International Space Station
ISS/Shuttle Joint Operations
Book

ISS-3A

Mission Operations Directorate
Operations Division

Final, Revision A
September 20, 2000

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

National Aeronautics and Space Administration
Lyndon B. Johnson Space Center
Houston, Texas
Incorporates the following:

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INGRESS STATION PROCEDURES
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1. TOOLS AND EQUIPMENT PREP FOR INGRESS

**MF57M**  Fanny Pack Assy (2) PLT and MS#3
--- Ratchet 1/4" Drive
--- 1/4" to 3/8" Adapter
--- 1/4" Hex Shank
--- 5/32" Hex Head, 1/4" Drive w/ 4" Extension
--- 3/16" Hex Head, 1/4" Drive
--- 1/4" Socket, 1/4" Drive
--- 3/8" Socket, 1/4" Drive w/ 4" Extension
--- 7/16" Socket, 1/4" Drive w/ 2" Extension
--- Wire Cutters
--- Static Wrist Tether
--- 6", 3/16" Ball Tip Hex Head Driver, 3/8" Drive
--- Velcro Straps (10)
--- Thermal Protective Gloves (Deerskin)
--- Ear Plugs

**MA16F**
--- Ratchet 1/4" Drive
--- 1/4" to 3/8" Adapter
--- 1/4" Hex Shank
--- 5/32" Hex Head, 1/4" Drive w/ 4" Extension
--- 3/16" Hex Head, 1/4" Drive
--- 1/4" Socket, 1/4" Drive
--- 3/8" Socket, 1/4" Drive w/ 4" Extension
--- 7/16" Socket, 1/4" Drive w/ 2" Extension
--- Wire Cutters
--- Static Wrist Tether
--- 6", 3/16" Ball Tip Hex Head Driver, 3/8" Drive
--- Velcro Straps (10)
--- Thermal Protective Gloves (Deerskin)
--- Ear Plugs

**MF43K**  Fanny Pack Assy (1) MS#4
--- Ratchet 1/4" Drive
--- 4" Extension, 1/4" Drive
--- Short Screwdriver
--- 5/16" Socket
--- 5/32" Hex Head, 1/4" Drive
--- 7/16" Deep Socket, 1/4" Drive
--- 7/16" Socket, 1/4" Drive
--- Static Wrist Tether
--- Thermal Protective Gloves (Deerskin)
--- Ear Plugs

**MA16D**  1/4" Trq Wrench, 30-200 in-lbs
--- 10" Adjustable Wrench
--- Braycote 601 Lubricant
--- Connector Pliers
--- Makita Battery
--- Short Screwdriver
--- Phillips Screwdriver #1
--- ACBM to PCBME Ground Straps
--- RTL PIP Pins
--- CBCS 1/4-turn Fasteners
--- Cargo Transfer Bag (CTB), Single (1)
--- 12" x 12" Ziplock Bag (1), contains:
    --- Protective Cap (4) (P/N NATC-RPC-N-09-0)
    --- Protective Cap (4) (P/N NATC-RPC-N-09-0)
    --- Protective Cap (4) (P/N NATC-RPC-N-11-0)
    --- Protective Cap (4) (P/N NATC-PPC-N-11-0)
--- IMV O-ring Replacement Kit
--- Bore O-ring
--- Face O-ring
--- Alcohol Wipes
--- Rubber Gloves (four pairs)
Towels
Dry Wipes
Ziplock Bag for ESA Stowage

Middeck Ceiling
(Upper Port Small Bag)
1-1/2" Open End Wrench
Docking Mechanism Accessory Kit
  APAS Hatch Tool
  Cleaning Pads
  Docking Target Base Plate Cover
  Docking Target Standoff Cross Bag

MF28O
General Purpose Tape 2"
Digital Multimeter Kit
Temperature Probe Kit
Kapton Tape

MF71E
Atmosphere Sampling Bottles (2)

MF57E/
MA16G
ISS CUE CARDS
ISS EMERGENCY EGESS/ISS CONTINGENCY EGRESS (two)
NODE 1 FIRE SMOKE/FGB FIRE SMOKE (two)
Sharpie Pen and colored dots (for marking crosshairs)

EXT Airlock Floor Bag
Jettison Stowage Bag

Personal Items
Marking Pens
Scissors
Laundry to wrap CLAs for stowage
Flashlight

Timers (2) for Z1 procedures
EXT A/L 1. √ODS Upper Hatch closed
   Equal vlv caps (two) → installed

   Unstrap Centerline Camara Diffuser flex duct from EXT A/L wall.
   Attach flex duct to camera bracket to direct air flow to window.
   If required, tape diffuser open.

AW18A 2. LTG FLOOD 1(3,4) – OFF

MO13Q 3. AIRLK FAN A(B) – OFF

EXT A/L 4. Disconnect airlock flex duct from booster fan muffler, rotate into middeck, and secure.

MO13Q 5. AIRLK FAN A(B) – ON

6. AIRLK 2 – OFF/ON

7. If Tunnel Adapter Flown
   TNL ADAPT 1 – OFF/ON

8. √Airflow at muffler

Middeck 9. Close Inner Hatch per decal.

10. Equal vlv (two) – OFF, install caps
1. Notify MCC, “Beginning initial hatch leak checks.”

2. \( \sqrt{14.7} \) CAB REG INLET SYS 1, SYS 2 (two) – CL

3. SM 177 EXTERNAL AIRLOCK
   - Record A/L-VEST ΔP: _____ psid.
   - Record EXT A/L PRESS: _____ psia.

4. SM 220 NODE 1-2N
   - Record NODE 1 CAB PRESS: _____ psia.

5. Wait 20 minutes.

   ************************************************************
   | If A/L-VEST ΔP \leq \text{previously recorded} - 0.16 psid |
   | Notify MCC-H (possible leakage through Hatches).         |
   | If EXT A/L Press \leq \text{previously recorded} - 0.16 psia |
   | Notify MCC-H (possible leakage from EXT A/L).            |
   | If NODE PRESS \leq \text{previously recorded} - 0.02 psia |
   | Notify MCC-H (possible leakage from NODE 1/PMA 2).       |
   ************************************************************

A6L 1. LT VEST PORT, STBD (two) – OFF
2. LT TRUSS FWD, AFT (two) – OFF

Inner Hatch 3. Equal vlv caps (two) – remove
4. Equal vlv (two) – NORM
5. √Hatch ΔP < 0.2 psid
6. Open Hatch per decal.
7. Equal vlv (two) – OFF, reinstall caps

MO13Q 8. If Tunnel Adapter Flown
   TNL ADAPT 1 – ON/OFF
9. AIRLK 2 – ON/OFF
10. AIRLK FAN A(B) – OFF

Middeck 11. Remove diffuser cap from floor fitting.
   Stow.
   Mark stowage location (will be reused).

EXT A/L/ Middeck 12. Unstrap airlock flex duct.
   Connect to middeck floor fitting and to booster fan muffler inlet.

MO13Q 13. AIRLK FAN A(B) – ON

AW18A 14. As required, LTG FLOOD 1(3,4) – ON

15. √Airflow at top of external airlock halo

EXT A/L 16. Unstrap centerline camera diffuser flex duct from camera bracket.
   Stow duct along Stbd top of EXT A/L wall (in straps).
17. Remove, stow Centerline Camera.
NOTE
1. Tables below provide parameter FDA that will be changed prior to Orbiter Depress/Repress.
2. **MCC** will reset software limits via TMBU.

**C&W CONFIGURATION**

1. Reset H/W C&W limits per table.

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2. Contact **MCC** to TMBU the following limits to appropriate values for the given activity (depress or repress).

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<tr>
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If Spacehab present

<table>
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</table>
C&W RESET

3. Reset H/W C&W.

<table>
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<tr>
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<th>ENA/INH</th>
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4. Contact MCC to TMBU the following parameters to the appropriate values.

<table>
<thead>
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<th>VALUE</th>
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<td>SM ALERT</td>
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</tr>
<tr>
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<td>0640101</td>
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</tr>
<tr>
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<td>CABIN O2 CONC</td>
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</table>

If Spacehab present

<table>
<thead>
<tr>
<th>B/U C&amp;W</th>
<th>PARAM ID</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH CAB PRESS</td>
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<tr>
<td>SH CAB PPO2 - 1</td>
<td>0472012</td>
<td></td>
</tr>
<tr>
<td>SH CAB PPO2 - 2</td>
<td>0472113</td>
<td></td>
</tr>
</tbody>
</table>
ODS VESTIBULE/PMA2 PRESSURIZATION
(JNT OPS/3A/FIN) Page 1 of 1 page

NOTE
Expect possible dP/dt klaxon ‘S66 CABIN PRES’ and ‘S66 CABIN PPO2’ alarms during pressurization.

ODS Hatch
1. ODS Equal vlv (one) → remove cap

NOTE
Cycling of Equal vlv is required to avoid excessive negative delta pressure across the APAS Hatch.

2. ODS Equal vlv (one) → cycle to NORM for 8 seconds, OFF for 30 seconds
Repeat 10 cycles, then
ODS Equal vlv (one) → NORM

NOTE
Pressurization will take 15 minutes.

3. When ODS Hatch ΔP < 0.2 psid
ODS Equal vlv → OFF
Wait 5 minutes for thermal stabilization.

SM 177 EXTERNAL AIRLOCK

CRT
Wait 30 minutes.

*************************************************************
If A/L-VEST ΔP ≥ previously recorded + 0.16 psid
Notify MCC-H (Vestibule/PMA 2 Leak).
*************************************************************

5. Report results of leak monitoring to MCC-H, “Vestibule final leak check successful, ready for PMA2 ingress.”

ODS
6. ODS Equal valve → OFF, Install Cap
1. **POWER SOURCE VERIFICATION**
   If APCU 2 powering N14B power bus
   
   CRT
   ```
   √APCU 1,2 OUT VOLTS RES LOW ≥ 121 Volts
   √APCU 2 (CONV A OUT AMPS + CONV B OUT AMPS) < 2 Amps
   ```
   
   If RACU 6 powering N14B power bus (Node 1 Internal Y Cable Installed)
   ```
   SM 200 APCU Status
   √APCU 1 OUT VOLTS RES LOW ≥ 121 Volts
   SM 224 FGB-2N
   √RACU 6 – On
   √RACU 6 Output Current > 1.7 Amps
   ```

2. **SMOKE DETECTOR SD 1 ACTIVATION**
   PCS
   Node 1: ECLSS: SD1
   Node 1 Smoke Detector 1

   2.1 `sel RPCM N14B C RPC 03`
   ```
   RPCM N14B C RPC 03
   `cmd` RPC Position – Close (Verify – Cl)
   ```
   
   **NOTE**
   If using time-tagged commands, allow a minimum 2-second delay between the close RPC command and the monitor enable command to allow the smoke detector voltages to stabilize.

   2.2 `[Node 1 Smoke Detector 1]`
   `Monitoring`
   ```
   `cmd` Enable
   `Active Bit`
   √Status – In Progress
   Wait 3 seconds, then
   √Status – Complete
   √Failure – blank
   `Monitoring`
   √Status – Enabled
   ```
3. **SMOKE DETECTOR SD 2 ACTIVATION**

PCS

Node 1: ECLSS: SD2

Node 1 Smoke Detector 2

3.1 `sel RPCM N13B A RPC 16`

RPCM N13B A RPC 16

**cmd** RPC Position – Close (Verify – Cl)

**NOTE**
If using time-tagged commands, allow a minimum 2-second delay between the close RPC command and the monitor enable command to allow the smoke detector voltages to stabilize.

3.2 `Node 1 Smoke Detector 2`

'Monitoring'

**cmd** Enable

'Active Bit'

√Status – In Progress

Wait 3 seconds, then

√Status – Complete
√Failure – blank

'Monitoring'

√Status – Enabled

4. **ENABLING FDIR**

PCS

Node 1: ECLSS: FDIR

Node 1 FDIR

'Node 1-1 MDM'

4.1 **cmd** IMV FDIR – Enable

√Status – Enabled

4.2 **cmd** Fire Isolation – Enable

√Status – Enabled

'Node 1-2 MDM'
4.3 **cmd** IMV FDIR – Enable

√Status – Enabled

4.4 **cmd** Fire Isolation – Enable

√Status – Enabled

5. **NODE 1 CABIN FAN ACTIVATION**

PCS

Node 1: ECLSS: Cab Fan

**Node 1 Cabin Fan**

NOTE
Per SPN 15271, NCS R2 does not report the Cabin Fan’s RPC data correctly to the PCS. Upon commanding the RPC to CLOSE, the telemetry will still indicate ‘OPEN’. Assume RPC has closed and continue with the procedure. **MCC-H** has insight to the correct status.

5.1 sel RPCM N14B B RPC 17

RPCM N14B B RPC 17

**cmd** RPC Position – Close (Verify – Cl)

Node 1 Cabin Fan

5.2 **cmd** State – On

√State – On
√Speed, rpm: 3549 --- 4251
√dP, mmHg ≤ 5.0

‘Speed Limiting’

√Status – Enabled
To prevent APCU 2 trip condition, N14B power bus loads must be managed whenever Node 1 Cabin Fan speed is increased or decreased.

1. **CHANGING NODE 1 CABIN FAN SPEED**

PCS Node 1: ECLSS: Cab Fan

<table>
<thead>
<tr>
<th>State – On</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
</tr>
</tbody>
</table>

‘Speed’

**NOTE**

The valid speed range for the cabin fan speed command is 3,209 --- 7,666 rpm. The fan software has under and over speed FDIR that is normally set to 3200 rpm and 7000 rpm, respectively. Commanding outside the FDIR range while FDIR is enabled will cause the fan software to shut the fan down and issue the ‘Cabin Fan Fail – Node 1’ warning message.

