMOVAL

Figure 2.- Location of MDM Fasteners.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

4. Don Static Wrist Tether.
   Secure clip end to unpainted metal surface.

CAUTION
Do not allow MDM, tools to impact or damage coldplate. Coldplate that MDM mounts to is extremely thin and fragile.

5. Attach Avionics Box Handle to failed GNC-1.

CAUTION
MDM blind mate connectors are subject to damage during removal of unit from structure. Ensure that left, right fasteners are unfastened before loosening center fastener.

6. Unfasten left, right fastener (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

7. Unfasten center fastener (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

8. Remove failed GNC-1 MDM.
   Temporarily stow.
REPLACEMENT

9. Attach Avionics Box Handle to replacement GNC-1 MDM.

10. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

11. Clean coldplate bonding surfaces (Dry Wipes).

12. Position replacement GNC-1 MDM between location guides. Slide MDM along Coldplate Assembly until tip of center fastener enters its mating receptacle.

**CAUTION**

MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

13. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

14. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

**CAUTION**

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

15. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

16. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

17. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

18. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

19. Release Avionics Box Handle from replacement GNC-1 MDM. Temporarily stow.
CHECKOUT
20. Perform {4.402  GNC MDM TRANSITION B: TRANSITIONING GNC BACKUP MDM 2(1) FROM OFF TO WAIT WHILE PRIMARY GNC IS OPERATIONAL}, all (SODF: SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

CLOSEOUT
21. Perform {3.2.301  AREA SMOKE DETECTOR R&R LAB1SD5/LAB1PD1}, Installation steps only (SODF: ISS IFM: LAB: CORRECTIVE), then:

22. Perform {1.201  LAB RACK ROTATE}, appropriate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

POST MAINTENANCE
23. Inform **MCC-H** of task completion.

24. √MATS for stowage location of failed MDM
Stow tools, materials.
OBJECTIVE:
Remove and replace failed Guidance, Navigation, and Control MDM 2 (GNC-2).

LOCATION:
Installed: LAB1D7
Stowed: √ Maintenance and Assembly Task Supplement (MATS)

PARTS:
GNC-2 MDM (P/N 8259015-906)

DURATION:
60 minutes

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
  7/16” Socket, 3/8” Drive
Kit E:
  Ratchet, 3/8” Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8” Drive
Lid #1:
  Static Wrist Tether

REFERENCED PROCEDURE(S):
1.201 LAB RACK ROTATE
4.403 GNC MDM TRANSITION C: TRANSITIONING BACKUP GNC MDM 2(1) FROM WAIT TO DIAGNOSTIC/OFF WHILE PRIMARY GNC MDM IS OPERATIONAL
4.402 GNC MDM TRANSITION B: TRANSITIONING GNC BACKUP MDM 2(1) FROM OFF TO WAIT WHILE PRIMARY GNC IS OPERATIONAL

SAFING

WARNING
1. Failure to remove power can result in electrical shock hazard.
2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.
1. Perform \{4.403 GNC MDM TRANSITION C: TRANSITIONING BACKUP GNC MDM 2(1) FROM WAIT TO DIAGNOSTIC/OFF WHILE PRIMARY GNC MDM IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

ACCESSING

2. Perform \{1.201 LAB RACK ROTATE}, step 2, appropriate Rack Down step only (SODF: S&M: NOMINAL: RACK), then:

![Diagram of Lab Aft Endcone](image)

Figure 1.- Lab Aft Endcone.
REMOVAL

Figure 2.- Location of MDM Fasteners.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

3. Don Static Wrist Tether.
Secure clip end to unpainted metal surface.

CAUTION
Do not allow MDM, tools to impact or damage coldplate. Coldplate that MDM mounts to is extremely thin and fragile.

4. Attach Avionics Box Handle to failed GNC-2.

CAUTION
MDM blind mate connectors are subject to damage during removal of unit from structure. Ensure that left, right fasteners are unfastened before loosening center fastener.

5. Unfasten left, right fastener (Ratchet, 3/8” Drive; 7/26” Socket).
Refer to Figure 2.

6. Unfasten center fastener (Ratchet, 3/8” Drive; 7/26” Socket).
Refer to Figure 2.

7. Remove failed GNC-2 MDM.
Temporarily stow.
8. Attach Avionics Box Handle to replacement GNC-2 MDM.

9. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

10. Clean coldplate bonding surfaces (Dry Wipes).

11. Position replacement GNC-2 MDM between location guides. Slide MDM along Coldplate Assembly until tip of center fastener enters its mating receptacle.

**CAUTION**
MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

12. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8" Drive; 7/26" Socket; (30-200 in-lbs) Trq Wrench).

13. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/26" Socket; (30-200 in-lbs) Trq Wrench).

**CAUTION**
1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.
2. Do not unfasten center fastener more than 1/2 turn.

14. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

15. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/26" Socket; (30-200 in-lbs) Trq Wrench).

16. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8" Drive; 7/26" Socket; (30-200 in-lbs) Trq Wrench).

17. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/26" Socket; (30-200 in-lbs) Trq Wrench).

18. Release Avionics Box Handle from replacement GNC-2 MDM. Temporarily stow.
CHECKOUT
19. Perform \{4.402 GNC MDM TRANSITION B: TRANSITIONING GNC BACKUP MDM 2(1) FROM OFF TO WAIT WHILE PRIMARY GNC IS OPERATIONAL\}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

CLOSEOUT
20. Perform \{1.201 LAB RACK ROTATE\}, appropriate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

POST MAINTENANCE
21. Inform **MCC-H** of task completion.

22. √MATS for stowage location of failed MDM
    Stow tools, materials.
OBJECTIVE:
Remove and replace failed Command and Control MDM 1 (C&C-1) in the Avionics-2 (AV-2) Rack.

DURATION:
60 minutes

LOCATION:
Installed: AV-2 (LAB1D1)
Stowed: √Maintenance and Assembly Task Supplement (MATS)

PARTS:
C&C-1 MDM (P/N 8259015-907)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
  7/16" Socket, 3/8" Drive
Kit E:
  Ratchet, 3/8" Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #1:
  Static Wrist Tether

REFERENCED PROCEDURE(S):
4.303  CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED/DIAGNOSTIC/OFF
4.302  CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)
4.407  INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.406  INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL
4.411  PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF
4.410  PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP
4.414  PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.413  PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL
C&T AUDIO ORU POWER UP FOR AVIONICS RACK #2
4.304  C&T SYSTEMS DEACTIVATION AVIONICS RACK #2 (LAB1D1)
SAFING

WARNING

1. Failure to remove power can result in electrical shock hazard.

2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform {4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(backup) TO FAILED/DIAGNOSTIC/OFF}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

2. Perform {4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

3. Perform {4.411 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

4. Perform {4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

5. Perform {4.304 C&T SYSTEMS DEACTIVATION AVIONICS RACK #2 (LAB1D1)}, all (SODF: C&T: CORRECTIVE: SYSTEMS), then:

6. RACK POWER switch → OFF

7. Verifying LAB1D1 Rack Safed

PCS

Lab: EPS: Rack Power: Rack Power 1
Rack Power 1
‘Rack LAB1D1’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1D1’

Verify RPCM_LA1B_D_RPC_04 Position – Op
8. Open lower faceplate of Avionics Rack 2 (thumb latches).

Figure 1.- Avionics Rack 2, Faceplate Open.

Figure 2.- Location of MDM Fasteners.
9. Don Static Wrist Tether.
   Secure clip end to unpainted metal surface.

10. Attach Avionics Box Handle to failed C&C-1 MDM.

11. Unfasten left, right fastener (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive). Refer to Figure 2.

12. Unfasten center fastener (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive). Refer to Figure 2.

13. Remove failed C&C-1 MDM.
    Temporarily stow.

**REPLACEMENT**

14. Attach Avionics Box Handle to replacement C&C-1 MDM.

15. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

16. Clean coldplate bonding surfaces (Dry Wipes).

17. Position replacement C&C-1 MDM between location guides.
    Slide MDM along Coldplate Assembly until tip of center fastener enters its mating receptacle.
CAUTION

MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

18. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

19. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

CAUTION

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

20. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive).

21. Torque center fastener to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

22. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

23. Retorque fasteners (three) to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

24. Release Avionics Box Handle from replacement C&C-1 MDM. Temporarily stow.

CLOSEOUT


CHECKOUT

26. RACK POWER switch → ON

27. Closing LAB1D1 RPC

PCS

Lab: EPS: Rack Power: Rack Power 1
Rack Power 1
‘Rack LAB1D1’

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena
‘Rack Power On’

**cmd** LAB1D1 Pwr On

‘Rack Power LAB1D1’

Verify RPCM_LA1B_D_RPC_04 Position – Cl

28. Perform **{4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)}**, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

29. Perform **{4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL)**, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

30. Perform **{4.410 PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP}**, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

31. Perform **{4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL}**, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

32. Perform **{C&T AUDIO ORU POWERUP FOR AVIONICS RACK #2}**, all (SODF: C&DH: TBD), then:

**POST MAINTENANCE**

33. Inform **MCC-H** of task completion.

34. √MATS for stowage location of failed MDM

   Stow tools, materials.
OBJECTIVE:
Remove and replace failed Command and Control MDM 2 (C&C-2) in the Avionics-1 (AV-1) Rack.

DURATION:
60 minutes

LOCATION:
Installed: Avionics Rack 1
Stowed: √ Maintenance Assembly Task Supplement (MATS)

PARTS:
C&C-2 MDM (P/N 8259015-907)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C: 7/16” Socket, 3/8” Drive
Kit E: Ratchet, 3/8” Drive
Kit G: (30-200 in-lbs) Trq Wrench, 3/8” Drive
Lid #1: Static Wrist Tether

REFERENCED PROCEDURE(S):
4.303  CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED/DIAGNOSTIC/OFF
4.302  CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)
4.407  INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.406  INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL
4.414  PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.413  PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL
C&T AUDIO ORU POWER UP FOR AVIONICS RACK #1
4.303  C&T SYSTEMS DEACTIVATION AVIONICS RACK #1 (LAB1D5)
SAFING

WARNING

1. Failure to remove power can result in electrical shock hazard.

2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform {4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED DIAGNOSTIC/OFF}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS Tier I), then:

2. Perform {4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

3. Perform {4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

4. Perform {4.303 C&T SYSTEMS DEACTIVATION AVIONICS RACK #1 (LAB1D5)}, all (SODF: C&T: CORRECTIVE: SYSTEMS), then:

5. RACK POWER switch → OFF

6. Verifying LAB1D5 Rack Safed

PCS

Lab: EPS: Rack Power: Rack Power 2
Rack Power 2
‘Rack LAB1D5’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1D5’

Verify RPCM_LA2B_C_RPC_02 Position – Op
ACCESSING

Figure 1.- Avionics Rack 1, Faceplate Open.

7. Open lower faceplate of Avionics Rack 1 (thumb latches).

REMOVAL

Figure 2.- Location of MDM Fasteners.
8. Don Static Wrist Tether. Secure clip end to unpainted metal surface.

9. Attach Avionics Box Handle to failed C&C-2 MDM.

10. Unfasten left, right fastener (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive). Refer to Figure 2.

11. Unfasten center fastener (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive). Refer to Figure 2.

12. Remove failed C&C-2 MDM. Temporarily stow.

13. Attach Avionics Box Handle to replacement C&C-2 MDM.

14. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

15. Clean coldplate bonding surfaces (Dry Wipes).


CAUTION
MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.
17. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

18. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

**CAUTION**

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

19. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

20. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

21. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

22. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

23. Release Avionics Box Handle from replacement C&C-2 MDM. Temporarily stow.

**CLOSEOUT**


**CHECKOUT**

25. RACK POWER switch → ON

26. Closing LABID5 RPC

PCS

Lab: EPS: Rack Power: Rack Power 2

[Rack Power 2 ]

‘Rack LAB1D5’

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

**cmd** LAB1D5 Pwr On

‘Rack Power LAB1D5’

Verify RPCM_LA2B_C_RPC_02 Position – Cl
27. Perform {4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

28. Perform {4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2 (1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

29. Perform {4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

30. Perform {C&T AUDIO ORU POWERUP FOR AVIONICS RACK #1}, all (SODF: C&DH: TBD), then:

**POST MAINTENANCE**

31. Inform **MCC-H** of task completion.

32. √MATS for stowage of failed MDM
   Stow tools, materials.
OBJECTIVE:
Remove, replace failed Command and Control MDM 3 (C&C-3).

DURATION:
60 minutes

LOCATION:
Installed: LAB1D0
Stowed: √Maintenance and Assembly Task Supplement (MATS)

PARTS:
C&C-3 MDM (P/N 8259015-907)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
   7/16" Socket, 3/8" Drive
Kit E:
   Ratchet, 3/8" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #1:
   Static Wrist Tether

REFERENCED PROCEDURE(S):
1.201 LAB RACK ROTATE
4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1,2) MDM FROM STANDBY(BACKUP) TO FAILED/DIAGNOSTIC/OFF
4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)
3.2.301 AREA SMOKE DETECTOR R&R LAB1SD5/LAB1PD1

SAFING

WARNING
1. Failure to remove power can result in electrical shock hazard.
2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform [4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED/DIAGNOSTIC/OFF], all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:
ACCESSING

2. Perform \([3.2.301 \text{ AREA SMOKE DETECTOR R&R LAB1SD5/LAB1PD1}\]),
   Removal steps only (SODF: ISS IFM: LAB: CORRECTIVE), then:

3. Perform \([1.201 \text{ LAB RACK ROTATE}\]), step 1, appropriate Rack Down
   steps only, (SODF: S&M: NOMINAL: RACK), then:

Figure 1.- Lab Forward Endcone.
REMOVAL

4. Don Static Wrist Tether.
   Secure clip end to unpainted metal surface.

5. Attach Avionics Box Handle to failed C&C-3 MDM.

6. Unfasten left, right fastener (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).
   Refer to Figure 2.

7. Unfasten center fastener (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).
   Refer to Figure 2.

8. Remove failed C&C-3 MDM.
   Temporarily stow.

REPLACEMENT

9. Attach Avionics Box Handle to replacement C&C-3 MDM.

10. Remove Electrical Connector Protective Covers from replacement MDM.
    Install on failed MDM.
11. Clean coldplate bonding surfaces (Dry Wipes).

12. Position replacement C&C-3 MDM between location guides. Slide MDM along Coldplate Assembly until tip of center fastener enters its mating receptacle.

**CAUTION**

MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

13. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

14. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

**CAUTION**

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

15. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

16. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

17. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

18. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

19. Release Avionics Box Handle from replacement C&C-3 MDM. Temporarily stow.

**CLOSEOUT**

20. Perform {3.2.301 AREA SMOKE DETECTOR R&R LAB1SD5/LAB1PD1}, Installation steps only (SODF: ISS IFM: LAB: CORRECTIVE), then:

21. Perform {1.201 LAB RACK ROTATE}, appropriate Rack Up steps only, (SODF: S&M: NOMINAL: RACK), then:
3.2.105  C&C-3 MDM R&R LAB1D0  
(ISS IFM/5A - ALL/FIN A)  
Page 5 of 5 pages

CHECKOUT
22. Perform {4.302  CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

POST MAINTENANCE
23. Inform MCC-H of task completion.

24. √MATS for stowage location of failed MDM
   Stow tools, materials.
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OBJECTIVE:
Remove, replace failed Internal MDM 1 (INT-1) in the Avionics-2 (AV-2).

LOCATION:
Installed: AV-2 (LAB1D1)
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
60 minutes

PARTS:
INT-1 MDM (P/N 8259015-908)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
  7/16" Socket, 3/8" Drive
Kit E:
  Ratchet, 3/8" Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #1:
  Static Wrist Tether

REFERENCED PROCEDURE(S):
4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED DIAGNOSTIC/OFF
4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)
4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL
4.411 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF
4.410 PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP
4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL
4.304 C&T SYSTEMS DEACTIVATION AVIONICS RACK #2 (LAB1D1)
C&T AUDIO ORU POWER UP FOR AVIONICS RACK #2
SAFING

### WARNING

1. Failure to remove power can result in electrical shock hazard.

2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform {4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED DIAGNOSTIC/OFF}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

2. Perform {4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

3. Perform {4.411 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

4. Perform {4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

5. Perform {4.304 C&T SYSTEMS DEACTIVATION AVIONICS RACK #2 (LAB1D1)}, all (SODF: C&T: CORRECTIVE: SYSTEMS), then:

6. RACK POWER switch → OFF

7. Verifying LAB1D1 Rack Safed

   Lab: EPS: Rack Power: Rack Power 1
   
   Rack Power 1
   ‘Rack LAB1D1’

   Verify Switch Position – Off
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power LAB1D1’

   Verify RPCM_LA1B_D_RPC_04 Position – Op
8. Open lower faceplate of Avionics Rack 2 (thumb latches).
REMOVAL

Figure 2.- Location of MDM Fasteners.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

9. Don Static Wrist Tether. Secure clip end to unpainted metal surface.

CAUTION
Do not allow MDM, tools to impact or damage coldplate. Coldplate that MDM mounts to is extremely thin and fragile.

10. Attach Avionics Box Handle to failed INT-1 MDM.

CAUTION
MDM blind mate connectors are subject to damage during removal of unit from structure. Ensure that left, right fasteners are unfastened before loosening center fastener.

11. Unfasten left, right fastener (Ratchet, 3/8” Drive; 7/16” Socket). Refer to Figure 2.

12. Unfasten center fastener (Ratchet, 3/8” Drive; 7/16” Socket). Refer to Figure 2.

13. Remove failed INT-1 MDM. Temporarily stow.
REPLACEMENT

14. Attach Avionics Box Handle to replacement INT-1 MDM.

15. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

16. Clean coldplate bonding surface (Dry Wipes).

17. Position replacement INT-1 MDM between location guides. Slide MDM along coldplate until tip of center fastener enters its mating receptacle.

CAUTION
MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

18. Tighten, torque center fastener to 95 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

19. Tighten left, right fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

CAUTION
1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

20. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

21. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

22. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

23. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

24. Release Avionics Box Handle from replacement INT-1 MDM. Temporarily stow.
CLOSEOUT

CHECKOUT
26. RACK POWER switch → ON
27. Closing LABID1 RPC

Lab: EPS: Rack Power: Rack Power 1
   Rack Power 1
   ‘Rack LAB1D1’

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

cmd LAB1D1 Pwr On

‘Rack Power LAB1D1’

Verify RPCM_LA1B_D_RPC_04 Position – Cl

28. Perform \{4.302  CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)} , all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

29. Perform \{4.406  INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL} , all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

30. Perform \{4.410  PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP} , all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

31. Perform \{4.413  PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL} , all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

32. Perform \{C&T AUDIO ORU POWERUP FOR AVIONICS RACK #2\} , all (SODF: C&DH: TBD), then:

POST MAINTENANCE
33. Inform MCC-H of task completion.

34. √MATS for stowage location of failed MDM
    Stow tools, materials.
OBJECTIVE:
Remove, replace failed Internal MDM 2 (INT-2) in the Avionics-1 (AV-1) Rack.

DURATION:
60 minutes

LOCATION:
Installed: AV-1 (LAB1D5)
Stowed: √ Maintenance and Assembly Task Supplement (MATS)

PARTS:
INT-2 MDM (P/N 8259015-901)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
   7/16" Socket, 3/8" Drive
Kit E:
   Ratchet, 3/8" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #1:
   Static Wrist Tether

REFERENCED PROCEDURE(S):
4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED DIAGNOSTIC/OFF
4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)
4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL
4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL
4.303 C&T SYSTEMS DEACTIVATION AVIONICS RACK #1 (LAB1D5)
C&T AUDIO ORU POWER UP FOR AVIONICS RACK #1
SAFING

WARNING

1. Failure to remove power can result in electrical shock hazard.

2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform {4.303  CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED DIAGNOSTIC/OFF}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

2. Perform {4.407  INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

3. Perform {4.414  PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

4. Perform {4.303  C&T SYSTEMS DEACTIVATION AVIONICS RACK #1 (LAB1D5)}, all (SODF: C&T: CORRECTIVE: SYSTEMS), then:

5. RACK POWER switch → OFF

6. Verifying LAB1D5 Rack Safed

PCS

Verifying Switch Position – Op
Verifying Switch Avail – Yes
Verifying Monitoring Status – Ena

‘Rack Power LAB1D5’

Verify RPCM_LA2B_C_RPC_02 Position – Op
7. Open lower faceplate of Avionics Rack 1 (thumb latches).
REMOVAL

8. Don Static Wrist Tether. Secure clip end to unpainted metal surface.

9. Attach Avionics Box Handle to failed INT-2 MDM.

10. Unfasten left, right fasteners (Ratchet, 3/8” Drive; 7/16” Socket). Refer to Figure 2.

11. Unfasten center fastener (Ratchet, 3/8” Drive; 7/16” Socket). Refer to Figure 2.

12. Remove failed INT-2 MDM. Temporarily stow.
REPLACEMENT

13. Attach Avionics Box Handle to replacement INT-2 MDM.

14. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

15. Clean coldplate bonding surfaces (Dry Wipes).


**CAUTION**

| MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

17. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

18. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

**CAUTION**

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

19. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

20. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

21. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

22. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

23. Release Avionics Box Handle from replacement INT-2 MDM. Temporarily stow.
CLOSEOUT

CHECKOUT
25. RACK POWER switch → ON

26. Closing LAB1D5 RPC 1

PCS
Lab: EPS: Rack Power: Rack Power 2
   Rack Power 2
   ‘Rack LAB1D5’
   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Mounting Status – Ena

   ‘Rack Power On’

   cmd LAB1D5 Pwr On
   ‘Rack Power LAB1D5’
   Verify RPCM_LA2B_C_RPC_02 Position – Cl

27. Perform \{4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)\}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

28. Perform \{4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL\}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

29. Perform \{4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL\}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

30. Perform \{C&T AUDIO ORU POWERUP FOR AVIONICS RACK #1\}, all (SODF: C&DH: TBD), then:

POST MAINTENANCE
31. Inform MCC-H of task completion.

32. √MATS for stowage location of failed MDM
   Stow tools, materials.
OBJECTIVE:
Remove and replace failed Lab 1 MDM (LA-1).

LOCATION:
Installed: LAB1P0
Stowed: √Maintenance and Assembly Task Supplement (MATS)

PARTS:
LA-1MDM (P/N 8258906-911)

DURATION:
60 minutes

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
    7/16” Socket, 3/8” Drive
Kit E:
    Ratchet, 3/8” Drive
Kit G:
    (30-200 in-lbs) Trq Wrench, 3/8” Drive
Lid #1:
    Static Wrist Tether

REFERENCED PROCEDURE(S):
1.201 LAB RACK ROTATE
3.2.301 AREA SMOKE DETECTOR R&R LAB1SD5/LAB1PD1 R&R
4.502 LAB MDM TRANSITION B: TRANSITIONING LAB MDM FROM OFF TO OPERATIONAL
4.503 LAB MDM TRANSITION C: TRANSITIONING LAB MDM FROM OPERATIONAL/MIN OPS/STANDBY TO DIAGNOSTIC/OFF

SAFING

WARNING
1. Failure to remove power can result in electrical shock hazard.

2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform (4.503 LAB MDM TRANSITION C: TRANSITIONING LAB MDM FROM OPERATIONAL/MIN OPS/STANDBY TO DIAGNOSTIC/OFF), all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER III), then:
ACCESSING

2. Perform \{3.2.301 AREA SMOKE DETECTOR R&R LAB1SD5/LAB1PD1 R&R\}, Removal steps only (SODF: ISS IFM: LAB: CORRECTIVE), then:

3. Identify type of rack requiring rotation
   - If RVCO/ZSR
     Perform \{1.201 LAB RACK ROTATE\}, step 2, Rack Down steps only, (SODF: S&M: NOMINAL: RACK), then:
   - If ARIS-Equipped Rack
     Perform \{LAB ARIS RACK ROTATE\}, Rack Down steps only, (SODF: S&M: NOMINAL: RACK), then:
   - If Payload Rack (all non-ARIS Payload Racks)
     √ Maintenance and Assembly Task Supplement (MATS) or PODF for specific rack rotation procedure
     Perform Rack Down steps only.
REMOVAL

4. Don static wrist tether. Secure clip end to unpainted metal surface.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

5. Attach Avionics Box Handle to failed LA-1 MDM.

CAUTION
MDM blind mate connectors are subject to damage during removal of unit from structure. Ensure that left, right fasteners are unfastened before loosening center fastener.

6. Unfasten left, right fasteners (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

7. Unfasten center fastener (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

8. Remove failed LA-1 MDM. Temporarily stow.
3.2.108 LA-1 MDM R&R LAB1P0

9. Attach Avionics Box Handle to replacement MDM.

10. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

11. Clean coldplate bonding surfaces (Dry Wipes).

12. Position replacement LA-1 MDM between location guides. Slide MDM along Coldplate Assembly until tip of center fastener enters its mating receptacle.

**CAUTION**

MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

13. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

14. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

**CAUTION**

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

15. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

16. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

17. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

18. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

19. Release Avionics Box Handle from replacement LA-1 MDM. Temporarily stow.
CLOSEOUT
20. Perform {3.2.301 AREA SMOKE DETECTOR R&R LAB1SD5/LAB1PD1 R&R}, Installation steps only (SODF: ISS IFM: LAB: CORRECTIVE), then:

21. Identify type of rack requiring rotation
   If RVCO/ZSR
      Perform {1.201 LAB RACK ROTATE}, step 2, Rack Up steps only, (SODF: S&M: NOMINAL: RACK), then:
      If ARIS-Equipped Rack
         Perform {LAB ARIS RACK ROTATE}, Rack Up steps only, (SODF: S&M: NOMINAL: RACK), then:
      If Payload Rack (all non-ARIS Payload Racks)
         √Maintenance and Assembly Task Supplement (MATS) or PODF
         for specific rack rotation procedure.
         Perform Rack Up steps only.

CHECKOUT
22. Perform {4.502 LAB MDM TRANSITION B: TRANSITIONING LAB MDM FROM OFF TO OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITION TIER III), then:

POST MAINTENANCE
23. Inform MCC-H of task completion.

24. √MATS for stowage location of failed MDM
    Stow tools, materials.
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OBJECTIVE:
Remove and replace failed Lab 2 MDM (LA-2).

LOCATION:
Installed: LAB1S7
Stowed: √Maintenance and Assembly Task Supplement (MATS)

PARTS:
LA-2 MDM (P/N 8258906-917)

DURATION:
60 minutes

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C: 
    7/16” Socket, 3/8” Drive
Kit E:
    Ratchet, 3/8” Drive
Kit G:
    (30-200 in-lbs) Trq Wrench, 3/8” Drive
Lid #1:
    Static Wrist Tether

REFERENCED PROCEDURE(S):
1.201 LAB RACK ROTATE
4.502 LAB MDM TRANSITION B: TRANSITIONING LAB MDM FROM OFF TO OPERATIONAL
4.503 LAB MDM TRANSITION C: TRANSITIONING LAB MDM FROM OPERATIONAL/MIN OPS/STANDBY TO DIAGNOSTIC/OFF

SAFING

WARNING

1. Failure to remove power can result in electrical shock hazard.

2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance

1. Perform 4.503 LAB MDM TRANSITION C: TRANSITIONING LAB MDM FROM OPERATIONAL/MIN OPS/STANDBY TO DIAGNOSTIC/OFF, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER III), then:
2. Perform {1.201 LAB RACK ROTATE}, step 2, appropriate RACK DOWN steps only, all (SODF: S&M: NOMINAL: RACK), then:

ACCESSING

![Diagram of Lab Aft Endcone.]

Figure 1.- Lab Aft Endcone.
Figure 2.- Location of MDM Fasteners.

### CAUTION

Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

3. **Don Static Wrist Tether.**
   Secure clip end to unpainted metal surface.

### CAUTION

Do not allow MDM, tools to impact or damage coldplate. Coldplate that MDM mounts to is extremely thin and fragile.

4. **Attach Avionics Box Handle to failed LA-2 MDM.**

### CAUTION

MDM blind mate connectors are subject to damage during removal of unit from structure. Ensure that left, right fasteners are unfastened before loosening center fastener.

5. **Unfasten left, right fastener (Ratchet, 3/8" Drive; 7/16" Socket).**
   Refer to Figure 2.

6. **Unfasten center fastener (Ratchet, 3/8" Drive; 7/16" Socket).**
   Refer to Figure 2.

7. **Remove failed LA-2 MDM.**
   Temporarily stow.
3.2.109 LA-2 MDM R&R LAB1S7
(ISS IFM/5A - ALL/FIN A) Page 4 of 5 pages

REPLACEMENT
8. Attach Avionics Box Handle to replacement MDM.

9. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

10. Clean coldplate bonding surfaces (Dry Wipes).


CAUTION
MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

12. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

13. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

CAUTION
1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

14. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

15. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

16. Torque two outer fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

17. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket; (30-200 in-lbs) Trq Wrench).

18. Release Avionics Box Handle from replacement LA-2 MDM. Temporarily stow.
CLOSEOUT
19. Perform \{1.201 LAB RACK ROTATE\}, appropriate RACK UP steps only, all (SODF: S&M: NOMINAL: RACK), then:

CHECKOUT
20. Perform \{4.502 LAB MDM TRANSITION B: TRANSITIONING LAB MDM FROM OFF TO OPERATIONAL\}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER III), then:

POST MAINTENANCE

22. √MATS for stowage location of failed MDM
    Stow tools, materials.
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OBJECTIVE:
Remove and replace failed Lab 3 MDM (LA-3).

LOCATION:
Installed: LAB1D7
Stowed: \(\checkmark\) Maintenance and Assembly Task Supplement (MATS)

PARTS:
LA-3 MDM (P/N 8258906-913)

DURATION:
60 minutes

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
  7/16" Socket, 3/8" Drive
Kit E:
  Ratchet, 3/8" Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #1:
  Static Wrist Tether

REFERENCED PROCEDURE(S):
1.201 LAB RACK ROTATE
4.502 LAB MDM TRANSITION B: TRANSITIONING LAB MDM FROM OFF TO OPERATIONAL
4.503 LAB MDM TRANSITION C: TRANSITIONING LAB MDM FROM OPERATIONAL/MIN OPS/STANDBY TO DIAGNOSTIC/OFF

SAFING

WARNING
1. Failure to remove power can result in electrical shock hazard.
2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform {4.503 LAB MDM TRANSITION C: TRANSITIONING LAB MDM FROM OPERATIONAL/MIN OPS/STANDBY TO DIAGNOSTIC/OFF}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER III), then:
ACCESSING

2. Perform (1.201 LAB RACK ROTATE), step 2, appropriate Rack Down steps only, (SODF: S&M: NOMINAL: RACK), then:

Figure 1.- Lab Aft Endcone.
REMOVAL

3. Don Static Wrist Tether. Secure clip end to unpainted metal surface.

CAUTION
Do not allow MDM, tools to impact or damage coldplate. Coldplate that MDM mounts to is extremely thin and fragile.

4. Attach Avionics Box Handle to failed LA-3 MDM.

CAUTION
MDM blind mate connectors are subject to damage during removal of unit from structure. Ensure that left, right fasteners are unfastened before loosening center fastener.

5. Unfasten left, right fastener (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

6. Unfasten center fastener (Ratchet, 3/8" Drive; 7/26" Socket). Refer to Figure 2.

7. Remove failed LA-3 MDM. Temporarily stow.

Figure 2.- Location of MDM Fasteners.
REPLACEMENT

8. Attach Avionics Box Handle to replacement MDM.

9. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

10. Clean coldplate bonding surfaces (Dry Wipes).

11. Position replacement LA-3 MDM between location guides. Slide MDM along Coldplate Assembly until tip of center fastener enters its mating receptacle.

CAUTION

MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

12. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8" Drive; 7/26" Socket; (30-200 in-lbs) Trq Wrench).

13. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/26" Socket; (30-200 in-lbs) Trq Wrench).

CAUTION

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

14. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

15. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/26" Socket; (30-200 in-lbs) Trq Wrench).

16. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8" Drive; 7/26" Socket; (30–200 in-lbs) Trq Wrench).

17. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/26" Socket; (30-200 in-lbs) Trq Wrench).

18. Release Avionics Box Handle from replacement LA-3 MDM. Temporarily stow.

CLOSEOUT

19. Perform 1.201 LAB RACK ROTATE, appropriate Rack Up steps only, all (SODF: S&M: NOMINAL: RACK), then:
CHECKOUT
20. Perform \(4.502\) LAB MDM TRANSITION B: TRANSITIONING LAB MDM FROM OFF TO OPERATIONAL, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER III), then:

POST MAINTENANCE

22. √MATS for stowage location of failed MDM
Stow tools, materials.
OBJECTIVE:
Remove, replace failed Payload 1 MDM (PL-1) in the Avionics-2 (AV-2) Rack.

DURATION:
60 minutes

LOCATION:
Installed: AV-2 (LAB1D1)
Stowed: √Maintenance and Assembly Task Supplement (MATS)

PARTS:
PL-1 MDM (P/N 8259015-907)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
   7/16” Socket, 3/8” Drive
Kit E:
   Ratchet, 3/8” Drive
Kit G:
   30-200 Trq Wrench, 3/8” Drive
Lid #1:
   Static Wrist Tether

REFERENCED PROCEDURE(S):
4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED DIAGNOSTIC/OFF
4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)
4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL
4.411 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF
4.410 PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP
4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL
4.304 C&T SYSTEMS DEACTIVATION AVIONICS RACK #2 (LAB1D1)
C&T AUDIO ORU POWER UP FOR AVIONICS RACK 2
### SAFING

#### WARNING

1. Failure to remove power can result in electrical shock hazard.
2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform {4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY (BACKUP) TO FAILED DIAGNOSTIC/OFF}, all (SODF: USOS: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

2. Perform {4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1 (2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: USOS: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

3. Perform {4.411 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF}, all (SODF: USOS: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

4. Perform {4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: USOS: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

5. Perform {4.304 C&T SYSTEMS DEACTIVATION AVIONICS RACK #2 (LAB1D1)}, all (SODF: C&T: CORRECTIVE: SYSTEMS), then:

6. RACK POWER switch → OFF

7. Verifying LAB1D1 ISS Rack Safed

<table>
<thead>
<tr>
<th>PCS</th>
<th>Lab: EPS: Rack Power: Rack Power 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rack Power 1</td>
</tr>
<tr>
<td></td>
<td>‘Rack LAB1D1’</td>
</tr>
<tr>
<td></td>
<td>Verify Switch Position – Off</td>
</tr>
<tr>
<td></td>
<td>Verify Switch Avail – Yes</td>
</tr>
<tr>
<td></td>
<td>Verify Monitoring Status – Ena</td>
</tr>
<tr>
<td></td>
<td>‘Rack Power LAB1D1’</td>
</tr>
<tr>
<td></td>
<td>Verify RPCM_LA1B_D_RPC_04 Position – Op</td>
</tr>
</tbody>
</table>
3.2.111  PL-1 MDM R&R LAB1D1

ACCESSING

Figure 1.- Avionics Rack 2, Faceplate Open.

8. Open upper faceplate of Avionics Rack 2 (thumb latches).

REMOVAL

Figure 2.- Location of MDM Fasteners.
3.2.111 PL-1 MDM R&R LAB1D1

9. Don Static Wrist Tether. Secure clip end to unpainted metal surface.

10. Attach Avionics Box Handle to failed PL-1 MDM.

11. Unfasten left, right fastener (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

12. Unfasten center fastener (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

13. Remove failed PL-1 MDM. Temporarily stow.

REPLACEMENT
14. Attach Avionics Box Handle to replacement PL-1 MDM.

15. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

16. Clean coldplate bonding surfaces (Dry Wipes).

17. Position replacement PL-1 MDM between location guides. Slide MDM along Coldplate Assembly until tip of center fastener enters its mating receptacle.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

CAUTION
Do not allow MDM, tools to impact or damage coldplate. Coldplate that MDM mounts to is extremely thin and fragile.

CAUTION
MDM blind mate connectors are subject to damage during removal of unit from a structure. Ensure that left, right fasteners are unfastened before loosening center fastener.

