



International Space Station Assembly Operations Book

ISS-20A

Mission Operations Directorate
Operations Division

22 JAN 10

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National Aeronautics and
Space Administration

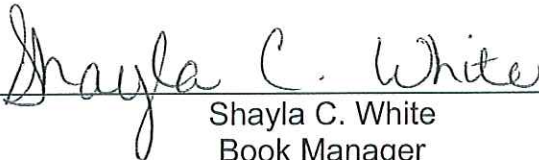
Lyndon B. Johnson Space Center
Houston, Texas



**INTERNATIONAL SPACE STATION
ASSEMBLY OPERATIONS BOOK
ISS-20A**

22 JAN 10

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784.....	06 OCT 09	834.....	TPIB
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GLACIER STATUS CHECK				
(Front)	845	ASSY OPS-1a/20A/A	30 SEP 09	
(Back)	846	ASSY OPS-1b/20A/A	30 SEP 09	

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ACTIVATION AND CHECKOUT

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1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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OBJECTIVE:

To perform initial powerup and functional activation of Node 3 equipment prior to ingress. All Node 3 DDCUs and RPCMs are powered, HCZ and N3 MDMs are brought up, and other electrical Node 3 equipment is powered up. Node 3 IATCS is started up in dual loop mode, then moded to contingency (single loop) mode to provide all NH3 cooling with ETCS Loop A/N3 MT Heat exchanger. N3 CCAA is also activated.

INITIAL CONDITIONS:

The following Node 1 to Node 3 vestibule connections are mated:

Audio Bus B (Node 3 J2)

1553 ch B (Node 3 J3)

1553 ch A (Node 3 J12)

Audio Bus A / Video (Node 3 J14)

Waste Water (Node 3 A2)

External S0/Node 3 Channel 2/3 and Channel 1/4 avionics umbilicals are mated.

External S0/Node 3 NH3 jumpers are connected, and ETCS Loop A QDs are opened to provide NH3 flow to Node 3 MT Heat Exchanger.

Node 3 MT IFHX:

Isol: Open (flow through)

By: Open (bypass)

MBSU 1 RBI 13 is Open

MBSU 2 RBI 2 is Open

MBSU 2 RBI 13 is Open

MBSU 4 RBI 4 is Open

1. CONFIGURING FOR NODE 3 ACTIVATION

MCC-H

1.1 Configuring C&W for Node 3 Activation

The Caution and Warning messages should be suppressed during Node 3 activation to prevent nuisance tones.

NOTE

SCR/SPN 34816 Node 3 DDCU RT 1553 FDIR is default enabled upon initialization of the PMCU. There is no method to inhibit Node 3 DDCU FDIR. Expect Loss of Comm C&W prior to power on Node 3 DDCU when PMCU existence PPL is loaded.

1.2 Uploading PMCU MDM PPL to Existence Table

Use the following to perform [1.231 CCS BUILD DATA LOAD COMMAND](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

Destination Device – Prim PMCU

Storage Type – RAM

File to Load – PPL 3, ver 3140

Perform [1.236 CCS DATA LOAD MANAGEMENT](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

1.100 NODE 3 INITIAL ACTIVATION

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1.3 Uploading CCS MDM PPL for DDCU 50Hz Data Latch

Use the following to perform [1.231 CCS BUILD DATA LOAD COMMAND](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

Destination Device – Prim
Storage Type – RAM
File to Load – PPL 143, ver 8003

Perform [1.236 CCS DATA LOAD MANAGEMENT](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

2. NODE 3 DDCU N31B ACTIVATION

PCS

2.1 Closing MBSU 1 RBI 13

S0: EPS: MBSU 1: RBI 13

'Cmded Position'

cmd Close – Arm

cmd Close – (Verify – Cl)

Verify Voltage > 145 V

2.2 Verifying RT I/O Comm for DDCU N31B

CDH: Primary PMCU MDM: LB EPS HAB 14: RT Status

'RT 18'

Verify RT Status – Ena

2.3 Verifying Integration Counter DDCU N31B

Node 3: EPS: DDCU N31B4A Dist: DDCU N31B

Verify Integration Counter – incrementing

Verify Input Voltage: 146 to 165 V

Verify Converter Temp: -37.3 to 43.8 C

Verify Power Supply Temp: -37.3 to 49.5 C

Verify Baseplate Temp: -37.3 to 40.3 C

2.4 Enabling RT FDIR for DDCU N31B

CDH: Primary PMCU MDM: LB HAB 14: RT Status

Verify 18 DDCU N31B Enable FDIR – Ena

2.5 Clearing DDCU N31B Power On Reset Flag

Node 3: EPS: DDCU N3S1B: Firmware

'Clear Commands'

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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cmd Common Clear

Verify Power On Reset – blank

sel Trip Status

DDCU N31B Trip Status

'Parallel DDCU Input Undervoltage Trip'

cmd Inhibit – Arm

cmd Inhibit – Inhibit

Verify Trip Function – Inh

3. NODE 3 DDCU N34A ACTIVATION

3.1 Closing MBSU 4 RBI 4

S0: EPS: MBSU 4: RBI 4

MBSU 4 RBI 4

'Cmdded Position'

cmd Close – Arm

cmd Close (Verify – Cl)

Verify Voltage > 145 V

3.2 Verifying RT I/O Comm for DDCU N34A

CDH: Primary PMCU MDM: LB EPS HAB 14: RT Status

LB EPS HAB 14 RT Status

'RT 14'

Verify RT Status – Ena

3.3 Verifying DDCU N34A Telemetry

Node 2: EPS: DDCU N34A

DDCU N34A

Verify Integration Counter – incrementing

Verify Input Voltage: 146 to 165 V

Verify Converter Temp: -37.3 to 43.8° C

Verify Power Supply Temp: -37.3 to 49.5° C

Verify Baseplate Temp: -37.3 to 40.3° C

3.4 Enabling RT FDIR for DDCU N34A

CDH: Primary PMCU MDM: LB HAB 14: RT Status

LB HAB 14 RT Status

Verify 14 DDCU N34A RT FDIR Status – Ena

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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3.5 Clearing DDCU N34A Power On Reset Flag

Node 3: EPS: DDCU N34A: Firmware

DDCU N34A Firmware

'Clear Commands'

cmd Common Clear

Verify Power On Reset – blank

sel Trip Status

DDCU N34A Trip Status

'Parallel DDCU Input Undervoltage Trip'

cmd Inhibit – Arm

cmd Inhibit – Inhibit

Verify Trip Function – Inh

4. APPLYING POWER TO N31B4A RPCMs

4.1 Powering On DDCU N31B

Node 3: EPS: DDCU N31B4A Dist: DDCU N31B: Converter

DDCU N31B Converter

cmd Converter On – Arm

cmd Converter On – On

DDCU N31B

Verify Converter Status – On

Verify Output Voltage: 120.2 to 128.8 V

Verify Output Current: 0 ± 3.75 A

4.2 Powering On DDCU N34A

Node 3: EPS: DDCU N31B4A Dist: DDCU N34A: Converter

DDCU N34A Converter

cmd Converter On – Arm

cmd Converter On – On

DDCU N34A

Verify Converter Status – On

Verify Output Voltage: 120.2 to 128.8 V

Verify Output Current: 0 ± 3.75 A

'Power Share Ratio, %'

Verify DDCU N31B: 50

Verify DDCU N34A: 50

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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- 4.3 Verifying RT I/O Comm for RPCM N31B4A F1
CDH: Primary PMCU MDM: LB EPS HAB 14: RT Status
LB EPS HAB 14 RT Status

Verify 5 RPCM N31B4A F1 RT Status – Enable

- 4.4 Verifying Integration Counter for RPCM N31B4A F1
Node 3: EPS
Node 3:EPS

sel RPCM N31B4A F1

RPCM N31B4A F1

Verify Integration Counter – incrementing

- 4.5 Enabling RT FDIR for RPCM N31B4A F1
CDH: Primary PMCU MDM: LB EPS HAB 14: RT Status
LB EPS HAB 14 RT Status

cmd 5 RPCM N31B4A F1 Enable FDIR **Execute** (Verify – Ena)

5. ACTIVATING DDCU N32A

- 5.1 Closing MBSU 2 RBI 2
S0: EPS: MBSU 2: RBI 2
MBSU 2 RBI 2
'Cmded Position'

cmd Close – Arm
cmd Close (Verify – Cl)

Verify Voltage > 145 V

- 5.2 Enabling RT I/O Comm for DDCU N32A
CDH: Primary PMCU MDM: LB EPS HAB 23: RT Status
LB EPS HAB 23 RT Status
'RT 14'

Verify RT Status – Ena

- 5.3 Verifying Integration Counter DDCU N32A
Node 3: EPS: DDCU N32A
DDCU N32A

Verify Integration Counter – incrementing
Verify Input Voltage: 146 to 165 V
Verify Converter Temp: -37.3 to 43.8° C
Verify Power Supply Temp: -37.3 to 49.5° C
Verify Baseplate Temp: -37.3 to 40.3° C

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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5.4 Enabling RT FDIR for DDCU N32A

CDH: Primary PMCU MDM: LB HAB 23: RT Status

LB EPS HAB 23 RT Status

Verify 14 DDCU N32A Enable FDIR – Ena

5.5 Clearing DDCU N32A Power On Reset Flag

Node 3: EPS: DDCU N32A: Firmware

DDCU N32A Firmware

'Clear Commands'

cmd Common Clear

Verify Power On Reset – blank

sel Trip Status

DDCU N32ATrip Status

'Parallel DDCU Input Undervoltage Trip'

cmd Inhibit – Arm

cmd Inhibit – Inhibit

Verify Trip Function – Inh

6. ACTIVATING DDCU N32B

6.1 Closing MBSU 2 RBI 13

S0: EPS: MBSU 2: RBI 13

MBSU 2 RBI 13

'Cmded Position'

cmd Close – Arm

cmd Close (Verify – Cl)

Verify Voltage > 145 V

6.2 Enabling RT I/O Comm for DDCU N32B

CDH: Primary PMCU MDM: LB EPS HAB 23: RT Status

LB EPS HAB 23 RT Status

'RT 18'

Verify RT Status – Ena

6.3 Verifying Integration Counter DDCU N32B

Node 3: EPS: DDCU N32B

DDCU N32B

Verify Integration Counter – incrementing

Verify Input Voltage: 146 to 165 V

Verify Converter Temp: -37.3 to 43.8° C

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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Verify Power Supply Temp: -37.3 to 49.5° C

Verify Baseplate Temp: -37.3 to 40.3° C

6.4 Enabling RT FDIR for DDCU N32B

CDH: Primary PMCU MDM: LB HAB 23: RT Status

LB HAB 23 RT Status

Verify 18 DDCU N32B RT FDIR Status – Ena

6.5 Clearing DDCU N32B Power On Reset Flag

Node 3: EPS: DDCU N32B: Firmware

DDCU N32B Firmware

'Clear Commands'

cmd Common Clear

Verify Power On Reset – blank

sel Trip Status

DDCU N32B Trip Status

'Parallel DDCU Input Undervoltage Trip'

cmd Inhibit – Arm

cmd Inhibit – Inhibit

Verify Trip Function – Inh

7. APPLYING POWER TO N32A2B RPCMs

7.1 Powering On DDCU N32A

Node 3: EPS: DDCU N32A2B Dist: DDCU N32A: Converter

DDCU N32A Converter

cmd Converter On – Arm

cmd Converter On – On

DDCU N32A

Verify Converter Status – On

Verify Output Voltage: 120.2 to 128.8 V

Verify Output Current: 0 ± 3.75 A

7.2 Powering On DDCU N32B

Node 3: EPS: DDCU N32A2B Dist: DDCU N32B: Converter

DDCU N32B Converter

cmd Converter On – Arm

cmd Converter On – On

DDCU N32B

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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Verify Converter Status – On
Verify Output Voltage: 120.2 to 128.8 V
Verify Output Current: 0 ± 3.75 A

'Power Share Ratio, %'

Verify DDCU N32A: 50
Verify DDCU N32B: 50

7.3 Enabling RT I/O Comm for RPCM N32A2B-F1

CDH: Primary PMCU MDM: LB EPS HAB 23: RT Status

Verify 5 RPCM N32A2B F1 RT Status – Enable

7.4 Verifying Integration Counter for RPCM N32A2B-F1

Node 3: EPS

sel RPCM N32A2B F1

Verify Integration Counter – incrementing

7.5 Enabling RT FDIR for RPCM N32A2B-F1

CDH: Primary PMCU MDM: LB EPS HAB 23: RT Status

cmd 5 RPCM N32A2B-F1 Enable FDIR **Execute** (Verify – Ena)

8. ACTIVATING AND C/O NODE 3 HCZ 1 MDM

8.1 Powering On HCZ 1 MDM

Node 3: EPS: DDCU N31B4A Dist

sel RPCM N31B4A F1

sel RPC 1

Verify Close Cmd – Enable

cmd RPC Position – Close (Verify – Cl)

Wait 5 minutes before performing the next step.

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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8.2 Enabling Comm With C&C MDM

CDH: Primary C&C: CB CT 4: RT Status

CB CT 4 RT Status

cmd 22 MDM HCZ 1 RT Status – Enable **Execute** (√ – Ena)

8.3 Inhibiting Loss of Local Bus Safing Response for HCZ

CDH: Primary HCZ: MDM FDIR

Primary HCZ MDM FDIR

'Loss of Local Bus Safing Response'

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

8.4 Verifying Status after Powerup

CDH: Primary HCZ

Primary HCZ MDM

Verify Frame Count – incrementing

Verify MDM ID – HCZ 1

Verify Processing State – Standby

√Sync Status – In Sync

* If HCZ fails to mode to Standby

* Perform step 23.

*

* Go to step 9.

sel MDM BIT Status

Primary HCZ BIT Summary Table A

'Word 1: Summary'

Record all non-blank fields in Table 1.

Table 1.

Hard Fail	
Rev. Soft Fail	
Soft Fail	
POST Fail	
BIT Fail	
I/O Bus Fail	
I/O List Fail	
SX Card Fail	
I/O BIT Fail	
POST in Prog	

1.100 NODE 3 INITIAL ACTIVATION

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```
*****
* If BST not blank
* | CDH Summary: Primary HCZ: MDM Utilities
* | Primary HCZ MDM Utilities
* | 'Clear Latched Data in BST A'
* |
* | cmd Clear Execute
*****
```

8.5 Verifying HCZ 1 Software and PPL Configuration

Use the following to perform [1.231 CCS BUILD DATA LOAD COMMAND](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

Destination Device – Prim HCZ
Storage Type – RAM
File to Load – Per Software Roadmap

Verify All PPL version IDs match the intended configuration.

Perform [1.236 CCS DATA LOAD MANAGEMENT](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

8.6 Transitioning to Operational State

CDH: Primary HCZ
Primary HCZ MDM

Verify Frame Count – incrementing
Verify MDM ID – HCZ 1
Verify Processing State – Standby

sel Processing State

Primary HCZ Processing State Transitions
'Operational State'

cmd Arm Execute
cmd Transition to Operational State Execute

√Current State – Operational

8.7 Enabling HCZ RT FDIR

CDH: Primary C&C: CB CT 4: RT Status
CB CT 4 RT Status

cmd 22 MDM HCZ 1 RT FDIR Status – Enable FDIR Execute (√ – Ena)

8.8 ENA Retry for HCZ

C&DH Summary: Primary CCS MDM
Primary CCS MDM
'Software Control'

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sel Recovery Retry

sel HCZ MDM

'Retry Enable'

cmd Enable **Execute** (Verify – Ena)

8.9 Enabling Loss of Local Bus Safing for HCZ

CDH: Primary HCZ: MDM FDIR

'Auto Transition to Diagnostic'

cmd Enable **Execute** (Verify – Ena)

8.10 Inhibiting MPLM RT IO

CDH: Primary HCZ: LB Sys HCZ 2: RT Status

17 MDM MPLM RT Status – **cmd** Inh **Execute**

9. VERIFYING RT I/O AND ENABLING RT FDIR FOR NODE 3 RPCMs

9.1 Verifying RT I/O Comm for RPCM N31B4A-B1, D1, A2, B2, C2, D2

CDH: Primary HCZ MDM: LB SEPS HCZ 14: RT Status

'RT [X]' where [X] =

Verify RT Status – Ena

Repeat

9.2 Verifying RT I/O Comm for RPCM N31B4A-A1, C1, E1, E2, F2

CDH: Primary HCZ MDM: LB SEPS N3 14: RT Status

'RT [X]' where [X] =

Verify RT Status – Ena

Repeat

9.3 Verifying Integration Counter for Node 3 Channel 1/4 RPCMs

Node 3: EPS

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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sel RPCM N31B4A [XX] where [XX] =

Verify Integration Counter – incrementing

Repeat

9.4 Verifying RT FDIR for RPCM N31B4A-B1, D1, A2, B2, C2, D2
CDH: Primary HCZ MDM: LB SEPS HCZ 14: RT Status

'RT [X]' where [X] =

cmd RT [X] Enable FDIR **Execute** (Verify – Ena)

Repeat

9.5 Verifying RT FDIR for RPCM N31B4A-A1, C1, E1, E2, F2
CDH: Primary HCZ MDM: LB SEPS N3 14: RT Status

'RT [X]' where [X] =

cmd RT [X] Enable FDIR **Execute** (Verify – Ena)

Repeat

9.6 Verifying RT I/O Comm for RPCM N32A2B-B1, A2, B2, C2, D2
CDH: Primary HCZ MDM: LB SEPS HCZ 23: RT Status

'RT [X]' where [X] =

Verify RT Status – Ena

Repeat

9.7 Verifying RT I/O Comm for RPCM N32A2B-A1, C1, E1, E2, F2
CDH: Primary HCZ MDM: LB SEPS N3 23: RT Status

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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'RT [X]' where [X] =

Verify RT Status – Ena

Repeat

9.8 Verifying Integration Counter for Node 3 Channel 2/3 RPCMs

Node 3: EPS

sel RPCM N32A2B [XX] where [XX] =

Verify Integration Counter – incrementing

Repeat

9.9 Configuring RT FDIR for RPCM N32A2B-B1, A2, B2, C2, D2

CDH: Primary HCZ MDM: LB SEPS HCZ 23: RT Status

'RT [X]' where [X] =

cmd RT [X] Enable FDIR Execute (Verify – Ena)

Repeat

9.10 Configuring RT FDIR for RPCM N32A2B-A1, C1, E1, E2, F2

CDH: Primary HCZ MDM: LB SEPS N3 23: RT Status

'RT [X]' where [X] =

cmd RT [X] Enable FDIR Execute (Verify – Ena)

Repeat

9.11 Configuring RT I/O Comm for RPCM N32A2B-D1

CDH: Primary HCZ MDM: LB SEPS HCZ 23: RT Status

NOTE

RPCM N32A2B-D1 does not physically exist. RT I/O comm and RT FDIR should be inhibited.

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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Verify RT 11 RPCM N32A2B D1 RT Status – Inh

Verify RT [X] FDIR Status – Inh

NOTE

RT I/O comm should be inhibited for Regen ECLSS Rack RPCMs that are not installed at activation.

RPCM N3A51B4A-A

RPCM N3A41B4A-A

RPCM N3D42A2B_A

9.12 Configuring RT I/O Comm for RPCM N3A51B4A-A and RPCM N3A41B4A-A

CDH: Primary HCZ MDM: LB SEPS N3 14: RT Status

LB SEPS N3 14 RT Status

'RT [X]' where [X] =

cmd RT Status [X] Inhibit **Execute** (Verify – Inh)

Repeat

9.13 Configuring RT I/O Comm for RPCM N3D42A2B A

CDH: Primary HCZ MDM: LB SEPS HCZ 23: RT Status

LB SEPS HCZ 23 RT Status

'RT [X]' where [X] =

cmd RT Status [X] Inhibit **Execute** (Verify – Inh)

Repeat

10. ACTIVATING N3 MDMs

10.1 Powering On N3-1 MDM

Node 3: EPS: RPCM N31B4A E2: RPC 03

RPCM N31B4A E2 RPC 03

cmd RPC Position – Close (Verify – Cl)

10.2 Powering On N3-2 MDM

Node 3: EPS: RPCM N32A2B E2: RPC 03

RPCM N32A2B E2 RPC 03

cmd RPC Position – Close (Verify – Cl)

Wait 5 minutes before performing the next step.

10.3 Verifying I/O to the N3-1 MDM

CDH: Primary HCZ MDM: LB SYS N3 1: RT Status

RT Status

Verify 22 MDM N3-1 RT Status – Ena

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10.4 Verifying MDM N3-1 Status

CDH: N3-1 MDM

N3-1 MDM

Verify Frame Count – incrementing
Verify Processing State – Operational

√Sync Status – In Sync

sel MDM BIT Status

N3 1 BIT Summary Table A

'Word 1: Summary'

Record all non-blank fields in Table 2.

Table 2.

Hard Fail	
Rev. Soft Fail	
Soft Fail	
POST Fail	
BIT Fail	
I/O Bus Fail	
I/O List Fail	
SX Card Fail	
I/O BIT Fail	
POST in Prog	

```
*****  
* If BST not blank  
* | CDH Summary: N3 1 MDM: MDM Utilities  
* | N3 1 MDM Utilities  
* | 'Clear Latched Data in BST A'  
* |  
* | cmd Clear Execute  
*****
```

10.5 Enabling RT FDIR to the N3-1 MDM

CDH: Primary HCZ MDM: LB SYS N3 1: RT Status

RT Status

cmd 22 MDM N3-1 RT FDIR Status – Enable Execute (Verify – Ena)

10.6 Verifying I/O to the N3-2 MDM

CDH: Primary HCZ MDM: LB SYS N3 2: RT Status

RT Status

Verify 22 MDM N3-2 RT STATUS – Ena

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10.7 Verifying MDM N3-2 Status

CDH: N3-2 MDM

N3-2 MDM

Verify Frame Count – incrementing
Verify Processing State – Operational

√Sync Status – In Sync

sel MDM BIT Status

N3 2 BIT Summary Table A

'Word 1: Summary'

Record all non-blank fields in Table 3.

Table 3.

Hard Fail	
Rev. Soft Fail	
Soft Fail	
POST Fail	
BIT Fail	
I/O Bus Fail	
I/O List Fail	
SX Card Fail	
I/O BIT Fail	
POST in Prog	

```
* If BST not blank
* | CDH Summary: N3 2 MDM: MDM Utilities
* | N3 2 MDM Utilities
* | 'Clear Latched Data in BST A'
* |
* | cmd Clear Execute
```

10.8 Enabling RT FDIR to the N3-2 MDM

CDH: Primary HCZ MDM: LB SYS N3 2: RT Status

RT Status

cmd 22 MDM N3-2 RT FDIR Status – Enable Execute (Verify – Ena)

10.9 Powering On N3-1 MDM SDO CARD

US NODE 3: EPS: DDCU N31B4A Dist

DDCU N31B4A Dist

sel RPCM N31B4A E2

RPCM N31B4A E2

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sel RPC [X] where [X] =

cmd RPC Position – Close (Verify – Cl)

Repeat

10.10 Powering On N3-2 MDM SDO Cards US NODE 3: EPS: DDCU N32A2B Dist

sel RPCM N32A2B E2

sel RPC [X] where [X] =

cmd RPC Position – Close (Verify – Cl)

Repeat

10.11 Verifying N3 SYS Software and PPL Configuration

Use the following to perform [1.231 CCS BUILD DATA LOAD COMMAND](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

Destination Device – N3-1, N3-2

Storage Type – DRAM

File to Load – Per Software Roadmap

Verify All PPL version IDs match the intended configuration.

Perform [1.236 CCS DATA LOAD MANAGEMENT](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

10.12 Reconfiguring Node 3 RPS

For applicable Node 3 RPS, Perform [4.365 RPS MONITORING NOMINAL RECONFIGURATION](#), all (SODF: EPS: CORRECTIVE: SECONDARY POWER SYSTEM), then:

11. ACTIVATING NODE 3 IATCS MT LOOP

11.1 Verifying Accumulator Level

NOTE
Accumulator launch level is 85 %.

Node 3: TCS

'PPA MTL'

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Verify Avg Accum Qty > 70 %

11.2 Applying Power to IATCS MTL Components

Table 4. MTL IATCS Loads to Be Powered

RPCM	RPC	LOAD
N3-1B4A-E2	12	LCA Valve 1
N3-1B4A-F2	1	MTL NIA Vent Valve
	2	MTL NIA Iso Valve
	4	MTL TWMV
	6	MTL SOV
	7	MTL SFCA
	8	MTL Regen TWMV
	18	MTL PPA Pwr
N3-2A2B-E2	12	LCA Valve 2

Node 3: EPS

Node 3:EPS

For each of the loads listed in Table 4

cmd RPC – Close (Verify RPC Posn – Cl)

11.3 Verifying LCA Configured to DUAL Position

Node 3: TCS: LCA

Node 3 LCA Commands

'Commands'

√Vlv 1 Position – Dual

√Vlv 2 Position – Dual

11.4 Enabling I/O to the MTL PPA

CDH: Primary HCZ MDM: LB SYS N3 1: RT Status

LB SYS N3 1 RT Status

cmd 19 PPA N3 MTL RT Status Enable **Execute** (Verify – Ena)

11.5 Latching MT Leak Limits

Node 3: TCS: MTL Software

Node3 MTL Software Commands

'MTL IATCS Leak Recovery'

cmd Set Normal Leak Limits – MTL

11.6 Checking MTL FDIR Status

Node 3: TCS: MTL Software

Node3 MTL Software Commands

'MTL IATCS'

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- √Leak Recovery Auto Shutdown – Ena
- √Failure Recovery Fail Rcvy – Ena
- √SFCA Overpress Protection Status – Ena

11.7 IATCS MTL Automated Activation

NOTE

MT loop activation is expected to occur within 75 seconds after the “startup” N3 MT LOOP IATCS command has been issued. The software will automatically retry the startup process (if the first attempt fails), which can last another 75 seconds.

Node 3: TCS: MTL Software

Node3 MTL Software Commands

'MTL IATCS'

Verify the following:

- Mode – Dual
- IATCS Status – Idle
- IATCS Activation – Not In Prog

cmd Startup – Startup

Verify IATCS Activation – In Prog

Wait up to 3 minutes, then

Verify IATCS Status – Oper

Node 3: TCS: MTL PPA

Node3 MTL PPA Commands

'Commands MTL PPA'

Verify the following:

- √Pump Software – Started
- √Pump Speed – 18300 ± 1250 rpm

11.8 Enabling FDIR for the MTL PPA

CDH: Primary HCZ MDM: LB SYS N3 1: RT Status

LB SYS N3 1 RT Status

cmd 19 PPA N3 MTL Enable FDIR **Execute** (Verify – Ena)

11.9 Setting Leak Limit for the MTL PPA

Node 3: TCS

PPA

Record MTL Avg Accum Qty: _____ %

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sel MTL Software

Node3 MTL Software Commands

'MTL IATCS'

cmd Set Normal Leak Limits – MTL

12. INTEGRATING NODE 3 MTL IFHX

S1(P1): TCS: Loop A(B) Software: Loop A(B) Manual Startup
'Telemetry'

Verify ETCS Mode – Cooling

CAUTION

If any IFHX Valve position is Unknown, driving the Valve in the direction opposite its last direction of motion can potentially result in damage to the Valve seal.

NOTE

The ETCS must be in Cooling Mode to open the IFHX Isolation Valve and command the Bypass Valve to flowthru.

12.1 Opening Node 3 MTL IFHX Isolation Valve

NOTE

Once commanded, if the Valve does not reach the commanded position, the operator is allowed to issue the same position command up to 10 additional times.

Node 3: TCS: MTL IFHX

Node3 MTL IFHX Commands

'Commands'

'Node3 MTL IFHX NH3'

'Isol Vlv'

cmd Cntl Avail Open – Ena (\surd Cntl Avail – Ena)

cmd Position – Open (Verify Position – Open)

12.2 Commanding Node 3 MTL IFHX Bypass Valve to Flothru

NOTE

Once commanded, if the Valve does not reach the commanded position, the operator is allowed to issue the same position command up to 10 additional times.

Node 3: TCS: MTL IFHX

Node3 MTL IFHX Commands

'Commands'

'Node3 MTL IFHX NH3'

'Byv Vlv'

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cmd Cntl Avail Flothru – Ena ($\sqrt{\text{Cntl Avail – Ena}}$)
cmd Position – Flothru (Verify Position – Flothru)

13. ACTIVATING NODE 3 LTL LOOP

13.1 Verifying Accum Level

NOTE Accumulator launch level is 85 %.
--

Node 3: TCS

Node 3: TCS

'PPA LTL'

Verify Avg Accum Qty > 70 %

13.2 Applying Power to LTL IATCS Components

Table 5. LTL IATCS Loads to Be Powered

RPCM	RPC	LOAD
N3-2A2B-F2	1	LTL NIA Vent Valve
	2	LTL NIA Iso Valve
	4	LTL TWMV
	6	LTL SOV
	7	LTL SFCA
	18	LTL PPA Pwr

Node 3: EPS

Node 3:EPS

For each of the loads listed in Table 5

cmd RPC – Close (Verify RPC Posn – Cl)

13.3 Enabling I/O to the LTL PPA

CDH: Primary HCZ MDM: LB SYS N3 2: RT Status

LB SYS N3 2 RT Status

cmd 19 PPA N3 LTL RT Status Enable **Execute** (Verify – Ena)

13.4 Latching LT Leak Limits

Node 3: TCS: LTL Software

Node3 LTL Software Commands

'LTL IATCS Leak Recovery'

cmd Set Normal Leak Limits – LTL

13.5 Checking LTL FDIR Status

Node 3: TCS: LTL Software

Node3 LTL Software Commands

'LTL IATCS'

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- √Leak Recovery Auto Shutdown – Ena
- √Failure Recovery Fail Rcvy – Ena
- √SFCA Overpress Protection Status – Ena

13.6 IATCS LTL Automated Activation

NOTE

LT loop activation is expected to occur within 75 seconds after the “startup” N3 MT LOOP IATCS command has been issued. The software will automatically retry the startup process (if the first attempt fails), which can last another 75 seconds.

Node 3: TCS: LTL Software

Node3 LTL Software Commands

'MTL IATCS'

Verify the following:

- Mode – Dual
- IATCS Status – Idle
- IATCS Activation – Not In Prog

cmd Startup – Startup

Verify IATCS Activation – In Prog

Wait up to 3 minutes, then

Verify IATCS Status – Oper

Node 3: TCS: LTL PPA

Node3 LTL PPA Commands

'Commands LTL PPA'

Verify the following:

- √Pump Software – Started
- √Pump Speed – 16500 ± 1250 rpm

13.7 Enabling FDIR for the LTL PPA

CDH: Primary HCZ MDM: LB SYS N3 2: RT Status

LB SYS N3 2 RT Status

cmd 19 PPA N3 LTL Enable FDIR **Execute** (Verify – Ena)

13.8 Setting Leak Limit for the LTL PPA

Node 3: TCS

PPA

Record LTL Avg Accum Qty: _____ %

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sel LTL Software

Node3 LTL Software Commands

'LTL IATCS'

cmd Set Normal Leak Limits – LTL

14. CONFIGURING NODE 3 IATCS FROM DUAL MODE TO CONTINGENCY MT (SINGLE MT LOOP) MODE

Perform 2.707 NODE 3 ITCS TRANSITION TO CONTINGENCY LT(MT)

MODE, all for Contingency MT (SODF: TCS: CORRECTIVE: NODE 3), then:

15. ACTIVATING AND CHECKING OUT NODE 3 SHELL HEATERS

Node 3: TCS: Heaters: Htr 1A: Node3 Htr 1-6 Availability

Node3Htr16avail

where [X] = 1A, 1B, 2A, 2B, 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B

cmd Ena Operate (Verify Availability – Ena Oper)

'Node3 Htr 7-9 Availability'

Node3Htr79avail

where [X] = 7A,7B, 8A, 8B, 9A, 9B

cmd Ena Operate (Verify Availability – Ena Oper)

16. DEACTIVATING NODE 3 LTA HEATERS

16.1 Deactivating String 1 LTA Heaters

Node1: EPS: RPCM N1RS1 B

RPCM N1RS1 B

Table 6. Node 3 LTA String 1 RPCs

RPCM	RPC	LOAD
N1 RS1 B	1	Airlock Secondary Htr 1
	2	Airlock Secondary Htr 2
	15	Airlock Secondary Htr 15
	16	Airlock Secondary Htr 16

For each of the loads listed in Table 6

cmd RPC – Open (Verify RPC Posn – Op)

cmd RPC Close Cmd – Inhibit (Verify Close Cmd – Inh)

16.2 Deactivating Node 3 LTA String 2 RPCs

Table 7. Node 3 LTA String 2 RPCs

RPCM	RPC	LOAD
N1 RS2 B	1	PMA 3 Htr 1A
	2	PMA 3 Htr 1B
	3	PMA 3 Htr 2A
	4	PMA 3 Htr 2B

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For each of the loads listed in Table 7

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

| **cmd** RPC Close Cmd – Inhibit (Verify Close Cmd – Inh)

17. ACTIVATING NODE 3 PCA

Perform 1.201 PCA ACTIVATION, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: ACS), then:

18. ACTIVATING NODE 3 AREA SMOKE DETECTORS

18.1 Activating Node 3 Smoke Detectors

For the Node 3 Cabin Detector(s)

| Perform 1.401 SMOKE DETECTOR ACTIVATION, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: FDS), then:

18.2 Enabling Node 3 Fire Response Safing

To enable response for Node 1, Airlock, Lab, and Node 3

| Perform 2.408 USOS FIRE RESPONSE SOFTWARE RESPONSE INHIBIT/ENABLE, step 2 (SODF: ECLSS: NOMINAL: FDS), then:

19. ACTIVATING INTRAMODULE VENTILATION

19.1 Activating Node 3 CCAA

For the Node 3 Cabin Detector(s)

| Perform 1.516 NODE 3 CCAA ACTIVATION, steps 2 to 8 (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:

19.2 Activating Fwd Stbd IMV Fan

For the Node 3 Fwd Stbd IMV Fan in Intra-mode

| Perform 1.504 IMV FAN ACTIVATION/DEACTIVATION POST CCS, steps 1 and 2 (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:

20. ACTIVATING NODE 3 GLAs

NOTE

SCR 38597 - Node 3 lighting PCS display and Node 3 RPCM PCS displays have incorrect location coding for Node 3 GLA.

Node 3: EPS: Lights

Node3 Lights

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Table 8. Node 3 GLA Power

RPCM [X]	RPC [Y]	GLA
N31B4A F1	2	NOD3AO5
N31B4A F1	3	NOD3AO4
N31B4A F1	4	NOD3AO1 (Stbd)
N31B4A F1	5	NOD3AO2 (Port)
N31B4A F1	6	NOD3FD2
N32A2B F1	2	NOD3FO5
N32A2B F1	3	NOD3FO4
N32A2B F1	4	NOD3FO1 (Stbd)
N32A2B F1	5	NOD3FO2
N32A2B F1	6	NOD3AD2

For each of the GLAs listed in Table 8

√RPC [Y] Close Cmd – Ena

cmd RPC [Y] – Close (Verify RPC Posn – Cl)

21. APPLYING POWER TO NODE 3 ELPS CHARGERS

NOTE

SCR 38597/SPN38597 - Node 3 lighting PCS display and Node 3 RPCM PCS displays have incorrect location coding for Node 3 ELPS. Additionally, the Node 3 lighting PCS display does not list all three ELPS. Use RPCM display for the Node 3 ELPS NOD3O6 (Aft Endcone).

Node 3: EPS: Lights

Node3 Lights

Table 9. Node 3 ELPS Power

RPCM [X]	RPC [Y]	ELPS	LOCATION
N31B4A E2	2	NOD3AD5	Starboard Endcone
N32A2B E2	2	NOD3AD5	Starboard Endcone
N31B4A E2	10	NOD3O3	Port Endcone
N32A2B E2	10	NOD3O3	Port Endcone

For each of the ELPS listed in Table 9

√RPC [Y] Close Cmd – Ena

cmd RPC [Y] – Close (Verify RPC Posn – Cl)

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For Node 3 ELPS NOD3O6 (Aft Endcone)

Node 3: EPS: RPCM N32A2B E2: RPC 01

RPCM N32A2B E2 RPC 01

√RPC 01 Close Cmd – Ena

cmd RPC 01 – Close (Verify RPC Posn – Cl)

Node 3: EPS: RPCM N31B4A E2: RPC 01

RPCM N31B4A E2 RPC 01

√RPC 01 Close Cmd – Ena

cmd RPC 01 – Close (Verify RPC Posn – Cl)

22. ACTIVATING AND CHECKING OUT NODE 3 AUDIO SYSTEM

22.1 Activating Node 3 ABC 5 and ABC 6

NODE3: EPS: DDCU N31B4A Dist: F1

RPCM N31B4A F1

sel RPCM N31B4A F1 RPC 09

RPCM N31B4A F1 RPC 09

cmd RPC Position – Close (Verify – Cl)

C&T: Audio Subsystem: ABC 5

ABC 5

'IAC [X]' where [X] = Active and Powered IAC 1(2)

cmd Enable (Verify Bus I/O – Enable)

NODE 3: EPS: DDCU N32A2B Dist: F1

RPCM N32A2B F1

sel RPCM N32A2B F1 RPC 09

RPCM N32A2B F1 RPC 09

cmd RPC Position – Close (Verify – Cl)

C&T: Audio Subsystem: ABC 6

ABC 6

'IAC [X]' where [X] = Active and Powered IAC 1(2)

cmd Enable (Verify Bus I/O – Enable)

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22.2 Activating and Checking Out Node 3 ATU 1 and ATU 2

C&T

'Node 3'

sel ATU1

sel RPCM N31B4A F1 RPC 11

cmd RPC Position – Close (Verify – Cl)

'IAC [X]' where [X] = Active and Powered IAC 1(2)

cmd Enable (Verify Bus I/O – Enable)

Verify PBIT – blank

Verify ABIT – blank

'Node 3'

sel ATU2

sel RPCM N32A2B F1 RPC 07

cmd RPC Position – Close (Verify – Cl)

'IAC [X]' where [X] = Active and Powered IAC 1(2)

cmd Enable (Verify Bus I/O – Enable)

Verify PBIT – blank

Verify ABIT – blank

22.3 Placing Node 3 ATU 1 in Public Call 1 and 2

C&T

'ATUs'

sel Node 3 ATU1

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Node 3 ATU 1

'IAC[X]' where [X] = Active and Powered IAC 1(2)

'Node 3 ATU 1 State'

cmd Active (Verify Node 3 ATU 1 State – Active)

CNT Group Overview

sel IAC[X] Call Select where [X] = Active and Powered IAC 1(2)

IAC[X] Call Select

'Public 1'

sel Call Setup

Public1 Call Select

'Talk/Listen (TL)'

cmd N3 ATU1 TL

IAC[X] Call Select

'Public 1'

Verify N3 ATU1 TL in Public 1.

IAC[X] Call Select

'Public 2'

sel Call Setup

Public2 Call Select

'Listen Only'

cmd N3 ATU1 L

IAC[X] Call Select

'Public 2'

Verify N3 ATU1 L in Public 2.

22.4 Placing Node 3 ATU 2 in Public Call 1 and 2

C&T

CNT Group Overview

'ATUs'

sel Node 3 ATU2

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Node 3 ATU 2

'IAC[X]' where [X] = Active and Powered IAC 1(2)

'Node 3 ATU 2 State'

cmd Active (Verify Node 3 ATU 2 State – Active)

CNT Group Overview

sel IAC[X] Call Select where [X] = Active and Powered IAC 1(2)

IAC[X] Call Select

'Public 1'

sel Call Setup

Public1 Call Select

'Talk/Listen (TL)'

cmd N3 ATU2 TL

IAC[X] Call Select

'Public 1'

Verify N3 ATU2 TL in Public 1.

IAC[X] Call Select

'Public 2'

sel Call Setup

Public2 Call Select

'Listen Only'

cmd N3 ATU2 L

IAC[X] Call Select

'Public 2'

Verify N3 ATU2 L in Public 2.

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22.5 Crew Performs Node 3 ATU1 Voice Checks

NOTE

At a convenient time, adjust ATU Volume Level to or above 9 volume bars out of 12 to ensure that Class 2 and 3 tones are audible throughout Node 3.

N3 ATU1

pb N3 ATU1 → 1

√ATU Display – 1TG 2G

Perform voice check with **MCC-H** via S/G1.

pb N3 ATU1 → 2

√ATU Display – 1G 2TG

Perform voice check with **MCC-H** via S/G2.

22.6 Crew Performs Node 3 ATU2 Voice Checks

NOTE

At a convenient time, adjust ATU Volume Level to or above 9 volume bars out of 12 to ensure that Class 2 and 3 tones are audible throughout Node 3.

N3 ATU2

pb N3 ATU2 → 1

√ATU Display – 1TG 2G

Perform voice check with **MCC-H** via S/G1.

pb N3 ATU2 → 2

√ATU Display – 1G 2TG

Perform voice check with **MCC-H** via S/G2.

22.7 Activating Node 3 DAIU 2 and RAIU 3

NODE 3: EPS: DDCU N31B4A Dist: F1

RPCM N31B4A F1

sel RPCM N31B4A F1 RPC 12

RPCM N31B4A F1 RPC 12

cmd RPC Position – Close (Verify – Cl)

C&T: Audio Subsystem: DAIU 2

DAIU 2

'IAC [X]' where [X] = Active and Powered IAC 1(2)

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cmd Enable (Verify Bus I/O – Enable)

NODE 3: EPS: DDCU N32A2B Dist: F1

RPCM N32A2B F1

sel RPCM N32A2B F1 RPC 10

RPCM N32A2B F1 RPC 10

cmd RPC Position – Close (Verify – Cl)

C&T: Audio Subsystem: RAIU 3

RAIU 3

'IAC [X]' where [X] = Active and Powered IAC 1(2)

cmd Enable (Verify Bus I/O – Enable)

23. ACTIVATING AND CHECKOUT OF HCZ 2 MDM

23.1 Powering On Backup HCZ MDM 2

Node 3: EPS: RPCM N32A2B F1: RPC 01

RPCM N32A2B F1 RPC 01

Verify Close Cmd – Enable

cmd RPC Position – Close (Verify – Cl)

Wait 5 minutes for the Backup HCZ MDM to go through bootup and POST and come up to Standby.

23.2 Enabling Backup HCZ MDM RT on CC MDM

CDH: Primary C&C: CB CT BIA 23: RT Status

CB CT BIA 23 RT Status

cmd 22 MDM HCZ 2 RT Status – Enable **Execute** (√ – Ena)

23.3 Verifying Backup HCZ MDM Status

CDH: Backup HCZ

Backup HCZ MDM

Verify Frame Count – incrementing

Verify MDM ID – HCZ 2

Verify Processing State – Standby

√Sync Status – In Sync

sel MDM BIT Status

Backup HCZ BIT Summary Table A

'Word 1: Summary'

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Record all non-blank fields in Table 10.

Table 10.

Hard Fail	
Rev. Soft Fail	
Soft Fail	
POST Fail	
BIT Fail	
I/O Bus Fail	
I/O List Fail	
SX Card Fail	
I/O BIT Fail	
POST in Prog	

* If BST not blank

* | CDH Summary: Backup HCZ: MDM Utilities

* |

* | 'Clear Latched Data in BST A'

* |

* | **cmd Clear Execute**

23.4 Enabling RT FDIR for Backup HCZ MDM

CDH: Primary C&C: CB CT BIA 23: RT Status

cmd 22 MDM HCZ 2 RT FDIR Status – Enable FDIR Execute
(√ – Ena)

23.5 Enabling Recovery for HCZ

C&DH Summary: Primary CCS MDM

'Software Control'

sel Recovery Retry

sel HCZ MDM

'Recovery Enable'

cmd Enable Execute (Verify – Ena)

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23.6 Verifying HCZ 2 Software and PPL Configuration

Use the following to perform [1.231 CCS BUILD DATA LOAD COMMAND](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

Destination Device – Bkup HCZ
Storage Type – EEPROM, DRAM
File to Load – Per Software Roadmap

Perform [1.236 CCS DATA LOAD MANAGEMENT](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

24. ACTIVATING AND CHECKING OUT NODE 3 VIDEO SYSTEM

24.1 Activating and Checking Out Node 3 VSU-5

Perform [1.611 VDS VIDEO SWITCH UNIT 5 CHECKOUT](#), all (SODF: C&T: ACTIVATION AND CHECKOUT: VIDEO), then:

24.2 Activating Node 3 CVIU-9

C&T: Video: CVIU

'NOD3'

sel CVIU 9

cmd RPC Position – Close (Verify – Cl)

24.3 Activating Node 3 CVIU-13

C&T: Video: CVIU

'NOD3'

sel CVIU 13

cmd RPC Position – Close (Verify – Cl)

24.4 Activating Node 3 CVIU-14

C&T: Video: CVIU

'NOD3'

sel CVIU 14

cmd RPC Position – Close (Verify – Cl)

1.100 NODE 3 INITIAL ACTIVATION

(ASSY OPS/20A/FIN 1/SPN)

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25. CONFIGURING BACKUP PMCU MDM FOR NODE 3 OPERATIONS

25.1 Powering Up Backup PMCU

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: MDM STATE TRANSITIONS TIER II), then:

25.2 Uploading PMCU MDM PPL to Existence Table

Use the following to perform [1.231 CCS BUILD DATA LOAD COMMAND](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

Destination Device – Prim PMCU, Backup PMCU
Storage Type – EEPROM
File to Load – PPL 3, ver 3140

Perform [1.236 CCS DATA LOAD MANAGEMENT](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

25.3 Powering Down Backup PMCU

Go to [4.414 PMCU MDM TRANSITION C: TRANSITIONING BACKUP MDM 1\(2\) FROM WAIT TO DIAGNOSTICS/OFF WHILE MDM 2\(1\) IS OPERATIONAL](#), steps 1 to 3, 6 and 7 (SODF: C&DH: MDM STATE TRANSITIONS TIER II).

25.4 PCMU Bus Clean Up (If Required)

Command PMCU LB busses back to CH A, as required.

cmd Select Ch A **Execute**

Verify Channel Selected – A

25.5 Uploading CCS MDM PPL for DDCU 50Hz Data Latch

Use the following to perform [1.231 CCS BUILD DATA LOAD COMMAND](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

Destination Device – Prim CCS
Storage Type – EEPROM
File to Load – PPL 143, ver 8003

Perform [1.236 CCS DATA LOAD MANAGEMENT](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

25.6 Uploading CCS MDM PPL for DDCU 50Hz Data Latch

Use the following to perform [1.231 CCS BUILD DATA LOAD COMMAND](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

Destination Device – Backup CCS, Standby CCS
Storage Type – RAM, EEPROM
File to Load – PPL 143, ver 8003

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Perform [1.236 CCS DATA LOAD MANAGEMENT](#), all (SODF: GND AVIONICS: C&DH: NOMINAL), then:

26. [POWER ON NODE 3 UOPs](#)

Table 11.

Module	UOP Number [X]	Location	RPCM [Y]	RPC [Z]
NODE 3	UOP 1	NOD3FD5	N31B4A_F1	17
NODE 3	UOP 2	NOD3AS6	N32A2B F1	17
NODE 3	UOP 3	NOD3AD4	N32A2B E2	17
NODE 3	UOP 4	NOD3O3	N31B4A E2	18

NOTE

SCR 39117 - NODE 3 and Cupola UOP location coding is incorrect on PCS.

Node3: EPS: RPCM [Y]: RPC [Z]

RPCM [Y] RPC [Z]

cmd RPC Position – Close (Verify – CI)

27. [PERFORMING RPCM POWER ON RESET](#)

For RPCMs N31B4A A1, B1, C1, D1, E1, F1, A2, B2, C2, D2, E2, F2 and

RPCMs N32A2B A1, B1, C1, E1, F1, A2, B2, C2, D2, E2, F2

Go to [5.420 RPCM POWER ON RESET](#), all (SODF: GND SYSTEMS: EPS: CORRECTIVE).

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1.101 NODE 3 INITIAL ACTIVATION FOR CHANNEL 1/4 OR CHANNEL 2/3 ACT ONLY

(ASSY OPS/20A/FIN)

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OBJECTIVE:

To provide procedure modifications to [1.100 NODE 3 INITIAL ACTIVATION](#) (SODF: ASSY OPS: ACTIVATION AND CHECKOUT: NODE 3) in the event that Node 3 can only be activated using the Channel 1/4 or Channel 2/3 power domain only.

The following table provides deltas to each step in procedure [1.100 NODE 3 INITIAL ACTIVATION](#) (SODF: ASSY OPS: ACTIVATION AND CHECKOUT: NODE 3) for Node 3 Activation using Channel 1/4 or Channel 2/3 only.

Table 1. Node 3 Initial Activation - Channel 1/4 and Channel 2/3 Activation Deltas

Step	Actions	Channel 1/4 Act	Channel 2/3 Act
1	Configure for Node 3 Activation	All	All
2	Node 3 DDCU N31B Act	All	Not performed
3	Node 3 DDCU N34A Act	All	Not performed
4	Applying Power to N31B4A RPCMs	All	Not performed
5	Node 3 DDCU N32A Act	Not performed	All
6	Node 3 DDCU N32B Act	Not performed	All
7	Applying Power to N32A2B RPCMs	Not performed	All
8	Activating and C/O N3 HCZ-1 MDM	All	Activate HCZ-2 instead of HCZ-1
9	Verifying RT I/O and Enabling RT FDIR for Node 3 RPCMs	Channel 1/4 RPCMs only 9.1 to 9.5, 9.12, 9.13 Add steps 9.5a, 9.5b and 9.5c Note 1	Channel 2/3 RPCMs only 9.6 to 9.12, 9.13 Add steps 9.5a, 9.5b and 9.5c Note 2
10	Activate N3 MDMs	N3-1 MDM Act only 10.1, 10.3 to 10.5, 10.9, 10.11 Add step 10.5a Note 1	N3-2 MDM Act only 10.2, 10.6 to 10.8, 10.10, 10.11 Add step 10.5a Note 2
11	Activating Node-3 IATCS MT Loop	Replace step per Note 3	Replace step per Note 4 (LT Loop activated)
12	Integrating Node 3 MTL IFHX	All	All
13	Activating Node 3 LTL Loop	Not performed	Not performed
14	Configure Node 3 IATCS From Dual Mode to Contingency (Single Loop) Mode	Not performed	Not performed
15	Activating and Checking Out Node 3 Shell Htrs	Replace step per Note 5	Replace step per Note 6
16	Deactivating Node 3 LTA Heaters	All	All
17	Activating Node 3 PCA	Not performed	All

**1.101 NODE 3 INITIAL ACTIVATION FOR CHANNEL 1/4 OR CHANNEL 2/3
ACT ONLY**

(ASSY OPS/20A/FIN)

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Continuation of Table 1. Node 3 Initial Activation - Channel 1/4 and
Channel 2/3 Activation Deltas

Step	Actions	Channel 1/4 Act	Channel 2/3 Act
18	Activating Node 3 Area Smoke Detectors	SD-1 activation only Replace 18.1 per Note 7 Perform 18.2 (Enabling Fire Response)	Perform 18.2 only (Enabling Fire Response). Fwd Stbd Fan does not provide smoke detection.
19	Activating Node 3 Inter-module Ventilation	19.1 (N3 CCAA only)	19.2 (Fwd Stbd Fan Only)
20	Activating Node 3 GLAs	Channel 1/4 GLAs only (5 of 10)	Channel 2/3 GLAs only (5 of 10)
21	Applying Power to Node 3 ELPS Chargers	Channel 1/4 ELPS only (3 of 6)	Channel 2/3 ELPS only (3 of 6)
22	Activating and Checking Out Node 3 Audio System	22.1 (ABC 5 act only), 22.2 (ATU 1 act only), 22.3, 22.5, 22.7 (DAUI 2 only)	22.1 (ABC 6 act only), 22.2 (ATU 2 only), 22.4, 22.6, 22.7 (RAUI 3 only)
23	Activating and Checkout of HCZ 2 MDM	Not performed	Not performed
24	Activating and Checking Out Node 3 Video System	24.1 (VSU-5 act)	24.2, 24.3, 24.4 (CVIU-9, CVIU-13, CVIU-14 act)
25	Config Backup PMCU for Node 3 Operations	All	All
26	Power on Node 3 UOPs	UOP 1 and 4 only	UOP 2 and 3 only
27	Perform RPCM POWER ON RESET	Channel 1/4 RPCMs only	Channel 2/3 RPCMs only

NOTE

The bracketed numbers in the location column refer to notes.

[1] CHANNEL 1/4 ACTIVATION STEP ADDITIONS

NOTE

1. For channel 1/4 single string activation RT I/O comm and RT FDIR will remain inhibited for DDCU N32A, DDCU N32B and all RPCMs on N32A2B power bus.
2. RPCM N32A2B-D1 does not physically exist. RT I/O comm and RT FDIR should be inhibited.

9.5a Configuring RT I/O Comm for RPCM N32A2B-B1, D1, A2, B2, C2, D2

CDH: Primary HCZ MDM: LB SEPS HCZ 23: RT Status

LB SEPS HCZ 23 RT Status

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'RT [X]' where [X] =

cmd RT Status [X] Inhibit Execute (Verify – Inh)

Repeat

9.5b Configuring RT I/O Comm for RPCM N32A2B-A1, C1, E1, E2, F2
CDH: Primary HCZ MDM: LB SEPS N3 23: RT Status

'RT [X]' where [X] =

cmd RT Status [X] Inhibit Execute (Verify – Inh)

Repeat

9.5c Configuring RT I/O Comm for DDCU N32A and DDCU N32B
CDH: Primary PMCU MDM: LB EPS HAB 23: RT Status

'RT [X]' where [X] =

cmd RT Status [X] Inhibit Execute (Verify – Inh)

Repeat

10.5a Inhibiting N3-2 MDM I/O
CDH: Primary HCZ MDM: LB SYS N3 2: RT Status

cmd 22 MDM N3-2 RT Status – Inhibit Execute (Verify – Inh)

[2]

CHANNEL 2/3 ACTIVATION STEP ADDITIONS

NOTE

For channel 2/3 single string activation RT I/O comm and RT FDIR will remain inhibited for DDCU N31B, DDCU N34A, and all RPCMs on N31B4A power bus.

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9.5a Configuring RT I/O Comm for RPCM N31B4A-B1, D1, A2, B2, C2, D2

CDH: Primary HCZ MDM: LB SEPS HCZ 14: RT Status

LB SEPS HCZ 14 RT Status

'RT [X]' where [X] =

cmd RT Status [X] Inhibit Execute (Verify – Inh)

Repeat

9.5b Configuring RT I/O Comm for RPCM N31B4A-A1, C1, E1, E2, F2

CDH: Primary HCZ MDM: LB SEPS N3 14: RT Status

LB SEPS N3 14 RT Status

'RT [X]' where [X] =

cmd RT Status [X] Inhibit Execute (Verify – Inh)

Repeat

9.5c Configuring RT I/O Comm for DDCU N31B and DDCU N34A

CDH: Primary PMCU MDM: LB EPS HAB 14: RT Status

LB EPS HAB 14 RT Status

'RT [X]' where [X] =

cmd RT Status [X] Inhibit Execute (Verify – Inh)

Repeat

10.5a Inhibiting N3-1 MDM I/O

CDH: Primary HCZ MDM: LB SYS N3 1: RT Status

RT Status

cmd 22 MDM N3-1 RT Status – Inhibit Execute (Verify – Inh)

[3] Replace step 11 for Channel 1/4 Act with the following:

11. ACTIVATING NODE 3 IATCS MT LOOP

NOTE

The following procedure requires crew actions.

Perform 4.102 ITCS CONTINGENCY STARTUP WITH N3-2 MDM FAILED, all (SODF: ASSY OPS: TCS), then:

1.101 NODE 3 INITIAL ACTIVATION FOR CHANNEL 1/4 OR CHANNEL 2/3 ACT ONLY

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[4] Replace step 11 for Channel 2/3 Act with the following:

11. ACTIVATING NODE 3 IATCS LT LOOP

NOTE

The following procedure requires crew actions.

Perform 4.100 ITCS CONTINGENCY STARTUP WITH N3-1 MDM FAILED, all (SODF: ASSY OPS: TCS), then:

[5] For Channel 1/4 Act, replace step 15 with the following:

15. ACTIVATING AND CHECKING OUT NODE 3 SHELL HEATERS

NOTE

1. After Activation, Node 3 B-String shell heaters may experience '**Temp Sensor Disagree**' faults and/or remain on due to N3-2 MDM not being available. If this occurs, **MCC-H** will manually fail the temperature sensors by transposing upper and lower setpoints on affected RTDs.
2. In addition to all B-string heaters being unpowered, Shell Heater zones 7A and 9A closed loop control is lost due to those zones' only RTD being connected to the N3-2 MDM. **MCC-H** will consider manual heater operations.

Node 3: TCS: Heaters: Htr 1A: Node3 Htr 1-6 Availability

Node3Htr16avail

where [X] = 1A 2A 3A 4A 5A 6A

cmd Ena Operate (Verify Availability – Ena Oper)

'Node3 Htr 7-9 Availability'

Node3Htr79avail

where [X] = 8A

cmd Ena Operate (Verify Availability – Ena Oper)

1.101 NODE 3 INITIAL ACTIVATION FOR CHANNEL 1/4 OR CHANNEL 2/3 ACT ONLY

(ASSY OPS/20A/FIN)

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[6] For Channel 2/3 Act, replace step 15 with the following:

15. ACTIVATING AND CHECKING OUT NODE 3 SHELL HEATERS

NOTE

1. After Activation, Node 3 A-String shell heaters may experience '**Temp Sensor Disagree**' faults and/or remain on due to N3-1 MDM not being available. If this occurs, **MCC-H** will manually fail the temperature sensors by transposing upper and lower setpoints on affected RTDs.
2. In addition to all A-string heaters being unpowered, Shell Heater zones 1B and 7B closed loop control is lost due to those zones' only RTD being connected to the N3-1 MDM. **MCC-H** will consider manual heater operations.

Node 3: TCS: Heaters: Htr 1A: Node3 Htr 1-6 Availability

Node3Htr16avail

where [X] = 2B 3B 4B 5B 6B

cmd Ena Operate (Verify Availability – Ena Oper)

'Node3 Htr 7-9 Availability'

Node3Htr79avail

where [X] = 8B 9B

cmd Ena Operate (Verify Availability – Ena Oper)

[7] Replace step 18.1 for Channel 1/4 Act with the following:

18.1 Activating Node 3 Smoke Detectors

For the Node 3 Cabin Detector(s)

For SD 1 only, perform 1.401 SMOKE DETECTOR ACTIVATION, all (SODF: ECLSS: ACTIVATION AND CHECKOUT: FDS), then:

C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Enable

Enable an Event

input Event Code – 1 5 7 6 2 ('**Cabin Smoke Detector 1 Active BIT Fail-Node 3**')

cmd Execute

**1.101 NODE 3 INITIAL ACTIVATION FOR CHANNEL 1/4 OR CHANNEL 2/3
ACT ONLY**

(ASSY OPS/20A/FIN)

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input Event Code – 1 5 7 6 3 ('Cabin Smoke Detector 1
Fail-Node 3')

cmd Execute

input Event Code – 1 5 7 6 4 ('Cabin Smoke Detector 1 Lens
Contamination-Node 3')

cmd Execute

**1.101 NODE 3 INITIAL ACTIVATION FOR CHANNEL 1/4 OR CHANNEL 2/3
ACT ONLY**

(ASSY OPS/20A/FIN)

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SUMMARY OF EQUIPMENT LOST WITHOUT NODE 3 CHANNEL 2/3 POWER

RPCM N32A2B A1

MPLM PDB Pwr 1
CRV Pwr 2
PVGF Redundant Power

RPCM N32A2B A2

Node 3 B String Shell Heaters

RPCM N32A2B B1

Power Bus N3D42A2B

RPCM N32A2B B2

MTL IFHX Htrs
PMA 3 Shell Heaters

RPCM N32A2B C1

WHC Pwr 1

RPCM N32A2B C2

Port CBM CPA 1-4 Sec
Forward CBM CPA 1-4 Sec
Aft CBM CPA 1-4 Sec
CUP ATU
CUP UOP 1

RPCM N32A2B D2

Nadir CBM CPA 1-4 Sec
CUP UOP 2

RPCM N32A2B E1

Node 3 SD 2
Node 3 IMV Port Fwd Vlv
Node 3 IMV Stbd Ovd Fan
Node 3 IMV Fwd Stbd Fan
Node 3 IMV Aft Port Fan

RPCM N32A2B E2

N3-2 MDM
Node 3 LCA Valve 2
Node 3 UOP 3
Node 3 OGA H2 Vent Valve

RPCM N32A2B F1

HCZ-2 MDM
Half of Node 3 lights
Node 3 ATU 2
ABC 6
RAIU 3
CVIU 14
CVIU 9
Node 3 UOP 2

RPCM N32A2B F2

Node 3 LTL
Node 3 PCA

RPCM N3D42A2B A

UPA
WPA
WPA (NOD3D5) AAA
WPA (NOD3D5) SD

**1.101 NODE 3 INITIAL ACTIVATION FOR CHANNEL 1/4 OR CHANNEL 2/3
ACT ONLY**

(ASSY OPS/20A/FIN)

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SUMMARY OF EQUIPMENT LOST WITHOUT NODE 3 CHANNEL 1/4 POWER

RPCM N31B4A A1

OGA PSM

RPCM N31B4A A2

Node 3 A String Shell Heaters

RPCM N31B4A B1

MPLM PDB Pwr 3

CRV Pwr 1

Power Bus N3S51B4A

Power Bus N3S41B4A

RPCM N31B4A B2

LTL IFHX Htrs

RPCM N31B4A C1

COLBERT/T2

RPCM N31B4A C2

Port CBM CPA 1-4 Pri

Forward CBM CPA 1-4 Pri

Aft CBM CPA 1-4 Pri

RPCM N31B4A D1

PVGF Prime Power

RPCM N31B4A D2

Nadir CBM CPA 1-4 Pri

RPCM N31B4A E1

Node 3 SD 1

Node 3 IMV Stbd Ovhd Vlv

Node 3 IMV Stbd Deck Vlv

Node 3 IMV Deck Stbd Vlv

Node 3 IMV Port Fwd Fan

Node 3 IMV Deck Stbd Fan

Node 3 IMV Stbd Deck Fan

Node 3 DASA Zenith

RPCM N31B4A E2

N3-1 MDM

C&W

Node 3 LCA Valve 1

Node 3 CCAA

Node 3 UOP 4

Node 3 CCAA

Node 3 SDS Valves

Node 3 CDRA VLPT

Node 3 CDRA CVVs

Node 3 MCA Vent Valve

RPCM N31B4A F1

HCZ-1 MDM

Half of Node 3 lights

ABC 5

VSU 5

Node 3 ATU 1

DAIU 2

CVIU 13

Node 3 UOP 1

RPCM N31B4A F2

Node 3 MTL

Node 3 RAMV

RPCM N3A41B4A A

Node 3 MCA

Node 3 TCCS

Node 3 CDRA

Node 3 AR Rack AAA

Node 3 AR Rack SD

RPCM N3A51B4A A

Node 3 OGA

Node 3 OGA AAA

Node 3 OGA SD

**1.101 NODE 3 INITIAL ACTIVATION FOR CHANNEL 1/4 OR CHANNEL 2/3
ACT ONLY**

(ASSY OPS/20A/FIN)

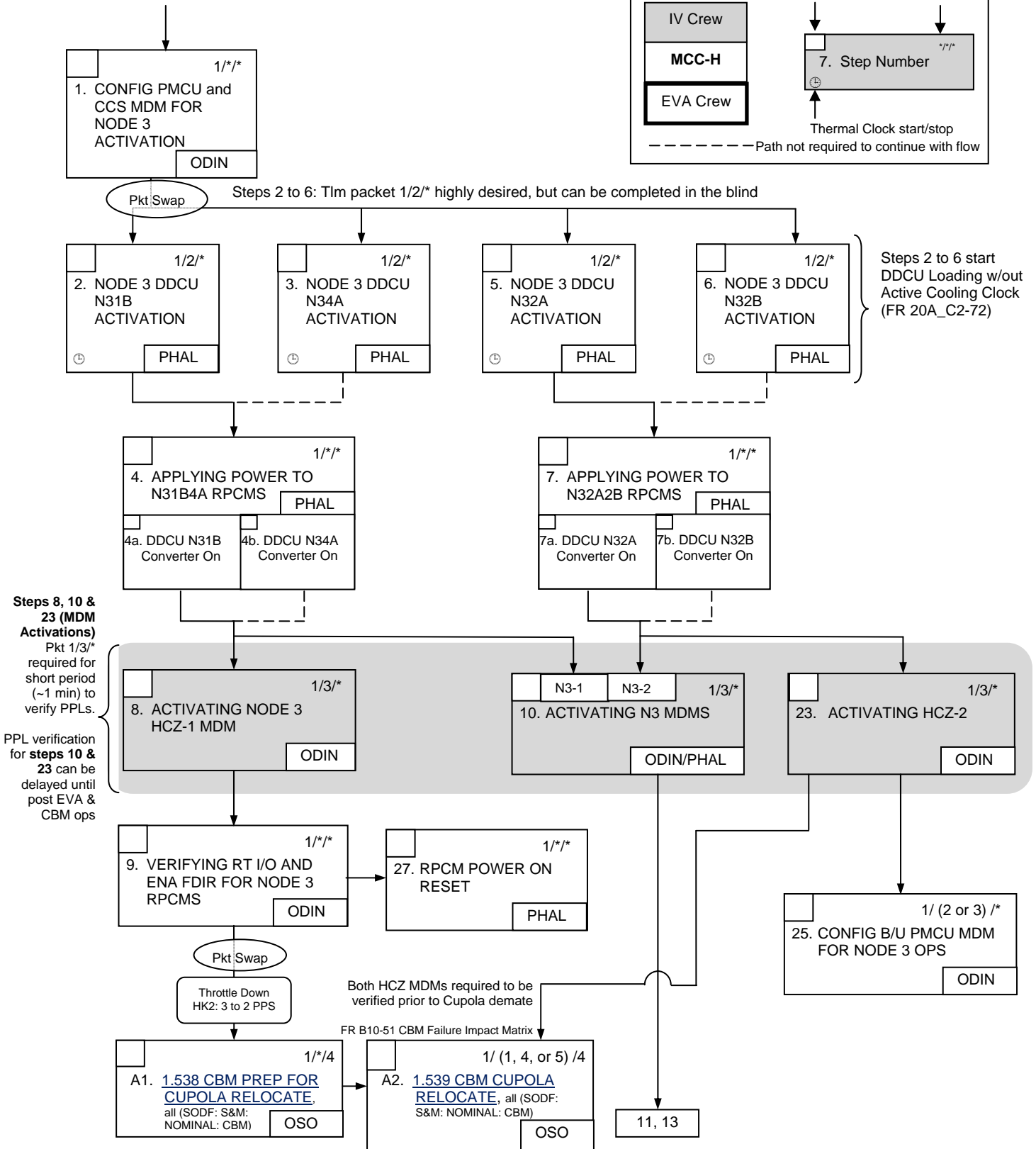
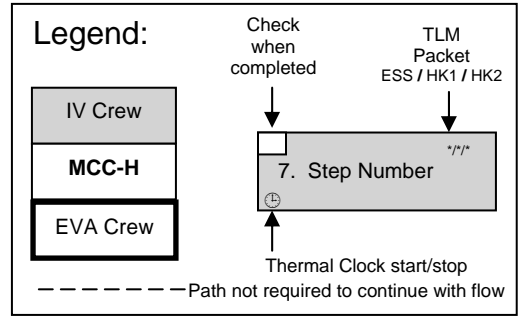
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Table 2. Node 3 System Impacts with Channel 1/4 (Channel 2/3) Activated Only

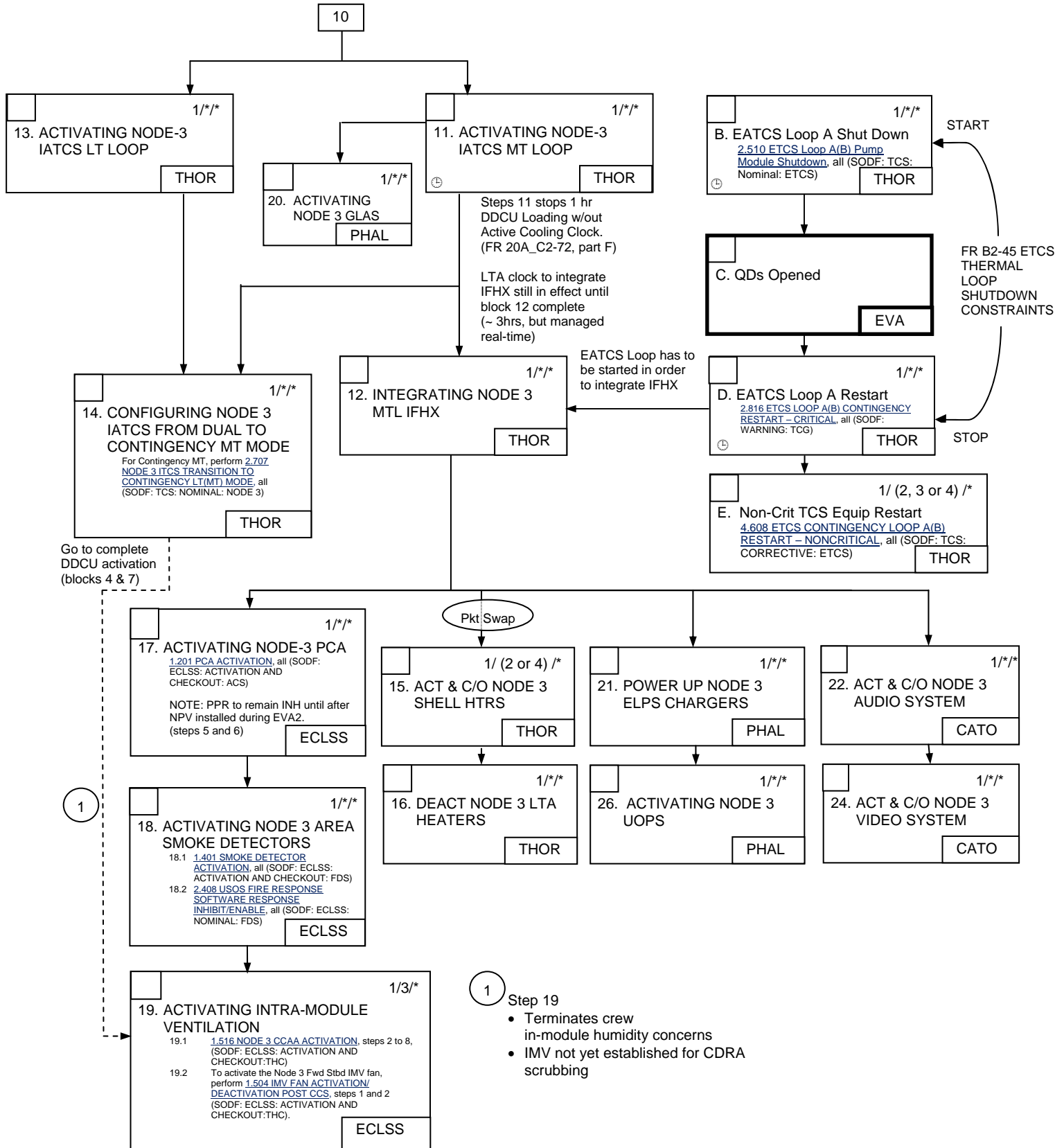
System	Node 3 Channel 1/4 Act Only - Impacts	Node 3 Channel 2/3 Act Only - Impacts
C&DH	HCZ-2 MDM ↓ N3-2 MDM ↓	HCZ-1 MDM ↓ N3-1 MDM ↓ N3 C&W Panel ↓
EPS	DDCU N32A and all downstream loads ↓ DDCU N32B and all downstream loads ↓ 5 of 10 GLAs ↓ 3 of 6 ELPS ↓ 2 of 4 Node 3 UOPs ↓	DDCU N31B and all downstream loads ↓ DDCU N34A and all downstream loads ↓ 5 of 10 GLAs ↓ 3 of 6 ELPS ↓ 2 of 4 Node 3 UOPs ↓
C&T	ABC-6 ↓ ATU-2 ↓ RAUI-3 CVIU-9, CVIU-13, and CVIU-14 ↓	ABC-5 ↓ ATU-1 ↓ DAUI-2 ↓ VSU-5 ↓
TCS	N3 IATC LT Pump ↓ Contingency N3 IATCS Act required Shell B heaters ↓	N3 IATCS MT Pump ↓ Contingency N3 IATCS Act required Shell A heaters ↓
ECLSS	PCA ↓	CCA ↓
S&M	Cupola Demate/Mate CBM ops not allowed due to zero fault tolerance on EPS and CDH connectivity	Cupola Demate/Mate CBM ops not allowed due to zero fault tolerance on EPS and CDH connectivity

1.102 NODE 3 ACTIVATION FLOWCHART (ASSY OPS/20A/FIN 1)

Tlm Packet 1/ (1 or 4) /*
 required for EVA prep thru : CREWLOCK
 DEPRESS/REPRESS CUE CARD – DEPRESS
 and POST DEPRESS.
 (Ending with POST DEPRESS CC - steps 1 and 2)



1.102 NODE 3 ACTIVATION FLOWCHART
(ASSY OPS/20A/FIN 1)



1.104 VESTIBULE OUTFITTING NOD1 TO NOD3

(ASSY OPS/20A/FIN 1) Page 1 of 67 pages

OBJECTIVE:

Outfit the vestibule between Node 1 and Node 3 modules.

LOCATION:

NOD1 Port - NOD3 Stbd Vestibule

DURATION:

9 hours, 30 minutes Total

- 25 minutes - Node 1 Closeout Panel Removal (step 1)
- 5 minutes - Node 1 Port Hatch Opening (step 2)
- 20 minutes - Center Disk Cover Removal (step 3)
- 45 minutes - CBM CPA Removal (step 4)
- 15 minutes - Node 3 Thermal Blanket Removal (step 5)
- 20 minutes - Ground Strap Installation (step 6)
- 10 minutes - Node 3 Starboard Hatch Opening (step 7)
- 25 minutes - IMV Supply Temporary Installation (step 8)
- (10 minutes) - Demating CBM Connectors (Step 9, if required)
- 25 minutes - Avionics Connections (step 10)
- 40 minutes - Potable Water Jumper Installation (step 11)
- 5 minutes - Avionics Connections (step 12)
- 25 minutes - Waste Water Jumper Installation (step 13)
- 5 minutes - Waste Water Bus Connection (step 14)
- 30 minutes - Avionics Connections and Cable Restraint (step 15)
- 5 minutes - Air Sample Jumper Installation (step 16)
- 25 minutes - Air Sample Valve Reconfiguration (step 17)
- 30 minutes - O2 and N2 Connection Preparation (step 18 and 19)
- 25 minutes - Nitrogen Jumper Installation (step 20)
- 40 minutes - Oxygen Jumper Installation (steps 21)
- 60 minutes - MTL Jumper Installation (step 22)
- 25 minutes - Removing CBM Hardware (step 23)
- 25 minutes - IMV Return Jumper Installation (step 24)
- <ground> Safing for 1553 Channel B Connection (step 25)
- 10 minutes - 1553 Channel B connection (step 26)
- <ground> Safing for 1553 Channel A Connection (step 27)
- 5 minutes - 1553 Channel A connection (step 28)
- 10 minutes - Wireless Audio Connection (step 29)
- <ground> 1553 Normalization (step 30)
- 15 minutes - Cleanup (step 31)

PARTS:

Element Ground Strap Assy (two) P/N 683-13477-7
1.0 CTB w/ Window, Single (two) P/N SEG33111837-301
CTB Shelf Divider (two) P/N SEG33111841-309

Node 3 Vestibule Outfitting Kit: (listed in order of use)

- 24" x 24" Ziplock Bag (four) P/N 528-50000-8, labeled "Node 1 Port CBM CPA"
- Each contains: Partitioned Ziplock Bag labeled "Node 1 Port CBM CPA"
- Protective Cap (one) P/N NATC-RPC-N-15-0
- Protective Cap (one) P/N NATC-PPC-N-15-0
- Protective Cap (two) P/N NATC-RPC-N-11-0

1.104 VESTIBULE OUTFITTING NOD1 TO NOD3

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Protective Cap (two) P/N NATC-PPC-N-11-0
Protective Cap (six) P/N NATC-RPC-N-13-0
Protective Cap (six) P/N NATC-PPC-N-13-0
IMV Supply Vestibule Jumper P/N 683-99521-1
IMV Jumper O-Rings (three) P/N 2-161S0604-70
1553 CH A/ISL Ethernet Vestibule Jumper (W9429) P/N 683-99429-1
MSS BCP Vestibule Jumper (W9432) P/N 683-99432-1
Video/Audio Bus A Vestibule Jumper (W9434) P/N 683-99434-1
Potable Water Vestibule Jumper P/N 683-99511-11
Wireless Audio Vestibule Jumper (W9433) P/N 683-99433-1
Waste Water Vestibule Jumper P/N 683-99511-10
MSS Video Vestibule Jumper (W9431) P/N 683-99431-1
1553 CH B Vestibule Jumper (W9430) P/N 683-99430-1
Audio Bus B Vestibule Jumper (W9435) P/N 683-99435-1
Air Sample Vestibule Jumper P/N 683-99511-12
Nitrogen Vestibule Jumper P/N 683-99511-9
Oxygen Vestibule Jumper P/N 683-99511-8
MTL Supply Vestibule Jumper P/N 683-99511-13
MTL Return Vestibule Jumper P/N 683-99511-14
IMV Return Vestibule Jumper P/N 683-99521-2

Prelabeled Ziplocks (in VOK):

“NOD1-NOD3 CBM Hardware”
“NOD1-NOD3 IMV Hardware”
“NOD1-NOD3 Electrical Protective Caps”
“NOD1-NOD3 Fluid Caps”
“Node 3 Closeout Panel Launch Bolts”

MATERIALS:

Towel
Gray Tape
Sharpie
Velcro Straps
Wire Ties
Nitrile Gloves P/N SEG33116807-301
Clean Room Gloves P/N SEG33116979-301
Clean Room Tape P/N 1251
Braycote
Safety Goggles
Dust Mask
ALSP Kit:
Povidone Iodine Pads (if required)

TOOLS:

Digital Camera
Mini Maglite
Work Light
FFTD and Gamah Seal Maintenance Kit P/N SEG33114223-301
CSA-O2 (two)
Adjustable Bungee (two)

1.104 VESTIBULE OUTFITTING NOD1 TO NOD3

(ASSY OPS/20A/FIN 1) Page 3 of 67 pages

ISS IVA Toolbox:

Drawer 2:

- Ratchet, 1/4" Drive
- Ratchet, 3/8" Drive
- 1/8" Hex Head, 1/4" Drive
- 3/16" Hex Head, 1/4" Drive
- 5/32" Hex Head, 1/4" Drive
- 7/16" Socket, 1/4" Drive
- 7/16" Deep Socket, 1/4" Drive
- 1/2" Deep Socket, 1/4" Drive
- 3/8" Socket, 1/4" Drive
- 4" Ext, 1/4" Drive
- (40-200 in-lbs) Trq Wrench, 1/4" Drive
- (10-50 in-lbs) Trq Wrench, 1/4" Drive
- 1/4" to 3/8" Adapter

Drawer 3:

- #6 Long Torq Driver, 3/8" Drive

Drawer 5:

- Static Wrist Tether

REFERENCED PROCEDURE(S):

- 1.105 CBM CENTER DISK COVER REMOVAL
- 1.102 ACBM TO PCBM GROUND STRAP INSTALLATION
- 1.101 CBM CONTROLLER PANEL ASSEMBLY REMOVAL - GENERIC
- A.2.1 FLUID FITTING TORQUE DEVICE (FFTD) ASSEMBLY AND USAGE
- A.2.3 MATING GAMAH FITTING USING THE FFTD

1.104 VESTIBULE OUTFITTING NOD1 TO NOD3

1. PREPARING NODE 1 FOR VESTIBULE OUTFITTING

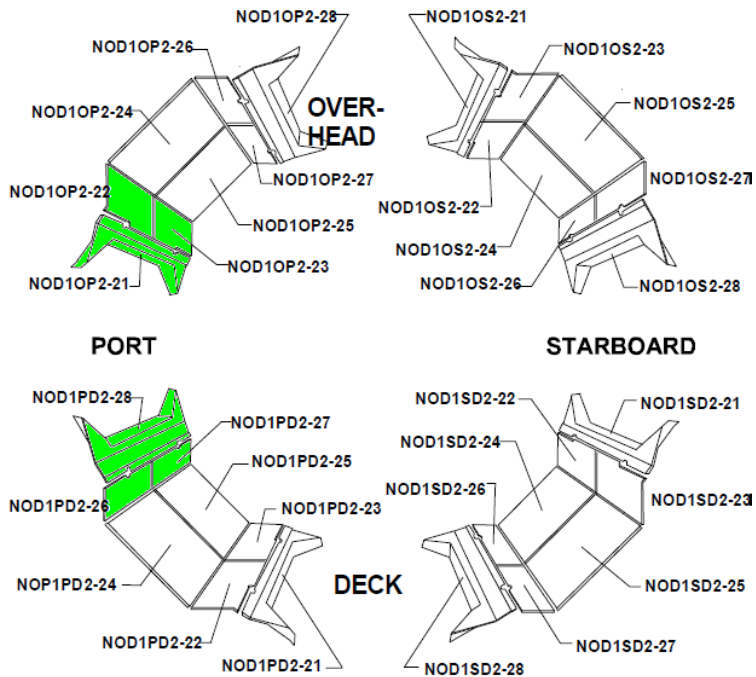


Figure 1. - Node 1 Radial Closeout Panels to be Removed.

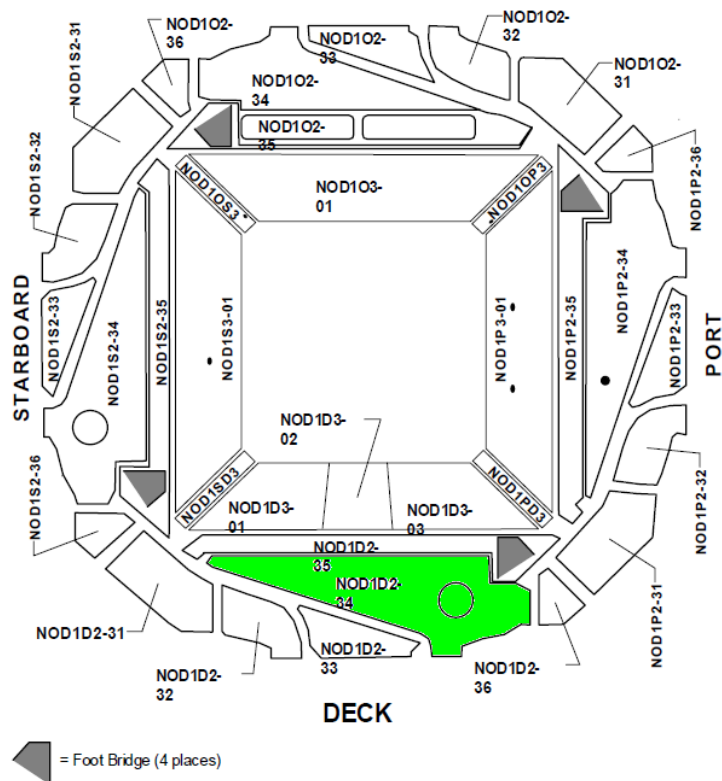


Figure 2. - Node 1 Midbay Closeout Panels to be Removed.

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- 1.1 Remove the following Closeout Panels (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive):
 - NOD1OP2-21 (fifteen fasteners)
 - NOD1OP2-22, -23 (three fasteners each, remove as a group)
 - NOD1PD2-28 (fifteen fasteners)
 - NOD1PD2-26, -27 (three fasteners each, remove as a group)
 - NOD1D2-34 (twenty-four fasteners)Stow Closeout Panels in Node 1.
Refer to Figures 1 and 2.

* If required for removal of NOD1OP2-22, -23 (NOD1PD2-26, -27)
* Closeout Panels
* Remove L-shaped Closeout Seam Supports (two), fasteners
* (four each) (Ratchet, 1/4" Drive; 1/8" Hex Head, 1/4" Drive).
* Remove T-shaped Closeout Seam Support, fasteners (eight)
* (Ratchet, 1/4" Drive; 1/8" Hex Head, 1/4" Drive).

- 1.2 If work will begin behind Closeout Panels within 1.3 hours of panel removal,

NOTE

Two CSA-O2 units are required to take independent samples in the open cabin in order to protect against CSA-O2 sensor error.

Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).

Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).

Verify CSA-O2 sampling from both units are within 1.1% of each other.

Verify O2% within nominal range specified on CSA-O2 Decal.

Perform CSA-O2 sampling behind removed Closeout Panel.
Verify O2% within nominal range specified on CSA-O2 Decal.

2. OPENING NODE 1 PORT HATCH

- 2.1 Open NOD1 Port Hatch per decal.

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CAUTION

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

- 2.2 Verify no condensate is present in vestibule.
If required, wipe any condensate from vestibule (Towel).
Notify **MCC-H** of condensate location.

3. REMOVING NODE 1 PORT CBM CENTER DISK COVER

Perform 1.105 CBM CENTER DISK COVER REMOVAL, all (SODF: S&M: NOMINAL: VESTIBULE), then:

4. REMOVING CBM CONTROLLER PANEL ASSEMBLIES

Perform 1.101 CBM CONTROLLER PANEL ASSEMBLY REMOVAL - GENERIC, steps 1 to 4 (SODF: S&M: NOMINAL: VESTIBULE), then:

Notify **MCC-H** CBM Controller Panel Assembly removal complete.

5. REMOVING NODE 3 THERMAL BLANKET

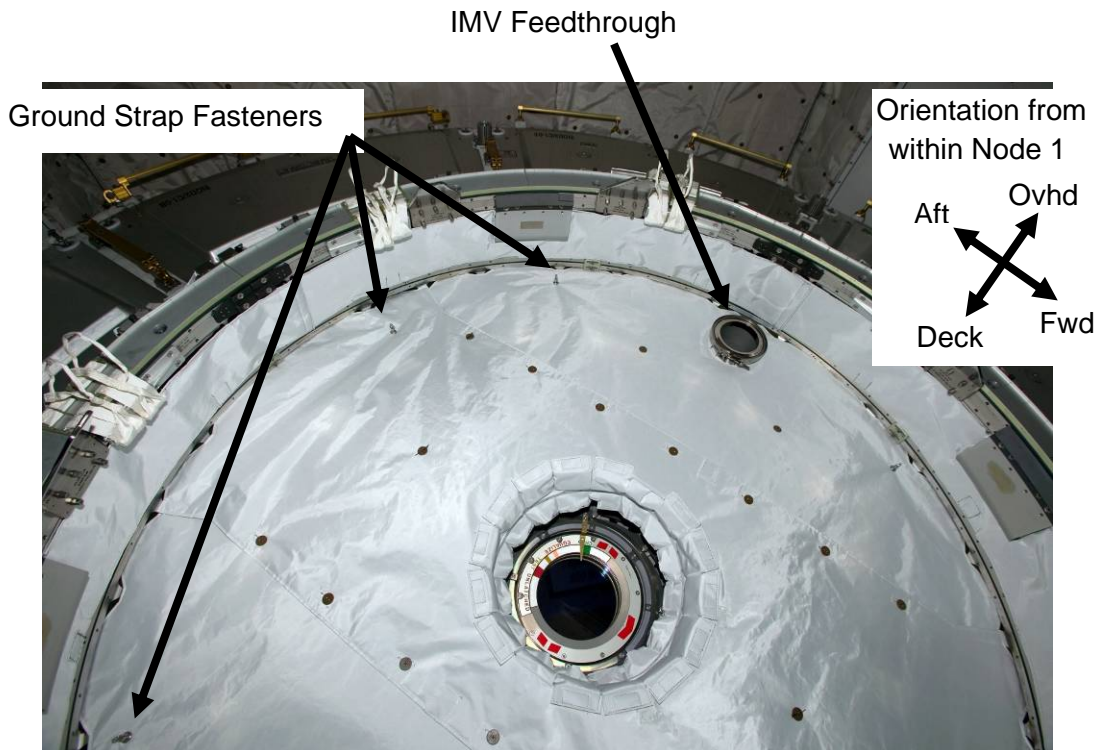


Figure 3.- Thermal Blanket Installed on NOD2 Bulkhead and Hatch (NOD3 Thermal Blanket is similar).

1.104 VESTIBULE OUTFITTING NOD1 TO NOD3

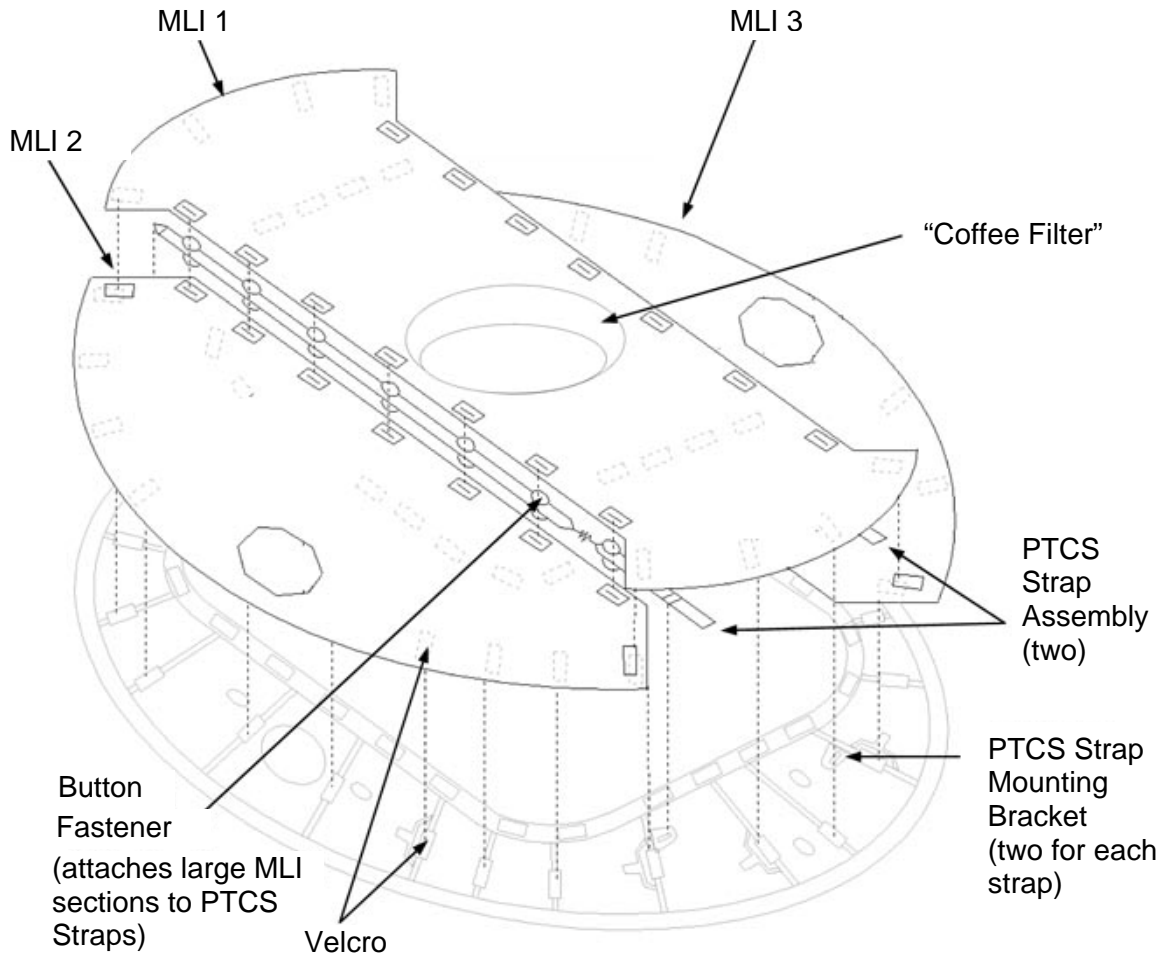


Figure 4.- NOD3 Thermal MLI Blanket.

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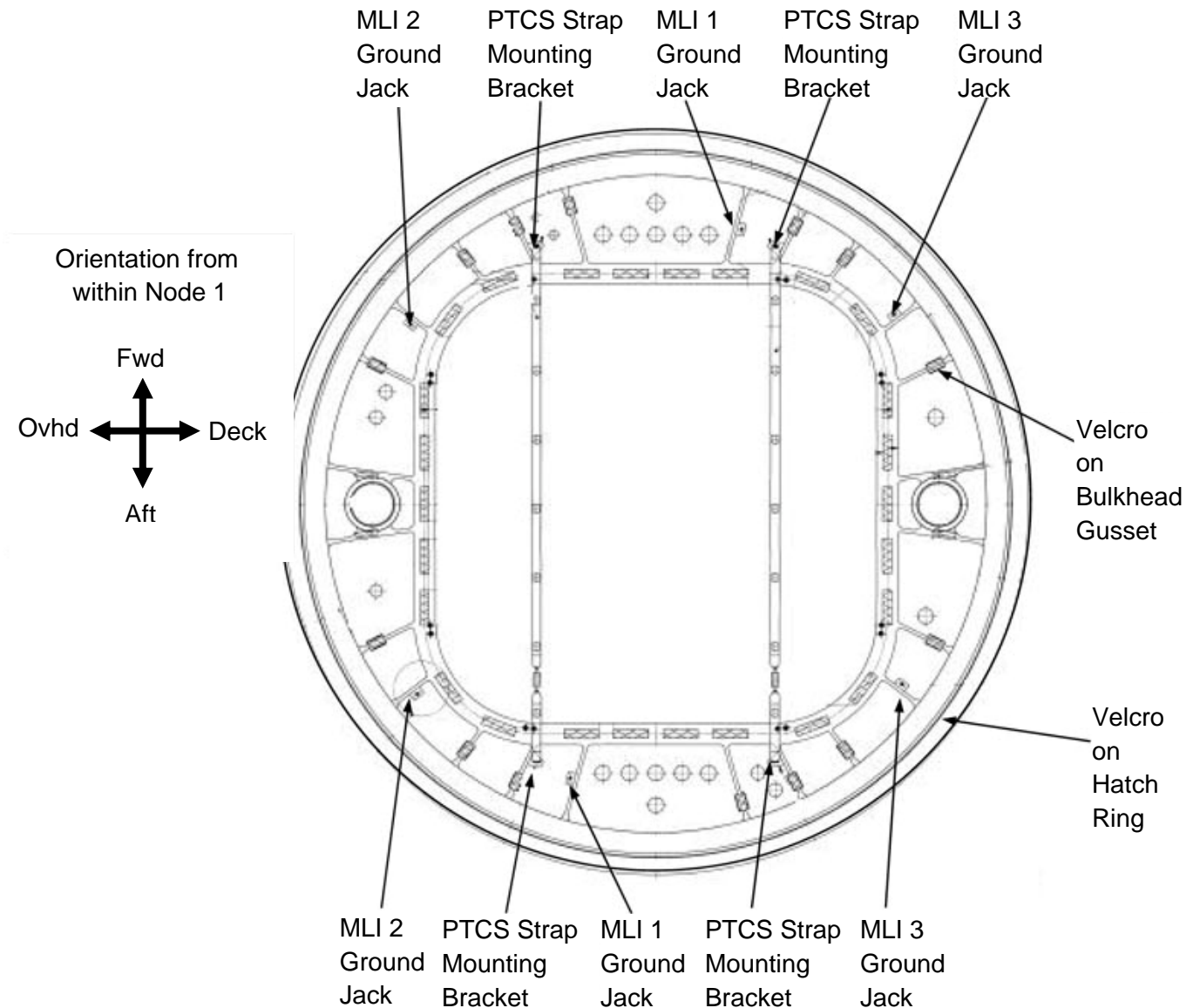


Figure 5.- Bulkhead Interfaces for the NOD3 Thermal Blanket and PTCS Strap Assemblies (Shown with Blankets Removed).

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Figure 6.- MLI Interfaces on Bulkhead.

CAUTION

NOD3 Thermal Blanket is rolled instead of folded to prevent damage to the multilayer insulation of the Blanket.

- 5.1 Gently pull back edges of MLI to expose ground connectors (six) on NOD3 Bulkhead.
Refer to Figures 3 to 6.
- 5.2 1/4 Turn Grounding Connectors (two per MLI section, six total) ←|→ Bulkhead Bracket
Refer to Figures 3 to 6.
- NOD3 Fwd 5.3 Remove upper PTCS strap non-captive fasteners (two) (#6 Long Torq Driver, 3/8" Drive; 1/4" to 3/8" Adapter; Ratchet, 1/4" Drive). Temporarily stow fasteners by installing in Mounting Brackets (hand tighten).
Refer to Figures 3 to 6.
- NOD3 Aft 5.4 Unhook opposite end of PTCS straps from Bulkhead Bracket (two places) to release Blanket.
Refer to Figures 3 to 6.
- 5.5 Release remaining Velcro, remove MLI Blanket from vestibule, then roll up (Velcro Straps).
Temporarily stow.

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6. INSTALLING GROUND STRAPS

NOTE

CBM Alignment Guides will be removed in this and subsequent steps. To aid with Alignment Guide reinstatement, guides will be sequentially numbered.

- 6.1 Number CBM Alignment guides 1 to 16, starting at overhead position, working clockwise (Sharpie).
- 6.2 Photo document CBM Alignment Guide numbering (Digital Camera).

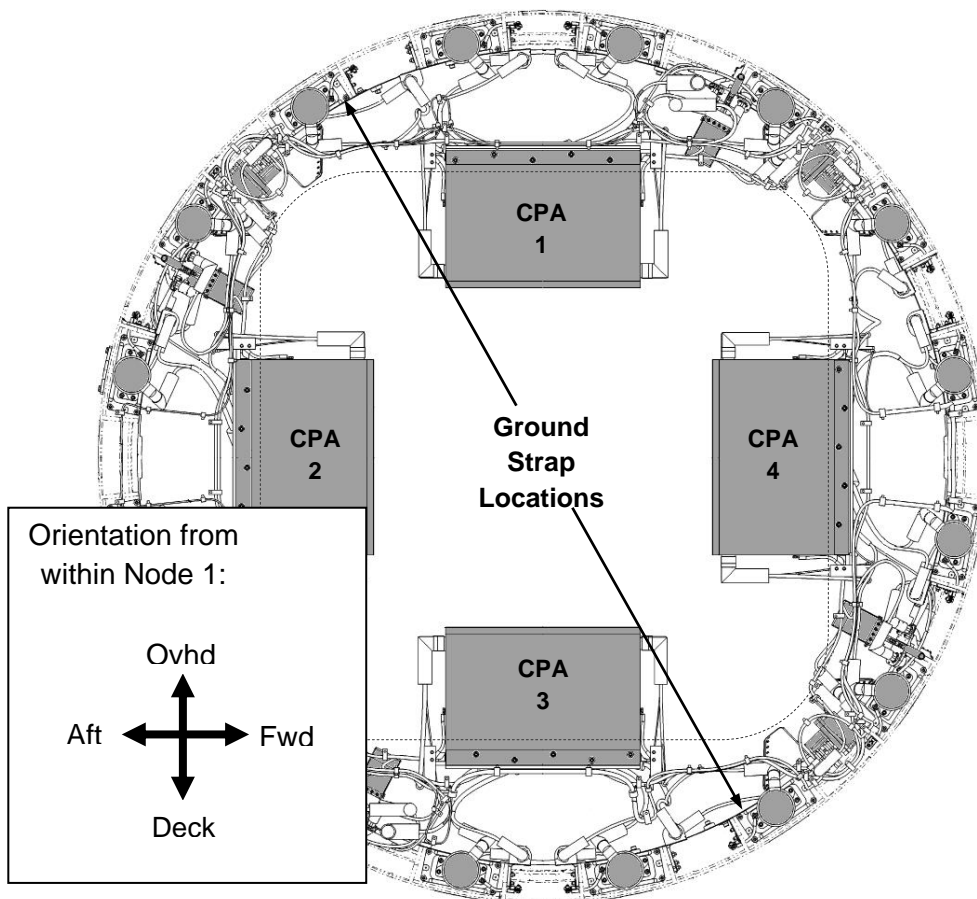


Figure 7.- Ground Strap Locations on ACBM (Interior View).

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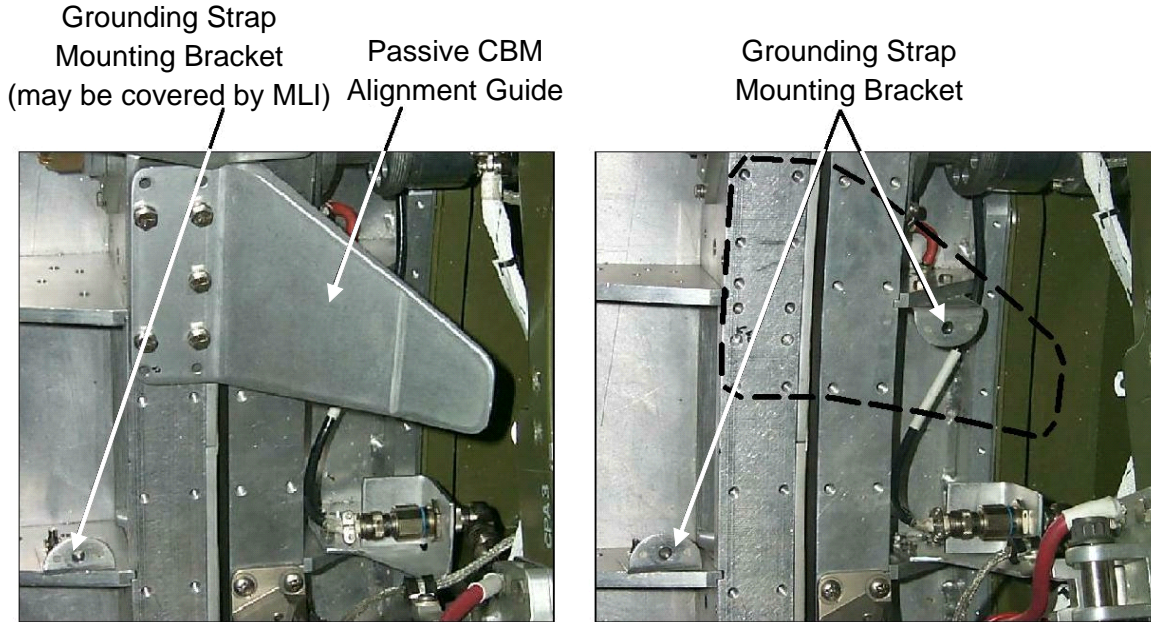


Figure 8.- Ground Strap Mounting Brackets on CBM Rings.

- 6.3 Locate four Ground Strap Mounting Brackets (two on Active CBM Ring and two on Passive CBM Ring). Gently pull back on MLI Blanket as required. Refer to Figure 7 and 8.

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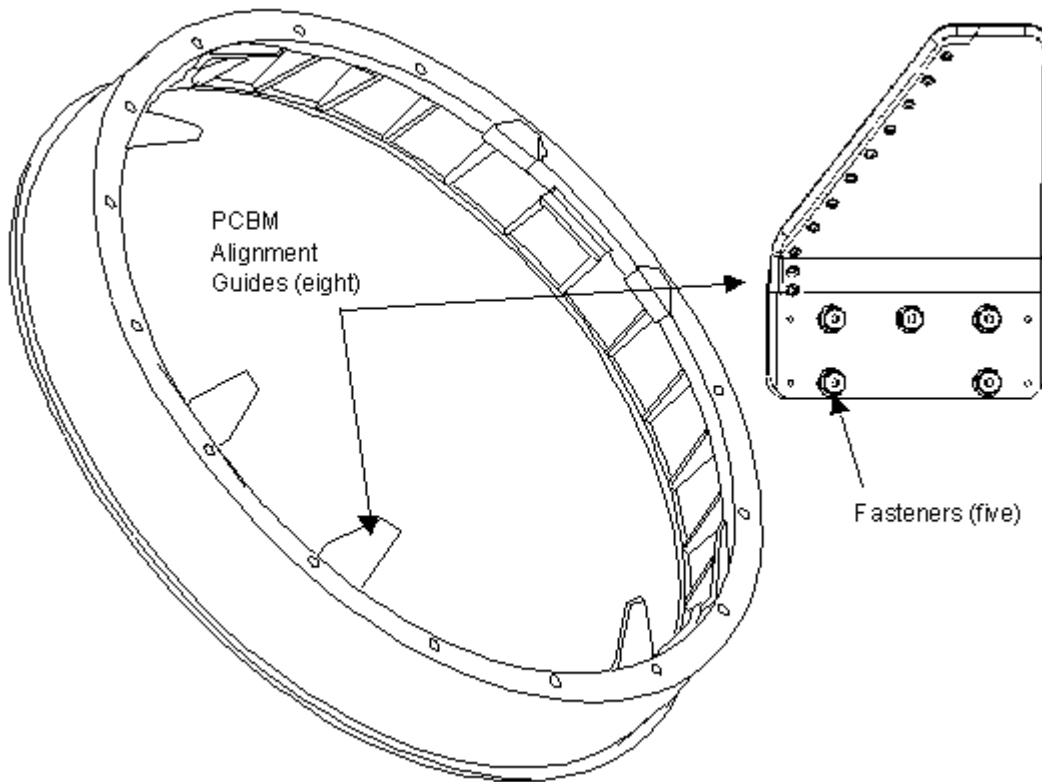


Figure 9.- PCBM Alignment Guides.

NOTE

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

- 6.4 Remove PCBM Alignment Guides covering Ground Strap Mounting Brackets, loosen Fasteners (five per alignment guide) (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 3/8" Socket, 1/4" Drive). Stow Alignment Guide in 12" x 12" Ziplock, labeled "NOD1-NOD3 CBM Hardware."
Refer to Figure 9.

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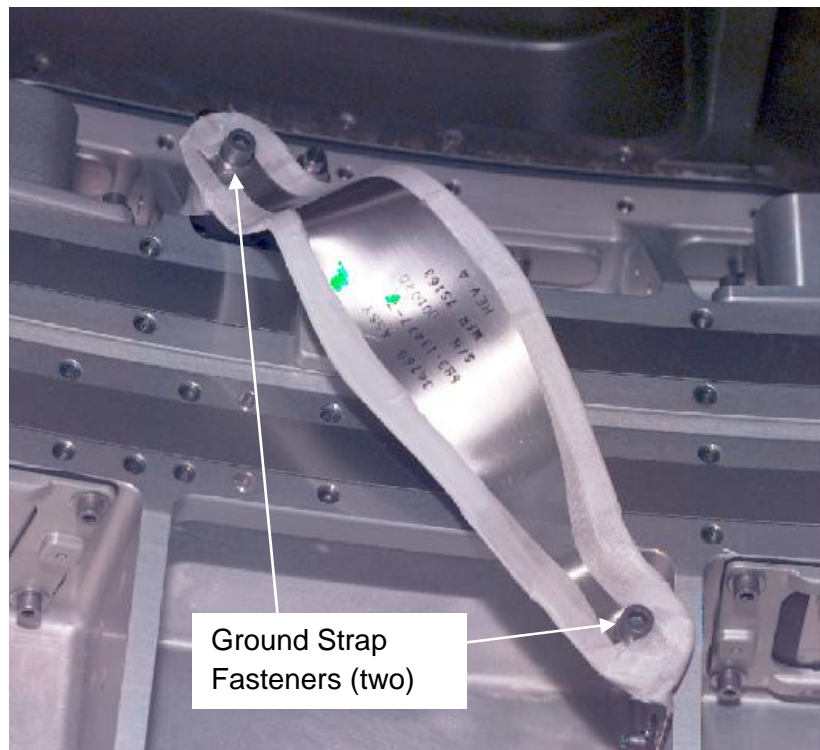


Figure 10.- Ground Strap Installed Across ACBM to PCBM Interface.

NOTE

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

- 6.5 Install Ground Straps (two) from ACBM bracket to PCBM bracket, bending as necessary.
Refer to Figure 10.
- 6.6 Tighten fasteners (two per Ground Strap).
Torque to 90 in-lbs [Ratchet, 1/4" Drive; 3/16" Hex Head; (40-200 in-lbs) Trq Wrench, 1/4" Drive].
Refer to Figure 10.
- 6.7 Return Node 3 PCBM-Ring MLI Blanket back to original configuration if moved during Ground Strap installation.
- 6.8 Photo document newly installed Ground Strap and Alignment Guide stowage (Digital Camera).

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7. INGRESSING NODE 3

7.1 Don Safety Goggles and Dust Mask.

This PPE must be worn until Node 3 module has exchanged air with ISS via IMV Supply Vestibule Jumper for at least 75 minutes and no particulate FOD is visible.

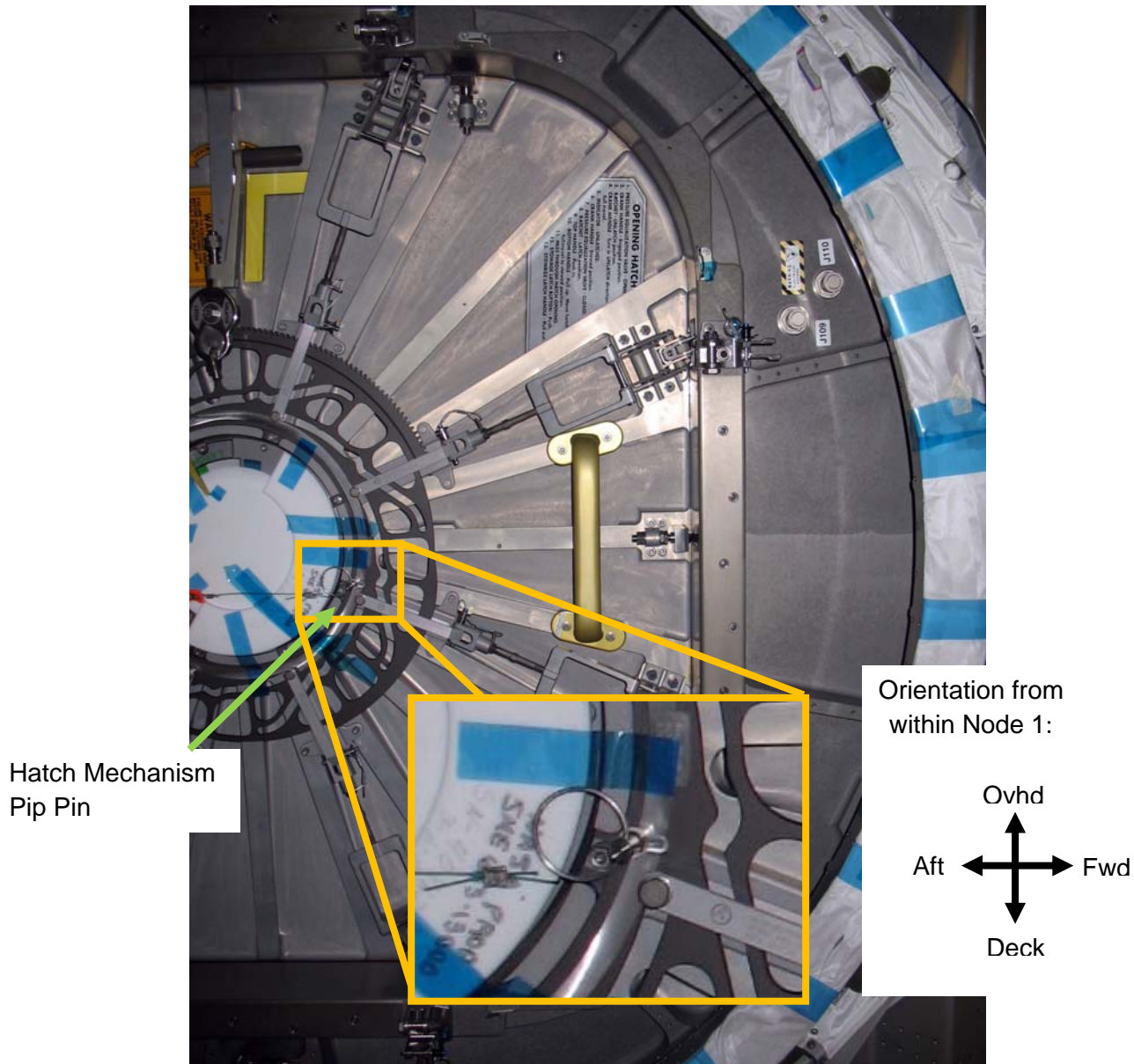



Figure 11. - Hatch Pip Pin Location (Generic Hatch Shown).

7.2 ✓ Hatch Mechanism Pip Pin - not installed.
Refer to Figure 11.

7.3 **On MCC-H GO**, Equalize pressure between Node 3 and ISS Stack:
Push PPRV Handle, rotate  to "OVERRIDE"

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7.4 Open Node 3 Starboard Hatch.

7.5 PPRV Handle rotate to "Normal"

NOTE
Refer to Figures 12, 13, 14 for all vestibule connections.

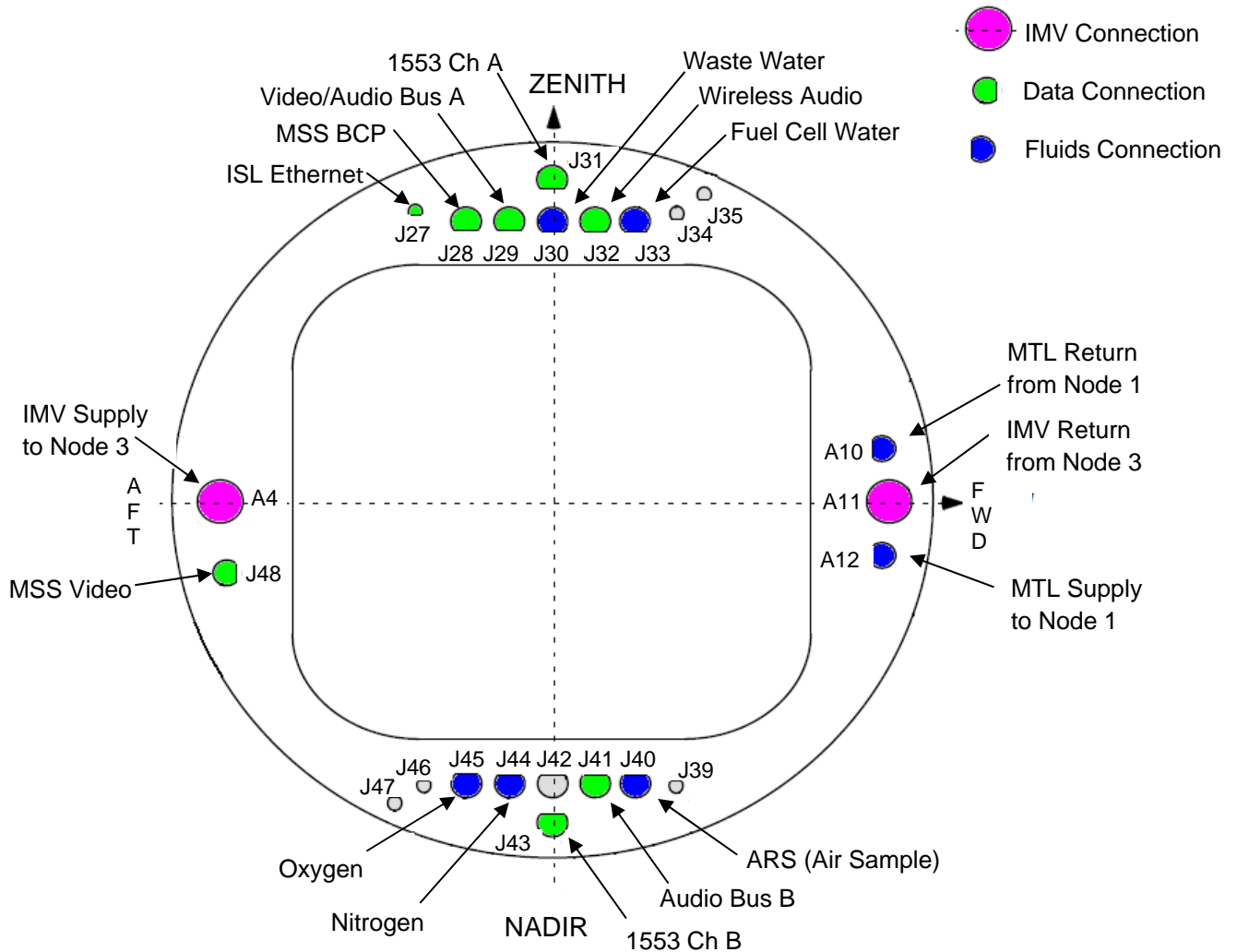


Figure 12.- NOD1 Bulkhead
(View from Inside Node 1, Looking Port).

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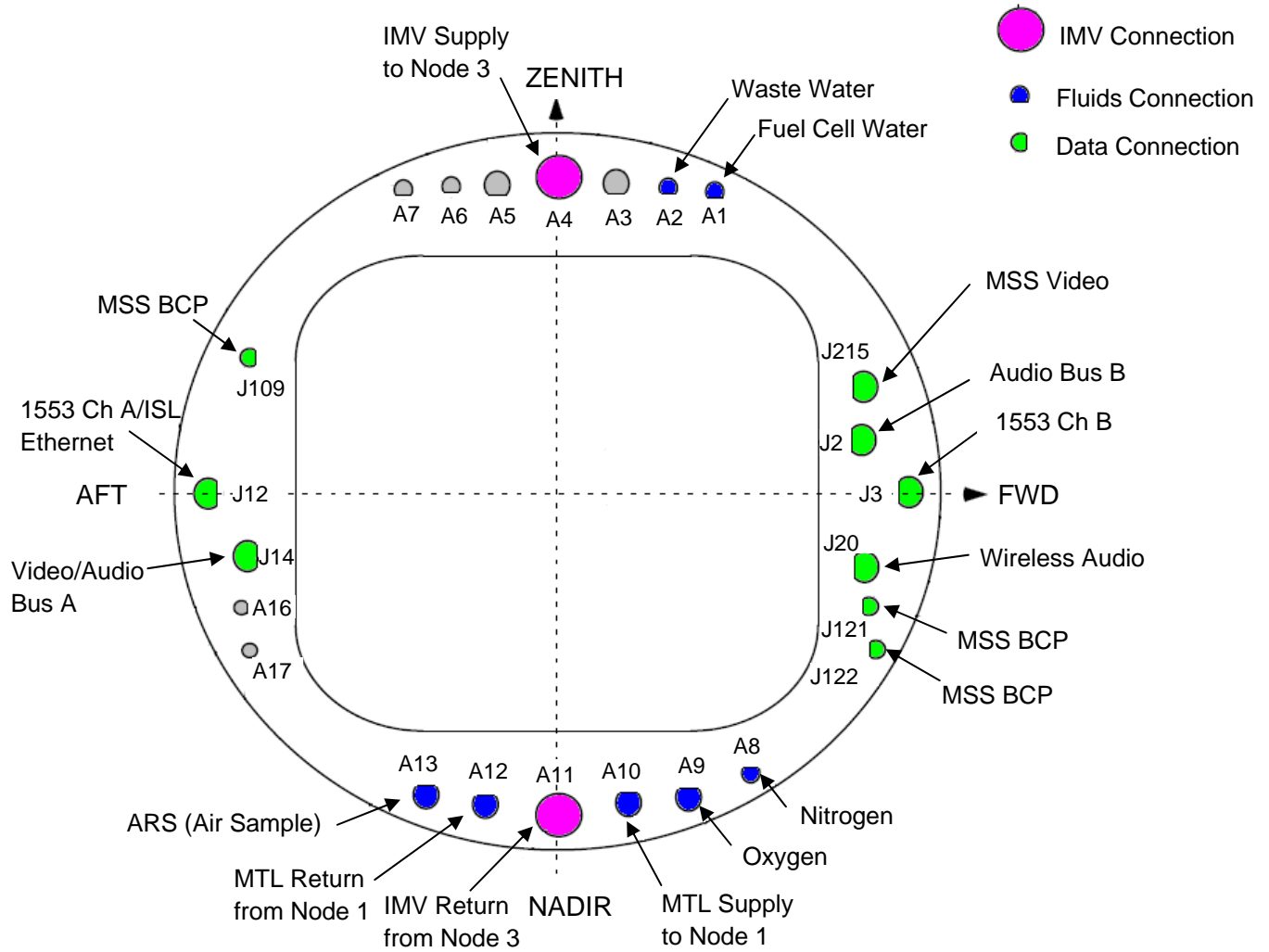


Figure 13.- NOD3 Bulkhead
(View from Node 1, Looking Port).

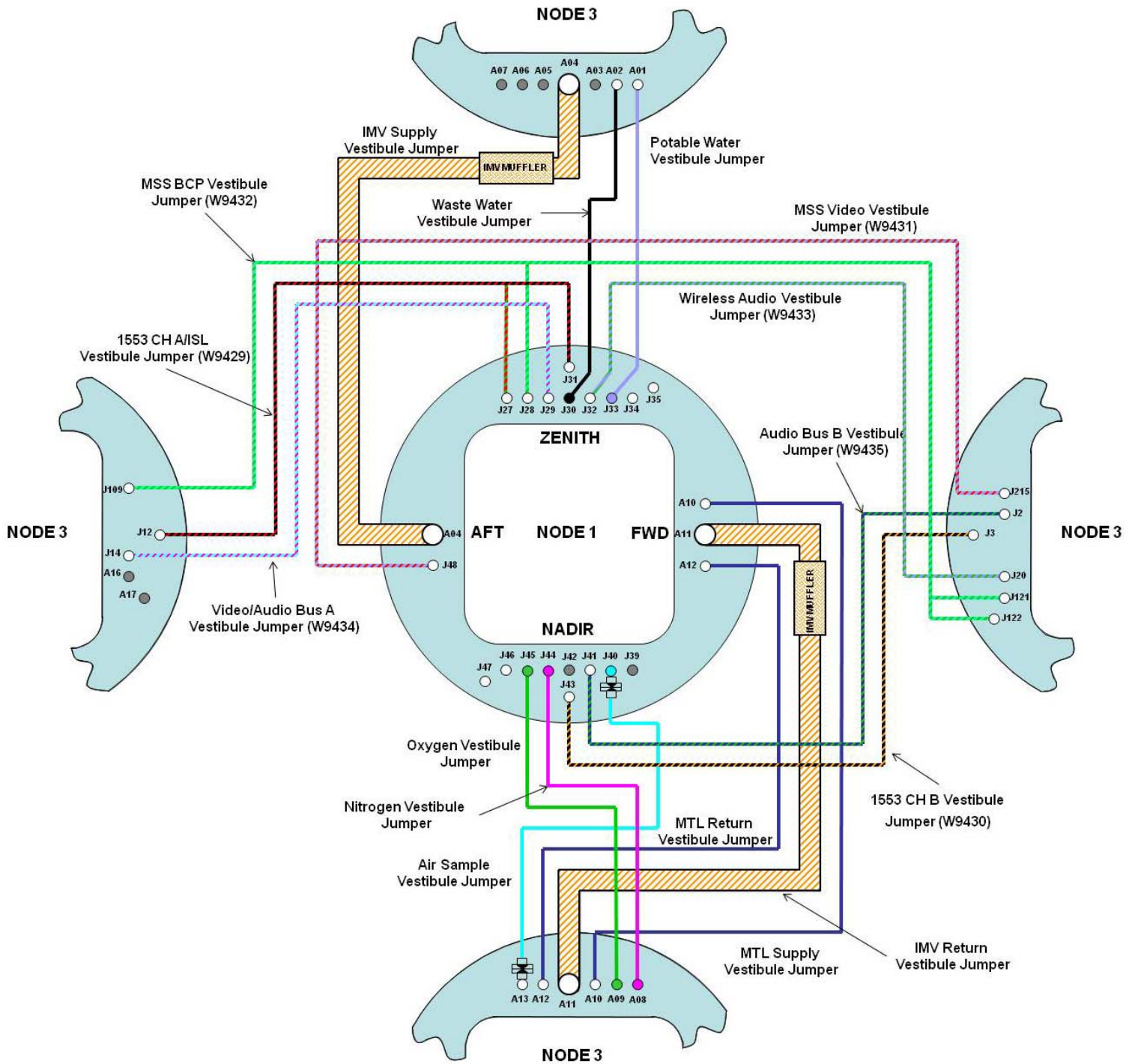


Figure 14.- Vestibule Connections Overview.

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8. INSTALLING IMV SUPPLY JUMPER IN TEMPORARY CONFIG

**MCC-H/
PCS**

8.1 Activating Node 1 IMV Port Aft Valve

Node 1: ECLSS: IMV Port Aft Vlv

Node 1 IMV Port Aft Vlv

sel RPCM N13B B RPC 16

RPCM N13B B RPC 16

√Close Cmd - Ena

cmd RPC Position - Close (Verify - Cl)

Node 1 IMV Port Aft Vlv

'State'

'Enable'

cmd Arm

√Arm Status - Armed

cmd Enable

√State - Enabled

8.2 Opening Node 1 IMV Port Aft Valve

'Position'

'Open'

cmd Arm

√Arm Status - Armed

cmd Open

√Position - In Transit

Wait 25 seconds.

√Position - Open

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8.3 Closing Node 1 IMV Port Aft Valve

'Position'

'Close'

cmd Arm

√Arm Status - Armed

cmd Close

√Position - In Transit

Wait 25 seconds.

√Position - Closed

Vestibule

8.4 Loosen, remove V-Band Clamp on NOD1 Port Aft (A4) IMV Flange (Ratchet, 1/4" Drive; 1/2" Deep Socket, 1/4" Drive or 7/16" Deep Socket, 1/4" Drive).

Remove IMV Cap from NOD1 (A4) IMV Flange.

Place IMV Cap in Ziplock Bag labeled "NOD1-NOD3 IMV H/W."

Stow in IMV Cap VOK CTB.

Retain V-Band Clamp for use in subsequent step.

8.5 Don Nitrile Gloves.

8.6 Retrieve IMV Jumper O-ring (one of two) from ziplock taped to IMV Supply Vestibule Jumper muffler. Remaining O-Ring will be used for later activity.

8.7 Apply small amount of Braycote to fingertip.
Work Braycote between fingertips until a very thin film is achieved with no visible pieces present.

8.8 Use lubricated fingertip to apply thin film of Braycote to IMV Jumper O-ring.

If Glove begins to stick to seal surface, repeat previous step for lubrication of Glove.

8.9 Install IMV Jumper O-Ring on NOD1 end (flexible duct end) of IMV Supply Vestibule Jumper.

8.10 Doff Nitrile Gloves

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CAUTION

1. Care must be taken while installing the IMV Supply Vestibule Jumper on the IMV Flanges. Damaging the sealing surfaces of the IMV Flanges could prevent the jumper, once installed, from maintaining pressure.
2. IMV Supply Vestibule Jumper will be a hatch drag-through for the Node 3 Starboard Hatch. To ensure hatchway can be cleared in an emergency, Node 1 Port Aft V-Band Clamp Nut must not be torqued to allow hand-actuation of clamp release. Other end of IMV Supply Vestibule Jumper will have a 20 foot extension installed in subsequent activity.

- 8.11 Install IMV Supply Vestibule Jumper (flexible duct end) onto NOD1 Port Aft (A4) IMV Flange.
Install V-Band Clamp loosely to allow rotation of jumper in next step.
Verify V-Band Clamp is sufficiently loose to allow hand-actuated release in event of emergency.



Figure 15.- IMV Supply Vestibule Jumper Temporary Install
(View Looking Aft-Port).

- 8.12 Route IMV Supply Vestibule Jumper (muffler end) through NOD3 Starboard Hatch, placing muffler end of jumper in Node 3 Starboard-Aft area.
Temporarily restrain IMV Supply Vestibule Jumper to Handrail (Velcro Straps).
Refer to Figure 15.

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- 8.13 ISS ↓ **MCC-H:** "Node 3 Temporary IMV Jumper installed. Go to Open Node 1 Port Aft IMV Valve."

**MCC-H/
PCS**

- 8.14 Opening Node 1 IMV Port Aft Valve

Node 1 IMV Port Aft Vlv

'Position'

'Open'

cmd Arm

√Arm Status - Armed

cmd Open

√Position - In Transit

Wait 25 seconds.

√Position - Open

- 8.15 Remove Closeout Panel NOD1O1-01, fasteners (eight) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

NOTE

Two CSA-O2 units are required to take independent samples in the open cabin in order to protect against CSA-O2 sensor error.

- 8.16 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).
- 8.17 Verify CSA-O2 sampling from both units are within 1.1% of each other.
Verify O2% within nominal range specified on CSA-O2 Decal.
- 8.18 Perform CSA-O2 sampling behind removed Closeout Panel.
Verify O2% within nominal range specified on CSA-O2 Decal.

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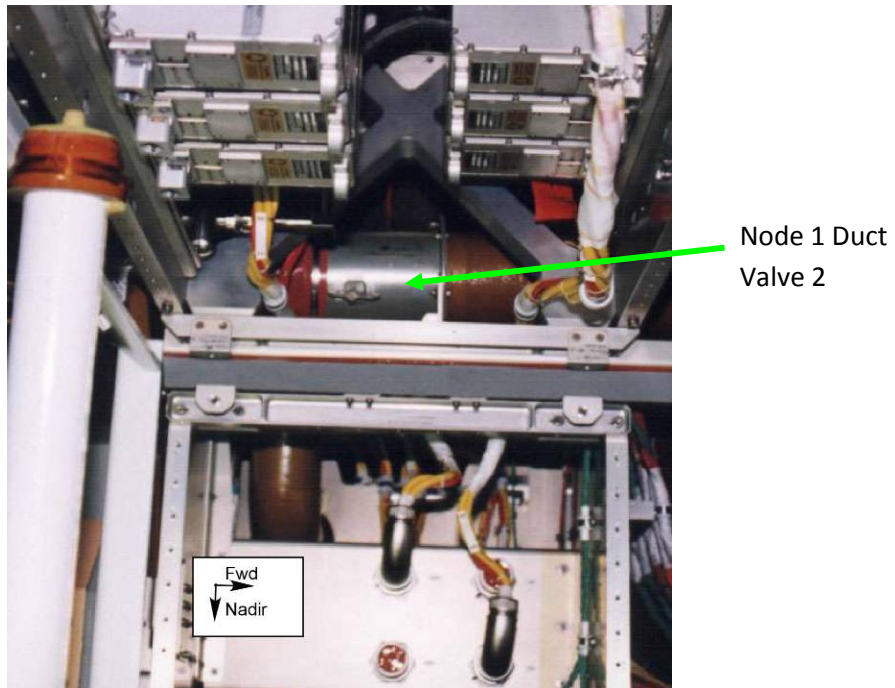


Figure 16. – Node 1 Duct Valve 2 (Located at NOD1OP1).

NOD1O1-01 8.19 Node 1 IMV Duct Valve 2 → Open
Secure IMV Duct Valve 2 in Open position (Kapton Tape)
Refer to Figure 16.

8.20 Install Closeout Panel NOD1O1-01, fasteners (eight) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).



Figure 17.- Node 1 Duct Valve 4
(Located at NOD1OP2, View Looking Zenith).

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NOD1OP2 8.21 Remove any tape present on IMV Duct Valve 4
Node 1 IMV Duct Valve 4 → CLOSE
Secure IMV Duct Valve 4 in CLOSE position (Kapton Tape)
Refer to Figure 17.

NOD3 8.22 Verify IMV Flow exiting temporary IMV Jumper configuration.

9. DEMATING CBM CONNECTORS FOR ACCESS (IF REQUIRED)

This step is only performed if crew determines CBM connectors interfere with installation of hardware in subsequent steps.

NOTE

1. Ground testing indicated that no CBM connectors would need to be removed for Node 1 to Node 3 Vestibule outfitting. Step 9 is provided in the event that on-orbit conditions require CBM connector demating.
2. After removal of CBM Controller Panel Assemblies, all CBM connectors are safe to demate.

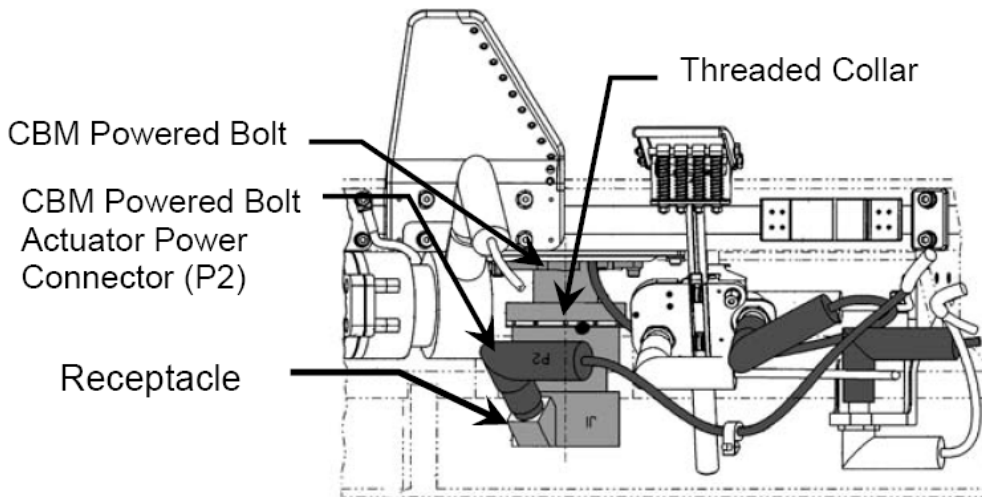


Figure 18. - Powered Bolt Actuator Connector.

- 9.1 If Powered Bolt(Latch) Actuator Connector prohibits installation of Vestibule Jumper
Don Static Wrist Tether.
Powered Bolt(Latch) Actuator Connector ←|→ Powered Bolt(Latch) Actuator
Place Kapton Tape over demated connector and receptacle.
Secure Powered Bolt(Latch) Actuator Connector to Bulkhead (Velcro Strap).
Refer to Figure 18.

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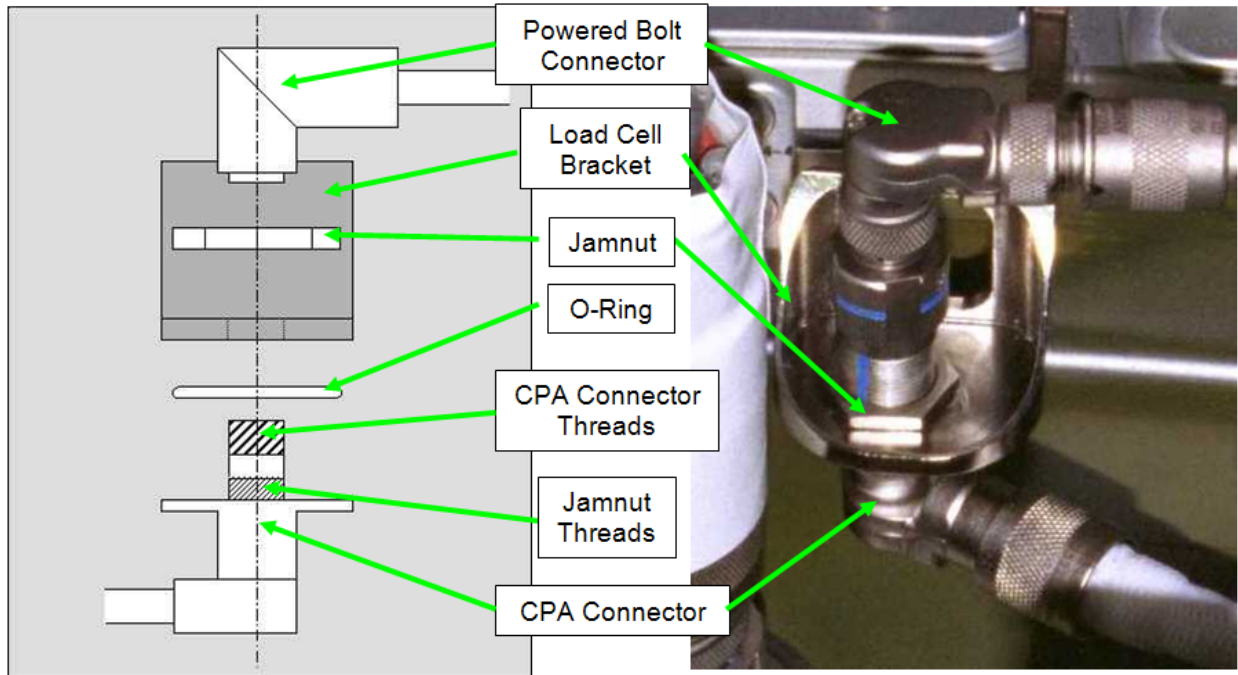


Figure 19. - Load Cell Bracket and Connectors.

9.2 If Powered Bolt Connector prohibits installation of Vestibule Jumper,
Powered Bolt Connector ←|→ Load Cell Bracket

Remove Jamnut (Ratchet, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive).

Slide CPA Connector out of Load Cell Bracket.
Hand tighten Jamnut back onto CPA Connector.

Powered Bolt Connector →|← CPA Connector
Secure mated connectors to Bulkhead (Velcro Strap).
Refer to Figure 19.

9.3 Photo document final configuration of connectors (Digital Camera).

9.4 Doff Static Wrist.

9.5 Notify **MCC-H** which CBM connectors were demated.

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10. INSTALLING AVIONICS JUMPERS (PART 1 OF 3)

Table 1. Avionics Jumpers

Jumper Name	P/N	Harness Number	NOD1 Connection	NOD3 Connection
1553 CH A/ISL Ethernet Vestibule Jumper (W9429)	683-99429-1	W9429	J31 (Ovhd)	J12 (Aft)
			J27 (Ovhd)	
MSS BCP Vestibule Jumper (W9432)	683-99432-1	W9432	J28 (Ovhd)	J109 (Aft)
				J122 (Fwd)
				J121 (Fwd)
Video/Audio Bus A Vestibule Jumper (W9434)	683-99434-1	W9434	J29 (Ovhd)	J14 (Aft)

Vestibule 10.1 Don Static Wrist Tether.
Clip to unpainted, unanodized metal surface.

- 10.2 Removing Caps
 1553 Bus Terminator (1F89991-1) ←|→ J31 (NOD1 Ovhd)
 Protective Cap ←|→ J27 (NOD1 Ovhd)
 Protective Cap ←|→ J12 (NOD3 Aft)
 Protective Caps (three) ←|→ 1553 CH A/ISL Ethernet Vestibule Jumper (W9429)
 Stow Protective Caps and 1553 Bus Terminator in Ziplock Bag labeled "NOD1-NOD3 Electrical Protective Caps."

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- 10.3 Installing 1553 CH A/ISL Ethernet Vestibule Jumper (W9429)
P31 →|← J31 (NOD1 Ovhd)
P27 →|← J27 (NOD1 Ovhd)
P12 →|← J12 (NOD3 Aft)
Refer to Table 1.
- 10.4 Removing Caps
Protective Cap ←|→ J28 (NOD1 Ovhd)
Protective Cap ←|→ J109 (NOD3 Aft)
Protective Cap ←|→ J122 (NOD3 Fwd)
Protective Cap ←|→ J121 (NOD3 Fwd)
Protective Caps (four) ←|→ MSS BCP Vestibule Jumper (W9432)
Stow Protective Caps in Ziplock Bag labeled "NOD1-NOD3 Electrical Protective Caps."
- 10.5 Installing MSS BCP Vestibule Jumper (W9432)
P28 →|← J28 (NOD1 Ovhd)
P109 →|← J109 (NOD3 Aft)
P122 →|← J122 (NOD3 Fwd)
P121 →|← J121 (NOD3 Fwd)
Refer to Table 1.
- 10.6 Removing Caps
Protective Cap ←|→ J29 (NOD1 Ovhd)
Protective Cap ←|→ J14 (NOD3 Aft)
Protective Caps (two) ←|→ Video/Audio Bus A Vestibule Jumper (W9434)
Stow Protective Caps in Ziplock Bag labeled "NOD1-NOD3 Electrical Protective Caps."
- 10.7 Installing Video/Audio Bus A Vestibule Jumper (W9434)
P29 →|← J29 (NOD1 Ovhd)
P14 →|← J14 (NOD3 Aft)
Refer to Table 1.
- 10.8 Doff Static Wrist Tether.
- 10.9 Photo document newly installed Vestibule Jumpers (Digital Camera).

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11. INSTALLING POTABLE WATER VESTIBULE JUMPER

NOTE

There are two FFTDs on orbit (S/N 001, S/N 003). They have different calibrations and require different input torque values to reach a desired torque. The FFTD Calibration Card can be found on the FFTD Kit Lid or in Figures 2, 3 of A.2.1 Fluid Fitting Torque Device (FFTD) Assembly and Usage.

Table 2. Potable Water Vestibule Jumper

Jumper Name	Node 1 Bulkhead Interface	Node 3 Bulkhead Interface	Part Number	Input Torque (in-lbs)	Output Torque (in-lbs)	FFTD Gear Size (in)	
						Reaction Gear	Drive Gear
Potable Water Vestibule Jumper	J33 FUEL CELL WATER (Ovhd)	A1 FUEL CELL WATER (Ovhd)	683-99511-11	Per FFTD Calibration Card	345	0.625	1.00

WARNING

Contact with the fluid-contacting surfaces of the potable water system (aka "Fuel Cell Water") Gamah fittings can potentially lead to contamination of water supply and crew illness.

- * If contact is made with fluid-contacting surface of potable water
- * | system
- * | Clean surfaces with Povidone Iodine Pads from the ALSP Kit.
- * | Notify **MCC-H**.

NOTE

1. Gamah fitting and FFTD reference information can be found in the following procedures:
 - [A.2.1 FLUID FITTING TORQUE DEVICE \(FFTD\) ASSEMBLY AND USAGE](#) (SODF: IFM: REFERENCE: APPENDIX A: ISS IVA TOOLS)
 - [A.2.3 MATING GAMAH FITTING USING THE FFTD](#) (SODF: IFM: REFERENCE: APPENDIX A: ISS IVA TOOLS)
2. Node 3 fluid lines are filled with low-pressure Nitrogen (4 to 7 psid). A slight hiss may be heard while loosening Gamah Caps.

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- 11.1 During following steps
 - Inspect both sides of each Gamah fitting for damage, debris before mating.
 - Verify Metal Seal installed and not compacted into cone-shape.
 - Report damage, debris to MCC-H.
 - Inspect male threads for absence of Braycote before mating.
 - If required, apply one drop of Braycote to male threads, then spread around threads with gloved hands.
 - Replace soiled Glove.
- 11.2 Loosen, but do not remove, NOD1 J33 (NOD 1 Ovhd) and NOD3 A1 (NOD3 Ovhd) Gamah fitting feedthrough caps (two) (Fluid Fitting Torque Device; Ratchet, 3/8" Drive). Refer to Table 2.
- 11.3 Don Clean Room Gloves.
- 11.4 Removing Caps
 - Gamah Cap ←|→ J33 FUEL CELL WATER (NOD1 Ovhd)
 - Gamah Cap ←|→ "TO: NOD1 J33" of Potable Water Vestibule Jumper
 - Stow Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid Caps."
- 11.5 Installing Potable Water Vestibule Jumper on Node 1
 - "TO: NOD1 J33" →|← J33 FUEL CELL WATER (NOD1 Ovhd)
 - Hand tighten.
 - Refer to Table 2.
- 11.6 Removing Caps
 - Gamah Cap ←|→ A1 FUEL CELL WATER (NOD3 Ovhd)
 - Gamah Cap ←|→ "TO: NOD3 A1" of Potable Water Vestibule Jumper
 - Stow Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid Caps."
- 11.7 Installing Potable Water Vestibule Jumper on Node 3
 - "TO: NOD3 A1" →|← A1 FUEL CELL WATER (NOD3 Ovhd)
 - Hand tighten.
 - Refer to Table 2.
- 11.8 Doff Clean Room Gloves.
- 11.9 Set torque wrench to Input Torque on FFTD Calibration Card for Output Torque of 345 in-lbs [FFTD, 1/4" to 3/8" Adapter; (40-200 in-lbs) Trq Wrench, 1/4" Drive]. Refer to FFTD Calibration Card on FFTD Kit lid.
- 11.10 Torque NOD1 J33 Gamah Fitting with FFTD.

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11.11 Torque NOD3 A1 Gamah Fitting with FFTD.

11.12 Photo document newly installed jumper (Digital Camera).

11.13 ISS ↓ **MCC-H**, "Potable Water Vestibule Jumper installed."

12. INSTALLING AVIONICS JUMPERS (PART 2 OF 3)

Table 3. Avionics Jumpers

Jumper Name	P/N	Harness Number	NOD1 Connection	NOD3 Connection
Wireless Audio Vestibule Jumper (W9433)	683-99433-1	W9433	J32 (Ovhd)	J20 (Fwd)

12.1 Don Static Wrist Tether.
Clip to unpainted, unanodized metal surface.

12.2 Removing Caps

Protective Cap ←|→ J32 (NOD1 Ovhd)

Protective Cap ←|→ J20 (NOD3 Fwd)

Protective Caps (two) ←|→ Wireless Audio Vestibule Jumper (W9433)

Stow Protective Caps in Ziplock Bag labeled "NOD1-NOD3 Electrical Protective Caps."

12.3 Installing Wireless Audio Vestibule Jumper (W9433)

P32 →|← J32 (NOD1 Ovhd)

P20 →|← J20 (NOD3 Fwd)

Refer to Table 3.

12.4 Doff Static Wrist Tether.

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13. INSTALLING WASTE WATER JUMPER

Table 4. Waste Water Vestibule Jumper

Jumper Name	Node 1 Bulkhead Interface	Node 3 Bulkhead Interface	Part Number	Input Torque (in-lbs)	Output Torque (in-lbs)	FFTD Gear Size (in)	
						Reaction Gear	Drive Gear
Waste Water Vestibule Jumper	J30 WASTE WATER	A2 WASTE WATER	683-99511-10	Per FFTD Calibration Card	345	0.625	1.00

NOTE

1. Gamah fitting and FFTD reference information can be found in the following procedures:

[A.2.1 FLUID FITTING TORQUE DEVICE \(FFTD\)](#)

[ASSEMBLY AND USAGE FFTD](#) (SODF: IFM: REFERENCE: APPENDIX A: ISS IVA TOOLS)

[A.2.3 MATING GAMAH FITTING USING THE FFTD](#)

(SODF: IFM: REFERENCE: APPENDIX A: ISS IVA TOOLS)

2. Node 3 fluid lines are filled with low-pressure Nitrogen (4 to 7 psid). A slight hiss may be heard while loosening Gamah caps.

13.1 During following steps

Inspect both sides of each Gamah fitting for damage, debris before mating.
Report damage, debris to **MCC-H**.
Verify Metal Seal installed and not compacted into cone-shape.
Inspect male threads for absence of Braycote before mating.
If required, apply one drop of Braycote to male threads, then spread around threads with gloved hand.
Replace soiled Glove.

- #### 13.2 Loosen, but do not remove, NOD1 J30 (NOD 1 Ovhd) and NOD3 A2 (NOD3 Ovhd) Gamah fitting feedthrough caps (two) (Fluid Fitting Torque Device; Ratchet, 3/8" Drive).

13.3 Removing Caps

Gamah Cap ←|→ J30 WASTE WATER (NOD1 Ovhd)

Gamah Cap ←|→ "TO: NOD1 J30" of Waste Water Vestibule Jumper

Stow Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid Caps."

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- 13.4 Installing Waste Water Vestibule Jumper on Node 1
TO: NOD1 J30 →|← J30 WASTE WATER
Hand tighten.
Refer to Table 4.
- 13.5 Removing Caps
Gamah Cap ←|→ A2 WASTE WATER (NOD3 Ovhd)
Gamah Cap ←|→ "TO: NOD3 A2" of Waste Water Vestibule Jumper
Stow Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid Caps."
- 13.6 Installing Waste Water Vestibule Jumper on Node 3
TO: NOD3 A2 →|← A2 WASTE WATER
Hand tighten.
Refer to Table 4.
- 13.7 Set torque wrench to Input Torque on FFTD Calibration Card for Output Torque of 345 in-lbs [FFTD, 1/4" to 3/8" Adapter; (40-200 in-lbs) Trq Wrench, 1/4" Drive].
Refer to FFTD Calibration Card on FFTD Kit lid.
- 13.8 Torque NOD1 J30 Gamah Fitting with FFTD.
- 13.9 Torque NOD3 A2 Gamah Fitting with FFTD.
- 13.10 Photo document newly installed jumpers (Digital Camera).
- 13.11 ISS ↓ **MCC-H**, "Waste Water Vestibule Jumper installed."

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14. CONNECTING WASTE WATER BUS

QD1E30
(NOD1 Waste Water Hose
connection location)

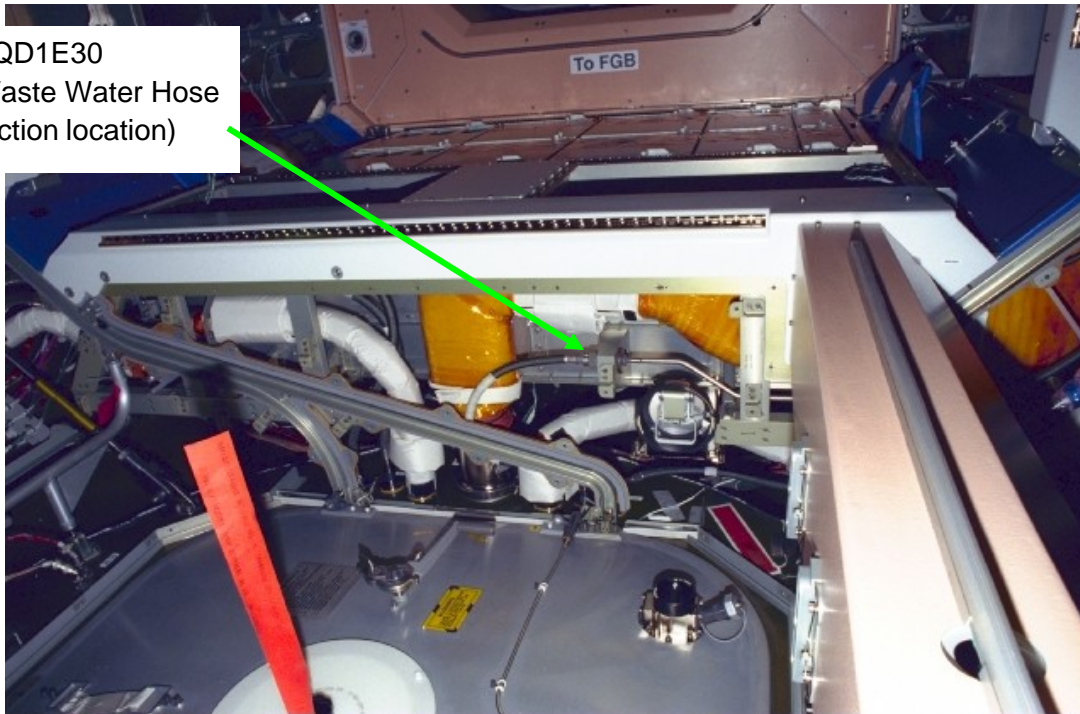


Figure 20.- Node 1 Nadir Midbay, Forward Side.

- 14.1 Locate NOD1 Waste Water Hose stowed near QD1E30. Refer to Figure 20.
- 14.2 QD1E30 female flexline QD $\leftarrow| \rightarrow$ QD1E30 male QD (on Node 1 structure)
- 14.3 Protective Cap $\leftarrow| \rightarrow$ NOD1 Waste Water Hose To: NOD1 NADIR MIDBAY WASTE WATER
- 14.4 Protective Cap $\rightarrow| \leftarrow$ QD1E30 female flexline QD

NOTE

Connection of dry hoses/jumpers in Node 1 and Node 3 will result in the introduction of an air bubble into the WPA Waste Water Tank. Analysis indicates the WPA can process this air bubble successfully.

- 14.5 NOD1 Waste Water Hose To: NOD1 NADIR MIDBAY WASTE WATER $\rightarrow| \leftarrow$ QD1E30 male QD (on Node 1 structure)
- 14.6 Photo document NOD1 Waste Water Hose connection (Digital Camera).

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- 14.7 Install Closeout Panel NOD1D2-34, fasteners (twenty-four)
(Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

15. INSTALLING AVIONICS JUMPERS (PART 3 OF 3)

Table 5. Avionics Jumpers

Jumper Name	P/N	Harness Number	NOD1 Connection	NOD3 Connection
MSS Video Vestibule Jumper (W9431)	683-99431-1	W9431	J48 (Aft)	J215 (Fwd)
1553 CH B Vestibule Jumper (W9430)	683-99430-1	W9430	J43 (Deck)	J3 (Fwd)
Audio Bus B Vestibule Jumper (W9435)	683-99435-1	W9435	J41 (Deck)	J2 (Fwd)

- 15.1 Don Static Wrist Tether.
Clip to unpainted, unanodized metal surface.
- 15.2 Removing Caps
Protective Cap ←|→ J48 (NOD1 Aft)
Protective Cap ←|→ J215 (NOD3 Fwd)
Protective Caps (two) ←|→ MSS Video Vestibule Jumper (W9431)
Stow Protective Caps in Ziplock Bag labeled "NOD1-NOD3 Electrical Protective Caps."
- 15.3 Installing MSS Video Vestibule Jumper (W9431)
P48 →|← J48 (NOD1 Aft)
P215 →|← J215 (NOD3 Fwd)
Refer to Table 5.
- 15.4 Removing Caps
1553 Bus Terminator (1F89991-1) ←|→ J43 (NOD1 Deck)
Protective Cap ←|→ J3 (NOD3 Fwd)
Protective Caps (two) ←|→ 1553 CH B Vestibule Jumper (W9430)
Stow Protective Caps and 1553 Bus Terminator in Ziplock Bag labeled "NOD1-NOD3 Electrical Protective Caps."

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- 15.5 Installing 1553 CH B Vestibule Jumper (W9430)
P43 →|← J43 (NOD1 Deck)
P3 →|← J3 (NOD3 Fwd)
Refer to Table 5.
- 15.6 Removing Caps
Protective Cap ←|→ J41 (NOD1 Deck)
Protective Cap ←|→ J2 (NOD3 Fwd)
Protective Caps (two) ←|→ Audio Bus B Vestibule Jumper (W9435)
Stow Protective Caps in Ziplock Bag labeled “NOD1-NOD3
Electrical Protective Caps.”
- 15.7 Installing Audio Bus B Vestibule Jumper (W9435)
P41 →|← J41 (NOD1 Deck)
P2 →|← J2 (NOD3 Fwd)
Refer to Table 5.
- 15.8 Route and restrain cables in vestibule area (Wire Ties, Gray Tape).
If excess length present in Wire Harness, create S-bends.
- 15.9 Photo document newly installed jumpers (Digital Camera).
- 15.10 Doff Static Wrist Tether.

16. INSTALLING AIR SAMPLE VESTIBULE JUMPER

Table 6. Air Sample Jumper

Jumper Name	P/N	NOD1 Connection	NOD3 Connection
Air Sample Vestibule Jumper	683-99511-12	J40 ARS (SDS) (Deck)	A13 ARS (Deck)

- 16.1 Removing Caps and Plugs
QD Cap ←|→ J40 ARS (SDS) (NOD1 Deck)
QD Cap ←|→ A13 ARS (NOD3 Deck)
QD Plugs (two) ←|→ Air Sample Vestibule Jumper
Stow QD Caps, Plugs in Ziplock Bag labeled “NOD1-NOD3 Fluid
Caps.”
- 16.2 Installing Air Sample Vestibule Jumper
“To: NOD1 J40” →|← J40 ARS (SDS) (NOD1 Deck)
“To: NOD3 A13” →|← A13 ARS (NOD3 Deck)
Refer to Table 6.

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17. CONFIGURING AIR SAMPLE SYSTEM

- 17.1 Remove Closeout Panel NOD1D1-01, fasteners (eight) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
- 17.2 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).
- 17.3 Verify CSA-O2 sampling from both units are within 1.1% of each other.
Verify O2% within nominal range specified on CSA-O2 Decal.
- 17.4 Perform CSA-O2 sampling behind removed Closeout Panel.
Verify O2% within nominal range specified on CSA-O2 Decal.



Figure 21.- NOD1 Deck Manual SDS Valve
(Under NOD1D1-01 Closeout Panel).

- NOD1D1 17.5 NOD1 Deck Manual SDS Vlv → OPEN
Refer to Figure 21.

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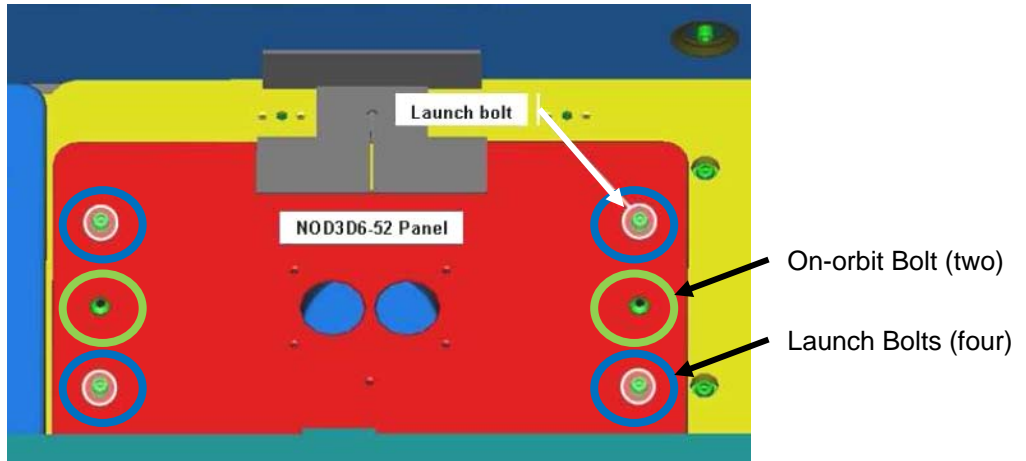


Figure 22.- NOD3D6-52 Launch Bolts.

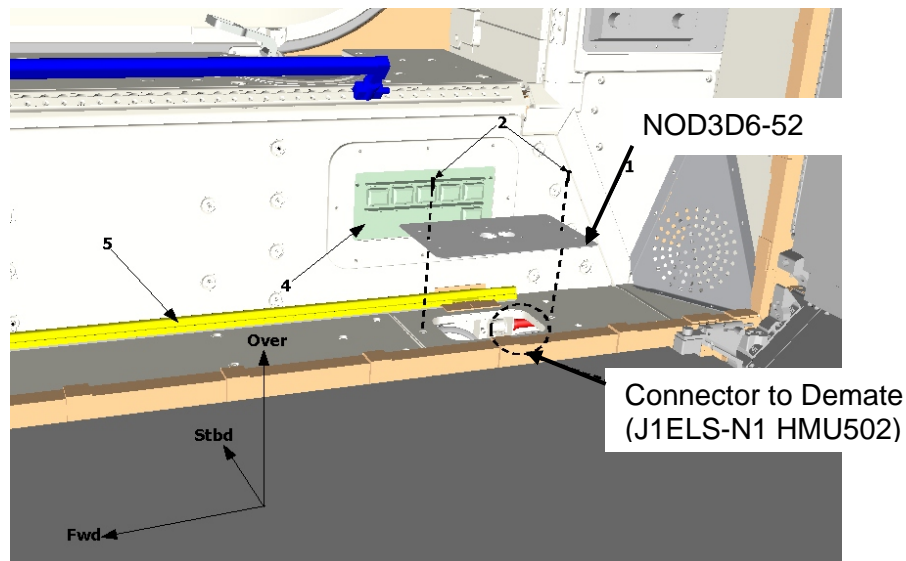


Figure 23.- Access to Starboard Endcone EELS Connector Under NOD3D6-52.

- NOD3D6 17.6 Remove noncaptive Launch Restraint Bolts, Washers (four) from NOD3D6-52 Closeout Panel (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Refer to Figure 22 and 23.

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17.7 Remove NOD3D6-52 Closeout Panel, fasteners (two) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

17.8 EELS Power Cable P1 ←|→ J1ELS-N1 HMU502
Refer to Figure 23.

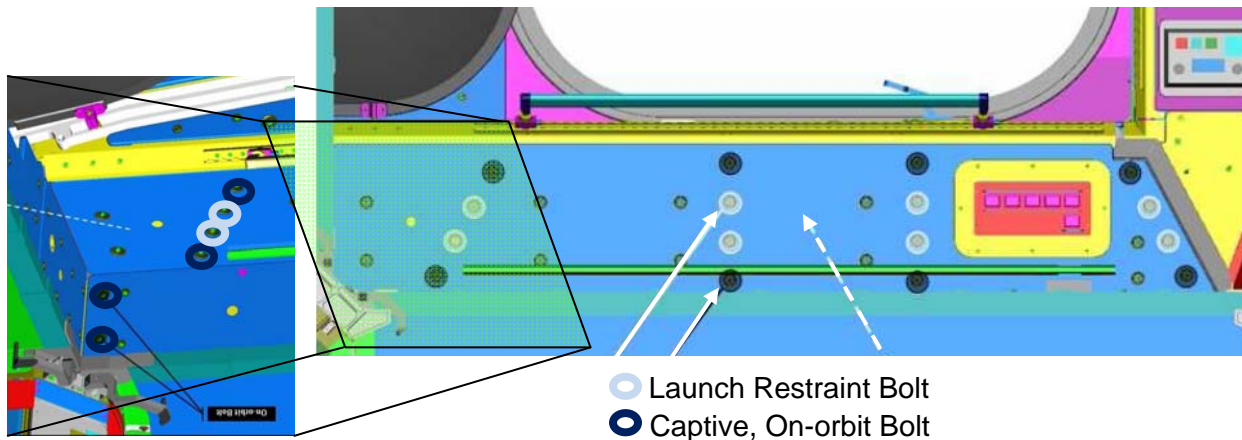


Figure 24.- NOD3D6-51 Launch Restraint Bolts.

NOD3D6-51 17.9 Remove noncaptive Launch Restraint Bolts, washers (eight) from NOD3D6-51 Closeout Panel (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figure 24.

17.10 Unfasten NOD3D6-51 Closeout Panel, fasteners (ten) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

17.11 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).

17.12 Verify CSA-O2 sampling from both units are within 1.1% of each other.
Verify O2% within nominal range specified on CSA-O2 Decal.

17.13 Perform CSA-O2 sampling behind removed Closeout Panel.
Verify O2% within nominal range specified on CSA-O2 Decal.

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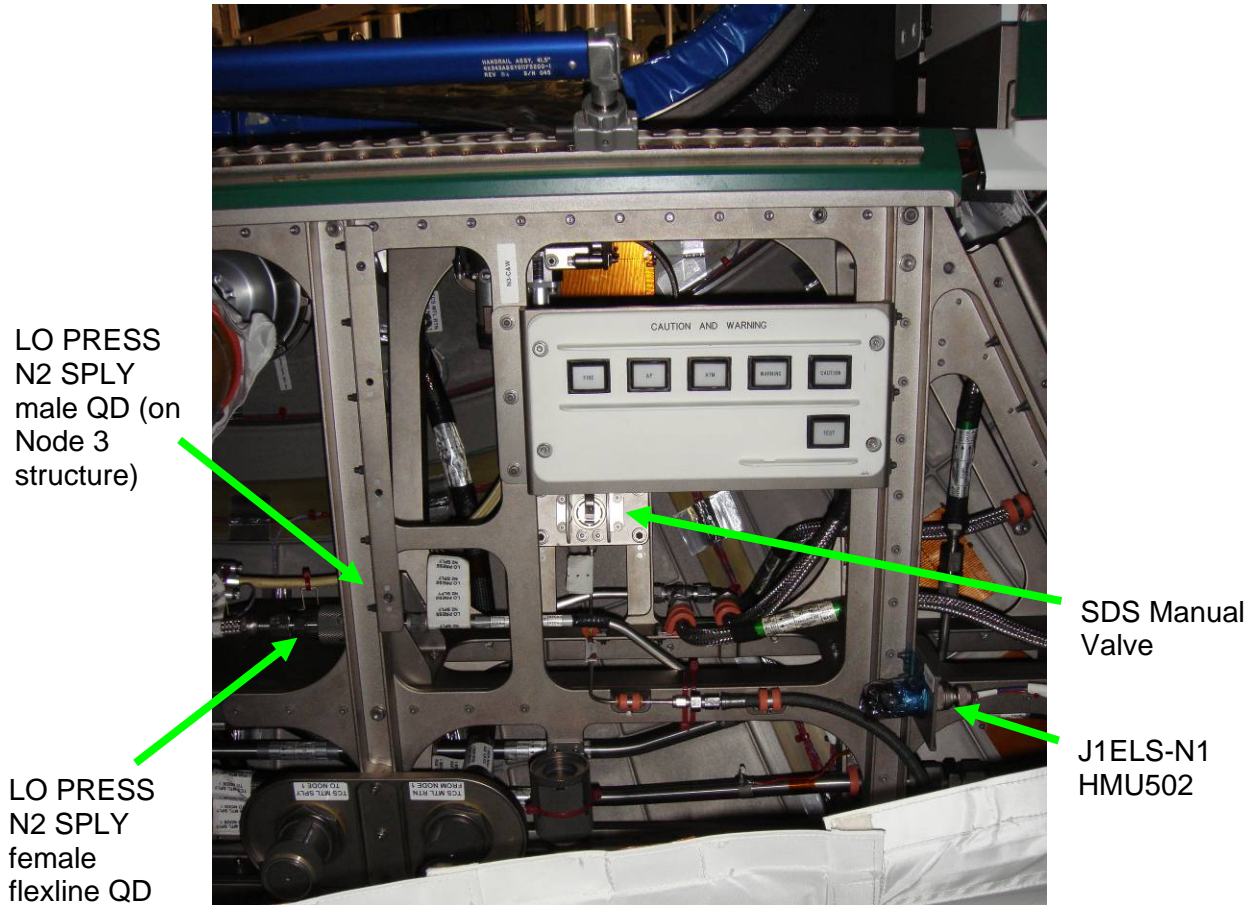


Figure 25.- NOD3D6 Endcone.

17.14 NOD3 Stbd SDS Manual Valve → OPEN
Refer to Figure 25.

17.15 ISS ↓ **MCC-H**, “Node 1 and Node 3 ARS Valves open.”

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18. OXYGEN SAFETY STEPS

WARNING

Failure to maintain clean environment during oxygen system maintenance could result in fire hazard.

To prevent fire hazard during this procedure
Minimize the time connectors and caps(plugs) are open or cover using
Teflon Bags or Clean Room Gloves.

If Clean Room Gloves become contaminated or damaged
Replace immediately with new Clean Room Gloves.

If contaminants are found
Notify **MCC-H**.
Photo document (Digital Camera).
Remove using Brass Picks and retain for return to ground.

If contaminants cannot be completely removed
Cover connectors with Clean Room Gloves and hold for detailed
MCC-H analysis.

19. CONFIGURING O2 AND N2 SYSTEMS FOR VESTIBULE CONNECTION

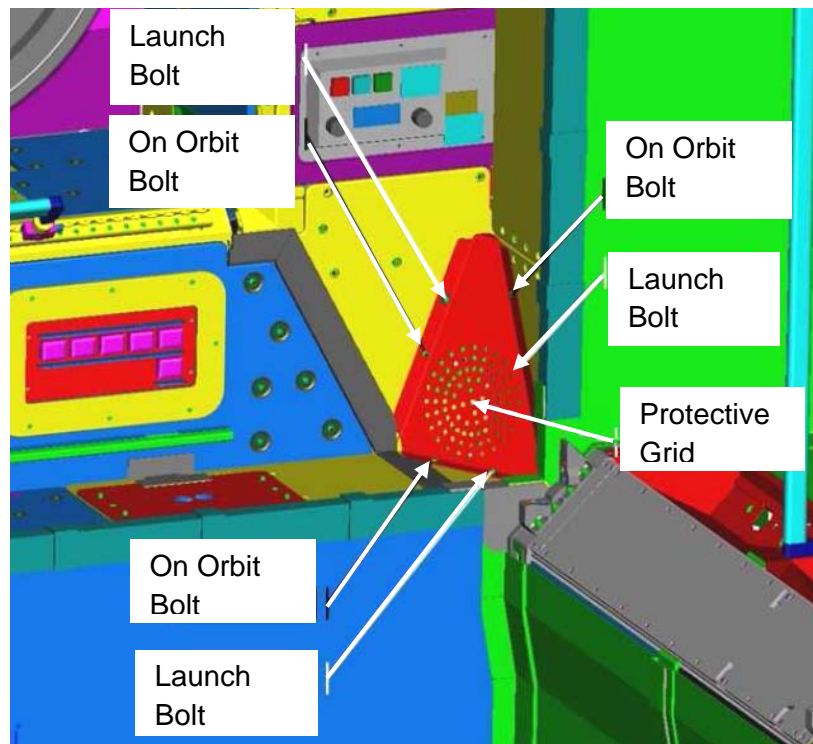


Figure 26.- Starboard Deck Grille Launch Restraint Bolts at NOD3AD6.

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- NOD3AD6 19.1 Remove noncaptive Launch Restraint Bolts, washers (three) from Node 3 Starboard Aft Deck Grille (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Stow non-captive parts in Ziplock for later disposal.
Refer to Figure 26.
- 19.2 Unfasten Node 3 Starboard Aft Deck Grille, fasteners (three) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
- 19.3 Don Clean Room Gloves
- NOD3D6-51 19.4 LO PRESS N2 SLPY female flexline QD ←|→ LO PRESS N2 SLPY male QD (on Node 3 Structure)
Refer to Figure 25.
- 19.5 Cover QDs (male and female) with Clean Room Gloves (Clean Room Gloves, Clean Room Tape).

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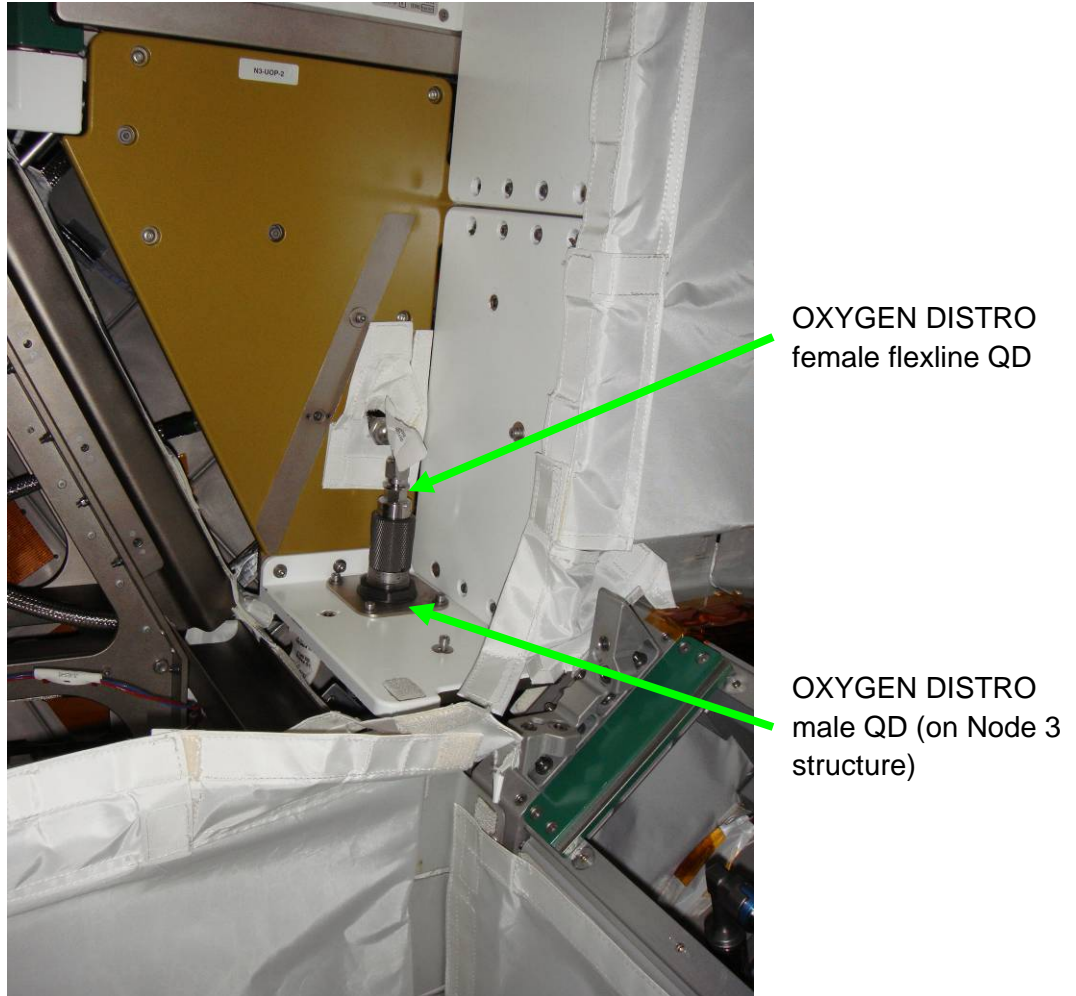


Figure 27.- Low Pressure Oxygen QD at NOD3AD6 (Grille Removed).

- 19.6 OXYGEN DISTRO female flexline QD \leftrightarrow OXYGEN DISTRO male QD (on Node 3 Structure).
Refer to Figure 27.
- 19.7 Cover QDs (male and female) with new Clean Room Gloves (Clean Room Gloves, Clean Room Tape).
- 19.8 Doff Clean Room Gloves.
- 19.9 Photo document OXYGEN DISTRO QD, LO PRESS N2 SLPY QD, and ARS Manual Valve.
- 19.10 Install Closeout Panel NOD3D6-51, fasteners (ten) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

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- 19.11 EELS Power Cable P1 →|← J1ELS-N1 HMU502.
Refer to Figure 23.
- 19.12 If Oxygen and Nitrogen Purge and Leak Check will not occur on same day
Install Closeout Panel NOD3D6-52 Closeout Panel, fasteners (two) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Install Node 3 Starboard Aft Deck Grille, fasteners (three) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

NOTE

Original Node 1 Oxygen (1F98656) and Nitrogen (1F98655) hoses will be connected to QD in NOD1D1 alcove. These hoses will be disconnected in another procedure. New Oxygen and Nitrogen hoses installed on ULF3 must not be connected to avoid contamination of Oxygen and Nitrogen buses.

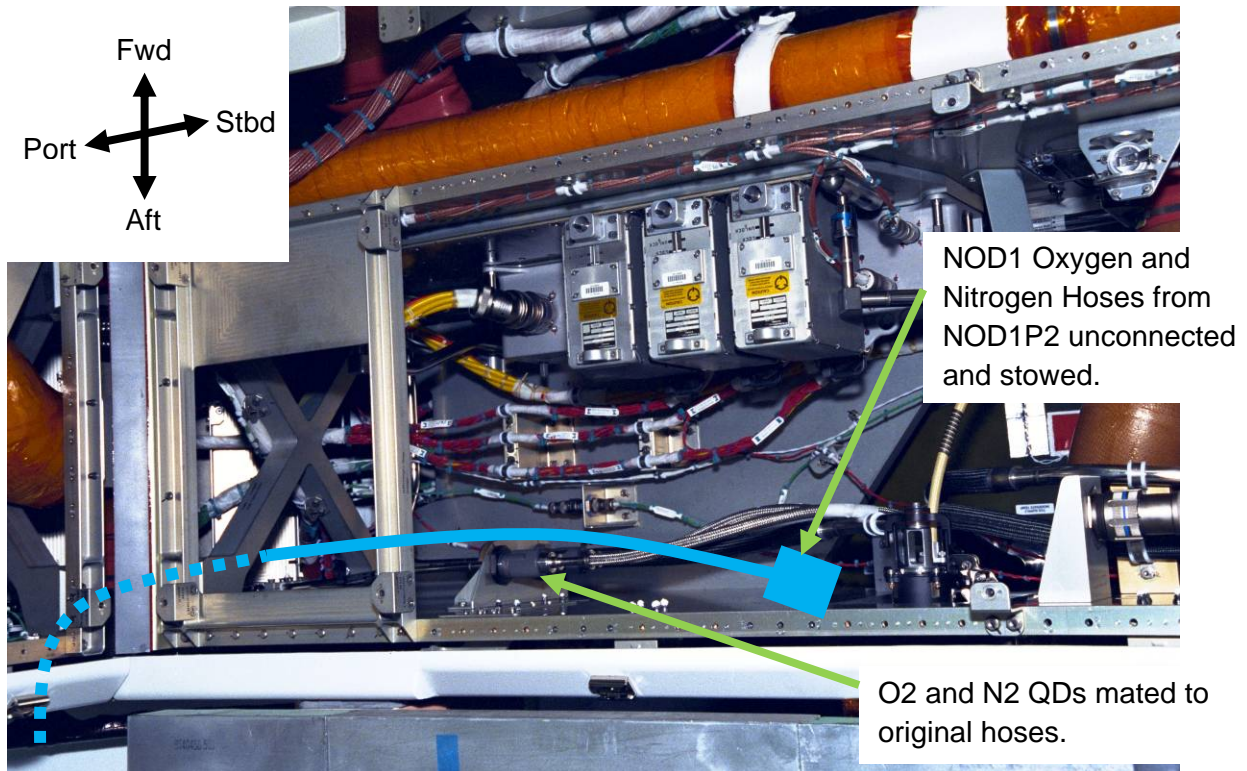


Figure 28.- Node 1 Oxygen and Nitrogen Connections in NOD1D1 Alcove.

- NOD1D1 19.14 Verify NOD1 Oxygen Hose To: NOD1 Nadir Alcove Oxygen (683-99511-1) ←|→ (not connected) QD1E22
Verify NOD1 Oxygen Hose capped.
Refer to Figure 28.
- 19.15 Verify NOD1 Nitrogen Hose To NOD1 Nadir Alcove Nitrogen (683-99511-2) ←|→ (not connected) QD1E23

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Verify NOD1 Nitrogen Hose capped.
Refer to Figure 28.

- 19.16 Install Closeout Panel NOD1D1-01, fasteners (eight) (Ratchet, 1/4" Drive; 5/32" Hex Head)

20. INSTALLING NITROGEN VESTIBULE JUMPER

Table 7. Nitrogen Vestibule Jumper

Jumper Name	Node 1 Bulkhead Interface	Node 3 Bulkhead Interface	Part Number	Input Torque (in-lbs)	Output Torque (in-lbs)	FFTD Gear Size (in)	
						Reaction Gear	Drive Gear
Nitrogen Vestibule Jumper	J44 NITROGEN (Deck)	A8 LO PRESS N2 SPLY (Deck)	683-99511-9	Per FFTD Calibration Card	185	0.625	0.875

NOTE

1. Gamah fitting and FFTD reference information can be found in the following procedures:

[A.2.1 FLUID FITTING TORQUE DEVICE \(FFTD\) ASSEMBLY AND USAGE](#) (SODF: IFM: REFERENCE: APPENDIX A: ISS IVA TOOLS)
[A.2.3 MATING GAMAH FITTING USING THE FFTD](#) (SODF: IFM: REFERENCE: APPENDIX A: ISS IVA TOOLS)
2. In order to minimize exposure time, jumper will be installed one end at a time. The cap on the feedthrough and the plug on the jumper will be loosened first, then after donning Clean Room Gloves, they will be removed one at a time and inspected before mating.

20.1 During following steps

Inspect both sides of each Gamah fittings for damage, debris before mating.
Verify Metal Seal installed and not compacted into cone-shape.
Report damage, debris to **MCC-H**.
Inspect male threads for absence of Braycote before mating.
If required, apply one drop of Braycote to male threads, then spread around threads with gloved hand.

- 20.2 Loosen, but do not remove NOD1 J44 (Deck) and NOD3 A8 (Deck) Gamah fitting feedthrough caps (two) (Fluid Fitting Torque Device; Ratchet, 3/8" Drive).

- 20.3 Don Clean Room Gloves.

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20.4 Removing Caps

Gamah Cap ←|→ NOD1 J44 NITROGEN (NOD1 Deck)

Gamah Cap ←|→ "To: NOD1 J44" of Nitrogen Vestibule Jumper
Stow Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid Caps."

20.5 Installing Nitrogen Vestibule Jumper on Node 1

"To: NOD1 J44" →|← J44 NITROGEN

Hand tighten.

20.6 Removing Caps

Gamah Cap ←|→ NOD3 A8 NITROGEN (NOD3 Deck)

Gamah Cap ←|→ "To: NOD3 A8" of Nitrogen Vestibule Jumper
Stow Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid Caps."

20.7 Installing Nitrogen Vestibule Jumper on Node 3

"To: NOD3 A8" →|← A8 NITROGEN

Hand tighten.

20.8 Doff Clean Room Gloves.

20.9 Set torque wrench to Input Torque on FFTD Calibration Card for Output Torque of 185 in-lbs [FFTD, 1/4" to 3/8" Adapter; (10-50 in-lbs) Trq Wrench, 1/4" Drive].
Torque NOD1 J44 Gamah Fitting with FFTD.
Refer to FFTD Calibration Card on FFTD Kit lid.

20.10 Torque NOD1 J44 Gamah Fitting with FFTD.

20.11 Torque NOD3 A8 Gamah Fitting with FFTD.

20.12 Photo document newly installed jumpers (Digital Camera).

20.13 ISS ↓ **MCC-H**, "Nitrogen Vestibule Jumper installed."

21. INSTALLING OXYGEN VESTIBULE JUMPER

Table 8. Oxygen Vestibule Jumper

Jumper Name	Node 1 Bulkhead Interface	Node 3 Bulkhead Interface	Part Number	Input Torque (in-lbs)	Output Torque (in-lbs)	FFTD Gear Size (in)	
						Reaction Gear	Drive Gear
Oxygen Vestibule Jumper	J45 OXYGEN (Deck)	A9 LO PRESS O2 SPLY (Deck)	683-99511-8	Per FFTD Calibration Card	185	0.625	0.875

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- 21.1 During following steps
- Inspect both sides of each Gamah fittings for damage, debris before mating.
 - Verify Metal Seal installed and not compacted into cone-shape.
 - Report damage, debris to **MCC-H**.
 - Inspect male threads for absence of Braycote before mating.
 - If required, apply one drop of Braycote to male threads, then spread around threads with gloved hand.
- 21.2 Loosen, but do not remove, NOD1 J45 (Deck) and NOD3 A9 (Deck) Gamah fitting feedthrough caps (two) (Fluid Fitting Torque Device; Ratchet, 3/8" Drive).
- 21.3 Don Clean Room Gloves.
- 21.4 Removing Caps
- Gamah Cap ←|→ NOD1 J45 OXYGEN (NOD1 Deck)
 - Gamah Cap ←|→ "To: NOD1 J45" of Oxygen Vestibule Jumper
 - Stow Gamah Caps in new Clean Room Glove.
 - Seal Glove with Clean Room Tape.
 - Place Clean Room Glove with Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid Caps."
- 21.5 Installing Oxygen Vestibule Jumper on Node 1
- "To: NOD1 J45" →|← J45 OXYGEN
 - Hand tighten.
- 21.6 Removing Caps
- Gamah Cap ←|→ NOD3 A9 OXYGEN (NOD3 Deck)
 - Gamah Cap ←|→ "To: NOD3 A9" of Oxygen Vestibule Jumper
 - Stow Gamah Caps in new Clean Room Glove.
 - Seal Glove with Clean Room Tape.
 - Place Clean Room Glove with Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid Caps."
- 21.7 Installing Oxygen Vestibule Jumper on Node 3
- "To: NOD3 A9" →|← A9 OXYGEN
 - Hand tighten.
- 21.8 Doff Clean Room Gloves.
- 21.9 Set torque wrench to Input Torque on FFTD Calibration Card for Output Torque of 185 in-lbs [FFTD, 1/4" to 3/8" Adapter; (10-50 in-lbs) Trq Wrench, 1/4" Drive].
Refer to Table 2, FFTD Calibration Card on FFTD Kit lid.
- 21.10 Torque NOD1 J45 Gamah Fitting with FFTD.
- 21.11 Torque NOD3 A9 Gamah Fitting with FFTD.
- 21.12 Photo document newly installed jumpers (Digital Camera).

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21.13 ISS ↓ **MCC-H**, "Oxygen Vestibule Jumper installed."

22. INSTALLING MTL VESTIBULE JUMPERS

Table 9. MTL Supply and Return Vestibule Jumper

Jumper Name	Node 1 Bulkhead Interface	Node 3 Bulkhead Interface	Part Number	Input Torque (in-lbs)	Output Torque (in-lbs)	FFTD Gear Size (in)	
						Reaction Gear	Drive Gear
MTL Supply Vestibule Jumper	A10 (Fwd)	A10 TCS MTL SPLY TO NODE 1 (Deck)	683-99511-13	Per FFTD Calibration Card	700	1.000	1.375
MTL Return Vestibule Jumper	A12 (Fwd)	A12 TCS MTL RTN FROM NODE 1 (Deck)	683-99511-14	Per FFTD Calibration Card	700	1.000	1.375

22.1 During following steps

Inspect both sides of each Gamah fittings for damage, debris before mating.
Verify Metal Seal installed and not compacted into cone-shape.
Report damage, debris to **MCC-H**.
Inspect male threads for absence of Braycote before mating.
If required, apply one drop of Braycote to male threads, then spread around threads with gloved hand.

22.2 Loosen, but do not remove, NOD1 A10, A12 (Fwd) and NOD3 A10, A12 (Deck) Gamah fitting feedthrough caps (four) (Fluid Fitting Torque Device; Ratchet, 3/8" Drive).

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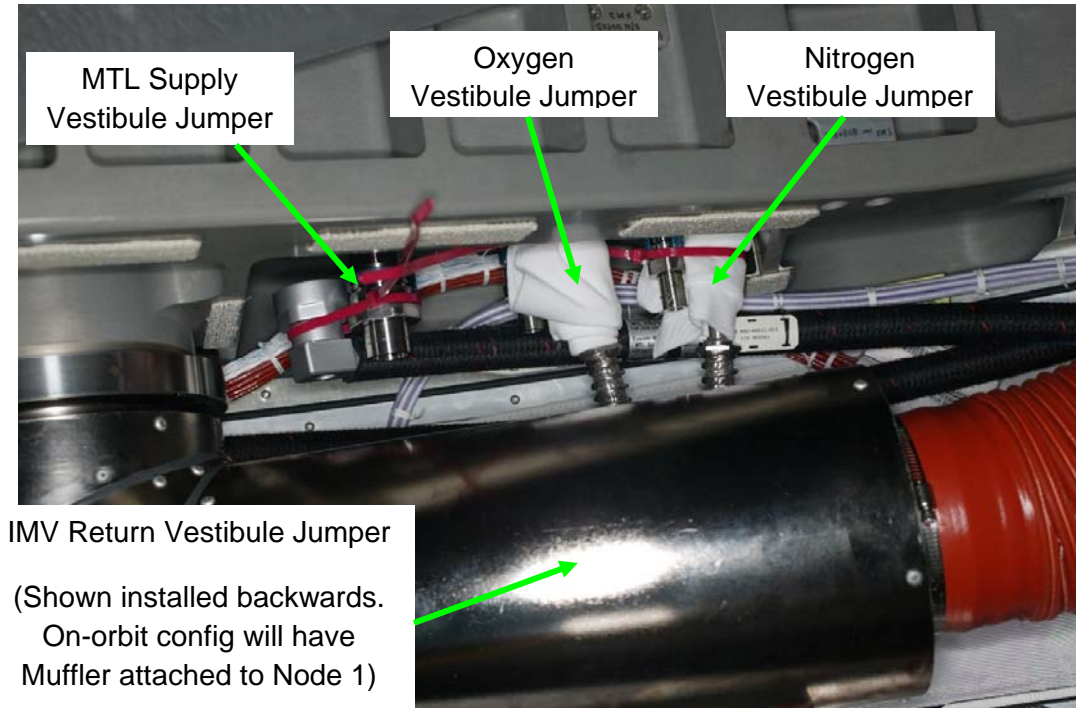


Figure 29. - MTL Supply Vestibule Jumper Routing
(View Looking Nadir).

- 22.3 Route "To: NOD3 A10" (90 degree Gamah fitting) of MTL Supply Vestibule Jumper below Oxygen and Nitrogen jumpers to NOD3 A10 Gamah fitting.
Ensure access to Nitrogen and Oxygen Vestibule Jumper Gamah fittings still available.
Refer to Figure 29.

22.4 Removing Caps

Gamah Cap \leftarrow | \rightarrow NOD3 A10 TCS MTL SPLY TO NODE1 (NOD3 Deck)

Gamah Cap \leftarrow | \rightarrow "To: NOD3 A10" (90 degree Gamah fitting) of MTL Supply Vestibule Jumper

Stow Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid Caps."

22.5 Installing MTL Supply Vestibule Jumper on Node 3

"To: NOD3 A10" \rightarrow | \leftarrow A10 (NOD3 Deck)

Hand tighten.

22.6 Removing Caps

Gamah Cap \leftarrow | \rightarrow NOD1 A10 (NOD1 Fwd)

Gamah Cap \leftarrow | \rightarrow "To: NOD1 A10" (straight Gamah fitting) of MTL Supply Vestibule Jumper

Stow Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid Caps."

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- 22.7 Installing MTL Supply Vestibule Jumper on Node 1
"To: NOD1 A10" →|← A10 (NOD1 Fwd)
Hand tighten.
- 22.8 Removing Caps
Gamah Cap ←|→ NOD1 A12 (NOD1 Fwd)
Gamah Cap ←|→ "To: NOD1 A12" (90 degree Gamah fitting) of
MTL Return Vestibule Jumper
Stow Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid
Caps."
- 22.9 Installing MTL Return Vestibule Jumper on Node 1
"To: NOD1 A12" →|← A12 (NOD1 Fwd)
Hand tighten.
- 22.10 Removing Caps
Gamah Cap ←|→ NOD3 A12 TCS MTL SPLY TO NODE 1 (NOD3
Deck)
Gamah Cap ←|→ "To: NOD3 A12" (straight Gamah fitting) of MTL
Return Vestibule Jumper
Stow Gamah Caps in Ziplock Bag labeled "NOD3-NOD1 Fluid
Caps."
- 22.11 Installing MTL Return Vestibule Jumper on Node 3
"To: NOD3 A12" →|← A12 (NOD3 Deck)
Hand tighten.
- 22.12 Set torque wrench to Input Torque on FFTD Calibration Card for
Output Torque of 700 in-lbs [FFTD, 1/4" to 3/8" Adapter;
(40-200 in-lbs) Trq Wrench, 1/4" Drive].
Refer to FFTD Calibration Card on FFTD Kit lid.
- 22.13 Torque following Gamah Fittings with FFTD and record:
NOD3 A10 _____ (check when complete)
NOD3 A12 _____
NOD1 A10 _____
NOD1 A12 _____
- 22.14 Photo document newly installed jumpers (Digital Camera).
- 22.15 ISS ↓ **MCC-H**, "MTL Supply and Return Vestibule Jumpers
installed."

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23. REMOVING CBM HARDWARE

NOTE

1. During ground testing, interference between the IMV Return Vestibule Jumper muffler and the Forward-Nadir CBM Alignment Guides was discovered. The Forward-Nadir CBM Ready-to-Latch Assembly must also be removed.
2. RTL Paddle will be held in stowed position to remove Alignment Guide.
3. After removal of five fasteners, CBM Alignment Guide may be held in place by tight tolerances on guide pins. Gently rocking CBM Alignment Guide while pulling away from CBM Ring may help.

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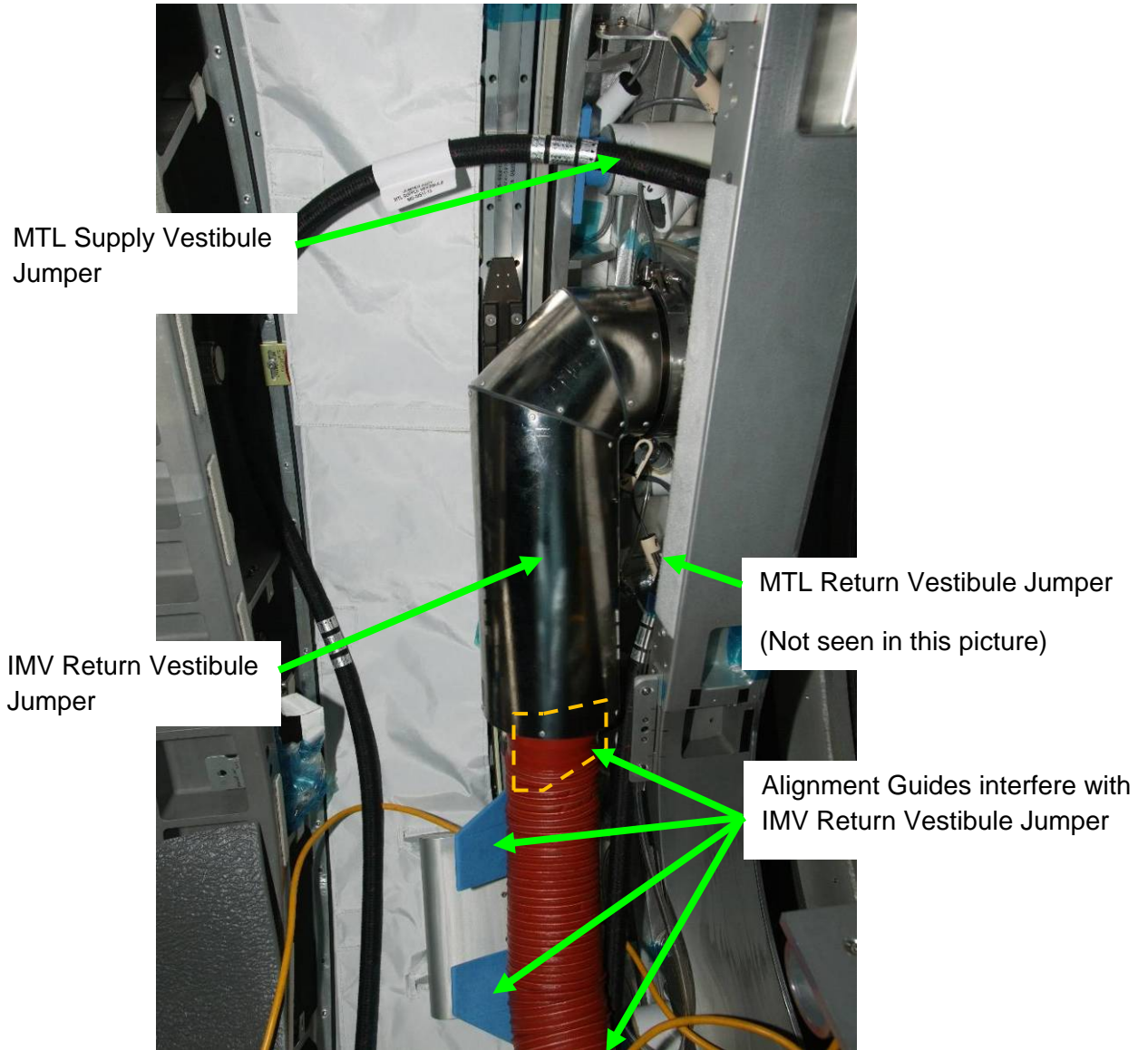


Figure 30.- IMV Return Vestibule Jumper.

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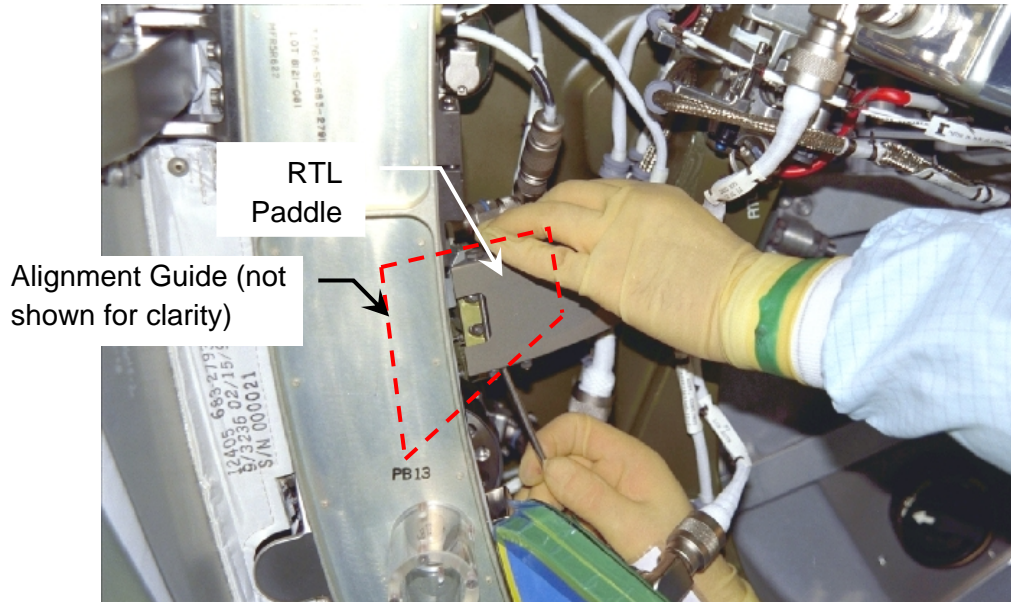


Figure 31.- RTL Paddle being Depressed
(Alignment Guide Not Installed).

Forward-deck 23.1 Remove CBM Alignment Guides, fasteners (three guides, five Vestibule, fasteners each) from forward-deck quadrant of vestibule (Ratchet, NOD1 side 1/4" Drive; 4" Ext, 1/4" Drive; 3/8" Socket, 1/4" Drive).
Temporarily stow CBM Alignment Guides (four) in Ziplock Bag labeled "NOD1-NOD3 CBM Hardware."

* If Alignment Guide removal is not possible due to spring forces
* | in RTL applying pressure to Alignment Guide,
* | A second crewmember should hold RTL Paddle away from
* | Alignment Guide during Alignment Guide removal.

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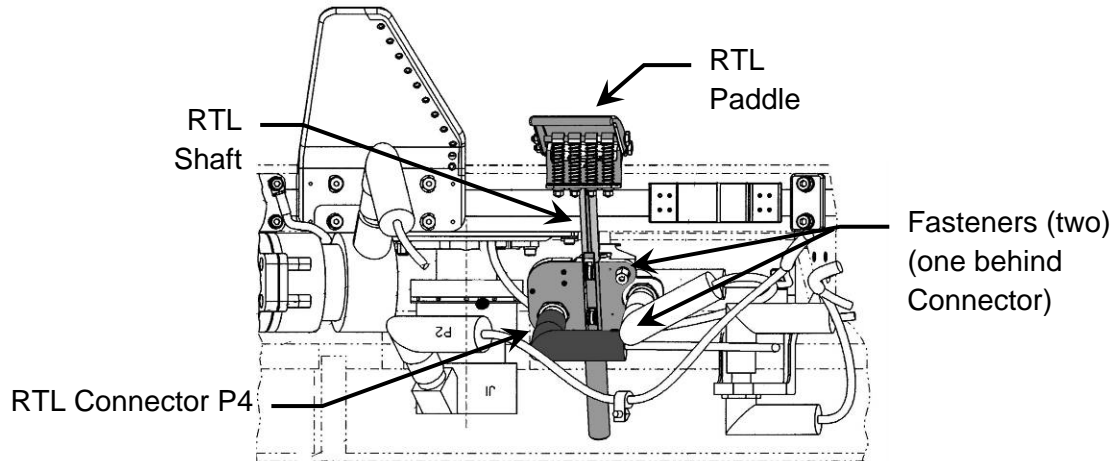


Figure 32.- Ready to Latch (PCBM Alignment Guide Not Shown).

23.2 RTL connector (P4) ←|→ RTL
Refer to Figure 32.

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

23.4 Stow RTL with Alignment Guides in Ziplock Bag labeled
"NOD1-NOD3 CBM Hardware."
Restrain Ziplock in Aft-Nadir area of vestibule for long-term stowage
(Gray Tape).

23.5 Photo document CBM Ring with Alignment Guides removed and
location of CBM Hardware Ziplock. (Digital Camera).

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24. INSTALLING IMV RETURN VESTIBULE JUMPER

**MCC-H/
PCS**

24.1 Activating Node 1 IMV Port Fwd Valve

Node 1: ECLSS: IMV Port Fwd Vlv

Node 1 IMV Port Fwd Vlv

sel RPCM N14B C RPC 14

RPCM N14B C RPC 14

√Close Cmd - Ena

cmd RPC Position - Close (Verify - CI)

Node 1 IMV Port Fwd Vlv

'State'

'Enable'

cmd Arm

√Arm Status - Armed

cmd Enable

√State - Enabled

24.2 Opening Node 1 IMV Port Fwd Valve

'Position'

'Open'

cmd Arm

√Arm Status - Armed

cmd Open

√Position - In Transit

Wait 25 seconds.

√Position - Open

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24.3 Closing Node 1 IMV Port Fwd Valve

'Position'

'Close'

cmd Arm

√Arm Status - Armed

cmd Close

√Position - In Transit

Wait 25 seconds.

√Position - Closed

- Vestibule
- 24.4 Loosen, remove V-Band Clamp on NOD1 Port Forward (A11) IMV Flange (Ratchet, 1/4" Drive; 1/2" Deep Socket, 1/4" Drive or 7/16" Deep Socket, 1/4" Drive).
Remove IMV Cap from NOD1 (A4) IMV Flange.
Place IMV Cap in Ziplock Bag labeled "NOD1-NOD3 IMV H/W."
Stow in VOK CTB.
Retain V-Band Clamp for use in subsequent step.
- 24.5 Loosen, remove V-Band Clamp on NOD3 Stbd Nadir (A11) IMV Flange (Ratchet, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive).
Remove IMV Flange Saver from NOD3 (A11) IMV Flange.
Place IMV Flange Saver in Ziplock Bag labeled "NOD1-NOD3 IMV H/W."
Stow in VOK CTB.
Retain V-Band Clamp for use in subsequent step.
- 24.7 Don Nitrile Gloves
- 24.8 Retrieve IMV Jumper O-ring (two) from ziplock taped to IMV Supply Vestibule Jumper muffler.
- 24.9 Apply small amount of Braycote to fingertip.
Work Braycote between fingertips until a very thin film is achieved with no visible pieces present.
- 24.10 Use lubricated fingertip to apply thin film of Braycote to seal crowns.

If Glove begins to stick to seal surface, repeat previous step for lubrication of Glove.
- 24.11 Install IMV Jumper O-Rings (two, one each end) on IMV Return Vestibule Jumper.
- 24.12 Doff Nitrile Gloves

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CAUTION

Care must be taken while installing the IMV Return Vestibule Jumper on the IMV Flanges. Damaging the sealing surfaces of the IMV Flanges could prevent the jumper, once installed, from maintaining pressure.

- 24.13 Install IMV Return Vestibule Jumper (Muffler end) onto NOD1 Port Fwd (A11) IMV Flange.

Install V-Band Clamp loosely to allow rotation of jumper in next step.

- 24.14 Route IMV Return Vestibule Jumper (flex duct end) to NOD3 Stbd Nadir (A11) IMV Flange.

- 24.15 Secure IMV Return Vestibule Jumper to NOD3 A11 IMV Flange with V-Band Clamp.

Torque V-Band Clamp to 38 in-lbs [Ratchet, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].

- 24.16 Secure IMV Return Vestibule Jumper to NOD1 A11 IMV Flange with V-Band Clamp.

If 1/2" Nut on V-Band Clamp

Torque to 135 in-lbs [Ratchet, 1/4" Drive; 1/2" Deep Socket, 1/4" Drive; (40-200 in-lbs) Trq Wrench, 1/4" Drive].

If 7/16" Nut on V-Band Clamp

Torque to 38 in-lbs [Ratchet, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].

- 24.17 Photo document IMV Return Vestibule Jumper installation (Digital Camera).

MCC-H 25. SAFING 1553 CHANNEL B FOR CONNECTION (GROUND ONLY)

NOTE

Prior to connecting NOD1 1553 CH B Cable (W9422) and NOD1 1553 CH A Cable (W9421), EVA termination of MSS_PDGF_LB bus must be complete. This consists of mating P1FGB and P2FGB on Node 3 Starboard Endcone. If the bus is not terminated, the Robotics system may experience communications errors and prevent SSRMS operations.

- 25.1 Inhibiting BC Comm Fail (ground only)

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

CCS Recovery Retry

cmd BC Comm Fail – Inhibit Execute (√Inh)

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25.2 Inhibiting Auto Transition to Diagnostics in PMCU MDM (ground only)

CDH: Primary PMCU: MDM FDIR

Primary PMCU MDM FDIR

cmd Auto Transition Diag – Inhibit **Execute** (√Inh)

25.3 Inhibiting Comm Safing Response in INT MDM (ground only)

CDH: Primary INT: MDM FDIR

Primary INT MDM FDIR

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

Table 10. Buses in Wire Harness

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

25.4 Inhibiting Channel Switching and Verifying Buses on Channel A (ground only)

Use Table 10 to verify channels are on A and inhibit channel switching.

sel [XX] where [XX] = Bus name from Table 10

[XX] Bus Status

Verify Channel Selected – A

'Auto Channel Switch Status'

cmd Inhibit **Execute** (√Inh)

Repeat

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25.5 Verify Robotics system is ready to support Robotics 1553 bus disruption during cable connections.

MSS: LAS5 Bus Config

LAS5 CEU Bus Configuration

√'Local Bus' 'PDGF' - A

MSS: LAP5 Bus Config

LAP5 CEU Bus Configuration

√'Local Bus' 'PDGF' - A

25.6 **MCC-H** ↑ ISS, "Go for 1553 Channel B connection in step 26."

26. CONNECTING 1553 CH B CABLE

26.1 √**MCC-H** to verify safing in place per step 25

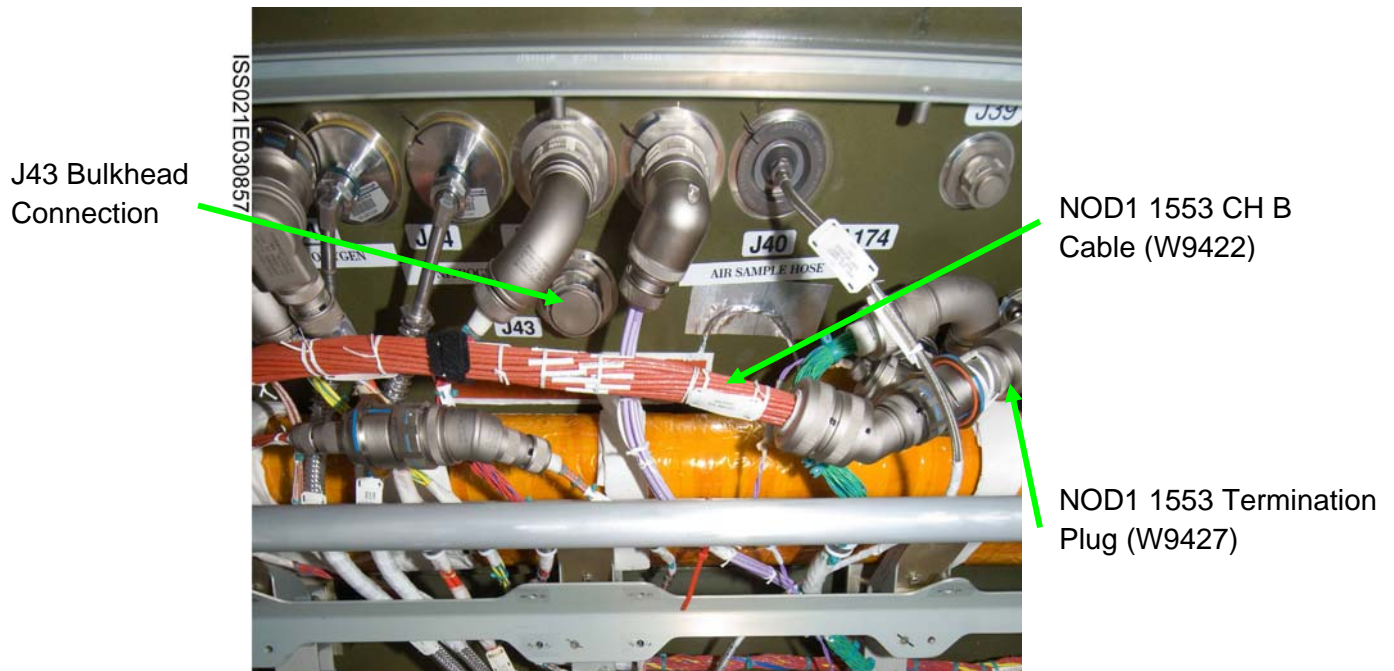


Figure 33. - NOD1 1553 CH B Cable After Installation on ULF3.

NOD1P2
Below
Hatch

26.2 Locate NOD1 1553 CH B Cable (W9422) and NOD1 1553 Termination Plug (W9427) (connected to each other) stowed below Node 1 Port Hatch. Refer to Figure 33.

26.3 NOD1 1553 CH B Cable (W9422) P43 ←|→ NOD1 1553 Termination Plug (W9427)

26.4 Protective Cap ←|→ J43 of Bulkhead
Protective Cap →|← NOD1 1553 Termination Plug (W9427)

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Stow NOD1 1553 Termination Plug (W9427) in Ziplock Bag labeled "NOD1-NOD3 Electrical Protective Caps."

- 26.5 NOD1 1553 CH B Cable (W9422) P43 →|← J43 of Bulkhead
- 26.6 ISS ↓ **MCC-H**: "Node 1 1553 Channel B connection complete. Go for step 27."
- 26.7 Photo document cable connection (Digital Camera).
- 26.8 Install the following Closeout Panels (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive):
NOD1PD2-28 (fifteen fasteners)
NOD1PD2-26, -27 (three fasteners each, install as a group)

* If required, for installation of Closeout Panels
* | Remove (install) L-shaped Closeout Seam Supports
* | (two), fasteners (four each) (Ratchet, 1/4" Drive; 1/8" Hex
* | Head, 1/4" Drive).
* | Remove (install) T-shaped Closeout Seam Support, fasteners
* | (eight) (Ratchet, 1/4" Drive; 1/8" Hex Head, 1/4" Drive).

MCC-H 27. [SAFING 1553 CHANNEL A FOR CONNECTION \(GROUND ONLY\)](#)

On ISS GO,

- 27.1 [Swap 1553 Buses to Channel B \(ground only\)](#)
Use Table 10 to swap 1553 buses to channel B.