Enter new speed in Set, rpm field.

**cmd** Set

| Speed, rpm: New commanded speed ± 9 % |
TOOLS AND EQUIPMENT REQUIRED:

Tool Bag 1-1/2" Open End Wrench
          10" Adjustable Wrench

FDF Kit Sharpie pen and colored dots (for marking crosshairs)

Ingress Flashlight
Equip Jettison/Stowage Bag
Bag Rubber Gloves (two pair)
      Ear Plugs (two pair)
      Towel
Docking Target Base Plate Cover
Docking Target Standoff Cross Bag

PMA2 Docking Mechanism Accessory Kit
APAS APAS Hatch Tool
Hatch Cleaning Pads

1. SETTING UP EXTERNAL AIRLOCK FOR ODS AND PMA INGRESS
   1.1 Relocate Tool Bag, Jettison Stowage Bag to Ext A/L.

ODS 1.2 Temporary stow EMUs, Centerline Camera Bracket.

ODS 1.3 ODS Equal vlv (one) → remove cap, stow
Hatch Equal vlv (one) → NORM

   ✓ ODS Hatch ΔP ≤ 0.2 psid

2. ODS VESTIBULE INGRESS
   Open ODS Hatch per decal.
   Equal vlv (one) → OFF, install cap

   WARNING
   1. Surfaces may be below freezing for a short time after initial ODS hatch opening.
   2. Avoid direct contact with vestibule surfaces until VESTIBULE TEMP 1,2 (two) indicate > 40° F
      (SM 177 EXTERNAL AIRLOCK).

   Rotate Centerline Camera Diffuser Duct into vestibule.
   Wipe any condensate from vestibule volume and report to MCC-H.

3. DOCKING EQUIPMENT REMOVAL
   3.1 For each docking light
       Disconnect cables.
       Install caps on outlet.
       Remove the locking pin.
       Remove docking light.
       Reinstall locking pin.
3.2 Mark crosshairs with appropriate identification.

3.3 Remove crosshairs.
   Stow lights and crosshairs in post insertion locker.

4. INGRESS OPERATIONS PREPARATION

   **CAUTION**
   1. When the Standoff Cross is not mounted, it should be in its bag and the Docking Target Base Plate should be covered. The surfaces of these items are very easily scratched, which could impede future dockings.
   2. Donning of Rubber Gloves required in handling of Docking Target Standoff Cross and Docking Target Base Plate.

4.1. Remove Docking Target Standoff Cross from Docking Target Base Plate (10" Adjustable Wrench and 1-1/2" Open End Wrench) Temporarily stow jamnut by continuing to rotate it onto smaller, non-threaded diameter of receptacle.

4.2. Insert cross into Docking Target Standoff Cross Bag. Temporarily stow in Jettison Stowage Bag.

4.3. Install Docking Target Base Plate Cover.

4.4. Stow tools.

5. PMA2 INGRESS OPERATIONS

   **APAS Hatch**

   5.1 Select ‘РАБОЧЕЕ ПОЛОЖЕНИЕ’ (Working Position) torque setting on APAS Hatch Tool.

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

   Remove tool.
   Allow Hatch Seals to relax for three minutes.

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

   Open Hatch.
   Install APAS Hatch Cover.
   Secure Hatch in open position to PMA APAS Hatch Standoff.
MO13Q 5.2. ARLK FAN A(B) – OFF

Ext A/L 5.3. Halo Inlet Flex Duct ←|→ Halo

5.4. Obtain PMA/ODS Interface Duct from PMA2. 
PMA/ODS Interface Duct →|← Halo Inlet Flex Duct
(Use T-handle clamp.)

ODS 5.5. Stow Centerline Camera Diffuser Duct along starboard top of Hatch 
External Airlock wall (in straps).

PMA2 5.6 PMA2 Hard Duct Grille Cover → Open

MO13Q 5.7 ARLK FAN A(B) – ON

PMA2 5.8 √Airflow from grille
This Page Intentionally Blank
NOTE
This procedure is not necessarily to be executed in its entirety. Execute only those steps required for the desired valve reconfiguration.

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>
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<tr>
<td>Aft Stbd</td>
<td>RPCM N14B C RPC 04</td>
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<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>
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</table>

Refer to Table 1 for X and Y references that follow.

1. **NODE 1 IMV FDIR VERIFICATION**

PCS
Node 1: ECLSS: Node 1 FDIR

Node 1 FDIR

‘Node 1-1 MDM – IMV FDIR’

√ Status – Enabled

If Status – Inhibited

**cmd** Enable

√ Status – Enabled

‘Node 1-2 MDM – IMV FDIR’

√ Status – Enabled

If Status – Inhibited

**cmd** Enable

√ Status – Enabled

2. **NODE 1 IMV X VALVE ACTIVATION**

Node 1: ECLSS: Node 1 IMV X Vlv

Per SPN 15271, NCS R2 does not report the IMV Fwd Vlv’s RPC data correctly to the PCS. Upon commanding the RPC to CLOSE, the telemetry will still indicate ‘OPEN.’ Assume RPC has closed and continue with the procedure. **MCC-H** has insight to the correct status.

sel RPCM/RPC Y

RPCM/RPC Y

**cmd** RPC Position – Close (Verify – Cl)
Node 1 IMV X Vlv

**cmd** Enable

√Status – Enabled

### 3. OPENING NODE 1 IMV X VALVE

Node 1: ECLSS: IMV X Vlv

Node 1 IMV X Vlv

**cmd** Open – Arm

**cmd** Open

Wait 20 seconds.

√Position – Open

### 4. NODE 1 IMV X VALVE CLOSURE

PCS

Node 1: ECLSS: IMV X Vlv

Node 1 IMV X Vlv

**cmd** Close – Arm

**cmd** Close

Wait 20 seconds.

√Position – Closed

### 5. NODE 1 IMV X VALVE DEACTIVATION

PCS

Node 1: ECLSS: Node 1 IMV X Vlv

Node 1 IMV X Vlv

√Status – Enabled

**cmd** Inhibit

√Status – Inhibited

NOTE

Per SPN 15271, NCS R2 does not report the IMV Fwd Vlv’s RPC data correctly to the PCS. The RPC position will indicate ‘OPEN’ when it is actually closed. Continue with the procedure as written. **MCC-H** has insight to the correct status.

sel RPCM/RPC Y

**RPCM/RPC Y**

**cmd** RPC Position – Open (Verify – Op)

17 SEP 00

26
CAUTION

1. Aft Port - Verify corresponding IMV valve opened prior to activating IMV Fan.

2. Port Fwd, Stbd Aft - Verify ductwork is in the proper configuration prior to activating IMV Fan.

Table 1. Node 1 IMV Fan Information

<table>
<thead>
<tr>
<th>X (LOCATION)</th>
<th>Y (RPCM/RPC)</th>
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</thead>
<tbody>
<tr>
<td>Aft Port</td>
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<tr>
<td>Port Fwd</td>
<td>RPCM N13B C RPC 16</td>
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<tr>
<td>Stbd Aft</td>
<td>RPCM N13B A RPC 04</td>
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</table>

Refer to Table 1 above for X and Y references in the following steps.

1. **NODE 1 IMV X FAN ACTIVATION**
   
   PCS
   Node 1: ECLSS: IMV X Fan
   Node 1 IMV X Fan

   NOTE

   Per SPN 15271, NCS R2 does not report the IMV Port Fwd Fan’s RPC data correctly to the PCS. Upon commanding the RPC to CLOSE, the telemetry will still indicate ‘OPEN’. Assume RPC has closed and continue with the procedure. **MCC-H** has insight to the correct status.

   1.1 `sel RPCM/RPC Y`

<table>
<thead>
<tr>
<th>RPCM/RPC Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>cmd RPC Position – Close (Verify – Cl)</td>
</tr>
<tr>
<td>Node 1 IMV X Fan</td>
</tr>
</tbody>
</table>

   1.2 `cmd On`

   √ Status – In Transit
   Wait 15 seconds.
   √ Status – On
   √ Speed, rpm: 7745 --- 9278

2. **NODE 1 IMV X FAN DEACTIVATION**

   NOTE

   MDM conversion translates 0 volts (fan off) to 7164 rpm. Reference 2A SPN 8437.

   PCS
   Node 1: ECLSS: IMV X Fan
   Node 1 IMV X Fan
2.1 cmd Off – Arm

- cmd Off

- Status – Off
- Speed, rpm: 7164 ± 50

NOTE
Per SPN 15271, NCS R2 does not report the IMV Port Fwd Fan’s RPC data correctly to the PCS. The RPC position will indicate ‘OPEN’ when it is actually closed. Continue with the procedure as written. MCC-H has insight to the correct status.

2.2 sel RPCM/RPC Y

RPCM/RPC Y

- cmd RPC Position – Open (Verify – Op)
TOOLS REQUIRED:

Tool Bag  
Ratchet, 1/4" Drive  
7/16" Deep Well Socket  
10" Adjustable Wrench

Ingress ISS Cue Cards

Equip Atmosphere Sampling Bottle (two)

Bag General Purpose Tape, 2"

Jettison/Stowage Bag

1. PROVIDING POWER TO NODE 1 INTERNAL LIGHTS

PCS 1.1 Node 1: EPS: RPCM N13B A

RPCM N13B A

sel RPC [X] where [X] = 13

cmd RPC Position – Close (Verify – Cl)

Repeat

1.2 Node 1: EPS: RPCM N13B B

RPCM N13B B

sel RPC 1

cmd RPC Position – Close (Verify – Cl)

1.3 Node 1: EPS: RPCM N13B C

RPCM N13B C

sel RPC 1

cmd RPC Position – Close (Verify – Cl)

1.4 Node 1: EPS: RPCM N14B B

RPCM N14B B

sel RPC 1

cmd RPC Position – Close (Verify – Cl)

1.5 Node 1: EPS: RPCM N14B C

RPCM N14B C

sel RPC [X] where [X] = 2 15 16

cmd RPC Position – Close (Verify – Cl)

Repeat
2. SETTING UP QDMS FOR INGRESS CONTINGENCY SUPPORT
2.1 QDMs (two) ←|→ existing LEH O2 lines
    Obtain two HIUs.
    Install HIU and QDM to each of the two 70-ft O2 Hoses.

L2  2.2 √O2 XOVR SYS 1, SYS 2 (two) – OP
C7  2.3 √LEH O2 SPLY 1,2 vlv (two) – OP
MO32M 2.4 LEH O2 5,6 vlv (two) → CL
    Free end of 70-ft O2 Hoses (two) →|← LEH O2 5,6 vlv outlet
    LEH O2 5,6 vlv (two) → OP
MO39M 2.5 MIDDECK COMM CCU PWR → OFF
    Comm cables →|← MHA
    CCU PWR → ON (HIU control volume, as required)
MO42F 2.6 Don masks.
    Mask O2 Control → EMERGENCY
    Momentarily pull masks away from faces and verify O2 flow.
    Verify comm.

2.7 Mask O2 Control → NORM
2.8 Doff masks.
    Route both QDM/70-ft O2 Hoses to Ext A/L.

3. SETTING UP EXTERNAL AIRLOCK FOR NODE 1 INGRESS
3.1 Relocate Tool Bag and Ingress Equipment Bag to Ext A/L.
3.2 Collect one air sample inside the External Airlock and label location
    and MET on bottle.
    Stow bottle in Jettison Stowage Bag.

4. OPENING NODE 1 FWD HATCH
4.1 √MCC-H, “Go for Node Ingress.”

Node 1 Fwd Hatch
4.2 √ESA Handle – CLOSED
    √ESA Sample Valve – CLOSED
    Completely loosen ESA captive screws (four).
    Remove ESA from MPEV and place it inside Ziplock Bag.
    Stow in Jettison Stowage Bag.
WARNING

Don Earplugs prior to equalization. Doff Earplugs when equalization is complete.

4.3 MPEV → OPEN

CRT SPEC 78 SYS SUMM 1

4.4 When CABIN dP/dT < 0.01, open Node 1 Fwd Hatch per decal (Use 10" Adjustable Wrench if CPAs installed).

Node 1 4.5 Collect one air sample inside Node 1. Label location and MET on bottle. Stow bottle in Jettison Stowage Bag.

5. DUCT CONFIGURATION

Node 1 5.1 Node 1 IMV Fwd Stbd Vlv → OPEN

PMA2 5.2 IMV Cap ←|→ Node 1 Fwd Stbd IMV valve flange (Use Ratchet, 1/4" Drive, 7/16" Deep Well Socket, leave V-band clamp on flange.) Temporarily stow IMV Cap to IMV flex duct with white Velcro Strap.

MO13Q 5.3 AIRLK FAN A(B) – OFF

PMA2 5.4 PMA IMV Flex Duct Extension Assembly →|← Node 1 Fwd Stbd IMV valve flange (Use V-band clamp, Snug fastener using Ratchet, 1/4" Drive, 7/16" Deep Well Socket.)

MO13Q 5.5 AIRLK FAN A(B) – ON

PMA2 5.6 √Airflow at PMA2 grille

Node 1 5.7 Node 1 IMV Fwd Port Vlv → OPEN

PMA2 5.8 IMV Cap ←|→ Node 1 Fwd Port IMV valve flange (Use Ratchet and Deep Socket, leave V-band clamp on flange.) Temporarily stow IMV Cap to IMV flex duct with white Velcro Strap.