CAUTION
MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.
18. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

19. Tighten, torque left, right fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

**CAUTION**

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

20. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

21. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

22. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

23. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

24. Release Avionics Box Handle from replacement PL-1 MDM. Temporarily stow.

**CLOSEOUT**


**CHECKOUT**

26. RACK POWER switch → ON

27. Closing LAB1D1 RPC

**PCS**

Lab: EPS: Rack Power: Rack Power 1

' Rack Power 1 '

'Rack LAB1D1'

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

'Rack Power On'

**cmd** LAB1D1 Pwr On

‘Rack Power LAB1D1’

Verify RPCM_LA1B_D_RPC_04 Position – Cl
28. Perform \{4.302 CC MDM TRANSITION B: TRANSITIONING CC 3 (1,2) MDM FROM OFF TO STANDBY(BACKUP)\}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

29. Perform \{4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL\}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

30. Perform \{4.410 PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP\}, all (SODF: C&DH: CORRECTIVE: MDM TRANSITIONS TIER II), then:

31. Perform \{4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL\}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

32. Perform \{C&T AUDIO ORU POWERUP FOR AVIONICS RACK #2\}, all (SODF: C&DH: TBD), then:

**POST MAINTENANCE**

33. Inform **MCC-H** of task completion.

34. √MATS for stowage location of failed MDM
   Stow tools, materials.
START.IMS

OBJECTIVE:
Remove, replace failed Payload 2 MDM (PL-2) in the Avionics-3 (AV-3) Rack.

DURATION:
60 minutes

LOCATION:
Installed: AV-3 (LAB1D2)
Stowed: √Maintenance and Assembly Task Supplement (MATS)

PARTS:
PL-2 MDM (P/N 8259015-907)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Assembly
ISS Common IVA Tool Kit:
Kit C:
    7/16” Socket, 3/8” Drive
Kit E:
    Ratchet, 3/8” Drive
Kit G:
    (30-200 in-lbs) Trq Wrench, 3/8” Drive
Lid #1:
    Static Wrist Tether

REFERENCED PROCEDURE(S):
4.411 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF
4.410 PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP

SAFING

WARNING
1. Failure to remove power can result in electrical shock hazard.
2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform {4.11 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:
2. RACK POWER switch → OFF
3. Verifying LAB1D2 Rack Safed

PCS Lab: EPS: Rack Power: Rack Power 2
Rack Power 2
‘Rack LAB1D2’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1D2’

Verify RPCM_LA2B_C_RPC_04 Position – Op

ACCESSING

Figure 1.- Avionics Rack 3, Faceplate Open.

4. Open lower faceplate of Avionics Rack 3 (thumb latches).
REMOVAL

Figure 2.- Location of MDM Fasteners.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).</td>
</tr>
</tbody>
</table>

5. Don Static Wrist Tether. Secure clip end to unpainted metal surface.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not allow MDM, tools to impact or damage coldplate. Coldplate that MDM mounts to is extremely thin and fragile.</td>
</tr>
</tbody>
</table>

6. Attach Avionics Box Handle to failed PL-2 MDM.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDM blind mate connectors are subject to damage during removal of unit from a structure. Ensure that left, right fasteners are unfastened before loosening center fastener.</td>
</tr>
</tbody>
</table>

7. Unfasten left, right fastener (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

8. Unfasten center fastener (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

REPLACEMENT

10. Attach Avionics Box Handle to replacement PL-2 MDM.

11. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

12. Clean coldplate bonding surfaces (Dry Wipes).


**CAUTION**

MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

14. Tighten, torque center fastener to 95 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

15. Tighten left, right fastener to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

**CAUTION**

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

16. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive).

17. Torque center fastener to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

18. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

19. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

20. Release Avionics Box Handle from replacement PL-2 MDM. Temporarily stow.

**CHECKOUT**
22. RACK POWER switch → ON

23. Closing LAB1D2 RPC

PCS

| Lab: EPS: Rack Power: Rack Power 2 |
| Rack Power 2 |
| ‘Rack LAB1D2’ |

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

**cmd** LAB1D2 Pwr On

‘Rack Power LAB1D2’

Verify RPCM_LA2B_C_RPC_04 Position – Cl

24. Perform {4.410 PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

**POST MAINTENANCE**
25. Inform **MCC-H** of task completion.

26. √MATS for stowage location of failed MDM

Stow tools, materials.
OBJECTIVE:
Remove and replace failed Power Management and Control Unit 1 MDM (PMCU-1) in the Avionics-2 (AV-2) Rack.

DURATION:
60 minutes

LOCATION:
Installed: AV-2 (LAB1D1)
Stowed: √ Maintenance and Assembly Task Supplement (MATS)

PARTS:
PMCU-1 MDM (P/N 8259015-908)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
    7/16” Socket, 3/8” Drive
Kit E:
    Ratchet, 3/8” Drive
Kit G:
    (30-200 in-lbs) Trq Wrench, 3/8” Drive
Lid #1:
    Static Wrist Tether

REFERENCED PROCEDURE(S):
4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED DIAGNOSTIC/OFF
4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)
4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL
4.411 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF
4.410 PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP
4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL
4.304 C&T SYSTEMS DEACTIVATION AVIONICS RACK #2 (LAB1D1)
C&T AUDIO ORU POWER UP FOR AVIONICS RACK #2
SAFING

**WARNING**

1. Failure to remove power can result in electrical shock hazard.

2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform **{4.403 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED DIAGNOSTIC/OFF}**, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

2. Perform **{4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}**, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

3. Perform **{4.411 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF}**, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

4. Perform **{4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}**, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

5. Perform **{4.304 C&T SYSTEMS DEACTIVATION AVIONICS RACK #2 (LAB1D1)}**, all (SODF: C&T: CORRECTIVE: SYSTEMS), then:

6. RACK POWER switch → OFF

7. Verifying LAB1D1 ISS Rack Safed

PCS

Lab: EPS: Rack Power: Rack Power 1

Rack Power 1

‘Rack LAB1D1’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1D1’

Verify RPCM_LA1B_D_RPC_04 Position – Op
Figure 1.- Avionics Rack 2, Faceplate Open.

8. Open Faceplate Assembly of Avionics Rack 2 (thumb latches).
Figure 2.- Location of MDM Fasteners.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

9. Don Static Wrist Tether. Secure clip end to unpainted metal surface.

CAUTION
Do not allow MDM, tools to impact or damage coldplate. Coldplate that MDM mounts to is extremely thin and fragile.

10. Attach Avionics Box Handle to failed PMCU-1 MDM.

CAUTION
MDM blind mate connectors are subject to damage during removal of unit from structure. Ensure that left, right fasteners are unfastened before loosening center fastener.

11. Unfasten left, right fastener (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

12. Unfasten center fastener (Ratchet, 3/8" Drive; 7/16" Socket). Refer to Figure 2.

13. Remove failed PMCU-1 MDM. Temporarily stow.
REPLACEMENT

14. Attach Avionics Box Handle to replacement PMCU-1 MDM.

15. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

16. Clean coldplate bonding surfaces (Dry Wipes).

17. Position replacement PMCU-1 MDM between location guides. Slide MDM along Coldplate Assembly until tip of center fastener enters its mating receptacle.

**CAUTION**

MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

18. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

19. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

**CAUTION**

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

20. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive).

21. Torque center fastener to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

22. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

23. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8” Drive; 7/16” Socket, 3/8” Drive; (30-200 in-lbs) Trq Wrench).

24. Release Avionics Box Handle from replacement PMCU-1 MDM. Temporarily stow.
CLOSEOUT

CHECKOUT
26. RACK POWER switch → ON
27. Closing LAB1D1 RPC

PCS
Lab: EPS: Rack Power: Rack Power 1
| Lab: EPS: Rack Power: Rack Power 1 |
| Rack Power 1 |
| 'Rack LAB1D1'

Verify Switch Position  – On
Verify Switch Avail    – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

cmd LAB1D1 Pwr On

‘Rack Power LAB1D1’

Verify RPCM_LA1B_D_RPC_04 Position – Cl

28. Perform {4.302  CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

29. Perform {4.406  INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

30. Perform {4.410  PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

31. Perform {4.413  PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

32. Perform {C&T AUDIO ORU POWERUP FOR AVIONICS RACK #2}, all (SODF: C&DH: TBD), then:

POST MAINTENANCE
33. Inform MCC-H of task completion.

34. √MATS for stowage location of failed MDM
   Stow tools, materials.
OBJECTIVE:
Remove and replace failed Power Management and Control Unit 2 MDM (PMCU-2) in the Avionics-1 (AV-1) Rack.

DURATION:
60 minutes

LOCATION:
Installed: AV-1 (LAB1D5)
Stowed: √Maintenance and Assembly Task Supplement (MATS)

PARTS:
PMCU-2 MDM (P/N 8259015-901)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Avionics Box Handle
ISS Common IVA Tool Kit:
Kit C:
   7/16" Socket, 3/8" Drive
Kit E:
   Ratchet, 3/8" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #1:
   Static Wrist Tether

REFERENCED PROCEDURE(S):
4.303  CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED DIAGNOSTIC/OFF
4.302  CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)
4.407  INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.406  INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL
4.414  PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.413  PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL
4.303  C&T SYSTEMS DEACTIVATION AVIONICS RACK #1 (LAB1D5)
C&T AUDIO ORU POWER UP FOR AVIONICS RACK #1
SAFING

WARNING

1. Failure to remove power can result in electrical shock hazard.

2. Burn hazard. High temperatures are present at ORU. Allow ORU to cool for a minimum of 2 hours prior to performing maintenance.

1. Perform {4.403 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED DIAGNOSTICS/OFF}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

2. Perform {4.407 INTERNAL MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

3. Perform {4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

4. Perform {4.303 C&T SYSTEMS DEACTIVATION AVIONICS RACK #1 (LAB1D5)}, all (SODF: C&T: CORRECTIVE: SYSTEMS), then:

5. RACK POWER switch → OFF

6. Verifying LAB1S5 ISS Rack Safed

PCS

Lab: EPS: Rack Power: Rack Power 2
Rack Power 2
‘Rack LAB1D5’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1D5’

Verify RPCM_LA2B_C_RPC_02 Position – Op
7. Open upper faceplate of Avionics Rack 1 (thumb latches).
REMOVAL

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

8. Don Static Wrist Tether. Secure clip end to unpainted metal surface.

CAUTION
Do not allow MDM, tools to impact or damage coldplate. Coldplate that MDM mounts to is extremely thin and fragile.

9. Attach Avionics Box Handle to failed PMCU-2 MDM.

CAUTION
MDM blind mate connectors are subject to damage during removal of unit from structure. Ensure that left, right fasteners are unfastened before loosening center fastener.

10. Unfasten left, right fastener (Ratchet, 3/8” Drive; 7/16” Socket). Refer to Figure 2.

11. Unfasten center fastener (Ratchet, 3/8” Drive; 7/16” Socket). Refer to Figure 2.

12. Remove failed PMCU-2 MDM. Temporarily stow.
13. Attach Avionics Box Handle to replacement PMCU-2 MDM.

14. Remove Electrical Connector Protective Covers from replacement MDM. Install on failed MDM.

15. Clean coldplate bonding surface (Dry Wipes).


**CAUTION**

MDM blind mate connectors are subject to damage during securing of replacement unit to the structure. Ensure that center fastener is tightened fully to properly engage blind mate connectors before fastening left, right fasteners.

17. Tighten, torque center fastener to 107 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

18. Tighten, torque left, right fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

**CAUTION**

1. MDM center fastener is subject to damage during torque of left, right fastener. Ensure that center fastener is unfastened 1/4 to 1/2 turn to properly release tension in center fastener.

2. Do not unfasten center fastener more than 1/2 turn.

19. Unfasten center fastener 1/4 to 1/2 turn (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).

20. Torque center fastener to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

21. Torque outer fasteners (two) to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

22. Retorque all three fasteners to 56 in-lbs (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench).

23. Release Avionics Box Handle from replacement PMCU-2 MDM. Temporarily stow.
CLOSEOUT

CHECKOUT
25. RACK POWER switch → ON

26. Closing LAB1D5 RPC

PCS

Lab: EPS: Rack Power: Rack Power 2

<table>
<thead>
<tr>
<th>Rack Power 2</th>
<th>‘Rack LAB1D5’</th>
</tr>
</thead>
</table>

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

cmd LAB1D5 Pwr On

‘Rack Power LAB1D5’

Verify RPCM_LA2B_C_RPC_02 Position – Cl

27. Perform {4.302  CC MDM TRANSITION B. TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

28. Perform {4.406  INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

29. Perform {4.413  PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: C&DH: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

30. Perform {C&T AUDIO ORU POWERUP FOR AVIONICS RACK #1}, all (SODF: C&DH: TBD), then:

POST MAINTENANCE
31. Inform MCC-H of task completion.

32. √MATS for stowage location of failed MDM
Stow tools, materials.
OBJECTIVE:
Remove and replace failed Area Smoke Detector from LAB1SD5 or LAB1PD1.

LOCATION:
Installed: LAB1SD5 or LAB1PD1
Stowed: √ Maintenance and Assembly Task Supplement (MATS)

DURATION:
40 minutes

PARTS:
Area Smoke Detector (P/N 2351520-1-1)

MATERIALS:
Gray Tape

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit E:
   Ratchet, 1/4” Drive
   6” Ext, 1/4” Drive
Kit F:
   5/16” Socket, 1/4” Drive
Kit J:
   Connector Pliers

REFERENCED PROCEDURE(S):
1.402 SMOKE DETECTOR DEACTIVATION
1.401 SMOKE DETECTOR ACTIVATION

SAFING

CAUTION
Deactivate LAB1SD5 or LAB1PD1 Smoke Detectors before maintenance.

1. For LAB1SD5 or LAB1PD1, perform {1.402 SMOKE DETECTOR DEACTIVATION}, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: FDS), then:
SMOKE DETECTOR REMOVAL

Figure 1.- Smoke Detector Fasteners and Power/Data Connector.

2. If LAB1SD5: P1-W3219 ←|→ J1
   LAB1PD1: P1-W3317 ←|→ J1 (Connector Pliers)

3. Remove fasteners (four) securing failed Smoke Detector to standoff bracket (Ratchet, 1/4" Drive; 6" Ext, 1/4" Drive; 5/6" Socket, 1/4" Drive). Label, temporarily stow.

REPLACEMENT

4. Replace Smoke Detector.
   Secure fasteners (four) (Ratchet, 1/4" Drive; 6" Ext, 1/4" Drive; 5/16" Socket, 1/4" Drive).

5. If LAB1SD5: P1-W3219 →|← J1
   LAB1PD1: P1-W3317 →|← J1

CHECKOUT

6. For LAB1SD5 or LAB1PD1, perform {1.401 SMOKE DETECTOR ACTIVATION}, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: FDS), then:

CLOSEOUT

7. Inform MCC-H of task completion.

8. √MATS for stowage location of failed Smoke Detector Stow expended Smoke Detector and tools.
OBJECTIVE:
To remove and replace failed Common Cabin Air Assembly (CCAA) Inlet Fan.

LOCATION:
Installed: LAB1P6
Stowed: Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
CCAA Inlet Fan (P/N SV811840-2)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
  9/16” Socket, 3/8” Drive
Kit E:
  Ratchet, 3/8” Drive
  11” Ext, 3/8” Drive
Kit G:
  (150-1000 in-lbs) Trq Wrench, 3/8” Drive

REFERENCED PROCEDURE(S):
2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

NOTE
1. System must be transitioned to single loop MT before disabling LAB1P6 Pump Package Assembly.
2. If LAB1P6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.

1. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:
2. Perform {2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)}, all (SODF: TCS: NOMINAL), then:

Table 1. LAB1P6 TCS Equipment

<table>
<thead>
<tr>
<th>LAB1P6 TCS Equipment - PCS Labels</th>
<th>RPC [X]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB LTL SFCA SOV</td>
<td>LAP61B_A RPC 5</td>
</tr>
<tr>
<td>LAB LTL SFCA Mod Vlv</td>
<td>LAP61B_A RPC 6</td>
</tr>
<tr>
<td>LAB LTL NIA Vlv</td>
<td>LAP61B_A RPC 7</td>
</tr>
<tr>
<td>LAB LTL NIA Isol Vlv</td>
<td>LAP61B_A RPC 8</td>
</tr>
<tr>
<td>LAB LTL PPA</td>
<td>LAP61B_A RPC 18</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1P6 TCS Equipment. Refer to Table 1.

PCS

Lab: EPS: LAB1P6

Lab_Rack_LAB1P6

sel RPCM LAP61B A

RPCM_LAP61B_A

sel RPC [X]

RPCM_LAP61B_A RPC [X]

`cmd` RPC Position – Open (Verify – Op)

`cmd` Close Cmd – Inhibit (Verify – Inh)

Repeat for remaining RPCs

4. RACK POWER switch → OFF

5. Verifying LAB1P6 Rack Safed

PCS

Lab: EPS: Rack Power: Rack Power 1

Rack Power 1

‘Rack LAB1P6’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1P6’

Verify RPCM_LA1B_D_RPC_03 Position – Op
6. Depress latches (three).  
   Open left-hand faceplate of Rack LAB1P6.

REMOVAL  
Refer to Figure 1.

7. Demate connectors  
   W62-P4 ←|→ J1 (data)  
   W14-P12 ←|→ J2 (power)  
   W62-P5 ←|→ J3 (data)  

8. Unfasten top outlet air duct clamp by hand.

9. Unfasten bottom inlet air duct clamp by hand.

10. Unfasten fasteners (four) on CCAA Inlet Fan (Ratchet, 3/8" Drive; 11” Ext; 9/16” Socket).

11. Remove failed CCAA Inlet Fan from installed location and label.  
    Temporarily stow.
12. Install replacement CCAA Inlet Fan in mounting location.

13. Tighten fasteners (four) on CCAA Inlet Fan (Ratchet, 3/8” Drive; 11” Ext; 9/16” Socket).

14. Torque fasteners (four) on CCAA Inlet Fan to 240 in-lbs ((150-1000 in-lbs) Trq Wrench); 11” Ext, 3/8” Drive; 9/16” Socket).

15. Fasten top outlet air duct clamp by hand.

16. Fasten bottom inlet air duct clamp by hand.

17. Mate connectors
   - W62-P4 →|← J1 (data)
   - W14-P12 →|← J2 (power)
   - W62-P5 →|← J3 (data)

CLOSEOUT

CHECKOUT
19. RACK POWER switch → ON

20. Closing LAB1P6 RPC

PCS

Lab: EPS: Rack Power: Rack Power 1
   | Rack Power 1 |
   ‘Rack LAB1P6’

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

cmd LAB1P6 Pwr On

‘Rack Power LAB1P6’

Verify RPCM.LA1B.D_RPC.03 Position – Cl
Refer to Table 1.

```
PCS
Lab: EPS: LAB1P6
| Lab_Rack_LAB1P6 |
| sel RPCM LAP61B A |
| RPCM LAP61B A |
| sel RPC [X] |
| RPCM LAP61B A RPC [X] |
| cmd Close Cmd – Enable (Verify – Ena) |
| cmd RPC Position – Closed (Verify – Cl) |
```
Repeat for remaining RPCs

22. Perform `{2.203 LAB IATCS TRANSITION TO DUAL (AUTO)}`, all (SODF: TCS: NOMINAL), then:

```
NOTE
Operational Configuration of LAB1P6 CCAA will be determined after maintenance has been performed. If determined that LAB1P6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.
```

23. √MCC-H for operational configuration

24. If required, perform `{2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}`, all (SODF: ECLSS: NOMINAL: THC), then:

**POST MAINTENANCE**
25. Inform MCC-H of task completion.

26. √MATS for stowage location of failed CCAA Inlet Fan
Stow failed CCAA Inlet Fan, tools, materials.
OBJECTIVE:
To remove and replace failed Common Cabin Air Assembly (CCAA) Inlet Fan.

LOCATION:
Installed: LAB1S6
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
CCAA Inlet Fan (P/N SV811840-2)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
   9/16" Socket, 3/8" Drive
Kit E:
   Ratchet, 3/8" Drive
   11" Ext, 3/8" Drive
Kit G:
   (150-1000 in-lbs) Trq Wrench, 3/8" Drive

REFERENCED PROCEDURE(S):
2.204  LAB IATCS TRANSITION TO SINGLE LT (AUTO)
2.203  LAB IATCS TRANSITION TO DUAL (AUTO)
2.505  CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

NOTE
1. System must be transitioned to single loop LT before disabling LAB1S6 Pump Package Assembly.
2. If LAB1S6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.

1. If required, perform {2.505  CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:
2. Perform {2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO)}, all (SODF: TCS: NOMINAL), then:

Table 1. LAB1S6 TCS Equipment

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<tr>
<td>LAB MTL SFCA Mod Vlv</td>
<td>LAS62B_A RPC 6</td>
</tr>
<tr>
<td>LAB MTL NIA Vlv</td>
<td>LAS62B_A RPC 7</td>
</tr>
<tr>
<td>LAB MTL NIA Isol Vlv</td>
<td>LAS62B_A RPC 8</td>
</tr>
<tr>
<td>LAB MTL PPA</td>
<td>LAS62B_A RPC 18</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

4. RACK POWER switch → OFF

5. Verifying LAB1S6 Rack Safed

 PCS

Lab: EPS: LAB1S6
Lab_Rack_LAB1S6

sel RPCM LAS62B

RPCM_LAS62B

sel RPC [X]

RPCM LAS62B RPC [X]

**cmd** RPC Position – Open (Verify – Op)
**cmd** Close Cmd – Inhibit (Verify – Inh)

Repeat for remaining RPCs

PCS

Lab: EPS: Rack Power: Rack Power 3
Rack Power 3
‘Rack LAB1S6’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Op
3.2.303 CCAA INLET FAN R&R LAB1S6
(ISS IFM/5A - ALL/FIN A) Page 3 of 5 pages

**ACCESSING**
6. Depress latches (three).
   Open right-hand faceplate of Rack LAB1S6.

**REMOVAL**
Refer to Figure 1.

7. Demate connectors
   W38-P4 ←→ J1 (data)
   W5-P12 ←→ J2 (power)
   W38-P5 ←→ J3 (data)

8. Unfasten top outlet air duct clamp by hand.

9. Unfasten bottom inlet air duct clamp by hand.

10. Unfasten fasteners (four) on CCAA Inlet Fan (Ratchet, 3/8” Drive; 11” Ext;
    9/16” Socket).

11. Lift CCAA Inlet Fan off of Alignment Guides and out of rack.

Figure 1.- CCAA Inlet Fan Installation.

Fasteners (four)
Outlet Air Duct Clamp
CCAA Inlet Fan
Inlet Air Duct Clamp
Electrical Connectors (three)
REPLACEMENT
Refer to Figure 1.

12. Place replacement CCAA Inlet Fan in rack on Alignment Guides.

13. Tighten fasteners (four) on CCAA Inlet Fan (Ratchet, 3/8" Drive; 11" Ext; 9/16" Socket).


15. Fasten top outlet air duct clamp by hand.

16. Fasten bottom inlet air duct clamp by hand.

17. Mate connectors
   W38-P4 → J1 (data)
   W5-P12 → J2 (power)
   W38-P5 → J3 (data)

CLOSEOUT

CHECKOUT
19. RACK POWER switch → ON

20. Closing LAB1S6 RPC

PCS

Lab: EPS: Rack Power: Rack Power 3
   Rack Power 3
   ‘Rack LAB1S6’

   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power On’

   cmd LAB1S6 Pwr On

   ‘Rack Power LAB1S6’

   Verify RPCM_LA2B_F_RPC_01 Position – Cl
21. Close Enable, Close RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

PCS

Lab: EPS: LAB1S6
Lab_Rack_LAB1S6

sel RPCM LAS62B

RPCM_LAS62B

sel RPC [X]

RPCM LAS62B RPC [X]

**cmd** Close Cmd – Enable
**cmd** RPC Position – Closed (Verify – Cl)

Repeat for remaining RPCs

22. Perform *(2.203 LAB IATCS TRANSITION TO DUAL (AUTO)), all (SODF: TCS: NOMINAL), then:

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Configuration of LAB1S6 CCAA will be determined after maintenance has been performed. If determined that LAB1S6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.</td>
</tr>
</tbody>
</table>

23. ✓**MCC-H** for operational configuration

24. If required, perform *(2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL), all (SODF: ECLSS: NOMINAL: THC), then:

**POST MAINTENANCE**

25. Inform **MCC-H** of task completion.

26. ✓**MATS** for stowage location of failed CCAA Inlet Fan
Stow failed CCAA Inlet Fan, tools, materials.
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OBJECTIVE:
To remove and replace failed Common Cabin Air Assembly (CCAA) Electrical Interface Box (EIB).

LOCATION:
Installed: LAB1P6
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Electrical Interface Box (P/N SV806488-1)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
ISS Common IVA Tool Kit:
Kit C:
   7/16" Socket, 3/8" Drive
Kit D:
   5/32” Hex Head, 1/4” Drive
   3/8” Hex Head, 3/8” Drive
Kit E:
   Ratchet, 3/8” Drive
   Speed Handle
   3/8” to 1/4” Adapter
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8” Drive

REFERENCED PROCEDURE(S):
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)
2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)
1.201 LAB RACK ROTATE
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

NOTE
1. System must be transitioned to single loop MT before disabling LAB1P6 Pump Package Assembly.
2. If LAB1P6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.
1. If required, perform (2.505  CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL), all (SODF: ECLSS: NOMINAL: THC), then:

2. Perform (2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)), all (SODF: TCS: NOMINAL), then:

<table>
<thead>
<tr>
<th>LAB1P6 TCS Equipment - PCS Labels</th>
<th>RPC [X]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB LTL SFCA SOV</td>
<td>LAP61B_A RPC 5</td>
</tr>
<tr>
<td>LAB LTL SFCA Mod Vlv</td>
<td>LAP61B_A RPC 6</td>
</tr>
<tr>
<td>LAB LTL NIA Vlv</td>
<td>LAP61B_A RPC 7</td>
</tr>
<tr>
<td>LAB LTL NIA Isol Vlv</td>
<td>LAP61B_A RPC 8</td>
</tr>
<tr>
<td>LAB LTL PPA</td>
<td>LAP61B_A RPC 18</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1P6 TCS Equipment. Refer to Table 1.

4. RACK POWER switch → OFF
3.2.304 CCAA ELECTRICAL INTERFACE BOX R&R LAB1P6

5. Verifying LAB1P6 Rack Safed

PCS
Lab: EPS: Rack Power: Rack Power 1
Rack Power 1
‘Rack LAB1P6’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1P6’

Verify RPCM_LA1B_D_RPC_03 Position – Op

ACCESSING
6. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

7. Remove rack rear access panel, fasteners (forty four) (Speed Handle; 1/4” to 3/8” Adapter; 5/32” Hex Head). Temporarily stow.

Figure 1.- Electrical Interface Box (Rear View of Rack).
8. Demate connectors from EIB (refer to Figure 1).
   W14-P10 ←→ J1
   W62-P2 ←→ J2
   W62-P1 ←→ J3

9. Remove Cross Brace under EIB (tool TBD).

10. Unfasten rear EIB fasteners (four) (Ratchet, 3/8" Drive; 7/16" Socket).
    Refer to Figure 2.

11. Remove EIB from rack.

**REPLACEMENT**

12. Install replacement EIB in rack.

13. Torque EIB fasteners (four) to 70 in-lbs ((30-200 in-lbs) Trq Wrench;
    7/16" Socket, 3/8" Drive).
    Refer to Figure 1.

14. Mate connectors to EIB (refer to Figure 1).
    W14-P10 ←→ J1
    W62-P2 ←→ J2
    W62-P1 ←→ J3

15. Install rack rear access panel, fasteners (forty four) (Speed Handle; 1/4" to 3/8" Adapter; 5/32" Hex Head).

16. Perform **1.201 LAB RACK ROTATE**, Rotate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

**CHECKOUT**

17. RACK POWER switch → ON

18. Closing LAB1P6 RPC

**PCS**

Lab: EPS: Rack Power: Rack Power 1

[**Rack Power 1**]

‘Rack LAB1P6’

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

**cmd** LAB1P6 Pwr On

‘Rack Power LAB1P6’

Verify RPCM_LA1B_D_RPC_03 Position – Cl
19. Close Enable, Close RPCs for LAB1P6 TCS Equipment. Refer to Table 1.

**PCS**

<table>
<thead>
<tr>
<th>Lab: EPS: LAB1P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab_Rack_LAB1P6</td>
</tr>
</tbody>
</table>

sel RPCM LAP61B A

**RPCM_LAP61B_A**

sel RPC [X]

**RPCM LAP61B A RPC [X]**

**cmd** RPC Close Command – Enable (Verify – Ena)

**cmd** RPC Position – Closed (Verify – Cl)

Repeat for remaining RPCs

20. Perform **{2.203 LAB IATCS TRANSITION TO DUAL (AUTO)}**, all (SODF: TCS: NOMINAL), then:

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Configuration of LAB1P6 CCAA will be determined after maintenance has been performed. If determined that LAB1P6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.</td>
</tr>
</tbody>
</table>

21. √**MCC-H** for operational configuration

22. If required, perform **{2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}**, all (SODF: ECLSS: NOMINAL: THC), then:

**POST MAINTENANCE**

23. Inform **MCC-H** of task completion.

24. √**MATS** for stowage location of failed EIB

Stow failed EIB, tools, materials.
OBJECTION:
To remove and replace failed Common Cabin Air Assembly (CCAA) Electrical Interface Box (EIB).

LOCATION:
Installed: LAB1S6
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Electrical Interface Box (P/N SV806488-3)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
ISS Common IVA Tool Kit:
Kit C:
   7/16" Socket, 3/8" Drive
Kit D:
   5/32" Hex Head, 1/4" Drive
   3/8" Hex Head, 3/8" Drive
Kit E:
   Ratchet, 3/8" Drive
   Speed Handle
   3/8" to 1/4" Adapter
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive

REFERENCED PROCEDURE(S):
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)
2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO)
1.201 LAB RACK ROTATE
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL
SAFING

WARNING

Failure to remove power can result in electrical shock hazard.

NOTE

1. System must be transitioned to single loop LT before disabling LAB1S6 Pump Package Assembly.

2. If LAB1S6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.

1. If required, perform [2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL], all (SODF: ECLSS: NOMINAL: THC), then:

2. Perform [2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO)], all (SODF: TCS: NOMINAL), then:

Table 1. LAB1S6 TCS Equipment

<table>
<thead>
<tr>
<th>LAB1S6 TCS Equipment - PCS Labels</th>
<th>RPC [X]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB MTL SFCA SOV</td>
<td>LAS62B_A RPC 5</td>
</tr>
<tr>
<td>LAB MTL SFCA Mod Vlv</td>
<td>LAS62B_A RPC 6</td>
</tr>
<tr>
<td>LAB MTL NIA Vlv</td>
<td>LAS62B_A RPC 7</td>
</tr>
<tr>
<td>LAB MTL NIA Isol Vlv</td>
<td>LAS62B_A RPC 8</td>
</tr>
<tr>
<td>LAB MTL PPA</td>
<td>LAS62B_A RPC 18</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

4. RACK POWER switch → OFF
5. Verifying LAB1S6 Rack Safed

PCS

<table>
<thead>
<tr>
<th>Lab: EPS: Rack Power: Rack Power 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rack Power 3</td>
</tr>
<tr>
<td>‘Rack LAB1S6’</td>
</tr>
</tbody>
</table>

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Op

ACCESSING

6. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

7. Remove rack rear access panel, fasteners (forty four) (Speed Handle; 1/4” to 3/8” Adapter; 5/32” Hex Head).
Temporarily stow.

Figure 1.- Electrical Interface Box (Rear View of Rack).
8. Demate connectors from EIB (refer to Figure 1).
   W5-P10 ←|→ J1
   W38-P2 ←|→ J2
   W38-P1 ←|→ J3

9. Remove Cross Brace under EIB (tool TBD).

10. Unfasten rear EIB fasteners (four) (Ratchet, 3/8" Drive; 7/16" Socket).
    Refer to Figure 2.

11. Remove EIB from rack.

**REPLACEMENT**

12. Install replacement EIB in rack.

13. Torque EIB fasteners (four) to 70 in-lbs ((30-200 in-lbs) Trq Wrench; 7/16" Socket, 3/8" Drive).
    Refer to Figure 2.

14. Mate connectors to EIB (refer to Figure 1).
    W5-P10 ←|→ J1
    W38-P2 ←|→ J2
    W38-P1 ←|→ J3

15. Install rack rear access panel, fasteners (forty four) (Speed Handle; 1/4" to 3/8" Adapter; 5/32" Hex Head).

16. Perform [1.201 LAB RACK ROTATE], Rotate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

**CHECKOUT**

17. RACK POWER switch → ON

18. Closing LAB1S6 RPC

PCS
Lab: EPS: Rack Power: Rack Power 3
   Rack Power 3
   ‘Rack LAB1S6’

Verify Switch Position  – On
Verify Switch Avail     – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

**cmd LAB1S6 Pwr On**

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Cl
19. Close Enable, Close RPCs for LAB1S6 TCS Equipment. 
   Refer to Table 1.

PCS  
Lab: EPS: LAB1S6
   Lab_Rack_LAB1S6
   sel RPCM LAS62B
   RPCM_LAS62B
   sel RPC [X]
   RPCM LAS62B RPC [X]
   cmd Close Cmd – Enable
   cmd RPC Position – Closed (Verify – Cl)

Repeat for remaining RPCs

20. Perform {2.203 LAB IATCS TRANSITION TO DUAL (AUTO)}, all (SODF: 
   TCS: NOMINAL), then:

   NOTE
   Operational Configuration of LAB1S6 CCAA will be determined 
   after maintenance has been performed. If determined that 
   LAB1S6 CCAA will be turned on, CCAA Heat Exchanger Dryout 
   for Microbial Control must be performed.

21. √MCC-H for operational configuration

22. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR 
   MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:

   POST MAINTENANCE
   23. Inform MCC-H of task completion.

24. √MATS for stowage location of failed EIB
   Stow failed EIB, tools, materials.
OBJECTIVE:
To remove and replace failed Common Cabin Air Assembly (CCAA) Heat Exchanger.

LOCATION:
Installed: LAB1P6
Stowed: √
Maintenance and Assembly Task Supplement (MATS)

DURATION:
2 hours

PARTS:
Heat Exchanger (P/N SV813900-1)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
  9/16" Socket, 3/8" Drive
Kit D:
  5/32" Hex Head, 3/8" Drive
Kit E:
  Ratchet, 3/8" Drive
  Speed Handle
  6" Ext, 3/8" Drive
  1/4" to 3/8" Adapter
Kit G:
  (150-1000 in-lbs) Trq Wrench, 3/8" Drive

REFERENCED PROCEDURE(S):
CCAA TEMPERATURE SENSOR R&R LAB1P6
3.2.308 CCAA TEMPERATURE CONTROL CHECK VALVE R&R LAB1P6
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)
2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)
1.201 LAB RACK ROTATE
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.
NOTE
1. System must be transitioned to single loop MT before disabling LAB1P6 Pump Package Assembly.
2. If LAB1P6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.

1. If required, perform [2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL], all (SODF: ECLSS: NOMINAL: THC), then:

2. Perform [2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)], all (SODF: TCS: NOMINAL), then:

Table 1. LAB1P6 TCS Equipment

<table>
<thead>
<tr>
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</thead>
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<td>LAB LTL SFCA Mod Vlv</td>
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</tr>
<tr>
<td>LAB LTL NIA Vlv</td>
<td>LAP61B_A RPC 7</td>
</tr>
<tr>
<td>LAB LTL NIA Isol Vlv</td>
<td>LAP61B_A RPC 8</td>
</tr>
<tr>
<td>LAB LTL PPA</td>
<td>LAP61B_A RPC 18</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1P6 TCS Equipment. Refer to Table 1.

4. RACK POWER switch → OFF

5. Verifying LAB1P6 Rack Safe
3.2.306 CCAA HEAT EXCHANGER R&R LAB1P6

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Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1P6’

Verify RPCM_LA1B_D_RPC_03 Position – Op

ACCESSING
6. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

7. Remove rack rear access panel, fasteners (forty four) (Speed Handle; 1/4” to 3/8” Adapter; 5/32” Hex Head). Temporarily stow.

REMOVAL

Figure 1.- LAB1P6 (Rear View).

```
NOTE
Use Dry Wipes to remove any excess moisture from demated QDs.
```

9. Demate connectors (refer to Figure 1).
- Slurper Line QD, A ←|→ Water Separator
- Air Return Line QD, B ←|→ Water Separator
- ARS draw port QD ←|→ Heat Exchanger
- Coolant Inlet QD (top) ←|→ Heat Exchanger
- Coolant Outlet QD (bottom) ←|→ Heat Exchanger

10. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

11. Depress latches (three).
    Open left-hand faceplate of Rack LAB1P6.

12. Perform {3.2.308 CCAA TEMPERATURE CONTROL CHECK VALVE R&R LAB1P6}, Removal steps only (SODF: ISS IFM: LAB: ECLSS), then:
    Temporarily stow.

13. Perform {CCAA TEMPERATURE SENSOR R&R LAB1P6}, Removal steps only (SODF: ISS IFM: LAB: ECLSS), then:
    Temporarily stow.
14. Unfasten bottom Heat Exchanger Inlet Air Coupling V-Band Clamp by hand. Refer to Figure 3.