```
sel [XX] where [XX] = Bus name from Table 10

[XX] Bus Status
'Channel Selected'

cmd Select Ch B Execute (√B)

Repeat
```

- 27.2 [MSS: LAS5 Bus Config](#)
[LAS5 CEU Bus Configuration](#)
- cmd** 'Local Bus' 'PDGF' - B (Verify - B)

[MSS: LAP5 Bus Config](#)
[LAP5 CEU Bus Configuration](#)

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

- 27.3 **MCC-H** ↑ ISS, "Go for 1553 Channel A connection in step 28."

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28. CONNECTING 1553 CH A CABLE

28.1 ✓ **MCC-H** to verify safing in place per step 27

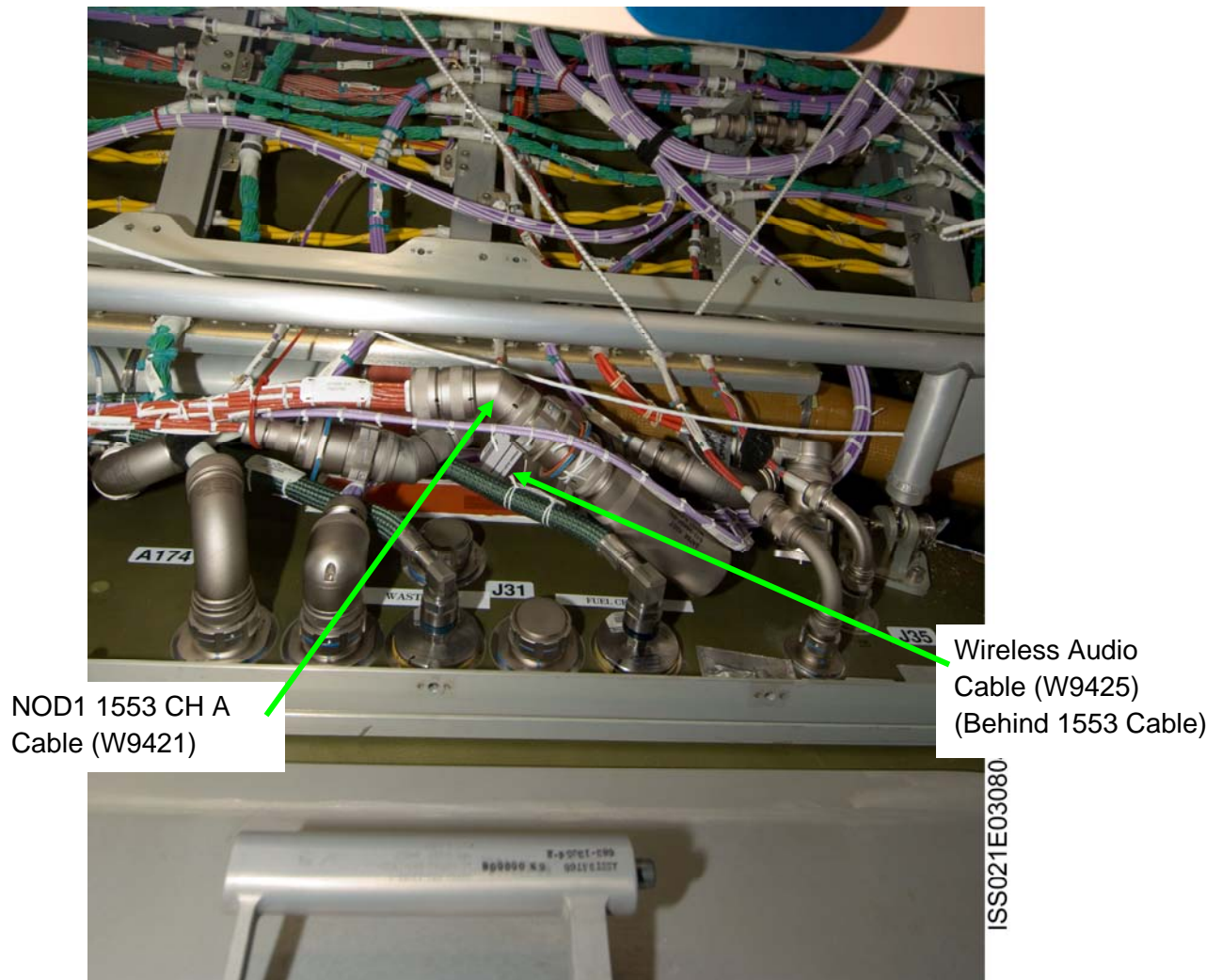


Figure 34. - NOD1 1553 CH A Cable and Wireless Audio Cable After ULF3.

- NOD1P2 Above Hatch
- 28.2 Locate NOD1 1553 CH A Cable (W9421) and NOD1 1553 Termination Plug (W9427) (connected to each other) stowed above Node 1 Port Hatch. Refer to Figure 34.
- 28.3 NOD1 1553 CH A Cable (W9421) P31 \leftrightarrow NOD1 1553 Termination Plug (W9427)
- 28.4 Protective Cap \leftrightarrow J31 of Bulkhead
Protective Cap $\rightarrow| \leftarrow$ NOD1 1553 Termination Plug (W9427)
Stow NOD1 1553 Termination Plug (W9427) in Ziplock Bag labeled "NOD1-NOD3 Electrical Protective Caps."

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28.5 NOD1 1553 CH A Cable (W9421) P31 →|← J31 of Bulkhead

28.6 ISS ↓ **MCC-H**: "Node 1 1553 Channel A connection complete. Go for step 30."

29. CONNECTING WIRELESS AUDIO CABLE

NOTE

Connection of NOD1 Wireless Audio Cable (W9425) does not require safing.

- NOD1P2
- 29.1 Locate NOD1 Wireless Audio Cable (W9425) and NOD1 Wireless Audio Loopback Plug (W9428) (connected to each other) stowed above Node 1 Port Hatch.
Refer to Figure 34.
- 29.2 NOD1 Wireless Audio Cable (W9425) P32 ←|→ NOD1 Wireless Audio Loopback Plug (W9428)
- 29.3 Protective Cap ←|→ J32 of Bulkhead
Protective Cap →|← NOD1 Wireless Audio Loopback Plug (W9428)
Stow NOD1 Wireless Audio Loopback Plug (W9428) in Ziplock Bag labeled "NOD1-NOD3 Electrical Protective Caps."
- 29.4 NOD1 Wireless Audio Cable (W9425) P32 →|← J32 of Bulkhead
- 29.5 Photo document cable connections (Digital Camera).
- 29.6 Install the following Closeout Panels (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive):
NOD1OP2-21 (fifteen fasteners)
NOD1OP2-22, -23 (three fasteners each, install as a group)
- *****
- * If required for installation of Closeout Panels
 - * | Remove (install) L-shaped Closeout Seam Supports (two), fasteners (four each) (Ratchet, 1/4" Drive; 1/8" Hex Head, 1/4" Drive).
 - * | Remove (install) T-shaped Closeout Seam Support, fasteners (eight) (Ratchet, 1/4" Drive; 1/8" Hex Head, 1/4" Drive).
- *****
- 29.7 ISS ↓ **MCC-H**, "NOD1 Wireless Audio Cable connection complete."
- 29.8 Go to step 31.

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MCC-H 30. 1553 NORMALIZATION

On ISS GO

30.1 Swap 1553 Buses to Channel A and Enable Channel Switching (ground only)

Use Table 10 to swap 1553 buses to channel A and enable channel switching.

sel [XX] where [XX] = Bus name from Table 10

[XX] Bus Status
'Channel Selected'

cmd Select Ch A Execute (√A)

'Auto Channel Switch Status'

cmd Enable Execute (√Ena)

Repeat

30.2 Enabling BC Comm Fail (ground only)

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

CCS Recovery Retry

cmd BC Comm Fail – Enable Execute (√Ena)

30.3 Enabling Auto Transition to Diagnostics in PMCU MDM (ground only)

CDH: Primary PMCU: MDM FDIR

Primary PMCU MDM FDIR

cmd Auto Transition Diag – Enable Execute (√Ena)

30.4 Enabling Comm Safing Response in INT MDM (ground only)

CDH: Primary INT: MDM FDIR

Primary INT MDM FDIR

cmd Comm Safing Response – Enable Execute (√Ena)

30.5 MSS: LAS5 Bus Config

LAS5 CEU Bus Configuration

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

MSS: LAP5 Bus Config

LAP5 CEU Bus Configuration

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

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31. CLEANUP

31.1 Photo document overview of all vestibule connections, cable and hose routings (Digital Camera).

31.2 Restow tools, equipment in Table 11 per Stowage Note.

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Table 11. Hardware to Restow

Stowage		Equipment	P/N	Qty	Notes	
CBM Center Disk Cover			683-14575-14	1	Will be installed at Node 3 Port.	
1.0 CTB w/ Window, Single			SEG33111837-301	1		
		CTB Shelf Divider	SEG33111841-309	1		
		12x12 Ziplock Bag	528-50000-5	2		
	24x24 Ziplock Bag "Node 1 Port CBM CPA"	CBM Controller Panel Assembly	2355260-1	1	Installed on CPA	
		Protective Cap	NATC-RPC-N-15-0	1		
		Protective Cap	NATC-RPC-N-11-0	2		
		Protective Cap	NATC-RPC-N-13-0	6		
	24x24 Ziplock Bag "Node 1 Port CBM CPA"	CBM Controller Panel Assembly	2355260-1			Installed on CPA
		Protective Cap	NATC-RPC-N-15-0	1		
		Protective Cap	NATC-RPC-N-11-0	2		
		Protective Cap	NATC-RPC-N-13-0	6		

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Continuation of Table 11. Hardware to Restow

1.0 CTB w/ Window, Single			SEG33111837-301	1	1.0 CTB w/ Window, Single		
		CTB Shelf Divider	SEG33111841-309	1			
		12x 12 Ziplock Bag	528-50000-5	2			
24x24 Ziplock Bag "Node 1 Port CBM CPA"		CBM Controller Panel Assembly	2355260-2	1	Installed on CPA		
		Protective Cap	NATC-RPC-N-15-0	1			
		Protective Cap	NATC-RPC-N-11-0	2			
		Protective Cap	NATC-RPC-N-13-0	6			
		24x24 Ziplock Bag "Node 1 Port CBM CPA"		CBM Controller Panel Assembly	2355260-3	1	Installed on CPA
				Protective Cap	NATC-RPC-N-15-0	1	
Protective Cap	NATC-RPC-N-11-0			2			
Protective Cap	NATC-RPC-N-13-0			6			

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Continuation of Table 11. Hardware to Restow

Stowage	Equipment	P/N	Qty	Notes
Node 3 PCBM Thermal Blanket		3120ND611	1	Thermal Blanket consists of three components attached to each other.
		3120ND613	2	
Ziplock Bag labeled "NOD1-NOD3 IMV H/W"	IMV Cap	Report	2	
	IMV Flange Saver	683-15016-8	2	
Ziplock Bag labeled "NOD1-NOD3 Electrical Protective Caps"	Protective Cap	NATC-PPC-N-25-0	13	
	Protective Cap	NATC-RPC-N-25-0	11	
	Protective Cap	NATC-PPC-N-13-0	3	
	Protective Cap	NATC-RPC-N-13-0	3	
	NOD1 Wireless Audio Loopback Plug (W9428)	683-99428	1	
	NOD1 1553 Termination Plug (W9427)	683-99427	2	
	1553 Bus Terminator	1F89991-1	2	

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Continuation of Table 11. Hardware to Restow

Ziplock labeled "NOD3-NOD1 Fluid Caps."	Gamah Caps	683-16347-818	4	From Potable and Waste Water Jumpers
	Gamah Caps	683-16347-822	2	From Nitrogen Jumpers
	Gamah Caps	683-16347-824	2	From Oxygen Jumpers, Stowed in Clean Room Glove
	Gamah Caps	683-16347-806	2	From MTL Supply Jumper
	Gamah Caps	683-16347-808	2	From MTL Return Jumper
	QD Plug	683-19485-9	2	From Air Sample Jumper
	Gamah Caps	683-16347-841	4	From Node 1 and Node 3 Water Feedthroughs
	Gamah Caps	683-16347-845	4	From Node 1 and Node 3 Oxygen and Nitrogen Feedthroughs, Oxygen caps should be stored in Clean Room Glove
	QD Cap	683-19485-6	2	From Node 1 and Node 3 ARS Feedthrough
	Gamah Caps	683-16347-847	4	From Node 1 and Node 3 MTL Feedthroughs

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Continuation of Table 11. Hardware to Restow

Stowage	Equipment	P/N	Qty	Notes
Ziplock bag labeled "NOD1-NOD3 CBM Hardware."	CBM Alignment Guides	683-13484	5	
	CBM Ready to Latch	683-13729	1	
Ziplock bag labeled "Node 3 Closeout Panel Launch Bolts"	Launch Bolts	NAS1351N3-10	4	NOD3D6-52
	Launch Washers	-	4	NOD3D6-52
	Launch Bolts	NAS1351-3-12	8	NOD3D6-51
	Launch Washers	-	8	NOD3D6-51
	Launch Bolts	NAS1351N3-10	3	Starboard Deck Grille
	Launch Washers	-	3	Starboard Deck Grille

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1.105 NODE 3 NITROGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1/IMPACT J) Page 1 of 7 pages

OBJECTIVE:

To purge and leak check the Node 3 Nitrogen System.

TOOLS:

Nitrogen Low Pressure Purge Adapter (Male) P/N 683-42344-8

(A/L101)

Clean Room Gloves P/N SEG33116979-301

Teflon Bags P/N 300045-08

Flashlight

Earplugs

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

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

1. ACCESSING LO PRESS N2 SPLY AND QD1E23 QDS

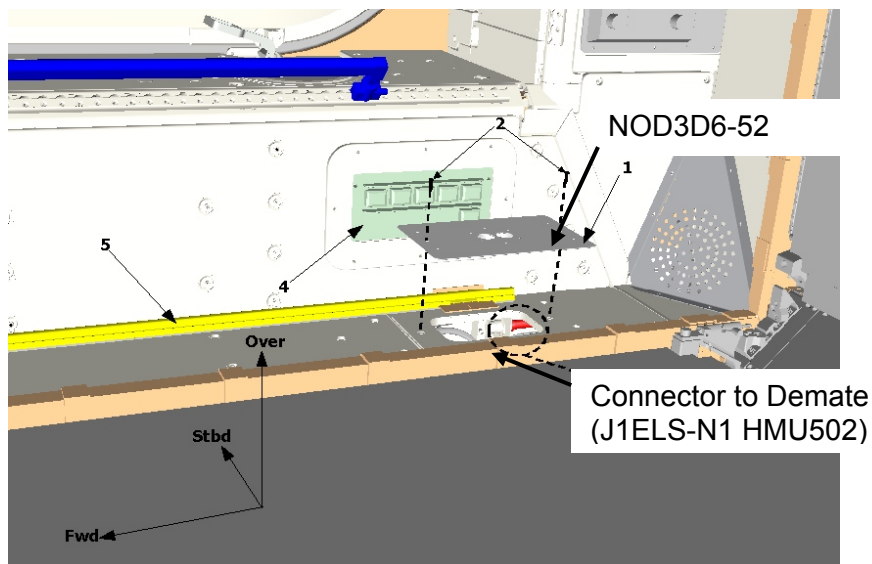


Figure 1.- Access to Starboard Endcone EELS Connector Under NOD3D6-52.

NOD3D6 1.1 Remove NOD3D6-52 Closeout Panel, fasteners (two) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Refer to Figure 1.

1.2 EELS Power Cable P1 ←|→ J1ELS-N1 HMU502

1.105 NODE 3 NITROGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1/IMPACT J) Page 2 of 7 pages

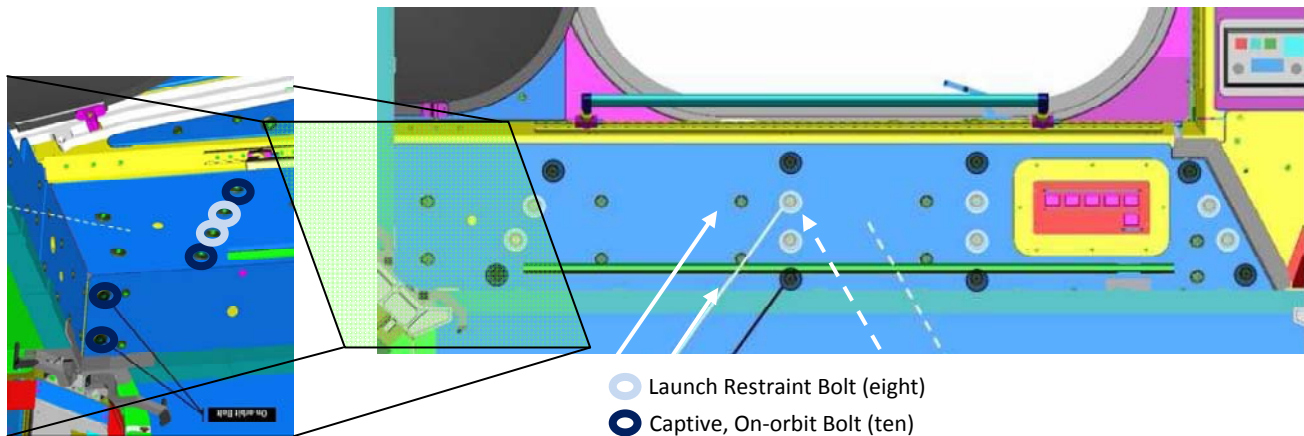


Figure 2.- NOD3D6-51 Launch Restraint Bolts.

1.3 Unfasten NOD3D6-51 Closeout Panel, fasteners (ten) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figure 2.

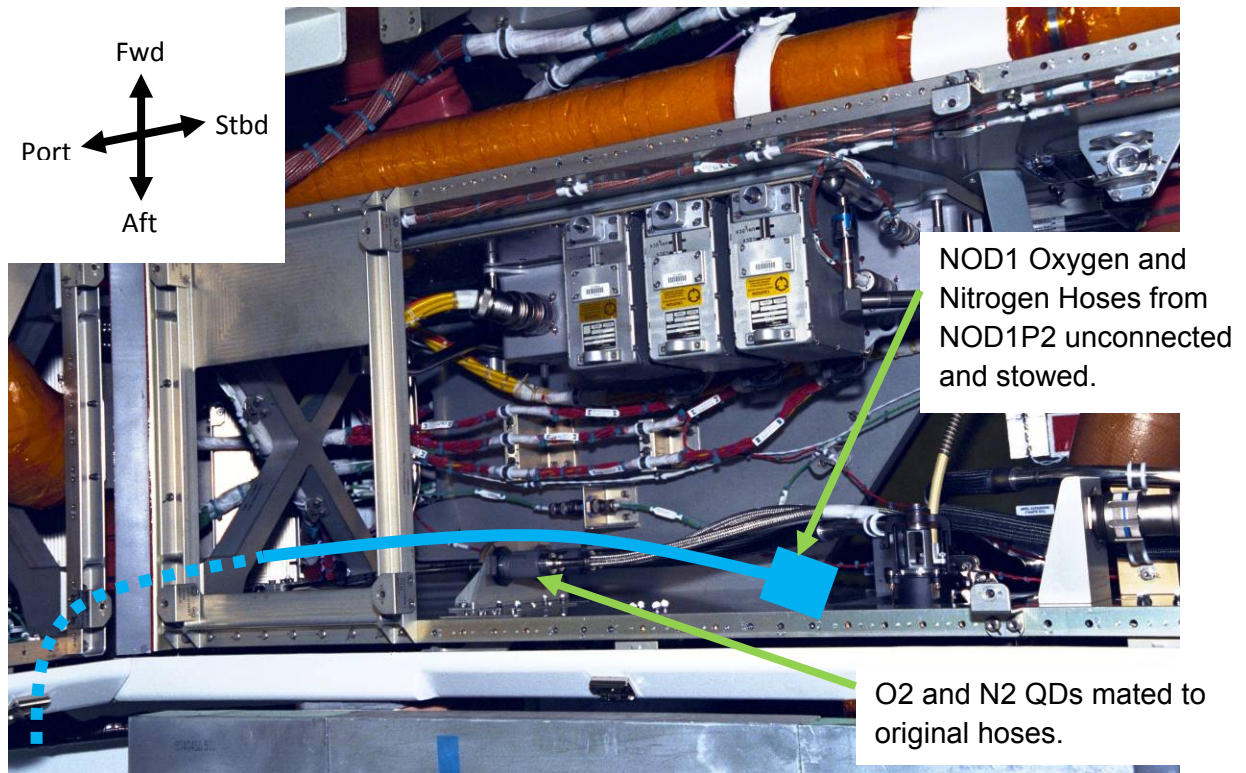


Figure 3.- Node 1 Oxygen and Nitrogen Connections in NOD1D1 Alcove.

NOD1D1 1.4 If NOD1D1-01 installed,
Remove closeout panel NOD1D1-01, fasteners (eight) (5/32" Hex Head, 1/4" Drive; Ratchet, 1/4" Drive).
Refer to Figure 3.

1.105 NODE 3 NITROGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1/IMPACT J) Page 3 of 7 pages

1.5 Perform CSA-O2 sampling in open cabin and behind removed Closeout Panels (NOD3D6 and NOD1D1).

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

2. CONFIGURING ISS N2 SYSTEM AND REDUCING TO AMBIENT PRESSURE

2.1 \surd **MCC-H** for ISS payload nitrogen configuration

A/L10A2 2.2 \surd VL013 (N2) – OPEN

PCS 2.3 Airlock: ECLSS: Nitrogen System

AL Nitrogen System

'N2 Supply Valve'

cmd Close (\surd Actual Position – Closed)

COL-CC 2.4 Perform [1.702 COL NITROGEN SUPPLY DEACTIVATION](#), step 1 (ESA SODF: ECLSS: ACTIVATION AND CHECKOUT), then:

SSIPC 2.5 Perform [2.016 JPM GN2 SYSTEM RECONFIGURATION - SSIPC](#), step 1 (JAXA SODF: GH: ECLSS: NOMINAL), then:

NOTE

1. Connection and disconnection of QDs requires adjoining lines to be at approximately ambient pressure on both sides of the QD, when possible.
2. As the N2 system pressure bleeds down and N2 is introduced into the cabin, the following messages may be received:
'PCA N2 Line Pressure Low – A/L',
'PCA N2 Line Pressure Low – LAB'
3. The messages will return to normal as the N2 system is repressurized (step 4).

PCS 2.6 Airlock: ECLSS: Nitrogen System

AL Nitrogen System

'AL PCA N2 Intro Valve'

cmd Open (\surd Actual Position – Open)

When PCA N2 Line Press <160 kPa (23 psi) or **On MCC-H GO**, proceed.

'AL PCA N2 Intro Valve'

1.105 NODE 3 NITROGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1/IMPACT J) Page 4 of 7 pages

cmd Close (\surd Actual Position – Closed)

3. CONFIGURING NODE 1 N2 SUPPLY FOR NODE 3 PURGE

3.1 Don Clean Room Gloves.

NOD1D1 3.2 QD1E23 Female Flexline QD \leftarrow | \rightarrow QD1E23 Male QD (on Node 1 Structure)
Refer to Figure 3.

3.3 Uncap Node 1 Nitrogen Hose To: Node 1 Nadir Alcove Nitrogen QD.
Use cap from Node 1 Nitrogen Hose To: Node 1 Nadir Alcove Nitrogen QD to cover QD1E23 Female Flexline QD.
Refer to Figure 3.

3.4 Node 1 Nitrogen Hose To: Node 1 Nadir Alcove Nitrogen QD \rightarrow | \leftarrow QD1E23 Male QD (on Node 1 structure)
Refer to Figure 3.

4. CONNECTING NOPA TO LO PRESS N2 SPLY QD

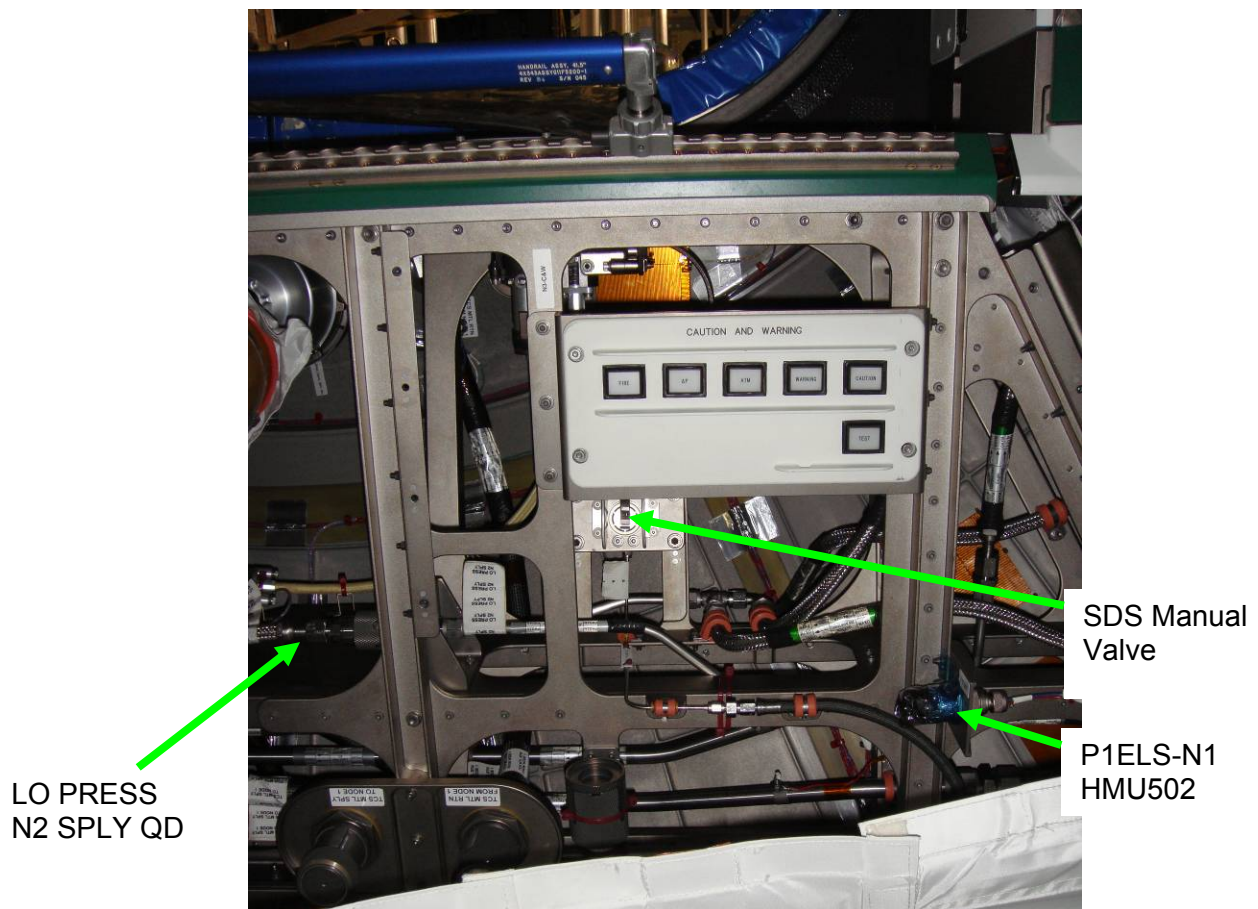


Figure 4.- NOD3D6 Endcone.

1.105 NODE 3 NITROGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1/IMPACT J) Page 5 of 7 pages

- NOD3D6-51
- 4.1 Uncap Nitrogen Low Pressure Purge Adapter (Male) QD.
Uncap Gamah end of Nitrogen Low Pressure Purge Adapter (Male).
Inspect both QDs for debris.
 - 4.2 Uncover LO PRESS N2 SPLY Female Flexline QD.
Refer to Figure 4.
 - 4.3 Nitrogen Low Pressure Purge Adapter (Male) →|← LO PRESS N2
SPLY Female Flexline QD

Bag Nitrogen Low Pressure Purge Adapter (Male) Cap and Gamah Cap.
 - 4.4 Doff Gloves.

5. PURGING NITROGEN SYSTEM

WARNING

Purging through the Node 1/Node 3 Vestibule Jumper may cause a loud hissing noise. Crew should don Earplugs.

- 5.1 Don Earplugs.
 - 5.2 Check **MCC-H** to verify N2 system configuration and purge duration for step 5.4.
- PCS
- 5.3 Airlock: ECLSS: Nitrogen System
AL Nitrogen System
'N2 Supply Valve'

cmd Open (√Actual Position – Open)
 - 5.4 If Nitrogen is being fed from the ISS Airlock Tanks,
Wait 30 seconds.

If Nitrogen is being fed from STS Tanks via Recharge Line,
Wait 2 minutes.
 - 5.5 Airlock: ECLSS: Nitrogen System
AL Nitrogen System
'N2 Supply Valve'

cmd Closed (√Actual Position – Closed)
 - 5.6 Doff Earplugs.

1.105 NODE 3 NITROGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1/IMPACT J) Page 6 of 7 pages

6. CONNECTING LO PRESS N2 SPLY QD

NOD3D6-51 6.1 Don new pair of Clean Room Gloves

6.2 Nitrogen Low Pressure Purge Adapter (Male) ←|→ LO PRESS N2 SPLY Female Flexline QD

Cap Nitrogen Low Pressure Purge Adapter (Male) QD and Gamah end.
Refer to Figure 4.

6.3 Uncover LO PRESS N2 SPLY Male QD (on Node 3 Structure).
LO PRESS N2 SPLY Female Flexline QD →|← LO PRESS N2 SPLY Male QD (on Node 3 Structure)

Refer to Figure 4.

Doff Gloves.

7. INSTALLING LO PRESS N2 SPLY QDS PANEL

NOD3D6 7.1 Install NOD3D6-51 Closeout Panel, fasteners (ten) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figure 2.

7.2 EELS Power Cable P1 →|← J1ELS-N1 HMU502

7.3 Install NOD3D6-52 Closeout Panel, fasteners (two) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figure 1.

8. CONFIGURING N2 SYSTEM FOR LEAK CHECK

8.1 Airlock: ECLSS: Nitrogen System

'N2 Supply Valve'

cmd Open (√Actual Position – Open)

8.2 Lab (Airlock, Node3): ECLSS: PCA

Verify that LAB, AL and Node 3 N2 Line Pressure > 750 kPa (108 psi).

8.3 Airlock: ECLSS: Nitrogen System

'N2 Supply Valve'

cmd Close (√Actual Position – Closed)

9. INITIATING FINE LEAK CHECK

Lab (Airlock, Node3): ECLSS: PCA

Record LAB Line Press: _____ kPa

1.105 NODE 3 NITROGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1/IMPACT J) Page 7 of 7 pages

Record Airlock Line Press: _____ kPa
Record Node 3 Line Press: _____ kPa

Record GMT: _____ / _____ : _____

Report above values to **MCC-H**.
Wait at least 10 hours or **On MCC-H GO**, proceed.

10. TERMINATING LEAK CHECK

NOTE

ECLSS will be using the following leak check criteria for the gross and fine leak check:

- < 4 psi in 30 minutes (Gross Leak Check)
- < 17 psi in 10 hours (Fine Leak Check)

Lab (Airlock, Node3): ECLSS: PCA

Lab (AL, Node 3) ACS

Record LAB Line Press: _____ kPa
Record Airlock Line Press: _____ kPa
Record Node 3 Line Press: _____ kPa

Record GMT: _____ / _____ : _____

11. RETURNING ISS NITROGEN SYSTEM TO NOMINAL OPERATIONS

11.1 Airlock: ECLSS: Nitrogen System

AL Nitrogen System

'N2 Supply Valve'

cmd Open (\surd Actual Position – Open)

COL-CC 11.2 Perform [1.701 COL NITROGEN SUPPLY ACTIVATION](#), all (ESA SODF: ECLSS: ACTIVATION AND CHECKOUT), then:

SSIPC 11.3 Go to [2.016 JPM GN2 SYSTEM RECONFIGURATION - SSIPC](#), step 2 (JAXA SODF: GH: ECLSS: NOMINAL).

If Node 3 Oxygen System has not been purged, omit step 12:

12. INSTALLING CLOSEOUT PANEL NOD1D1-01

On MCC-H Go,

NOD1D1 Install Closeout Panel NOD1D1-01, fasteners (eight) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

Refer to Figure 3.

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1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

(ASSY OPS/20A/FIN 1) Page 1 of 11 pages

OBJECTIVE:

Configure Flexible Ventilation ducting to route airflow through Node 3 during initial ingress of the module.

LOCATION:

Node 3

DURATION:

02:10 Total

00:10 Node 2 Duct Removal (step 1)

00:20 Node 3 Temporary IMV Config Install (step 2)

00:20 Configure for Crew Sleep (step 3)

00:20 Configure for Crew Wake (step 4)

01:00 Node 3 Temp IMV Removal and reconfig (steps 5 to 8)

CREW:

One

PARTS:

Node 2 Temporary Duct Assy

For step 6 only:

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

For step 7 only:

Radial Port Closeout P/N 683-60461-11

For step 8 only:

CSA-O2 (two)

MATERIALS:

Gray Tape

Ziplock

Zip Tie

Kapton Tape

TOOLS:

Digital Camera

Scissors

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

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

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

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

1/2" Deep Socket, 1/4" Drive

10" Ext, 1/4" Drive

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

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

Drawer 5:

2" Cut Scissors

1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

(ASSY OPS/20A/FIN 1)

Page 2 of 11 pages

1. GATHERING PARTS

1.1 ✓ **MCC-H** Node 2 Fwd Stbd IMV Fan is deactivated

Node 2 1.2 Remove Temporary Duct from IMV Aft Stbd Return (2" Cut Scissors).

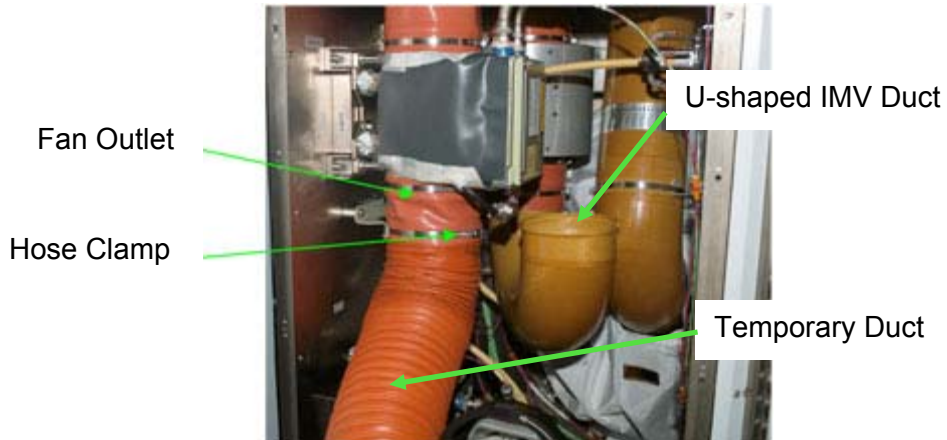


Figure 1.- Temporary Duct Installed to Node 2 Fwd Stbd IMV Fan Outlet.

1.3 Remove Temporary Duct from IMV Fan Outlet coupling, band clamp fastener (one) (Ratchet, 1/4" Drive; 10" Ext, 1/4" Drive; 1/4" Deep Socket, 1/4" Drive).
Refer to Figure 1.

1.4 Install U-Shaped IMV Duct into IMV Fan Outlet Coupling, band clamp fastener (one) (Ratchet, 1/4" Drive; 10" Ext, 1/4" Drive; 1/4" Deep Socket, 1/4" Drive).
Refer to Figure 1.

1.5 Transfer Temporary Duct to Node 3.

1.6 Notify **MCC-H** "IMV has been reconfigured, GO for Node 2 Fwd Stbd IMV Fan Activation".

1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

(ASSY OPS/20A/FIN 1)

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2. INSTALLING NODE 3 TEMPORARY IMV CONFIGURATION

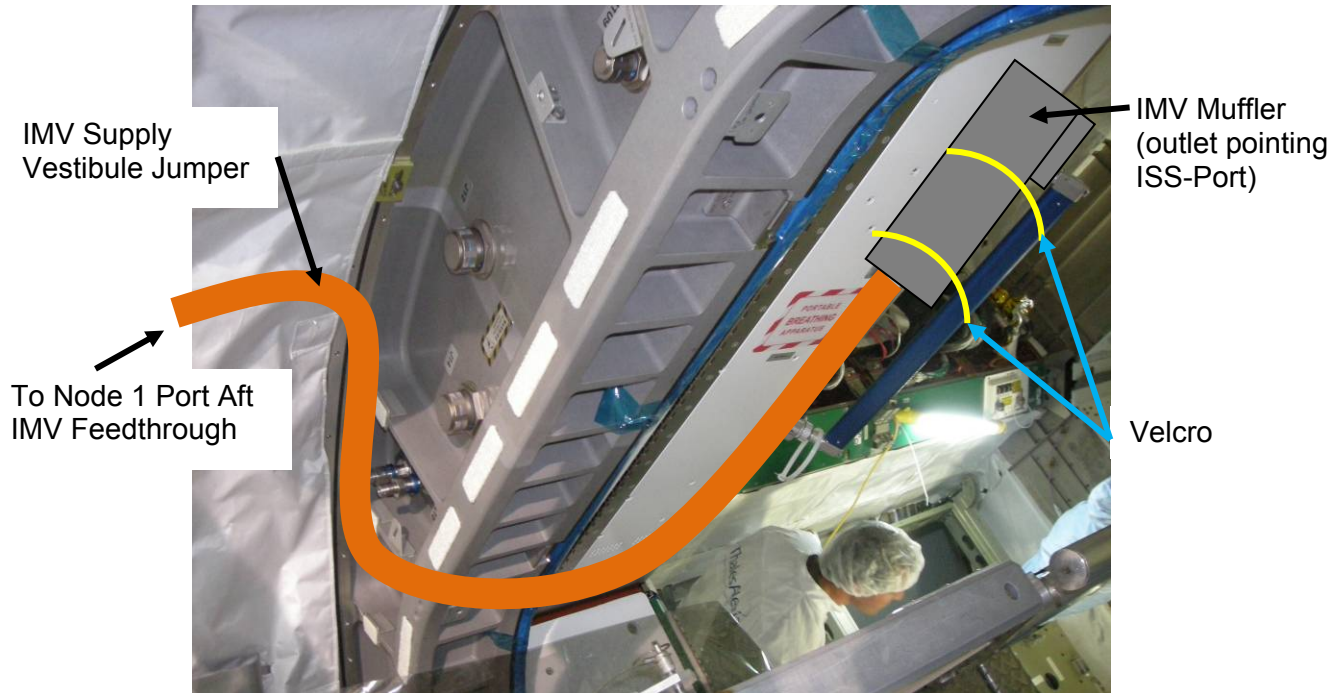


Figure 2.- IMV Supply Vestibule Jumper Temporary Install (View Looking Aft-Port).

Node 3

- 2.1 Remove IMV Supply Vestibule Jumper from temp stow location. Refer to Figure 2.
- 2.2 Remove muffler from Node 3 IMV Supply Jumper, fastener (one) (Ratchet, 1/4" Drive; 1/4" Deep Socket, 1/4" Drive). Slide Band Clamp up IMV Supply Jumper. Handtighten Band Clamp for temp stowage in this location.

NOTE

A Ziplock will be placed over the IMV Muffler outlet to protect the IMV sealing surface while muffler is being temporarily stowed.

- 2.3 Place Ziplock Bag over IMV Muffler outlet. Temporarily stow IMV Muffler for eventual reinstallation.
- 2.4 Insert IMV Supply Vestibule Jumper into Temporary Duct that was transferred from Node 2. Secure with Gray Tape or Zipties.
- 2.5 Route ducting assembly along overhead-aft Standoff to Node 3 Port, securing to structure per crew preference.

1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

(ASSY OPS/20A/FIN 1) Page 4 of 11 pages

2.6 Photo document installed configuration (Digital Camera).

3. RECONFIGURING IMV FOR CREW SLEEP

3.1 \surd **MCC-H** Node 2 Fwd Stbd IMV Fan is deactivated

3.2 Remove Node 2 Temporary Duct from IMV Supply Vestibule Jumper.

Node 2

3.3 Transfer Temporary Duct to Node 2.

3.4 Remove U-Shaped IMV Duct from IMV Fan Outlet Coupling, band clamp fastener (one) (Ratchet, 1/4" Drive; 10" Ext, 1/4" Drive; 1/4" Deep Socket, 1/4" Drive).
Refer to Figure 1.

3.5 Insert Temporary Duct in to IMV Fan Outlet coupling.
Secure in coupling, band clamp fastener (one) (Ratchet, 1/4" Drive; 10" Ext, 1/4" Drive; 1/4" Deep Socket, 1/4" Drive)
Refer to Figure 1.



Figure 3.- Node 2 Temporary Duct Routing.

3.6 Route Temporary Duct along deck standoff, to Node 2 Aft Stbd IMV Return.

Secure to structure per crew preference.
Refer to Figure 3.

3.7 Attach Temporary Duct to IMV Aft Stbd Return Grille, directing airflow through return grille towards US LAB (Zip Ties).

3.8 Notify **MCC-H** "IMV has been reconfigured, GO for Node 2 Fwd Stbd IMV Fan Activation".

1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

4. RECONFIGURING IMV FOR CREW WAKE

4.1 Repeat steps 1, 2.4 and 2.5

5. REMOVING NODE 3 TEMPORARY IMV CONFIGURATION

5.1 Repeat step 3.

5.2 Install, torque muffler on Node 3 IMV Supply Jumper with Band Clamp, fastener (one) to 18 in-lbs (Ratchet, 1/4" Drive; 1/4" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive).

5.3 Remove protective Ziplock Bag from muffler.

6. RECONFIGURING NODE 3 IMV FLOW PATH

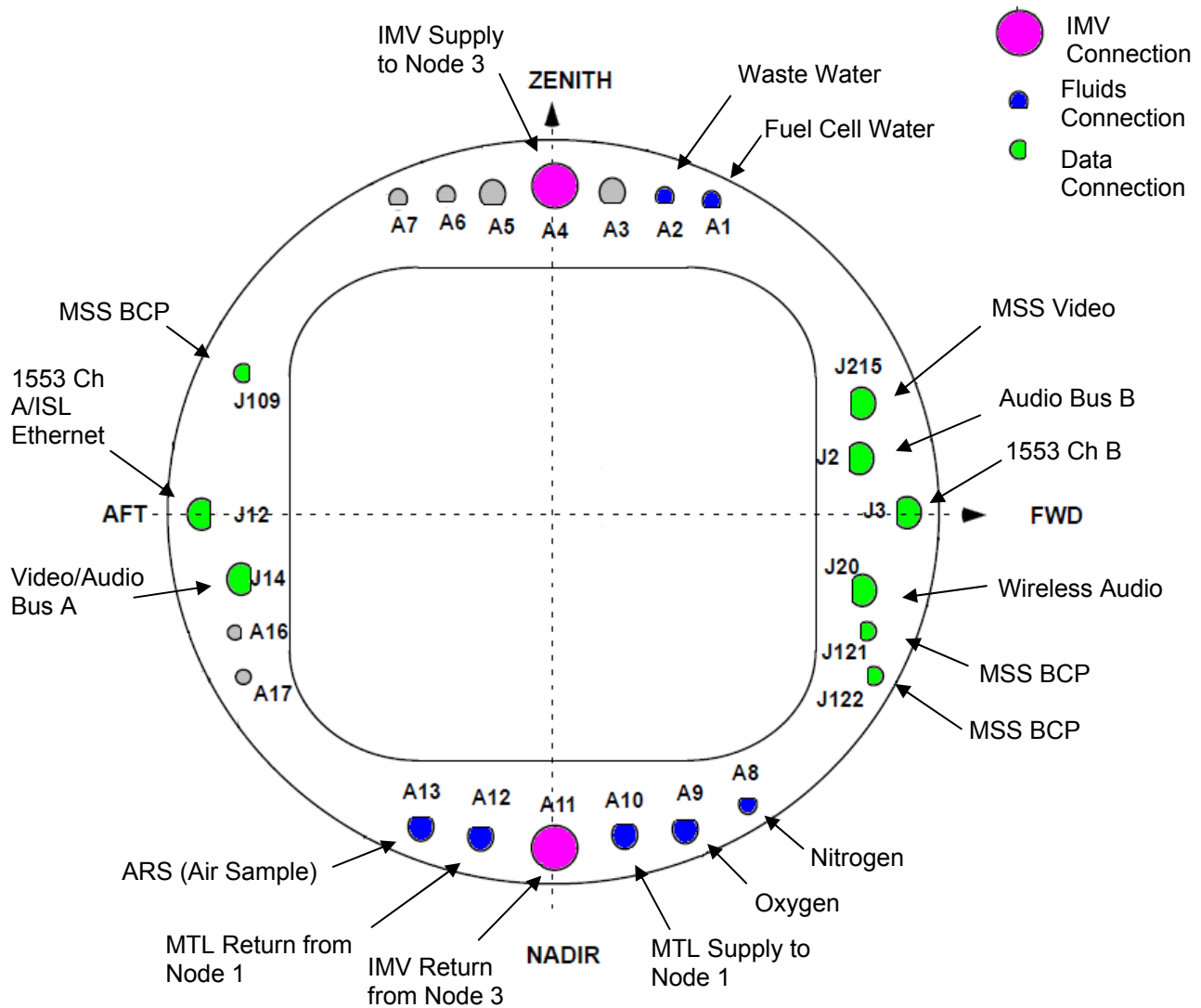


Figure 4.- Node 3 Vestibule (View Looking Port from Node 1)

1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

(ASSY OPS/20A/FIN 1)

Page 6 of 11 pages

PMA1 6.1 Open PMA1 IMV Duct Grill (Velcro cover).

PCS/
MCC-H 6.2 Deactivating Node 1 IMV Aft Port Fan
Node 1: ECLSS: IMV Aft Port Fan

Node 1 IMV Aft Port Fan

NOTE

Upon IMV Fan deactivation, rpm sensor registers 0V. MDM conversion translates 0V (0 counts) to 7164 ± 50 rpm.

6.2.1 'Off'

cmd Arm

√Arm Status - Armed

cmd Off

√State - Off

√Speed, rpm - $\sim 7164 \pm 50$

6.2.2 sel RPCM N14B C RPC 12

NOTE

A "?" may appear in the RPC data field because of other Fans (ODS Booster Fan, LAB IMV Fans, Node Aft Port IMV Fan) creating flow through the IMV duct and causing back EMF to the IMV Fan.

cmd RPC Position - Open (√ -Op)

6.3 Close Node 1 IMV Port Aft Valve
Node 1: ECLSS: IMV Port Aft Vlv

Node 1 IMV Port Aft Vlv

'Position'

'Close'

cmd Arm

√Arm Status - Armed

cmd Close

√Position - In Transit

1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

(ASSY OPS/20A/FIN 1)

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Wait 25 seconds

√Position - Closed

- Vestibule 6.4 Loosen, remove V-Band Clamp on NOD3 Ovhd (A4) IMV Flange (Ratchet, 1/4" Drive; 1/2" Deep Socket, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive).
Remove IMV Flange Saver from NOD3 (A4) IMV Flange.
Retain V-Band Clamp for use in subsequent step.
Temporarily stow IMV Flange Saver.

NOTE

O-Rings for the NOD3 end of the IMV Supply Vestibule Jumper are in a ziplock bag taped to the IMV Supply Vestibule Jumper. One set of these O-Rings was previously used on the NOD1 side of this vestibule jumper during Vestibule Outfitting.

- 6.5 Install O-Rings on NOD3 end of IMV Supply Vestibule Jumper.
Apply small amount of Braycote in two to three places around O-Ring grooves to prevent O-Rings from floating out.

CAUTION

Care must be taken while installing the IMV Supply Vestibule Jumper on the IMV Flanges. Damaging the sealing surfaces of the IMV Flanges could prevent the jumper, once installed, from maintaining pressure.

- 6.6 Install IMV Supply Vestibule Jumper (muffler end) onto NOD3 Ovhd (A4) IMV Flange.
Install V-Band Clamp loosely to allow rotation of jumper in next step.
- 6.7 Tighten, torque IMV Supply Vestibule Jumper to 35 in-lbs to NOD3 IMV Flange with V-Band Clamp Ratchet, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].

NOTE

During initial Vestibule Outfitting, the IMV Supply Vestibule Jumper V-Band Clamp was not torqued on the Node 1 side, to protect for an emergency quick release. Upon reconfiguration to a nominal Node 3 IMV path, this V-Band Clamp will be torqued to the final install value.

- 6.8 Tighten, torque IMV Supply Vestibule Jumper to 35 in-lbs to NOD1 IMV Flange with V-Band Clamp [Ratchet, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].
- PCS/
MCC-H 6.9 Open Node 1 Port Aft IMV Valve
Node 1: ECLSS: IMV Port Aft Vlv

1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

(ASSY OPS/20A/FIN 1)

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Node 1 IMV Port Aft Vlv

'Position'

'Open'

cmd Arm

√Arm Status - Armed

cmd Open

√Position - In Transit

Wait 25 seconds

√Position - Open

6.10 Activating Node 1 IMV Aft Port Fan Node 1: ECLSS: IMV Aft Port Fan

Node 1 IMV Aft Port Fan

6.10.1 sel RPCM N14B C RPC 12

cmd RPC Position – Close (Verify – Cl)

6.10.2 'On'

cmd On

√State - In Transit

Wait 15 seconds

√State - On

√Speed, rpm - 7745 to 9278

PMA1 6.11 Close PMA1 IMV Duct Grill (Velcro cover)

6.12 Photo document installed IMV Supply Vestibule Jumper (Digital Camera).

1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

(ASSY OPS/20A/FIN 1)

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7. INSTALLATION OF RADIAL PORT CLOSEOUT

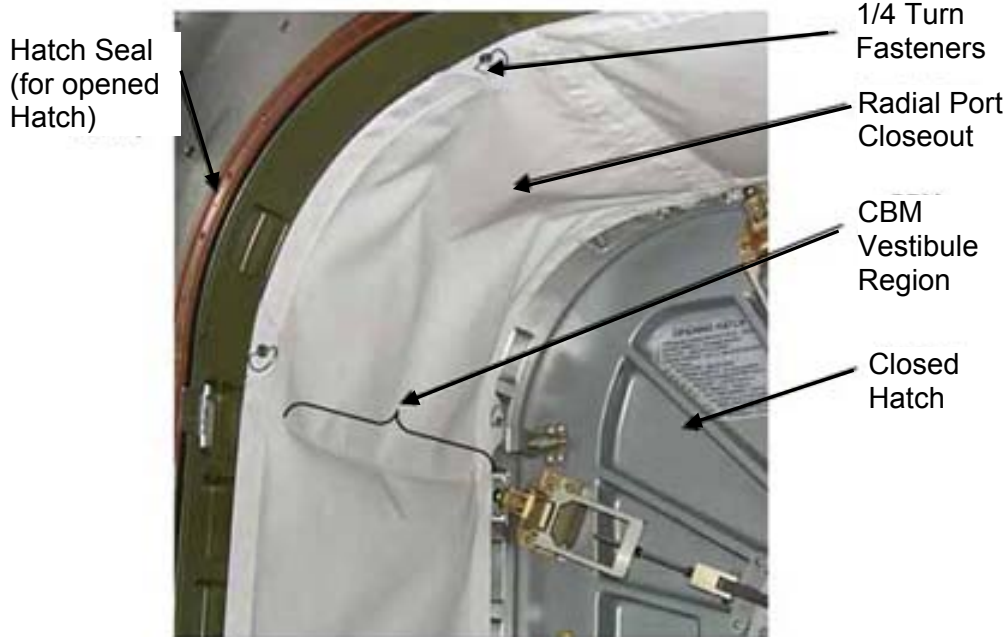


Figure 5.- Installation of Radial Port Closeout.

NOTE

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

- 7.1 Unroll Radial Port Closeout while installing over CBM Vestibule. Attach 1/4 Turn Fasteners starting at overhead forward corner, insert into mounting brackets, engage 1/4 Turn Fasteners. Refer to Figure 5.

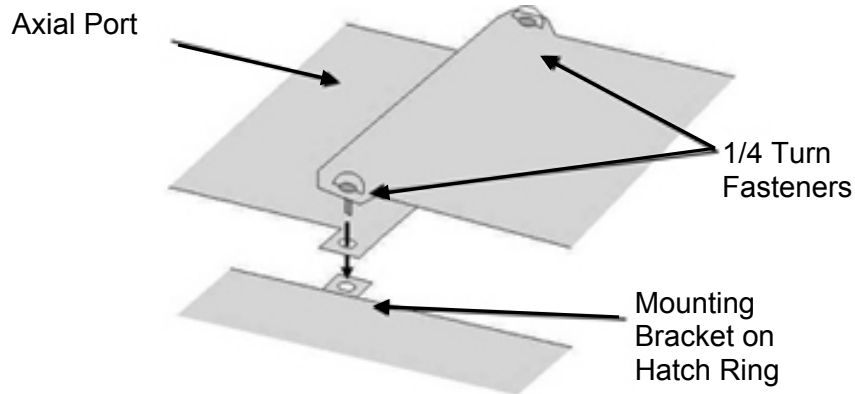


Figure 6.- Overlapping Ends of Closeout for Final Attachment.

- 7.2 Overlap ends of Radial Port Closeout, if necessary, detaching 1/4 Turn Fasteners at end of Closeout.

1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

(ASSY OPS/20A/FIN 1)

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Reattach 1/4 Turn Fasteners at end of Closeout by inserting through tabs on other end of Closeout.
Press Velcro at Closeout ends together.
Refer to Figure 6.

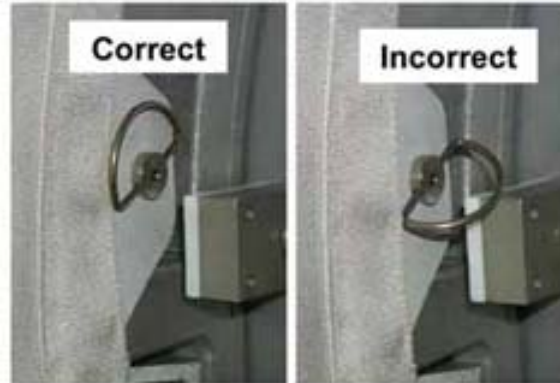


Figure 7.- 1/4 Turn Fastener D-Rings on Radial Port Closeout.

7.3 Verify 1/4 Turn Fastener D-Rings flush to prevent damage during Hatch closure.
Refer to Figure 7.

8. CLOSING OUT NODE 1 IMV CONFIGURATION

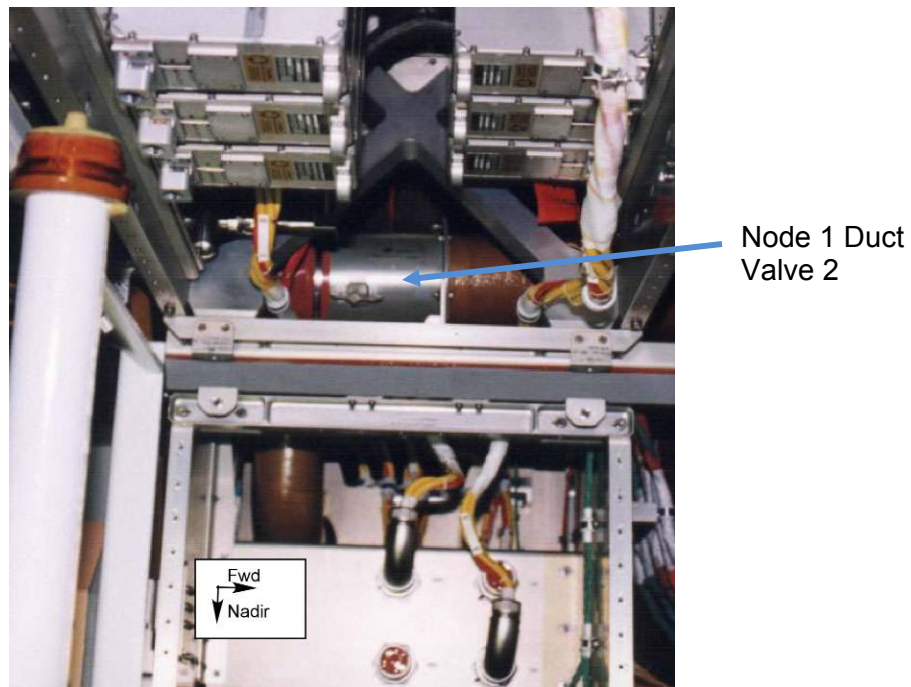


Figure 8.- Node 1 Duct Valve 2 (Located at NOD1OP1).

8.1 √MCC-H:

1.106 NODE 3 TEMPORARY VENTILATION INSTALL AND REMOVE FOR INITIAL INGRESS

(ASSY OPS/20A/FIN 1)

Page 11 of 11 pages

Node 3 Stbd Deck IMV Valve Open
Node 3 Stbd Deck IMV Fan Activated
Node 1 Port Fwd IMV Valve Open

- 8.2 Remove Closeout Panel NOD1O1-01, fasteners (eight) (Ratchet, 1/4" Drive; 5/32" Hex Head)

NOTE

Two CSA-O2 units are required to take independent samples in the open cabin in order to protect against CSA-O2 sensor error.

- 8.3 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).
- 8.4 Verify CSA-O2 sampling from both units are within 1.1% of each other.
Verify O2% within nominal range specified on CSA-O2 Decal.
- 8.5 Perform CSA-O2 sampling behind removed closeout panel.
Verify O2% within nominal range specified on CSA-O2 Decal.

- NOD1O1-01 8.6 Node 1 IMV Duct Valve 2 → CLOSED
Refer to Figure 8.

- 8.7 Place Kapton Tape on Node 1 IMV Duct Valve 2 to secure in the CLOSED position.

- 8.8 Install Closeout Panel NOD1O1-01, fasteners (eight) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

9. POST MAINTENANCE

- 9.1 Notify **MCC-H** of task completion.
Stow all parts, tools, and materials.

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1.107 NODE 3 OXYGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1)

Page 1 of 7 pages

OBJECTIVE:

To purge and leak check the Node 3 Oxygen System.

TOOLS:

Oxygen Low Pressure Purge Adapter (Male) P/N 683-42344-6

(A/L101)

Clean Room Gloves P/N SEG33116979-301

Teflon Bags P/N 300045-08

Flashlight

Earplugs

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

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

1. ACCESSING OXYGEN DISTRO AND QD1E22 QDS

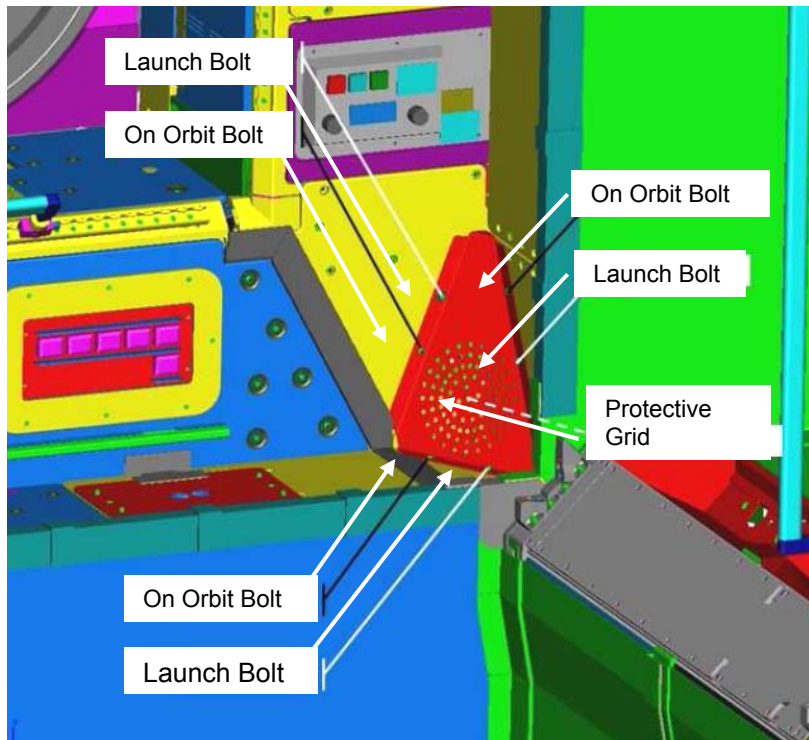


Figure 1.- Starboard Deck Grille Launch Restraint Bolts at NOD3AD6.

- NOD3AD6
- 1.1 Unfasten Node 3 Starboard Aft Deck Grille, fasteners (three) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figure 1
 - 1.2 Stow Grille on Closeout Panel near QD (Gray Tape).

1.107 NODE 3 OXYGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1)

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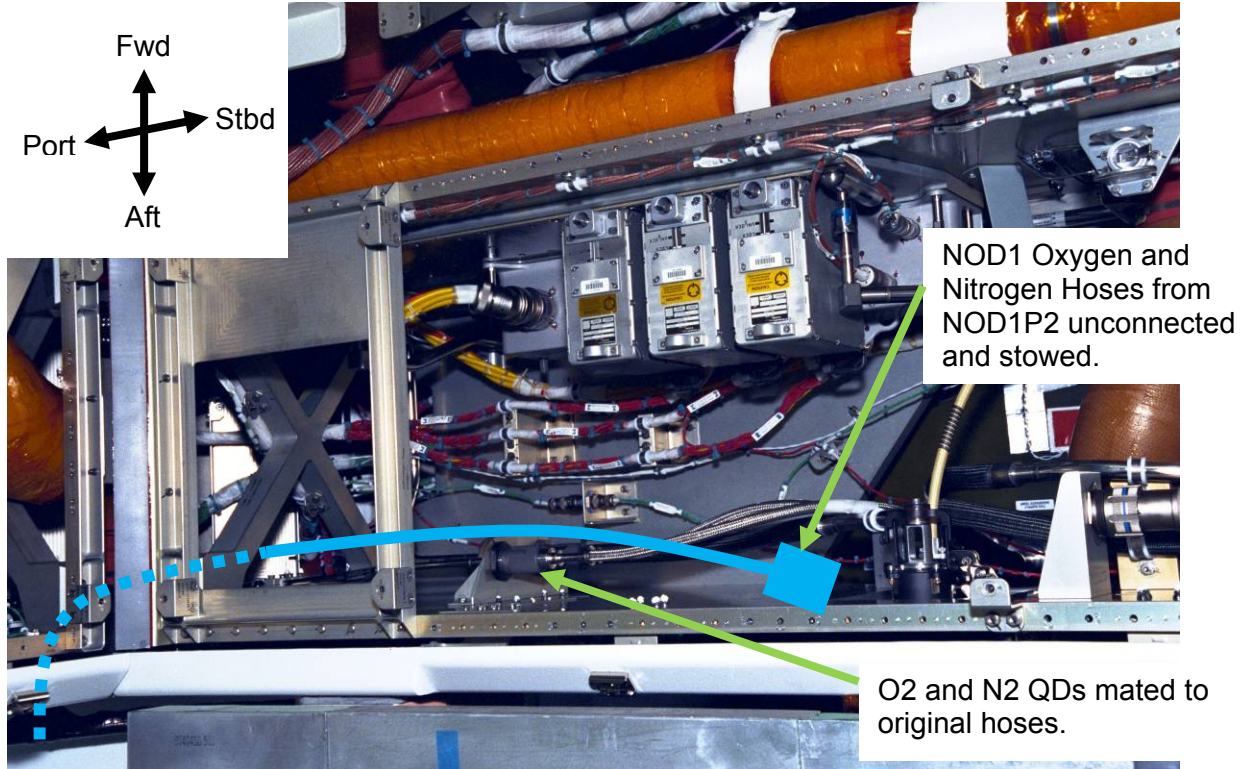


Figure 2.- Node 1 Oxygen and Nitrogen Connections in NOD1D1 Alcove.

- NOD1D1 1.3 If NOD1D1-01 installed,
Remove closeout panel NOD1D1-01, fasteners (eight) (5/32" Hex Head, 1/4" Drive; Ratchet, 1/4" Drive).
Refer to Figure 2.
- 1.4 Perform CSA-O2 sampling in open cabin and behind removed Closeout Panel (NOD1D1).
Verify O2 % within Nominal Range specified on CSA-O2 Decal.
2. REDUCING ISS O2 SYSTEM PRESSURE TO AMBIENT
- PCS 2.1 Airlock: ECLSS: Oxygen System
AL Oxygen System
'O2 Low Pressure Supply Valve'
- cmd** Close (√Actual Position – Closed)

1.107 NODE 3 OXYGEN SYSTEM PURGE AND LEAK CHECK

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WARNING

Hardline O2 from the ISS Oxygen System is unavailable for the duration of this procedure and the subsequent (10+ hour) leak check.

NOTE

1. When possible, connection and disconnection of QDs requires adjoining lines to be at approximately ambient pressure on both sides of the QD.
2. As the Low Pressure O2 system pressure bleeds down and O2 is introduced into the cabin, the following messages will be received:
'PCA O2 Line Pressure Low - A/L'
'PCA O2 Line Pressure Low - LAB'
3. The messages will return to normal as the O2 system is repressurized (step 6).
4. WPA will experience a Process Flow Fault when the Reactor O2 Pressure 2 (P_7214_2) sensor falls below its Low Limit. If WPA is in Process, it will transition to Standby. The following message will be received when this fault occurs:
'WPA Process Fault 3 - LAB'

2.2 Airlock: ECLSS: Oxygen System

AL Oxygen System

'AL PCA O2 Intro Valve'

cmd Open (\surd Actual Position – Open)

When PCA O2 Line Press <160 kPa (23 psi) or **On MCC-H GO**, proceed.

'AL PCA O2 Intro Valve'

cmd Close (\surd Actual Position – Closed)

3. CONFIGURING NODE 1 O2 SUPPLY FOR NODE 3 PURGE

3.1 Don new pair of Clean Room Gloves

NOD1D1 3.2 QD1E22 Female Flexline QD \leftarrow | \rightarrow QD1E22 Male QD (on Node 1 Structure)
Refer to Figure 2.

3.3 Uncap Node 1 Oxygen Hose To: Node 1 Nadir Alcove Oxygen QD.
Use cap from Node 1 Oxygen Hose To: Node 1 Nadir Alcove Oxygen QD to cover QD1E22 Female Flexline QD.
Refer to Figure 2.

1.107 NODE 3 OXYGEN SYSTEM PURGE AND LEAK CHECK

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- 3.4 Node 1 Oxygen Hose To: Node 1 Nadir Alcove Oxygen QD →|←
QD1E22 Male QD (on Node 1 structure)
Refer to Figure 2.

4. CONNECTING NOPA TO LO PRESS O2 SPLY QD

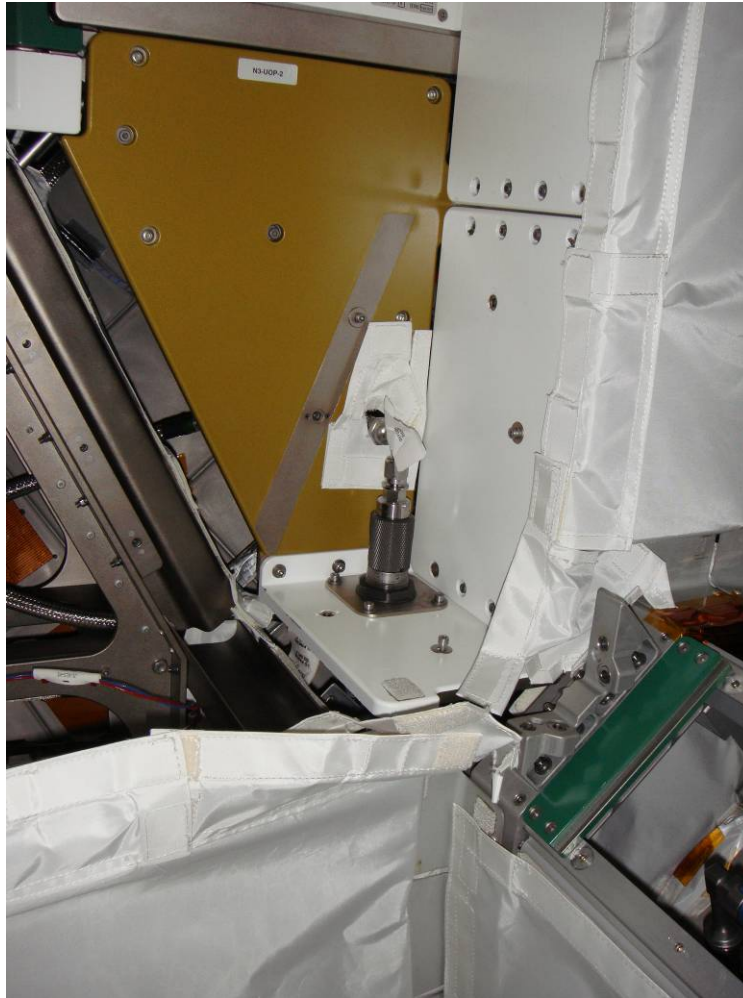


Figure 3.- Low Pressure Oxygen QD at NOD3AD6

- 4.1 Uncap Oxygen Low Pressure Purge Adapter (Male) QD.
Uncap Gamah end of Oxygen Low Pressure Purge Adapter (Male).
Inspect both QDs for debris.
Refer to Figure 3.
- NOD3AD6 4.2 Uncover OXYGEN DISTRO Female Flexline QD.
Refer to Figure 3.
- 4.3 Oxygen Low Pressure Purge Adapter (Male) →|← OXYGEN DISTRO
Female Flexline QD
Refer to Figure 3.

1.107 NODE 3 OXYGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1)

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Bag Oxygen Low Pressure Purge Adapter (Male) Cap and Gamah Cap.

4.4 Doff Gloves.

5. PURGING OXYGEN SYSTEM

WARNING

Purging through the Node 1/Node 3 Vestibule Jumper may cause a loud hissing noise. Crew should don Earplugs.

5.1 Don Earplugs.

PCS

5.2 Airlock: ECLSS: Oxygen System
AL Oxygen System
'O2 Low Pressure Supply Valve'

cmd Open (√Actual Position – Open)

5.3 Wait 30 seconds.

5.4 Airlock: ECLSS: Oxygen System
AL Oxygen System
'O2 Low Pressure Supply Valve'

cmd Close (√Actual Position – Close)

5.5 Doff Earplugs

6. CONNECTING OXYGEN DISTRO QD

6.1 Don new pair of Clean Room Gloves

NOD3AD6

6.2 Oxygen Low Pressure Purge Adapter (Male) ←|→ OXYGEN DISTRO
Female Flexline QD
Refer to Figure 3.

Cap Oxygen Low Pressure Purge Adapter (Male) QD and Gamah end.

6.3 Uncover OXYGEN DISTRO Male QD (on Node 3 Structure).
Refer to Figure 3.

OXYGEN DISTRO Female Flexline QD →|← OXYGEN DISTRO Male
QD (on Node 3 Structure)
Refer to Figure 3.

Doff Gloves.

7. INSTALLING OXYGEN DISTRO QD PANEL

Install Node 3 Starboard Aft Deck Grille, fasteners (three) (Ratchet, 1/4" Drive;
5/32" Hex Head, 1/4" Drive).

1.107 NODE 3 OXYGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1)

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Refer to Figure 1.

8. CONFIGURING O2 SYSTEM FOR LEAK CHECK

8.1 Airlock: ECLSS: Oxygen System

AL Oxygen System

'O2 Low Pressure Supply Valve'

cmd Open (√Actual Position – Open)

8.2 Lab (Airlock, Node3): ECLSS: PCA

Lab (AL, Node 3) ACS

Verify that LAB, AL and Node 3 N2 Line Pressure > 750 kPa (108 psi).

8.3 Airlock: ECLSS: Oxygen System

AL Oxygen System

'O2 Low Pressure Supply Valve'

cmd Close (√Actual Position – Closed)

9. INITIATING FINE LEAK CHECK

Lab (Airlock, Node3): ECLSS: PCA

Lab (AL, Node 3) ACS

Record LAB Line Press: _____ kPa

Record Airlock Line Press: _____ kPa

Record Node 3 Line Press: _____ kPa

Record GMT: _____ / _____ : _____

Report above values to **MCC-H**.

Wait at least 10 hours or **On MCC-H GO**, proceed.

10. TERMINATING LEAK CHECK

NOTE

ECLSS will be using the following leak check criteria for the gross and fine leak check:

< 7 psi in 30 minutes (Gross Leak Check)

< 7 psi in 10 hours (Fine Leak Check)

Lab (Airlock, Node3): ECLSS: PCA

Lab (AL, Node 3) ACS

Record LAB Line Press: _____ kPa

Record Airlock Line Press: _____ kPa

Record Node 3 Line Press: _____ kPa

Record GMT: _____ / _____ : _____

1.107 NODE 3 OXYGEN SYSTEM PURGE AND LEAK CHECK

(ASSY OPS/20A/FIN 1)

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11. RETURNING ISS OXYGEN SYSTEM TO NOMINAL OPERATIONS

Airlock: ECLSS: Oxygen System

AL Oxygen System

'O2 Low Pressure Supply Valve'

cmd Open ($\sqrt{\text{Actual Position}} - \text{Open}$)

NOTE

Due to the Gas Separator (GS) Liquid indicating WET due to condensation within the GS, the GS Fault Flag may be in alarm in addition to the ORUs being evaluated below.

12. RESTARTING WPA

US Lab: ECLSS: LAB Regen ECLSS: WPA: Additional TIm

LAB WPA Additional TIm