PMA2 5.9 Retrieve one IMV Cap (Flange Saver) Velcro strapped to flexible ducting. IMV Cap (Flange Saver) →|← Node 1 Fwd Port IMV valve flange (Use V-band clamp, Snug fastener using Ratchet, 1/4" Drive, 7/16" Deep Well Socket.)
5.10 PMA2 Hard Duct Grille Cover → Closed

5.11 Install Vestibule Closeout in PMA2/Node 1 CBM Vestibule.

6. CREW INGRESS
6.1 Relocate Tool Bag, Jettison Stowage Bag, and Ingress Equipment Bag to ISS. Set up necessary ISS cue cards.

Node 1 6.2 √ Node 1 Interior Lights (eight) – Full Bright

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>It may take 30 minutes for cold lights to come up full bright.</td>
</tr>
<tr>
<td>Lights must come up to full bright before turning them off.</td>
</tr>
</tbody>
</table>

6.3 Configure lighting per crew preference.

6.4 Retrieve two IMV Fan Outlet Grille Covers from NOD1O4_A1 and place over Node 1 IMV Aft Port IMV Fan outlet grilles NOD1OP3 and NOD1OP4 using Gray Tape.
Post ISS Ingress Configuration (cont)

- Used Desiccant Bags and Fans removed from flex brackets.
- New Fans installed with Batteries.
- New Desiccant Bags temporarily stowed in Node 1.
- FGB Hatches open, lights on, air sample collected.
- ISS PFE installed.

Figure 1.- Post ISS Ingress #1 Configuration. (FD04)
TOOLS AND EQUIPMENT REQUIRED:

NOD1O1  Internal Sampling Adapter (ISA)
Stbd  CTB

NOD1O4  Vacuum Access Jumper (VAJ) 35 ft
A1

NOD1O4  Vacuum Access Jumper (VAJ) 5 ft
C2

Ingress  Fluke 87 Multimeter
Equip  Thermal Protective Gloves (Deerskin)
Bag  Bungees and Anchors

NOTE
Do not begin this procedure until the Orbiter is fully equalized with Node/FGB volume. The leak check pass/fail criteria was set using these volumes. Using other volumes changes the criteria.

1. **Z1 PRESSURE DOME PRESSURIZATION AND GROSS LEAK CHECK**

   SM 78 SYS SUMM 1

   1.1 Record CABIN dP/dt; R₁ = ________.

   Node 1

   1.2 Uncap Overhead MPEV.

   Overhead

   **WARNING**

   1. Perform the following step only when all one-way Hatches are protected against negative pressure.

   2. Don Earplugs prior to equalization. Doff Earplugs when equalization is complete.

   3. Expect dP/dt alarm upon equalization.

   1.3 Overhead MPEV → OPEN

   1.4 Wait 60 seconds.

   SM 78 SYS SUMM 1

   CRT  1.5 Record CABIN dP/dt; R₂ = __________ (dR = R₂ - R₁ = __________)

   If dR >= 0.01, pressure dome gross leak check failed Overhead MPEV → CLOSED

   √MCC-H >>
Node 1

1.6 Overhead MPEV → CLOSED

Record MET, \( T_1 = \) _____________

1.7 Start 15 minute timer to allow for thermal stabilization.

2. ISA/VAJ/MPEV SETUP

2.1 ISA Sample Port Valve → CLOSED, capped

Refer to Figure 1.

Node 1

2.2 Deck MPEV – CLOSED

2.3 Uncap Deck MPEV.

2.4 Uncap ISA VAJ ports and VAJ ends.

Hand tighten VAJs to ISA, Overhead and Deck MPEV as shown in Figure 2 (Connect bent ends of VAJs to MPEVs).

WARNING

Failure to secure ISA/VAJ Assembly may result in damage to equipment and/or injury to crew.

2.5 Secure VAJs to seat track with bungees and anchors.
3. **MULTIMETER SETUP**

3.1 √ISA Pressure Module – OFF

3.2 √Multimeter – OFF

3.3 Plug ISA Pressure Module into Multimeter COM to COM, V to VΩ → | - _________

3.4 ISA Pressure Module → mmHgA

3.5 Press and hold yellow button for 2 seconds while selecting V.

**NOTE**

Each 0.0010 V on the Multimeter is equal to 1 mmHg.

4. **CHECKING VAJ LEAK**

4.1 Record Multimeter reading, \( P_1 = \) _________ V (0.6500 --- 0.7200 V expected)

**Node 1**

4.2 √Overhead MPEV – CLOSED

**Node 1**

4.3 Deck MPEV → OPEN

Wait 15 seconds.

4.4 If air flow/whistling sound coming from VAJ

Deck MPEV → CLOSED

√MCC-H >>
4.5 Record:
   Multimeter reading, \( P_2 = \) _________ V (< 0.0200 V expected)
   MET, \( T_2 = \) __________

Node 1 4.6 Deck MPEV → CLOSED

4.7 Verify Multimeter reading is not increasing.

5. **Z1 PRESSURE DOME FINE LEAK CHECK**

Node 1 5.1 When MET > \( T_1 \) + 15 minutes
   Overhead MPEV → OPEN

5.2 Record:
   Multimeter reading, \( P_3 = \) _________ V (0.6500 --- 0.7200 V expected) MET, \( T_3 = \) __________

5.3 Overhead MPEV → CLOSED

5.4 Start 15 minute timer.

5.5 When MET = \( T_3 \) + 15 minutes
   Overhead MPEV → OPEN
   Record multimeter reading \( P_4 = \) _________ V
   Overhead MPEV → CLOSED
   \( dP = P_3 - P_4 = \) __________ V
   If \( dP > 0.0450 \) V, fine leak check failed, \( \sqrt{\text{MCC-H}} >> \)

   **NOTE**
   If Multimeter reading has decreased by > 0.0450 V (i.e., 45 mmHg) over 15 minutes; then the Z1 Pressure Dome is leaking overboard at a rate of > 1 lb/hour (at a cabin pressure of \( \sim 700 \) mmHg).

6. **Z1 PRESSURE DOME INGRESS**

6.1 Multimeter → OFF

6.2 ISA Pressure Module → OFF

6.3 Uncap ISA Sample Port Valve

6.4 ISA Sample Port Valve → OPEN

6.5 Disconnect 5 ft VAJ from Overhead MPEV.
   Temporarily stow per crew preference.

**WARNING**
Z1 Pressure dome temps can range from -11°F to 48°F, which can damage human skin. Don Thermal Protective Gloves prior to ingress.
6.6 Open Node 1 Overhead Hatch per decal.

6.7 Inform MCC-H, “Z1 Vestibule Ingress Complete.”
TOOLS AND EQUIPMENT REQUIRED:

- Ingress Flashlight
- Equip Dry Wipes
- Bag Ratchet, 1/4" Drive
  7/16" Deep Well Socket
- Velcro Strap

NODE 1 AFT HATCH OPENING

Node 1

Aft

1. MPEV → Open

CRT

SM 78 SYS SUMM 1

2. When CABIN dP/dT < 0.01, open Node 1 Aft Hatch per decal.
   Notify MCC, “Node 1 Aft Hatch Open.”

NODE 1 AFT IMV CONFIGURATION FOR INGRESS

Node 1

Aft

3. Node1 IMV Aft Port Valve → Open

4. Node1 IMV Aft Stbd Valve → Open

PMA1

5. √PMA1 Grille Cover → Open

6. Cap ←|→ PMA1 hard duct (Ratchet, 1/4" Drive, 7/16" Deep Well Socket).
   Leave band clamp on duct.
   Stow Cap on nearby avionics close out labeled “Ventilation Duct Cap Stowage.”

7. IMV Cap ←|→ Node1 Aft Port IMV Valve Flange (Ratchet, 1/4" Drive,
   7/16" Deep Well Socket).
   Stow IMV cap in PMA2 IMV Cap stowage location (Air Duct Jumper Launch Restraint).

8. PMA1 IMV Flex Duct →|← Node 1 Aft Port IMV Valve Flange
   (Snug fastener using ratchet, 1/4" Drive, 7/16" Deep Well Socket)

9. IMV Cap ←|→ Node1 Aft Stbd IMV Valve Flange (Ratchet, 1/4" Drive,
   7/16" Deep Well Socket).
   Stow IMV Cap in PMA1 IMV Cap stowage location (Air Duct Jumper Launch Restraint).

10. Retrieve IMV Flange Saver from PMA2, then
    IMV Flange Saver →|← Node 1 Aft Stbd IMV Valve Flange
        (Snug fastener using ratchet, 1/4" Drive, 7/16" Deep Well Socket)
DESICCANT INSTALLATION AND PORTABLE FAN DISASSEMBLY

PMA1/ Node 1

11. Desiccant Bag Assemblies (four) ←|→ used Portable Fans (one in PMA, three in Node).

Stow used Desiccant Bag Assemblies in old wrappers located on Handrail, seal with Gray Tape.
Stow on NOD1S4.

WARNING
Do not attempt to open battery compartments of used Portable Fans. Doing so could release caustic material from corroded Batteries.

12. Portable Fan Assemblies (one in PMA, three in Node) ←|→ flexible brackets.

Put used Portable Fan Assemblies in plastic bags (four) taped to Handrail.
Stow them in Jettison/Stowage Bag.

13. Retrieve four replacement Portable Fan Assemblies from NOD1P4_E3 and four Desiccant Bag Assemblies from NOD1S4.

CAUTION
Do not remove Desiccant Bag Assemblies from cellophane covers until ready for final Node Egress.

14. As necessary, temporarily stow Desiccant Bag Assemblies in Node 1 using Duct Tape.

15. For each Portable Fan Assembly (four)
\( \sqrt{\text{Fan Pwr – OFF}} \)

Remove Batteries (16) from NOD1D4_K4 and install (four each)

Portable Fan Assemblies (three in Node 1 one in PMA1) →|← flexible brackets

16. Report to MCC, “PMA1 Ingress complete.”
**TOOLS AND EQUIPMENT REQUIRED:**

**Tool Bag**
- Tool Table Cloth
- 10" Adjustable Wrench
- 1-1/2" Open End Wrench
- 4" Ratchet Wrench, 1/4" Drive
- 7/16" Deep Socket, 1/4" Drive

**Ingress Equip Bag**
- Flashlight
- Jettison/Stowage Bag
- Rubber Gloves (two pair)
- Towel
- Docking Target Base Plate Cover
- Docking Target Standoff Cross Bag

**PMA2 APAS Hatch**
- Docking Mechanism Accessory Kit
- APAS Hatch Tool
- Cleaning Pads

**MF43M**
- Photo TV Flood Lighting

1. **SETTING UP EXTERNAL AIRLOCK FOR ODS AND PMA INGRESS**
   1.1 Relocate Tool Bag, Jettison Stowage Bag to Ext A/L.

2. **ODS VESTIBULE INGRESS**
   Open ODS Hatch per decal.
   Equal vlv (one) → OFF, install cap

   Rotate Centerline Camera Diffuser Duct into vestibule.
   Wipe any condensate from vestibule volume and report to MCC-H.

**WARNING**

1. Surfaces may be below freezing for a short time after initial ODS hatch opening.

2. Avoid direct contact with vestibule surfaces until VESTIBULE TEMP 1,2 (two) indicate > 40°F (SM 177 EXTERNAL AIRLOCK).
3. **INGRESS OPERATIONS PREPARATION**

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When the Standoff Cross is not mounted, it should be in its bag and the Docking Target Base Plate should be covered. The surfaces of these items are very easily scratched, which could impede future dockings.</td>
</tr>
<tr>
<td>2. Donning of Rubber Gloves required in handling of Docking Target Standoff Cross and Docking Target Base Plate.</td>
</tr>
</tbody>
</table>

3.1 Remove Docking Target Standoff Cross from Docking Target Base Plate (10" Adjustable Wrench, 1-1/2" Open End Wrench). Temporary stow jamnut by continuing to rotate it onto smaller, non-threaded diameter of receptacle.

3.2 Insert cross into Docking Target Standoff Cross Bag. Temporarily stow in Jettison Stowage Bag.

3.3 Install Docking Target Base Plate Cover.

3.4 Stow tools.

4. **PMA2 INGRESS OPERATIONS**

4.1 Select ‘РАБОЧЕЕ ПОЛОЖЕНИЕ’ (Working Position) torque setting on APAS hatch tool.

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

Remove tool. Allow Hatch Seals to relax for three minutes.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>APAS Hatch Seals require 3 minutes to relax before opening Hatch.</td>
</tr>
</tbody>
</table>

Open Hatch. Install APAS Hatch Cover. Secure Hatch in open position to PMA APAS Hatch Standoff.

4.2 AIRLK FAN A(B) – OFF

4.3 Halo Inlet Flex Duct ←|→ Halo

4.4 Obtain PMA/ODS Interface Duct from PMA2. PMA/ODS Interface Duct →|← Halo Inlet Flex Duct (Use T-handle clamp).
ODS  4.5  Stow Centerline Camera Diffuser Duct along starboard top of Hatch
       External Airlock wall (in straps).

MO13Q  4.6  AIRLK FAN A(B) – ON

PMA2  4.7  Airflow from PMA2 Duct Grille
This Page Intentionally Blank
TOOLS REQUIRED:
Tool Bag  10" Adjustable Wrench

1. **SETTING UP FOR NODE 1 INGRESS**
   1.1 QDMs (two) ←|→ existing LEH O2 lines
      Obtain two HIUs.
      Install HIU and QDM to each of the two 70-ft O2 Hoses.