15. Unfasten top Heat Exchanger Outlet Air Coupling V-Band Clamp by hand. Refer to Figure 3.

16. Unfasten Heat Exchanger fasteners (four) (Ratchet, 3/8" Drive; 6" Ext; 9/16" Socket). Refer to Figure 3.


REPLACEMENT

19. Align, tighten Heat Exchanger fasteners (four) (Ratchet, 3/8" Drive; 6" Ext; 9/16" Socket). Refer to Figure 3.
20. Torque Heat Exchanger fasteners (four) to 250 in-lbs ((150-1000 in-lbs) Trq Wrench; 6" Ext, 3/8" Drive; 9/16" Socket). Refer to Figure 3.

21. Fasten bottom Heat Exchanger Inlet Air Coupling V-Band Clamp by hand. Refer to Figure 3.

22. Fasten top Heat Exchanger Outlet Air Coupling V-Band Clamp by hand. Refer to Figure 3.

23. Perform [3.2.308 CCAA TEMPERATURE CONTROL CHECK VALVE R&R LAB1P6], Replacement steps only (SODF: ISS IFM: LAB: ECLSS), then:

24. Perform [CCAA TEMPERATURE SENSOR R&R LAB1P6], Replacement steps only (SODF: ISS IFM: LAB: ECLSS), then:


26. Perform [1.201 LAB RACK ROTATE], Rotate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

27. Mate connectors (refer to Figure 1).
   Coolant Inlet QD (top) →|← Heat Exchanger
   Coolant Outlet QD (bottom) →|← Heat Exchanger
   ARS draw port QD →|← Heat Exchanger
   Slurper line QD, A →|← Water Separator
   Air Return line QD, B →|← Water Separator


CLOSEOUT
29. Install rack rear access panel, snug fasteners (forty four) (Speed Handle; 1/4" to 3/8" Adapter; 5/32" Hex Head).

30. Perform [1.201 LAB RACK ROTATE], Rotate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

CHECKOUT
31. RACK POWER switch → ON

32. Closing LAB1P6 RPC

PCS
Lab: EPS: Rack Power: Rack Power 1
Rack Power 1
Rack LAB1P6

10 DEC 00  472
3.2.306 CCAA HEAT EXCHANGER R&R LAB1P6

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Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

**cmd** LAB1P6 Pwr On

‘Rack Power LAB1P6’

Verify RPCM_LA1B_D_RPC_03 Position – Cl

33. Close Enable, Close RPCs for LAB1P6 TCS Equipment.
Refer to Table 1.

```
PCS
Lab: EPS: LAB1P6
Lab_Rack_LAB1P6

  sel RPCM LAP61B A

  RPCM_LAP61B_A

  sel RPC [X]

  RPCM LAP61B A RPC [X]

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

Repeat for remaining RPCs
```

34. Perform **{2.203 LAB IATCS TRANSITION TO DUAL (AUTO)}**, all (SODF: TCS: NOMINAL), then:

```
**NOTE**
Operational Configuration of LAB1P6 CCAA will be determined after maintenance has been performed. If determined that LAB1P6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.
```

35. √MCC-H for operational configuration

36. If required, perform **{2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}**, all (SODF: ECLSS: NOMINAL: THC), then:

**POST MAINTENANCE**

37. Inform **MCC-H** of task completion.

38. √MATS for stowage location of failed CCAA Heat Exchanger
Stow failed CCAA Heat Exchanger, tools, materials.
OBJECTIVE:
To remove and replace failed Common Cabin Air Assembly (CCAA) Heat Exchanger.

LOCATION:
Installed: LAB1S6
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
2 hours

PARTS:
Heat Exchanger (P/N SV813900-1)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
   9/16" Socket, 3/8" Drive
Kit D:
   5/32" Hex Head, 3/8" Drive
Kit E:
   Ratchet, 3/8" Drive
   Speed Handle
   6" Ext, 3/8" Drive
   1/4" to 3/8" Adapter
Kit G:
   (150-1000 in-lbs) Trq Wrench, 3/8" Drive

REFERENCED PROCEDURE(S):
CCAA TEMPERATURE SENSOR R&R LAB1S6
3.2.309 CCAA TEMPERATURE CONTROL CHECK VALVE R&R LAB1S6
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)
2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO)
1.201 LAB RACK ROTATE
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.
NOTE

1. System must be transitioned to single loop LT before disabling LAB1S6 Pump Package Assembly.

2. If LAB1S6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.

1. If required, perform [2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL], all (SODF: ECLSS: NOMINAL: THC), then:

2. Perform [2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO)], all (SODF: TCS: NOMINAL), then:

Table 1. LAB1S6 TCS Equipment

<table>
<thead>
<tr>
<th>LAB1S6 TCS Equipment - PCS Labels</th>
<th>RPC [X]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB MTL SFCA SOV</td>
<td>LAS62B_A RPC 5</td>
</tr>
<tr>
<td>LAB MTL SFCA Mod Vlv</td>
<td>LAS62B_A RPC 6</td>
</tr>
<tr>
<td>LAB MTL NIA Vlv</td>
<td>LAS62B_A RPC 7</td>
</tr>
<tr>
<td>LAB MTL NIA Isol Vlv</td>
<td>LAS62B_A RPC 8</td>
</tr>
<tr>
<td>LAB MTL PPA</td>
<td>LAS62B_A RPC 18</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

PCS

Lab: EPS: LAB1S6
Lab_Rack_LAB1S6

sel RPCM LAS62B

RPCM_LAS62B

sel RPC [X]

RPCM LAS62B RPC [X]

**cmd** RPC Position – Open (Verify – Op)

**cmd** Close Cmd – Inhibit (Verify – Inh)

Repeat for remaining RPCs

4. RACK POWER switch → OFF

5. Verifying LAB1S6 Rack Safed

PCS

Lab: EPS: Rack Power: Rack Power 3
Rack Power 3
‘Rack LAB1S6’
Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Op

**ACCESSING**

6. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

7. Remove rack rear access panel, fasteners (forty four) (Speed Handle; 1/4” to 3/8” Adapter; 5/32” Hex Head). Temporarily stow.

**REMOVAL**

![Image](image_url)

Figure 1. - LAB1S6 (Rear View).

9. Demate connectors (refer to Figure 1).

<table>
<thead>
<tr>
<th>Slurper line QD, A</th>
<th>Water Separator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Return line QD, B</td>
<td>Water Separator</td>
</tr>
<tr>
<td>ARS draw port QD</td>
<td>Heat Exchanger</td>
</tr>
<tr>
<td>Coolant Inlet QD (top)</td>
<td>Heat Exchanger</td>
</tr>
<tr>
<td>Coolant Outlet QD (bottom)</td>
<td>Heat Exchanger</td>
</tr>
</tbody>
</table>

10. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:


12. Perform {3.2.309 CCAA TEMPERATURE CONTROL CHECK VALVE R&R LAB1S6}, Removal steps only (SODF: ISS IFM: LAB: ECLSS), then: Temporarily stow.

13. Perform {CCAA TEMPERATURE SENSOR R&R LAB1S6}, Removal steps only (SODF: ISS IFM: LAB: ECLSS), then: Temporarily stow.
14. Unfasten bottom Heat Exchanger Inlet Air Coupling V-Band Clamp by hand. Refer to Figure 3.

15. Unfasten top Heat Exchanger Outlet Air Coupling V-Band Clamp by hand. Refer to Figure 3.

16. Unfasten Heat Exchanger fasteners (four) (Ratchet, 3/8" Drive; 6" Ext; 9/16" Socket). Refer to Figure 3.


**REPLACEMENT**


19. Align, tighten Heat Exchanger fasteners (four) (Ratchet, 3/8" Drive; 6" Ext; 9/16" Socket). Refer to Figure 3.
20. Torque Heat Exchanger fasteners (four) to 250 in-lbs ((150-1000 in-lbs) Trq Wrench; 6” Ext, 3/8” Drive; 9/16” Socket).
   Refer to Figure 3.

21. Fasten bottom Heat Exchanger Inlet Air Coupling V-Band Clamp by hand.
   Refer to Figure 3.

22. Fasten Heat Exchanger Outlet Air Coupling V-Band Clamp by hand.
   Refer to Figure 3.

23. Perform {3.2.309  CCAA TEMPERATURE CONTROL CHECK VALVE R&R LAB1S6}, Replacement steps only (SODF: ISS IFM: LAB: ECLSS), then:

24. Perform {CCAA TEMPERATURE SENSOR R&R LAB1S6}, Replacement steps only (SODF: ISS IFM: LAB: ECLSS), then:


26. Perform {1.201  LAB RACK ROTATE}, Rotate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

27. Mate connectors (refer to Figure 1).
   Coolant Inlet QD (top) →|← Heat Exchanger
   Coolant Outlet QD (bottom) →|← Heat Exchanger
   ARS draw port QD →|← Heat Exchanger
   Slurper line QD, A →|← Water Separator
   Air Return line QD, B →|← Water Separator


CLOSEOUT
29. Install rack rear access panel, tighten fasteners (forty four) (Speed Handle; 1/4” to 3/8” Adapter; 5/32” Hex Head).

30. Perform {1.201  LAB RACK ROTATE}, Rotate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

CHECKOUT
31. RACK POWER switch → ON

32. Closing LAB1S6 RPC

PCS
| Lab: EPS: Rack Power: Rack Power 3
| Rack Power 3 |
| ‘Rack LAB1S6’ |

10 DEC 00  480  8462.doc
3.2.307 CCAA HEAT EXCHANGER R&R LAB1S6

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

\textbf{cmd} LAB1S6 Pwr On

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Cl

33. Close Enable, Close RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

34. Perform \textit{[2.203 LAB IATCS TRANSITION TO DUAL (AUTO)]}, all (SODF: TCS: NOMINAL), then:

\begin{center}
\textbf{NOTE}
Operational Configuration of LAB1S6 CCAA will be determined after maintenance has been performed. If determined that LAB1S6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.
\end{center}

35. \textbf{\checkmark MCC-H} for operational configuration

36. If required, perform \textit{[2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL]}, all (SODF: ECLSS: NOMINAL: THC), then:

\textbf{POST MAINTENANCE}
37. Inform \textbf{MCC-H} of task completion.

38. \textbf{\checkmark MATS} for stowage location of failed CCAA Heat Exchanger
Stow failed CCAA Heat Exchanger, tools, materials.
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OBJECTIVE:
To remove and replace failed Common Cabin Air Assembly (CCAA) Temperature Control Check Valve (TCCV).

LOCATION:
Installed: LAB1P6
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Temperature Control Check Valve (TCCV) (P/N SV805626-1)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
   7/16" Socket, 3/8" Drive
Kit E:
   Ratchet, 3/8" Drive
   6" Ext, 3/8" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive

REFERENCED PROCEDURE(S):
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)
2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

NOTE
1. System must be transitioned to single loop MT before disabling LAB1P6 Pump Package Assembly.
2. If LAB1P6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.

1. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:
2. Perform \textit{2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)}}, all
(SODF: TCS: NOMINAL), then:

Table 1. LAB1P6 TCS Equipment

<table>
<thead>
<tr>
<th>LAB1P6 TCS Equipment - PCS Labels</th>
<th>RPC [X]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB LTL SFCA SOV</td>
<td>LAP61B_A RPC 5</td>
</tr>
<tr>
<td>LAB LTL SFCA Mod Vlv</td>
<td>LAP61B_A RPC 6</td>
</tr>
<tr>
<td>LAB LTL NIA Vlv</td>
<td>LAP61B_A RPC 7</td>
</tr>
<tr>
<td>LAB LTL NIA Isol Vlv</td>
<td>LAP61B_A RPC 8</td>
</tr>
<tr>
<td>LAB LTL PPA</td>
<td>LAP61B_A RPC 18</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1P6 TCS Equipment.
Refer to Table 1.

4. RACK POWER switch \(\rightarrow\) OFF

5. Verifying LAB1P6 Rack Safed

6. Depress latches (three).
Open left-hand faceplate of Rack LAB1P6.
REMVAL
Refer to Figure 1.

7. Demate connectors.
   Power W62-P3 ←|→ J1
   Data W14-P11 ←|→ J2

8. Unfasten TCCV fasteners (six) (Ratchet, 3/8" Drive; 6" Ext; 7/16" Socket).

9. Remove TCCV by sliding off of alignment pins.
   Label, temporarily stow.

REPLACEMENT
Refer to Figure 1.

10. Install replacement TCCV by sliding onto alignment pins.

11. Tighten TCCV fasteners (six) (Ratchet, 3/8" Drive; 6" Ext; 7/16" Socket).

12. Torque TCCV fasteners (six) to 65 in-lbs ((30-200 in-lbs) Trq Wrench; 6" Ext, 3/8" Drive; 7/16" Socket).
3.2.308 CCAA TEMPERATURE CONTROL CHECK VALVE R&R LAB1P6

13. Mate connectors.
   Power W62-P3 → J1
   Data W14-P11 → J2

CLOSEOUT

CHECKOUT
15. RACK POWER switch → ON

16. Closing LAB1P6 RPC

PCS
Lab: EPS: Rack Power: Rack Power 1
   Rack Power 1
   ‘Rack LAB1P6’

   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power On’

   cmd LAB1P6 Pwr On
   ‘Rack Power LAB1P6’

   Verify RPCM_LA1B_D_RPC_03 Position – Cl

17. Close Enable, Close RPCs for LAB1P6 TCS Equipment.
    Refer to Table 1.

PCS
Lab: EPS: LAB1P6
   Lab_Rack_LAB1P6
   sel RPCM LAP61B A
   RPCM LAP61B_A
   sel RPC [X]
   RPCM LAP61B A RPC [X]

   cmd Close Cmd – Enable (Verify – Ena)
   cmd RPC Position – Closed (Verify – Cl)

   Repeat for remaining RPCs

18. Perform {2.203 LAB IATCS TRANSITION TO DUAL (AUTO)}, all (SODF: TCS: NOMINAL), then:
NOTE
Operational Configuration of LAB1P6 CCAA will be determined after maintenance has been performed. If determined that LAB1P6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.

19. √MCC-H for operational configuration

20. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:

POST MAINTENANCE

22. √MATS for stowage location of failed CCAA Temperature Control Check Valve
   Stow failed CCAA Temperature Control Check Valve, tools, materials.
OBJECTIVE:
To remove and replace failed Common Cabin Air Assembly (CCAA) Temperature Control Check Valve (TCCV).

LOCATION:
Installed: LAB1S6
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Temperature Control Check Valve (TCCV) (P/N SV805626-1)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
  7/16" Socket, 3/8" Drive
Kit E:
  Ratchet, 3/8" Drive
  6" Ext, 3/8" Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8" Drive

REFERENCED PROCEDURE(S):
2.203  LAB IATCS TRANSITION TO DUAL (AUTO)
2.204  LAB IATCS TRANSITION TO SINGLE LT (AUTO)
2.505  CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

NOTE
1. System must be transitioned to single loop LT before disabling LAB1S6 Pump Package Assembly.
2. If LAB1S6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.

1. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:
2. Perform \{2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO)\}, all (SODF: TCS: NOMINAL), then:

Table 1. LAB1S6 TCS Equipment

<table>
<thead>
<tr>
<th>LAB1S6 TCS Equipment - PCS Labels</th>
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</tr>
<tr>
<td>LAB MTL SFCA Mod Vlv</td>
<td>LAS62B_A RPC 6</td>
</tr>
<tr>
<td>LAB MTL NIA Vlv</td>
<td>LAS62B_A RPC 7</td>
</tr>
<tr>
<td>LAB MTL NIA Isol Vlv</td>
<td>LAS62B_A RPC 8</td>
</tr>
<tr>
<td>LAB MTL PPA</td>
<td>LAS62B_A RPC 18</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

4. RACK POWER switch → OFF

5. Verifying LAB1S6 Rack Safed

---

**PCS**

Lab: EPS: LAB1S6

Lab_Rack_LAB1S6

sel RPCM LAS62B

RPCM_LAS62B

sel RPC [X]

RPCM LAS62B RPC [X]

**cmd** RPC Position – Open (Verify – Op)

**cmd** Close Cmd – Inhibit (Verify – Inh)

Repeat for remaining RPCs

4. RACK POWER switch → OFF

5. Verifying LAB1S6 Rack Safed

**PCS**

Lab: EPS: Rack Power: Rack Power 3

Rack Power 3

‘Rack LAB1S6’

Verify Switch Position – Off

Verify Switch Avail – Yes

Verify Monitoring Status – Ena

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Op
ACCESSING
6. Depress latches (three).
   Open right-hand faceplate of Rack LAB1S6.

REMOVAL
Refer to Figure 1.

7. Demate connectors
   Power W38-P3 ←|→ J1
   Data W5-P11 ←|→ J2

8. Unfasten TCCV fasteners (six) (Ratchet, 3/8" Drive; 6" Ext; 7/16" Socket).

9. Remove TCCV by sliding off of alignment pins.
   Label, temporarily stow.

REPLACEMENT
Refer to Figure 1.

10. Install replacement TCCV by sliding onto alignment pins.

11. Tighten TCCV fasteners (six) (Ratchet, 3/8" Drive; 6" Ext; 7/16" Socket).
12. Torque TCCV fasteners (six) to 65 in-lbs ((30-200 in-lbs) Trq Wrench; 6" Ext, 3/8" Drive; 7/16" Socket).

13. Mate connectors
   - Power W38-P3 $\rightarrow$ J1
   - Data W5-P11 $\rightarrow$ J2

**CLOSEOUT**

**CHECKOUT**
15. RACK POWER switch $\rightarrow$ ON

**PCS**
16. Closing LAB1S6 RPC

   Lab: EPS: Rack Power: Rack Power 3
   **Rack Power 3**
   ‘Rack LAB1S6’
   
   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena
   ‘Rack Power On’

   **cmd** LAB1S6 Pwr On
   ‘Rack Power LAB1S6’

   Verify RPCM_LA2B_F_RPC_01 Position – Cl

17. Close Enable, Close RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

   **PCS**
   Lab: EPS: LAB1S6
   **Lab_Rack_LAB1S6**
   
   sel RPCM LAS62B
   **RPCM_LAS62B**
   
   sel RPC [X]
   **RPCM LAS62B RPC [X]**

   **cmd** Close Cmd – Enable
   **cmd** RPC Position – Closed (Verify – Cl)

   Repeat for remaining RPCs
18. Perform \{2.203 LAB IATCS TRANSITION TO DUAL (AUTO)\}, all (SODF: TCS: NOMINAL), then:

**NOTE**
Operational Configuration of LAB1S6 CCAA will be determined after maintenance has been performed. If determined that LAB1S6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.

19. √**MCC-H** for operational configuration

20. If required, perform \{2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL\}, all (SODF: ECLSS: NOMINAL: THC), then:

**POST MAINTENANCE**
21. Inform **MCC-H** of task completion.

22. √**MATS** for stowage location of failed CCAA Temperature Control Check Valve
   Stow failed CCAA Temperature Control Check Valve, tool, materials.
OBJECTIVE:
To remove and replace failed Common Cabin Air Assembly (CCAA) Water Separator.

LOCATION:
Installed: LAB1P6
Stowed: √

Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Water Separator (P/N SV813920-2)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
ISS Common IVA Tool Kit:
Kit C:
  9/16” Socket, 3/8” Drive
Kit D:
  5/32” Hex Head, 1/4” Drive
  3/8” Hex Head, 3/8” Drive
Kit E:
  Ratchet, 3/8” Drive
  Speed Handle
  3/8” to 1/4” Adapter
  4” Ext, 3/8” Drive
Kit G:
  (150-1000 in-lbs) Trq Wrench, 3/8” Drive

REFERENCED PROCEDURE(S):
2.203  LAB IATCS TRANSITION TO DUAL (AUTO)
2.205  LAB IATCS TRANSITION TO SINGLE MT (AUTO)
1.201  LAB RACK ROTATE
2.505  CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

NOTE
1. System must be transitioned to single loop MT before disabling LAB1P6 Pump Package Assembly.
2. If LAB1P6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.
1. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:

2. Perform {2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)}, all (SODF: TCS: NOMINAL), then:

Table 1. LAB1P6 TCS Equipment

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<tr>
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<th>RPC [X]</th>
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</thead>
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<td>LAP61B_A RPC 7</td>
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<td>LAB LTL NIA Isol Vlv</td>
<td>LAP61B_A RPC 8</td>
</tr>
<tr>
<td>LAB LTL PPA</td>
<td>LAP61B_A RPC 18</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1P6 TCS Equipment. Refer to Table 1.

4. RACK POWER switch → OFF

5. Verifying LAB1P6 Rack Safed

PCS

<table>
<thead>
<tr>
<th>Lab: EPS: LAB1P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab_Rack_LAB1P6</td>
</tr>
</tbody>
</table>

sel RPCM LAP61B A

| RPCM LAP61B_A |

sel RPC [X]

| RPCM LAP61B_A RPC [X] |

**cmd** RPC Position – Open (Verify – Op)

**cmd** Close Cmd – Inhibit (Verify – Inh)

Repeat for remaining RPCs

4. RACK POWER switch → OFF

5. Verifying LAB1P6 Rack Safed

PCS

<table>
<thead>
<tr>
<th>Lab: EPS: Rack Power: Rack Power 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Rack Power 1’</td>
</tr>
<tr>
<td>‘Rack LAB1P6’</td>
</tr>
</tbody>
</table>

Verify Switch Position – Off

Verify Switch Avail – Yes

Verify Monitoring Status – Ena

‘Rack Power LAB1P6’

Verify RPCM_LA1B_D_RPC_03 Position – Op
6. Perform {1.201  LAB RACK ROTATE}, ROTATE RACK DOWN steps only (SODF: S&M: NOMINAL: RACK), then:

7. Remove rack rear access panel, fasteners (forty four) (Speed Handle; 1/4” to 3/8” Adapter; 5/32” Hex Head). Temporarily stow.

Figure 1.- Water Separator Connector and Fastener Locations.
8. Demate connectors from Water Separator (refer to Figure 1).
   W62-P8 ←|→ J1
   W14-P13 ←|→ J2

9. Demate by hand
   Slurper Line
   Condensate Air Inlet
   Condensate Air Outlet

10. Unfasten Water Separator fasteners (three) (Ratchet, 3/8" Drive; 4" Ext;
    9/16" Socket).
    Refer to Figure 1.

11. Remove Water Separator from rack.

**REPLACEMENT**
12. Install replacement Water Separator in rack.

13. Torque fasteners (three) to 240 in-lbs ((150-1000 in-lbs) Trq Wrench;
    4" Ext; 9/16" Socket, 3/8" Drive).
    Refer to Figure 1.

14. Mate connectors to Water Separator.
    W14-P13 →|← J2
    W62-P8 →|← J1

15. Mate by hand
    Slurper Line
    Condensate Air Inlet
    Condensate Air Outlet

16. Install rack rear access panel, fasteners (forty four) (Speed Handle;
    1/4" to 3/8" Adapter; 5/32" Hex Head).

17. Perform {1.201 LAB RACK ROTATE }, ROTATE RACK UP steps only
    (SODF: S&M: NOMINAL: RACK), then:

**CHECKOUT**
18. RACK POWER switch → ON

19. Closing LAB1P6 RPC

   PCS
   Lab: EPS: Rack Power: Rack Power 1
   Rack Power 1
   ‘Rack LAB1P6’
   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena
3.2.310 CCAA WATER SEPARATOR R&R LAB1P6
(ISS IFM/5A - ALL/FIN A) Page 5 of 6 pages

‘Rack Power On’

\textbf{cmd} LAB1P6 Pwr On

‘Rack Power LAB1P6’

Verify RPCM\_LA1B\_D\_RPC\_03 Position – Cl

\begin{table}[h]
\centering
\begin{tabular}{|l|l|}
\hline
LAB1P6 TCS Equipment - PCS Labels & RPC [X] \\
\hline
LAB LTL SFCA SOV & LAP61B\_A RPC 5 \\
LAB LTL SFCA Mod Vlv & LAP61B\_A RPC 6 \\
LAB LTL NIA Vlv & LAP61B\_A RPC 7 \\
LAB LTL NIA Isol Vlv & LAP61B\_A RPC 8 \\
LAB LTL PPA & LAP61B\_A RPC 18 \\
\hline
\end{tabular}
\caption{LAB1P6 TCS Equipment}
\end{table}

20. Close Enable, Close RPCs for LAB1P6 TCS Equipment. Refer to Table 2.

\begin{enumerate}
\item \textbf{PCS} Lab: EPS: LAB1P6
\item \textbf{Lab\_Rack\_LAB1P6}
\item \textbf{sel RPCM LAP61B A}
\item \textbf{RPCM\_LAP61B\_A}
\item \textbf{sel RPC [X]}
\item \textbf{RPCM LAP61B A RPC [X]}
\item \textbf{cmd} Close Cmd – Enable (Verify – Ena)
\item \textbf{cmd} RPC Position – Closed (Verify – Cl)
\end{enumerate}

Repeat for remaining RPCs

21. Perform \{2.203 LAB IATCS TRANSITION TO DUAL (AUTO)\}, all (SODF: TCS: NOMINAL), then:

\begin{table}[h]
\centering
\begin{tabular}{|l|}
\hline
\textbf{NOTE} \\
Operational Configuration of LAB1P6 CCAA will be determined after maintenance has been performed. If determined that LAB1P6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.
\hline
\end{tabular}
\caption{NOTE}
\end{table}

22. \textbf{√MCC-H} for operational configuration

23. If required, perform \{2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL\}, all (SODF: ECLSS: NOMINAL: THC), then:
24. Inform **MCC-H** of task completion.

25. √MATS for stowage location of failed Water Separator  
   Stow failed Water Separator, tools, materials.
OBJECTIVE:
To remove and replace failed Common Cabin Air Assembly (CCAA) Water Separator.

LOCATION:
Installed: LAB1S6
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Water Separator (P/N SV813920-2)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
ISS Common IVA Tool Kit:
Kit C:
  9/16” Socket, 3/8” Drive
Kit D:
  5/32” Hex Head, 1/4” Drive
  3/8” Hex Head, 3/8” Drive
Kit E:
  Ratchet, 3/8” Drive
  Speed Handle
  3/8” to 1/4” Adapter
  4” Ext, 3/8” Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8” Drive

REFERENCED PROCEDURE(S):
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)
2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO)
1.201 LAB RACK ROTATE
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

NOTE
1. System must be transitioned to single loop LT before disabling LAB1S6 Pump Package Assembly.
2. If LAB1S6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.
1. If required, perform **(2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL)**, all (SODF: ECLSS: NOMINAL: THC), then:

2. Perform **(2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO))**, all (SODF: TCS: NOMINAL), then:

3. Open, Close Inhibit RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

### Table 1. LAB1S6 TCS Equipment

<table>
<thead>
<tr>
<th>LAB1S6 TCS Equipment - PCS Labels</th>
<th>RPC [X]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB MTL SFCA SOV</td>
<td>LAS61B_A RPC 5</td>
</tr>
<tr>
<td>LAB MTL SFCA Mod Vlv</td>
<td>LAS61B_A RPC 6</td>
</tr>
<tr>
<td>LAB MTL NIA Vlv</td>
<td>LAS61B_A RPC 7</td>
</tr>
<tr>
<td>LAB MTL NIA Isol Vlv</td>
<td>LAS61B_A RPC 8</td>
</tr>
<tr>
<td>LAB MTL PPA</td>
<td>LAS61B_A RPC 18</td>
</tr>
</tbody>
</table>

4. RACK POWER switch → OFF

5. Verifying LAB1S6 Rack Safed

 PCS

Lab: EPS: LAB1S6

Lab_Rack_LAB1S6

- sel RPCM LAS62B

RPCM_LAS62B

- sel RPC [X]

RPCM_LAS62B_RPC [X]

**cmd** RPC Position – Open (Verify – Op)

**cmd** RPC Close Command – Inhibit (Verify – Inh)

Repeat for remaining RPCs

 PCS

Lab: EPS: Rack Power: Rack Power 3

Rack Power 3

‘Rack Power LAB1S6’

Verify Switch Position – Off

Verify Switch Avail – Yes

Verify Monitoring Status – Ena

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Op
6. Perform (1.201 LAB RACK ROTATE), Rotate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

7. Remove rack rear access panel, fasteners (forty four) (Speed Handle; 1/4" to 3/8" Adapter; 5/32" Hex Head). Temporarily stow.

Figure 1.- Water Separator Connector and Fastener Locations.
8. Demate connectors from Water Separator (refer to Figure 1).
   W38-P8 ←→ J1
   W5-P13 ←→ J2

9. Demate by hand
   Slurper line
   Condensate Air Inlet
   Condensate Air Outlet

10. Unfasten Water Separator fasteners (three) (Ratchet, 3/8" Drive; 4" Ext; 9/16" Socket).
    Refer to Figure 1.

11. Remove Water Separator from rack.

REPLACEMENT
12. Install replacement Water Separator in rack.

13. Torque fasteners (three) to 240 in-lbs ((150-1000 in-lbs) Trq Wrench; 4" Ext, 3/8" Drive; 9/16" Socket).
    Refer to Figure 1.

14. Mate connectors to Water Separator.
    W38-P8 →|← J1
    W5-P13 →|← J2

15. Mate by hand
    Slurper Line
    Condensate Air Inlet
    Condensate Air Outlet

16. Install rack rear access panel, fasteners (forty four) (Speed Handle; 1/4" to 3/8" Adapter; 5/32" Hex Head).

17. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

CHECKOUT
18. RACK POWER switch → ON

19. Closing LAB1S6 RPC

PCS
Lab: EPS: Rack Power: Rack Power 3
   Rack Power 3
   ‘Rack LAB1S6’

   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena
Rack Power On

**cmd** LAB1S6 Pwr On

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Cl

20. Close Enable, Close RPCs for LAB1S6 TCS Equipment.
Refer to Table 1.

PCS

<table>
<thead>
<tr>
<th>Lab: EPS: LAB1S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab_Rack_LAB1S6</td>
</tr>
</tbody>
</table>

**sel** RPCM LAS62B

RPCM_LAS62B

**sel** RPC [X]  

RPCM LAS62B RPC [X]

**cmd** Close Cmd – Enable  
**cmd** RPC Position – Closed (Verify – Cl)

Repeat for remaining RPCs

21. Perform [2.203 LAB IATCS TRANSITION TO DUAL (AUTO)], all (SODF: TCS: NOMINAL), then:

**NOTE**
Operational Configuration of LAB1S6 CCAA will be determined after maintenance has been performed. If determined that LAB1S6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.

22. √MCC-H for operational configuration

23. If required, perform [2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL], all (SODF: ECLSS: NOMINAL: THC), then:

**POST MAINTENANCE**

24. Inform **MCC-H** of task completion.

25. √MATS for stowage location of failed Water Separator  
Stow failed Water Separator, tools, materials.
OBJECTIVE:
Replace failed Intermodule Ventilation (IMV) Valve with spare.

LOCATION:
Installed: LAB1P7, LAB1S7
Stowed: √

Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour

PARTS:
V-Band Clamp  (P/N MS 27115-21R)
IMV Valve  (P/N 2353024-5-1)

MATERIALS:
Rubber Gloves
Braycote Lubricant

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
   1/2" Deep Socket, 3/8" Drive
Kit D:
   5/32" Hex Head, 3/8" Drive
Kit E:
   3/8" to 1/4" Adapter
   1/4" to 3/8" Adapter
   Ratchet, 3/8" Drive
   Driver Handle, 1/4" Drive
   4" Ext, 1/4" Drive
   6" Ext, 1/4" Drive
   10" Ext, 1/4" Drive
Kit F:
   1/4" Deep Socket, 1/4" Drive
Kit G:
   (5-35 in-lbs) Trq Driver, 1/4" Drive
   (30-200 in-lbs) Trq Wrench, 3/8" Drive
Kit I:
   Small Flat Tip Driver, 3/8" Drive
Kit R:
   5/32" Stubby Hex Head, 1/4" Drive
Lid #2:
   Table Cloth

REFERENCED PROCEDURE(S):
None
SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. Removing Lab Aft Port IMV Power

PCS

Lab: EPS: DDCU LA2 B Distribution

DDCU LA2 B Dist

sel RPCM LA2 B G

RPCM_LA2B_G

sel RPC 16

RPCM_LA2B_G_RPC_06

cmd Open Cmd – Enable (Verify – Ena)

cmd RPC Position – Open (Verify – Op)

cmd Close Cmd – Inhibit (Verify – Inh)

2. Removing Lab Aft Starboard IMV Power

PCS

Lab: EPS: DDCU LA2 B Distribution

DDCU LA2 B Dist

sel RPCM LA2 B G

RPCM_LA2B_G

sel RPC 10

RPCM_LA2B_G_RPC_10

cmd Close Cmd – Inhibit (Verify – Inh)

cmd RPC Position – Open (Verify – Op)

cmd Open Cmd – Enable (Verify – Ena)
Figure 1.- Typical View IMV O-Rings.
Figure 2.- Typical IMV Configuration with V-Band Clamp.
Figure 3.- Typical IMV Assembly Configuration.
Figure 4.- Partial Typical IMV Configuration.

Protective Covers will be on both ends of valve, blue tape will not be present.

Two connector protective covers for J1 and J2

IMV V-Band Clamp

RMO Bolts and Protective Cover

IMV Valve

RMO Flex Cable external hex will mate to internal hex on IMV Actuator
3.2.312 LAB AFT IMV VALVE R&R

Access
3. Refer to Figure 2.

Table 2. LAB 1 FWD Closeout Panels

<table>
<thead>
<tr>
<th>IMV ORU REFDES</th>
<th>Closeout Panel</th>
<th>Captive Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1017 (AFT - STBD)</td>
<td>LAB 1S7-04</td>
<td>three each</td>
</tr>
<tr>
<td>A1017 (AFT - STBD)</td>
<td>LAB 1S7-03</td>
<td>three each</td>
</tr>
<tr>
<td>A1018 (AFT - PORT)</td>
<td>LAB 1P7-04</td>
<td>three each</td>
</tr>
<tr>
<td>A1018 (AFT - PORT)</td>
<td>LAB 1P7-03</td>
<td>three each</td>
</tr>
</tbody>
</table>

4. Manually remove Closeout Panels (1/4 Turn Fasteners). Temporarily stow. Refer to Table 2.

Table 3. LAB 1 J1 & J2 Connectors

<table>
<thead>
<tr>
<th>IMV ORU REFDES</th>
<th>Power Cable Connectors</th>
<th>ORU Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1017 (AFT - STBD)</td>
<td>W2171-P3</td>
<td>J1</td>
</tr>
<tr>
<td>A1017 (AFT - STBD)</td>
<td>W2364-P3</td>
<td>J2</td>
</tr>
<tr>
<td>A1018 (AFT - PORT)</td>
<td>W2171-P1</td>
<td>J1</td>
</tr>
<tr>
<td>A1018 (AFT - PORT)</td>
<td>W2308-P3</td>
<td>J2</td>
</tr>
</tbody>
</table>

5. Demate failed IMV Valve power and data cables (J1 and J2). Refer to Table 3.

6. Remove Remote Manual Override (RMO) Flex Cable Bolts (two) (on side of actuator) (Ratchet, 3/8” Drive; 5/32” Hex Head).

7. Loosen V-Band Clamp.
   Slide clamp over duct coupler.
   Remove pliable duct coupler from Valve (Driver Handle, 1/4” Drive; 1/4” to 3/8” Adapter; Small Flat Tip Driver, 3/8” Drive).

8. Before removing defective Valve, make reference mark on bulkhead for valve orientation. Refer to Figure 3.


10. Remove Protective Caps (four) from new IMV, RMO Protective Cover from IMV Valve. Temporarily stow. Refer to Figure 4.

11. √Gaskets (two) on mating surface of IMV Valve flange Refer to Figure 1.
3.2.312 LAB AFT IMV VALVE R&R
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**INSTALLATION**

12. Ensure IMV Valve fully closed to mechanical hard stop, RMO in closed position.

**NOTE**

The IMV Valve should be installed at an angle to provide optimum bend radius for mating of manual override cable. The manual override connector can be relocated by loosening, but not removing, Actuator Bolts on IMV Valve.

13. Apply thin film Braycote Lubricant to O-Rings (Rubber Gloves).

   Install V-Band Clamp to hold Valve in place (Ratchet, 3/8” Drive; 1/2” Deep Socket).

15. √ Manual Override Flex Cable to verify optimum bend radius
   Install fasteners (two).
   Refer to Figure 3.
   If optimum bend radius acquired
      Go to step 18.
   If optimum bend radius not acquired
      Continue with procedure.

Figure 5.- IMV Actuator Bolt Tightening Pattern.
NOTE
The IMV Valve Actuator Bolts are not captive. Loosen but do not remove.