```
*****
* 'ORU Fault'
*
* If Catalytic Reactor ORU – X and Process Controller ORU – X and
* | 'WPA Status Info'
* | Process Command = Standby and History Records
* | incremented by 1 and
* | US Lab: ECLSS: LAB Regen ECLSS: WPA: Catalytic Reactor
* | LAB WPA Catalytic Reactor
* |
* | If Process Command Status – not Process prior to Fault
* | | Reactor O2 Pressure 2 < 5170 mmHg (100 psia) or
* | |
* | If Process Command Status – Process prior to Fault
* | | Reactor O2 Pressure 2 < Reactor High Pressure 2 + 10.55, then:
* | |
* | | Go to 4.910 ECLSS SSR 18 WPA LOW O2 PRESSURE FAULT
* | | AND RECOVERY, step 2 (SODF: ECLSS: CORRECTIVE: REGEN).
*****
```

If Node 3 Nitrogen System has not been purged, omit step 13:

13. INSTALLING CLOSEOUT PANEL NOD1D1-01

On MCC-H GO,

NOD1D1 Install Closeout Panel NOD1D1-01, fasteners (eight) (Ratchet, 1/4" Drive;
5/32" Hex Head, 1/4" Drive).

Refer to Figure 2.

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1.108 NODE 3 POSITIVE PRESSURE RELIEF VALVE (PPRV) CAP INSTALL
(ASSY OPS/20A/FIN) Page 1 of 2 pages

OBJECTIVE:

Installs a PPRV Cap onto the Nadir and Aft Hatch PPRVs.

LOCATION:

Node 3 Nadir and Aft Hatches

DURATION:

10 minutes

CREW:

One

PARTS:

PPRV Cap P/N PPRV-1-915

MATERIALS:

None

TOOLS:

None

REFERENCED PROCEDURE(S):

None

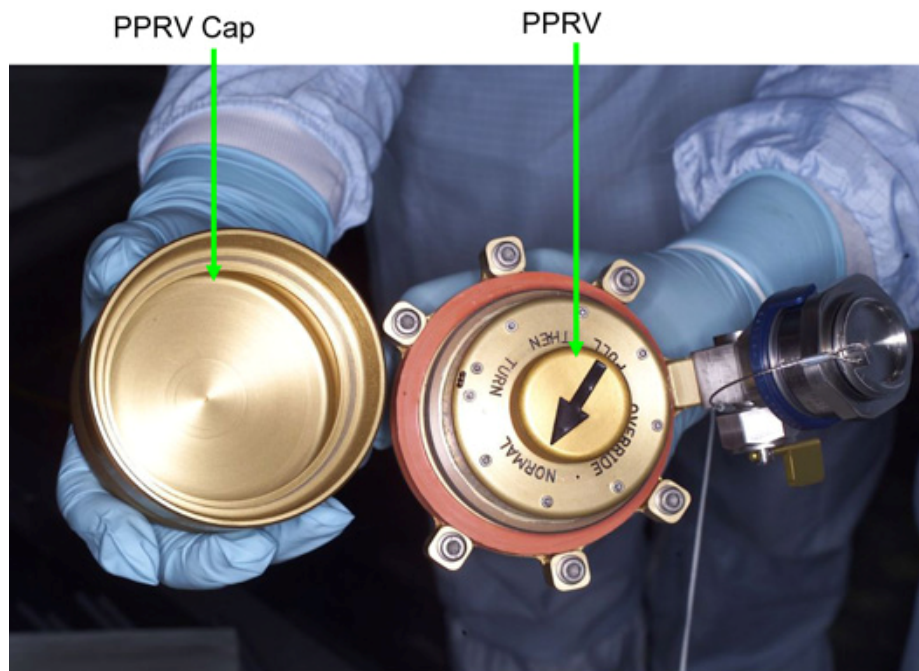


Figure 1.- PPRV Uninstalled and Cap to be Installed.



Figure 2.- PPRV Showing Threads for Cap.

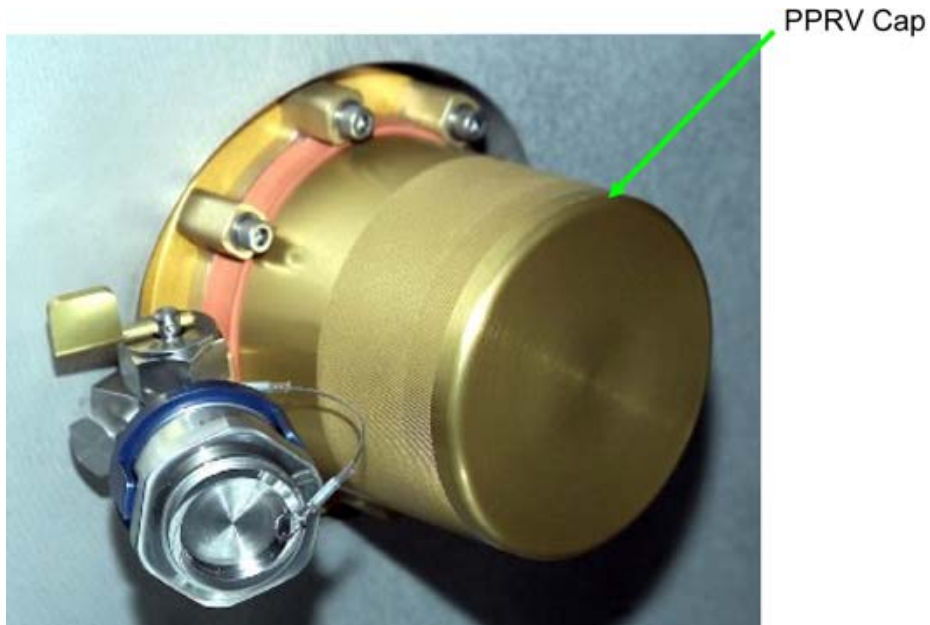


Figure 3.- Cap Installed on PPRV.

1. INSTALLING CAPS ON NADIR PPRV, AND AFT PPRV

1.1 Screw Cap onto PPRV on Nadir Hatch.
Refer to Figures 1, 2, and 3.

1.2 Hand tighten Cap on PPRV.

1.3 Perform steps 1.1 and 1.2 for Aft PPRV.

2. POST MAINTENANCE

2.1 Update IMS with stowage locations.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN) Page 1 of 21 pages

OBJECTIVE:

Utilize Internal Sampling Adapter (ISA), 5 foot Vacuum Access Jumper (VAJ), 35 foot VAJ, Potable Water Purge/Fill Adapter, Multimeter, and ISA Scopemeter Pressure Probe to depress the Nitrogen from the ISS Potable Water Bus through the Airlock (Node 3) PCA, and then use a PWR to backfill the evacuated bus with iodinated water. Also depressurizes the Node 3 Pre-treated Urine Line in preparation for filling at a later date.

This procedure assumes that Node to Element Fluid Jumper (P/N 683-13870-7) connecting the Node 1 potable bus to the LAB potable bus, connection labeled "M/W A14 N1," is disconnected from Node 1 Fwd External Bulkhead and capped, that the Potable Water Vestibule Jumper (P/N 683-99511-11) has been installed between Node 1 and Node 3, and that the NOD1 Potable Water Hose (P/N 683-99511-4) has been installed in Node 1. It also assumes that the WPA, OGS, TOCA, or REFH have not been connected to the Node 3 potable bus. All of these assumptions are confirmed through physical verification in step 1, except for the NOD1 Potable Water Hose, which was verified via photographs taken during ULF-3. The WPA, OGS, TOCA, and REFH will not be connected by the point in the 20A timeline when this procedure is executed.

LOCATION:

Node1/LAB Vestibule, Node 1/Node 3 Vestibule, A/L1D0 (NOD3FO), NOD3D4, and NOD3D5

DURATION:

2 hours, 10 minutes Total

- 25 minutes - Configuration Verification, Multimeter, ISA, and VAJ Setup
- 10 minutes - Wait for Urine Bus Depressurization
- 10 minutes - Wait for Potable Water Bus Depressurization
- 20 minutes - ISA/VAJ/ and Potable Water Purge/Fill Adapter Leak Check
- 30 minutes - Wait for Potable Water Bus Leak Check
- 10 minutes - Reconfigure ISA
- 5 minutes - Fill Potable Water Bus
- 20 minutes - Multimeter, ISA, and VAJ Teardown

CREW:

One

MATERIALS:

9V Alkaline Battery (if Battery changeout required)
Gray Tape
Quiet Ear Plugs

PARTS:

Potable Water Purge/Fill Adapter P/N 683-64435-1
Portable Water Reservoir (PWR)

TOOLS:

MPEV Internal Sampling Adapter (ISA) P/N 97M55830-1
VAJ-78-1 5ft P/N 683-17111-1
VAJ-83-1 35 ft P/N 683-17111-2
ISA Scopemeter Pressure Probe P/N 1525,760MMHGA/30PSIA

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN) Page 2 of 21 pages

Multimeter Kit P/N 10118-10018-04:

Multimeter

ISS IVA Toolbox:

Drawer 2:

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

1/4" to 3/8" Adapter

Flex Handle Ratchet, 3/8" Drive

Ratchet, 3/8" Drive

Drawer 3:

1 5/8" Crowfoot, 3/8" Drive

1 1/4" Crowfoot, 3/8" Drive

#0 Phillips Screwdriver (if Battery change out required)

CAUTION

To ensure that water is not vented through the LAB PCA Vent Relief Assembly, step 1 must be performed to verify that lines and equipment containing water are not connected to the dry potable water bus.

1. VERIFYING INITIAL CONFIGURATION

Node 1/

Node 3

Vestibule

Overhead

- 1.1 Disengage Vestibule Barrier Assembly 1/4 Turn Fasteners as required to access the overhead side of the vestibule.
- 1.2 Verify the feedthru on Node 3 Bulkhead Interface, external side, labeled "A1: Fuel Cell Water" is connected to the Potable Water Vestibule Jumper.
- 1.3 Verify the feedthru on Node 1 Bulkhead Interface, external side, labeled "J33: Fuel Cell Water" is connected to the Potable Water Vestibule Jumper.
- 1.4 Reengage Vestibule Barrier Assembly 1/4 Turn Fasteners, as required, to closeout the starboard side of the vestibule.

NOTE

To ensure that the LAB Potable Water Bus is not evacuated during the purge portion of the procedure, the Fuel Cell Water line between the LAB and Node 1 must be verified to be disconnected prior to filling the bus.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN) Page 3 of 21 pages

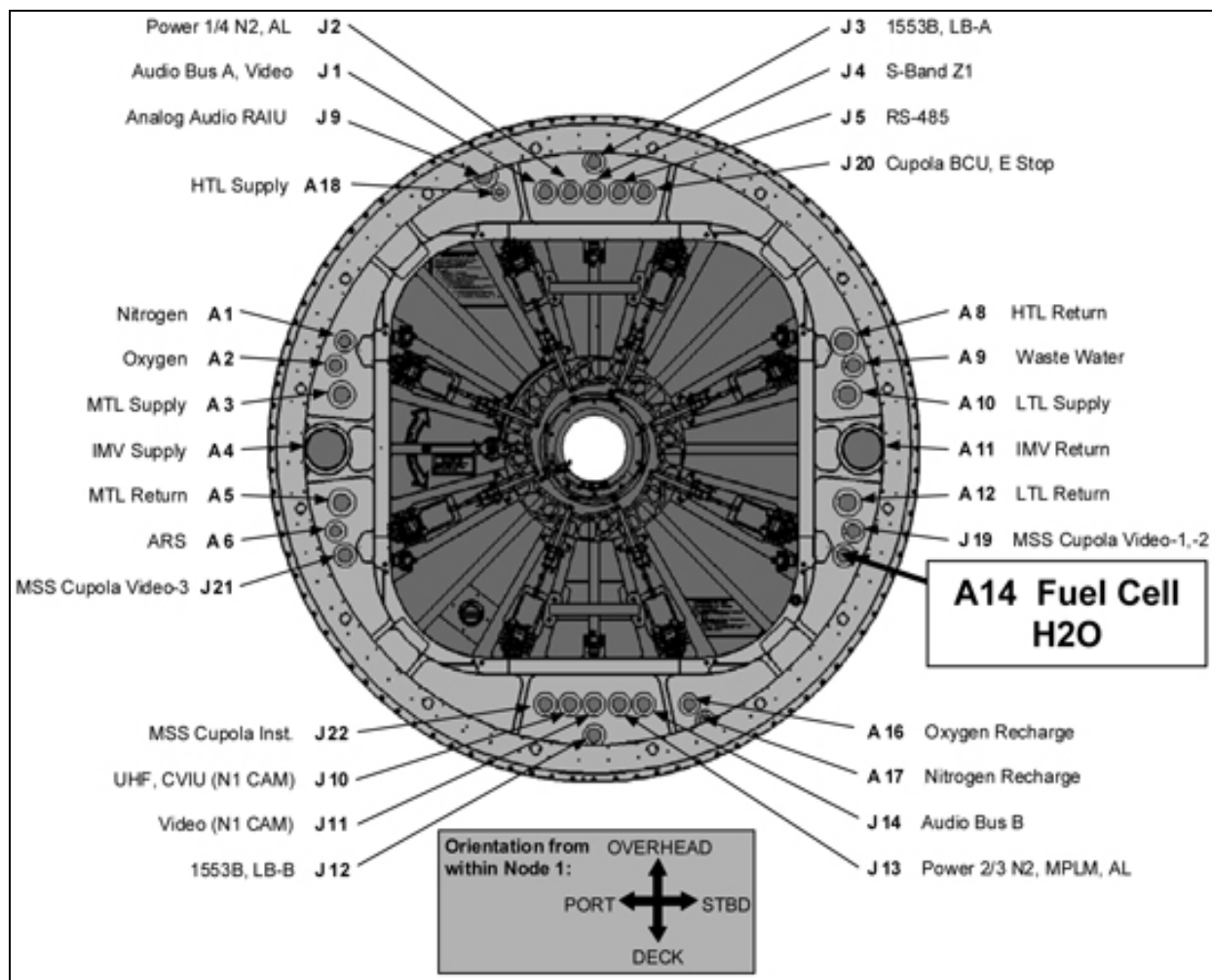


Figure 1.- LAB1 Aft Bulkhead Interior Location of Feedthroughs. (Orientation from Within Node 1 Looking Forward.)

- Node 1/
LAB
Vestibule
- 1.5 Disengage Vestibule Barrier Assembly 1/4 Turn Fasteners, as required, to access the starboard side of the vestibule.

NOTE

Bold text appears on LAB1 Bulkhead Labels next to feedthroughs. A14 Fuel Cell H2O will have the gamah end of the fuel cell water jumper mated to it.

- 1.6 Locate feedthrough labeled A14 Fuel Cell H2O on starboard side of LAB Aft Bulkhead, follow length of Node 1 to Element Fluid Jumper (P/N 683-13870-7) to QD labeled M/W A14 N1. Verify disconnected from Node 1 and capped. Refer to Figure 1 for connection point of mated end on LAB Aft.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN) Page 4 of 21 pages

2. SETTING UP ISA

NOTE

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

2.1 Gamah Cap ←|→ ISA VAJ Port

2.2 √ISA Scopemeter Pressure Probe →|← ISA

3. SETTING UP MULTIMETER

NOTE

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

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

3.2 √ISA Scopemeter Pressure Probe – OFF

3.3 Rotary Switch ↻ \overline{mV}

3.4 Verify voltage reading > 100 mV DC (good ISA Scopemeter Pressure Probe Battery indication).

If voltage reading < 100 mV DC

ISA Scopemeter Pressure Probe Battery must be replaced.

The 9V Battery is replaced by removing noncaptive screw on back of probe (#0 Phillips Screwdriver).

3.5 ISA Scopemeter Pressure Probe → mmHgA

4. VERIFYING ISA SCOPEMETER PRESSURE PROBE ACCURACY

NOTE

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

Multimeter

4.1 Rotary Switch ↻ \overline{V}

4.2 Record ISA Scopemeter Pressure Probe P₁: _____ mmHgA

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN) Page 5 of 21 pages

PCS 4.3 Airlock (Node3): ECLSS
Airlock (Node3): ECLSS

Record Cab Press P_2 : _____ mmHgA

* If $\Delta P |P_2 - P_1| > 20$ mmHg
* | Notify **MCC-H** ISA Scopemeter Pressure Probe is inaccurate.
* |
* | $\sqrt{\text{MCC-H}}$ for further instructions

5. CONNECTING VAJ, ISA, POTABLE WATER PURGE/FILL ADAPTER TO PRE-TREATED URINE LINE

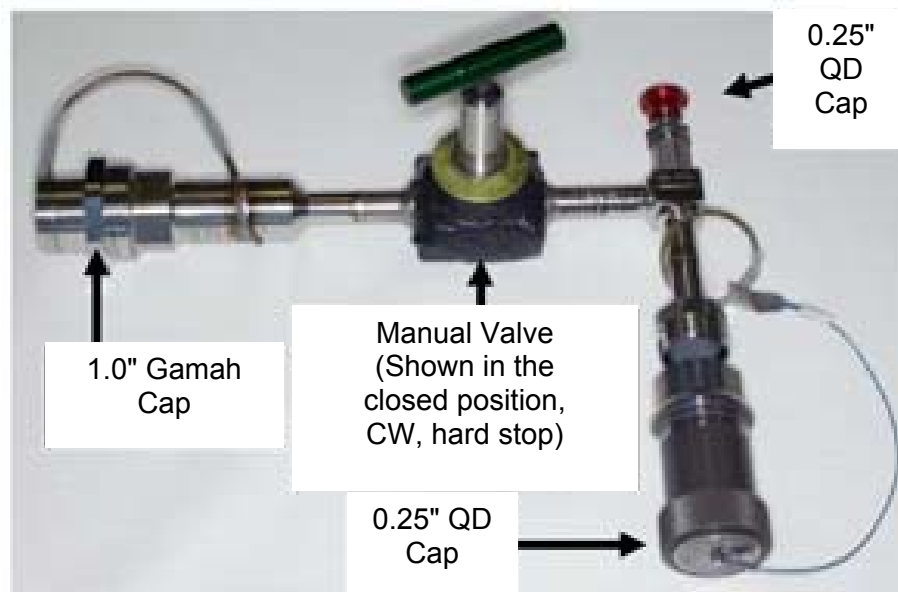


Figure 2.- Potable Water Purge/Fill Adapter.

5.1 0.5" QD Cap \leftrightarrow Potable Water Purge/Fill Adapter
Refer to Figure 2.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN) Page 6 of 21 pages



Figure 3.- NOD3D4, WRS-2 Umbilicals in Launch Restraints.

NOD3D4 5.2 0.5" QD Cap ←|→ Pre-treated Urine Line
Refer to Figure 3.

5.3 √ Potable Water Purge/Fill Adapter Manual Valve ↻ CLOSED
Refer to Figure 2.

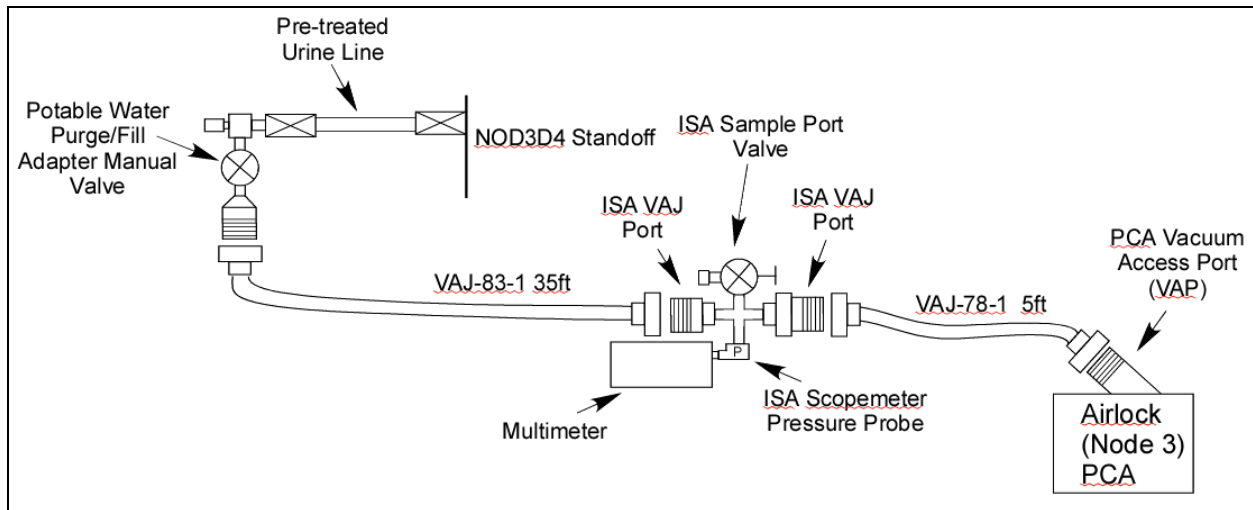


Figure 4.- ISA/VAJ/Purge Adapter Connection.

5.4 Potable Water Purge/Fill Adapter 0.5" QD →|← Pre-treated Urine Line
Refer to Figures 3 and 4.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN) Page 7 of 21 pages

- 5.5 Gamah Cap ←|→ VAJ-78-1 5ft (both ends)
Verify seals have no visible damage.
Notify **MCC-H** if any damage noted to seals.

- 5.6 1.0" Gamah Cap ←|→ Potable Water Purge/Fill Adapter
ISA VAJ Port →|← VAJ-78-1 5ft
Hand tighten.
Potable Water Purge/Fill Adapter →|← VAJ-78-1 5ft (Free end)
Hand tighten.
Refer to Figure 4.

- 5.7 √**MCC-H** to find out whether the 35 ft VAJ is being connected to the Airlock PCA VAP or the Node 3 PCA VAP

MCC-H

- 5.8 Verifying Vent Relief Isolation Valve (VRIV) and Vent Relief Control Valve (VRCV) Closed

Airlock (Node 3): ECLSS: PCA

Airlock (Node 3) ACS

'Pressure Control Assembly'

sel VRCV (Icon)

Airlock (Node 3) PCA VRCV

√Position – Closed

Airlock (Node 3): ECLSS: PCA

Airlock (Node 3) ACS

'Pressure Control Assembly'

sel VRIV (Icon)

Airlock (Node 3) PCA VRIV

√Position – Closed

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN) Page 8 of 21 pages

5.9 Disconnecting Airlock VAJ and Connecting 35 Ft VAJ to the Airlock PCA VAP if Airlock PCA Being Used

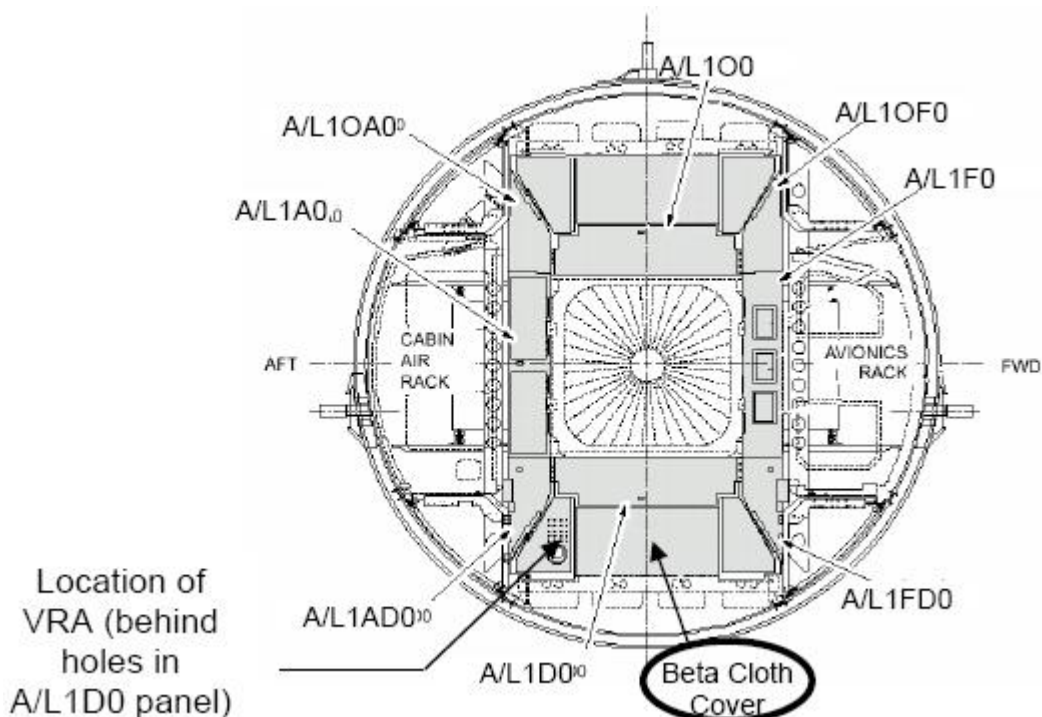


Figure 5.- Airlock Port Closeout Panels.

CAUTION

Use extreme care when removing A/L1D0 beta cloth, stowage items and when accessing the area around the Vent Relief Assembly (VRA). The VRIV J1 connector is damaged and taped in place.

NOTE

1. Before disconnecting the VAJ, access the excess VAJ hose coiled under the deck of the A/L to determine which panels need to be removed.
2. Expedition 11 and 14 crews indicated access to the disconnection of the VAJ from VRIV was able to be performed by "feel."
3. VAJ installed in Airlock is labeled "VAJ-83-2" (P/N 683-17111-3) and is referred to as "Airlock VAJ" throughout the procedure.

- 5.9.1 Remove A/L1D0 Beta Cloth Cover (Velcro).
Remove, temporarily stow items from behind Closeout.
Refer to Figure 5.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN)

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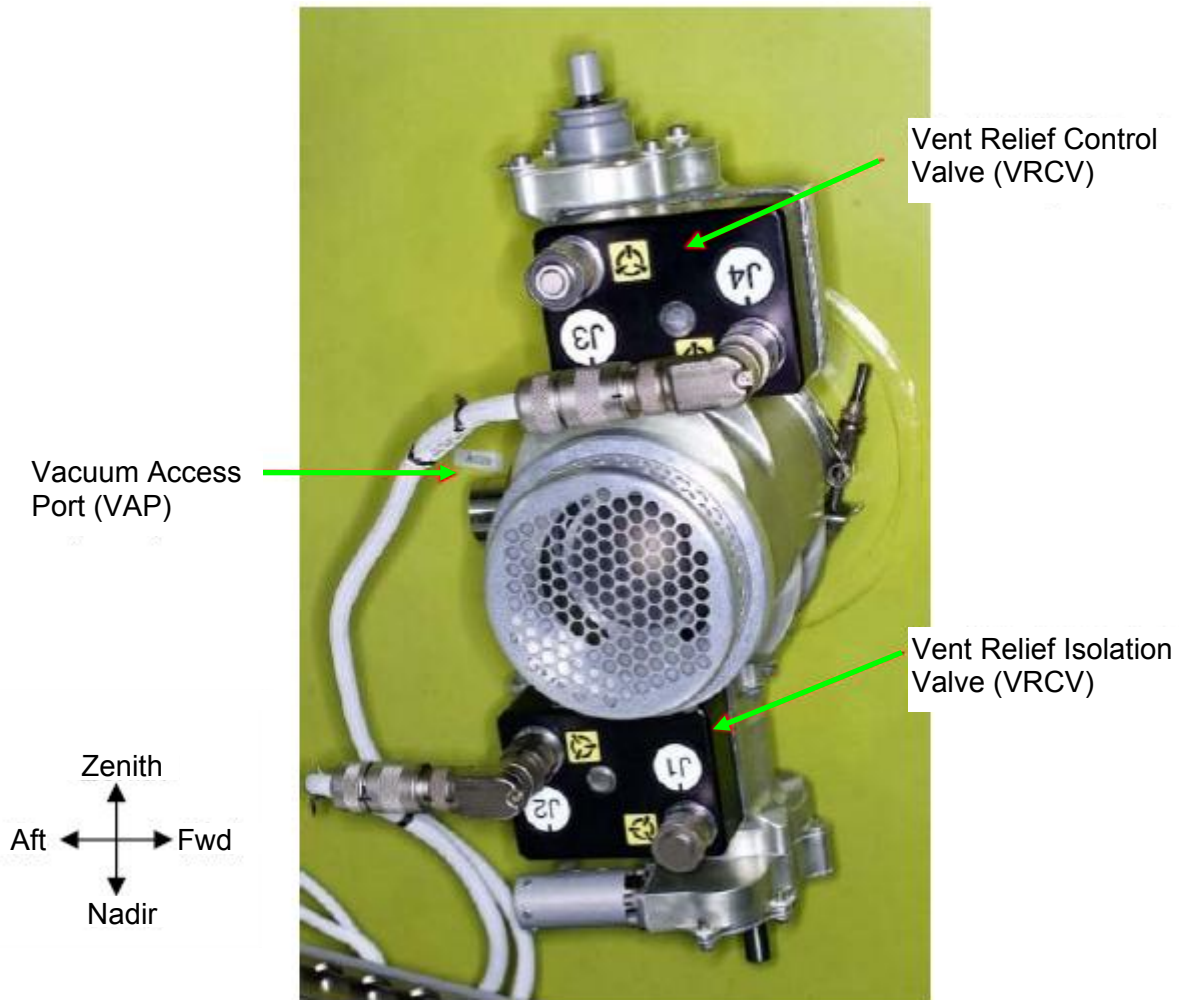


Figure 6.- Vent Relief Assembly (VRA) (VAJ Connection to VAP Not Shown).

AL1D0 5.9.2 Airlock VAJ (bent end) ←|→ VRA Vacuum Access Port (VAP), by hand
Refer to Figures 5 and 6.
Verify soft seal installed in VAJ Gamah fitting.
Inspect soft seal for damage, debris.

5.9.3 Retrieve Gamah Cap (should be temp-stowed to structure near Vacuum Access Port).
Verify seal on Gamah Cap has no visible damage.
Gamah Cap →|← Airlock VAJ
Temporarily secure free end of Airlock VAJ for future reinstallation.

NOD3FO-11 5.10 Removing Panel if Connecting to the Node 3 PCA VAP
Remove Closeout Panel NOD3FO-11, 1/4 Turn Fasteners (fourteen)
(Ratchet, 1/4" Drive; 5/32" Hex Head).
Temporarily stow Closeout Panel.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN) Page 10 of 21 pages

- 5.11 Gamah Cap ←|→ VAJ-83-1 35 ft (both ends)
Verify seals have no visible damage.
Notify **MCC-H** if any damage noted to seals.
- 5.12 Removing VAP Cap If Connecting to the Node 3 PCA VAP
Gamah Cap ←|→ PCA Vacuum Access Port (VAP)
Temporarily stow Gamah Cap on Closeout Panel (Gray Tape).

A/L1D0 (NOD3FO-11) 5.13 Mating to VAP
VAJ-83-1 35 ft (bent end) →|← PCA VAP
Hand tighten.
Refer to Figure 4.

NOD3D5 5.14 Gamah Cap ←|→ ISA VAJ Port (capped)
VAJ-83-1 35 ft (straight end) →|← ISA VAJ Port
Hand tighten.
Refer to Figure 4.

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

- 5.15 Secure ISA/VAJ Assembly.
- 5.16 Go to step 6 if VAJ is connected to Airlock PCA VAP.

6. INHIBITING POSITIVE PRESSURE RELIEF IF VAJ CONNECTED TO NODE 3 PCA VAP

<u>NOTE</u>
'Positive P Relief Failure - Node 3' Caution message will be received after PPR is inhibited. No action required. This message will return to normal once PPR is reenabled.

6.1 Suppressing Caution
C&W Summ
Caution & Warning Summary
'Event Code Tools'

sel Get Status

input Event Code – 1 7 0 5 3 ('Positive P Relief Failure - Node 3')

√SUP

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN) Page 11 of 21 pages

```
* If Event Code 17053 is not suppressed
* | Caution & Warning Summary
* | 'Event Code Tools'
* |
* | sel Suppress
* |
* | Suppress an Event
* |
* | input Event Code – 1 7 0 5 3 ('Positive P Relief Failure - Node 3')
* | cmd Arm
* | cmd Execute
```

PCS

6.2 **On MCC-H GO**
Node 3: ECLSS: PCA: PCA Commands
Node 3 PCA Commands
'Positive Press Relief'
'Inhibit'

cmd Arm (√Status – Armed)
cmd Inhibit

√Positive Pressure Relief Status – Inhibited

7. LEAK CHECKING ISA/VAJ CONNECTIONS

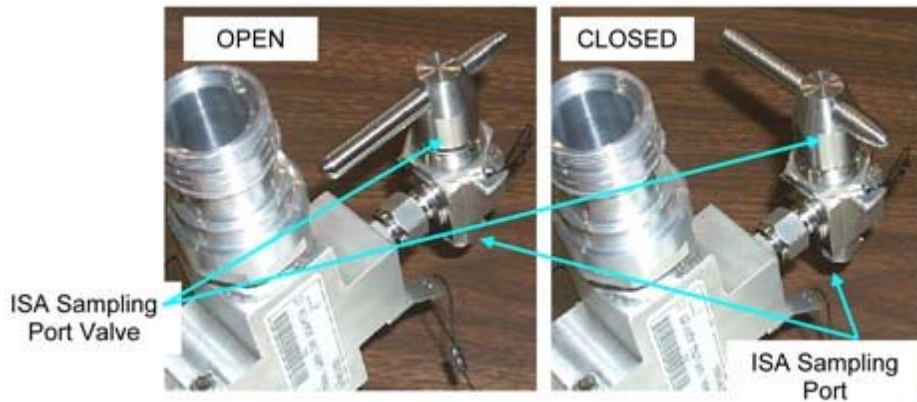


Figure 7.- ISA Sampling Port Valve.

7.1 ISA Sampling Port Valve → CLOSED
Refer to Figure 7.

WARNING

Opening the VRIV will vent the ISA and VAJs to space and may cause a loud hissing noise. Crew in the vicinity should don Quiet Ear Plugs.

7.2 Don Quiet Ear Plugs.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

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7.3 Opening PCA VRIV
Airlock (Node 3): ECLSS: PCA
Airlock (Node 3) ACS
'Pressure Control Assembly'

sel VRIV (Icon)

Airlock (Node 3) PCA VRIV
'Open'

cmd Arm (√Status – Armed)
cmd Open

√Position – Open
√Open Indicator – √

7.4 Wait 10 minutes to depressurize ISAVAJ setup.

7.5 Closing PCA VRIV
Airlock (Node 3): ECLSS: PCA
Airlock (Node 3) ACS
'Pressure Control Assembly'

sel VRIV (Icon)

Airlock (Node 3) PCA VRIV
'Close'

cmd Close

√Position – Closed
√Closed Indicator – √

7.6 Doff Quiet Ear Plugs.

7.7 Wait 3 minutes for thermal stabilization.

7.8 Rotary Switch  \overline{mV}

Multimeter 7.9 Record ISA Scopemeter Pressure Probe P₃: _____ mmHg
Record GMT: _____ GMT (____/____:____:____)

7.10 Wait 5 minutes for leak check.

7.11 Record ISA Scopemeter Pressure Probe P₄: _____ mmHg
Record GMT: _____ GMT (____/____:____:____)

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

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* If $\Delta P | P_4 - P_3 | > 10$ mmHg during monitoring period
* Notify **MCC-H** of suspected ISA/VAJ leak.
*
* \surd **MCC-H** for further instructions

8. DEPRESSURIZING NODE 3 URINE BUS

WARNING
Opening the Potable Water Purge/Fill Adapter Manual Valve will vent the Urine Bus to space and may cause a loud hissing noise. Crew in the vicinity should don Quiet Ear Plugs.

8.1 Don Quiet Ear Plugs.

PCS

8.2 Opening PCA VRIV
Airlock (Node 3): ECLSS: PCA
Airlock (Node 3) ACS
'Pressure Control Assembly'

sel VRIV (Icon)

Airlock (Node 3) PCA VRIV
'Open'

cmd Arm (\surd Status – Armed)
cmd Open

\surd Position – Open
 \surd Open Indicator – \surd

NOD3D4

8.3 Potable Water Purge/Fill Adapter Manual Valve \curvearrowright OPEN
Refer to Figure 2.

PCS

8.4 Verifying Cabin Pressure is Stable
Airlock (Node 3): ECLSS
Airlock (Node 3):ECLSS
'Cab Press'

Verify Cab Press is not decreasing.

8.5 Wait approximately 5 minutes for depressurization.

Multimeter

8.6 Verify ISA Pressure < 11 mmHgA.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

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PCS 8.7 Closing PCA VRIV
Airlock (Node 3): ECLSS: PCA
Airlock (Node 3) ACS
'Pressure Control Assembly'

sel VRIV

Airlock (Node 3) PCA VRIV
'Close'

cmd Close

√Position – Closed
√Closed Indicator – √

8.8 Doff Quiet Ear Plugs.

Multimeter 8.9 Record ISA Scopemeter Pressure Probe P₅: _____ mmHg
Record GMT: _____ GMT (____/____:____:____)

NOD3D4 8.10 Potable Water Purge/Fill Adapter Manual Valve ☞ CLOSED
Refer to Figure 2.

9. DEPRESSURIZING AND LEAK CHECKING POTABLE WATER BUS



Figure 8.- NOD3D5 WRS-1 Umbilicals With WRS-1 Potable Water Jumper QD Pointed Out.

NOD3D5 9.1 0.5" QD Cap ←|→ WRS-1 Potable Water Jumper
Refer to Figure 8.

9.2 √Potable Water Purge/Fill Adapter Manual Valve ☞ CLOSED
Refer to Figure 2.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

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NOD3D4 9.3 Potable Water Purge/Fill Adapter 0.5" QD ←|→ Pre-treated Urine Line
Refer to Figures 3 and 4.

9.4 0.5" QD Cap →|← Pre-treated Urine Line

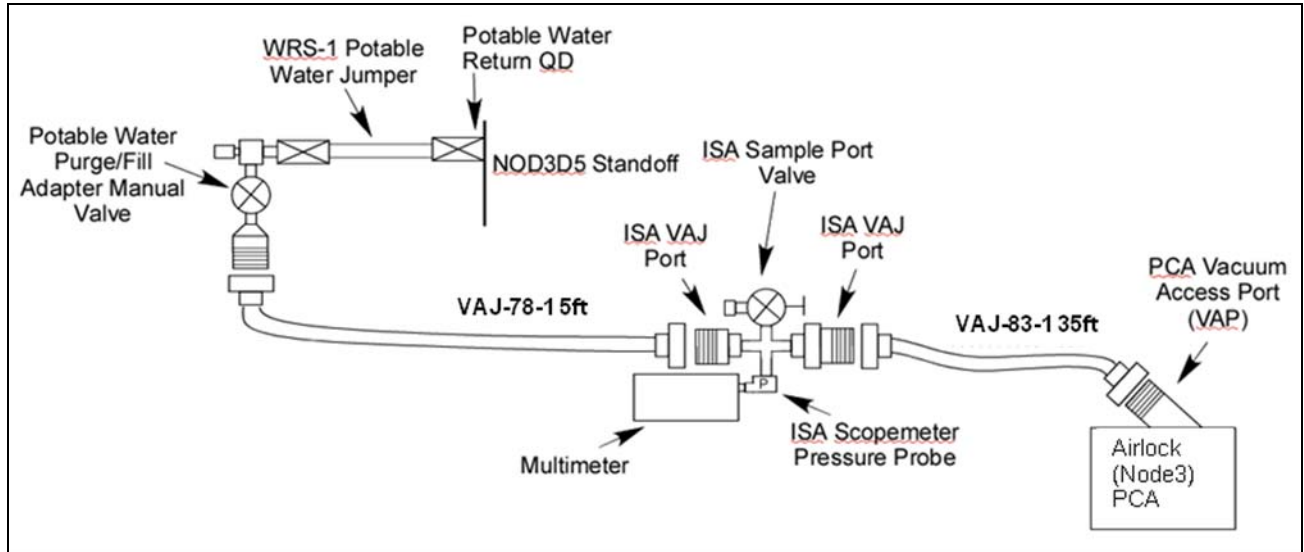


Figure 9.- ISA/VAJ/Purge Adapter Connection.

9.5 Potable Water Purge/Fill Adapter 0.5" QD →|← WRS-1 Potable Water Jumper
Refer to Figures 8 and 9.

WARNING

Opening the Potable Water Purge/Fill Adapter Manual Valve will vent the Potable Water Bus to space and may cause a loud hissing noise. Crew in the vicinity should don Quiet Ear Plugs.

9.6 Don Quiet Ear Plugs.

PCS 9.7 Opening PCA VRIV
Airlock (Node 3): ECLSS: PCA
Airlock (Node 3) ACS
'Pressure Control Assembly'

sel VRIV (Icon)

Airlock (Node 3) PCA VRIV
'Open'

cmd Arm (√Status – Armed)
cmd Open

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

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√Position – Open
√Open Indicator – √

NOD3D5 9.8 Potable Water Purge/Fill Adapter Manual Valve \curvearrowright OPEN
Refer to Figure 2.

PCS 9.9 Verifying Cabin Pressure is Stable
Airlock (Node 3): ECLSS
Airlock (Node 3):ECLSS
'Cab Press'

Verify Cab Press is not decreasing.

9.10 Wait approximately 10 minutes for depressurization.

Multimeter 9.11 Verify ISA Pressure < 11 mmHgA.

PCS 9.12 Closing PCA VRIV
Airlock (Node 3): ECLSS: PCA
Airlock (Node 3) ACS
'Pressure Control Assembly'

sel VRIV

Airlock (Node 3) PCA VRIV
'Close'

cmd Close

√Position – Closed
√Closed Indicator – √

9.13 Doff Quiet Ear Plugs.

Multimeter 9.14 Record ISA Scopemeter Pressure Probe P₆: _____ mmHg
Record GMT: _____ GMT (____/____:____:____)

NOD3D5 9.15 Potable Water Purge/Fill Adapter Manual Valve \curvearrowleft CLOSED
Refer to Figure 2.

9.16 ISA Scopemeter Pressure Probe → OFF

9.17 Rotary Switch \curvearrowright OFF

9.18 Wait 30 minutes for leak check.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

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- PCS 9.19 Opening PCA VRIV
Airlock (Node 3): ECLSS: PCA
Airlock (Node 3) ACS
'Pressure Control Assembly'
- sel VRIV (Icon)
- Airlock (Node 3) PCA VRIV
'Open'
- cmd** Arm (√Status – Armed)
cmd Open
- √Position – Open
√Open Indicator – √
- Wait 30 seconds, then:
- 9.20 Closing PCA VRIV
Airlock (Node 3): ECLSS: PCA
Airlock (Node 3) ACS
'Pressure Control Assembly'
- sel VRIV
- Airlock (Node 3) PCA VRIV
'Close'
- cmd** Close
- √Position – Closed
√Closed Indicator – √
- 9.21 ISA Scopemeter Pressure Probe → mmHgA
- 9.22 Rotary Switch ↻ \overline{mV}
- NOD3D5 9.23 Potable Water Purge/Fill Adapter Manual Valve ↻ OPEN
Refer to Figure 2.
- 9.24 Record ISA Scopemeter Pressure Probe P₇: _____ mmHg
Record GMT: _____ GMT (____/____:____:____)

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

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* If $\Delta P | P_7 - P_6 | > 9.5$ mmHg during monitoring period
* | Notify **MCC-H** of suspected Potable Bus leak.
* |
* | \surd **MCC-H** for further instructions

9.25 Notify **MCC-H** of pressure readings 1 to 7.

9.26 ISA Scopemeter Pressure Probe → OFF

9.27 Rotary Switch ↻ OFF

9.28 Venting Residual Pressure
If $P_7 \geq 11$ mmHg, repeat steps 9.6 to 9.13, then:

9.29 Go to step 10 if VAJ connected to Airlock PCA VAP.

10. ENABLING POSITIVE PRESSURE RELIEF IF VAJ CONNECT TO NODE 3 PCA VAP

PCS 10.1 **On MCC-H GO**
Node 3: ECLSS: PCA: PCA Commands
Node 3 PCA Commands
'Positive Press Relief'

cmd Enable (\surd Positive Pressure Relief Status – Enabled)

11. FILLING POTABLE WATER BUS

NOD3D5 11.1 Potable Water Purge/Fill Adapter Manual Valve ↻ CLOSED
Refer to Figure 2.

11.2 Cap ←|→ ISA Sample Port

ISA Sampling Port Valve → OPEN
Refer to Figure 5.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

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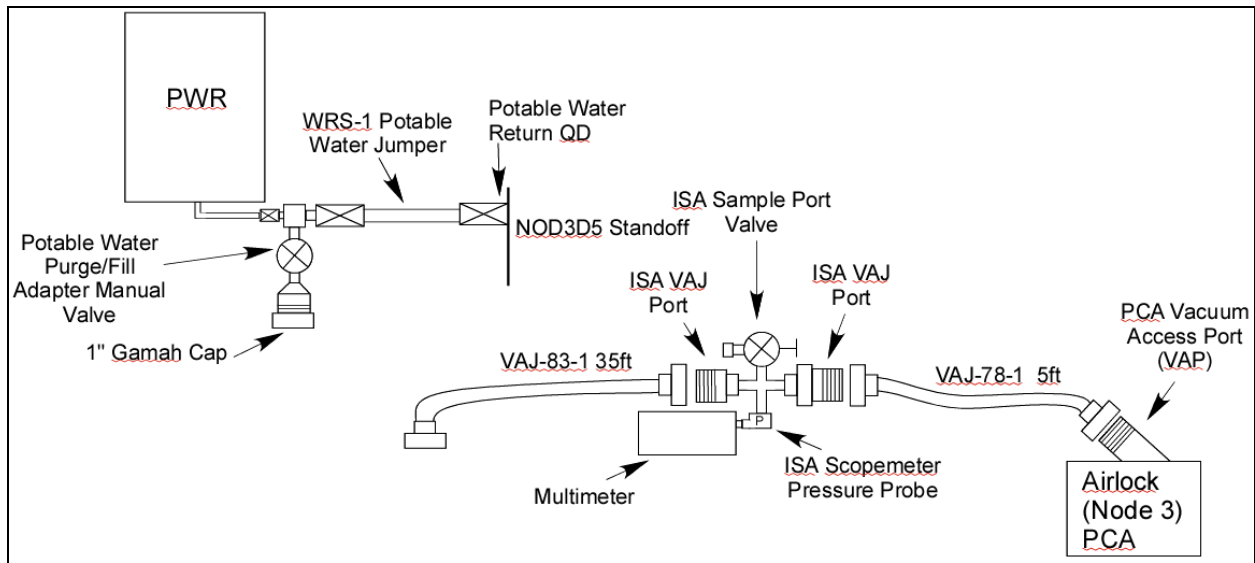


Figure 10.- PWR/Purge Adapter Connection.

CAUTION

The VAJ-78-1 5ft must be disconnected from the Potable Water Purge/Fill Adapter prior to mating the PWR to avoid getting water in the LAB PCA Vent Relief Assembly.

- 11.3 VAJ-78-1 5ft ←|→ Potable Water Purge/Fill Adapter
 1" Gamah Cap →|← Potable Water Purge/Fill Adapter
 Hand tighten.
 Gamah Cap →|← VAJ-78-1 5ft
 Hand tighten.
 Refer to Figure 10.

- 11.4 ISA Sampling Port Valve → CLOSED

Cap →|← ISA Sample Port
 Refer to Figure 7.

NOTE

- Once the PWR is mated to the Potable Water Purge/Fill Adapter, the Potable Water Bus will begin to fill.
- The volume of the potable water bus being filled is 5.48 liters (approximately 55 % of a full PWR).

- 11.5 0.25" QD Plug ←|→ PWR
 0.25" QD Cap ←|→ Potable Water Purge/Fill Adapter
 Refer to Figure 3.
 PWR →|← Potable Water Purge/Fill Adapter
 Refer to Figure 10.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN)

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- 11.6 Wait ~5 minutes for the potable water bus to fill.
When water flow has stopped, continue.

12. DISASSEMBLING, STOWING EQUIPMENT AND CONNECTING WPA TO POTABLE WATER BUS

- 12.1 PWR ←|→ Potable Water Purge/Fill Adapter
0.25" QD Plug →|← PWR
0.25" QD Cap →|← Potable Water Purge/Fill Adapter
- 12.2 Potable Water Purge/Fill Adapter ←|→ WRS-1 Potable Water Jumper
0.5" QD Plug →|← WRS-1 Potable Water Jumper
0.5" QD Cap →|← Potable Water Purge/Fill Adapter
Refer to Figure 3.

- 12.3 Multimeter ←|→ ISA Scopemeter Pressure Probe

- 12.4 VAJ-83-1 35 ft ←|→ PCA VAP
VAJ-83-1 35 ft ←|→ ISA VAJ Port
Gamah Cap →|← VAJ-83-1 35 ft (both ends)
Hand tighten.
Gamah Cap →|← ISA VAJ Port
Hand tighten.

A/L1D0

12.5 Reconnecting Airlock VAJ to Airlock VAP, If Necessary

- 12.5.1 Gamah Cap ←|→ Airlock VAJ (bent end)
Airlock VAJ (bent end) →|← AL VRA VAP, hand tighten
Secure Gamah Cap to structure (Gray Tape).
- 12.5.2 Restow items behind Beta Cloth Cover.
Install A/L1D0 Beta Cloth Cover.

NOD3FO-11

12.6 Reconnecting Gamah Cap to Node 3 VAP, If Necessary

- 12.6.1 Verify seal on PCA VAP Gamah Cap has no visible damage.
Gamah Cap →|← PCA VAP
Hand tighten.
- 12.6.2 Install Closeout Panel NOD3FO-11, fasteners (fourteen) (Ratchet, 1/4" Drive; 5/32" Hex Head).

- 12.7 VAJ-78-1 5ft ←|→ ISA VAJ Port
Gamah Cap →|← VAJ-78-1 5ft (both ends)
Hand tighten.
Gamah Cap →|← ISA VAJ Port
Hand tighten.

- 12.8 Check for FOD within 1 m radius.

1.109 NODE 1 AND NODE 3 POTABLE WATER AND URINE BUS PURGE WITH VACUUM BACKFILL OF POTABLE WATER BUS

(ASSY OPS/20A/FIN)

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- Node1/
LAB
Vestibule
- 12.9 Connecting Node 1/Node 3 Potable Bus to LAB Potable Bus
Uncap Node to Element Fluid Jumper (P/N 683-13870-7) labeled
"M/W A14 N1" and →|← A14 Fuel Cell H2O QD.
Refer to Figure 1 for connection point.
- 12.10 Reengage Vestibule Barrier Assembly 1/4 Turn Fasteners, as required, to
closeout the starboard side of the vestibule.
- 12.11 ✓ **MCC-H** to determine if step 11.13 is required next
- NOD3D5
- 12.12 Mating WRS-1 Potable Water Jumper to WRS-1 UIP
0.5" QD Plug ←|→ WRS-1 Potable Water Jumper
WRS-1 POTABLE WATER JUMPER TO: WRS-1 POTABLE WATER
RETURN →|← POTABLE WATER RETURN on WRS-1 Rack UIP
- 12.13 Stow tools and materials.
Update IMS with stowage location of hardware.

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1.110 NODE 3 NEGATIVE PRESSURE RELIEF VALVE (NPRV) INSPECTION
(ASSY OPS/20A/FIN) Page 1 of 4 pages

OBJECTIVE:

Inspect Negative Pressure Relief Valves (NPRVs) in the Node 3 Aft Stbd, Aft Port, Stbd Deck, and Stbd 0 locations, and reseal valve if deployed during launch.

LOCATION:

Installed: NOD3A2-33, NOD3D6-02, NOD3A2-13, and NOD3O6-02

DURATION:

30 minutes

CREW:

One

PARTS:

None

MATERIALS:

None

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

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

Driver Handle, 1/4" Drive

REFERENCED PROCEDURE(S):

None

1. ACCESSING AFT STBD NPRV

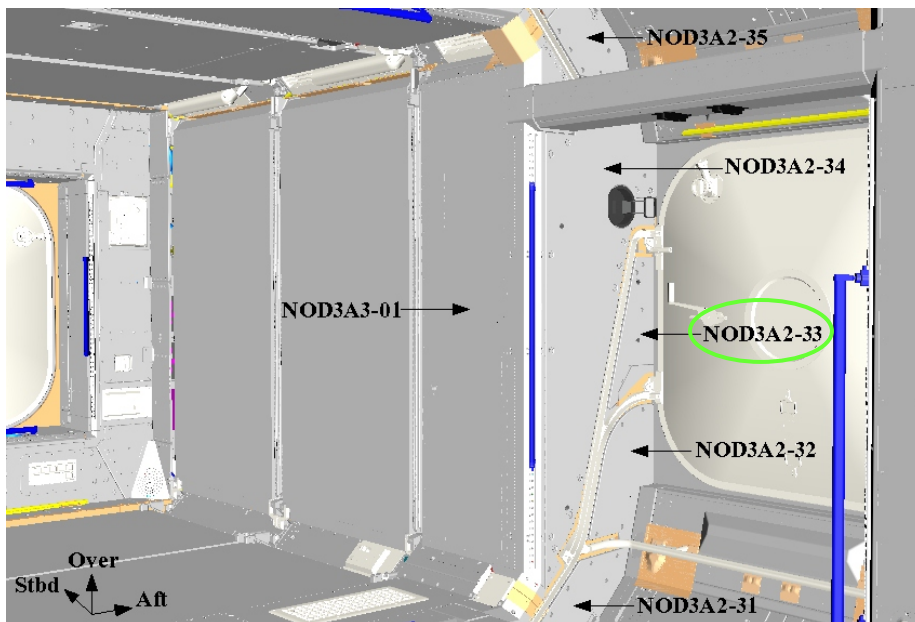


Figure 1. - Node 3 Aft Stbd Closeout Panels.

- 1.1 Remove Closeout Panel, NOD3A2-33, Fasteners (three) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Refer to Figure 1.

2. INSPECTING AFT STBD NPRV



Figure 2.- Deployed NPRV.



Figure 3.- Fully Seated NPRV.

- 2.1 Verify NPRV is fully seated. Refer to Figures 2, 3.
- 2.2 If NPRV deployed
| Press external cover toward bulkhead until cover snaps into place against Base Assembly.

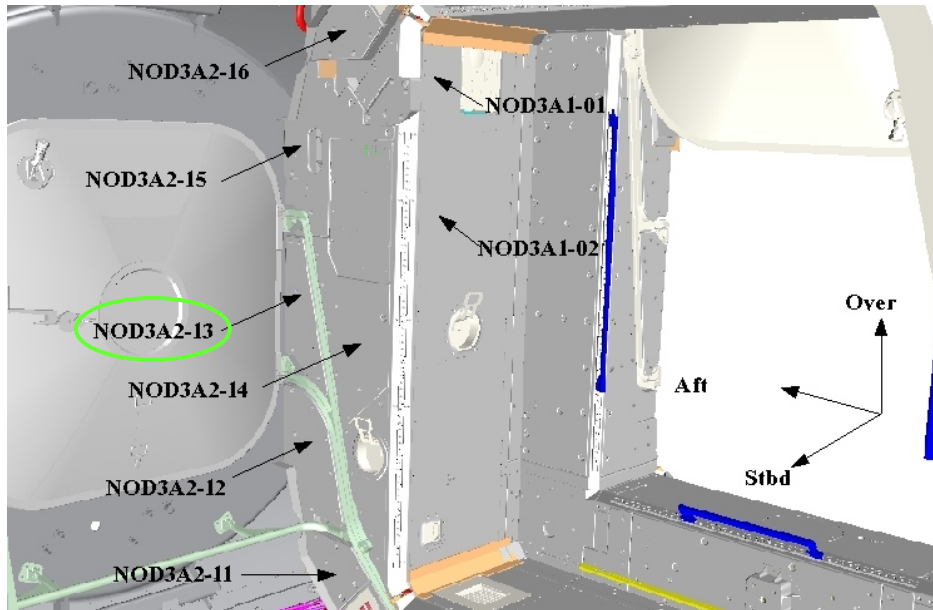


Figure 4. - Node 3 Aft Port Closeout Panels.

3. ACCESSING AFT PORT NPRV

3.1 Remove Closeout Panel, NOD3A2-13, Fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figure 4.

4. INSPECTING AFT PORT NPRV

4.1 Verify NPRV fully seated.
Refer to Figures 2, 3.

4.2 If NPRV deployed
| Press external cover toward bulkhead until cover snaps into
| place against Base Assembly.

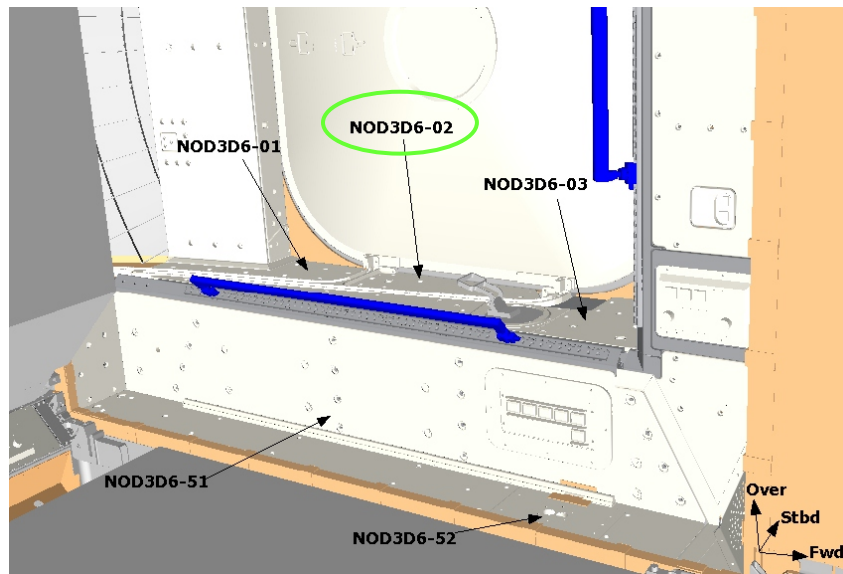


Figure 5. - Node 3 Stbd Deck Closeout Panels.

5. ACCESSING STBD DECK NPRV

5.1 Remove Closeout Panel, NOD3D6-02, Fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figure 5.

6. INSPECTING STBD DECK NPRV

6.1 Verify NPRV fully seated.
Refer to Figures 2, 3.

6.2 If NPRV deployed
| Press external cover toward bulkhead until cover snaps into
| place against Base Assembly.

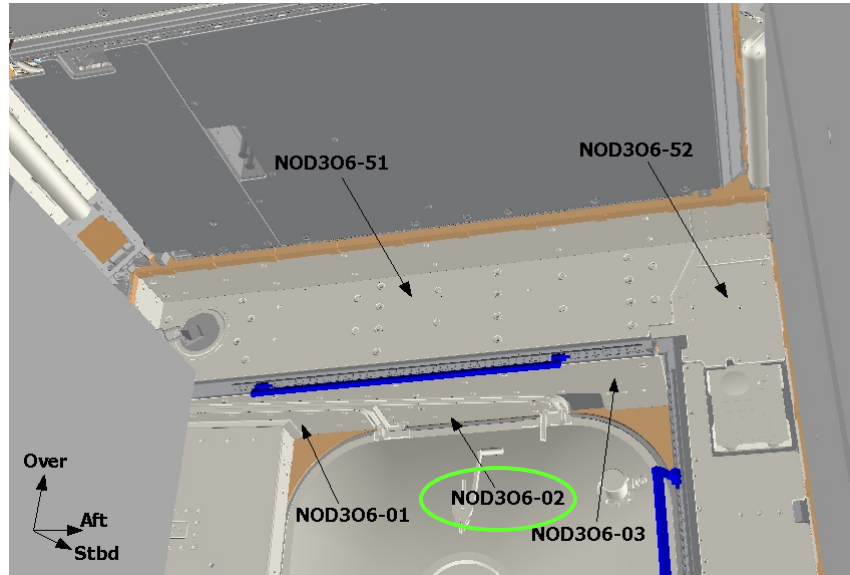


Figure 6. - Node 3 Stbd Ovhd Closeout Panels.

7. ACCESSING STBD OVHD NPRV

7.1 Remove Closeout Panel, NOD306-02, Fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Refer to Figure 6.

8. INSPECTING STBD OVHD NPRV

8.1 Verify NPRV fully seated.
Refer to Figures 2, 3.

8.2 If NPRV deployed
| Press external cover toward bulkhead until cover snaps into place against Base Assembly.

9. CLOSEOUT

9.1 Check for FOD within 1 meter of work area.

9.2 Photo document NPRVs (two) (Digital Camera).

9.3 Reinstall Closeout Panels.
Refer to Figures 1, 4, 5, and 6.

10. POST MAINTENANCE

10.1 Notify **MCC-H** of task completion and if any NPRVs were deployed (along with locations).

10.2 Stow tools and equipment.

1.111 NODE 3 OVERHEAD IMV CAP INSTALLATION

(ASSY OPS/20A/FIN)

Page 1 of 5 pages

OBJECTIVE:

Install IMV Caps on Node 3 Overhead IMV feedthroughs. Feedthroughs launched with only a single, external IMV Cap installed, which is a violation of safety requirements.

LOCATION:

NOD3O2

DURATION:

25 minutes

CREW:

One

PARTS:

IMV Cap w/Test Adapter (two) P/N 683-15016-6

Face O-Ring (two) P/N 2-255S0604

Bore O-Ring (two) P/N 2-248S0604

V-Band Coupling Clamps (two) P/N MS27115-21R

MATERIALS:

Ziplock Bag

Braycote

Disposable Gloves

Dry Wipes

TOOLS:

CSA-O2 (two)

Digital Camera

ISS IVA Toolbox:

Drawer 2:

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

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

Driver Handle, 1/4" Drive

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

1.111 NODE 3 OVERHEAD IMV CAP INSTALLATION

(ASSY OPS/20A/FIN)

Page 2 of 5 pages

1. ACCESS

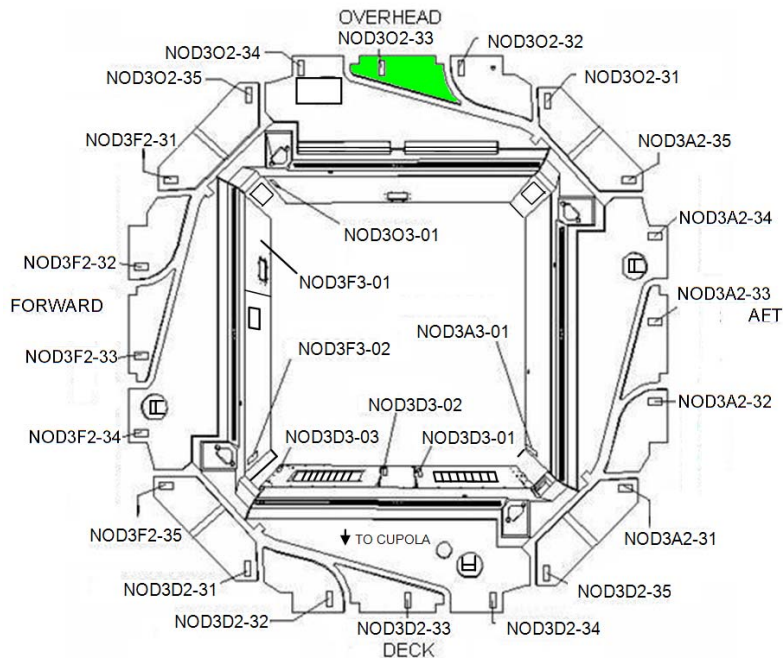


Figure 1.- Node 3 Radial Bay, looking Starboard.

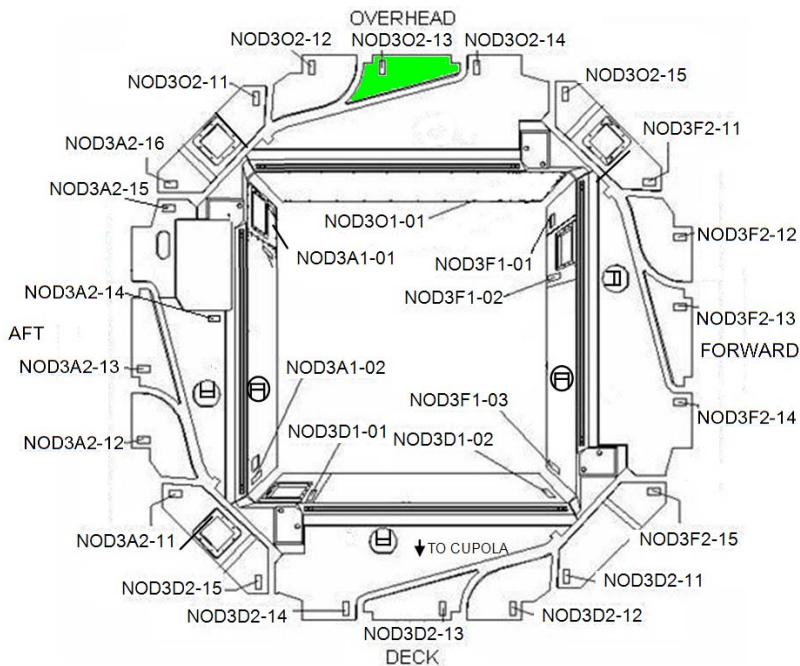


Figure 2. - Node 3 Radial Bay, looking Port.

- 1.1 If required, remove launch restraint bolts (two) from Closeout Panel NOD3O2-33 (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Stow Bolts and Washers in Ziplock Bag for later disposal. Refer to Figure 1.

1.111 NODE 3 OVERHEAD IMV CAP INSTALLATION

(ASSY OPS/20A/FIN)

Page 3 of 5 pages

- 1.2 Remove Closeout Panel NOD3O2-33, fasteners (three) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Temporarily stow.
Refer to Figure 1.
- 1.3 If required, remove launch restraint bolt (one) from Closeout Panel NOD3O2-13 (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Stow Bolt and Washers in Ziplock Bag for later disposal.
Refer to Figure 2.
- 1.4 Remove Closeout Panel NOD3O2-13, fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Temporarily stow.
Refer to Figure 2.

NOTE

Two CSA-O2 units are required to take independent samples in the open cabin in order to protect against CSA-O2 sensor error.

- 1.5 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).
- 1.6 Verify CSA-O2 sampling from both units are within 1.1 % of each other.
Verify O2 % is within nominal range specified on CSA-O2 Decal.
- 1.7 Perform CSA-O2 sampling behind removed Closeout Panel.
Verify O2 % is within nominal range specified on CSA-O2 Decal.

2. INSTALLING IMV CAPS

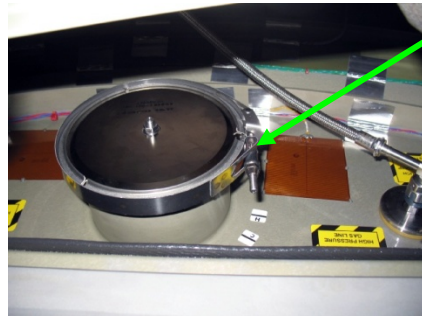


Figure 3.- Plastic Protective Cover Installed on IMV Feedthrough Flange.

1.111 NODE 3 OVERHEAD IMV CAP INSTALLATION

(ASSY OPS/20A/FIN)

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V-Band Clamp

Figure 4.- Example IMV Cap w/Test Adapter Installed.

NOTE

Ground processing photos indicate that Node 3 IMV feedthroughs may have launched with plastic protective covers installed. This configuration is not expected, but if the covers are present, they will be removed.

- 2.1 If present, remove plastic protective cover from IMV feedthrough flange.
Refer to Figure 3.
 - 2.2 For each installation location, record the following:
 - Node 3 Overhead Port IMV Feedthrough:
IMV Cap Part Number: _____
IMV Cap Serial Number or Barcode: _____
 - Node 3 Overhead Starboard IMV Feedthrough:
IMV Cap Part Number: _____
IMV Cap Serial Number or Barcode: _____
 - 2.3 Inspect IMV Cap and Feedthrough sealing surfaces for debris or damage.
As required, clean IMV Cap and IMV Feedthrough sealing surfaces (Dry Wipe).
 - 2.4 Don Disposable Gloves.
 - 2.5 Apply small drop of Braycote to index finger.
Create a thin film between index finger and thumb.
Grasp Face O-Ring.
Using finger and thumb, apply thin film of Braycote to Face O-Ring.
Install Face O-Ring on IMV Cap.
 - 2.6 Repeat step 2.5 for Bore O-Ring.
- NOD302-13 2.7 Install IMV Cap (P/N 683-15016-6) with V-Band Clamp, torque to 38 in-lbs [Driver Handle, 1/4" Drive, 7/16" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].

1.111 NODE 3 OVERHEAD IMV CAP INSTALLATION

(ASSY OPS/20A/FIN)

Page 5 of 5 pages

2.8 Repeat step 2.1 to 2.7 to install remaining IMV Cap on IMV Flange behind NOD1O2-33 Closeout.

2.9 Doff Disposable Gloves.

2.10 Photo document newly installed hardware (Digital Camera).

3. CLOSEOUT

3.1 Install Closeout Panel NOD3O2-13, fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

3.2 Install Closeout Panel NOD3O2-33, fasteners (three) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

4. POST MAINTENANCE

4.1 Notify **MCC-H** of task completion, whether plastic protective cover was present on bulkhead, and information recorded in step 2.2. Stow all parts, tools, and materials.

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1.112 PORTABLE FIRE EXTINGUISHER AND PORTABLE BREATHING APPARATUS INSTALLATION

(ASSY OPS/20A/FIN 1) Page 1 of 7 pages

OBJECTIVE:

Inspect, install Portable Breathing Apparatuses (PBAs) (each consists of Quick Don Mask Assembly (QDMA) and Oxygen Bottle) and Portable Fire Extinguisher. An Extension Hose Tee Kit will be installed in the NOD3A6 location only.

LOCATION:

NOD3A2-14 (Aft Alcove)
NOD3A6 (Starboard Aft Endcone)

DURATION:

35 minutes

PARTS:

Extension Hose Tee Kit (EHTK)
PBAs (two)
PFE

MATERIALS:

None

TOOLS:

ISS IVA Toolbox:

Drawer 2:

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

1. AFT ALCOVE EMERGENCY LOCKER PFE INSTALLATION

- 1.1 If required, unfasten, remove Launch Bolts (five) from Alcove Aft Emergency Locker panel (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Stow Launch Bolts.

Open Emergency Locker Door using Door Latch.
Refer to Figure 1.

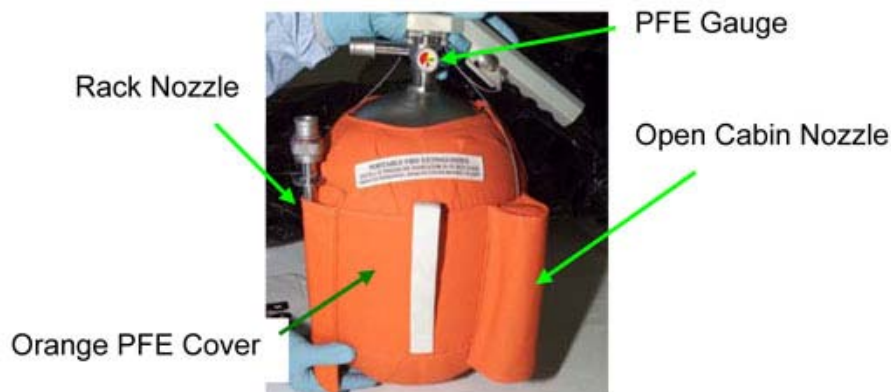


Figure 1.- PFE with Nozzles.

1.112 PORTABLE FIRE EXTINGUISHER AND PORTABLE BREATHING APPARATUS INSTALLATION

(ASSY OPS/20A/FIN 1) Page 2 of 7 pages

- 1.2 Retrieve PFE from stowage location.
Verify both nozzles stowed, tethered on PFE.
Verify Orange PFE Cover on PFE.
Verify gauge needle in green.
Refer to Figure 1.

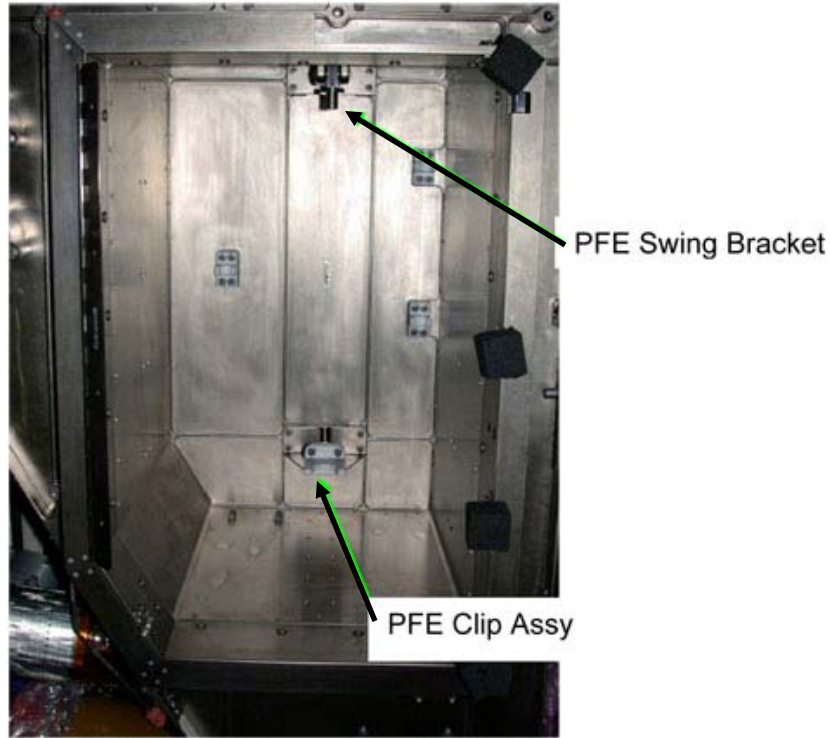


Figure 2.- PFE Install Location.

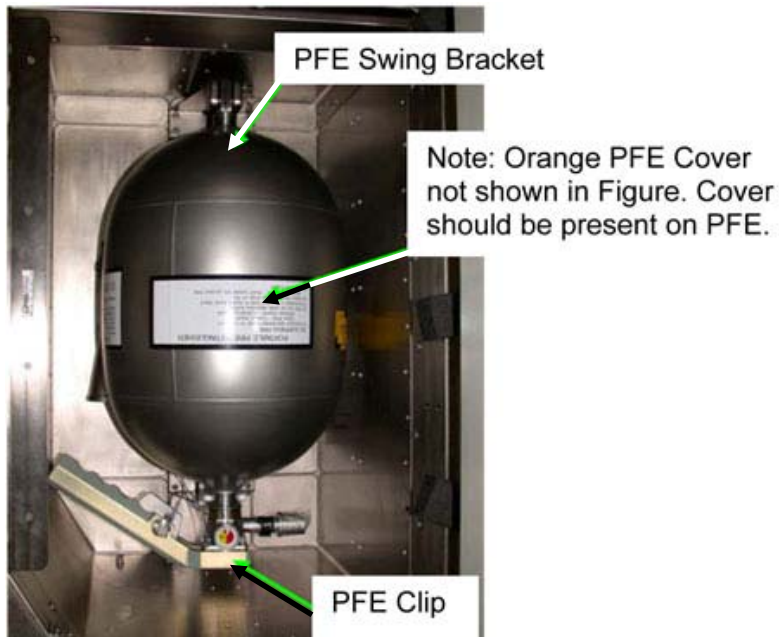


Figure 3.- PFE Installed.

1.112 PORTABLE FIRE EXTINGUISHER AND PORTABLE BREATHING APPARATUS INSTALLATION

(ASSY OPS/20A/FIN 1) Page 3 of 7 pages

- 1.3 Engage Swing Bracket Assembly with bottom of PFE. Refer to Figures 2, 3.
- 1.4 Slide neck of PFE into Clip Assembly. Refer to Figures 2, 3.

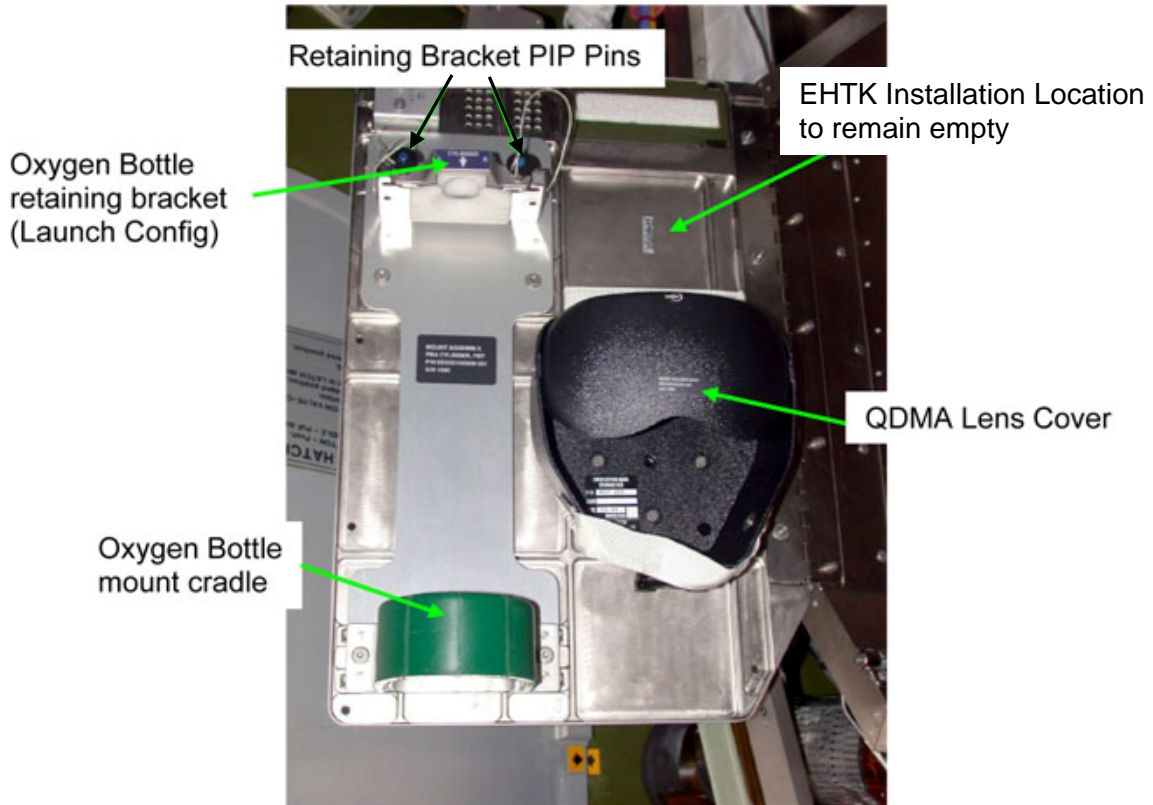


Figure 4.- PBA Install Location.

2. AFT ALCOVE EMERGENCY LOCKER PBA INSTALL

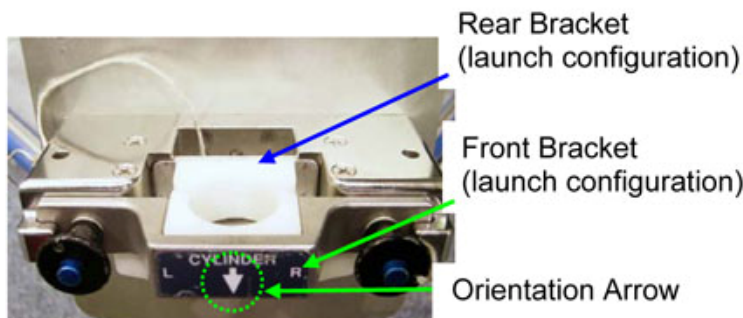


Figure 5.- Oxygen Bottle Retaining Bracket.

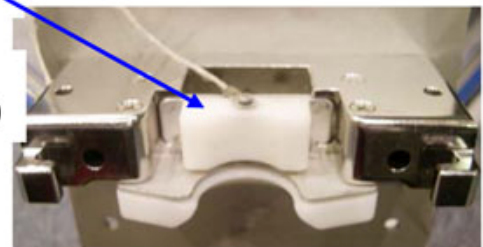


Figure 6.- Oxygen Bottle Rear Bracket.

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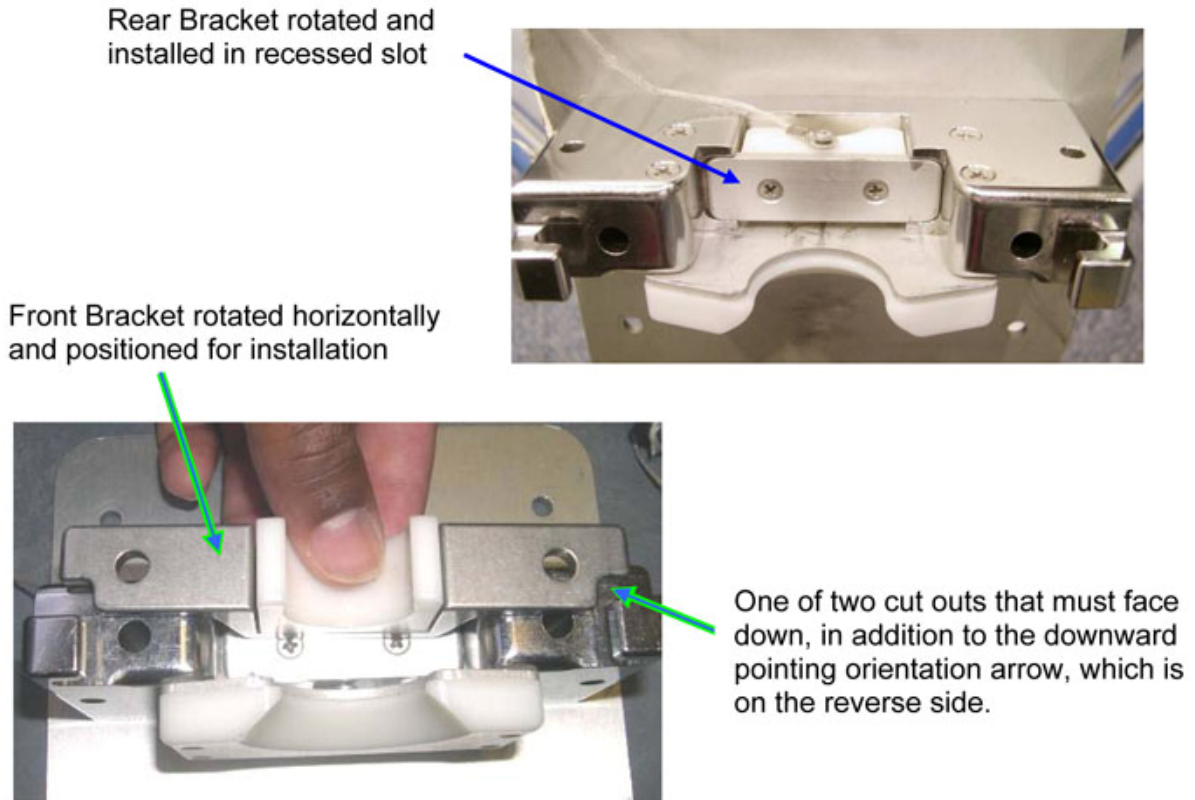


Figure 7.- Front and Rear Brackets in On-orbit Configuration.

- 2.1 Remove tethered PIP Pins (two) to release front and rear brackets. Refer to Figures 4, 5, 6, 7.
- 2.2 Rotate and install rear bracket in recessed slot. Refer to Figures 5, 6, 7.
- 2.3 Horizontally rotate front bracket and install with two cutouts and orientation arrow pointing down. Reinstall PIP Pins. Refer to Figures 4, 5, 7.

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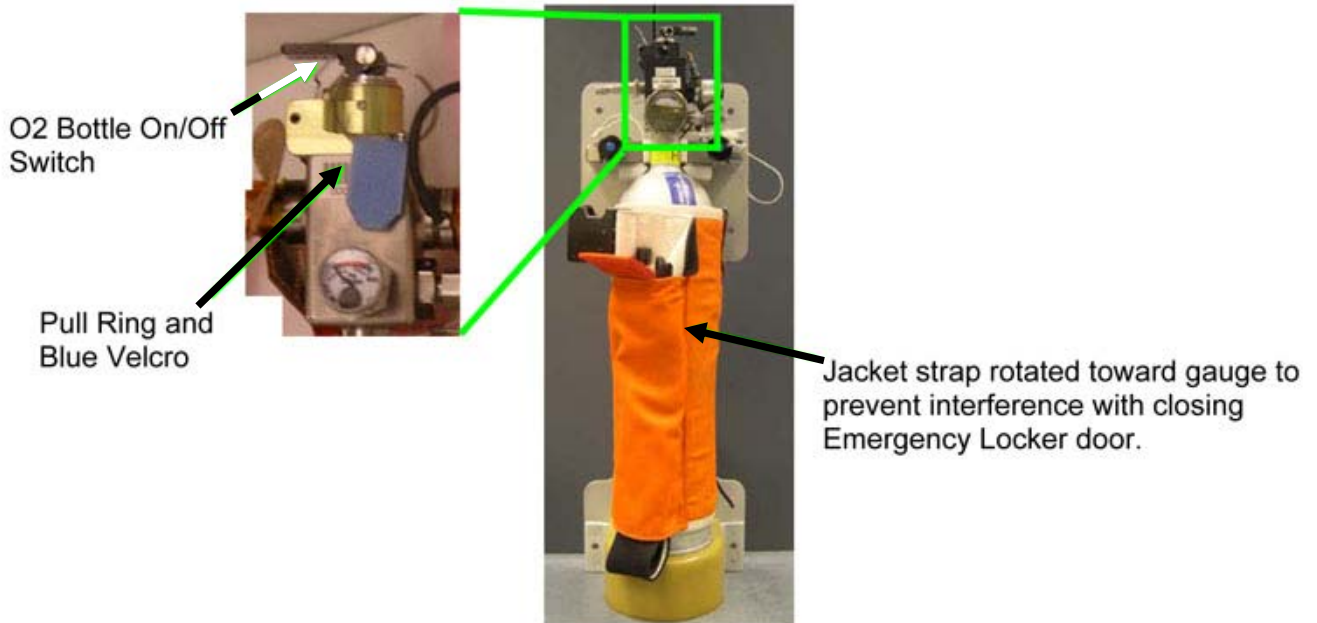


Figure 8.- PBA Installed in Bracket with Jacket Rotated.

- 2.4 Verify gauge needle is in Green Zone, aligned with or above previous Sharpie reference mark.
Refer to Figure 8.
 - 2.5 Rotate PBA Oxygen Bottle Jacket so that it is in line with the gauge and will not interfere with installing bottle on bracket or closing Emergency Locker door.
Refer to Figure 8.
 - 2.6 Lower Oxygen Bottle of PBA onto mount cradle.
 - 2.7 Push top of Oxygen Bottle into retaining bracket.
 - 2.8 Insert QDMA into Lens Cover.
 - 2.9 If installed
| Pull launch restraint pin from O2 Bottle On/Off switch (Blue
| Velcro, Pull Ring).
- Stow Pin or Ring for trash.
Refer to Figure 8.
- 2.10 Verify hoses are cleared from pinch points, and close Emergency Locker Door.

1.112 PORTABLE FIRE EXTINGUISHER AND PORTABLE BREATHING APPARATUS INSTALLATION

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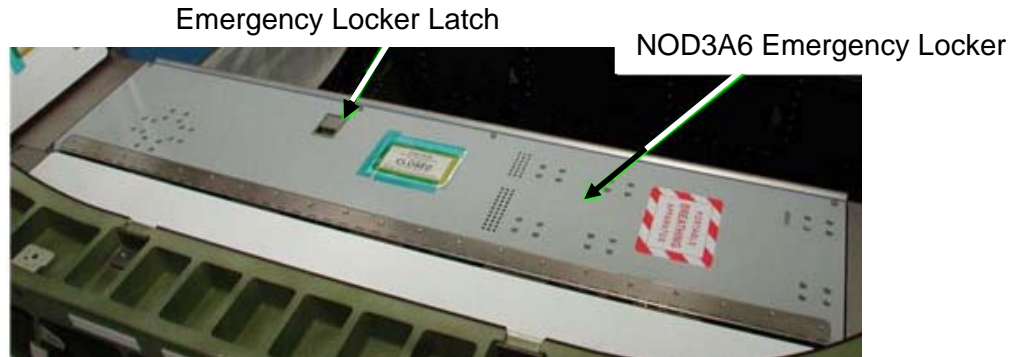


Figure 9.- NOD3A6 Emergency Locker.

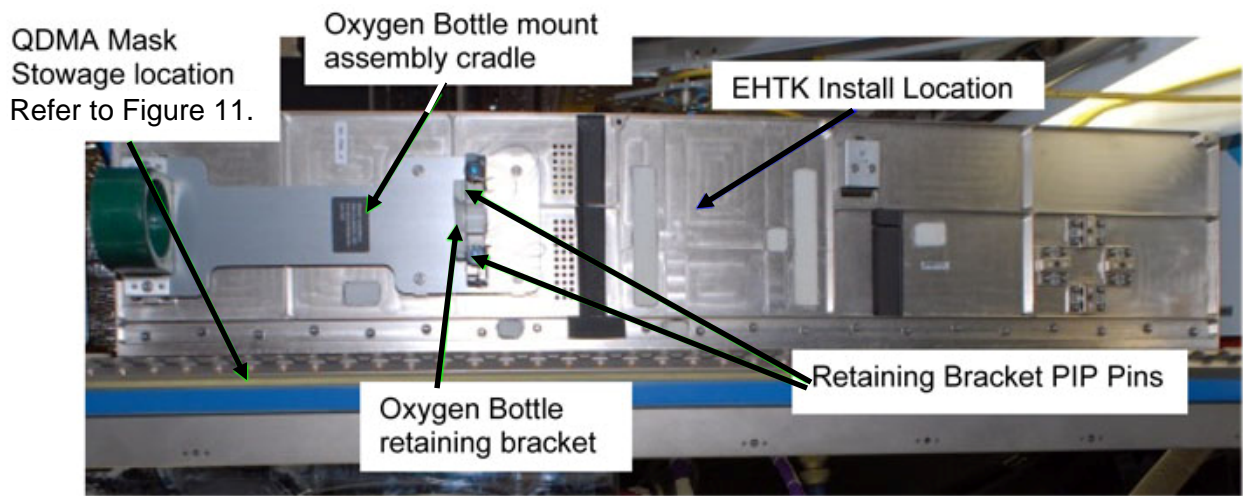


Figure 10.- NOD3A6 Emergency Locker Open (Node 2 Photo).

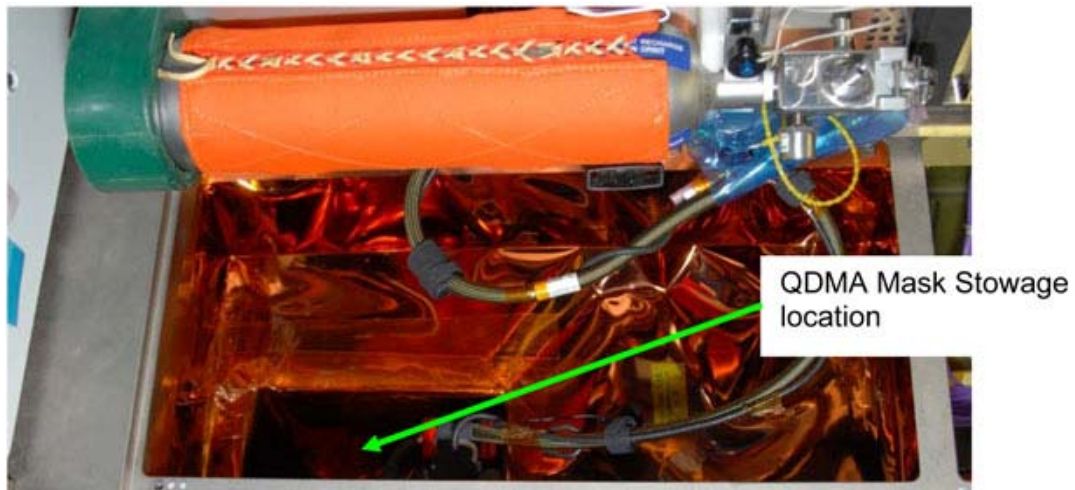


Figure 11.- NOD3A6 QDMA Mask Stowage Location.

1.112 PORTABLE FIRE EXTINGUISHER AND PORTABLE BREATHING APPARATUS INSTALLATION

(ASSY OPS/20A/FIN 1) Page 7 of 7 pages

3. NOD3A6 EMERGENCY LOCKER PBA INSTALLATION

- 3.1 If required, unfasten, remove Launch Bolts (four) from panel
NOD3A6-01 Emergency Locker (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Stow Launch Bolts.

Disengage latch and open locker by pulling the latch with finger.
Refer to Figures 9, 10.

- 3.2 Unstow and install, Extension Hose Tee Kit (EHTK) using Velcro, on Emergency Box Door.
- 3.3 Remove tethered PIP Pins (two) to release front and rear brackets.
Refer to Figures 4, 5, 6, 7.
- 3.4 Rotate and install rear bracket in recessed slot.
Refer to Figures 5, 6, 7.
- 3.5 Horizontally rotate front bracket and install with two cutouts, and orientation arrow pointing down.
Reinstall PIP Pins.
Refer to Figures 4, 5, 7.
- 3.6 Rotate PBA Oxygen Bottle Jacket so that it is in line with the gauge and will not interfere with installing bottle on bracket or closing Emergency Locker door.
Refer to Figure 8.
- 3.7 Lower Oxygen Bottle of PBA onto mount cradle.
- 3.8 Push top of Oxygen Bottle into retaining bracket.
- 3.9 Insert QDMA into Mask Stowage Location.
Refer to Figure 11.
- 3.10 Verify hoses are cleared from pinch points, then close Emergency Locker Door.

4. POST MAINTENANCE

- 4.1 Notify **MCC-H** of task completion.
- 4.2 Update IMS with stowage locations.

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1.114 NODE 3 PORT-AFT IMV CAP INSTALLATION

(ASSY OPS/20A/FIN 1) Page 1 of 7 pages

OBJECTIVE:

Install IMV Cap on Node 3 Port-Aft feedthrough prior to Cupola Relocation.

LOCATION:

NOD3A0

DURATION:

1 hour

CREW:

One

PARTS:

IMV Cap w/Test Adapter P/N 683-15016-6

V-Flange IMV Cap P/N 683-15016-1

Face O-Ring (two) P/N 2-255S0604

Bore O-Ring (two) P/N 2-248S0604

MATERIALS:

Ziplock Bag

Braycote

Disposable Gloves

Dry Wipes

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

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

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

Driver Handle, 1/4" Drive

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

1.114 NODE 3 PORT-AFT IMV CAP INSTALLATION

(ASSY OPS/20A/FIN 1) Page 2 of 7 pages

1. ACCESS

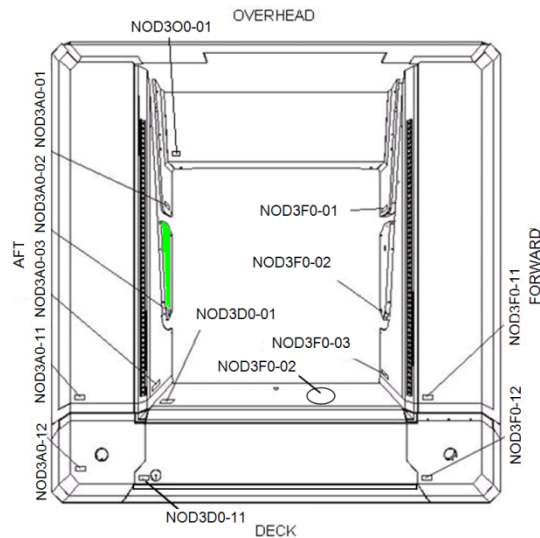


Figure 1.- Node 3 Port Endcone.

- 1.1 If required, remove launch restraint bolts (two) from Closeout Panel NOD3A0-02 (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Stow Bolts and Washers in Ziplock Bag.
- 1.2 Remove Closeout Panel NOD3A0-02, fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Temporarily stow. Refer to Figure 1.

NOTE

Two CSA-O2 units are required to take independent samples in the open cabin in order to protect against CSA-O2 sensor error.

- 1.3 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).
- 1.4 Verify CSA-O2 sampling from both units are within 1.1 % of each other.
Verify O2 % is within nominal range specified on CSA-O2 Decal.
- 1.5 Perform CSA-O2 sampling behind removed Closeout Panel.
Verify O2 % is within nominal range specified on CSA-O2 Decal.

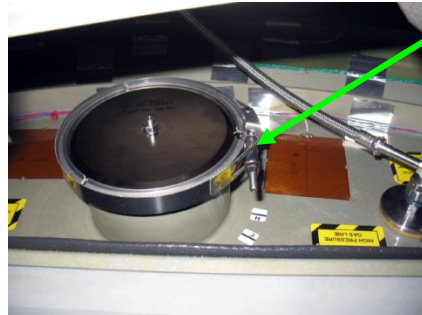
2. INSTALLING INTERNAL IMV CAP

- 2.1 Loosen V-Band Clamp fastener (one) (Driver Handle, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive).
Remove V-Band Clamp, IMV Flange Saver (P/N 683-15016-8).
Temporarily stow IMV Flange Saver.

1.114 NODE 3 PORT-AFT IMV CAP INSTALLATION

(ASSY OPS/20A/FIN 1)

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V-Band Clamp

Figure 2.- Example IMV Cap w/Test Adapter Installed.

- 2.2 Verify part number of IMV Cap w/Test Adapter: 683-15016-6.
Record Serial Number or Barcode: _____
- 2.3 Inspect IMV Cap and Feedthrough sealing surfaces for debris or damage.
As required, clean IMV Cap and IMV Feedthrough sealing surfaces (Dry Wipe).
- 2.4 Don Disposable Gloves.
- 2.5 Apply small drop of Braycote to index finger.
Create a thin film between index finger and thumb.
Grasp Face O-Ring.
Using finger and thumb, apply thin film of Braycote to Face O-Ring.
Install Face O-Ring on IMV Cap.
- 2.6 Repeat step 2.5 for Bore O-Ring.
- 2.7 Doff Disposable Gloves.
- 2.8 Install IMV Cap w/Test Adapter (P/N 683-15016-6) with V-Band Clamp, torque to 38 in-lbs [Driver Handle, 1/4" Drive, 7/16" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].
- 2.9 Photo document newly installed hardware (Digital Camera).
- 2.10 Replace Closeout Panel NOD3A0-02, fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figure 1.

1.114 NODE 3 PORT-AFT IMV CAP INSTALLATION

(ASSY OPS/20A/FIN 1) Page 4 of 7 pages

3. INSTALLING EXTERNAL IMV CAP

CAUTION	
1.	Care must be taken while working in the vicinity of Hatch Seal to avoid rubbing, scratching, or placing any type of direct pressure on Seal. Damaging Hatch Seal could prevent Hatch from maintaining pressure when closed.
2.	The Cupola CBCS Assembly is installed in the Cupola Vestibule. The Cupola CBCS Assembly mirror integrity is essential for the subsequent Cupola relocation tasks and crew should avoid unnecessary contact with the Cupola CBCS Assembly and mirror during this procedure.

NOTE	
Once opened, the Node 3 Port Hatch will remain open for the installation of a CBM Center Disk Cover. It will not be closed during this procedure.	

- 3.1 Open Node 3 Port Hatch per decal.
- 3.2 Perform CSA-O2 sampling in Cupola volume.
Verify O2 % is within nominal range specified on CSA-O2 Decal.

PCBM Alignment Guides (covered by blue protective material on ground)

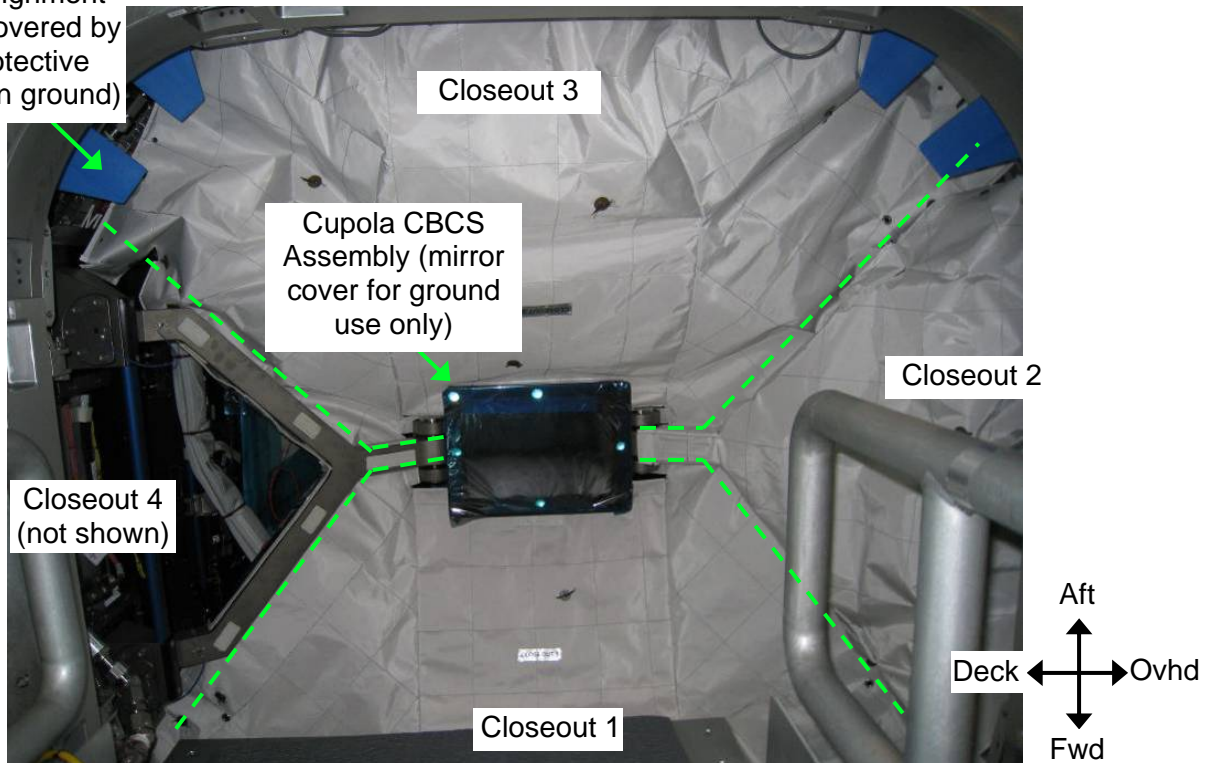


Figure 3.- Cupola Internal MLI (Closeout 4 Not Installed).

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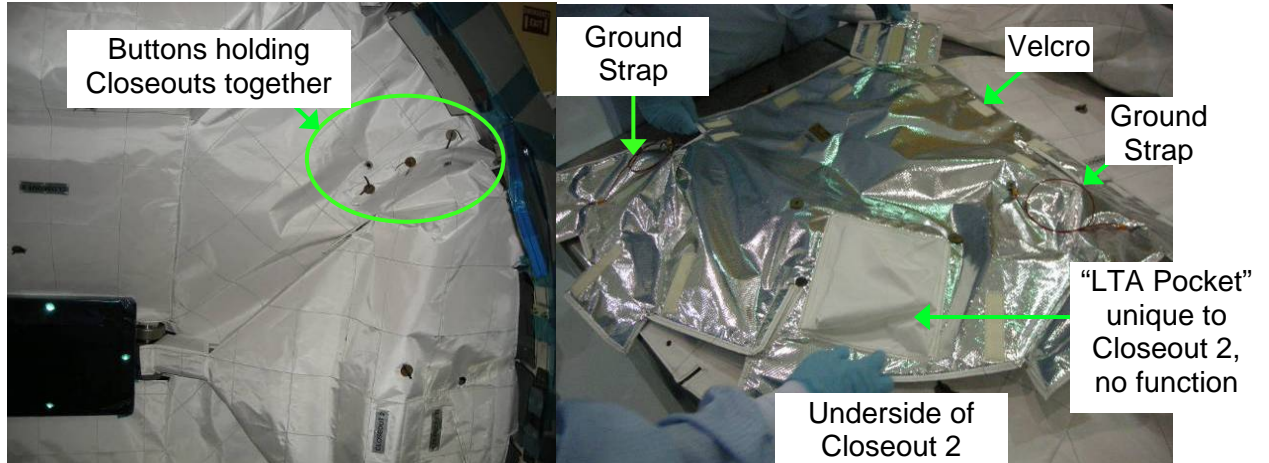


Figure 4.- Cupola Internal MLI Buttons, Velcro for Installation.

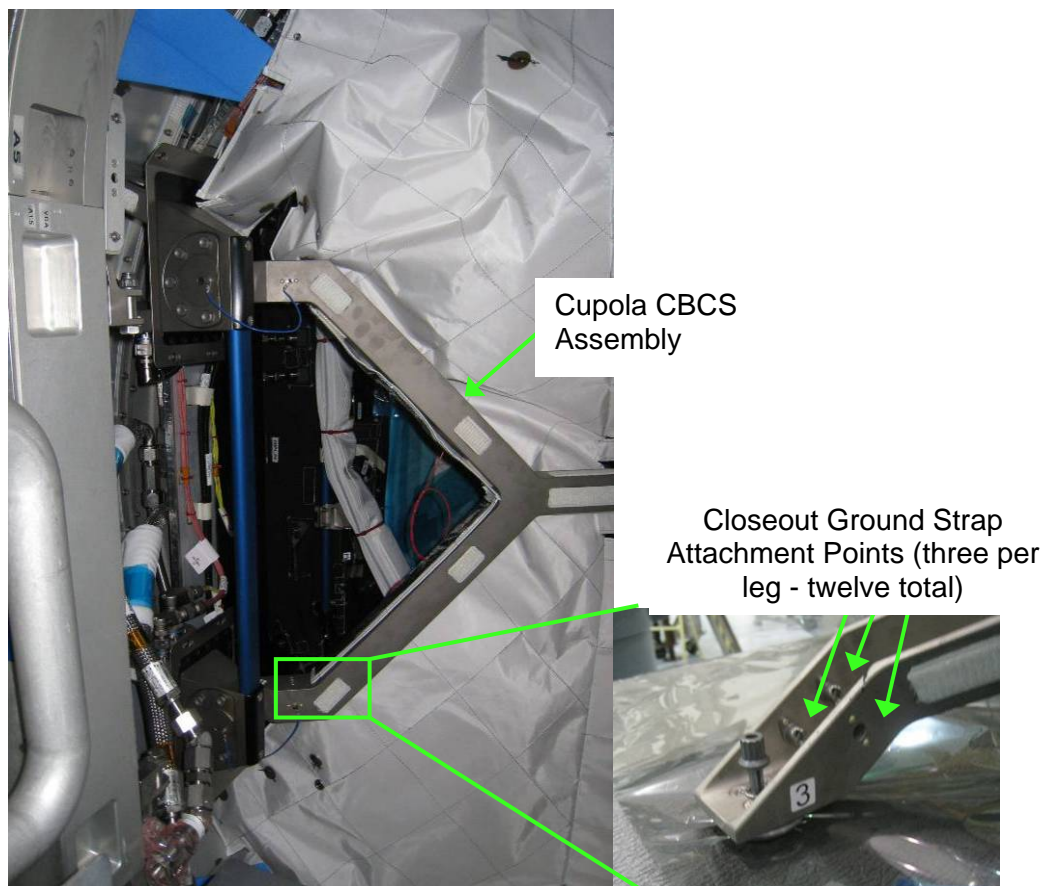


Figure 5.- Closeout Ground Strap Attachment Points on Cupola CBCS Assembly.

1.114 NODE 3 PORT-AFT IMV CAP INSTALLATION

(ASSY OPS/20A/FIN 1) Page 6 of 7 pages

NOTE

1. The Cupola internal MLI is composed of four Closeout sections attached to Cupola and the Cupola CBCS Assembly partially by Velcro.
2. Closeouts 1 and 3 (large sections) have four Ground Straps that attach to the Cupola CBCS Assembly. Closeouts 2 and 4 (small, triangular) have two ground straps that attach to the Cupola CBCS Assembly.
3. The Closeouts attach to one another with buttons.

- 3.3 If required, remove Cupola internal MLI for access to IMV Feedthrough
Release Velcro holding Closeout 3 to Cupola secondary structure, Cupola CBCS Assembly, and PCBM.
Release buttons holding Closeout 3 to Closeouts 2 and 4.
Fold Closeout 3 away from worksite, using care to not strain ground straps.
Refer to Figures 3, 4, 5.
- 3.4 If required, remove CPA for access to IMV Feedthrough
For Aft CPA only
Perform [1.101 CBM CONTROLLER PANEL ASSEMBLY REMOVAL - GENERIC](#), steps 2.2 to 4.4, 4.7 (SODF: S&M: NOMINAL: VESTIBULE), then:
Temporarily stow CPA.
- 3.5 Loosen V-Band Clamp Fastener (one) (Driver Handle, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive).
Remove V-Band Clamp, IMV Flange Saver (P/N 683-15016-8).
Temporarily stow IMV Flange Saver.
- 3.6 Verify part number of V-Flange IMV Cap: 683-15016-1.
Record Serial Number or Barcode: _____
- 3.7 Inspect IMV Cap and Feedthrough sealing surfaces for debris or damage. As required, clean IMV Cap and IMV Feedthrough sealing surfaces (Dry Wipe).
- 3.8 Don Disposable Gloves.
- 3.9 Apply small drop of Braycote to index finger.
Create a thin film between index finger and thumb.
Grasp Face O-Ring.
Using finger and thumb, apply thin film of Braycote to Face O-Ring.
Install Face O-Ring on IMV Cap.
- 3.10 Repeat step 3.9 for Bore O-Ring.

1.114 NODE 3 PORT-AFT IMV CAP INSTALLATION

(ASSY OPS/20A/FIN 1) Page 7 of 7 pages

- 3.11 Doff Disposable Gloves.
 - 3.12 Install V-Flange IMV Cap (P/N 683-15016-1) with V-Band Clamp, torque to 38 in-lbs [Driver Handle, 1/4" Drive, 7/16" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].
 - 3.13 Photo document newly installed hardware (Digital Camera).
 - 3.14 If CPA was removed in step 3.4,
 - Perform [1.100 CBM CONTROLLER PANEL ASSEMBLY - GENERIC](#), steps 3.1 to 3.6, 4.1, 4.3 (SODF: S&M: NOMINAL: VESTIBULE), then:
 - 3.15 If MLI was removed in step 3.3
 - Replace Cupola internal MLI.
 - Install all buttons holding Closeouts together.
 - Fasten Velcro holding Closeout 3 to Cupola secondary structure, Cupola CBCS Assembly, and PCBM.
 - Refer to Figures 3, 4, 5.
 - 3.16 Inspect vestibule area for the following:
 - No FOD
 - CBM Capture Latches clear of obstructions
 - CBM Capture Fittings clear of MLI
 - 3.17 Photo document final configuration of Cupola internal MLI and Cupola CBCS Assembly (Digital Camera).
4. [POST MAINTENANCE](#)
- 4.1 Notify **MCC-H** of task completion and information recorded in steps 2.2 and 3.6.
Stow all parts, tools, and materials.

Table 1. Restow Hardware

Part Name	Part Number	Qty
IMV Flange Saver	683-15016-8	two

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1.115 NODE 3 PCA VRIV/VRCV/NIV/OIV CHECKOUT

(ASSY OPS/20A/FIN)

Page 1 of 2 pages

OBJECTIVE:

Performs a checkout of the Node 3 PCA VRIV, VRCV, NIV and OIV.

NOTE

'Positive P Relief Failure - Node 3' Caution message will be received after PPR is inhibited. No action required. Message will return to normal once PPR is reenabled.

- PCS
1. INHIBITING PPR
Node 3: ECLSS: PCA: PCA Commands
Node 3 PCA Commands
'Positive Pressure Relief'

cmd Arm ($\sqrt{\text{Status}}$ – Armed)
cmd Inhibit ($\sqrt{\text{Status}}$ – Inhibited)

2. VRIV CHECKOUT
Node 3: ECLSS: PCA: VRCV
Node 3 PCA VRCV

$\sqrt{\text{Position}}$ – Closed

Node 3: ECLSS: PCA: VRIV
Node 3 PCA VRIV
'Open'

cmd Arm ($\sqrt{\text{Status}}$ – Armed)
cmd Open ($\sqrt{\text{Position}}$ – Open)

'Closed'

cmd Close ($\sqrt{\text{Position}}$ – Closed)

3. VRCV CHECKOUT
Node 3: ECLSS: PCA: VRIV
Node 3 PCA VRIV

$\sqrt{\text{Position}}$ – Closed

Node 3: ECLSS: PCA: VRCV
Node 3 PCA VRCV
'Full Flow'

cmd Arm ($\sqrt{\text{Status}}$ – Armed)
cmd Full Flow ($\sqrt{\text{Position}}$ – Open)

'Low Flow'

cmd Arm ($\sqrt{\text{Status}}$ – Armed)
cmd Low Flow ($\sqrt{\text{Position}}$ – Low Flow)

1.115 NODE 3 PCA VRIV/VRCV/NIV/OIV CHECKOUT

(ASSY OPS/20A/FIN)

Page 2 of 2 pages

'Closed'

cmd Close ($\sqrt{\text{Position}}$ – Closed)

4. ENABLING PPR

Node 3: ECLSS: PCA: PCA Commands

Node 3 PCA Commands

'Positive Pressure Relief'

cmd Enable ($\sqrt{\text{Status}}$ – Enabled)

5. NIV CHECKOUT

Node 3: ECLSS: PCA: NIV

Node 3 PCA N2 Intro Valve

cmd Open ($\sqrt{\text{Position}}$ – Open)

Node 3 ACS

$\sqrt{dP/dt} > 0.05$ mmHg/min

Node 3: ECLSS: PCA: NIV

Node 3 PCA N2 Intro Valve

cmd Close ($\sqrt{\text{Position}}$ – Closed)

Node 3 ACS

$\sqrt{dP/dt} < 0.05$ mmHg/min

6. OIV CHECKOUT

Node 3: ECLSS: PCA: OIV

Node 3 PCA O2 Intro Valve

cmd Open ($\sqrt{\text{Position}}$ – Open)

Node 3 ACS

$\sqrt{dP/dt} > 0.05$ mmHg/min

Node 3: ECLSS: PCA: OIV

Node 3 PCA O2 Intro Valve

cmd Close ($\sqrt{\text{Position}}$ – Closed)

Node 3 ACS

$\sqrt{dP/dt} < 0.05$ mmHg/min

1.117 NODE 1/NODE 3 VESTIBULE PRESSURIZATION AND LEAK CHECK

(ASSY OPS/20A/FIN/MULTI J/HC) Page 1 of 8 pages

OBJECTIVE:

Utilize Internal Sampling Adapter (ISA), Vacuum Access Jumper (VAJ), Multimeter, and ISA Scopemeter Pressure Probe to pressurize and verify integrity of pressure in Node 1/Node 3 vestibule. Perform an overnight fine leak check of the vestibule.

LOCATION:

Node 1 Port

DURATION:

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

CREW:

One

MATERIALS:

9V Alkaline Battery (if Battery changeout required)
Earplugs

TOOLS:

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

ISS IVA Toolbox:

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

1. SETTING UP ISA

NOTE

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

1.1 Gamah Cap ←|→ ISA VAJ Port

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

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

2. SETTING UP MULTIMETER

NOTE

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

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

2.2 √ISA Scopemeter Pressure Probe – OFF

2.3 Rotary Switch ↻ \overline{mV}

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

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

2.5 ISA Scopemeter Pressure Probe → mmHgA

3. VERIFYING ISA SCOPEMETER PRESSURE PROBE ACCURACY

NOTE

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

Multimeter 3.1 Rotary Switch ↻ \overline{V}

3.2 Record ISA Scopemeter Pressure Probe P₁: _____ mmHg

PCS 3.3 US Lab: ECLSS
 Lab: ECLSS

Record Cab Press P₂: _____ mmHgA

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

1.117 NODE 1/NODE 3 VESTIBULE PRESSURIZATION AND LEAK CHECK
(ASSY OPS/20A/FIN/MULTI J/HC) Page 3 of 8 pages

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

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

4.2 Gamah cap ←|→ ISA Sampling Port

ISA Sampling Port Valve → CLOSED
Refer to Figure 1.

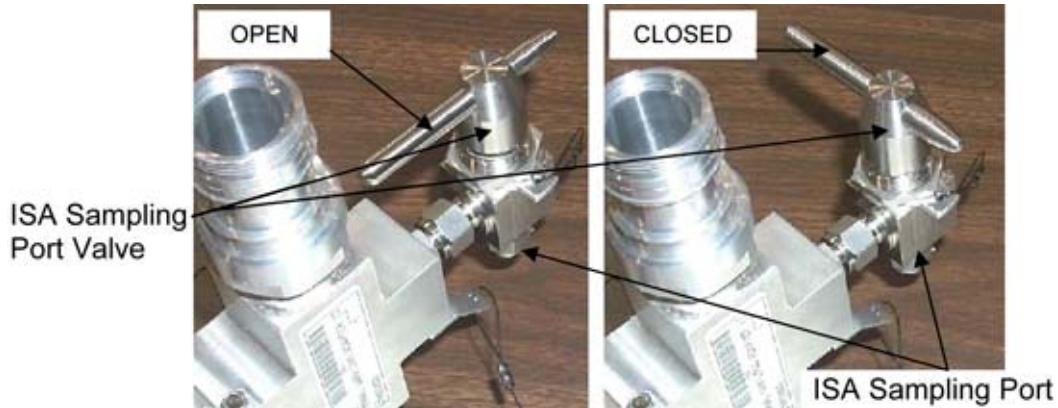


Figure 1.- ISA Sampling Port Valve.

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

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

4.5 Gamah cap ←|→ MPEV
VAJ-78-1 5 ft (bent end) →|← MPEV
Hand tighten.
Refer to Figures 2 and 3.

WARNING

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

4.6 Secure ISA/VAJ Assembly.

1.117 NODE 1/NODE 3 VESTIBULE PRESSURIZATION AND LEAK CHECK
 (ASSY OPS/20A/FIN/MULTI J/HC) Page 4 of 8 pages

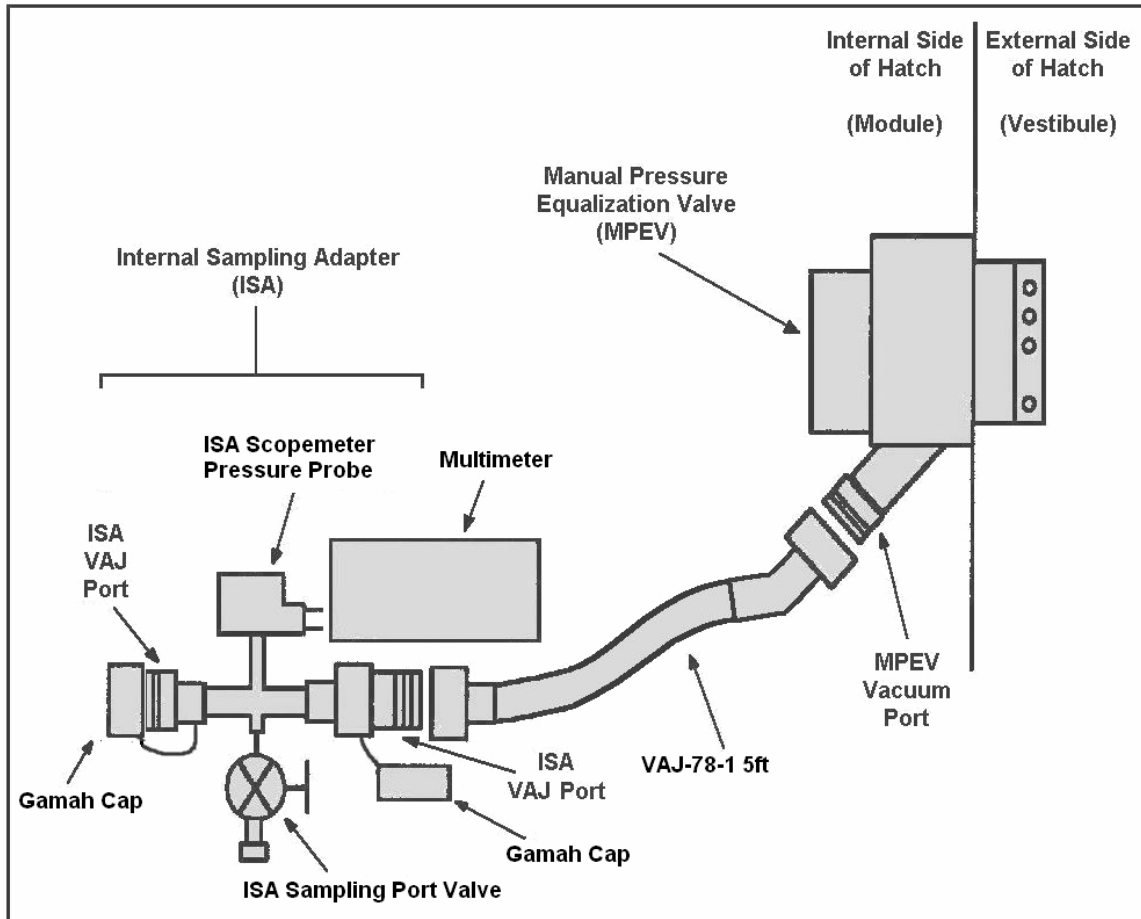


Figure 2.- ISA/VAJ/MPEV/Multimeter Connection.

5. LEAK CHECKING ISA/VAJ CONNECTION

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

5.1 Don Earplugs.

Node 1 Port Hatch 5.2 MPEV → OPEN

5.3 Wait 5 minutes to depressurize ISA/VAJ setup.

Multimeter 5.4 Rotary Switch ↻ \overline{mV}

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

1.117 NODE 1/NODE 3 VESTIBULE PRESSURIZATION AND LEAK CHECK
(ASSY OPS/20A/FIN/MULTI J/HC) Page 5 of 8 pages

- 5.6 MPEV → CLOSE
- 5.7 Doff Earplugs.
- 5.8 Wait 3 minutes for thermal stabilization.
- 5.9 Record ISA Scopemeter Pressure Probe P₄: _____ mmHg
Record GMT: _____ GMT
- 5.10 Wait 5 minutes for ISA/VAJ leak check.
- 5.11 Record ISA Scopemeter Pressure Probe P₅: _____ mmHg
Record GMT: _____ GMT

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

6. PARTIALLY PRESSURIZING VESTIBULE

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

- 6.1 Don Earplugs.
- Node 1 Port Hatch 6.2 MPEV → OPEN

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

- 6.3 ISA Sampling Port Valve → OPEN
Refer to Figure 1.
- 6.4 Wait 2 minutes to begin incremental pressurization of vestibule.
- 6.5 ISA Sampling Port Valve → CLOSED
Note ISA Scopemeter Pressure Probe reading.

1.117 NODE 1/NODE 3 VESTIBULE PRESSURIZATION AND LEAK CHECK
(ASSY OPS/20A/FIN/MULTI J/HC) Page 6 of 8 pages

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

6.7 Doff Earplugs.

7. PERFORMING GROSS LEAK CHECK OF VESTIBULE

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

7.2 Wait 10 minutes for thermal stabilization.

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

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

Node 1 Port Hatch

7.4 MPEV → CLOSE

7.5 Wait 30 minutes for vestibule gross leak check.

7.6 MPEV → OPEN

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

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

7.8 MPEV → CLOSE

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

8. COMPLETING VESTIBULE PRESSURIZATION

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

8.1 Don Earplugs.

Multimeter

8.2 Rotary Switch ↶ 

1.117 NODE 1/NODE 3 VESTIBULE PRESSURIZATION AND LEAK CHECK

(ASSY OPS/20A/FIN/MULTI J/HC) Page 7 of 8 pages

8.3 ISA Sampling Port Valve → OPEN

Node 1 Port Hatch 8.4 MPEV → OPEN

PCS 8.5 US Lab: ECLSS
Lab: ECLSS

Monitor LAB Cab Press for 10 minutes.

If LAB Cab Press decreases by more than 4 mmHgA

ISA Sample Port Valve → CLOSED

MPEV → CLOSE

√**MCC-H** for instructions, >>

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

8.7 ISA Sampling Port Valve → CLOSED

8.8 MPEV → CLOSE

8.9 Doff Earplugs.

9. INITIALIZING VESTIBULE FINE LEAK CHECK

Node 1 Port Hatch 9.1 MPEV → OPEN

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

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

9.3 MPEV → CLOSE

9.4 ISA Scopemeter Pressure Probe → OFF

9.5 Rotary Switch ↻ OFF

9.6 Wait overnight.

10. PERFORMING VESTIBULE FINE LEAK CHECK

Multimeter 10.1 Rotary Switch ↻ \bar{V}

10.2 ISA Scopemeter Pressure Probe → mmHgA

10.3 MPEV → OPEN

1.117 NODE 1/NODE 3 VESTIBULE PRESSURIZATION AND LEAK CHECK
(ASSY OPS/20A/FIN/MULTI J/HC) Page 8 of 8 pages

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

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

10.5 MPEV → CLOSE

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

11. DISASSEMBLING AND STOWING EQUIPMENT

11.1 ISA Scopemeter Pressure Probe → OFF

11.2 Rotary Switch ↺ OFF

11.3 Multimeter ←|→ ISA Scopemeter Pressure Probe

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

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

Gamah Cap →|← ISA VAJ Port
Hand tighten.

11.6 ISA Sampling Port Valve → OPEN

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

11.7 Check for FOD within 1 m.

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

11.9 Stow tools and materials.

1.118 NODE 3 STBD DECK NPRV REMOVAL AND IMV VALVE INSTALLATION
(ASSY OPS/20A/FIN) Page 1 of 14 pages

OBJECTIVE:

Replace Node 3 Starboard Deck Negative Pressure Relief Valve (NPRV) with Intermodule Ventilation (IMV) Valve and connect Remote Manual Override (RMO). The valve to be installed will be obtained as part of this procedure from its stowed location, NOD3F3-02.

LOCATION:

Installed: NOD3D6
Stowed: NOD3F3-02 Forward Midbay Volume

DURATION:

1 hour, 15 minutes

CREW:

One

PARTS:

None

MATERIALS:

Dry Wipes
Clean Room Gloves

TOOLS:

CSA-O2 (two)
Digital Camera
Drawer 2:
Ratchet, 1/4" Drive
4" Ext, 1/4" Drive
6" Ext, 1/4" Drive
5/32" Hex Head, 1/4" Drive
7/16" Deep Socket, 1/4" Drive
1/4" Socket, 1/4" Drive
(10-50 in-lbs) Trq Wrench, 1/4" Drive
Driver Handle, 1/4" Drive
Universal Joint, 1/4" Drive
Drawer 3:
4" Common Tip Screwdriver
Drawer 4:
Wire Cutters
Drawer 5:
Scissors
Static Wrist Tether

REFERENCED PROCEDURE(S):

None

1. SAFING

- 1.1 $\sqrt{\text{MCC-H}}$ to verify safing complete:
RPCM N31B4A E1 RPC 03 – Open, Close Inh
DDCU N31B (or N34A) – converter OFF

2. ACCESS

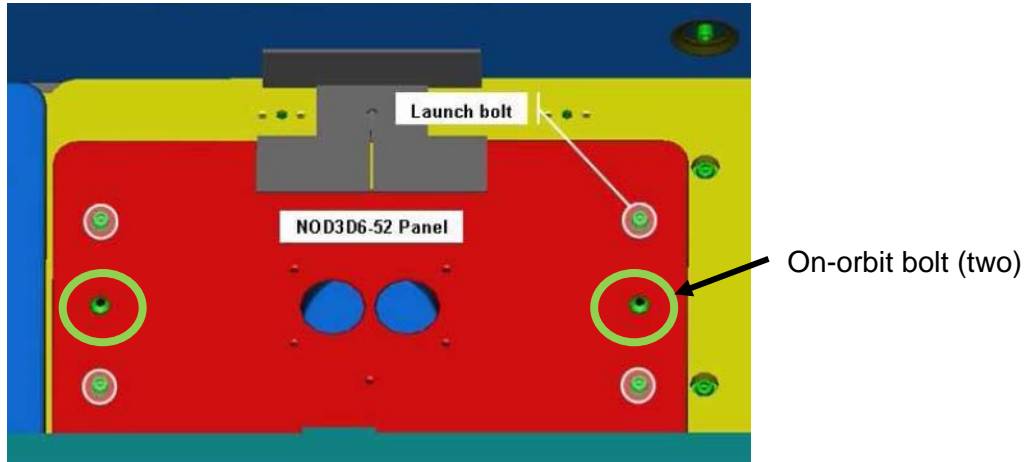


Figure 1.- NOD3D6-52 Launch Bolts.

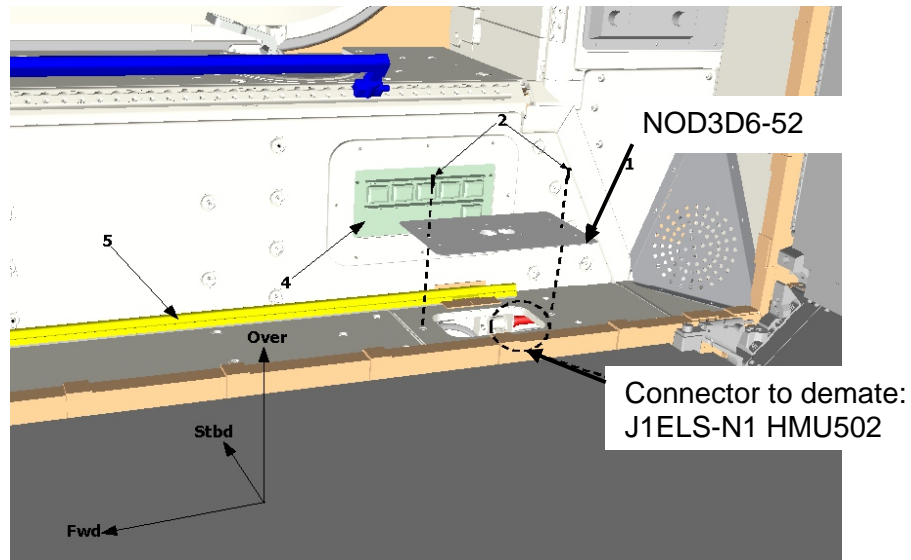


Figure 2.- Access to Starboard Endcone EELS Connector under NOD3D6-52.

Table 1. Node 3 Closeout

IMV Location	Closeout Panel	Fasteners
Stbd Deck	NOD3D6-51	10 Captive 8 Non-captive
	NOD2D6-02	4 Captive 2 Non-captive
IMV Valve Stowage Volume	NOD3F3-02	4 Captive 28 Non-captive

1.118 NODE 3 STBD DECK NPRV REMOVAL AND IMV VALVE INSTALLATION
(ASSY OPS/20A/FIN) Page 3 of 14 pages

- NOD3D6
- 2.1 Remove NOD3D6-52 Closeout Panel, fasteners (two) (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
 - 2.2 EELS Power Cable P1 ←|→ J1ELS-N1 HMU502.
Refer to Figure 2.
 - 2.3 Remove Closeout Panels listed in Table 1 (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Stow non-captive fasteners and washers in Ziplock Bag for later disposal.
Temporarily stow Closeout Panels.

<p>NOTE</p> <p>Two CSA-O2 units are required to take independent samples in the open cabin in order to protect against CSA-O2 sensor error.</p>
--

- 2.4 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).
- 2.5 Verify CSA-O2 sampling from both units are within 1.1 % of each other.
Verify O2 % within nominal range specified on CSA-O2 Decal.
- 2.6 Perform CSA-O2 sampling behind removed Closeout Panel.
Verify O2 % within nominal range specified on CSA-O2 Decal.



Figure 3.- Example NPRV installed.

3. INSPECTION AND REMOVAL OF STBD DECK NPRV



Figure 4.- Deployed NPRV.



Figure 5.- Fully Seated NPRV.

- 3.1 Verify NPRV fully seated.
Refer to Figures 3, 4, and 5.
- 3.2 If NPRV deployed
| Press external cover toward bulkhead until cover snaps into
| place against Base Assembly.

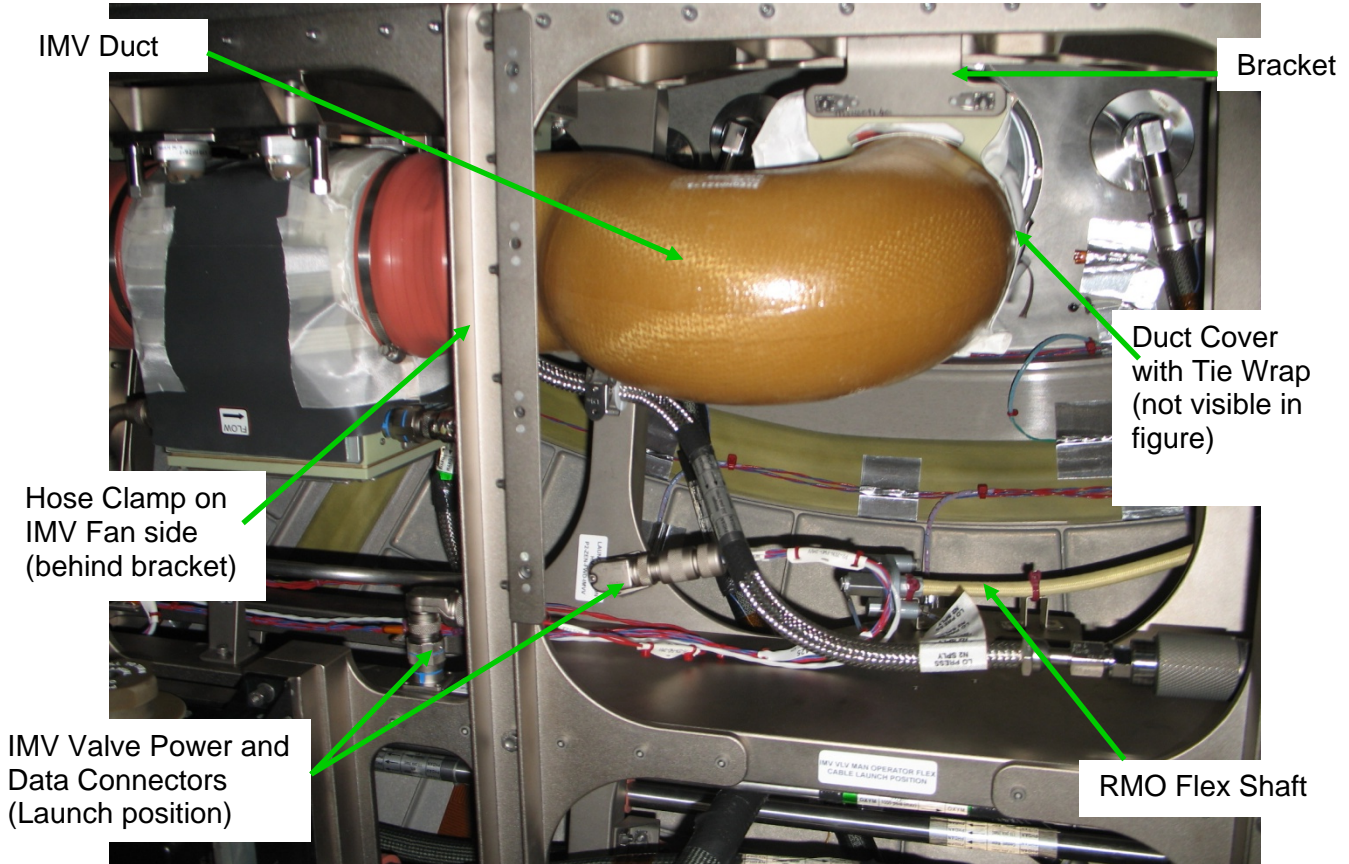


Figure 6.- Starboard Deck IMV Duct and NPRV (view looking Stbd).

3.3 Temporarily Rotating IMV Duct Out Of Way

Remove Duct Cover on IMV Duct, cut Tie-Wrap (Scissors).

Temporarily stow Duct Cover and Tie Wrap.

Loosen Hose Clamp on IMV Duct on IMV Valve side (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 1/4" Socket, 1/4" Drive).

Slide Hose Clamp off bracket and rotate IMV Duct out of way to access NPRV.

Refer to Figure 6.

3.4 If required for worksite access,

Loosen and release Hose Clamp on IMV Duct on IMV Fan side (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 1/4" Socket, 1/4" Drive).

Remove IMV Duct.

Temporarily stow.

3.5 Loosen, remove V-Band Clamp and stow at bulkhead (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive).

Remove NPRV.

Photo document bulkhead sealing surface (Digital Camera).

3.6 Record NPRV serial number: _____
 Temporarily stow NPRV.

4. OBTAINING IMV VALVE FROM STOWED LOCATION

Stbd Deck
 IMV Valve

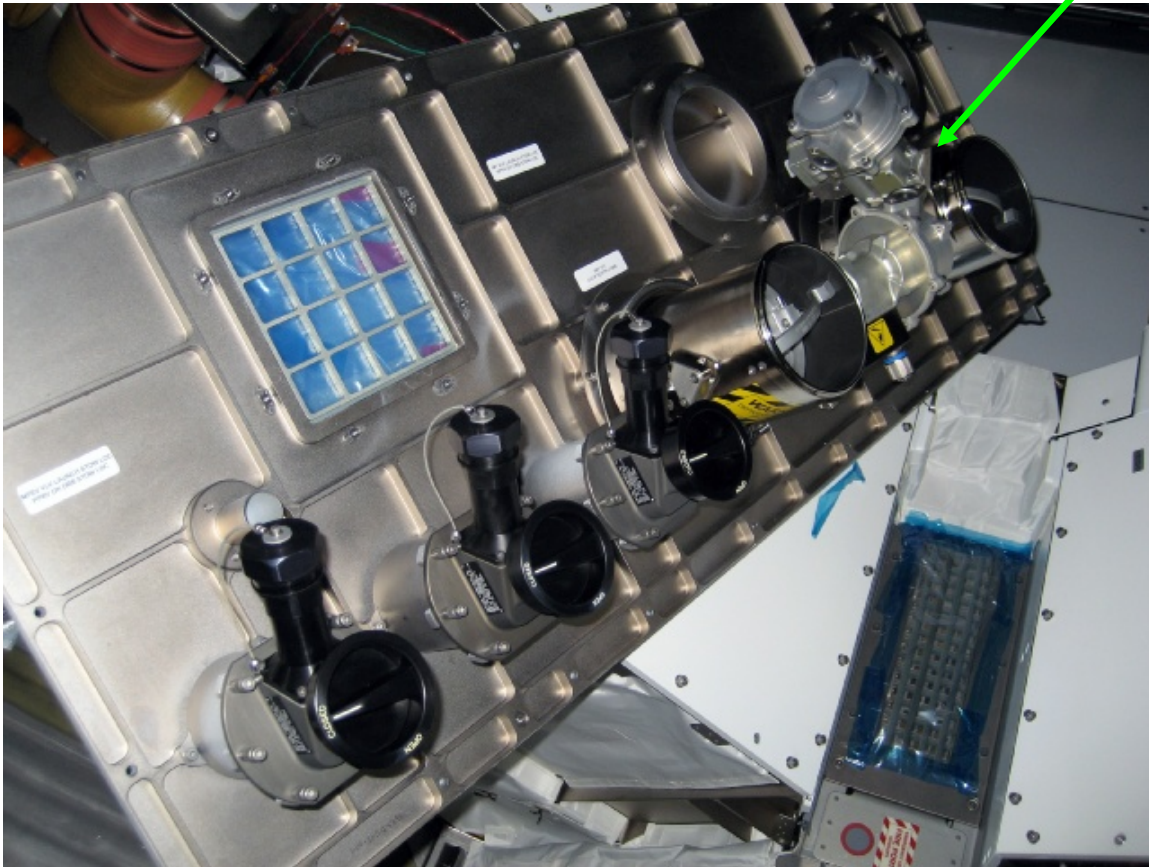


Figure 7.- Node 3 Forward Midbay Stowage Location for IMV Valves.

Table 2. IMV Valve Identification

IMV Valve Stowage Label	Installation Location	P/N	S/N
IMV VLV DECK ZENITH CONE	Starboard Deck	P/N 2353024-2-1	D0011

NOTE

IMV Valve labels at stowage location were not updated to account for the reorientation of Node 3. "Deck Zenith" should be "Starboard Deck".

4.1 Retrieve IMV Valve identified by label from rear side of NOD3F3-02 Closeout Panel (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive).
 Refer to Table 2 and Figure 7.

1.118 NODE 3 STBD DECK NPRV REMOVAL AND IMV VALVE INSTALLATION
(ASSY OPS/20A/FIN) Page 7 of 14 pages

- 4.2 Stow NPRV on rear side of NOD3F3-02 Closeout Panel and replace V-Band Clamp.
Snug V-Band Clamp (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive).
Refer to Table 2 and Figure 7.

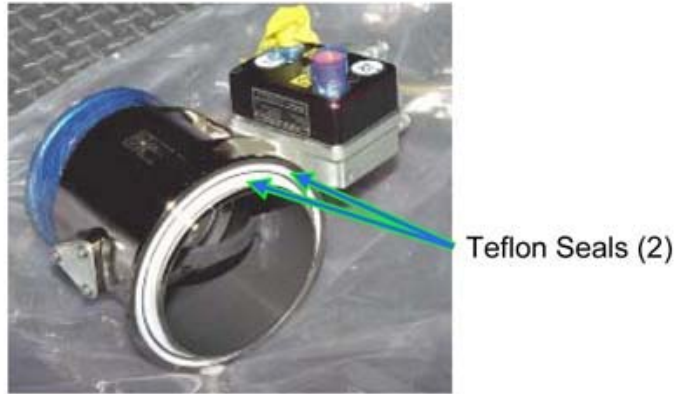


Figure 8.- Typical View IMV Teflon Seals.

- 4.3 ✓ Teflon Seal (two) on mating surface of IMV Valve flange clean, free of debris
Clean if required by wiping around circumference of seal (Clean Room Gloves, Dry Wipes).
Refer to Figure 8.
- 4.4 ✓ No debris in or around valve installation location at bulkhead



Figure 9.- Bulkhead Alignment Mark and IMV Valve With Alignment Mark.

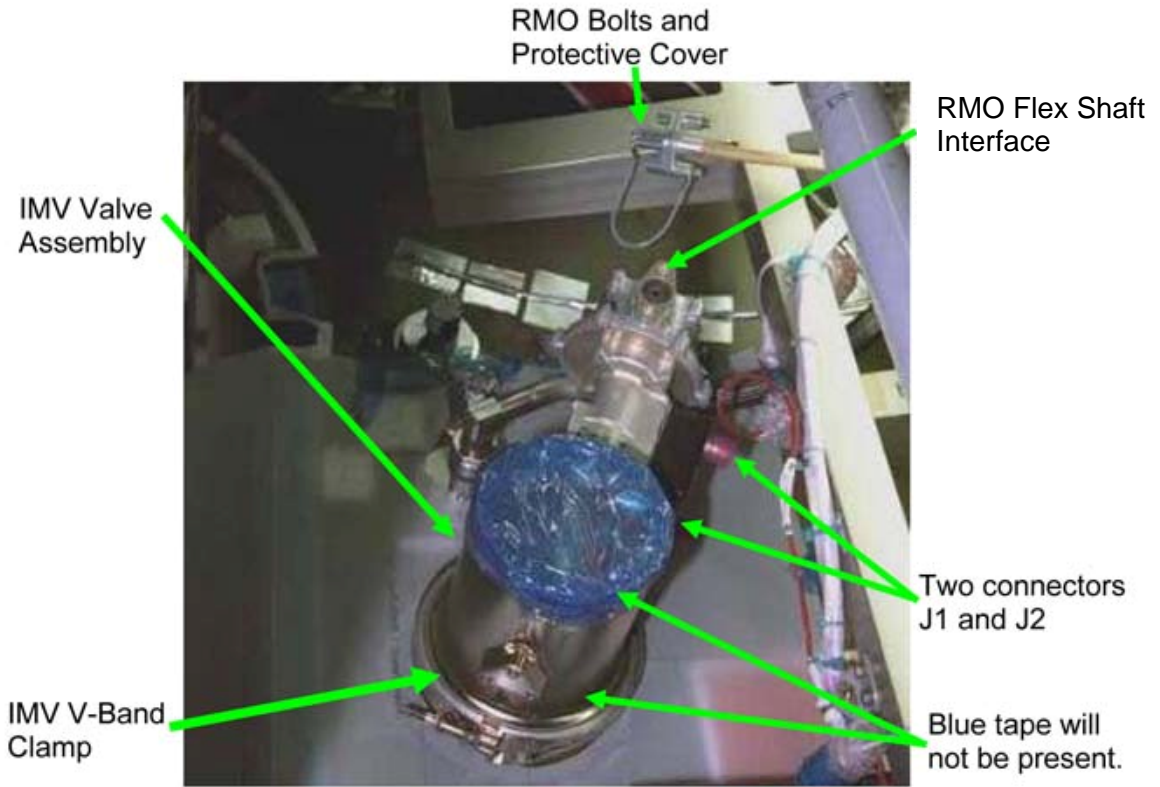


Figure 10.- IMV Valve Partially Installed (Representative IMV Valve).

5. INSTALLATION

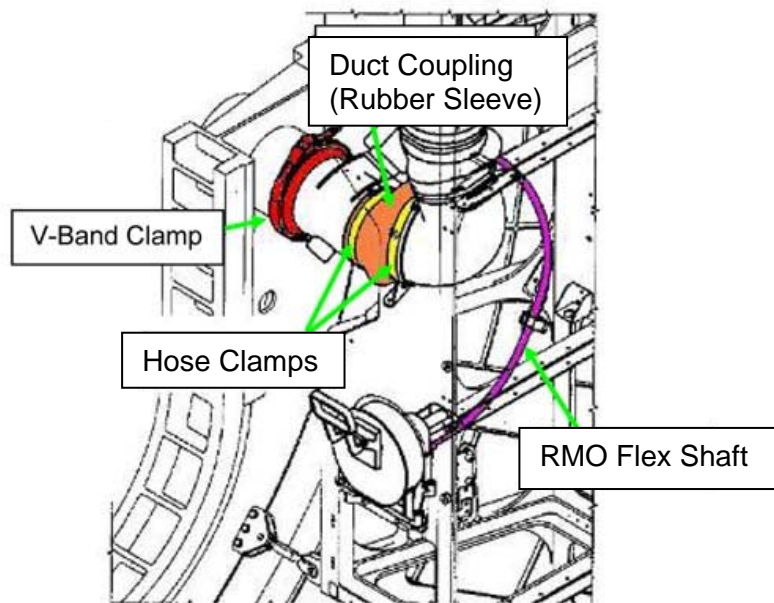


Figure 11.- IMV Valve with RMO Installed with Proper Bend Radius.



Figure 12.- Example of Closed IMV Valve.

- 5.1 Visually verify IMV Valve is in Closed position.
Refer to Figure 12.

CAUTION

RMO will not operate without optimum bend radius of RMO Flex Shaft. Installation of IMV Valve using alignment mark insures optimum bend radius of RMO Flex Shaft. Minimum RMO Flex Shaft Bend radius is 8 inches.

- 5.2 Using reference mark "H" (on bulkhead) and "IMV VLV ALIGNMENT MARK" arrow (on valve), align IMV Valve to bulkhead. Install V-Band Clamp loosely to hold Valve in place (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive). Refer to Figures 8, 9, 10, 11, 12.
- 5.3 Release RMO Flex Shaft from launch location by cutting red wire ties (Wire Cutters). Remove Tethered Cap from end of RMO Flex Shaft (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Refer to Figure 6.

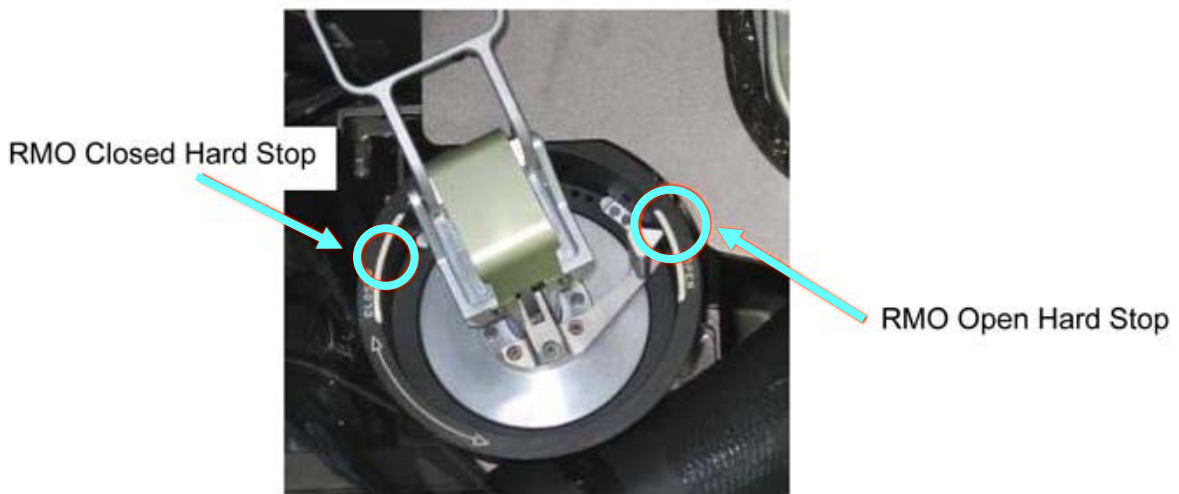


Figure 13.- RMO Handle.

1.118 NODE 3 STBD DECK NPRV REMOVAL AND IMV VALVE INSTALLATION
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- 5.4 Verify RMO is at the Closed position hardstop.
Refer to Figure 13.
- 5.5 Position RMO Flex Shaft, verify acceptable bend radius (minimum radius of 8 inches), install Fasteners (two) (Driver Handle, 1/4" Drive; 6" Ext, 1/4" Drive; Universal Joint; 5/32" Hex Head, 1/4" Drive).
Refer to Figures 9, 10, 11.

Table 3. Node 3 Stbd IMV Valve J1 and J2 Connectors.

IMV Label	Power/Data Cable Connectors	ORU Connectors
N3- Stbd_Deck_IMV_VLV	P1-ZEN_FWD_IMVV HMU 249	J1
	P2-ZEN_FWD_IMVV HMU 425	J2

- 5.6 Don Static Wrist Tether.
Connect to unpainted, unanodized metal surface.
- 5.7 Demate IMV Valve power and data cables from dummy connector plate near installation location.
Refer to Table 3, figure 6.
- 5.8 P1-ZEN_FWD_IMVV HMU 249 →|← J1 on IMV Valve
P2-ZEN_FWD_IMVV HMU 425 →|← J2 on IMV Valve
- 5.9 Doff Static Wrist Tether.

6. CHECKOUT

- 6.1 Notify **MCC-H**: replacement Valve installed and ready for checkout.

MCC-H/
PCS

- 6.2 Activating Node 3 IMV Stbd Deck Valve
Node 3: ECLSS: Stbd Deck Valve
Node 3 IMV Stbd Deck Vlv

sel RPCM N31B4A E1 RPC 03

RPCM N31B4A E1 RPC 03

cmd Close Cmd – Ena (Verify – Ena)
cmd RPC Position – Close (Verify – Cl)

Node 3 IMV Stbd Deck Vlv

'State'
 'Enable'

cmd Arm

√Arm Status – Armed

cmd Enable

√State – Enabled

NOTE

Per SPN 38815, the Node 3 IMV Valve Open/Close Arm Status is not displayed correctly.

6.3 Opening Node 3 IMV Stbd Deck Valve

'Position'

'Open'

cmd Arm

Wait 10 seconds.

cmd Open

√Position – In Transit

Wait 25 seconds.

√Position – Open

Node 3

6.4 Verify RMO Handle pointer contacting OPEN range marking.
Refer to Figure 13.
Notify **MCC-H** results.

6.5 Photo document RMO showing pointer position (Digital Camera).

MCC-H/
PCS

6.6 Closing Node 3 IMV Stbd Deck Valve

Node 3 IMV Stbd Deck VIV

'Position'

'Close'

cmd Arm

Wait 10 seconds.

cmd Close

√Position – In Transit

Wait 25 seconds.

√Position – Closed

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(ASSY OPS/20A/FIN) Page 12 of 14 pages

- 6.7 Verify RMO Handle pointer contacting CLOSED range marking.
Refer to Figure 13.
Notify **MCC-H** results.
- 6.8 Photo document RMO showing pointer position (Digital Camera).

NOTE

The following Caution message will be received when the IMV Valve is manually actuated and the commanded and manual positions do not match:

'IMV Stbd Deck Valve Failure - Node 3'

No crew action required. This message will return to normal once commanded and manual positions match.

- 6.9 Deploy RMO Handle, rotate ↻ until pointer contacts RMO OPEN hardstop.
Release RMO Handle.
Allow handle to return to neutral position.
Refer to Figure 13.
- 6.10 Verify Position of Stbd Deck IMV Valve

Node 3 IMV Stbd Deck VIV

√Position – Open
- 6.11 Verify RMO Handle pointer contacting OPEN range marking.
Notify **MCC-H** of results.
- 6.12 Photo document RMO showing pointer position (Digital Camera).
- 6.13 Deploy RMO Handle, rotate ↻ until pointer contacts RMO CLOSED hardstop.
Release RMO Handle.
Allow handle to return to neutral position.
Refer to Figure 13.
- 6.14 Verifying Position of Stbd Deck IMV Valve

Node 3 IMV Stbd Deck VIV

√Position – Closed
- 6.15 Verify RMO Handle pointer contacting CLOSED range marking.
Notify **MCC-H** of results.
- 6.16 Photo document RMO showing pointer position (Digital Camera).

7. TORQUING IMV VALVE

- 7.1 Tighten, torque RMO Flex Shaft bolts (two) (on side of actuator) to 24 in-lbs [Driver Handle, 1/4" Drive; 6" Ext, 1/4" Drive; Universal Joint; 5/32" Hex Head, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].
- 7.2 Tighten IMV Valve V-Band Clamp nut, torque to 38 in-lbs [(10-50 in-lbs) Trq Wrench, 1/4" Drive; 4" Ext, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive].
- 7.3 Photo document IMV Valve configuration (Digital Camera).

8. DUCT CONNECTION

NOTE

Some IMV hose clamps may require 4" Common Tip Screwdriver instead of 1/4" Socket, 1/4" Drive. This is dependent on space between head of fastener and interface tolerances to band clamp.

- 8.1 If IMV Duct was removed in step 3.4, install IMV Duct.
 - Slide Duct Coupling (on IMV Fan side) onto end of IMV Duct. Allow approximately 1 inch overlap between Duct Coupling and IMV Duct.
 - Align Hose Clamp so that it is at least 1/8" from end of Duct Coupling.
 - 8.2 Rotate IMV Duct in place over IMV Valve.
Refer to Figures 6 and 11.
 - 8.3 Loosen hose clamp stowed on IMV Duct to allow Duct Coupling to slide onto end of IMV Valve (Driver Handle, 1/4" Drive 1/4" Socket, 1/4" Drive).
 - 8.4 Position Duct Coupling over IMV Duct and IMV Valve such that approximately 1 inch of Duct Coupling overlaps IMV Duct and IMV Valve.
 - 8.5 Align Hose Clamps such that they are at least 1/8" from end of Duct Coupling.
 - 8.6 Tighten all Hose Clamp Fasteners, torque to 10 in-lbs [Driver Handle 1/4" Drive, 1/4" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].
- 9. CLOSEOUT**
- 9.1 Install following Closeout Panels (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 5/32" Hex Head, 1/4" Drive):
 - NOD3D6-51 (ten fasteners)
 - NOD3D6-02 (four fasteners)
 - NOD3F3-02 (four fasteners)

1.118 NODE 3 STBD DECK NPRV REMOVAL AND IMV VALVE INSTALLATION
 (ASSY OPS/20A/FIN) Page 14 of 14 pages

9.2 EELS Power Cable P1 →|← J1ELS-N1 HMU502.
 Refer to Figure 2.

9.3 Install NOD3D6-52 Closeout Panel, fasteners (two) (Ratchet,
 1/4" Drive; 4 Ext, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

10. POST MAINTENANCE

10.1 Notify **MCC-H** of task completion.

10.2 Report NPRV Serial Number recorded in step 3.6.

10.3 Stow tools, materials.

Table 4. Restow Table

Part Name	Part Number	Qty	Stowed
NPRV	683-16322-3	1	NOD3F3-02
IMV Duct Cover	2210ND543-401	1	
IMV Connector Caps	N/A	2	
NOD3F3-02 Launch Bolts and Washers	NAS1351N4-16	28	(If not removed by previous activity)
NOD3D6-02 Launch Bolts and Washers	NAS1351N3-10	2	(If not removed by previous activity)
NOD3D6-51 Launch Bolts and Washers	NAS1351N3-12	8	(If not removed by previous activity)

1.119 NODE 3 STBD OVHD NPRV REMOVAL AND IMV VALVE INSTALLATION
(ASSY OPS/20A/FIN) Page 1 of 13 pages

OBJECTIVE:

Replace Node 3 Starboard Overhead Negative Pressure Relief Valves (NPRV) with Intermodule Ventilation (IMV) Valve and connect Remote Manual Override (RMO). The Valve to be installed will be obtained as part of this procedure from its stowed location, NOD3F3-02.

LOCATION:

Installed: NOD306
Stowed: NOD3F3-02 Forward Midbay Volume

DURATION:

1 hour 15 minutes

CREW:

One

PARTS:

None

MATERIALS:

Dry Wipes
Clean Room Gloves
Ziplock Bag

TOOLS:

CSA-O2 (two)
Digital Camera
Drawer 2:
Ratchet, 1/4" Drive
4" Ext, 1/4" Drive
6" Ext, 1/4" Drive
5/32" Hex Head, 1/4" Drive
7/16" Deep Socket, 1/4" Drive
1/4" Socket, 1/4" Drive
(10-50 in-lbs) Trq Wrench, 1/4" Drive
Driver Handle, 1/4" Drive
Universal Joint, 1/4" Drive
Drawer 3:
4" Common Tip Screwdriver
Drawer 4:
Wire Cutters
Drawer 5:
Scissors
Static Wrist Tether

REFERENCED PROCEDURE(S):

None

1. SAFING

- 1.1 **MCC-H** to verify safing complete the following:
 RPCM N31B4A E1 RPC 02 - Open, Close Inh
 DDCU N31B (or N34A) - converter OFF

2. ACCESS

Table 1. Node 3 Closeout

IMV Location	Closeout Panel	Fasteners
Stbd Ovhd	NOD3O6-51	10 Captive 8 Non-Captive
	NOD3O6-02	4 Captive 2 Non-Captive
IMV Valve Stowage Volume	NOD3F3-02	4 Captive 28 Non-Captive

- 2.1 Remove Closeout Panels listed in Table 1 (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
 Stow non-captive fasteners and washers in Ziplock Bag for later disposal.
 Temporarily stow closeout panels.

NOTE

Two CSA-O2 units are required to take independent samples in the open cabin in order to protect against CSA-O2 sensor error.

- 2.2 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
 Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).
- 2.3 Verify CSA-O2 sampling from both units are within 1.1% of each other.
 Verify O2% within nominal range specified on CSA-O2 Decal.
- 2.4 Perform CSA-O2 sampling behind removed closeout panel.
 Verify O2% within nominal range specified on CSA-O2 Decal.



Figure 1. - Example NPRV installed.

3. INSPECTION AND REMOVAL OF STBD OVHD NPRV



Figure 2. - Deployed NPRV.



Figure 3. - Fully Seated NPRV.

NOD306 3.1 Verify NPRV fully seated.
Refer to Figures 1 to 3.

15 JAN 10

- 3.2 If NPRV deployed, press external cover toward bulkhead until cover snaps into place against Base Assembly.

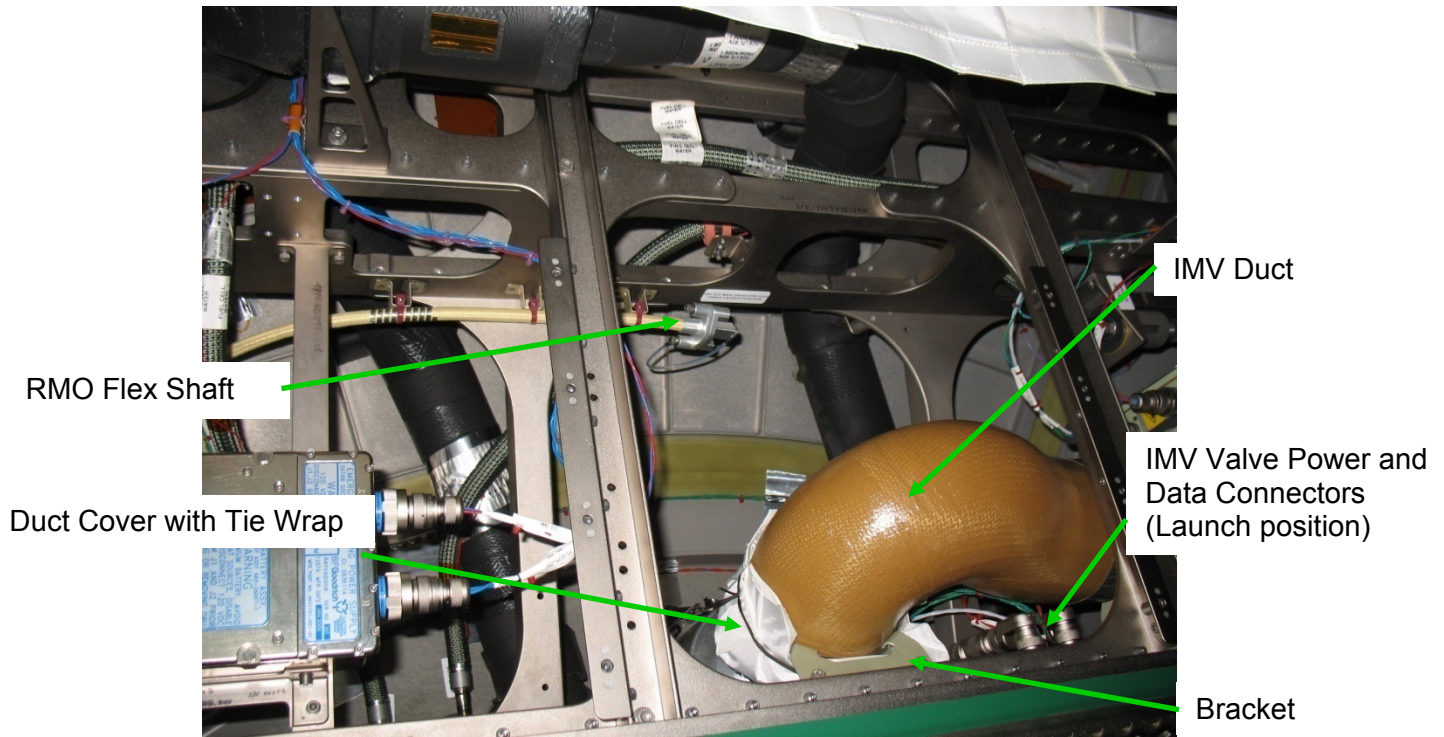


Figure 4. - Node 3 Starboard Overhead IMV Duct. (View looking Stbd).

- 3.3 Temporarily rotating IMV duct out of way.
Remove Duct Cover on IMV Duct, cut tie-wrap (Scissors).
Temporarily stow Duct Cover and tie-wrap.
Loosen Hose Clamp on IMV Duct on IMV Valve side (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 1/4" Socket).
Slide Hose Clamp off bracket and rotate IMV Duct out of way to access NPRV.
Refer to Figure 4.
- 3.4 If required for worksite access,
Loosen and release Hose Clamp on IMV Duct on IMV Fan side (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 1/4" Socket, 1/4" Drive).
Remove IMV Duct.
Temporarily stow.
- 3.5 Loosen, remove V-Band Clamp and stow at bulkhead (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive).
Remove NPRV.
Temporarily stow NPRV.
Photo document bulkhead sealing surface (Digital Camera).
- 3.6 Record NPRV serial number: _____
Temporarily stow NPRV.

4. OBTAINING IMV VALVE FROM STOWED LOCATION

Stbd Ovhd
IMV Valve

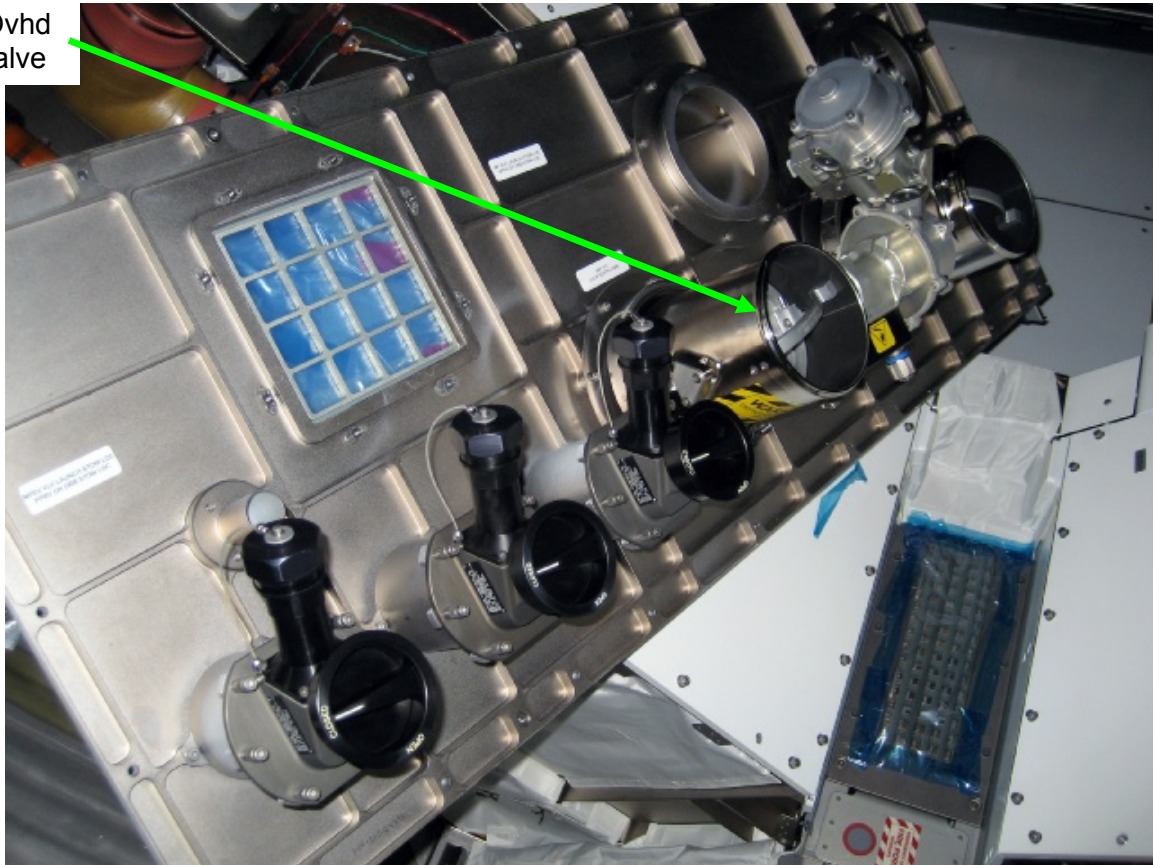


Figure 5. - Node 3 Forward Midbay Stowage Location for IMV Valves.

Table 2. IMV Valve Identification.

IMV Valve Stowage Label	Installation Location	P/N	S/N
IMV VLV OVER ZENITH CONE	Starboard Overhead	P/N 2353024-7-1	D0007

NOTE

IMV Valve labels at stowage location were not updated to account for the reorientation of Node 3. The “Over Zenith” should be “Starboard Overhead.”

- 4.1 Retrieve IMV Valve identified by label from rear side of NOD3F3-02 closeout panel (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive).

Refer to Table 2, Figure 5.

1.119 NODE 3 STBD OVHD NPRV REMOVAL AND IMV VALVE INSTALLATION
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- 4.2 Stow NPRV on rear side of NOD3F3-02 closeout panel and replace V-Band Clamp. Snug V-Band Clamp. (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive). Refer to Table 2, Figure 5.

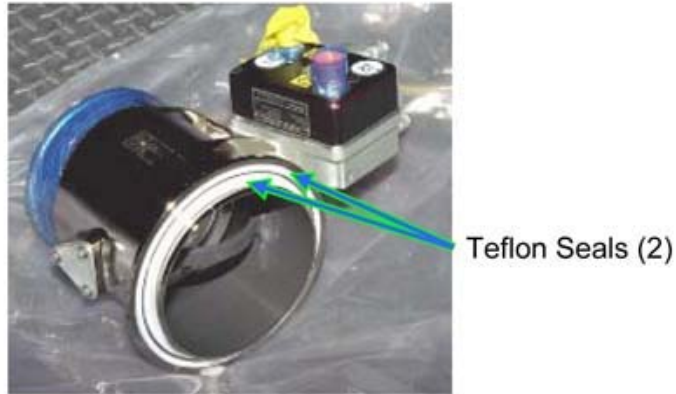


Figure 6. - Typical View IMV Teflon Seals.

- 4.3 ✓Teflon Seal (two) on mating surface of IMV Valve flange clean, free of debris
Clean if required by wiping around circumference of seal (Clean Room Gloves; Dry Wipes).
Refer to Figure 6.
- 4.4 ✓No debris in or around valve installation location at bulkhead



Figure 7. - Bulkhead Alignment Mark and IMV Valve With Alignment Mark.

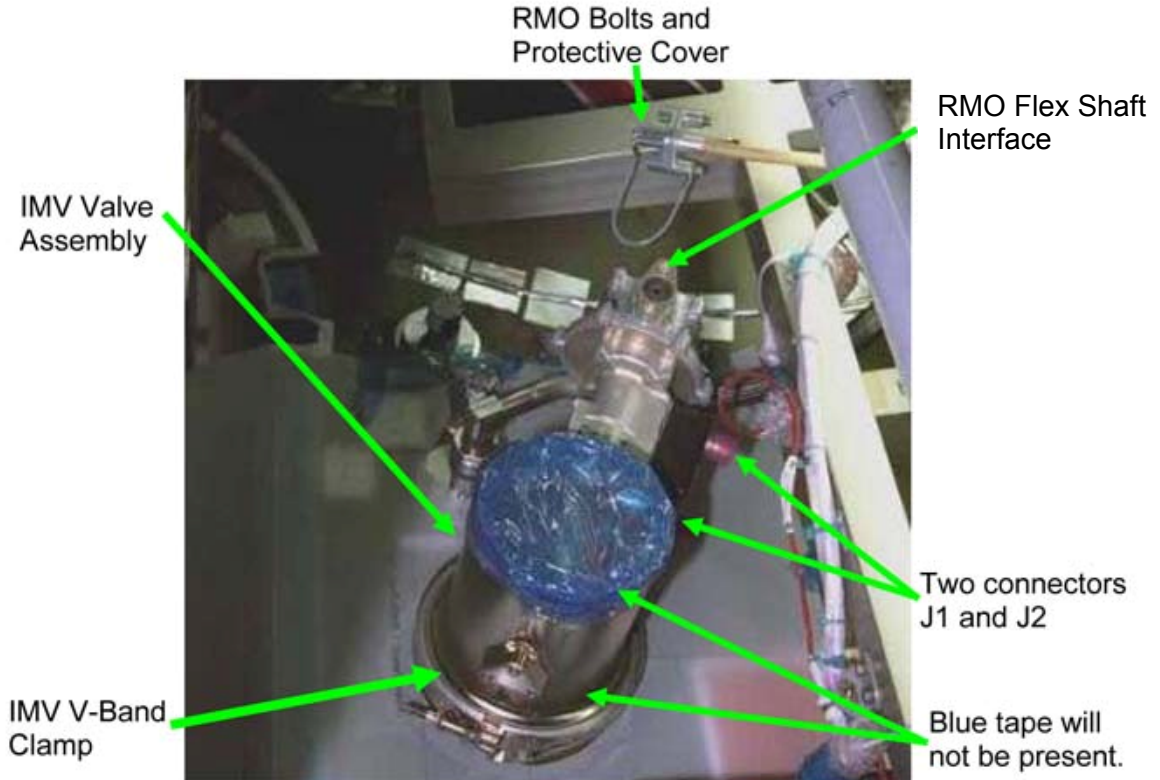


Figure 8. - IMV Valve Partially Installed. (Representative IMV Valve).

5. INSTALLATION

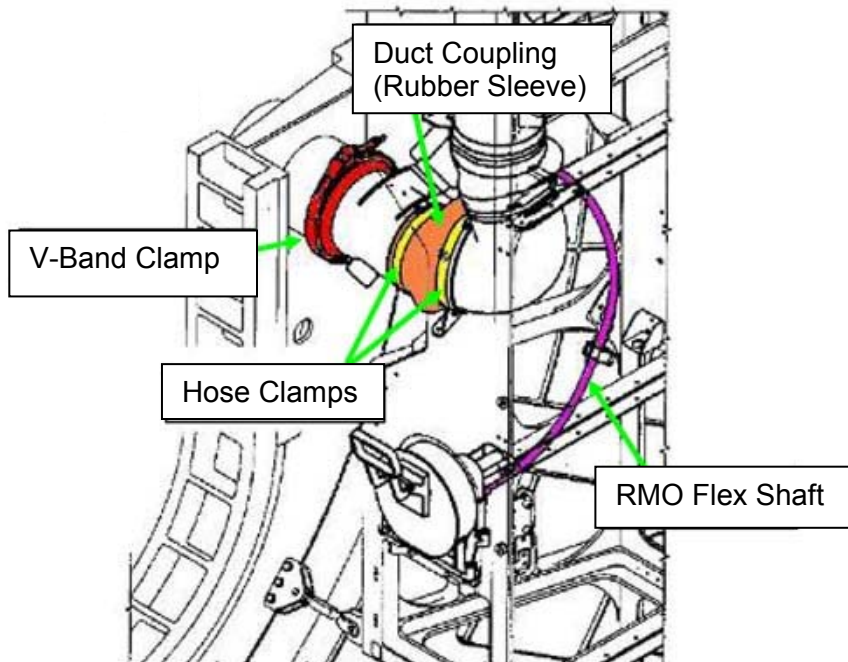


Figure 9. - IMV Valve with RMO Installed with Proper Bend Radius.



Figure 10. - Example of Closed IMV Valve.

- 5.1 Visually verify IMV Valve is in Closed position.
Refer to Figure 10.

CAUTION

RMO will not operate without optimum bend radius of RMO Flex Shaft. Installation of IMV Valve using alignment mark insures optimum bend radius of RMO Flex Shaft. Minimum RMO Flex Shaft Bend radius is 8 inches.

- 5.2 Using reference mark "H" (on bulkhead) and "IMV VLV ALIGNMENT MARK" arrow (on valve), align IMV Valve to bulkhead. Install V-Band Clamp loosely to hold Valve in place (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive). Refer to Figures 6 to 10.
- 5.3 Release RMO Flex Shaft from launch location by cutting red wire ties (Wire Cutters). Remove Tethered Cap from end of RMO Flex Shaft (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Refer to Figure 4.

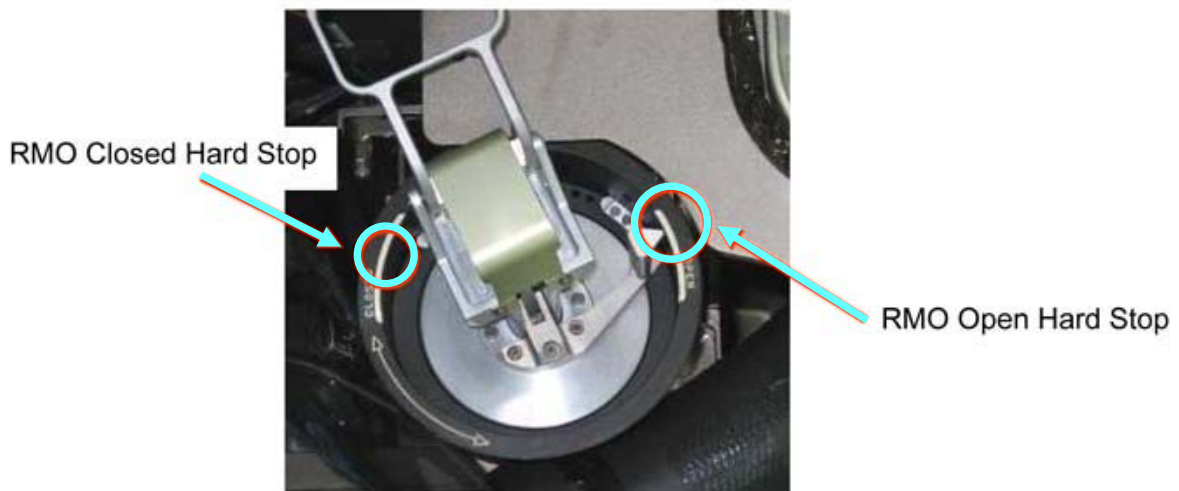


Figure 11. - RMO Handle.

1.119 NODE 3 STBD OVHD NPRV REMOVAL AND IMV VALVE INSTALLATION
 (ASSY OPS/20A/FIN) Page 9 of 13 pages

- 5.4 Verify RMO is at the Closed position hardstop.
Refer to Figure 11.
- 5.5 Position RMO Flex Shaft, verify acceptable bend radius (minimum radius of 8 inches), install Fasteners (two) (Driver Handle, 1/4" Drive; 6" Ext, 1/4" Drive; Universal Joint, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figures 7 to 9.

Table 3. Node 3 Stbd IMV Valve J1 and J2 Connectors

IMV Label	Power/Data Cable Connectors	ORU Connectors
N3- Stbd_Ovhd_IMV_VLV	P1-ZEN_AFT_IMVV HMU 253	J1
	P2-ZEN_AFT_IMVV HMU 428	J2

- 5.6 Don Static Wrist Tether.
Connect to unpainted, unanodized metal surface.
- 5.7 Demate IMV Valve power and data cables from dummy connector plate stowed near installation location.
Refer to Table 3, Figure 4
- 5.8 P1-ZEN_AFT_IMVV HMU 253 →|← J1 on IMV Valve
P2-ZEN_AFT_IMVV HMU 428 →|← J2 on IMV Valve
- 5.9 Doff Static Wrist Tether.

6. CHECKOUT

- 6.1 Notify **MCC-H**: replacement Valve installed and ready for checkout.

MCC-H/
PCS

- 6.2 Activating Node 3 IMV Stbd Ovhd Valve
Node 3: ECLSS: Stbd Ovhd Valve
Node 3 IMV Stbd Ovhd Vlv