   L2  1.2 √O2 XOVR SYS 1, SYS 2 (two) – OP

   C7  1.3 √LEH O2 SPLY 1,2 vlv (two) – OP

   MO32M  1.4 LEH O2 5,6 vlv (two) → CL
      Free end of 70-ft O2 Hoses (two) →|← LEH O2 5, 6 vlv outlet
      LEH O2 5, 6 vlv (two) → OP

   MO39M  1.5 MIDDECK COMM CCU PWR → OFF
      Comm cables →|← MHA
      CCU PWR → ON (HIU control volume, as required)

   MO42F  1.6 Don masks.
      Mask O2 Control → EMERGENCY
      Momentarily pull masks away from faces and verify O2 flow.
      Verify comm.

   1.7 Mask O2 Control → NORM

   1.8 Doff masks.
      Route both QDM/70-ft O2 Hoses to Ext A/L.

   1.9 Relocate Tool Bag and Ingress Equipment Bag to Ext A/L.

2. **OPENING NODE1 FWD HATCH**

   Node1 Fwd MPEV → Open

   CRT  **SPEC 78 SYS SUMM 1**

   When CABIN dP/dT < 0.01, open Node1 Fwd Hatch per decal.
   (Use 10" Adjustable Wrench if CPAs installed.)
3. CREW INGRESS

Node1
3.1 Position Photo TV Flood Lighting as necessary

3.2 Node1 Fwd Stbd IMV vlv → Open
   Node1 Fwd Port IMV vlv → Open
   Handle stowed.

PMA2
3.3 PMA2 Duct Grille Cover → Closed

3.4 Relocate Tool Bag and Ingress Equipment Bag to ISS.
   Set up necessary ISS cue cards.

NOD1
3.5 Unstow PPRV caps (two) and install on Node1 Port, Starboard D4_D1 Hatches.

4. PORTABLE FAN ASSEMBLY SETUP

4.1 Relocate Node1 Fan/Clamp/Bracket Assemblies (three) to each planned work site in Node 1 as necessary.

Per work site as necessary
4.2 Fan Power → High

   NOTE
   Low power position setting has been disabled.

4.3 √ Fan RPM control position – Full CW ⤵

4.4 √ Fan is running
Changes:

- Docking Target Standoff Cross removed and bagged, Docking Target covered.
- APAS Hatch open and covered, Hatch secured with Hatch Standoff.
- QDMs/O2 Hoses stowed in PMA 2.
- Node IMV Fwd Stbd Valve opened.
- Node IMV Fwd Port Valve opened.
- PMA 2 Grille Cover closed.
- PPRV Caps installed on PPRVs.
- FGB Hatches open, lights on.
- Alarm Control Panel activated.
- ISS PFE Installed in Node PFE Locker.

Figure 1.- Post ISS Ingress #2 Configuration (FD09).
POC PROCEDURES
If Setting up in the Shuttle AFD

1. **UNSTOWING PCS**
   - MF71C
     - PCS Thinkpads (two)
     - ORB Power Supply Adapter Cable 10’ (two)
     - KIT, IBM THINKPAD (one 1553 Card and 22-inch Adapter Cable in each Kit) (two)
     - ORB DC Power Cable 6’ (one)
     - ORB DC Power Cable 10’ (one)
     - ORB 1553 Data Cable 8’ (two)
     - RS/ORB DC Power Supply (two)

2. **POWER OFF VERIFICATION**
   - Pwr Sply
     - PCS1 28V DC PWR SPLY switch – Off
     - PCS2 28V DC PWR SPLY switch – Off

   Refer to **UTILITY OUTLET PLUG-IN PLAN ORBIT CONFIGURATION (FDF, REF DATA FS, UTIL PWR)** for DC UTIL PWR outlet availability.

   - A15
     - DC UTIL PWR MNC – OFF (J2)
   - O19
     - DC UTIL PWR MNA – OFF

3. **PCS POWER AND DATA CABLE CONNECTIONS**
   - Refer to Figure 1.

   Connect 22” Adapter cable to the 1553 PC Card for both PCSs.
   Insert 1553 PC Card into either PCS PCMCIA slot for both PCSs.

   Connect both Power Supply Adapter Cable 10’ to PCS 1,2 and to 28V DC power supply outlets (J2).

   - A15
     - Connect PCS 1 Power Supply Adapter Cable 10’ to MNC DC UTIL power outlet (J2) and to 28V DC power supply outlet (J1).
   - O19
     - Connect PCS 2 ORB DC Power Cable 6’ to DC UTIL PWR MNA outlet (J2) and to 28V DC power supply outlet (J1).
   - L12/A3
     - Connect PCS 1 ORB 1553 Data Cable 8’ to N1-1 (J103) outlet and to 1553 PC Card Adapter Cable.
     - Connect PCS 2 ORB 1553 Data Cable 8’ to N1-2 (J107) outlet and to 1553 PC Card Adapter Cable.

   **NOTE**
   About 1 minute into PCS bootup, the user will be required to enter the “b -r” command.
4. **TURNING ON PCS**

- **A15** DC UTIL PWR MNC – ON (J2)
- **Pwr Sply** PCS1 28V DC PWR SPLY switch → On (Lt On)
- **O19** DC UTIL PWR MNA – ON
- **Pwr Sply** PCS2 28V DC PWR SPLY switch → On (Lt On)
- **PCS** PCS 1,2 Thinkpad PWR switches → On

~1 minute into bootup, user will see
Screen title: ‘<<<< **Current Boot Parameters >>>>’

Prompt: Select (b)oot or (i)nterpreter, then:

Type “b -r” at the prompt within 5 seconds.

******************************************************************************
If the command prompt missed
Wait 2 minutes for the desktop to appear with
the taskbar at the bottom of the display.

sel Exit

Wait for ‘**type any key to continue**’.

PCS Thinkpad PWR switch → Off, then On

Wait for command prompt.
******************************************************************************

5. **CONNECTING PCS TO MDM DATA (IF MDMs ARE UP AND RUNNING)**

- **PCS2** After bootup when taskbar appears at bottom of display
  sel Arrow directly above PCS logo (as required)
  sel Start/Restart PCS CDS (as required)
  sel Icon to open PCSCDS Main Control Panel Window (as required)

√Status Box is green and ‘**Connected**’ is displayed in the PCSCDS
Main Control Panel Window (as required)

**NOTE**
Per SPN 13756, when the PCSCDS Main Control Panel is iconified,
an informational popup alerting a Limit Server failure will not be
shown. Loss of the Limit Server leads to the loss of limit sensing.
Restoring the CDS UI icon will provide the popup.

Do not iconify PCSCDS Main Control Panel Window.
If Status Box is not green, select CONNECT TO MDM button if the MDMs are on.

**********************************************************

NOTE
Per SPN 12171, NCS may not be able to process a PCS connect request. If the first PCS or Early Comm connection with NCS is dropped for any reason, NCS will refuse all connection requests until the remaining PCS connections are dropped. At that time, NCS will start processing connect requests.

NOTE
1. PCS connection to MDM is indicated by green in the Status Box and ‘Connected’ message displayed in the PCSCDS Main Control Panel Window only when the associated Node MDM is up and running as the Primary MDM.

2. If MDMs are not up and running and step 5 is executed, expect a PCS ‘CW Server Error Msg’ and a ‘CDS Signon Fail’.

After connected to the MDMs, if the PCS displays ‘The MDM Connection has failed’, open the PCSCDS Main Control Panel Window and select CONNECT TO MDM button to reconnect.

If no joy, close all displays and anything iconified and redo step 5.

If still no joy, perform {LOSS OF PCS TELEMETRY}, all (SODF: ISS MAL: C&DH), then

6. PCS CONFIGURATION FOR DISPLAYS (AS REQUIRED)

NOTE
After PCSCDS has been selected, wait 30 seconds before starting CDDF displays.

sel Arrow above PCS logo
sel Start PCS CDDF display

After approx 1 minute, ‘Increment 3A Home Page’ is displayed.

**********************************************************

If GMT - static or telemetry fields in Caution & Warning Tool Bar are cyan, perform {PCS RECONNECT}, all (SODF: ISS OPS: C&DH), then:

**********************************************************

Displays may now be selected as desired.

Inform MCC-H when complete. >>
If Setting up in the FGB

7. UNSTOWING PCS
   PCS Thinkpad
   ORB Power Supply Adapter Cable 10’
   KIT, IBM THINKPAD (one 1553 Card and 22-inch Adapter Cable in each
   Kit)
   RS DC Power and 1553 Data Cable 8’
   RS/ORB DC Power Supply

8. POWER OFF VERIFICATION
   If N1-2 is Primary, use switches and connectors on Panel 427.
   If N1-1 is Primary, use switches and connectors on Panel 227.

   427(227) On panel OUTLET PWR-10/3 AMPS (PBC-10/3)
   \Switch – Off
   Pwr Sply \PCS 28V DC PWR SPLY switch – Off

9. PCS POWER AND DATA CABLE CONNECTIONS
   Refer to Figure 2.

   Connect 22” Adapter cable to the 1553 PC Card
   Insert 1553 PC Card into either PCS PCMCIA slot

   Connect RS DC Power and 1553 Data Cable 8’ to
   427(227) Receptacle on panel GNC 2/RS Bus 8 (GNC 1/RS Bus 7)
   Pwr Sply 28V DC power supply outlet (J1)
   PCS 22” Adapter Cable

   Pwr Sply Connect the ORB Power Supply Adapter Cable 10’ to the PCS and to the
   RS/ORB DC power supply outlet (J2).

   427(227) Connect the cable protruding from the GNC 2/RS Bus 8 (GNC 1/RS
   Bus 7) panel (cables are labeled 77KM-2120-1670 and
   77KM-2120-2190 respectively) to the 10A connector on panel
   OUTLET PWR-10/3 AMPS (PBC-10/3).

   NOTE
   About 1 minute into PCS bootup, the user
   will be required to enter the “b -r” command.

10. TURNING ON PCS
    427(227) On panel OUTLET PWR-10/3 AMPS (PBC-10/3)
    Pwr Sply 28V DC PWR SPLY switch → On (Lt On)
    PCS PCS Thinkpad PWR switch → On

    ~1 minute into bootup, user will see
    Screen title: ‘<<<< Current Boot Parameters >>>>’

    Prompt: Select (b)oot or (i)nterpreter, then:
Type “b -r” at the prompt within 5 seconds.

**********************************************************
If the command prompt missed
Wait 2 minutes for the desktop to appear with
the taskbar at the bottom of the display.

sel Exit

Wait for ‘type any key to continue’.

PCS Thinkpad PWR switch → Off, then On

Wait for command prompt.
**********************************************************

11. CONNECTING PCS TO MDM DATA (IF MDMs ARE UP AND RUNNING)

PCS2 After bootup when taskbar appears at bottom of display
sel Arrow directly above PCS logo (as required)
sel Start/Restart PCS CDS (as required)
sel Icon to open PCSCDS Main Control Panel Window (as required)

✓Status Box is green and ‘Connected’ is displayed in the PCSCDS
Main Control Panel Window (as required)

NOTE
Per SPN 13756, when the PCSCDS Main Control Panel is iconified,
an informational popup alerting a Limit Server failure will not be
shown. Loss of the Limit Server leads to the loss of limit sensing.
Restoring the CDS UI icon will provide the popup.

Do not iconify PCSCDS Main Control Panel Window.

**********************************************************
If Status Box is not green, select CONNECT TO
MDM button if the MDMs are on.
**********************************************************

NOTE
Per SPN 12171, NCS may not be able to process a PCS connect
request. If the first PCS or Early Comm connection with NCS is
dropped for any reason, NCS will refuse all connection requests
until the remaining PCS connections are dropped. At that time,
NCS will start processing connect requests.
NOTE
1. PCS connection to MDM is indicated by green in the Status Box and ‘Connected’ message displayed in the PCSCDS Main Control Panel Window only when the associated Node MDM is up and running as the Primary MDM.

2. If MDMs are not up and running and step 5 is executed, expect a PCS ‘CW Server Error Msg’ and a ‘CDS Signon Fail’.

After connected to the MDMs, if the PCS displays ‘The MDM Connection has failed’, open the PCSCDS Main Control Panel Window and select CONNECT TO MDM button to reconnect.

If no joy, close all displays and anything iconified and redo step 5.

If still no joy, perform [LOSS OF PCS TELEMETRY], all (SODF: ISS MAL: C&DH).

12. PCS CONFIGURATION FOR DISPLAYS (AS REQUIRED)

NOTE
After PCSCDS has been selected, wait 30 seconds before starting CDDF displays.

sel Arrow above PCS logo
sel Start PCS CDDF display

After approx 1 minute, √‘Increment 3A Home Page’ is displayed.

**************************************************************************************************
If GMT - static or telemetry fields in Caution & Warning Tool Bar are cyan, perform {PCS RECONNECT}, all (SODF: ISS OPS: C&DH), then:
**************************************************************************************************

Displays may now be selected as desired.

Inform MCC-H when complete. >>

If Setting up in the Service Module

13. UNSTOWING PCS

PCS Thinkpad
ORB Power Supply Adapter Cable 10’ KIT, IBM THINKPAD (one 1553 Card and 22-inch Adapter Cable in each Kit)
RS DC Power and 1553 Data Cable 8’
RS/ORB DC Power Supply

14. POWER OFF VERIFICATION

Pwr Sply √PCS 28V DC PWR SPLY switch – Off
15. **PCS POWER AND DATA CABLE CONNECTIONS**
Refer to Figure 3.