16. Loosen IMV Valve Actuator Noncaptive Bolts (six) on top of Actuator located on upper end of valve (Ratchet, 3/8" Drive; 3/8" to 1/4" Adapter; 5/32" Stubby Hex Head Driver).
Refer to Figure 5.

17. Carefully turn Actuator left or right to relocate manual override connection for optimum cable bend radius.

18. Retighten Actuator Bolts in star pattern to 23 in-lbs ((5-35 in-lbs) Trq Driver; 5/32" Stubby Hex Head Driver, 1/4" Drive; 3/8" to 1/4" Adapter (6" Ext required for Fwd Stbd)).
Refer to Figure 5.

19. Install RMO Flex Cable Bolts (two) (on side of Actuator).
Tighten, torque to 39 in-lbs (Ratchet, 3/8" Drive; 5/32" Hex Head Driver; (30-200 in-lbs) Trq Wrench).

NOTE
Some IMV Valve V-Band Clamps may require Flat Tip Driver or 1/4" Deep Socket, 1/4" Drive. This is dependent on space between head of fastener and interface tolerances to V-Band Clamp.

20. Tighten IMV Valve V-Band Clamp Nut, torque to 135 in-lbs (Ratchet, 3/8" Drive; 1/2" Deep Socket; (30-200 in-lbs) Trq Wrench (10" Ext may be required for Fwd Port)).

CAUTION
Excessive torque applied to the duct clamp captive fastener will damage duct assembly. Do not apply more than 12 in-lbs of torque on captive fastener.

21. Slide V-Band Clamp over edge of coupling duct and beaded flange on IMV Valve so that it lies at least 1/8" from beaded end.
Tighten fastener, torque to 11 in-lbs (Driver Handle, 1/4" Drive; Small Flat Tip Head Driver, 3/8" Drive; 1/4" to 3/8" Adapter; (5-35 in-lbs) Trq Driver).

22. Mate IMV Valve power and data cables (J1 and J2) to connectors.
Align main key with main keyway.
Turn until fully seated.
Refer to Table 3.

CLOSEOUT
23. Install Closeout Panels.
Tighten 1/4 turn closeout fasteners on Closeout Panels (Driver Handle, 1/4" Drive; 5/32" Stubby Hex Head Driver).
Refer to Table 2.
24. Tighten fasteners, torque to 15 in-lbs (Driver Handle, 1/4" Drive; 5/32" Hex Head; (5-35 in-lbs) Trq Driver).

25. Restore power to AFT Starboard IMV Valve.

26. Restore power to Lab AFT Port IMV power.

27. Inform MCC-H of task completion.

28. √MATS for stowage location of failed IMV Valve
   Stow tools, materials.
OBJECTIVE:
Replace failed Intermodule Ventilation (IMV) Valve with spare.

LOCATION:
Installed: LAB1P0, LAB1S0
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
56 minutes

PARTS:
V-Band Clamp (P/N MS 27115-21R)
IMV Valve (P/N 2353024-5-1)

MATERIALS:
Rubber Gloves
Braycote Lubricant

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
  1/2" Deep Socket, 3/8" Drive
Kit D:
  5/32" Hex Head, 3/8" Drive
Kit E:
  3/8" to 1/4" Adapter
  1/4" to 3/8" Adapter
  Ratchet, 3/8" Drive
  Driver Handle, 1/4" Drive
  4" Ext, 1/4" Drive
  6" Ext, 1/4" Drive
  10" Ext, 1/4" Drive
Kit F:
  1/4" Deep Socket, 1/4" Drive
Kit G:
  (5-35 in-lbs) Trq Driver, 1/4" Drive
  (30-200 in-lbs) Trq Wrench, 3/8" Drive
Kit I:
  Small Flat Tip Driver, 3/8" Drive
Kit R:
  5/32" Stubby Hex Head, 1/4" Drive
Lid #2:
  Table Cloth

REFERENCED PROCEDURE(S):
None
SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

REMOVING LAB FORWARD PORT IMV POWER

PCS 1. Lab: EPS: DDCU LA1 B Distribution

<table>
<thead>
<tr>
<th>DDCU LA1 B Dist</th>
<th>sel RPCM LA1 B E</th>
<th>RPCM_LA1_B_E</th>
<th>sel RPC 03</th>
<th>RPCM_LA1B_E_RPC_03</th>
</tr>
</thead>
<tbody>
<tr>
<td>cmd Open Cmd</td>
<td>cmd RPC Position</td>
<td>cmd Close Cmd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>− Enable (Verify − Ena)</td>
<td>− Open (Verify − Op)</td>
<td>− Inhibit (Verify − Inh)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REMOVING LAB FORWARD STARBOARD IMV POWER

2. Lab: EPS: DDCU LA1 B Distribution

<table>
<thead>
<tr>
<th>DDCU LA1 B Dist</th>
<th>sel RPCM LA1 B B</th>
<th>RPCM_LA1B_B</th>
<th>sel RPC 16</th>
<th>RPCM_LA1_B_B_RPC_16</th>
</tr>
</thead>
<tbody>
<tr>
<td>cmd Open Cmd</td>
<td>cmd RPC Position</td>
<td>cmd Close Cmd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>− Enable (Verify − Ena)</td>
<td>− Open (Verify − Op)</td>
<td>− Inhibit (Verify − Inh)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.2.313 LAB FWD IMV VALVE R&R

Figure 1.- Typical View IMV O-Rings.
Figure 2.- Typical IMV Configuration with V-Band Clamp.
Figure 3.- Typical IMV Assembly Configuration.
Figure 4.- Partial Typical IMV Configuration.

- IMV V-Band Clamp
- Protective Covers will be on both ends of valve, blue tape will not be present.
- Two connector Protective Covers for J1 and J2
- IMV Valve
- RMO Bolts and Protective Cover
- RMO Flex Cable external hex will mate to internal hex on IMV Actuator
3.2.313 LAB FWD IMV VALVE R&R
(ISS IFM/5A - ALL/FIN A)  Page 7 of 11 pages

ACCESS
Refer to Figure 2.

Table 2. LAB 1 FWD Closeout Panels

<table>
<thead>
<tr>
<th>IMV ORU REFDES</th>
<th>Closeout Panel</th>
<th>Captive Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td>A91 (FWD - STBD)</td>
<td>LAB 1S0-04</td>
<td>3 each</td>
</tr>
<tr>
<td>A91 (FWD - STBD)</td>
<td>LAB 1S0-03</td>
<td>3 each</td>
</tr>
<tr>
<td>A93 (FWD - PORT)</td>
<td>LAB 1P0-04</td>
<td>3 each</td>
</tr>
<tr>
<td>A93 (FWD - PORT)</td>
<td>LAB 1P0-03</td>
<td>3 each</td>
</tr>
</tbody>
</table>

3. Manually remove Closeout Panels (1/4 turn fasteners). Temporarily stow. Refer to Table 2.

Table 3. LAB 1 FWD J1 & J2 Connectors

<table>
<thead>
<tr>
<th>IMV ORU REFDES</th>
<th>Power Cable Connectors</th>
<th>ORU Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1020 (FWD -STBD)</td>
<td>W2171-P3</td>
<td>J1</td>
</tr>
<tr>
<td>A1020 (FWD -STBD)</td>
<td>W2364-P4</td>
<td>J2</td>
</tr>
<tr>
<td>A1019 (FWD -PORT)</td>
<td>W2136-P3</td>
<td>J1</td>
</tr>
<tr>
<td>A1019 (FWD -PORT)</td>
<td>W2308-P4</td>
<td>J2</td>
</tr>
</tbody>
</table>

4. Demate IMV Valve power and data cables (J1 and J2). Refer to Table 3.

5. Remove Remote Manual Override (RMO) Flex Cable Bolts (two) (on side of actuator) (Ratchet, 3/8" Drive; 5/32" Hex Head).

6. Loosen V-Band Clamp. Slide clamp over duct coupler. Remove pliable duct coupler from valve (Driver Handle, 1/4" Drive; 1/4" to 3/8" Adapter; Small Flat Tip Driver, 3/8" Drive).

7. Before removing defective valve, make reference mark on bulkhead for valve orientation. Refer to Figure 3.


9. Remove Protective Caps (four) from new IMV. Remove RMO Protective Cover from IMV Valve. Temporarily stow. Refer to Figure 4.

10. √Gaskets (two) on mating surface of IMV Valve Flange

Refer to Figure 1.
11. Ensure IMV Valve fully closed to mechanical hard stop. Ensure RMO in closed position.

**NOTE**
The IMV Valve should be installed at an angle to provide optimum bend radius for mating of manual override cable. Manual override connector can be relocated by loosening, but not removing, Actuator Bolts on IMV Valve.

12. Apply thin film Braycote Lubricant to O-Rings (Rubber Gloves).


14. Manual Override Flex Cable to verify optimum bend radius
   - Install fasteners (two).
   - Refer to Figure 3.
   - If optimum bend radius acquired
     - Go to step 16.
   - If optimum bend radius not required
     - Continue with procedure.
3.2.313 LAB FWD IMV VALVE R&R
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15. Loosen IMV Valve Actuator Noncaptive Bolts (six) on top of Actuator located on upper end of valve (Ratchet, 3/8" Drive; 3/8" to 1/4" Adapter; 5/32" Stubby Hex Head Driver).
Refer to Figure 5.

16. Carefully turn Actuator left or right to relocate manual override connection for optimum cable bend radius.

17. Retighten Actuator Bolts in star pattern to 23 in-lbs (5/32" Stubby Hex Head Driver, 1/4" Drive; 3/8" to 1/4" Adapter; (5-35 in-lbs) Trq Driver (6" Ext required for Fwd Stbd)).
Refer to Figure 5.

18. Install RMO Flex Cable Bolts (two) (on side of Actuator).
Tighten, torque to 39 in-lbs (Ratchet, 3/8" Drive; 5/32" Hex Head Driver; (30-200 in-lbs) Trq Wrench)).
3.2.313 LAB FWD IMV VALVE R&R
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NOTE
Some IMV V-Band Clamps may require Flat Tip Driver or 1/4" Deep Socket, 1/4" Drive. This is dependent on space between head of fastener and interface tolerances to V-Band Clamp.

19. Tighten IMV Valve V-Band Clamp Nut, torque to 120-150 in-lbs (Ratchet, 3/8" Drive; 1/2" Deep Socket; (30-200 in-lbs) Trq Wrench (10" Ext may be required for Fwd Port)).

CAUTION
Excessive torque applied to the duct clamp captive fastener will damage duct assembly. Do not apply more than 12 in-lbs of torque on captive fastener.

20. Slide V-Band Clamp over edge of coupling duct and beaded flange on IMV Valve so that it lies at least 1/8" from beaded end. Tighten fastener, torque to 11 in-lbs (Driver Handle, 1/4" Drive; 1/4" to 3/8" Adapter; Small Flat Tip Driver, 3/8" Drive; (5-35 in-lbs) Trq Driver).

21. Mate IMV Valve power and data cables (J1 and J2) to connectors. Align main key with main keyway, turn ∨ until fully seated. Refer to Table 3.

CLOSEOUT
22. Install Closeout Panels, tighten 1/4 turn closeout fasteners on Closeout Panels (Driver Handle, 1/4" Drive; 5/32" Stubby Hex Head Driver). Refer to Table 2.

23. Tighten fasteners, torque to 15 in-lbs (Driver Handle, 1/4" Drive; 5/32" Hex Head; (5-35 in-lbs) Trq Driver).

RESTORING POWER TO LAB FORWARD STARBOARD IMV

PCS 24. Lab: EPS: DDCU LA1 B Distribution

DDCU LA1 B Dist

sel RPCM LA1 B B

RPCM_LA1_B_B

sel RPC 16

RPCM_LA1B_B_RPC 16

cmd Close Cmd – Enabled (Verify – Ena)
cmd RPC Position – Open (Verify – Op)
cmd Open Cmd – Inhibit (Verify – Inh)
RESTORING POWER TO LAB FORWARD PORT IMV

25. Lab: EPS: DDCU LA1 B Distribution

| DDCU LA1 B Dist |

RPCM LA1B E

| RPCM_LA1B_E |

sel RPC 03

| RPCM_LA1B_E_RPC 03 |

**cmd** Close Cmd – Enable (Verify – Ena)
**cmd** RPC Position – Close (Verify – Cl)
**cmd** Open Cmd – Inhibit (Verify – Inh)

POST MAINTENANCE

26. Inform **MCC-H** of task completion.

27. √MATS for stowage location of failed IMV Valve
Stow tools, materials.
OBJECTIVE:
Remove and replace a failed IMV Fan from the Lab Fwd/Stbd location.

LOCATION:
Installed: LAB1S0
Stowed: √
Maintenance and Assembly Task Supplement (MATS)

DURATION:
50 minutes

PARTS:
IMV Fan Assembly (P/N SV809111-6)

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
   3/8” Socket, 1/4” Drive
   7/16” Socket, 1/4” Drive
Kit E:
   Ratchet, 1/4” Drive
   6” Ext, 1/4” Drive
   Univ Joint, 1/4” Drive
Kit G:
   (10-50 in-lbs) Trq Wrench, 1/4” Drive

REFERENCED PROCEDURE(S):
1.504 LAB IMV FAN ACTIVATION/DEACTIVATION

SAFING

WARNING
1. Shock hazard, failure to remove power could result in personal injury.
2. IMV Fan must be cooled for 2 hours prior to maintenance. Failure to comply can result in personal injury.

1. Perform {1.504 LAB IMV FAN ACTIVATION/DEACTIVATION}, step 2 (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:

ACCESSING
2. Remove Closeout Panel LAB1S0-01, 1/4 turn fasteners (12), by hand. Temporarily stow.
3.2.316 IMV FAN R&R LAB1S0
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REMOVAL
3. Demate power and data cables.
   W2359-P8 ←|→ J1
   W2118-P2 ←|→ J2

4. Loosen Inlet Air Duct Band Clamp, manually push it up onto duct
   (Ratchet; 6” Ext; 3/8” Socket).

5. Loosen Outlet Air Duct V-Band Clamp, push it down onto duct (Ratchet;
   6” Ext; 3/8” Socket).

6. Remove IMV Fan, fasteners (four) (Ratchet; 6” Ext; Univ Joint; 7/16” Socket).
   Temporarily stow.

REPLACEMENT
7. Remove Electrical Connector Caps (two) from replacement IMV Fan and
   place them on failed unit.

8. Install replacement IMV Fan by aligning it on guide pins, snug fasteners
   (four) (Ratchet; 6” Ext; Univ Joint; 7/16” Socket).

9. Torque fasteners (four) to 32 in-lbs ((10-50 in-lbs) Trq Wrench; 6” Ext;
   Univ Joint; 7/16” Socket).

10. Attach inlet duct to IMV Fan and secure V-Band Clamp (Ratchet; 6” Ext;
    3/8” Socket).

11. Attach outlet duct to IMV Fan and secure V-Band Clamp (Ratchet; 6” Ext;
    3/8” Socket).

12. Replace power and data cables.
    W2359-P8 →|← J1
    W2118-P2 →|← J2

CHECKOUT
13. Perform {1.504 LAB IMV FAN/ACTIVATION DEACTIVATION}, step 1
    (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:

CLOSEOUT
14. Replace Closeout Panel LAB1S0-01, 1/4 turn fasteners (12) by hand.

POST MAINTENANCE
15. Inform MCC-H of task completion.

16. √MATS for stowage location of failed IMV Fan
    Stow tools, equipment.
3.2.317 IMV FAN SWAPOUT NOD1P5/LAB1P0

OBJECTIVE:
Remove functional IMV Fan from LAB1P0.
Remove failed IMV Fan from NOD1P5 (Aft Port position) and replace with functional IMV Fan removed from LAB1P0.

DURATION:
2 hours 15 minutes

LOCATION:
Installed: LAB1P0, NOD1P5
Stowed: √/Maintenance and Assembly Task Supplement (MATS)

PARTS:
IMV Fan (P/N SV809111-6)

MATERIALS:
Gray Tape
Dry Wipes
ML 60-E:
Ziplock Bags, Two, 8” x 8” (P/N 528-50000-3)

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Power Tool
Equipment Bag
Kit D:
1/8” Hex Head, 1/4” Drive
5/32” Hex Head, 1/4” Drive
3/16” Hex Head, 1/4” Drive
5/16” Hex Head, 1/4” Drive
Hex Shank, 1/4” Drive
Kit E:
1/4” Drive Univ Joint
10” Ext, 1/4” Drive
1/4” to 3/8” Adapter
Driver Handle, 1/4” Drive
Ratchet, 1/4” Drive
Kit F:
7/16” Socket, 1/4” Drive
Kit G:
(5-35 in-lbs) Trq Driver, 1/4” Drive
Kit I:
Small Flat Tip Driver, 3/8” Drive
Common Tip Screwdriver 4”

REFERENCED PROCEDURES:
1.506 NODE 1 IMV FAN ACTIVATION/DEACTIVATION PRE-CCS
1.504 IMV FAN ACTIVATION/DEACTIVATION POST CCS
SAFINING

1. Opening Primary RPCs for IMV Fan
   Node 1: EPS: RPCM N1 4B-C
   [RPCM N1 4B-C]

   sel  RPC 12
   cmd  RPC Position – Open (Verify – Op)

2. Inhibiting Close Command for IMV Fan Primary RPCs
   Node 1: EPS: RPCM N1 4B-C
   [RPCM N1 4B-C]

   sel  RPC 12
   cmd  Close Cmd – Inhibit (Verify – Inh)

3. Verify LAB1P0 Fan is off {1.504 LAB IMV FAN ACTIVATION/DEACTIVATION POST CCS}, step 2 (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:

   **WARNING**
   High temperatures may be present around IMV Fan housing. Nominally functional fan requires 2-hour cooldown.

4. Verify IMV Fans have cooled down for 2 hours.

ACCESSING SCAVENGED FAN

5. Remove Closeout Panels LAB1P0-01 and LAB1P0-02 1/4 turn fasteners (twelve), by hand.
   Temporarily stow.

REMOVAL OF SCAVENGED FAN

6. Demate power and data cables.
   W2356-P8 ←→ J1
   W2117-P4 ←→ J2
   Secure with Gray Tape.

7. Loosen Inlet Air Duct Band Clamp, push it zenith onto duct (Common Tip Screw Driver).

8. Loosen Outlet Air Duct Band Clamp, push it nadir onto duct (Common Tip Screw Driver).

9. Remove IMV Fan, fasteners (four) and secure 8" ziplock over open ducts (two) (Ratchet; 10" Ext; Univ Joint; 7/16" Socket; Gray Tape).
   Temporarily stow.

10. Replace Closeout Panels LAB1P0-01 and LAB1P0-02 1/4 turn fasteners (twelve), by hand.
3.2.317 IMV FAN SWAPOUT NOD1P5/LAB1P0
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FAILED IMV FAN NOD1P5 ACCESS

WARNING
High temperatures are present around IMV Fan housing. Failed fan requires 2-hour cooldown.

11. Verify failed IMV Fan A95 has cooled down for 2 hours.

NOTE
The Seat Track Buttons securing long handrail (HR41) must be removed before Closeout Panel NOD1P4-03 can be removed.


13. Remove Seat Track Buttons (two), fasteners (two each) (Driver Handle, 1/4” Drive; 1/8” Hex Head). Temporarily stow.

NOTE
Captive fasteners on Closeout Panels can be used to tether them away from work area.

14. Remove Closeout Panel NOD1P4-03 fasteners (twenty) (Power Tool; Hex Shank, 1/4” Drive; 5/32” Hex Head). Temporarily stow.

15. Remove Closeout Panel NOD1O4-03 fasteners (five) (Power Tool; Hex Shank, 1/4” Drive; 5/32” Hex Head). Temporarily stow.

16. Remove Closeout Panel NOD1P5-01 fasteners (four) (Power Tool; Hex Shank, 1/4” Drive; 5/32” Hex Head). Temporarily stow.

FAILED IMV FAN NOD1P5 REMOVAL

17. Power Cable Connector W0135-P405 ←→ J2
   Data Cable Connector W0303-P406 ←→ J1

18. Secure cables out of way (Gray Tape).
Figure 3.- IMV FAN NOD1P5 Assembly Drawing.

Figure 4.- IMV FAN NOD1P5 with Closeout Panels Removed.
19. Loosen band clamp on duct at top of IMV Fan, fastener (one each) (Common Tip Screwdriver 4”).
   Refer to Figures 3 and 4.

20. Slide band clamp and acoustic insulation up onto duct at top of IMV Fan.

21. Disconnect duct, acoustic insulation at top of IMV Fan.

22. Loosen band clamps (two), fasteners (one each), on duct located between IMV Fan and Lower Silencer. Slide band clamps to middle of duct to stow (Common Tip Screwdriver 4”).

23. Remove acoustic insulation, duct, and band clamps between IMV Fan and Silencer.
   Temporarily stow.

**NOTE**

1. Acoustic insulation on failed IMV Fan does not have to be removed because replacement has its own insulation.

2. Outboard fasteners have blind access. Failed IMV Fan is removed by lowering it from the structural support and toward open side to clear structure.

24. Loosen fasteners (four) on IMV Fan (Ratchet, 1/4” Drive; 10” Ext; 3/16” Hex Head).

25. Label, remove IMV Fan.

26. If IMV Fan can not be removed due to Lower Silencer interference
   Perform steps 27, 28, 29.

   If IMV Fan can be removed
   Go to step 30.

27. Loosen band clamp on lower duct on bottom of Lower Silencer, fastener (one).
   Slide clamp away from Silencer along duct (Common Tip Screwdriver 4”).

28. Disconnect bottom duct from Lower Silencer.

29. Remove Lower Silencer from its mounting bracket, fasteners (four) (Driver Handle, 1/4” Drive; 5/32” Hex Head).
   Temporarily stow.
SCAVENTED IMV FAN INTO NOD1P5 LOCATION

30. Retrieve replacement IMV Fan from Equipment Bag and stow failed IMV Fan in bag.

**NOTE**
Mating surfaces should be free of any residue, corrosion, or excessive wear.

31. Inspect, clean mating surfaces of replacement IMV Fan, mounting plate (Dry Wipes).
Document any anomalies.

32. Install replacement IMV Fan, tighten fasteners (four) torque to 32 in-lbs (Ratchet; 10" Ext; Univ Joint; 7/16" Socket; (5-35 in-lbs) Trq Driver).

33. Check removed ducts for damage.
If holes or cracks are present, document, patch with Gray Tape.

34. Install duct, acoustic insulation, band clamp on top of IMV Fan by placing edges of duct and insulation over IMV Fan seal bead.

35. Position band clamps over top IMV Fan seal bead and duct, at least 1/8" from edge of duct.

36. Secure band clamp fastener, torque to 8 in-lbs (Small Flat Tip Driver, 3/8" Drive; 1/4" to 3/8" Adapter; (5-35 in-lbs) Trq Driver).

37. If Lower Silencer was removed
   Perform steps 38 --- 42.

   If Lower Silencer was not removed
   Go to step 43.

38. Install Lower Silencer, tighten fasteners (four), torque to 32 in-lbs (Ratchet, 1/4" Drive; 10" Ext; 3/16" Hex Head; (5-35 in-lbs) Trq Driver).

39. Check removed ducts for damage.
If holes or cracks are present, document, patch with Gray Tape.

40. Install duct, band clamp on bottom of Lower Silencer by placing edges of duct over seal bead.

41. Position band clamp over seal bead and duct, at least 1/8" from edge of duct.

42. Secure band clamp fastener, torque to 8 in-lbs (Small Flat Tip Driver, 3/8" Drive; 1/4" to 3/8" Adapter; (5-35 in-lbs) Trq Driver).

43. Install duct, band clamps between IMV Fan and Lower Silencer by placing edges of duct and insulation over seal beads.
44. Position band clamps over seal beads and duct, at least 1/8" from edges of duct.

45. Secure band clamp fasteners (one each), torque to 8 in-lbs (Small Flat Tip Driver, 3/8" Drive; 1/4" to 3/8" Adapter; (5-35 in-lbs) Trq Driver).

46. Remove Gray Tape securing cables.
   Power Cable Connector W0135-P405 →|← J2
   Data Cable Connector W0303-P406 →|← J1

CHECKOUT
47. √MCC-H for repair verification

ENABLING CLOSE COMMAND FOR IMV FAN PRIMARY RPC
Node 1: EPS: RPCM N1 4B-C
RPCM N1 4B-C
sel  RPC 12
cmd Close Cmd – Enable (Verify – Ena)

48. To activate Node 1 Aft Port IMV Fan, perform {1.506 NODE 1 IMV FAN ACTIVATION/DEACTIVATION PRE-CCS}, step 1 (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:

CLOSEOUT
49. Install Closeout Panel NOD1P5-01.
   Secure fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head).

50. Install Closeout Panel NOD1O4-03.
   Secure fasteners (five) (Driver Handle, 1/4" Drive; 5/32" Hex Head).

51. Install Closeout Panel NOD1P4-03.
   Secure fasteners (twenty) (Power Tool; Hex Shank, 1/4" Drive; 5/32" Hex Head).

52. Fasten Seat Track Buttons (two), fasteners (two each) on Closeout Panel NOD1P4-03, torque to 27 in-lbs (Driver Handle, 1/4" Drive; 5/32" Hex Driver; (5-35 in-lbs) Trq Driver).

53. Replace long handrail on Seat Track Buttons.

POST MAINTENANCE
54. Inform MCC-H of task completion.

55. √MATS for stowage location of failed IMV Fan
   Stow tools, equipment.
OBJECTIVE:
Remove failed Trace Contaminant Control Subsystem TCCS Flow Meter Assembly and replace it with an operable assembly.

LOCATION:
Installed: LAB1D6 - AR Rack, TCCS
Stowed: √Maintenance and Assemble Task Supplement (MATS)

DURATION:
1.5 hours

PARTS:
TCCS Flow Meter Assembly (P/N 5835405-501)

MATERIALS:
Gray Tape
Marking Pen
Rubber Gloves
Silicon Grease

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit E:
   - Ratchet, 1/4" Drive
   - 4" Ext, 1/4" Drive
   - 3/8" to 1/4" Adapter
Kit F:
   - 3/8" Socket, 1/4" Drive
   - 5/16" Socket, 1/4" Drive
Kit G:
   - (10-50 in-lbs) Trq Wrench, 1/4" Drive
   - (30-200 in-lbs) Trq Wrench, 3/8" Drive
Kit J:
   - Connector Pliers
Kit TBD:
   - O-Ring Extraction Tool
Lid #2:
   - Table Cloth

REFERENCED PROCEDURE(S):
1.301 ATMOSPHERE REVITALIZATION RACK ACTIVATION

WARNING
High Temperatures are present in Trace Contaminant Control System (TCCS). Verify system has been shut down for minimum of 4 hours prior to performing maintenance. Failure to comply could result in personal injury.
SAFING

1. RACK POWER switch → OFF

2. Verifying LAB1D6 Rack Safed

   PCS
   Lab: EPS: Rack Power: Rack Power 2
   Rack Power 2
   ‘Rack LAB1D6’

   Verify Switch Position – Off
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power LAB1D6’

   Verify RPCM_LA2B_C_RPC_01 Position – Op

3. Verify Atmosphere Revitalization (AR) Rack deactivated 4 hours prior to maintenance.

ACCESSING

Figure 1.- Front View of Trace Contaminant Control Subassembly.
4. Depress latches (two).
   Open upper left-hand side faceplate of Rack LAB1D6.

   **NOTE**
   Quick Disconnects are spring-loaded, hold sample line tubing when disconnecting.

5. Disconnect Major Constituent Analyzer (MCA) sample line QDs (two) located in upper left quadrant of TCCS.
   Tether to side to prevent obstruction.
   Refer to Figure 1.

   Refer to Figure 1.

7. Unfasten TCCS Grounding Strap Bolts (two) (Ratchet, 1/4" Drive; 4" Ext; 3/8" Socket).
   Refer to Figure 1.

8. Rotate TCCS knurled locking rings (two) located on stem of T-shaped handles.
   Refer to Figure 1.

9. Rotate left-hand TCCS T-shaped locking handle 90°.
    Rotate right-hand TCCS T-shaped locking handle 90°.
    Refer to Figure 1.

10. Slide TCCS out to fully extended, latched position by pulling on two unlocked handles.
    Verify locking mechanism (one) engaged on right slide assembly.

**REMOVAL**

Figure 2.- Top view of TCCS.
11. Electrical connector W2P1 ←|→ A4J1  
   Refer to Figure 2.

12. Disconnect outlet/inlet air duct (one each).  
   Turn handtight.  
   Refer to Figure 2.

13. Loosen fasteners (four) from flow meter mounting pad (Ratchet,  
   1/4” Drive; 4” Ext; 5/16” Socket).  
   Refer to Figure 2.

14. Remove expended Flow Meter through right side of TCCS.  
   Label “Expended,” temporarily stow.

15. Remove O-Rings (one each) from inlet/outlet tubing interfaces (O-Ring 
   Extraction Tool).

16. Apply thin layer of Silicon Grease on new O-Rings (one each).

REPLACEMENT

17. Install replacement O-Rings (one each) on inlet/outlet tubing interfaces by 
   rolling over ends and seating into O-Ring grooves.

18. Remove Protective Wrap from replacement, temporarily stow.  
   Remove Protective Caps (two) from replacement, place on failed.

19. Slide replacement Flow Meter into TCCS through right side.  
   Position on fastener location.

20. Snug fasteners (four) (Ratchet, 1/4” Drive; 4” Ext; 5/16” Socket).  
   Refer to Figure 2.

21. Torque fasteners (four) 30 in-lbs ((10-50 in-lbs) Trq Wrench; 4” Ext; 
   5/16” Socket).

22. Connect inlet/outlet air ducts (one each) to Flow Meter.  
   Turn handtight.  
   Refer to Figure 2.

23. Electrical Connector W2P1 →|← A4J1 of Flow Meter  
   Refer to Figure 2.
3.2.343 TCCS FLOW METER ASSEMBLY R&R LAB1D6
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CLOSEOUT

CAUTION
Ensure all loose Equipment, tools, debris have been removed from behind TCCS.

24. Depress locking mechanism (one) on right slide assembly.
   Push TCCS back to retracted position.

   NOTE
   Ensure TCCS is fully retracted position and T-shaped handles locked.

25. Rotate left-hand TCCS T-shaped locking handle 90°.
    Rotate right-hand TCCS T-shaped locking handle 90°.

26. Rotate TCCS knurled locking rings (two) located on stem of T-shaped handle.

27. Connect Major Constituent Analyzer (MCA) sample line QDs (two).
    Press on collar, snap into place.
    Refer to Figure 1.

    Refer to Figure 1.

29. Fasten TCCS Grounding Strap Bolts (two) (Ratchet, 1/4" Drive; 4" Ext; 3/8" Socket).
    Refer to Figure 1.


CHECKOUT
32. RACK POWER switch → ON

33. Closing LAB1D6 RPCM
   LAB: EPS: Rack Power: Rack Power 2
   [Rack Power 2]
   ‘Rack LAB1D6’

   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power On’

   cmd LAB1D6 Pwr On
‘Rack Power LAB1D6’

Verify RPCM_LA2B_C_RPC_01 Position – Cl

34. Perform {1.301 ATMOSPHERE REVITALIZATION RACK ACTIVATION}, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: ARS), then:

POST MAINTENANCE
35. Inform MCC-H of task completion.

36. √MATS for stowage location of failed Flow Meter
   Stow tools, materials.
OBJECTIVE:
Remove and replace a failed Utility Outlet Panel (UOP) in US Lab.

LOCATION:
Installed:  Lab
Stowed:  √Maintenance and Assembly Task Supplement (MATS)

DURATION:
40 minutes

PARTS:
Utility Outlet Panel (P/N 683-27709)

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit D:  
  1/8” Hex Head, 1/4” Drive
Kit E:
  Driver Handle, 1/4” Drive
Kit G:
  (5-35 in-lbs) Trq Driver, 1/4” Drive
Lid #1:
  Static Wrist Tether

REFERENCED PROCEDURE(S):
1.213  LAB UOP CHECKOUT

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Prior to removing power from UOP output power must be disabled to prevent damage to UOP Ground Fault Circuit Interrupt (GFCI) relay.
Table 1. LAB UOP Locations

<table>
<thead>
<tr>
<th>Utility Outlet Panel</th>
<th>Location</th>
<th>Power Source</th>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>UOP # 1</td>
<td>LAB1OS2</td>
<td>RPCM LA1A4A-C RPC-5</td>
<td>System 1553 &amp; Payload Ethernet</td>
</tr>
<tr>
<td>UOP # 2</td>
<td>LAB1OS4</td>
<td>RPCM LA1A4A-C RPC-6</td>
<td>Payload 1553 &amp; NASA 1553</td>
</tr>
<tr>
<td>UOP # 3</td>
<td>LAB1OP2</td>
<td>RPCM LA2A3B-C RPC-3</td>
<td>Checs 1553</td>
</tr>
<tr>
<td>UOP # 4</td>
<td>LAB1OP4</td>
<td>RPCM LA2A3B-C RPC-4</td>
<td>Payload 1553 &amp; Payload Ethernet</td>
</tr>
<tr>
<td>UOP # 5</td>
<td>LAB1PD2</td>
<td>RPCM LA2B-H RPC-18</td>
<td>System 1553</td>
</tr>
<tr>
<td>UOP # 6</td>
<td>LAB1SD5</td>
<td>RPCM LA1B-G RPC-18</td>
<td>System 1553 &amp; Checs 1553</td>
</tr>
</tbody>
</table>

1. Remove all portable electrical equipment from failed UOP.
   Install Protective Caps on output power connectors (J3 and J4).

2. Verify failed UOP POWER OUT pbi – Non-depressed
   √ ENABLE – Dark
   √ RESET – Dark or Green
   √ OK – Dark or Green

3. **OPENING AND CLOSING INHIBIT FAILED UOP RPC**
   PCS Lab: EPS: UOP X (Refer to Table 1.)
   **LAB UOP’s**
   
   * `cmd` RPCM XXXX X RPC X Open (Verify – Op)
   
   * `sel` RPCM XXXX X RPC X
   
   * `RPCM XXXX X RPC X`
   
   * `cmd` RPC Close Command – Inhibit (Verify – Inh)
   
   Repeat

**REMOVAL**

**CAUTION**

Equipment contains parts sensitive to damage by Electronic Discharge (ESD).

4. Don Static Wrist Tether.
   Secure to unpainted metal surface near failed UOP.

**CAUTION**

Pulling UOP too far from standoff prior to demating Power and Data Wire Harnesses may result in damage to Wire Harnesses.
5. Unfasten fasteners (six) on failed UOP. Remove from standoff (Driver Handle; 1/8" Hex Head Driver). Refer to Figure 1.

Table 2. LAB UOP Connectors

<table>
<thead>
<tr>
<th>Utility Outlet Panel (Ref. Designator)</th>
<th>Input Power Wire Harness To (J1)</th>
<th>Input Data Wire Harness to (J2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UOP # 1 (A117)</td>
<td>W3104-P3</td>
<td>W3107-P1</td>
</tr>
<tr>
<td>UOP # 2 (A118)</td>
<td>W3104-P6</td>
<td>W3108-P1</td>
</tr>
<tr>
<td>UOP # 3 (A147)</td>
<td>W3404-P2</td>
<td>W3407-P1</td>
</tr>
<tr>
<td>UOP # 4 (A148)</td>
<td>W3404-P1</td>
<td>W3408-P1</td>
</tr>
<tr>
<td>UOP # 5 (A137)</td>
<td>W3331-P2</td>
<td>W3307-P1</td>
</tr>
<tr>
<td>UOP # 6 (A128)</td>
<td>W3203-P2</td>
<td>W3208-P1</td>
</tr>
</tbody>
</table>
6. Input Power (Wire Harness) ←|→ J1 of failed UOP. Refer to Table 2 and Figure 2.

7. Input Data (Wire Harness) ←|→ J2 of failed UOP. Refer to Table 2 and Figure 2.

8. Label failed UOP. Temporarily Stow.

REPLACEMENT
9. Remove Protective Caps from replacement UOP. Place on failed UOP. Temporarily stow.

10. Input Power (Wire Harness) →|← J1 of replacement UOP. Refer to Table 2 and Figure 2.

11. Input Data (Wire Harness) →|← J2 of failed UOP. Refer to Table 2 and Figure 2.

12. Install replacement UOP in standoff. Tighten fasteners (six), torque to 30 in-lbs (Driver Handle; 1/8" Hex Head; (5-35 in-lbs) Trq Driver).
CHECKOUT
13. Perform {1.213 LAB UOP CHECKOUT}, applicable steps (SODF: EPS: ACTIVATION AND CHECKOUT: POWER DISTRIBUTION), then:

POST MAINTENANCE

15. √Maintenance and Assembly Tasks Supplement for stowage of failed UOP tools, materials
Stow tools, equipment.
OBJECTIVE:
Remove and replace Lab Emergency Light Power Supply (ELPS) Battery Module Assembly (BMA).