```
sel RPCM N31B4A E1 RPC 02
RPCM N31B4A E1 RPC 02
```

```
cmd Close Cmd – Ena (Verify - Ena)
cmd RPC Position - Close (Verify - Cl)
```

```
Node 3 IMV Stbd Ovhd Vlv
'State'
'Enable'
```

```
cmd Arm
```

√Arm Status - Armed

cmd Enable

√State - Enabled

NOTE

Per SPN 38815, the Node 3 IMV Valve Open/Close Arm Status is not displayed correctly.

6.3 Opening Node 3 IMV Stbd Ovhd Valve

'Position'

'Open'

cmd Arm

Wait 10 seconds.

cmd Open

√Position - In Transit

Wait 25 seconds.

√Position - Open

Node 3

6.4 Verify RMO Handle pointer contacting OPEN range marking.
Refer to Figure 11.
Notify **MCC-H** results.

6.5 Photo document RMO showing pointer position (Digital Camera).

MCC-H/PCS 6.6 Closing Node 3 IMV Stbd Ovhd Valve

Node 3 IMV Stbd Ovhd Vlv

'Position'

'Close'

cmd Arm

Wait 10 seconds.

cmd Close

√Position - In Transit

Wait 25 seconds.

√Position - Closed

1.119 NODE 3 STBD OVHD NPRV REMOVAL AND IMV VALVE INSTALLATION
(ASSY OPS/20A/FIN) Page 11 of 13 pages

- 6.7 Verify RMO Handle pointer contacting CLOSED range marking.
Refer to Figure 11.
Notify **MCC-H** results.
- 6.8 Photo document RMO showing pointer position (Digital Camera).

NOTE

The following Caution message will be received when the IMV Valve is manually actuated and the commanded and manual positions do not match:
'IMV Stbd Zen Valve Failure - Node 3'
No crew action required. This message will return to normal once commanded and manual positions match.

- 6.9 Deploy RMO Handle, rotate ↻ until pointer contacts RMO OPEN hardstop.
Release RMO Handle.
Allow handle to return to neutral position.
Refer to Figure 11.
- 6.10 Verifying Position of Stbd Ovhd IMV Valve

Node 3 IMV Stbd Ovhd Vlv

√Position - Open
- 6.11 Verify RMO Handle pointer contacting OPEN range marking.
Notify **MCC-H** of results.
- 6.12 Photo document RMO showing pointer position (Digital Camera).
- 6.13 Deploy RMO Handle, rotate ↻ until pointer contacts RMO CLOSED hardstop.
Release RMO Handle.
Allow handle to return to neutral position.
Refer to Figure 11.
- 6.14 Verifying Position of Stbd Ovhd IMV Valve

Node 3 IMV Stbd Ovhd Vlv

√Position - Closed
- 6.15 Verify RMO Handle pointer contacting CLOSED range marking.
Notify **MCC-H** of results.
- 6.16 Photo document RMO showing pointer position (Digital Camera).

7. TORQUING IMV VALVE

- 7.1 Tighten, torque RMO Flex Shaft bolts (two) (on side of actuator) to 24 in-lbs [Driver Handle, 1/4" Drive; 6" Ext, 1/4" Drive; Universal Joint, 1/4" Drive; 5/32" Hex Head, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].
- 7.2 Tighten IMV Valve V-Band Clamp nut, torque to 38 in-lbs [(10-50 in-lbs) Trq Wrench, 1/4" Drive; 4" Ext, 1/4" Drive; 7/16" Deep Socket, 1/4" Drive].
- 7.3 Photo document IMV Valve configuration (Digital Camera).

8. DUCT CONNECTION

NOTE

Some IMV hose clamps may require 4" Common Tip Screwdriver instead of 1/4" Socket, 1/4" Drive. This is dependent on space between head of fastener and interface tolerances to band clamp.

- 8.1 If IMV Duct was removed in step 3.4, install IMV Duct.
 - Slide Duct Coupling (on IMV Fan side) onto end of IMV Duct.
 - Allow approximately 1 inch overlap between Duct Coupling and IMV Duct.
 - Align Hose Clamp so that it is at least 1/8" from end of Duct Coupling.
- 8.2 Rotate IMV Duct in place over IMV Valve.
Refer to Figure 6, 9.
- 8.3 Loosen hose clamp stowed on IMV Duct to allow Duct Coupling to slide onto end of IMV Valve (Driver Handle 1/4" Drive, 1/4" Socket).
- 8.4 Position Duct Coupling over IMV Duct and IMV Valve so that approximately 1 inch of Duct Coupling overlaps IMV Duct and IMV Valve.
- 8.5 Align Hose Clamps such that they are at least 1/8" from end of Duct Coupling.
- 8.6 Tighten all Hose Clamp Fasteners, torque to 10 in-lbs [Driver Handle 1/4" Drive, 1/4" Deep Socket, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].

1.119 NODE 3 STBD OVHD NPRV REMOVAL AND IMV VALVE INSTALLATION
 (ASSY OPS/20A/FIN) Page 13 of 13 pages

9. CLOSEOUT

- 9.1 Install following Closeout Panels (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive, 5/32" Hex Head, 1/4" Drive):
 NOD3O6-51 (ten fasteners)
 NOD3O6-02 (four fasteners)
 NOD3F3-02 (four fasteners)

10. POST MAINTENANCE

- 10.1 Notify **MCC-H** of task completion.
 10.2 Report NPRV Serial Number recorded in Step 3.6.
 10.3 Stow tools, materials.

Table 4. Restow Table

Part Name	Part Number	Qty	Stowed
NPRV	683-16322-3	1	NOD3F3-02
IMV Duct Cover	2210ND543-401	1	
IMV Connector Caps	N/A	2	
NOD3F3-02 Launch Bolts and Washers	NAS1351N4-16	28	(If not removed by previous activity)
NOD3O6-02 Launch Bolts and Washers	NAS1351N3-10	2	(If not removed by previous activity)
NOD3O6-51 Launch Bolts and Washers	NAS1351N3-12	8	(If not removed by previous activity)

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1.120 NODE 3 PPRV SAMPLE PORT CAP REMOVAL

(ASSY OPS/20A/FIN)

Page 1 of 4 pages

OBJECTIVE:

Remove Hatch PPRV Sample Port Cap with Fluid Fitting Torque Device (FFTD) (to overcome 800 in-lbs torque) and replace Metal Gamah Seal with a Soft Gamah Seal. Allows the crew to remove and replace the PPRV Sample Port Cap by hand in the future. Due to the fragility of the PPRV Sample Port, additional precautions are taken when using the FFTD to remove the cap.

LOCATION:

Installed: Hatch

DURATION:

45 minutes

CREW:

One

PARTS:

None

MATERIALS:

Tie Wraps

Braycote

Rubber Gloves

TOOLS:

Digital Camera

Fluid Fitting Torque Device (FFTD) and Gamah Seal Maintenance Kit (GSMK):

FFTD (with 1.625" Drive Gear and 1.25" Reaction Gear) P/N 990204-101

Brass Picks P/N 887-200

Soft Gamah Seal, 1" Gamah Fitting P/N S2L121-V75

Dry Wipes P/N SEG33107170-306

Gamah Seal Removal Tool, 1" Gamah Fitting P/N 683-60467-4

Retaining Ring Installation/Removal Tool, 1" Gamah Fitting P/N 683-60474-4

ISS IVA Toolbox:

Drawer 2:

Ratchet, 3/8" Drive

Universal Joint, 3/8" Drive

Drawer 4:

Wire Cutters

REFERENCED PROCEDURE(S):

A.2.1 FLUID FITTING TORQUE DEVICE (FFTD) ASSEMBLY AND USAGE

A.2.3 MATING GAMAH FITTINGS USING THE FFTD

A.2.13 GAMAH SEAL R&R

1.120 NODE 3 PPRV SAMPLE PORT CAP REMOVAL

(ASSY OPS/20A/FIN)

Page 2 of 4 pages

1. REMOVING GAMAH CAP FROM PPRV SAMPLE PORT

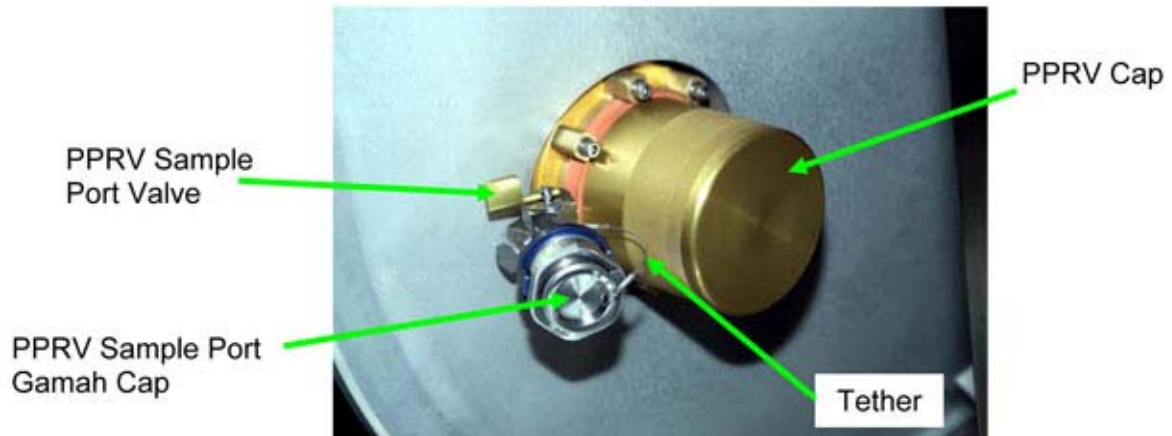


Figure 1. - Hatch PPRV.

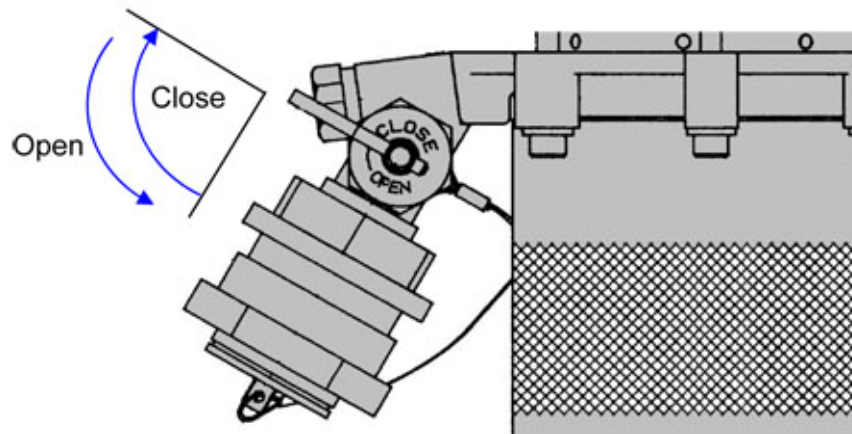


Figure 2. - Hatch PPRV Sample Port Valve (shown CLOSED).

1.1 ✓ PPRV Sample Port Valve – CLOSED

Refer to Figures 1, 2.

1.2 ✓ PPRV Cap →|← PPRV

Refer to Figure 1.

NOTE

The Tether on the PPRV Sample Port Cap interferes with the use of the FFTD. The Tether must be cut to remove the interference.

1.3 Cut PPRV Sample Port Cap Tether (Wire Cutters), discard Tether.

WARNING

Do not put side loads on the FFTD. Failure to properly restrain the FFTD during PPRV Sample Port Cap removal can result in hardware damage to the PPRV Sample Port and possible leakage to space.

1.120 NODE 3 PPRV SAMPLE PORT CAP REMOVAL

(ASSY OPS/20A/FIN)

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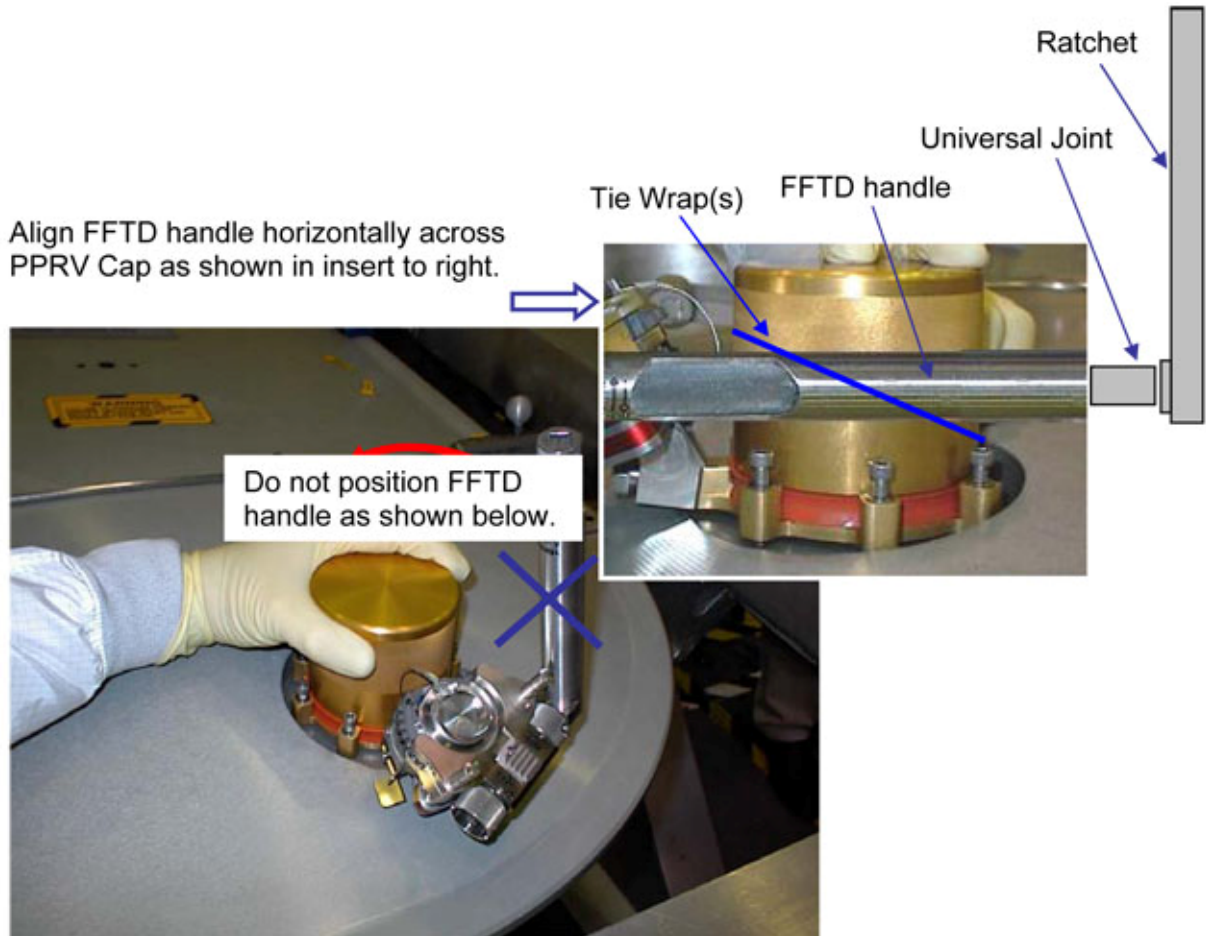


Figure 3. - FFTD Installed on Hatch PPRV Sample Port. (To prevent side loading with the FFTD, the FFTD handle is positioned horizontally across and tie wrapped to PPRV Cap.)

NOTE

For assembly and usage of the FFTD, refer to [A.2.1 FLUID FITTING TORQUE DEVICE \(FFTD\) ASSEMBLY AND USAGE](#) and [A.2.3 MATING GAMAH FITTINGS USING THE FFTD](#) (SODF: IFM: REFERENCE: APPENDIX A: ISS IVA TOOLS).

- 1.4 Install FFTD on PPRV Sample Port without FFTD handle attached (FFTD; 1.625" Drive Gear; 1.25" Reaction Gear). Refer to Figure 3.
- 1.5 Install FFTD handle on Drive Head Assembly, positioned horizontally across the PPRV Cap. Refer to Figure 3 insert.
- 1.6 Secure FFTD to PPRV Cap (Tie Wraps). Refer to Figure 3.

1.120 NODE 3 PPRV SAMPLE PORT CAP REMOVAL

(ASSY OPS/20A/FIN)

Page 4 of 4 pages

1.7 Attach other tools to FFTD (Universal Joint, 3/8" Drive; Ratchet, 3/8" Drive).
Refer to Figure 3.

1.8 PPRV Sample Port ←|→ PPRV Sample Port Cap (FFTD; 1.625" Drive Gear; 1.25" Reaction Gear; Universal Joint, 3/8" Drive; Ratchet, 3/8" Drive)

2. REPLACING METAL SEAL WITH SOFT SEAL

NOTE

For removal of Retaining Ring and Metal Gamah seal, refer to [A.2.13 GAMAH SEAL R&R](#) (SODF: IFM: REFERENCE: APPENDIX A: ISS IVA TOOLS).

- 2.1 Remove Retaining Ring from PPRV Sample Port Cap (Retaining Ring Installation/Removal Tool, 1" Gamah Fitting).
Discard used retaining ring.
- 2.2 Remove Metal Gamah Seal from PPRV Sample Port Cap (Gamah Seal Removal Tool, 1" Gamah Fitting).
Discard used Metal Gamah Seal.
- 2.3 Wipe PPRV Sample Port Cap visibly clean (Dry Wipes).
- 2.4 Retrieve new Soft Gamah Seal for 1" Gamah Fitting.
Inspect Soft Gamah Seal for nicks and cuts.
Inspect PPRV Sample Port Cap grooves for nicks and burrs.
- 2.5 Don Rubber Gloves.
- 2.6 Apply thin film of Braycote to new soft seal.
- 2.7 Install new Soft Seal on PPRV Sample Port Cap.
- 2.8 Doff, discard Rubber Gloves.

3. REINSTALLING GAMAH CAP

- 3.1 PPRV Sample Port Cap →|← PPRV Sample Port
Hand tighten.
- 3.2 Photo document final configuration of Hatch PPRV (Digital Camera).

4. POST MAINTENANCE

- 4.1 Stow tools, equipment.
- 4.2 Notify **MCC-H** of task completion.

1.122 NODE 3 PPRV REMOVAL AND MPEV INSTALLATION

(ASSY OPS/20A/FIN) Page 1 of 5 pages

OBJECTIVE:

Remove any PPRV from Node 3 and install a Manual Pressure Equalization Valve (MPEV). This can be used on Stbd or Nadir PPRV locations.

LOCATIONS:

Stowed: Node 3 Midbay Fwd

Installed: Node 3 Stbd Hatch, Node 3 Nadir Hatch

DURATION:

30 minutes (each location)

CREW:

One

PARTS:

MPEV P/N 2353028-2-1

MATERIALS:

Dry Wipes

Braycote Lubricant

Gray Tape

Latex Gloves

Sharpie

TOOLS:

ISS IVA Toolbox:

Drawer 2:

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

Ratchet, 1/4" Drive

4" Ext, 1/4" Drive

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

REFERENCED PROCEDURE(S):

None

NOTE

1. Removal or installation both occur on cabin (dome) side of Hatch.
2. Hatch should remain open, stowed throughout procedure.

1.122 NODE 3 PPRV REMOVAL AND MPEV INSTALLATION

(ASSY OPS/20A/FIN)

Page 2 of 5 pages

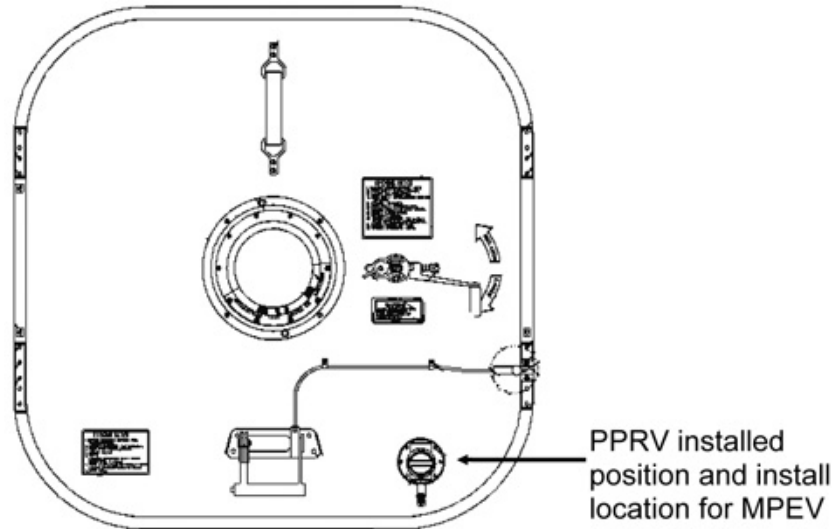


Figure 1.- Hatch (Dome Side).

1. PPRV REMOVAL

1.1 Remove PPRV, Fasteners (six) (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

Label, temporarily stow PPRV (Gray Tape, Sharpie).

Record part number of PPRV: _____

Record serial number of PPRV: _____

Refer to Figure 1.

1.2 Remove PPRV Spacer.

1.3 Clean Hatch at PPRV removal location (Dry Wipes).

1.4 Temporarily stow PPRV.

2. UNSTOWING MPEV

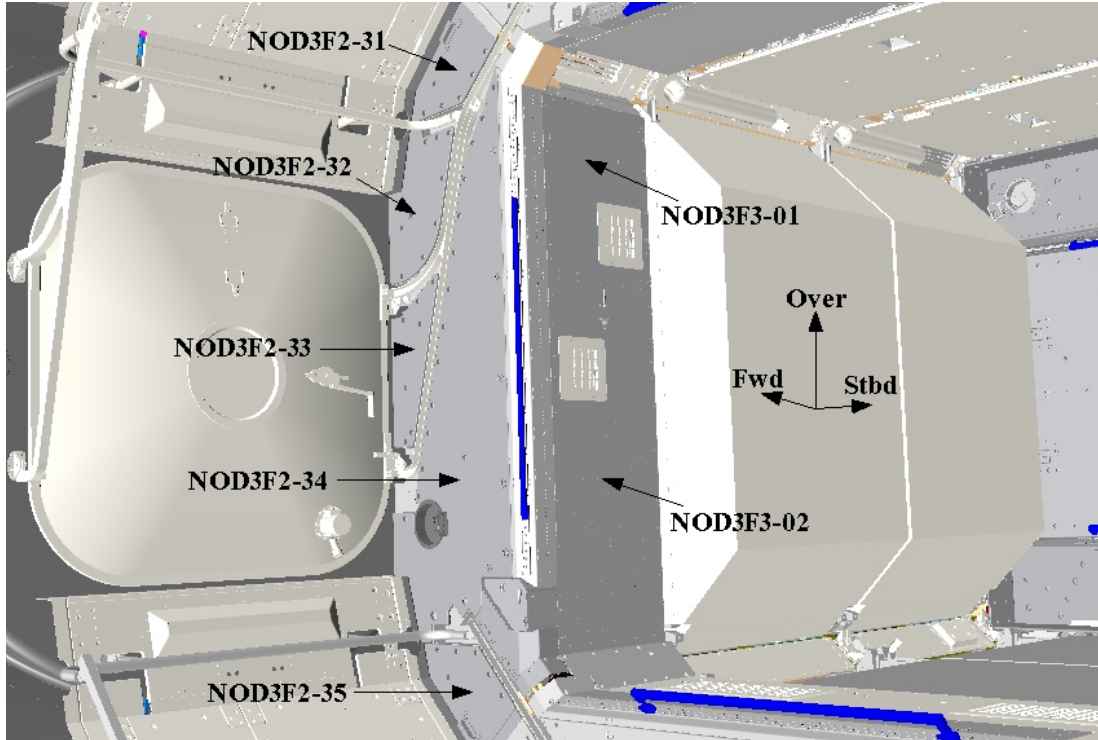


Figure 2.- Forward Midbay with Closeout Panels.

1.122 NODE 3 PPRV REMOVAL AND MPEV INSTALLATION

(ASSY OPS/20A/FIN)

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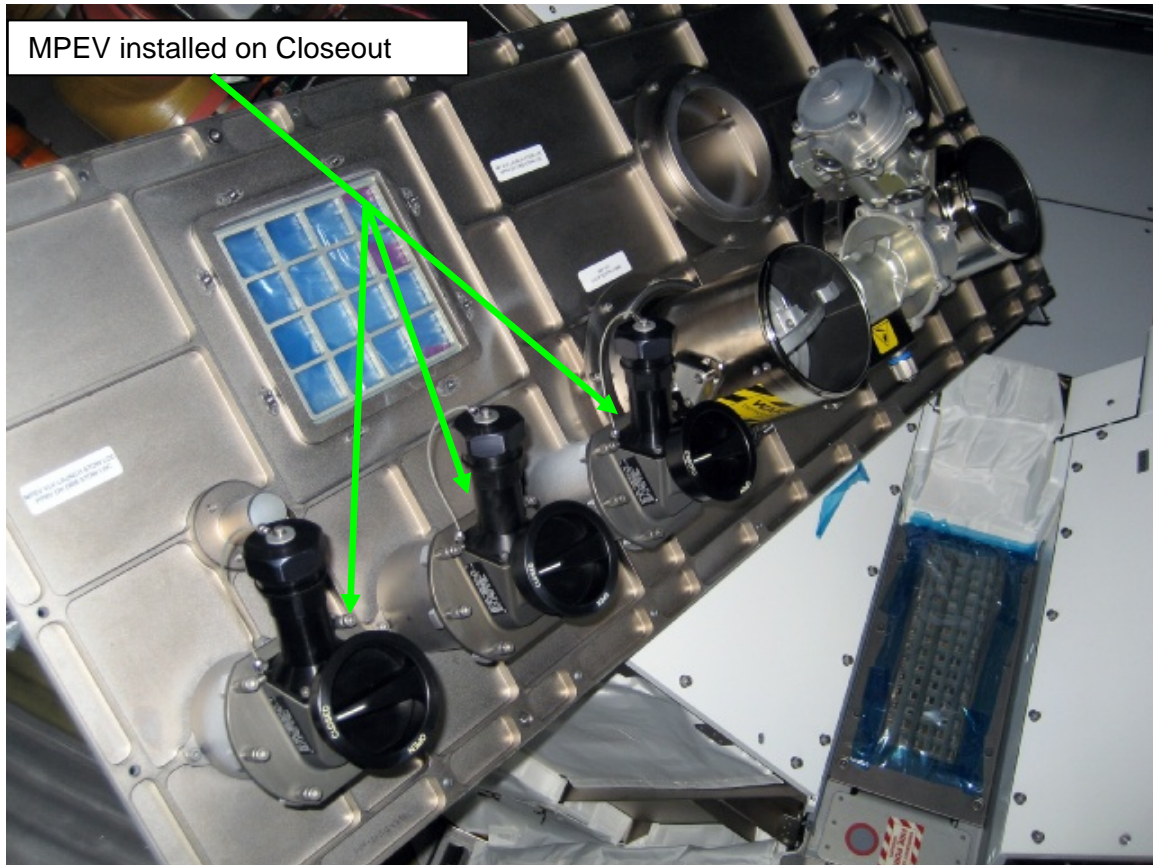


Figure 3.- Forward Midbay with Closeout Removed.

- 2.1 If required, remove Forward Midbay Closeout Panel NOD3F3-02, Launch Restraint Bolts (twenty-eight) (Ratchet, 1/4" Drive; 5/32" Hex Head Driver, 1/4" Drive).
- 2.2 Remove Forward Midbay Closeout Panel NOD3F3-02, Fasteners (four) (Ratchet, 1/4" Drive; 5/32" Hex Head Driver, 1/4" Drive).
- 2.3 Remove MPEV from stowed location at NOD3F3-02, Fasteners (six) (Ratchet, 1/4" Drive; 5/32" Hex Head Driver, 1/4" Drive). Refer to Figure 3.
- 2.4 Record part number of MPEV: _____
Record serial number of MPEV: _____
- 2.5 Remove shipping closures (two) from MPEV, place on PPRV. Temporarily stow PPRV.
- 2.6 Stow PPRV.
- 2.7 Replace Forward Midbay Closeout Panel NOD3F3-02, Fasteners (four) (Ratchet, 1/4" Drive; 5/32" Hex Head Driver, 1/4" Drive).

1.122 NODE 3 PPRV REMOVAL AND MPEV INSTALLATION

(ASSY OPS/20A/FIN)

Page 5 of 5 pages

3. MPEV INSTALLATION

3.1 Replacement MPEV – OPEN, cap removed

NOTE

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



Figure 4.- MPEV Shown in Closed Position.

- 3.2 Apply a small amount of Braycote to MPEV seals and position MPEV in proper installation orientation (Latex Gloves, Braycote Lubricant). Refer to Figures 1, 4.
- 3.3 Tighten, torque Fasteners (six) in star pattern, to 66 in-lbs [Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive; 4" Ext, 1/4" Drive; (40-200 in-lbs) Trq Wrench, 1/4" Drive].

WARNING

MPEV must be closed to be prepared for emergency Hatch closing.

- 3.4 MPEV → CLOSED, uncapped
- 3.5 Check for FOD around work area within 3' radius.
- 3.6 Photo document final configuration (DCS 760 Camera).

4. POST MAINTENANCE

- 4.1 Notify **MCC-H** of task completion, part numbers, serial numbers.
- 4.2 Update IMS with stowage locations.
Stow tools, equipment.

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1.124 NODE 3 VACUUM ACCESS PORT CAP SEAL R&R

(ASSY OPS/20A/FIN)

Page 1 of 11 pages

OBJECTIVE:

Remove the metal seal launched in the Node 3 Vacuum Access Port (VAP) Cap and replace it with a rubber seal.

LOCATION:

NOD3F0

DURATION:

1 Hour

CREW:

One

TOOLS:

FFTD and Gamah Seal Maintenance Kit (P/N SJG33114223):

Retaining Ring Installation/Removal Tool P/N 683-60474-4

Gamah Seal Removal Tool, 1" Gamah Fitting P/N 683-60467-4

1.0 Gamah Fitting Soft Seal P/N S2L121-V75

ISS IVA Toolbox:

Drawer 2:

Ratchet, 3/8" Drive

Driver Handle, 1/4" Drive

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

Drawer 3:

Breaker Bar, 3/8" Drive

1-5/8" Crowfoot, 3/8" Drive

2" Crowfoot, 3/8" Drive

1. SAFING

√ **MCC-H** Node 3 VRIV – closed

2. ACCESS

2.1 Remove Closeout Panel NOD3F0-03, fasteners (thirteen) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

If Required

| Remove Launch Bolts (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

2.2 Remove Closeout Panel NOD3F0-02, fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

If Required

| Remove Launch Bolts (two) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

3. REMOVING VAP CAP



Figure 1.- Node 3 Vacuum Access Port

NOTE

Vacuum Access Port Cap is a 1" Gamah Fitting, requiring two wrenches to break its 725-800 in-lbs of torque. The 1-5/8" Crowfoot is for torquing the fitting, and the 2" Crowfoot is used to hold the large reaction flats.

CAUTION

During removal of the Vacuum Access Port Cap, the reaction flats should remain stationary. If they turn, damage to the port may occur.

- 3.1 Remove Vacuum Access Port Cap 1" Gamah Fitting (Ratchet, 3/8" Drive; 1-5/8" Crowfoot, 3/8" Drive; Breaker Bar, 3/8" Drive; 2" Crowfoot, 3/8" Drive).

1.124 NODE 3 VACUUM ACCESS PORT CAP SEAL R&R

(ASSY OPS/20A/FIN)

Page 3 of 11 pages

CAUTION

Debris and mishandling of Gamah Fitting assembly may cause damage to sealing surface. Inspection of seals and sealing surfaces for debris will ensure that metal seal and Retaining Ring are properly installed prior to mate of Gamah Fitting.

NOTE

1. Retaining Ring Removal: The Retaining Ring Removal Tool removes a Retaining Ring from a Gamah Fitting by picking it off with a small steel pick. This method of removing the Retaining Ring is preferred over using Brass Picks as Brass Picks generate particulate that may get inside the Gamah Fitting.
2. Gamah Seal Removal: The Gamah Seal Removal Tool uses a gate to clamp down on the Metal Seal and a plunger that pushes the fitting out from under the seal.
3. Gamah Seal and Retaining Ring Installation: No tools are required for Gamah Fitting Metal Seal installation. The Retaining Ring Installation Tool installs the Retaining Ring onto the Gamah Fitting by temporarily expanding its diameter to fit over the Gamah Fitting.
4. If the Gamah Seal Removal Tool or Retaining Ring Installation/Removal Tool fails to remove the Metal Seal or Retaining Ring, respectively, use Brass Picks from the Gamah Seal Maintenance Kit to remove the Metal Seal or Retaining Ring.

4. REMOVING VAP CAP RETAINING RING

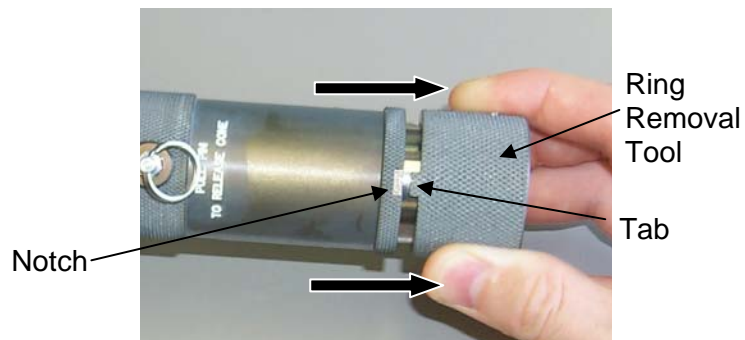


Figure 2.- Releasing Ring Removal Tool.

- 4.1 Release Ring Removal Tool by pulling knurled end of tool until tab clears notch.
Refer to Figure 2.



Figure 3.- Unscrew Ring Removal Tool Off of Ring Installation Tool.

- 4.2 Rotate Ring Removal Tool to unscrew it from Ring Installation Tool. Refer to Figure 3.



Figure 4.- Completely Disengage Ring Removal Tool from Ring Installation Tool.

- 4.3 Remove Ring Removal Tool from Ring Installation Tool. Refer to Figure 4.

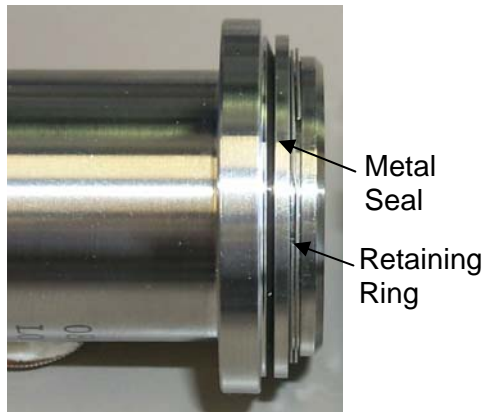


Figure 5.- Slide Gamah Nut Back to Expose Retaining Ring and Metal Seal.

- 4.4 Slide Gamah Nut back to expose Retaining Ring and Metal Seal. Refer to Figure 5.



Figure 6.- Alignment of Ring Removal Tool and Gamah Fitting.

- 4.5 Align Ring Removal Tool with end of Gamah Fitting.
Refer to Figure 6.

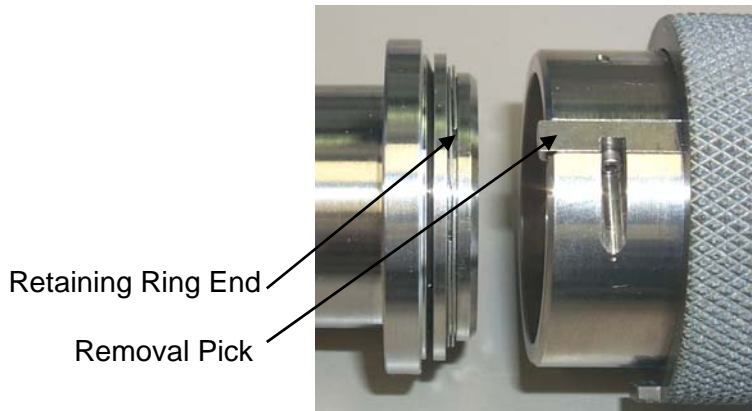


Figure 7.- Placement of Ring Removal Tool onto Gamah Fitting.

- 4.6 Rotate Ring Removal Tool to align removal pick with end of Retaining Ring.
Refer to Figure 7.



Figure 8.- Place Removal Tool onto Gamah Fitting.

- 4.7 Press Ring Removal Tool against Gamah Fitting with removal pick next to end of Retaining Ring.
Rotate Ring Removal Tool to catch end of Retaining Ring in removal pick.
Refer to Figure 8.

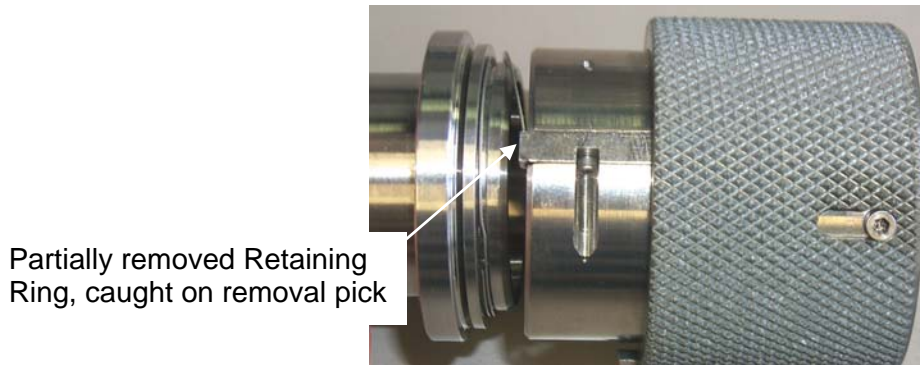


Figure 9.- Partially Removed Retaining Ring.

- 4.8 Continue to rotate Ring Removal Tool and pull it away from Gamah Fitting.
Retaining Ring should pull away from Gamah Fitting.
Refer to Figure 9.

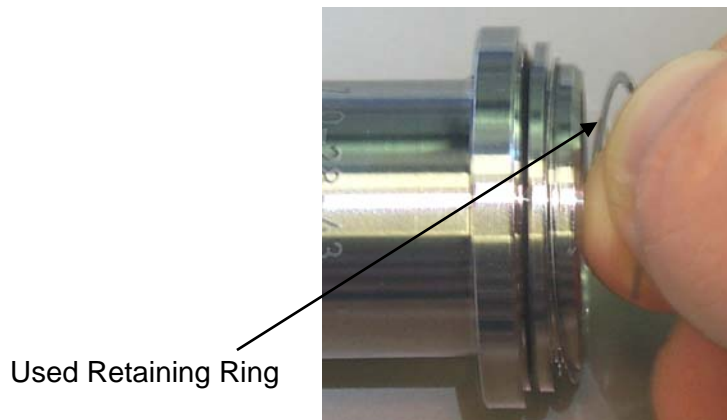


Figure 10.- Removal of Retaining Ring by Hand.

- 4.9 Remove Ring Removal Tool.
Pull Retaining Ring off the rest of the way by hand.
Reinstall Ring Removal Tool onto back of Ring Installation Tool.
Screw Ring Removal Tool onto Ring Installation Tool, until tab snaps into notch on Ring Installation Tool.
Refer to Figure 10.

5. REMOVING GAMAH FITTING METAL SEAL

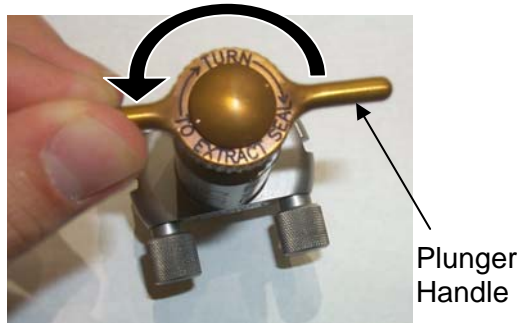


Figure 11.- Plunger Handle.

- 5.1 Turn Plunger Handle ↻ to fully retract plunger.
Refer to Figure 11.

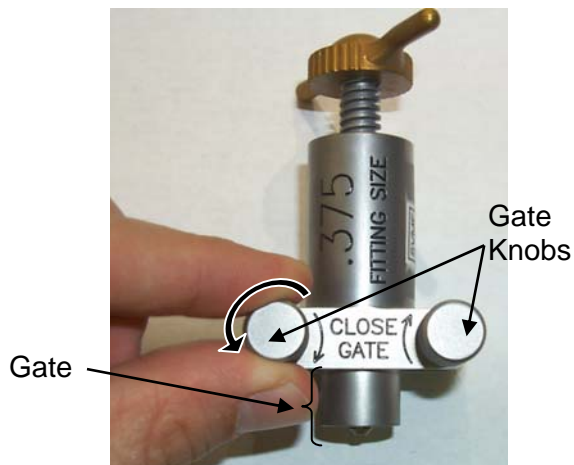


Figure 12.- Gate Knobs.

- 5.2 Turn Gate Knobs ↻ to open gate.
Refer to Figure 12.

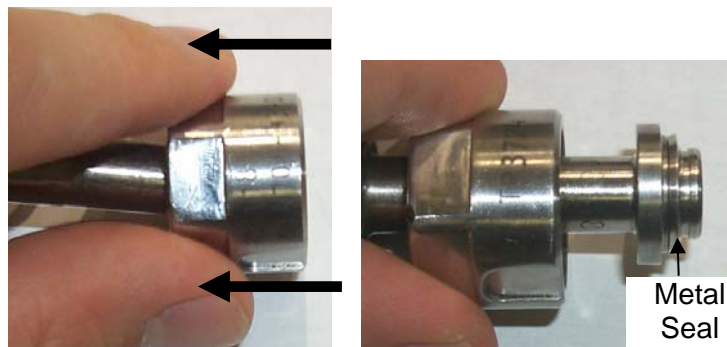


Figure 13.- Gamah Nut.

- 5.3 Slide Gamah Nut back to expose Metal Seal.
Refer to Figure 13.



Figure 14.- Alignment of Gamah Seal Removal Tool and Gamah Fitting.

- 5.4 Align Gamah Seal Removal Tool with Gamah Fitting. Refer to Figure 14.

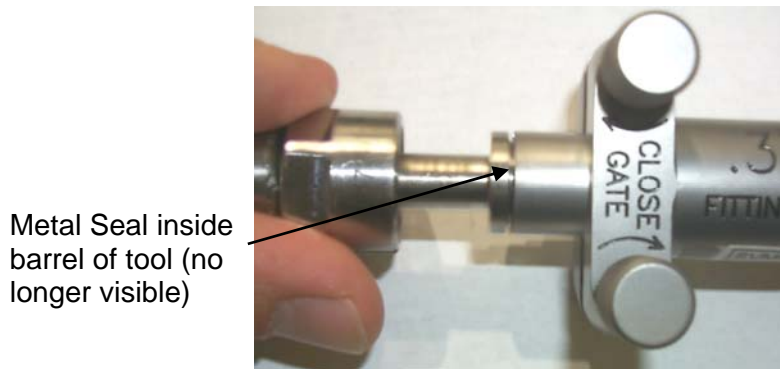


Figure 15.- Placement of Gamah Seal Removal Tool onto Gamah Fitting.

- 5.5 Slide Gamah Seal Removal Tool onto Gamah Fitting. Verify Metal Seal is inside tool barrel and seal is no longer visible. Refer to Figure 15.



Figure 16.- Tighten Gate Knobs Until Gate is Clamped Onto Metal Seal.

- 5.6 Rotate both Gate Knobs ↻ one full turn. Then turn both knobs ↻ until finger tight. Gate is now closed and clamped onto Metal Seal. Refer to Figure 16.



Figure 17.- Rotate Plunger Handle to Hardstop.

- 5.7 Rotate Plunger Handle ↻ (see top of handle) to extract Metal Seal, a “ping” may be heard when seal is removed from Gamah Fitting. Refer to Figure 17. Repeat steps 5.5 to 5.7 as required to remove Metal Seal.

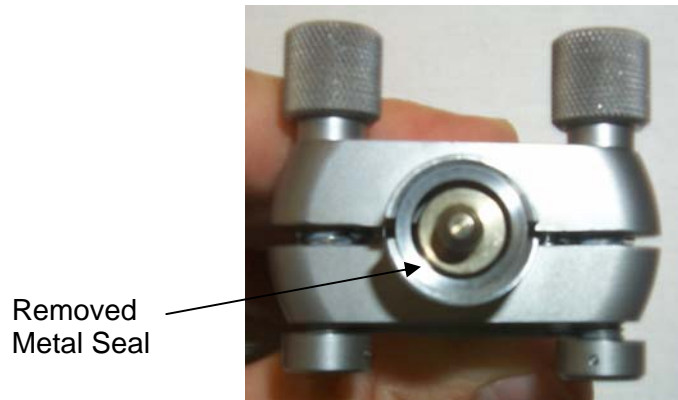


Figure 18.- Remove Tool from Gamah Fitting
(Seal is Kept Inside Tool Barrel).

- 5.8 Remove Gamah Seal Removal Tool from Gamah Fitting; removed Metal Seal is still inside barrel of tool.
Refer to Figure 18.



Figure 19.- Remove Tool from Gamah Fitting
(Seal is Kept Inside Tool Barrel).

- 5.9 Loosen Gate Knobs to release used Metal Seal.
Refer to Figure 19.

1.124 NODE 3 VACUUM ACCESS PORT CAP SEAL R&R

(ASSY OPS/20A/FIN)

Page 11 of 11 pages

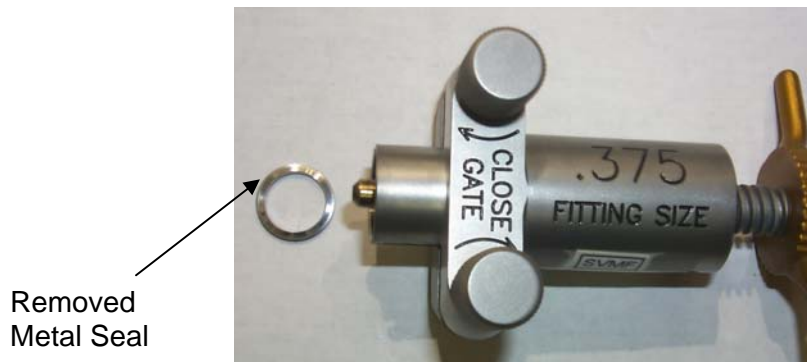


Figure 20.- Tap Tool Against Palm of Hand to Remove Metal Seal.

- 5.10 Tap Gamah Seal Removal Tool against palm of hand to remove Metal Seal.
Refer to Figure 20.

6. REPLACING VAP CAP

- 6.1 Install 1.0 Gamah Fitting Soft Seal.
- 6.2 Photo-document newly installed Gamah Fitting Soft Seal (Digital Camera).
- 6.3 Install VAP Cap on to Vacuum Access Port, hand tighten.

7. CLOSEOUT

- 7.1 Install Closeout Panel NOD3F0-03, fasteners (thirteen) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
- 7.2 Install Closeout Panel NOD3F0-02, fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

8. POST MAINTENANCE

- 8.1 Notify **MCC-H** of task completion.
- 8.2 Stow all tools and materials.

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1.126 NODE 3 ELPS ENABLE POWER SENSING

(ASSY OPS/20A/FIN)

Page 1 of 3 pages

OBJECTIVE:

Test and Enable Node 3 Emergency Lighting Power Supplies (ELPS) and Emergency Egress Lighting Strips (EELS). Assumes Node 3 ELPS RPCMs have been powered a minimum of 16 hours for this verification to be conducted.

LOCATION:

NOD3AD5

DURATION:

20 minutes

CREW:

One

PARTS:

None

MATERIALS:

None

TOOLS:

ISS IVA Toolbox:

Drawer 2:

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

Driver Handle, 1/4" Drive

REFERENCED PROCEDURE(S):

None

NOTE

Node 3 ELPS RPCMs must have been powered a minimum of 16 hours for this verification to be conducted.

1. PROVIDING POWER TO NODE 3 EMERGENCY LIGHTING POWER SUPPLIES (ELPS)

Table 1. Node 3 ELPS Power Sources

ELPS	Closeout Panel (fasteners)	Corresponding EEL Location	Power Sources	
N3-ELPS-Stbd	NOD3AD5-01 (twenty-two)	Starboard Hatch	RPCM N31B4A_E2 RPC 02	RPCM N32A2B_E2 RPC 02

1.1 **√MCC-H** - RPCs powering Node 3 ELPS have been Closed per Table 1

1.126 NODE 3 ELPS ENABLE POWER SENSING

(ASSY OPS/20A/FIN)

Page 2 of 3 pages

2. ACCESSING NODE 3 ELPS

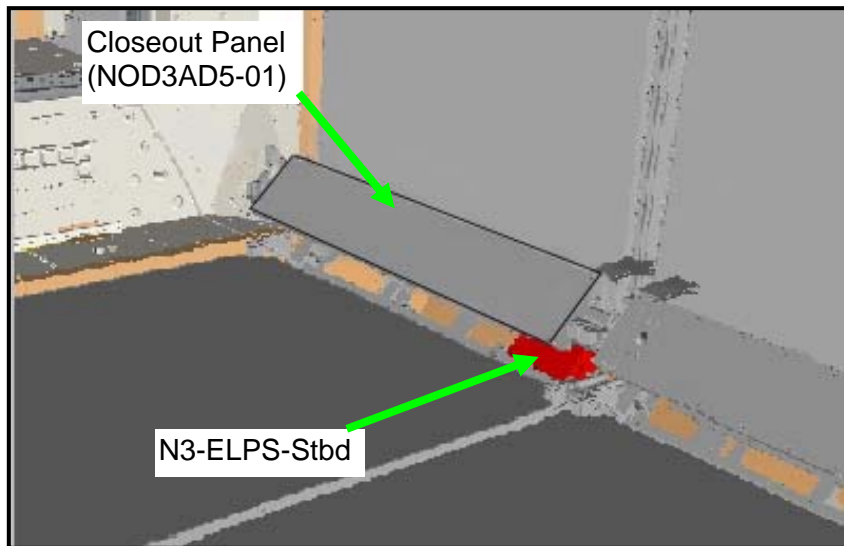


Figure 1.- N3-ELPS-Stbd Location (NOD3AD5).

- 2.1 Remove Closeout Panel NOD3AD5-01, fasteners (twenty-two) (Driver Handle; 5/32" Hex Head, 1/4" Drive). Temporarily stow Closeout Panel. Refer to Figure 1.

3. ELPS VERIFICATION



Figure 2.- ELPS Switch Location.

ELPS

- 3.1 sw ELPS → TEST (hold switch in this position)
Refer to Figure 2 for switch location.

- 3.2 Verify ELPS LED – illuminated

If ELPS LED – flashing
Notify **MCC-H**.

1.126 NODE 3 ELPS ENABLE POWER SENSING

(ASSY OPS/20A/FIN)

Page 3 of 3 pages

EELS 3.3 Verify EELS in corresponding Endcone – illuminated

If EELS – not illuminated

Notify **MCC-H**.

Refer to Table 1.

ELPS 3.4 sw ELPS → ENABLE

4. CLOSEOUT

Install Closeout Panel NOD3AD5-01, fasteners (twenty-two)

(Driver Handle; 5/32" Hex Head, 1/4" Drive).

Refer to Table 1.

5. POST MAINTENANCE

Notify **MCC-H** of task completion, stow tools.

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1.127 CUPOLA CREW RESTRAINT INSTALLATION

(ASSY OPS/20A/FIN)

Page 1 of 6

OBJECTIVE

Install the Cupola Crew Restraint.

LOCATION

Cupola

DURATION

20 Minutes

CREW:

One

PARTS:

Cupola Crew Restraint P/N 1700CU001-403 S/N 001
CCR Upper Restraint P/N 1710CU001-403 S/N 001
Platform Joint P/N 1723CU001-403 S/N 001
Lower Knee Post P/N 1724CU001-403 S/N 001
Upper Knee Post P/N 1722CU001-403 S/N 001

TOOLS

Digital Camera

1.127 CUPOLA CREW RESTRAINT INSTALLATION
(ASSY OPS/20A/FIN)

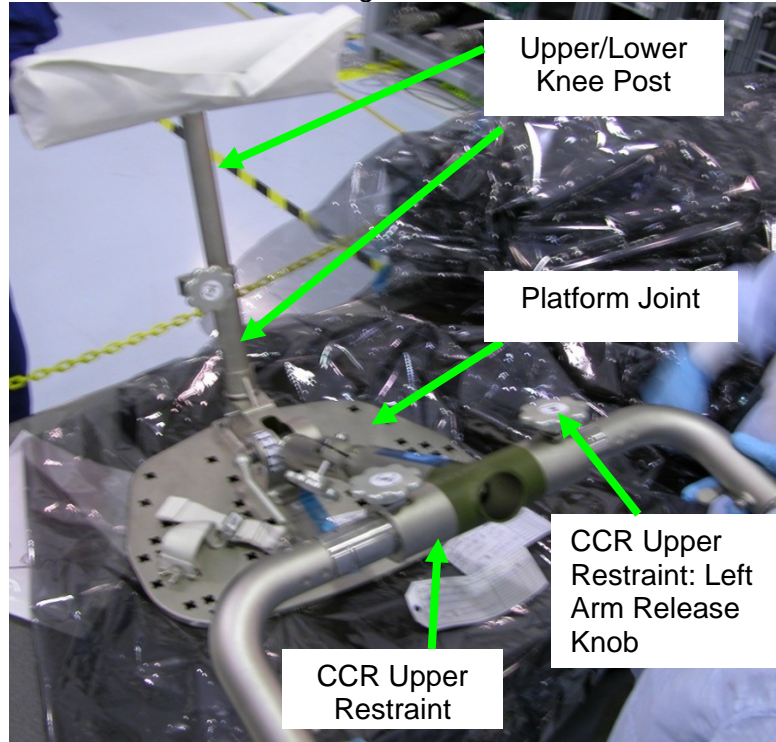


Figure 1. Cupola Crew Restraint Fully Assembled.

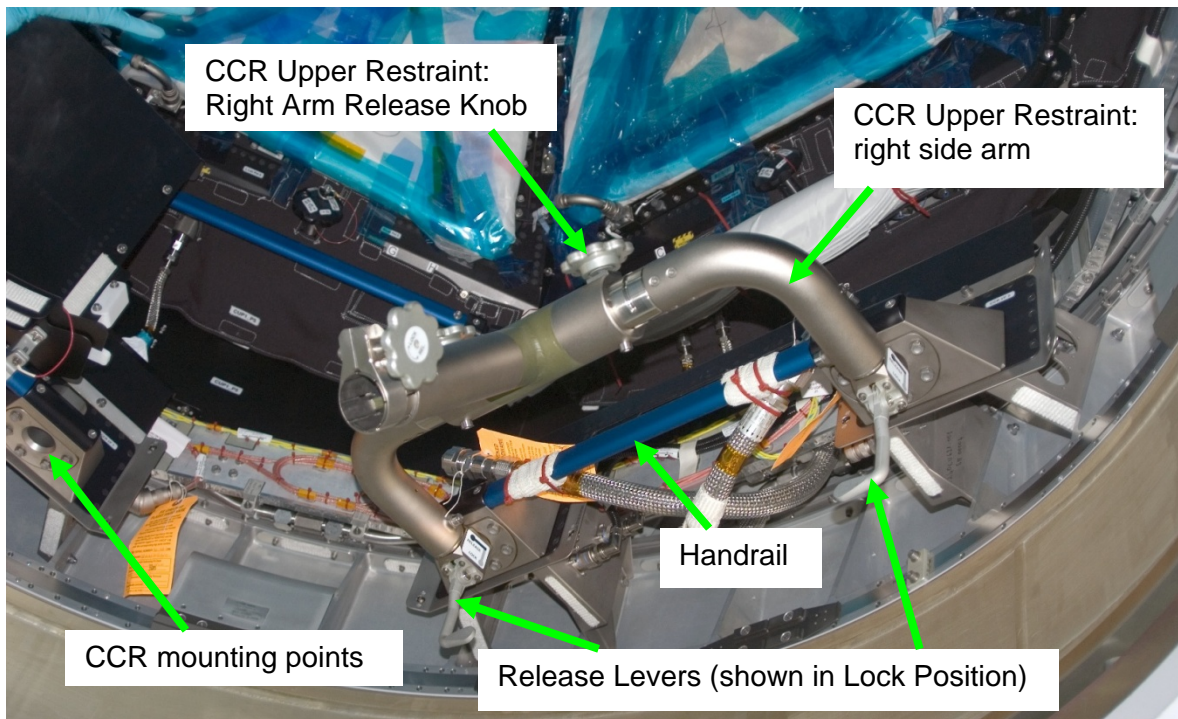


Figure 2. Mounting Location Directly in Front of Cupola Handrails
(Shown Installed at Window 4 Position).

1.127 CUPOLA CREW RESTRAINT INSTALLATION
(ASSY OPS/20A/FIN)

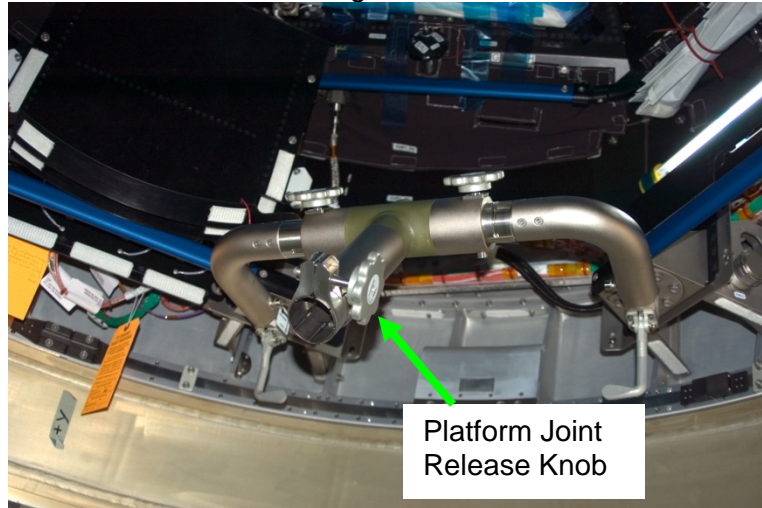


Figure 3. Mounting Location Between Cupola Handrails (Only CCR Upper Restraint Installed).



Figure 4. Upper Restraint: Right Arm Extended.

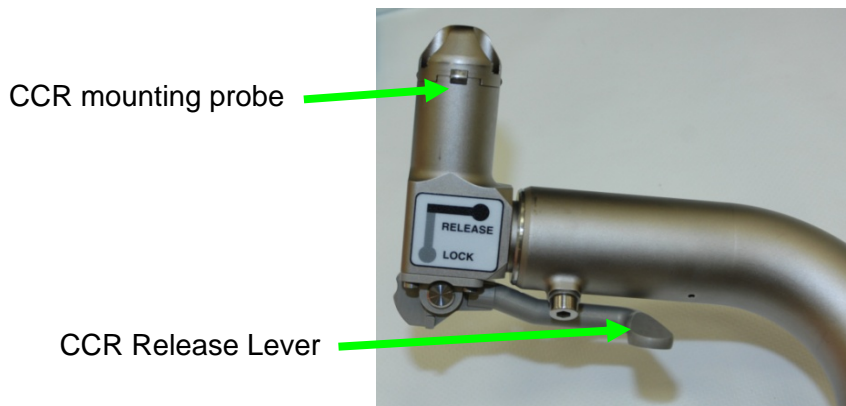


Figure 5. CCR Mounting Probe and Release Lever.

1.127 CUPOLA CREW RESTRAINT INSTALLATION

(ASSY OPS/20A/FIN)

Page 4 of 6

NOTE

1. There are eight possible mounting positions for the Cupola Crew Restraint (CCR): directly in front of a Cupola Handrail (see Figure 2) or between a set of Handrails (see Figure 3).
2. Mounting between the handrails requires the right side arm of the CCR to slide out at the shoulder joint because the mounting points on Cupola are further apart.
3. Position of Cupola Crew Restraint is intended to be in front of RWS, but is up to crew discretion.
4. The reference for left and right is as you position your feet on the CCR.

1. INSTALLING CCR UPPER RESTRAINT IN CUPOLA

- 1.1 Adjusting Left Arm Length on CCR Upper Restraint
Loosen release knob on CCR Upper Restraint Left Arm by turning in REL. direction.
Slide out the Left Arm to hard stop.
Rotate Left Arm ~90 degrees, referring to Figure 2.
Tighten release knob by turning in LOCK direction.
Refer to Figures 1 and 2.
- 1.2 Adjusting Right Arm Length on CCR Upper Restraint
Loosen release knob on CCR Upper Restraint Right Arm by turning in REL. direction.
Rotate Right Arm ~90 degrees to match Left Arm.
Hold CCR Upper Restraint up to desired installation location to determine required width of Right Arm.
Insert the two Mounting Probes on the CCR Upper Restraint into Cupola mounting locations, adjusting Right Arm width as required.
Once proper width is obtained, tighten release knob by turning in LOCK direction.
Refer to Figures 1 to 5.
- 1.3 Move CCR Release Levers (two) to Lock position to secure CCR Upper Restraint to Cupola Structure.
Refer to Figure 5.

1.127 CUPOLA CREW RESTRAINT INSTALLATION (ASSY OPS/20A/FIN)

Page 5 of 6

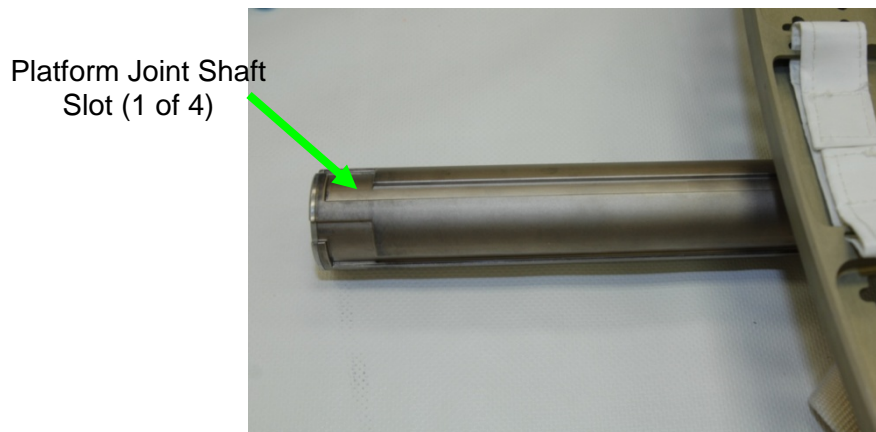


Figure 6. Platform Joint Shaft.

NOTE

There are four different mounting positions of the Platform Joint because of the four slots on the Platform Joint Shaft.

2. INSTALLING PLATFORM JOINT INTO UPPER RESTRAINT

- 2.1 Loosen Platform Joint Release Knob on CCR Upper Restraint by turning in REL. direction.
Refer to Figure 3.
- 2.2 Align the slots of the Platform Joint with the tab inside the end of the CCR Upper Restraint in desired orientation.
Refer to Figure 6.
- 2.3 Insert the Platform Joint Shaft approx. 1" into CCR Upper Restraint, then rotate 45 degrees and continue sliding shaft into Upper Restraint to desired length.
- 2.4 Tighten Platform Joint Release Knob by turning in LOCK direction.

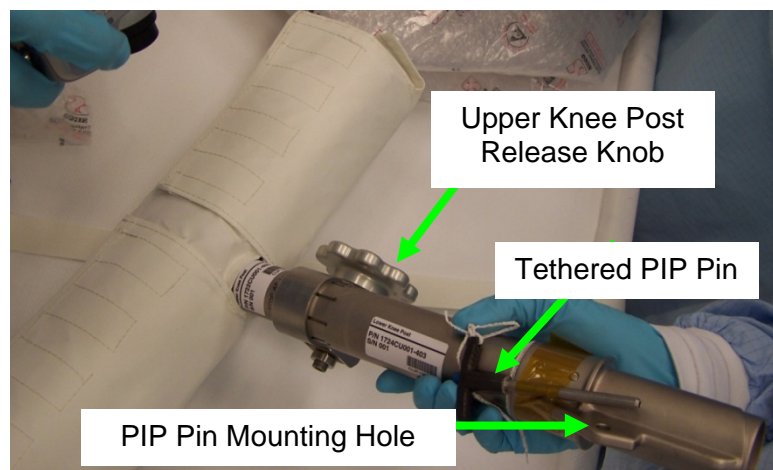


Figure 7. Upper and Lower Knee Post.

1.127 CUPOLA CREW RESTRAINT INSTALLATION (ASSY OPS/20A/FIN)

Page 6 of 6

3. INSTALLING LOWER/UPPER KNEE POST

- 3.1 Insert the end of the Lower Knee Post into the Platform Joint and secure with tethered PIP pin.
Refer to Figure 7.
- 3.2 Loosen Upper Knee Post Release Knob by turning in REL. direction, and adjust Upper Knee Post as desired.
Tighten Upper Knee Post Release Knob by turning in LOCK direction.
- 3.3 Photo document completed installation of Cupola Crew Restraint, showing attachment points as well as overview.

CCR Upper Restraint:
Left side arm



Figure 8. Cupola Crew Restraint – Installed.

4. FINAL CONFIGURATION

Refer to Figure 8.

1.128 NODE 3 ITCS SAMPLING ADAPTER INSTALLATION - MTL (NOD3O6)

(ASSY OPS/20A/FIN 1) Page 1 of 6 pages

OBJECTIVE:

Install Node 3 MTL (NOD3O6) ITCS Coolant Sampling Adapter.

LOCATION:

NOD3O6 (MTL)

DURATION:

45 minutes (1 hour 20 minutes if Rack Rotation required)

CREW:

One

PARTS:

ITCS Coolant Sampling Adapter P/N 683-56147-14

MATERIALS:

None

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

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

Driver Handle, 1/4" Drive

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

REFERENCED PROCEDURE(S):

None

RESTOW:

Ziplock Bag labeled "NOD3O6 ITCS Sampling Adapter Cap, Plug, Insulation & Spacer."

1. SAFING

√**MCC-H** to verify the following:

Verify Node 3 MTL Three Way Mix Valve is in full bypass.

Node 3 MTL is in stable configuration.

2. ACCESSING

2.1 Record S/N or B/C of ITCS Coolant Sampling Adapter to be installed: _____

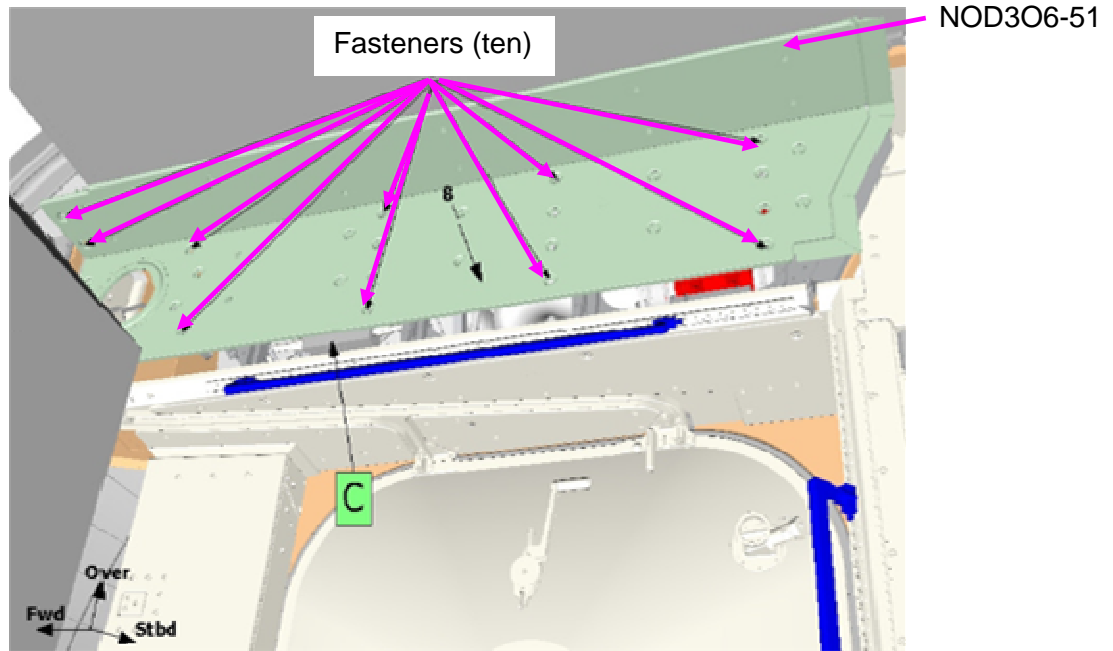


Figure 1.- Location of Closeout Panel NOD306-51.

- 2.2 Unhook the FDS Beta Cloth from the Closeout Panel NOD306-51 edge (Velcro).
- 2.3 Remove Closeout Panel NOD306-51, fasteners (ten) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

3. RELOCATING ITCS QD MOUNTING BRACKET

ITCS QD
 Mounting
 Bracket -
 Launch
 Config

TCS MTL
 SPLY TO
 HX

Final
 position
 for ITCS
 QD
 Mounting
 Bracket



Figure 2.- NOD306 ITCS QD Mounting Bracket Launch Config and Final Position.

3.1 Assess access to ITCS Coolant Sampling Adapter installation location.

- *****
- * If unable to relocate bracket or install ITCS Coolant Sampling Adapter due to poor access
 - * Notify **MCC-H**.
 - * Perform [1.212 NODE 3 RACK ROTATE](#), steps to rotate NOD305 Rack down only (SODF: S&M: NOMINAL: RACK), then:
- *****

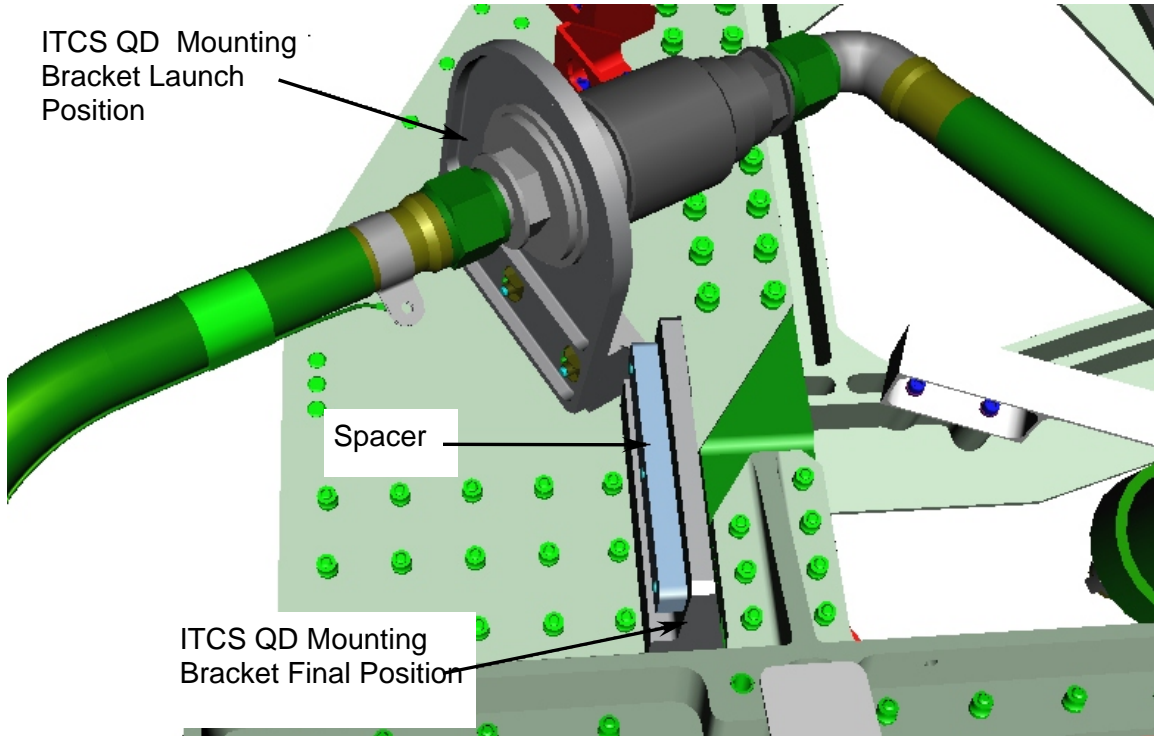


Figure 3.- Spacer Installed on the ITCS QD Mounting Bracket Final Position.

3.2 Remove Spacer installed at the ITCS QD Mounting Bracket final position, fasteners (three) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Temporarily stow Spacer.
Refer to Figure 3.

3.3 **On MCC-H GO:**
TCS MTL SPLY TO HX ←|→ ITCS QD Mounting Bracket

3.4 Remove ITCS QD Mounting Bracket from launch position, fasteners (three) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figures 2, 3.

<p>NOTE Final location of QD Mounting Bracket is labeled "SAMPLE TOOL LOCATION".</p>

3.5 Install ITCS QD Mounting Bracket in final position, fasteners (three) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figures 2, 3.

3.6 Torque ITCS QD Mounting Bracket fasteners (three) to 35 in-lbs [(10-50 in-lbs) Trq Wrench; 5/32" Hex Head, 1/4" Drive].

4. INSTALLING ITCS SAMPLING ADAPTER



Figure 4.- NOD306 ITCS Coolant Sampling Adapter - Final Configuration.



Figure 5. - ITCS Coolant Sampling Adapter.

- 4.1 Remove cap and plug from ITCS Coolant Sampling Adapter QDs. Temporarily stow cap and plug.
- 4.2 Remove insulation covering ITCS Coolant Sampling Adapter Metering Valve and Luer Lock Interface. Temporarily stow.
- 4.3 ITCS Coolant Sampling Adapter 3/4" Female QD (inlet) →|← ITCS Mounting Bracket Refer to Figures 4, 5.
- 4.4 TCS MTL SPLY TO HX →|← ITCS Coolant Sampling Adapter 3/4" Male QD (outlet)

Refer to Figures 4, 5.

4.5 ISS ↓ **MCC-H**, "MTL Sampling Tool Installed."

5. CLOSEOUT

5.1 Stow ITCS Coolant Sampling Adapter cap, plug, insulation, and Mounting Bracket Spacer in Ziplock Bag.
Label Ziplock Bag "NOD306 ITCS Sampling Adapter Cap, Plug, Insulation, & Spacer."

5.2 Photo document final configuration of ITCS Coolant Sampling Adapter and Ziplock Bag.

5.3 If NOD305 Rack was rotated for access
| Perform [1.212 NODE 3 RACK ROTATE](#), steps to rotate
| NOD305 Rack up only (SODF: S&M: NOMINAL: RACK), then:

5.4 Install Closeout Panel NOD306-51, fasteners (ten) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

6. POST MAINTENANCE

Report the following to **MCC-H**:

Barcode or S/N of ITCS Coolant Sampling Adapter installed at NOD306.

Is NOD106-51 Closeout Panel removal sufficient access for ITCS Sampling tasks or will Rack rotation be required?

1.130 NODE 3 ITCS SAMPLING ADAPTER INSTALLATION - LTL (NOD3D6)

(ASSY OPS/20A/FIN 1) Page 1 of 7 pages

OBJECTIVE:

Install Node 3 LTL (NOD3D6) ITCS Coolant Sampling Adapter.

LOCATION:

NOD3D6 (LTL)

DURATION:

45 minutes (1 hour, 20 minutes if Rack Rotation required)

CREW:

One

PARTS:

ITCS Coolant Sampling Adapter P/N 683-56147-14

ITCS Coolant Sampling Adapter Mitten P/N 5561ND001-415

ITCS Coolant Sampling Adapter Mitten P/N 5561ND001-413

MATERIALS:

None

TOOLS:

Digital Camera

Drawer 2:

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

Ratchet, 1/4" Drive

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

REFERENCED PROCEDURE(S):

None

RESTOW:

Ziplock Bag labeled "NOD3D6 Insulation and ITCS Sampling Adapter Cap, Plug, & Spacer"

TCS LTL SPLY TO HX QD Insulation P/N 5561ND001-401

TCS LTL SPLY TO HX QD Insulation P/N 5561ND001-405

3/4" QD Plug

3/4" QD Cap

Spacer

1. SAFING

√**MCC-H** to verify the following:

Node 3 LTL Three-way Mix Valve (TWMV) is in full bypass, if required.

Node 3 ITCS is in a stable configuration.

2. RELOCATING ITCS QD MOUNTING BRACKET

2.1 Record S/N or B/C of ITCS Coolant Sampling Adapter to be installed: _____

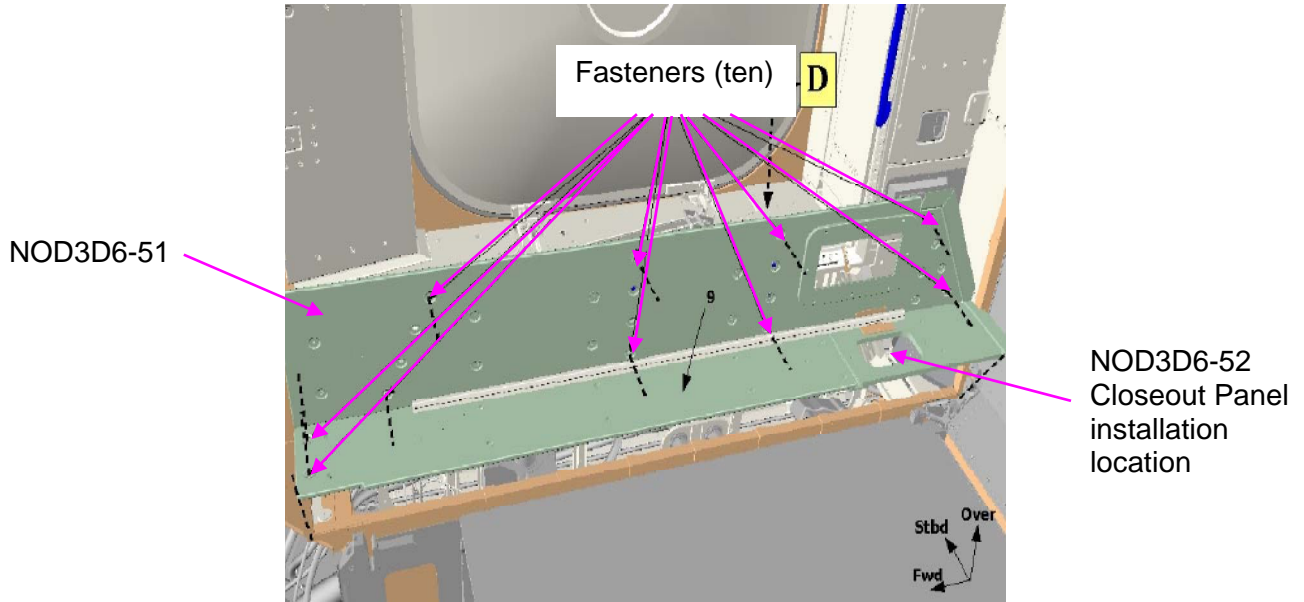


Figure 1.- Closeout Panel NOD3D6-51.

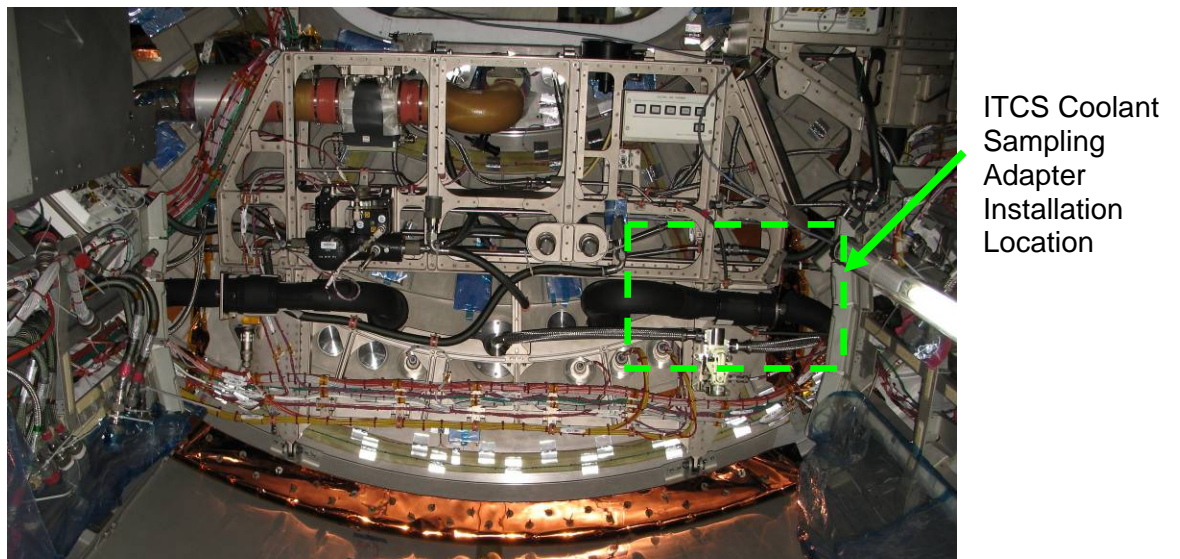


Figure 2.- ITCS Coolant Sampling Adapter Installation Location (View with Closeout Panel and NOD3D5 Rack Removed).

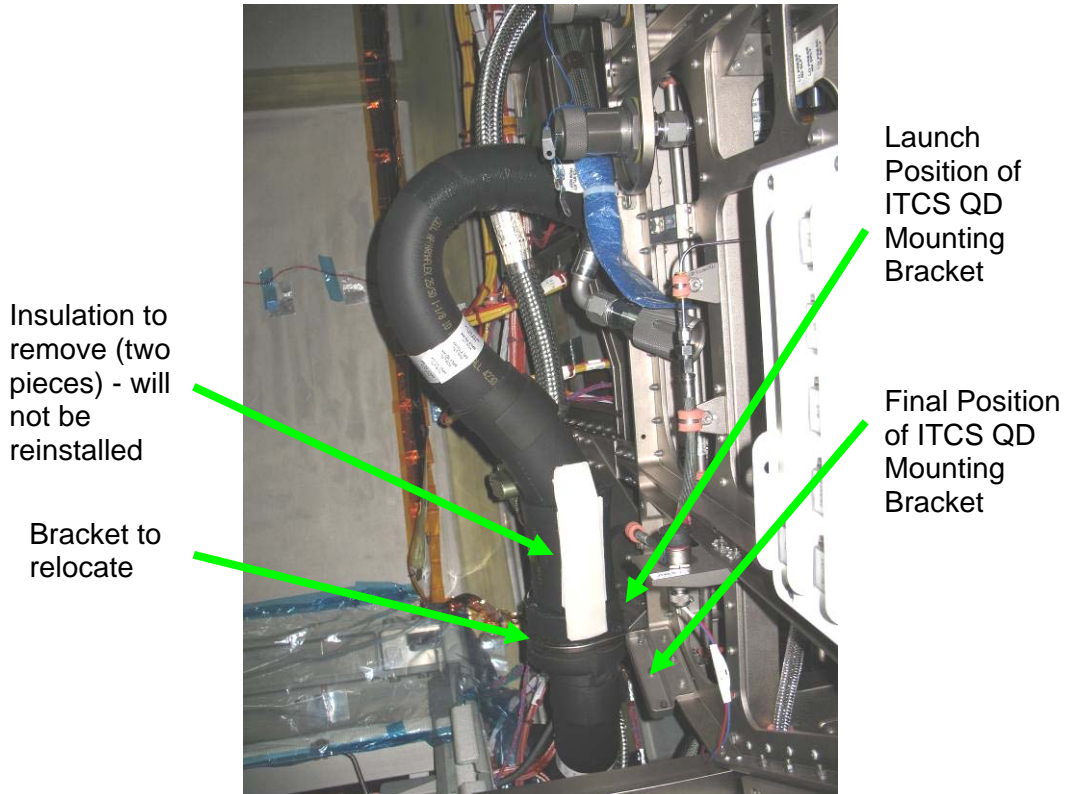


Figure 3.- Launch Configuration of ITCS Coolant Sampling Adapter Installation Location.

- 2.2 If no Rack installed in NOD3D5 Rack bay, open Beta Cloth covering NOD3D6 (Velcro).
- 2.3 If Rack installed in NOD3D5, or required for additional access
 - 2.3.1 Unhook the FDS Beta Cloth from the Closeout Panel NOD3D6-51 edge (Velcro).
 - 2.3.2 Remove Closeout Panel NOD3D6-52, fasteners (two) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
 - 2.3.3 EELS Power Cable P1 ←|→ J1ELS-N1 HMU502
 - 2.3.4 Remove Closeout Panel NOD3D6-51, fasteners (ten) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

1.130 NODE 3 ITCS SAMPLING ADAPTER INSTALLATION - LTL (NOD3D6)
(ASSY OPS/20A/FIN 1) Page 4 of 7 pages

* If unable to relocate Mounting Bracket or install ITCS Coolant
* Sampling Adapter due to poor access and a Rack is installed in
* NOD3D5
* Notify **MCC-H**.
* Perform [1.212 NODE 3 RACK ROTATE](#), steps to rotate
* NOD3D5 Rack down only (SODF: S&M: NOMINAL: RACK),
* then:
* If unable to relocate Mounting Bracket or install ITCS Coolant
* Sampling Adapter due to poor access and ISP is installed in
* NOD3D5
* Notify **MCC-H**.

2.4 Remove insulation covering TCS LTL SPLY TO HX QDs.
Temporarily Stow insulation.
Refer to Figures 2, 3.

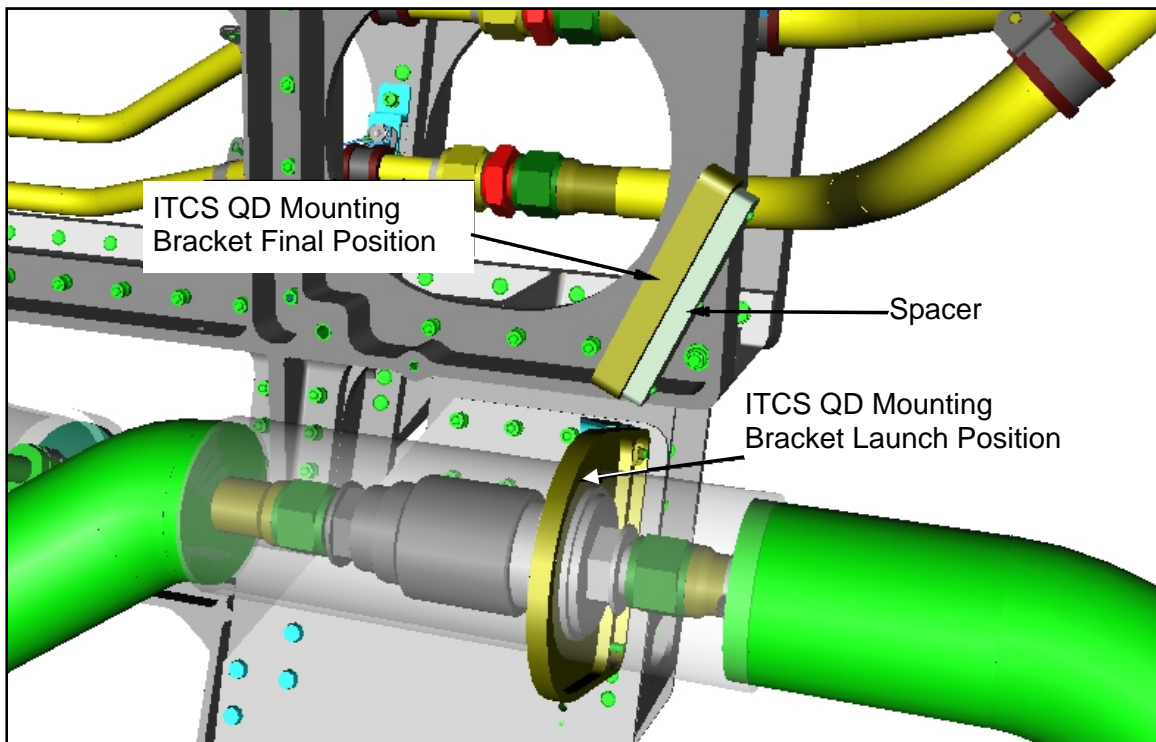


Figure 4.- Spacer Installed on the ITCS QD Mounting Bracket Final Position.

2.5 Remove Spacer installed at the ITCS QD Mounting Bracket final position, fasteners (three) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Temporarily stow.
Refer to Figure 4.

2.6 **On MCC-H GO:**
TCS LTL SPLY TO HX 3/4" Female QD ←|→ 3/4" Male QD

1.130 NODE 3 ITCS SAMPLING ADAPTER INSTALLATION - LTL (NOD3D6)
(ASSY OPS/20A/FIN 1) Page 5 of 7 pages

- 2.7 Remove ITCS QD Mounting Bracket from launch position, fasteners (three) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive)
Refer to Figures 2, 3.
- 2.8 Install ITCS QD Mounting Bracket in final position, fasteners (three) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figures 2, 3, 4.
- 2.9 Torque Mounting Bracket fasteners (three) to 45 in-lbs [(10-50 in-lbs) Trq Wrench, 1/4" Drive, 5/32" Hex Head, 1/4" Drive).

3. INSTALLING NOD3D6 ITCS SAMPLING ADAPTER



Figure 5.- ITCS Coolant Sampling Adapter Mittens (two).

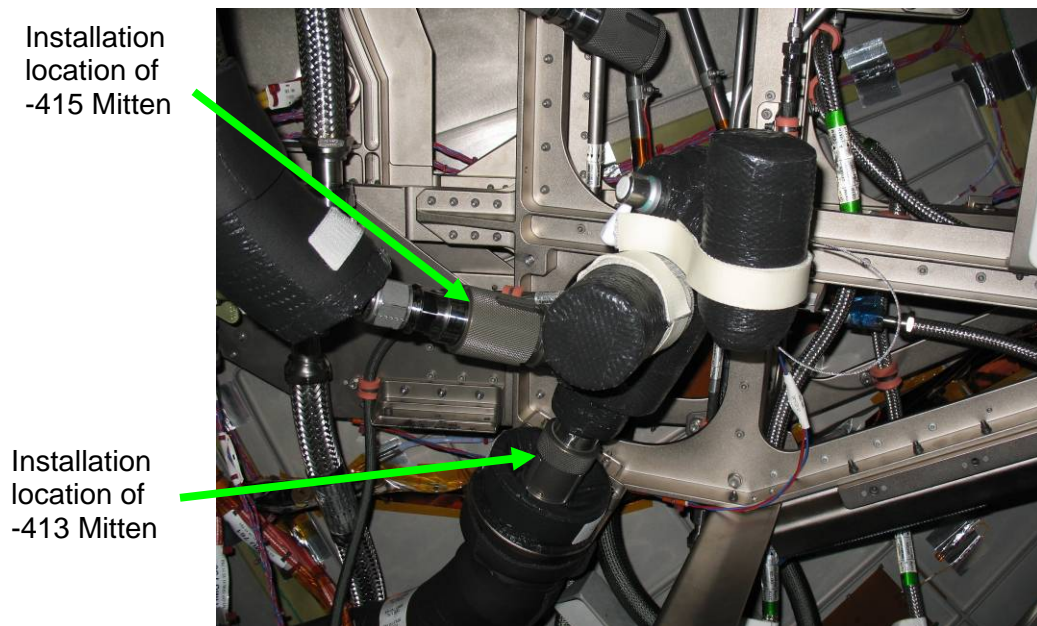


Figure 6.- ITCS Coolant Sampling Adapter Installed in NOD3D6.

1.130 NODE 3 ITCS SAMPLING ADAPTER INSTALLATION - LTL (NOD3D6)

(ASSY OPS/20A/FIN 1) Page 6 of 7 pages



3.1 Remove cap and plug from ITCS Coolant Sampling Adapter QDs. Temporarily stow cap and plug.

3.2 √ITCS Coolant Sampling Adapter Shutoff Valve – CLOSED

3.3 ITCS Coolant Sampling Adapter 3/4" Female QD (INLET) →|←
ITCS QD Mounting Bracket 3/4" Male QD
Refer to Figure 6.

3.4 TCS LTL SPLY TO HX 3/4" Female QD →|← ITCS Coolant
Sampling Adapter 3/4" Male QD (OUTLET)

3.5 Install ITCS Coolant Sampling Adapter Mitten (-413) around ITCS
Coolant Sampling Adapter 3/4" Female QD connection.
Refer to Figure 6.

3.6 Install ITCS Coolant Sampling Adapter Mitten (-415) around ITCS
Coolant Sampling Adapter 3/4" Male QD connection.
Refer to Figure 6.

3.7 ISS ↓ **MCC-H**, "LTL Sampling Tool Installed."

4. CLOSEOUT

4.1 Stow TCS LTL SPLY TO HX Insulation and ITCS Coolant Sampling
Adapter cap, plug, Spacer in Ziplock Bag.
Label Ziplock Bag "NOD3D6 Insulation and ITCS Coolant Sampling
Adapter Cap, Plug, & Spacer."
Tape Ziplock Bag to structure near ITCS QD Mounting Bracket.

4.2 Photo document final configuration (including Ziplock Bag) before
closeout.

4.3 If opened, close Beta Cloth covering NOD3D6 endcone, Velcro.

1.130 NODE 3 ITCS SAMPLING ADAPTER INSTALLATION - LTL (NOD3D6)

(ASSY OPS/20A/FIN 1) Page 7 of 7 pages

- 4.4 If Closeout Panel NOD3D6-51 was removed for access
 - 4.4.1 Install Closeout Panel NOD3D6-51, fasteners (ten)
(Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
 - 4.4.2 EELS Power Cable P1 →|← J1ELS-N1 HMU502
 - 4.4.3 Install Closeout Panel NOD3D6-52, fasteners (two)
(Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
- 4.5 If NOD3D5 Rack was rotated for access
 - Perform [1.212 NODE 3 RACK ROTATE](#), steps to rotate
NOD3O5 Rack up only (SODF: S&M: NOMINAL: RACK), then:

5. POST MAINTENANCE

Report the following to **MCC-H**:

Barcode or S/N of ITCS Coolant Sampling Adapter installed at
NOD3D6.

Is NOD1D6-51 or NOD1D6-52 Closeout Panel removal sufficient
access for ITCS Sampling tasks or will Rack rotation be required?

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1.132 NODE 3 CCAA ANTI-VIBRATION MODULE (AVM) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

Page 1 of 6 pages

OBJECTIVE:

To engage the Node 3 Common Cabin Air Assembly (CCAA) Anti-Vibration Mounts (AVMs) by removing six (6) Launch Brackets that will not be reinstalled. Removes the CCAA Water Separator Saddle Bracket that is only needed for launch.

LOCATION:

Installed: NOD3A3

DURATION:

1 hour

CREW:

One

PARTS:

None

MATERIALS:

None

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

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

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

10" Ext, 1/4" Drive

Univ Joint, 1/4" Drive

1/4" to 3/8" Adapter

Ratchet, 1/4" Drive

Driver Handle, 1/4" Drive

Drawer 3:

6" Long, 3/16" Ball Tip Hex head, 3/8" Drive

Drawer 5:

8-1/4" Long, 2" Cut Scissors

1. ACCESS

Remove NOD3A3-01 Closeout Panel, fasteners (six) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Temporarily stow.

1.132 NODE 3 CCAA ANTI-VIBRATION MODULE (AVM) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

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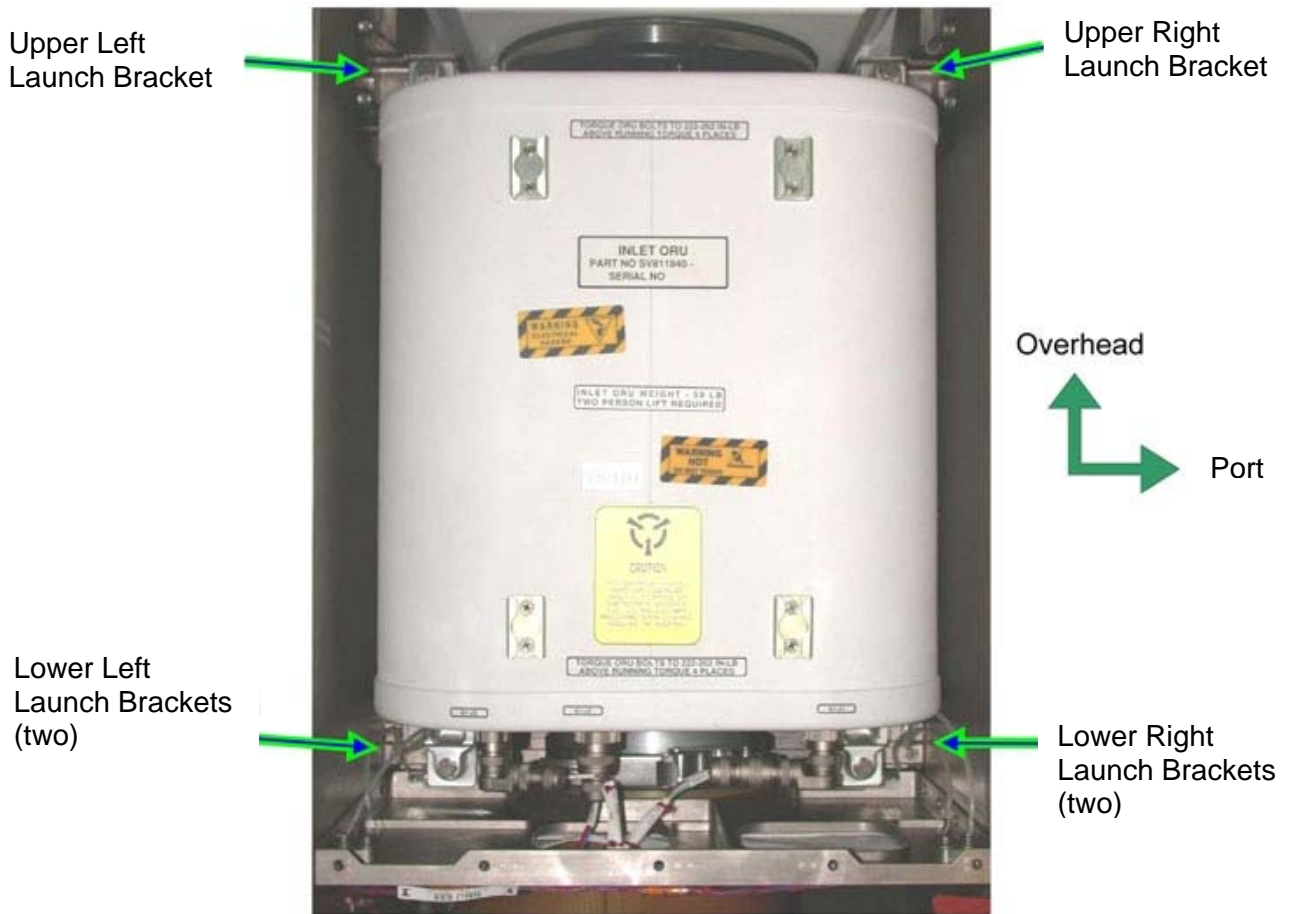


Figure 1. - View of Node 3 CCAA Inlet ORU.

2. REMOVING CCAA UPPER AVM LAUNCH BRACKETS

NOTE

1. Fasteners A to D attach AVM Launch Bracket to midbay secondary structure while Fasteners in group E attach AVM Launch Bracket to CCAA Fan mounting structure.
2. Fasteners are captive on their relevant Brackets.

1.132 NODE 3 CCAA ANTI-VIBRATION MODULE (AVM) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

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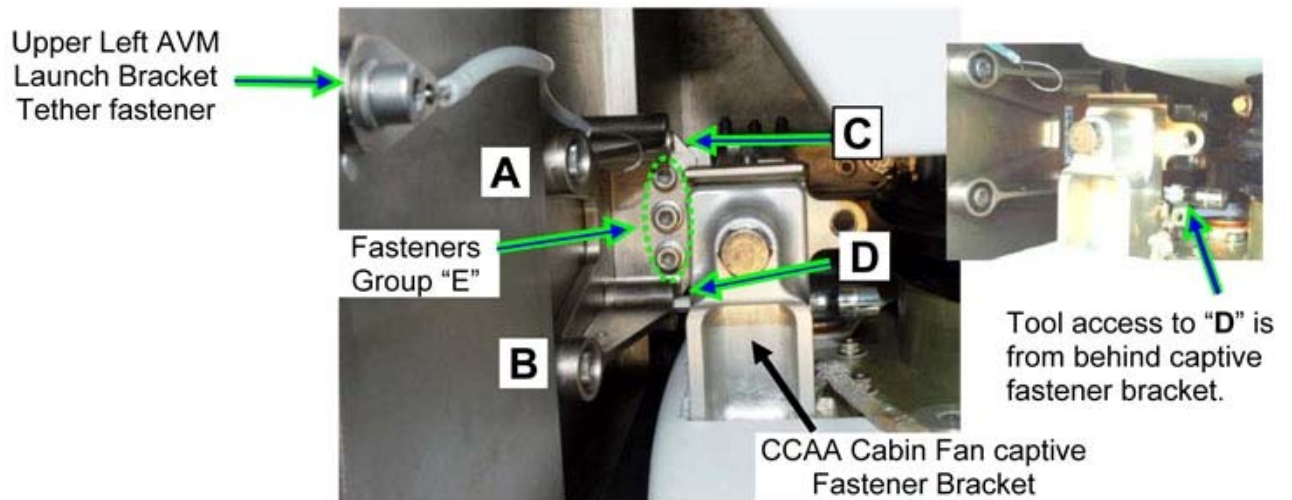


Figure 2. - CCAA Inlet ORU Upper Left AVM Launch Bracket (Upper Right Bracket is Mirror Image).

- 2.1 Unfasten CCAA Upper Left AVM Launch Bracket fasteners "A" and "B" (Ratchet, 1/4" Drive; 3/16" Hex Head, 1/4" Drive). Refer to Figures 1, 2.
- 2.2 Unfasten CCAA Upper Left AVM Launch Bracket fastener "C" (Ratchet, 1/4" Drive; 3/16" Hex Head, 1/4" Drive). Refer to Figures 1, 2.

NOTE

CCAA Upper Left AVM Launch Bracket fastener "D" is accessible from behind the CCAA Cabin Fan captive fastener Bracket.

- 2.3 Unfasten CCAA Upper Left AVM Launch Bracket fastener "D" (Ratchet, 1/4" Drive; Univ Joint; 3/16" Hex Head, 1/4" Drive). Refer to Figures 1, 2.
- 2.4 Unfasten CCAA Upper Left AVM Launch Bracket fasteners (three) in Group "E" (Ratchet, 1/4" Drive; 3/16" Hex Head, 1/4" Drive; 10" Ext, 1/4" Drive). Refer to Figures 1, 2.
- 2.5 Move the CCAA Upper Left AVM Launch Bracket upward and pull it out of the Midbay Port secondary structure using the tether.
- 2.6 Unfasten CCAA Upper Left AVM Launch Bracket Tether fastener (one) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Refer to Figures 1, 2. Stow Launch Bracket.
- 2.7 Repeat steps 2.1 to 2.6 for CCAA Upper Right AVM Launch Bracket.

1.132 NODE 3 CCAA ANTI-VIBRATION MODULE (AVM) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

Page 4 of 6 pages

3. REMOVING CCAA LOWER AVM LAUNCH BRACKETS

CCAA Lower Left AVM
Launch Bracket #1 with
Group "F" fasteners (6)

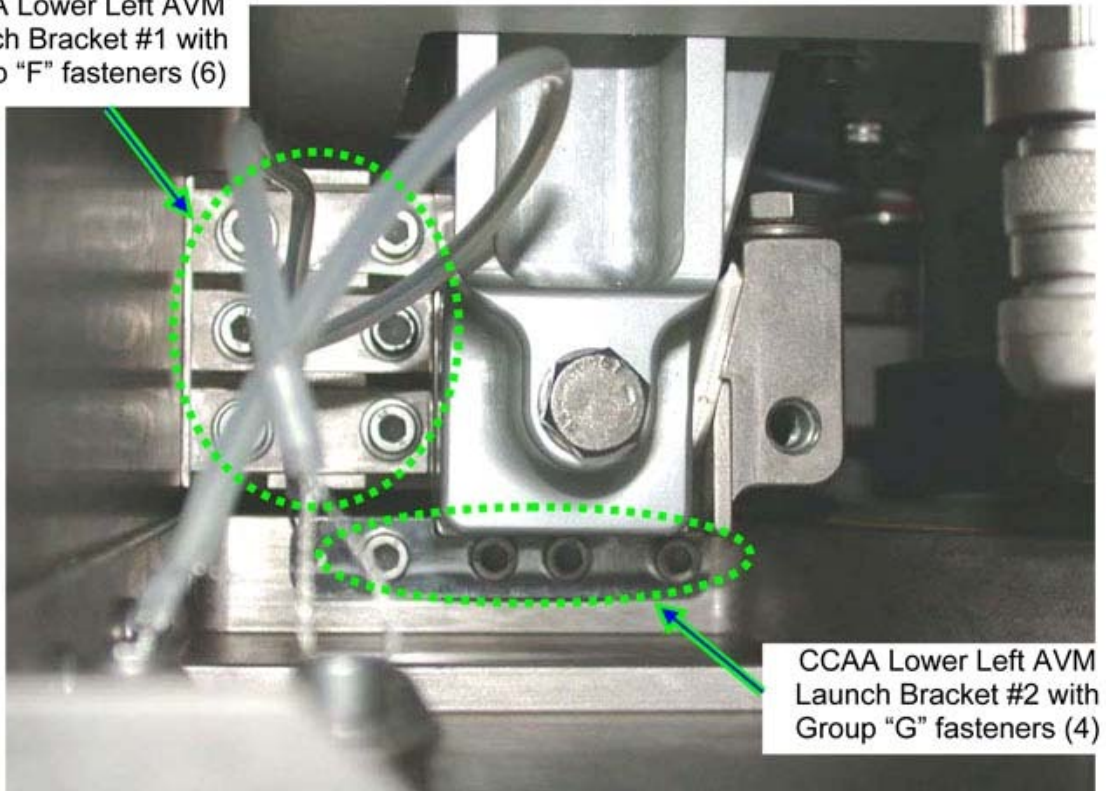


Figure 3. - View of CCAA Inlet ORU Lower Left AVM Launch Brackets (Lower Right Bracket is Mirror Image).

NOTE

Fasteners are captive on their relevant Brackets.

- 3.1 Remove CCAA Lower Left AVM Launch Bracket #1, Group "F" fasteners (six) (Ratchet, 1/4" Drive; 3/16" Hex Head, 1/4" Drive; 10" Ext, 1/4" Drive).
Refer to Figures 1, 3.
- 3.2 Remove CCAA Lower Left AVM Launch Bracket #1 by pulling it out of the Midbay port secondary structure using its dedicated tether.
- 3.3 Remove CCAA Lower Left AVM Launch Bracket #1 tether fastener (one) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Stow Launch Bracket.
- 3.4 Remove CCAA Lower Left AVM Launch Bracket #2, Group "G" fasteners (four) (Ratchet, 1/4" Drive; 3/16" Hex Head, 1/4" Drive; 10" Ext, 1/4" Drive).

1.132 NODE 3 CCAA ANTI-VIBRATION MODULE (AVM) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

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If required, use 6" Long, 3/16" Ball Tip Hex Head, 3/8" Drive; 1/4" to 3/8" Adapter.

Refer to Figures 1, 3.

- 3.5 Remove CCAA lower Left AVM Launch Bracket #2 by pulling it out of the Midbay port secondary structure using its dedicated tether.
- 3.6 Remove CCAA Lower Left AVM Launch Bracket #2 tether fastener (one) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Stow Launch Bracket.
- 3.7 Repeat steps 3.1 to 3.6 for CCAA Lower Right AVM Launch Brackets #1, #2.

4. REMOVING CCAA WATER SEPERATOR SADDLE BRACKET

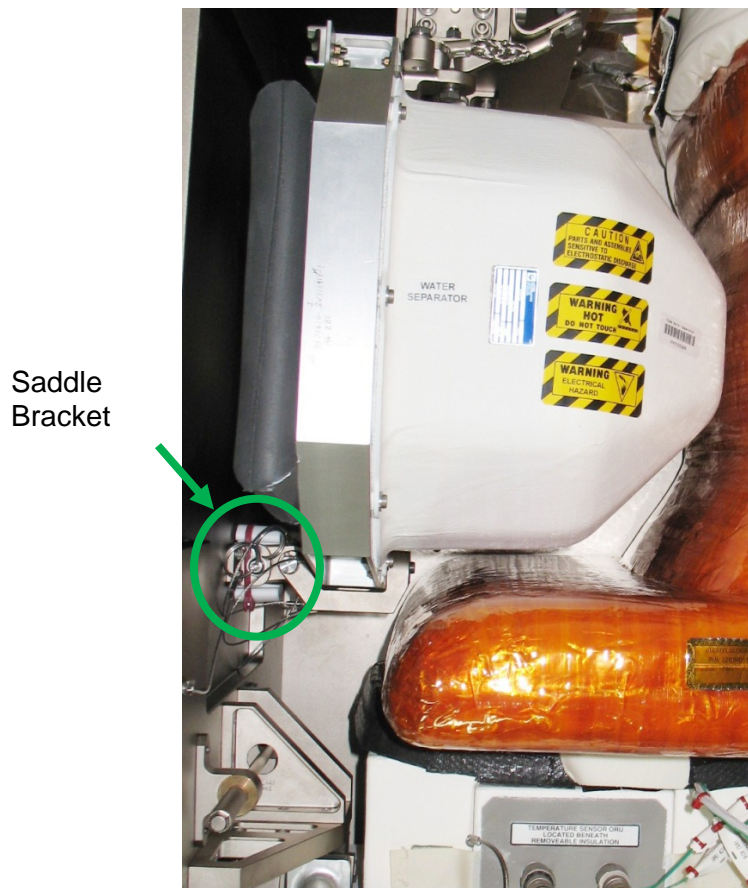


Figure 4.- Node 3 CCAA Water Separator ORU.

- 4.1 Remove red Zip Tie from Saddle Bracket (8-1/4" Long, 2" Cut Scissors). Refer to Figure 4.

1.132 NODE 3 CCAA ANTI-VIBRATION MODULE (AVM) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

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4.2 Remove Saddle Bracket.
Temporarily stow.

5. CLOSEOUT

5.1 Check for FOD within 3' radius.

5.2 Photo document final configuration prior to closeout
(Digital Camera).

5.3 Install NOD3A3-01 Closeout Panel, fasteners (six) (Driver Handle,
1/4" Drive; 5/32" Hex Head, 1/4" Drive).

5.4 Notify **MCC-H** of task completion.

Table 1.

Bracket Name	Part Number
CCAA Upper Left AVM Launch Bracket	N2-DR-OHB-01.44.43.037
CCAA Upper Right AVM Launch Bracket	N2-DR-OHB-01.44.43.037
CCAA Lower Left AVM Bracket #1	N2-DR-OHB-01.44.43.020
CCAA Lower Left AVM Bracket #2	N2-DR-OHB-01.44.43.047
CCAA Lower Right AVM Bracket #1	N2-DR-OHB-01.44.43.017
CCAA Lower Right AVM Bracket #2	N2-DR-OHB-01.44.43.047
Saddle Bracket	1190ND905

1.134 NODE 3 LTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN 1) Page 1 of 10 pages

OBJECTIVE:

Enable the Node 3 Low Temperature Loop (LTL) Pump Package Assembly (PPA) Anti-Vibration Mountings (AVMs) by removing Launch Brackets that will not be reinstalled.

LOCATION

Installed: NOD3D1

Stowed: √Inventory Management System

DURATION

2 hours

CREW

One

PARTS

None

MATERIALS

None

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 1:

5/16" Combination Wrench

Drawer 2:

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

5/16" Socket, 1/4" Drive

1/2" Socket, 1/4" Drive

2" Ext, 1/4" Drive

4" Ext, 1/4" Drive

6" Ext, 1/4" Drive

10" Ext, 1/4" Drive

Ratchet, 1/4" Drive

Driver Handle, 1/4" Drive

Universal Joint, 1/4" Drive

Drawer 3:

Inspection Mirror

REFERENCED PROCEDURE(S)

None

1.134 NODE 3 LTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN 1)

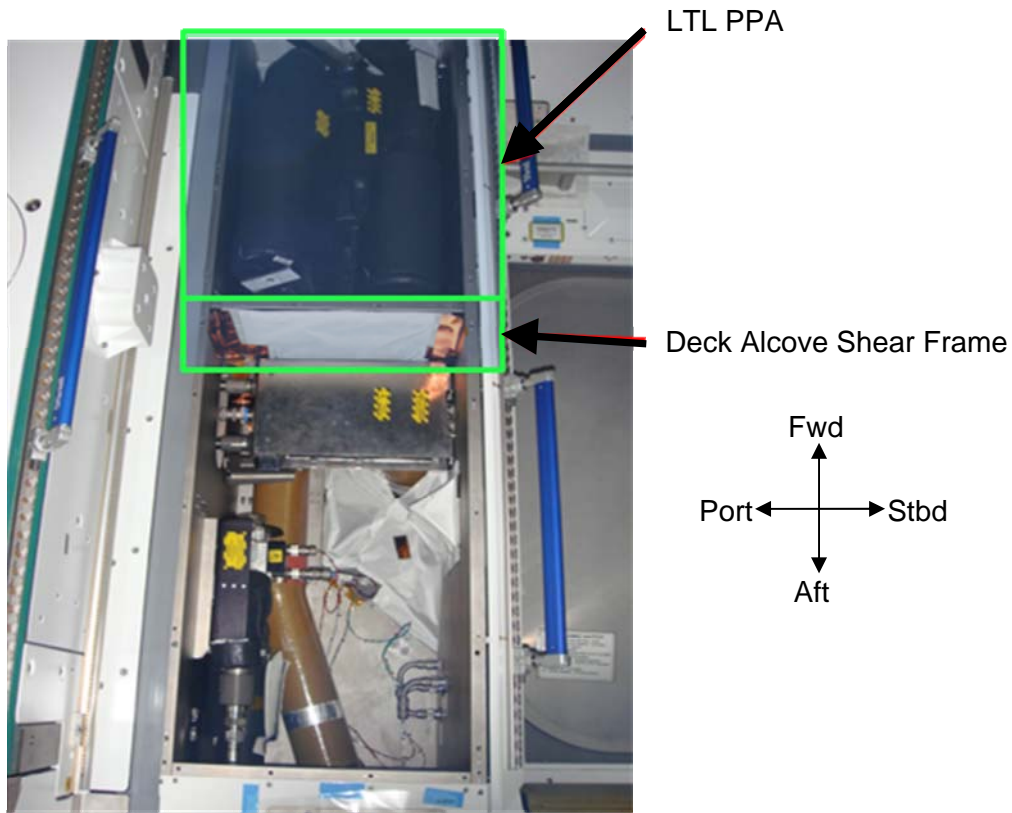


Figure 1.- LTL Alcove Overview.

1. ACCESSING LTL PPA LAUNCH BRACKETS

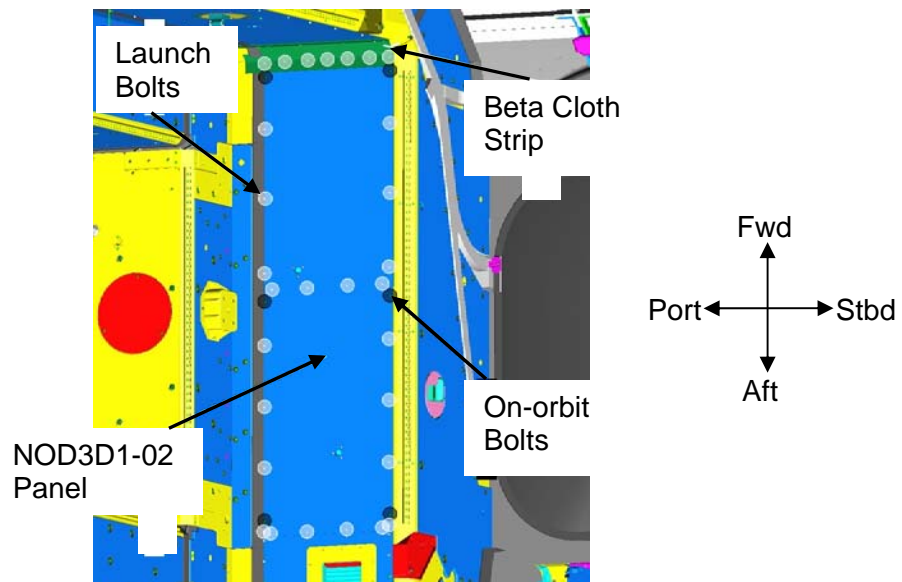


Figure 2.- Launch Bolts on NOD3D1-02 Closeout Panel.

1.134 NODE 3 LTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN 1)

Page 3 of 10 pages

- 1.1 Remove Beta Cloth on NOD3D1-02.
Temporarily stow
Refer to Figure 2.
- 1.2 Remove Closeout Panel NOD3D1-02 Launch Restraint Bolts (twenty-nine), fasteners (six) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Refer to Figure 2.

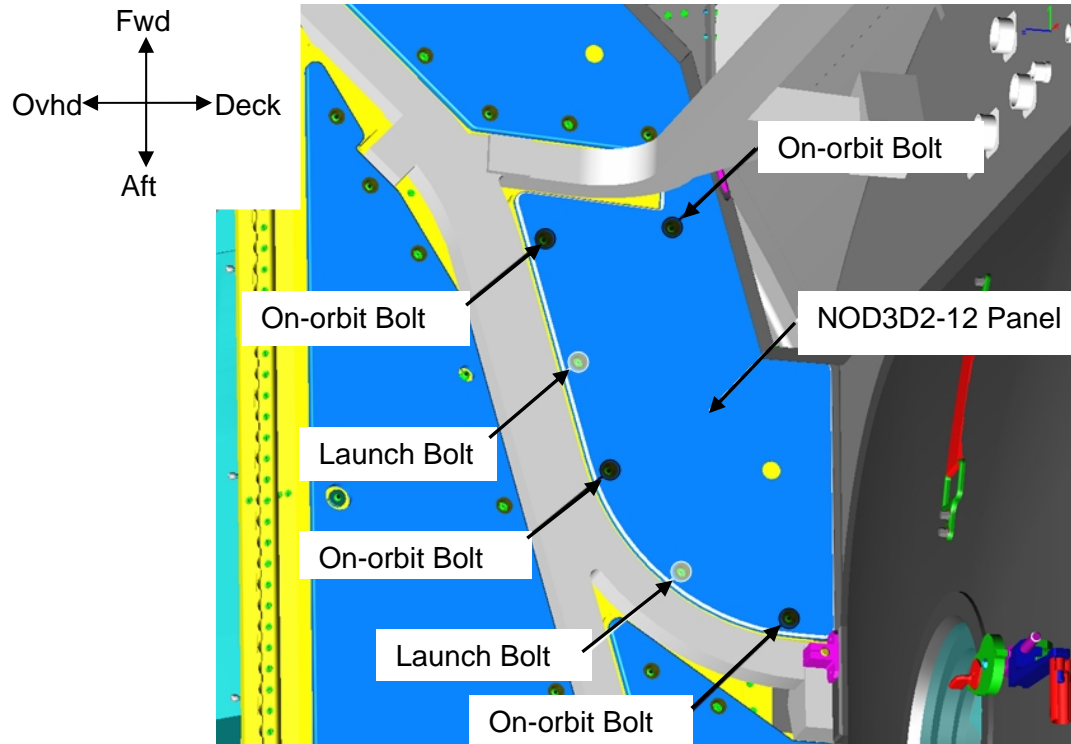


Figure 3.- Launch Bolts on NOD3D2-12 Closeout Panel.

- 1.3 Remove Closeout Panel NOD3D2-12 Launch Restraint Bolts (two), fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Temporarily stow.
Refer to Figure 3.

1.134 NODE 3 LTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN 1)

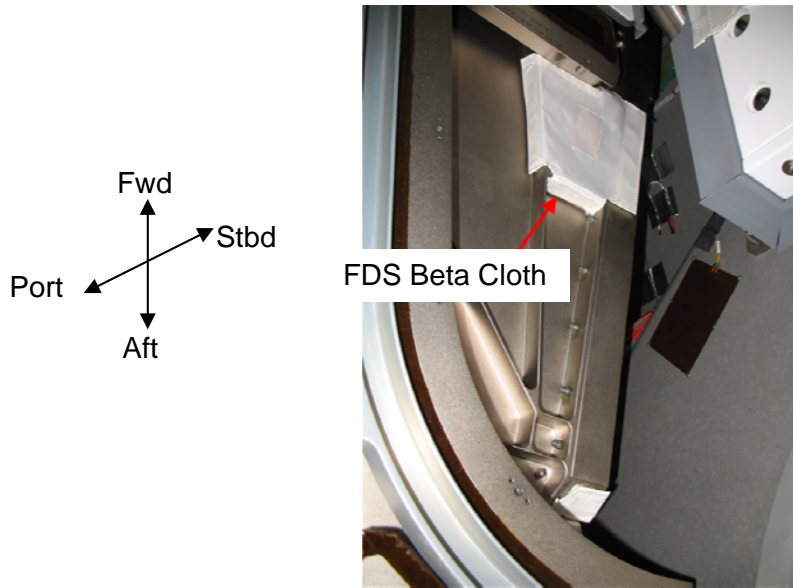


Figure 4.- FDS Beta Cloth.

- 1.4 Remove FDS Closeouts behind NOD3D2-12 (Velcro).
Temporarily stow.
Refer to Figure 4.

2. REMOVING DECK ALCOVE SHEAR FRAME

NOTE

1. In Figure 5, fasteners may not be visible in the photo. That is because they are obscured behind the shear panel.
2. The number of fasteners to be removed at a circled location is indicated if it is more than one.

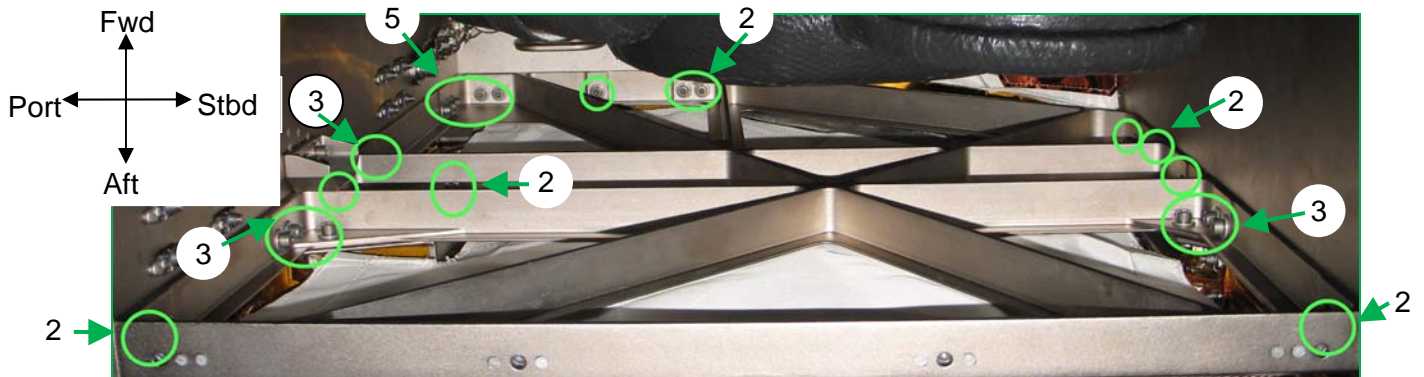


Figure 5.- Shear Frame, Fastener Locations Circled.

NOTE

Some of the Shear Frame fasteners may require a 2" Ext or 5/16" Combination Wrench for access to break torque on fasteners.

1.134 NODE 3 LTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN 1) Page 5 of 10 pages

Remove Deck Alcove Shear Frame, fasteners (twenty-eight) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
If required, use the following tools: (10" Ext, 1/4" Drive; Universal Joint, 1/4" Drive; 2" Ext, 1/4" Drive; 5/16" Combination Wrench, 1/4" Drive).
Refer to Figure 5.
Temporarily stow Shear Frame.

3. REMOVING THE LTL PPA LAUNCH BRACKETS

NOTE
PPA is installed inside Deck Alcove via a dedicated plate on four Anti-vibration mounts.

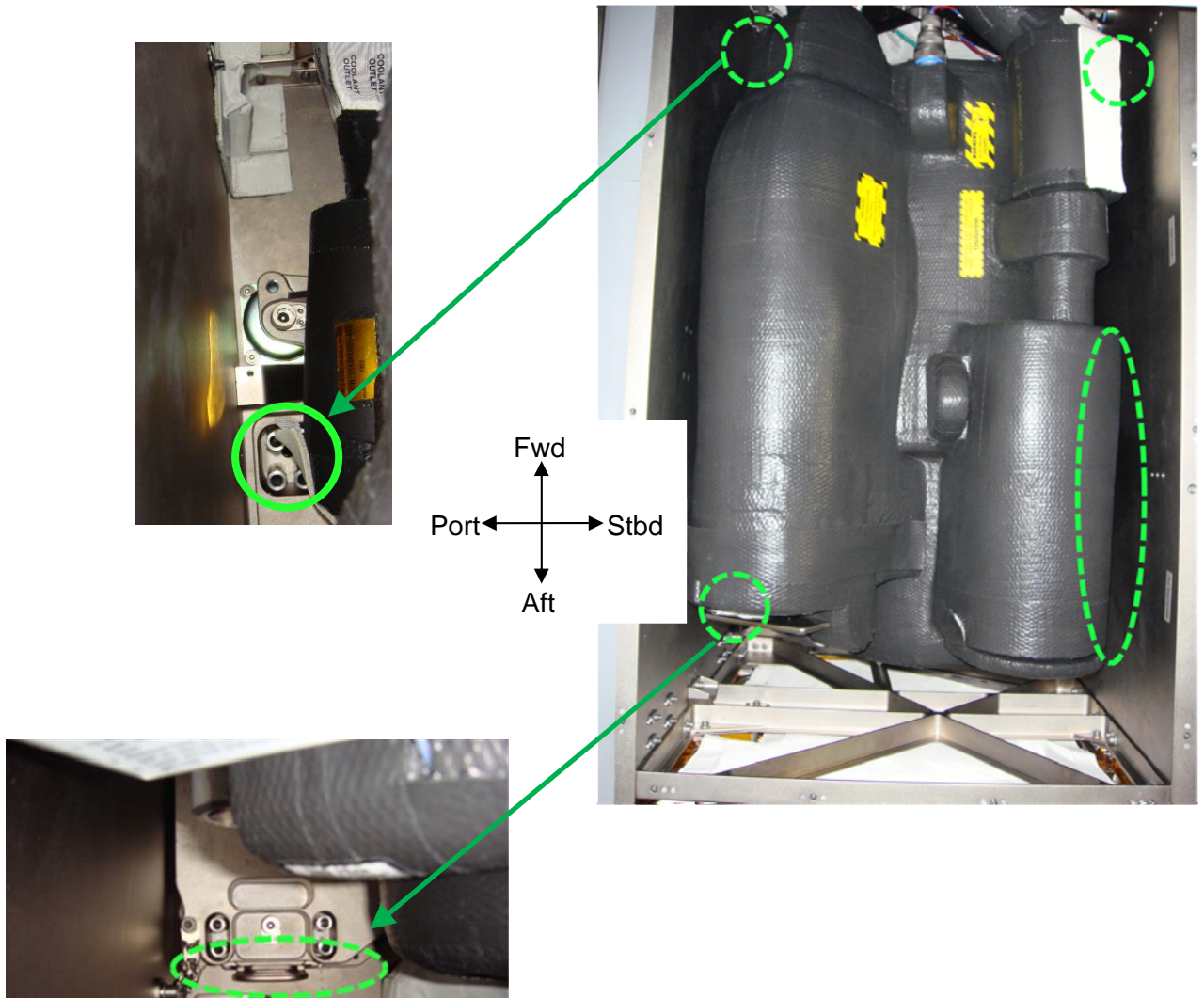


Figure 6.- AVM Launch Bracket Launch Bolts Locations.

1.134 NODE 3 LTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN 1)

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NOTE

The Starboard side AVM Launch Bracket Launch bolts (four each) can only be accessed from inside the Deck Alcove structure.

- 3.1 Remove Fwd Port LTL PPA AVM Launch Bracket Launch Bolts (four) (Ratchet, 1/4" Drive; 10" Ext, 1/4" Drive; 6" Ext, 1/4" Drive; 4" Ext, 1/4" Drive; 1/2" Socket, 1/4" Drive). Refer to Figure 6.
- 3.2 Remove Aft Port LTL PPA AVM Launch Bracket Launch Bolts (four) (Ratchet, 1/4" Drive; 10" Ext, 1/4" Drive, 6" Ext, 1/4" Drive; 4" Ext, 1/4" Drive; 1/2" Socket, 1/4" Drive). Refer to Figure 6.

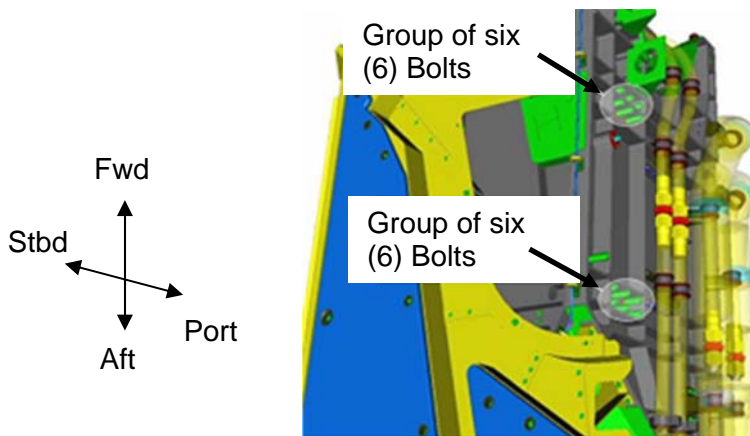


Figure 7.- Starboard AVM Launch Bracket Bolts.

1.134 NODE 3 LTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN 1)

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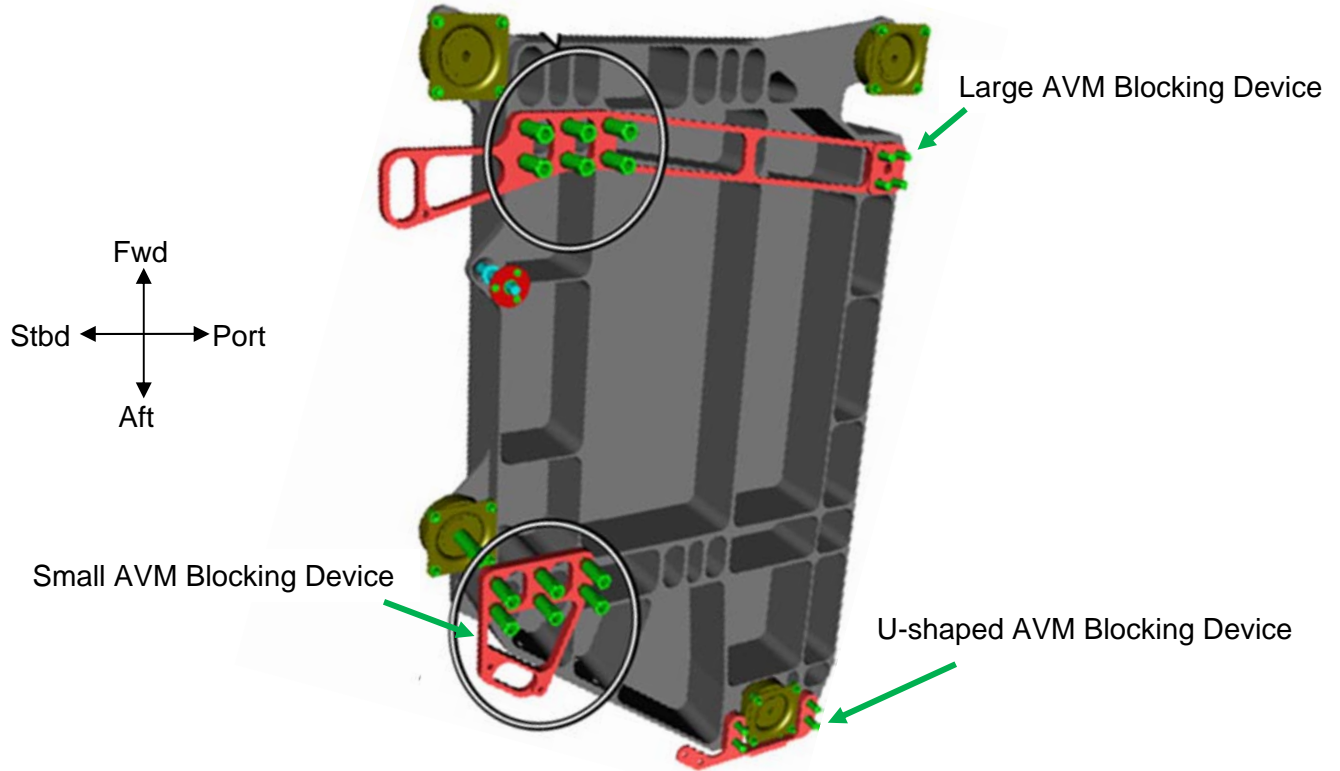


Figure 8.- AVM Launch Brackets and Starboard Launch Bolts (Circled)

NOTE

The AVM Launch Bracket Launch Bolts (six each) on the Starboard side for both AVM Brackets can only be accessed from under the Deck Alcove structure by removing NOD3D2-12 Closeout Panel.

- 3.3 Remove Fwd Starboard Large AVM Blocking Device Launch Bolts (six) (Ratchet, 1/4" Drive; 1/2" Socket, 1/4" Drive; Inspection Mirror).
Refer to Figures 6, 7, 8.
- 3.4 Remove Aft Small AVM Blocking Device Launch Bolts (six) (Ratchet, 1/4" Drive; 1/2" Socket, 1/4" Drive; Inspection Mirror).
Refer to Figures 6, 7, 8.

**1.134 NODE 3 LTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET
REMOVAL**

(ASSY OPS/20A/FIN 1)

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4. REMOVING BLOCKING DEVICE SPACERS

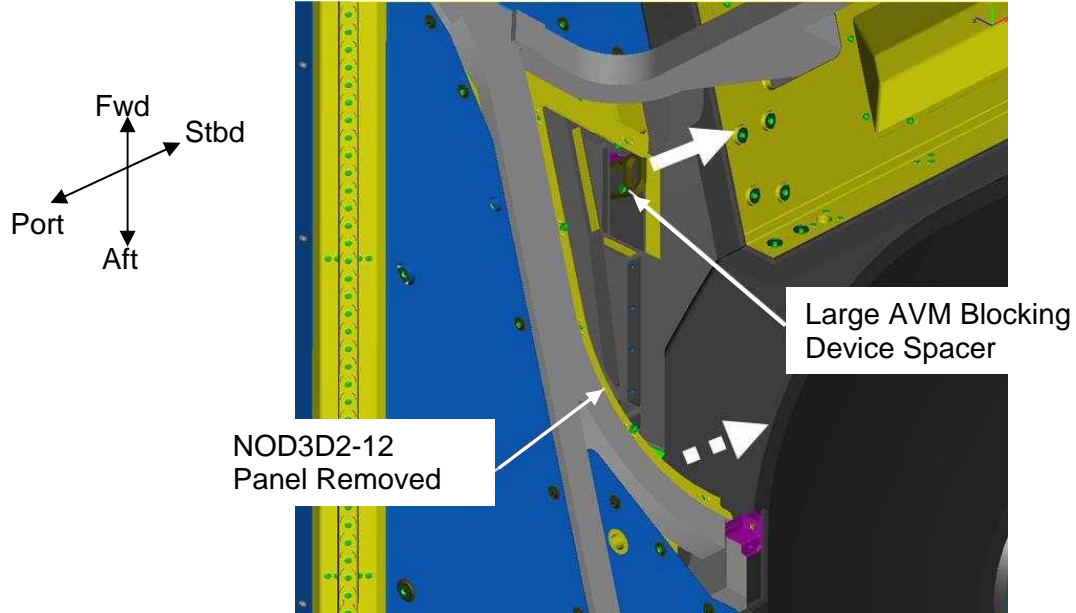


Figure 9.- Large AVM Blocking Device Location.

- 4.1 Remove Large AVM Blocking Device.
Refer to Figures 8, 9.

1.134 NODE 3 LTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN 1)

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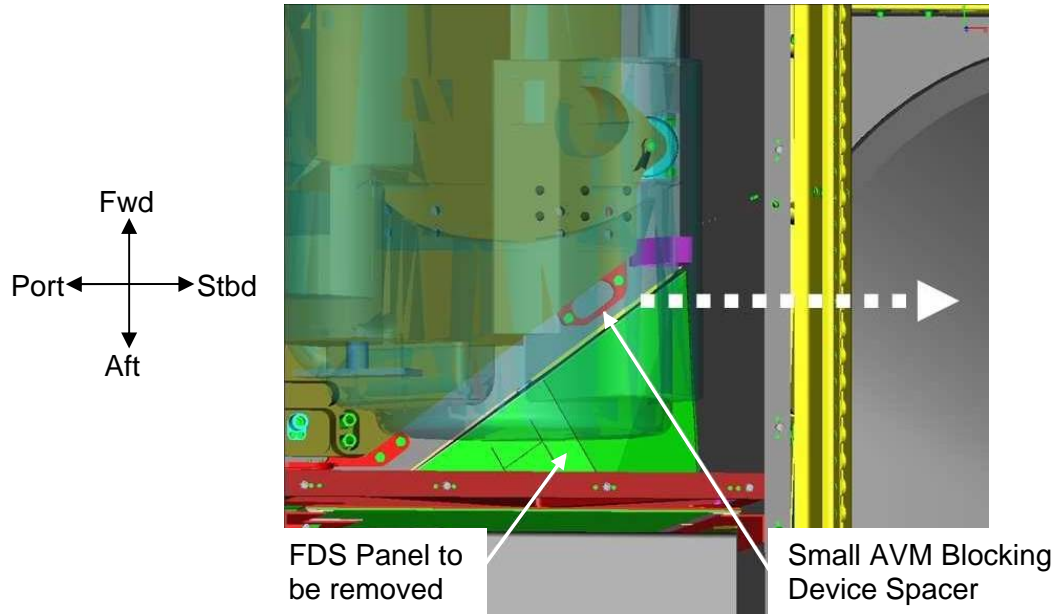


Figure 10.- Small AVM Blocking Device.

- 4.2 Remove Small AVM Blocking Device.
Refer to Figures 8, 10.

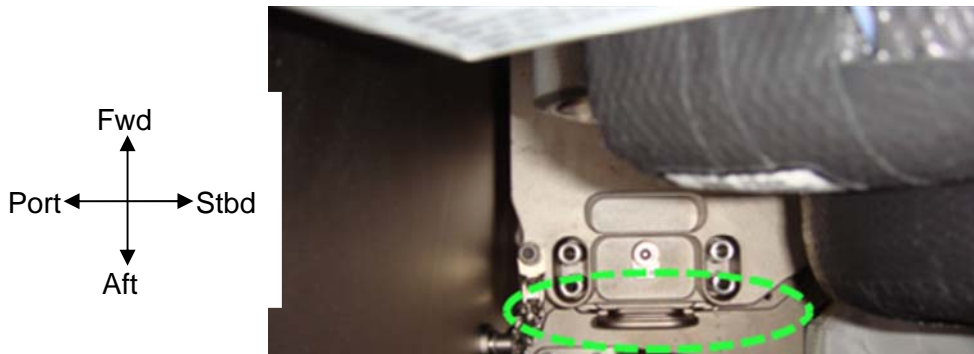


Figure 11.- View of U-shaped AVM Blocking Device.

- 4.3 Remove U-shaped AVM Blocking Device.
Refer to Figures 8, 11.

5. CLOSEOUT

- 5.1 Check for FOD within 3' radius.
- 5.2 Photo document final configuration prior to closeout (Digital Camera).

1.134 NODE 3 LTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN 1) Page 10 of 10 pages

- 5.3 Install Closeout Panels NOD3D1-02 Fasteners (six), NOD3D2-12 Fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
- 5.4 Notify **MCC-H** of task completion.
Stow tools, Launch Brackets, Bolts (twenty), Shear Frame diagonal frame, and Closeout Panel Launch Bolts (thirty-one).
Update IMS.

1.136 NODE 3 MTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

Page 1 of 9 pages

OBJECTIVE:

Enable the Node 3 Moderate Temperature Loop (MTL) Pump Package Assembly (PPA) Anti-Vibration Mountings (AVMs) by removing the Launch Bracket.

LOCATION:

Installed: NOD3O1

Stowed: √Inventory Management System

DURATION:

2 hours

CREW:

One

PARTS:

None

MATERIALS:

None

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 1:

5/16" Combination Wrench

Drawer 2:

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

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

1/2" Socket, 1/4" Drive

5/16" Socket, 1/4" Drive

2" Ext, 1/4" Drive

4" Ext, 1/4" Drive

6" Ext, 1/4" Drive

10" Ext, 1/4" Drive

Ratchet, 1/4" Drive

Driver Handle, 1/4" Drive

Drawer 3:

Inspection Mirror

REFERENCED PROCEDURE(S):

None

1.136 NODE 3 MTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

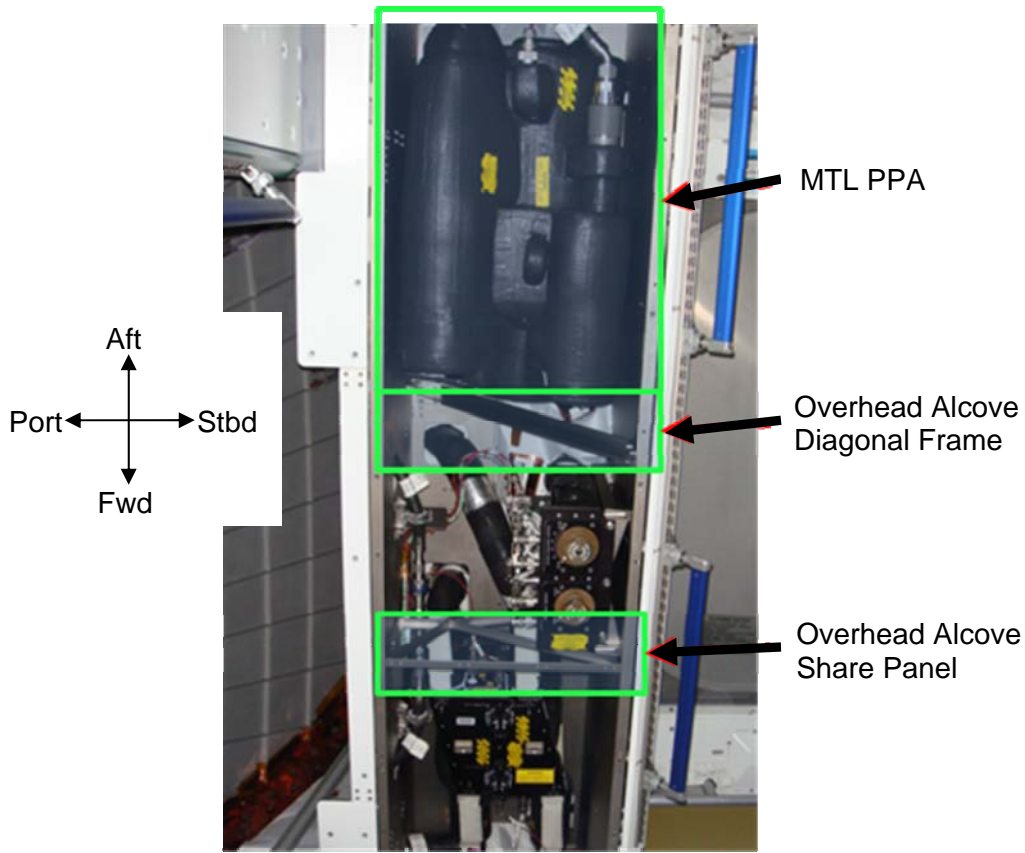


Figure 1.- MTL Alcove Overview.

1. ACCESSING MTL PPA LAUNCH BRACKETS

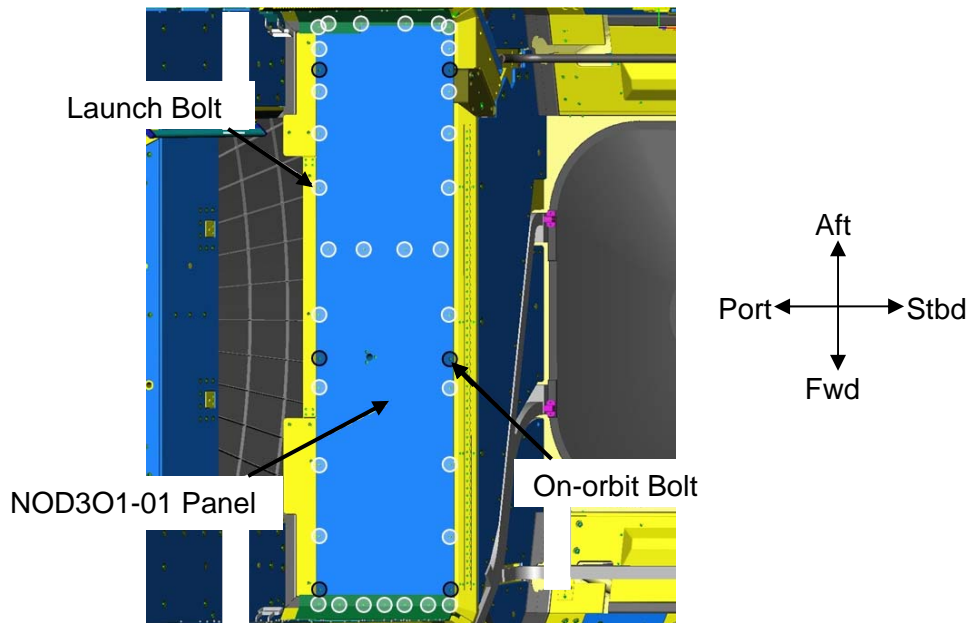


Figure 2.- Launch Bolts on NOD301-01 Closeout Panel.

1.136 NODE 3 MTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

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- 1.1 Remove Closeout Panel NOD3O1-01 Launch Bolts (thirty-three), Fasteners (six) (Driver Handle; 5/32" Hex Head, 1/4" Drive). Refer to Figure 2.

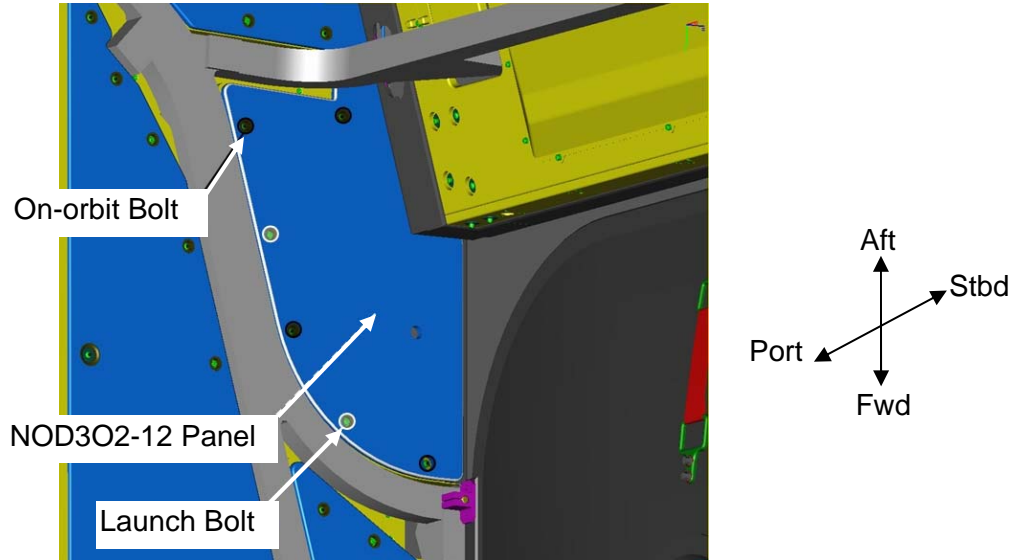


Figure 3.- Launch Bolts on NOD3O2-12 Closeout Panel.

- 1.2 Remove Closeout Panel NOD3O2-12 Launch Bolts (two), fasteners (four) (Driver Handle; 5/32" Hex Head, 1/4" Drive). Temporarily stow. Refer to Figure 3.
- 1.3 Remove FDS Closeouts behind NOD3O2-12 (Velcro). Temporarily stow.

1.136 NODE 3 MTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

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2. REMOVING OVERHEAD ALCOVE DIAGONAL AND SHEAR FRAME

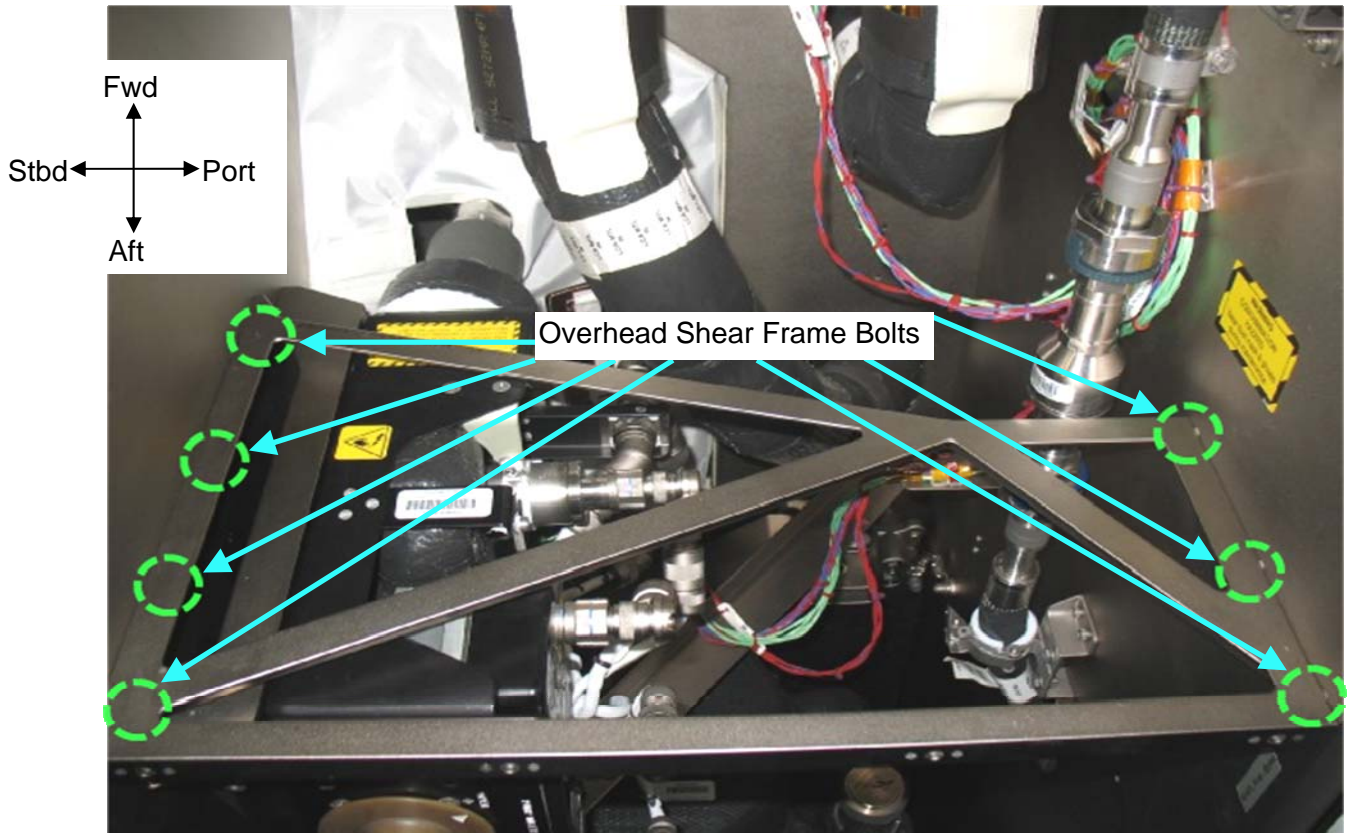


Figure 4.- Overhead Shear Frame With Bolts Circled.

NOTE

Some of the Shear Frame fasteners may require a 2" Ext or 5/32" L- Wrench for access to break torque on fasteners.

- 2.1 Remove Overhead Alcove Shear Frame, fasteners (seven) (Ratchet, 1/4" Drive; 5/16" Socket, 1/4" Drive).
If required, use 2" Ext, 1/4" Drive or 5/32" L-Wrench, 1/4" Drive.
Refer to Figure 4.
Temporarily stow Shear Frame.

1.136 NODE 3 MTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

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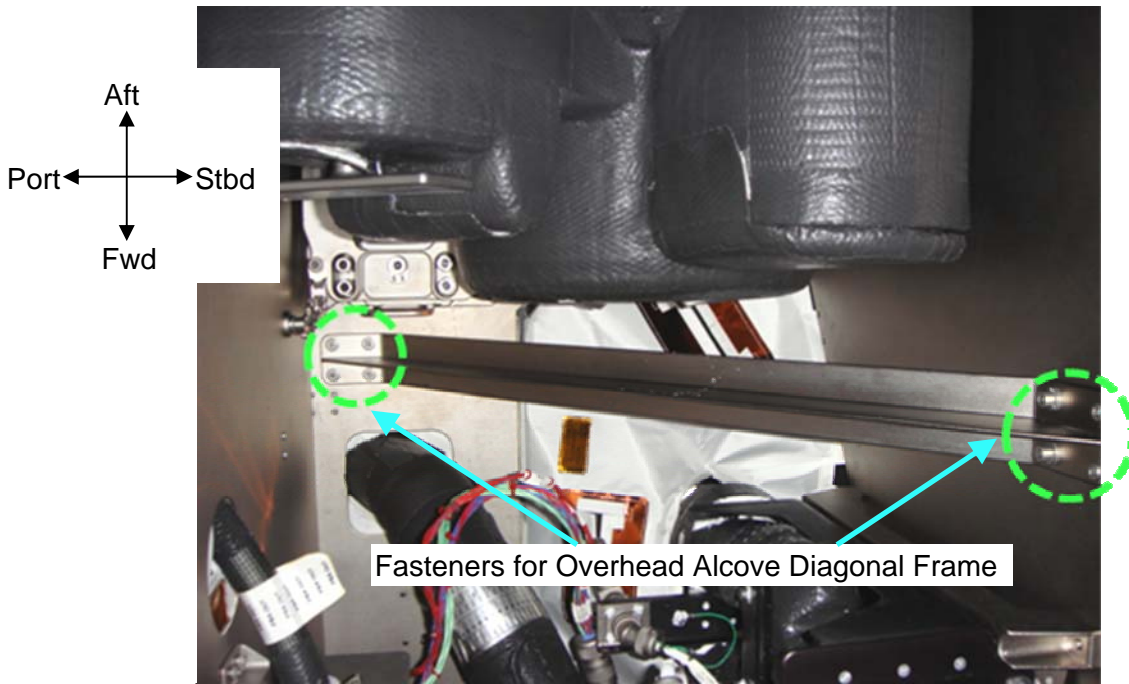


Figure 5.- Overhead Alcove Diagonal Frame.

- 2.2 Remove Overhead Alcove Diagonal Frame, fasteners (eight) (Ratchet, 1/4" Drive; 4" Ext, 1/4" Drive; 10" Ext, 1/4" Drive; 3/16" Hex Head, 1/4" Drive). Refer to Figure 5. Temporarily stow Diagonal Frame.

3. REMOVING THE MTL PPA LAUNCH BRACKETS

NOTE

PPA is installed inside Deck Alcove via a dedicated plate on four Anti-vibration mounts.

1.136 NODE 3 MTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

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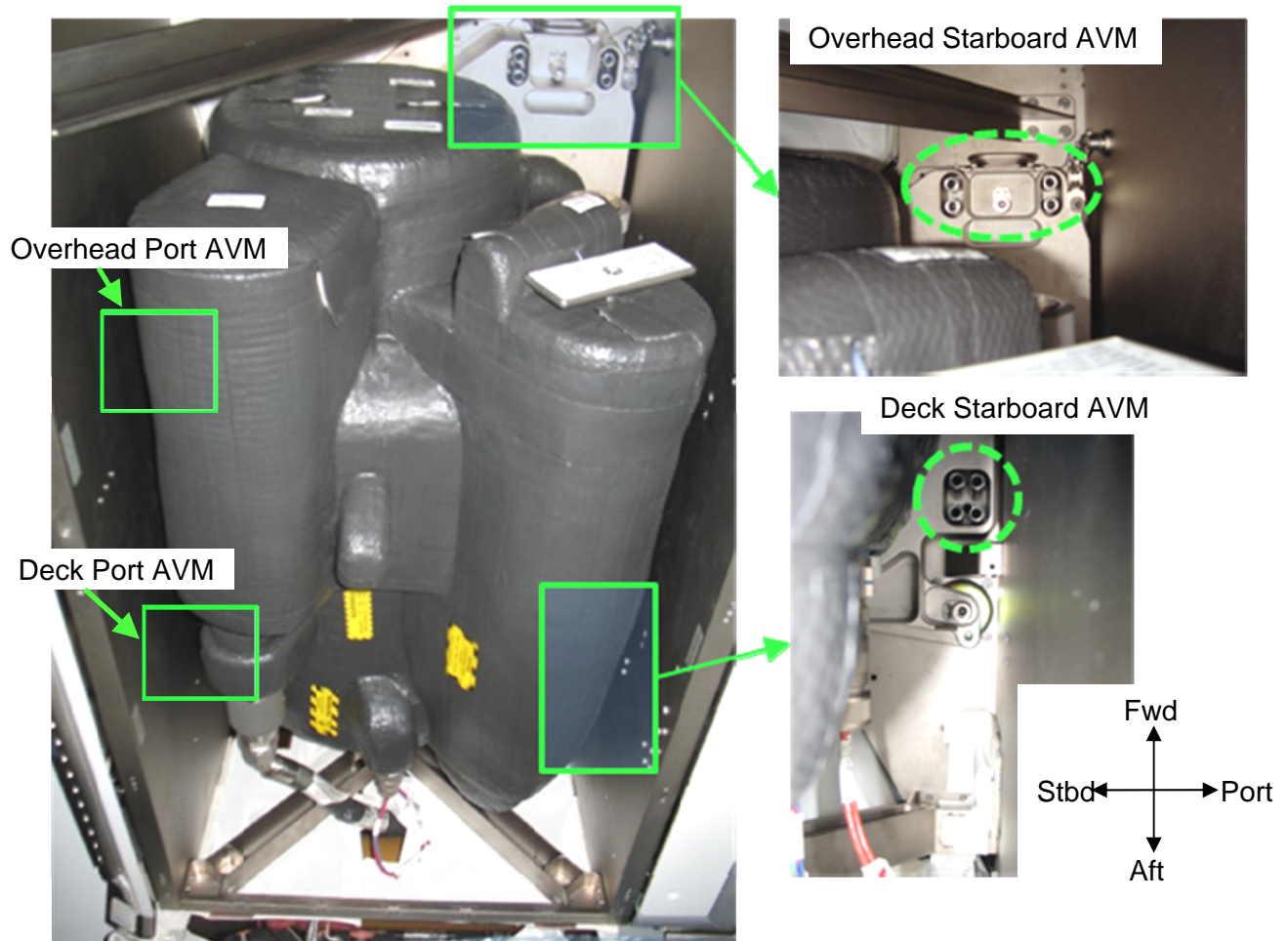


Figure 6.- AVM Blocking Devices and Launch Bolts.

NOTE

The starboard side AVM Launch Bracket Launch Bolts (four each) can only be accessed from inside the Overhead Alcove structure.

- 3.1 Remove Fwd Starboard MTL PPA AVM Launch Bracket Launch Bolts (four) (Ratchet, 1/4" Drive; 10" Ext, 1/4" Drive; 6" Ext, 1/4" Drive; and 4" Ext, 1/4" Drive; 1/2" Socket, 1/4" Drive). Refer to Figure 6.
- 3.2 Remove Aft Starboard MTL PPA AVM Launch Bracket Launch Bolts (four) (Ratchet, 1/4" Drive; 10" Ext, 1/4" Drive; 6" Ext, 1/4" Drive; and 4" Ext, 1/4" Drive; 1/2" Socket, 1/4" Drive). Refer to Figure 6.

**1.136 NODE 3 MTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET
REMOVAL**

(ASSY OPS/20A/FIN)

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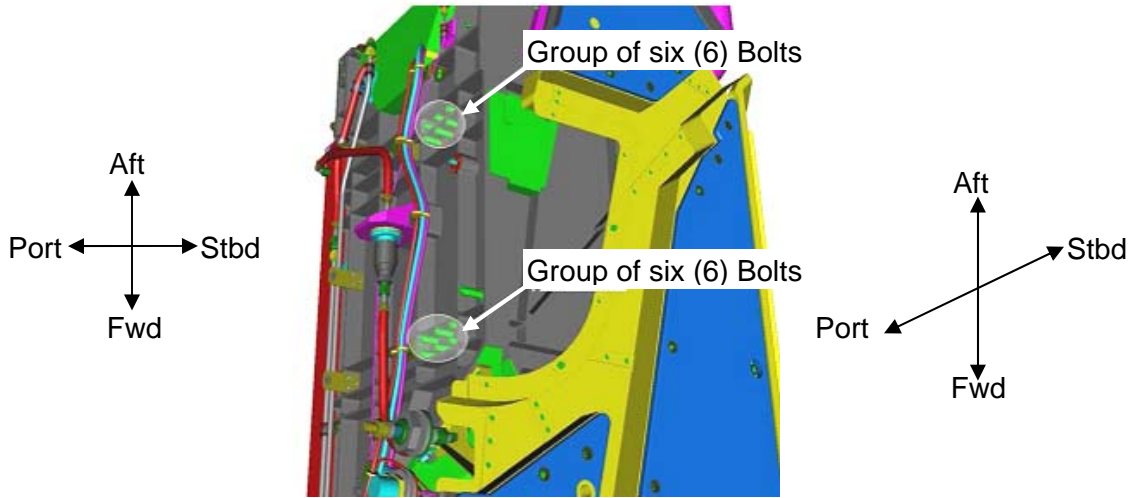


Figure 7.- AVM Launch Bracket Port Side (As seen in Figure 4) Launch Bolts.

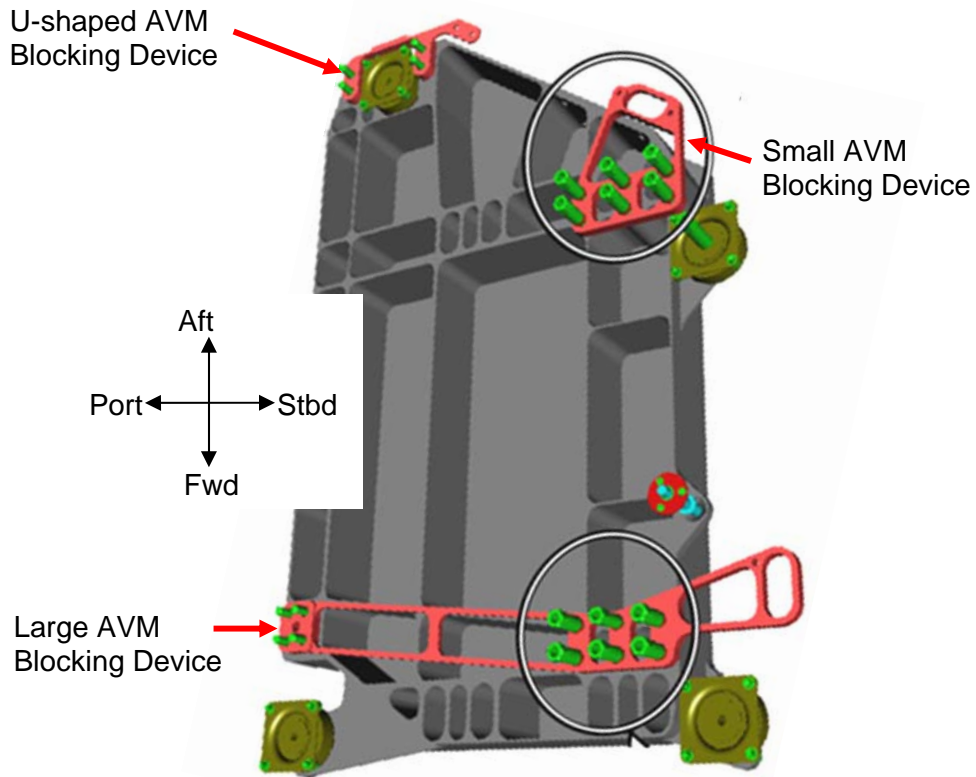


Figure 8.- AVM Launch Brackets and Port Launch Bolts (Circled).

NOTE

The Stbd AVM Launch Bracket Launch Bolts (six each) can only be accessed from above the Overhead Alcove structure by removing NOD302-12 Closeout Panel.

1.136 NODE 3 MTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

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- 3.3 Remove Overhead Port MTL PPA AVM Launch Bracket Launch Bolts (six) (Ratchet, 1/4" Drive; 1/2" Socket, 1/4" Drive; Inspection Mirror).

Temporarily stow.

Refer to Figures 6, 7, and 8.

- 3.4 Remove Deck Port MTL PPA AVM Launch Bracket Launch Bolts (six) (Ratchet, 1/4" Drive; 1/2" Socket, 1/4" Drive; Inspection Mirror).

Temporarily stow.

Refer to Figures 6, 7, and 8.

4. REMOVING BLOCKING DEVICE SPACERS

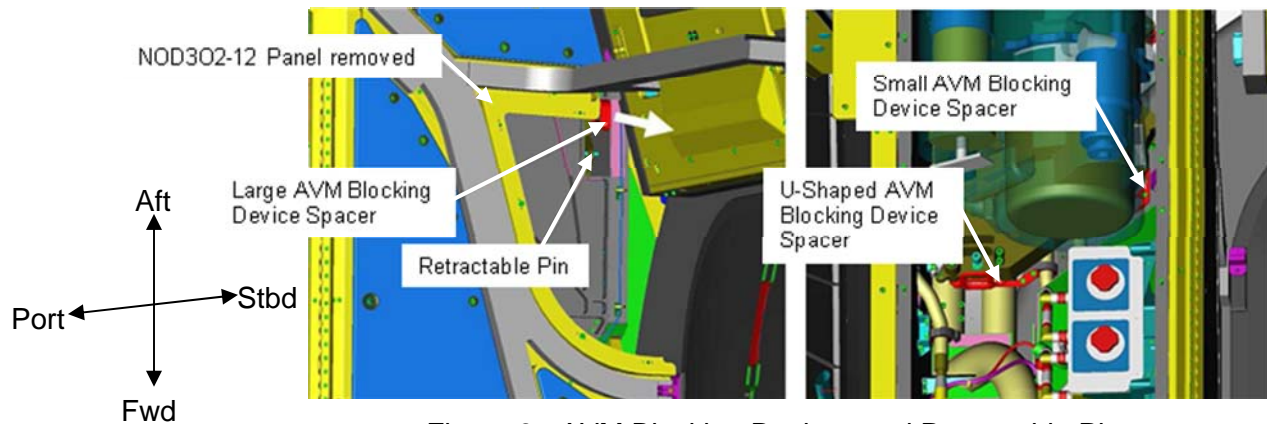


Figure 9.- AVM Blocking Devices and Retractable Pin.

- 4.1 Remove Large AVM Blocking Device. Refer to Figure 8 and 9.

- 4.2 Remove Small AVM Blocking Device. Refer to Figure 8 and 9.

1.136 NODE 3 MTL PUMP PACKAGE ASSEMBLY (PPA) LAUNCH BRACKET REMOVAL

(ASSY OPS/20A/FIN)

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Figure 10.- U-Shaped AVM Blocking Device.

- 4.3 Remove U-Shaped AVM Blocking Device.
Refer to Figures 8, 9, and 10.

5. CLOSEOUT

- 5.1 Check for FOD within 3' radius.
- 5.2 Photo document final configuration prior to closeout (Digital Camera).
- 5.3 Install Closeout Panel NOD3O1-01 fasteners (six), NOD3O2-12 fasteners (four) (Driver Handle, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
- 5.4 Notify **MCC-H** of task completion.
Stow tools, Launch Brackets, Bolts (twenty), Shear Frame, Diagonal Frame, and Closeout Panel Launch Bolts (thirty-five).
Update IMS.

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1.138 NODE 3 LAUNCH RESTRAINT BOLT REMOVAL

(ASSY OPS/20A/FIN)

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OBJECTIVE:

Prepare Node 3 closeout panels for nominal on-orbit ops by removing Launch Restraint Bolts.

LOCATION

Node 3

DURATION

Port Cone (Bay 0): 30 minutes

Alcove (Bay 1): 60 minutes

Radial Bays (Bay 2): 45 minutes

Midbay (Bay 3): 60 minutes

Avionics Racks (Bay 4 and 5): 10 minutes

Starboard Cone (Bay 6): 60 minutes

CREW

One

PARTS

None

MATERIALS

Ziplock Bag (18"x18")

TOOLS:

Digital Camera

Driver Drill

12 V Battery

ISS IVA Toolbox:

Drawer 2:

Hex Shank, 1/4" Drive

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

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

Driver Handle, 1/4" Drive [Fwd and Aft End Cone]

REFERENCED PROCEDURE(S)

None

NOTE

1. Some launch restraint bolts may have already been removed depending on timed procedures.
2. Standoffs have no Launch Restraint Bolts.
3. All removed bolts and washer may be stored in a single Ziplock.
4. Launch Restraint Bolts were marked with a yellow/green paint pen.

1.138 NODE 3 LAUNCH RESTRAINT BOLT REMOVAL

(ASSY OPS/20A/FIN)

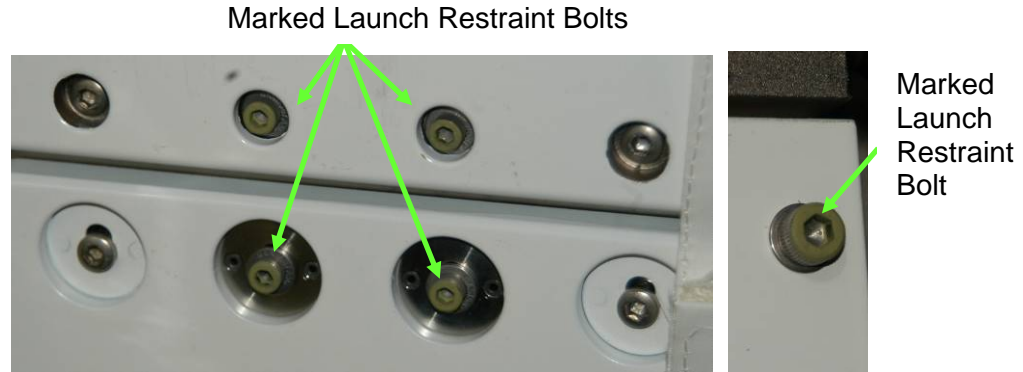


Figure 1.- Example of Marked Launch Restraint Bolts.

1. REMOVING LAUNCH RESTRAINT BOLTS FROM PORT CONE (BAY 0)

Table 1. Port Cone Launch Restraint Bolt Locations (5/32" Hex Head)

Location	Closeout Panel	Launch Bolts	Complete
Fwd Port Cone	NOD3F0-01	2	
Fwd Port Cone	NOD3F0-02	2	
Fwd Port Cone	NOD3F0-03	4	
Fwd Port Cone	NOD3F0-11	3	
Fwd Port Cone	NOD3F0-12	0	
Ovhd Port Cone	NOD3O0-01	6	
Port Cone Aft	NOD3A0-01	2	
Port Cone Aft	NOD3A0-02	2	
Port Cone Aft	NOD3A0-03	4	
Port Cone Aft	NOD3A0-11	3	
Port Cone Aft	NOD3A0-12	0	
Deck Port Cone	NOD3D0-01	0	
Deck Port Cone	NOD3D0-02	0	
Deck Port Cone	NOD3D0-11	0	
	Total	28	

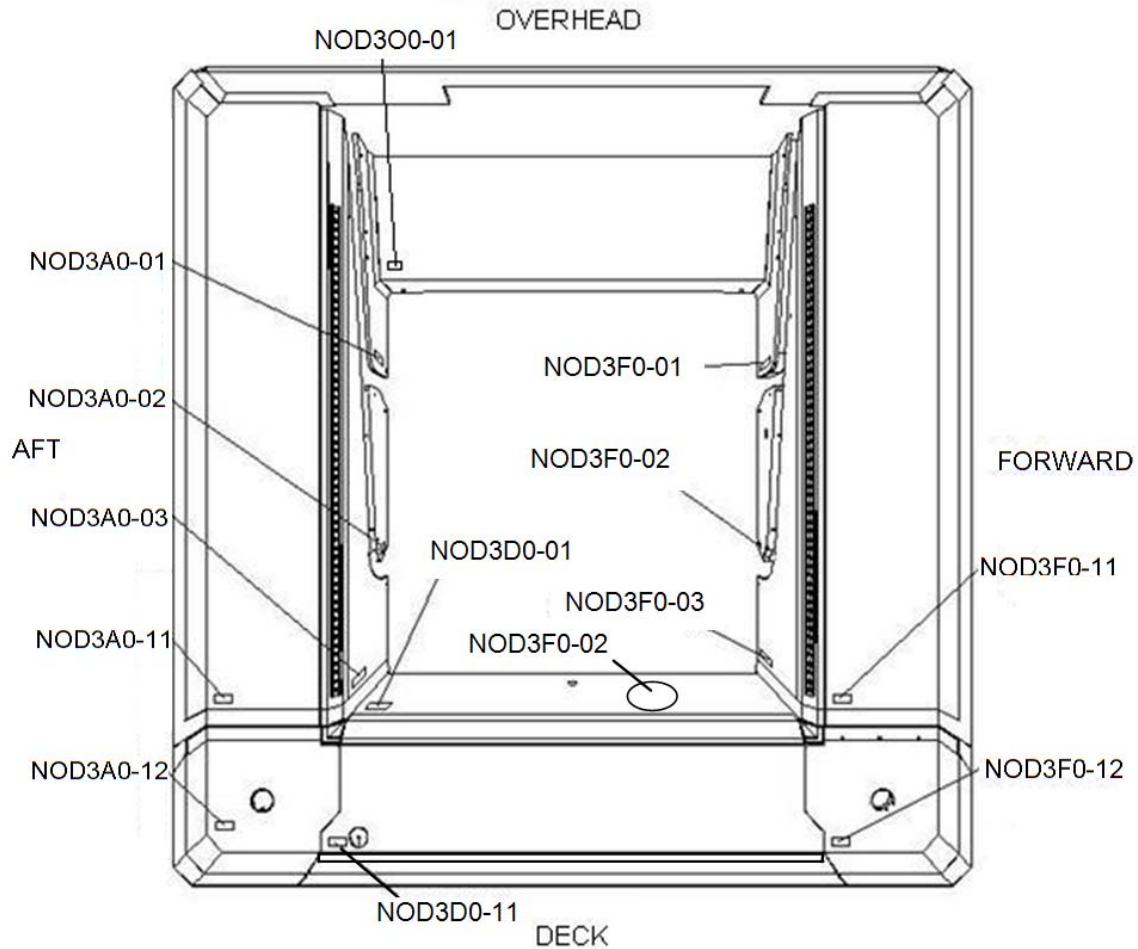


Figure 2.- Node 3 Port Cone (Looking Port).

- 1.1 Remove non-captive Launch Restraint Bolts (twenty-eight) from Node 3 Port Cone Closeout Panels (Driver Drill; Hex Shank, 1/4" Drive; 5/32" Hex Head, 1/4" Drive). Stow bolts and washers in Ziplock Bag. Refer to Table 1 and Figure 2.
- 1.2 Photo document Final Configuration (Digital Camera).

1.138 NODE 3 LAUNCH RESTRAINT BOLT REMOVAL

(ASSY OPS/20A/FIN)

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2. REMOVING LAUNCH RESTRAINT BOLTS FROM ALCOVE (BAY 1)

Table 2. Alcove Launch Restraint Bolt Locations (5/32" Hex Head)

Location	Closeout Panel	Launch Bolts	Complete
Alcove Forward	NOD3F1-01	9	
Alcove Forward	NOD3F1-02	4	
Alcove Forward	NOD3F1-03	20	
Alcove Forward	NOD3F2-11	2	
Alcove Forward	NOD3F2-12	2	
Alcove Forward	NOD3F2-13	1	
Alcove Forward	NOD3F2-14	5	
Alcove Forward	NOD3F2-15	2	
Alcove Overhead	NOD3O1-01	33 (if not already done)	
Alcove Overhead	NOD3O2-11	1	
Alcove Overhead	NOD3O2-12	2 (if not already done)	
Alcove Overhead	NOD3O2-13	1	
Alcove Overhead	NOD3O2-14	5	
Alcove Overhead	NOD3O2-15	1	
Alcove Aft	NOD3A1-01	21	
Alcove Aft	NOD3A1-02	32	
Alcove Aft	NOD3A2-11	2	
Alcove Aft	NOD3A2-12	2	
Alcove Aft	NOD3A2-13	1 (if not already done)	
Alcove Aft	NOD3A2-14	3	
Alcove Aft	NOD3A2-15	1	
Alcove Aft	NOD3A2-16	2	
Alcove Deck	NOD3D1-01	16	
Alcove Deck	NOD3D1-02	29 (if not already done)	
Alcove Deck	NOD3D2-11	2	
Alcove Deck	NOD3D2-12	2 (if not already done)	
Alcove Deck	NOD3D2-13	1	
Alcove Deck	NOD3D2-14	5	
Alcove Deck	NOD3D2-15	1	
	Total	208	

1.138 NODE 3 LAUNCH RESTRAINT BOLT REMOVAL

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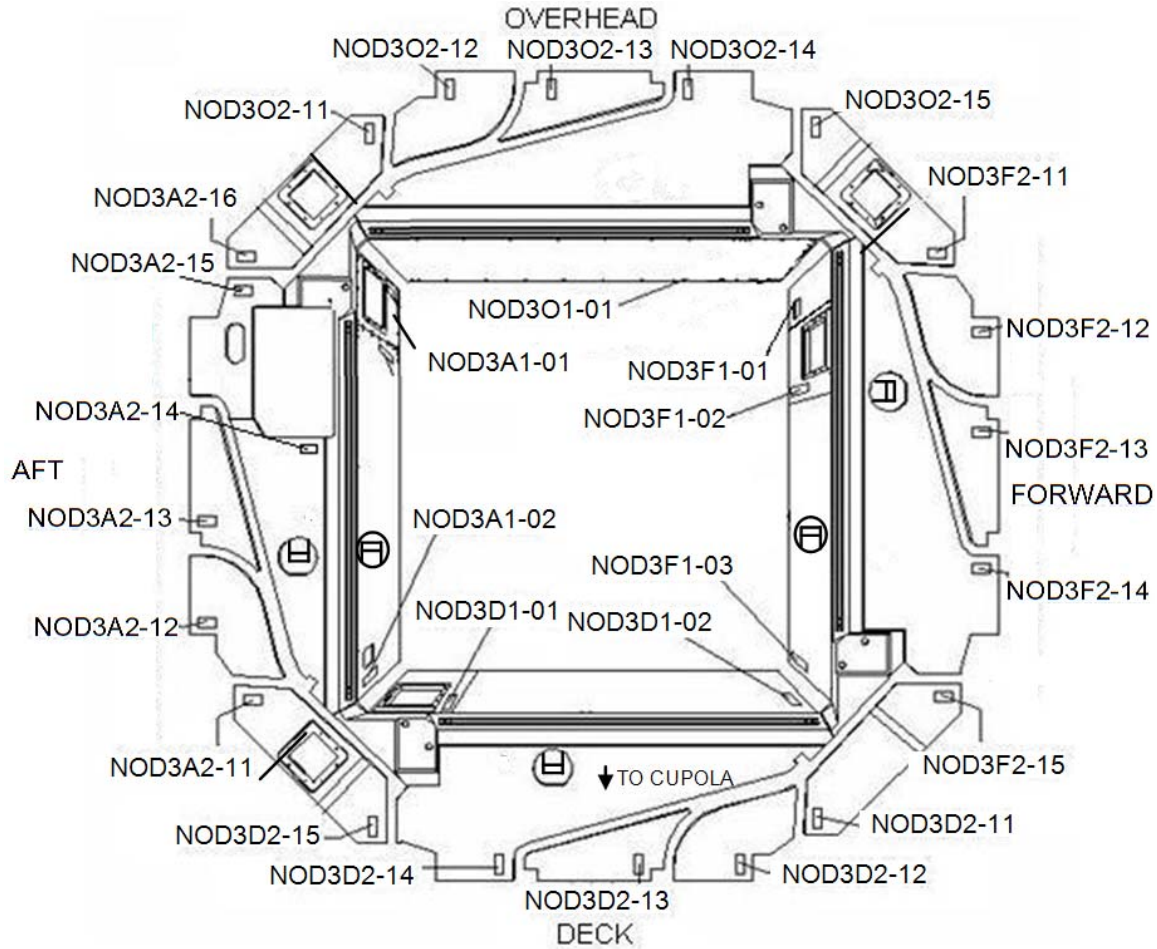


Figure 3.- Node 3 Alcove (Looking Port).

2.1 Remove non-captive Launch Restraint Bolts (two hundred eight) from Node 3 Alcove Closeout Panels (Driver Drill; Hex Shank, 5/32" Hex Head, 1/4" Drive).
Stow bolts and washers in Ziplock Bag.
Refer to Table 2 and Figure 3.

2.2 Photo document Final Configuration (Digital Camera).

3. LAUNCH BEAM ASSEMBLY LAUNCH BOLT REMOVAL

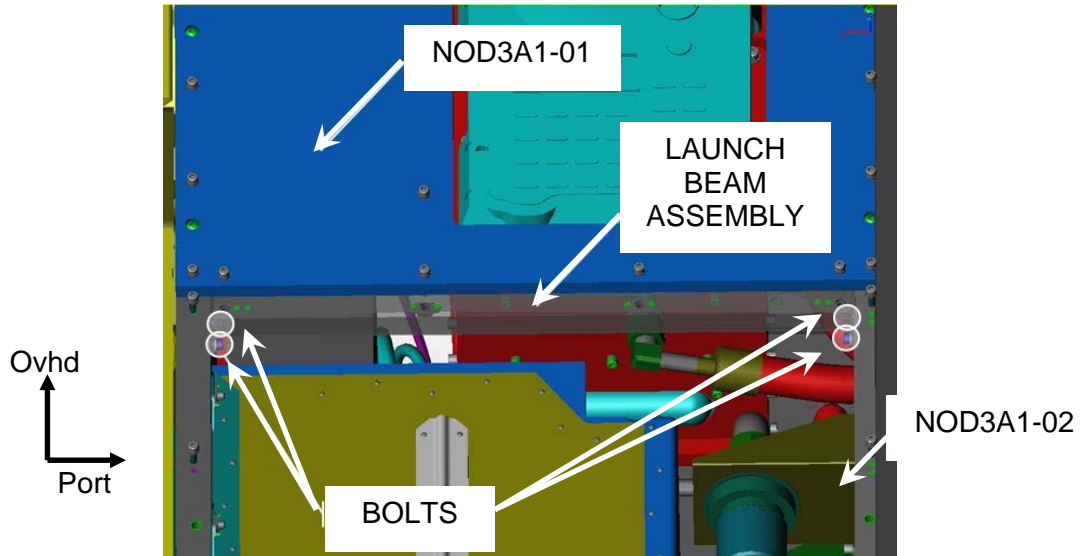


Figure 4.- Launch Beam Assembly Bolt Location.

- NOD3A1
- 3.1 Loosen captive fasteners (six) on Closeout Panel NOD3A1-02 (Driver Drill; Hex Shank, 5/32" Hex Head, 1/4" Drive).
 - 3.2 Temporarily stow Closeout Panel NOD3A1-02.
 - 3.3 Remove non-captive Launch Restraint Bolts (4) from Launch Beam Assembly (Driver Drill; Hex Shank, 5/32" Hex Head, 1/4" Drive). Stow bolts and washers in Ziplock Bag. Refert to Figure 4.
 - 3.4 Remove Launch Beam Assembly.
 - 3.5 Install Closeout Panel NOD3A1-02, captive fasteners (6) (Driver Handle; 5/32" Hex Head, 1/4" Drive).

1.138 NODE 3 LAUNCH RESTRAINT BOLT REMOVAL

(ASSY OPS/20A/FIN)

4. REMOVING LAUNCH RESTRAINT BOLTS FROM RADIAL BAYS (BAY 2)

Table 3. Radial Bay Launch Restraint Bolt Locations (5/32" Hex Head)

Location	Closeout Panel	Launch Bolts	Complete
Ovhd Fwd Radial Bay	NOD3OF2-21	8	
Ovhd Fwd Radial Bay	NOD3OF2-22	10	
Ovhd Fwd Radial Bay	NOD3OF2-23	10	
Ovhd Fwd Radial Bay	NOD3OF2-24	8	
Ovhd Aft Radial Bay	NOD3OA2-21	8	
Ovhd Aft Radial Bay	NOD3OA2-22	10	
Ovhd Aft Radial Bay	NOD3OA2-23	10	
Ovhd Aft Radial Bay	NOD3OA2-24	8	
Aft Deck Radial Bay	NOD3AD2-21	8	
Aft Deck Radial Bay	NOD3AD2-22	10	
Aft Deck Radial Bay	NOD3AD2-23	10	
Aft Deck Radial Bay	NOD3AD2-24	8	
Fwd Deck Radial Bay	NOD3FD2-21	8	
Fwd Deck Radial Bay	NOD3FD2-22	10	
Fwd Deck Radial Bay	NOD3FD2-23	10	
Fwd Deck Radial Bay	NOD3FD2-24	8	
	Total	144	

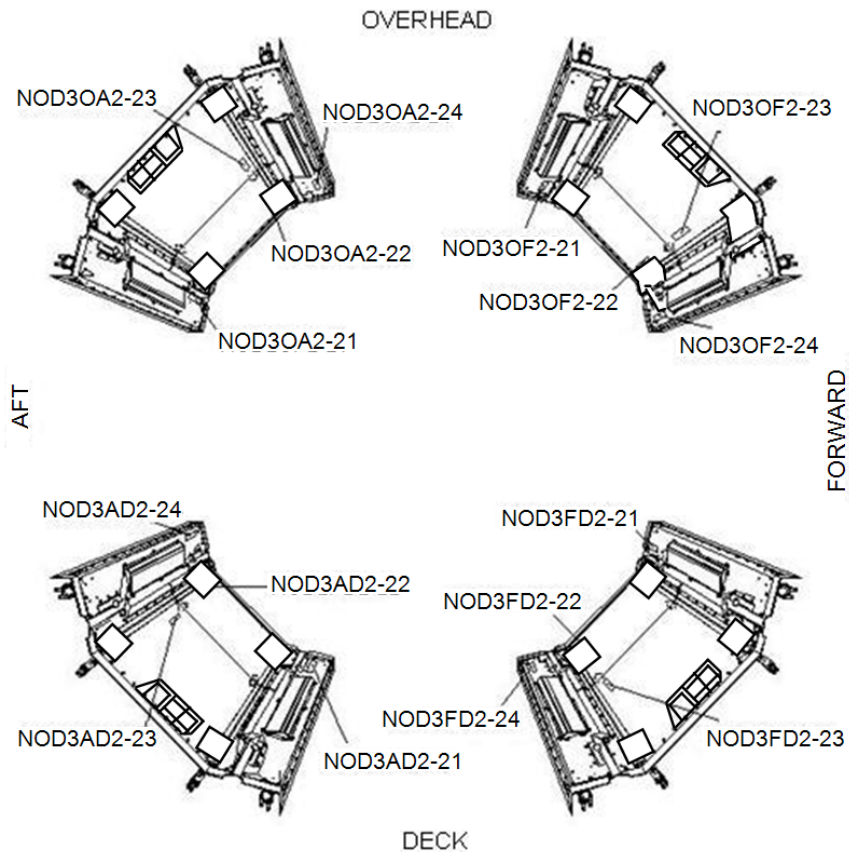


Figure 5.- Node 3 Radial Bays (Looking Port).

1.138 NODE 3 LAUNCH RESTRAINT BOLT REMOVAL

(ASSY OPS/20A/FIN)

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- 4.1 Remove non-captive Launch Restraint Bolts (one hundred forty-four) from Node 3 Radial Bay Closeout Panels (Driver Drill; Hex Shank, 5/32" Hex Head, 1/4" Drive).
Stow bolts and washers in Ziplock Bag.
Refer to Table 3 and Figure 5.

- 4.2 Photo document Final Configuration (Digital Camera).

5. REMOVING LAUNCH RESTRAINT BOLTS FROM MIDBAY (BAY 3)

Table 4. Midbay Launch Restraining Bolt Locations (5/32" Hex Head)

Location	Closeout Panel	Launch Bolts	Complete
Midbay Forward	NOD3F2-31	2	
Midbay Forward	NOD3F2-32	3	
Midbay Forward	NOD3F2-33	2	
Midbay Forward	NOD3F2-34	6	
Midbay Forward	NOD3F2-35	2	
Midbay Forward	NOD3F3-01	20	
Midbay Forward	NOD3F3-02	28 (if not already done)	
Midbay Overhead	NOD3O2-31	2	
Midbay Overhead	NOD3O2-32	3	
Midbay Overhead	NOD3O2-33	2	
Midbay Overhead	NOD3O2-34	6 (if not already done)	
Midbay Overhead	NOD3O2-35	2	
Midbay Overhead	NOD3O3-01	31	
Midbay Aft	NOD3A2-31	1	
Midbay Aft	NOD3A2-32	0	
Midbay Aft	NOD3A2-33	2 (if not already done)	
Midbay Aft	NOD3A2-34	3	
Midbay Aft	NOD3A2-35	2	
Midbay Deck	NOD3D2-31	2	
Midbay Deck	NOD3D2-32	3	
Midbay Deck	NOD3D2-33	2	
Midbay Deck	NOD3D2-34	7	
Midbay Deck	NOD3D2-35	2	
Midbay Deck	NOD3D3-01	22	
Midbay Deck	NOD3D3-02	20	
Midbay Deck	NOD3D3-03	22	
	Total	197	

1.138 NODE 3 LAUNCH RESTRAINT BOLT REMOVAL

(ASSY OPS/20A/FIN)

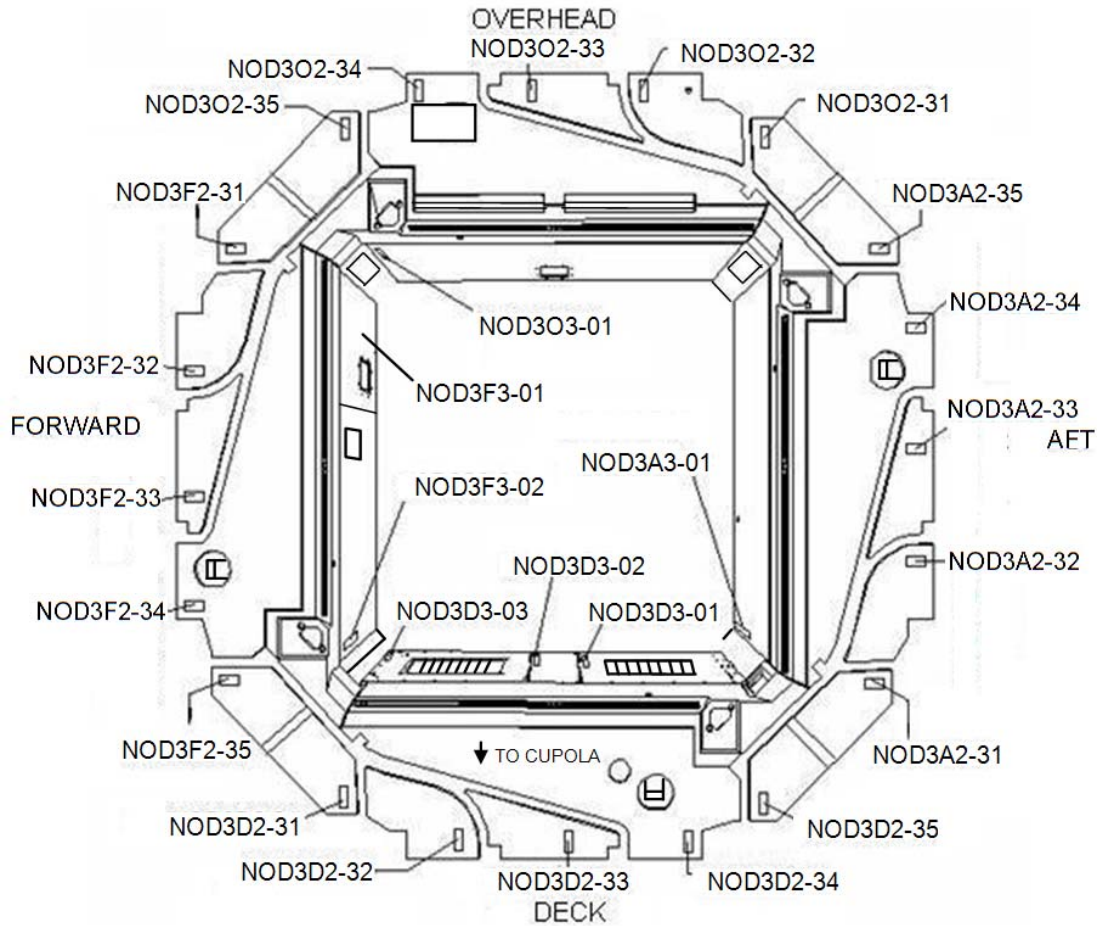


Figure 6.- Node 3 Midbay (Looking Starboard).

5.1 Remove non-captive Launch Restraint Bolts (one hundred ninety-seven) from Node 3 Midbay Closeout Panels (Driver Drill; Hex Shank, 5/32" Hex Head, 1/4" Drive). Stow bolts and washers in Ziplock Bag. Refer to Table 4 and Figure 6.

5.2 Photo document Final Configuration (Digital Camera).

Table 5. Midbay Launch Restraint Bolt Locations (3/16" Hex Head)

Location	Closeout Panel	Launch Bolts	Complete
Midbay Aft	NOD3A3-01	31 (if not already done)	

5.3 Remove non-captive Launch Restraint Bolts (thirty-one) from Node 3 Midbay Closeout Panels NOD3A3-01 (Driver Drill; Hex Shank, 3/16" Hex Head, 1/4" Drive). Stow bolts and washers in Ziplock Bag. Refer to Table 5 and Figure 6.

5.4 Photo document Final Configuration (Digital Camera).

6. REMOVING LAUNCH RESTRAINT BOLTS FROM AVIONICS RACKS (BAY 4 AND BAY 5)

Table 6. Avionics Racks Launch Retraint Bolt Locations (5/32" Hex Head)

Location	Closeout Panels	Launch Bolts	Complete
Avionics Rack	NOD3O4-01	11	
Avionics Rack	NOD3O4-02	7	
Avionics Rack	NOD3O5-01	8	
Avionics Rack	NOD3O5-02	7	
	Total	33	

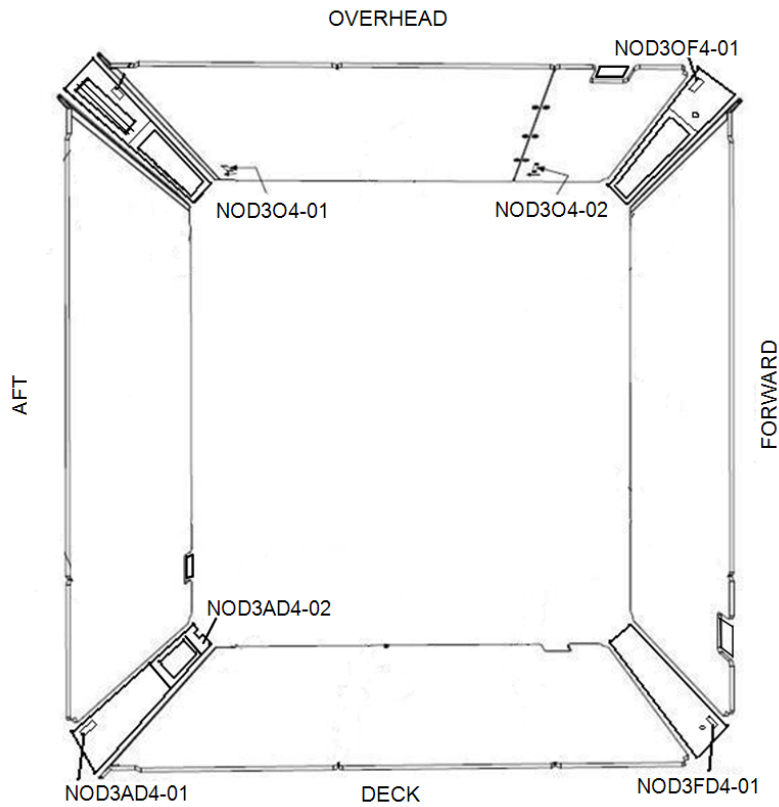


Figure 7.- Node 3 Bay 4 (Looking Port).

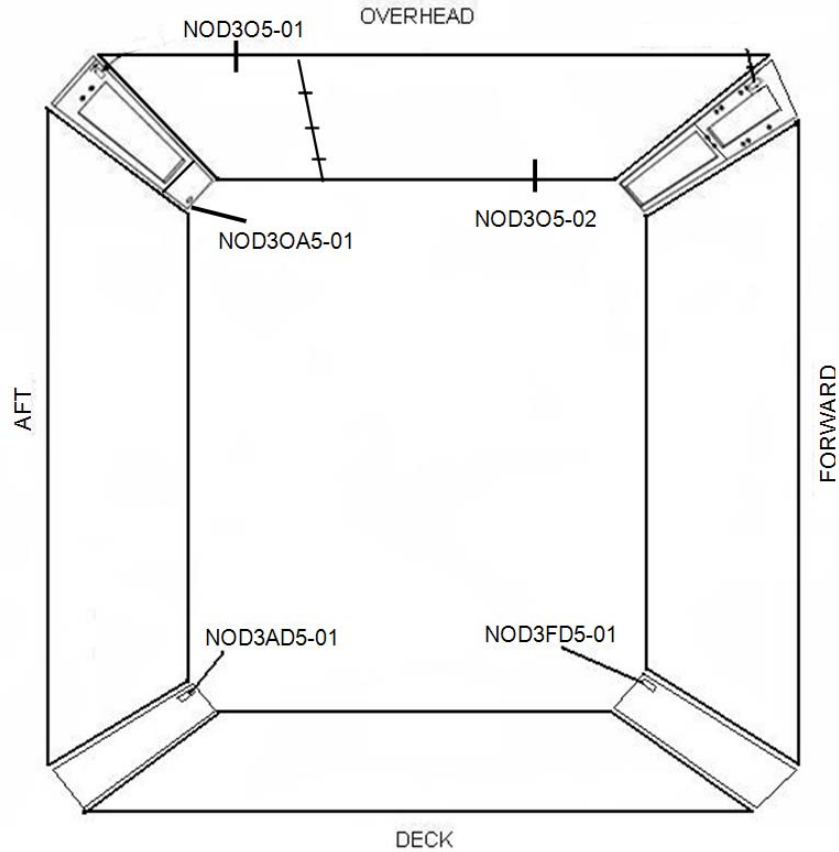


Figure 8.- Node 3 Bay 5 (Looking Port).

- 6.1 Remove non-captive Launch Restraint Bolts (thirty-three) from Node 3 Avionics Racks Closeout Panels (Driver Drill; Hex Shank, 5/32" Hex Head, 1/4" Drive).
Stow bolts and washers in Ziplock Bag.
Refer to Table 6 and Figures 7, 8.
- 6.2 Photo document Final Configuration (Digital Camera).

1.138 NODE 3 LAUNCH RESTRAINT BOLT REMOVAL

(ASSY OPS/20A/FIN)

7. REMOVING LAUNCH RESTRAINT BOLTS FROM STARBOARD CONE (BAY 6)

Table 7. Starboard Cone Launch Restraint Bolt Locations (5/32" Hex Head)

Location	Closeout Panel	Launch Bolts	Complete
Fwd Stbd Cone	NOD3F6-01	6	
Ovhd Stbd Cone	NOD3O6-01	3	
Ovhd Stbd Cone	NOD3O6-02	2 (if not already done)	
Ovhd Stbd Cone	NOD3O6-03	5	
Ovhd Stbd Cone	NOD3O6-51	8 (if not already done)	
Ovhd Stbd Cone	NOD3O6-52	3	
Aft Stbd Cone	NOD3A6-01	4 (if not already done)	
Aft Stbd Cone	NOD3A6-51	7	
Aft Stbd Cone	NOD3A6-52	4	
Deck Stbd Cone	NOD3D6-01	3	
Deck Stbd Cone	NOD3D6-02	2 (if not already done)	
Deck Stbd Cone	NOD3D6-03	7	
Deck Stbd Cone	NOD3D6-51	8(if not already done)	
Deck Stbd Cone	NOD3D6-52	4	
	Total	66	

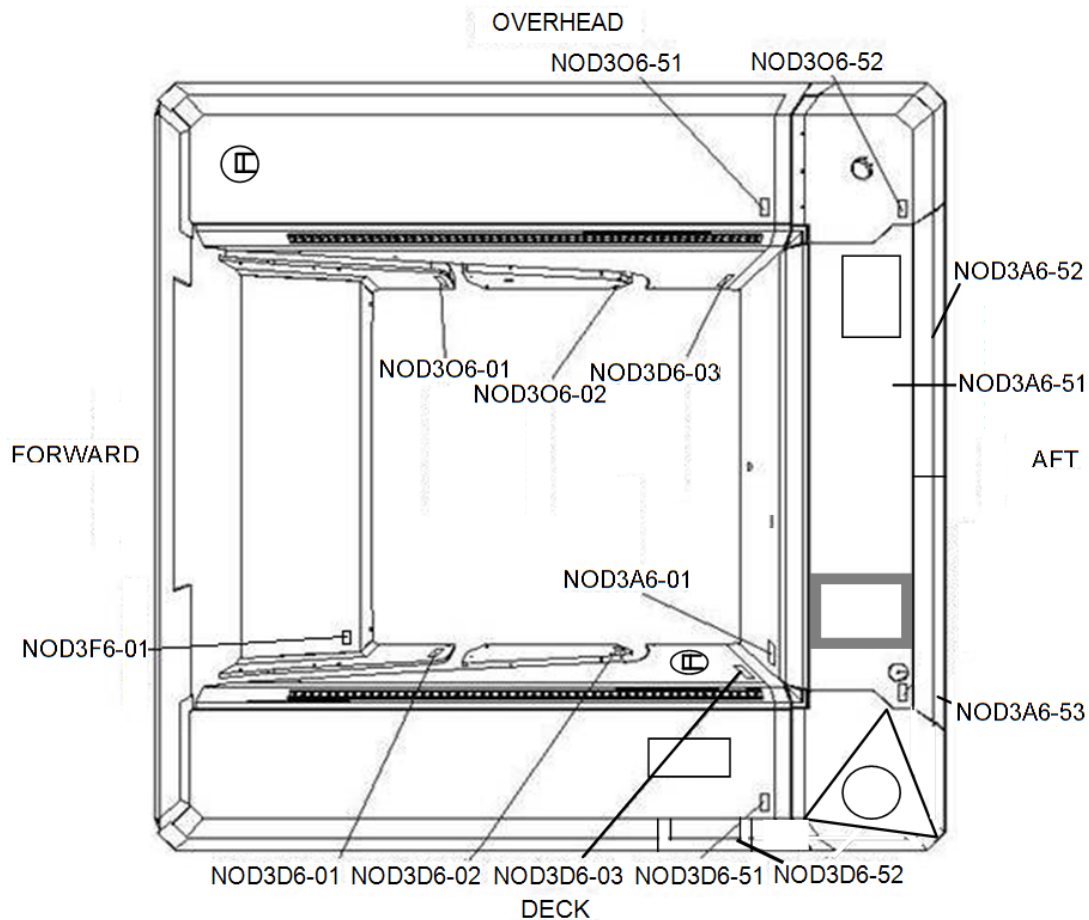


Figure 9.- Node 3 Starboard Cone (Looking Starboard).

1.138 NODE 3 LAUNCH RESTRAINT BOLT REMOVAL

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- 7.1 Remove non-captive Launch Restraint Bolts (sixty-eight) from Node 3 Starboard Cone Closeout Panel (Driver Drill; Hex Shank, 5/32" Hex Head, 1/4" Drive).
Stow bolts and washers in Ziplock Bag.
Refer to Table 7 and Figure 9.

- 7.2 Photo document Final Configuration (Digital Camera).

Table 8. Starboard Cone Launch Restraint Bolt Locations (3/16" Hex Head)

Location	Closeout Panel	Launch Bolts	Complete
Stbd Cone Aft	NOD3A6-53	6 (if not already done)	

- 7.3 Remove non-captive Launch Restraint Bolts (six) from Node 3 Starboard Cone Closeout Panel NOD3A6-53 (Driver Drill; Hex Shank, 3/16" Hex Head, 1/4" Drive).
Stow bolts and washers in Ziplock Bag.
Refer to Table 8 and Figure 9.

- 7.4 Photo document Final Configuration (Digital Camera).

8. POST MAINTENANCE

- 8.1 Remove all Kapton Tape from remaining bolts.
- 8.2 Stow tools, bolts.
- 8.3 Notify **MCC-H** of task completion.

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1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

(ASSY OPS/20A/FIN)

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OBJECTIVE:

To setup the Fluid System Servicer (FSS). Purge Cupola ITCS lines to vacuum and then fill with ITCS coolant using the FSS. Reconfigure Cupola ITCS QDs so that Cupola is cooled by the Node 3 ITCS. Close the MTL Cupola MFCV. Purge the dry Node 3/Node 1 ITCS lines and then fill with ITCS coolant. Reconfigure Node 3 ITCS QDs to connect Node 3 to the Node 1 ITCS. Reconfigure Node 1 ITCS QDs so that Node 3 provides cooling to Node 1 and Airlock instead of the LAB ITCS. After FSS operations are complete, drain and purge the FSS and FSS jumpers.

LOCATION:

Node 3: Cupola ITCS Reconfiguration QDs at NOD3D6 (Starboard Endcone)

Node 3: Node 3 ITCS Reconfiguration QDs at NOD3D3 (Deck Midbay)

Node 1: Node 1 Mod Kit ITCS Jumper installed at NOD1P1 (Port Alcove)

DURATION:

Cupola FSS Fill

30 minutes for FSS Setup (steps 1 to 8)

75 minutes for Cupola Purge and Fill (steps 9 to 15)

30 minutes for Cupola ITCS QD Reconfiguration (steps 16 to 17)

10 minutes for MTL Cupola MFCV Manipulation (step 18)

5 minutes for FSS safing (step 19)

Node 3/1 FSS Fill

30 minutes for FSS preparation for Node 3/Node 1 ITCS Fill (steps 20 to 24)

60 minutes for Node 3/Node 1 ITCS Fill (steps 25 to 30)

25 minutes for Node 3 ITCS QD Reconfiguration (steps 31 to 32)

25 minutes for Node 1 ITCS QD Reconfiguration (steps 33 to 36)

10 minutes to for FSS safing (step 37)

FSS Cleanup

90 minutes for FSS Cleanup (steps 38 to 44)

PARTS:

Ziplock Bag labeled "1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS"

TCS MTL SUPPLY FROM NODE 3 Label (two)

TCS MTL RETURN TO NODE 3 Label (two)

MATERIALS:

Ziplock Bag, small (one)

Kapton Tape

Gray Tape

Aluminum Tape

Sharpie

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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TOOLS:

Digital Camera

CSA-O2 (two) P/N SED46115801-305

PWR labeled "ITCS Water" P/N SEG46117689-301 S/N 1035

PWR labeled "ITCS Water" P/N SEG46117689-301 S/N 1034

PWR labeled "ITCS Water" P/N SEG46117689-301 S/N 1002

PS-120 Cable P/N SEG33114649-301

PEEK, 120 VDC 12 AMP 20" Extension Cable P/N SEG33112596-303

Restraint Mobility Aids (RMAs):

41.5" Hand Rail Assembly (two) P/N G11F5200-1

Adjustable Length Tether (one) P/N G11F5140-1

Fluid System Servicer (FSS):

Fluids Control Pump Assembly (FCPA) P/N 683-17117-1

Vacuum Access Jumpers:

VAJ-83-1 35 ft P/N 683-17111-2

FSS Jumpers:

20 ft FSS Jumpers

FSS-72-1 P/N 683-17111-11

FSS-72-2 P/N 683-17111-12

5 ft FSS Jumpers

FSS-79-1 P/N 683-17111-9

FSS-79-2 P/N 683-17111-10

4 ft FSS Jumpers

FSS PWR Adapter P/N SEG46118440-301

3 ft FSS Jumpers

FSS-70-2 P/N 683-17111-20

FSS-64-2 Jumper P/N 683-17111-22

1.5 ft FSS Jumpers

FSS-68-1 Jumper P/N 683-17111-13

FSS-68-2 Jumper P/N 683-17111-14

FSS-69-1 Jumper P/N 683-17111-15

FSS-69-2 Jumper P/N 683-17111-16

FSS-77-2 P/N 683-17111-18

ISS IVA Toolbox:

Drawer 2:

Ratchet, 3/8" Drive

4" Ext, 3/8" Drive

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

1/4" Hex Head Driver, 3/8" Drive (may be required in step 2.1)

Drawer 4:

Wire Cutters

REFERENCED PROCEDURE(S):

None

1. PREPARING FSS WORKSITE

NOTE
 Remove and replace protective caps, plugs from jumpers, electrical connectors as required throughout procedure.

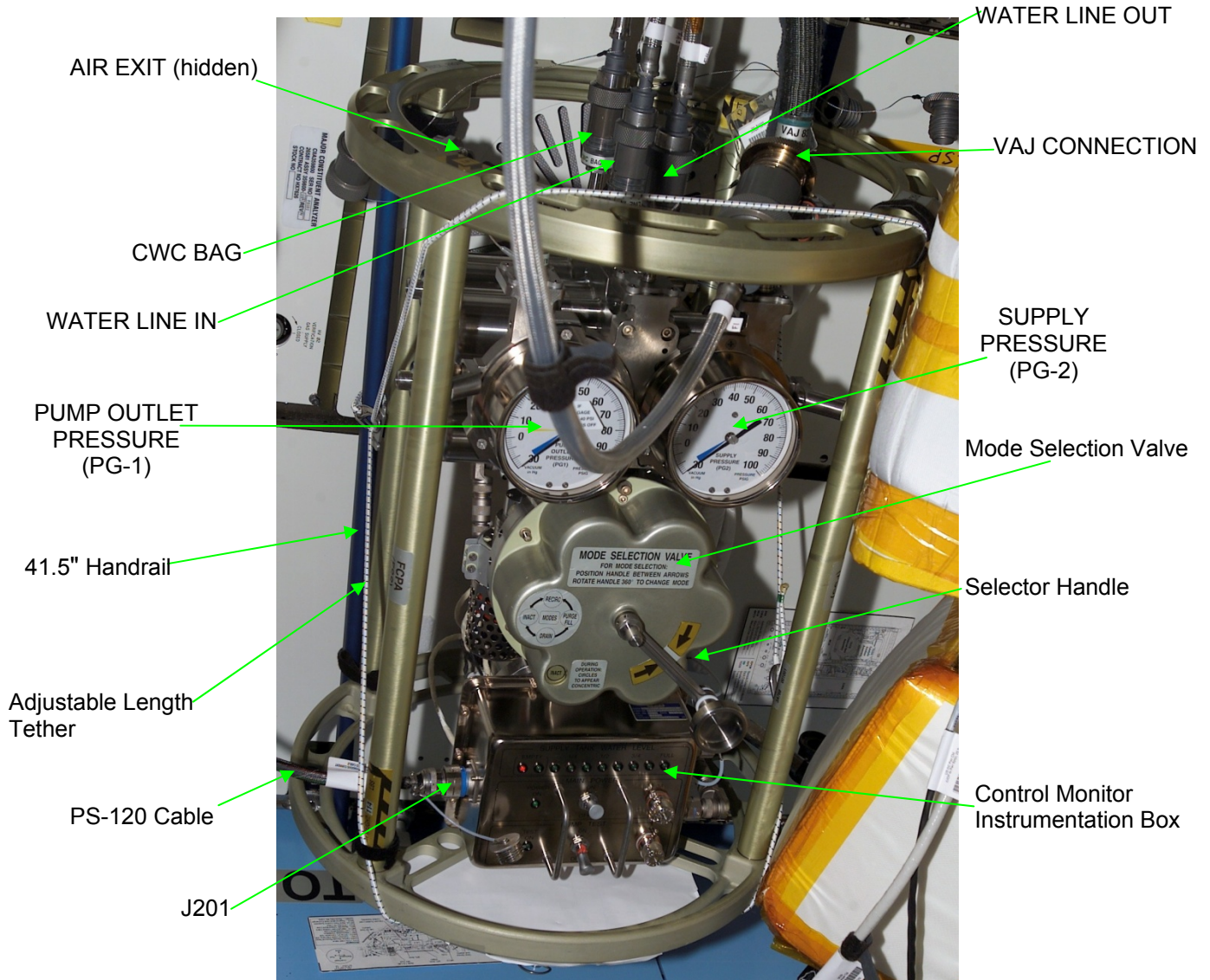


Figure 1.- Fluid Control Pump Assembly (FCPA).

- NOD3 1.1 Install 41.5\" Handrails (two) on seat tracks, in parallel, 6 to 8 inches apart, per crew preference. Refer to Figure 1.
- LAB106 1.2 Remove FSS Beta Cloth Closeout covering top portion of LAB106 Rack, fold. Temporarily stow.

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

(ASSY OPS/20A/FIN)

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2. SETTING UP FCPA

2.1 Unfasten triangular restraint bracket fasteners (six) securing FCPA by hand (if required, Ratchet, 3/8" Drive; 1/4" Hex Head, 3/8" Drive).

2.2 Remove FCPA.
Temporarily reinstall triangular restraint bracket.

2.3 Remove any FSS jumpers coiled in end of FCPA.
Temporarily stow jumpers.

NOD3

2.4 Place FCPA on pre-installed set of 41.5" Handrails (two), secure with Adjustable Length Tether (one).

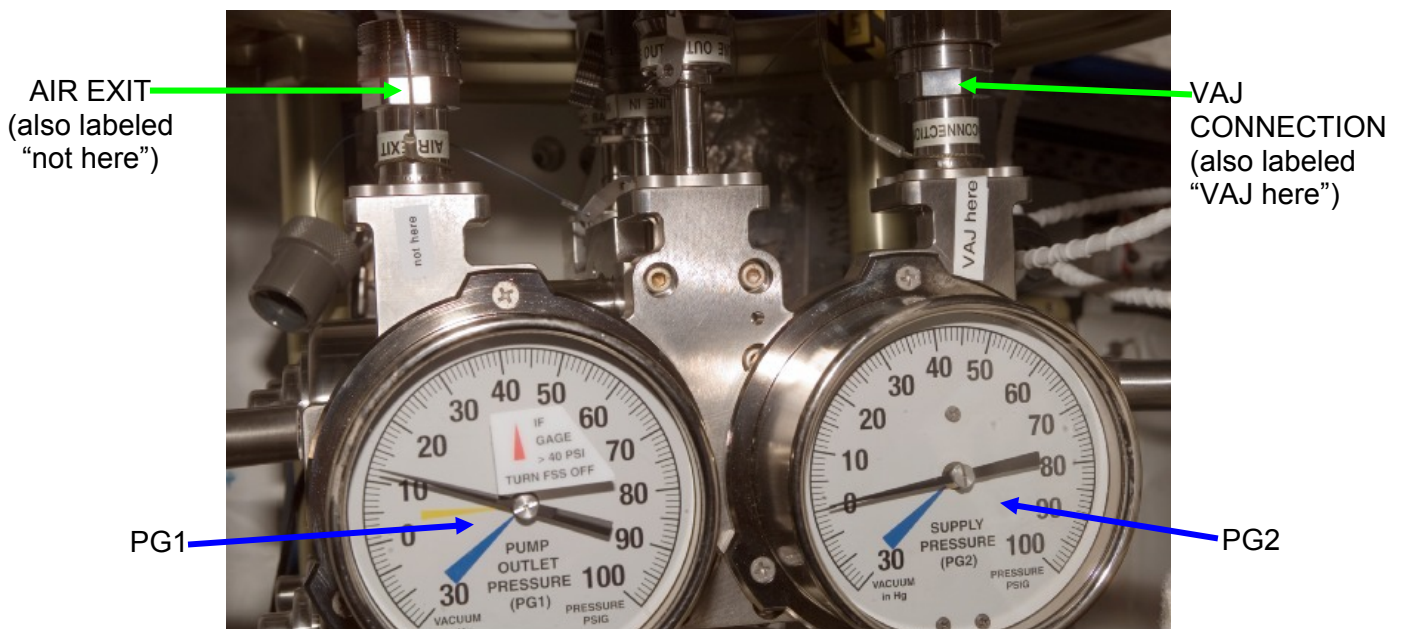


Figure 2.- AIR EXIT and VAJ CONNECTION on FCPA.

2.5 Gamah Cap ←|→ AIR EXIT on FCPA
Refer to Figures 1, 2.

2.6 Verifying FSS Power and Valve Positions

- | | |
|-----------------------|--------------|
| √sw FSS MAIN POWER | - OFF |
| √MODE SELECTION VALVE | - INACT |
| √MV1 | - BYPASS |
| √MV2 | - CLOSE |
| √MV3 | - DF1/SUPPLY |

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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3. CONFIGURING POWER

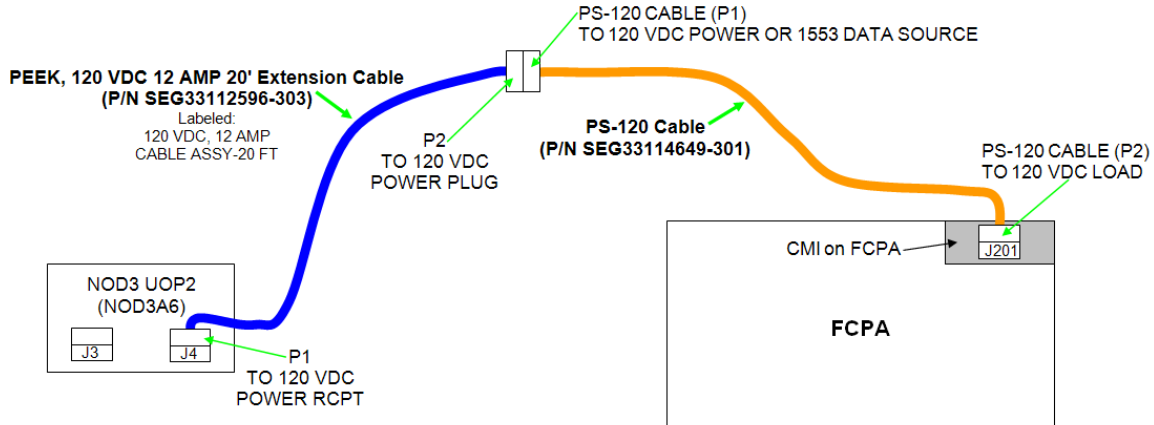


Figure 3.- FSS Power Configuration.

NOD3 UOP2 3.1 POWER OUT – RESET (illuminated)
(NOD3A6)

Verify FAULT/TEST – not illuminated

3.2 Configuring Power Cables Per Figure 3

PS-120 CABLE (P2) TO 120 VDC LOAD on PS-120 Cable →|←
J201 on FCPA

P2 TO 120 VDC POWER PLUG on PEEK, 120 VDC 12 AMP 20'
Extension Cable →|← PS-120 CABLE (P1) TO 120 VDC POWER
OR 1553 DATA SOURCE on PS-120 Cable

P1 TO 120 VDC POWER RCPT on PEEK, 120 VDC 12 AMP 20'
Extension Cable →|← J4 on NOD3 UOP2

Refer to Figure 3.

3.3 POWER OUT – (green ENABLE)

Verify FAULT/TEST – (green OK)

3.4 sw FSS MAIN POWER → ON

Verify POWER ON LED is illuminated.

3.5 sw PUMP TEST → ON for less than 3 seconds.

TEST ON LED will illuminate, pump noise should be heard.

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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4. CONNECTING TO VACUUM SOURCE

- PCS 4.1 Verifying Vent and Relief Isolation Valve (VRIV), Vent and Relief Control Valve (VRCV) Closed
Node 3: ECLSS: PCA

'Pressure Control Assembly'
- sel VRCV (Icon)
-
- Verify Position – Closed
- Node 3: ECLSS: PCA

'Pressure Control Assembly'
- sel VRIV (Icon)
-
- Verify Position – Closed
- NOD3F0 4.2 Remove Closeout Panel NOD3F0-03, fasteners (thirteen) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- 4.3 Remove Closeout Panel NOD3F0-02, fasteners (four) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- 4.4 Gamah Cap ←|→ PCA Vacuum Access Port
Temporarily stow Gamah Cap.
- 4.5 Verify VAJ seals free from damage, debris on both ends of VAJ-83-1 35 ft.
- 4.6 VAJ-83-1 35 ft (bent end) →|← PCA Vacuum Access Port, hand tighten.
- 4.7 Gamah Cap ←|→ VAJ CONNECTION on FCPA
VAJ-83-1 35 ft (straight end) →|← VAJ CONNECTION on FCPA, hand tighten.
Restrain VAJ-83-1 35 ft per crew preference.
Refer to Figures 1 and 2.
- MCC-H 4.8 Suppressing Node 3 PPR Failure Caution
C&W Summ

'Event Code Tools'

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

(ASSY OPS/20A/FIN)

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sel Suppress

Suppress Annunciation of an Event

input Event Code – 1 7 0 5 3 ('Positive P Relief Failure - Node 3')

cmd Arm

cmd Execute

NOTE

The following Caution message will be received after PPR is inhibited: '**Positive P Relief Failure - Node 3**'

No action required. This message will return to normal once PPR is re-enabled.

PCS

4.9 Disabling Positive Pressure Relief

Node 3: ECLSS: PCA: PCA Commands

Node 3 PCA Commands

'PCA'

Verify State – Monitor

'Positive Pressure Relief'

'Inhibit'

cmd Arm (Verify Status – Armed)

cmd Inhibit (Verify Positive Pressure Relief Status – Inhibited)

4.10 Opening Vacuum Relief Isolation Valve (VRIV)

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV (Icon)

Node 3 PCA VRIV

'Open'

cmd Arm (Verify Status – Armed)

cmd Open (Verify Position – Open)

5. CONFIGURING FOR DRAIN OF FSS JUMPERS

NOTE

Refer to Figure 4 for step 5.

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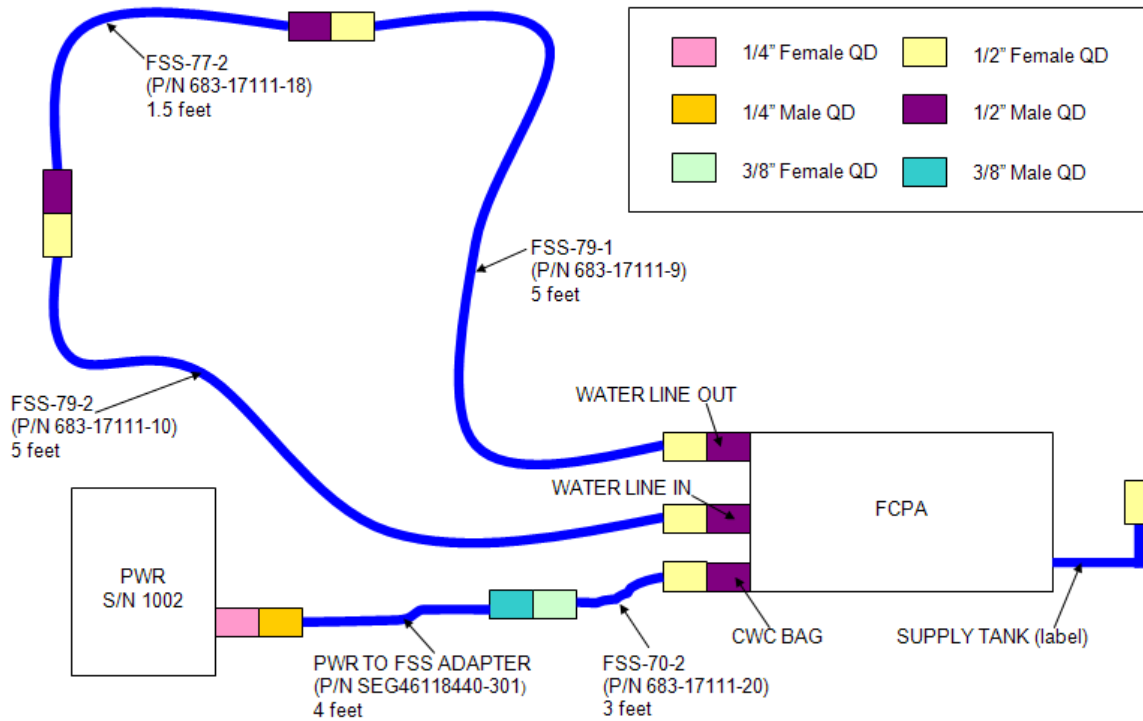


Figure 4.- FSS and Jumper Drain and Purge Setup.

- 5.1 FSS-79-1 →|← WATER LINE OUT on FCPA
 FSS-79-1 →|← FSS-77-2
 FSS-79-2 →|← FSS-77-2
 FSS-79-2 →|← WATER LINE IN on FCPA
- 5.2 FSS-70-2 →|← CWC BAG on FCPA
 PWR TO FSS ADAPTER →|← FSS-70-2
 PWR TO FSS ADAPTER →|← PWR S/N 1002

6. DRAINING FSS AND FSS JUMPERS

CAUTION
1. While in DRAIN, FILL, RECIRC mode (FSS Pump is on), PG1 (Pump Outlet Pressure) must be monitored to ensure FSS and ITCS lines do not become overpressurized.
2. PWR S/N 1002 must be monitored to avoid overfilling during DRAIN operations. If PWR S/N 1002 appears to approach the full point, MODE SELECTION VALVE should be rotated to INACT.

- 6.1 MV2 → OPEN
- 6.2 MODE SELECTION VALVE ↻ DRAIN (FCPA pump will turn ON)
- 6.3 Drain until PG-1 is in yellow range for 1 minute.

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```
*****
* If PWR S/N 1002 appears to be approaching full
* |   MODE SELECTION VALVE ↻ INACT
* |
* |   √MCC-H for further instructions
* |
* If PG1 pressure > 40 psig
* |   sw FSS MAIN POWER → OFF
* |
* |   √MCC-H for further instructions
*****
```