Connect 22" Adapter cable to the 1553 PC Card.
Insert 1553 PC Card into either PCS PCMCIA slot.

Connect RS DC Power and 1553 Data Cable 8' to
Aft of 209 Receptacle labeled “LAPTOP” on panel aft of 209
Pwr Sply 28V DC power supply outlet (J1)
PCS 22" Adapter Cable

Pwr Sply Connect the ORB Power Supply Adapter Cable 10' to the PCS and to the
RS/ORB DC power supply outlet (J2)

**NOTE**
About 1 minute into PCS bootup, the user will be required to enter the “b-r” command.

16. **TURNING ON PCS**

Pwr Sply 28V DC PWR SPLY switch → On (Lt On)
PCS PCS Thinkpad PWR switch → On

~1 minute into bootup, user will see
Screen title: ‘<<<< Current Boot Parameters >>>>>’

Prompt: Select (b)oot or (i)nterpreter, then:

Type “b -r” at the prompt within 5 seconds

**********************************************************
If the command prompt missed
Wait 2 minutes for the desktop to appear with the taskbar at the bottom of the display.

sel Exit

Wait for ‘type any key to continue’.

PCS Thinkpad PWR switch → Off, then On

Wait for command prompt.
**********************************************************

17. **CONNECTING PCS TO MDM DATA (IF MDMs ARE UP AND RUNNING)**

PCS2 After bootup when taskbar appears at bottom of display
sel Arrow directly above PCS logo (as required)
sel Start/Restart PCS CDS (as required)
sel Icon to open PCSCDSD Main Control Panel Window (as required)

✓ Status Box is green and ‘Connected’ is displayed in the PCSCDS Main Control Panel Window (as required)
**NOTE**
Per SPN 13756, when the PCSCDS Main Control Panel is iconified, an informational popup alerting a Limit Server failure will not be shown. Loss of the Limit Server leads to the loss of limit sensing. Restoring the CDS UI icon will provide the popup. 

Do not iconify PCSCDS Main Control Panel Window.

******************************************************************
If Status Box is not green, select CONNECT TO MDM button if the MDMs are on.
******************************************************************

**NOTE**
Per SPN 12171, NCS may not be able to process a PCS connect request. If the first PCS or Early Comm connection with NCS is dropped for any reason, NCS will refuse all connection requests until the remaining PCS connections are dropped. At that time, NCS will start processing connect requests.

**NOTE**
1. PCS connection to MDM is indicated by green in the Status Box and 'Connected' message displayed in the PCSCDS Main Control Panel Window only when the associated Node MDM is up and running as the Primary MDM.

2. If MDMs are not up and running and step 5 is executed, expect a PCS 'CW Server Error Msg' and a 'CDS Signon Fail'.

After connected to the MDMs, if the PCS displays 'The MDM Connection has failed', open the PCSCDS Main Control Panel Window and select CONNECT TO MDM button to reconnect.

If no joy, close all displays and anything iconified and redo step 5.
If still no joy, perform {LOSS OF PCS TELEMETRY}, all (SODF: ISS MAL: C&DH).

18. **PCS CONFIGURATION FOR DISPLAYS (AS REQUIRED)**

**NOTE**
After PCSCDS has been selected, wait 30 seconds before starting CDDF displays.

sel Arrow above PCS logo
sel Start PCS CDDF display

After approx 1 minute, √'Increment 3A Home Page' is displayed.
If GMT - static or telemetry fields in Caution & Warning Tool Bar are cyan, perform {PCS RECONNECT}, all (SODF: ISS OPS: C&DH), then:

Displays may now be selected as desired.

Inform **MCC-H** when complete. >>
FIGURE 1.- AFD PCS Configuration.

NOTE

The 1553 Data Cable I/Fs with a 22-inch pigtail connector (Ch A and B) connects to the 1553 Card that inserts into the PC Card PCMIA Upper slot in the PCS.
Figure 2.- FGB PCS Configuration.

If N1-2 is Primary, connect to PCR RS 8 (GNC-2) for data.
If N1-1 is Primary, connect to PCR RS 7 (GNC-1) for data.

NOTE
1. The Russian Power Cable is fixed in place and only needs to be connected to the Russian 10A PWR outlet.
2. The 1553 Data cable I/Fs with a 22-inch pigtail connector (Ch A and B) connects to the 1553 Card that inserts into the PC Card PCMIA Upper slot in the PCS.
Figure 3.- SM PCS Configuration.

If N1-2 is Primary, connect to PCR RS 8 (GNC-2) for data.
If N1-1 is Primary, connect to PCR RS 7 (GNC-1) for data.

NOTE
The 1553 Data cable I/Fs with a 22-inch pigtail connector (Ch A and B) connects to the 1553 Card that inserts into the PC Card PCMIA Upper slot in the PCS.
1. **PCS POWERDOWN**
   Close all display windows.
   Disconnect CDS from MDM.
   Close CDS Window.

   At the taskbar on bottom of display,
   sel EXIT

   On ‘Logout Confirmation’ window,
   sel OK

   When ‘Type any key to continue’ appears,

   If shuttle AFD
   **PCS**
   PCS 1,2 Thinkpad PWR switches → Off
   **Pwr Sply**
   PCS1 28V DC PWR SPLY switch → Off (Lt Off)
   PCS2 28V DC PWR SPLY switch → Off (Lt Off)
   **O19**
   DC UTIL PWR MNA – OFF (J1)
   **A15**
   DC UTIL PWR MNC – OFF (J2)
   **L12/A3**
   DC PWR 2 CAB PL – OFF

   If ISS RS
   **PCS**
   PCS Thinkpad PWR switch → Off
   **Pwr Sply**
   PCS 28V DC PWR SPLY switch → Off (Lt Off)
   **РБС-10/3**
   RS Power switch → Off

2. **EPCS POWER AND DATA CABLE DISCONNECT**
   If shuttle AFD
   **L12/A3**
   Disconnect both ORB 1553 Data Cables 8’ from N1-1 (J103) and N1-2 (J107) from the1553 PC Card Adapter Cables.

   Disconnect both the ORB DC Power Cable 6’ and ORB DC Power Cable 10’ from the RS/ORB DC power supply (J1) and the ORB DC (J2) outlets, A15 MNC, and O19 MNA.

   Disconnect both the ORB Power Supply Adapter Cable 10’ from the PCS DC power outlet and the RS/ORB DC Power Supply (J2).

   If ISS RS
   **РБС -10/3**
   Disconnect RS Power Cable.

   Disconnect RS DC Power and 1553 Data Cable 8’ to PCR outlet and the RS/ORB DC power supply outlet (J1) and the 1553 PC Card Adapter Cable.

   **Pwr Sply**
   Disconnect the ORB Power Supply Adapter Cable 10’ from the RS/ORB DC power supply outlet (J2) and from the PCS.
3. **STOWING PCS**

**MF71C**
- PCS Thinkpads (two)
- 20V DC Power Cables 10’ (two)
- PCS KITS, IBM THINKPAD (two) (One 1553 card and 22-inch Adapter Cable in each Kit)

If shuttle AFD
- Stow:
  - ORB DC Power Cable 6’ (one)
  - ORB DC Power Cable 10’ (one)
  - ORB 1553 Data Cable 8’ (two)
  - RS/ORB DC Power Supply (two)

If ISS RS
- Stow:
  - RS DC PWR and 1553 Data Cable 8’ in the FGB
  - RS/ORB DC Power Supply (one)
MATED OPERATIONS PROCEDURES
NOTE
ISS steps should be performed by appropriate crew, but may be performed by MCC-H or MCC-M.

1. VERIFYING ORBITER NOT IN CONTROL
C3
\[ \sqrt{\text{DAP: A/FREE/VERN(ALT)}} \]

\[ \text{GNC 20 DAP CONFIG} \]
\[ \sqrt{\text{DAP A12, B12 loaded}} \]

Orbiter ⇒ ISS, MCC-H, “Orbiter ready to begin controlling attitude of Mated Stack.”

2. CONFIGURING ISS TO FREE DRIFT
If this step is being performed by ground
MCC-H ⇒ MCC-M, “Perform Russian steps to mode Thrusters to Indicator.”

If this step is being performed by ISS crew,
Perform steps to mode Thrusters to Indicator.

ISS (MCC-H) ⇒ Orbiter, “ISS is in Free Drift.”

3. ASSUMING CONTROL WITH ORBITER
If ALT DAP required
O14, O15, O16:F

If required attitude per Flight Plan is LVLH,
DAP – A/LVLH/VERN(ALT)

If required attitude per Flight Plan is Inertial,
DAP – A/INRTL/VERN(ALT)

\[ \text{GNC UNIV PTG} \]

When rates are damped < 0.1 deg/sec/axis,
DAP – A/AUTO/VERN(ALT)

Shuttle ⇒ ISS, MCC-H, “Orbiter has established attitude control.”
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NOTE
ISS steps should be performed by appropriate crew, but may be performed by MCC-H or MCC-M.

1. VERIFYING ISS NOT IN CONTROL
PCS
SM: MCS
SM: MCS
‘MCS Status’
Verify RS GNC Mode – Indicator

2. PREPARING ISS TO TAKE CONTROL
If this step is being performed by ground, MCC-H ⇒ MCC-M, “Perform preparatory Russian steps to mode Indicator to Thrusters.”
If this step is being performed by ISS crew, Perform preparatory Russian steps to mode Indicator to Thrusters.
ISS(MCC-H) ⇒ Orbiter, “ISS ready to begin controlling attitude of Mated Stack.”

3. PLACING ORBITER INTO FREE DRIFT
C3(A6)
DAP: FREE
Orbiter ⇒ ISS, MCC-H, “Orbiter is in Free Drift.”

4. ASSUMING CONTROL WITH ISS
If this step is being performed by ground, Russian MCC-H ⇒ MCC-M, “Perform Russian steps to mode Indicator to Thrusters.”
If this step is being performed by ISS crew, Perform Russian steps to mode Indicator to Thrusters.
ISS(MCC-H) ⇒ Orbiter, “ISS has assumed attitude control.”

5. RETURNING ORBITER TO NOMINAL CONFIGURATION
If ALT DAP, return to Group B powerdown
O14, PRI RJD DRIVER, LOGIC (sixteen) – OFF
O15, RJDA-1A L2/R2 MANF DRIVER – ON
O16:F

22 JUN 00
71
O2 REPRESS
(JNT OPS/3A/FIN) Page 1 of 2 pages

NOTE
1. Purpose is to pressurize stack to 14.96 psia from 14.7 psia using orbiter O2 while maintaining ISS O2 concentration below US Segment limit of 24.1%.
2. O2 repress will be repeated as required to allow adequate mixing and to avoid higher than acceptable O2 concentration in orbiter cabin.

FDA, C/W LIMITS RESET

NOTE
1. CABIN PRESS H/W C/W upper limit is not changed because it is adequate for the target pressures.
2. PPO2 limits are inhibited to avoid nuisance alarms.
3. O2 is limit-sensed by O2 concentration.

1. Contact MCC-H for uplink of B/U C/W and SM ALERT limit resets via TMBU, if desired.

<table>
<thead>
<tr>
<th>B/U C&amp;W</th>
<th>PARAM ID</th>
<th>ENA/INH</th>
<th>HI EU</th>
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<tbody>
<tr>
<td>CABIN PRESS</td>
<td>0612405</td>
<td>INH</td>
<td></td>
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<tr>
<td>PPO2 A</td>
<td>0612511</td>
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<tr>
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<td>0612513</td>
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<td>SH PPO2-2</td>
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<tr>
<td>H2O LOOP 1 ICH OUT T</td>
<td>0612724</td>
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<tr>
<td>H2O LOOP 2 ICH OUT T</td>
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<td>INH</td>
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<table>
<thead>
<tr>
<th>H/W C&amp;W</th>
<th>CHANNEL</th>
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<tr>
<td>PPO2 A</td>
<td>34</td>
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</tr>
<tr>
<td>PPO2 B</td>
<td>44</td>
<td>INH</td>
</tr>
</tbody>
</table>

2. √MCC-H for repress Cryo configuration

Node 1
3. √PPRV caps installed on port, stbd Hatches

O2 REPRESS INITATION

OCAC 4. Perform OCAC filter cleaning
OCAC PWR → OFF

C5 5. DIRECT O2 vlv – OP

6. When ‘S78 O2 CONC’ or ‘S66 CABIN PRESS’ or ‘S210 NODE 1 CAB PRESS’ message
   DIRECT O2 vlv – CL

22 JUN 00 73
7. MCC-H may ask for another cycle.
   Wait for O2 to mix and O2 concentration to stabilize.
   
   On call from MCC-H, repeat steps 5 --- 7.

OCAC 8. OCAC PWR → ON

9. √MCC-H for post-repress cryo configuration
NOTE
1. **MCC** will provide MET/EVENT and desired pressure values for use in this procedure.
2. Expect possible dP/dT Klaxon alarm during depress.

**MO10W**
1. √14.7 CABIN REG INLET SYS 1,SYS 2 (two) – CL

**AW82B**
2. AIRLK DEPRESS vlv cap – Vent, remove
   AIRLK DEPRESS vlv – 0

**SM 66 ENVIRONMENT**

**CRT**
3. If PPO2 < 2.7 at anytime during depress
   DIRECT O2 vlv – OP

**CRT**
4. When CABIN PRESS = desired pressure
   DIRECT O2 vlv – CL

**AW82B**
   AIRLK DEPRESS vlv – CL
   Install AIRLK DEPRESS vlv cap

<table>
<thead>
<tr>
<th>MET/EVENT</th>
<th>DESIRED PRESSURE</th>
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</table>
NOTE
MCC will provide MET/EVENT and desired pressure values for use in this procedure.