LOCATION:
Lab Forward and Aft Endcone

DURATION:
40 minutes

PARTS:
None

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit E:
  Ratchet, 1/4" Drive
Kit F:
  1/4" Socket, 1/4" Drive

REFERENCED PROCEDURE(S):
3.1.401  LAB EMERGENCY LIGHT POWER SUPPLY - INSPECTION

NOTE
1. This procedure may be performed for one Lab ELPS or repeated for both.
2. Each ELPS has two RPCs supplying power.

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

Table 1. ELPS RPCs

<table>
<thead>
<tr>
<th>ELPS Location</th>
<th>Designator</th>
<th>RPVM</th>
<th>RPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Aft</td>
<td>A0120</td>
<td>LA2-2B-G</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LA1-1B-F</td>
<td>14</td>
</tr>
<tr>
<td>Lab Forward</td>
<td>A0119</td>
<td>LA2-2B-B</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LA1-1B-E</td>
<td>1</td>
</tr>
</tbody>
</table>
PCS

1. Opening and Closing Inhibit ELPS RPCs

Lab: EPS: RPCM [X] RPC [Y] where [X,Y] = Refer to Table 1.

RPCM [X] RPC [Y]

- cmd RPC Position – Open (Verify – Op)
- cmd RPC Close Command – Inhibit (Verify – Inh)

Repeat

ACCESS

Table 2. ELPS Closeout Panels

<table>
<thead>
<tr>
<th>Location</th>
<th>Designator</th>
<th>Closeout Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Forward</td>
<td>A0119</td>
<td>LABSD0-09</td>
</tr>
<tr>
<td>Lab Aft</td>
<td>A0120</td>
<td>LABPD7-09</td>
</tr>
</tbody>
</table>

2. Loosen closeout panel quarter-turn fasteners (six) by hand.
   Remove Closeout Panel.
   Refer to Table 2.
   Temporarily stow.

REMOVAL

3. ELPS switch → Disable

Refer to Figure 1.
4. Loosen ELPS BMA fasteners (four), remove BMA (Ratchet, 1/4” Drive; 1/4” Socket).
   Refer to Figure 1.
   Temporarily stow.

**REPLACEMENT**
5. Install replacement EELS BMA onto ELPS, snug fasteners (four)
   (Ratchet, 1/4” Drive; 1/4” Socket).

**CHECKOUT**
6. Perform {3.1.401 LAB EMERGENCY LIGHT POWER SUPPLY - INSPECTION}, all (SODF: ISS IFM: LAB: NOMINAL), then:

**CLOSEOUT**
7. Install Endcone Closeout Panel, snug quarter-turn fasteners (six) by hand.
   Refer to Table 2.

**POST MAINTENANCE**
8. Repeat for remaining ELPS BMA.

9. Inform **MCC-H** of task completion.

10. □/MATS for stowage location of failed BMA
    Stow tools and materials.
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OBJECTIVE:
Remove and replace Lab Emergency Light Power Supplies (ELPS).

LOCATION:
Lab forward and aft endcone.

DURATION:
1 hour

PARTS:
None

MATERIALS:
None

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit E:
   Ratchet, 1/4" Drive
Kit F:
   1/4" Socket, 1/4" Drive
Lid #1:
   Static Wrist Tether

REFERENCED PROCEDURE(S):
3.1.401 LAB EMERGENCY LIGHT POWER SUPPLY - INSPECTION

NOTE
1. This procedure may be performed for one Lab ELPS or repeated for both.
2. Each ELPS has two RPCs supplying power.

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

<table>
<thead>
<tr>
<th>ELPS Location</th>
<th>Designator</th>
<th>RPCM</th>
<th>RPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Forward</td>
<td>A0119</td>
<td>LA2-2B-B</td>
<td>11</td>
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<tr>
<td></td>
<td></td>
<td>LA1-1B-E</td>
<td>1</td>
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<tr>
<td>Lab Aft</td>
<td>A0120</td>
<td>LA2-2B-G</td>
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<td></td>
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<td>LA1-1B-F</td>
<td>14</td>
</tr>
</tbody>
</table>
3.2.403 LAB EMERGENCY LIGHT POWER SUPPLY R&R
(ISS IFM/5A - ALL/FIN A)  Page 2 of 4 pages

PCS

1. Opening and Closing Inhibit ELPS RPCs
   Lab: EPS: RPCM [X] RPC [Y] where [X,Y] = Refer to Table 1.
   
   cmd RPC Position – Open (Verify – Op)
   cmd RPC Close Command – Inhibit (Verify – Inh)

   Repeat

ACCESS

Table 2.- ELPS Closeout Panels

<table>
<thead>
<tr>
<th>Location</th>
<th>Designator</th>
<th>Closeout Panel</th>
</tr>
</thead>
<tbody>
<tr>
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<td>LABSD0-09</td>
</tr>
<tr>
<td>Lab Aft</td>
<td>A0120</td>
<td>LABPD7-09</td>
</tr>
</tbody>
</table>

2. Loosen closeout panel quarter-turn fasteners (six) by hand, remove panel.
   Refer to Table 2.
   Temporarily stow.

REMOVAL

Figure 1.- ELPS.

3. ELPS Switch → Disable
   Refer to Figure 1.
4. Don Static Wrist Tether.
   Secure to unpainted metal surface.

   Table 3. ELPS Connectors

<table>
<thead>
<tr>
<th>Location</th>
<th>Wire Plug</th>
<th>Receptacle</th>
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</thead>
<tbody>
<tr>
<td>Lab Forward</td>
<td>P1-W2118</td>
<td>J1</td>
</tr>
<tr>
<td></td>
<td>P2-W2117</td>
<td>J2</td>
</tr>
<tr>
<td></td>
<td>P3-W2122</td>
<td>J3</td>
</tr>
<tr>
<td>Lab Aft</td>
<td>P1-W2173</td>
<td>J1</td>
</tr>
<tr>
<td></td>
<td>P2-W2171</td>
<td>J2</td>
</tr>
<tr>
<td></td>
<td>P3-W2176</td>
<td>J3</td>
</tr>
</tbody>
</table>

5. Demate connectors (three) from ELPS.
   Refer to Figure 1 and Table 3.

6. Loosen ELPS fasteners (four), remove ELPS (Ratchet, 1/4" Drive; 4" Ext; 5/16" Socket).
   Temporarily Stow.

   REPLACEMENT
7. √Replacement ELPS Test Switch in Disable position

   Remove Protective Caps (three), place on failed ELPS.

8. Install ELPS in mounting bracket, tighten fasteners (four).
   Torque to 32 in-lbs (Ratchet, 1/4" Drive; 4" Ext; 5/16" Socket; (10-50 in-lbs) Trq Wrench).

9. Mate connectors (three) to ELPS.
   Refer to Figure 1 and Table 3.

10. Remove Static Wrist Tether.

   CHECKOUT
11. Perform [3.1.401 LAB EMERGENCY LIGHT POWER SUPPLY - INSPECTION], all (SODF: ISS IFM: LAB: NOMINAL), then:

   CLOSEOUT
12. Install Endcone Closeout Panel, snug quarter-turn fasteners (six) by hand.

   POST MAINTENANCE
13. Repeat for remaining ELPS.

15. √MATS for stowage location of failed ELPS
   Stow failed ELPS, tools, supplies.
OBJECTIVE:
Remove and replace failed RPCM.

LOCATION:
Installed: LAB1D1
Stowed: √

Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour

PARTS:
RPCM INT Type V (P/N R077419-51)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Static Wrist Tethers
ISS Common IVA Tool Kit:
Kit E:
   Ratchet, 3/8" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive
Kit R:
   7/16" EVA Socket, 3/8" Drive

REFERENCED PROCEDURE(S):
4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED/DIAGNOSTIC/OFF
4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)
4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL
4.411 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF
4.410 PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY/BACKUP
4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL
AUDIO & VIDEO SYSTEM DEACTIVATION AVIONICS RACK #2
AUDIO SYSTEM ACTIVATION AVIONICS RACK #2
SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD)

1. Perform {4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED/DIAGNOSTIC/OFF}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS: TIER I), then:

2. Perform {4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

3. Perform {4.411 PAYLOAD MDM TRANSITION C: TRANSITION PL MDM FROM OPERATIONAL TO STANDBY/DIAGNOSTIC/OFF}, all (SODF: EPS: CORRECTIVE: MDM STATE: TRANSITIONS TIER II), then:

4. Perform {4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

5. Perform {AUDIO & VIDEO SYSTEM DEACTIVATION AVIONICS RACK #2}, all (SODF: EPS: TBD), then:

6. RACK POWER switch → OFF

7. Verifying LAB1D1 Rack Safed

PCS
Lab: EPS: Rack Power: Rack Power 1
Rack Power 1
‘Rack LAB1D1’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1D1’

Verify RPCM_LA1B_D_RPC_04 Position – Op
ACCESSING

8. Open Rack Front Access Panel by depressing the latch buttons to access the RPDA. Refer to Figure 1.

REMOVAL
9. Locate failed RPCM on RPDA.

CAUTION

1. Failure to use 7/16" EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.
2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.
3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.
10. Don Static Wrist Tether.
   Attach Static Wrist Tether to unpainted surface near RPCM location.
   Refer to Figure 1.

11. Align, insert 7/16" EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw.
    Refer to Figure 2.

   **NOTE**
   1. RPCM Status Indicator will move from “LOCK” line to “UNLOCK” line when Drive Screw Assembly is disengaged.
   2. RPCM Status Indicator may remain at or below “UNLOCK” line when RPCM is removed from SPDA.

12. Applying constant pressure to keep RPCM lock springs released, loosen failed RPCM Drive Screw (Ratchet, 3/8" Drive; 7/16" EVA Socket).

13. √Status indicator – UNLOCK
    Refer to Figure 2.

14. Label, remove failed RPCM from receptacle by sliding it off guide rail.

   **CAUTION**
   Although internal RPCMs appear physically similar, RPCMs have uniquely keyed connectors that can be damaged. Part numbers must be checked when selecting replacement part to ensure that correct part will be installed. Failure to comply may result in damage to equipment.
15. Verify replacement RPCM by part number and Power Out connector pins. Refer to Figure 3.

16. Exchange Electrical Connector Protective Caps (two) between replacement PCM and failed RPCM. Temporarily stow failed RPCM.

**REPLACEMENT**
17. Inspect replacement RPCM and mounting location for foreign matter/debris, damage to alignment guide, pins, sockets.

18. Clean coldplate bonding surfaces with Dry Wipes.


20. Insert RPCM into RPDA receptacle until status indicator reaches “UNLOCK” position.

**CAUTION**

1. Failure to use 7/16” EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.

2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.

3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.

21. Align, insert 7/16” EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. Refer to Figure 2.
22. Applying constant pressure, tighten RPCM Drive Screw, torque to 60 in-lbs (Ratchet, 3/8" Drive; 7/16" EVA Socket; (30-200 in-lbs) Trq Wrench).

23. \( \sqrt{ \text{Status indicator} } \) – LOCK
   Refer to Figure 2.

**CHECKOUT**

24. RACK POWER switch \( \rightarrow \) ON

25. Closing LAB1D1 RPC

<table>
<thead>
<tr>
<th>PCS</th>
<th>Lab: EPS: Rack Power: Rack Power 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rack Power 1</td>
</tr>
<tr>
<td></td>
<td>‘Rack LAB1D1’</td>
</tr>
</tbody>
</table>

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

**cmd** LAB1D1 P Power On

‘Rack Power LAB1D1’

Verify RPCM_LA1B_D_RPC_04 Position – Cl

26. Perform \{4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY.BACKUP\}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

27. Perform \{4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL\}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

28. Perform \{4.410 PAYLOAD MDM TRANSITION B: TRANSITION PL MDM FROM OFF TO STANDBY.BACKUP\}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

29. Perform \{4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL\}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

30. Perform \{AUDIO SYSTEM ACTIVATION AVIONICS RACK #2\}, all (SODF: EPS: TBD), then:
CLOSEOUT

POST MAINTENANCE
32. Inform MCC-H of task completion.

33. √MATS for stowage location of failed RPCM
    Stow tools, materials.
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OBJECTIVE:
Remove and replace failed RPCM.

LOCATION:
Installed: LAB1D5
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour

PARTS:
RPCM INT Type V (P/N R077419-51)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Static Wrist Tethers
ISS Common IVA Tool Kit:
Kit E:
   Ratchet, 3/8” Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8” Drive
Kit R:
   7/16” EVA Socket, 3/8” Drive

REFERENCED PROCEDURE(S):
4.303  CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED/DIAGNOSTIC/OFF
4.302  CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY(BACKUP)
4.407  INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.406  INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL
4.414  PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL
4.413  PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL

AUDIO & VIDEO SYSTEM DEACTIVATION AVIONICS RACK #2
AUDIO SYSTEM ACTIVATION AVIONICS RACK #2

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.
3.2.407 RPCM R&R LAB1D5

1. Perform {4.303 CC MDM TRANSITION C: TRANSITIONING CC 3(1, 2) MDM FROM STANDBY(BACKUP) TO FAILED/DIAGNOSTIC/OFF}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

2. Perform {4.407 INTERNAL MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM STANDBY TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

3. Perform {4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1(2) FROM WAIT TO DIAGNOSTIC/OFF WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

4. Perform {AUDIO & VIDEO SYSTEM DEACTIVATION AVIONICS RACK #2}, all (SODF: EPS: TBD), then:

5. RACK POWER switch → OFF

6. Verifying LAB1D5 Rack Safed

PCS

Lab: EPS: Rack Power: Rack Power 2
Rack Power 2
‘Rack LAB1D5’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1D5’

Verify RPCM_LA2B_C_RPC_02 Position – Op
**ACCESSING**

7. Open Rack Front Access Panel by depressing the latch buttons to access the RPDA. Refer to Figure 1.

**REMOVAL**
8. Locate failed RPCM on RPDA.

**CAUTION**

1. Failure to use 7/16" EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.

2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.

3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.
9. Don Static Wrist Tether. 
   Attach to unpainted surface near RPCM location. 
   Refer to Figure 1.

10. Align, insert 7/16" EVA Socket into RPCM Lock Assembly until it bottoms 
    out, locking springs have released drive screw. 
    Refer to Figure 2.

**NOTE**
1. RPCM Status Indicator will move from “LOCK” line to 
   “UNLOCK” line when Drive Screw Assembly is 
   disengaged.

2. RPCM Status Indicator may remain at or below “UNLOCK” 
   line when RPCM is removed from SPDA.

11. Applying constant pressure to keep RPCM lock springs released, loosen 
    failed RPCM Drive Screw (Ratchet, 3/8" Drive; 7/16" EVA Socket).

12. √ Status indicator – UNLOCK 
    Refer to Figure 2.

13. Label, remove failed RPCM from receptacle by sliding it off guide rail.

**CAUTION**
Although internal RPCMs appear physically similar, 
RPCMs have uniquely keyed connectors that can 
be damaged. Part numbers must be checked when 
selecting replacement part to ensure that correct 
part will be installed. Failure to comply may result 
in damage to equipment.
14. Verify replacement RPCM by part number and Power Out connector pins. Refer to Figure 3.

15. Exchange Electrical Connector Protective Caps (two) between replacement RPCM and failed RPCM. Temporarily stow failed RPCM.

REPLACEMENT

16. Inspect replacement RPCM and mounting location for foreign matter/debris, damage to alignment guide, pins, sockets.

17. Clean coldplate bonding surfaces with Dry Wipes.


19. Insert RPCM into RPDA receptacle until status indicator reaches “UNLOCK” position.

**CAUTION**

1. Failure to use 7/16” EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.

2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.

3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.
20. Align, insert 7/16" EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. Refer to Figure 2.

21. Applying constant pressure, tighten RPCM Drive Screw, torque to 60 in-lbs (Ratchet, 3/8" Drive; 7/16" EVA Socket; (30-200 in-lbs) Trq Wrench).

22. √Status indicator – LOCK
   Refer to Figure 2.

CHECKOUT
23. RACK POWER switch → ON

24. Closing LAB1D5 RPC

PCS

Lab: EPS: Rack Power: Rack Power 2
   ‘Rack Power 2’
   ‘Rack LAB1D5’
   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena
   ‘Rack Power On’

   cmd LAB1D5 Pwr On
   ‘Rack Power LAB1D5’
   Verify RPCM_LA2B_C_RPC_02 Position – Cl

25. Perform {4.302 CC MDM TRANSITION B: TRANSITIONING CC 3(1,2) MDM FROM OFF TO STANDBY/BACKUP}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER I), then:

26. Perform {4.406 INTERNAL MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO STANDBY WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

27. Perform {4.413 PMCU MDM TRANSITION B: TRANSITIONING BACKUP MDM 1(2) FROM OFF TO WAIT WHILE MDM 2(1) IS OPERATIONAL}, all (SODF: EPS: CORRECTIVE: MDM STATE TRANSITIONS TIER II), then:

28. Perform {AUDIO SYSTEM ACTIVATION AVIONICS RACK #2}, all (SODF: EPS: TBD), then:

CLOSEOUT
30. Inform MCC-H of task completion.

31. √MATS for stowage location of failed RPCM
   Stow tools, materials.
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OBJECTIVE:
Remove and replace failed RPCM.

LOCATION:
Installed: LAB1D6
Stowed: \(\sqrt{\text{Maintenance and Assembly Task Supplement (MATS)}}\)

DURATION:
1 hour

PARTS:
RPCM INT Type V (P/N R077419-51)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Static Wrist Tethers
ISS Common IVA Tool Kit:
Kit E:
  Ratchet, 3/8" Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8" Drive
Kit R:
  7/16" EVA Socket, 3/8" Drive

REFERENCED PROCEDURE(S):
1.302 ATMOSPHERE REVITALIZATION RACK DEACTIVATION
1.301 ATMOSPHERE REVITALIZATION RACK ACTIVATION

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

1. Perform {1.302 ATMOSPHERE REVITALIZATION RACK DEACTIVATION }, all (SODF: EPS: ACTIVATION AND CHECKOUT: ARS), then:

2. RACK POWER switch \(\rightarrow\) OFF
3.2.408 RPCM R&R LAB1D6
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3. Verify LAB1D6 Rack Safed

PCS Lab: EPS: Rack Power: Rack Power 2
     Rack Power 2
     ‘Rack LAB1D6’

     Verify Switch Position  – Off
     Verify Switch Avail      – Yes
     Verify Monitoring Status – Ena

     ‘Rack Power LAB1D6’

     Verify RPCM_LA2B_C_RPC_01 Position – Op

ACCESSING

Figure 1.- ARS Rack, Faceplate Assembly Open.
4. Open Rack Front Access Panel by depressing the latch buttons to access the RPDA. 
   Refer to Figure 1.

REMOVAL
5. Locate failed RPCM on RPDA.

**CAUTION**

| 1. | Failure to use 7/16” EVA Socket Ext can result in damage to RPCM Drive Screw Assembly. |
| 2. | Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly. |
| 3. | Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly. |

**Figure 2.** View of RPCM Status Indicator, Drive Screw Assembly.

6. Don Static Wrist Tether. 
   Attach to unpainted surface near RPCM location. 
   Refer to Figure 1.

7. Align, insert 7/16” EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. 
   Refer to Figure 2.

**NOTE**

| 1. | RPCM Status Indicator will move from “LOCK” line to “UNLOCK” line when Drive Screw Assembly is disengaged. |
| 2. | RPCM Status Indicator may remain at or below “UNLOCK” line when RPCM is removed from SPDA. |
8. Applying constant pressure to keep RPCM lock springs released, loosen failed RPCM Drive Screw (Ratchet, 3/8” Drive; 7/16” EVA Socket).

9. √ Status indicator – UNLOCK
Refer to Figure 2.

10. Label, remove failed RPCM from receptacle by sliding it off guide rail.

**CAUTION**
Although internal RPCMs appear physically similar, RPCMs have uniquely keyed connectors that can be damaged. Part numbers must be checked when selecting replacement part to ensure that correct part will be installed. Failure to comply may result in damage to equipment.

<table>
<thead>
<tr>
<th>Type I</th>
<th>Type II, Type VI</th>
<th>Type III, Type IV</th>
<th>Type V</th>
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<tbody>
<tr>
<td></td>
<td>Power Output (P1A)</td>
<td>Power Input (P1B)</td>
<td>Data Bus Interface (P1B)</td>
</tr>
</tbody>
</table>

Figure 3.- RPCM Connector Identification Chart.

11. Verify replacement RPCM by part number and Power Out connector pins. Refer to Figure 3.

12. Exchange Electrical Connector Protective Caps (two) between replacement RPCM and failed RPCM. Temporarily stow failed RPCM.

**REPLACEMENT**
13. Inspect replacement RPCM and mounting location for foreign matter/debris, damage to alignment guide, pins, sockets.


15. Position replacement RPCM on guide rail of failed RPCM location.

16. Insert RPCM into RPDA receptacle until status indicator reaches “UNLOCK” position.
CAUTION

1. Failure to use 7/16" EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.
2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.
3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.

17. Align, insert 7/16" EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. Refer to Figure 2.

18. Applying constant pressure, tighten RPCM Drive Screw, torque to 60 in-lbs (Ratchet, 3/8" Drive; 7/16" EVA Socket; (30-200 in-lbs) Trq Wrench).

19. √Status indicator – LOCK Refer to Figure 2.

CHECKOUT
20. RACK POWER switch → ON

21. Closing LAB1D6 RPC

PCS
Lab: EPS: Rack Power: Rack Power 2
Rack Power 2
‘Rack LAB1D6’

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

cmd LAB1D6 Pwr On
‘Rack Power LAB1D6’

Verify RPCM_LA2B_C_RPC_01 Position – Cl

22. Perform \{1.301 ATMOSPHERE REVITALIZATION RACK ACTIVATION\}, all (SODF: EPS: ACTIVATION AND CHECKOUT: ARS), then:

CLOSEOUT
24. Inform MCC-H of task completion.

25. MATS for stowage location of failed RPCM
   Stow tools, materials.
OBJECTIVE:
Remove and replace failed RPCM.

LOCATION:
Installed: LAB1P6
Stowed: √

Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour

PARTS:
RPCM INT Type V (P/N R077419-51)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Static Wrist Tethers
ISS Comon IVA Tool Kit:
Kit E:
  Ratchet, 3/8” Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8” Drive
Kit R:
  7/16” EVA Socket, 3/8” Drive

REFERENCED PROCEDURE(S):
1.503  CCAA DEACTIVATION
1.501  CCAA ACTIVATION
2.205  LAB IATCS TRANSITION TO SINGLE MT (AUTO)
2.203  LAB IATCS TRANSITION TO DUAL (AUTO)

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

1. Perform {1.503 CCAA DEACTIVATION}, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:

2. Perform {2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)}, all (SODF: EPS: TBD), then:
3. RACK POWER switch → OFF

4. Verify LAB1P6 Rack Safed

   PCS
   Lab: EPS: Rack Power: Rack Power 1
   Rack Power 1
   ‘Rack LAB1P6’
   Verify Switch Position – Off
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power LABP6’
   Verify RPC_LA1B_D_RPC_03 Position – Op

5. Open Rack Front Access Panel by depressing the latch buttons to access the RPDA.
   Refer to Figure 1.
REMOVAL

6. Locate failed RPCM on RPDA.

**CAUTION**

1. Failure to use 7/16” EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.

2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.

3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.

Figure 2.- View of RPCM Status Indicator, Drive Screw Assembly.

7. Don Static Wrist Tether.
   Attach to unpainted surface near RPCM location.
   Refer to Figure 1.

8. Align, insert 7/16” EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw.
   Refer to Figure 2.

**NOTE**

1. RPCM Status Indicator will move from “LOCK” line to “UNLOCK” line when Drive Screw Assembly is disengaged.

2. RPCM Status Indicator may remain at or below “UNLOCK” line when RPCM is removed from SPDA.
3.2.412 RPCM R&R LAB1P6
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9. Applying constant pressure to keep RPCM lock springs released, loosen failed RPCM Drive Screw (Ratchet, 3/8” Drive; 7/16” EVA Socket).

10. √Status indicator – UNLOCK
Refer to Figure 2.

11. Label, remove failed RPCM from receptacle by sliding it off guide rail.

**CAUTION**
Although internal RPCMs appear physically similar, RPCMs have uniquely keyed connectors that can be damaged. Part numbers must be checked when selecting replacement part to ensure that correct part will be installed. Failure to comply may result in damage to equipment.

12. Verify replacement RPCM by part number and Power Out connector pins. Refer to Figure 3.

13. Exchange Electrical Connector Protective Caps (two) between replacement RPCM and failed RPCM. Temporarily stow failed RPCM.

**REPLACEMENT**

15. Clean coldplate bonding surfaces with Dry Wipes.

17. Insert RPCM into RPDA receptacle until status indicator reaches “UNLOCK” position.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Failure to use 7/16” EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.</td>
</tr>
<tr>
<td>2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.</td>
</tr>
<tr>
<td>3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.</td>
</tr>
</tbody>
</table>

18. Align, insert 7/16” EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. Refer to Figure 2.

19. Applying constant pressure, tighten RPCM Drive Screw, torque to 60 in-lbs (Ratchet, 3/8” Drive; 7/16” EVA Socket; (30-200 in-lbs) Trq Wrench).

20. √ Status indicator – LOCK
   Refer to Figure 2.

**CHECKOUT**

21. RACK POWER switch → ON

22. Closing LAB1P6 RPC

   PCS
   LAB: EPS: Rack Power: Rack Power 1
   Rack Power 1
   ‘Rack LAB1P6’

   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power On’

   cmd LAB1P6 Pwr On

   ‘Rack Power LAB1P6’

   Verify RPCM_LA1B_D_RPC_03 Position – Cl

23. Perform {1.501 CCAA ACTIVATION}, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:
24. Perform **2.203 LAB IATCS TRANSITION TO DUAL (AUTO)**, all (SODF: EPS: NOMINAL), then:

**CLOSEOUT**

**POST MAINTENANCE**
26. Inform **MCC-H** of task completion.

27. √MATS for stowage location of failed RPCM
Stow tools, materials.
OBJECTIVE:
Remove and replace failed RPCM.

LOCATION:
Installed: LAB1P7
Stowed: \(\checkmark\) Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour

PARTS:
RPCM INT Type V (P/N R077419-31) or
RPCM INT Type VI (P/N R077420-31)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Static Wrist Tethers
ISS Common IVA Tool Kit:
Kit E:
   Ratchet, 3/8" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive
Kit R:
   7/16" EVA Socket, 3/8" Drive

REFERENCED PROCEDURE(S):
1.211 LAB DDCU LA2B DEACTIVATION FROM CCS
1.209 LAB DDCU LA2B ACTIVATION FROM CCS
1.201 LAB RACK ROTATE

SAFING FAILED RPCM

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

1. Perform {1.211 LAB DDCU LA2B DEACTIVATION FROM CCS}, all
(SODF: EPS: ACTIVATION AND CHECKOUT: ENERGY
CONVERSION), then:
ACCESSING
2. Remove Closeout Panel LAB1P6-01, 1/4 turn fasteners (six).
   Remove Closeout Panel LAB1O6-03, 1/4 turn fasteners (three).
   Temporarily stow Panels.
3. Perform [1.201 LAB RACK ROTATE], step 1, appropriate Rack Down
   steps only, (SODF: S&M: NOMINAL: RACK), then:
4. Remove Shear Panel in front of SPDA LA2B, 1/8" hex-head fasteners
   (thirty eight) (Handle, 1/4" Drive; 1/8" Head Head).

REMOVAL

Figure 1.- SPDA LA2B with Panels LAB1P6-01, LAB1O6-03.
Removed Rack LAB1P6 Rotated Down.

5. Locate failed RPCM on SPDA LA2B.
   Refer to Figure 1 and Table 1.

Table 1. LAB1P7 RPDA/RPCM Identification

<table>
<thead>
<tr>
<th>Name</th>
<th>Reference Designator</th>
<th>RPCM Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPDA LA2B</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>RPCM LA2B-A</td>
<td>(A13)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA2B-B</td>
<td>(A14)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA2B-C</td>
<td>(A17)</td>
<td>VI</td>
</tr>
<tr>
<td>RPCM LA2B-D</td>
<td>(A18)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA2B-E</td>
<td>(A19)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA2B-F</td>
<td>(A20)</td>
<td>VI</td>
</tr>
<tr>
<td>RPCM LA2B-G</td>
<td>(A23)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA2B-H</td>
<td>(A24)</td>
<td>V</td>
</tr>
</tbody>
</table>
### CAUTION

| 1. Failure to use 7/16” EVA Socket Ext can result in damage to RPCM Drive Screw Assembly. |
| 2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly. |
| 3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly. |

Figure 2.- View of RPCM Status Indicator, Drive Screw Assembly.

6. Don Static Wrist Tether.
Attach to unpainted surface near RPCM location.
Refer to Figure 1.

7. Align, insert 7/16” EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw.
Refer to Figure 2.

### NOTE

| 1. RPCM Status Indicator will move from “LOCK” line to “UNLOCK” line when Drive Screw Assembly is disengaged. |
| 2. RPCM Status Indicator may remain at or below “UNLOCK” line when RPCM is removed from SPDA. |

8. Applying constant pressure to keep RPCM lock springs released, loosen failed RPCM Drive Screw (Ratchet, 3/8” Drive; 7/16” EVA Socket).

9. √Status indicator – UNLOCK

10. Label, remove failed RPCM from receptacle by sliding it off guide rail.
CAUTION
Although internal RPCMs appear physically similar, RPCMs have uniquely keyed connectors that can be damaged. Part numbers must be checked when selecting replacement part to ensure that correct part will be installed. Failure to comply may result in damage to equipment.

NOTE
This procedure is for all eight RPCMs that are installed on the SPDA in the aft endcone. Six of these are Type V with part number R077419-31. The two remaining are Type VI with part number R077420-31.

---

11. Verify replacement RPCM by part number and Power Out connector pins. Refer to Figure 3.

12. Exchange Electrical Connector Protective Caps (two) between replacement RPCM and failed RPCM. Temporarily stow failed RPCM.

REPLACEMENT
13. Inspect replacement RPCM and mounting location for foreign matter/debris, damage to alignment guide, pins, sockets.


15. Position replacement RPCM on guide rail of failed RPCM location.
16. Insert RPCM into SPDA receptacle until status indicator reaches “UNLOCK” position.

**CAUTION**

1. Failure to use 7/16” EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.
2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.
3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.

17. Align, insert 7/16” EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. Refer to Figure 4.

18. Applying constant pressure, tighten RPCM Drive Screw, torque to 60 in-lbs (Ratchet, 3/8” Drive; 7/16” EVA Socket; (30-200 in-lbs) Trq Wrench).

19. \(\sqrt{\text{Status indicator – LOCK}}\)

**CHECKOUT**

20. Perform {1.209 LAB DDCU LA2B ACTIVATION FROM CCS}, all (SODF: EPS: ACTIVATION AND CHECKOUT: ENERGY CONVERSION), then:

**CLOSEOUT**

21. Reinstall Shear Panel in front of SPDA LA2B, 1/8” hex-head fasteners (thirty eight) (Handle, 1/4” Drive; 1/8” Hex Head Driver).

22. Perform {1.201 LAB RACK ROTATE}, appropriate Rack Up steps only, (SODF: S&M: NOMINAL: RACK), then:

23. Reinstall Closeout Panel LAB1P6-01, 1/4 turn fasteners (six). Reinstall Closeout Panel LAB1O6-03, 1/4 turn fasteners (three).

**POST MAINTENANCE**

24. Inform MCC-H of task completion.

25. \(\sqrt{\text{MATS for stowage location of failed RPCM}}\)

Stow tools, equipment, supplies.
OBJECTIVE:
Remove and replace failed RPCM.

LOCATION:
Installed: LAB1S0
Stowed: √ MTA Supplement (MATS)

DURATION:
1 hour

PARTS:
RPCM INT Type V (P/N R077419-31) or
RPCM INT Type VI (P/N R077420-31)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Static Wrist Tethers
ISS Common IVA Tool Kit:
Kit E:
   Ratchet, 3/8” Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8” Drive
Kit R:
   7/16” EVA Socket, 3/8” Drive

REFERENCED PROCEDURE(S):
1.207 LAB DDCU LA1B DEACTIVATION FROM CCS
1.205 LAB DDCU LA1B ACTIVATION FROM CCS
1.201 LAB RACK ROTATE

SAFING FAILED RPCM

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

1. Perform {1.207 LAB DDCU LA1B DEACTIVATION FROM CCS}, all (SODF: EPS: ACTIVATION AND CHECKOUT: ENERGY CONVERSION), then:

ACCESSING
2. Remove Closeout Panel LAB1S1-01, 1/4 turn fasteners (six).
   Remove Closeout Panel LAB1O1-04, 1/4 turn fasteners (three).
   Temporarily stow Panels.
3. Perform \{1.201 LAB RACK ROTATE\}, step 1, appropriate Rack Down steps only, (SODF: S&M: NOMINAL: RACK), then:

4. Remove Shear Panel in front of SPDA LA1B, 1/8" hex-head fasteners (thirty eight) (Handle, 1/4" Drive; 1/8" Head Head Driver).

**REMOVAL**

Figure 1.- SPDA LA1B with Panels LAB1S1-01, LAB1O1-04 removed, Rack LAB1S1 Rotated Down.

5. Locate failed RPCM on SPDA LA1B.
   Refer to Figure 1 and Table 1.
### Table 1. LAB1S0 RPDA/RPCM Identification

<table>
<thead>
<tr>
<th>Name</th>
<th>Reference Designator</th>
<th>RPCM Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPDA LA1B</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>RPCM LA1B-A</td>
<td>(A1)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA1B-B</td>
<td>(A2)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA1B-C</td>
<td>(A8)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA1B-D</td>
<td>(A5)</td>
<td>VI</td>
</tr>
<tr>
<td>RPCM LA1B-E</td>
<td>(A6)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA1B-F</td>
<td>(A7)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA1B-G</td>
<td>(A11)</td>
<td>V</td>
</tr>
<tr>
<td>RPCM LA1B-H</td>
<td>(A12)</td>
<td>V</td>
</tr>
</tbody>
</table>

**CAUTION**

1. Failure to use 7/16" EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.

2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.

3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.

---

6. **Don Static Wrist Tether.**
   - Attach to unpainted surface near RPCM location.
   - Refer to Figure 1.

7. **Align, insert 7/16" EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw.**
   - Refer to Figure 2.
NOTE
1. RPCM Status Indicator will move from “LOCK” line to “UNLOCK” line when Drive Screw Assembly is disengaged.

2. RPCM Status Indicator may remain at or below “UNLOCK” line when RPCM is removed from SPDA.

8. Applying constant pressure to keep RPCM lock springs released, loosen failed RPCM Drive Screw (Ratchet, 3/8” Drive; 7/16” EVA Socket).

9. √Status indicator – UNLOCK

10. Label, remove failed RPCM from receptacle by sliding it off guide rail.

CAUTION
Although internal RPCMs appear physically similar, RPCMs have uniquely keyed connectors that can be damaged. Part numbers must be checked when selecting replacement part to ensure that correct part will be installed. Failure to comply may result in damage to equipment.

NOTE
This procedure is for all eight RPCMs that are installed on the SPDA in the forward endcone. Seven of these are Type V with part number R077419-31. The remaining is Type VI with part number R077420-31.

Figure 3.- RPCM Connector Identification Chart.

11. Verify replacement RPCM by part number and Power Out connector pins. Refer to Figure 3.
12. Exchange Electrical Connector Protective Caps (two) between replacement RPCM and failed RPCM. Temporarily stow failed RPCM.

REPLACEMENT
13. Inspect replacement RPCM and mounting location for foreign matter/debris, damage to alignment guide, pins, sockets.


15. Position replacement RPCM on guide rail of failed RPCM location.

16. Insert RPCM into SPDA receptacle until status indicator reaches “UNLOCK” position.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1. Failure to use 7/16” EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.</td>
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<tr>
<td>2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.</td>
</tr>
<tr>
<td>3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.</td>
</tr>
</tbody>
</table>

17. Align, insert 7/16” EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. Refer to Figure 4.

18. Applying constant pressure, tighten RPCM Drive Screw, torque to 60 in-lbs (Ratchet, 3/8” Drive; 7/16” EVA Socket; (30-200 in-lbs) Trq Wrench).

19. √Status indicator – LOCK

CHECKOUT
20. Perform {1.205 LAB DDCU LA1B ACTIVATION FROM CCS}, all (SODF: EPS: ACTIVATION AND CHECKOUT: ENERGY CONVERSION), then:

CLOSEOUT
21. Reinstall Shear Panel in front of SPDA LA1B, 1/8” hex-head fasteners (thirty eight) (Handle, 1/4” Drive; 1/8” Hex Head Driver).