6.4 MV2 → CLOSE
Drain for an additional 2 minutes.

7. PURGING FSS AND FSS JUMPERS

7.1 MODE SELECTION VALVE ↻ PURGE/FILL
(FCPA pump will turn OFF)

7.2 MV2 → OPEN

7.3 Purge until PG-1 is in blue arc for 30 seconds.
This action should take less than 10 minutes.

Record PG1 pressure: _____ in Hg

Record PG2 pressure: _____ in Hg

```
*****
* If blue arc is not reached for 30 seconds within 10 minutes
* |   MODE SELECTION VALVE ↻ INACT, then:
* |
* |   MODE SELECTION VALVE ↻ DRAIN
* |
* |   Drain until PG-1 is in yellow range for 30 seconds.
* |
* |   If PWR S/N 1002 appears to be approaching full
* | |   MODE SELECTION VALVE ↻ INACT
* | |
* | |   √MCC-H for further instructions
* | |
* |   MV2 → CLOSE
* |
* |   Drain an additional 2 minutes.
* |
* |   If PWR S/N 1002 appears to be approaching full
* | |   MODE SELECTION VALVE ↻ INACT
* | |
* | |   √MCC-H for further instructions
* | |
* |   MODE SELECTION VALVE ↻ INACT
* |
* |   Restart procedure from step 7.1.
* |   Notify MCC-H.
*****
```

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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7.4 MV2 → CLOSE

7.5 MODE SELECTION VALVE ↻ INACT

8. DISCONNECTING FSS JUMPERS

8.1 Disconnecting FSS-77-2 Jumpers

FSS-77-2 ←|→ FSS-79-1

FSS-77-2 ←|→ FSS-79-2

Stow FSS-77-2.

8.2 Disconnecting PWR

FSS-70-2 ←|→ CWC BAG QD on FCPA

FSS-70-2 ←|→ PWR TO FSS ADAPTER

PWR TO FSS ADAPTER ←|→ PWR S/N 1002

9. REMOVING NODE 3 DECK MIDBAY CLOSEOUT PANELS

NOTE

Refer to Figure 5 for step 9.

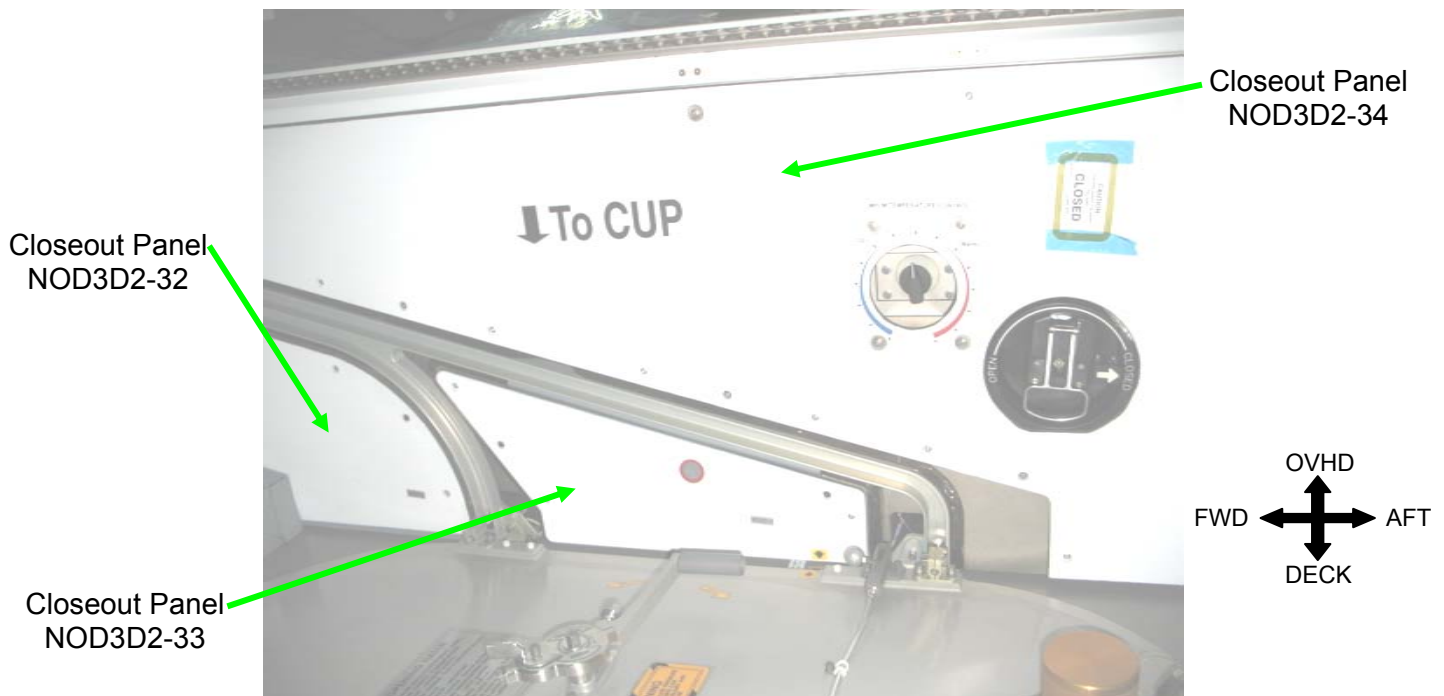


Figure 5.- Node 3 Deck Midbay Closeout Panels (looking Starboard).

NOD3D2 9.1 Remove Closeout Panel NOD3D2-32, fasteners (four) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).

9.2 Remove Closeout Panel NOD3D2-33, fasteners (three) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).

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- 9.3 Remove Closeout Panel NOD3D2-34, fasteners (seventeen)
(Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- 9.4 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).

Verify CSA-O2 sampling from both units are within 1.1 % of each other.

- 9.5 Perform CSA-O2 sampling in area where Closeout Panel was removed for 1 minute.
If O2 % is between 16.5 to 23.3 %, proceed.

10. DEMATING CUPOLA HTL QDS FOR FSS FILL

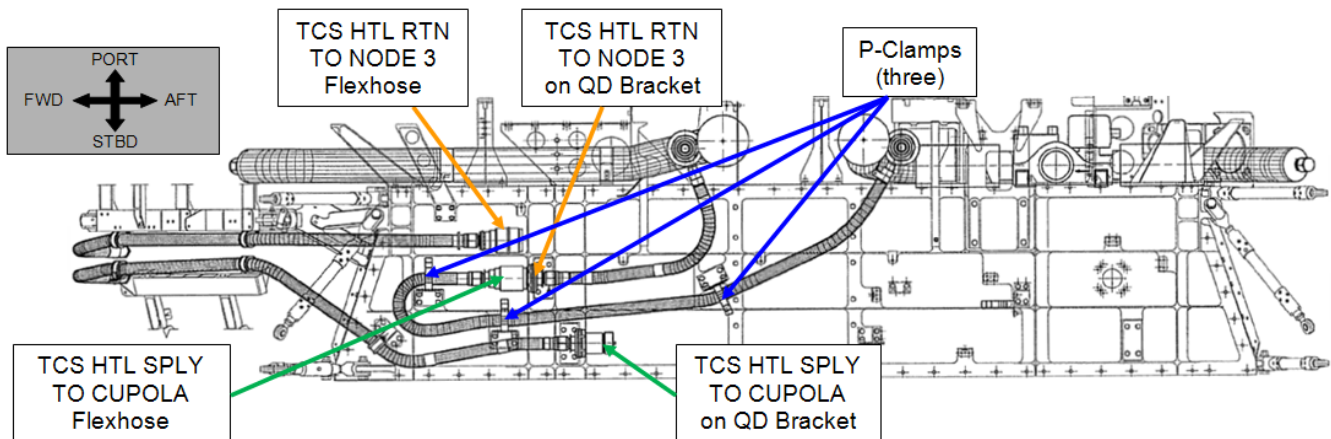


Figure 6.- Launch Configuration of Cupola HTL QDs (looking Overhead on Deck side of Deck Midbay).

Closeout Panel NOD3D2-32 (Installation Location)



Figure 7.- Cupola HTL QDs in Node 3 Deck Midbay (looking Starboard).

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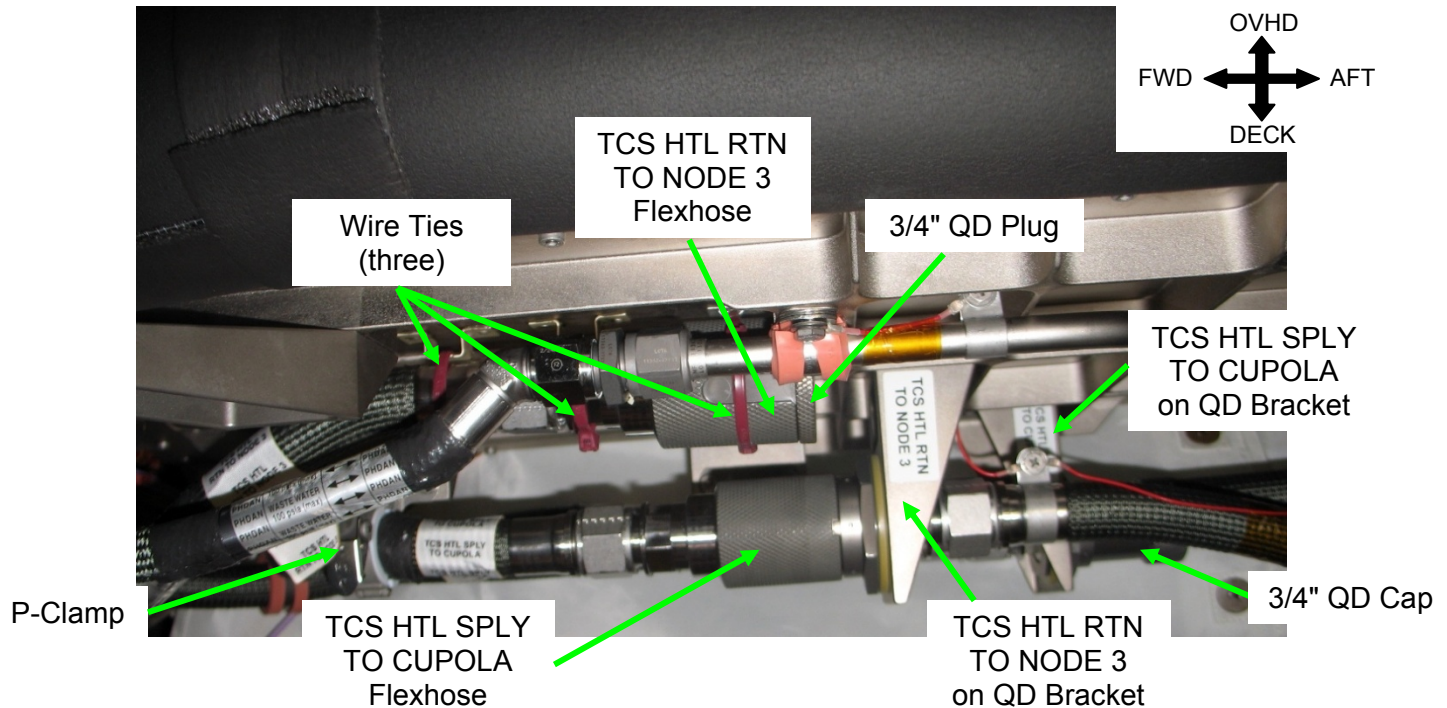


Figure 8.- Cupola HTL QDs (looking Starboard).

- NOD3D3 10.1 Disengage P-Clamps (three) securing TCS HTL SPLY TO CUPOLA Flexhose to structure.
Refer to Figures 6, 7, and 8.
- 10.2 TCS HTL SPLY TO CUPOLA Flexhose ←|→ TCS HTL RTN TO NODE 3 on QD Bracket
Refer to Figures 6, 7, and 8.

11. CONFIGURING FSS JUMPERS FOR CUPOLA FILL

NOTE

1. Refer to Figures 6, 7, 8, and 9 for step 11.
2. PWR S/N 1035 and associated jumpers shown in Figure 9 will not be connected until step 13.

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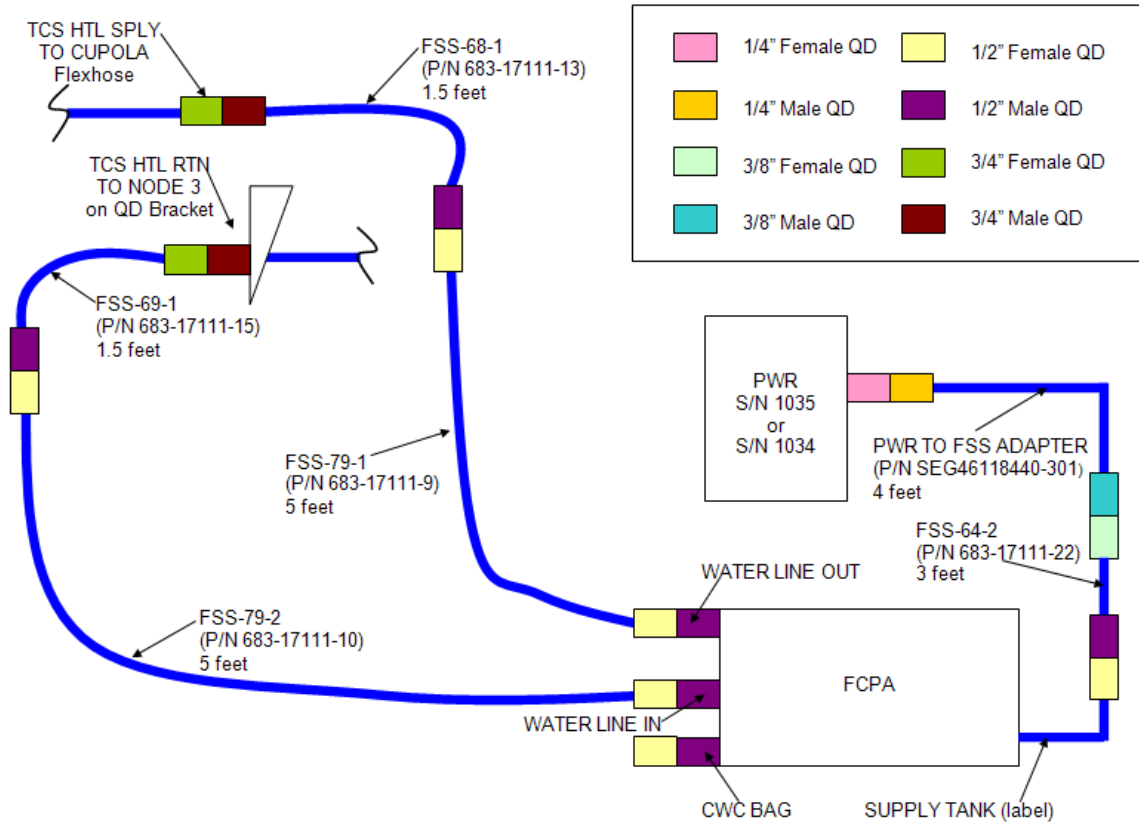


Figure 9.- FSS and Jumper Configuration for Cupola Fill.

- FCPA 11.1 ✓ FSS-79-1 →|← WATER LINE OUT on FCPA
 ✓ FSS-79-2 →|← WATER LINE IN on FCPA
- NOD3D3 11.2 FSS-68-1 →|← FSS-79-1
 FSS-68-1 →|← TCS HTL SPLY TO CUPOLA Flexhose
- 11.3 FSS-69-1 →|← FSS-79-2
 FSS-69-1 →|← TCS HTL RTN TO NODE 3 on QD Bracket

12. PURGING CUPOLA

- FCPA 12.1 MODE SELECTION VALVE ↺ PURGE/FILL
- 12.2 MV2 → OPEN
- 12.3 Purge until PG-1 is in blue arc for 30 seconds.
 This action should take less than 10 minutes.

Record PG1 pressure: _____ in Hg
 Record PG2 pressure: _____ in Hg

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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```
*****
* If blue arc is not reached for 30 seconds within 10 minutes
* | MODE SELECTION VALVE ↻ INACT, then:
* |
* | MODE SELECTION VALVE ↻ DRAIN
* |
* | Drain until PG-1 is in yellow range for 30 seconds.
* |
* | MV2 → CLOSE
* |
* | Drain an additional 2 minutes.
* |
* | MODE SELECTION VALVE ↻ INACT
* |
* | Restart procedure from step 12.1.
* | Notify MCC-H.
*****
```

12.4 MV2 → CLOSE

12.5 MODE SELECTION VALVE ↻ INACT

13. CONNECTING PAYLOAD WATER RESERVOIR (PWR)

13.1 FSS-64-2 →|← SUPPLY TANK on FCPA
FSS-64-2 →|← PWR TO FSS ADAPTER

13.2 PWR TO FSS ADAPTER →|← PWR S/N 1035
Refer to Figure 8.

14. FILLING AND RECIRCULATING CUPOLA

CAUTION

While in DRAIN, FILL, RECIRC mode (FSS Pump is on), PG1 (Pump Outlet Pressure) must be monitored to ensure FSS and ITCS lines do not become overpressurized.

14.1 MODE SELECTION VALVE ↻ PURGE/FILL

14.2 MV2 → OPEN

14.3 MV1 → FILL (FCPA pump will turn ON)

```
*****
* If PG1 pressure > 40 psig
* | sw FSS MAIN POWER → OFF
* |
* | √MCC-H for further instructions
*****
```


1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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```
*****
* If PWR S/N 1035 appears empty
* | MV1 → BYPASS (FCPA pump will turn OFF)
* |
* | MODE SELECTION VALVE ↶ to INACT
* |
* | Notify MCC-H.
* |
* | PWR TO FSS ADAPTER ←|→ PWR S/N 1035
* | PWR TO FSS ADAPTER →|← PWR S/N 1034
* |
* | MODE SELECTION VALVE ↶ PURGE/FILL
* |
* | MV1 → FILL (FCPA pump will turn ON)
*****
```

Wait 15 minutes.

Record PG1 pressure: _____ psig

Record PG2 pressure: _____ psig

14.4 MV1 → BYPASS (FCPA pump will turn OFF)

14.5 MODE SELECTION VALVE ↶ RECIRC (FCPA pump will turn ON)

```
*****
* If PG1 pressure > 40 psig
* | sw FSS MAIN POWER → OFF
* |
* | √MCC-H for further instructions
*****
```

Recirculate for 5 minutes.

Record PG1 pressure: _____ psig

Record PG2 pressure: _____ psig

14.6 MODE SELECTION VALVE ↶ INACT (FCPA pump will turn OFF)

14.7 MV2 → CLOSE

14.8 Notify **MCC-H** of coolant quantity remaining in PWR S/N 1035, 1034.

15. DISCONNECTING FSS FROM CUPOLA HTL QDS

NOD3D3

15.1 FSS-68-1 ←|→ TCS HTL SPLY TO CUPOLA Flexhose
3/4" QD Cap →|← FSS-68-1

15.2 FSS-69-1 ←|→ TCS HTL RTN TO NODE 3 on QD Bracket
3/4" QD Plug →|← FSS-69-1

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16. RECONFIGURING CUPOLA HTL QDS

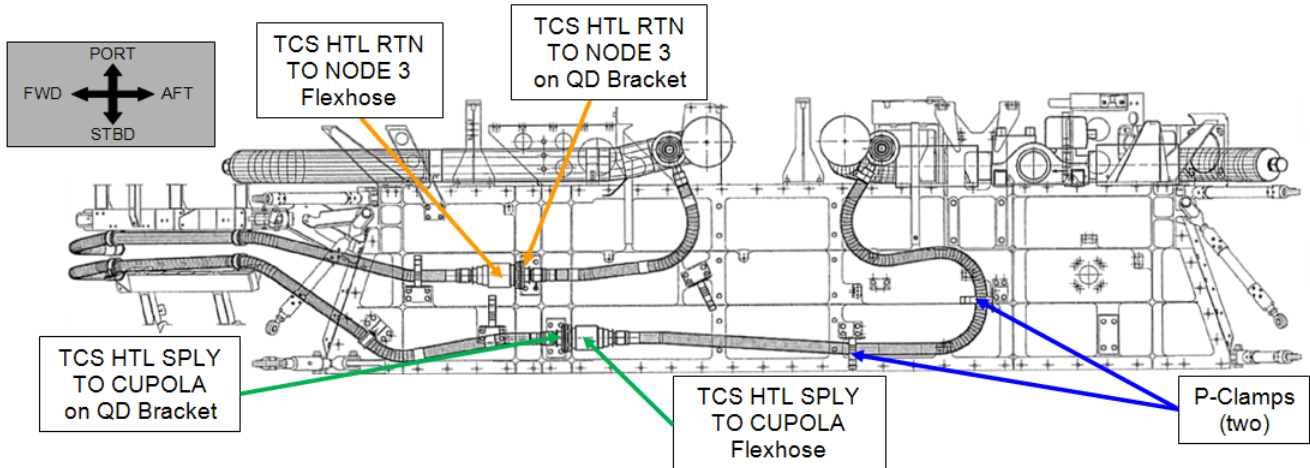


Figure 10.- On-Orbit Configuration of Cupola HTL QDs
(looking Overhead on Deck side of Deck Midbay).

16.1 3/4" QD Cap ←|→ TCS HTL SPLY TO CUPOLA on QD Bracket
TCS HTL SPLY TO CUPOLA Flexhose →|← TCS HTL SPLY TO
CUPOLA on QD Bracket
Refer to Figures 6 to 10.

16.2 Route TCS HTL SPLY TO CUPOLA Flexhose in on-orbit
configuration.
Engage P-Clamps (two).
Refer to Figure 10.

16.3 Cut Wire Ties (three) securing TCS HTL RTN TO NODE 3
Flexhose to structure (Wire Cutters).
Refer to Figure 8.

16.4 3/4" QD Plug ←|→ TCS HTL RTN TO NODE 3 Flexhose
TCS HTL RTN TO NODE 3 Flexhose →|← TCS HTL RTN TO
NODE 3 on QD Bracket
Refer to Figures 8 and 10.

16.5 3/4" QD Cap (from step 16.1) →|← 3/4" QD Plug (from step 16.4)

17. INSTALLING NODE 3 DECK MIDBAY CLOSEOUT PANELS

NOTE

Refer to Figure 5 for step 17.

NOD3D2 17.1 Install Closeout Panel NOD3D2-32, fasteners (four) (Ratchet,
3/8" Drive; 5/32" Hex Head, 3/8" Drive).

17.2 Install Closeout Panel NOD3D2-33, fasteners (three) (Ratchet,
3/8" Drive; 5/32" Hex Head, 3/8" Drive).

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17.3 Install Closeout Panel NOD3D2-34, fasteners (seventeen) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).

18. CLOSING CUPOLA MTL MFCV

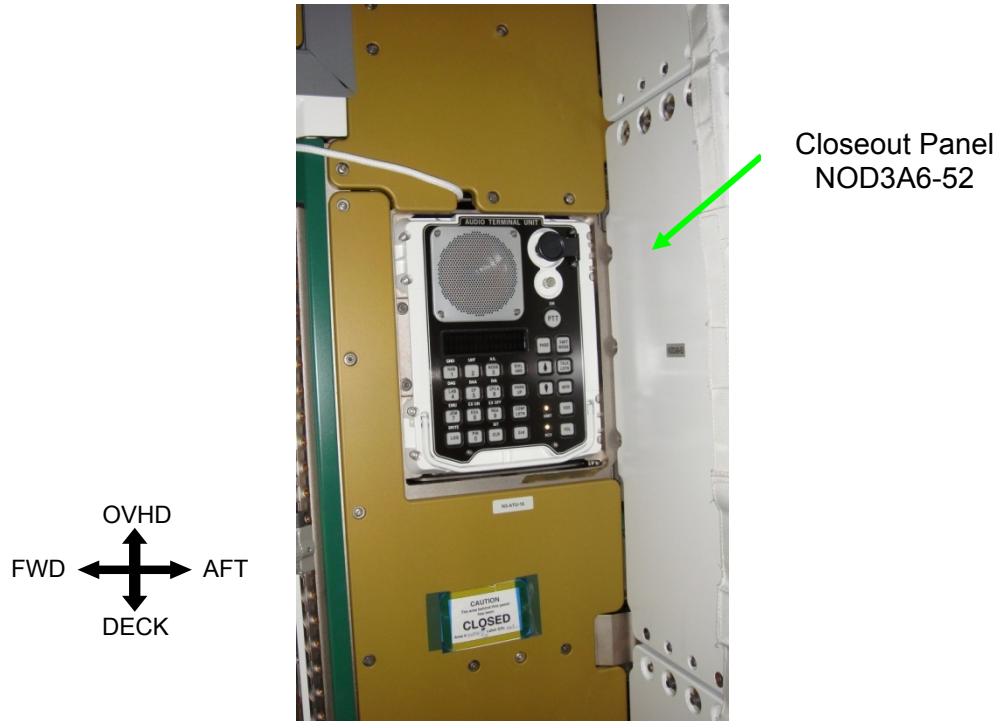


Figure 11.- Aft Portion of Node 3 Starboard Endcone (looking Starboard).

NOD3A6 18.1 Remove Closeout Panel NOD3A6-52, fasteners (four) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive). Refer to Figure 11.

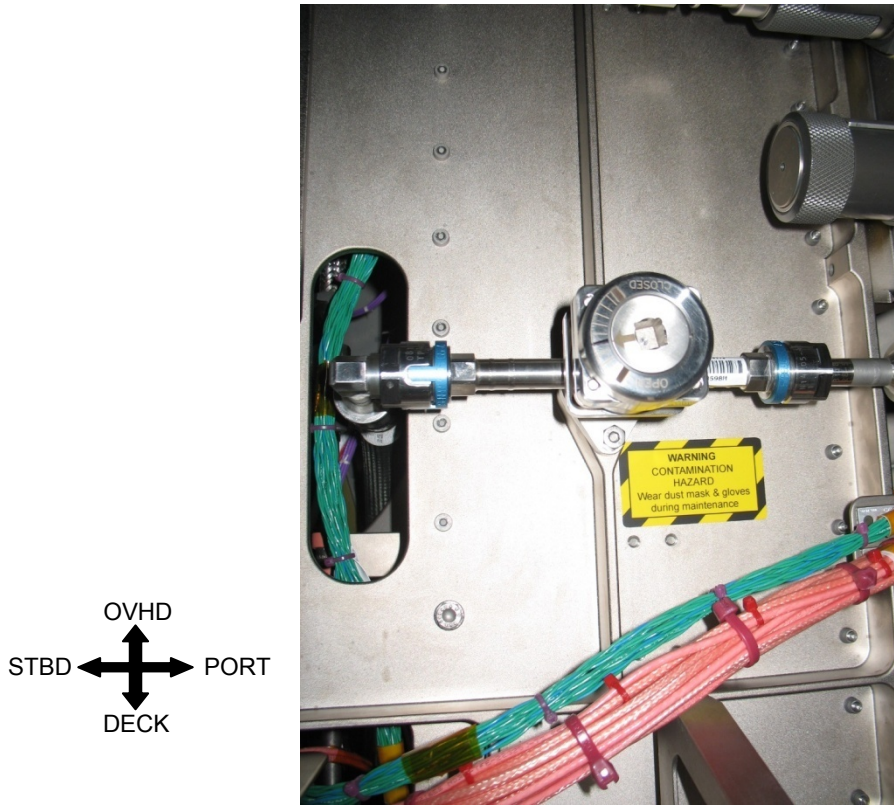


Figure 12.- N3-HTL/MTL-CUP/N1-MFCV (looking Aft).

CAUTION

When rotating the Manual Flow Control Valve (MFCV), rotate no faster than one tick mark every 15 seconds. If the MFCV is moved too quickly, ITCS FDIR software will automatically reduce the speed to the LTL and MTL pumps. Reduction in the pump speed protects the System Flow Control Assembly (SFCA) delta pressure sensor from damage.

18.2 Rotate N3-HTL/MTL-CUP/N1-MFCV ↻ Closed by incrementing one tick mark every 15 seconds (Ratchet, 3/8" Drive; 4" Ext, 3/8" Drive).

Refer to Figure 12.

18.3 Install Closeout Panel NOD3A6-52, fasteners (four) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).

19. SAFING FSS (IF REQUIRED)

19.1 sw FSS MAIN POWER → OFF

19.2 Verifying FSS Power and Valve Positions

- √sw FSS MAIN POWER - OFF
- √MODE SELECTION VALVE - INACT
- √MV1 - BYPASS
- √MV2 - CLOSE
- √MV3 - DF1/SUPPLY

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19.3 Gamah Cap →|← AIR EXIT on FCPA, hand tighten
Refer to Figures 1 and 2.

PCS

19.4 Closing VRIV
Node 3: ECLSS: PCA
Node 3 ACS
'Pressure Control Assembly'

sel VRIV (Icon)

Node 3 PCA VRIV
'Close'

cmd Close (Verify Position – Closed)

19.5 Enabling Positive Pressure Relief (PPR)
Node 3: ECLSS: PCA: PCA Commands
Node 3 PCA Commands
'Positive Press Relief'
'Enable'

cmd Enable (Verify Positive Pressure Relief State – Enabled)

MCC-H

19.6 Enabling Node 3 PPR Failure Caution
C&W Summ
Caution & Warning Summary
'Event Code Tools'

sel Enable

Enable an Event

input Event Code – 1 7 0 5 3 ('Positive P Relief Failure - Node 3')

cmd Execute

19.7 ISS ↓ **MCC-H**, "FSS safing complete."

20. RECONFIGURING FOR FSS OPS (IF REQUIRED)

FCPA

20.1 Verifying FSS Power and Valve Positions

√sw FSS MAIN POWER	- OFF
√MODE SELECTION VALVE	- INACT
√MV1	- BYPASS
√MV2	- CLOSE
√MV3	- DF1/SUPPLY

20.2 Gamah Cap ←|→ AIR EXIT on FCPA
Refer to Figures 1 and 2.

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MCC-H

20.3 Suppressing Node 3 PPR Failure Caution C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Suppress

Suppress Annunciation of an Event

input Event Code – 1 7 0 5 3 ('**Positive P Relief Failure - Node 3**')
cmd Arm
cmd Execute

NOTE

The following Caution message will be received after PPR is inhibited: '**Positive P Relief Failure - Node 3**'

No action required. This message will return to normal once PPR is re-enabled.

PCS

20.4 Disabling Positive Pressure Relief Node 3: ECLSS: PCA: PCA Commands

Node 3 PCA Commands

'PCA'

Verify State – Monitor

'Positive Pressure Relief'

'Inhibit'

cmd Arm (Verify Status – Armed)

cmd Inhibit (Verify Positive Pressure Relief Status – Inhibited)

20.5 Opening Vacuum Relief Isolation Valve (VRIV)

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV (Icon)

Node 3 PCA VRIV

'Open'

cmd Arm (Verify Status – Armed)

cmd Open (Verify Position – Open)

20.6 sw FSS MAIN POWER → ON

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21. CONFIGURING PWR FOR DRAINING FSS AND FSS JUMPERS

NOTE
Refer to Figure 13 for step 21.

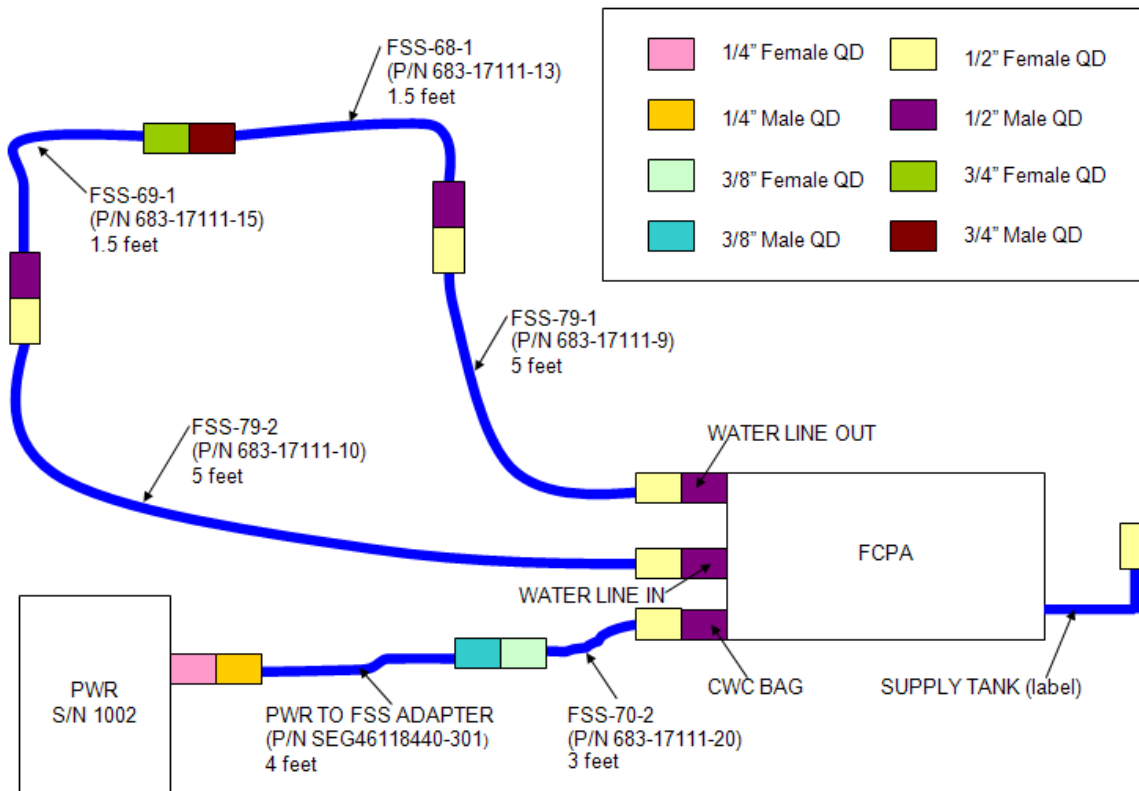


Figure 13.- FSS and FSS Jumper Drain and Purge Configuration.

- FCPA
- 21.1 FSS-68-1 →|← FSS-69-1
 - 21.2 FSS-64-2 ←|→ SUPPLY TANK on FCPA
FSS-64-2 ←|→ PWR TO FSS ADAPTER
PWR S/N 1034 ←|→ PWR TO FSS ADAPTER
 - 21.3 FSS-70-2 →|← CWC BAG on FCPA
PWR TO FSS ADAPTER →|← FSS-70-2
PWR TO FSS ADAPTER →|← PWR S/N 1002
 - 21.4 √FSS jumpers configured per Figure 13

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22. DRAINING FSS AND FSS JUMPERS

CAUTION
1. While in DRAIN, FILL, RECIRC mode (FSS Pump is on), PG1 (Pump Outlet Pressure) must be monitored to ensure FSS and ITCS lines do not become overpressurized.
2. PWR S/N 1002 must be monitored to avoid overfilling during DRAIN operations. If PWR S/N 1002 appears to approach the full point, MODE SELECTION VALVE should be rotated to INACT.

22.1 MV2 → OPEN

22.2 MODE SELECTION VALVE ↻ DRAIN (FCPA pump will turn ON)

22.3 Drain until PG-1 is in yellow range for 1 minute.

```
*****
* If PWR S/N 1002 appears to be approaching full
* | MODE SELECTION VALVE ↻ INACT
* |
* | √MCC-H for further instructions
* |
* If PG1 pressure > 40 psig
* | sw FSS MAIN POWER → OFF
* |
* | √MCC-H for further instructions
*****
```

22.4 MV2 → CLOSE

Drain for an additional 2 minutes.