WARNING
Terminate all WCS activity during repress.

L2
1. O2/N2 CNTLR VLV SYS 1 – OP (N2)
   2 – AUTO

MO10W
2. O2 REG INLET SYS 2 – OP
3. 14.7 CAB REG INLET SYS 1 vlv – OP
4. On MCC GO
   14.7 CABIN REG INLET SYS 2 vlv – OP

SM 66 ENVIRONMENT

CRT
5. When CABIN PRESS = desired pressure
MO10W
14.7 CAB REG INLET SYS 1,SYS 2 vlv (two) – CL

<table>
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6. If required
   Go to PCS 1(2) CONFIG (ORB OPS, ECLS).

If not required
MO10W
O2 REG INLET SYS 2 – CL
L2
O2/N2 CNTLR VLV SYS 2 – CL (O2)
Z1 PRESSURE DOME EGRESS
(JNT OPS/3A/FIN A)  Page 1 of 3 pages

TOOLS AND EQUIPMENT REQUIRED:
NOD1O1  Internal Sampling Adapter (ISA)
Stbd CTB

NOD1O4  Vacuum Access Jumpers (VAJ) 35 ft
A1

NOD1O4  Vacuum Access Jumpers (VAJ) 5 ft
C2

Ingress  Fluke 87 Multimeter
Equip
Bag

1. Z1 PRESSURE DOME EGRESS

   Node 1  Overhead

      1.1 Inspect Z1 Dome Hatch Seals and seal surfaces for condensation,
contamination, or damage (nicks, cuts, etc.).
If hatch seal damage is found, √MCC-H.
If condensate present, dry Hatch Seals with Dry Wipe (using blotting
   technique).

      1.2 √All returning items removed from Z1 Dome

      1.3 Close Node1 Overhead Hatch per decal.

2. ISA/VAJ/MPEV SETUP

   2.1 Connect 5 ft VAJ to Node1 Overhead MPEV as shown in Figure 2.

   2.2 ISA Sample Port Valve – CLOSED, capped
      Refer to Figure 1.

   Figure 1.- ISA Sample Valve.

   Node 1  Deck

      2.3 √Deck MPEV – CLOSED

      2.4 √Multimeter COM to COM, V to VΩ→ - _______
2.5 ISA Pressure Module → mmHgA

2.6 Press and hold yellow button for 2 seconds while selecting V.

2.7 Verify Multimeter reading 0.6700 --- 0.7600

![ ISA/VAJ/MPEV Configuration. ]

3. **Z1 PRESSURE DOME DEPRESS**

   3.1 Deck MPEV → OPEN

   3.2 Overhead MPEV → OPEN

   3.3 When Multimeter reading < 0.0100 V (< 2 minutes):
       Deck MPEV → CLOSED

   3.4 Verify Multimeter reading is not increasing.

4. **NODE1 OVERHEAD HATCH FINE LEAK CHECK**

   4.1 Record Multimeter reading: \( P_1 = \) _______ V

   4.2 Overhead MPEV → CLOSED

   4.3 Start 30 minute timer.

   4.4 When timer expires
       Deck MPEV → OPEN

   4.5 Wait 30 seconds, then
       Deck MPEV → CLOSED
Node 1 4.6 Overhead MPEV → OPEN

4.7 Record multimeter reading: \( P_2 = \text{______ V} \)
\((dP = \text{______ V})\)
If \(dP > 0.0005\) V, hatch leak check failed
Overhead MPEV → CLOSE

\(\sqrt{\text{MCC-H}} \gg\)

### NOTE
If Multimeter reading has increased by > 0.0005 V (i.e., 0.5 mmHg) over 30 minutes, then overhead hatch is leaking at a rate which would cause the Z1 dome volume to repressurize to ~3 psia (and ~30 deg F dewpoint) in five days.

5. **DISMANTLE AND STOW EQUIPMENT**

Node 1 5.1 Overhead MPEV → CLOSE

5.2 Multimeter → OFF

5.3 ISA Pressure Module → OFF

5.4 Disconnect and stow Multimeter in Ingress Equipment Bag.

5.5 Uncap ISA Sample Port Valve

5.6 ISA Sample Port Valve → OPEN

5.7 Wait 30 seconds, then
ISA Sample Port Valve → CLOSED, capped

5.8 Disconnect VAJs, cap ends.
Stow 5 ft VAJ in NOD1O4_C2.
Stow 35 ft VAJ in NOD1O4_A1.

5.9 Cap all ISA ports and stow in NOD1O1 Stbd CTB.

6. **CAP DECK AND OVERHEAD MPEV**

Node 1 6.1 Hand tighten Deck MPEV Cap.

Node 1 6.2 Hand tighten Overhead MPEV Cap.

6.3 Inform MCC-H, “Z1 Vestibule Egress Complete.”
TOOLS AND EQUIPMENT REQUIRED:

Ingress  
Flashlight

Equip  
Dry Wipes

Bag  
Gray Tape

1. **VERIFYING PMA1 EGRESS CONFIGURATION**
   1.1 Inspect Aft Hatch Seals and seal surfaces for condensation, contamination, or damage (nicks, cuts, etc.). If condensate present, dry Hatch Seals with Dry Wipe (using blotting technique).

   PMA1  
   1.2 √ All equipment bags and returning items removed from PMA1

2. **CONFIGURING FOR NODE 1 EGRESS**
   NOD1  
   2.1 Stow Docking Mechanism Accessory Kit (used during FGB Ingress)  
   D4_G1 APAS Hatch Tool  
   Cleaning Pads

   2.2 √ All equipment bags, ISS cue cards and returning items removed from Node 1  
   Ingress Equipment Bag  
   Jettison/Stowage Bag

   Node 1 Deck  
   2.3 MPEV → uncapped

   Node 1 Fwd  
   2.4 Inspect Hatch Seals and seal surfaces for condensation, contamination, or damage (nicks, cuts, etc.). If condensate present, dry Hatch Seals with Dry Wipes (using a blotting technique).

   2.5 √ MPEV – CLOSED (not capped)

   PMA2  
   2.6 PMA2 Duct Grille Cover → Open

   Node 1  
   2.7 Node1 Fwd Stbd IMV Vlv → (deploy handle) Close (stow handle)  
   Node1 Fwd Port IMV Vlv → (deploy handle) Close (stow handle)

   NOD1 P1_01  
   2.8 General Lighting Master Switch pb → On

   Node 1 Fwd Hatch  
   2.9 Close Node 1 Forward Hatch per decal.
Post Egress Configuration

- Node Aft Port IMV Fan deactivated; FGB Fans deactivated.
- PMA1 to FGB duct removed from PMA1 hard duct and stowed in FGB.
- PMA1 hard duct cap installed on hard duct; PMA1 grille cover opened.
- Node Aft Port IMV fan deactivated.
- FGB alarm control panel deactivated; PILOT lights off.
- RPM1/2 Hatch closed.
- QDMs, and ingress equipment removed.
- PMA2 grille cover opened.
- Node Fwd Port & Aft IMV valve closed, not capped.
- Node Fwd Hatch closed (MPEV closed, not capped).
- PMA/ODS interface duct removed from Halo Inlet Flex Duct and stowed in PMA2 (restrained to handrail).
- APAS Hatch Standoff disengaged from Hatch and restrained to handrail.
- APAS Hatch cover removed and stowed in PMA2.
- APAS Hatch closed.
- Docking target uncovered and standoff cross reinstalled.
- ODS Hatch closed.

Figure 1.- Post ISS Egress Configuration (FD04).
1. **POWER BUS STATUS VERIFICATION**
   √MCC-H to verify proper loads on power bus

2. **NODE 1 CABIN FAN DEACTIVATION**
   PCS
   Node 1: ECLSS: Cab Fan
   Node 1 Cabin Fan
   
   2.1 **cmd Off – Arm**
   cmd Off
   √State – Off
   √Speed, rpm: 2000 ± 50

   **NOTE**
   Per SPN 15271, NCS R2 does not report the Cabin Fan’s RPC data correctly to the PCS. The RPC position will indicate ‘OPEN’ when it is actually closed. Continue with the procedure as written. MCC-H has insight to the correct status.

   2.2 **sel RPCM N14B B RPC 17**
   
   **RPCM N14B B RPC 17**
   cmd RPC Position – Open (Verify – Op)

3. **SMOKE DETECTOR 1 DEACTIVATION**
   Node 1: ECLSS: SD1
   Node 1 Smoke Detector 1
   ‘Monitoring’
   
   3.1 **√Status – Enabled**
   cmd Inhibit
   √Status – Inhibited

   3.2 **sel RPCM N14B C RPC 03**
   
   **RPCM N14B C RPC 03**
   cmd RPC Position – Open (Verify – Op)

4. **SMOKE DETECTOR 2 DEACTIVATION**
   Node 1: ECLSS: SD2
   Node 1 Smoke Detector 2
   ‘Monitoring’
   
   4.1 **√Status – Enabled**
**cmd** Inhibit

√Status – Inhibited

4.2. sel RPCM N13B A RPC 16

**RPCM N13B A RPC 16**

**cmd** RPC Position – Open (Verify – Op)
Tools and Equipment Required:

- Tool Bag
  - 10" Adjustable Wrench
  - 1-1/2" Open End Wrench
- Ingress Equipment Bag
  - Rubber Gloves
- PMA2 Docking Mechanism Accessory Kit
- APAS Hatch Tool
- Cleaning Pads
- Jettison Stowage Bag
  - Docking Target Standoff Cross (in Bag)

1. Oxygen Equipment Relocation

1.1 Relocate QDMs and 70-ft O2 Hoses to shuttle.

MO32M 1.2 LEH O2 5, 6 vlv (two) – CL

1.3 70-ft O2 Hoses (two) ←|→ LEH O2 5, 6 vlv outlet

Middeck 1.4 QDM (two) ←|→ 70-ft O2 Hoses and comm cables

QDM (two) →|← existing LES O2 lines and comm cables

Stow 70-ft O2 Hoses.

MO32M 1.5 LEH O2 5, 6 vlv (two) – OP

2. Configuring IMV and Hatch for Egress

MO13Q 2.1 AIRLK FAN A(B) – OFF

Ext A/L 2.2 PMA/ODS Interface Duct ←|→ Halo Inlet Flex Duct

(Leave T-handle clamp attached to Halo Inlet Flex Duct).

PMA2 2.3 Stow free end of PMA/ODS Interface Duct into PMA2 on port side Handrail.

Ext A/L 2.4 Halo Inlet Flex Duct →|← Halo (Use T-handle clamp)

MO13Q 2.5 AIRLK FAN A(B) – ON

Airflow at halo

2.6 All equipment bags and returning items removed from PMA2

Jettison Stowage Bag
Tool Bag
Ingress Equipment Bag
Docking Mechanism Accessory Kit
APAS Hatch Tool
Cleaning Pads
3. APAS HATCH CLOSURE

CAUTION
Hatch Seals are delicate. Exercise caution when inspecting/cleaning Hatch Seals.


Select ‘РАБОЧЕЕ ПОЛОЖЕНИЕ’ (Working Position) torque setting on Hatch Tool. Insert tool in hatch socket (ensure fully seated). Rotate tool 3 --- 4 turns in direction of ‘ЗАТП’ (Close) arrow until tool clicks.

3.2 √APAS EQUAL VLV – OP

CAUTION
Donning of Rubber Gloves required in handling of Docking Target Standoff Cross and Docking Target Base Plate.

3.3 Remove Docking Target Base Plate Cover from Target Base Plate. Stow Cover in Ingress Equipment Bag.

3.4 Obtain Docking Target Standoff Cross from Standoff Cross Bag. Stow Standoff Cross Bag in Ingress Equipment Bag.

NOTE
Ensure key on Standoff Cross shaft is aligned with keyway on mating receptacle, and insert shaft until collar bottoms out on receptacle surface.

3.5 Insert Docking Target Standoff Cross into keyed receptacle on Docking Target Base Plate until shaft collar bottoms out.
NOTE
When all mating parts are correctly assembled, a groove on docking target standoff cross shaft should be visible above capnut (not recessed).

3.6 Ensure jamnut is positioned onto smaller, non-threaded diameter of docking target base plate receptacle.
Align and mate standoff cross threaded hexagonal capnut onto docking target base plate receptacle.
Continue to rotate hexagonal capnut , and tighten firmly onto receptacle (10” Adjustable Wrench).
Thread jamnut onto receptacle, rotating , until contact with hexagonal capnut shoulder occurs.
While maintaining a torque on hexagonal capnut, firmly tighten jamnut against hexagonal capnut shoulder to a torque of 34 --- 36 in-lbf (1-1/2” Open End Wrench).

3.7 Stow tools.

4. **ODS HATCH CLOSURE**
4.1 Close ODS Hatch per decal.

4.2 Equal vlv (two) – OFF, capped
TOOLS REQUIRED:

Ingress
Flashlight

Equip
Portable Fan Assemblies (four)
Desiccant Bag Assemblies (four)

Bag
Portable Fan Assemblies (four w/batteries)
D-Cell Batteries (sixteen spares)
Flexible Brackets (four, already installed)
Handrail Clamps (two, already installed)
Standard Short Screwdriver

NODE 1 AND PMA 1 PORTABLE FAN CONFIGURATION

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The exact locations of portable fans in Node 1 and PMA 1 are not critical.</td>
</tr>
<tr>
<td>2. Do not deploy Desiccant Bag Assemblies until just prior to Hatch closure.</td>
</tr>
</tbody>
</table>

1. Using Handrail Clamps and Flexible Brackets, mount four new Portable Fan Assemblies on the flexible brackets already installed in Node 1 (three) and PMA 1 (one).