22. Perform {1.201 LAB RACK ROTATE}, appropriate Rack Up steps only, (SODF: S&M: NOMINAL: RACK), then:

23. Reinstall Closeout Panel LAB1S1-01, 1/4 turn fasteners (six). Reinstall Closeout Panel LAB1O1-04, 1/4 turn fasteners (three).
3.2.414  RPCM R&R LAB1S0

POST MAINTENANCE
24. Inform MCC-H of task completion.

25. √MATS for stowage location of failed RPCM
   Stow tools, equipment supplies.
OBJECTIVE:
Remove and replace failed RPCM.

LOCATION:
Installed: LAB1S6
Stowed: √

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
Static Wrist Tethers
ISS Common IVA Tool Kit:
Kit E:
Ratchet, 3/8” Drive
Kit G:
(30-200 in-lbs) Trq Wrench, 3/8” Drive
Kit R:
7/16” EVA Socket, 3/8” Drive

REFERENCED PROCEDURE(S):
1.503 CCAA DEACTIVATION
1.501 CCAA ACTIVATION
2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

CAUTION
Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

1. Perform {1.503 CCAA DEACTIVATION}, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:

2. Perform {2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)}, all (SODF: EPS: TBD), then:
3. RACK POWER switch → OFF

4. Verify LAB1S6 Rack Safed

PCS

LAB: EPS: Rack Power: Rack Power 3
  Rack Power 3
  ‘Rack LAB1S6’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Op

ACCESSING

![Diagram of Cabin Air MTL Rack, Faceplate Assembly Open](RPCM location)

Figure 1.- Cabin Air MTL Rack, Faceplate Assembly Open.
5. Open Rack Front Access Panel by depressing the latch buttons to access the RPDA. Refer to Figure 1.

REMOVAL
6. Locate failed RPCM on RPDA.

**CAUTION**

1. Failure to use 7/16" EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.

2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.

3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.

**NOTE**

1. RPCM Status Indicator will move from "LOCK" line to "UNLOCK" line when Drive Screw Assembly is disengaged.

2. RPCM Status Indicator may remain at or below "UNLOCK" line when RPCM is removed from SPDA.

Figure 2.- View of RPCM Status Indicator, Drive Screw Assembly.

7. Don Static Wrist Tether. Attach to unpainted surface near RPCM location. Refer to Figure 1.

8. Align, insert 7/16" EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. Refer to Figure 2.
9. Applying constant pressure to keep RPCM lock springs released, loosen failed RPCM Drive Screw (Ratchet, 3/8" Drive; 7/16" EVA Socket).

10. √Status indicator – UNLOCK
Refer to Figure 2.

11. Label, remove failed RPCM from receptacle by sliding it off guide rail.

### CAUTION

Although internal RPCMs appear physically similar, RPCMs have uniquely keyed connectors that can be damaged. Part numbers must be checked when selecting replacement part to ensure that correct part will be installed. Failure to comply may result in damage to equipment.

![RPCM Connector Identification Chart](image)

12. Verify replacement RPCM by part number and Power Out connector pins. Refer to Figure 3.

13. Exchange Electrical Connector Protective Caps (two) between replacement RPCM and failed RPCM. Temporarily stow failed RPCM.

### REPLACEMENT


15. Clean coldplate bonding surfaces with Dry Wipes.

17. Insert RPCM into RPDA receptacle until status indicator reaches “UNLOCK” position.

**CAUTION**

1. Failure to use 7/16” EVA Socket Ext can result in damage to RPCM Drive Screw Assembly.

2. Failure to align and fully seat Socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.

3. Combined linear and rotational motion on Socket during insertion can result in damage to RPCM Drive Screw Assembly.

18. Align, insert 7/16” EVA Socket into RPCM Lock Assembly until it bottoms out, locking springs have released drive screw. Refer to Figure 2.

19. Applying constant pressure, tighten RPCM Drive Screw, torque to 60 in-lbs (Ratchet, 3/8” Drive; 7/16” EVA Socket; (30-200 in-lbs) Trq Wrench).

20. √Status indicator – LOCK
   Refer to Figure 2.

**CHECKOUT**

21. RACK POWER switch → ON

22. Closing LAB1S6 RPC

   PCS
   Lab: EPS: Rack Power: Rack Power 3
   Rack Power 3
   ‘Rack LAB1S6’

   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power On’

   cmd LAB1S6 Pwr On

   ‘Rack Power LAB1S6’

   Verify RPCM_LA2B_F_RPC_01 Position – Cl

23. Perform {1.501  CCAA ACTIVATION}, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:
24. Perform \{2.203 LAB IATCS TRANSITION TO DUAL (AUTO)\}, all (SODF: EPS: TBD), then:

**CLOSEOUT**

**POST MAINTENANCE**
26. Inform **MCC-H** of task completion.

27. √MATS for stowage location of failed RPCM
   Stow tools, materials.
OBJECTIVE:
To remove and replace failed Low Temperature (LT) Thermal Control System (TCS) Pump Package Assembly (PPA).

LOCATION:
Installed: LAB1P6
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Pump Package Assembly (P/N 2353170-1-1)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
   1/2” Deep Socket, 3/8” Drive
Kit D:
   5/32” Hex Head, 3/8” Drive
Kit E:
   Ratchet, 3/8” Drive
   Speed Handle
   1/4” to 3/8” Adapter
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8” Drive

REFERENCED PROCEDURE(S):
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)
2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)
1.201 LAB RACK ROTATE
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.
NOTE
1. System must be transitioned to single loop MT before disabling LAB1P6 Pump Package Assembly.

2. If LAB1P6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.

1. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:

2. Perform {2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)}, all (SODF: TCS: NOMINAL), then:

<table>
<thead>
<tr>
<th>LAB1P6 TCS Equipment - PCS Labels</th>
<th>RPC [X]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB LTL SFCA SOV</td>
<td>LAP61B_A RPC 5</td>
</tr>
<tr>
<td>LAB LTL SFCA Mod Vlv</td>
<td>LAP61B_A RPC 6</td>
</tr>
<tr>
<td>LAB LTL NIA Vlv</td>
<td>LAP61B_A RPC 7</td>
</tr>
<tr>
<td>LAB LTL NIA Isol Vlv</td>
<td>LAP61B_A RPC 8</td>
</tr>
<tr>
<td>LAB LTL PPA</td>
<td>LAP61B_A RPC 18</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1P6 TCS Equipment.
   Refer to Table 1.

   PCS
   Lab: EPS: LAB1P6
   Lab_Rack_LAB1P6
   sel RPCM LAP61B A
   
   | RPCM_LAP61B_A |
   |              |
   
   sel RPC [X]
   
   | RPCM LAP61B A RPC [X] |
   |                      |
   
   cmd RPC Position – Open (Verify – Op)
   cmd Close Cmd – Inhibit (Verify – Inh)

   Repeat (for remaining RPCs)

4. RACK POWER switch → OFF
5. Verifying LAB1P6 Rack Safed

PCS

Lab: EPS: Rack Power: Rack Power 1
   Rack Power 1
   ‘Rack LAB1P6’

   Verify Switch Position – Off
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power LAB1P6’

   Verify RPCM_LA1B_D_RPC_03 Position – Op

ACCESSING

6. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

7. Remove rack rear access panel, fasteners (forty four) (Speed Handle; 1/4” to 3/8” Adapter; 5/32” Hex Head). Temporarily stow.

REMOVAL

Figure 1.- LAB1P6 PPA (Rear View).
8. Demate connectors from rear of PPA (refer to Figure 1).
   W14-P4 ←|→ J1
   W61-P5 ←|→ J2
   W60-P2 ←|→ J3
   Nitrogen Line ←|→ Nitrogen Inlet
   Inlet Flex Hose ←|→ PPA
   Outlet Flex Hose ←|→ PPA

9. Unfasten rear PPA fasteners (eight) (Ratchet, 3/8” Drive; 1/2” Deep Socket).
   Refer to Figure 2.

10. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

11. Depress latches (two), open upper right-hand faceplate of Rack LAB1P6.

12. Unfasten front PPA fasteners (eight) (Ratchet, 3/8” Drive; 1/2” Deep Socket).
    Refer to Figure 2.

13. Remove PPA straight out from front of rack, label, temporarily stow.

REPLACEMENT

15. Tighten front PPA fasteners (eight) (Ratchet, 3/8” Drive; 1/2” Deep Socket).
    Refer to Figure 2.

17. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

18. Tighten rear PPA fasteners (eight) (Ratchet 3/8" Drive, 1/2" Deep Socket).
    Refer to Figure 2.

19. Torque rear PPA fasteners (eight) to 95 in-lbs ((30-200 in-lbs) Torque Wrench; 1/2" Deep Socket, 3/8" Drive).
    Refer to Figure 2.

20. Mate connectors to rear of PPA (refer to Figure 1).
    W14-P4 →|← J1
    W61-P5 →|← J2
    W60-P2 →|← J3
    Nitrogen Line →|← Nitrogen Inlet
    Inlet Flex Hose →|← PPA
    Outlet Flex Hose →|← PPA

21. Replace rack rear access panel, tighten fasteners (forty four) (Speed Handle; 1/4” to 3/8” Adapter; 5/32” Hex Head).

22. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

23. Depress latches (two).
    Open upper right-hand faceplate of Rack LAB1P6.

24. Torque front PPA fasteners (eight) to 95 in-lbs ((30-200 in-lbs) Trq Wrench; 1/2” Deep Socket, 3/8” Drive).
    Refer to Figure 2.

CLOSEOUT

CHECKOUT
26. RACK POWER switch → ON

27. Closing LAB1P6 RPC

PCS
Lab: EPS: Rack Power: Rack Power 1
   Rack Power 1
   ‘Rack LAB1P6’

   Verify Switch Position  – On
   Verify Switch Avail     – Yes
   Verify Monitoring Status – Ena
3.2.601 PUMP PACKAGE ASSEMBLY R&R LAB1P6

(Rack Power On)

**cmd** LAB1P6 Pwr On

‘Rack Power LAB1P6’

Verify RPCM_LA1B_D_RPC_03 Position – Cl

28. Close Enable, Close RPCs for LAB1P6 TCS Equipment. Refer to Table 1.

`PCS`

Lab: EPS: LAB1P6

<table>
<thead>
<tr>
<th>Lab_Rack_LAB1P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>sel RPCM LAP61B A</td>
</tr>
<tr>
<td>{RPCM_LAP61B_A}</td>
</tr>
<tr>
<td>sel RPC [X]</td>
</tr>
<tr>
<td>{RPCM LAP61B A RPC [X]}</td>
</tr>
<tr>
<td><strong>cmd</strong> Close Cmd – Enable (Verify – Ena)</td>
</tr>
<tr>
<td><strong>cmd</strong> RPC Position – Closed (Verify – Cl)</td>
</tr>
</tbody>
</table>

Repeat for remaining RPCs

29. Perform {2.203 LAB IATCS TRANSITION TO DUAL (AUTO)}, all (SODF: TCS: NOMINAL), then:

**NOTE**
Operational Configuration of LAB1P6 CCAA will be determined after maintenance has been performed. If determined that LAB1P6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.

30. √MCC-H for operational configuration

31. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:

**POST MAINTENANCE**
32. Inform MCC-H of task completion.

33. √MATS for stowage location of failed PPA

Stow failed PPA, tools, materials.
OBJECTIVE:
To remove and replace failed Moderate Temperature (MT) Thermal Control System (TCS) Pump Package Assembly (PPA).

LOCATION:
Installed: LAB1S6
Stowed: √Maintenance and Assembly Task Supplement (MATS)

DURATION:
1 hour 30 minutes

PARTS:
Pump Package Assembly (P/N 2353170-1-1)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
  1/2” Deep Socket, 3/8” Drive
Kit D:
  5/32” Hex Head, 3/8” Drive
Kit E:
  Ratchet, 3/8” Drive
  Speed Handle
  1/4” to 3/8” Adapter
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8” Drive

REFERENCED PROCEDURE(S):
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)
2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO)
1.201 LAB RACK ROTATE
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

NOTE
1. System must be transitioned to single loop LT before disabling LAB1S6 Pump Package Assembly.
2. If LAB1S6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.
1. If required, perform **2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL**, all (SODF: ECLSS: NOMINAL: THC), then:

2. Perform **2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO)**, all (SODF: TCS: NOMINAL), then:

<table>
<thead>
<tr>
<th>Table 1. LAB1S6 TCS Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB1S6 TCS Equipment - PCS Labels</td>
</tr>
<tr>
<td>LAB MTL SFCA SOV</td>
</tr>
<tr>
<td>LAB MTL SFCA Mod Vlv</td>
</tr>
<tr>
<td>LAB MTL NIA Vlv</td>
</tr>
<tr>
<td>LAB MTL NIA Isol Vlv</td>
</tr>
<tr>
<td>LAB MTL PPA</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

   PCS
   Lab: EPS: LAB1S6
   Lab_Rack_LAB1S6
   sel RPCM LAS62B
   **RPCM LAS62B**
   sel RPC [X]
   **RPCM LAS62B RPC [X]**

   **cmd** RPC Position – Open (Verify – Op)
   **cmd** Close Cmd – Inhibit (Verify – Inh)

   Repeat for remaining RPCs

4. RACK POWER switch → OFF

5. Verifying LAB1S6 Rack Safed

   PCS
   Lab: EPS: Rack Power: Rack Power 3
   **Rack Power 3**
   ‘Rack LAB1S6’

   Verify Switch Position – Off
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power LAB1S6’

   Verify RPCM_LA2B_F_RPC_01 Position – Op
6. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Down steps only (SODF: S&M: NOMINAL: RACK), then:

7. Remove rack rear access panel, fasteners (forty four) (Speed Handle; 1/4" to 3/8" Adapter; 5/32" Hex Head). Temporarily stow.

---

**REMOVAL**

**Figure 1.-** LAB1S6 PPA (Rear View).

**Figure 2.-** LAB1S6 (Front View).
8. Demate connectors from rear of PPA (refer to Figure 1).
   W5-P4 ←|→ J1
   W37-P5 ←|→ J2
   W40-P2 ←|→ J3
   Nitrogen Line ←|→ Nitrogen Inlet
   Inlet Flex Hose ←|→ PPA
   Outlet Flex Hose ←|→ PPA

9. Unfasten rear PPA fasteners (eight) (Ratchet, 3/8” Drive; 1/2” Deep Socket).
   Refer to Figure 2.

10. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Up steps only (SODF:
   S&M: NOMINAL: RACK), then:

11. Depress latches (two).
    Open upper left-hand faceplate of Rack LAB1S6.

12. Unfasten front PPA fasteners (eight) (Ratchet, 3/8” Drive; 1/2” Deep Socket).
    Refer to Figure 2.

13. Remove PPA straight out from front of rack, label, temporarily stow.


15. Tighten front PPA fasteners (eight) (Ratchet, 3/8” Drive; 1/2” Deep Socket).
    Refer to Figure 2.


17. Perform {1.201 LAB RACK ROTATE}, Rotate Rack Down steps only
    (SODF: S&M: NOMINAL: RACK), then:

18. Tighten rear PPA fasteners (eight) (Ratchet, 3/8” Drive; 1/2” Deep Socket).
    Refer to Figure 2.

19. Torque rear PPA fasteners (eight) to 95 in-lbs ((30-200 in-lbs) Trq Wrench; 1/2” Deep Socket, 3/8” Drive).
    Refer to Figure 2.

20. Mate connectors to rear of PPA (refer to Figure 1).
    W5-P4 ←|→ J1
    W37-P5 ←|→ J2
    W40-P2 ←|→ J3
    Nitrogen Line ←|→ Nitrogen Inlet
    Inlet Flex Hose ←|→ PPA
    Outlet Flex Hose ←|→ PPA
21. Replace rack rear access panel, tighten fasteners (forty four) (Speed Handle; 1/4” to 3/8” Adapter; 5/32” Hex Head).

22. Perform (1.201 LAB RACK ROTATE), Rotate Rack Up steps only (SODF: S&M: NOMINAL: RACK), then:

23. Depress latches (two).
Open upper left-hand faceplate of Rack LAB1S6.

24. Torque front PPA fasteners (eight) to 95 in-lbs ((30-200 in-lbs) Trq Wrench; 1/2” Deep Socket, 3/8” Drive,).
Refer to Figure 2.

CLOSEOUT

CHECKOUT
26. RACK POWER switch → ON

27. Closing LAB1S6 RPC

PCS
Lab: EPS: Rack Power: Rack Power 3
  Rack Power 3
‘Rack LAB1S6’

Verify Switch Position – On
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power On’

cmd LAB1S6 Pwr On

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Cl
28. Close Enable, Close RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

PCS

Lab: EPS: LAB1S6
Lab_Rack_LAB1S6

sel RPCM LAS62B

RPCM_LAS62B

sel RPC [X]

RPCM LAS62B RPC [X]

cmd Close Cmd – Enable
cmd RPC Position – Closed (Verify – Cl)

Repeat for remaining RPCs

29. Perform {2.203 LAB IATCS TRANSITION TO DUAL (AUTO)}, all (SODF: TCS: NOMINAL), then:

NOTE
Operational Configuration of LAB1S6 CCAA will be determined after maintenance has been performed. If determined that LAB1S6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.

30. √MCC-H for operational configuration

31. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:

POST MAINTENANCE
32. Inform MCC-H of task completion.

33. √MATS for stowage location of failed PPA
Stow failed PPA, tools, materials.
OBJECTIVE:
Remove and replace failed Common Cabin Air Assembly (CCAA) System Flow Control Assembly (SFCA).

LOCATION:
Installed: LAB1P6
Stowed: √Maintenance and Task Supplement (MATS)

DURATION:
50 minutes

PARTS:
System Flow Control Assembly (P/N 2353190-1-1)

MATERIALS:
Dry Wipes

TOOLS REQUIRED:
Equipment Bag
ISS Common IVA Tool Kit:
Kit C:
  3/8" Socket, 3/8" Drive
Kit E:
  Ratchet, 3/8" Drive
  6" Ext, 3/8" Drive
Kit G:
  (30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #1:
  Static Wrist Tether
  Eye Protection

REFERENCED PROCEDURE(S):
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)
2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

NOTE
1. System must be transitioned to single loop MT before disabling LAB1P6 Pump Package Assembly.

2. If LAB1P6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.
1. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:

2. Perform {2.205 LAB IATCS TRANSITION TO SINGLE MT (AUTO)}, all (SODF: TCS: NOMINAL), then:

<table>
<thead>
<tr>
<th>Table 1. LAB1P6 TCS Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LAB1P6 TCS Equipment - PCS Labels</strong></td>
</tr>
<tr>
<td>LAB LTL SFCA SOV</td>
</tr>
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<td>LAB LTL SFCA Mod Vlv</td>
</tr>
<tr>
<td>LAB LTL NIA Vlv</td>
</tr>
<tr>
<td>LAB LTL NIA Isol Vlv</td>
</tr>
<tr>
<td>LAB LTL PPA</td>
</tr>
</tbody>
</table>

3. Open, Close Inhibit RPCs for LAB1P6 TCS Equipment. Refer to Table 1.

4. RACK POWER switch → OFF

5. Verifying LAB1P6 Rack Safed

   **PCS**
   
   **Lab: EPS: LAB1P6**
   
   **Lab_Rack_LAB1P6**
   
   `sel RPCM LAP61B A`
   
   `[RPCM LAP61B A]`
   
   `sel RPC [X]`
   
   `[RPCM LAP61B_A_RPC [X]]`
   
   **cmd** RPC Position – Open (Verify – Op)
   
   **cmd** Close Cmd – Inhibit (Verify – Inh)
   
   Repeat for remaining RPCs

   **PCS**
   
   **Lab: EPS: Rack Power: Rack Power 1**
   
   `Rack Power 1`
   
   `‘Rack LAB1P6’`
   
   Verify Switch Position – Off
   
   Verify Switch Avail – Yes
   
   Verify Monitoring Status – Ena
   
   `‘Rack Power LAB1P6’`
   
   Verify RPCM_LA1B_D_RPC_03 Position – Op
ACCESSING
6. Open Faceplate Assembly and locate failed SFCA.
   Refer to Figures 1 and 2.
REMOVAL

**CAUTION**

Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

7. Don Static Wrist Tether. Secure clip to unpainted metal surface.

8. Demate connectors from SFCA (refer to Figure 3).
   - W14-P5 \(\leftrightarrow\) J1
   - W61-P6 \(\leftrightarrow\) J2

9. Demate QD connectors from SFCA (refer to Figure 3).
   - Pump Return Flex Hose QD \(\leftrightarrow\) SFCA QD
   - Return Header Flex Hose Assembly QD \(\leftrightarrow\) SFCA QD
   - Supply Header Flex Hose Assembly QD \(\leftrightarrow\) SFCA QD

10. Unfasten front SFCA fasteners (three) (Ratchet, 3/8" Drive; 3/8" Socket). Refer to Figures 1 and 3.

11. Remove SFCA from rack.

REPLACEMENT

**CAUTION**

Corrosion Hazard. All surfaces must be dry before mating occurs for corrosion protection. May result in equipment damage.

12. Clean rack location bonding surface using Dry Wipes. Inspect for damage to connector sockets. Refer to Figure 3.

13. Stow used Dry Wipes.
14. Install replacement SFCA on rack shelf. Refer to Figure 1.

15. Torque SFCA fasteners (three) to 60 in-lbs (7/16" Socket, 3/8" Drive; (30-200 in-lbs) Trq Wrench). Refer to Figure 1 and 2.

16. Mate QD connectors to SFCA (refer to Figure 3).
   - Pump Return Flex Hose QD →|← SFCA QD
   - Return Header Flex Hose Assembly QD →|← SFCA QD
   - Supply Header Flex Hose Assembly QD →|← SFCA QD

17. Mate connectors to SFCA (refer to Figure 3).
   - W14-P5 →|← J1
   - W61-P6 →|← J2

18. Remove Static Wrist Tether.

CHECKOUT
19. RACK POWER switch → ON

20. Closing LAB1P6 RPC

   PCS
   Lab: EPS: Rack Power: Rack Power 1
   [Rack Power 1]
   ‘Rack Power 1’

   Verify Switch Position – On
   Verify Switch Avail – Yes
   Verify Monitoring Status – Ena

   ‘Rack Power On’

   cmd LAB1P6 Pwr On

   ‘Rack Power LAB1P6’

   Verify RPCM_LA1B_D_RPC_03 Position – Cl
   Refer to Table 1.

PCS  
Lab: EPS: LAB1P6
Lab_Rack_LAB1P6

   sel RPCM LAP61B A
       
RPCM_LAP61B_A

   sel RPC [X]
       
RPCM LAP61B A RPC [X]

   cmd Close Cmd – Enable (Verify – Ena)
   cmd RPC Position – Closed (Verify – Cl)

Repeat for remaining RPCs

22. Perform \{2.203 LAB IATCS TRANSITION TO DUAL (AUTO)\}, all (SODF: TCS: NOMINAL), then:

   \textbf{NOTE}
   Operational Configuration of LAB1P6 CCAA will be determined after maintenance has been performed. If determined that LAB1P6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.

23. √MCC-H for operational configuration

24. If required, perform \{2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL\}, all (SODF: ECLSS: NOMINAL: THC), then:

\textbf{POST MAINTENANCE}
25. Inform MCC-H of task completion.

26. √MATS for stowage location of failed SFCA
   Stow failed SFCA, tools, materials.
**OBJECTIVE:**
Remove and replace failed Common Cabin Air Assembly (CCAA) System Flow Control Assembly (SFCA).

**LOCATION:**
Installed: LAB1S6  
Stowed: √ Maintenance and Task Supplement (MATS)

**DURATION:**
50 minutes

**PARTS:**
System Flow Control Assembly (P/N 2353190-1-1)

**MATERIALS:**
Dry Wipes

**TOOLS REQUIRED:**
Equipment Bag  
ISS Common IVA Tool Kit:  
Kit C: 3/8" Socket, 3/8" Drive  
Kit E: Ratchet, 3/8" Drive  
6" Ext, 3/8" Drive  
Kit G: (30-200 in-lbs) Trq Wrench, 3/8" Drive  
Lid #1: Static Wrist Tether  
Eye Protection

**REFERENCED PROCEDURE(S):**
2.203 LAB IATCS TRANSITION TO DUAL (AUTO)  
2.204 LAB IATCS TRANSITION TO SINGLE LT (AUTO)  
2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL

**SAFING**

**WARNING**
Failure to remove power can result in electrical shock hazard.

**NOTE**
1. System must be transitioned to single loop LT before disabling LAB1S6 Pump Package Assembly.

2. If LAB1S6 CCAA is operational at time of R&R, CCAA Heat Exchanger Dryout for Microbial Control procedure must be performed.
1. If required, perform **{2.505  CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}**, all (SODF: ECLSS: NOMINAL: THC), then:

2. Perform **{2.204  LAB IATCS TRANSITION TO SINGLE LT (AUTO)}**, all (SODF: TCS: NOMINAL), then:

```
Table 1. LAB1S6 TCS Equipment

<table>
<thead>
<tr>
<th>LAB1S6 TCS Equipment - PCS Labels</th>
<th>RPC [X]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB MTL SFCA SOV</td>
<td>LAS62B A RPC 5</td>
</tr>
<tr>
<td>LAB MTL SFCA Mod Vlv</td>
<td>LAS62B A RPC 6</td>
</tr>
<tr>
<td>LAB MTL NIA Vlv</td>
<td>LAS62B A RPC 7</td>
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<tr>
<td>LAB MTL NIA Isol Vlv</td>
<td>LAS62B A RPC 8</td>
</tr>
<tr>
<td>LAB MTL PPA</td>
<td>LAS62B A RPC 18</td>
</tr>
</tbody>
</table>
```

3. Open, Close Inhibit RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

```
PCS
Lab: EPS: LAB1S6
Lab Rack LAB1S6

sel RPCM LAS62B

RPCM_LAS62B

sel RPC [X]

RPCM_LAS62B_RPC_[X]

(cmd) RPC Position – Open (Verify – Op)
(cmd) RPC Close Command – Inhibit (Verify – Inh)

Repeat for remaining RPCs
```

4. RACK POWER switch → OFF

5. Verifying LAB1S6 Rack Safed

```
PCS
Lab: EPS: Rack Power: Rack Power 3
Rack Power 3
‘Rack LAB1S6’

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

‘Rack Power LAB1S6’

Verify RPCM_LA2B_F_RPC_01 Position – Op
```
### ACCESSING

6. Open Faceplate Assembly.
   Locate failed SFCA.
   Refer to Figures 1 and 2.

---

**Figure 1.** Front View of LAB1S6.

**Figure 2.** Front View of Installed SFCA.
REMOVAL

CAUTION

Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

7. Don Static Wrist Tether. Secure clip to unpainted metal surface.

8. Demate connectors from SFCA (refer to Figure 3).
   W5-P5 ←|→ J1
   W37-P6 ←|→ J2

9. Demate QD connectors from SFCA (refer to Figure 3).
   Pump Return Flex Hose QD ←|→ SFCA QD
   Return Header Flex Hose Assembly QD ←|→ SFCA QD
   Supply Header Flex Hose Assembly QD ←|→ SFCA QD

10. Unfasten front SFCA fasteners (three) (Ratchet, 3/8" Drive; 3/8" Socket). Refer to Figures 1 and 3.

11. Remove SFCA from rack.

REPLACEMENT

CAUTION

Corrosion Hazard. All surfaces must be dry before mating occurs for corrosion protection. May result in equipment damage.

12. Clean rack location bonding surface using Dry Wipes. Inspect for damage to connector sockets. Refer to Figure 3.

13. Stow used Dry Wipes.
   Refer to Figure 1.

15. Torque SFCA fasteners (three) to 60 in-lbs ((30-200 in-lbs) Trq Wrench;  
    7/16" Socket, 3/8" Drive).  
   Refer to Figures 1 and 2.

16. Mate QD connectors to SFCA (refer to Figure 3).  
   Pump Return Flex Hose QD → SFCA QD  
   Return Header Flex Hose Assembly QD → SFCA QD  
   Supply Header Flex Hose Assembly QD → SFCA QD

17. Mate connectors to SFCA (refer to Figure 3).  
   W5-P5 → J1  
   W37-P6 → J2

18. Remove Static Wrist Tether.

CHECKOUT

19. RACK POWER switch → ON

20. Closing LAB1S6 RPC

PCS

Lab: EPS: Rack Power: Rack Power 3
   Rack Power 3
   ‘Rack LAB1S6’

   Verify Switch Position – On  
   Verify Switch Avail – Yes  
   Verify Monitoring Status – Ena

   ‘Rack Power On’

   cmd LAB1S6 Pwr On

   ‘Rack Power LAB1S6’

   Verify RPCM_LA2B_F_RPC_01 Position – Cl
21. Close Enable, Close RPCs for LAB1S6 TCS Equipment. Refer to Table 1.

PCS

Lab: EPS: LAB1S6

[Lab_Rack_LAB1S6]

sel RPCM LAS62B

[RPCM_LAS62B]

sel RPC [X]

[RPCM_LAS62B RPC [X]]

**cmd** Close Cmd – Enable

**cmd** RPC Position – Closed (Verify – Cl)

Repeat for remaining RPCs

22. Perform {2.203 LAB IATCS TRANSITION TO DUAL (AUTO)}, all (SODF: TCS: NOMINAL), then:

**NOTE**

Operational Configuration of LAB1S6 CCAA will be determined after maintenance has been performed. If determined that LAB1S6 CCAA will be turned on, CCAA Heat Exchanger Dryout for Microbial Control must be performed.

23. √MCC-H for operational configuration

24. If required, perform {2.505 CCAA HEAT EXCHANGER DRYOUT FOR MICROBIAL CONTROL}, all (SODF: ECLSS: NOMINAL: THC), then:

CLOSEOUT

25. Close Faceplate Assembly.

POST MAINTENANCE

26. Inform **MCC-H** of task completion.

27. √MATS for stowage location of failed SFCA

Stow failed SFCA, tools, materials.
OBJECTIVE:
To install the Internal Pressure Cover (IPC).

LOCATION:
Installed: LAB1D3
Stowed: \check\ Maintenance and Assembly Tasks Supplement (MATS)

DURATION:
30 minutes

PARTS:

NOTE
The following part is found in a Pressure Cover Stowage Bag (PCS). B.

Internal Pressure Cover (IPC) P/N 683-11403-4

MATERIALS:
Dry Wipes
Tethers
Gray Tape
Braycote Lubricant

TOOLS REQUIRED:
ISS Common IVA Tool Kit:
Kit C:
   7/16" Socket, 3/8" Drive
Kit E:
   Ratchet, 3/8" Drive
   6" Ext, 3/8" Drive
Kit G:
   (30-200 in-lbs) Trq Wrench, 3/8" Drive
Lid #2:
   Tablecloth

REFERENCED PROCEDURE(S):
None
SAFING

WARNING
Failure to remove power can result in electrical shock hazard.

1. √SPA heater/RTD power off

PCS LAB: TCS: IATCS Details: LAB Window Heater Commands

LAB Window Heater Commands

‘LAB Window Heater’

√CLC – Inh

If required

cmd CLC – Inh

√CLC – Inh

ACCESSING

2. If required, remove equipment attached to the window frame.

Figure 1.- Internal Pressure Cover (IPC) (front and side views).
3.3.301 LAB WINDOW INTERNAL PRESSURE COVER INSTALLATION - PRE-FSS
(ISS IFM/5A - ALL/FIN) Page 3 of 5 pages

Figure 2.- Scratch Pane Assembly (SPA) and Lab Window Frame (Internal Pressure Cover not shown).

REMOVAL OF SCRATCH PANE ASSY (SPA) RTD WIRE AND GROUND STRAP
3. Demate SPA RTD electrical connector (W3309) on lower portion of frame.
   Refer to Figure 2.

4. Secure SPA RTD wire away from window using tether or tape.

   NOTE
   Grounding strap is attached to wall structure and fastener number 2. The grounding strap has a spade tongue terminal, therefore loosening fastener number 2 will detach grounding strap from SPA.

5. Remove Ground Strap.
   Loosen SPA fastener number 2 (Ratchet, 3/8" Drive; 7/16" Socket).
   Refer to Figure 2.

6. Secure Ground Strap away from window using tether or tape.
INSTALLATION OF INTERNAL PRESSURE COVER (IPC)

Figure 3.- IPC Stowed in PCSB.

7. Open IPC QD Velcro Cover and remove IPC from PCSB. Refer to Figure 3.

Figure 4.- Velcro Strips and Two of the Four PIP Pins.

NOTE
1. There are a total of four PIP Pins. Each protector has two pins 180 deg apart.

2. Bolt protector must be removed first.

3. Do not remove seal protector until after cover has been translated to the worksite and immediately prior to installation on the window.

8. Remove bolt protector by releasing PIP Pins (two) and detaching Velcro strips (two). Refer to Figure 4. Stow bolt protector in PCSB.

NOTE
Seal protector may have grease on it. Care should be taken to avoid contamination of the local environment and personnel.
3.3.301 LAB WINDOW INTERNAL PRESSURE COVER INSTALLATION - PRE-FSS
(ISS IFM/5A - ALL/FIN) Page 5 of 5 pages

9. Remove seal protector by releasing PIP Pins (two).
   Refer to Figure 4.
   Stow seal protector in seal protector liner bag of PCSB.
   Temporarily stow PCSB.

10. Inspect IPC seals.
    If required, clean seals of any residue that may prohibit effective seal
    (Dry Wipes) and apply lubricant (Braycote).

11. Inspect IPC sealing surface on Pressure Pane Assembly.
    If required, clean sealing surface of any residue that may prohibit
    effective seal (Dry Wipes).

12. Position alignment holes marked “A” on IPC with alignment pins on
    window frame, using alignment arrows on IPC and window frame for
    orientation.
    Refer to Figures 1 and 2.

   **NOTE**
   Torquing sequence follows numbered labels
   found on IPC. Fasteners will be torqued to
   30 in-lbs, 67 in-lbs, and then 100 in-lbs.

13. Hand tighten IPC fasteners (thirty).
    Torque fasteners to 30 in-lbs in labeled sequence (thirty) (Ratchet,
    3/8" Drive; 7/16" Socket; 6" Ext; (30-200 in-lbs) Trq Wrench).
    Refer to Figure 1.

14. Torque IPC fasteners to 67 in-lbs in labeled sequence (thirty) (Ratchet,
    3/8" Drive; 7/16" Socket; 6" Ext; (30-200 in-lbs) Trq Wrench).

15. Torque IPC fasteners to 100 in-lbs in labeled sequence (thirty) (Ratchet,
    3/8" Drive; 7/16" Socket; 6" Ext; (30-200 in-lbs) Trq Wrench).

16. Verify IPC fasteners torqued to 100 in-lbs in labeled sequence (thirty)
    (Ratchet, 3/8" Drive; 7/16" Socket; 6" Ext; (30-200 in-lbs) Trq Wrench).

**POST MAINTENANCE**
17. Inform **MCC-H** of task completion.

NOTE
This procedure will only be used in the event that a leak is detected in the US Lab and the module is isolated to allow determination of the leaking module.

OBJECTIVE:
Pinpoint and repair pressure leaks in US Lab. Crewmembers will work simultaneously using crew senses to check penetration points.

LOCATION:
US Lab, Node 1, PMA1

DURATION:
Situation dependent

PARTS:
None

MATERIALS:
Gray Tape

TOOLS REQUIRED:
Γ-A-PMA1 Hatch
Docking Mechanism Accessory Kit (33У 9962.003)
APDS/APAS Hatch Tool
Cleaning Pads
Flashlight (two)
ISS Patch Kit
ISS Common IVA Tool Kit:
Kit E:
Ratchet, 1/4" Drive
4" Ext, 1/4" Drive
Kit F:
1/2" Deep Socket, 1/4" Drive
7/16" Deep Socket, 1/4" Drive
3/8" Socket, 1/4" Drive
Kit G:
(10-50 in-lbs) Trq Wrench, 1/4" Drive
(40-200 in-lbs) Trq Wrench, 1/4" Drive
Lid #1:
Static Wrist Tether

REFERENCED PROCEDURE(S):
2.3.501 NODE 1 ISS LEAK PINPOINT AND REPAIR
1.201 LAB RACK ROTATE
LAB ARIS RACK ROTATE

1. To allow access to Node 1 to gather tools in preparation to ingress the US Lab, perform [2.3.501 NODE 1 ISS LEAK PINPOINT AND REPAIR], steps 1 --- 7 (SODF: IFM: NODE 1: MALFUNCTION FAULT ISOLATION AND RECOVERY/S&M).
NOTE

1. Hatch leaks can occur at seal interfaces and/or penetration points.

2. Crew sight, sound, and touch senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).

Figure 1.- Node 1 and Lab Hatch Penetration Points.