23. PURGING FSS AND FSS JUMPERS

23.1 MODE SELECTION VALVE ↻ PURGE/FILL
(FCPA pump will turn OFF)

23.2 MV2 → OPEN

23.3 Purge until PG-1 is in blue arc for 30 seconds.
This action should take less than 10 minutes.

Record PG1 pressure: _____ in Hg

Record PG2 pressure: _____ in Hg

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```
*****
* If blue arc is not reached for 30 seconds within 10 minutes
* | MODE SELECTION VALVE ↻ INACT, then:
* |
* | MODE SELECTION VALVE ↻ DRAIN
* |
* | Drain until PG-1 is in yellow range for 30 seconds.
* |
* | If PWR S/N 1002 appears to be approaching full
* | | MODE SELECTION VALVE ↻ INACT
* | |
* | | √MCC-H for further instructions
* |
* | MV2 → CLOSE
* |
* | Drain an additional 2 minutes.
* |
* | If PWR S/N 1002 appears to be approaching full
* | | MODE SELECTION VALVE ↻ INACT
* | |
* | | √MCC-H for further instructions
* |
* | MODE SELECTION VALVE ↻ INACT
* |
* | Restart procedure from step 23.1.
* | Notify MCC-H.
*****
```

23.4 MV2 → CLOSE

23.5 MODE SELECTION VALVE ↻ INACT

24. DISCONNECTING FSS JUMPERS

24.1 Disconnecting FSS Jumpers

FSS-68-1 ←|→ FSS-69-1

FSS-68-1 ←|→ FSS-79-1

FSS-69-1 ←|→ FSS-79-2

FSS-79-1 ←|→ WATER LINE OUT on FCPA

FSS-79-2 ←|→ WATER LINE IN on FCPA

24.2 Disconnecting PWR

FSS-70-2 ←|→ CWC BAG QD on FCPA

FSS-70-2 ←|→ PWR TO FSS ADAPTER

PWR TO FSS ADAPTER ←|→ PWR S/N 1002

25. REMOVING NODE 1 PORT ALCOVE CLOSEOUT PANEL

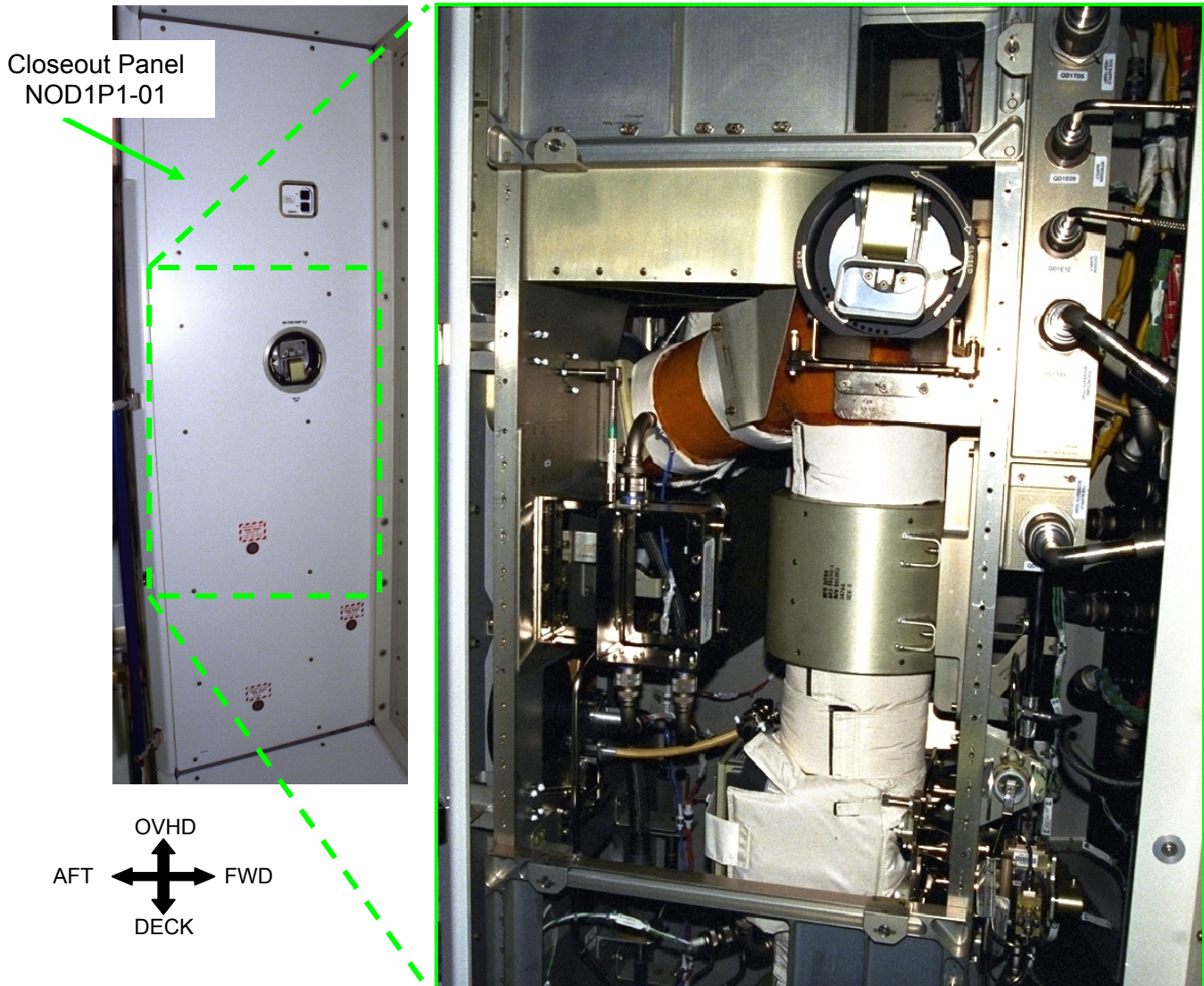


Figure 14.- Node 1 Port Alcove.

- NOD1P1
- 25.1 Remove Closeout Panel NOD1P1-01, fasteners (twelve) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive). Refer to Figure 14.
 - 25.2 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).

Verify CSA-O2 sampling from both units are within 1.1 % of each other.
 - 25.3 Perform CSA-O2 sampling in area where Closeout Panel was removed for 1 minute.
If O2 % is between 16.5 to 23.3 %, proceed.

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26. CONFIGURING FSS AND JUMPERS FOR NODE 3/NODE 1 FILL

NOTE

FCPA should be relocated near Node 3 Starboard Endcone. FSS-72-1 and FSS-72-2 (each 20 feet long) jumpers will reach across Node 3/Node 1 hatchway to QDs behind Closeout Panel NOD1P1-01.

NOD3

26.1 Relocate FSS FCPA to Node 3 Starboard Endcone.

NOTE

1. Refer to Figures 14 and 15 for step 26.
2. PWR S/N 1035 and associated jumpers shown in Figure 15 will not be connected until step 28.

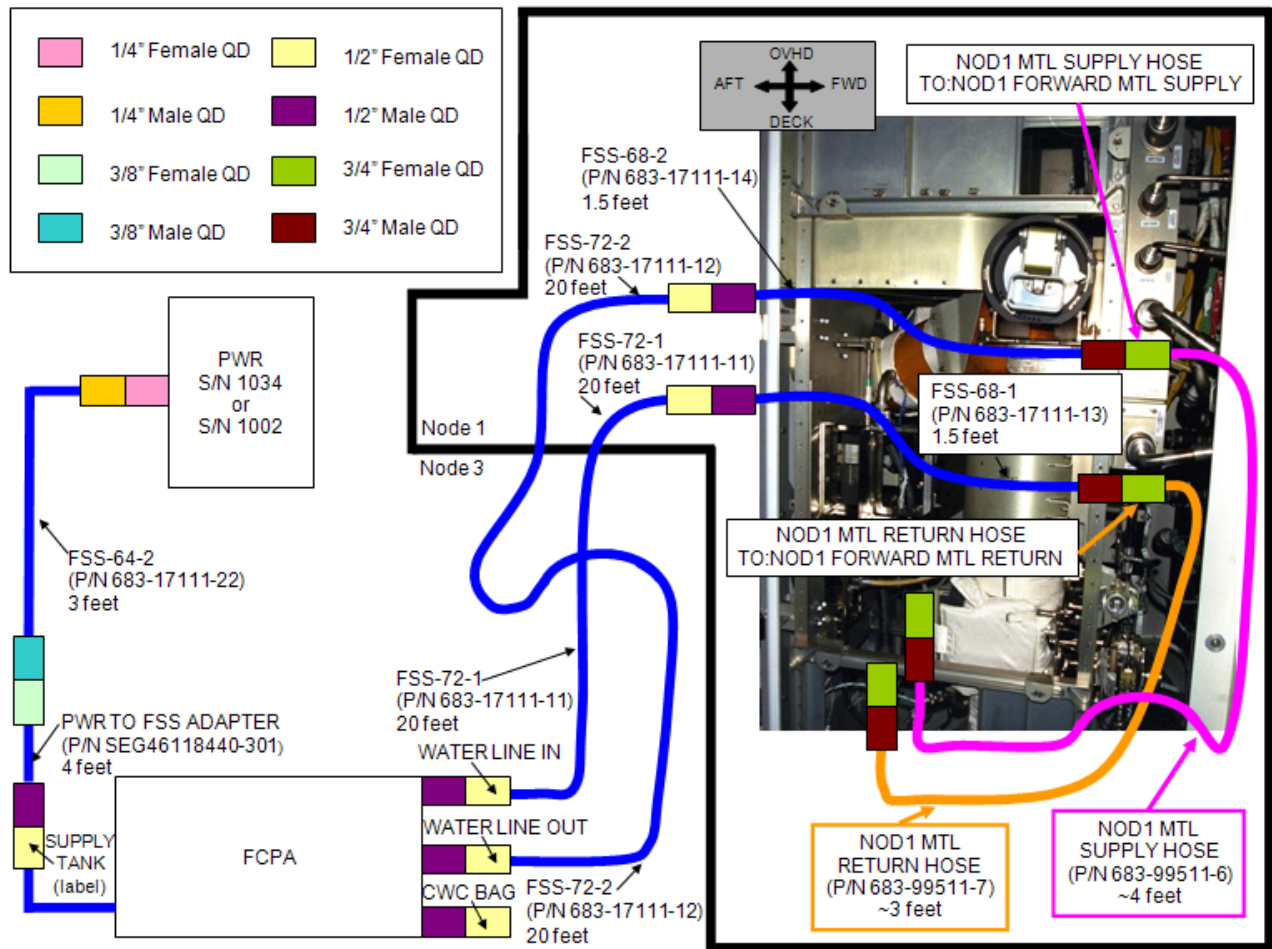


Figure 15.- FSS Jumpers Connected to Node 1 Mod Kit MTL Jumpers Routed in Node 1 Port Alcove (looking Port).

FCPA

26.2 FSS-72-1 →|← WATER LINE IN on FCPA
 FSS-72-2 →|← WATER LINE OUT on FCPA

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NOD1P1 26.3 FSS-68-1 →|← FSS-72-1
3/4" QD Plug ←|→ TO: NOD1 FORWARD MTL RETURN on NOD1
MTL RETURN HOSE
FSS-68-1 →|← TO: NOD1 FORWARD MTL RETURN on NOD1
MTL RETURN HOSE

26.4 FSS-68-2 →|← FSS-72-2
3/4" QD Plug ←|→ TO: NOD1 FORWARD MTL SUPPLY on NOD1
MTL SUPPLY HOSE
FSS-68-2 →|← TO: NOD1 FORWARD MTL SUPPLY on NOD1
MTL SUPPLY HOSE

26.5 Temporarily stow 3/4" QD Plugs (two).

27. PURGING NODE 3/NODE 1 ITCS MTL LINES

FCPA 27.1 MODE SELECTION VALVE ↶ PURGE/FILL

27.2 MV2 → OPEN

27.3 Purge until PG-1 is in blue arc for 30 seconds.
This action should take less than 15 minutes.

Record PG1 pressure: _____ in Hg

Record PG2 pressure: _____ in Hg

* If blue arc is not reached for 30 seconds within 15 minutes
* MODE SELECTION VALVE ↶ INACT, then:

*

* MODE SELECTION VALVE ↶ DRAIN

*

* Drain until PG-1 is in yellow range for 30 seconds.

*

* MV2 → CLOSE

*

* Drain an additional 2 minutes.

*

* MODE SELECTION VALVE ↶ INACT

*

* Restart procedure from step 27.1.

*

* Notify **MCC-H**.

27.4 MV2 → CLOSE

27.5 MODE SELECTION VALVE ↶ INACT

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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28. CONNECTING PAYLOAD WATER RESERVOIR (PWR)

28.1 FSS-64-2 →|← SUPPLY TANK on FCPA
FSS-64-2 →|← PWR TO FSS ADAPTER

28.2 PWR TO FSS ADAPTER →|← PWR S/N 1034
Refer to Figure 15.

29. FILLING AND RECIRCULATING NODE 3/NODE 1 ITCS MTL LINES

CAUTION
While in DRAIN, FILL, RECIRC mode (FSS Pump is on), PG1 (Pump Outlet Pressure) must be monitored to ensure FSS and ITCS lines do not become overpressurized.

29.1 MODE SELECTION VALVE ↻ PURGE/FILL

29.2 MV2 → OPEN

29.3 MV1 → FILL (FCPA pump will turn ON)

* If PG1 pressure > 40 psig
* | sw FSS MAIN POWER → OFF
* |
* | √MCC-H for further instructions

* If PWR S/N 1034 appears empty
* | MV1 → BYPASS (FCPA pump will turn OFF)
* |
* | MODE SELECTION VALVE ↻ to INACT
* |
* | Notify MCC-H.
* |
* | PWR TO FSS ADAPTER ←|→ PWR S/N 1034
* | PWR TO FSS ADAPTER →|← PWR S/N 1002
* |
* | MODE SELECTION VALVE ↻ PURGE/FILL
* |
* | MV1 → FILL (FCPA pump will turn ON)

Wait 10 minutes.

Record PG1 pressure: _____ psig
Record PG2 pressure: _____ psig

29.4 MV1 → BYPASS (FCPA pump will turn OFF)

29.5 MODE SELECTION VALVE ↻ RECIRC (FCPA pump will turn ON)

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```
*****  
* If PG1 pressure > 40 psig  
* | sw FSS MAIN POWER → OFF  
* |  
* | √MCC-H for further instructions  
*****
```

Recirculate for 5 minutes.

Record PG1 pressure: _____ psig

Record PG2 pressure: _____ psig

29.6 MODE SELECTION VALVE ↺ INACT (FCPA pump will turn OFF)

29.7 MV2 → CLOSE

29.8 Notify **MCC-H** of quantity of coolant remaining in PWR S/N 1034, 1002.

30. DISCONNECTING FSS FROM NODE 1 MOD KIT TCS JUMPERS

NOD1P1 30.1 FSS-68-1 ←|→ TO: NOD1 FORWARD MTL RETURN on NOD1 MTL RETURN HOSE

3/4" QD Plug (from step 26.5) →|← TO: NOD1 FORWARD MTL RETURN on NOD1 MTL RETURN HOSE

30.2 FSS-68-2 ←|→ TO: NOD1 FORWARD MTL SUPPLY on NOD1 MTL SUPPLY HOSE

3/4" QD Plug (from step 26.5) →|← TO: NOD1 FORWARD MTL SUPPLY on NOD1 MTL SUPPLY HOSE

31. REMOVING NODE 3 STARBOARD ENDCONE CLOSEOUT PANELS



Figure 16.- Node 3 Starboard Endcone Deck Closeout Panels (looking Starboard).

NOD3D6 31.1 Remove NOD3D6-52 Closeout Panel, fasteners (two) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive). Refer to Figure 16.

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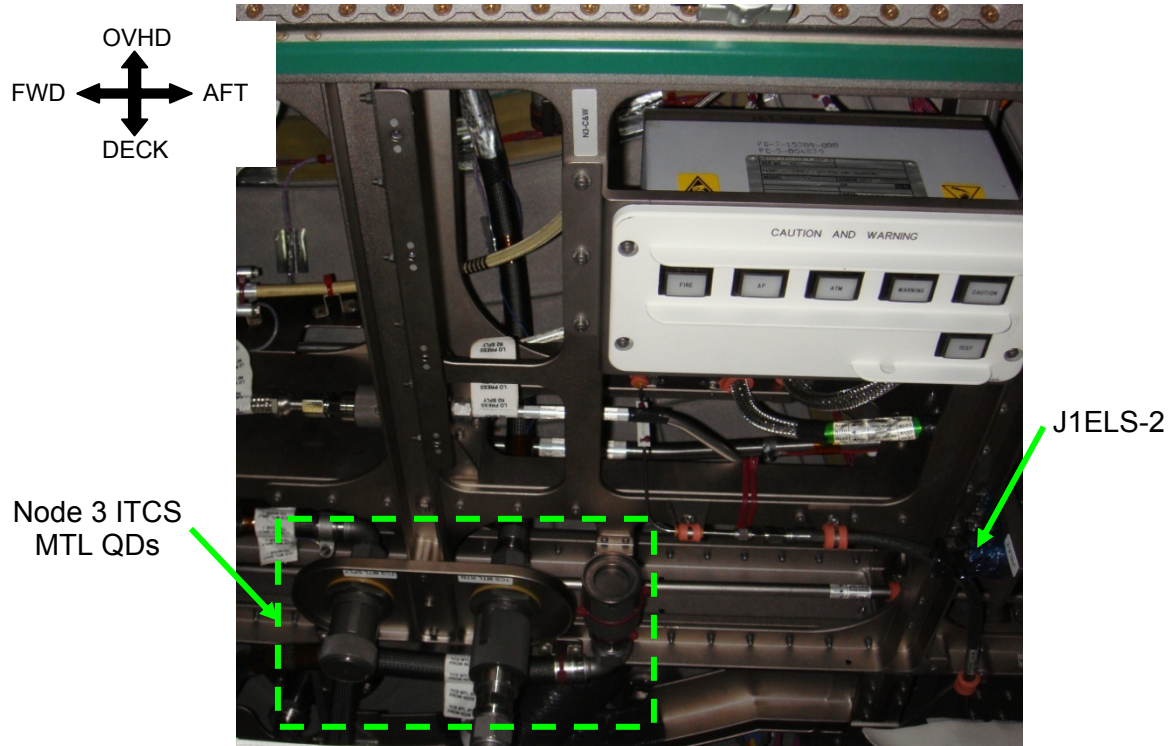


Figure 17.- Node 3 Deck Starboard Endcone (looking Deck Starboard).

31.2 EELS Power Cable ←|→ J1EELS-2
Refer to Figure 17.

31.3 Remove NOD3D6-51 Closeout Panel, fasteners (ten) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
Refer to Figure 16.

31.4 Record CSA-O2 sampling in open cabin: _____ % (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____ % (second CSA-O2).

Verify CSA-O2 sampling from both units are within 1.1 % of each other.

31.5 Perform CSA-O2 sampling in area where Closeout Panel was removed for 1 minute.
If O2 % is between 16.5 to 23.3 %, proceed.

32. RECONFIGURING NODE 3 ITCS MTL QDS

32.1 √ **MCC-H** to verify Node 3 MTL Stbd RFCA closed

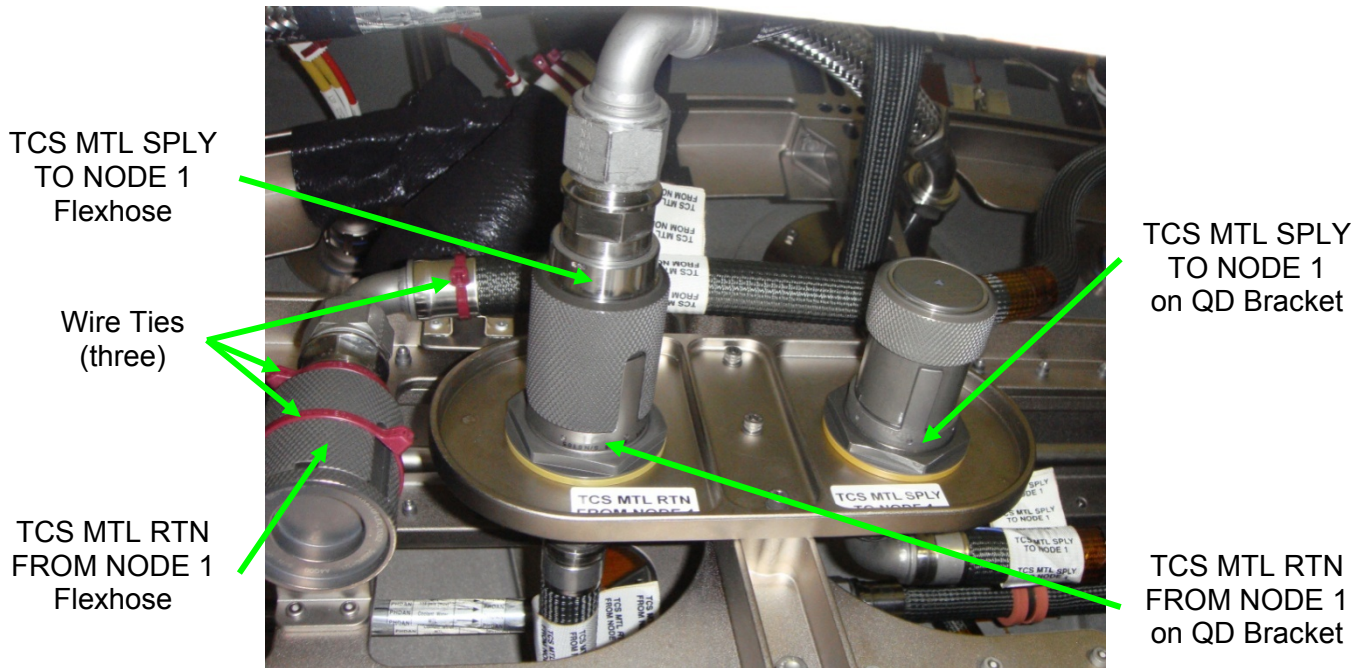


Figure 18.- Node 3 ITCS MTL QDs.

32.2 **On MCC-H GO**

3/4" QD Cap ←|→ TCS MTL SPLY TO NODE 1 on QD Bracket
 TCS MTL SPLY TO NODE 1 Flexhose ←|→ TCS MTL RTN FROM
 NODE 1 on QD Bracket
 TCS MTL SPLY TO CUPOLA Flexhose →|← TCS MTL SPLY TO
 CUPOLA on QD Bracket
 Refer to Figures 17 and 18.

32.3 Cut Wire Ties (three) securing TCS MTL RTN FROM NODE 1
 Flexhose to structure (Wire Cutters).
 Refer to Figure 18.

32.4 3/4" QD Plug ←|→ TCS MTL RTN FROM NODE 1 Flexhose
 TCS MTL RTN FROM NODE 1 Flexhose →|← TCS MTL RTN
 FROM NODE 1 on QD Bracket
 Refer to Figures 17 and 18.

32.5 3/4" QD Cap (from step 32.2) →|← 3/4" QD Plug (from step 32.4)

32.6 ISS ↓ **MCC-H**, "Node 3 ITCS QD reconfiguration complete."

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33. RECONFIGURING NODE 1/AIRLOCK FROM LAB TO NODE 3

33.1 Retrieve 3/4" QD Plugs (two) removed earlier in procedure.

NOTE

1. Cooling will be lost to the hardware in the Node 1 and Airlock when Node 1 MTL Rack Flow Control Assembly (RFCA) closed in step 33.2. Cooling is restored after the completion of step 33.6.
2. Refer to Figures 15 and 19 for step 33.

33.2 ISS ↓ **MCC-H**, "Ready to close Node 1 MTL RFCA."

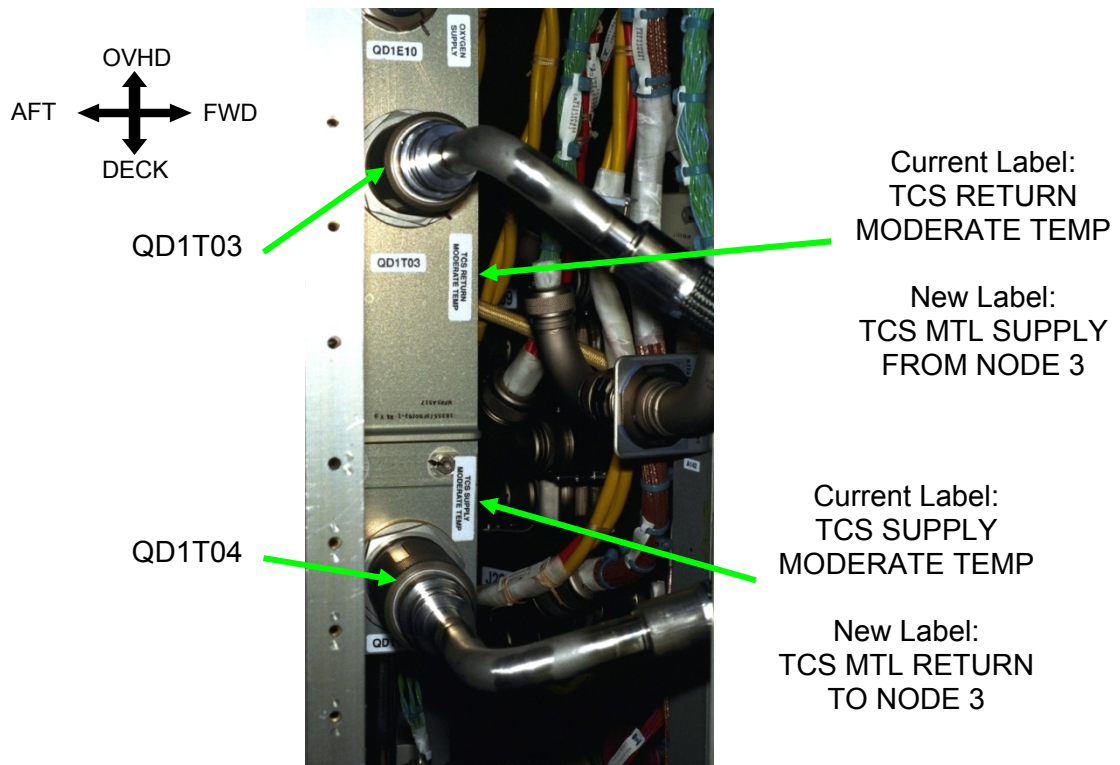


Figure 19.- Node 1 ITCS MTL QDs in Node 1 Port Alcove.

CAUTION

Both Flexhoses must be demated from QD1T03 and QD1T04 prior to mating NOD1 MTL SUPPLY HOSE and NOD1 MTL RETURN HOSE to prevent cross-strapping Node 3 and LAB.

NOD1P1

33.3 On MCC-H GO

3/4" QD Plug ←|→ TO: NOD1 FORWARD MTL SUPPLY on NOD1 MTL SUPPLY HOSE

Flexhose ←|→ QD1T03

3/4" QD Plug →|← Flexhose

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- 33.4 3/4" QD Plug ←|→ TO: NOD1 FORWARD MTL RETURN on NOD1
MTL RETURN HOSE →|← QD1T04
Flexhose ←|→ QD1T04
3/4" QD Plug →|← Flexhose
- 33.5 TO: NOD1 FORWARD MTL SUPPLY on NOD1 MTL SUPPLY
HOSE →|← QD1T03
- 33.6 TO: NOD1 FORWARD MTL RETURN on NOD1 MTL RETURN
HOSE →|← QD1T04
- 33.7 ISS ↓ **MCC-H**: "Node 1 ITCS QD reconfiguration complete. Ready
to open Node 1 MTL RFCA and initiate Node 3 ITCS flow."
- 33.8 Secure disconnected Flexhoses (two) to structure.

NOTE

New labels were flown with 20A Vestibule Outfitting hardware.
If MTL Supply and MTL Return labels are not found, new
labels can be fabricated using the Label Maker.

- 33.9 Cover current TCS labels (Aluminum Tape).
Install new TCS MTL SUPPLY FROM NODE 3 (one) and TCS MTL
RETURN TO NODE 3 (one) labels.
Refer to Figure 19.
- 33.10 Photo document newly installed labels (Digital Camera).

34. RELABELING QD1T11 AND QD1T12 IN NODE 1 PORT ALCOVE

NOTE

During ULF-3, NOD1 MTL RETURN HOSE was mated to
QD1T11 and NOD1 MTL SUPPLY HOSE was mated to
QD1T12. Neither hose is installed in Figure 20.

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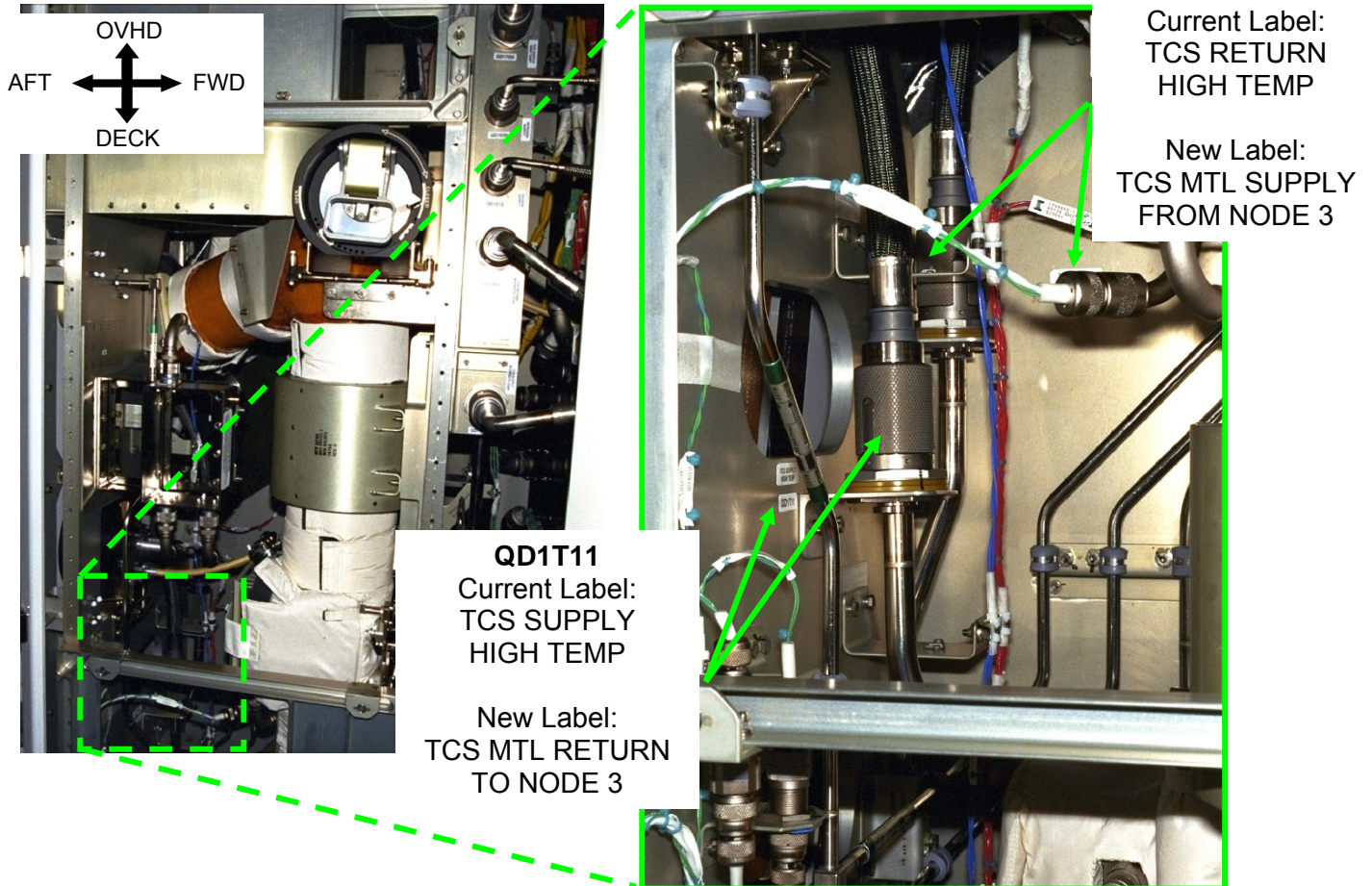


Figure 20.- QD1T11 and QD1T12 in Node 1 Port Alcove.

NOTE

New labels were flown with 20A Vestibule Outfitting hardware. If MTL Supply and MTL Return labels are not found, new labels can be fabricated using the Label Maker.

- NOD1P1 34.1 Cover current TCS labels (Aluminum Tape).
Install new TCS MTL SUPPLY FROM NODE 3 (one), TCS MTL RETURN TO NODE 3 (one) labels.
Refer to Figure 20.
- 34.2 Photo document newly installed labels (Digital Camera).
35. INSTALLING NODE 1 PORT ALCOVE CLOSEOUT PANEL
35.1 Install Closeout Panel NOD1P1-01, fasteners (twelve) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- NOD3D6 36. INSTALLING NODE 3 STARBOARD ENDCONE CLOSEOUT PANELS
36.1 Install NOD3D6-51 Closeout Panel, fasteners (ten) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
Refer to Figure 16.

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- 36.2 EELS Power Cable →|← J1ELS-2
Refer to Figure 17.
- 32.3 Install NOD3D6-52 Closeout Panel, fasteners (two) (Ratchet,
3/8" Drive; 5/32" Hex Head, 3/8" Drive).
Refer to Figure 16.

37. SAFING FSS (IF REQUIRED)

- 37.1 sw FSS MAIN POWER → OFF

37.2 Verifying FSS Power and Valve Positions:

- √sw FSS MAIN POWER - OFF
- √MODE SELECTION VALVE - INACT
- √MV1 - BYPASS
- √MV2 - CLOSE
- √MV3 - DF1/SUPPLY

- 37.3 Gamah Cap →|← AIR EXIT on FCPA, hand tighten.
Refer to Figures 1 and 2.

PCS

37.4 Closing VRIV

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV (Icon)

Node 3 PCA VRIV

'Close'

cmd Close (Verify Position – Closed)

37.5 Enabling Positive Pressure Relief (PPR)

Node 3: ECLSS: PCA: PCA Commands

Node 3 PCA Commands

'Positive Press Relief'

'Enable'

cmd Enable (Verify Positive Pressure Relief State – Enabled)

MCC-H

37.6 Enabling Node 3 PPR Failure Caution

C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Enable

Enable an Event

input Event Code – 1 7 0 5 3 ('Positive P Relief Failure - Node 3')

cmd Execute

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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- NOD3F0 37.7 Disconnecting from Node 3 Vacuum Access Port:
VAJ-83-1 35 ft ←|→ PCA Vacuum Access Port
Verify Gamah Cap seal free from FOD, damage.
Gamah Cap →|← VAJ-83-1 35 ft
- 37.8 Verify PCA Vacuum Access Port Gamah Cap seal free from FOD, damage.
Gamah Cap →|← PCA Vacuum Access Port
- 37.9 Install Closeout Panel NOD3F0-03, fasteners (thirteen) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- 37.10 Install Closeout Panel NOD3F0-02, fasteners (four) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- 37.11 ISS ↓ **MCC-H**, "FSS safing complete."

38. RECONFIGURING FOR FSS OPS (IF REQUIRED)

- FCPA 38.1 Verifying FSS Power and Valve Positions:
√sw FSS MAIN POWER - OFF
√MODE SELECTION VALVE - INACT
√MV1 - BYPASS
√MV2 - CLOSE
√MV3 - DF1/SUPPLY

- 38.2 Gamah Cap ←|→ AIR EXIT on FCPA
Refer to Figures 1 and 2.

- PCS 38.3 Verifying Vent and Relief Isolation Valve (VRIV), Vent and Relief Control Valve (VRCV) Closed

Node 3: ECLSS: PCA

'Pressure Control Assembly'

sel VRCV (Icon)

Verify Position – Closed

Node 3: ECLSS: PCA

'Pressure Control Assembly'

sel VRIV (Icon)

Verify Position – Closed

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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- NOD3F0 38.4 Remove Closeout Panel NOD3F0-03, fasteners (thirteen) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- 38.5 Remove Closeout Panel NOD3F0-02, fasteners (four) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- 38.6 Gamah Cap ←|→ PCA Vacuum Access Port
Temporarily stow Gamah Cap.
- 38.7 Verify VAJ seal free from damage, debris on bent end of VAJ-83-1 35 ft.
- 38.8 VAJ-83-1 35 ft (bent end) →|← PCA Vacuum Access Port, hand tighten
Restrain VAJ-83-1 35 ft per crew preference.

MCC-H

- 38.9 Suppressing Node 3 PPR Failure Caution
C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Suppress

Suppress Annunciation of an Event

input Event Code – 1 7 0 5 3 ('Positive P Relief Failure - Node 3')

cmd Arm

cmd Execute

NOTE

The following Caution message will be received after PPR is inhibited: '**Positive P Relief Failure - Node 3**'

No action required. This message will return to normal once PPR is re-enabled.

PCS

- 38.10 Disabling Positive Pressure Relief
Node 3: ECLSS: PCA: PCA Commands

Node 3 PCA Commands

'PCA'

Verify State – Monitor

'Positive Pressure Relief'

'Inhibit'

cmd Arm (Verify Status – Armed)

cmd Inhibit (Verify Positive Pressure Relief Status – Inhibited)

38.11 Opening Vacuum Relief Isolation Valve (VRIV)

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV (Icon)

Node 3 PCA VRIV

'Open'

cmd Arm (Verify Status – Armed)

cmd Open (Verify Position – Open)

38.12 sw FSS MAIN POWER → ON

39. CONFIGURING PWR FOR DRAINING FSS AND FSS JUMPERS

NOTE
 Refer to Figure 21 for step 39.

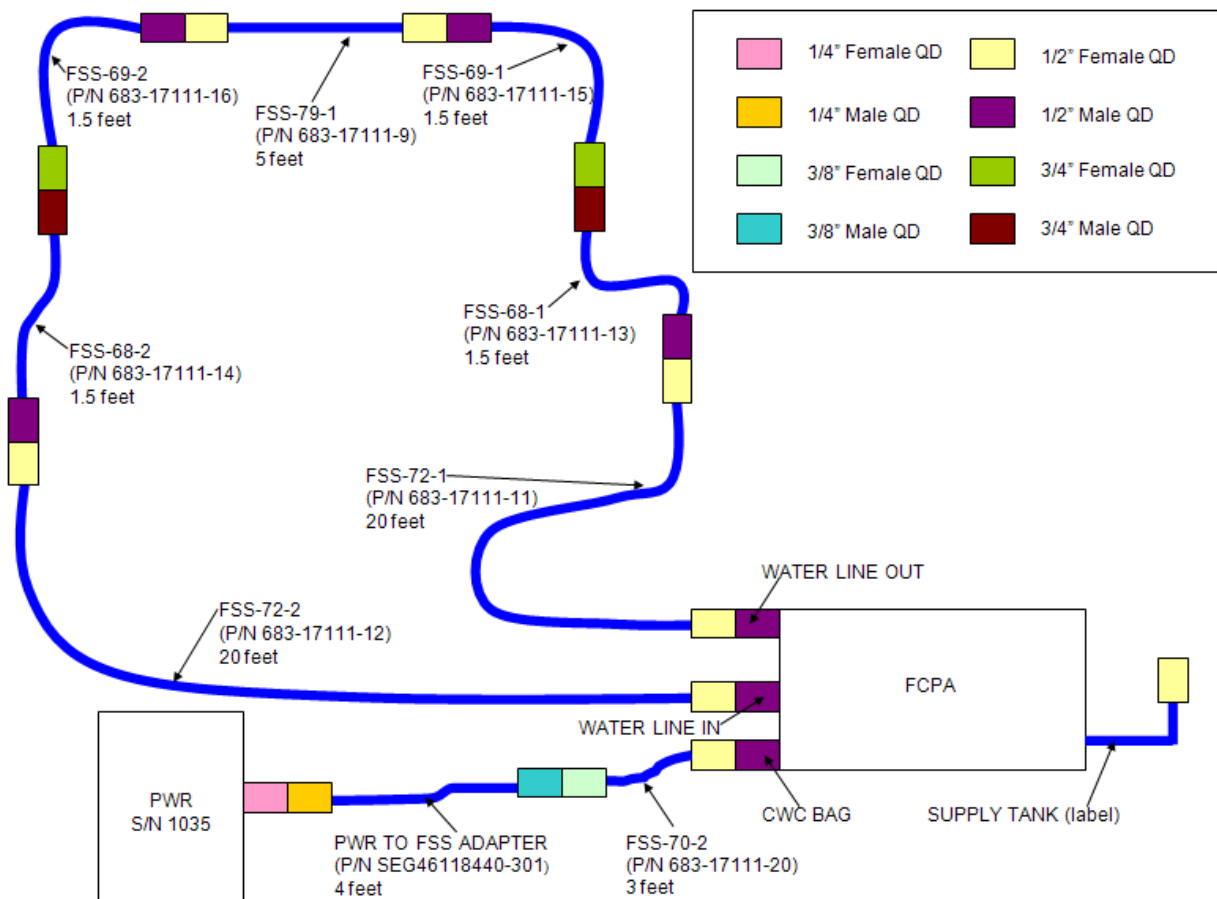


Figure 21.- FSS and FSS Jumper Drain and Purge Setup.

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

(ASSY OPS/20A/FIN)

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- FCPA
- 39.1 FSS-64-2 ←|→ SUPPLY TANK on FCPA
FSS-64-2 ←|→ PWR TO FSS ADAPTER
PWR S/N 1034 or 1002 ←|→ PWR TO FSS ADAPTER
 - 39.2 If required, label FSS-64-2, "WET" (Gray Tape, Sharpie).
 - 39.3 FSS-70-2 →|← CWC BAG on FCPA
PWR TO FSS ADAPTER →|← FSS-70-2
PWR TO FSS ADAPTER →|← PWR S/N 1035
 - 39.4 √FSS-72-1 →|← WATER LINE OUT

FSS-68-1 →|← FSS-72-1
FSS-68-1 →|← FSS-69-1
FSS-79-1 →|← FSS-69-1
FSS-79-1 →|← FSS-69-2
FSS-68-2 →|← FSS-69-2
FSS-68-2 →|← FSS-72-2

√FSS-72-2 →|← WATER LINE IN

40. DRAINING FSS AND FSS JUMPERS

CAUTION
1. While in DRAIN, FILL, RECIRC mode (FSS Pump is on), PG1 (Pump Outlet Pressure) must be monitored to ensure FSS and ITCS lines do not become overpressurized.
2. PWR S/N 1035 must be monitored to avoid overfilling during DRAIN operations. If PWR S/N 1035 appears to approach the full point, MODE SELECTION VALVE should be rotated to INACT.

- 40.1 MV2 → OPEN
- 40.2 MODE SELECTION VALVE ↻ DRAIN (FCPA pump will turn ON)
- 40.3 Drain until PG-1 is in yellow range for 1 minute.

```
*****
* If PWR S/N 1035 appears to be approaching full
* | MODE SELECTION VALVE ↻ INACT
* |
* | √MCC-H for further instructions
* |
* If PG1 pressure > 40 psig
* | sw FSS MAIN POWER → OFF
* |
* | √MCC-H for further instructions
*****
```


1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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40.4 MV2 → CLOSE
Drain for an additional 2 minutes.

41. PURGING FSS AND FSS JUMPERS FOR STOWAGE

41.1 MODE SELECTION VALVE ↺ PURGE/FILL
(FCPA pump will turn OFF)

41.2 MV2 → OPEN

41.3 Purge until PG-1 is in blue arc for 30 seconds.
This action should take less than 20 minutes.

Record PG1 pressure: _____ in Hg

Record PG2 pressure: _____ in Hg

* If blue arc is not reached for 30 seconds within 20 minutes

* | MODE SELECTION VALVE ↺ INACT, then:

* |

* | MODE SELECTION VALVE ↺ DRAIN

* |

* | Drain until PG-1 is in yellow range for 30 seconds.

* |

* | If PWR S/N 1035 appears to be approaching full

* | | MODE SELECTION VALVE ↺ INACT

* | |

* | | √**MCC-H** for further instructions

* | |

* | | MV2 → CLOSE

* | |

* | | Drain an additional 2 minutes.

* | |

* | | If PWR S/N 1035 appears to be approaching full

* | | | MODE SELECTION VALVE ↺ INACT

* | | |

* | | | √**MCC-H** for further instructions

* | | |

* | | | MODE SELECTION VALVE ↺ INACT

* | | |

* | | | Restart procedure from step 41.1.

* | | | Notify **MCC-H**.

41.4 MV2 → CLOSE

41.5 MODE SELECTION VALVE ↺ INACT

41.6 Gamah Cap →|← AIR EXIT on FCPA, hand tighten

41.7 sw FSS MAIN POWER → OFF


1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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42. DEAMATING POWER CABLES

NOD3
UOP2
(NOD3A6)

42.1  POWER OUT – RESET (illuminated)

√FAULT/TEST – not illuminated

42.2 Disconnecting Power Cables

PS-120 CABLE (P2) TO 120 VDC LOAD on PS-120 Cable ←|→
J201 on FCPA

P2 TO 120 VDC POWER PLUG on PEEK, 120 VDC 12 AMP 20'


Extension Cable ←|→ PS-120 CABLE (P1) TO 120 VDC POWER
OR 1553 DATA SOURCE on PS-120 Cable

P1 TO 120 VDC POWER RCPT on PEEK, 120 VDC 12 AMP 20'

Extension Cable ←|→ NOD3 UOP2 J4

NOD3
UOP2
(NOD3A6)

42.3  POWER OUT –  (green ENABLE)

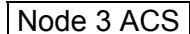
√FAULT/TEST –  (green OK)

43. DISCONNECTING FROM VACUUM SOURCE

PCS

43.1 Closing VRIV

Node 3: ECLSS: PCA



'Pressure Control Assembly'

sel VRIV (Icon)



'Close'

cmd Close (Verify Position – Closed)

43.2 Enabling Positive Pressure Relief (PPR)

Node 3: ECLSS: PCA: PCA Commands



'Positive Press Relief'

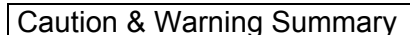
'Enable'

cmd Enable (Verify Positive Pressure Relief State – Enabled)

MCC-H

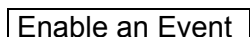
43.3 Enabling Node 3 PPR Failure Caution

C&W Summ



'Event Code Tools'

sel Enable



input Event Code – 1 7 0 5 3 ('Positive P Relief Failure - Node 3')

cmd Execute

1.140 CUPOLA AND NODE 3/NODE 1 ITCS FILL USING FSS

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- FCPA 43.4 VAJ-83-1 35 ft (straight end) ←|→ VAJ CONNECTION on FCPA
- NOD3F0 43.5 Disconnecting from Node 3 Vacuum Access Port
VAJ-83-1 35 ft ←|→ PCA Vacuum Access Port
Verify Gamah Cap seal free from FOD, damage.
Gamah Cap →|← VAJ-83-1 35 ft
- 43.6 Verify PCA Vacuum Access Port Gamah Cap seal free from FOD, damage.
Gamah Cap →|← PCA Vacuum Access Port
- 43.7 Gamah Cap →|← VAJ-83-1 35 ft (both ends)
Hand tighten.
- 43.8 Install Closeout Panel NOD3F0-03, fasteners (thirteen) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- 43.9 Install Closeout Panel NOD3F0-02, fasteners (four) (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- FCPA 44. DISCONNECTING AND STOWING FSS AND JUMPERS
- 44.1 Disconnecting All FSS Jumpers
FSS-72-1 ←|→ WATER LINE OUT
FSS-68-1 ←|→ FSS-72-1
FSS-68-1 ←|→ FSS-69-1
FSS-79-1 ←|→ FSS-69-1
FSS-79-1 ←|→ FSS-69-2
FSS-68-2 ←|→ FSS-69-2
FSS-68-2 ←|→ FSS-72-2
FSS-72-2 ←|→ WATER LINE IN
- 44.2 Disconnecting PWR
FSS-70-2 ←|→ CWC BAG QD on FCPA
FSS-70-2 ←|→ PWR TO FSS ADAPTER
PWR TO FSS ADAPTER ←|→ PWR S/N 1028
- Place Ziplock Bag over 1/4" QD on PWR TO FSS ADAPTER, secure with Kapton Tape.
- 44.3 If required, label FSS-70-2, "WET" (Gray Tape, Sharpie).
- 44.4 Notify **MCC-H** of the status of PWR S/N 1035, S/N 1034, S/N 1002.
- 44.5 Untether FCPA from Handrails.
- LAB1O6 44.6 Remove triangular restraint bracket.
Slide FCPA into LAB1O6 Rack.
Install triangular restraint bracket, and hand-tighten one bolt.

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- 44.7 Reinstall Beta Cloth Closeout FSS stowage area (Velcro).
- 44.8 Stow all FSS jumpers, VAJ-83-1 35 ft, and 3/4" QD Caps mated to 3/4" QD Plugs (two of each).
- 44.9 Remove Handrails and Adjustable Length Tether, then stow.
- 44.10 Check for FOD around work area within 1 m radius.
- 44.11 Notify **MCC-H** of task completion and all recorded values.

1.142 PREPARE NODE 3 FOR RACK INSTALLATION ON 20A

(ASSY OPS/20A/FIN)

Page 1 of 4 pages

OBJECTIVE:

Remove and Install Rack hardware in Node 3 to support installation of Racks transferred from the LAB.

LOCATION:

Node 3

DURATION:

35 minutes

NOD3A4 - 5 minutes

NOD3D5 - 10 minutes

NOD3D4 - 5 minutes

NOD3F4 - 10 minutes

NOD3A5 - 5 minutes

MATERIALS:

None

PARTS:

ARIS - Pivot Fitting Bottom Left P/N 683-61711-31

K-BAR Capture Fitting, Left P/N 683-62201-27

K-BAR Capture Fitting, Right P/N 683-62201-28

Knee Brace Assembly P/N 683-683-50249-4

TOOLS:

Digital Camera

ISS Toolbox

Drawer 2:

Ratchet, 1/4" Drive

Ratchet, 3/8" Drive

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

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

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

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

REFERENCED PROCEDURE(S):

None

NOD3A4 1. [PREPARING NOD3A4 FOR NODE 3 ARS RACK INSTALLATION](#)

Note

The Node 3 ARS Rack uses an "outside," right pivot fitting. This pivot fitting is currently installed at the JPM1F3 location with the Node 3 ARS Rack and will be installed as part of the Rack transfer procedure.

1.142 PREPARE NODE 3 FOR RACK INSTALLATION ON 20A

(ASSY OPS/20A/FIN)

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Remove ARIS - Pivot Fitting Bottom Right (P/N 683-61711-32), fastener (one) from NOD3A4 standoff (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).

Record S/N of ARIS - Pivot Fitting Bottom Right (P/N 683-61711-32):

NOD3D5 2. PREPARING NOD3D5 FOR WRS-1 RACK INSTALLATION

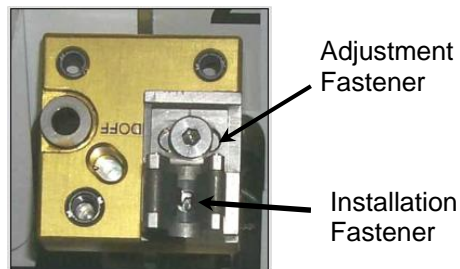


Figure 1.- K-BAR Capture Fitting Installation

2.1 Record K-BAR Capture Fitting, Left S/N: _____
Record K-BAR Capture Fitting, Right S/N: _____

2.2 Install K-BAR Capture Fitting, Left on NOD3AD5 standoff, Installation Fastener (Ratchet, 1/4" Drive, 5/32" Hex Head, 3/8" Drive). Refer to Figure 1.

* If unable to access Installation Fastener
* | Loosen Adjustment Fastener one turn (Ratchet, 1/4" Drive,
* | 5/32" Hex Head, 3/8" Drive).

2.3 Repeat step 2.2 for K-BAR Capture Fitting, Right.

2.4 Torque both K-BAR Capture Fittings, Left and Right Installation Fastener (one) to 37 in-lbs ((10-50 in-lbs) Trq Wrench, 1/4" Drive; 5/32" Hex Head, 3/8" Drive).

2.5 Record S/N of ARIS - Pivot Fitting Bottom Left (P/N 683-61711-31):

2.6 Install, torque ARIS - Pivot Fitting Bottom Left, fastener (one) to 150 in-lbs [Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive; (40-200 in-lbs) Trq Wench, 3/8" Drive].

1.142 PREPARE NODE 3 FOR RACK INSTALLATION ON 20A

(ASSY OPS/20A/FIN)

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NOD3D4 3. [PREPARING NOD3D4 FOR WRS-2 RACK INSTALLATION](#)

Note

The WRS-2 Rack uses an “outside,” right pivot fitting. This pivot fitting is currently installed at the LAB1D4 location with the WRS-2 Rack and will be installed as part of the Rack transfer procedure.

Remove ARIS - Pivot Fitting Bottom Right (P/N 683-61711-32), fastener (one) from NOD3A4 standoff (Ratchet, 3/8” Drive; 6” Long, 3/8” Hex Head, 3/8” Drive).

Record S/N of ARIS - Pivot Fitting Bottom Right (P/N 683-61711-32):

NOD3F4 4. [PREPARING NOD3F4 FOR WHC RACK INSTALLATION](#)

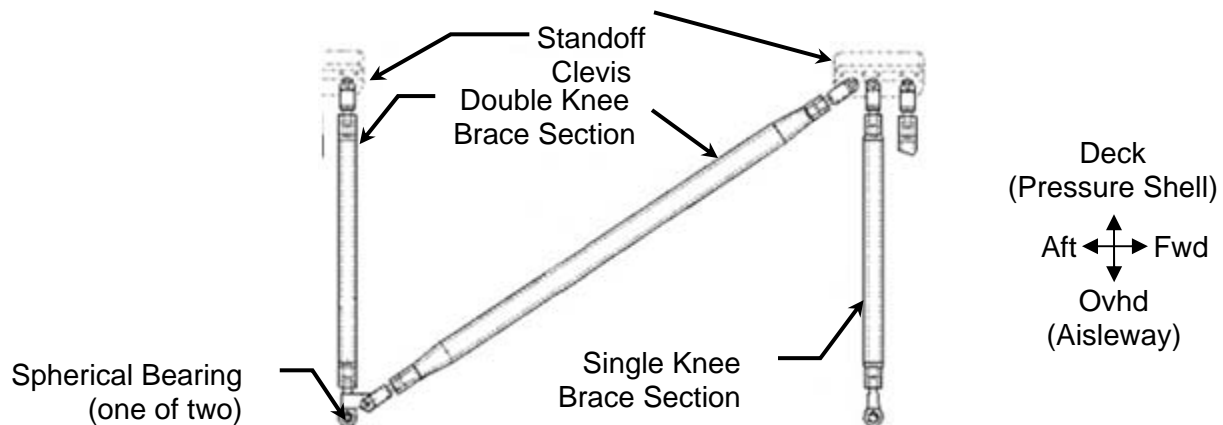


Figure 2.- NOD3F4 Knee Brace Installation.

4.1 Record Knee Brace S/N: _____

4.2 Install Knee Brace Assembly sections (P/N 683-50249-4) by engaging tethered PIP Pins (three) into Standoff Clevis. Refer to Figure 2.

NOD3A5 5. [PREPARING NOD3A5 FOR OGS RACK INSTALLATION](#)

Note

The OGS Rack uses an “outside,” right pivot fitting. This pivot fitting is currently installed at the LAB1P1 location with the OGS Rack and will be installed as part of the Rack transfer procedure.

Remove ARIS - Pivot Fitting Bottom Right (P/N 683-61711-32), fastener (one) from NOD3A4 standoff (Ratchet, 3/8” Drive; 6” Long, 3/8” Hex Head, 3/8” Drive).

Record S/N of ARIS - Pivot Fitting Bottom Right (P/N 683-61711-32):

1.142 PREPARE NODE 3 FOR RACK INSTALLATION ON 20A

(ASSY OPS/20A/FIN) Page 4 of 4 pages

6. CLOSEOUT

- 6.1 Photo document newly installed hardware (Digital Camera).
- 6.2 Check for FOD within 3 ft radius.
- 6.3 Stow tools.
Notify **MCC-H** of task completion, S/Ns of installed hardware.

Table 1.- Restow

Ops Nom	P/N	Qty
ARIS - Pivot Fitting Bottom Right	683-61711-32	3

1.144 NODE 3 AVIONICS RACKS OUTFITTING

(ASSY OPS/20A/FIN) Page 1 of 7 pages

OBJECTIVE:

Configure Node 3 Avionics Racks for on-orbit operations. Includes installation of left and right Pivot Pins for Racks NOD3O4 and NOD3O5, installation of K-Bars, and removal of Knee Braces for NOD3O4.

LOCATION:

NOD3O4 and NOD3O5

DURATION:

1 hour, 15 minutes for NOD3O4

20 minutes for NOD3O5

CREW:

One

PARTS:

ARIS - Pivot Fitting Bottom Left (two) P/N 683-61711-31

ARIS - Pivot Fitting Bottom Right (two) P/N 683-61711-32

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

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

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

Ratchet, 3/8" Drive

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

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

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

Drawer 3:

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

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

Speed Handle Assy

Drawer 5:

Static Wrist Tether

NOTE

This procedure can be run as a stand-alone procedure for each individual Rack.

1. LOWER LAUNCH RESTRAINT DISENGAGEMENT

- 1.1 Select one of the two Node 3 Avionics Racks to outfit (NOD3O4, NOD3O5).

CAUTION

Disengagement sequence must be followed exactly to allow any induced loads to be released safely back into structure. Start on either left or right side of rack.

NOTE

All directional references (up, down, left, right) are with respect to front face of rack (crewmember facing Rack).

1.144 NODE 3 AVIONICS RACKS OUTFITTING

(ASSY OPS/20A/FIN)

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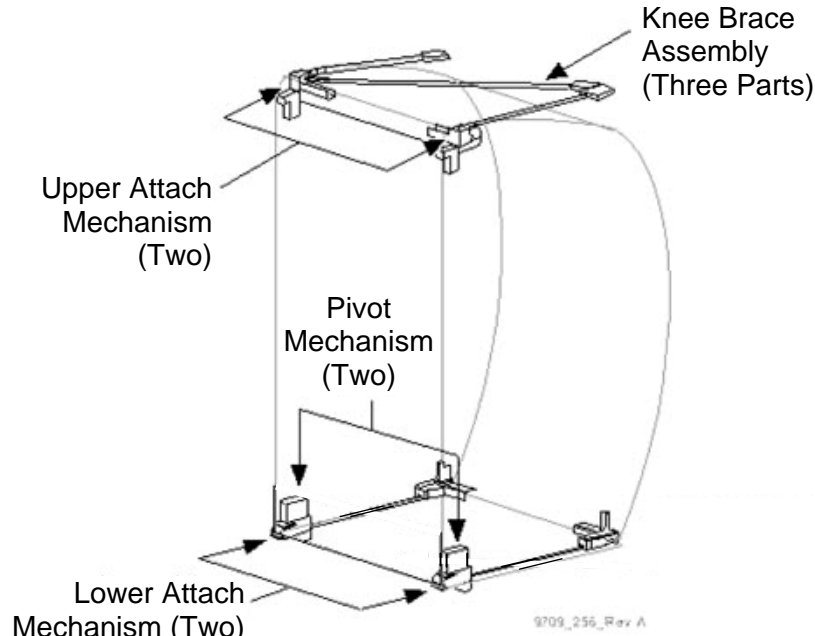


Figure 1.- Location of Rack Attachment Mechanisms.

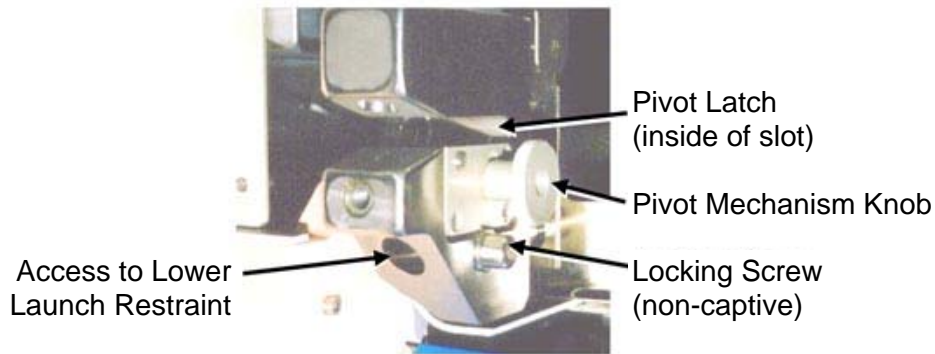


Figure 2.- Lower Launch Restraint (Left Side).

NOTE

A loud pop may occur during release of first Lower Launch Restraint.

- 1.2 Remove non-captive Locking Screw (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
Refer to Figures 1, 2.
- 1.3 Disengage Lower Launch Restraint 10 to 12 turns until hard stop (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 1.4 Reinstall, snug Locking Screw (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 1.5 Repeat steps 1.2 to 1.4 for opposite side.

2. PIVOT FITTING INSTALLATION

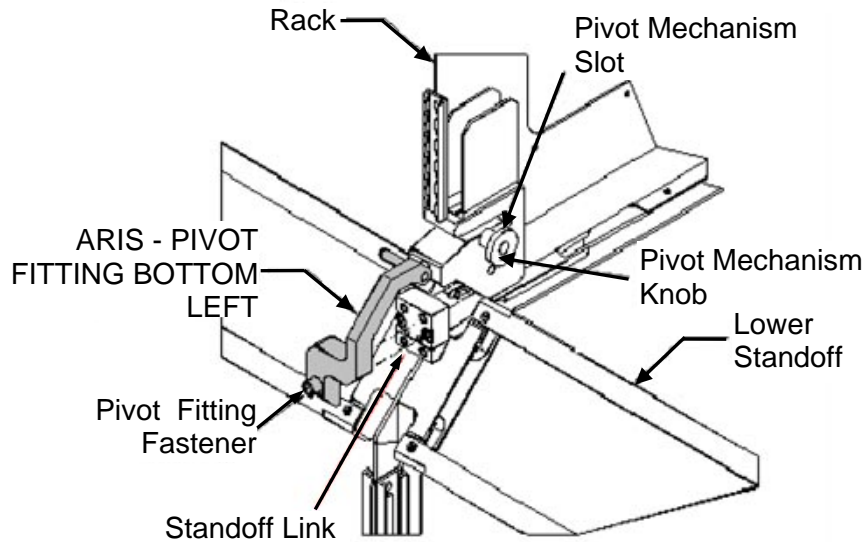


Figure 3.- Installation of Pivot Fitting, Left Side.

- 2.1 Loosen both left and right Pivot Mechanism Knobs one turn then snug in the unlatched, down position.
Refer to Figures 2 and 3.
- 2.2 Install ARIS - Pivot Fitting Bottom Left (P/N 683-61711-31) onto Standoff Link located on lower left Standoff.
- 2.3 Tighten, torque Fastener to 150 in-lbs [Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head; (40-200 in-lbs) Trq Wrench, 3/8" Drive].
- 2.4 Install ARIS - Pivot Fitting Bottom Right (P/N 683-61711-32) onto Standoff Link located on lower right Standoff.
- 2.5 Tighten, torque Fastener to 150 in-lbs [Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head; (40-200 in-lbs) Trq Wrench, 3/8" Drive].
- 2.6 Loosen both left and right Pivot Mechanism Knobs one turn, then snug in latched, up position.
- 2.7 If working on Rack at NOD305, then:
Go to step 7.

3. UPPER ATTACH MECHANISM DISENGAGEMENT

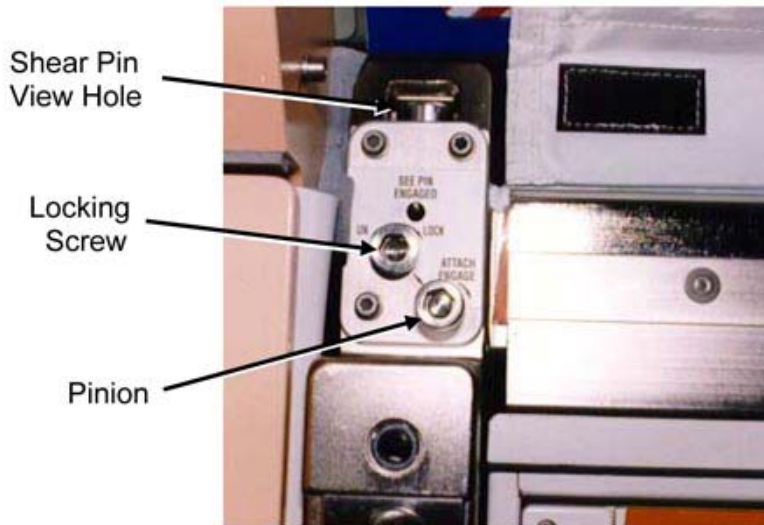


Figure 4.- Upper Attach Mechanism, Left Side, Typical.

- 3.1 Loosen left Locking Screw 10 to 12 turns or until threads completely disengage (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
Refer to Figure 4.
- 3.2 Disengage left Pinion one full turn until hard stop (left ↺ , right ↻)
(Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
Refer to Figure 4.
- 3.3 Repeat for opposite side.

4. K-BAR INSTALLATION

Refer to Figure 5.

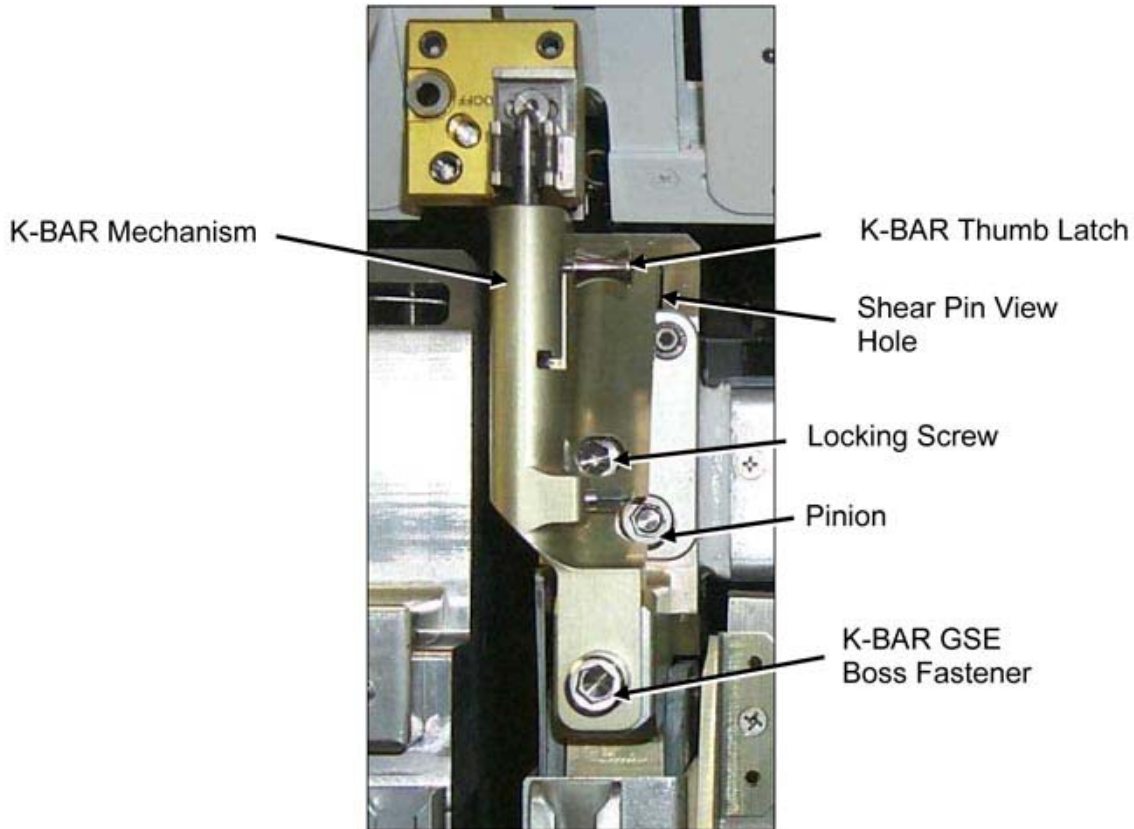


Figure 5.- K-BAR Assembly Installed (Rack Upper Left).

- 4.1 Rotate Rack down only ~15 cm (~5 in).

CAUTION

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

- 4.2 Place K-BAR Assy, Left (P/N 683-62201-33), into left Upper Attach Mechanism Shear Pin View Hole.
- 4.3 Verify Locking Screw fully unlocked.
- 4.4 Engage Pinion, one full turn, into K-BAR (left ↶, right ↷) (Ratchet, 3/8" Drive; 5" Long, 3/8" Ball Tip Hex Head, 3/8" Drive).
- 4.5 Snug Locking Screw and K-BAR GSE Boss Fastener (Ratchet, 3/8" Drive; 5" Long, 3/8" Ball Tip Hex Head, 3/8" Drive).
- 4.6 K-BAR Thumb Latch → down position
Refer to Figure 5.
- 4.7 Repeat steps 4.2 to 4.6 for K-BAR Assy, right (P/N 683-62201-34).

5. KNEE-BRACE REMOVAL

5.1 ✓Rack rotation path unobstructed

5.2 Slowly rotate Rack down to a controlled stop.

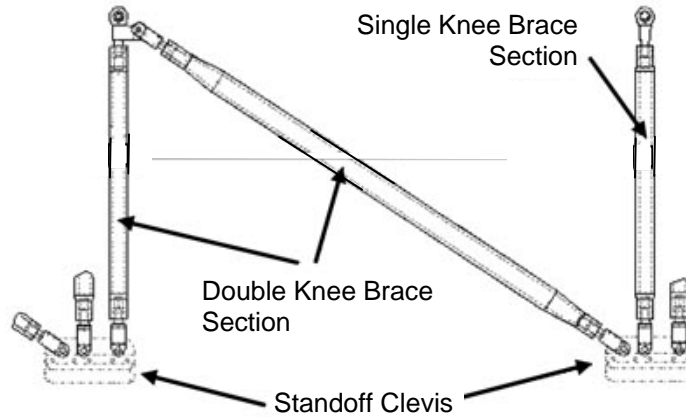


Figure 6.- Rack Knee Brace Assembly.

5.3 Remove Knee-Brace Assembly sections (P/N 683-50249-3) by pulling captive PIP Pins (three) from Standoff Clevis. Refer to Figure 6.

5.4 Temporarily stow Knee-Brace Assembly.

6. ROTATING RACK UP

6.1 ✓Rack Rotation path unobstructed

6.2 K-BAR Thumb Latches (two) → up position

6.3 Slowly rotate Rack up to a controlled stop.

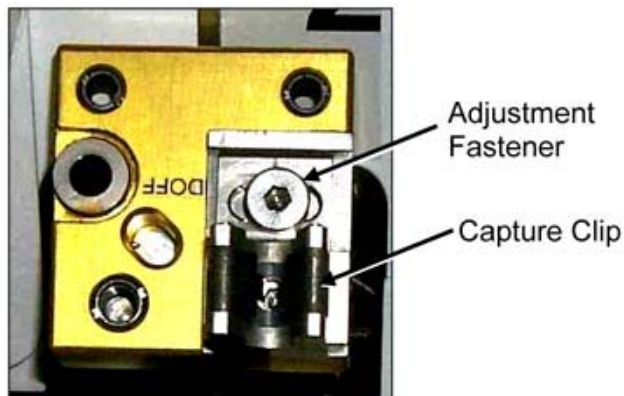


Figure 7.- K-BAR Capture Mechanism, Installed on Standoff.

6.4 Engage Rack K-BAR Thumb Latches (two) into Capture Mechanism located on Node 3 Standoff. Refer to Figure 7.

1.144 NODE 3 AVIONICS RACKS OUTFITTING

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- * If K-BAR does not align with Capture Mechanism
- * | Loosen Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex
- * | Head, 3/8" Drive).
- * | Slide capture clip left/right, as required to engage K-BAR.
- * | Once K-BAR engaged, re-tighten Adjustment Fastener
- * | (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- * |
- * Refer to Figure 7.

7. CLOSEOUT

Photo document newly installed hardware (Digital Camera).

8. CONTINUING OUTFITTING OF REMAINING RACKS

Repeat steps 1 to 7 until both Racks in NOD304 and NOD305 are outfitted.

9. POST OUTFITTING

Notify **MCC-H** that Node 3 Avionics Racks outfitting activity is complete.
Stow tools, Knee Braces.
Update IMS.

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1.146 WHC RACK TRANSFER - LAB1P2 TO NOD3F4

(ASSY OPS/20A/FIN)

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OBJECTIVE:

Relocate Waste and Hygiene Compartment (WHC) Rack from LAB1P2 to NOD3F4. This relocation activity mates a jumper to the Rack so that it has the right interfaces to have the flush water line attached to the node utilities, releases WHC Rack Ground Strap, and transfers WHC Rack to NOD3F4. This procedure assumes that the WHC Kabin has been removed and temp stowed and that [1.142 PREPARE NODE 3 FOR RACK INSTALLATION ON 20A](#), all (SODF: ASSY OPS: ACTIVATION AND CHECKOUT: RACKS) has been performed to install Knee Brace at NOD3F4. Rack umbilical(s) are mated in a separate procedure.

LOCATION:

Start: LAB1P2

Finish: NOD3F4

DURATION:

1 hour and 30 minutes

CREW:

Two

PARTS:

<u>NOD3 WHC Flush Water Adapter Mod Kit</u>	P/N 683-99396-1:
NOD3 WHC Flush Water Adapter	P/N 683-99395-1
WHC Flush Water Jumper IMS Label	P/N 683-99224-10
Clear Tape	P/N TEMP-R-TAPE C

MATERIALS:

Ziplock Bags (12x12) (two)

Sharpie

Gray Tape

Dry Wipes

Kapton Tape

Towels

AMP Pallet 3, A3 (if required) P/N SEG52101140-301:

 Povidone Iodine Pads P/N 08486A7

Regen ECLSS Tox-2 PPE Kit P/N SEG42103702-302:

 Surgical Mask

 Safety Goggles

 Silver Shield Gloves

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

 9/16" Socket, 3/8" Drive

 Ratchet, 3/8" Drive

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

Drawer 3:

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

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

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1.146 WHC RACK TRANSFER - LAB1P2 TO NOD3F4

(ASSY OPS/20A/FIN)

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Drawer 4:

Wire Cutters

Adjustable Joint Pliers, Straight Jaw

Drawer 5:

Static Wrist Tether

NOTE

All directional references (up, down, left, right) are with respect to front face of WHC Rack, as you face Rack.

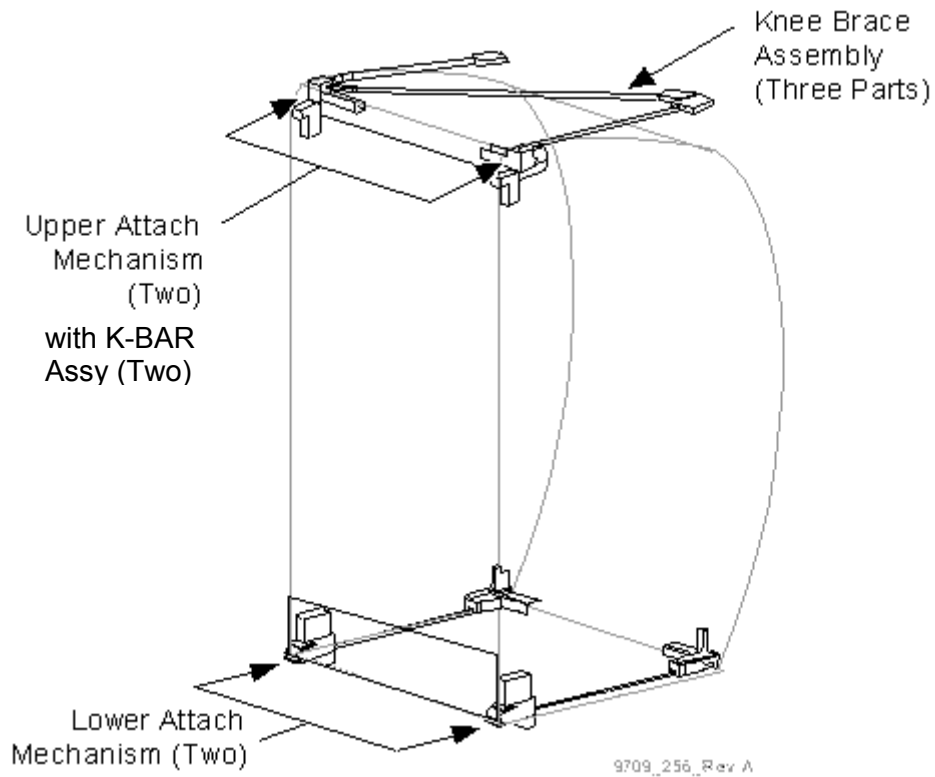


Figure 1.- Rack Attachment Mechanisms.

1. SAFING

1.1 $\sqrt{\text{MCC-H}}$ the following:

RPCM N32A2B C1 RPC 01 open and close command inh.

DDCU N32A(N32B) Converter – OFF

RPCM LA2A3B_A RPC-2 open and close command Inh.

DDCU LA2A(LA3B) Converter – OFF

UPA Configured for umbilical demate.

LAB1P4

1.2 $\sqrt{\text{WHC Urine Jumper}}$ $\leftarrow| \rightarrow$ Pre-treated Urine T-Valve

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1.146 WHC RACK TRANSFER - LAB1P2 TO NOD3F4

(ASSY OPS/20A/FIN)

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If WHC Urine Jumper →|← Pre-treated Urine T-Valve,
| Pre-treated Urine T-Valve → OFF (pull plunger, ~2.5 turns CW,
| Verify black window, drop plunger).

LAB1P2
MCC-H/PCS

1.3 Verify LAB1P2 Rack Power Safed
√sw WHC RACK POWER SWITCH- OFF
USLAB: EPS: Rack Power: Rack Power 3
Rack Power 3
'Rack LAB1P2'

Verify Switch Position - OFF
√Switch availability - YES
√Monitoring Status - ENABLED

NOD3F4

2. PREPARING INSTALLATION LOCATION (NOD3F4)
2.1 √Knee Brace (PN 683-50249-3) installed.
Refer to Figure 1.

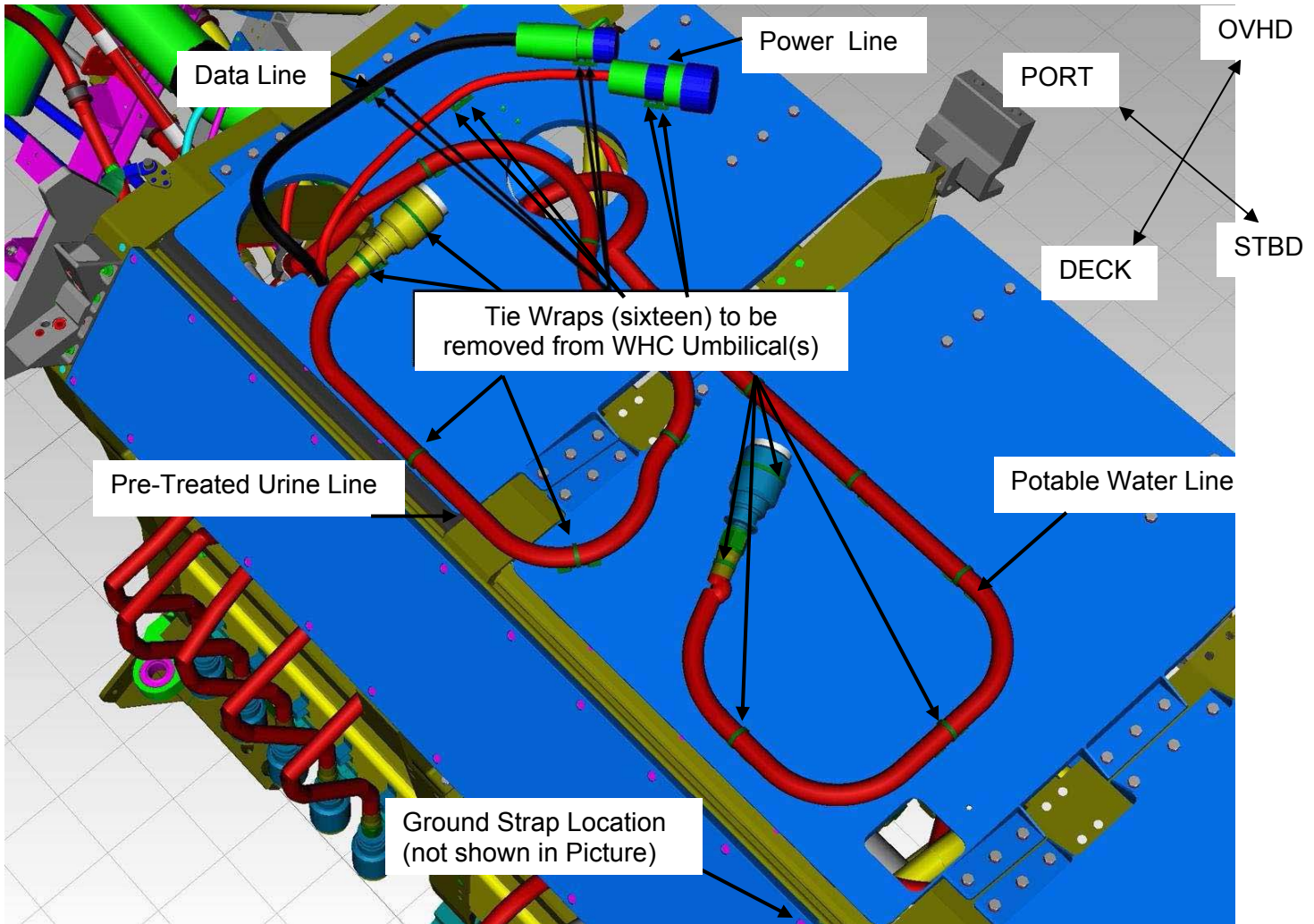


Figure 2.- Tie Wraps to be Removed from WHC Umbilical(s) (NOD3FD4).

- 2.2 Release umbilical(s) by cutting Tie Wraps (four per umbilical) (Wire Cutters).
Refer to Figure 2.
Release Ground Strap by cutting Tie Wraps (two) (Wire Cutters).
- 2.3 Dispose Tie Wraps (eighteen).
Restrain umbilical(s) out of Rack Bay (Kapton Tape).
- 2.4 ✓ WHC Rack installation location clear of equipment, Rack umbilicals out of way of Rack and stowed towards the aisle.

3. DEMATING WHC FLUID JUMPERS (LAB1P2)



Figure 3.- WHC Rack UIP Closeout.

- LAB1P2
- 3.1 Remove UIP Closeout from LAB1P2 Rack, 1/4 Turn Fasteners (two). Refer to Figure 3. Secure to standoff.
 - 3.2 Don Surgical Mask, Safety Goggles and Silver Shield Gloves. Preposition Towels and Ziplock Bag for clean-up in case of QD leak.

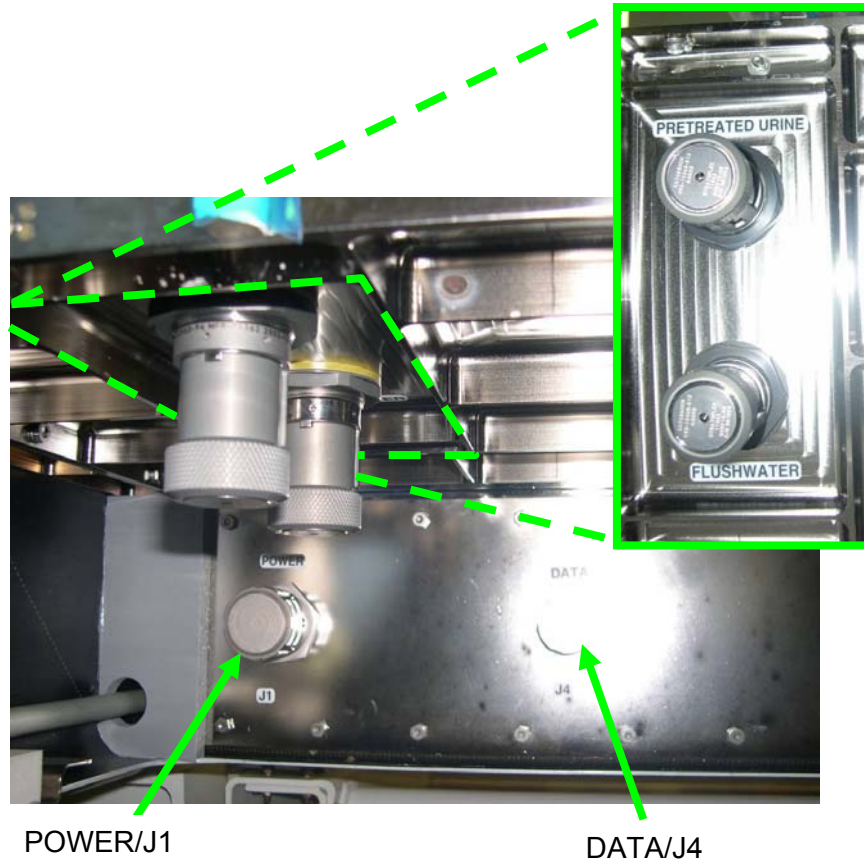


Figure 4.- WHC Rack Utility Interface Panel.

- 3.3 WHC Urine Jumper QD $\leftarrow| \rightarrow$ PRETREATED URINE on WHC Rack UIP.
Refer to Figure 4.
- 3.4 Retrieve caps stowed in Ziplock Bag labeled "WHC URINE JUMPER BAG" in WHC Rack UIP
Refer to Figure 3.
Cap $\rightarrow| \leftarrow$ WHC Urine Jumper QD
Cap $\rightarrow| \leftarrow$ PRETREATED URINE on WHC Rack UIP.
Cover QD end of WHC Urine Jumper (Ziplock Bag, Gray Tape)
Restow "WHC URINE JUMPER BAG" in WHC Rack UIP (Kapton Tape).
- 3.5 Doff Surgical Mask, Safety Goggles and Silver Shield Gloves.
- 3.6 Stow WHC Urine Jumper in the LAB1P2 Standoff near Z-Panel (Kapton Tape).

1.146 WHC RACK TRANSFER - LAB1P2 TO NOD3F4

(ASSY OPS/20A/FIN)

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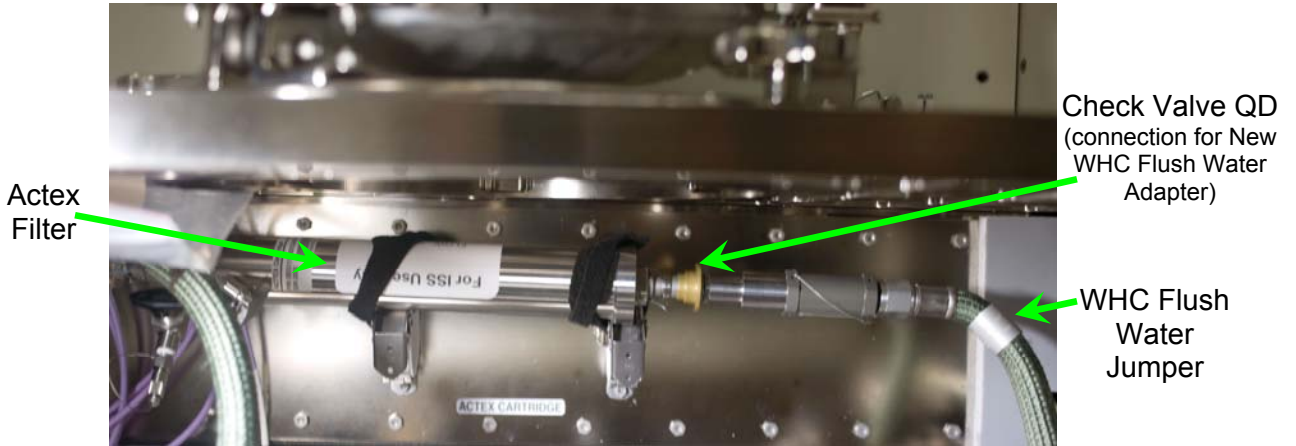


Figure 5.- WHC Actex Filter.

WARNING

Contact with the wetted surfaces of the potable water system QDs can lead to contamination and crew illness.

- 3.7 WHC Flush Water Jumper Check Valve QD \leftrightarrow Actex Filter
Tethered Cap \rightarrow | \leftarrow WHC Flush Water Jumper Check Valve QD
Refer to Figure 5.

If contact made with wet surface of QD, clean surface (Povidone Iodine Pads).

- 3.8 Stow WHC Flush Water Jumper in the LAB1P2 Standoff near Z-Panel (Kapton Tape).

4. INSTALLING NOD3 WHC FLUSH WATER ADAPTER

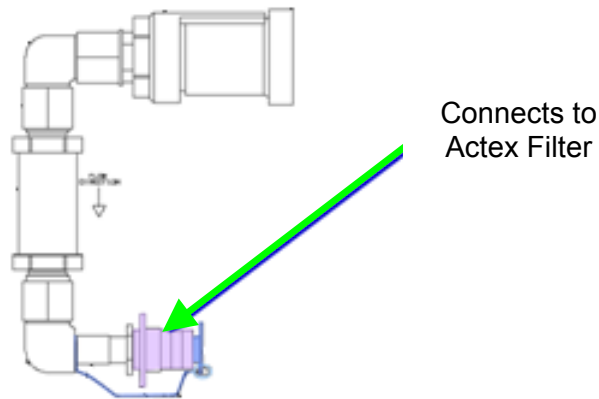


Figure 6.- NOD3 WHC Flush water Adapter.

- 4.1 Tethered Cap \leftrightarrow NOD3 WHC Flush Water Adapter
Refer to Figure 6.
- 4.2 NOD3 WHC Flush Water Adapter "TO: ACTEX INLET" \rightarrow | \leftarrow Actex Filter
Refer to Figures 5 and 6.

1.146 WHC RACK TRANSFER - LAB1P2 TO NOD3F4

(ASSY OPS/20A/FIN)

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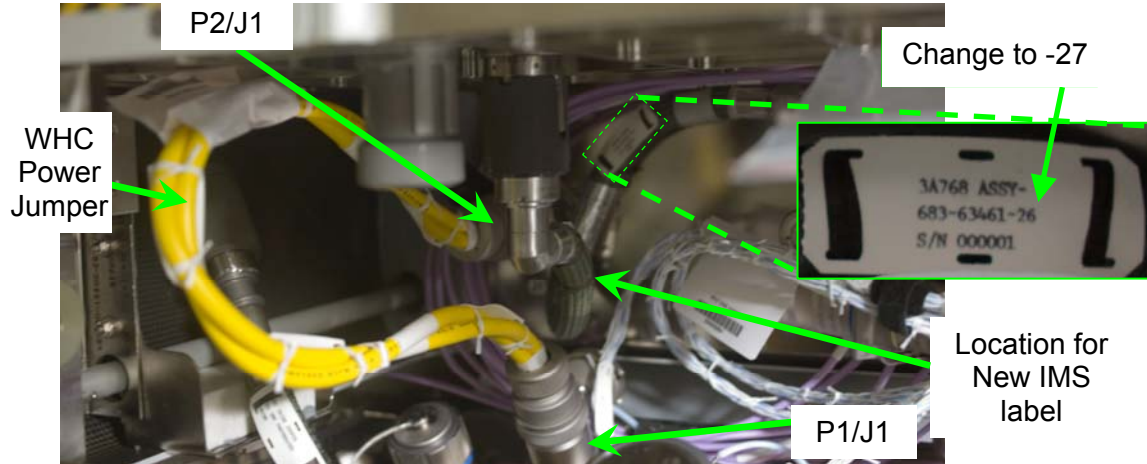


Figure 7.- Location for New IMS Label and WHC Power Jumper.

- 4.3 Apply new Node 3 WHC Flush Water Jumper IMS Label on WHC Flush Water Jumper close to end (Clear Tape). Refer to Figure 7.
- 4.4 Modify part number of WHC Flush Water Jumper from “-26” to “-27” located on existing assembly part number tag (Sharpie). Refer to Figure 7.
- 4.5 ✓Node 3 WHC Flush Water Jumper is secured to WHC Rack for Transfer to Node 3

5. DEMATING WHC POWER AND DATA JUMPERS

- 5.1 Don Static Wrist Tether.
Secure to unpainted, unanodized, metal surface.
- 5.2 WHC Power Jumper P2 ←|→ J1 on WHC Rack UIP.
WHC Power Jumper P1 ←|→ J1 on Z-Panel.
Tethered Cap →|←J1 on Z-Panel.
Connect caps to ends of WHC Power Jumper and J1 on WHC Rack UIP.
If cap not available, cover connector with Kapton Tape.
Refer to Figure 7.
- 5.3 Stow WHC Power Jumper in Ziplock Bag labeled “WHC Power/Data Jumpers” (Ziplock Bag, Gray Tape, Sharpie).

1.146 WHC RACK TRANSFER - LAB1P2 TO NOD3F4

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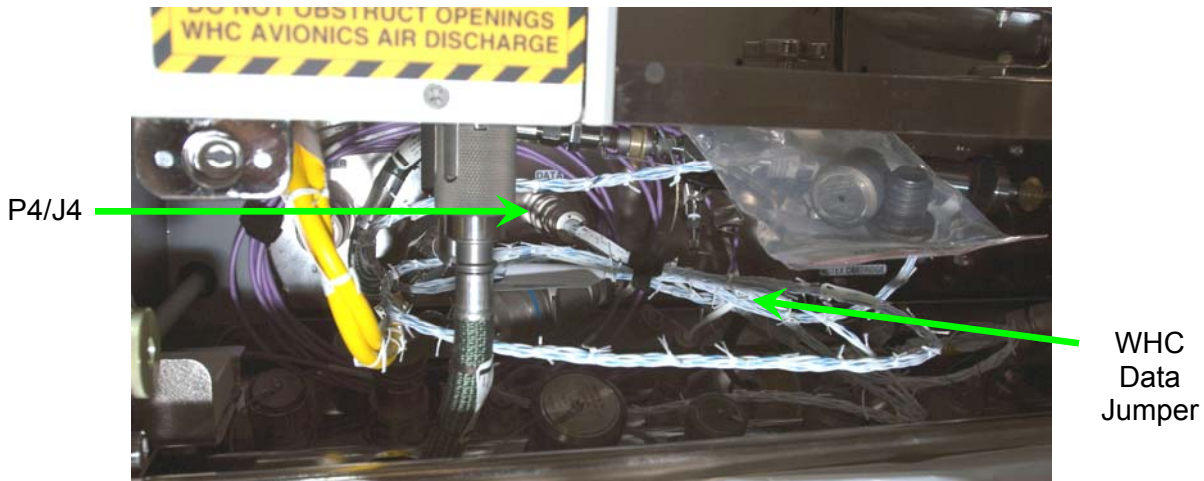


Figure 8.- WHC Data Jumper.

NOTE

RPS Switch Position will show "ON" on PCS display when WHC Data Jumper is demated.

- 5.4 WHC Data Jumper P4 \leftrightarrow J4 on WHC Rack UIP
WHC Data Jumper P43 \leftrightarrow J43 on Z-Panel
Tethered Cap \rightarrow | \leftarrow J43 on Z-Panel
Connect caps to ends of WHC Data Jumper and J4 on WHC Rack UIP.
If cap not available, cover connector with Kapton Tape.
Refer to Figure 8.

- 5.5 Stow WHC Data Jumper in Ziplock Bag labeled "WHC Power/Data Jumpers."

- 5.6 Doff Static Wrist Tether.

6. REMOVING K-BAR ASSY(S)

Refer to Figure 9.

1.146 WHC RACK TRANSFER - LAB1P2 TO NOD3F4

(ASSY OPS/20A/FIN)

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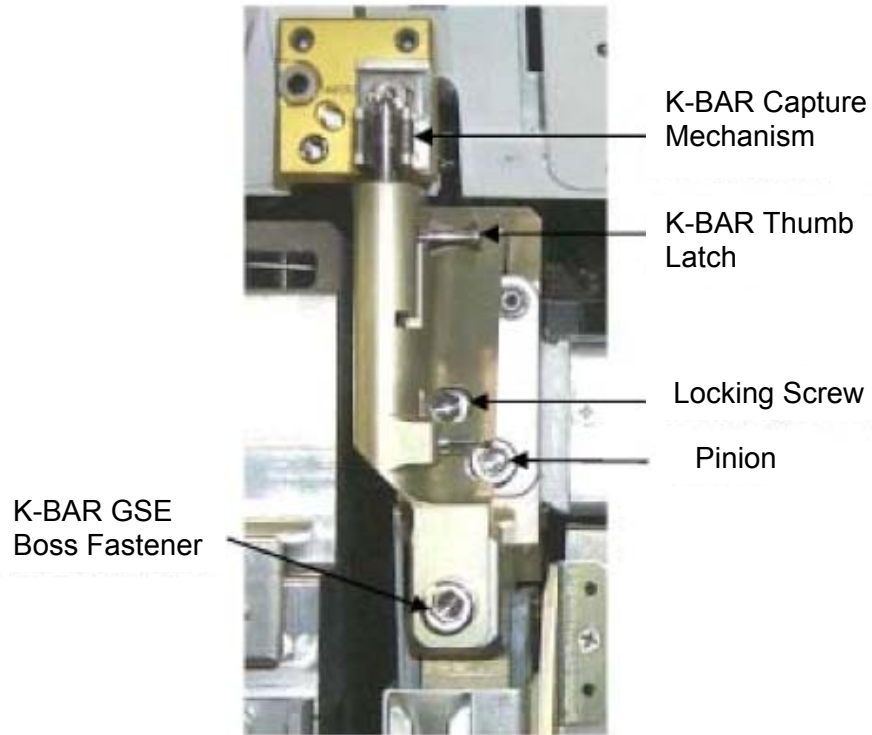


Figure 9. - USOS Rack Upper Left K-BAR Assy(Shown Installed).

- 6.1 K-BAR Assy, Left Thumb Latch → down position.
- 6.2 Disengage Locking Screw and K-BAR Assy GSE Boss fastener (Ratchet, 3/8" Drive; 5" Long, 3/8" Ball Tip Hex Head, 3/8" Drive).

NOTE

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

- 6.3 Disengage Pinion, one full turn, out of K-BAR Assy (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 6.4 Remove K-BAR Assy, Left (P/N 683-62201-33), from left Upper Attach Mechanism.
- 6.5 Repeat steps 6.1 to 6.4 for K-BAR Assy, Right (P/N 683-62201-34)
- 6.6 Record S/N of K-BAR Assy, Left: _____.
Record S/N of K-BAR Assy, Right: _____.
- 6.7 Temporarily stow K-BAR Assy(s) (two).

1.146 WHC RACK TRANSFER - LAB1P2 TO NOD3F4

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7. ROTATING RACK DOWN

CAUTION	
1.	All cables, equipment, tools must be removed from space behind, around Rack to prevent equipment damage.
2.	Keep NOD3F4 Rack Umbilicals in front of WHC Rack during final installation of Rack.

7.1 ✓ All unnecessary equipment protruding into Rack translation path has been removed, stowed (LAB, Node 1, Node 3)

LAB1P2

7.2 If required, remove any Handrails from the front of the Rack.

7.3 ✓ Rack rotation path unobstructed.

7.4 Slowly rotate Rack down to a controlled stop.

8. REMOVING GROUND STRAP

Refer to Figures 10 and 11.

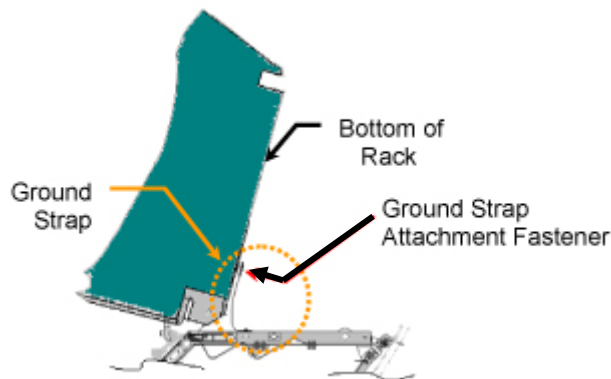


Figure 10. - Side View of Rotated Rack, Showing Rack Ground Strap Location.

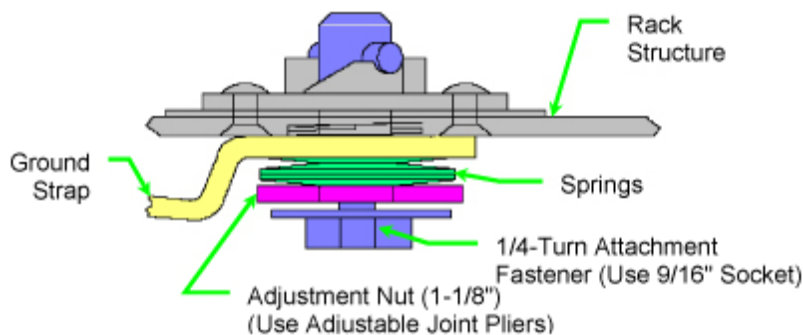


Figure 11. - Rack Ground Strap Cross-Section.

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(ASSY OPS/20A/FIN)

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- 8.1 Fully retract Adjustment Nut ↻ towards head of Attachment Fastener (Adjustable Joint Pliers, Straight Jaw).
- 8.2 Ground Strap ←|→ Rack, 1/4-Turn Attachment Fastener (Ratchet, 3/8" Drive; 9/16" Socket, 3/8" Drive)
- 8.3 Stow Ground Strap on standoff location.

9. TRANSFERRING RACK TO NOD3F4

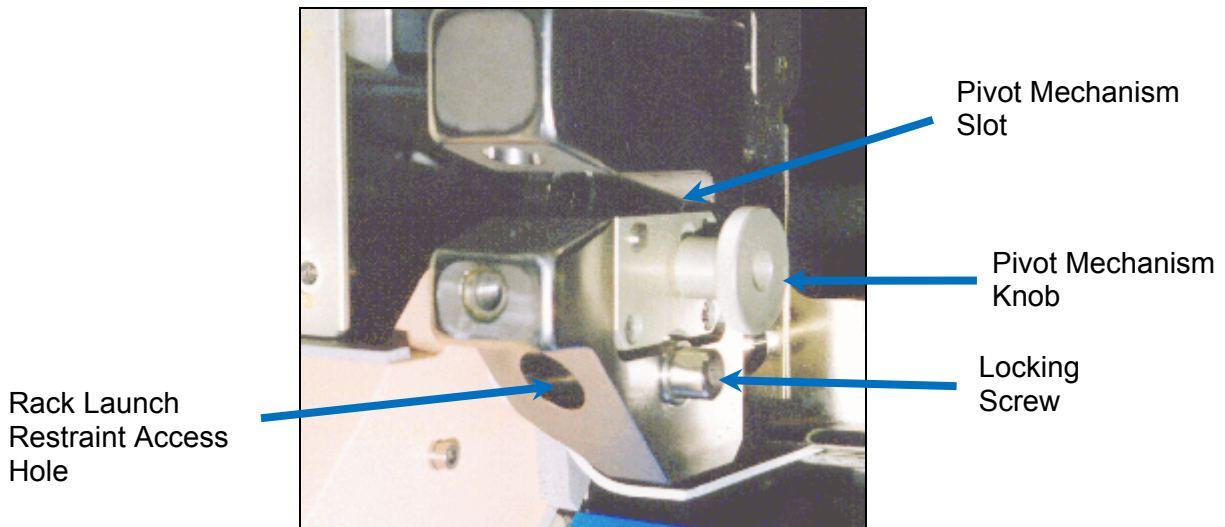


Figure 12.- Rack Launch Restraint, Lower Left, Typical.

- 9.1 Loosen both left, right Rack Pivot Mechanism Knobs one turn, then snug in unlatched, down position. Refer to Figure 12.
- 9.2 Lift Rack off of Pivot Fittings.
- 9.3 Loosen left and right Pivot Mechanism Knobs one turn, so latches are free to move.
- 9.4 Transfer Rack to NOD3F4.
- NOD3F4 9.5 Free-Float Rack into Rack Bay. Keep Rack rotated down.

10. INSTALLING RACK GROUNDING STRAP (NOD3F4)

WARNING

Improper installation of grounding strap could result in electrical shock hazard.

- 10.1 Inspect Grounding Strap contact surfaces for debris, clean if required (Dry Wipes).

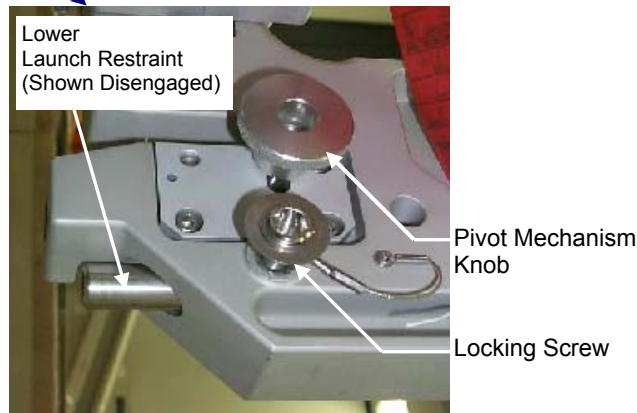
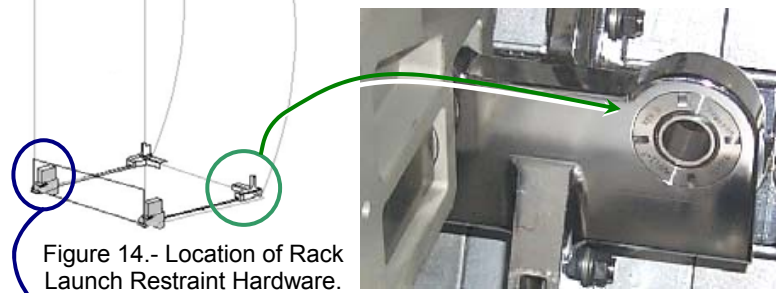
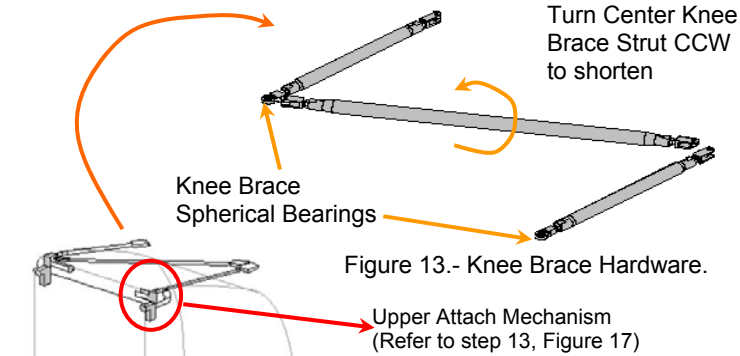
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- 10.2 Fully retract Adjustment Nut ↺ (towards head of Attachment Fastener), by hand.
Refer to Figure 11.
- 10.3 Ground Strap →|← WHC Rack, using 1/4 Turn Attachment Fastener (Ratchet, 3/8" Drive; 9/16" Socket, 3/8" Drive)
- 10.4 Snug Adjustment Nut ↺, until firm against Springs.
- 10.5 Tighten Adjustment Nut an additional 1/2 to 3/4 turn ↺ (Adjustable Joint Pliers, Straight Jaw).
- 10.6 Photo document installed Ground Strap (Digital Camera).

11. ROTATING RACK UP



11.1 ✓All unnecessary equipment behind Rack has been removed
 ✓Knee Brace Spherical Bearings (two) straight
 ✓Standoff lower-rear Spherical Bearings (two) straight
 Refer to Figures 13 to 15.

11.2 Slowly rotate Rack up, until Knee Brace Spherical Bearings (two) slide inside Upper Attach Mechanism.

CAUTION

Engagement sequence should be followed exactly for best probability of engaging all four Launch Restraints.

12. ENGAGING LOWER LAUNCH RESTRAINT

Refer to Figures 14 and 16.

- 12.1 Remove both Locking Screws (one each side of Rack) by hand.
- 12.2 Engage both Lower Launch Restraints five to six turns ↻ (left side first) (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 12.3 Engage both Lower Launch Restraints to hard stop, an additional five to six turns ↻ (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).

NOTE

To prevent galling, a Torque Wrench will be used to verify that the running torque limit is not exceeded while installing the Locking Screws.

12.4 Reinstalling Both Locking Screws

Set Trq Wrench to 60 in-lbs.

Install both Locking Screws [(40-200 in-lbs) Trq Wrench, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive].

If running torque on Locking Screw exceeds 60 in-lbs, √**MCC-H**

√Both Locking Screws flush with Rack structure

13. ENGAGING UPPER ATTACH MECHANISMS

Refer to Figures 14 and 17.

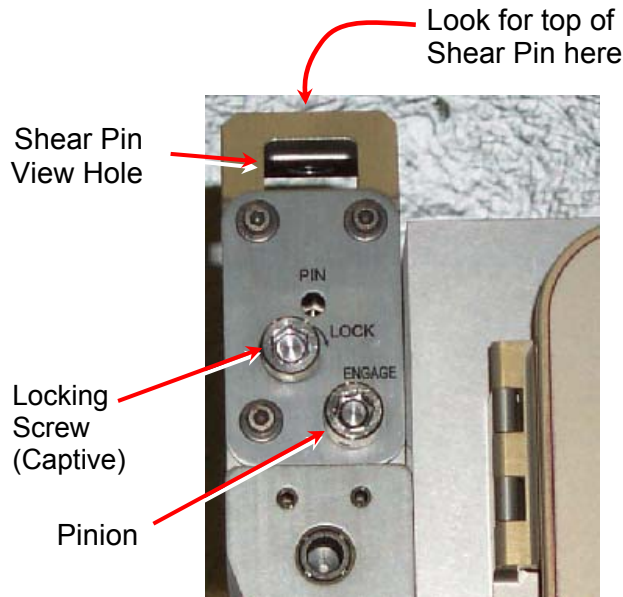


Figure 17.- Upper Attach Mechanism, Upper Left Side.

13.1 √Left Locking Screw fully unlocked

NOTE

1. Upper Attach Mechanism Pinion requires minimal force, if resistance is felt the spherical bearing is likely misaligned.
2. To engage left Pinion, turn ↺.
3. To engage right pinion, turn ↻.

* If unable to engage Pinions
* | The Knee Brace can be adjusted by
* | twisting any of the three Struts.
* | Turning ↺ shortens strut.
* | Refer to Figure 13.

13.2 Engage left Pinion, about three-quarters turn, until hard stop (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive). Verify Shear Pin visible at top of Upper Attach Mechanism.

13.3 Set Trq Wrench to 60 in-lbs. Tighten left Locking Screw to hard stop, about 10 turns ↻ [(40-200 in-lb) Trq Wrench, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive].

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If running torque on Locking Screw exceeds 60 in-lbs, √**MCC-H**

√Locking Screw flush with Rack structure.

13.4 Repeat Upper Attach Mechanism engagement for Rack right side.

14. POST MAINTENANCE

14.1 Notify **MCC-H** of task completion.

14.2 Photo document all newly installed hardware (Digital Camera).

14.3 Stow tools, materials, removed K-Bar Assy(s), WHC Power/Data Jumpers.

Table 1.- Restow Table

Item #	OpNom	P/N	Qty
1	Ziplock Labeled "WHC Power/Data Jumpers"	N/A	1
	WHC Power Jumper	683-99134-1	1
	WHC Data Jumper	683-99135-1	1
2	K-BAR Assy, Left	683-62201-33	1
3	K-BAR Assy, Right	683-62201-34	1

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1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

(ASSY OPS/20A/FIN 1) Page 1 of 17 pages

OBJECTIVE:

Transfer WRS-1 and WRS-2 (Water Recovery System) Racks from LAB1D4 and LAB1P4 to NOD3D4 and NOD3D5. This transfer activity demates all Rack umbilicals, releases K-BARs and Pivot Mechanisms, transfers each rack from the LAB and then structurally attaches each Rack in Node 3. Rack umbilicals are mated in a separate procedure.

LOCATION:

Start: LAB1D4 (LAB1P4)

Finish: NOD3D5 (NOD3D4)

DURATION:

3 hours, 25 minutes

40 minutes – Rack transfer prep

1 hour, 25 minutes – umbilical demate

80 minutes – Rack transfers

CREW:

Two (second crewmember required for transfer only)

PARTS:

Ziplock Bag labeled “WRS1 O₂ Caps/Plugs”

Ziplock Bag labeled “WRS1 Potable Water Caps/Plugs”

Ziplock Bag labeled “WRS2 Waste Water Caps/Plugs”

Ziplock Bag labeled “WRS Process Water Caps/Plugs”

Ziplock Bag labeled “WRS TCS Caps/Plugs”

Ziplock Bag labeled “WRS Pwr/Data Caps”

QD Plug (four) P/N 683-16348-813

MATERIALS:

Ziplock Bag

Gray Tape

Kapton Tape

Dry Wipes

Clean Room Gloves

Empty 3.0 CTB

AMP Pallet 3 (A3) P/N SEG52101140-301 (if required)

Povidone Iodine Pads (P/N 68548)

Regen ECLSS Tox-2 PPE Kit (P/N SEG42103702-302):

Surgical Mask

Safety Goggles

Silver Shield Gloves

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

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TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

- Ratchet, 3/8" Drive
- 9/16" Socket, 3/8" Drive
- (40-200 in-lbs) Trq Wrench, 3/8" Drive
- Ratchet, 1/4" Drive
- 5/16" Socket, 1/4" Drive

Drawer 3:

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

Drawer 4:

- Wire Cutters
- Adjustable Joint Pliers, Straight Jaw

Drawer 5:

- Static Wrist Tether

NOTE

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

1. RACK TRANSFER PREPARATION

1.1 ✓ All unnecessary equipment protruding into Rack translation path has been removed, stowed (LAB, Node 1, Node 3)

NOD3D5

1.2 ✓ ARIS Pivot Fitting Bottom Left (inside) (P/N 683-61711-31) installed on lower Standoff
✓ K-BAR Capture Mechanisms (two) installed on upper Standoff link



Figure 1.- NOD3D5, WRS-1 Umbilicals in Launch Restraints.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

(ASSY OPS/20A/FIN 1) Page 3 of 17 pages

NOTE

Utilities restrained on Node 3 Standoff need to be released to prevent interference with Rack during installation.

- 1.3 Release Umbilicals from Launch Restraints by cutting Zip Ties (two per umbilical) (Wire Cutters).
Release Ground Strap by cutting Zip Ties (two).
Refer to Figure 1.



Figure 2.- NOD3D4, WRS-2 Umbilicals in Launch Restraints.

- NOD3D4 1.4 Repeat steps 1.2 and 1.3 for second Rack bay.
Refer to Figure 2.
- LAB1P4 1.5 Restrain PWD Galley Supply Hose to LAB1P3 Rack, out of LAB1P4
rotation path.
- 1.6 Perform [1.291 WRS ACCESS](#), steps 2, 5 to 7 (SODF: S&M
NOMINAL: RACK), then:

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

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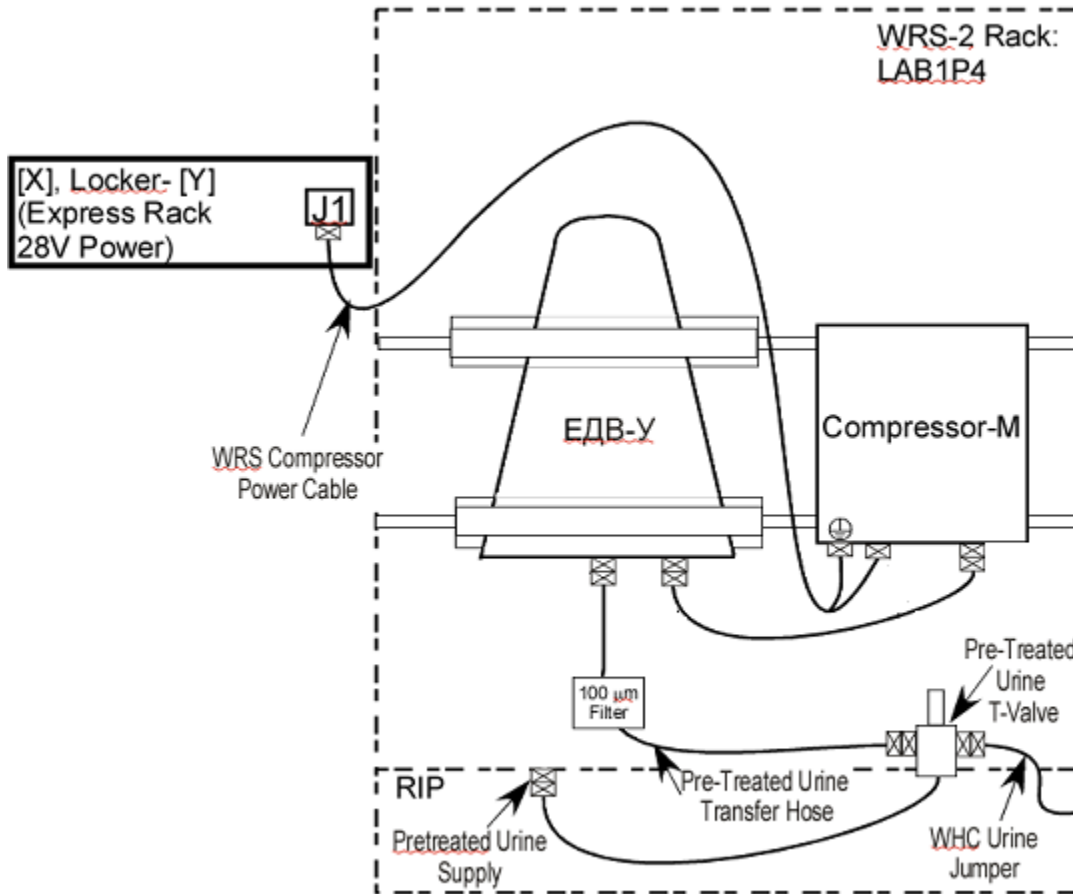


Figure 3.- EDV and Compressor setup on WRS-2.

1.7 Removing EDV and Compressor-M

Refer to Figure 3.

1.7.1 Don Static Wrist Tether.

LAB1O4

1.7.2 √sw LOCKER-4 POWER – OFF
√LOCKER-4 POWER Lt – Off

NOD3P4

1.7.3 Compressor-M Power Cable-P1 ←|→ LOCKER 4 POWER-J1
Cap →|← LOCKER 4 POWER-J1
Cap (or Kapton Tape) →|← WRS Compressor Power Cable P1

1.7.4 Doff Static Wrist Tether

WARNING

The UPA WSTA creates a positive pressure on the PRE-TREATED URINE SUPPLY QD. Removal of the Pre-treated Urine T-Valve from this QD without extra steps can result in the QD failing open and Tox-2 Fluid being released into the ISS cabin.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

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- 1.7.5 ✓ **MCC-H** to verify UPA WSTA in required configuration for disconnecting Pre-treated Urine T-Valve from WRS Rack 2 PRETREATED URINE SUPPLY
- 1.7.6 ✓ Pre-treated Urine T-valve → OFF (pull plunger, ~2.5 turns to OFF, verify black window, drop plunger)
- ЕДВ-У 1.7.7 Compressor-M Air Hose ←|→ compressed air inlet connection labeled ПОДАЧА ДАВЛЕНИЯ
- 1.7.8 Cap (tethered) → | ← Compressor-M Air Hose
Cap (tethered) → | ← ЕДВ-У fitting labeled ПОДАЧА ДАВЛЕНИЯ
- 1.7.9 Don Silver Shield Gloves, Surgical Mask, Safety Goggles.
- 1.7.10 WHC Urine Jumper ←|→ PRE-TREATED URINE T-VALVE
Install plug from Ziplock Bag taped to WHC Urine Jumper.
Cover T-valve male QD (Ziplock Bag; Gray Tape).
- 1.7.11 Feed WHC Urine Jumper back towards LAB1P3, and stow in LAB1P3 UIP area.
- 1.7.12 Pre-treated Urine T-Valve hose ←|→ PRETREATED URINE SUPPLY on WRS2
Plug (tethered) →|← Pre-treated Urine T-Valve hose
Tox-2 specific Cap (or Ziplock and Gray Tape) →|← PRETREATED URINE SUPPLY on WRS2.
- 1.7.13 Doff Silver Shield Gloves, Surgical Mask, Safety Goggles.
- 1.7.14 Secure hoses to EDV Seat Track Brackets (Gray Tape).
- 1.7.15 Remove EDV Seat Track Brackets (two), seat track thumbscrews (four).
- 1.7.16 Temporarily stow assembly in Node 3 for installation after Rack transfers.

WARNING

1. Rack Power Jumpers must be the first jumpers demated from each Rack.
2. Prior to demating power jumpers, the Rack Power Switch status must be verified via PCS or ground telemetry. This cannot be accomplished if data cables have been demated.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

(ASSY OPS/20A/FIN 1) Page 6 of 17 pages

2. SAFING

LAB1D4 2.1 √sw WRS-1 RACK POWER SWITCH → OFF

MCC-H/
PCS 2.2 USLAB: EPS: Rack Power: Rack Power 3

Rack Power 3
'Rack LAB1D4'

Verify Switch Position – OFF

√Switch availability – YES

√Monitoring Status – ENABLED

LAB1P4 2.3 √sw WRS-2 RACK POWER SWITCH → OFF

MCC-H/
PCS 2.4 USLAB: EPS: Rack Power: Rack Power 3

Rack Power 3
'Rack LAB1P4'

Verify Switch Position – OFF

√Switch availability – YES

√Monitoring Status – ENABLED

- 2.5 √**MCC-H** that the following has been performed
RPCM LA2A3B A RPC 1 is open and close cmd inhibited.
Either DDCU LA2A or DDCU LA3B Converter has been powered off.
Oxygen System safed for QD disconnection.

2.6 Oxygen Safety Steps

To prevent fire hazard during this procedure

Minimize the time connectors and caps(plugs) are open or cover using Teflon Bags or Clean Room Gloves.

If Clean Room Gloves become contaminated or damaged, replace immediately with new Clean Room Gloves.

If contaminants are found

 | Photo document (Digital Camera).

 | Remove using the Brass Picks.

 | Retain for return to Houston.

If contaminants cannot be completely removed

 | Temporarily cap connectors.

 | Notify **MCC-H**.

- 2.7 Remove WRS Closeout Assembly, seat track thumbscrews (two).
Temporarily stow.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

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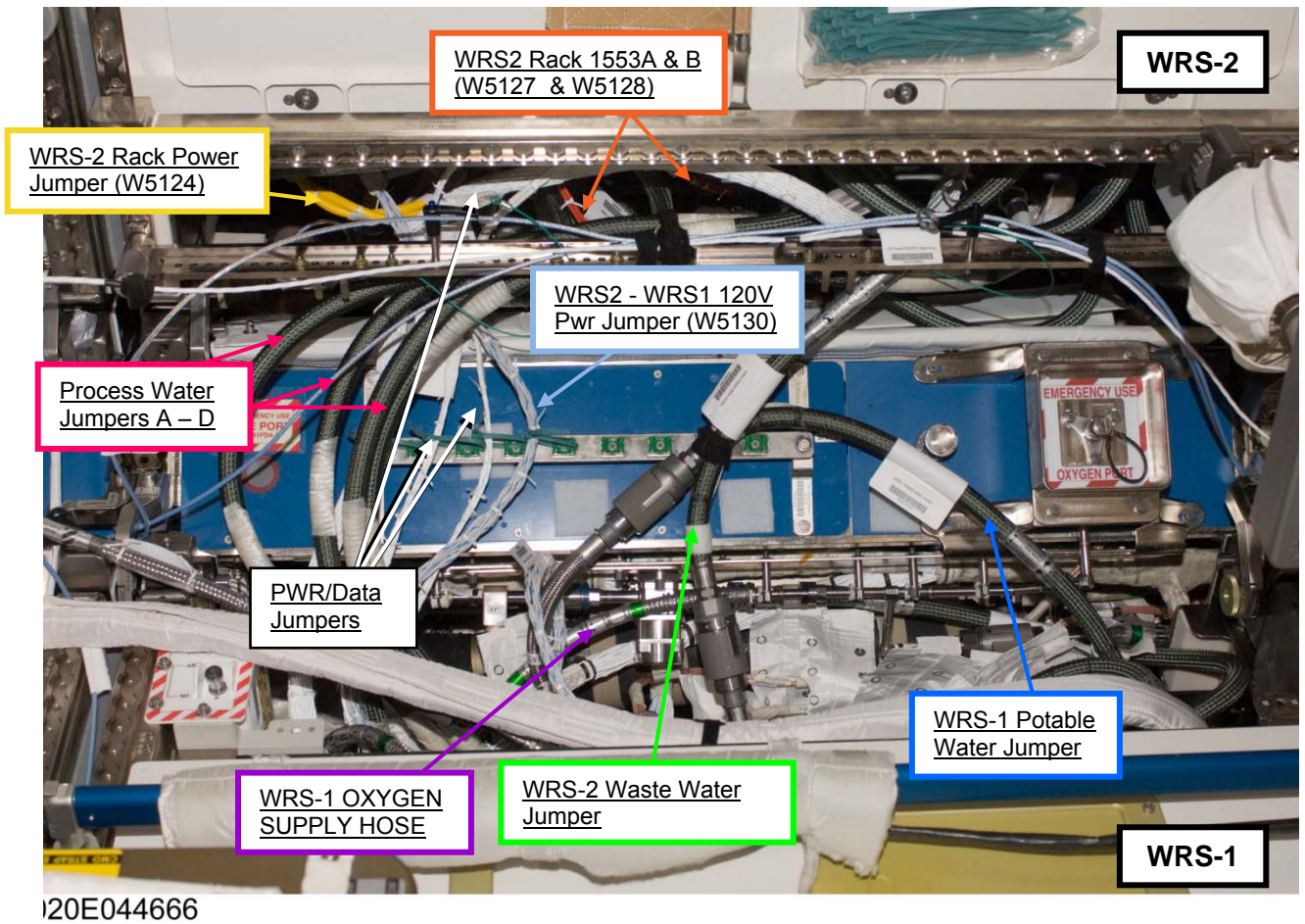


Figure 4.- WRS-1 and WRS-2 Jumpers.

3. DEMATING ELECTRICAL CABLES

Refer to Figure 4.

- 3.1 Don Static Wrist Tether.
Secure to unpainted, unannodized metal surface.

- LAB1PD4 3.2 For steps 3.3 to 3.13, install caps from Ziplock Bag labeled "WRS Pwr/Data Caps."
If cap not available, cover connector with Kapton Tape.

- 3.3 Demating WRS-2 Rack Power Jumper (W5124)
W5124-P1 ←|→ J1 on LAB1P4 ISPR Panel
W5124-P2 ←|→ J2 on Rack UIP
Release from WRS Jumper Support Bracket (Wire Cutters).
Stow in CTB.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

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- 3.4 Demating WRS2 - WRS1 120V Pwr Jumper (W5130)
W5130-P2 ←|→ J2 on LAB1D4 Rack UIP
W5130-P6 ←|→ J6 on LAB1P4 Rack UIP
Release from WRS Jumper Support Bracket (Wire Cutters).
Stow in CTB.

- 3.5 Demating WRS1 J6 - WRS2 J7 Pwr/Data Jumper (W5131)
W5131-P6 ←|→ J6 on LAB1D4 Rack UIP
W5131-P7 ←|→ J7 on LAB1P4 Rack UIP
Release from WRS Jumper Support Bracket (Wire Cutters).
Stow in CTB.

- 3.6 Demating WRS1 J7 - WRS2 J8 Pwr/Data Jumper (W5132)
W5132-P7 ←|→ J7 on LAB1D4 Rack UIP
W5132-P8 ←|→ J8 on LAB1P4 Rack UIP
Release from WRS Jumper Support Bracket (Wire Cutters).
Stow in CTB.

- 3.7 Demating WRS-1 J8 - WRS-2 J9 Data Jumper (W5133)
W5133-P8 ←|→ J8 on LAB1D4 Rack UIP
W5133-P9 ←|→ J9 on LAB1P4 Rack UIP
Release from WRS Jumper Support Bracket (Wire Cutters).
Stow in CTB.

- 3.8 Demating WRS-2 Rack 1553A Jumper (W5127)
W5127-P3 ←|→ J3 on LAB1P4 ISPR Panel
W5127-P4 ←|→ J4 on Rack UIP
Stow in CTB.

- 3.9 Demating WRS-2 Rack 1553B Jumper (W5128)
W5128-P4 ←|→ J4 on LAB1P4 ISPR Panel
W5128-P5 ←|→ J5 on Rack UIP
Stow in CTB.

- 3.10 Demating WRS-2 Rack Data Jumper (W5129)
W5129-P43 ←|→ J43 on LAB1P4 ISPR Panel
W5129-P3 ←|→ J3 on Rack UIP
Stow in CTB.

NOTE

RPS Switch Position will show "On" on PCS display when
Rack Data Jumper is demated.

- 3.11 Demating WRS-1 Rack Data Cable (W5120)
W5120-P3 ←|→ J3 on Rack UIP
Stow in CTB.

W5120-P1 ←|→ Manual RFCA temperature sensor connector on
WRS-1 MTL Return Jumper
Secure in Standoff.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

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- 3.12 Demating WRS-1 Rack 1553A Jumper (W5125)
W5125-J8 ←|→P8-W3305 (1553A Standoff umbilical)
Secure in standoff
W5125-P4 ←|→ J4 on Rack UIP
Stow in CTB.
- 3.13 Demating WRS-1 Rack 1553B Jumper (W5126)
W5126-J8 ←|→ P8-W3306 (1553B Standoff umbilical)
Secure in standoff
W5126-P5 ←|→ J5 on Rack UIP
Stow in CTB.
- 3.14 Doff Static Wrist Tether.

4. DEMATING FLUID LINES

4.1 Demating Process Water Jumpers

Cap and Plug both halves of QDs using Ziplock Bag labeled "WRS Process Water Caps/Plugs."



WRS Process Water A Jumper ←|→ "Process Water Line A" on both WRS Rack UIPs

WRS Process Water B Jumper ←|→ "Process Water Line B" on both WRS Rack UIPs

For WRS-1

| WRS Process Water C Jumper ←|→ "Process Water Line C" on WRS-1 Rack UIP

For WRS-2

| WRS Process Water C Jumper ←|→ check valve on "Process Water Line C" on WRS-2 Rack UIP

WRS Process Water D Jumper ←|→ "Process Water Line D" on both WRS Rack UIPs

Release from Velcro Straps.

Stow in CTB.

4.2 Demating WRS-2 Waste Water Jumper



Cap and Plug both halves of QDs using Ziplock Bag labeled "WRS2 Waste Water Caps/Plugs."

If QD cap(plug) not available

Cover QD with Ziplock Bag and secure with Gray Tape.

WRS-2 WASTE WATER JUMPER TO: X3 WASTE WATER BUS

←|→ LAB1D4 Waste Water Standoff umbilical

WRS-2 WASTE WATER JUMPER TO: WRS-2 WASTE WATER

←|→ WASTE WATER on Rack UIP

Release from Velcro Straps.

Stow in CTB.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

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4.3 For steps 4.4 to 4.7

Install caps and plugs from Ziplock Bag labeled "WRS TCS Caps/Plugs."

If QD cap(plug) not available

Cover QD with Ziplock Bag and secure with Gray Tape.

4.4 Demating WRS-1 MTL Return Jumper

MRFCA TO: MTL RETURN LAB1D4 JUMPER ←|→ MOD

TEMPERATURE COOLANT WATER RETURN in Standoff

MRFCA TO: WRS-1 MTL RETURN ←|→ TCS RETURN on Rack
UIP

Stow in CTB.

4.5 Demating WRS-1 MTL Supply Jumper

WRS-1 MTL SUPPLY JUMPER TO: X3 MTL SUPPLY ←|→ MOD

TEMPERATURE COOLANT WATER SUPPLY in Standoff

WRS-1 MTL SUPPLY JUMPER TO: WRS-1 TCS SUPPLY ←|→
TCS SUPPLY on Rack UIP

Stow in CTB.

4.6 Demating WRS-2 MTL Return Jumper

WRS-2 MTL RETURN JUMPER TO: LAB1P4 TCS MOD RETURN

←|→ TCS MOD RETURN on LAB1P4 ISPR Panel

WRS-2 MTL RETURN JUMPER TO: WRS-2 TCS RETURN ←|→
TCS RETURN on Rack UIP

Stow in CTB.

4.7 Demating WRS-2 MTL Supply Jumper

WRS-2 MTL SUPPLY JUMPER TO: LAB1P4 TCS MOD

SUPPLY←|→ TCS MOD SUPPLY on LAB1P4 ISPR Panel

WRS-2 MTL SUPPLY JUMPER TO: WRS-2 TCS SUPPLY ←|→
TCS SUPPLY on Rack UIP

Stow in CTB.

4.8 Don Clean Room Gloves.

4.9 For step 4.10

Install cap and plug from Teflon Bag labeled "WRS1 O₂ Caps/Plugs."

4.10 Demating WRS-1 Oxygen Supply Hose

WRS-1 OXYGEN SUPPLY HOSE←|→OXYGEN SUPPLY on Rack
UIP

Secure in Standoff (Velcro Straps).

WARNING

Contact with the wetted surfaces of the potable water system QDs may lead to contamination and crew illness.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

(ASSY OPS/20A/FIN 1) Page 11 of 17 pages

- 4.11 For step 4.12
| Install caps and plugs from Ziplock Bag labeled "WRS1 Potable Water Caps/Plugs."

4.12 Demating WRS-1 Potable Water Jumper



WRS-1 POTABLE WATER JUMPER TO: X3 FUEL CELL WATER BUS ←|→ FUEL CELL WATER in Standoff
WRS-1 POTABLE WATER JUMPER TO: WRS-1 POTABLE WATER RETURN ←|→ POTABLE WATER RETURN on Rack UIP
Release from Velcro Straps.
Stow in CTB.

If contact made with wetted surface of QD
Clean surface (Povidone Iodine Pads).

- 4.13 Doff Clean Room Gloves.

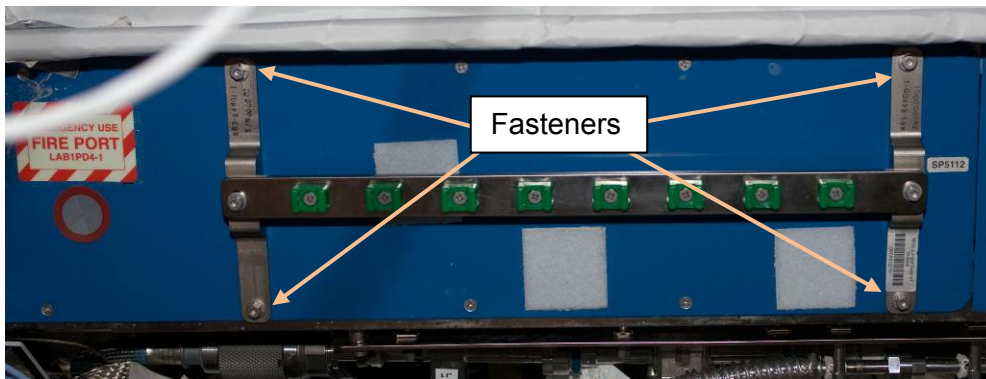


Figure 5.- WRS Jumper Support Bracket, Installed on LAB1PD4 Standoff.

- 4.14 Remove WRS Jumper Support Bracket, fasteners (four) (Ratchet, 1/4" Drive; 5/16" Socket, 1/4" Drive).
Temporarily stow.
Refer to Figure 5.

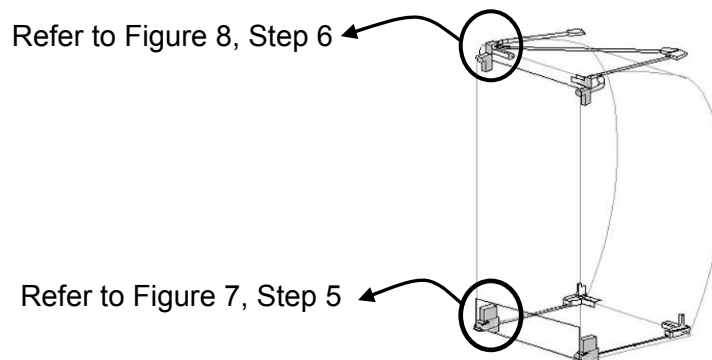


Figure 6.- Location of Rack Restraint Hardware.

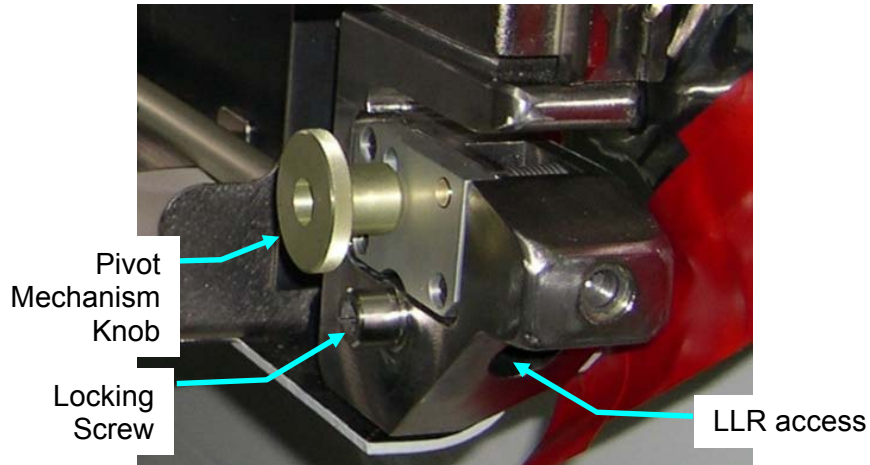


Figure 7.- WRS-2 Pivot Mechanism and Lower Launch Restraint (LLR), Right Side.

5. PIVOT MECHANISM KNOB DISENGAGEMENT

Refer to Figures 6 and 7.

- LAB1P4 (LAB1D4)
- 5.1 Loosen Pivot Mechanism Knob one turn.
Snug in down position so Rack is free to lift off Pivot Fitting.
 - 5.2 Repeat disengagement for opposite side.

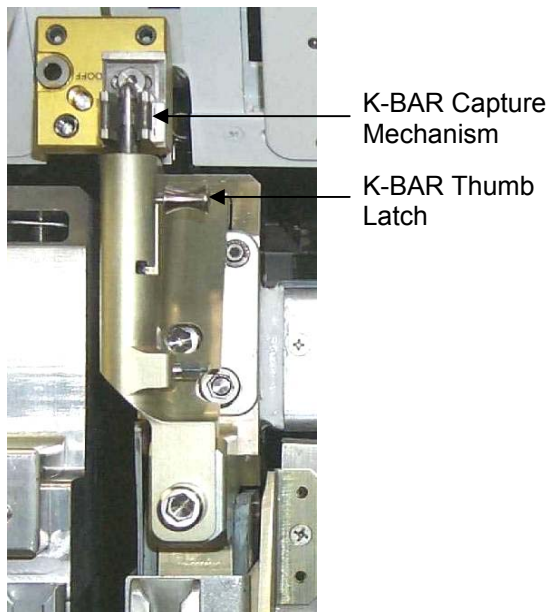


Figure 8.- K-BAR Shown Installed, Left Side.

6. K-BAR DISENGAGEMENT

Refer to Figures 6 and 8.

- 6.1 Disengage Rack K-BAR Thumb Latch from Standoff.
- 6.2 Repeat disengagement for opposite side.

6.3 Slowly rotate Rack down to a controlled stop.

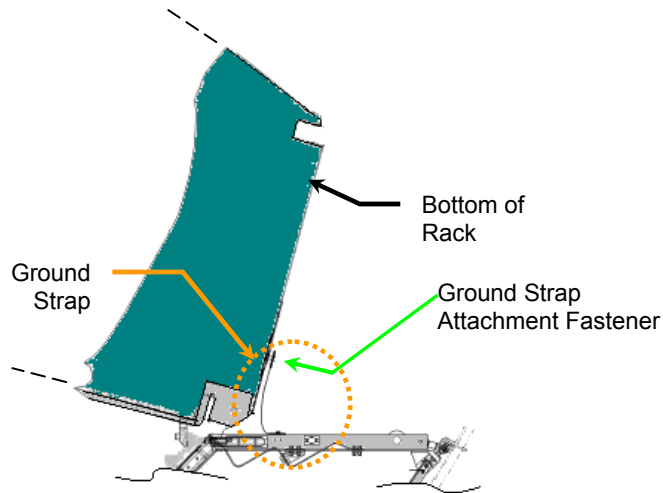


Figure 9.- Side View of Rotated Rack, Showing Rack Ground Strap Location.

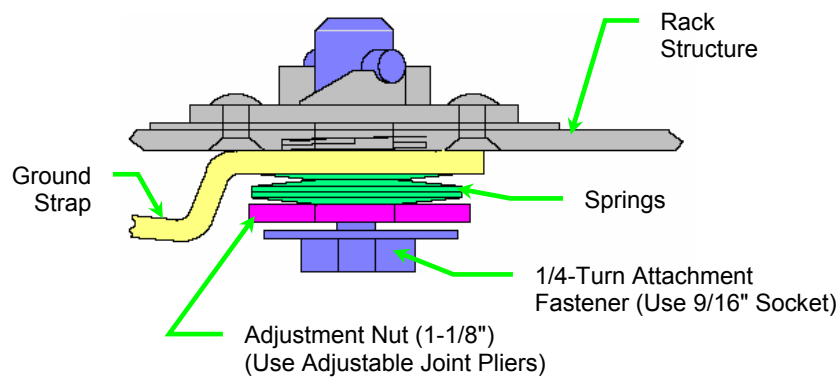


Figure 10.- Rack Ground Strap Cross Section.

7. REMOVING GROUND STRAP

Refer to Figures 9 and 10.

- 7.1 Fully retract Adjustment Nut ↻ towards head of Attachment Fastener (Adjustable Joint Pliers, Straight Jaw).
- 7.2 Ground Strap ←|→ Rack, 1/4-Turn Attachment Fastener (Ratchet, 3/8" Drive; 9/16" Socket, 3/8" Drive)
- 7.3 Stow Ground Strap on Standoff location.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

(ASSY OPS/20A/FIN 1) Page 14 of 17 pages

8. TRANSFERRING RACK TO NODE 3

8.1 Lift Rack off of Pivot Fittings.

NOTE

Due to the location of the Rack Power Switch, outside pivot fittings must be used on the right side to avoid interference.

The right side outer pivot fittings will transfer with the Racks.

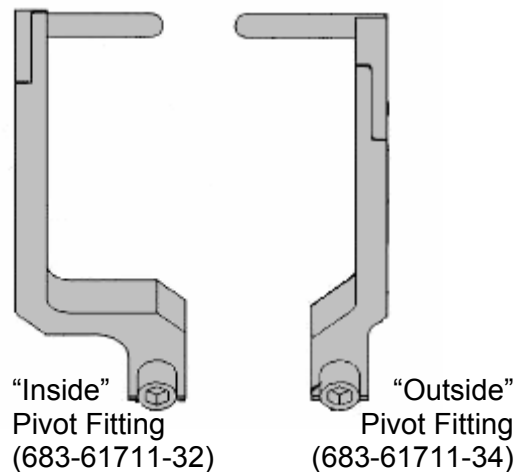


Figure 11.- ARIS Pivot Fitting Bottom Right, Outside vs. Inside.

- 8.2 Remove ARIS Pivot Fitting Bottom Right (outside) (P/N 683-61711-34) from lower Standoff (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive). Refer to Figure 11.
- 8.3 Loosen Mechanism Knobs so they are free to move. Refer to Figure 7.
- 8.4 Transfer WRS-1(WRS-2) Rack and Pivot Fitting to NOD3D5(NOD3D4).
- NOD3D5(4) 8.5 Install, torque ARIS Pivot Fitting Bottom Right (outside), fastener (one) to 150 in-lbs [Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive; (40-200 in-lbs) Trq Wrench, 3/8" Drive].
- 8.6 Align Rack onto Standoff until Rack Pivot Latches engage standoff Pivot Pin Brackets. Keep rack rotated down.
- 8.7 Tighten both Pivot Mechanism Knobs in latched, up position.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

(ASSY OPS/20A/FIN 1) Page 15 of 17 pages

9. INSTALLING GROUND STRAP

- 9.1 Inspect Ground Strap contact surfaces for debris, clean if required (Dry Wipes).
- 9.2 Fully retract Adjustment Nut ↺ (towards head of Attachment Fastener), by hand.
Refer to Figure 10.
- 9.3 Ground Strap →|← Rack, 1/4-Turn Attachment Fastener (Ratchet, 3/8" Drive; 9/16" Socket).
Refer to Figures 9 and 10.
- 9.4 Snug Adjustment Nut ↻, until firm against Springs.
- 9.5 Tighten Adjustment Nut an additional 1/2 to 3/4 turn ↻ (Adjustable Joint Pliers, Straight Jaw).
- 9.6 Photo document installed Ground Strap (Digital Camera).

10. FINAL INSTALLATION

- 10.1 √Rack rotation path is unobstructed
- 10.2 K-BAR Thumb Latches (two) → up position
Refer to Figure 8.

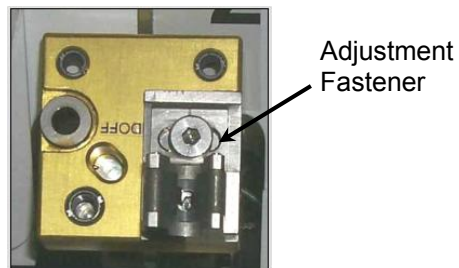


Figure 12.- K-BAR Capture Mechanism, Located on Upper Standoff.

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

* If K-BAR does not align with Capture Mechanism:
* | Loosen Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex
* | Head).
* | Slide capture clip left or right, as required, to engage K-BAR.
* | Once K-BAR engaged, re-tighten Adjustment Fastener
* | (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
* | Refer to Figure 12.

- 10.4 Repeat steps 5 to 10.3 for other Rack.

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

(ASSY OPS/20A/FIN 1) Page 16 of 17 pages

11. CLOSEOUT OR POST TRANSFER

WARNING

Do not mate WRS umbilicals at this time. Failure to follow appropriate umbilical safing procedure can result in electrical shock hazard.

- 11.1 Install EDV Seat Track Brackets (two) on aft end of WRS-2, seat track thumbscrews (four).
- 11.2 Photo document newly installed hardware (Digital Camera).
- 11.3 Label CTB "WRS and OGS Lab Mod Kit Jumpers."
Stow remaining parts, tools, materials.
Notify **MCC-H** transfer activity for WRS-1 and WRS-2 is complete, CTB S/N.

Table 1. Jumpers Restow Table (in CTB)

OpNom	P/N
WRS-1 Jumpers	
WRS-1 MTL Return Jumper	683-63495-1
WRS-1 MTL Supply Jumper	683-63461-10
WRS-1 Potable Water Jumper	683-63461-11
WRS1 Rack 1553A Jumper	683-95125-1
WRS1 Rack 1553B Jumper	683-95126-1
WRS-2 Jumpers	
WRS-2 MTL Supply Jumper	683-63461-12
WRS-2 MTL Return Jumper	683-63461-13
WRS2 Rack Data Jumper	683-95129-1
WRS2 Rack 1553A Jumper	683-95127-1
WRS2 Rack 1553B Jumper	683-95128-1
Temporary OGS/WRS2 Rack Power Jumper	683-95124-1
WRS-2 Waste Water Jumper	683-63461-14
Rack to Rack Jumpers	
WRS1 J6 - WRS2 J7 Pwr/Data Jumper	683-95131-1
WRS1 J7 - WRS2 J8 Pwr/Data Jumper	683-95132-1
WRS1 J8 - WRS2 J9 Data Jumper	683-95133-1
WRS2 - WRS1 120V Pwr Jumper	683-95130-1
WRS Process Water A Jumper	683-63461-15
WRS Process Water B Jumper	683-63461-16
WRS Process Water C Jumper	683-63461-17
WRS Process Water D Jumper	683-63461-18

1.150 WRS-1 & WRS-2 RACK TRANSFER LAB TO NOD3

(ASSY OPS/20A/FIN 1) Page 17 of 17 pages

Table 2. Closeout Bracket Restow

OpNom	P/N
WRS Closeout Assembly	
WRS Jumper Support Bracket	683-64400-1
WRS Closeout Assembly - Seat Track Bracket	683-64400-3

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1.151 WHC DEACTIVATION AND RACK POWER DOWN

(ASSY OPS/20A/FIN) Page 1 of 3 pages

OBJECTIVE:

Deactivation and power down of the Waste and Hygiene Compartment (WHC). There are two ways to power off the WHC (control panels or upstream power).

LOCATION:

NOD3F4 - WHC

DURATION:

5 minutes - crew steps

CREW:

One

1. DETERMINING DEACTIVATION STEPS REQUIRED

<u>NOTE</u>
1. The WHC Power Supply is the only ORU to interface with 120VDC; therefore, requires two upstream verifiable inhibits listed in Table 1. All other ORUs are 28VDC and the one upstream verifiable inhibit is listed in Table 1.
2. Nominally crew will only be needed for steps 2 and 4.1, ground can perform the remainder of the steps.

Table 1. WHC Deactivation and Hardware Requiring Rack Safing

WHC Deactivation and Hardware	Safing Required	Steps to Perform
Nominal Powerdown	Open RPCM N32A2B C1 RPC 01	2 to 4
Contingency Powerdown with Crew	Open RPCM N32A2B C1 RPC 01	3 to 4.1.2
Contingency Powerdown without Crew	Open RPCM N32A2B C1 RPC 01	3, 4.2
ACY Control Panel	Open RPCM N32A2B C1 RPC 01	2 to 4
Hydraulic Interface Control Panel	Open RPCM N32A2B C1 RPC 01	2 to 4
ACY Fan Control Panel	Open RPCM N32A2B C1 RPC 01	2 to 4
WHC Power Control Panel	Open RPCM N32A2B C1 RPC 01	2 to 4
WHC Power Supply	Open RPCM N32A2B C1 RPC 01 DDCU N32A or N32B converter off	2 to 4
WHC Avionics Fan	Open RPCM N32A2B C1 RPC 01	2 to 4
All other electrical ORUs	WHC Control Panels powered off	2

1.1 Perform steps specified in Table 1.

2. POWERING DOWN WHC CONTROL PANELS

Hydraulic Interface Control Panel 2.1 Powering Off Hydraulic Interface Control Panel

sw MANUAL → up
Verify MANUAL LED – □

↓ H2O FILLING OFF
Verify H2O FILLING LED – ■

1.151 WHC DEACTIVATION AND RACK POWER DOWN

(ASSY OPS/20A/FIN)

Page 2 of 3 pages

sw MANUAL → down
Verify MANUAL LED – ■

sw PANEL ON → down
Verify PANEL PWR LED – ■

↓ CHECK LIGHTS
Verify all LED – ■

ACY Fan Control Panel 2.2 sw AUTO → OFF

CAUTION

Hardware damage could occur if any button other than CHECK LIGHTS or CALL LIGHTS is pressed after powering off the ACY Control Panel.