DESICCANT INSTALLATION AND PORTABLE FAN ACTIVATION

2. √ Fan Pwr – Off
   - If required, replace Batteries.
   - If required, stow used Batteries in Jettison/Stowage Bag.

3. Remove Desiccant Bag Assembly from plastic bag.
   - Secure plastic bag to handrail with tape.

4. Desiccant Bag Assembly →|← Fan

5. Fan Power → High
   - Low power position setting has been disabled.

6. √ Fan RPM control position – Full CW

7. √ Fans are running
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1. **ΠΓΟ-ΓΑ HATCH LEAK CHECK CONFIGURATION**

   FGB: ECLSS
   [FGB: ECLSS]
   ‘FGB’

   1.1 Record Cab Press: ______ mmHg (FGB-ΠΓΟ closeout press)
   
   _____ - 20 mmHg

   1.2 Desired pressure: ______ mmHg

2. **FIRST PARTIAL DEPRESS**

   On MCC GO

   [*NOTE*]
   Estimated time for depress is ~1 minute.

   2.1 Perform {GENERIC DEPRESS} to drop to desired pressure (SODF: JNT OPS: MATED OPERATIONS), then:
   If at any time FGB-ΠΓΟ pressure decreases, stop depress, √MCC.

   2.2 Record time and FGB-ΠΓΟ pressure.
   
   ‘FGB’
   
   Cab Press: ______ mmHg
   GMT: _____/___:___:___

3. **CONFIGURATION FOR FGB ΓΑ-ΡΜΑ1 HATCH LEAK CHECK**

   PCS
   FGB: ECLSS
   [FGB: ECLSS]
   ‘Docking Adapter’

   3.1 Record Cab Press: ______ mmHg (FGB-ΓΑ closeout press)
   
   _____ - 20 mmHg

   3.2 Desired pressure: ______ mmHg

4. **SECOND PARTIAL DEPRESS**

   On MCC GO

   [*NOTE*]
   Estimated time for depress is ~1 minute.

   4.1 Perform {GENERIC DEPRESS} to drop to desired pressure (SODF: JNT OPS: MATED OPERATIONS), then:
   If at any time FGB-ΓΑ pressure decreases, stop depress, √MCC.
4.2 Record time and FGB-ΓΑ pressure.

'Docking Adapter'

Cab Press: _____ mmHg

GMT: _____/____:____

5.

5.1 At GMT +30 minutes past previous GMT recorded in step 2.2, proceed.

5.2 Record time and FGB-ΠΓΟ pressure.

'FGB'

Cab Press: _____ mmHg

GMT: _____/____:____

5.3 Report results of leak check to MCC (Nominal ≤ 4 mmHg Δ).

6.

6.1 At GMT +30 minutes past previous GMT recorded in step 4.2, proceed.

6.2 Record time and FGB-ΓΑ pressure.

'Docking Adapter'

Cab Press: _____ mmHg

GMT: _____/____:____

6.3 Report results of leak check to MCC (Nominal ≤ 4 mmHg Δ).
TOOLS AND EQUIPMENT REQUIRED:

Tool Bag
- Torque Wrench, 1/4" Drive
- Ratchet, 1/4" Drive
- 7/16" Deep Well Socket

Ingress Equip Bag
- Flashlight
- IMV Cap O-ring Replacement Kit (two)
- Alcohol Wipes
- Bore O-ring
- Face O-ring
- Braycote Lubricant
- Rubber Gloves
- Dry Wipes
- Gray Tape
- Atmosphere Sampling Bottle (one)

1. CONFIGURING FOR PMA1 EGRESS
   Node 1
   1.1 √Node1 Aft Port IMV Valve – Open
       Handle stowed.
   1.2 √Node1 Aft Stbd IMV Valve – Open
       Handle stowed.
   1.3 PMA1 IMV Grille cover → Open

   Node 1
   1.4 Inspect Aft Hatch Seals and seal surfaces for condensation,
       contamination, or damage (nicks, cuts, etc.).
       If condensate present, dry Hatch Seals with Dry Wipes (using a
       blotting technique).

   PMA1
   1.5 √All equipment bags and returning items removed from PMA1

2. CONFIGURING FOR NODE 1 EGRESS
   CAUTION
   Verification that caps are removed from each PPRV is
   required in order to provide fault tolerance to an
   overpressure relief condition of Node1/PMA1 structure.

   Node 1
   2.1 Remove PPRV caps (two).

   2.2 Stow caps in Rack NOD1D4_D1.

   2.3 Collect air sample (one) from inside Node 1.
       Label location and MET on bottle.
       Stow bottle (one) in Ingress Equipment Bag.
2.4 Stow Docking Mechanism Accessory Kit (used during FGB Ingress)
   APAS Hatch Tool
   Cleaning Pads

2.5 All equipment bags, ISS cue cards and returning items removed from Node 1
   Photo TV Lights
   Ingress Equipment Bag
   Jettison/Stowage Bag

2.6 Inspect Hatch Seals and seal surfaces for condensation, contamination, or damage (nicks, cuts, etc.)
   If condensate present, dry Hatch Seals with Dry Wipes (using a blotting technique).

2.7 MPEV – CLOSED (capped)

2.8 General Lighting Master Switch pb → On

2.9 Remove covers from Node 1 IMV Aft Port Fan outlet grilles, NOD1OP3 and NOD1OP4 and stow in NOD1O4_A1.

3. CONFIGURING PMA2 IMV FOR EGRESS

3.1 AIRLK FAN A(B) – OFF

3.2 Node 1 Fwd Stbd IMV Vlv → (deploy handle) Close (stow handle)
   Node 1 Fwd Port IMV Vlv → (deploy handle) Close (stow handle)

3.3 PMA2 IMV Duct Extension ←|→ Node 1 Fwd Stbd IMV Valve Flange, using Ratchet and Deep Socket, leave V-band clamp on flange.

   NOTE
   Donning of Rubber Gloves required during lubrication of O-rings.

3.4 Retrieve Fwd Stbd IMV Cap from temporary stow location.
   Remove bore and face O-rings from IMV Cap and discard.
   Using Alcohol Wipes, clean IMV flange and grooves on IMV Cap.
   Inspect cap grooves for nicks or burrs.
   Report any damage to MCC.
   Lubricate new O-rings with a thin film of Braycote.
   Cap Braycote Tube and stow back in Ziplock Bag.
   Install IMV Cap Bore O-rings and Face O-rings.

3.5 IMV Cap →|← Node 1 Fwd Stbd IMV Valve Flange
   (Use Ratchet and Deep Socket)
   Torque V-band clamp to 34-36 in-lbf [3.8 to 4.1 N•m].
   (Use Torque Wrench)
3.6 IMV Cap (Flang Saver) ←|→ Node 1 Fwd Port IMV Valve Flange, using Ratchet and Deep Socket, leave V-band clamp on flange. Stow in PMA2 with White Velcro Strap.

3.7 Retrieve Fwd Port IMV Cap from temporary stow location. Remove bore and face O-rings from IMV Cap and discard. Using Alcohol Wipes, clean IMV flange and grooves on IMV Cap. Inspect cap grooves for nicks or burrs. Report any damage to MCC. Lubricate new O-rings with a thin film of Braycote. Cap Braycote Tube and stow back in Ziplock Bag. Install IMV Cap Bore O-Rings and Face O-Rings. Dispose of used gloves in Dry Trash. Dispose of used Alcohol Wipes in Ziplock Bags then place in Dry Trash.

3.8 IMV Cap →|← Node 1 Fwd Port IMV Valve Flange (Use Ratchet and Deep Socket) Torque V-band clamp to 34-36 in-lbf [3.8 to 4.1 N•m]. (Use Torque Wrench)

3.9 PMA2 IMV Duct Extension ←|→ PMA2 IMV Duct Jumper Stow Duct Extension, V-band clamp, Velcro ties in orbiter MDK (Ceil) Upper Port Small Bag.

3.10 IMV Cap ←|→ PMA2 IMV Duct Jumper launch restraint Stow IMV Cap in Jettison Stowage Bag, leave V-band clamp on flange.


**CAUTION**

Flight 3A is the last planned ingress of PMA2 prior to its unberthing. All stowed/loose items in PMA2 must be removed to prevent obstruction during reberthing operations.

4. **CONFIGURING STATION/SHUTTLE IMV FOR EGRESS**

4.1 PMA/ODS Interface Duct ←|→ Halo Inlet Flex Duct (Leave T-handle clamp attached to Halo Inlet Flex Duct).

4.2 Secure to PMA Handrail with Velcro Straps.

4.4 Halo Inlet Flex Duct →|← Halo (Use T-handle clamp)
MO13Q 4.5 Airlk Fan A(B) – ON
√Airflow at halo

CAUTION

The desiccant assemblies are very efficient at moisture absorption. Do not deploy them until ready for hatch closure. Once desiccants are deployed, expedite crew egress.

5. Moisture Removal Activation and Node 1 Egress

Node 1 5.1 For each of the four Node 1/PMA1 fans, perform {Node 1 and PMA1 Moisture Removal Kit Setup}, step 2 --- 7 (SODF: JNT OPS: Egress Station), then:

5.2 Close Node 1 Forward Hatch per decal.

6. Node 1 Lighting Power Removal

6.1 Node 1: EPS: RPCM N14B B

RPCM N14B B

sel RPC 1

cmd RPC Position – Open (Verify – Op)

6.2 Node 1: EPS: RPCM N14B C

RPCM N14B C

sel RPC [X] where [X] = 2 15 16

cmd RPC Position – Open (Verify – Op)

Repeat
Post ISS Egress Configuration

- Node Aft Port IMV Fan deactivated.
- ГО-ГА Hatch Frame Ring removed and stowed.
- FGB air sample collected, alarm control panel deactivated, ГО lights off.
- ГО-ГА Hatch closed, leak check conducted, 1st partial depress.
- ГА-PMA1 Hatch closed, leak check conducted 2nd partial depress.
- Desiccant Bag/Portable Fan installed and activated in PMA1.
- PPRV Caps removed and stowed in Node Stowage Rack (NOD1D4_D1).
- QDMs, and ingress equipment removed; Node air sample collected.
- Node Fwd Stbd & Port IMV Valve closed, capped.
- Desiccant Bags/Portable Fans installed and activated in Node.
- Node Fwd Hatch closed (MPEV closed, not capped).
- PMA IMV flex duct extension removed from PMA 2.
- PMA/ODS Interface Duct removed from Halo Inlet Flex Duct & stowed in PMA 2.
- APAS Hatch Standoff disengaged from Hatch and restrained to handrail.
- APAS Hatch Cover removed and stowed in PMA2.

Post ISS Egress Configuration (cont.)

- APAS Hatch closed.
- Docking Target uncovered and Standoff Cross reinstalled.
- ODS Hatch closed.

Figure 1.- Post ISS Egress Configuration (FD09).
TOOLS AND EQUIPMENT REQUIRED:

- Tool Bag
  - 10" Adjustable Wrench
  - 1-1/2" Open End Wrench

- Ingress Equip Bag
  - IMV Cap O-Ring Replacement Kit
  - Alcohol Wipes
  - Bore O-ring
  - Face O-ring
  - Braycote Lubricant
  - Rubber Gloves

- PMA2
  - Docking Mechanism Accessory Kit

- APAS Hatch
  - APAS Hatch Tool
  - Cleaning Pads

- Jettison Stw Bag
  - Docking Target Standoff Cross (in Bag)

1. OXYGEN EQUIPMENT RELOCATION
   1.1 Relocate QDMs and 70-ft O2 Hoses to shuttle.

   MO32M
   1.2 LEH O2 5, 6 vlv (two) – CL

   1.3 70-ft O2 Hoses (two) ←|→ LEH O2 5, 6 vlv outlet

   Middeck
   1.4 QDM (two) ←|→ 70-ft O2 Hoses and comm cables
      QDM (two) →|← existing LES O2 lines and comm cables
      Stow 70-ft O2 Hoses.

   MO32M
   1.5 LEH O2 5, 6 vlv (two) – OP

2. APAS HATCH CLOSURE
   2.1 All equipment bags and returning items removed from PMA2
      Photo TV Flood Lighting
      Jettison Stowage Bag
      Tool Bag
      Ingress Equipment Bag
      Docking Mechanism Accessory Kit
      APAS Hatch Tool
      Cleaning Pads

   ODS Vest
   2.2 Disconnect Hatch from PMA APAS Hatch Standoff.
      Secure Hatch Standoff to PMA Handrail.
      Remove APAS Hatch Cover and return to earth.
      Inspect Hatch Seals and seal surfaces for debris/damage.
      Clean APAS Hatch Seals and surface with Cleaning Pads.
      Close APAS Hatch.
Select ‘РАБОЧЕЕ ПОЛОЖЕНИЕ’ (Working Position) torque setting on Hatch Tool. Insert tool in hatch socket (ensure fully seated). Rotate tool 3 --- 4 turns in direction of ‘ЗАТП’ (Close) arrow until tool clicks.

2.3 √APAS EQUAL VLV – OP

**CAUTION**

Donning of Rubber Gloves required in handling of Docking Target Standoff Cross and Docking Target Base Plate.