2. If Node 1 Fwd Hatch already open, then skip steps 3 --- 10.

Node 1

3. Search around all sealing surfaces at hatch penetration points of the Node 1 Fwd Hatch. Refer to Figure 1.

4. If leak is found around Hatch Seal, √MCC-H before opening Hatch to inspect seals.

5. √MCC-H, “Go to Open Node 1 Fwd Hatch.”

6. MCC-H report maximum duration for Node 1 to US Lab Vestibule ingress and equalization.
3.3.501 US LAB ISS LEAK PINPOINT AND REPAIR
(ISS IFM/5A - ALL/FIN A) Page 3 of 15 pages

Ingress Time: ______________

Equalization Time: ______________

Maximum Duration Time: ______________

Node 1 7. MPEV cap ←|→ MPEV
       Fwd Hatch

8. Node 1 Fwd Hatch MPEV → Open

NOTE
Hatch may be difficult to open if leakage causes ΔP across hatch.

9. Node 1 Fwd Hatch MPEV → Closed (capped)

10. Open Node 1 Fwd Hatch per decal.

*******************************************************************
If Node 1 Fwd Hatch will not open
       Node 1 Fwd Port and Fwd Stbd IMV Valves → Open
       Open Node 1 Fwd Hatch per decal.
*******************************************************************

Figure 2.- US Lab Aft Hatch Penetration Points and Vestibule feedthroughs,
View From Node 1 Side of Hatch.
11. If US Lab Aft Hatch is closed, perform a visual search for leaks around all sealing surfaces, at hatch penetration points, and at vestibule feedthroughs in the Fwd Vestibule between Node 1 and US Lab. Refer to Figure 2.

If leak is found around Hatch Seal, \(\sqrt{\text{MCC-H}}\) before opening Hatch to inspect seals.

\(\sqrt{\text{MCC-H}}\), “Go to Open US Lab Aft Hatch.”

\textbf{MCC-H} report maximum duration for US Lab ingress and equalization.

\textbf{Ingress Time: } ______________

\textbf{Equalization Time: } ______________

\textbf{Maximum Duration Time: } ______________

US Lab Aft Hatch MPEV cap \(\leftarrow|\rightarrow\) MPEV

US Lab Aft Hatch MPEV \(\rightarrow\) Closed (capped)

Open US Lab Aft Hatch per decal.

\begin{center}
\textbf{NOTE}
Additional portable fans may be required for local ventilation. These should be set up and moved around the cabin as needed.
\end{center}
NOTE
1. Crew sight, sound, and touch senses must be used to locate leak source (looking for debris/damage, listening for leak, and feeling around seals and connectors for air leak).

2. The areas that are easily accessible are checked first (valves and seals) then Closeout Panels are removed to check for leaks at passthroughs in the hatch vestibules and gore panels, and finally racks are rotated to gain access to check for leaks.

3. To speed detection process, one crewmember should search for leaks forward (steps 14 and 15) while another crewmember searches aft (steps 16 and 17).

4. Closeout Panels can be temporarily stowed during search. Once an area behind a Closeout Panel has been searched, reinstall panel with a minimum number of fasteners before continuing search.

5. Once an area behind a rack has been searched, rotate the rack back up and secure before continuing search.

6. Once leak is pinpointed, proceed to step 21.


√Lab Fwd Port and Fwd Stbd IMV Valves – Closed
√Cap Lab Fwd PPRV – Capped

NOTE
Hatch leaks can occur at seal interfaces and/or penetration points.

13. Search around all sealing surfaces at hatch penetration points of the US Lab Fwd Hatch.
Refer to Figure 1.
14. Search forward bulkhead around hatch for leaks.  
Remove Forward Endcone Closeouts, 1/4-turn fasteners.  
Refer to Figure 3.

Search for leaks around all vestibule connectors, connector backshells.  
Search for leaks around forward IMV ducting and IMV Valves.
Figure 4.- US Lab Fwd Endcone - External View, Looking Aft. Forward Gore Panels and Vent and Relief Valve.

15. Search Forward Endcone for leaks. Rotate Racks in Rack Bay 1 one rack at a time and remove any beta cloth closeouts as required to gain access to the forward Gore Panels. Refer to Figure 4.

For Systems Rack, perform \{1.201 LAB RACK ROTATE\}, step 1, appropriate rack down steps only, (SODF: S&M: NOMINAL: RACK)

For Payload Rack
   If RVCO/ZSR
      Perform \{1.201 LAB RACK ROTATE\}, step 2, rack down steps only, (SODF: S&M: NOMINAL: RACK).
   If ARIS-Equipped Rack
      Perform \{LAB ARIS RACK ROTATE\}, rack down steps only, (SODF: S&M: NOMINAL: RACK).
   If Payload Rack (all non-ARIS Payload Racks)
      √Maintenance and Assembly Task Supplement (MATS) or PODF for specific rack rotation procedure. Perform rack down steps only.
Search for leaks around all Gore Panel connectors, connector backshells.

<table>
<thead>
<tr>
<th><strong>CAUTION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).</td>
</tr>
</tbody>
</table>

Don Static Wrist Tether and secure clip end to unpainted metal surface before searching for leaks around forward Vent and Relief Valve (Static Wrist Tether).

Search for leaks behind rack volume after rack is rotated.

Rotate racks in Rack Bay 1 up as required after inspection behind rack volume for leaks.

For Systems Rack, perform \{1.201 LAB RACK ROTATE\}, appropriate rack up steps only, (SODF: S&M: NOMINAL: RACK).

For Payload Rack
- If RVCO/ZSR
  Perform \{1.201 LAB RACK ROTATE\}, step 2, rack up steps only, (SODF: S&M: NOMINAL: RACK).
- If ARIS-Equipped Rack
  Perform \{LAB ARIS RACK ROTATE\}, rack up steps only, (SODF: S&M: NOMINAL: RACK).
- If Payload Rack (all non-ARIS Payload Racks)
  √Maintenance and Assembly Task Supplement (MATS) or PODF for specific rack rotation procedure.
  Perform rack up steps only.
16. Search aft bulkhead around hatch for leaks. 
Remove aft Endcone Closeouts, 1/4-turn fasteners. 
Refer to Figure 5.

Search for leaks around all vestibule connectors, connector backshells.
Figure 6.- US Lab Aft Endcone - External View, Looking Fwd. Aft Gore Panels and Vacuum System Vent Valves.

NOTE
Rotate overhead and deck racks in Rack Bay 6 before rotating the port and starboard racks in this bay during leak isolation. The port (Low Temp) and starboard (Moderate Temp) racks require major reconfiguration in order to rotate, and should only be done as a last resort during the inspection of aft endcone penetrations.

17. Search aft Endcone for leaks.
Rotate racks in Rack Bay 6 one rack at a time and remove any beta cloth closeouts as required to gain access to the aft Gore Panels and Vacuum System Vent Valves.
Refer to Figure 6.

For Systems Rack, perform \{1.201 LAB RACK ROTATE\}, step 1, appropriate rack down steps only, (SODF: S&M: NOMINAL: RACK).
For Payload Rack
   If RVCO/ZSR
       Perform \textit{1.201 LAB RACK ROTATE}, step 2, rack down steps only, (SODF: S&M: NOMINAL: RACK).
   
   If ARIS-Equipped Rack
       Perform \textit{LAB ARIS RACK ROTATE}, rack down steps only, (SODF: S&M: NOMINAL: RACK).
   
   If Payload Rack (all non-ARIS Payload Racks)
       √ Maintenance and Assembly Task Supplement (MATS) or PODF for specific rack rotation procedure.
       Perform rack down steps only.

Search for leaks around all Gore Panel connectors, connector backshells.
Search for leaks around aft Vacuum System Vent Valves (two).
Search for leaks behind rack volume after each rack is rotated.

Rotate racks in Rack Bay 6 up as required after inspection behind rack volume for leaks.

For Systems Rack, perform \textit{1.201 LAB RACK ROTATE}, appropriate rack up steps only, (SODF: S&M: NOMINAL: RACK).

For Payload Rack
   If RVCO/ZSR
       Perform \textit{1.201 LAB RACK ROTATE}, step 2, rack up steps only, (SODF: S&M: NOMINAL: RACK).
   
   If ARIS-Equipped Rack
       Perform \textit{LAB ARIS RACK ROTATE}, rack up steps only, (SODF: S&M: NOMINAL: RACK).
   
   If Payload Rack (all non-ARIS Payload Racks)
       √ Maintenance and Assembly Task Supplement (MATS) or PODF for specific rack rotation procedure.
       Perform rack up steps only.
18. Search around Lab window for leaks. Rotate deck rack in Rack Bay 3 to gain access to the Lab window. Refer to Figure 7.

For Payload Rack in Rack Bay 3
If RVCO/ZSR
Perform \{1.201 LAB RACK ROTATE\}, step 2, rack down steps only, (SODF: S&M: NOMINAL: RACK).

If ARIS-Equipped Rack
Perform \{LAB ARIS RACK ROTATE\}, rack down steps only, (SODF: S&M: NOMINAL: RACK).

If Payload Rack (all non-ARIS Payload Racks)
√Maintenance and Assembly Task Supplement (MATS) or PODF for specific rack rotation procedure.
Perform rack down steps only.

Search for leaks around the Lab window installation. Search for leaks behind rack volume after rack is rotated.

Rotate rack up after inspection behind the rack volume for leaks.
3.3.501 US LAB ISS LEAK PINPOINT AND REPAIR
(ISS IFM/5A - ALL/FIN A)  Page 13 of 15 pages

For Payload Rack in Rack Bay 3
If RVCO/ZSR
   Perform \{(1.201 LAB RACK ROTATE)\}, step 2, rack up steps only, (SODF: S&M: NOMINAL: RACK).
If ARIS-Equipped Rack
   Perform \{(LAB ARIS RACK ROTATE)\}, rack up steps only, (SODF: S&M: NOMINAL: RACK).
If Payload Rack (all non-ARIS Payload Racks)
√ Maintenance and Assembly Task Supplement (MATS) or PODF for specific rack rotation procedure.
   Perform rack up steps only.

19. Search behind all other racks.
   Rotate all other racks in US Lab, starting with Rack Bay 2 and working aft to Rack Bay 5 to allow inspection behind each rack for leaks.

For Systems Rack, perform \{(1.201 LAB RACK ROTATE)\}, step 1, appropriate rack down steps only, (SODF: S&M: NOMINAL: RACK).

For Payload Rack
If RVCO/ZSR
   Perform \{(1.201 LAB RACK ROTATE)\}, step 2, rack down steps only, (SODF: S&M: NOMINAL: RACK).
If ARIS-Equipped Rack
   Perform \{(LAB ARIS RACK ROTATE)\}, rack down steps only, (SODF: S&M: NOMINAL: RACK).
If Payload Rack (all non-ARIS Payload Racks)
√ Maintenance and Assembly Task Supplement (MATS) or PODF for specific rack rotation procedure.
   Perform rack down steps only.

Search for leaks behind rack volume after each rack is rotated.
   Rotate rack up after inspection behind the rack volume for leaks.

For Systems Rack, perform \{(1.201 LAB RACK ROTATE)\}, appropriate rack up steps only, (SODF: S&M: NOMINAL: RACK).

For Payload Rack
If RVCO/ZSR
   Perform \{(1.201 LAB RACK ROTATE)\}, step 2, rack up steps only, (SODF: S&M: NOMINAL: RACK).
If ARIS-Equipped Rack
   Perform \{(LAB ARIS RACK ROTATE)\}, rack up steps only, (SODF: S&M: NOMINAL: RACK).
If Payload Rack (all non-ARIS Payload Racks)
3.3.501 US LAB ISS LEAK PINPOINT AND REPAIR
ISS IFM/5A - ALL/FIN A) Page 14 of 15 pages

Maintenance and Assembly Task Supplement (MATS) or PODF for specific rack rotation procedure.
Perform rack up steps only.

20. If leak not found, go to step 22.

REPAIR LEAK
21. If leak found
   If time permits, \( \checkmark \) MCC-H before initiating repair.

   If leak around aft Vacuum System Vent Valve at bulkhead flange
   Retighten eight fasteners at base of valve to 60 in-lbs (3/8" Socket, 1/4" Drive; 4" Ext; (10-50 in-lbs) Trq Wrench).

   CAUTION
   Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

   If leak around fwd Vent and Relief Valve at bulkhead flange
   Don Static Wrist Tether and secure clip end to unpainted metal surface before retightening V-Band coupling to 145 in-lbs ((40-200 in-lbs) Trq Wrench, 4" Ext; 1/2" Deep Socket, 1/4" Drive).

   If leak through IMV Valve flange
   Retighten V-Band coupling to 35 in-lbs ((10-50 in-lbs) Trq Wrench; 7/16" Deep Socket; 1/4" Drive).

   If leak due to puncture in surface area
   Patch hole with Dux Seal from ISS Patch Kit.
   Cover patch with Gray Tape.

   If leak through connector or seal
   Use Valve Foam Applicator from ISS Patch Kit, following decal instructions.

   If leak around Lab Window
   Install Internal Pressure Cover by performing (LAB WINDOW INTERNAL PRESSURE COVER INSTALLATION), (SODF: ISS IFM: LAB: MALFUNCTION).

US LAB EGRESS (LEAK NOT FOUND OR IRREPARABLE)
22. Report to MCC-H, “Leak not found” or “Leak irreparable.”

US Lab 23. \( \checkmark \) Lab Aft Port and Aft Stbd IMV Valves – Closed

24. Leave US Lab Aft Hatch open, and close Node 1 Fwd Hatch per decal.
   \( \checkmark \) Node 1 Fwd Hatch MPEV – Closed (capped)
25. √Node 1 Fwd Port and Fwd Stbd IMV Valves – Closed

26. √MCC-H for applicable US Lab powerdown steps
### Table A.1-1. Tool Kit Breakdown

<table>
<thead>
<tr>
<th>OPS NAME</th>
<th>IMS NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISS Common IVA Tool Kit</td>
<td>00000001</td>
</tr>
<tr>
<td>KIT A: Combination/Crowfoot/Adjustable Wrenches</td>
<td>00000002</td>
</tr>
<tr>
<td>KIT B: L-Wrench Kit</td>
<td>00000003</td>
</tr>
<tr>
<td>KIT C: Socket Kit, 3/8&quot; Drive</td>
<td>00000004</td>
</tr>
<tr>
<td>KIT D: Hex Head Drivers</td>
<td>00000005</td>
</tr>
<tr>
<td>KIT E: Ratchet, Handles, Accessories</td>
<td>00000006</td>
</tr>
<tr>
<td>KIT F: Sockets, 1/4&quot; Drive</td>
<td>00000007</td>
</tr>
<tr>
<td>KIT G: Trq Driver/Wrenches</td>
<td>00000008</td>
</tr>
<tr>
<td>KIT H: Files, Cutting Tools/Saws</td>
<td>00000009</td>
</tr>
<tr>
<td>KIT I: Screwdrivers</td>
<td>00000010</td>
</tr>
<tr>
<td>KIT J: Pliers, Cutters/Strippers, Crimp, Strap Wrench, Retaining Ring Tools</td>
<td>00000011</td>
</tr>
<tr>
<td>KIT K: Hammer/Chisel/Punch/Pry Bar</td>
<td>00000012</td>
</tr>
<tr>
<td>KIT L: Screw Extractor Set</td>
<td>00000013</td>
</tr>
<tr>
<td>KIT M: Tap and Die Set</td>
<td>00000014</td>
</tr>
<tr>
<td>Kit N: Limited Area Tool Kit</td>
<td>00000015</td>
</tr>
<tr>
<td>KIT O: Metric Sockets/Hex Head Drivers, 1/4&quot; Drive</td>
<td>00000016</td>
</tr>
<tr>
<td>Kit P: Metric Sockets/Hex Head Drivers/ Crowfoot Wrenches 3/8&quot; Drive</td>
<td>00000017</td>
</tr>
<tr>
<td>KIT Q: Metric Combination Wrenches</td>
<td>00000018</td>
</tr>
<tr>
<td>KIT R: Special Provisioning Tools</td>
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<tr>
<td>IVA Tool Box, Lid #2</td>
<td>00000020</td>
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<tr>
<td>IVA Tool Box, Lid #1</td>
<td>00000021</td>
</tr>
</tbody>
</table>
A.2.1 FLUID FITTING TORQUE DEVICE (FFTD) COMPONENTS

**Drive Head Assembly and Drive Gears**

- Drive Head Assembly and Drive Gears
- Right Angle Drive Assembly
- Drive Gear
- Reaction Gear
- "Jaws"

**Reaction Unit Assembly and Reaction Gears**

- Reaction Unit Assembly and Reaction Gears
- Right Angle Drive Assembly
- Reaction Unit Assembly
- Drive Head Assembly
- (Torque Driver or Ratchet tip goes here)

**Figure A.2-1. – Fluid Fitting Torque Device**

**FLUID FITTING TORQUE DEVICE (FFTD) CALIBRATION CARD**

<table>
<thead>
<tr>
<th>Fitting Size</th>
<th>Reaction Gear</th>
<th>Drive Gear</th>
<th>NOMINAL INPUT TORQUE (IN-LBS)</th>
<th>INPUT TORQUE RANGE (IN-LBS)</th>
<th>OUTPUT TORQUE RANGE (IN-LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.375</td>
<td>.625</td>
<td>.875</td>
<td>12</td>
<td>11-15</td>
<td>170-200</td>
</tr>
<tr>
<td>.500</td>
<td>.625</td>
<td>1.00</td>
<td>20</td>
<td>20-23</td>
<td>330-360</td>
</tr>
<tr>
<td>.750</td>
<td>1.00</td>
<td>1.375</td>
<td>40</td>
<td>40-45</td>
<td>675-725</td>
</tr>
<tr>
<td>1.00</td>
<td>1.250</td>
<td>1.625</td>
<td>45</td>
<td>45-50</td>
<td>750-825</td>
</tr>
</tbody>
</table>

**Figure A.2-2. – FFTD Calibration Card – SAMPLE ONLY.**
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1. Position Reaction Gear onto slot in Reaction Unit. Refer to Figure A.2-3.

2. Rotate Reaction Gear into Reaction Unit, engaging groove on Reaction Gear with key on Reaction Unit.

3. Push locking tangs (2) to lock Reaction Gear in place.
4. Place Drive Gear into Drive Head at angle. Refer to Figure A.2-6.

![Figure A.2-6 – Drive Gear and Drive Head](image)

5. Press halves of Drive Head together to engage groove on Drive Gear with key on Drive Head. Locking Slide will click into Closed position.

![Figure A.2-7 – Press Halves of Drive Head together.](image)

6. Align guide rails of Reaction Unit with guide shafts of Drive Head

![Figure A.2-8 - Align Reaction Head and Drive Head](image)
A.2.2 ASSEMBLY OF THE FLUID FITTING TORQUE DEVICE (FFTD)  

7. Slide guide rails of Reaction Unit into guide shafts of Drive Gear.

8. Align guide locking pin on Socket Drive Assembly with notch in locking collar on Drive Head.

9. Rotate locking collar on Drive Head to lock Socket Drive assembly in place.
10. Fully Assembled Fluid Fitting Torque Device (FFTD). The head/gear assembly has been rotated from that position shown in Figure A.2-11. This is done by disengaging Socket Drive assembly and rotating locking ring to new position, then reattaching Socket Drive Assembly.

Figure A.2-12 – Fully Assembled FFTD
A.2.3 MATING/DEMATE OF GAMAH FITTINGS USING THE FFTD
(ISS IFM/4A - ALL/FIN) Page 1 of 2 pages

1. Bring halves of gamah fitting in close proximity and pull back tightening nut to expose sealing surfaces.

![Figure A.2-13 – Unmated Gamah Fitting – Nut pulled back to expose sealing surfaces](image1)

2. Bring halves of gamah together to mate inner sealing surface together first. Align keys and slots.

![Figure A.2-14 – Unmated Gamah Fitting - Sealing Surfaces place together](image2)

3. Slide nut onto male half of gamah fitting to engage keys and slots. Slowly turn nut only. **Do not rotate pipe/hose.**

![Figure A.2-15 – Gamah fitting partially mated](image3)
4. Hand tighten gamah fitting. Slowly turn nut only. **Do not rotate pipe/hose.**

![Figure A.2-16 – Gamah Fitting mated hand tight](image)

5. Spread Reaction Unit and Drive Head of FFTD apart. Place FFTD onto gamah fitting engaging Reaction Gear with reaction nut. Refer to Figure A.2-17.

![Figure A.2-17 - FFTD jaws wide apart, Reaction Gear fitted around reaction nut](image)

6. Turn Drive Gear using Socket Drive Assembly to align Drive Gear with tightening nut. Slide Drive Head/Socket Drive Assembly onto tightening nut. Attach torque wrench to Socket Drive Assembly (3/8” Drive).

![Figure A.2-18 – Drive Gear aligned and slid onto tightening nut.](image)

7. The input torque value used to set the Torque Wrench is found on the FFTD Calibration Card (Figure A.2-2).
### A.2.5 TORQUE VALUE CONVERSION TABLE

<table>
<thead>
<tr>
<th>To Convert From</th>
<th>To</th>
<th>Multiply By</th>
<th>To Convert From</th>
<th>To</th>
<th>Multiply By</th>
</tr>
</thead>
<tbody>
<tr>
<td>in-lbs</td>
<td>oz.in.</td>
<td>16</td>
<td>oz.in.</td>
<td>in-lbs</td>
<td>0.0625</td>
</tr>
<tr>
<td>in-lbs</td>
<td>ft-lbs</td>
<td>0.08333</td>
<td>ft-lbs</td>
<td>in-lbs</td>
<td>12</td>
</tr>
<tr>
<td>in-lbs</td>
<td>kg.cm.</td>
<td>1.1519</td>
<td>kg.cm.</td>
<td>in-lbs</td>
<td>0.8681</td>
</tr>
<tr>
<td>in-lbs</td>
<td>N•m.</td>
<td>0.011519</td>
<td>N•m.</td>
<td>in-lbs</td>
<td>86.81</td>
</tr>
<tr>
<td>in-lbs</td>
<td>dN•m.</td>
<td>1.13</td>
<td>dN•m.</td>
<td>in-lbs</td>
<td>0.885</td>
</tr>
<tr>
<td>ft-lbs</td>
<td>kg.m.</td>
<td>0.1382</td>
<td>kg.m.</td>
<td>ft-lbs</td>
<td>7.236</td>
</tr>
<tr>
<td>ft-lbs</td>
<td>N•m.</td>
<td>1.356</td>
<td>N•m.</td>
<td>ft-lbs</td>
<td>0.7376</td>
</tr>
<tr>
<td>N•m</td>
<td>dN•m.</td>
<td>10</td>
<td>dN•m.</td>
<td>N•m</td>
<td>0.1</td>
</tr>
<tr>
<td>N•m</td>
<td>kg.cm.</td>
<td>10.2</td>
<td>kg.cm.</td>
<td>N•m</td>
<td>0.09807</td>
</tr>
<tr>
<td>N•m</td>
<td>kg.m.</td>
<td>0.102</td>
<td>kg.m.</td>
<td>N•m</td>
<td>9.807</td>
</tr>
</tbody>
</table>

### USE OF ADAPTERS, EXTENSIONS AND UNIVERSALS

**NOTE**

1. Torque is force applied at a distance.

2. The Torque Wrench micrometer scale setting is always Torque Wrench square drive torque. Refer to Figure 1.

3. Anytime an Adapter, Extension or Universal is used with a Torque Wrench in such a way that the fastener torque distance is different than the Torque Wrench square drive distance, an adjustment to set torque is required to get proper fastener torque. The units of distance and force must be consistent throughout an adjustment calculation. Refer to Figures 2 --- 6.

![Figure 1.- Torque Wrench Micrometer Scale Setting - Always Torque Wrench Square Drive Torque.](image)
Figure 2.- Fastener Torque Equals Torque Wrench Square Drive Torque.

Figure 3.- Using Wobble Extensions/Universals with Torque Wrenches.

Figure 4.- Fastener Torque Greater Than Torque Wrench Square Drive Torque.

Figure 5.- Fastener Torque Greater Than Torque Wrench Square Drive Torque.
Figure 6.- Fastener Torque Less Than Torque Wrench Square Drive Torque.
Figure B.1-1. Common screw head types.
There are 2 main types of fluid line connectors onboard the ISS: Gamah fittings and Quick Disconnects (QDs).

B.2.1 GAMAH FITTINGS

Figure B.2-1. Gamah fitting fluid connector exploded and connected views

The Gamah fitting needs to be torqued to a specified value using the Fluid Fitting Torque Device (FFTD). Reference Procedure FFTD Usage Procedure in Appendix A.2.1.
B.2 UMBILICAL CONNECTORS

B.2.2 QUICK DISCONNECTS

Figure B.2-2. Low Pressure Quick Disconnect fluid line connector

Figure B.2-3. High Pressure Quick Disconnect fluid line connector
Figures C.1-1 and C.1-2 show cable identification examples of NOD1 and LAB1, respectively.

Deciphering the Code (A):
Example: 1F9989-W0203P698 (A14J698)
Part Number: 1F8898
Wire Harness Number: W0203
Plug Number: P698
(Reference Designator): A14J698

Deciphering the Code (B):
Example: W0203P698 (A14J698)
Plug Harness Number: W0203
Plug Number: P698
(Reference Designator): A14J698

Figure C.1-1. PG-1 (McDonnell Douglas) Wire Harness Identifiers – Node 1
C.1 WIRE HARNESS IDENTIFICATION (TYPICAL)

Deciphering the Code (A):
Example: W3307-556-22-GRN
Wire Bundle Number: W3307
Wire Number: 556
Wire Gauge: 22
Wire Color: Green

Deciphering the Code (B):
Example: W3307 P1 M/W J3 OF A0128
Wire Bundle Number: W3307
Plug Number: P1
Mates With: M/W
Jack: J3
Of: OF
Reference Designator: A0128

Deciphering the Code (C):
Example: P1 TO J3 CONT
Plug Number: P1
Mates To: TO
Jack: J3
Connection: CONT

Figure C.1-2. PG-3 (Boeing) Wire Harness Identifiers – US LAB

Table C.1-1. Internal ISS Wiring Reference Guide. This is based off the internal wiring of Node 1. Wiring information in Parentheses is specific to Node 1. Color specifications are generally valid for all of ISS. This is due to the fact that Boeing and McDonnell Douglas use the same wiring contractors. There is no documented ISS scheme for wire coloring.

<table>
<thead>
<tr>
<th>Gauge</th>
<th>Description by Gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>1553 Data Bus - Red or Pink (W0200's)</td>
</tr>
<tr>
<td>22</td>
<td>Shielded Instrumentation - White (W0300's)</td>
</tr>
<tr>
<td>22</td>
<td>Instrumentation - Green (W0300's)</td>
</tr>
<tr>
<td>20</td>
<td>Power - Red (W0100's)</td>
</tr>
<tr>
<td>16</td>
<td>Power - Blue (W0100's)</td>
</tr>
<tr>
<td>8</td>
<td>Power - Yellow (W0100's)</td>
</tr>
<tr>
<td>4</td>
<td>Power - Red (W0100's)</td>
</tr>
<tr>
<td>Coax</td>
<td>Video - Purple or Brown (W0400's)</td>
</tr>
<tr>
<td>Fiber</td>
<td>Audio - Purple (W0400's)</td>
</tr>
<tr>
<td>Optic</td>
<td></td>
</tr>
</tbody>
</table>
C.1 WIRE HARNESS IDENTIFICATION (TYPICAL)

### Description by Wire Harness IDs

<table>
<thead>
<tr>
<th>Ref. Des.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W0100's</td>
<td>Power (usually 20 GA and larger, 120 VDC)</td>
</tr>
<tr>
<td>W0200's</td>
<td>Data busses (always local bus 22 GA shielded)</td>
</tr>
<tr>
<td>W0300's</td>
<td>Instrumentation (usually 22 GA shielded/unshielded, high and lower level analog, some low level audio)</td>
</tr>
<tr>
<td>W0400's</td>
<td>C&amp;T (Fiber Optic, Coax for video, audio)</td>
</tr>
<tr>
<td>W0900's</td>
<td>external endcone harnesses</td>
</tr>
<tr>
<td>W1000's</td>
<td>external jumpers (for early power and light stantions)</td>
</tr>
<tr>
<td>W2000's</td>
<td>Lab IVA jumpers (FWD PORT)</td>
</tr>
<tr>
<td>W3000's</td>
<td>Cupola/Node 2 IVA jumpers (Port radial hatch)</td>
</tr>
<tr>
<td>W4000's</td>
<td>None installed</td>
</tr>
<tr>
<td>W5000's</td>
<td>Airlock IVA jumpers (STBD hatch)</td>
</tr>
<tr>
<td>W6000's</td>
<td>MPLM/HAB (DECK hatch)</td>
</tr>
<tr>
<td>W7000's</td>
<td>None installed</td>
</tr>
</tbody>
</table>
Russian sockets and their US pin size equivalent:

Table C.2-1. Russian to US connector pin size conversion

<table>
<thead>
<tr>
<th>Russian Connector Type</th>
<th>RS Pin Size</th>
<th>US Pin Size Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC2РМДТ42Б45Г5В1В</td>
<td>1.5 mm</td>
<td>16 gauge</td>
</tr>
<tr>
<td>OC2РМД30БПН24Г5В1</td>
<td>.6 mm</td>
<td>22 gauge</td>
</tr>
<tr>
<td>OC2РМТ1867Г1В1В</td>
<td>1 mm</td>
<td>20 gauge</td>
</tr>
<tr>
<td>OC2РМД27519Г5В1</td>
<td>1.5 mm</td>
<td>16 gauge</td>
</tr>
<tr>
<td></td>
<td>2 mm</td>
<td>12 gauge</td>
</tr>
<tr>
<td></td>
<td>2.5 mm</td>
<td>8 gauge</td>
</tr>
<tr>
<td></td>
<td>3 mm</td>
<td>4 gauge</td>
</tr>
</tbody>
</table>

Figure C.2-1. Examples of Connector Pin/Sockets Array Types
C.2 ELECTRICAL CONNECTORS

Figure C.2-2. NASA Zero-G Lever (NZGL) electrical engagement and locking sequence.

Figure C.2-3: Mating connection of the three main types of ISS threaded connectors: NASA Breech Lock Coupling (NBLC), NASA Threaded Coupling (NATC), and NASA Zero-G Wing (NZGW).
### Table C.3-1- Workaround Cables on board the ISS

<table>
<thead>
<tr>
<th>Ops Name</th>
<th>Part Number</th>
<th>Length (ft)</th>
<th>Flight</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 V DC Power Cable Assembly</td>
<td>SEG33112266-301</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 V DC Power Cable Assembly</td>
<td>SEG33112266-303</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russian Power Cable Kit</td>
<td>SJG33112266-303</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Cable Assembly</td>
<td>SEG33112678-301</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Adapter</td>
<td>SEZ39134181-301</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 V DC Power Cable</td>
<td>SEG33112596-301</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 V DC Power Cable</td>
<td>SEG33112596-303</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 V DC Power Cable</td>
<td>SEG33112596-305</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Express Rack Source Adapter</td>
<td>SEG33112598-301</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 V DC &quot;Y&quot; Cable</td>
<td>SEZ39134173-303</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russian 28V/20-10A to Shuttle 28V/20A</td>
<td>SJG33112597-301</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shuttle 28V/20A to two shuttle 28V/10A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 V Source Adapter</td>
<td>SEG33112599-301</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Node 1 Patch panel Y-Jumper</td>
<td></td>
<td>3A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAB Aft SPDA Jumper</td>
<td></td>
<td>5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPLM Core Bus Jumper</td>
<td></td>
<td>5A.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPLM Payload Bus Jumper</td>
<td></td>
<td>5A.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARS Core Bus Jumper</td>
<td></td>
<td>5A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
General Function - To measure AC/DC voltage, resistance/continuity, temperature, pressure, and current. Any other measurements will be instructed via real-time procedures. Only oscilloscope functions will be covered in this diagnostic lesson. Scopemeter is really two boxes in one in that it is an oscilloscope and a digital multimeter. The oscilloscope mode will allow the capability to view various wave forms and digital signals.
Figure D.1-2 – Scopemeter Accessories. (A) Flowmeter, (B) Temperature Probe, (C) Pressure Sensure.
OBJECTIVE:
Check continuity using ScopeMeter and red and black banana leads.

TOOLS REQUIRED:
ISS Tool Kit:
  Lid #2
  Gray Tape, 1" width (if required to hold probes in place)
ScopeMeter and Accessories Kit (P/N : SEG33111784-301)
  Fluke 105B ScopeMeter
  Red banana lead
  Red banana test probe
  Black banana lead
  Black banana test probe

SETUP
2. Attach black test probe to black banana lead.
3. Attach red test probe to red banana lead.
4. Attach black banana lead to COM (black) of ScopeMeter.
   Refer to Figure 1.
5. Attach red banana lead to application (EXT MV) port (red) of ScopeMeter.
   Refer to Figure 1.
6. Hold down F5 key, ScopeMeter power → ON
7. Set up ScopeMeter for continuity measurement.
   Press MEASURE MENU (yellow key).
   Press F1 - More Measure.
   Scroll with blue arrows to CONTINUITY, press F5 to select item.
   Press F1 to change to OHM mode.
   Press SCOPEMETER (yellow key) to return to main menu.
D.1.1 CONTINUITY CHECK PROCEDURE (15 MIN)

Press SUBMENU (black key).
Press F2 to toggle audible tone ON.
Press SCOPEMETER (yellow key) to return to main menu.

EXECUTE
8. Touch test probes together and listen for tone to verify operation.
9. Place black banana lead on end of electrical path to be checked (pin, socket, grounding strap, etc.). Secure with Grey Tape if necessary.
10. Use red banana lead to find test for continuity by listening for the continuity tone.
D.1.2 CURRENT CHECK USING SCOPEMETER CURRENT PROBE  (15 MIN)
(ISS IFM/4A - ALL/FIN)  Page 1 of 2 pages

OBJECTIVE:
Identify current through a specific wire.

TOOLS REQUIRED:
Current Probe
ScopeMeter and Accessories Kit (P/N : SEG33111784-
  Fluke 105B ScopeMeter
  Red banana lead
  Red banana test probe
  Black banana lead
  Black banana test probe

![Fluke 80I-110s current probe attached to ScopeMeter Input A.](image)

Figure 1. Fluke 80I-110s current probe attached to ScopeMeter Input A.

SETUP
1. Current probe → Input A port (red). (Refer to Figure 1)
2. Set probe to 100 mV/A.
3. Verify Green current probe ON-indicator light glowing. If light not glowing or dim, battery must be replaced.
   9V Battery changed by removing non-captive screw in probe grip.

CONFIGURE SCOPEMETER
4. Hold down F5 key, power ON ScopeMeter.
5. Press Input A button (black).
6. Press F5 button to view PROBE A menu.
7. Press F5 button to activate SELECT ITEM.
8. Use blue arrows to select 100 mV/A
9. Press F5 button to select item.
10. Press F1 button to close menu.
11. √ DC Coupling selected (use F3 button to select if required).
12. Press SCOPEMETER button to return to main menu.
13. Use thumbwheel on probe top to zero probe (±0.005) on "A DC scale".
EXECUTE


NOTE
For best current readings, do not allow wire to touch sides of probe (keep wire centered in notch).

15. Place wire in notch of current probe.
16. Read current measurement in display.
OBJECTIVE:
To check voltage of either pin or socket type connectors using ISS ScopeMeter and Shuttle IFM Pin Kit. The Shuttle Pin Kit is used prior to arrival of the ISS Pin Kit on ISS 5A.1.

TOOLS REQUIRED:
ScopeMeter Accessories Kit:
- Black Low Voltage Test Probe
- Black Banana Lead
- Red 10 to 1 Probe
- Red Probe Tip to Banana Adapter
ScopeMeter
ScopeMeter Power Adapter
Shuttle IFM Pin Kit:
- Fuse and Test Lead Container Assy.
- Flap 6:
  - Magnifying Glass

SAFE
1. \( \sqrt{\text{ScopeMeter} \rightarrow \text{OFF}} \)
2. \( \sqrt{\text{MCC-H connector, pins/sockets to verify, equipment in safe config. to continue.}} \)

Figure 1. - ScopeMeter setup for use to check voltage. Figure shows ScopeMeter accessory build-up for checking voltage of connector with 16 gauge sockets. Voltage check for pin type connectors is similar except
Pin/Pin Jumper is not used. Rather a Socket/Socket Jumper is used on the Red Test Adapter.

Figure 2. – Probe configuration at top of ScopeMeter.