ACY Control Panel 2.3 Powering Off ACY Control Panel
sw PANEL → down

↓ CHECK LIGHTS (hold)
Wait until all lights – ■ (~20 seconds)

↓ CALL LIGHTS (hold)
Verify ACY PWR ON light – ■

3. INHIBITING WHC AVIONICS FAN CAUTION (GROUND ONLY)

MCC-H Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS, 1 to 3, 5, 8 (SODF: GND AVIONICS: C&DH: NOMINAL), noting the following, then:

Action to perform:

Inhibit C&W Event – Event Code: 17036 - '**WHC Fan Speed Failure-Node3**'

4. POWERING DOWN WHC

WARNING

Power down of the WHC while in use by crew and connected to the UPA may cause a Tox 2 fluid leak due to backflow from UPA.

1.151 WHC DEACTIVATION AND RACK POWER DOWN

(ASSY OPS/20A/FIN)

Page 3 of 3 pages

PCS

4.1 If crew available

4.1.1 Verify WHC not in use.

4.1.2 sw RACK POWER → OFF

4.1.3 Verifying NOD3F4 Rack Safed
NODE 3: EPS: Rack Power

'NOD3F4'

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

'NOD3F4 WHC1'

sel RPCM N32A2B C1 RPC 01

Verify RPC Position – Op

cmd Close Cmd Inhibit (Verify – Inh)

MCC-H

4.2 If crew unavailable

4.2.1 Verify WHC not in use.

4.2.2 Powering Off NOD3F4 Rack (Ground Only)
NODE 3: EPS: DDCU N32A2B

sel WHC

Verify Integration Counter – incrementing

cmd Open Cmd Enable (Verify – Ena)
cmd RPC Position – Open (Verify – Op)
cmd Close Cmd Inhibit (Verify – Inh)

4.3 If required, for Rack safing

√ **MCC-H** to verify the following configuration
Verify DDCU N32A (DDCU N32B) Converter - OFF

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1.152 ARS RACK TRANSFER JPM1F3 TO NOD3A4

(ASSY OPS/20A/FIN 1/IMPACT J/HC) Page 1 of 11 pages

OBJECTIVE:

Relocate ARS Rack from JPM1F3 to NOD3A4. This relocation activity releases ARS Rack Ground Strap and transfers ARS Rack to NOD3A4. Rack umbilicals are mated in a separate procedure. Includes post maintenance steps to be performed at the JPM1F3 location.

LOCATION:

Start: JPM1F3

Finish: NOD3A4

DURATION:

1 hour, 20 minutes

1 hour for ARS Rack transfer

20 minutes for JPM post maintenance

CREW:

Two

PARTS:

Soft Dummy Panel P/N 80AS51741-103

MATERIALS:

Dry Wipes

Kapton Tape

Velcro Straps

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

9/16" Socket, 3/8" Drive

Ratchet, 3/8" Drive

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

Ratchet, 1/4" Drive

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

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

Drawer 3:

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

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

Drawer 4:

Wire Cutters

Adjustable Joint Pliers, Straight Jaw

NOTE
 All directional references (up, down, left, right) are with respect to front face of ARS Rack, as you face the Rack.

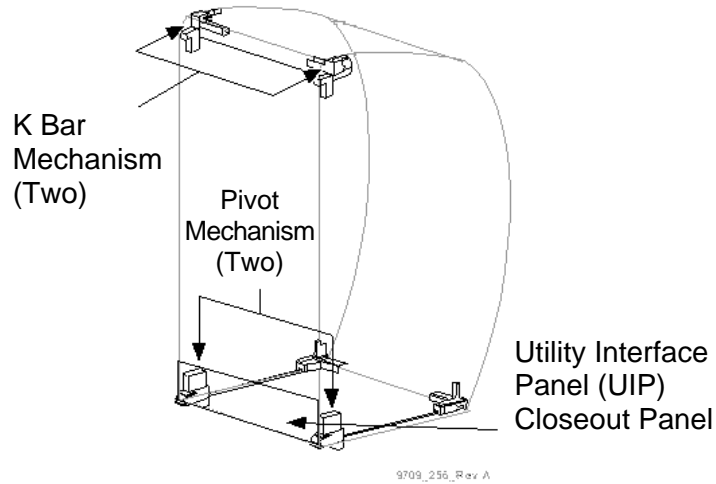


Figure 1.- Rack Attachment Mechanisms.

1. RELEASING ARS RACK UTILITIES (NOD3AD4)

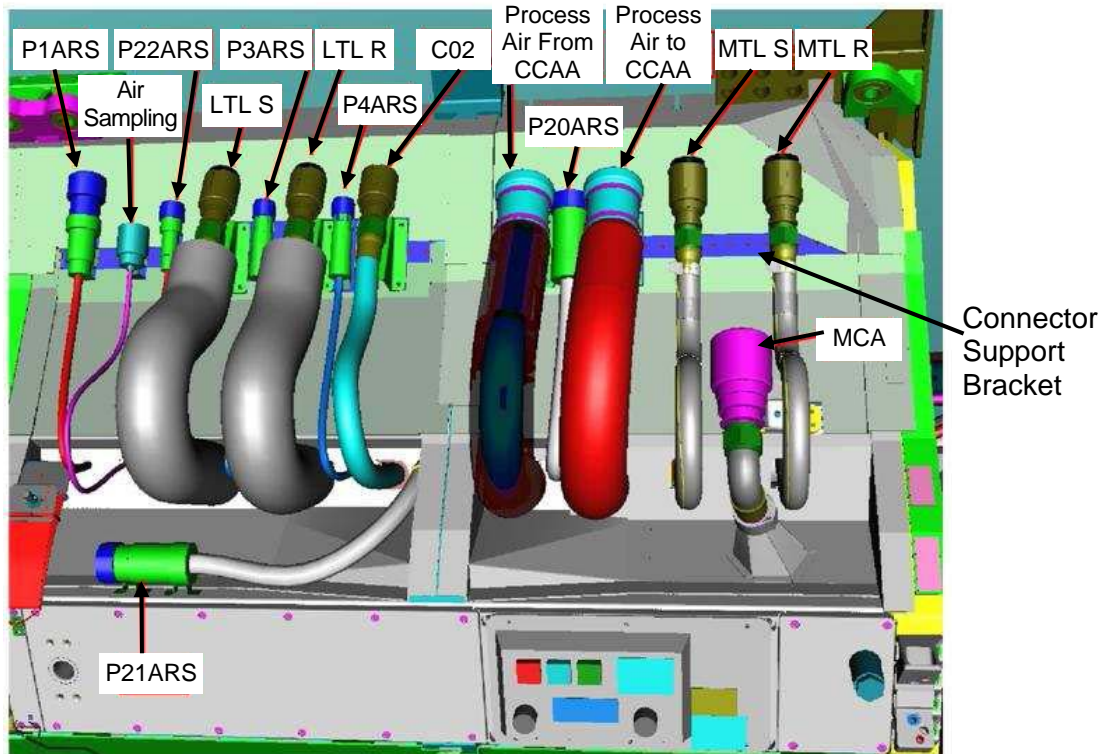


Figure 2.- ARS Utilities, NOD3AD4 (Launch Configuration).



Figure 3.- ARS Ground Strap with Tie Wraps (Launch Configuration).

NOTE

Utilities parked in Node 3 Aft Deck Standoff need to be released to prevent interference with Rack during installation.

- 1.1 Remove the umbilicals from connector support bracket by cutting Tie Wraps (Wire Cutters).
Refer to Figure 2.
Restrain umbilicals out of Rack bay (Kapton Tape).
- 1.2 Cut the two Tie Wraps restraining the Rack Ground Strap (P/N 683-56201-2) (Wire Cutters).
Refer to Figure 3.
- 1.3 Dispose all removed Kapton Foil, Beta Cloth, Tie Wraps (Trash Bag).

1.152 ARS RACK TRANSFER JPM1F3 TO NOD3A4

(ASSY OPS/20A/FIN 1/IMPACT J/H/C) Page 4 of 11 pages

2. ROTATING RACK DOWN (JPM1F3)

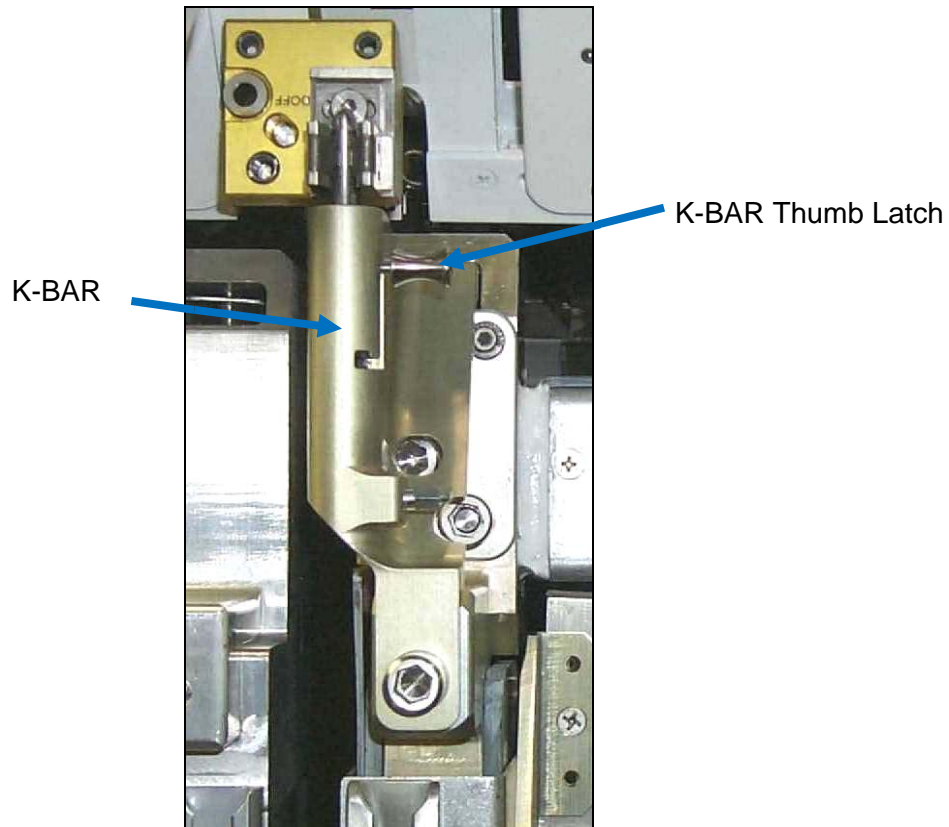


Figure 4.- K-BAR Mechanism Installed (Rack Upper Left).

JPM1F3

2.1 K-BAR Thumb Latches (two) → Down position
Refer to Figure 4.

2.2 ✓ Rack rotation, path unobstructed

2.3 Slowly rotate Rack down to a controlled stop.

1.152 ARS RACK TRANSFER JPM1F3 TO NOD3A4

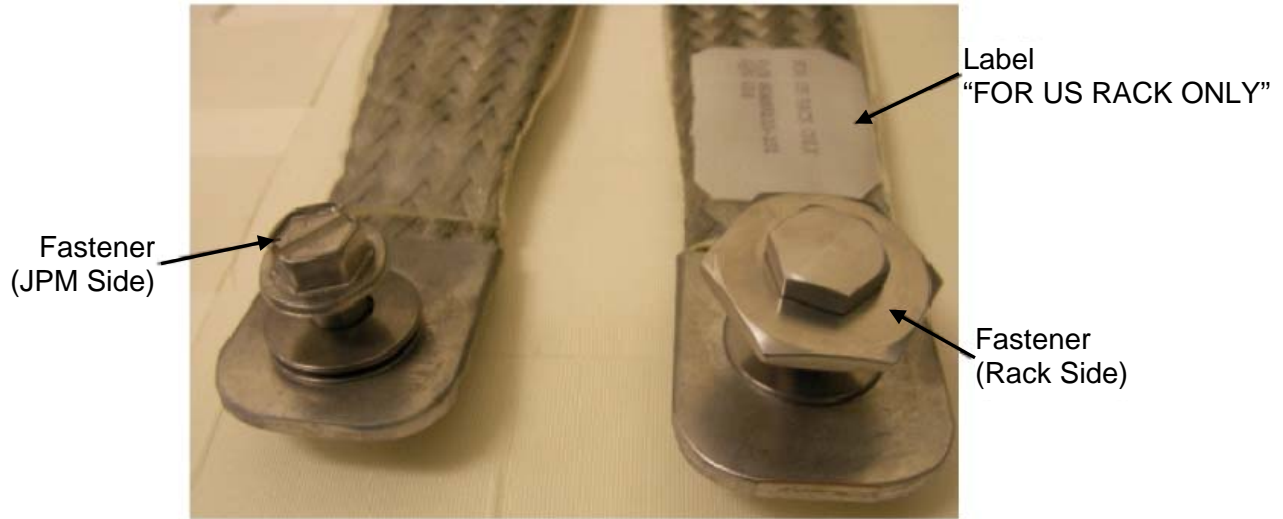


Figure 5.- JEM Ground Strap NASA Rack.

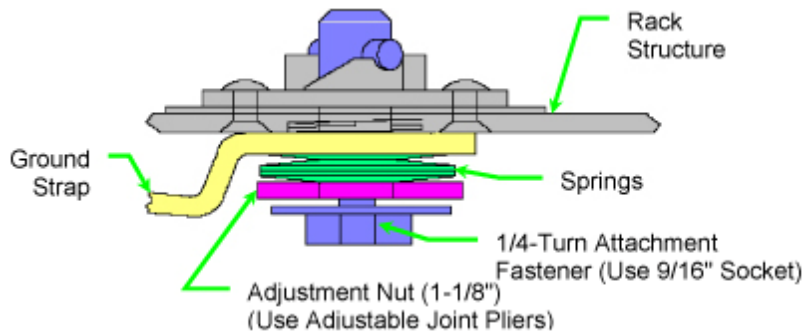


Figure 6.- Rack Ground Strap Cross-Section at Rack Structure.

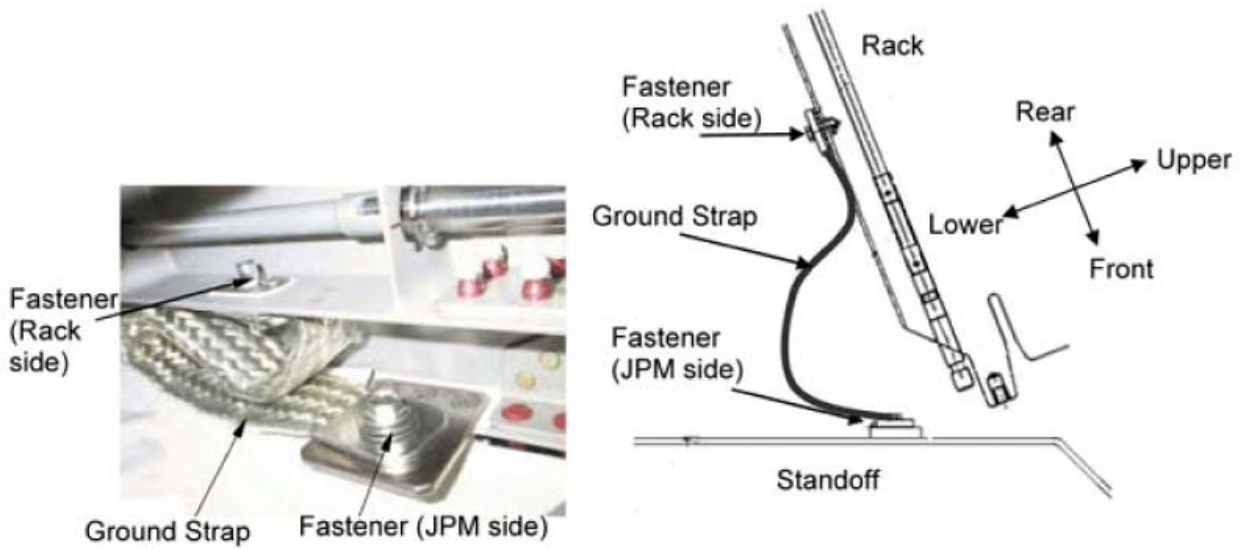


Figure 7.- JEM Ground Strap NASA Rack Installation.

1.152 ARS RACK TRANSFER JPM1F3 TO NOD3A4

(ASSY OPS/20A/FIN 1/IMPACT J/HC) Page 6 of 11 pages

NOTE

JEM Ground Strap NASA Rack will remain on JPM1F3 Standoff. Ground strap should be released from only Rack side.

2.4 Fully retract Adjustment Nut (towards head of attachment fastener) (Adjustable Joint Pliers, Straight Jaw).
Refer to Figures 5, 6.

2.5 JEM Ground Strap NASA Rack ←|→ Left side of ARS Rack, 1/4 Turn Fastener (Ratchet, 3/8" Drive; 9/16" Socket).
Refer to Figure 7.

3. TRANSLATING RACK TO NOD3A4

3.1 √All unnecessary equipment protruding into Rack translation path has been removed, stowed (JPM, Node 2, LAB, Node 1, Node 3)

NOD3A4 3.2 Verify that ARS Rack installation location is clear of equipment, Rack umbilicals out of way of Rack and stowed towards the aisle.

JPM1F3 3.3 Remove any Handrails from the front of the Rack.

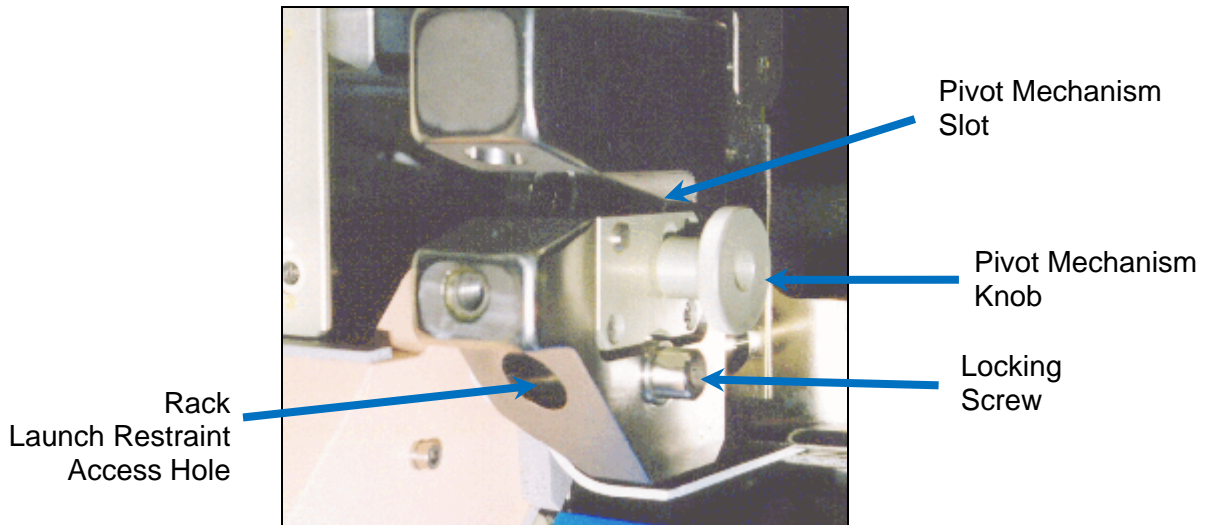


Figure 8.- Rack Launch Restraint, Lower Left, Typical.

3.4 Loosen both Left, Right Rack Pivot Mechanism Knobs one turn, then snug in unlatched, down position.
Refer to Figure 8.

3.5 Lift Rack off of Pivot Fittings.

3.6 Loosen both Left, Right Rack Pivot Mechanism Knobs one turn, so latches are free to move.

1.152 ARS RACK TRANSFER JPM1F3 TO NOD3A4

(ASSY OPS/20A/FIN 1/IMPACT J/H/C) Page 7 of 11 pages

NOTE

ARIS PIVOT FITTING BOTTOM LEFT will remain on JPM1F3 standoff. Only ARIS PIVOT FITTING BOTTOM RIGHT should be removed from Standoff.

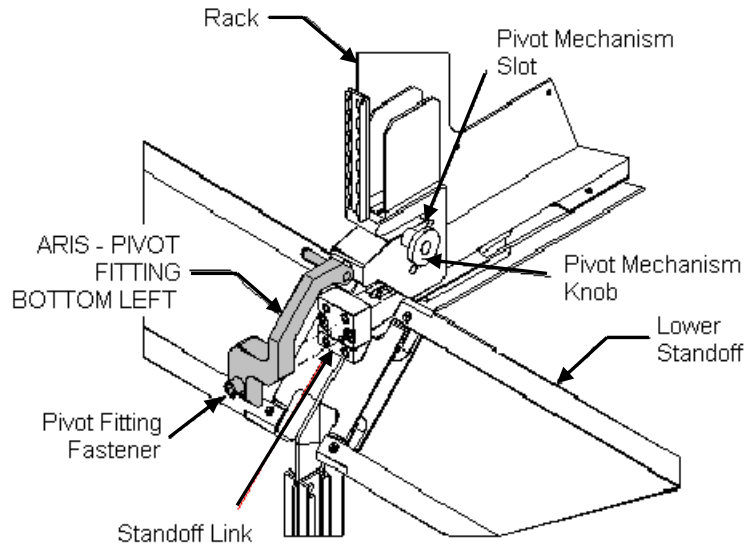


Figure 9.- Installation of Pivot Fitting, Left Side.

3.7 Remove ARIS PIVOT FITTING BOTTOM RIGHT (PN 683-61711-34), fastener (one) (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).

Refer to Figure 9.

3.8 Transfer Rack and ARIS PIVOT FITTING BOTTOM RIGHT (PN 683-61711-34) to NOD3A4.

NOD3A4 3.9 Install ARIS PIVOT FITTING BOTTOM RIGHT (PN 683-61711-34) onto Standoff Link located on lower right Standoff (Ratchet, 3/8" Drive; 6" Long 3/8" Hex Head).

Torque fastener to 150 in-lbs [(40-200 in-lbs) Trq Wrench, 3/8" Drive; 6" Long 3/8" Hex Head].

Refer to Figures 1, 9.

3.10 Align Rack onto Standoff until Rack Pivot Latches engage Pivot Fittings.

Keep Rack rotated down.

3.11 Tighten both Left, Right Pivot Mechanism Knobs in latched, up position.

4. INSTALLING RACK GROUNDING STRAP

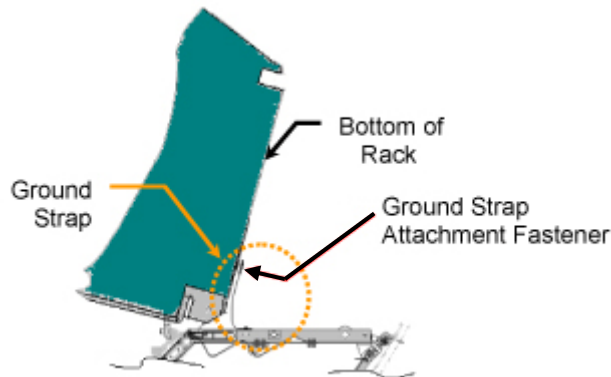


Figure 10.- Side View of Rotated Rack, Showing Rack Ground Strap Location.

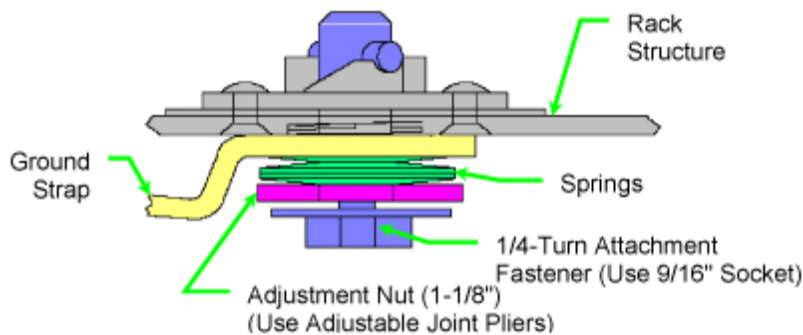


Figure 11.- Rack Ground Strap Cross-Section.

- 4.1 Inspect Grounding Strap contact surfaces for debris, clean if required (Dry Wipes).
- 4.2 Fully retract Adjustment Nut ↺ (towards head of Attachment Fastener) by hand.
Refer to Figure 11.
- 4.3 Ground Strap →|← ARS Rack, using 1/4 Turn Attachment Fastener (Ratchet, 3/8" Drive; 9/16" Socket).
Refer to Figure 10.
- 4.4 Snug Adjustment Nut ↺ until firm against Springs.
- 4.5 Tighten Adjustment Nut an additional 1/2 to 3/4 turn ↻ (Adjustable Joint Pliers, Straight Jaw).
- 4.6 Photo document installed Ground Strap (Digital Camera).

5. ROTATING RACK TO FINAL POSITION

- 5.1 K-BAR Thumb Latches (two) → Up position

5.2 ✓ Rack rotation path unobstructed

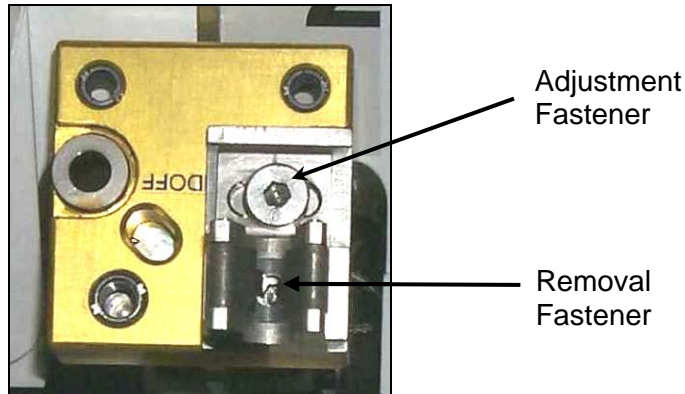


Figure 12.- K-BAR Capture Mechanism, Installed on NOD3 Standoff.

- *****
- * If K-BAR does not align with Capture
 - * | Mechanism, loosen Adjustment Fastener using Ratchet,
 - * | 3/8" Drive; 6" Long, 5/32" Hex Head.
 - * |
 - * Refer to Figure 12.
- *****

5.3 Slowly rotate Rack up.
Engage Rack K-BAR Thumb Latches (two) into Capture Mechanism located on NOD3 Standoff.
Refer to Figures 4,12.

5.4 Stow Rack Umbilicals in Rack UIP area, restrain as needed (Velcro Straps).

6. CLOSEOUT

6.1 Photo document all newly installed hardware (Digital Camera).

6.2 Notify **MCC-H** that ARS Rack is transferred to NOD3A4.

7. POST MAINTENANCE FOR JPM

JPM1F3

7.1 Securing JEM Ground Strap NASA Rack
Secure JEM Ground Strap NASA Rack onto Standoff (Kapton Tape).

<p>NOTE</p> <p>After ARIS PIVOT FITTING BOTTOM RIGHT is removed, no Pivot Fitting will be installed at this location for an undetermined period of time. Kapton Tape should be applied to standoff link to prevent dust accumulation.</p>
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1.152 ARS RACK TRANSFER JPM1F3 TO NOD3A4

(ASSY OPS/20A/FIN 1/IMPACT J/HC)

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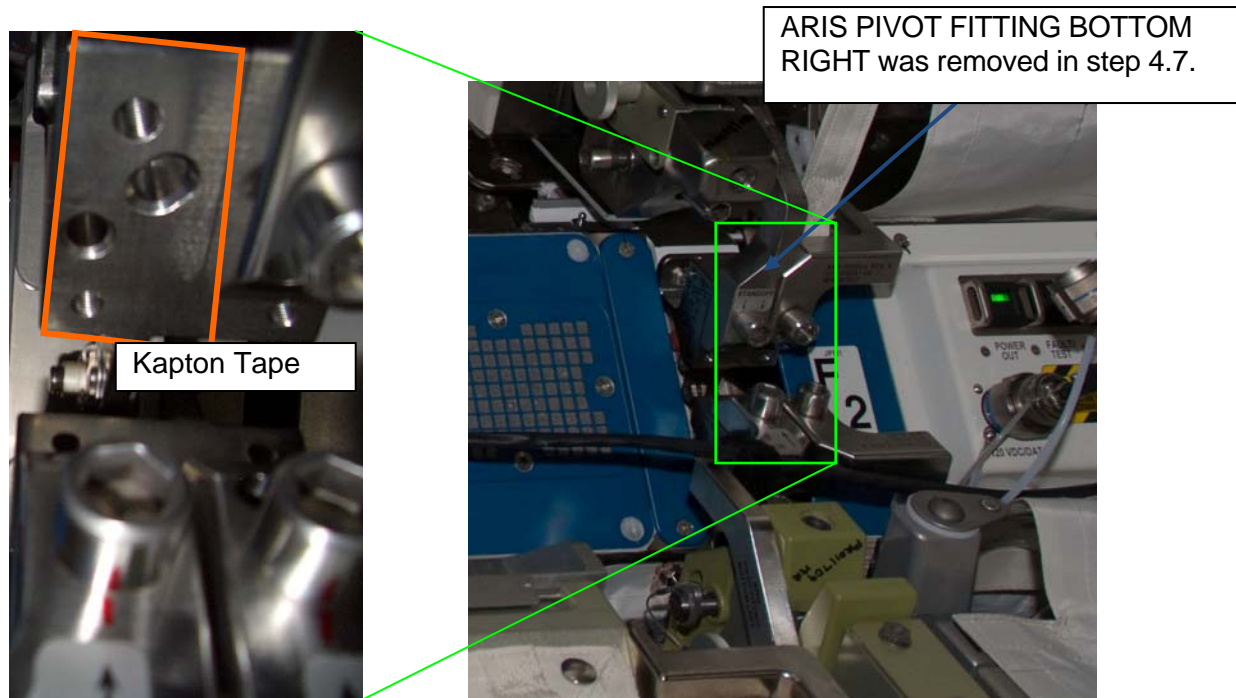


Figure 13.- Standoff Link After Pivot Fitting Is Removed.

7.2 Covering Pivot Fitting I/F on Standoff Link

Apply Kapton Tape to Standoff link.

Refer to Figure 13.

7.3 Photo document (Digital Camera) the following:

Lower left and right Standoff links

Ground strap

JPM1F3 Z-Panel

Overview of Rack vacant area

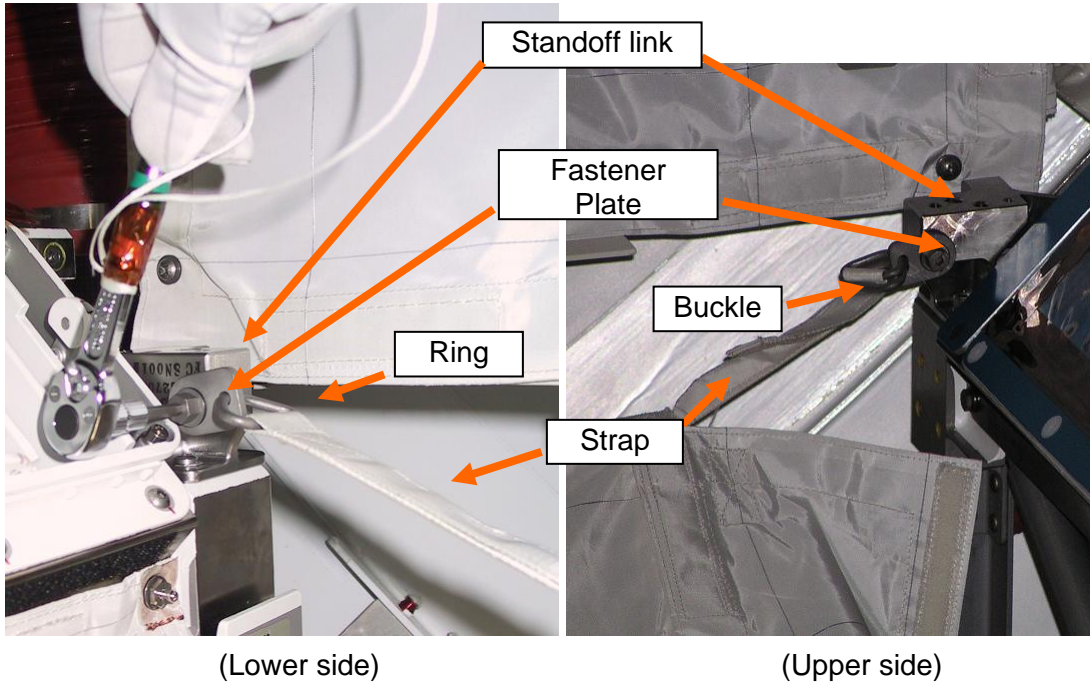


Figure 14.- Fastener and Strap of Soft Dummy Panel.

7.4 Installing Soft Dummy Panel After ARS Rack Removal

Refer to Figure 14.

7.4.1 Install lower side of Soft Dummy Panel (P/N 80AS51741-103) to Standoff link.

Tighten, torque fasteners (two) to 30 in-lbs [Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].

7.4.2 Install upper side of Soft Dummy Panel (P/N 80AS51741-103) to Standoff link.

Tighten, torque fasteners (two) to 30 in-lbs [Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive; (10-50 in-lbs) Trq Wrench, 1/4" Drive].

7.4.3 Adjust tension of Soft Dummy Panel (P/N 80AS51741-103) by pulling Straps (two) on Upper Attachment.

7.4.4 Closeout upper and lower side of Soft Dummy Panel (P/N 80AS51741-103), Velcro.

7.4.5 Record B/C of Soft Dummy Panel _____

7.5 Notify **SSIPC** that JPM1F3 post maintenance is completed and B/C of Soft Dummy Panel.

Stow tools, equipment.

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1.153 WHC ACTIVATION

(ASSY OPS/20A/FIN)

Page 1 of 6 pages

OBJECTIVE:

Power up of the Waste and Hygiene Compartment (WHC). If specific ORUs were replaced or a break in operations occurred, the WHC will be activated manually to actuate the Pre-Treat and Water Pump (ДКВ) to allow pre-treat to enter the system. A functionality test will be performed after ORU changeout.

LOCATION:

WHC - NOD3F4

DURATION:

25 minutes

10 minutes Power Control Panels

10 minutes Activation

5 minutes Functionality Test

CREW:

One

CAUTION

Powering the WHC with control panel switches out of configuration may cause hardware damage.

1. VERIFYING WHC INITIAL CONFIGURATION

Checking Control Panel Switch Positions

ACY Fan Control Panel	√sw AUTO – down
	√sw MANUAL – down
ACY Control Panel	√sw PANEL – down
	√sw BK1 – down
	√sw MANUAL – down
	√sw DOSE – 2
Hydraulic Interface Control Panel	√sw PANEL ON – down
	√sw MANUAL – down

1.153 WHC ACTIVATION

(ASSY OPS/20A/FIN)

2. POWERING WHC RACK

2.1 If Rack Power Switch or RPC open command was used to remove power

WHC Power
Control Panel

PCS

2.1.1 sw RACK POWER → On

2.1.2 Powering NOD3F4 Rack
NODE 3: EPS: DDCU N32A2B Dist
DDCU N32A2B Dist

sel WHC

RPCM N32A2B C1 RPC 01

Verify Integration Counter – incrementing

cmd Close Cmd – Enable (Verify – Ena)

cmd RPC Position – Close (Verify – Cl)

cmd Open Cmd – Inhibit (Verify – Inh)

NOTE

MCC will only receive Fan Speed Threshold Low telemetry with CCS R9. With CCS R8 either crew PCS verification or a HCZ data dump can be performed to verify the Fan Speed Threshold Low telemetry.

2.1.3 Verifying Nominal WHC Avionics Fan

NODE 3: ECLSS: WHC

Node 3 WHC

'WHC Status'

Verify Fan Speed: greater than 188 and less than 2047

Verify Fan Speed Threshold Low: 188

Verify Fan Speed Threshold High: 2047

If Ground is performing Verifications and using CCS R8

Perform 11.106 WHC DATA DUMP, all (SODF: GND SUPPORT: S&M: NOMINAL), then:

*If Fan Speed Thresholds not correct

* input Low: 1 8 8

* input High: 2 0 4 7

*

* **cmd** Set

*

* Verify Fan Speed Threshold Low: 188

* Verify Fan Speed Threshold High: 2047

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MCC-H

2.1.4 Enabling WHC Avionics Fan Caution

Noting the following, perform [1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS](#), all (SODF: GND AVIONICS), then:

Action to perform: Enable C&W Event in Prime and Backup C&C MDM.

Event Code: '17036 - WHC Fan Speed Fail-Node3'

WHC Power 2.2 ✓cb1 AVIONICS FAN – Close
Control Panel ✓cb3 ACY PWR – Close

3. POWERING WHC CONTROL PANELS

ACY Control Panel 3.1 Power and Checkout ACY Control Panel
sw PANEL → up

↓ CALL LIGHTS

Verify ACY PWR ON light –

↓ H/W MATE CK

Verify H/W MATE light –

↓ CHECK LIGHTS

Verify all lights except for ACY PWR ON –

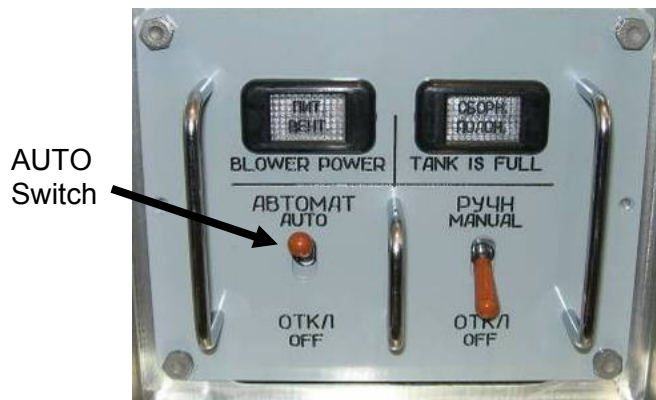


Figure 1.- ACY Fan Control Panel with AUTO Switch in Up Position.

ACY Fan Control Panel 3.2 sw AUTO → up
Refer to Figure 1.

Hydraulic Interface Control Panel 3.3 Power and Checkout Hydraulic Interface Control Panel
sw PANEL ON → up

Verify PANEL PWR –

Verify VLV КлИ2 OPEN –

Verify VLV КлИ3 OPEN –

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↓ CHECK LIGHTS

Verify all lights –

↓ H/W MATE CK

Verify H/W MATE CK light –

sw MANUAL → up

Verify MANUAL light –

↓ H2O FILLING OFF

Verify H2O FILLING light –

3.4 MCC-H for required integration with UPA

If integrated with UPA, go to step 3.5.

If not integrated with UPA

↓ UR TANK FEED ON

Verify VLV КлИ3 OPEN –

Verify VLV КлИ4 OPEN –

Verify UR TANK FEED –

3.5 sw MANUAL → down

Verify MANUAL light –

4. [DETERMINING ACTIVATION STEPS REQUIRED](#)

NOTE

Manual activation (step 5) is necessary after specific ORU replacement. All other reasons require only a functionality test in step 6.

Table 1. WHC Hardware Replacement Requiring Manual Activation

Hardware Name	Number of Dose Pump Actuations Required [N]	
	Dose 2 Mode	Dose 1 Mode
Pre-Treat Tank (E-K) and Pre-Treat Tank Hose	20	40
Pre-Treat Tank Hose	20	40
Pre-Treat and Water Pump (ДКиВ)	6	12
Pre-Treat Tank Hose, E-K and ДКиВ	20	40
Pump Separator (МНР-НС)	3	6

4.1 If any ORU listed in Table 1 was replaced
Proceed to step 5.

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4.2 If ORU is not listed in Table 1
Proceed to step 6.

4.3 If no WHC maintenance performed
Proceed to step 7.

5. WHC ACTIVATION AFTER HARDWARE REPLACEMENT OR WHC INACTIVE

ACY Control Panel 5.1 sw MANUAL – up

5.2 If Pump Separator (MHP-HC) was replaced
sw BK1 → up

NOTE PRETREAT BAD QUAL light may illuminate after Dose Pump actuation.

Urine Receptacle 5.3 Remove Urine Receptacle from stowed location.
Remove Urine Receptacle lid.

Open [KTO] Seat Receptacle.

Urine Valve ↻ OPEN

ACY Control Panel 5.4 Verify SEPARATOR –
Verify DOSE PUMP – ~4-8 seconds, then

Record if PRETREAT BAD QUAL – (yes or no) _____

Verify air suction from Urine Receptacle and [KTO] Seat Receptacle.

CAUTION
1. Do not press the pb DOSE PUMP ON for more than two seconds as this could cause hardware damage.
2. Hardware damage may occur if the Pre-treat and Water Pump has not stopped actuating and the pb DOSE PUMP ON is pressed before waiting 2 seconds after the DOSE PUMP light is off.

5.5 Actuating Pre-Treat and Water Pump

Record Number of Uses on ACY Control Panel Usage
Rate Counter: _____

↓ DOSE PUMP ON

Verify DOSE PUMP – , then after ~8 seconds

Wait 2 seconds.

Repeat [N] times; refer to Table 1 for value of [N].

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- Urine Receptacle 5.6 Urine Valve ↻ CLOSED
- ACY Control Panel 5.7 Verify SEPARATOR – ■
- 5.8 If PRETREAT BAD QUAL – □
 ↓ INITIAL MODE
 Verify PRETREAT BAD QUAL – ■
- 5.9 sw MANUAL → down
- 5.10 If Pump Separator (MHP-HC) was replaced
 sw BK1 → down

6. WHC NOMINAL FUNCTIONALITY TEST

NOTE

After switching the Urine Valve to OPEN, the Pump Separator and Pre-Treat and Water Pump should actuate within 15 seconds.

- 6.1 Open [KTO] Seat Receptacle lid.
Remove Urine Receptacle lid.
Urine Valve ↻ OPEN
- Verify the following items:
SEPARATOR – □
PRETREAT BAD QUAL – ■
DOSE PUMP – □ for ~8 seconds
- Verify air suction from Urine Receptacle and [KTO] Seat Receptacle.
- 6.2 After ~30 seconds
Urine Valve ↻ CLOSED
- 6.3 Install Urine Receptacle lid and close [KTO] Seat Receptacle lid.
- 6.4 Verify SEPARATOR – ■

7. POST ACTIVATION

- 7.1 Record Number of Uses on Usage Rate Counter: _____
- 7.2 Notify **MCC-H** of Number of Uses recorded in steps 5.5 and 7.1 and Pretreat Bad Qual Light status from step 5.4.

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OBJECTIVE:

Transfer Oxygen Generation System (OGS) Rack from LAB1P1 to NOD3A5. This transfer activity demates all Rack umbilicals, releases K-BARs and Pivot Mechanisms, transfers the Rack from the LAB and then structurally attaches the Rack to the Node 3 module. Rack umbilicals will be subsequently remated using a separate procedure.

LOCATION:

Stowed: LAB1P1

Installed: NOD3A5

DURATION:

1 hour, 45 minutes

45 minutes - Demate Jumpers

30 minutes - Transfer

30 minutes - Install in Node 3, Closeout

CREW:

Two (second crewmember required for transfer only)

PARTS:

3.0 CTB labeled "WRS and OGS Lab Mod Kit Jumpers"

Ziplock Bag labeled "OGS Jumper Electrical Plugs"

Ziplock Bag labeled "OGS Jumper Fluid Plugs"

Ziplock Bag labeled "WHC/OGS Potable Water QD Caps"

Ziplock Bags (As required to replace Caps/Plugs)

Gray Tape

MATERIALS:

Dry Wipes

AMP Pallet 3, A3 (SEG52101140-301) (if required)

Povidone Iodine Pads (P/N 08486A7)

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

Ratchet, 3/8" Drive

9/16" Socket, 3/8" Drive

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

Ratchet, 1/4" Drive

6" Ext, 1/4" Drive

5/16" Socket, 1/4" Drive

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

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

Drawer 3:

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

Drawer 4:

Wire Cutters

Adjustable Joint Pliers, Straight Jaw

Drawer 5:

Static Wrist Tether

19 JAN 10

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NOTE

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

1. SAFING

LAB1P1 1.1 \checkmark sw RACK POWER – OFF

PCS 1.2 US Lab: EPS Rack Power: Rack Power 1
Rack Power 1
'Rack LAB1P1'

Verify Switch Position – Off
Verify Switch Avail – Yes
Verify Monitoring Status – Ena

1.3 \checkmark **MCC-H** to verify Rack power safing in place:
Either DDCU LA1A or DDCU LA4A converter Off, and
RPCM LA1A4A A RPC 2 Open, Close Cmd Inhibited, and
RPCM LA2B C RPC 3 Open, Close Cmd Inhibited.

1.4 \checkmark **MCC-H** to verify system is safed and H2 Vent Valve closed

2. RACK TRANSLATION PREPARATION

NOTE

Umbilicals restrained on Node 3 Standoff need to be released to prevent interference with Rack during installation.



Figure 1.- NOD3A5 Umbilicals in Launch Restraint.

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- NOD3A5 2.1 Release Umbilicals from Launch Restraints by cutting Zip Ties (two per umbilical; Wire Cutters).
Release Ground Strap by cutting Zip Ties (two).
Refer to Figure 1.
- LAB1P1 2.2 ✓All unnecessary equipment protruding into rack translation path has been removed, stowed (US LAB, Node 1, Node 3)
- 2.3 If installed, remove ARIS Microgravity Rack Barrier from Mounting Posts, latches (two).
Unscrew, remove Mounting Posts (two) from Standoff closest to OGS.
Temporarily stow.
- 2.4 Remove any hardware or Handrails from the face of the Rack.
- If Water Delivery System is still connected on OGS
| Proceed to step 3.
- If Water Delivery System not connected on OGS, go to step 4.

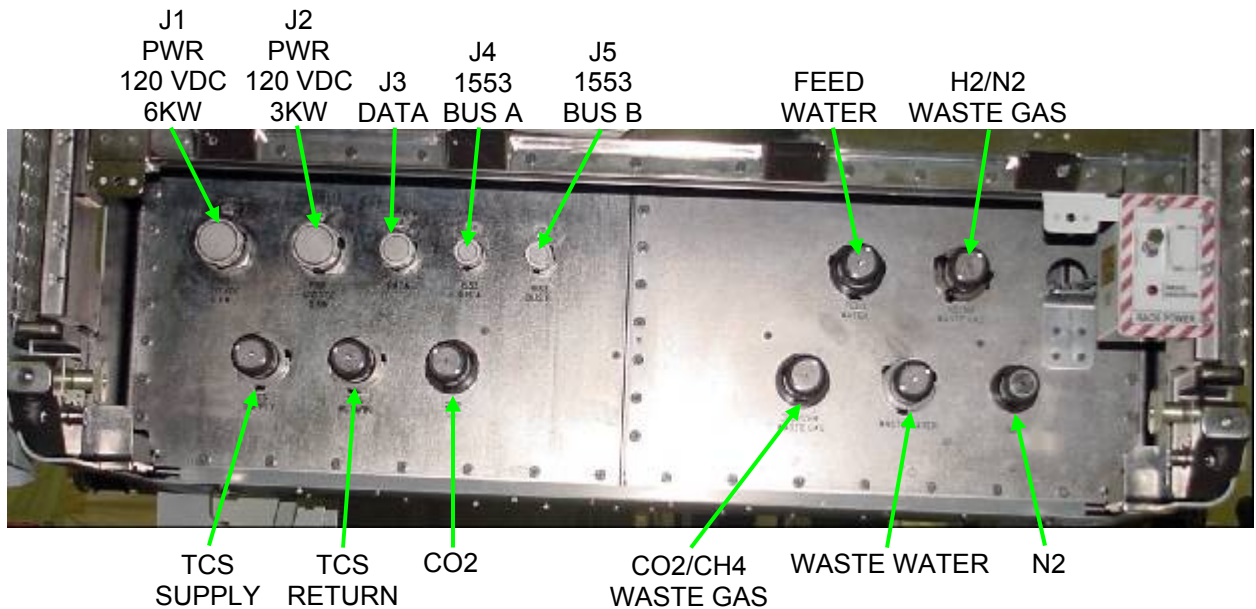


Figure 2.- OGS Rack Utility Interface Panel.

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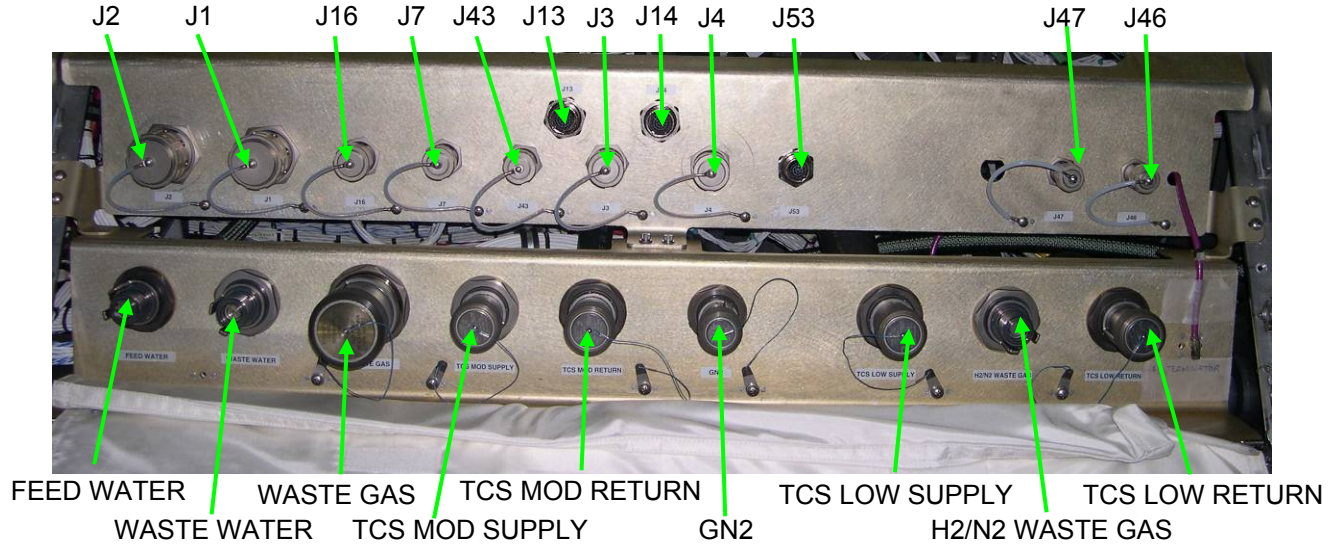


Figure 3.- LAB1P1 Modified Z-Panel.

NOTE

The Feed Water Hose in the Standoff did not fit through the Z-Panel cutout, it was routed around the Z-Panel instead.

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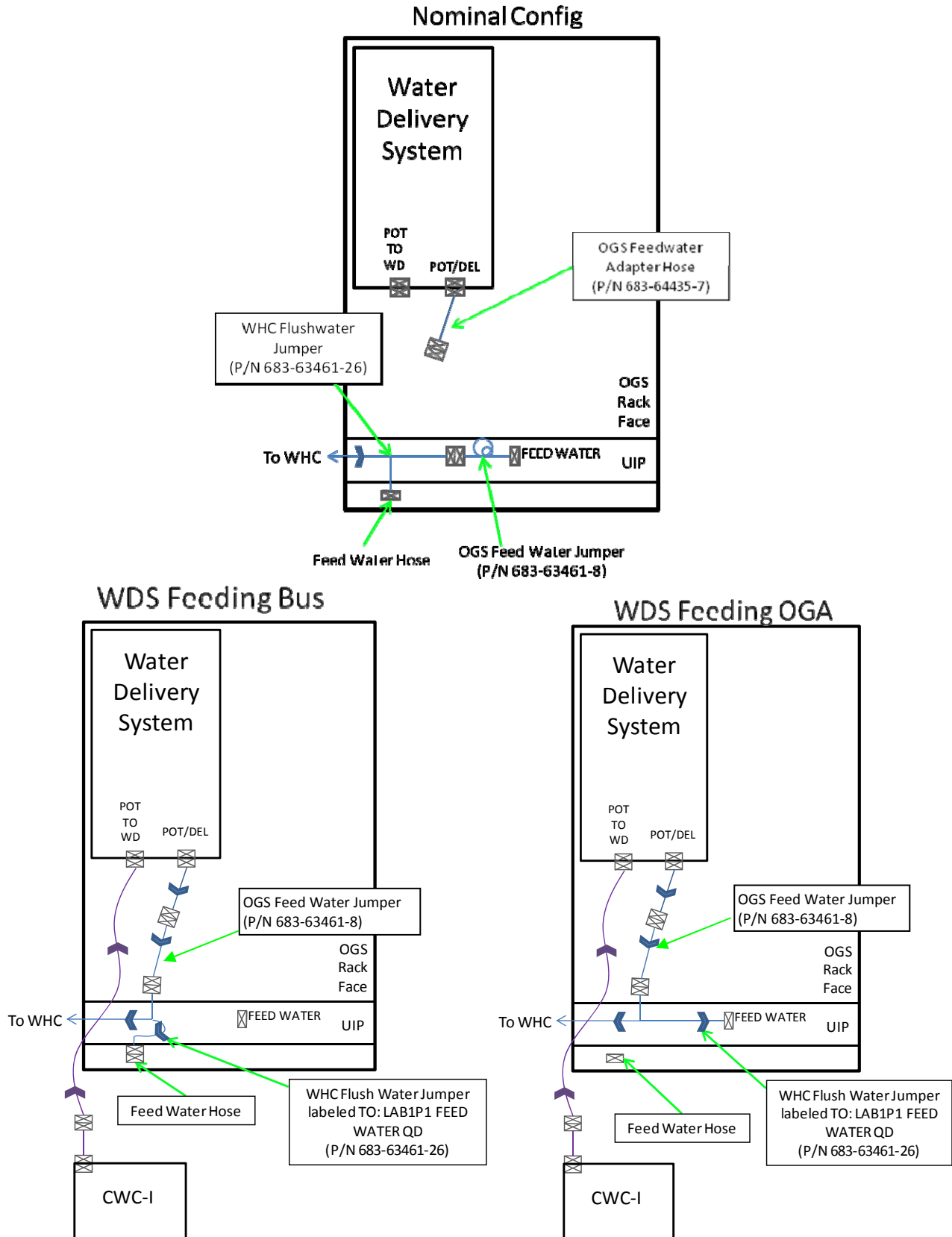


Figure 4.- Possible Potable Water System Connections.

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3. DEMATING POTABLE WATER UMBILICALS

Refer to Figures 2 to 4.

- 3.1 At any point in this procedure, if QD caps or plugs are not available, cover QD with Ziplock Bag and secure with Gray Tape.

LAB1P1 3.2 Remove UIP Closeout from Rack, 1/4 Turn fasteners (two).

WARNING

Contact with the wetted surfaces of the potable water system QDs can lead to contamination and crew illness.

- 3.3 If contact made with wetted surface of Potable Water QD, clean surface (Povidone Iodine Pads).

- 3.4 Retrieve Potable Water Plug from PWD:
1/2" QD Plug ←|→ 1/2" QD Cap, tethered to PWD Inlet

- 3.5 If Nominal Configuration (WPA feeding Potable Water Bus)

3.5.1 WHC Flush Water Jumper TO: OGS FEED WATER
JUMPER ←|→ OGS Feed Water Jumper TO: OGS FEED WATER

1/2" QD Cap, tethered →|← WHC Flush Water Jumper TO:
OGS FEED WATER JUMPER

1/2" QD Plug (From Ziplock Bag labeled "WHC/OGS
Potable Water QD Caps") →|← OGS Feed Water Jumper
TO: OGS FEED WATER

3.5.2 WHC Flush Water Jumper TO: LAB1P1 FEED WATER
QD ←|→ FEED WATER HOSE (routed past Z-Panel from
Standoff)

1/2" QD Plug (From PWD) →|← WHC Flush Water Jumper
labeled TO: LAB1P1 FEED WATER QD

1/2" QD Cap (tethered to Z-Panel) →|← FEED WATER
HOSE

3.5.3 OGS Feed Water Jumper TO: LAB1P1 FEED WATER/OGS
FEED WATER ADAPTER HOSE ←|→ FEED WATER
on OGS Rack

3.5.4 OGS Feed Water Jumper TO: LAB1P1 FEED WATER/OGS
FEED WATER ADAPTER HOSE →|← OGS Feed Water
Adapter Hose TO: OGS FEED WATER JUMPER

- 3.6 If Water Delivery System configured to feed Potable Water Bus

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- 3.6.1 WHC Flush Water Jumper TO: OGS FEED WATER
JUMPER ←|→ OGS Feed Water Jumper TO: OGS FEED WATER

1/2" QD Cap, tethered →|← WHC Flush Water Jumper TO: OGS FEED WATER JUMPER

1/2" QD Plug (From Ziplock Bag labeled "WHC/OGS Potable Water QD Caps") →|← OGS Feed Water Jumper TO: OGS FEED WATER
- 3.6.2 WHC Flush Water Jumper TO: LAB1P1 FEED WATER
QD ←|→ FEED WATER HOSE (routed past Z-Panel from Standoff)

1/2" QD Plug (From PWD) →|← WHC Flush Water Jumper labeled TO: LAB1P1 FEED WATER QD

1/2" QD Cap (tethered to Z-Panel) →|← FEED WATER HOSE
- 3.7 If Water Delivery System configured to feed OGA
 - 3.7.1 WHC Flush Water Jumper TO: OGS FEED WATER
JUMPER ←|→ OGS Feed Water Jumper TO: OGS FEED WATER

1/2" QD Cap, tethered →|← WHC Flush Water Jumper TO: OGS FEED WATER JUMPER

1/2" QD Plug (From Ziplock Bag labeled "WHC/OGS Potable Water QD Caps") →|← OGS Feed Water Jumper TO: OGS FEED WATER
 - 3.7.2 WHC Flush Water Jumper labeled TO: LAB1P1 FEED WATER QD ←|→ FEED WATER on OGS Rack

1/2" QD Cap (tethered to Z-Panel) →|← FEED WATER HOSE

1/2" QD Plug (From PWD) →|← WHC Flush Water Jumper labeled TO: LAB1P1 FEED WATER QD
- 3.8 Stow WHC Flush Water Jumper in 3.0 CTB labeled "WRS and OGS Lab Mod Kit Jumpers."
- 3.9 Remove Water Delivery System from LAB1P1, knobs (four) by hand. Temporarily stow Water Delivery System.

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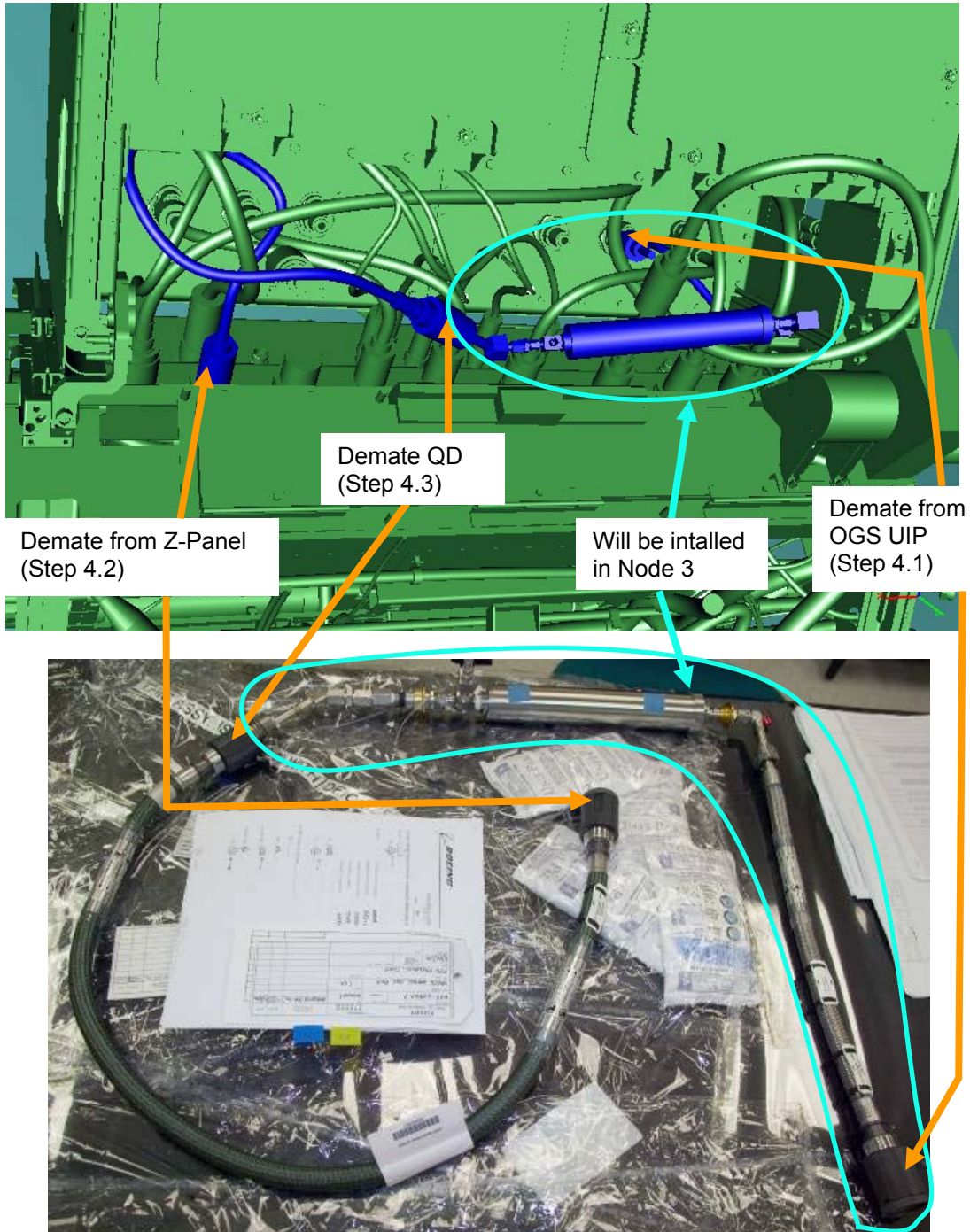


Figure 5.- OGS Waste Water Jumper (P/N 683-63461-7) - Check Valve Not Shown.

4. DEMATING WASTE WATER UMBILICAL

Refer to Figure 5.

4.1 OGS Waste Water Jumper labeled TO: OGS Waste Water ←|→
WASTE WATER on Rack UIP

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4.2 OGS Waste Water Jumper labeled TO: OGS Waste Water ←|→
WASTE WATER on Z-Panel

4.3 Green flex hose ←|→ metal line

Install plugs from Ziplock Bag “OGS Jumper Fluid Plugs” or tethered to the Z-Panel.

4.4 Stow green flex hose in 3.0 CTB labeled “WRS and OGS Lab Mod Kit Jumpers.”

4.5 Temporarily stow remaining portion of OGS Waste Water Jumper (Check Valve, ACTEX filter, and metal-braided hose) for later installation in Node 3.

5. DEMATING REMAINING FLUID UMBILICALS

Refer to Figures 2 and 3.

WARNING

OGS Rack Data Jumper must be removed last to ensure proper operation of Rack Power Switch. Failure to comply could result in electrical shock hazard.

Table 1. OGS Fluid Jumpers

OGS Rack Jumper	P/N	Z-Panel Connector	Rack Connector
OGS MTL Supply Jumper	683-63461-4	TCS MOD SUPPLY	TCS SUPPLY
OGS MTL Return Jumper	683-63461-5	TCS MOD RETURN	TCS RETURN
OGS Nitrogen Jumper	683-63461-6	GN2	N2
OGS H2/N2 Vent Jumper	683-63461-9	H2/N2 WASTE GAS	H2/N2 WASTE GAS

5.1 Remove fluid jumpers, demating both ends.
Refer to Table 1.

5.2 Install caps and plugs from Ziplock Bag “OGS Jumper Fluid Plugs” or tethered to the Z-Panel.

5.3 Stow Jumpers in 3.0 CTB labeled “WRS and OGS Lab Mod Kit Jumpers.”

6. DEMATING ELECTRICAL UMBILICALS PART 1

Refer to Figures 2 and 3.

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Table 2. OGS Electrical Jumpers

OGS Rack Jumper	P/N	Z-Panel Connector	Rack Connector
OGS Rack Pri Pwr Jumper	683-95134-1	J1	J1 PWR 120 VDC 6KW
OGS Rack Sec Pwr Jumper	683-95135-1	J2	J2 PWR 120 VDC 3KW
OGS Rack 1553A Y-Jumper	683-95112-1	J3	J4 1553 BUS A
OGS Rack 1553B Y-Jumper	683-95113-1	J4	J5 1553 BUS B

- 6.1 Don Static Wrist Tether.
Secure to unpainted, unannodized metal surface.
- 6.2 Demate electrical jumpers, demating both ends.
Do not demate OGS Rack Data Jumper at this time.
Refer to Table 2.
- 6.3 Install electrical caps from Ziplock Bag labeled "OGS Jumper Electrical Plugs."
- 6.4 Stow Jumpers in 3.0 CTB labeled "WRS and OGS Lab Mod Kit Jumpers."

7. DEMATING ELECTRICAL UMBILICALS PART 2

Refer to Figures 2 and 3.

NOTE
RPS Switch Position will show "On" on PCS display when Rack Data Jumper is demated.

Table 3. OGS Electrical Jumper

OGS Rack Jumper	P/N	Z-Panel Connector	Rack Connector
OGS Rack Data Jumper	683-95136-1	J43	J3
		J53	

- 7.1 Demate OGS Rack Data Jumper, demating both ends.
Refer to Table 3.
- 7.2 Install electrical caps from Ziplock Bag labeled "OGS Jumper Electrical Plugs."
- 7.3 Doff Static Wrist Tether.

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- 7.4 Stow OGS Rack Data Jumper in 3.0 CTB labeled "WRS and OGS Lab Mod Kit Jumpers."
Temporarily stow CTB.

8. SAFING AND REMOVING SMOKE DETECTOR

MCC-H/
PCS

8.1 Deactivating and Safing Smoke Detector

LAB Fire Display
'Smoke Detectors'

sel PD1

LAB1 PD1Smoke Detector
'Monitoring'

cmd Inh

√Status – Inhibited

sel RPCM_LA1B_H_RPC_03

RPCM_LA1B_H_RPC_03

cmd RPC Position – Open (Verify – Op)

cmd Close Cmd – Inhibit (Verify – Inh)

LAB1PD1

8.2 Removing Smoke Detector

8.2.1 P1-W3360 ←|→ J1

8.2.2 Remove Fasteners (four) securing Smoke Detector Bracket to Standoff (Ratchet, 1/4" Drive; 6" Ext, 1/4" Drive; 5/16" Socket, 1/4" Drive).

8.2.3 Cover connector plug, jack (small Ziplock Bag, Gray Tape).

8.2.4 Temporarily stow.

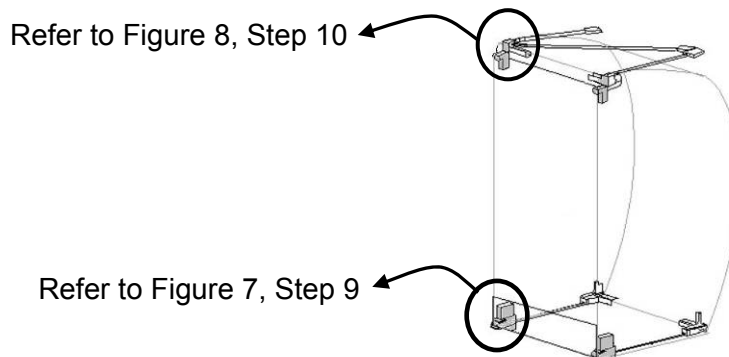


Figure 6.- Location of Rack Restraint Hardware.

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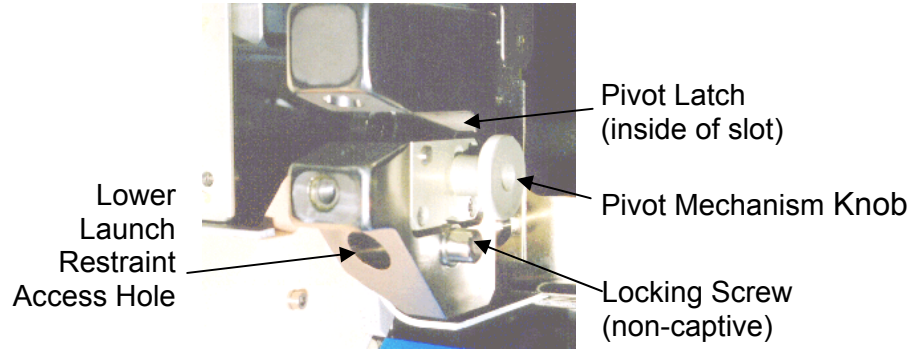


Figure 7.- Lower Launch Restraint, Left Side

9. PIVOT MECHANISM KNOB DISENGAGEMENT

Refer to Figures 6 and 7.

- 9.1 Loosen Pivot Mechanism Knob one turn.
Snug in down position so Rack is free to lift off Pivot Fitting.
- 9.2 Repeat disengagement for opposite side.

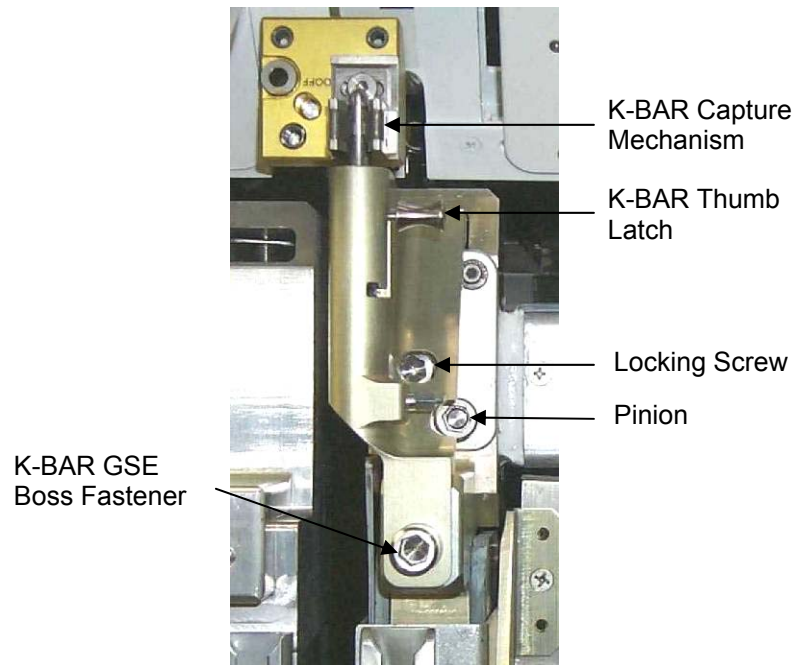


Figure 8.- K-BAR Shown Installed, Left Side.

10. K-BAR DISENGAGEMENT

Refer to Figures 6 and 8.

- 10.1 Disengage Rack K-BAR Thumb Latches (two) from Standoff.
- 10.2 Rotate Rack down to a controlled stop.

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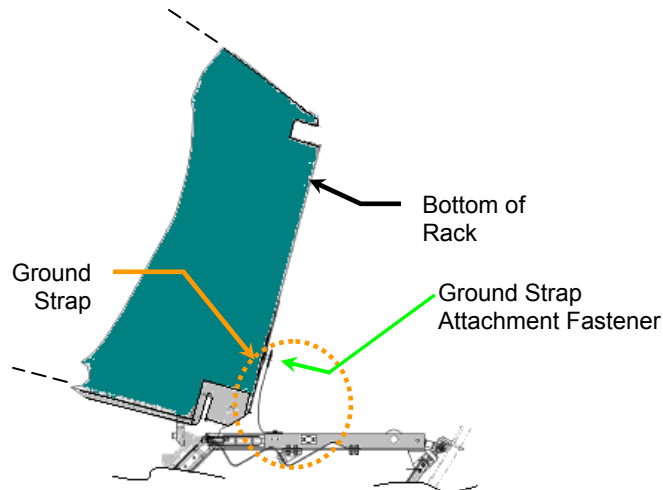


Figure 9.- Side View of Rotated Rack, Showing Rack Ground Strap Location.

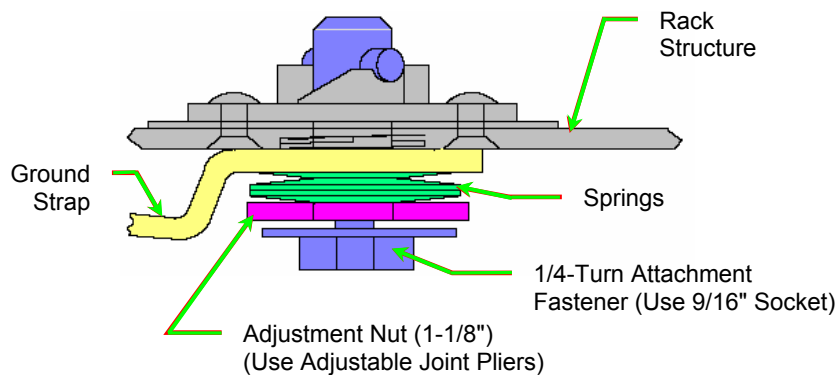


Figure 10.- Rack Ground Strap Cross Section.

11. REMOVING GROUND STRAP

Refer to Figures 9 and 10.

11.1 Fully retract Adjustment Nut ↺ towards head of Attachment Fastener (Adjustable Joint Pliers, Straight Jaw).

11.2 Ground Strap ←|→ Rack, 1/4-Turn Attachment Fastener (Ratchet, 3/8" Drive; 9/16" Socket, 3/8" Drive).

11.3 Stow Ground Strap into Standoff location.

12. TRANSFERRING OGS TO NODE 3

12.1 Lift Rack off of Pivot Fittings.

12.2 Loosen Mechanism Knobs one turn so they are free to move. Refer to Figure 7.

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- 12.3 Remove ARIS - Pivot Fitting Bottom Right (outside)
(P/N 683-61711-34) from lower standoff (Ratchet, 3/8" Drive; 6"
Long, 3/8" Hex Head, 3/8" Drive)
- 12.4 Transfer OGS Rack and Pivot Fitting to NOD3A5.
- 12.5 Install, torque ARIS - Pivot Fitting Bottom Right (outside), fastener
(one) to 150 in-lbs [Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head;
(40-200 in-lbs) Trq Wrench, 3/8" Drive].
- NOD3A5 12.6 With Node 3 Umbilicals routed toward the front of the rack, align
Rack onto Standoff until Rack Pivot Latches engage standoff Pivot
Fittings.
Keep Rack rotated down.
- 12.7 Tighten both Pivot Mechanism Knobs in latched, up position.
13. INSTALLING GROUND STRAP
 - 13.1 Inspect Ground Strap contact surfaces for debris, clean if required
(Dry Wipes).
 - 13.2 Fully retract Adjustment Nut ↶ (towards head of Attachment
Fastener), by hand.
Refer to Figure 9.
 - 13.3 Ground Strap →|← Rack, 1/4-Turn Attachment Fastener (Ratchet,
3/8" Drive; 9/16" Socket, 3/8" Drive).
Refer to Figures 9 and 10.
 - 13.4 Snug Adjustment Nut ↷, until firm against Springs.
 - 13.5 Tighten Adjustment Nut an additional 1/2 to 3/4 turn ↷ (Adjustable
Joint Pliers, Straight Jaw).
 - 13.6 Photo document installed Ground Strap (Digital Camera).
14. FINAL INSTALLATION
 - 14.1 √Rack rotation path is unobstructed
 - 14.2 K-BAR Thumb Latches (two) → up position
Refer to Figure 8.

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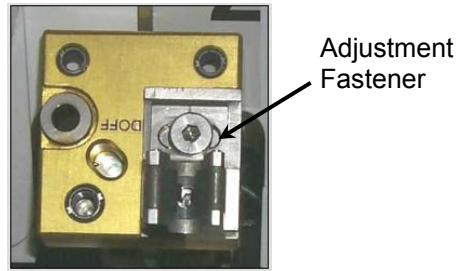


Figure 11.- K-BAR Capture Mechanism.

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

- * If K-BAR does not align with Capture Mechanism:
- * | Loosen Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex
- * | Head, 3/8" Drive).
- * | Slide capture clip left or right, as required to engage K-BAR.
- * | Once K-BAR engaged, re-tighten Adjustment Fastener
- * | (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- * |
- * Refer to Figure 11.

15. REINSTALLING SMOKE DETECTOR

- LAB1PD1 15.1 Remove Ziplock Bag, Gray Tape, from connectors.

15.2 P1-W3360 →|← J1

15.3 Install Smoke Detector Bracket on standoff, fasteners (four)
(Ratchet, 1/4" Drive; 6" Ext, 1/4" Drive; 5/16" Socket, 1/4" Drive).

15.4 Tighten, torque Fasteners (four) to 22 in-lbs [Ratchet, 1/4" Drive;
6" Ext, 1/4" Drive; 5/16" Socket, 1/4" Drive; (5-35 in-lbs) Trq
Driver, 1/4" Drive].

16. CLOSEOUT OR POST TRANSFER

16.1 Notify **MCC-H** smoke detector installed, transfer activity complete.
Stow tools, materials, parts.

16.2 Photo document OGS in Node 3 and LAB1P1 Z-Panel (Digital
Camera).

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Table 4. Restow Table

OpNom	P/N
WHC Flush Water Jumper	683-63461-26
OGS Rack Data Jumper	683-95136-1
OGS Rack Pri Pwr Jumper	683-95134-1
OGS Rack Sec Pwr Jumper	683-95135-1
OGS Rack 1553A Y-Jumper	683-95112-1
OGS Rack 1553B Y-Jumper	683-95113-1
OGS MTL Supply Jumper	683-63461-4
OGS MTL Return Jumper	683-63461-5
OGS Nitrogen Jumper	683-63461-6
OGS H2/N2 Vent Jumper	683-63461-9
OGS Waste Water Jumper (Green Flex Hose)	683-63461-7
OGS Waste Water Jumper (ACTEX Hose)	

1.156 VESTIBULE OUTFITTING N3 - CUPOLA

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OBJECTIVE:

To remove N3 Nadir Common Berthing Mechanism (CBM) hardware, Cupola Multi-Layer Insulation (MLI), Cupola CBCS Assembly (CCA), and install Cupola umbilicals.

LOCATION:

N3 Nadir - Cupola Vestibule

DURATION:

5 hours, 15 minutes total

- 5 minutes for Opening Node 3 Nadir Hatch (step 1)
- 20 minutes for Removing Center Disk Cover (step 2)
- 45 minutes for Removing Node 3 Nadir CPAs (step 3)
- 15 minutes for Removing Cupola Internal MLI (steps 4 to 5)
- 25 minutes for Removing Cupola CBCS Assembly (CCA) (step 6)
- 20 minutes for Installing ACBM to PCBM Ground Straps (step 7)
- 10 minutes for Removing N3 Nadir IMV Supply Cap (step 8)
- 20 minutes for Mating 1553 Data Umbilicals (steps 9 to 11)
- 10 minutes for Demating Node 3 Wire Harnesses For Safing (steps 12 to 13)
- 15 minutes for Mating Power Umbilicals (steps 14 to 16)
- 10 minutes for Remating Node 3 Power Wire Harnesses (step 17)
- 25 minutes for Mating Remaining Audio/Data Umbilicals (steps 18 to 22)
- 90 minutes for Installing Cupola HTL Lines (steps 23 to 24)

CREW:

Two

PARTS:

- 1.0 CTB w/ Window, Single (two) P/N SEG33111837-301
- Divider, Cargo Transfer Bag (two) P/N SEG33111841-309
- 24" x 24" Ziplock Bag labeled "NODE 3 NADIR CBM CPA Removal Hardware, Protective Cap, 24 x 24 Ziplock Bags, Qty: 6" containing:
 - (a) 24 x 24 Ziplock Bags (six: four for CPAs, two to be used for alignment guide removal) P/N 528-50000-8
 - (b) Ziplock Bags (four)
 - (c) Each Subdivided Ziplock Bag contains:
 - Protective Cap (one) P/N NATC-RPC-N-15-0
 - Protective Cap (one) P/N NATC-PPC-N-15-0
 - Protective Cap (six) P/N NATC-PPC-N-13-0
 - Protective Cap (six) P/N NATC-RPC-N-13-0
 - Protective Cap (two) P/N NATC-RPC-N-11-0
 - Protective Cap (two) P/N NATC-PPC-N-11-0
- Element Ground Strap Assy (two) P/N 683-13477-7
- IMV Flange Saver (stowed in Ziplock Bag labeled "NOD1-NOD3 IMV H/W" during Node 3 Vestibule Outfitting)

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MATERIALS:

Towels (as required)
Gray Tape
Velcro Straps
Sharpie
Safety Goggles
Dust Mask
Kapton Tape
Ziplock bags (three)
Adjustable Bungee P/N SED32103198-302

TOOLS:

Digital Camera
Mini Maglite/LED Headlamp (crew preference)
Work Light (crew preference)
CSA-O2 (two) P/N SED46115801-305
Scissors
Portable Fan Assy (MRK Fan) P/N 96M52440-1
D-Cell Batteries (four) (if required)
FFTD and Gamah Seal Maintenance Kit P/N SJG33114223:
Fluid Fitting Torque Device Kit (FFTD) P/N 990204-101
1.375" Drive Gear
1.000" Reaction Gear
Gamah Seal Removal Tool, 3/4" Gamah Fitting P/N 683-60467-3
Retaining Ring Installation/Removal Tool P/N 683-60474-3
Metal Seals (two) P/N S14707C (for Gamah fitting size 0.75")
Retaining Rings (two) P/N R14107C (for Gamah fitting size 0.75")
Braycote (if required)

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive
Ratchet, 3/8" Drive
Driver Handle, 1/4" Drive
4" Ext, 1/4" Drive
6" Ext, 3/8" Drive
1/4" Hex Head, 1/4" Drive
5/32" Hex Head, 1/4" Drive
3/16" Hex Head, 3/8" Drive
3/8" Socket, 1/4" Drive
7/16" Socket, 1/4" Drive
7/16" Deep Socket, 3/8" Drive
(40-200 in-lbs) Trq Wrench, 3/8" Drive
(10-50 in-lbs) Trq Wrench, 1/4" Drive

Drawer 4:

Wire Cutters

Drawer 5:

Static Wrist Tether

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REFERENCED PROCEDURE(S):

1.105 CBM CENTER DISK COVER REMOVAL

1.101 CBM CONTROLLER PANEL ASSEMBLY REMOVAL - GENERIC

A.2.1 FLUID FITTING TORQUE DEVICE (FFTD) ASSEMBLY AND USAGE

A.2.3 MATING GAMAH FITTINGS USING THE FFTD

A.2.13 GAMAH SEAL R&R

1. OPENING HATCH

N3 Deck

1.1 **On MCC-H GO**

N3 Deck Hatch PPRV  OVERRIDE

1.2 Open Node 3 Nadir Hatch per decal.

1.3 N3 Deck Hatch PPRV  NORMAL

CAUTION

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

1.4 Verify no condensation is present in vestibule.

If required, wipe any condensate from vestibule (Towel).

Notify **MCC-H**.

2. REMOVING NODE 3 NADIR CBM CENTER DISK COVER

Perform [1.105 CBM CENTER DISK COVER REMOVAL](#), all (SODF: ASSY OPS: S&M), then:

3. REMOVING CBM CONTROLLER PANEL ASSEMBLIES (CPA)

N3/Cupola
Vestibule

Perform [1.101 CBM CONTROLLER PANEL ASSEMBLY REMOVAL - GENERIC](#), steps 1 to 4 for Node 3 Nadir CPAs (SODF: ASSY OPS: S&M: NOMINAL: VESTIBULE), then:

Notify **MCC-H** CBM Controller Panel Assembly removal completed.

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4. REMOVING CUPOLA INTERNAL MLI CLOSEOUTS

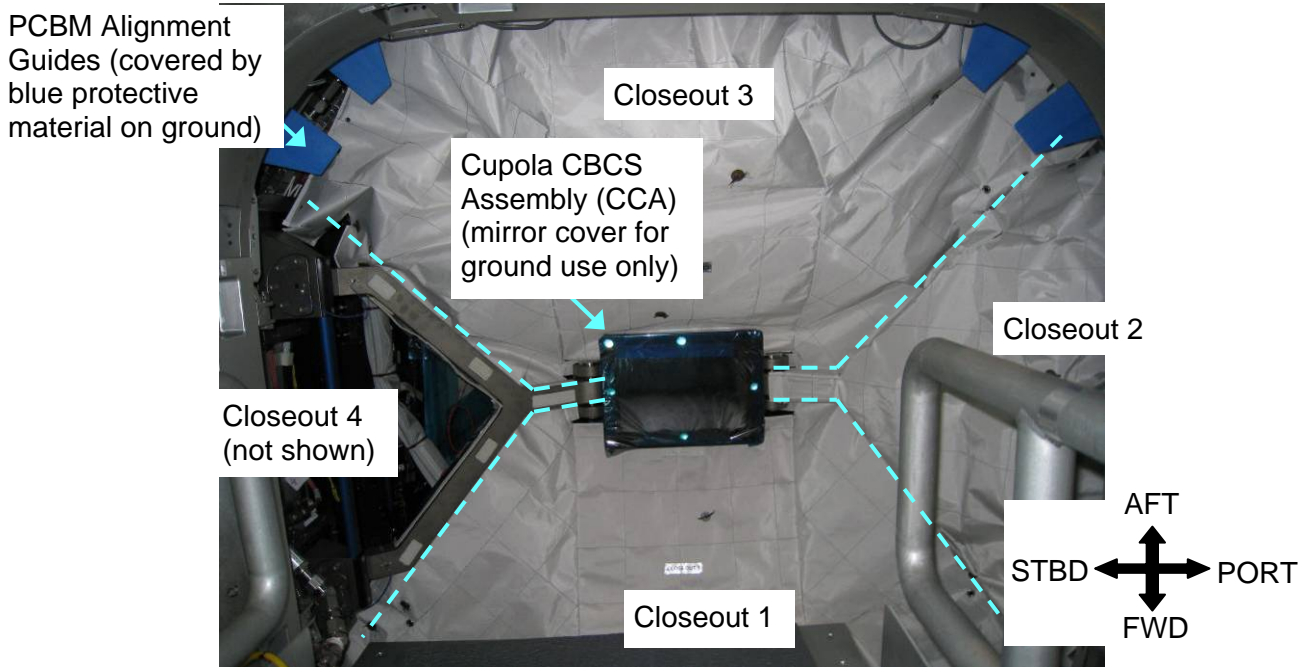


Figure 1.- Ground Photo From OOCT of Cupola Internal MLI (Closeout 4 not installed).

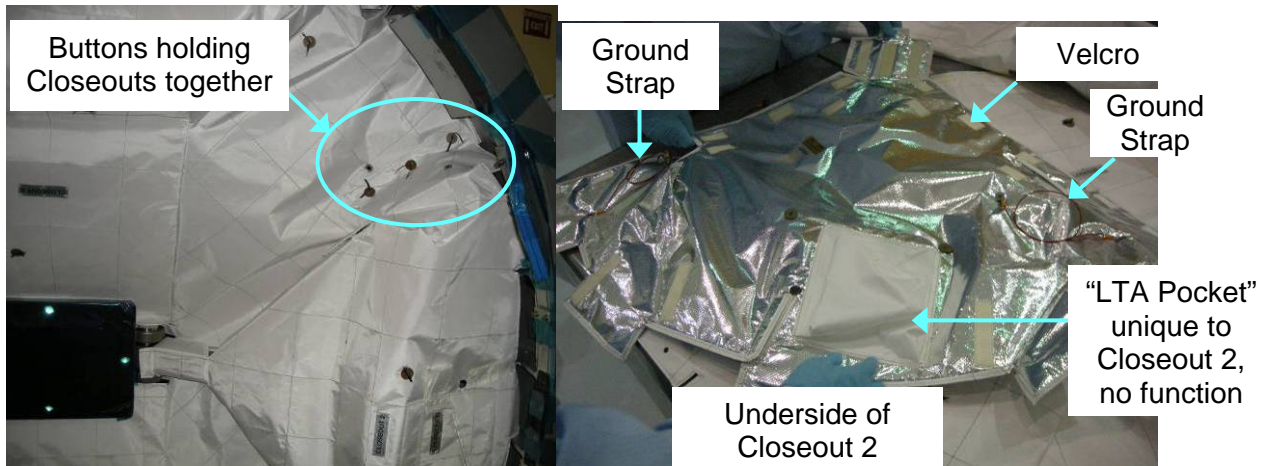


Figure 2.- Cupola Internal MLI Buttons, Velcro for Installation.

NOTE

1. The Cupola Internal MLI is composed of four Closeout sections attached to Cupola and the Cupola CBCS Assembly (CCA) partially by Velcro.
2. Closeouts 1 and 3 (large sections) have four ground straps that attach to the CCA. Closeouts 2 and 4 (small, triangular) have two Ground Straps that attach to the CCA.
3. The Closeouts attach to one another with buttons.

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- 4.1 Don Safety Goggles, Dust Mask for ingress into Cupola.
This PPE must be worn until verification is complete that no particulate FOD is visible in Cupola.
- 4.2 Release all buttons holding Closeouts together.
Release Velcro holding Closeouts 2 and 4 to Cupola CBCS Assembly (CCA).
(At this point, Ground Straps will still be holding Closeouts to the CCA).
Refer to Figures 1, 2.

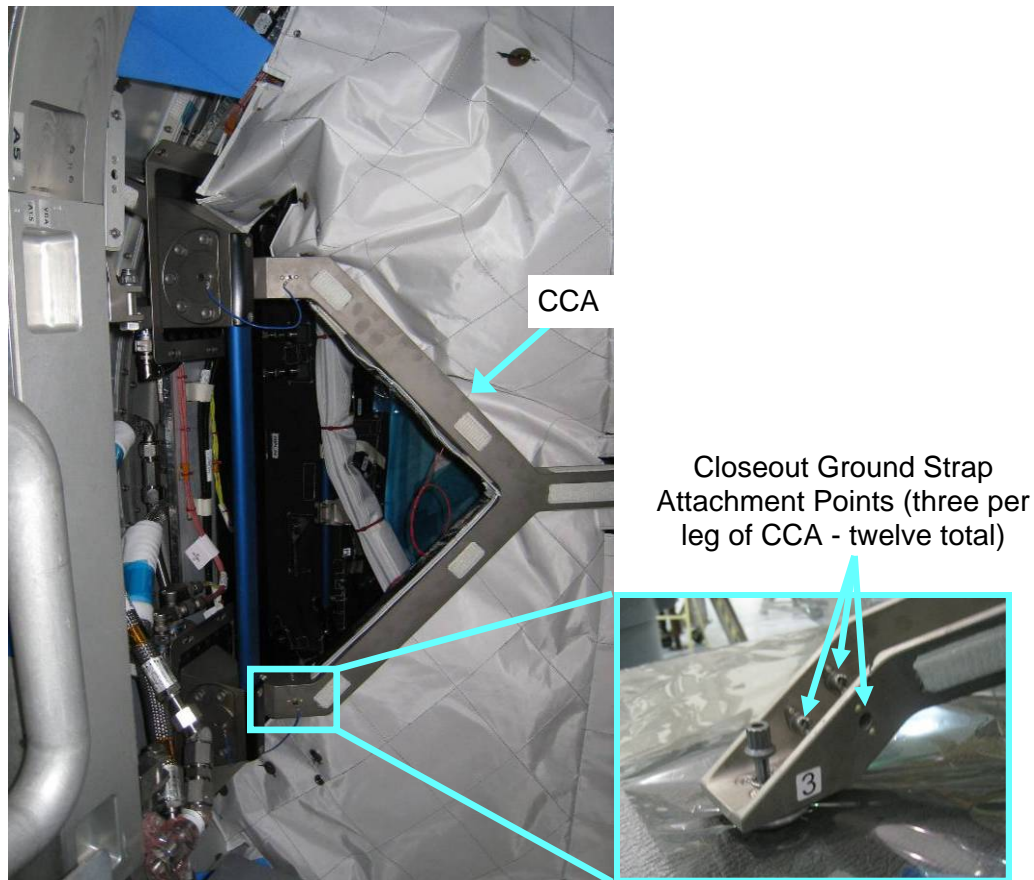


Figure 3.- Closeout Ground Strap Attachment Points on CCA.

- 4.3 For Closeouts 2 and 4, remove Ground Straps (two on each Closeout) (Driver Handle, 1/4" Drive; 1/4" Hex Head).
Remove, fold Closeouts 2 and 4.
Temporarily stow.
Refer to Figure 3.
- 4.4 Release Velcro holding Closeouts 1 and 3 to CCA and Cupola structure.
(At this point, ground straps will still be holding closeouts to the CCA).
Refer to Figures 1, 2.

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4.5 For Closeouts 1 and 3, remove Ground Straps (four on each Closeout) (Driver Handle, 1/4" Drive; 1/4" Hex Head).
Remove, fold Closeouts 2, 4.
Temporarily stow.
Refer to Figure 3.

4.6 Inspect Cupola for FOD, condensation.

If FOD, condensation found

Notify **MCC-H**.

Photo document (Digital Camera).

4.7 Per crew preference, install Portable Fan Assy (MRK Fan) to increase ventilation during outfitting.

If battery changeout required

Install four D-Cell Batteries.

5. RELEASING HTL LINES FROM LAUNCH CONFIG

NOTE

1. The HTL lines were wrapped in insulation to protect them from damage during launch.
2. The insulated lines were then wire tied to the CCA.

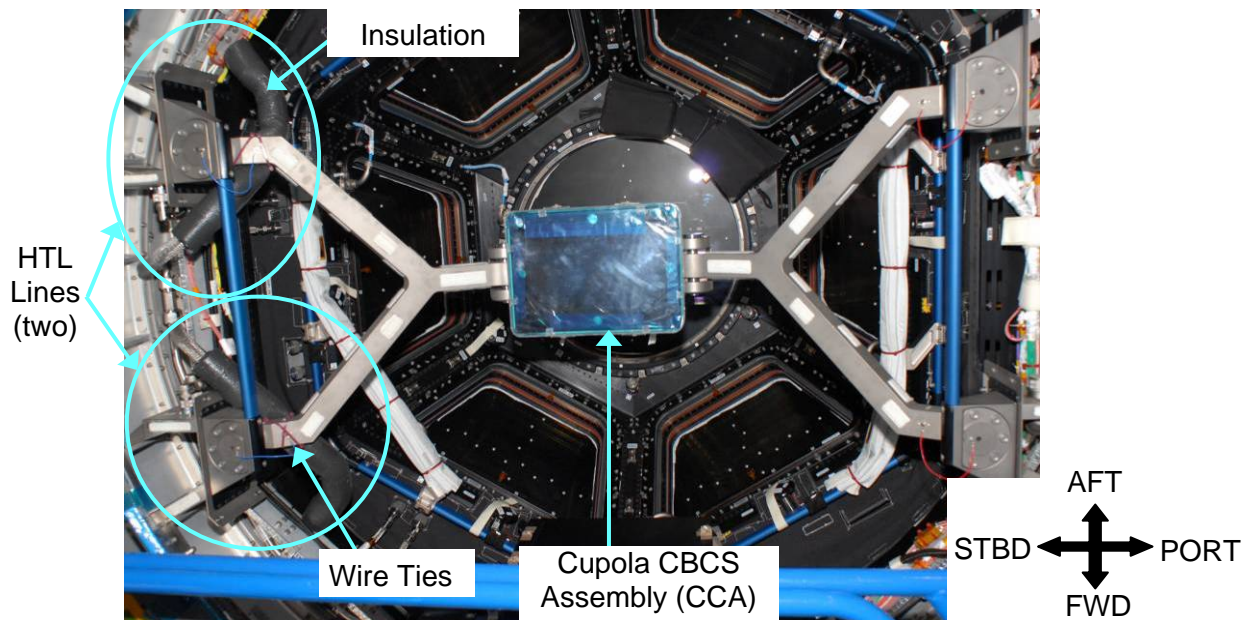


Figure 4.- HTL Lines Stowed for Launch.

5.1 Cut Wire Ties securing insulated HTL lines to Cupola CBCS Assembly (CCA) (Wire Cutters).
Dispose of Wire Ties in Ziplock Bag.
Refer to Figure 4.

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CAUTION

Care should be taken when cutting launch insulation from HTL lines so as not to cut/damage the thermal lines.

- 5.2 Cut insulation from HTL lines along lengthwise seam (Scissors).
Temporarily stow insulation (will be used again in step 23.11).
Secure HTL lines out of the way to provide room to safely remove the CCA (Velcro Straps).

6. REMOVING CUPOLA CBCS ASSEMBLY (CCA)

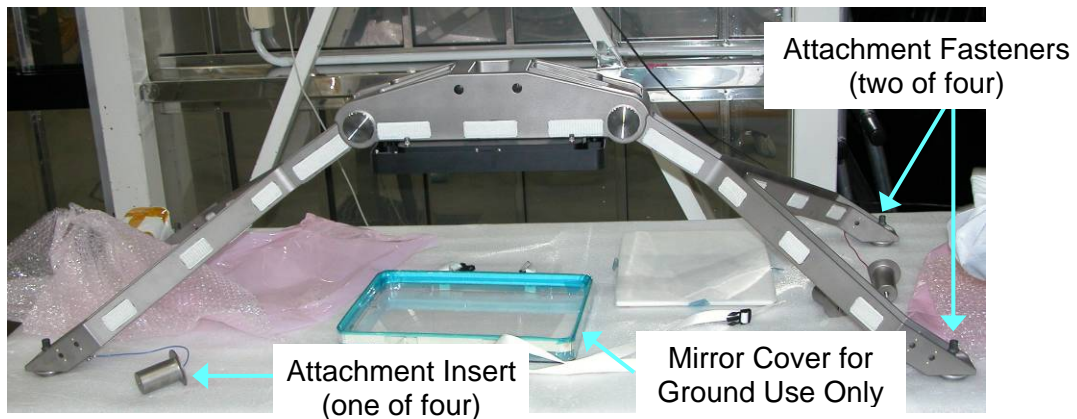


Figure 5.- Cupola CBCS Assembly (CCA) (Ground Photo).

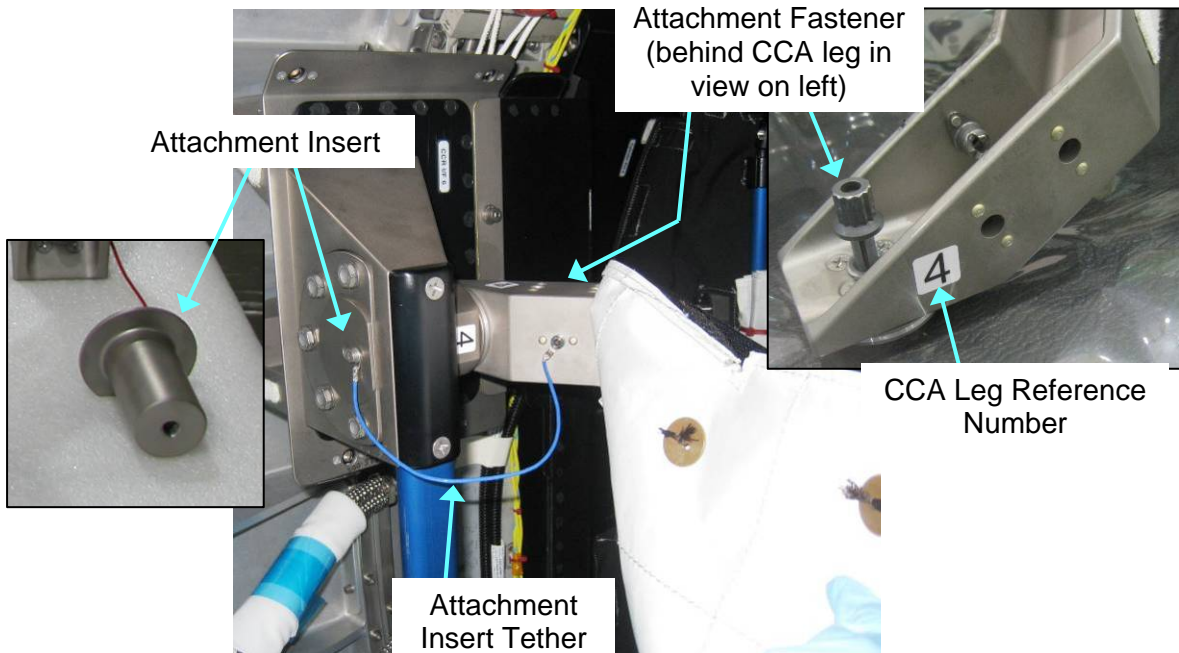


Figure 6.- Closeout Ground Strap Attachment Points on CCA.

- 6.1 Cover CCA mirror with soft material to protect it while stowed (CTB Divider, Towel or T-shirt, and Gray Tape).

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CAUTION

Once CCA Attachment Fasteners are removed in step 6.2, CCA will be free floating in Cupola. Care should be taken to not impact Cupola windows.

- 6.2 Remove CCA Attachment Fasteners, four (Ratchet, 3/8" Drive; 6" Ext; 7/16" Deep Socket).
Pull tethered Attachment Inserts out of Cupola structure.
(CCA will now be free floating in Cupola volume).
Refer to Figures 5, 6.

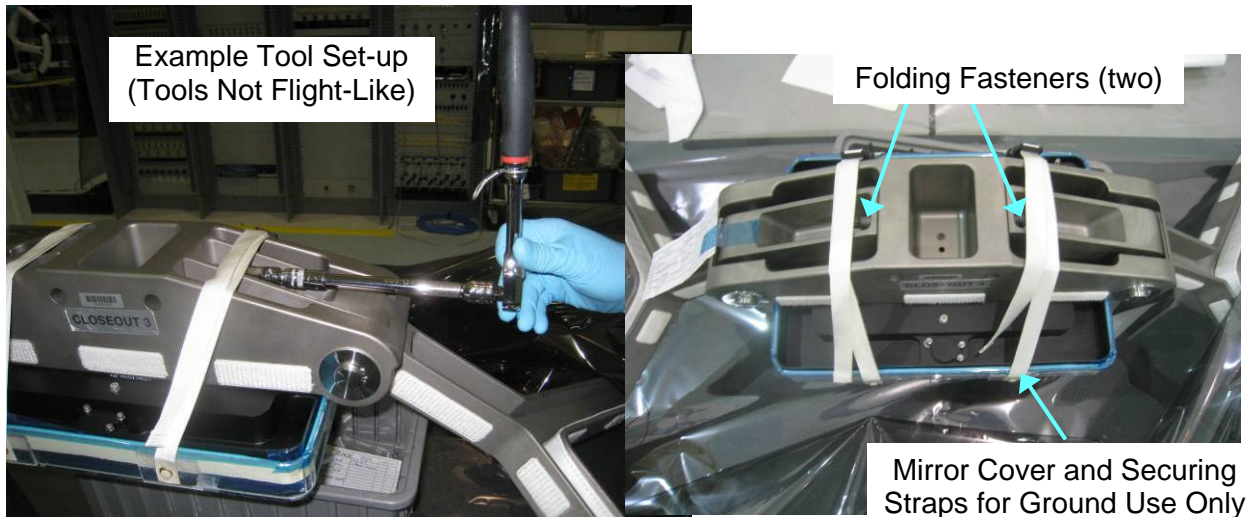


Figure 7.- CCA Folding Fasteners.



Figure 8.- CCA in Folded Position.

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- 6.3 Remove CCA Folding Fasteners, two (Ratchet, 3/8" Drive; 6" Ext; 7/16" Deep Socket).
Fold CCA.
Remove from Cupola.
Refer to Figures 7, 8.
- 6.4 Install Adjustable Bungee around CCA to secure CCA Legs.
Temporarily stow CCA.
Refer to Figure 8.

7. INSTALLING GROUND STRAPS

NOTE

1. Based on imagery analysis, CBM Alignment Guides should not need to be removed for Ground Strap Installation. Alignment Guides will be sequentially numbered in this step, in case Alignment Guide removal is required.
2. Alignment Guides will be removed in a later procedure due to interference with Cupola Corner Panel installation.

- 7.1 Number CBM Alignment guides 1 to 16, starting at ISS Fwd position and moving clockwise while looking into Cupola (Kapton Tape, Sharpie).
- 7.2 Photo document CBM Alignment Guide numbering (Digital Camera).

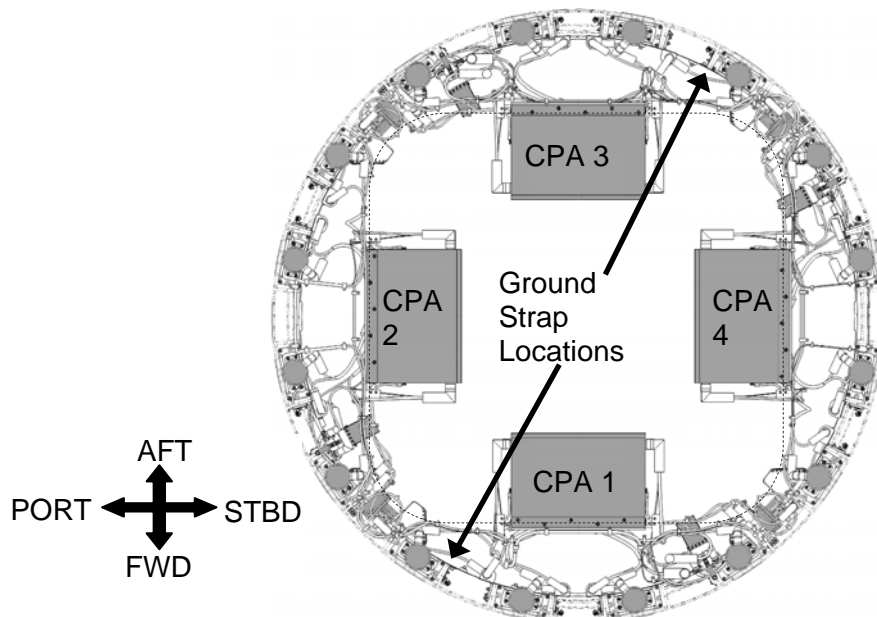


Figure 9.- Ground Strap Locations on ACBM (view from inside Cupola looking Zenith towards Node 3).

1.156 VESTIBULE OUTFITTING N3 - CUPOLA

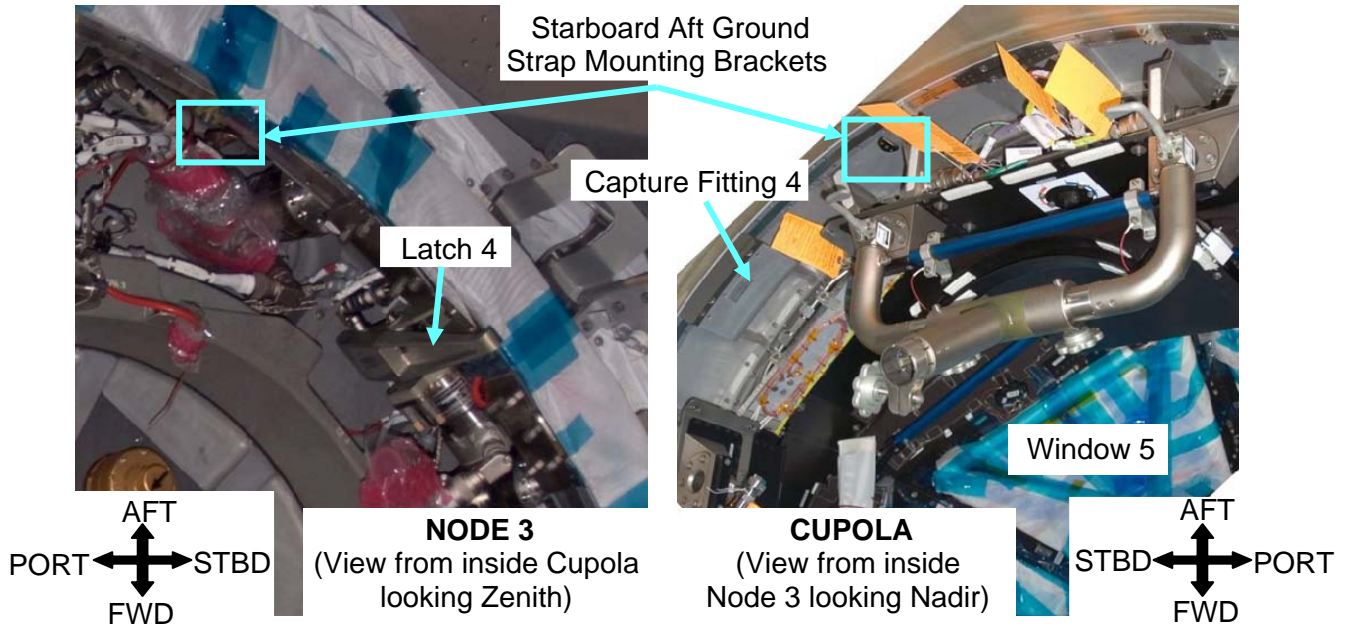


Figure 10.- Starboard Aft Ground Strap Mounting Brackets (Ground Photos).

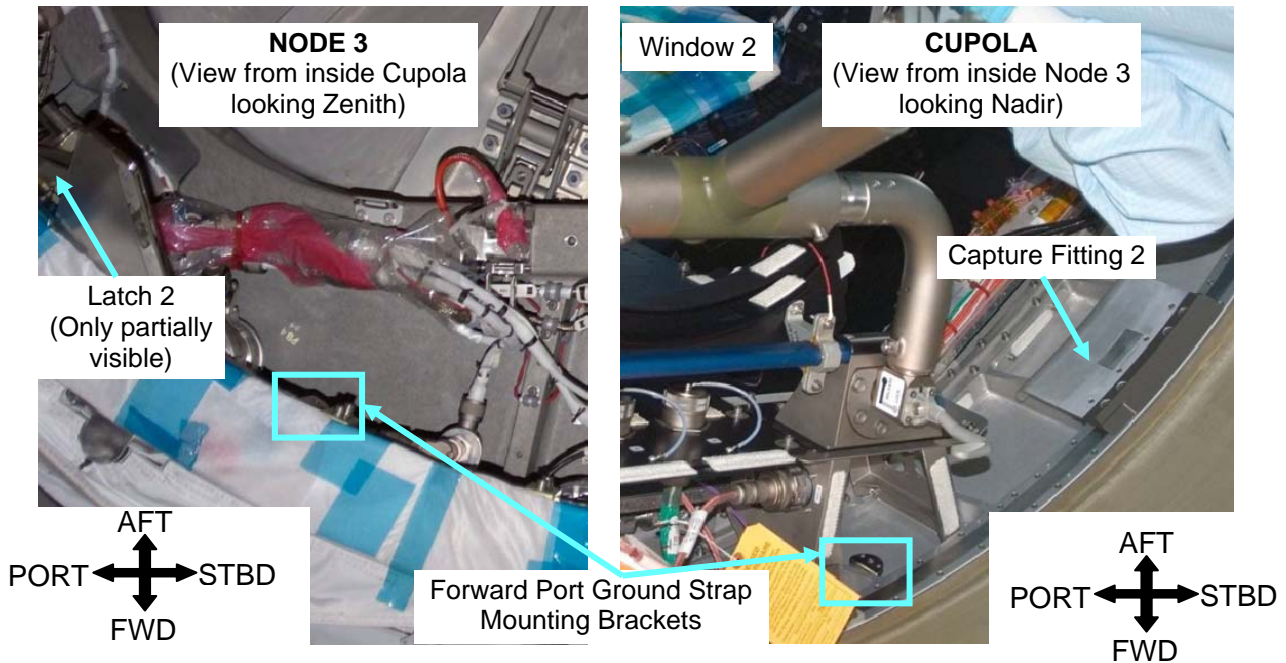


Figure 11.- Forward Port Ground Strap Mounting Brackets (Ground Photos).

- 7.3 Locate four Ground Strap Mounting Brackets (two on Active CBM Ring and two on Passive CBM Ring). Refer to Figures 9, 10, 11.

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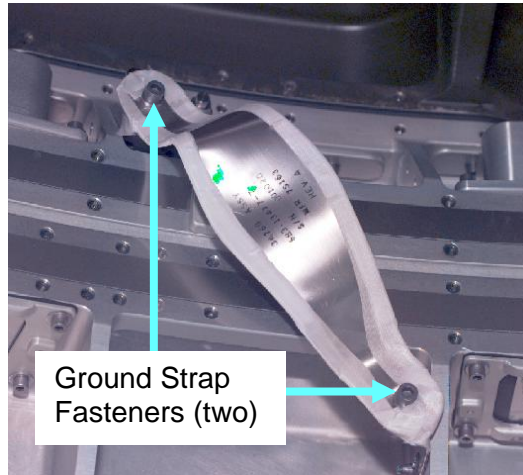


Figure 12.- Ground Strap Installed Across ACBM to PCBM Interface (Photo not of Node 3 Nadir/Cupola Vestibule).

NOTE

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

7.4 Install Ground Straps (two) from ACBM bracket to PCBM bracket, bending as necessary. Refer to Figures 10, 11, 12.

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

NOTE

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

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

* 7.4.2 Stow Alignment Guides in 24" x 24" Ziplock Bag.

* 7.4.3 Label Ziplock Bag, "NOD3-Cupola Alignment Guides."

* 7.4.4 Tape Ziplock Bag in convenient location in Cupola for use during Cupola Corner Panel Installation activity later in the flight.

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- 7.5 Tighten, torque fasteners (two per Ground Strap) to 90 in-lbs [Ratchet, 3/8" Drive; 3/16" Hex Head; (40-200 in-lbs) Trq Wrench]. Refer to Figure 12.
- 7.6 Photo document newly installed Ground Straps and Alignment Guide stowage location (Digital Camera).

8. [REMOVING N3 NADIR IMV SUPPLY CAP](#)

MCC-H

8.1 [Activating Node 3 IMV Deck Stbd Valve \(ground-only\)](#)

Node 3: ECLSS: IMV Deck Stbd Vlv

sel RPCM N31B4A E1 RPC 05

cmd RPC Position – Close (Verify – Cl)

'State'

'Enable'

cmd Arm (Verify Arm Status – Armed)

cmd Enable (Verify State – Enabled)

NOTE

Per SPN 38815, the Node 3 IMV Valve Open/Close Arm Status is not displayed correctly.

8.2 [Opening Node 3 IMV Deck Stbd Valve \(ground-only\)](#)

'Position'

'Open'

cmd Arm

Wait 10 seconds.

cmd Open (Verify Position – In Transit)

Wait 25 seconds.

Verify Position – Open

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8.3 Closing Node 3 IMV Deck Stbd Valve (ground only)

Node 3 IMV Deck Stbd Vlv

'Position'

'Open'

cmd Arm

Wait 10 seconds.

cmd Close (Verify Position – In Transit)

Wait 25 seconds.

Verify Position – Closed

NOTE

1. Connections represented in blue in Figure 13 will be mated in this procedure.
2. Text boxes in Figure 13 represent labels on Node 3 Nadir Bulkhead.

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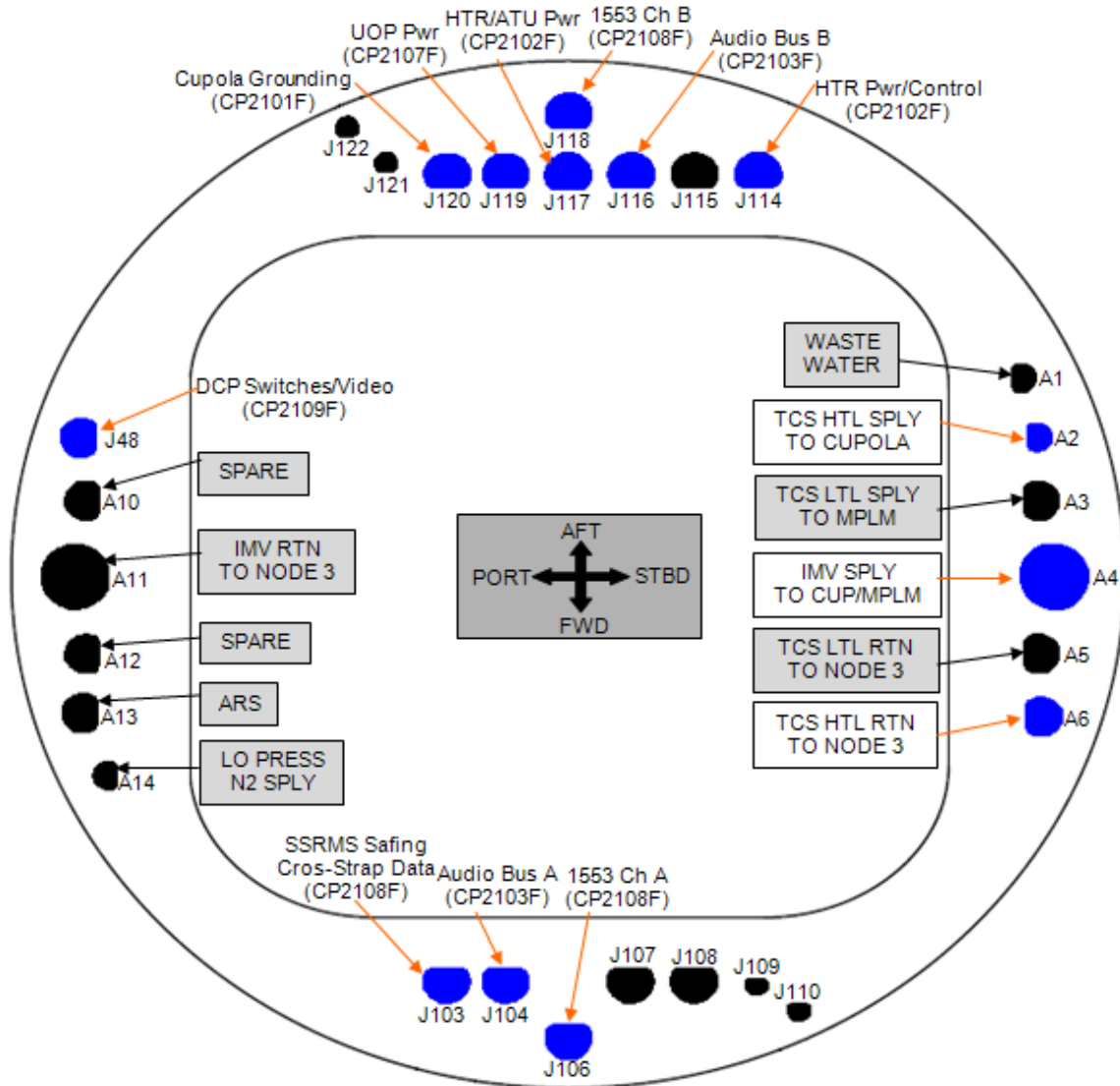


Figure 13.- Node 3 Nadir Bulkhead (view from inside Cupola looking Zenith towards Node 3).

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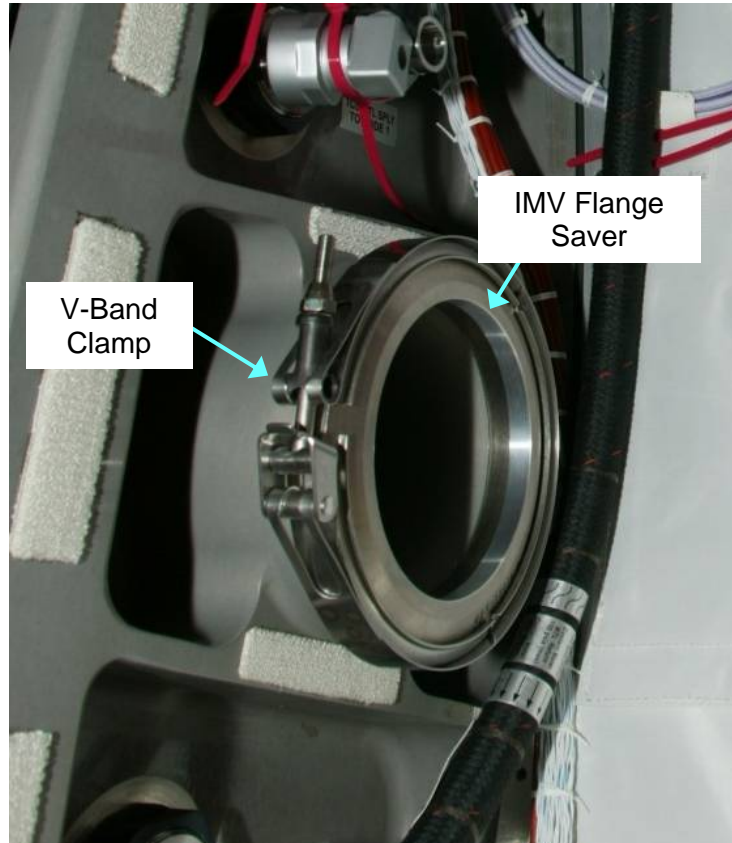


Figure 14.- IMV Flange Saver Installed (Example Photo from N3 Stbd Vestibule).

- N3 Nadir Vestibule
- 8.4 **On MCC-H GO**, loosen, remove V-Band Clamp on NOD3 Nad Stbd (A4) IMV Flange (Ratchet, 1/4" Drive; 7/16" Deep Socket). Remove IMV Cap from NOD3 (A4) IMV Flange. Place IMV Cap in 12" x 12" Ziplock Bag. Label Ziplock Bag, "N3 Nadir IMV Supply Cap" (Sharpie). Temporarily stow. Refer to Figures 13, 14.
- 8.5 Retrieve IMV Flange Saver stowed in Ziplock Bag labeled, "NOD1-NOD3 IMV H/W" during Node 3 Vestibule Outfitting. Install on NOD3 (A4) IMV Flange. Refer to Figures 13, 14.
- 8.6 Secure IMV Flange Saver to NOD3 IMV Flange with V-Band Clamp. Tighten, torque V-Band Clamp to 35 in-lbs [Ratchet, 1/4" Drive; 7/16" Deep Socket; (10-50 in-lbs) Trq Wrench, 1/4" Drive]. Refer to Figures 13, 14.

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NOTE

Per SPN 38815, the Node 3 IMV Valve Open/Close Arm Status is not displayed correctly.

MCC-H 8.7 Opening Node 3 IMV Deck Stbd Valve (ground-only)

Node 3 IMV Deck Stbd Vlv

'Position'

'Open'

cmd Arm

Wait 10 Seconds.

cmd Open (Verify Position – In Transit)

Wait 25 seconds.

Verify Position – Open

8.8 Activating Node 3 IMV Deck Stbd Fan (ground-only)

Node 3: ECLSS: IMV Deck Stbd Fan

Node 3 IMV Deck Stbd Fan

sel RPCM N31B4A E1 RPC 10

RPCM N31B4A E1 RPC 10

cmd RPC Position – Close (Verify – Cl)

Node 3 IMV Deck Stbd Fan

'On'

cmd On (Verify State – In Transit)

Wait 15 seconds.

Verify State – On

Verify Speed – 7745 to 9278 rpm

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9. MATING 1553 CH B DATA CONNECTOR (CP2108F)

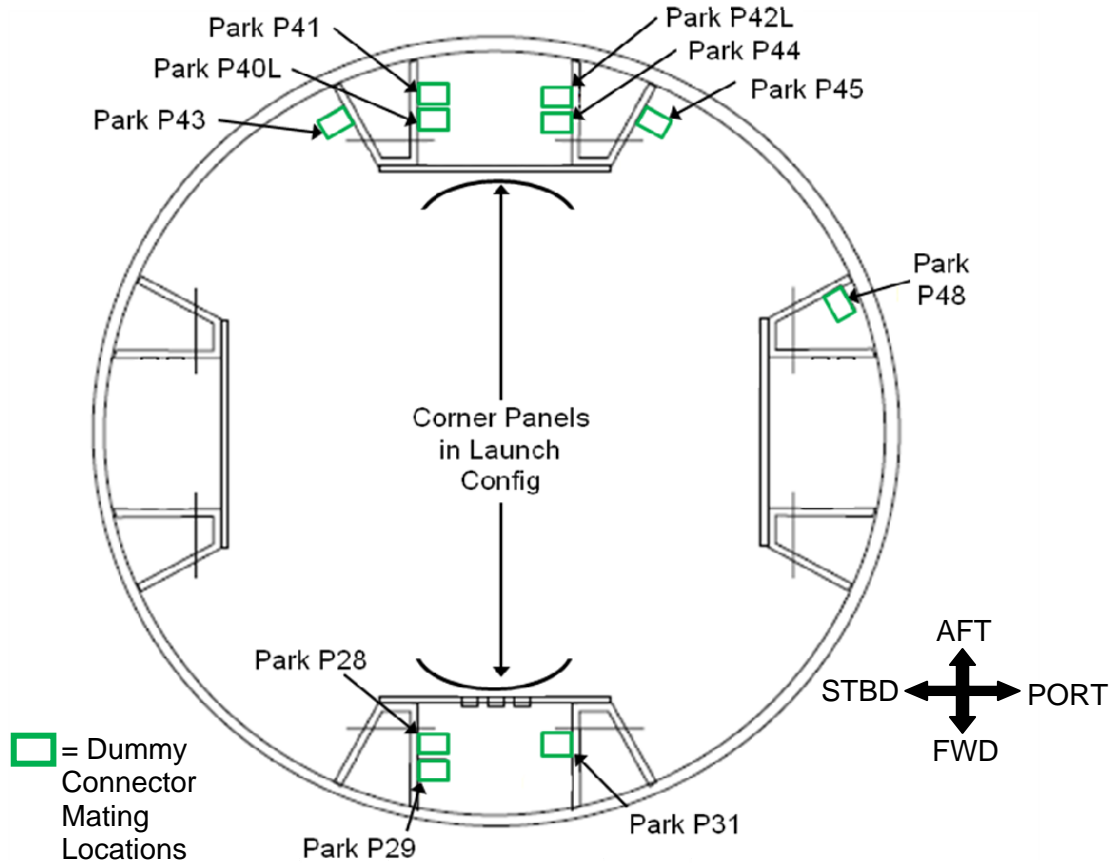


Figure 15.- Cupola Vestibule Dummy Connections (view from inside Node 3 looking Nadir towards Cupola).

NOTE

1. Figures 13 and 15 are printed again as an appendix at the end of this procedure so that they can be ripped out by crew.
2. The following steps configure the CDH buses to install the Cupola 1553 CH B (CP2108F) umbilical.
3. If desired, CDH steps can be executed by the ground if S-Band is available.
4. CDH buses are on channel A nominally.

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MCC-H

9.1 Inhibiting C&C MDM BC Comm Failure (ground-only)

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

CCS Recovery Retry

'BC Comm Fail'

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

9.2 Inhibiting Auto Transition to Diagnostics in HCZ MDM (ground-only)

CDH: Primary HCZ: MDM FDIR

Primary HCZ MDM FDIR

'Auto Transition to Diagnostic'

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

Table 1. Data Buses to Be Safed

Bus Name[XX]	Controlling MDM
LB-SYS-HCZ-1	Prime HCZ
LB-SYS-HCZ-2	Prime HCZ
CB INT 2	Prime C&C

9.3 Inhibiting Channel Switching, Verifying Buses on Channel A (ground-only)

CDH: Primary HCZ (Primary C&C)

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

[XX]

sel 'Bus Status'

[XX] Bus Status

Verify Channel Selected – A

'Auto Channel Switch Status'

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

Repeat

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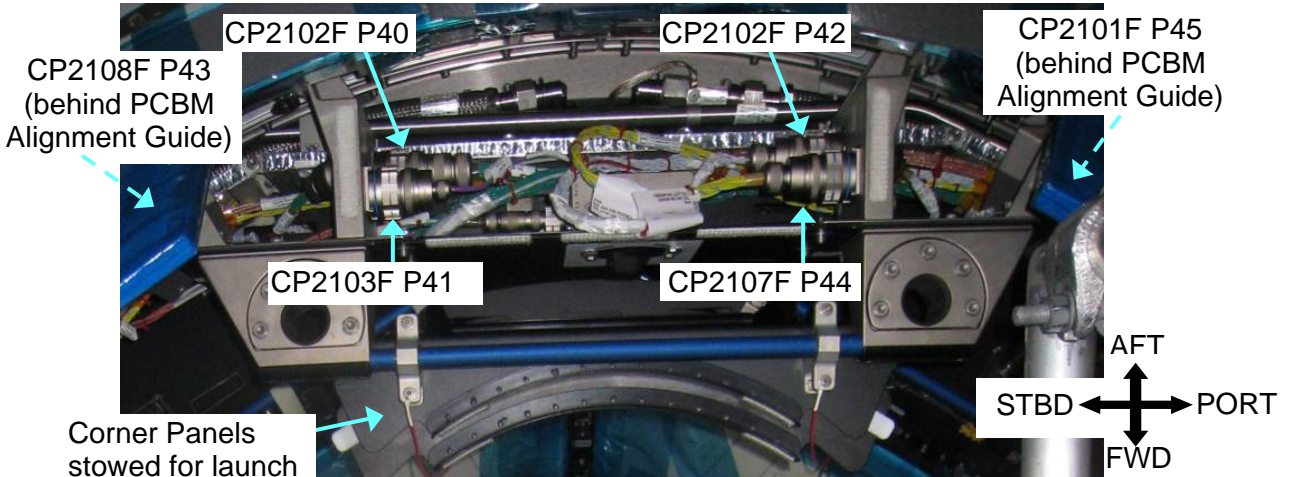


Figure 16.- Cupola Aft Quadrant Dummy Connections.

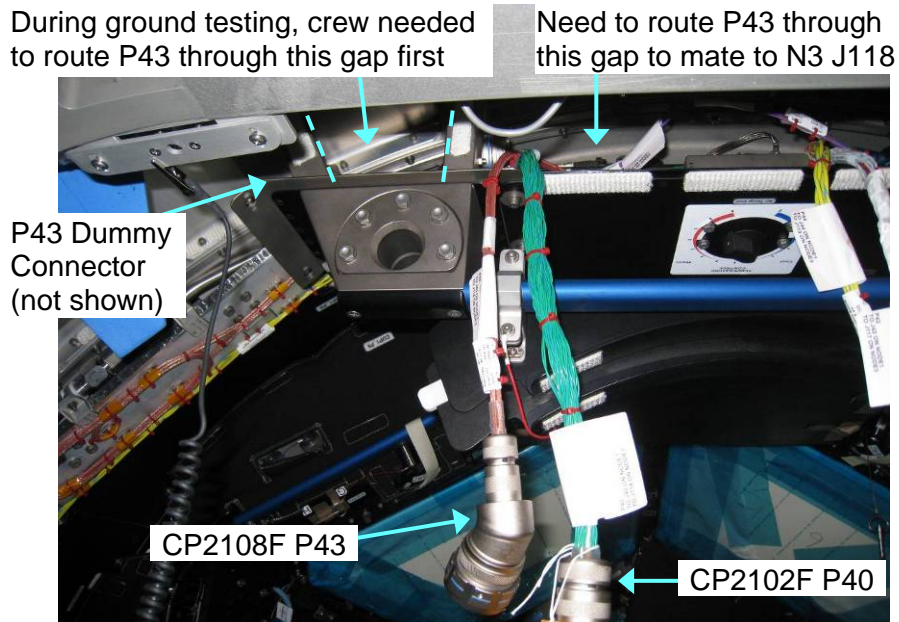


Figure 17.- CP2108F P43 Routing During Ground Testing.

NOTE

1. During ground testing, crew found they had to route CP2108F P43 behind/through Cupola structure to mate to N3 J118. Refer to Figure 17.
2. During ground testing, several Wire Ties had to be cut to enable umbilical routing/mating. These Wire Ties should have been replaced with Velcro Straps before launch.

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Table 2. 1553 Channel B Umbilical

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
1553 Ch B	RWS Port & 1553 Data Bus ELH Assembly	CP2108F	3500384-508	J118	Park P43

9.4 Using Sharpie, label Ziplock Bag, "Node 3 Nadir Vestibule Protective Caps - Removed GMT xxx."
Secure Ziplock Bag in Vestibule.

9.5 **On MCC-H GO**

Remove Velcro Straps securing CP2108F umbilical as required.

* If Wire Ties securing Cupola umbilicals need to be cut

*
*
*
*
*
*
*
*
*
*
*

WARNING

Care should be taken to only cut Wire Ties. If Wire Harnesses nicked or cut, could result in shock hazard.

Cut Wire Ties (Wire Cutters).
Trash Wire Ties in Ziplock Bag.

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

Cupola Vestibule

9.7 Demating 1553 Channel B Connector (CP2108F) from Cupola Dummy Connector

CP2108F P43 ←|→ Cupola Dummy Connector labeled "Park P43"
Route CP2108F through Cupola as required to mate to J118 on N3 Nadir Bulkhead.
Refer to Figures 13, 15 to 17, Table 2.

N3 Bulkhead

9.8 1553 Bus Terminator ←|→ J118 on N3 Nadir Bulkhead
Label removed 1553 Bus Terminator "Mates with N3 Nadir J118" (Sharpie).
Photo document 1553 Bus Terminator, newly installed label (Digital Camera).
Stow 1553 Bus Terminator in Ziplock Bag labeled "Node 3 Nadir Vestibule Protective Caps - Removed GMT xxx."

9.9 CP2108F P43 →|← J118 on N3 Nadir Bulkhead

9.10 ISS ↓ **MCC-H**: "Channel B umbilical mated. Go for channel swap."

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10. MATING 1553 CH A DATA CONNECTOR (CP2108F)

MCC-H 10.1 Swapping to 1553 Channel B for Channel A Mate (ground-only)

```

CDH: Primary HCZ (Primary C&C)

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

[XX]

sel 'Bus Status'

[XX] Bus Status
'Channel Selected'

cmd Select Ch B Execute (Verify – Ch B selected)

Repeat
    
```



Figure 18.- Cupola Fwd Quadrant Dummy Connections.

Table 3. Channel A Umbilical

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
1553 Ch A	RWS Port & 1553 Data Bus ELH Assembly	CP2108F	3500384-508	J106	Park P31

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10.2 On MCC-H GO

Remove Velcro Straps securing CP2108F umbilical as required.

Cupola
Vestibule

10.3 Demating 1553 Channel A Connector (CP2108F) from Cupola Dummy Connector

CP2108F P31 ←|→ Cupola Dummy Connector labeled “Park P31”
Route CP2108F through Cupola as required to mate to J106 on N3 Nadir Bulkhead.

Refer to Figures 13, 15, 18, Table 3.

N3 Bulkhead

10.4 1553 Bus Terminator ←|→ J106 on N3 Nadir Bulkhead

Label removed 1553 Bus Terminator “Mates with N3 Nadir J106” (Sharpie).

Photo document 1553 Bus Terminator, newly installed label (Digital Camera).

Stow 1553 Bus Terminator in Ziplock Bag labeled “Node 3 Nadir Vestibule Protective Caps.”

10.5 CP2108F P31 →|← J106 on N3 Nadir Bulkhead

10.6 Unclip Static Wrist Tether for use on N3 Nadir IV Bulkhead connections.

10.7 ISS ↓ **MCC-H**, “Complete with data umbilical installation.”

11. RECONFIGURING DATA BUSES (MCC-H) (GROUND-ONLY)

NOTE

Data bus reconfiguration is a non time critical step.

MCC-H

11.1 Swapping Back to Channel A and Enabling Channel Switching

CDH: Primary HCZ (Primary C&C)

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

[XX]

sel ‘Bus Status’

[XX] Bus Status

‘Channel Selected’

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

‘Auto Channel Switch Status’

cmd Enable **Execute** (Verify – Ena)

Repeat

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- 11.2 Enabling C&C MDM BC Comm Failure
CDH: Primary C&C MDM: Recovery Retry: CCS MDM

'BC Comm Fail'

cmd Enable **Execute** (Verify – Ena)

- 11.3 Enabling Auto Transition to Diagnostics in HCZ MDM
CDH: Primary HCZ: MDM FDIR

'Auto Transition to Diagnostic'

cmd Enable **Execute** (Verify – Ena)

12. SAFING FOR REMAINING CUPOLA UMBILICAL MATES

NOTE

Safing for umbilical mates (step 12) will be executed by the ground if S-Band is available.

MCC-H

- 12.1 Safing Heater Power for Windows 1 to 4 (ground-only)

Cupola: TCS

sel Heater 1

sel RPCM N32A2B E2 RPC 04

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

cmd Close Cmd – Inh **Execute** (Verify – Inh)

NOTE

The PCS display for the Cupola TCS Overlay has heaters 5 and 6 swapped. When heater 5 is clicked, a pop-up for heater 6 comes up, and vice versa for heater 6. Reference SPN 38309/5481.

- 12.2 Safing Heater Power for Windows 5, 6, 7A, 7B (ground-only)

Cupola: TCS

sel Heater 5

sel RPCM N32A2B E2 RPC 05

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

cmd Close Cmd – Inh **Execute** (Verify – Inh)

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12.3 Safing ATU Power (ground-only)

Cupola: EPS

sel RPCM N32A2B C2 RPC 14

RPCM N32A2B C2 RPC 14

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

cmd Close Cmd – Inh **Execute** (Verify – Inh)

12.4 Safing UOP 1 Power (ground-only)

Cupola: EPS

sel RPCM N32A2B C2 RPC 17

RPCM N32A2B C2 RPC 17

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

cmd Close Cmd – Inh **Execute** (Verify – Inh)

12.5 Safing UOP 2 Power (ground-only)

Cupola: EPS

sel RPCM N32A2B D2 RPC 17

RPCM N32A2B D2 RPC 17

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

cmd Close Cmd – Inh **Execute** (Verify – Inh)

12.6 Powering Off Either DDCU N32A or DDCU N32B Converter (ground-only)

Node 3: EPS: DDCU N32A2B Dist: DDCU N32A(N32B): Converter

DDCU N32A(N32B) Converter

cmd Converter Off – Off (single-step command, Arm not required)

DDCU N32A(N32B)

'Power Share Ratio, %'

Verify DDCU N32A(N32B) < 30

12.7 **MCC-H** ↑ ISS: "Safing complete. Go for step 13.7."

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13. DEMATING NODE 3 POWER WIRE HARNESES FOR SAFING

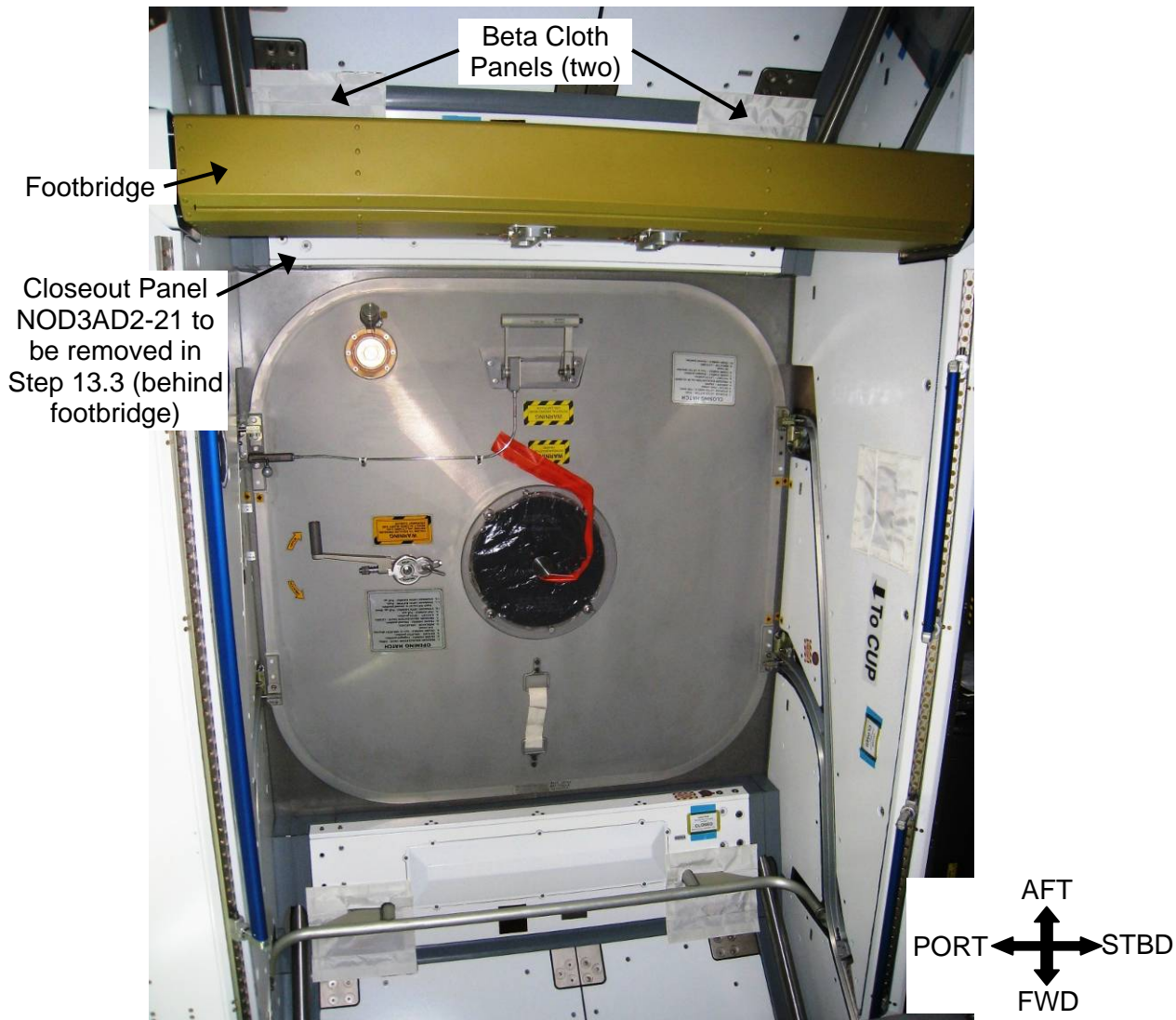


Figure 19.- Node 3 Nadir Hatch (Ground Photo).

- NOD3D2 13.1 Remove Beta Cloth Panels (two) from Closeout Panel NODAD2-21. Refer to Figure 19.
- 13.2 If Closeout Panel NOD3AD2-21 Launch Bolt Restraints (painted heads) have not yet been removed
Remove Launch Bolt Restraints (eight) (Ratchet, 1/4" Drive; 5/32" Hex Head).
Stow in Ziplock Bag with discarded Wire Ties.
Refer to Figure 19.

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- 13.3 Remove Closeout Panel NOD3AD2-21, fasteners (four) (Ratchet, 1/4" Drive; 5/32" Hex Head).
Temporarily stow Closeout Panel.
Refer to Figure 19.

WARNING

CSA-O2 readings are required to insure O2 % is not above flammability levels or N2 pockets do not exist that can cause crew asphyxiation.

NOTE

1. Two CSA-O2 units are required to take independent samples in the open cabin in order to protect against CSA-O2 sensor error.
2. Only one CSA-O2 unit required for sampling within Rack volume.

- 13.4 Record CSA-O2 sampling in open cabin: _____% (first CSA-O2).
Record CSA-O2 sampling in open cabin: _____% (second CSA-O2)

Verify CSA-O2 sampling from both units are within 1.1 % of each other.

Verify O2 % within nominal range specified on CSA-O2 Decal.

- 13.5 Perform CSA-O2 sampling behind removed Closeout Panel.
Verify O2 % within Nominal Range specified on CSA-O2 Decal.

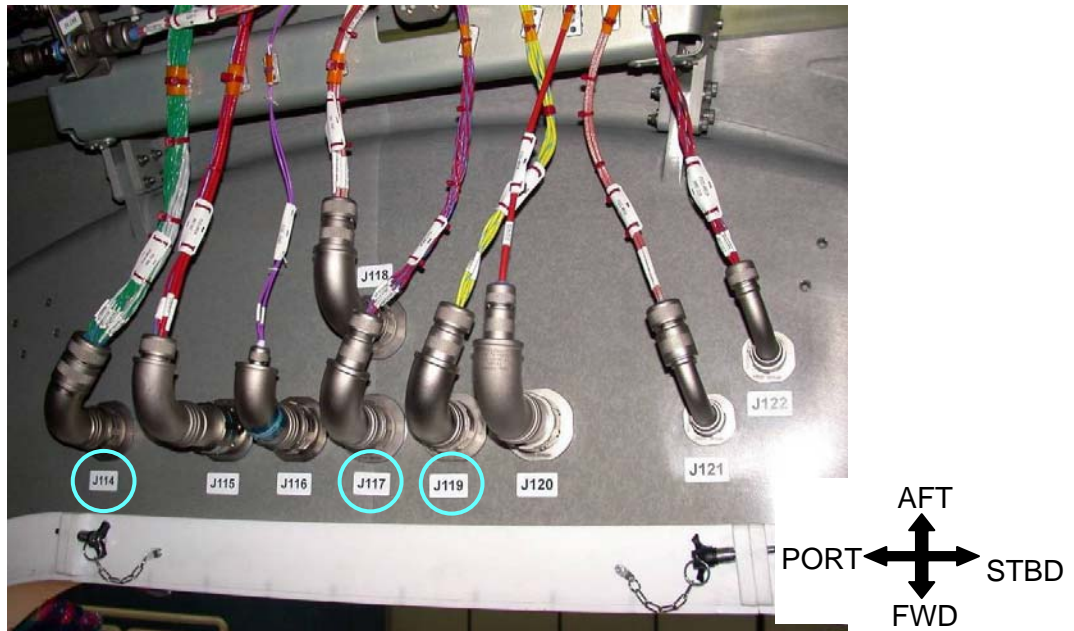


Figure 20.- Node 3 Nadir Internal Bulkhead Aft Quadrant Connections (Closeout Panel NOD3AD2-21 removed).

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

N3 Nad IV
Bulkhead

13.7 On MCC-H GO

HMU 416 P114-MPLM ←|→ J114 on N3 (Htr Pwr)

HMU 274 P117-MPLM ←|→ J117 on N3 (Htr/ATU Pwr)

HMU 208 P119-MPLM ←|→ J119 on N3 (UOP Pwr)

Refer to Figure 20.

13.8 Install Kapton Tape over exposed electrical connections (six) to protect from FOD, damage.

Temporarily secure Wire Harnesses as required.