2.4 Remove Docking Target Base Plate Cover from Target Base Plate. Stow cover in Ingress Equipment Bag.

2.5 Obtain Docking Target Standoff Cross from Standoff Cross Bag. Stow Standoff Cross Bag in Ingress Equipment Bag.

**NOTE**

Ensure key on Standoff Cross shaft is aligned with keyway on mating receptacle, and insert shaft until collar bottoms out on receptacle surface.

2.6 Insert Docking Target Standoff Cross into keyed receptacle on Docking Target Base Plate until shaft collar bottoms out.

**NOTE**

When all mating parts are correctly assembled, a groove on Docking Target Standoff Cross shaft should be visible above capnut (not recessed).

2.7 Ensure jamnut is positioned onto smaller, non-threaded diameter of docking target base plate receptacle. Align and mate standoff cross threaded hexagonal capnut onto docking target base plate receptacle. Continue to rotate hexagonal capnut ⬇️, and tighten firmly onto receptacle (10” Adjustable Wrench, 80-100 in-lbs design torque). Thread jamnut onto receptacle, rotating ⬇️, until contact with hexagonal capnut shoulder occurs. While maintaining a ⬇️ torque on hexagonal capnut, firmly tighten jamnut against hexagonal capnut shoulder (1-1/2” Open End Wrench, 80-100 in-lbs design torque).

2.8 Stow tools.

3. **ODS HATCH CLOSURE**

3.1 Close ODS Hatch per decal.

3.2 √Equal vlv (two) – OFF, capped
1. √ODS Hatch closed

2. √ODS Hatch Equal vlv (two) – OFF, caps installed

A6L 3. √cb ESS 1BC(2CA) SYS PWR CNTL SYS 1(2) – cl

4. √SYS PWR MNA(MNB) – ctr (tb-ON)

5. cb ESS 1BC(2CA) DEP SYS 1(2) VENT ISOL – cl

6. cb MNA(B) DEP SYS 1(2) VENT – cl

7. VEST DEP VLV SYS 1(SYS 2) VENT ISOL – OP (tb-OP)

8. VEST DEP VLV SYS 1(SYS 2) VENT – OP (tb-OP)
   Wait 15 minutes.

9. VEST DEP VLV SYS 1(SYS 2) VENT – CL (tb–CL)

   **NOTE**
   MCC-H will perform ODS Hatch, Node Fwd Hatch, and IMV leak check overnight.
EMERGENCY RESPONSE PROCEDURES
NOTE
1. This Expedited undocking should be used for the following failures
   - Non-isolatable prop leak (shuttle)
   - Cabin Leak (shuttle)
   - Loss of cooling (two cabin fans, water coolant loops, Freon coolant loops (shuttle))

2. Entrance to this procedure based on Cabin Leak or Loss of Cooling scenario assumes that this
   procedure will be worked concurrently with the associated FDF ORB PKT and ENTRY PKT
   powerdown.

3. At least 20 minutes are required to perform mandatory activities through physical separation. An
   additional 45 minutes required for ANY ATTITUDE SEPARATION, or an additional 18 minutes
   required for SHUTTLE EMERGENCY SEPARATION (to OMS TIG).

4. Highly desirable steps are listed beginning with step 21. These steps should be performed as time
   permits.
<table>
<thead>
<tr>
<th>CREW ABOARD ISS</th>
<th>MS</th>
<th>CDR/PLT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MS1/MS4</strong></td>
<td>1. IF COMM, <strong>MCC</strong>&lt;br&gt; If not using ISS atmosphere Perform EMERGENCY ISS EGRESS Cue Card, all (SODF: JNT OPS: CUE CARD), then:</td>
<td></td>
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<tr>
<td></td>
<td><strong>MS3</strong></td>
<td>2. If time available, PERFORMING ISS LOADSHEDE&lt;br&gt;Node 1 Loadshed&lt;br&gt;SM 220_NODE 1-2N&lt;br&gt;ITEM 4 - 9 2 EXEC</td>
</tr>
</tbody>
</table>
| | **MS2/3** | 4. Perform ISS SAFING (DFD, ORB PKT, PL PWRDN) as required, then MS reports to CDR “Pre-Undock ISS Safing complete.”<br>**NOTE**<br>If time available, perform steps 21 --- 24 for ECS powerup and EPCS shutdown. | **CDR** | 3. PREPARING FOR UNDOCKING<br>**A6U**
\(\backslash \text{SENSE}: -Z\)
\(\backslash \text{DAP}: \text{LO Z}\)<br>**O14**
**pri RJD DRIVER, LOGIC (sixteen) – ON**
**O15**, **O16:F**
**O14**, All DDU cbs (six) – cl<br>**O15**, **O16:E** | |
| | | **MS3** | 8. PERFORMING APCU DEACT<br>APCU 1,2 CONV – OFF<br>\(\checkmark\) CONV tb – bp<br>\(\checkmark\) OUTPUT tb – bp<br>OUTPUT – OFF | **PLT** | 10. FLT CNTLR PWRUP<br><br>**GNC 25 RM ORBIT**<br>SW RM INH – ITEM 16 (*)<br><br>**A6U** FLT CNTLR PWR – ON | |
| | **MS1** | 9. DEPRESSURIZING SHUTTLE VESTIBULE<br>\(\checkmark\) ODS Hatch closed<br>\(\checkmark\) ODS HATCH EQUAL VLVS (two) – OFF, caps installed<br>cb ESS 1BC PWR CNTL SYS 1 – cl<br>cb ESS 2CA PWR CNTL SYS 2 – cl<br>cb ESS 1BC DEP SYS 1 VENT ISOL – cl<br>cb ESS 2CA DEP SYS 2 VENT ISOL – cl<br>cb ESS MNA DEP SYS 1 VENT – cl<br>cb ESS MNB DEP SYS 2 VENT – cl<br>SYs PWR MN A, MN B (two) – on (hold 5 seconds)<br>\(\checkmark\) SYS PWR SYS 1, SYS 2 tb (two) – ON<br>VEST DEP VLV SYS 1(2) VENT ISOL (two) – OP (tb-OP)<br>VEST DP VLV SYS 1(2) VENT (two) – OP (tb-OP)<br>**PLT** | 10. FLT CNTLR PWRUP<br><br>**GNC 25 RM ORBIT**<br>SW RM INH – ITEM 16 (*)<br><br>**A6U** FLT CNTLR PWR – ON | **CRT** | SW RM INH – ITEM 16 (*) | |
**MS1 12. ODS PREPARATION FOR UNDOCKING**

If required, perform PMA-2 HOOKS OPEN (FDF, RNDZ, APDS), then:

Perform DOCKING MECHANISM PWRUP (FDF, RNDZ, APDS), then:

If Airlock Pressure < 8.0 PSIA
- If time permits, terminate EVA & repress airlock
- If time not available, expect hooks motor drive to fail during drive operation

Perform UNDOCKING PREP (FDF, RNDZ, APDS), then:

**PLT 11. CONFIGURING DAP**

A6U DAP: FREE

<p>| GNC_UNIV_PTG | Rates &lt; 0.1 °/second |
| GNC_20_DAP_CONFIG | CONFIG DAP A,B to A7,B7 |
| DAP A CNTL ACC - ITEM 28 +0 EXEC |
| DAP B CNTL ACC - ITEM 48 +0 EXEC |</p>
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19. Perform DOCKING MECHANISM PWRDN (FDF, RNDZ, APDS), then:

20. If required, return to PL SAFING (FDF, ORB PKT, PL PWRDN).

**NOTE**
Steps 21 --- 24 are performed if time available after step 4.

21. ECS POWERUP

```
SM_223_EARLY_COMM-2N
```

N1RS2A RPC 11 CL - ITEM 15 EXEC (*)
N1RS2A RPC 10 CL - ITEM 13 EXEC (*)
N1RS2A RPC 5 CL  - ITEM 9 EXEC (*)
N1RS1C RPC 5 CL  - ITEM 1 EXEC (*)
N1RS1C RPC 12 CL - ITEM 5 EXEC (*)

22. INHIBITING RT FDIR


```
UB_ORB_N1_2(1)_RT_Status
```

**cmd**

| 08 OIU Inhib FDIR | Execute |

Verify 08 OIU RT FDIR Status – Inh

23. TAKING EPCS OFF ORB BUS

When EPCS no longer required

PCS CDS Main Control panel window

sel “Terminate to MDM” icon

24. ECS TRANSMITTER ON

**NOTE:**
Wait until step 23 is complete and at least 1 minute (if possible) after step 21 before executing the following Transmitter ON command. Both of these steps are needed for the ECS to establish a link with the primary MDM.

```
SM_223_EARLY_COMM-2N
```

XMIT ON - ITEM 17 EXEC (*)
ISS CONTINGENCY EGRESS
(JNT OPS/3A/FIN A/MULTI) (HC)  Page 1 of 2 pages

If Progress Hatch open
2. Remove cap from vestibule depressurization valve.
3. Report, “Progress 1 Egress Complete.”

If SM Hatches open
SM ПpК-СУ  4. Remove tools and equipment from SM.
SM ПpК  6. \КВД ПpК-СУ – ELECTRICAL CONTROL
SM РO  7. Deactivate lights.
Panels 466, 434, 417
SM ПxO  8. \КВД ПxO-СУ – ELECTRICAL CONTROL

If FGB Hatches open
FGB ПГО  11. Remove tools and equipment from FGB.
13. \КВД ПГО-СУ – ELECTRICAL CONTROL
Panels 430, 414
15. \КВД ГА-ПМА1 – ELECTRICAL CONTROL
16. Clear hatchway and close FGB ГА-ПМА1 Hatch with hatch tool.

If Z1 Vestibule pressurized
Node 1  18. Remove tools and equipment from Z1.
19. Close Node 1 Ovhd hatch per decal.
20. Hand tighten free end of ISA/VAJ Hose Assembly to Node 1 Overhead MPEV.
21. ISA Sample Port Valve → CLOSED
22. Node 1 Deck MPEV → OPEN
23. Node 1 Ovhd MPEV → OPEN
24. Wait 20 Seconds
25. Node 1 Deck MPEV → CLOSED
26. Node 1 Ovhd MPEV → CLOSED
27. ISA Sample Port Valve → OPEN
28. Disconnect VAJs from both Ovhd and Deck MPEVs, cap both MPEVs.
If Node 1 open

Node 1 30. Remove tools and equipment from Node 1.
Port, Stbd 31. Remove two PPRV Caps.
Hatches 32. Remove two IMV Grille covers from NOD1OP3 and NOD1OP4.
Stow in NOD1O4_A1.
33. Install and activate four Moisture Removal Kits.

Node 1 Fwd 34. Node 1 Fwd Port, Stbd IMV vlvs (two) → CLOSED
PMA2 35. Clear hatchway and close Node 1 Fwd Hatch per decal
   (Use 10" Adjustable Wrench if CPAs installed).
36. \MPEV – CLOSED
37. Report, “Node 1 Egress Complete.”

If PMA2 open

MO13Q 38. ARLK FAN A(B) → OFF
PMA2 39. Disconnect PMA/Node extension duct from starboard IMV flange.
   (Use Rachet and Deep Well Socket. Leave V-band clamp on
   flange.)
40. Install IMV Cap to starboard IMV flange.
   Tighten V-band clamp 34 --- 36 in-lbf (3.8 to 4.1 N•m).
41. Remove Flange Saver Cap from port IMV flange.
   (Use Rachet and Deep Well Socket. Leave V-band clamp on
   flange.)
   Stow Flange Saver Cap in PMA2 cap stowage location.
42. Install IMV Cap to port IMV flange.
   Tighten V-band clamp 34 --- 36 in-lbf (3.8 to 4.1 N•m).
Ext A/L 43. Disconnect Station/Shuttle Extension ducting.
   Stow in PMA2.
ODS 44. Clear hatchway and close PMA2 APAS Hatch with APAS hatch
   Vestibule tool.
45. \APAS EQUAL VLV → OPEN
46. Remove Docking Target baseplate cover, then
   Install Docking Cross by hand on PMA2 APAS Hatch.
47. Report, “PMA2 Egress Complete.”
Ext A/L 48. Clear hatchway and close ODS Hatch per decal.
   \Equal Vlv (two) – OFF, capped
49. Report, “ODS Hatch Closed, ISS Egress Complete.”
EMERGENCY ISS EGRESS

If Progress 1 Hatch open

SM ПрК-СУ
1. Clear hatchway and close Progress Hatch with hatch tool.
2. Remove cap from vestibule depressurization valve.
3. Clear hatchway and close SM ПрК-СУ Hatch with hatch tool.

SM ПрK
4. \КВД ПрК-СУ – ELECTRICAL CONTROL
5. Report, “Progress 1 Egress Complete.”

If FGB Hatches open

FGB ГА
6. \КВД ГА-ПМА1 – ELECTRICAL CONTROL
7. Clear hatchway and close FGB ГА-ПМА1 Hatch with hatch tool.

If Z1 Vestibule pressurized

Node 1
9. Open Node 1 Ovhd Hatch per decal.

If Node 1 open

Node 1 Fwd
10. Node 1 Fwd Port, Stbd IMV vlvs (two) → CLOSED

PMA2
11. Clear hatchway and close Node 1 Fwd Hatch using 10” adjustable wrench.
12. \МПЕВ – CLOSED

If PMA2 open

Ext A/L

ODS Vest
15. Clear hatchway and close PMA2 APAS Hatch with APAS hatch tool
16. \APAS EQUAL VLV → OPEN
17. Remove Docking Target baseplate cover, then install Docking Cross by hand on PMA2 APAS Hatch.

Ext A/L
19. Clear hatchway and close ODS Hatch per decal. \Equal Vlvs (two) – OFF, capped