SETUP
3. Red Probe Tip to Banana Adapter →|← Red 10 to 1 Probe. (Refer to Figure 1)
4. Black Low Voltage Test Probe →|← Black Banana Lead. (Refer to Figure 1)
5. Red 10 to 1 Probe →|← Input A port of ScopeMeter. (Refer to Figure 1)
6. Black Banana Lead →|← COM port of ScopeMeter. (Refer to Figure 2)
7. Hold down F5 key, ScopeMeter power→ON
8. For socket type connectors:
   Verify gauge of connector sockets.
   Retrieve Red Test Adapter of socket gauge from Flap 7 of Shuttle IFM Pin Kit.
   Retrieve Pin/Pin Jumper of socket gauge from Flap 7 of Shuttle IFM Pin Kit.
9. For Pin type connectors:
   Verify gauge of connector pins.
   Retrieve Red Test Adapter of pin gauge from Fuse And Test Lead Container Assy. of Shuttle IFM Pin Kit.
   Retrieve Socket/Socket Jumper of pin gauge from Fuse And Test Lead Container Assy. of Shuttle IFM Pin Kit.

EXECUTE (SOCKET TYPE CONNECTOR)
10. Red Test Adapter →|← specified positive voltage socket of connector.
    (Refer to Figure 1)
11. Red 10 to 1 Probe →|← Red Test Adapter. (Refer to Figure 1)
12. Pin/Pin Jumper →|← specified common ground socket of connector.  (Refer to Figure 1)
13. Black Test Adapter →|← Pin/Pin Jumper. (Refer to Figure 1)
14. Black Banana Lead →|← Black Test Adapter. (Refer to Figure 1)
15. Verify Voltage reading within specified voltage limit.

EXECUTE (PIN TYPE CONNECTOR)
16. Socket/Socket Jumper →|← specified positive voltage pin of connector.  (Refer to Figure 1)
17. Red Test Adapter →|← Socket/Socket Jumper. (Refer to Figure 1)
18. Red 10 to 1 Probe →|← Red Test Adapter. (Refer to Figure 1)
19. Black Test Adapter →|← specified common ground pin of connector.  (Refer to Figure 1)
20. Black Banana Lead →|← Black Test Adapter. (Refer to Figure 1)
OBJECTIVE:
Use pressure probe to check cabin pressure.

TOOLS REQUIRED:
Crystal Pressure probe
Fluke ScopeMeter 105B

3. Pressure Probe banana plugs → | ← top of ScopeMeter. Refer to Figure 1.
4. Hold down F5 key, power ON ScopeMeter.
5. Press F5 button to highlight EXT.mV mode.
6. Press F1 button to close mode change message if required.
7. Verify V reading is > 100mV (battery reading).
   If V reading < 100 mV, battery must be replaced.
   9V battery replaced by removing non-captive screw on back of module.
8. Select PSIA or mm HgA on pressure probe using probe slide switch.
    \texttt{MCC-H} which unit of measure to select.
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OBJECTIVE:
Use Fluke ScopeMeter and Temperature to measure temperature of selected objects.

TOOLS REQUIRED:
Fluke 80T-150U Temperature probe
Fluke ScopeMeter 105B

NOTE
Red dot on temperature probe must be inserted in red terminal on ScopeMeter.

Figure 1. Fluke Temperature Probe attached to Fluke ScopeMeter

3. Temperature Probe banana plugs → | ← top of ScopeMeter.
   Refer to Figure 1.
4. Hold down F5 key, Power ON ScopeMeter
5. Press F5 button to highlight EXT.mV mode.
6. Press F1 button to close mode change message if required.
7. Verify V reading is > 100mV (Temperature Probe battery reading).
   If V reading < 100 mV, battery must be replaced.
   9V battery replaced by removing non-captive screw on back of module.
8. √MCC-H which unit of temperature to measure.
   Select unit of measure on Temperature Probe using probe slide switch.
9. Read measured temperature from display.
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D.2 POWER SUPPLY

The power supply accepts power from a power source and allows the output power to be regulated. In normal conditions, the output voltage is controlled, and the output current varies to maintain a steady voltage.

D.2.1 SPECIFICATIONS AND CHARACTERISTICS

Electrical Specifications

Output Ratings:
- Output Voltage: 0-150 V
- Output Current: 0-7 A
- Output Power: 1050 W

Meter Accuracy:
- Voltage: (1% of V max + 1 count) 1.6 V
- Current: (1% of I max +1 count) 0.08 A

Output Noise and Ripple (V):
- rms: 20mV
- p-p (0-20MHz): 150 mV

Power Factor: 0.98 minimum for full load

Maximum Voltage Differential from output to safety ground: 600Vdc

Stability:
- Voltage (0.05% of V max): 75 mV
- Current (0.05% of I max): 3.5 mA

Maximum Remote Sense Line Drop Compensation (Line drop is subtracted from total voltage available at supply output): 5 V/line

Over Voltage Protection (OVP) Adjustment Range (5% to 110% of V max): 7.5-165 V

D.2.2 SAFETY

High Energy/High Voltage Warning

Exercise caution when using and servicing power supplies. High energy levels can be stored at the output voltage terminals on all power supplies in normal operations. In addition, potentially lethal voltages exist in the power circuit and the output connector. Filter capacitors store potentially dangerous energy for some time after power is removed.

Use extreme caution when biasing the output relative to the chassis due to potential high voltage levels at the output terminals.

D.2.3 VENTILATION

Ensure cooling air reaches the ventilation inlets and that the fan can exhaust from the rear of the unit. Additional ventilation space at the top and bottom of the supply will further lower internal operating temperatures.
D.2  POWER SUPPLY

D.2.4  LOAD CONNECTION

This section provides recommendations for load wiring and connecting as they apply to both single and multiple load configurations.

D.2.5  LOAD WIRING

When connecting load wiring to the power supply, consider the following factors:
- the current carrying capacity of the wire
- the maximum load wiring length for operation with sense lines
- noise and impedance effects of the load lines

D.2.6  CONNECTING LOADS

The front panel binding posts have a built-in current limiting function which will not allow more than 30A to be drawn from the output on units with high output current capability. If the draw exceeds 30A, the BPO (Binding Post Overload) LED on the front panel lights up and the current draw is limited to 30A. Once the load draw drops below 30A, the BPO LED goes out and normal operation resumes.

D.2.7  SERIAL POWER DISTRIBUTION

This distribution involves connecting leads from the power supply to one load, from that load, to the next load, and so on for each load in the system. This method results in the voltage at each load depending on the current drawn by the other loads and allows DC ground loops to develop. Except for low current applications, this method is not recommended.

D.2.8  PARALLEL POWER DISTRIBUTION METHOD

To connect distributed loads, we recommend that you use radial power distribution. With this method, you connect power to each load individually from a single pair of terminals designated as the positive and negative distribution terminals. These terminals may be the power supply output terminals, the terminals of one of the loads, or a distinct set of terminals especially established for distribution use. Connect the sense leads to these terminals to compensate for losses and minimize the effect of one load upon the another. Voltage is the same over all the loads however current varies.

D.2.9  OPERATING MODES AND AUTOMATIC CROSSOVER

The power supply has two basic operating modes: Constant Voltage Mode and Constant Current Mode, and two control modes: Local Control Mode (default setting) and Remote Programming Mode. Both operating modes are available regardless of which control mode is used.
D.2.10 PHYSICAL LAYOUT

Figure D.2-1. - Power Supply Front Panel

Table D.2-1. - Front panel functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVP Adjust Potentiometer</td>
<td>Turn to adjust overvoltage limit</td>
</tr>
<tr>
<td>OVP Shutdown Indicator</td>
<td>An overvoltage has occurred. The OVP circuit shuts down the main power converter and turns on the OVP LED whenever the power supply output exceeds a preset voltage limit.</td>
</tr>
<tr>
<td>Shutdown Indicator</td>
<td>If LED is ON, then power supply is in</td>
</tr>
</tbody>
</table>
### D.2 POWER SUPPLY

#### (ISS IFM/4A - ALL/FIN) Page 4 of 5 pages

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote Programming Indicator</td>
<td>If LED is ON, then the power supply is in remote programming mode.</td>
</tr>
<tr>
<td>OVP Setting Preview Button</td>
<td>Displays overvoltage limit on voltage display</td>
</tr>
<tr>
<td>V/I Check</td>
<td>Previews the voltage and current limit settings at any time during normal operation of the power supply. <em>Note: Bushings can be used to secure knobs.</em></td>
</tr>
<tr>
<td>Standby Button</td>
<td>Disables or enables the power supply’s output so that you can make adjustments to either the load or the power supply without shutting off the power supply.</td>
</tr>
<tr>
<td>Remote/Local Programming Select Button</td>
<td>Selects remote programming mode vs. local control mode.</td>
</tr>
<tr>
<td>Over Temperature Shutdown Indicator</td>
<td>If LED is ON, then the power supply has shutdown due to high temperatures.</td>
</tr>
<tr>
<td>AC Fail Indicator</td>
<td>Input voltage is too low. From experimentation, voltage must drop &gt;30% in order for indicator to illuminate and power supply to shut down. When input power once again rises to satisfactory levels, the power supply will automatically turn itself back on.</td>
</tr>
<tr>
<td>AC Power Switch</td>
<td>Main power ON/OFF</td>
</tr>
<tr>
<td>Front Panel Binding Posts</td>
<td>Connection point for leads.</td>
</tr>
<tr>
<td>Output Voltage Control Knob</td>
<td>Turn to vary output voltage.</td>
</tr>
<tr>
<td>Voltage Mode Indicator</td>
<td>If LED is on, the power supply is regulating the output voltage, thus the current will vary. This is normal operational mode.</td>
</tr>
<tr>
<td>Output Current Limit Control Knob</td>
<td>Turn to vary current limit.</td>
</tr>
<tr>
<td>Current Mode Indicator</td>
<td>If the Current control LED turns on during normal operation, the power supply has automatically switched to regulating current instead of voltage. The output voltage will vary.</td>
</tr>
</tbody>
</table>

#### D.2.11 POWER SUPPLY USAGE PROCEDURE

**OBJECTIVE:**
Provide power

**TOOLS REQUIRED:**
- 4’ Cable
- UOP connection cable

**SAFE**
1. Ensure power switch on front panel is in OFF (0) position.
2. Ensure REM/LOC (Remote/Local) switch is set to OUT position for front panel (local) operation.
3. Voltage and current controls fully.
4. Connect power supply to UOP.

**WARNING**
Ensure STANDBY button pressed in. Failure to do so may cause bodily injury and damage to H/W.

**POWERING - UP**
5. Press → STANDBY button to in.
6. Turn the power supply power switch to ON ( ). After a short, power-on delay, the front digital meters light up. Both the voltmeter and ammeter displays read zero. The green voltage mode LED turns on.

**CHECK-OUT**
7. Next you will check current limit and connecting loads required. Press and hold → V/I CHECK to display voltage and current control settings on voltmeter and ammeter displays, to see if output is 0.
8. While pressing → V/I check button, adjust voltage control to 120 ± .5 volts (varies based on application).
9. Continue pressing → V/I check button. Adjust the current control to 3.5 ± .1 amps (varies based on application).
11. Verify "STANDBY LED" remained ON.

**SET OVER VOLTAGE PROTECTION**
12. Press → OVP CHECK button to see OVP set point on voltmeter display.
13. Holding down → OVP CHECK, turn OVP SET potentiometer to desired level (This varies based on hardware specifications).

**CAUTION**
Extreme caution required when connecting or disconnecting wires at binding posts.

**SETUP**
14. Make required connections, making positive, ground, and chassis ground connections.
15. Press → STANDBY button OUT (position to resume normal operation).

**CLOSE-OUT**
16. Power switch → OFF. After a short delay, front digital meters will turn off.

**CAUTION**
Extreme caution required when connecting or disconnecting wires at binding posts.
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A function sweep generator is an instrument used to provide a variety of waveform signals to a device under test. A function sweep generator can be used for testing both analog and digital circuits, as well as for the calibration of test equipment.

**General Specifications**
- Frequency Range: 1 mHz to 50 MHz
- Frequency Resolution: 3 digits, best case .0.01 mHz
- Frequency Stability: $\pm 0.2\%$, $\pm 0.5\%$ (24 hours)
- Pulse Width Range: 10 ns to 999 ns
- Pulse Width Resolution: 3 digits, best case 0.1 ns
- Output Impedance: $50 \, \Omega \pm 2.5 \, \Omega$

### D.3.1 SWITCHING ON

The HP8116 Pulse/Function Generator performs a “self-test: when the power is switched on. All the front panel LEDs should light momentarily.

If a fault is detected, an error code is displayed on the front panel digital display. The possible error codes are:

- **[]**: A key is stuck in the depressed position.
- **E11**: There is a fault with the Auto Vernier/External Sweep trigger.
- **E21**: There is a fault in the internal repetition rate generator.
- **E31**: There is a fault in the internal width circuits. The width setting in pulse mode, and the time between bursts in internal burst mode are affected.
- **E41/42**: The output amplifier is faulty.
- **E51-E62**: Error indication for dedicated service tests.
D.3.2 MODE SELECTION

The currently active mode is shown by LED indicator. The trigger mode can be cycled through available options by pressing the key below the mode indicators. The standard instrument offers the following trigger modes:

- **NORM**: In normal mode a continuous output waveform is generated.
- **TRIG**: In trigger mode each active input edge triggers a single output cycle.
- **GATE**: In gate mode the active level of the external input signal enables output cycles. The last output cycle is always completed.
- **E WID**: In external width mode, which is only valid with pulse waveform, the external input signal is shaped to determine output pulse width. This mode can be used for pulse recovery.
- **I SWP**: In internal sweep mode the instrument repeatedly sweeps the output frequency logarithmically between specified start and stop frequencies. The sweep time per frequency decade is selectable between 10 ms and 500 s in intervals in the 1:2:5.
- **E SWP**: In external sweep mode an external trigger initiates a single sweep cycle. A second trigger is required to reset the instrument to the start frequency.
- **I BUR**: In internal burst mode the instrument repeatedly generated a specified number of output cycles (in the rage of 1 to 1999). The time between bursts can be selected in the range 100 ns to 999 ms.
- **E BUR**: In external burst mode an external trigger initiates an output burst. The external trigger signal required in some trigger modes must be applied to the EXT INPUT BNC connector.

**Trigger Slope**: Select a positive or negative trigger slope by pressing key respectively. The current trigger slope is indicated by the LED on the key. The trigger can be switched off by pressing the currently active key again. Both key LEDs will then be off.

**Trigger Level**: The trigger level can be varied in the range ±10 V using the LEVEL adjuster.

**Manual Trigger**: This key can be used to simulate the external trigger signal.

**Single Cycle**: This key initiates a single output cycle in GATE, I BUR and E BUR modes.
Trigger Output: The trigger output provides a timing reference signal synchronized to the main output signal. Output levels are 0 and 2.4 V into 50Ω.

Control Input: A signal can be applied to the control input to modulate or control the HP 8116A output signal.

Mode Selection: The currently active mode is shown by LED indicator. The trigger mode can be cycled through available options by pressing the key below the mode indicators. Figure 3-3 indicates the permitted combinations of control mode, trigger mode and output waveform:

- Frequency Modulation (FM): The output signal frequency can be modulated to a maximum of ±5% of the programmed value by applying a control voltage in the range ±6 V.
- Amplitude Modulation (AM): The output signal amplitude can be modulated from 0 to 100% using a ground symmetrical control voltage in the range ±2.5 V. Double Side Band Suppressed Carrier (DSBSC) is obtained using a control voltage in the range +2.5V to -7.5V which gives 200% modulation.
- Pulse Width Modulation (PWM): In pulse mode, the pulse width can be controlled using a control voltage in the range ±6.5 V. There are 8 non-overlapping pulse width ranges available, as shown below:

Output:
Pressing the DISABLE key disables the instrument output, pressing the key again enables the output. The DISABLE key LED is lit when the output is disabled.

Parameter Controls:
- AMP: Output amplitude
- FRQ: Output frequency
- DTY: Duty cycle
- OFS: Output signal offset

Adjustment:
The currently selected parameter is adjusted using the VERNIER and RANGE rocker keys. Each VERNIER key increments or decrements the corresponding digit in the digital display. Similarly, the RANGE key increases or decreases the parameter value by a factor of 10.

Waveform: Select the desired waveform by pressing the appropriate key.
D.3 FUNCTION SWEEP GENERATOR

D.3.3 FUNCTION SWEEP GENERATOR WAVEFORM PROCEDURE (20 MIN)

OBJECTIVE:
Provide waveform to ORU for diagnostics

TOOLS REQUIRED:
Function/Sweep Generator
BNC Cable Assembly
10 to 1 probe
Negative lead
Test Probe
UOP Power cable

ACCESS
1. Verify that one end of power cable is connected to Function/Sweep Generator, power connector located in rear of unit.
2. Connect remaining end of power cable to UOP.
3. Remove BNC connector (with screw-down test points) from Diagnostic Caddie's stowage compartment.
4. Attach BNC connector (with screw-down test points) to BNC connector labeled OUTPUT on function generator.
5. Connect probe tip to banana adapter to end of 10:1 probe.
6. Connect low voltage banana adapter to negative test lead.
7. Connect the positive and negative test leads to the BNC connector (with screw-down test points).
8. Connect 10:1 Probe to “INPUT A” located at top of ScopeMeter. Connect ground lead to COM at top of ScopeMeter

WARNING
Immediately after power on verify disable button is illuminated. Failure to do so may cause bodily injury and damage to H/W.

9. Press power switch on Function/Sweep Generator front panel to Power On instrument. (Note: All front panel LEDs should light momentarily indicating that unit is performing its self test. If a problem is detected an error code is displayed on front panel display). Function/Sweep Generator output will be disabled.
10. Select function (ex. Sinewave) by pressing the function button (ex., the button with Sinewave drawn above it).
11. By pressing the appropriate button and using Vernier and Range keys, set following parameters:
   AMP (amplitude)
   DTY (duty cycle)
   FRQ (frequency)
12. Press the disable key on the Function/Sweep Generator to enable
13. Verify that the waveform is displayed on the ScopeMeter.
14. Connect ORU using available
This Page Intentionally Blank
Purpose: To supply 28 V DC or variable 1.5 to 28 V DC power to equipment.

Stowage:
- One Breakout Box (BOB) and one DC harness cables.
- FGB utility outlet adapter will be provided to interface with BOB and FGB utility outlet cable.

DC harness cables: 24 ft. long cables.
- Used to supply DC utility power to the OOM Breakout Box. Can be used to power experiments.

AUX port: Provides 28 VDC utility power at the outlet.
- Outlet is identical to a Orbiter DC utility outlet and can be controlled by the AUX OUT switch on the box. The red LED indicates that the port is powered.
- AUX 28 VDC allows the BOB to be used as a portable DC utility outlet, or it allows the Breakout Box to be used at any outlet without eliminating another piece of equipment from that outlet.

B side: Provides 28 VDC fused power to any one of four sets of sockets.
- Jumpers/cables are attached to the sockets to provide power to electrical equipment.

Figure 22. Shuttle Breakout Box. (From JSC-23446 page 2-16)
- PWR B - ON/OFF switch sends power through selected fuse/sockets
- Fuse holder is launched empty. A fuse must be inserted for this side's output to operate. The fuse rating is chosen to fit the application. The rotary knob selects which set of sockets will be powered by the fuse.

- With fuse inserted, PWR switch on will light the green LED indicating which sockets are powered.
- Sockets provide +, RTN, and GND. Brackets are used to secure jumper leads in place.

**A Side:** Provides 28 VDC or variable VDC power to any one of four sets of sockets.
- 28V/VAR Volts switch chooses between straight-through 28 VDC and the BOB variable voltage board internal to the box. The green LED indicates that the variable board has been selected.
- Variable volts are controlled by a potentiometer. Output ranges from about 2 volts, up to about 32 volts with a 28 VDC input.
- Scopemeter leads are inserted into the Test Ports to measure the output voltage. **Always start with variable supply at lowest setting** (pot fully CCW) because high output voltages can cause overload.
- Variable source will shutdown if overloaded. To repower, B PWR - OFF, turn potentiometer CCW to lower output voltage, 28 V/VAR Volts switch to 28 V and than back to VAR.
- Fuse holder is launched empty. A fuse must be inserted for this side's output to operate. The fuse rating is chosen to fit the application. The rotary knob selects which set of sockets will be powered by the fuse.
- With fuse inserted, PWR switch on will light the green LED indicating which sockets are powered.
- Sockets provide +, RTN, and GND. Brackets are used to secure jumper leads in place.

Note: Setup and operation - will be included in procedures. Remember to insert proper fuse.
E.1 NODE 1 CLOSEOUT PANEL LOCATIONS

Forward Endcone, Alcove, and Radial Port Face
LOOKING FORWARD

Radial Port
LOOKING FORWARD

Aft Radial Port Face, and Midbay Quadrant
LOOKING AFT

Rackbay Quadrant, and Aft Endcone
LOOKING AFT

= Foot Bridge (4 places)
E.2 Node 1 Aft Port Endcone

Notes
All Fasteners Are Captive Unless Otherwise Specified

*= ORU Not Shown
[] = Fasteners Per Closeout Panel
{} = Reference Designator

Closeout Panel Assembly

ORU Access

Handrail Seat Track 1
Handrail Seat Track 2

Handrail

Emergency Lighting Power Supply (ELPS) Installation

Structure

J3 Switch

J1 J2

IMV Fan Installation

*IFM Fan Acoustic Insulation Not Shown*
(View has been rotated 90° CW about the Zenith axis)

IMV Valve Installation

(View has been rotated 90° CW about the Zenith axis)

Notes
All Fasteners Are Captive Unless Otherwise Specified

*= ORU Not Shown
[] = Fasteners Per Closeout Panel
{} = Reference Designator

Flexhose

Muffler

Band Clamp

Actuator Cap

V-Band Clamp

IMV Valve (A93)

Band Clamp

Actuator Bolts [6]

RMO Cable

IMV Fan (View has been rotated 90° CW about the Zenith axis)

Flexhose

RMO
E.3 Node 1 Aft Starboard Endcone

Notes
All fasteners are captive unless otherwise specified

* = ORU Not Shown
[ ] = Fasteners Per Closeout Panel
{ } = Reference Designator

Closeout Panel Assembly

Remote Power Switch Installation

Aft Starboard IMV Valve Installation
(View has been rotated 90° CCW about the Zenith axis)

14 Dec 00
E.5 Node 1 Deck Alcove

Notes
All fasteners are captive unless otherwise specified

*= ORU Not Shown
[] = Fasteners Per Closeout Panel
{} = Reference Designator

Closeout Panel Assembly

Fwd Port IMV Valve Installation
(View has been rotated 90° CW about the Zenith axis)

Remote Power Switch Installation

Remote Power Controller Module (RPCM) Installation

ORU Access
(View has been rotated 90° CW about the Port axis)
E.6 Node 1 Starboard Alcove

Notes
All fasteners are captive unless otherwise specified

* = ORU Not Shown
[ ] = Fasteners Per Closeout Panel
( ) = Reference Designator

Closeout Panel Assembly

ORU Access

Starboard Fwd IMV Valve Installation
(View has been rotated 90° CCW about the Zenith axis)

Fwd Starboard IMV Valve Installation
(View has been rotated 90° CW about the Zenith axis)
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E.7 Node 1 Forward Endcone
View Looking Forward

Emergency Lighting Power Supply (ELPS) Installation
57 Inch EEL Installation

14 Dec 00
E.8 Node 1 Midbay Deck

**Notes**
All fasteners are captive unless otherwise specified

* = ORU Not Shown
[] = Fasteners Per Closeout Panel
{} = Reference Designator

---

**Closeout Panel Assembly**

- NOD1D3-02 [4]
- NOD1D2-31 [6]

**ORU Access**

- NOD1D3-03 [4]
- NOD1D2-36 [24]
- NOD1D2-35 [11]

**Deck Aft IMV Valve Installation**
(View has been rotated 90° CW about the Zenith axis)

- Duct Coupling
- Band Clamp
- IMV Valve
- Actuator Cap
- Actuator Bolts [6]
- Deck Aft RMO
- RMO Cable
- V-Band Clamp
- Deck Bulkhead

**Smoke Detector (SD) Installation**
(View has been rotated 180° about the Zenith axis)

- Structure
- Canister
- Detector
- Pull Tabs
- Aligning Pin

**HEPA Filter Installation**

18 Dec 00
E.9 Node 1 Midbay Port

**Notes**
All fasteners are captive unless otherwise specified

* = ORU Not Shown
[ ] = Fasteners Per Closeout Panel
( ) = Reference Designator

---

**Closeout Panel Assembly**

- NOD1P3-01 [6]
- NOD1P2-35 [11]
- NOD1P2-34 [24]
- NOD1P2-33 [5]
- Port Aft Hatch Track
- NOD1P2-32 [7]
- NOD1P2-31 [6]

---

**ORU Access**

- Upper Duct Work
- Fastener Bracket
  (See Fastener Bracket Install)
- Cabin Fan
- SDS Starboard Valve
- Direction of airflow

---

**SDS Starboard Valve Installation**
(View has been rotated)

- Aligning Pin
- Valve
- From Airlock
- From Node 1 Sample Probe Kit
- To Selector Valve

---

**Cabin Fan Installation**
(View has been rotated 90° CCW about the Port axis)

- SDS Starboard Valve
- Electro-Mechanical Rotary Actuator

---

**Fastener Bracket Installation**

- Set Screw
- Fastener Bracket
- Fastener Bracket
- Fastener Bracket

---

**Electro-Mechanical Rotary Actuator Installation**

- Aligning Pin
- Valve
- From Airlock
- From Node 1 Sample Probe Kit
- To Selector Valve

---

**Sample Probe Kit**

- SDS Starboard Valve*

---

14 Dec 00
E.10 Node 1 Midbay Starboard

**Notes**
All fasteners are captive unless otherwise specified

* = ORU Not Shown
[] = Fasteners Per Closeout Panel
{} = Reference Designator

---

**Closeout Panel Assembly**

**IMV Fan Installation**
*IFM Fan Acoustic Insulation Not Shown*

**ORU Access**

**Fwd Port IMV Valve Installation**
(View has been rotated 90° CW about the Zenith axis)

---

14 Dec 00

725
E.11 Node 1 Overhead Alcove

Notes
All fasteners are captive unless otherwise specified

* = ORU Not Shown
[ ] = Fasteners Per Closeout Panel
{ } = Reference Designator

Closeout Panel Assembly

ORU Access
(View has been rotated 90° CW about the Port axis)
E.12 Node 1 Port Alcove
Sheet 1 of 2
Notes
All fasteners are captive unless otherwise specified

* = ORU Not Shown
[ ] = Fasteners Per Closeout Panel
( ) = Reference Designator

Closeout Panel Assembly
Port Bulkhead

Emergency Lighting Power Supply (ELPS) Installation

Remote Power Switch Installation
Remote Power On/Off Switch*

IMV Fan Installation
*IFM Fan Acoustic Insulation Not Shown*

Port Fwd IMV Valve Installation
(View has been rotated 90° CW)

Fwd Port IMV Valve Installation
(View has been rotated 90° CCW)

14 Dec 00
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E.13 Node 1 Port Alcove
Sheet 2 of 2

Notes
All fasteners are captive unless otherwise specified

* = ORU Not Shown
[ ] = Fasteners Per Closeout Panel
( ) = Reference Designator

Electro-Mechanical Rotary Actuator

Electro-Mechanical Rotary Actuator Installation

Sample Delivery System (SDS) Installation

SDS Selector Valve Installation

SDS Deck Valve Installation

SDS Forward Valve Installation

Aft Forward
Deck
Overhead

Starboard
Forward

Port

To Forward Valve
From Selector Valve

From Stbd Valve

Valve
Aligning Pin
Fastener (1 of 4)

From Hab

To Deck Valve

J1

From Selector Valve

Valve
Aligning Pin
Fastener (1 of 4)

From Lab

To Forward Valve

J1

From Selector Valve

Valve
Aligning Pin
Fastener (1 of 4)

From Deck Valve

J1

From Selector Valve

Valve
Aligning Pin
Fastener (1 of 4)
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### E.16 Air Revitalization Rack

**Sheet 1 of 2**

**LAB1D6**

Air Revitalization Rack Equipment Install

**DWG# 683-53000**

#### Acronym | Part Name | Part Number
--- | --- | ---
----- | Absolute Pressure Sensor | 2352515-1-1
AAA | Avionics Air Assembly | SV809992-5
----- | Fan Assembly | 5844815-501
----- | Fan/Precooler Unit | 2352550-1-1
CAT OX | Catalytic Oxidizer | 5823630-503
CDRA | CO₂ Removal Assembly | N/A
----- | CO₂ Selector Valve | 2352720-1-1
----- | Charcoal Bed Assembly | 5823608-501
----- | Delta Pressure Sensor | 2352516-1-1
----- | Desiccant Sorbent Bed | 2352540-1-1
EIA | Electronic Interface Assembly | 5835398-503
----- | Filter Element | AC-C321F-4
----- | Flow Meter | 5835405-501
----- | Heater Controllers | 2354222-1-1
LVPS | Low Voltage Power Supply | 360110-001
MCA | Major Constituent Analyzer | N/A
MFCV | Manual Flow Control Valve | 683-50430-2
----- | Mass Spectrum Assembly | 359675-002
----- | MCA Data Control Assembly | 359650-002
----- | Motor Controllers (FMC, PMC) | 359425-002
----- | Post-Sorbent Bed | 23523623-503
----- | Pressure Transducer | 360110-001
----- | Sample Distribution Assembly | 359675-002
----- | Series Sample Pump Assembly | 359425-002
SD | Smoke Detector | 2351520-2-1
TCCS | Trace Contaminant Control System | N/A
----- | Temp Sensor | 2352514-1-1
----- | Temp Sensor | 2352514-1-1
----- | Two Stage Pump | 2352730-1-1
----- | Verification Gas Assembly | 359850-002

#### Notes

* = ORU Not Shown  
( ) = RPC Number  
{ } = Reference Designator

**Rack Access:**
- Rear Panel - 44 fasteners
- Side Panel - 32 fasteners/panel

**Utilities and Overhead Access Door**

**Access Door Hinge Axis**

**CDRA Access Door Thumb Latches**

**MCA Access Door (4 captive fasteners)**

**TCCS Access Door Thumb Latches**

**ADS Rack Faceplate**

**DWG# 683-53000**
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E.17 Air Revitalization Rack
Sheet 2 of 2
LAB1D6
Air Revitalization Rack Equipment Install
DWG# 683-53000

CDRA Installation: Rear Iso View

CDRA Acronyms:
ASV – Air Selector Valve
AVV – Air Vent Valve
CSV – CO₂ Selection Valve
FMC – Fan Motor Controller
PMC – Pump Motor Controller

Utilities Installation: Top View
Front of Rack ↑

MCA Installation: Top View
Front of Rack ↑

TCCS Installation: Rear Iso View

CDRA Acronyms:
ASV – Air Selector Valve
AVV – Air Vent Valve
CSV - CO₂ Selection Valve
FMC – Fan Motor Controller
PMC – Pump Motor Controller
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Part Name</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC</td>
<td>Audio Bus Coupler</td>
<td>3000005-301</td>
</tr>
<tr>
<td>CSA</td>
<td>Condensate Storage Assembly</td>
<td>683-20181-1</td>
</tr>
<tr>
<td>C&amp;C</td>
<td>Command &amp; Control MDM</td>
<td>8259015-913</td>
</tr>
<tr>
<td>IAC</td>
<td>Internal Audio Controller</td>
<td>3000016-301</td>
</tr>
<tr>
<td>INT</td>
<td>Internal MDM</td>
<td>8259015-912</td>
</tr>
<tr>
<td>MFCV</td>
<td>Manual Flow Control Valve</td>
<td>683-50430-2</td>
</tr>
<tr>
<td>PMCU</td>
<td>Photovoltaic Management Cntr Unit</td>
<td>8259015-912</td>
</tr>
<tr>
<td>RPS</td>
<td>Rack Power Switch</td>
<td>N/A</td>
</tr>
<tr>
<td>SSSR</td>
<td>Space to Space Station Radio</td>
<td>SED16102579-301</td>
</tr>
<tr>
<td>SCU</td>
<td>Sync &amp; Control Unit</td>
<td>1360AE7010-302</td>
</tr>
<tr>
<td>Temp Sensor</td>
<td>Temp Sensor</td>
<td>2365430-1-1</td>
</tr>
<tr>
<td>VSU</td>
<td>Video Switch Unit</td>
<td>3000008-301</td>
</tr>
</tbody>
</table>

* = ORU Not Shown
( ) = RPC Number
{} = Reference Designator

Rack Access:
Rear Panel - 44 fasteners
Side Panel - 32 fasteners/panel

Temp Sensor* (behind MFCV)

IAC-2, ABC-2 Install: View looking Overhead

Avionics Rack 1 Faceplate
DWG# 683-50400
**Acronym** | **Part Name** | **Part Number**
---|---|---
ABC | Audio Bus Coupler | 3000005-301
AIU | Audio Interface Unit | 3000022-301
CVIU | Common Video Interface Unit | 3000008-301
C&C | Command & Control MDM | 8259015-913
INT | Internal MDM | 8259015-912
MFCV | Manual Flow Control Valve | 683-50430-2
PMCU | Photovoltaic Management Cntr Unit | 8259015-912
RPS | Rack Power Switch | N/A
SCU | Sync & Control Unit | 1360AE7010-302
Temp Sensor | Temp Sensor | 2365430-1-1
VSU | Video Switch Unit | 3000008-301

Notes:

* = ORU Not Shown
( ) = RPC Number
{ } = Reference Designator

Rack Access:
- Rear Panel - 44 fasteners
- Side Panel - 32 fasteners/panel

18 Dec 00
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E.31 Lab Overhead Starboard Standoff
LAB1OS (X1)
DWG# 683-56901

Note: * = ORU Not Shown

View 1

LAB1OS1
GLA*
UOP*

LAB1OS2
GLA

LAB1OS3
GLA

LAB1OS4
GLA

LAB1OS5
GLA

LAB1OS6
GLA

Port
Fwd

Starboard: ISPR
HRF-1
ISPR
ISPR
MSS-1
MT CCAA

Lab Standoff Structure
View Looking Aft

Lab1OS Cross Section
Starboard Overhead

CCAA Supply Damper Vlv

General Luminaire Assembly (GLA)

Lamp Housing Assembly (LHA)

Utility Outlet Panel (UOP)

Baseplate Ballast Assembly (BBA)

ISPR Panel Install

Fasteners (2 of 4)

Fastener Row (9 total)

Total of 17 fasteners

Fasteners are captive

18 Dec 00

745
E.32 Lab Port Deck Standoff
LAB1PD (X3)
DWG# 683-56903

Note: * = ORU Not Shown

Port: LT CCAA   MSS-2   ISPR   DDCU-1   ISPR   ISPR
Fwd

HEPA Filter Install

Rack Flow Control Assembly (RFCA)

Pump Bypass

SDS Filter

Utility Outlet Panel (UOP)

Temp Sensor

Smoke Detector Install

View 2

CCAA Inlet s/o vlv

Pump Bypass*

HEPA Filter

SDS Filter*

HEPA Filter

UOP

Fwd

Smoke Detector
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** MT IPB Drawings Differ From Engineering Drawings **

Notes

* = ORU Not Shown
() = Reference Designator

** Rack Access:**
- Rear Panel - 42 fasteners
- Side Upper Panel - 23 fasteners/panel
- Side Lower Panel - 26 fasteners/panel

Water Separator
(01) (A1028)

PPA Install: Front Iso View

PPA (18) (A9001)

Gas Trap Assembly

Filter Assembly

--- Cabin Air Heat Exchanger
--- Cabin Air ORU Inlet
--- EIB Electrical Interface Box
--- Filter Assembly
--- Gas Trap Assembly
--- MFCV Manual Flow Control Valve
--- NIA Nitrogen Interface Assembly
--- PPA Pump Package Assembly
--- RPS Rack Power Switch
--- SFCA System Flow Control Assembly
--- TCCV Temperature Control Check Valve
--- Temp Sensor
--- Water Separator

Part Number

SV813900-1
SV811840-2
SV806488-3
2353561-1-1
2353130-1-1
2366110-1-1
683-16353-1
2353170-1-1
N/A
2353190-1-1
SV805626-1
2365430-1-1
SV813920-1

--- EIB (03) (A1015)
--- Condensate Water Inlet
--- Condensate Water Outlet
--- Temp Sensor* (behind MFCV)
--- MFCV*
--- NIA (07, 08) (A3025)
--- SFCA (05, 06) (A9002)
--- Pump Inlet Shutoff
--- Header Pressure Control

1 RPCM LAS62B_A (A52)
2 TCCV (02) (A1031)

18 Dec 00