13.9 Un-clip Static Wrist Tether.

14. MATING WINDOW HTR PWR AND CONTROL/ATU PWR CONNECTOR (CP2102F)

NOTE

1. The highest priority connections to mate as a part of Cupola vestibule outfitting are the two CP2102F umbilical mates (step 14: J117 to P42, step 15: J114 to P40). Mating these heater connections is a constraint for removal of the Cupola EVA thermal cover.
2. During ground testing, crew found the P42 connector difficult to reach and had to follow the harness up to reach the P42 connector.

Table 4. Window Heater Control and Power/ATU Power Umbilical

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
Window Heater Control and Power/ATU Power	Window & ATU Power ELH Assembly	CP2102F	3500384-502	J117	Park P42L

Cupola
Vestibule

14.1 Secure Static Wrist Tether to unpainted, unanodized material.

14.2 Remove Velcro Straps securing CP2102F umbilical as required.

14.3 Demating Window Htr Pwr & Cntrl/ATU Pwr Umbilical (CP2102F) from Cupola Dummy Connector

CP2102F P42 ←|→ Cupola Dummy Connector labeled "Park P42L"

Route CP2102F through Cupola, as required, to mate to J117 on N3 Nadir Bulkhead.

Refer to Figures 13, 15 and 16, Table 4.

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N3 Bulkhead 14.4 Protective Cap ←|→ J117 on N3 Nadir Bulkhead
Stow Protective Cap in Ziplock Bag labeled “Node 3 Nadir Vestibule Protective Caps.”

14.5 CP2102F P42 →|← J117 on N3 Nadir Bulkhead

15. MATING WINDOW HTR PWR AND CONTROL CONNECTOR (CP2102F)

NOTE

1. During ground testing, a Wire Tie prohibited the P40 connection from mating. This Wire Tie was cut and should have been replaced with a Velcro Strap on the ground.
2. During ground testing, P40 had a loose backshell. This was corrected on the ground.

Table 5. Window Heater Control and Power Umbilical

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
Window Heater Control and Power	Window & ATU Power ELH Assembly	CP2102F	3500384-502	J114	Park P40L

15.1 Remove Velcro Straps securing CP2102F umbilical as required.

Cupola Vestibule 15.2 Demating Window Htr Pwr and Cntrl/ATU Pwr Connector (CP2102F) from Cupola Dummy Connector

CP2102F P40 ←|→ Cupola Dummy Connector labeled “Park P40L”
Route CP2102F through Cupola, as required, to mate to J114 on N3 Nadir Bulkhead.
Refer to Figures 13, 15 and 16, Table 5.

N3 Bulkhead 15.3 Protective Cap ←|→ J114 on N3 Nadir Bulkhead
Stow Protective Cap in Ziplock Bag labeled “Node 3 Nadir Vestibule Protective Caps.”

15.4 CP2102F P40 →|← J114 on N3 Nadir Bulkhead

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16. MATING UOP PWR CONNECTOR (CP2107F)

Table 6. UOP Power Umbilical

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
UOP Power	UOP 1&2 Pwr ELH Assembly	CP2107F	3500384-507	J119	Park P44

16.1 Remove Velcro Straps securing CP2107F umbilical as required.

Cupola Vestibule 16.2 Demating UOP PWR Connector (CP2107F) from Cupola Dummy Connector
 CP2107F P44 ←|→ Cupola Dummy Connector labeled "Park P44"
 Route CP2107F through Cupola, as required, to mate to J119 on N3 Nadir Bulkhead.
 Refer to Figures 13, 15 and 16, Table 6.

N3 Bulkhead 16.3 Protective Cap ←|→ J119 on N3 Nadir Bulkhead
 Stow Protective Cap in Ziplock Bag labeled "Node 3 Nadir Vestibule Protective Caps."

16.4 CP2107F P44 →|← J119 on N3 Nadir Bulkhead

16.5 Un-clip Static Wrist Tether.

17. REMATING NODE 3 WIRE HARNESSSES

N3 Nad IV Bulkhead 17.1 Secure Static Wrist Tether to unpainted, unanodized metal surface.

17.2 Remove, discard Kapton Tape covering electrical connectors on N3 IV Bulkhead.
 Release Wire Harness tethers as required.

17.3 HMU 416 P114-MPLM →|← J114 on N3 (Htr Pwr)
 HMU 274 P117-MPLM →|← J117 on N3 (Htr/ATU Pwr)
 HMU 208 P119-MPLM →|← J119 on N3 (UOP Pwr)
 Refer to Figure 20.

17.4 ISS ↓ **MCC-H**, "Node 3 Wire Harnesses remated."

17.5 Unclip Static Wrist Tether.

17.6 Retrieve Closeout Panel NOD3AD2-21.
 Install Closeout Panel NOD3AD2-21, fasteners four (Driver Handle, 1/4" Drive; 5/32" Hex Head).
 Refer to Figure 19.

17.7 Reinstall Beta Cloth Panels (two) on Closeout Panel NOD3AD2-21.
 Refer to Figure 19.

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18. MATING AUDIO BUS B CONNECTOR (CP2103F)

Table 7. Audio Bus B Umbilical

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
Audio Bus B	Audio Bus FOH Assembly	CP2103F	3500384-503	J116	Park P41

CAUTION

The CP2103F umbilical mated in steps 17 and 19 contains fiber optic lines. This umbilical should not be exposed to tension or a tight bend radius (less than 2 inches). Failure to comply may result in equipment damage.

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

18.2 Remove Velcro Straps securing CP2103F umbilical as required.

Cupola
Vestibule

18.3 Demating Audio Bus B Connector (CP2103F) from Cupola Dummy Connector

CP2103F P41 ←|→ Cupola Dummy Connector labeled, "Park P41"
Route CP2103F through Cupola, as required, to mate to J116 on N3 Nadir Bulkhead.

Refer to Figures 14 to 16, Table 7.

N3
Bulkhead

18.4 Protective Cap ←|→ J116 on N3 Nadir Bulkhead
Stow Protective Cap in Ziplock Bag labeled, "Node 3 Nadir Vestibule Protective Caps."

18.5 CP2103F P41 →|← J116 on N3 Nadir Bulkhead

19. MATING CUPOLA GROUNDING CONNECTOR (CP2101F)

NOTE

If ABCM to PCBM Ground Straps successfully installed (step 7), Cupola Grounding Umbilical not required. In the event that crew has issues mating the J120/P45 connection, the connector mate should be omitted.

Table 8. Cupola Grounding Umbilical

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
Cupola Grounding	Gnd ELH Assembly	CP2101F	3500384-501	J120	Park P45

19.1 Remove Velcro Straps securing CP2101F umbilical as required.

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

Cupola
Vestibule

19.3 Demating Grounding Connector (CP2101F) from Cupola Dummy Connector

CP2101F P45 ←|→ Cupola Dummy Connector labeled, "Park P45"
Route CP2101F through Cupola, as required, to mate to J120 on
N3 Nadir Bulkhead.

Refer to Figures 13, 15 and 16, Table 8.

N3
Bulkhead

19.4 Protective Cap ←|→ J120 on N3 Nadir Bulkhead
Stow Protective Cap in Ziplock Bag labeled, "Node 3 Nadir
Vestibule Protective Caps."

19.5 CP2101F P45 →|← J120 on N3 Nadir Bulkhead

20. MATING AUDIO BUS A CONNECTOR (CP2103F)

Table 9. Audio Bus A Umbilical

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
Audio Bus A	Audio Bus FOH Assembly	CP2103F	3500384-503	J104	Park P29

20.1 Remove Velcro Straps securing CP2103F umbilical as required.

Cupola
Vestibule

20.2 Demating Audio Bus A Connector (CP2103F) from Cupola Dummy Connector

CP2103F P29 ←|→ Cupola Dummy Connector labeled, "Park P29"
Route CP2103F through Cupola, as required, to mate to J104 on
N3 Nadir Bulkhead.

Refer to Figures 14 to 16, Table 9.

N3
Bulkhead

20.3 Protective Cap ←|→ J104 on N3 Nadir Bulkhead
Stow Protective Cap in Ziplock Bag labeled, "Node 3 Nadir
Vestibule Protective Caps."

20.4 CP2103F P29 →|← J104 on N3 Nadir Bulkhead

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21. MATING SSRMS SAFING CROSS-STRAP DATA CONNECTOR (CP2108F)

Table 10. SSRMS Safing, E-Stop Cross-strap Umbilical

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
SSRMS Safing, E-Stop Cross-strap	RWS Port & 1553 Data Bus ELH Assembly	CP2108F	3500384-508	J103	Park P28

21.1 Remove Velcro Straps securing CP2108F umbilical as required.

Cupola Vestibule

21.2 Demating SSRMS Safing, E-Stop Cross-strap Connector (CP2108F) from Cupola Dummy Connector

CP2109F P28 ←|→ Cupola Dummy Connector labeled “Park P28”
Route CP2108F through Cupola, as required, to mate to J103 on N3 Nadir Bulkhead.

Refer to Figures 13, 15, 18, Table 10.

N3 Bulkhead

21.3 Protective Cap ←|→ J103 on N3 Nadir Bulkhead
Stow Protective Cap in Ziplock Bag labeled, “Node 3 Nadir Vestibule Protective Caps.”

21.4 CP2108F P28 →|← J103 on N3 Nadir Bulkhead

22. MATING DCP SWITCHES AND VIDEO CONNECTOR (CP2109F)

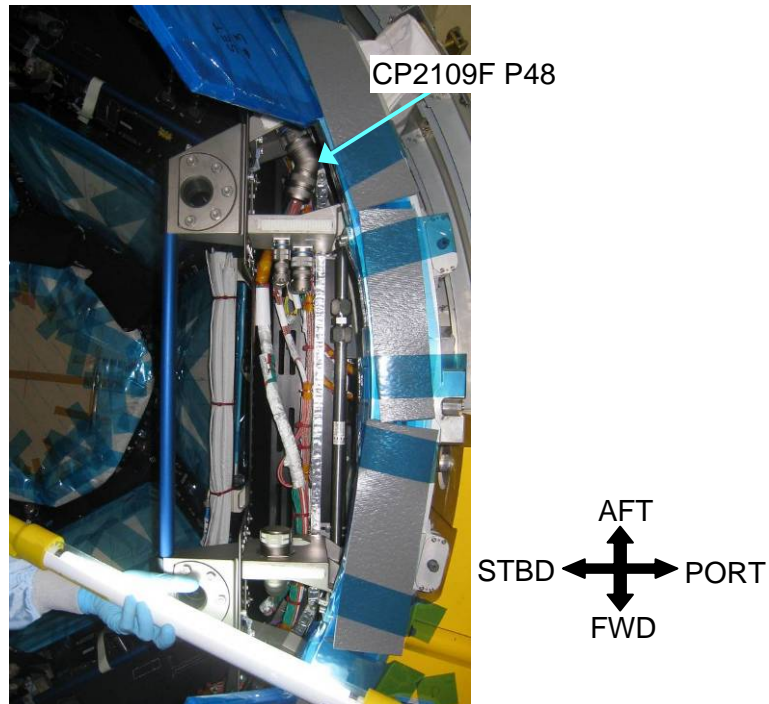


Figure 21.- P48 Park Position on Cupola (Ground Photo).

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Table 11. DCP Switches and Video Umbilical

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
DCP Switches and Video	RWS Port Video Link ELH Assembly	CP2109F	3500384-509	J48	Park P48

22.1 Remove Velcro Straps securing CP2109F umbilical as required.

Cupola Vestibule

22.2 Demating DCP Switches and Video Connector (CP2109F) from Cupola Dummy Connector

CP2109F P48 ←|→ Cupola Dummy Connector labeled, "Park P48"
Route CP2109F through Cupola, as required, to mate to J48 on N3 Nadir Bulkhead.

Refer to Figures 13, 15, and 21, Table 11.

N3 Bulkhead

22.3 Protective Cap ←|→ J48 on N3 Nadir Bulkhead
Stow Protective Cap in Ziplock Bag labeled, "Node 3 Nadir Vestibule Protective Caps."

22.4 CP2109F P48 →|← J48 on N3 Nadir Bulkhead

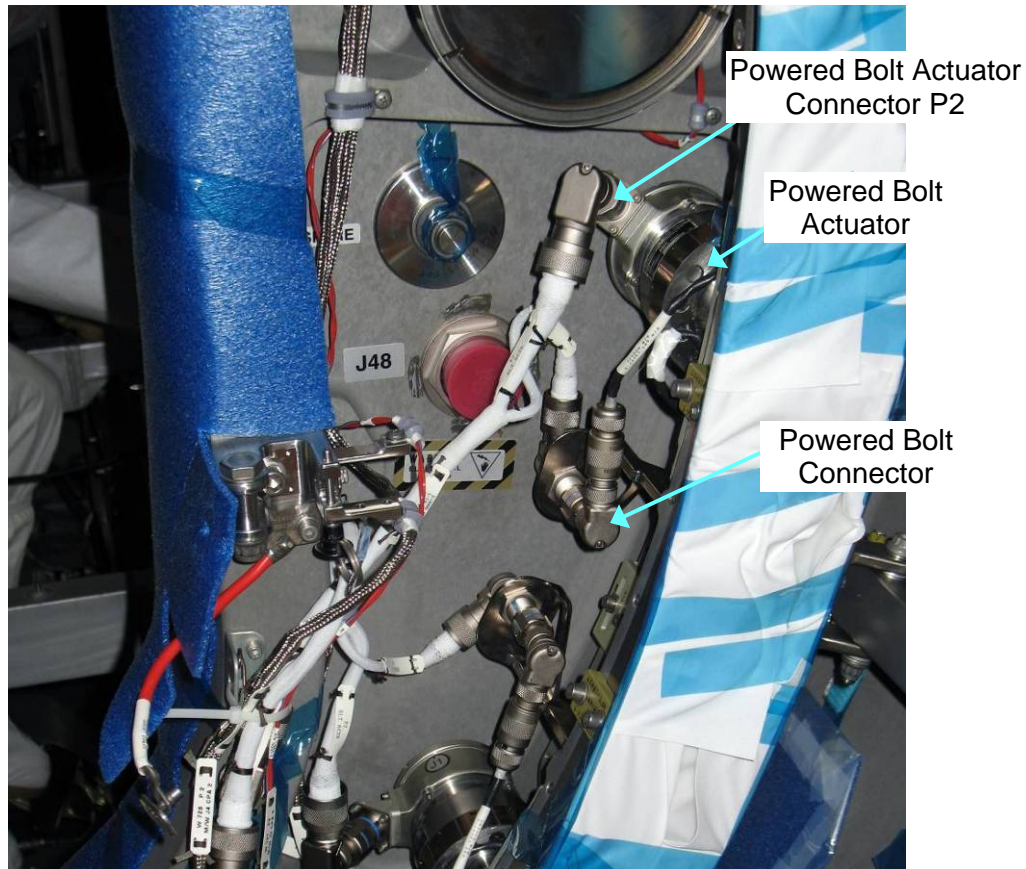


Figure 22.- J48 Possible Interference with Powered Bolt Connectors (Ground Photo).

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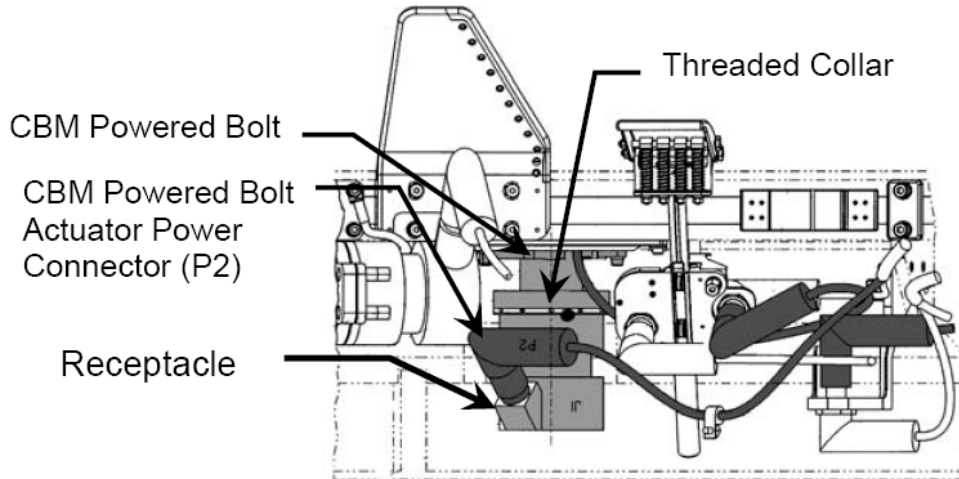


Figure 23.- Powered Bolt Actuator Connector.

NOTE

Ground testing showed that a Powered Bolt Connector or Powered Bolt Actuator Connector may have to be removed to allow for the mating of P48 to J48.

- 22.5 If Powered Bolt Actuator Connector prohibits mating of P48 to J48
 Powered Bolt Actuator Connector P2 ←|→ Powered Bolt Actuator
 Place Kapton Tape over demated connector and receptacle.
 Secure Powered Bolt Actuator Connector to Bulkhead (Velcro Strap).
 Refer to Figures 22, 23.

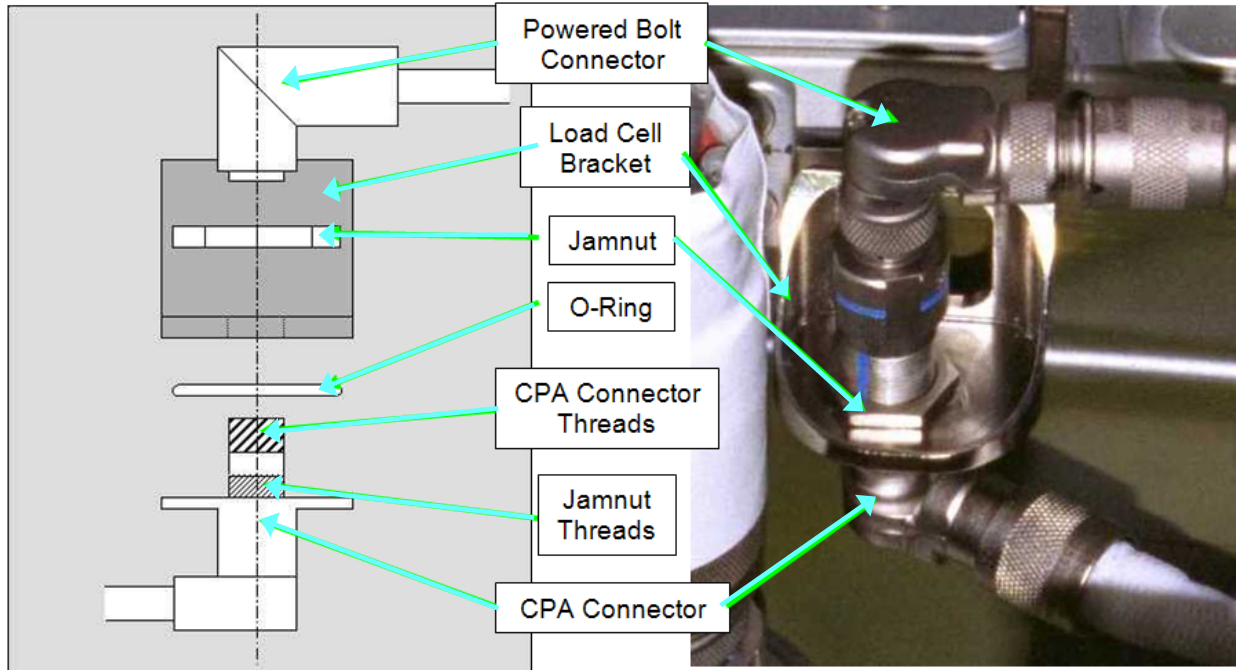


Figure 24.- Load Cell Bracket and Connectors.

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- 22.6 If Powered Bolt Connector prohibits mating of P48 to J48
Powered Bolt Connector ←|→ Load Cell Bracket
- Remove Jamnut (Ratchet, 3/8" Drive; 7/16" Deep Socket).
Slide CPA Connector out of Load Cell Bracket.
Hand tighten Jamnut back onto CPA Connector.
- Powered Bolt Connector →|← CPA Connector
Secure mated connectors to Bulkhead (Velcro Strap).
Refer to Figures 22, 24.
- 22.7 If demated, photo document final configuration of Powered Bolt Connectors (Digital Camera).
- 22.8 Doff Static Wrist Tether.
- 22.9 Notify **MCC-H** which CBM connectors were demated.

23. INSTALLING CUPOLA HTL LINES

NOTE

1. The Cupola HTL lines mate to Node 3 with Gamah Fittings, which require the Fluid Fitting Torque Device (FFTD).
2. Refer to the following FFTD/Gamah Seal Reference procedures.
[A.2.1 FLUID FITTING TORQUE DEVICE \(FFTD\) ASSEMBLY AND USAGE](#) (SODF: ASSY OPS: S&M).
[A.2.3 MATING GAMAH FITTINGS USING THE FFTD](#) (SODF: ASSY OPS: S&M).
[A.2.13 GAMAH SEAL R&R](#) (SODF: ASSY OPS: S&M).
3. Refer to Figures 13, 25 and 26, Table 12 for step 23.
4. The HTL lines were pressurized with Nitrogen at 5 psi on the ground and then capped. The Gamah caps (two) were torqued to 600 in-lbs.

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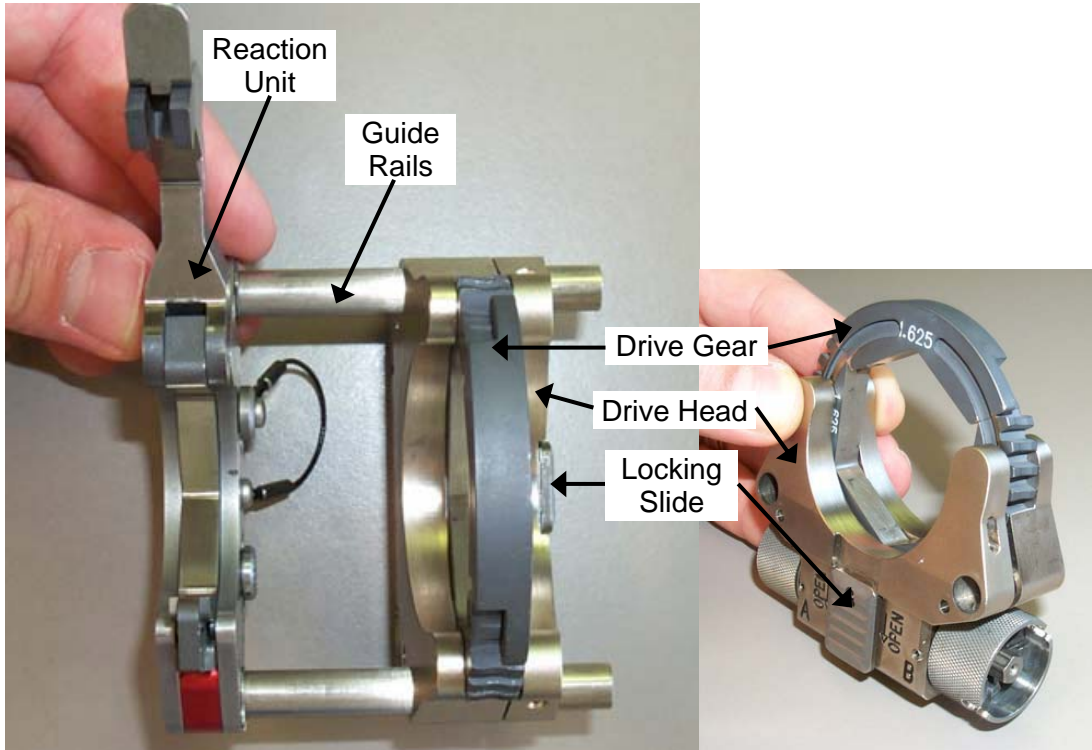


Figure 25.- Correct Orientation of Drive Head on Reaction Unit.

Table 12. Thermal Control System Jumpers

Jumper Name	NOD3 Bulkhead Interface	Input Torque (in-lbs)	Gamah Fitting Size (in)	Output Torque (in-lbs)	FFTD Gear Size (in)	
					Reaction Gear	Drive Gear
Coolant Water HTL Supply TO TCS HTL SPLY TO CUPOLA	A2 (TCS HTL SPLY To Cupola)	Per FFTD Calibration Card	0.750	700	1	1.375
Coolant Water HTL Return TO TCS HTL RTN TO NODE 3	A6 (TCS HTL RTN To Node 3)	Per FFTD Calibration Card	0.750	700	1	1.375

23.1 During following steps:
 Inspect both sides of each Gamah fitting for damage, debris before mating.
 Report damage, debris to **MCC-H**.
 Inspect male threads for absence of Braycote before mating.
 If required, apply one drop of Braycote to male threads; spread around threads by gloved hand.

23.2 If restrained, release Cupola HTL lines.
 Tethered Gamah Caps (two) ←|→ Cupola HTL Supply, Return Lines (FFTD; Ratchet, 3/8" Drive)

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- 23.3 For both HTL line Gamah Fittings (size 0.750")
 - Perform A.2.13 GAMAH SEAL R&R, all (SODF: ASSY OPS: S&M), then:
- 23.4 Label Ziplock Bag, "NOD3-Cupola HTL Gamah Caps" (Sharpie). Temporarily stow.
- 23.5 Gamah Cap ←|→ A2 (N3 Side) (FFTD; Ratchet, 3/8" Drive)
Stow Gamah Cap in Ziplock Bag labeled, "NOD3-Cupola HTL Gamah Caps."
- 23.6 Gamah Cap ←|→ A6 (N3 Side) (FFTD; Ratchet, 3/8" Drive)
Stow Gamah Cap in Ziplock Bag labeled, "NOD3-Cupola HTL Gamah Caps."

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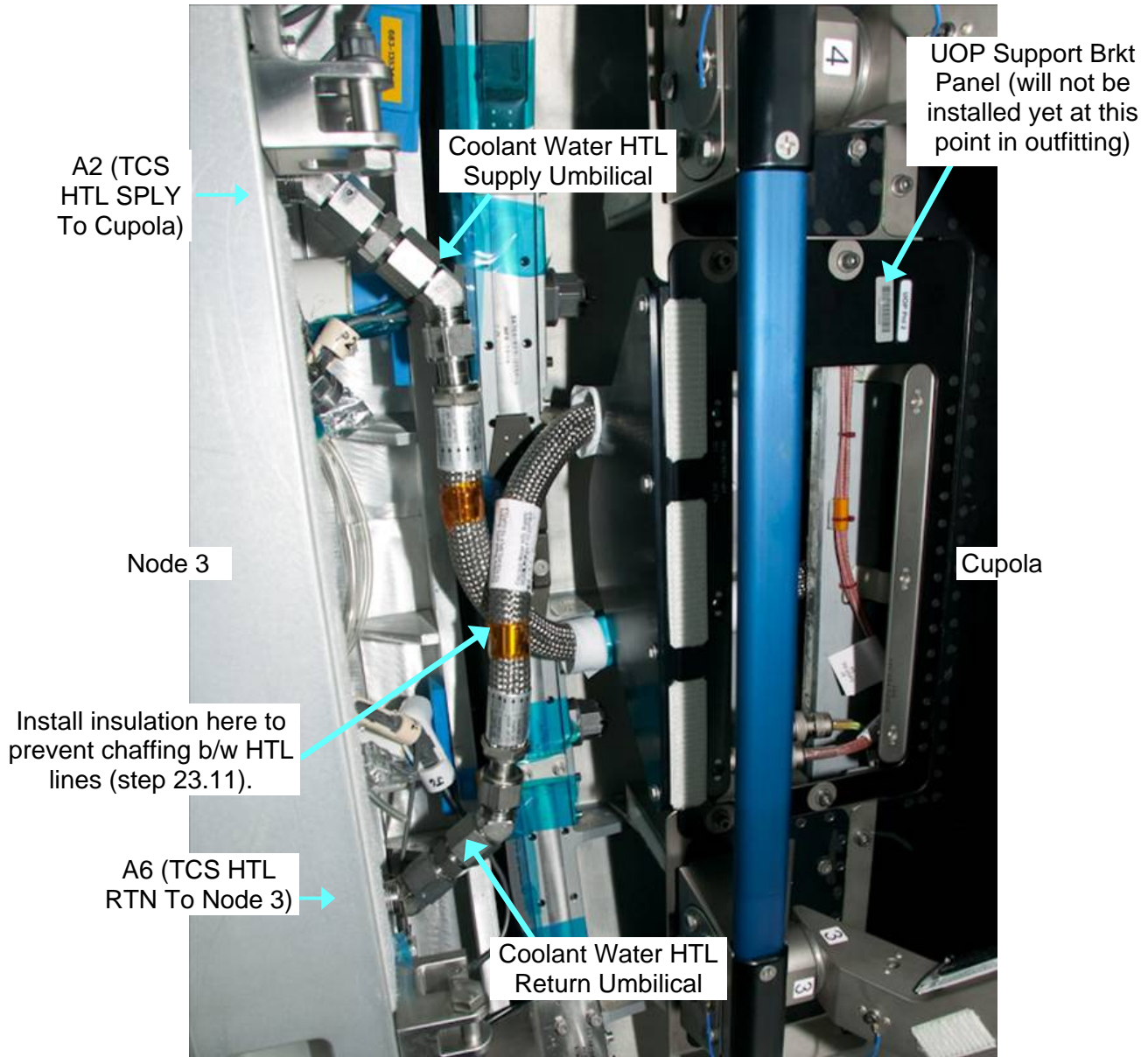


Figure 26.- Cupola HTL Lines with UOP Panel Installed (Ground Photo).

23.7 Installing Coolant Water HTL Supply on NOD3

TO TCS HTL SPLY TO CUPOLA →|← A2 (NOD3 Bulkhead), hand tighten

Refer to Figures 13, 26, Table 12.

NOTE

There are two FFTDs on orbit (S/N 001, S/N 003). They have different calibrations and require different input torque values to reach a desired torque. The FFTD Calibration Card can be found on the FFTD Kit Lid or in Figures 2, 3 of A.2.1 Fluid Fitting Torque Device (FFTD) Assembly and Usage.

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- 23.8 Set torque wrench to Input Torque on FFTD Calibration Card for Output Torque of 700 in-lbs [FFTD, (40-200 in-lbs) Trq Wrench, 3/8" Drive].
Torque Coolant Water HTL Supply to NOD3 with FFTD.
Refer to Table 12, FFTD Calibration Card on FFTD Kit lid.

NOTE

Ground testing found that the HTL Supply umbilical needs to be pushed gently outboard so as to not contact the HTL Return umbilical during its installation. This will allow the HTL Return umbilical to be aligned and mated properly.

- 23.9 Installing Coolant Water HTL Return on NOD3
Gently hold HTL Supply Umbilical in the outboard direction to allow for proper alignment of the HTL Return Umbilical.
TO TCS HTL RTN TO NODE 3 →|← A6 (NOD3 Bulkhead), hand tighten
Refer to Figures 10, 23, Table 12.
- 23.10 Torque Coolant Water HTL Return to NOD3 with FFTD.
Refer to FFTD Calibration Card on FFTD Kit lid.
- 23.11 Retrieve HTL Insulation temporarily stowed in step 5.2.
Cut small piece of insulation, and insert between HTL lines at intersection point to prevent chaffing (Scissors).
Temporarily stow remaining HTL insulation.

24. CLOSEOUT

- 24.1 ISS ↓ **MCC-H**, "Go for powering Cupola."
Stow all tools, equipment, and materials.
Refer to Table 13 for materials to restow.
- 24.2 Photo document all newly installed umbilicals, showing general routing overview as well as closeups of mated connections (Digital Camera).

Table 13. Restow Items

1	CBM Center Disk Cover	P/N 683-14575
2,3	1.0 CTB w/ Window, Single (two per CTB) [Contains CPAs (four)]	P/N SEG33111837-301 Notify MCC-H of S/N.
4	Cupola Internal MLI (four pieces)	
5	Cupola CBCS Assembly (CCA)	
6	Ziplock Bag containing discarded Wire Ties, launch bolts	
7	Ziplock Bag labeled, "N3 Nadir IMV Supply Cap"	P/N 683-15016-6
8	Ziplock Bag labeled, "Node 3 Nadir Vestibule Protective Caps"	Contains eight Protective Caps, two 1553 Bus Terminators
9	Ziplock Bag labeled, "NOD3-Cupola HTL Gamah Caps"	Contains two Gamah Caps
10	Leftover HTL Insulation	

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25. APPENDIX

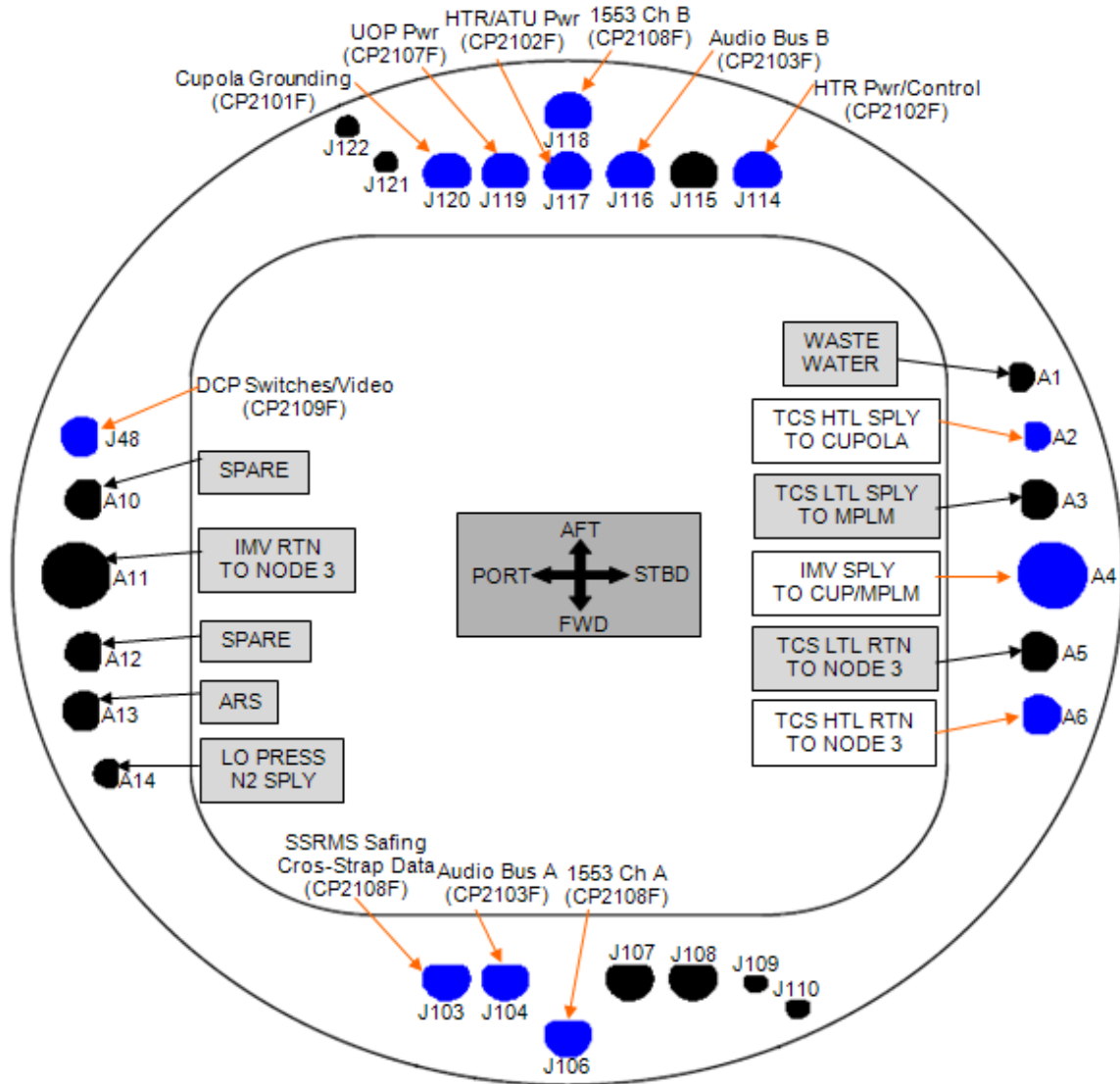


Figure 27.- Node 3 Nadir Bulkhead (view from inside Cupola looking Zenith towards Node 3).

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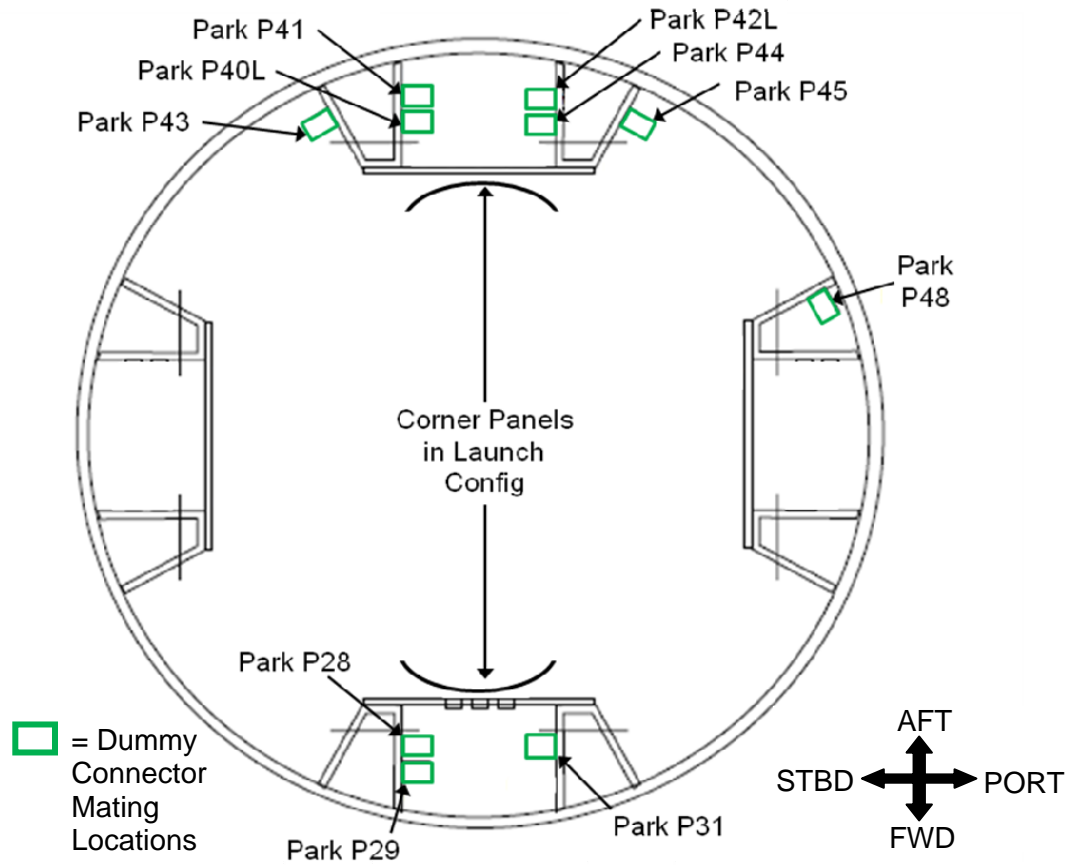


Figure 28.- Cupola Zenith Vestibule Dummy Connections (view from inside Node 3 looking Nadir towards Cupola).

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Table 14. Cupola Umbilicals

Connector Function	Umbilical Label	Harness Number	P/N	NOD3	Cupola Dummy Connector
1553 Ch B	RWS Port & 1553 Data Bus ELH Assembly	CP2108F	3500384-508	J118	Park P43
1553 Ch A	RWS Port & 1553 Data Bus ELH Assembly	CP2108F	3500384-508	J106	Park P31
Window Heater Control and Power/ATU Power	Window & ATU Power ELH Assembly	CP2102F	3500384-502	J117	Park P42L
Window Heater Control and Power	Window & ATU Power ELH Assembly	CP2102F	3500384-502	J114	Park P40L
UOP Power	UOP 1&2 Pwr ELH Assembly	CP2107F	3500384-507	J119	Park P44
Audio Bus B	Audio Bus FOH Assembly	CP2103F	3500384-503	J116	Park P41
Cupola Grounding	Gnd ELH Assembly	CP2101F	3500384-501	J120	Park P45
Audio Bus A	Audio Bus FOH Assembly	CP2103F	3500384-503	J104	Park P29
SSRMS Safing, E-Stop Cross-Strap	RWS Port & 1553 Data Bus ELH Assembly	CP2108F	3500384-508	J103	Park P28
DCP Switches and Video	RWS Port Video Link ELH Assembly	CP2109F	3500384-509	J48	Park P48

1.158 CUPOLA UTILITY OUTLET PANEL INSTALLATION

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OBJECTIVE:

Install UOPs and associated hardware in the Cupola.

LOCATION:

Installed: CUP1P1, CUP1S1

Stowed: √Inventory Management System (IMS)

DURATION:

60 minutes

CREW:

One

PARTS:

UOP 1 (located at CUP1P1) P/N 683-27710-5 S/N 1029

UOP 2 (located at CUP1S1) P/N 683-27710-5 S/N 1030

UOP Support Bracket (located at CUP1P1) P/N 1240CU751-401 B/C CUP0023E

UOP Support Bracket (located at CUP1S1) P/N 1240CU751-401 B/C CUP0024E

MATERIALS:

Dry Wipes

Gray Tape

Sharpie

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

1/8" Hex Head, 1/4" Drive

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

Driver Handle, 1/4" Drive

Ratchet, 1/4" Drive

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

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

Drawer 4:

Wire Cutters

Drawer 5:

Static Wrist Tether

1.158 CUPOLA UTILITY OUTLET PANEL INSTALLATION

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REFERENCED PROCEDURE(S):

1.110 GENERIC UOP ACTIVATION AND CHECKOUT

1. SAFING

Table 1. UOP Locations and Power Sources

Utility Outlet Panel [X]	Location [Q]	Power Source [Y]	Parallel DDCU Set	Data Sources	UOP Support Bracket B/C [T]
CUP UOP 1 (S/N 1029)	CUP1P1	RPCM N32A2B C2 RPC 17	N32A & N32B	System 1553	CUP0023E
CUP UOP 2 (S/N 1030)	CUP1S1	RPCM N32A2B D2 RPC 17	N32A & N32B	System 1553	CUP0024E

√**MCC-H** that the following is true:

[Y] is open and close command inhibited

Either DDCU N32A or DDCU N32B converter is powered off

2. UOP PANEL ASSEMBLY INSTALLATION

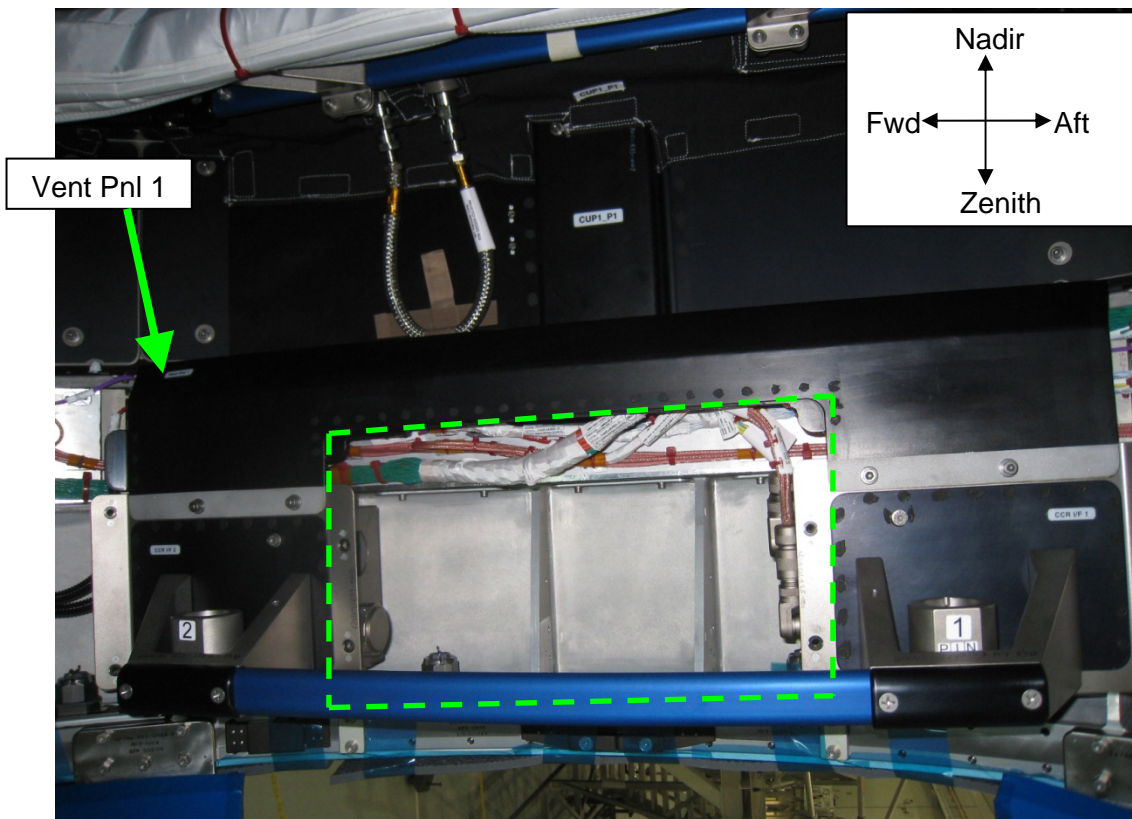


Figure 1.- UOP 1 Installation Area (Ground Photo Looking ISS Port).

1.158 CUPOLA UTILITY OUTLET PANEL INSTALLATION

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Figure 2.- UOP Support Bracket (Photos Taken at Bench Review).

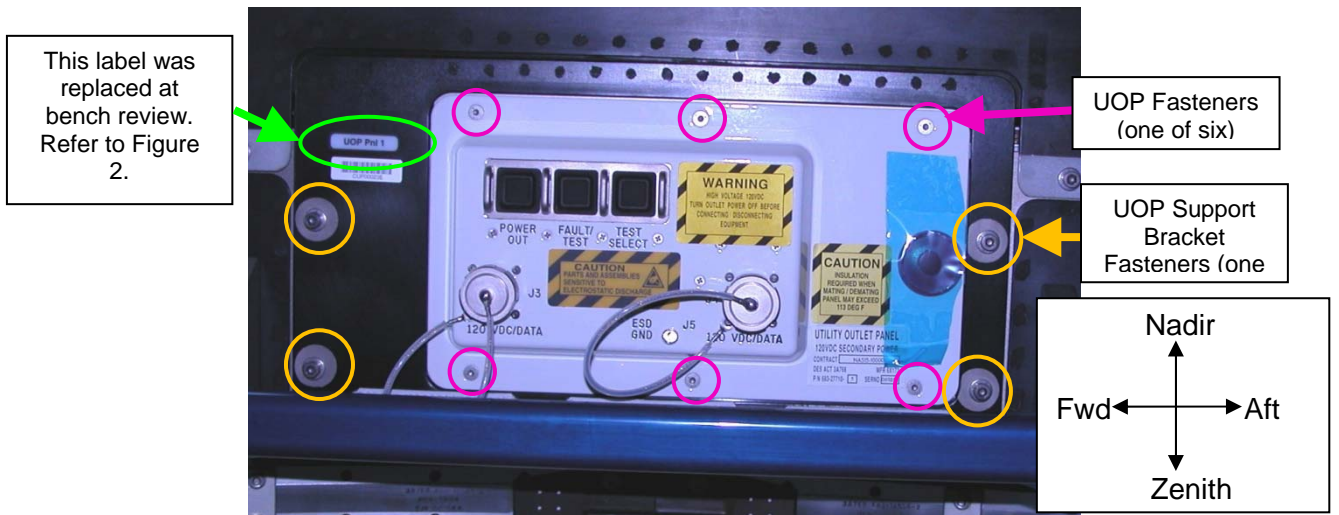


Figure 3.- UOP 1 Installed in UOP Support Bracket.

NOTE

The Cupola UOP Support Brackets have IMV deflector plates to distribute airflow entering from Node 3 throughout Cupola. Refer to Figure 2.

- Install UOP Support Bracket (B/C [T]) at [Q] by maneuvering behind handrail, fasteners (four).
- Tighten, torque UOP Support Bracket fasteners (four) to 115 in-lbs [Ratchet, 1/4" Drive; 3/16" Hex Head, 1/4" Drive; (40-200 in-lbs) Trq Wrench, 1/4" Drive].
- Refer to Figures 2 and 3.

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3. UOP INSTALLATION

Table 2. UOP Connectors and Wire Harnesses

Utility Outlet Panel [X]	Input Power Wire Harness to UOP J1 [V]	Input Data Wire Harness to UOP J2 [U]	Power Wire Harness Dummy Connector Label [S]	Data Wire Harness Dummy Connector Label [R]
CUP UOP 1	UOP1_P1 CP2107F	UOP1_P2 CP2108F	Park UOP1 P1	Park UOP1 P2
CUP UOP 2	UOP2_P1 CP2107F	UOP2_P2 CP2108F	Park UOP2 P1	Park UOP2 P2

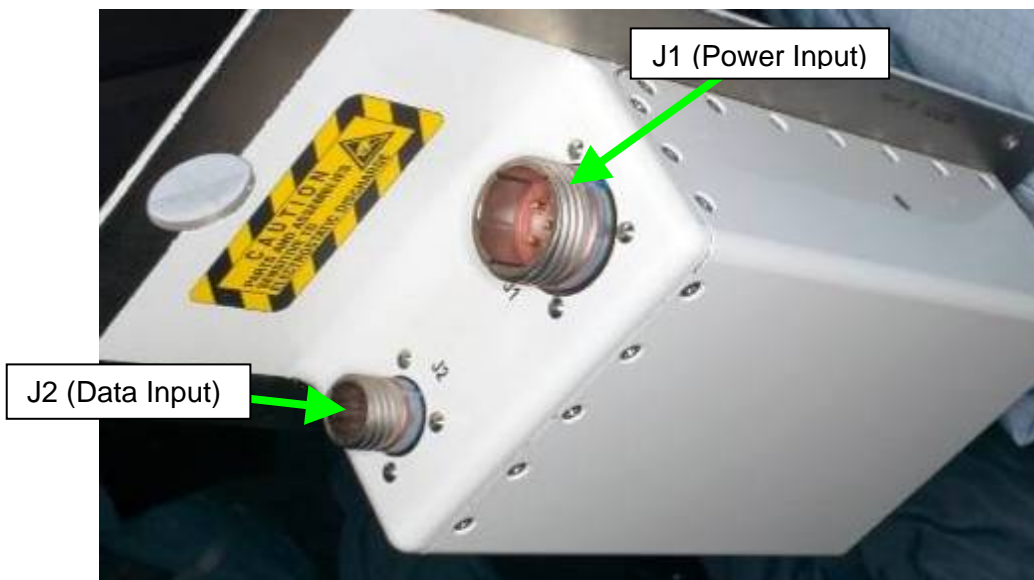


Figure 4.- Utility Outlet Panel Input Connectors (rear view of UOP).

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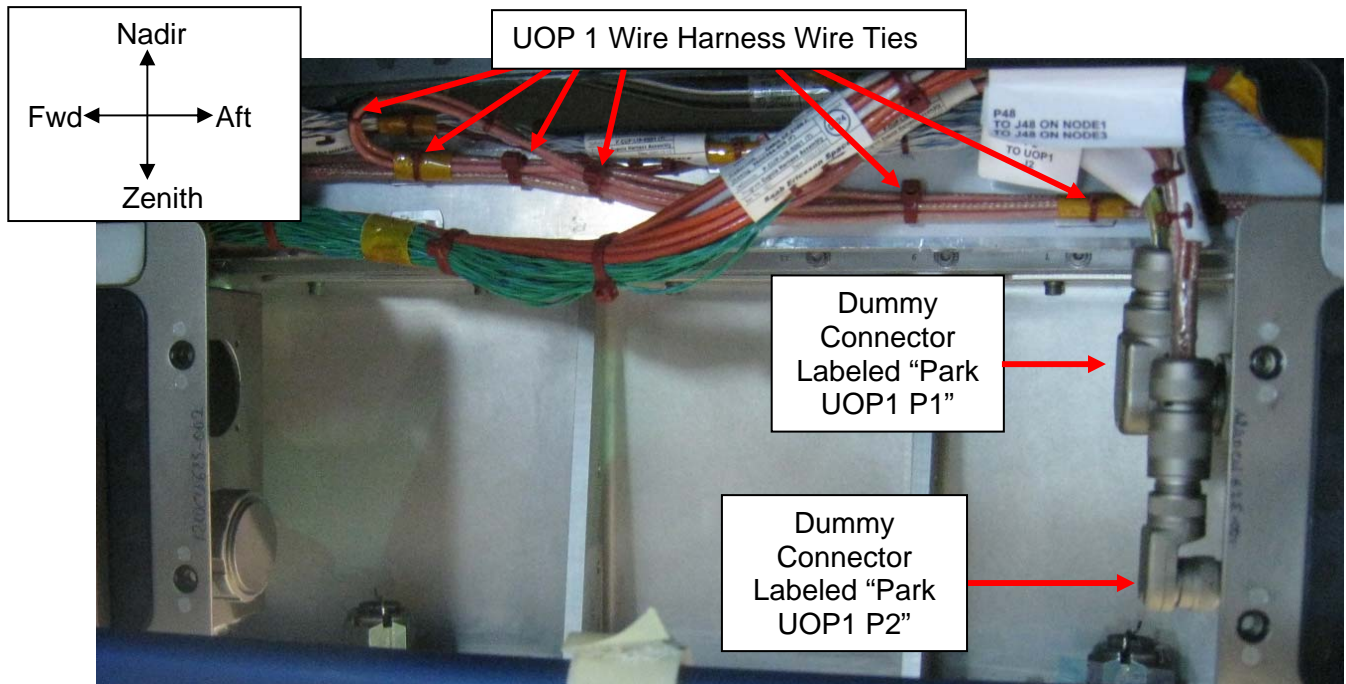


Figure 5.- CUP UOP 1 Installation Site.

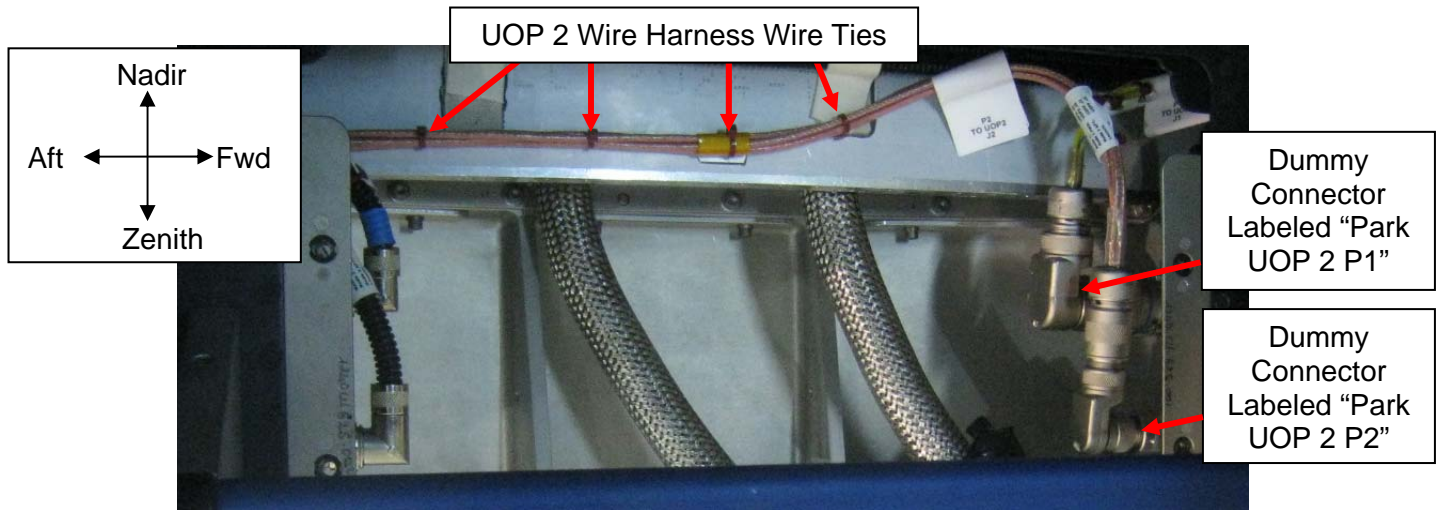


Figure 6.- CUP UOP 2 Installation Site.

- 3.1 Record P/N of [X]: _____
Record S/N of [X]: _____

WARNING
Care should be taken to only cut wire ties. If wire harnesses nicked or cut, could result in shock hazard.

- 3.2 As required, to provide adequate line length, cut wire ties securing UOP cables (Wire Cutters).

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Refer to Figures 5 and 6.

- 3.3 Don Static Wrist Tether.
Secure to unpainted, unanodized metal surface.
- 3.4 Demate Power Wire Harness [V] ←|→ Dummy Connector [S]
Demate Data Wire Harness [U] ←|→ Dummy Connector [R]
Refer to Table 2 and Figures 3, 4, and 5.
- 3.5 Route Power Wire Harness [V], Data Wire Harness [U] through opening in UOP Panel Assembly.
Remove protective caps on UOP, stow on Dummy Connector [S], Dummy Connector [R].
- 3.6 Input Power Wire Harness [V] →|← J1 on [X]
Input Data Wire Harness [U] →|← J2 on [X]
Refer to Table 2 and Figures 4, 5, and 6.
- 3.7 Install [X], assuring wire harnesses not pinched underneath UOP Support Bracket, fasteners (six).
Tighten, torque UOP Support Bracket to 30 in-lbs [Driver Handle, 1/4" Drive; 1/8" Hex Head, 1/4" Drive; (10-40 in-lbs) Trq Wrench, 1/4" Drive].
- 3.8 Doff static wrist tether.
- 3.9 Photo document final configuration (digital camera).
- 3.10 Repeat steps 1 to 3.9 for remaining Cupola UOP.
4. CHECKOUT
Perform 1.110 GENERIC UOP ACTIVATION AND CHECKOUT, all (SODF: EPS: ACTIVATION AND CHECKOUT: PRIMARY POWER SYSTEM), then:
5. POST MAINTENANCE
 - 5.1 Stow tools.
 - 5.2 Notify **MCC-H** of task completion, P/Ns, S/Ns of installed UOPs.

1.160 CUPOLA RWS RELOCATION

(ASSY OPS/20A/FIN)

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OBJECTIVE:

Remove the RWS Bracket Adapters from launch positions.
Transfer the Cupola RWS (Robotics Workstation) from LAB1S5 to Cupola.
Cupola Corner Panels must be removed from launch location and installed in Cupola
and RWS Monitor Bumper installation must be complete before performing this
procedure.

LOCATION:

LAB1S5, Cupola

DURATION:

2 hours

- 30 minutes - Install RWS Bracket Adapters (step 2)
- 60 minutes - Move Cupola RWS (step 3)
- 20 minutes - Reconnect Cupola RWS (step 4)
- 10 minutes - Closeout, Post-Maintenance (steps 5 and 6)

CREW:

Steps 1 to 3.15: One

Steps 3.16 to 4.3: Two (RWS Transfer)

Steps 4.4 to end: One

PARTS:

Upper RWS Adapter (launched installed in Cupola) P/N 1240CU531-401

Lower RWS Adapter (launched installed in Cupola) P/N 1240CU641-401

Wire Harness - DC Panel Power/Data P/N 683-51192-1

RWS Wire Harness W1193 P/N 683-51193-2

US DC Power & 1553 Cable (UOP to Power Supply) P/N SEZ39129268-303

MATERIALS:

Velcro Ties

Gray Tape

Sharpie

Ziplock Bag

TOOLS:

Digital Camera

ISS IVA Toolbox:

Drawer 2:

- Ratchet, 1/4" Drive
- Driver Handle, 1/4" Drive
- 5/32" Hex Head, 1/4" Drive
- 3/8" Hex Head, 1/4" Drive
- (10-50 in-lbs) Trq Wrench, 1/4" Drive

Drawer 5:

- Static Wrist Tether

1.160 CUPOLA RWS RELOCATION

(ASSY OPS/20A/FIN)

1. SAFING FOR RWS REMOVAL FROM LAB

NOTE

RPCM LAS52A3B_A RPC 18 needs to be opened, close command inhibited before crew demates the UOP bypass cables in step 3.7 of this procedure.

√MCC-H - RPCM LAS52A3B_A RPC 18 is open, close cmd inh

2. REMOVING RWS BRACKET ADAPTERS FROM LAUNCH LOCATION (CUPOLA)

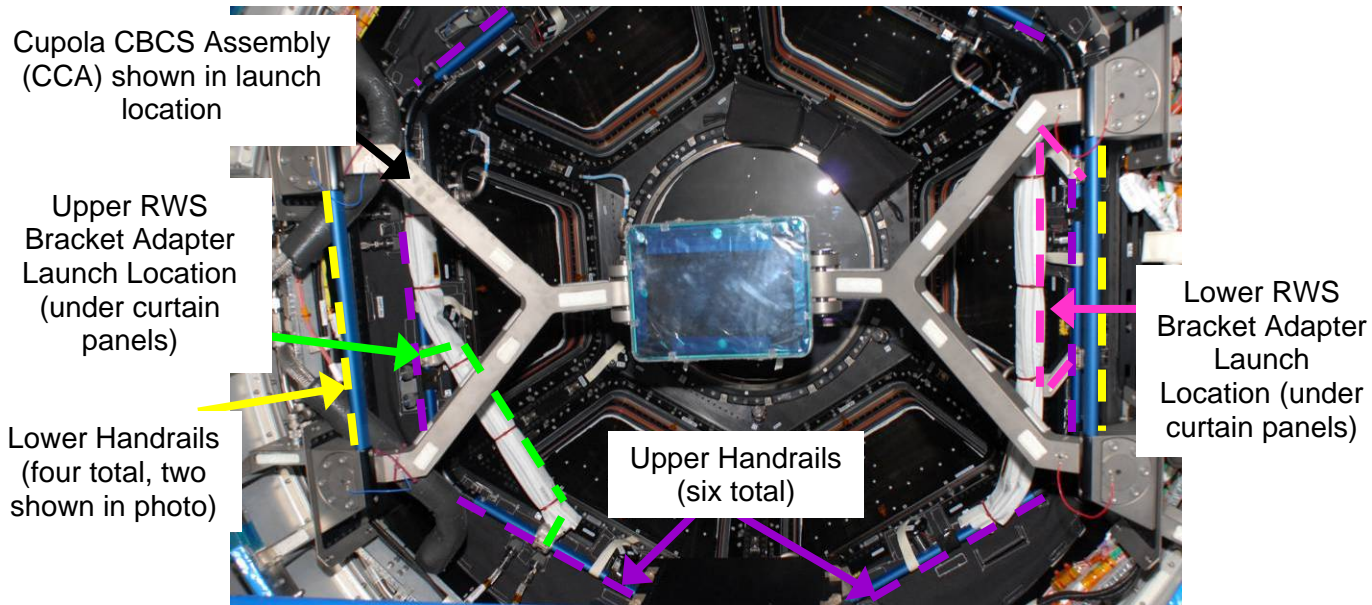


Figure 1.- RWS Bracket Adapters in Launch Locations (Ground Photo).

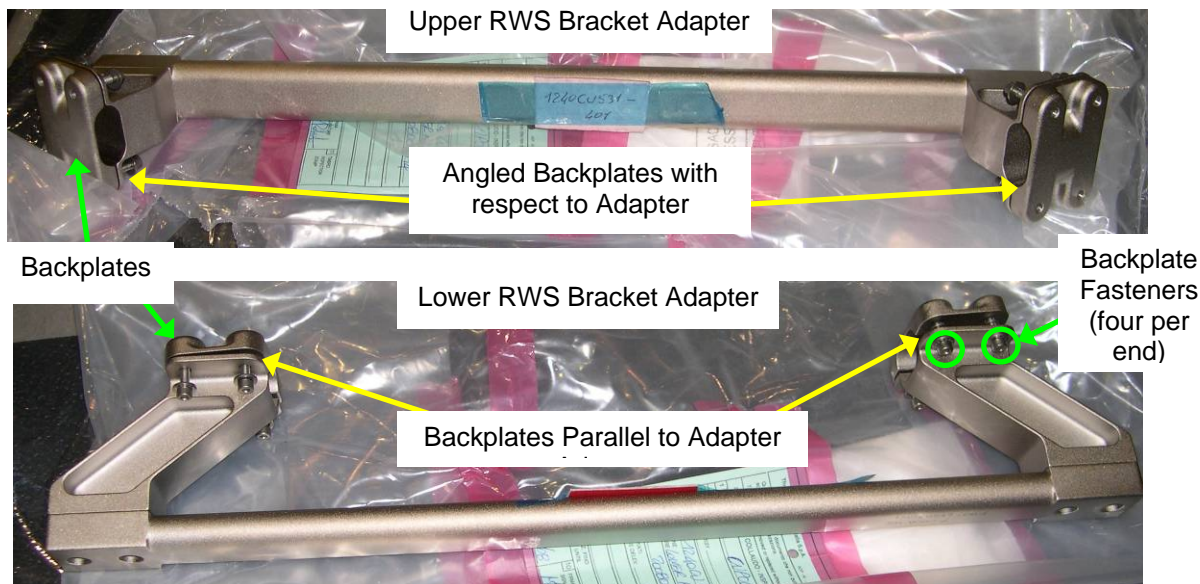


Figure 2.- RWS Bracket Adapters.

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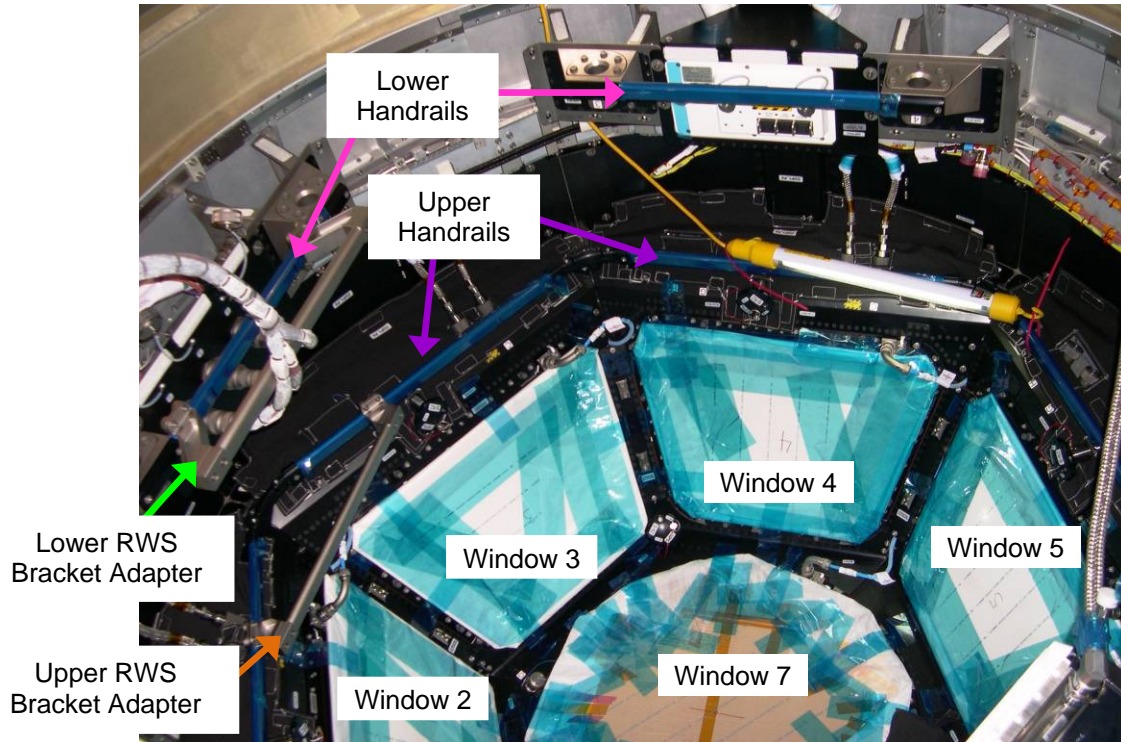


Figure 3.- RWS Bracket Adapters Installed in Position 2/3 (Ground Photo).

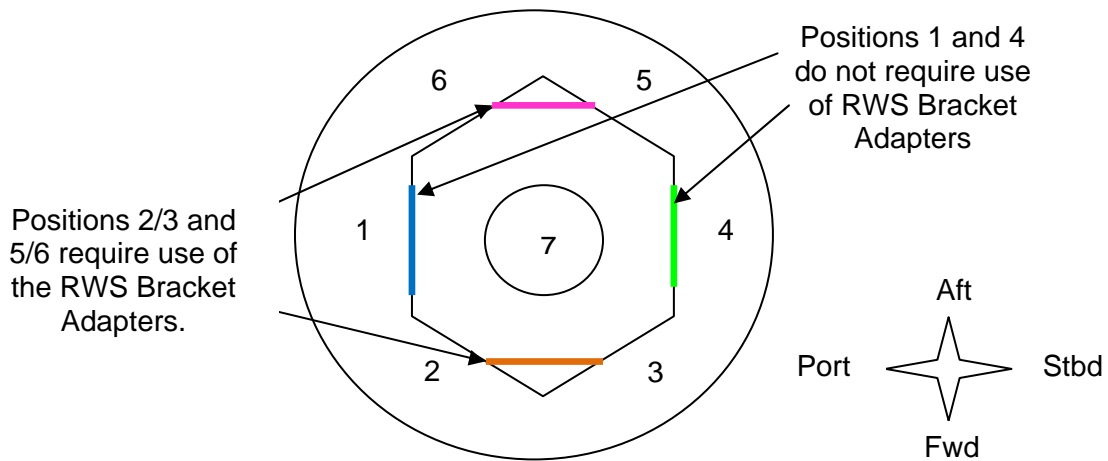


Figure 4.- Cupola RWS Installation Positions (Internal View of Cupola Looking Nadir from Node 3).

- NOTE**
1. Cupola RWS installation positions correspond to the Cupola window numbers. The RWS will be installed on Handrails positioned below Cupola windows.
 2. RWS Bracket Adapters are required when the RWS is installed at window positions 2/3 or 5/6. They allow the RWS to install further from Cupola structure to avoid interference with a Cupola Window Shutter Knob.

1.160 CUPOLA RWS RELOCATION

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- 2.1 **MCC-H** for RWS installation position inside Cupola
- Cupola
- 2.2 Label RWS Bracket Adapters (two) as “Upper RWS Bracket Adapter” and “Lower RWS Bracket Adapter” according to Figure 2 (Sharpie).
- 2.3 If installing Cupola RWS in Position 1 or 4
RWS Bracket Adapters are not required for RWS installation Positions 1 and 4.
When performing steps 2.6 to 2.10, install RWS Bracket Adapters in either position 2/3 or 5/6 for permanent stowage.
Report stowage position to **MCC-H**.
- 2.4 If installing Cupola RWS in Position 2/3 or 5/6
RWS Bracket Adapters will be installed at the specified RWS installation position in steps 2.6 - 2.10.
- 2.5 Remove RWS Bracket Adapters (two) from launch positions by removing non-captive Backplates (two per Adapter), fasteners (four per Backplate) (Ratchet, 1/4" Drive; 5/32" Hex Head).
Temporarily stow.
Refer to Figures 1, 2.

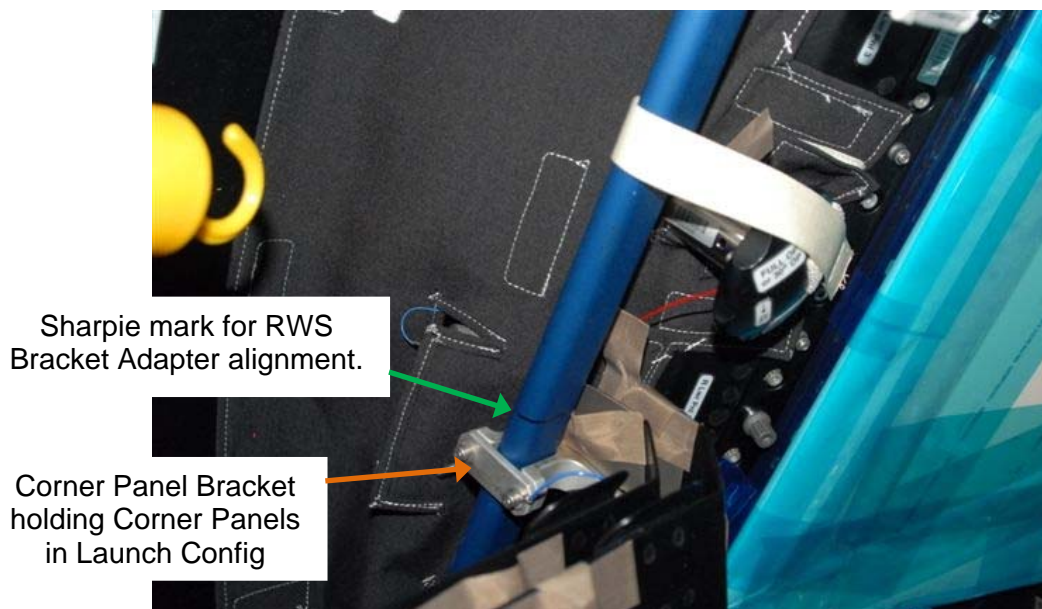


Figure 5.- Sharpie mark on Upper Handrail for RWS Bracket Adapter Alignment.

- 2.6 Align Upper RWS Bracket Adapter with Sharpie marks on front side of upper Handrails.
Refer to Figure 5.
- 2.7 Position backplates (two) on Upper RWS Bracket Adapter.
Align fasteners on RWS Bracket Adapters with receptacles on Backplates.
Refer to Figures 2 and 3.

1.160 CUPOLA RWS RELOCATION

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- 2.8 Tighten, torque fasteners (eight per adapter) to 29 in-lbs (Ratchet, 1/4" Drive; 5/32" Hex Head; (10-50 in-lbs) Trq Wrench). Refer to Figure 2.
- 2.9 Position Lower RWS Bracket Adapter on lower Handrail. Align fasteners on RWS Bracket Adapters with receptacles on Backplates. Refer to Figures 2 and 3.
- 2.10 Tighten, torque fasteners (eight per adapter) to 29 in-lbs (Ratchet, 1/4" Drive; 5/32" Hex Head; (10-50 in-lbs) Trq Wrench). Refer to Figure 2.
- 2.11 Photo document RWS Adapter installation (Digital Camera).
- 2.12 ✓ Translation path from Cupola to LAB is clear for RWS translation

3. REMOVING CUPOLA RWS FROM LAB

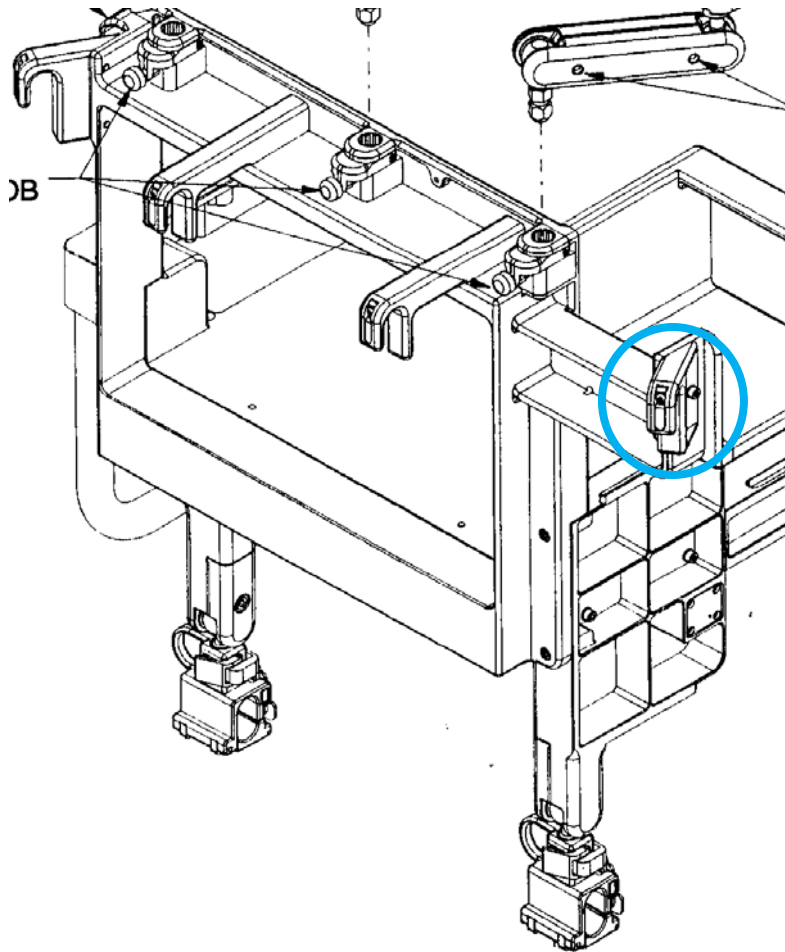


Figure 6.- Left U-Hook to be Removed.

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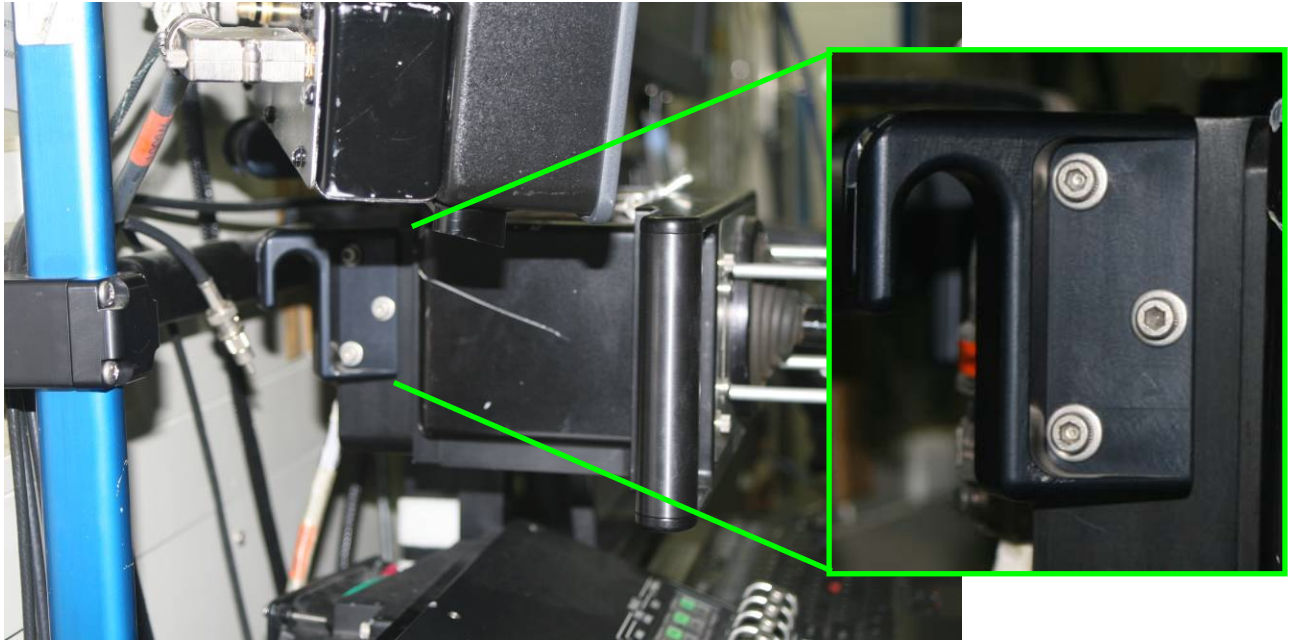


Figure 7.- Left U-Hook to be Removed (Ground Mock-up Photo).

WARNING

Once U-Hook is removed, there possibly could be sharp edges on area of RWS that U-Hook was removed from as well as on the U-Hook itself. Care should be taken when removing U-Hook.

NOTE

The left U-Hook needs to be removed from the Cupola RWS due to interference with Cupola structure.

- LAB1S5
- 3.1 Locate left U-Hook on Cupola RWS (behind Translation Hand Controller).
Refer to Figures 6 and 7.
 - 3.2 Remove U-Hook by releasing non-captive fasteners, washers (three each) (Driver Handle, 1/4" Drive; 3/8" Hex Head).
Assess U-Hook installation location for sharp edges.
Notify **MCC-H** if sharp edges found, pad as required with layers of Gray Tape.
 - 3.3 Stow U-Hook, non-captive fasteners, and washers in a Ziplock Bag labeled "Cupola RWS U-Hook P/N 830934-601" (Sharpie).
 - 3.4 Remove Rack Interface Panel Closeout, 1/4 Turn Fasteners (two).
 - 3.5 Don Static Wrist Tether.
Secure to unpainted, unanodized metal surface.

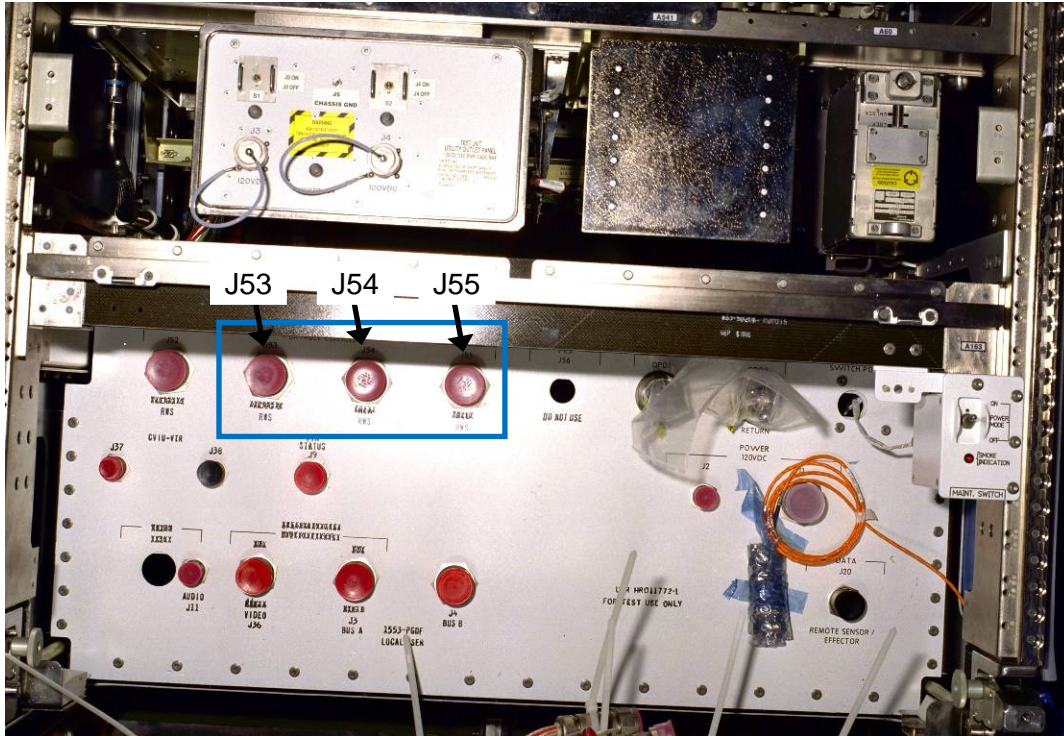


Figure 8.- MSS-1 (LAB1S5) Rack Interface Panel (Ground Photo).

NOTE

A new 14 ft W1193 cable (P/N 683-51193-2) is being launched on 20A to replace the 9 ft W1193 cable (P/N 683-51193-1) removed in step 3.6. The extra line length is required for RWS installation in Cupola.

3.6 Removing 9 Ft RWS Wire Harness W1193

- RWS Wire Harness W1193-P1 ←|→ J53 on Rack Interface Panel
 - RWS Wire Harness W1193-P2 ←|→ J54 on Rack Interface Panel
 - RWS Wire Harness W1193-P3 ←|→ J55 on Rack Interface Panel
 - RWS Wire Harness W1193-P4 ←|→ J3 on Display and Control Panel (DCP)
- Coil W1193 for stowage.
Refer to Figure 8.

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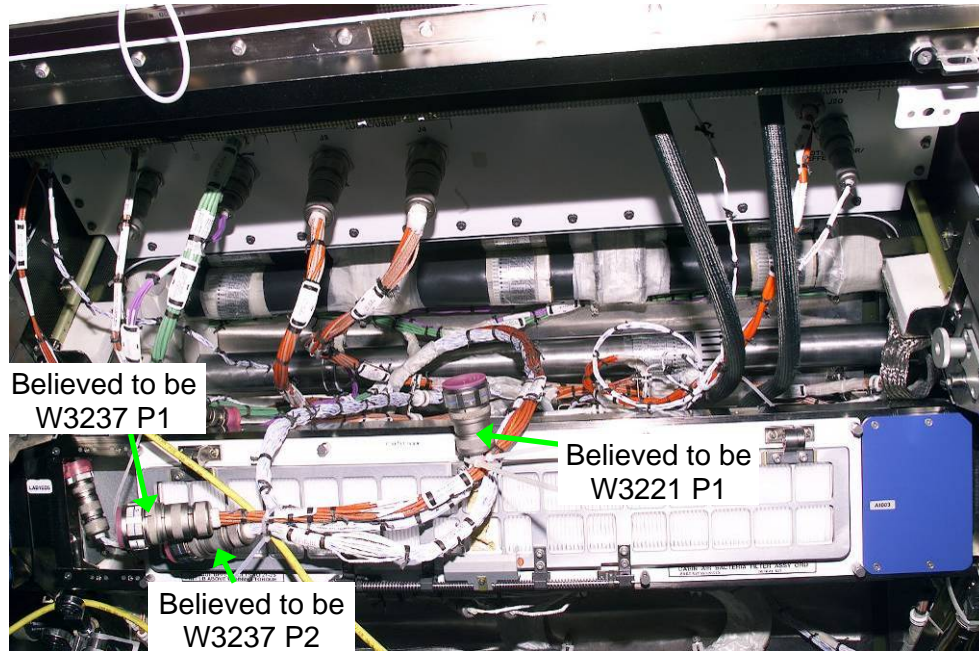


Figure 9.- Ground Photo showing W3237 and W3221 Zip-Tied Together.

NOTE

Mating the connections in step 3.8 is required to connect RWS signals/video from Cupola to the necessary components in LAB1S5.

- 3.7 Locate the following stowed Wire Harness connections in the LAB1S5 Rack Interface Panel:
- W3237 P1 (orange cable)
 - W3237 P2 (white cable)
 - W3221 P1 (white cable)

Refer to Figure 9.

- 3.8 Remove Protective Caps from W3237 P1, W3237 P2, W3221 P1.

W3237-P2 →|← J53 on Rack Interface Panel
W3237-P1 →|← J54 on Rack Interface Panel
W3221-P1 →|← J55 on Rack Interface Panel

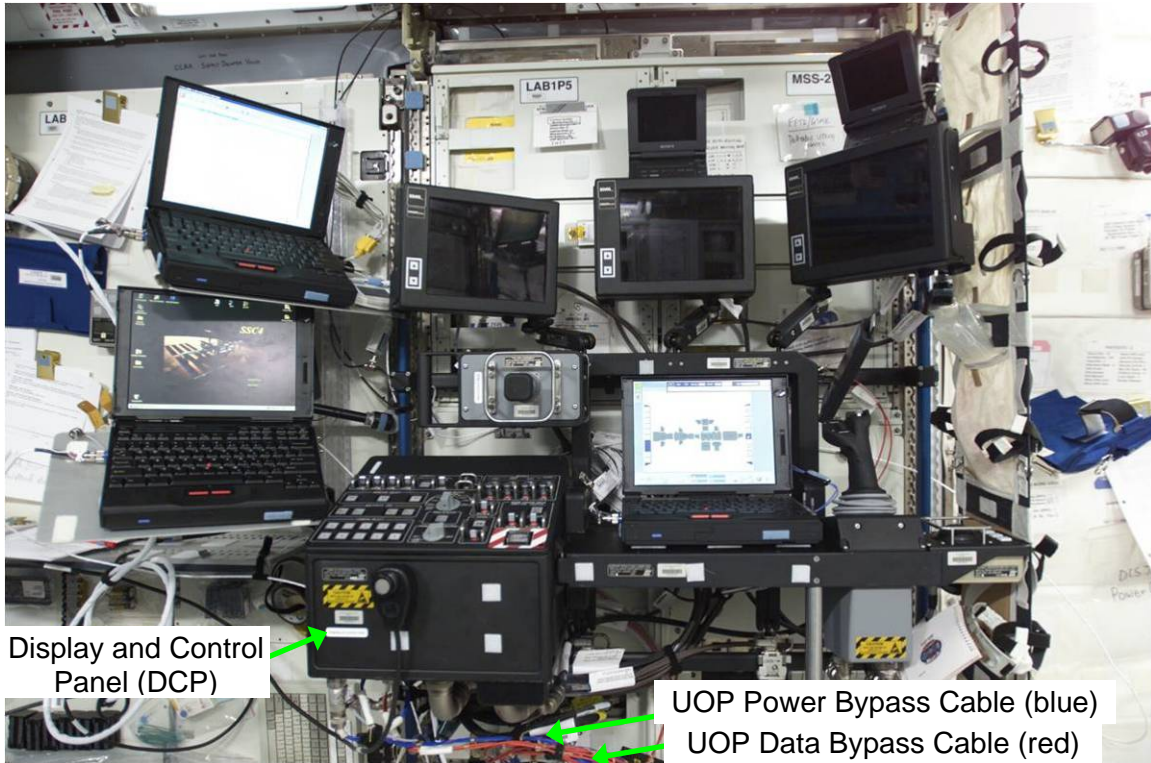


Figure 10.- Photo of LAB RWS (LAB1P5) (Analogous Hardware to LAB1S5).

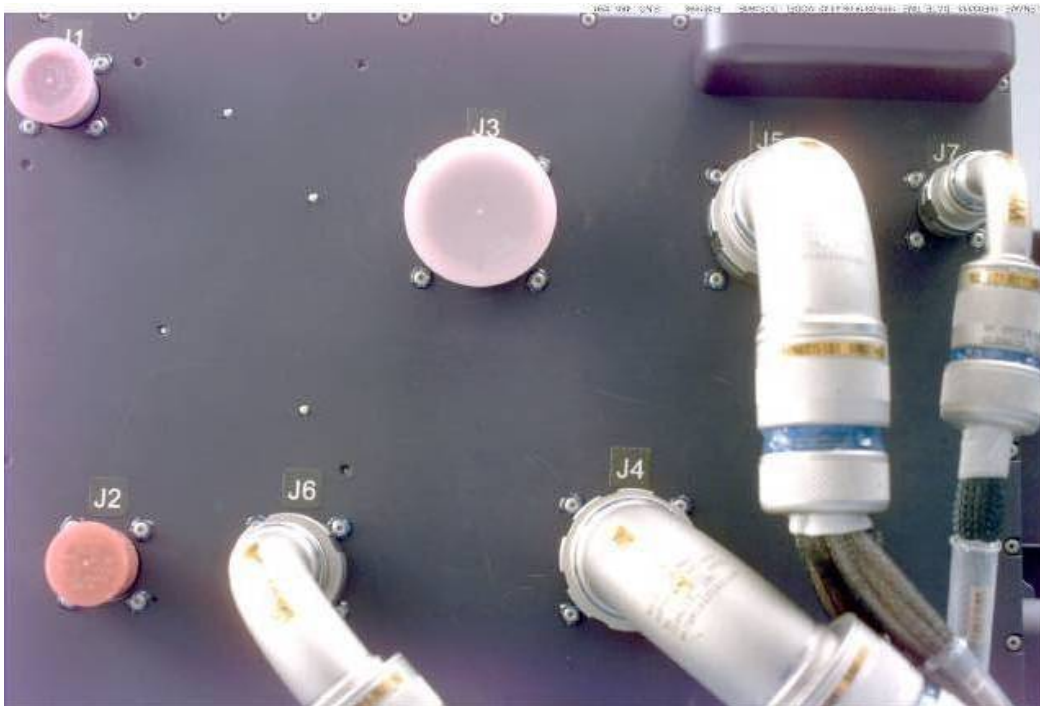


Figure 11.- Underside View of Display and Control Panel (DCP).

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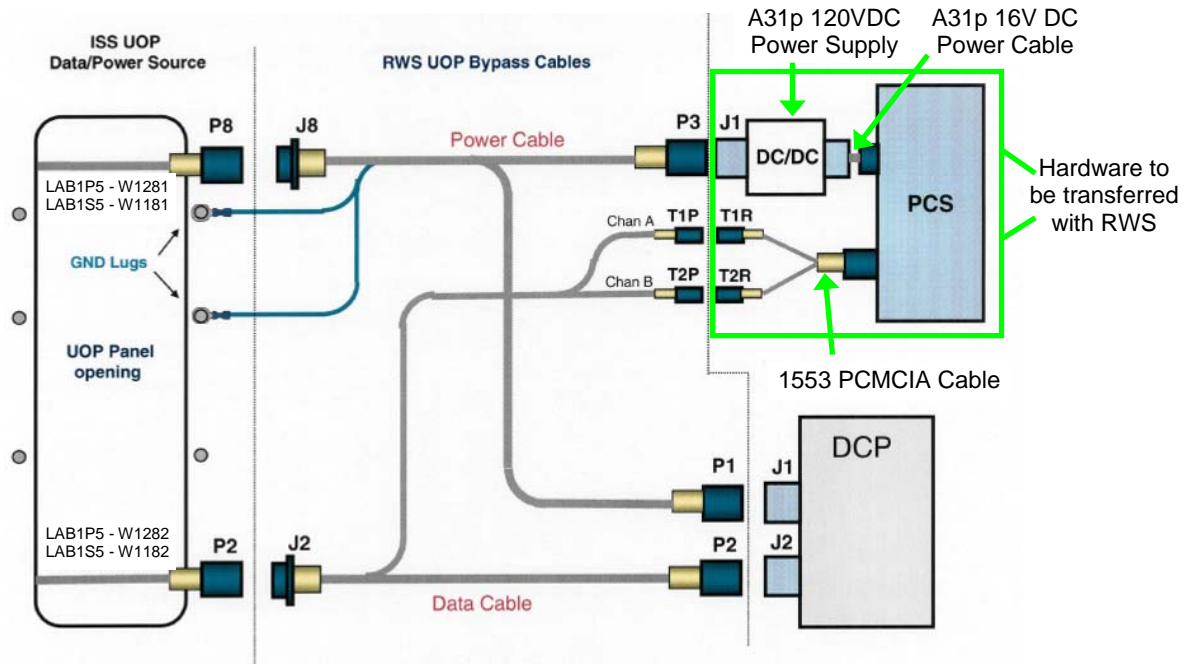


Figure 12.- UOP Bypass Cable Schematic.

3.9 Removing UOP Bypass Cables

Refer to Figures 10 to 12.

NOTE

The tool required to remove the Grounding Lug fasteners in step 3.9.1 for the UOP Power Bypass Cable is unknown. Crew discretion should be used to determine the correct tool. If the fastener has hex head interface, recommend trying a 1/8" Hex Head.

3.9.1 Removing UOP Power Bypass Cable (P/N 1J00137-1, Blue Cable)

Photo document Grounding Lugs in installed config for ground data in the event that bypass cable needs to be reinstalled (Digital Camera).

Remove Grounding Lugs (two) (Tool Unknown).

Notify **MCC-H** - correct tool to remove Grounding Lugs.

UOP Power Bypass Cable P1 ←|→ J1 on DCP

UOP Power Bypass Cable P3 ←|→ J1 on A31p 120VDC Power Supply (P/N SEG33116412-302 or -303)

UOP Power Bypass Cable J8 ←|→ P8 on W1181 (UOP Power Input Cable)

Tethered Cap →|← P1 on UOP Power Bypass Cable

Tethered Cap →|← P3 on UOP Power Bypass Cable

Coil cable for stowage.

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3.9.2 Removing UOP Data Bypass Cable (P/N 1J00138-1)

UOP Data Bypass Cable P2 ←|→ J2 on DCP

UOP Data Bypass Cable T1P (PCS Chan A) ←|→ T1R on
1553 PCMCIA Cable (P/N SDZ33119901-301)

UOP Data Bypass Cable T2P (PCS Chan B) ←|→ T2R on
1553 PCMCIA Cable (P/N SDZ33119901-301)

UOP Power Bypass Cable J2 ←|→ P2 on W1182 (UOP Data
Input Cable)

Tethered Cap →|← P2 on UOP Data Bypass Cable

Tethered Cap →|← T1P on UOP Power Bypass Cable

Tethered Cap →|← T2P on UOP Power Bypass Cable

Coil cable for stowage.

3.9.3 The following cables and hardware will be left attached to the PCS and should be secured as required to be transferred with the RWS:

- a) Enhanced A31p 16V DC Power Cable (P/N
SEG33116459-301)
- b) A31p 120VDC Power Supply (P/N SEG33116412-302 or -
303)
- c) 1553 PCMCIA Cable (P/N SDZ33119901-301)
connected
1553 PCMCIA Card (P/N SDZ33119900-301)
(should be inserted in PCMCIA Slot in PCS)

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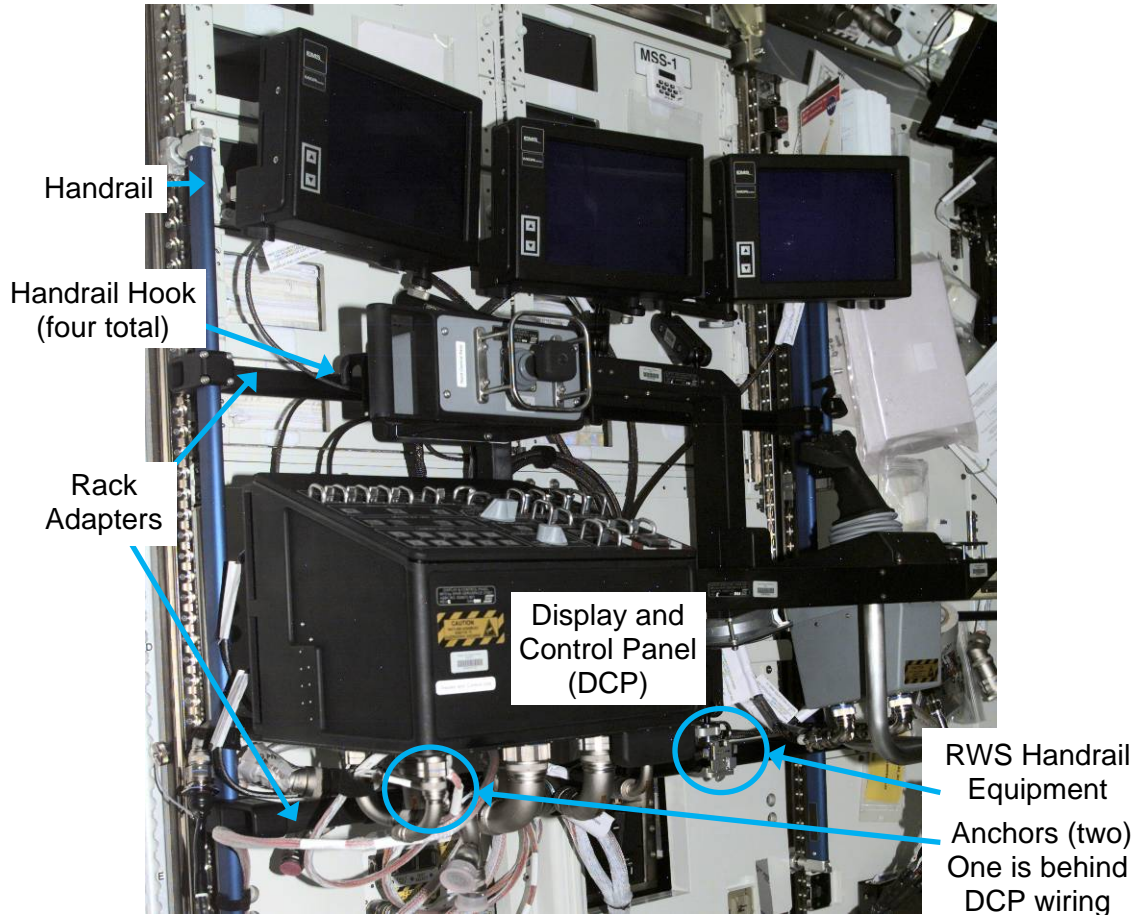


Figure 13.- Cupola RWS (LAB1S5).

- 3.10 Inspect if there is cabling running behind Rack Adapters that needs to be demated, rerouted, then remated to ensure that all cables are free from Rack structure and ready for translation with RWS. Refer to Figure 13.
- 3.11 Doff Static Wrist Tether.
- 3.12 Secure loose cables as required to be transferred with RWS (Velcro Ties).

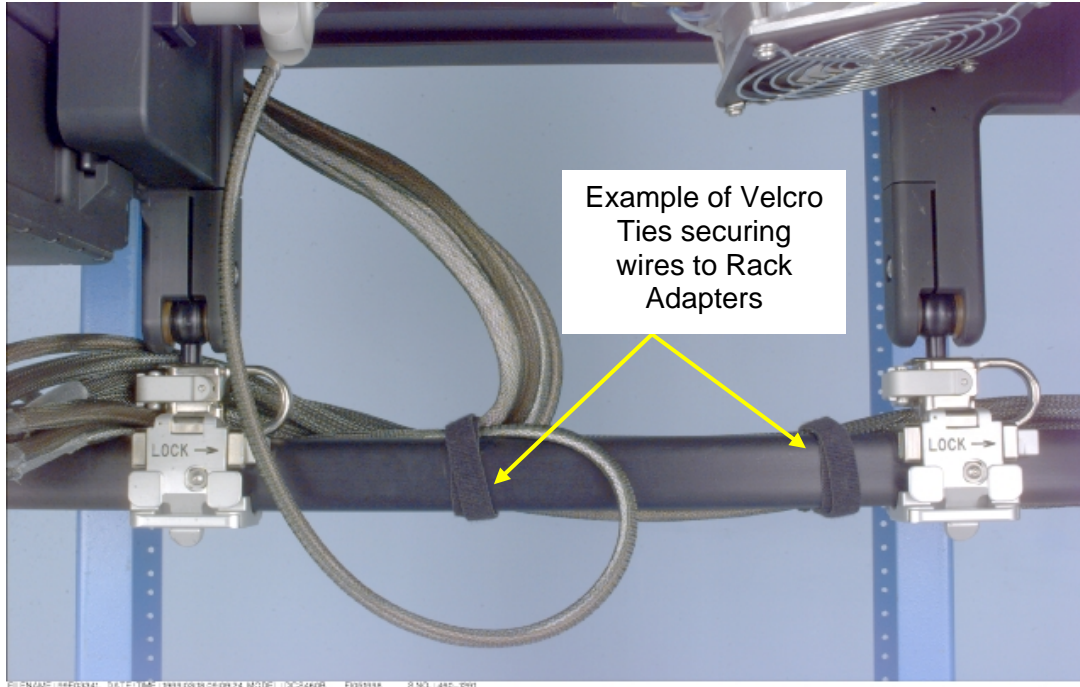


Figure 14.- RWS Handrail Equipment Anchors and Velcro Attached to RWS Rack Adapters.

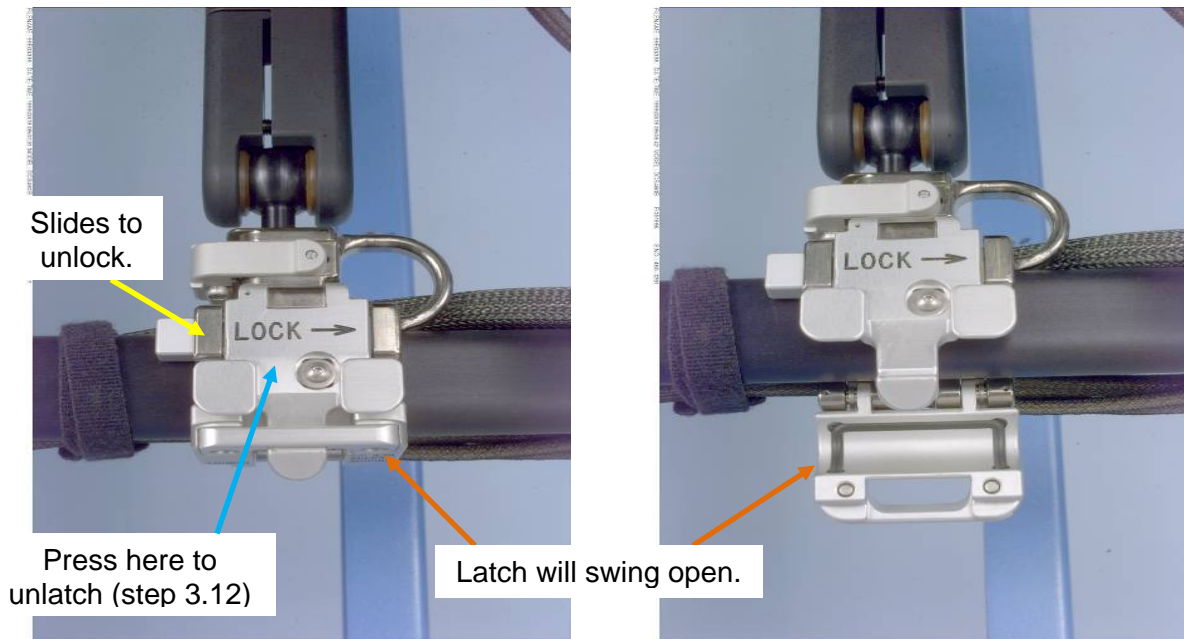


Figure 15.- RWS Handrail Equipment Anchors: Closed and Open Positions.

- 3.13 Detach all Velcro Ties from Rack Adapters or Handrails. Velcro Ties should remain wrapped around wires for use at Cupola location. Refer to Figures 13 and 14.

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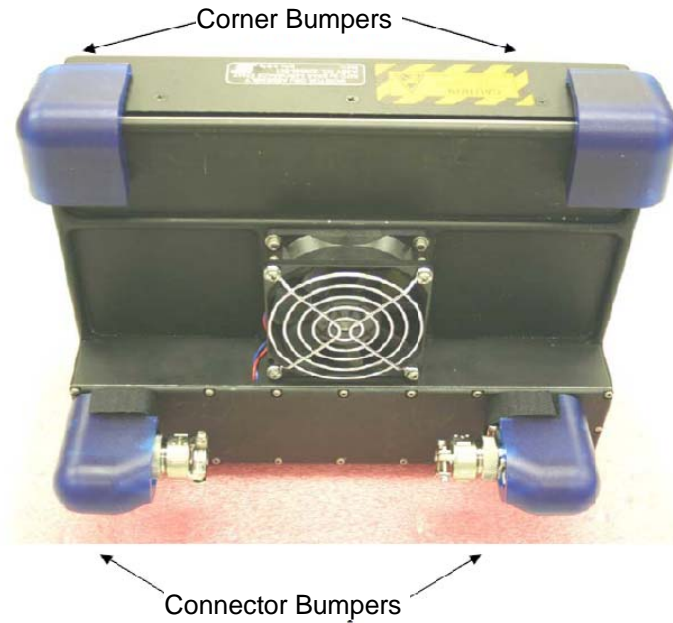


Figure 16.- RWS Monitor Bumpers.

- 3.14 Verify RWS Monitor Bumpers are installed on Cupola RWS Monitors (required before RWS transfer to Cupola to protect Cupola windows).
Fold RWS Monitors forward to protect them during translation and allow easier positioning of the RWS in Cupola.
Refer to Figure 16.

1.160 CUPOLA RWS RELOCATION

(ASSY OPS/20A/FIN)

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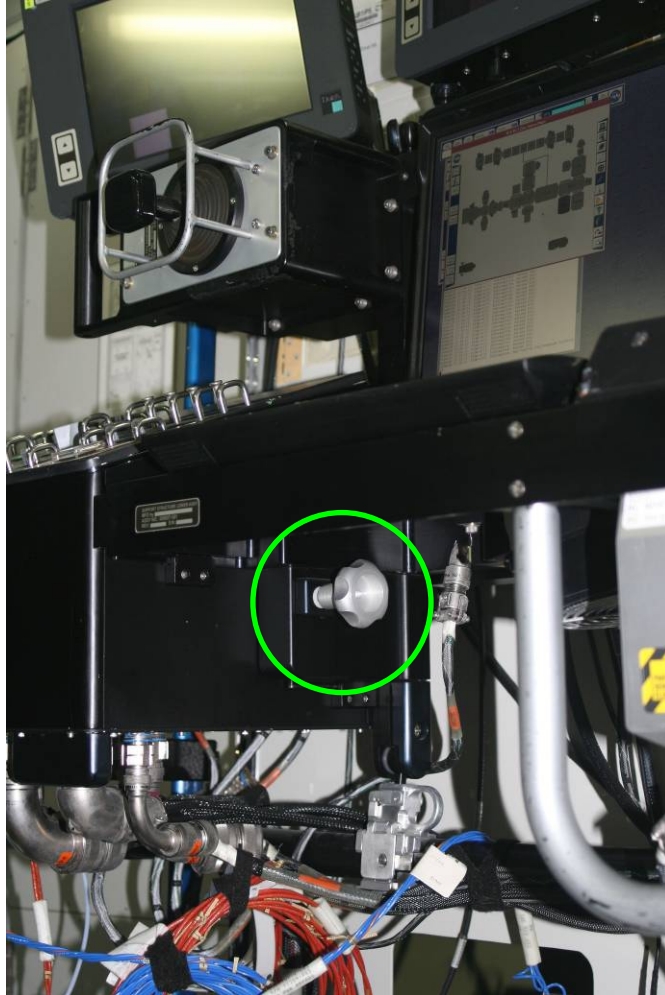


Figure 17.- DCP Adjustment Knob (Ground Mock-up Photo).

- 3.15 Loosen DCP Adjustment Knob.
Slide DCP fully forward until hardstop to allow for proper clearances in Cupola.
Tighten DCP Adjustment Knob.
Refer to Figure 17.

CAUTION

To prevent damage to sensitive equipment, touching or holding RWS Video Monitor Screens, Translation Hand Controller, and Rotation Hand Controller should be avoided.

- 3.16 Unlatch RWS Handrail Equipment Anchors (two) by sliding bar to unlock position then pressing face of anchor.
Refer to Figures 14 and 15.
- 3.17 Lift Cupola RWS off of the Rack Adapters (two crew).
√Cupola RWS is free from structure and ready for translation
Refer to Figure 13.

1.160 CUPOLA RWS RELOCATION

(ASSY OPS/20A/FIN)

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LAB1S5 3.18 Retrieve Wire Harness - DC Panel Power/Data (P/N 683-51192-1) from stowage inside LAB1S5_C2 Rack to be transferred with RWS.

3.19 Transfer Cupola RWS from the LAB to Cupola (two crew).

4. INSTALLING CUP RWS IN CUPOLA

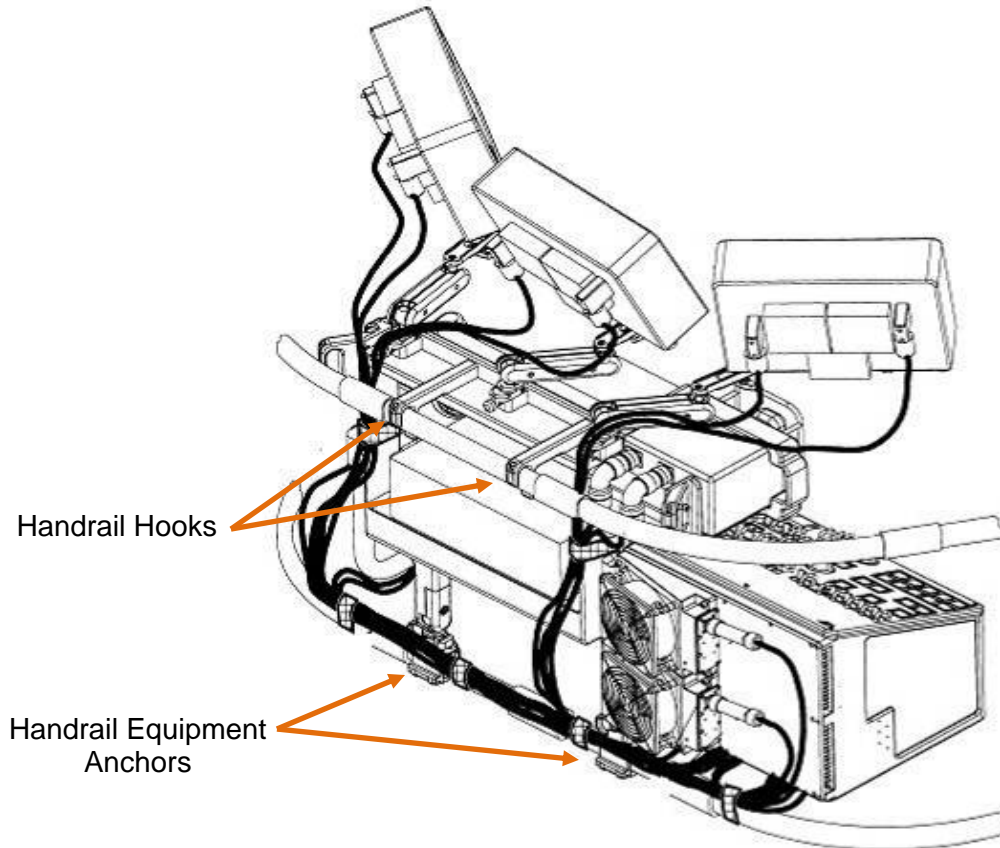


Figure 18.- Cup RWS Final Configuration - Position One or Four Shown.

- Cupola
- 4.1 Install two center Handrail Hooks over upper Handrail at specified RWS installation location; remaining outer hook will not attach to Handrail.
Refer to Figures 13 and 18.
 - 4.2 If installing Cupola RWS in Position 2/3 or 5/6
| Shift RWS as far as possible to the right on RWS Bracket
| Adapters (when facing the RWS) to allow for optimal access to
| Window Shutter Handwheels.
 - 4.3 Install RWS Handrail Equipment Anchors (two) on lower Handrail by closing latch then sliding bar to lock position.
Refer to Figures 14 and 15.

1.160 CUPOLA RWS RELOCATION

(ASSY OPS/20A/FIN)

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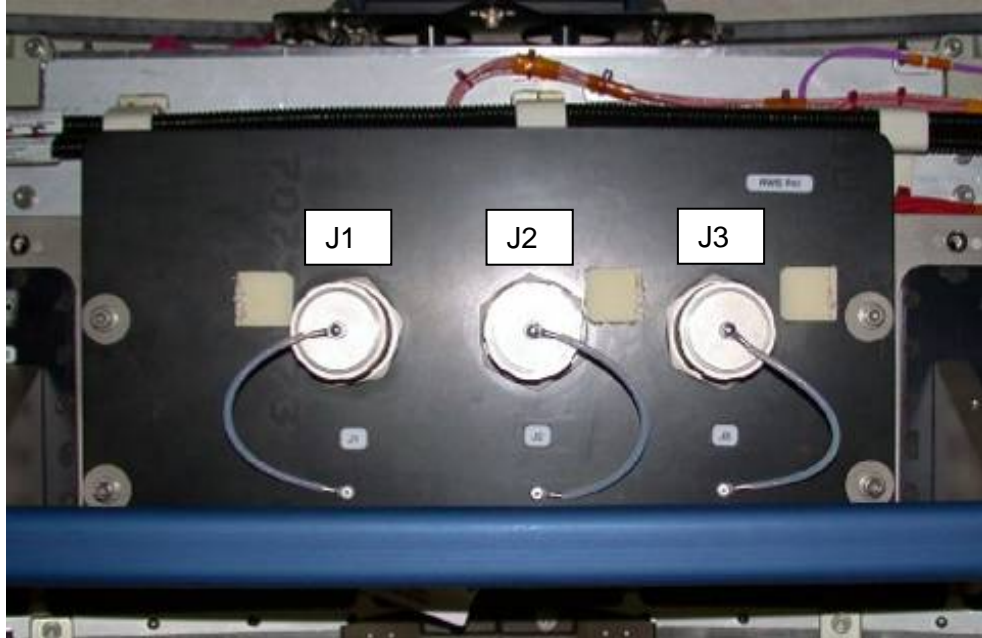


Figure 19.- RWS Panel in Cupola (CUP1F1).

NOTE

W1193 P5 and P6 will not be mated to anything. They were designed for use with the Backup Display and Control Panel, which is not on orbit.

4.4 Installing 14 Ft RWS Wire Harness W1193

Retrieve 14 ft RWS Wire Harness W1193 (P/N 683-51193-2).

W1193-P1 →|← J1 on RWS Pnl in Cupola

W1193-P2 →|← J2 on RWS Pnl in Cupola

W1193-P3 →|← J3 on RWS Pnl in Cupola

W1193-P4 →|← J3 on DCP

Refer to Figure 19.

CUP1P1/
CUP1S1

4.5 Verifying No Power Applied to Cupola UOP 1 and 2

For both Cupola UOPs

| √POWER OUT – ✓ (blue RESET)

| √Fault/Test – dark

4.6 Installing RWS Wire Harness W1192

Wire Harness - DC Panel Power/Data W1192-P1 →|← J1 on DCP

Wire Harness - DC Panel Power/Data W1192-P2 →|← J2 on DCP

Wire Harness - DC Panel Power/Data W1192-P3 →|← J3 on UOP 1
(CUP1P1)

Refer to Figures 11 and 13.

1.160 CUPOLA RWS RELOCATION

(ASSY OPS/20A/FIN)

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4.7 Reconnecting PCS

US DC Power & 1553 Cable P3 →|← J1 on A31p 120VDC Power Supply

US DC Power & 1553 Cable P1 →|← T1R on 1553 PCMCIA Cable

US DC Power & 1553 Cable P2 →|← T2R on 1553 PCMCIA Cable

US DC Power & 1553 Cable P4 →|← J4 on UOP-2 (CUP1S1)

Refer to Figure 12.

4.8 Route, secure all Wire Harnesses as required (Velcro Straps).
Refer to Figures 11 and 13.

5. CLOSEOUT

Cupola

5.1 Photo document overview configuration of Cupola RWS as well as routing of Wire Harnesses (Digital Camera).

LAB1S5

5.2 Photo document final configuration of MSS-1 (LAB1S5) without Cup RWS installed (Digital Camera).

6. POST MAINTENANCE

6.1 Notify **MCC-H** of task completion.

6.2 Stow tools and materials including Ziplock Bag labeled "Cupola RWS U-Hook P/N 830934-601."

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION

(ASSY OPS/20A/FIN 1)

Page 1 of 12 pages

OBJECTIVE:

Install Audio Terminal Unit (ATU) in Cupola.

LOCATION:

Cupola

DURATION:

1 Hour

CREW:

One

PARTS:

Audio Terminal Unit P/N 3000001-301

Cupola ATU Coldplate P/N 2000CU301-801

Cupola ATU Bracket P/N 1240CU801-401

Cupola ATU Cnctr P/N 1F15244-501

MATERIALS

Ziplock (small)

Velcro Straps

TOOLS

Digital Camera

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

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

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

REFERENCED PROCEDURE(S):

None

RESTOW

Ziplock Bag "Cupola ATU Launch Fasteners" with
ATU fasteners (six)

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION (ASSY OPS/20A/FIN 1)

1. INSTALLING ATU IN ATU BRACKET

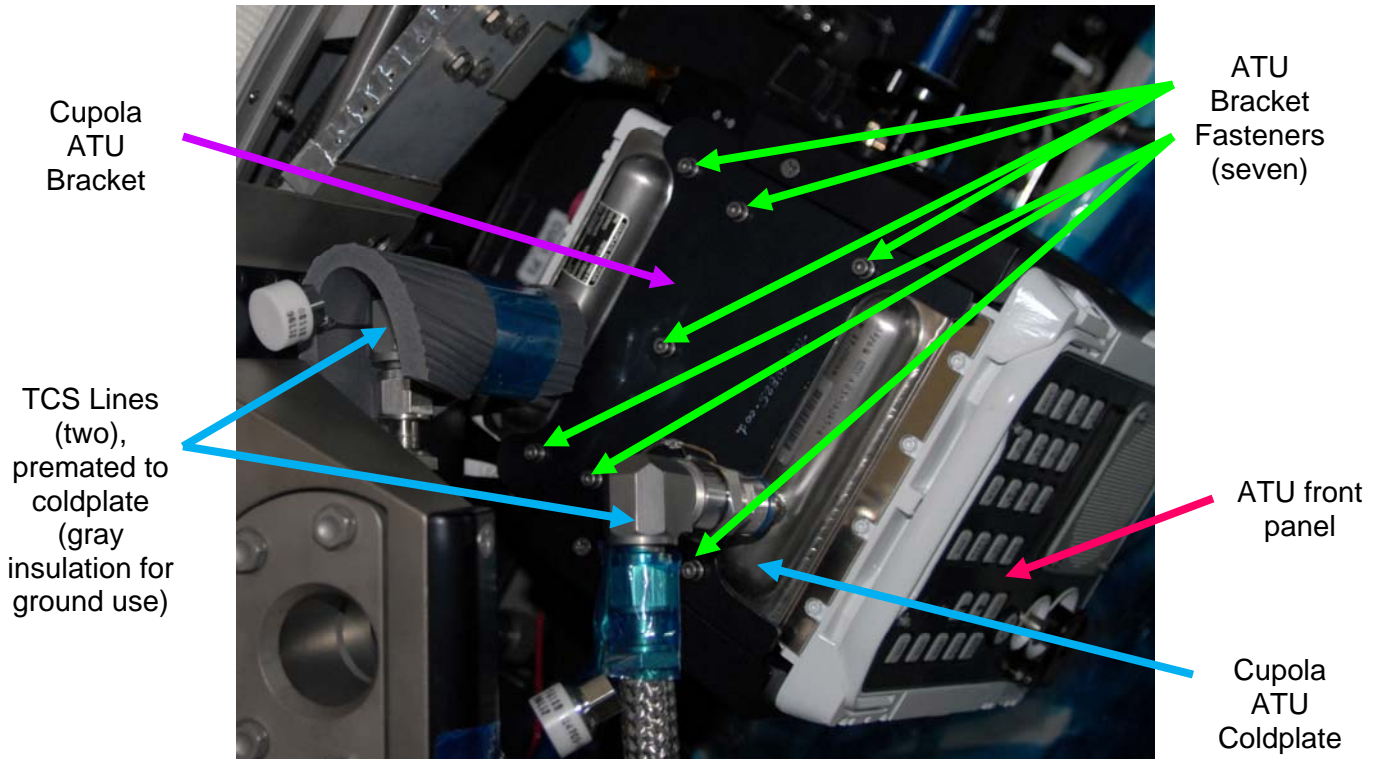


Figure 1. - Bottom View of ATU installed in Bracket (Ground Photo).

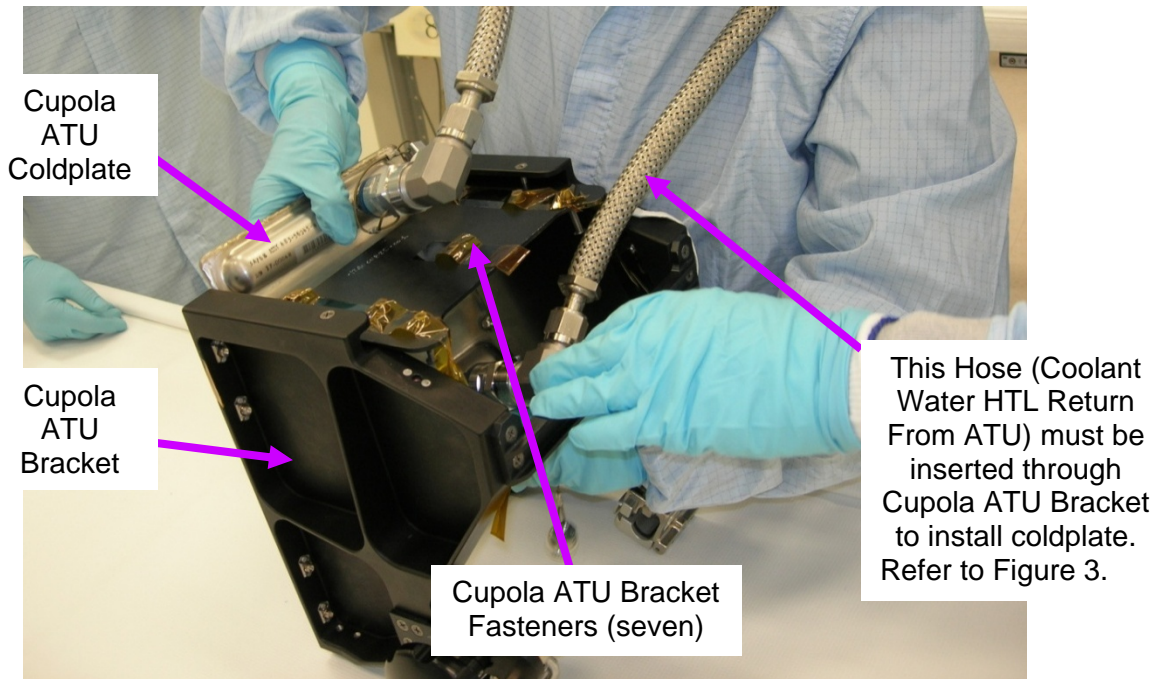


Figure 2.- Cupola ATU Coldplate Installation into Cupola ATU Bracket.

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION (ASSY OPS/20A/FIN 1)

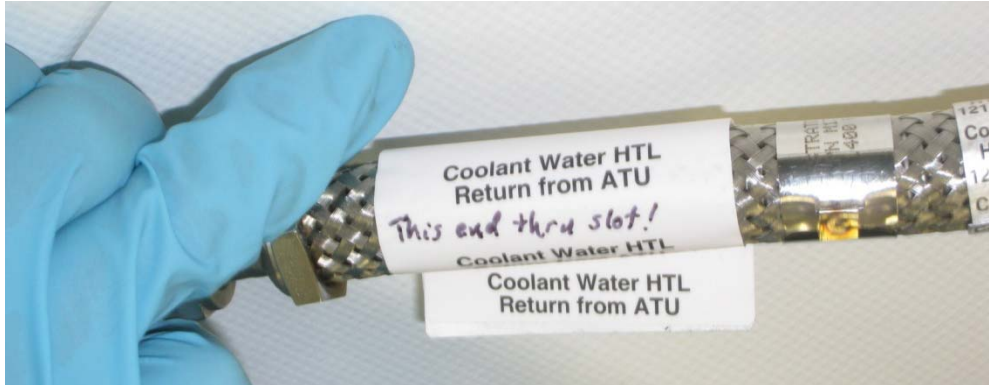


Figure 3. - Crew Preference Label on HTL Line to be Routed through Cupola ATU Bracket.

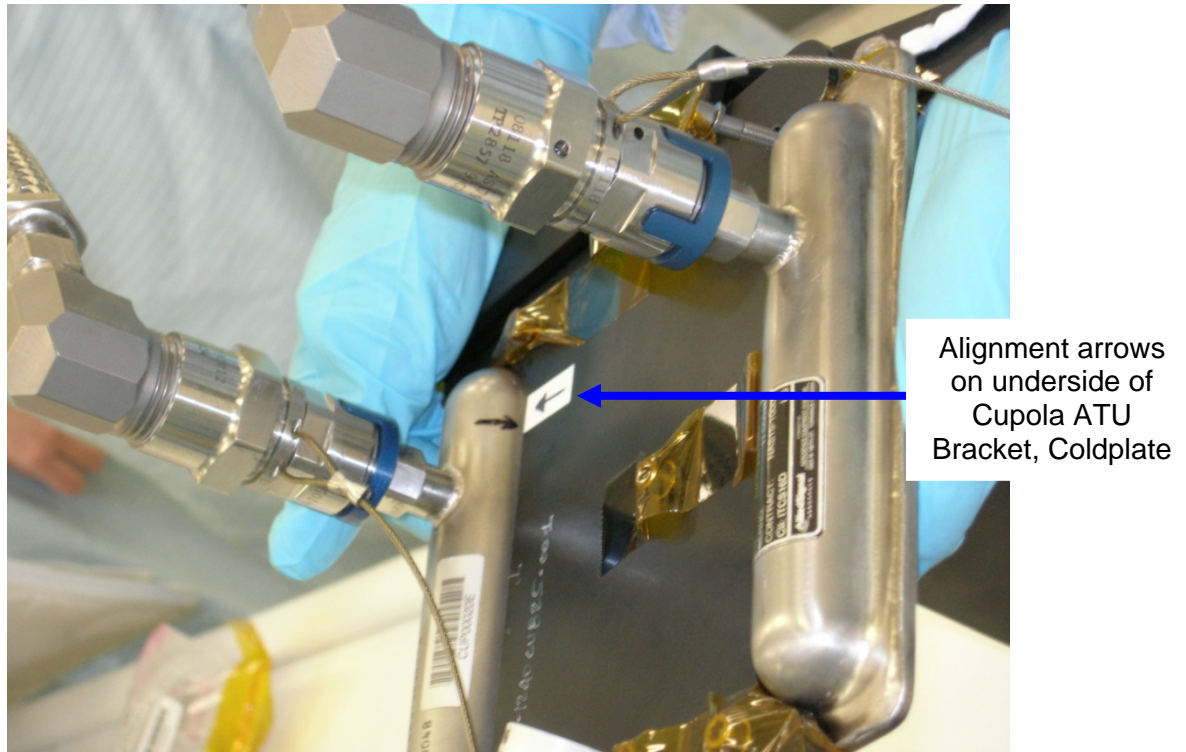


Figure 4. - Crew Preference Labeling to Assist with Orientation of Cupola ATU Coldplate.

NOTE

Coolant Water HTL Return Line label includes a crew preference label to remind crew that it is the line that needs to be fed through the Cupola ATU Bracket. There are also alignment arrows on the underside of the Cupola ATU Bracket and Coldplate to help make orientation easier. Refer to Figures 2 to 4.

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION (ASSY OPS/20A/FIN 1)

Page 4 of 12 pages

- 1.1 Locate HTL line labeled "Coolant Water HTL Return From ATU" on Cupola ATU Coldplate.
Route through Cupola ATU Bracket according to Figure 2.
Carefully rotate Cupola ATU Coldplate as required to install Coldplate into Bracket using alignment arrows to assist with orientation.
Refer to Figures 1 to 4.

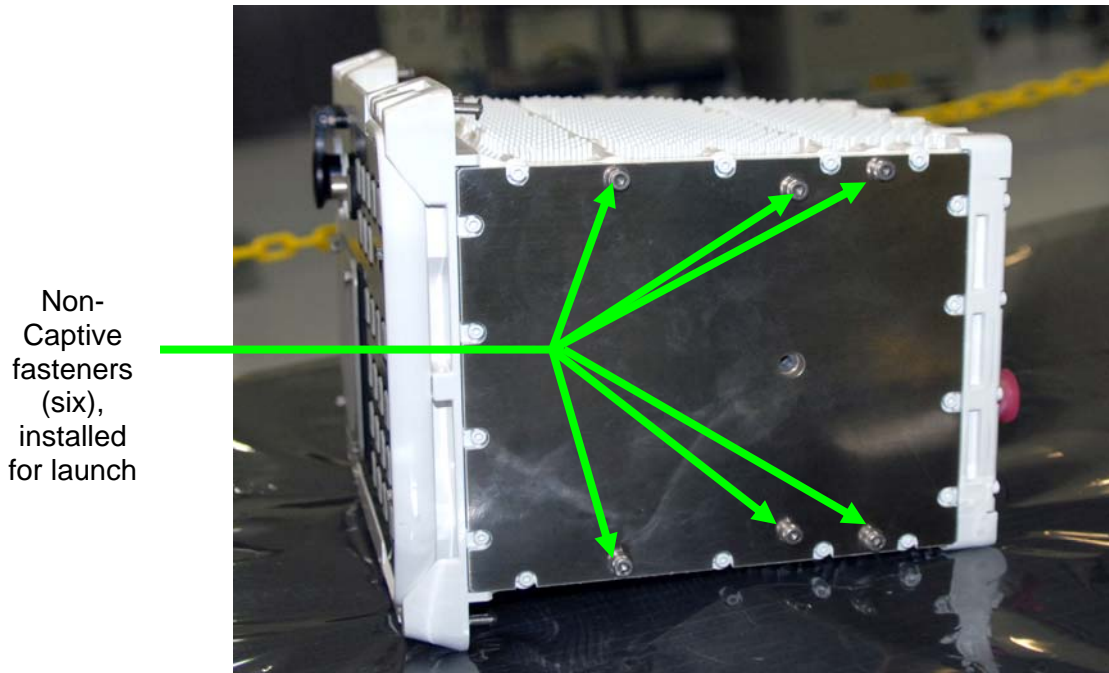


Figure 5. - Bottom View of ATU with Six Launch Fasteners Installed.

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION (ASSY OPS/20A/FIN 1)

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Figure 6. - ATU Outer Flange Fasteners.

- 1.2 Remove non-captive fasteners (six) from baseplate of ATU (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Stow in Ziplock Bag. Label Ziplock Bag "Cupola ATU Launch Fasteners."
Temporarily stow ziplock bag.
Refer to Figure 5.
- 1.3 Slide ATU into Cupola ATU Bracket.
Refer to Figure 1.
- 1.4 Remove Kapton Tape from Cupola ATU Bracket Fasteners.
Check alignment of Cupola ATU Bracket fasteners (seven) by hand threading each one individually to ensure there is no binding or misalignment of threads.
Refer to Figures 1, 2.
- 1.5 Snug ATU outer flange fasteners (eight) (Ratchet, 1/4" Drive; 5/32" Hex Head. 1/4" Drive).
Refer to Figure 6.

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION (ASSY OPS/20A/FIN 1)

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1.6 Tighten, torque Cupola ATU Bracket Fasteners (seven) to 61 in-lbs [Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive; (40-200) in-lbs Trq Wrench, 1/4" Drive].

Refer to Figure 2.

1.7 Tighten, torque outer flange fasteners (eight) to 52 in-lbs [Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive; (40-200) in-lbs Trq Wrench, 1/4" Drive].

2. INSTALLING ATU BRACKET ON HANDRAIL

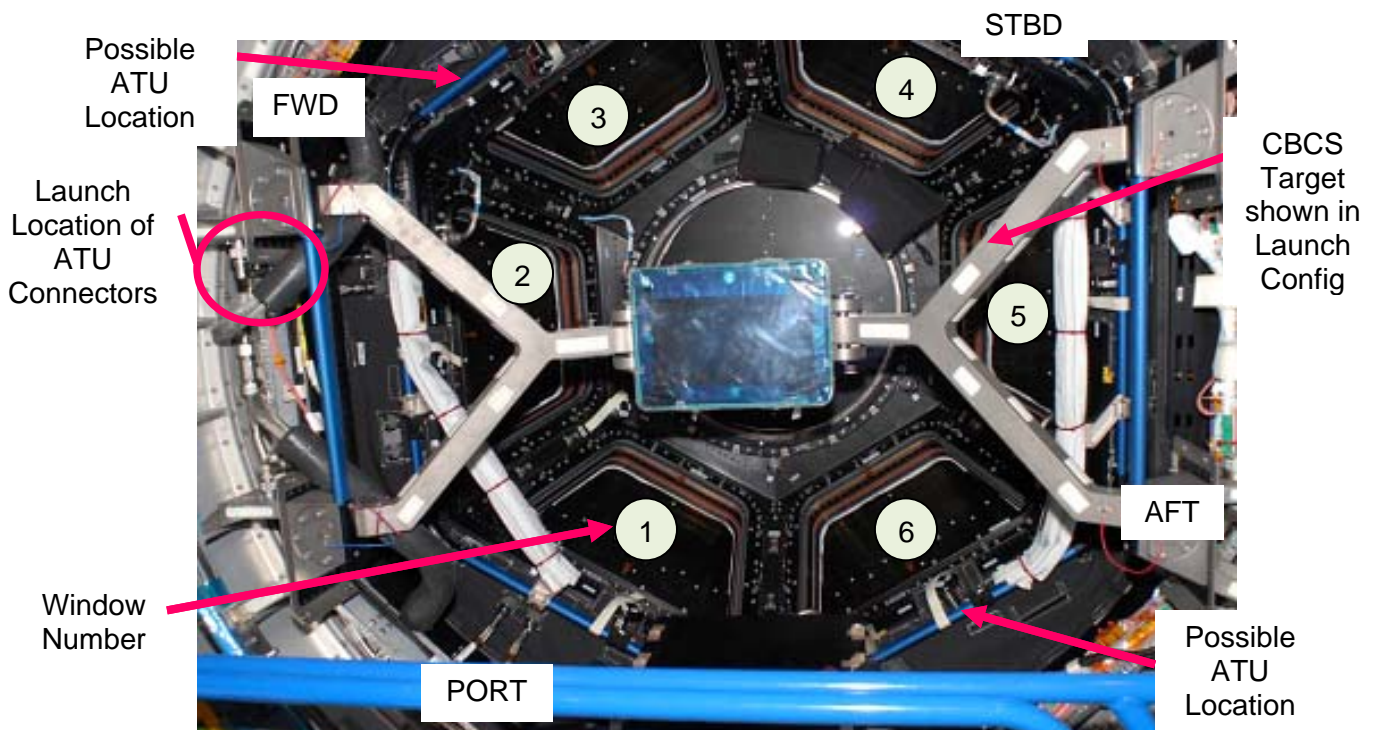


Figure 7. - ATU Installation Locations (two).

NOTE

The Cupola ATU can be installed in front of Window 3 or in front of Window 6. The installation location will depend on the installation location of the Robotic Workstation. When the RWS is installed in front of Windows 2&3 or Window 4, the ATU must be installed in front of Window 6. When the RWS is installed in front of Windows 5&6 or Window 1, the ATU must be installed in front of Window 3.

2.1 √**MCC-H** to determine ATU Installation Location and to verify RPCM N32A2B_C2 RPC 14 is open, close command inhibited and either DDCU N32A or DDCU N32B converter is off

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION (ASSY OPS/20A/FIN 1)

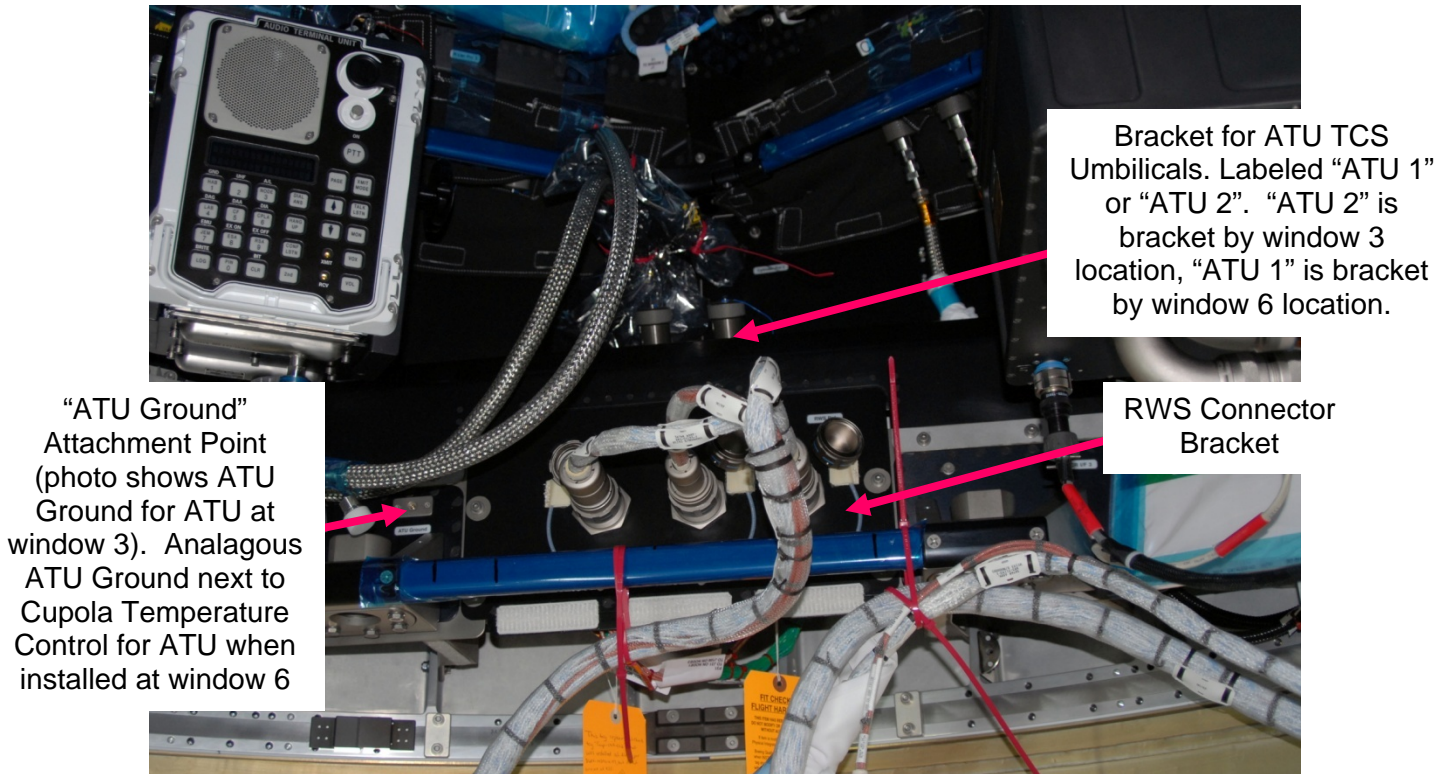


Figure 8. - Location of ATU Interfaces (ATU shown Installed at Window 3 Location).

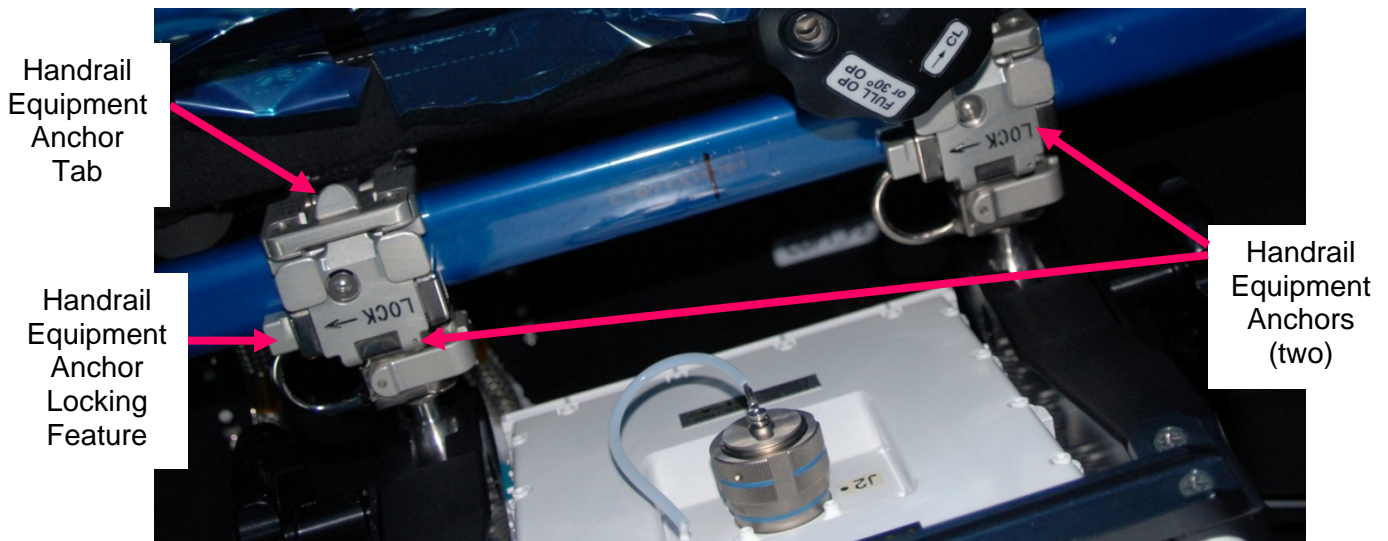


Figure 9. - ATU Installed on Handrail with Handrail Equipment Anchors in Locked Position.

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION

(ASSY OPS/20A/FIN 1)

Page 8 of 12 pages

NOTE

Handrail Equipment Anchors are opened by performing the following:

- a. Pressing Locking Feature in opposite direction from LOCK arrow.
- b. Pressing Tab to allow anchor to rotate open.

Refer to Figure 9.

2.2 Install Cupola ATU Bracket on Handrail using Handrail Equipment Anchors (two).

√Handrail Equipment Anchors (two) are in locked position

Refer to Figures 8, 9.

3. CONNECTING ATU GROUND STRAP

NOTE

1. ATU Grounding Fastener is located at the loose end of a white wire extending from the right, lower rear corner of the Cupola ATU Bracket.
2. There are two ATU Ground attachment points (one for each ATU installation location). When the ATU is installed at Window 3, the ATU Ground attachment point next to the RWS Connector Bracket (CUP1F1) is used. When the ATU is installed at Window 6, the ATU Ground next to the Cupola Temperature Control (CUP1A1) is used. Refer to Figure 8.

3.1 Install ATU Grounding Fastener (one) into ATU Ground hole (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

Refer to Figure 8.

3.2 Torque ATU Grounding Fastener (one) to 50 in-lbs [5/32" Hex Head, 1/4" Drive; (40-200) in-lbs Trq Wrench, 1/4" Drive].

4. MATING ATU TCS INTERFACES

4.1 Tethered Cap ←|→ MTL Sply on ATU 1(ATU 2) Bracket

Tethered Cap ←|→ MTL Rtn on ATU 1(ATU 2) Bracket

Refer to Figure 8.

4.2 Plug ←|→ COOLANT WATER MTL SUPPLY QD

Plug ←|→ COOLANT WATER MTL RETURN QD

Mate Plugs to Tethered Caps on MTL Sply and Rtn.

4.3 COOLANT WATER HTL SUPPLY →|← MTL Sply on ATU 1(ATU 2) Bracket

COOLANT WATER HTL RETURN →|← MTL Rtn on ATU 1(ATU 2) Bracket

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION (ASSY OPS/20A/FIN 1)

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5. CONFIGURING ATU POWER AND AUDIO LINES

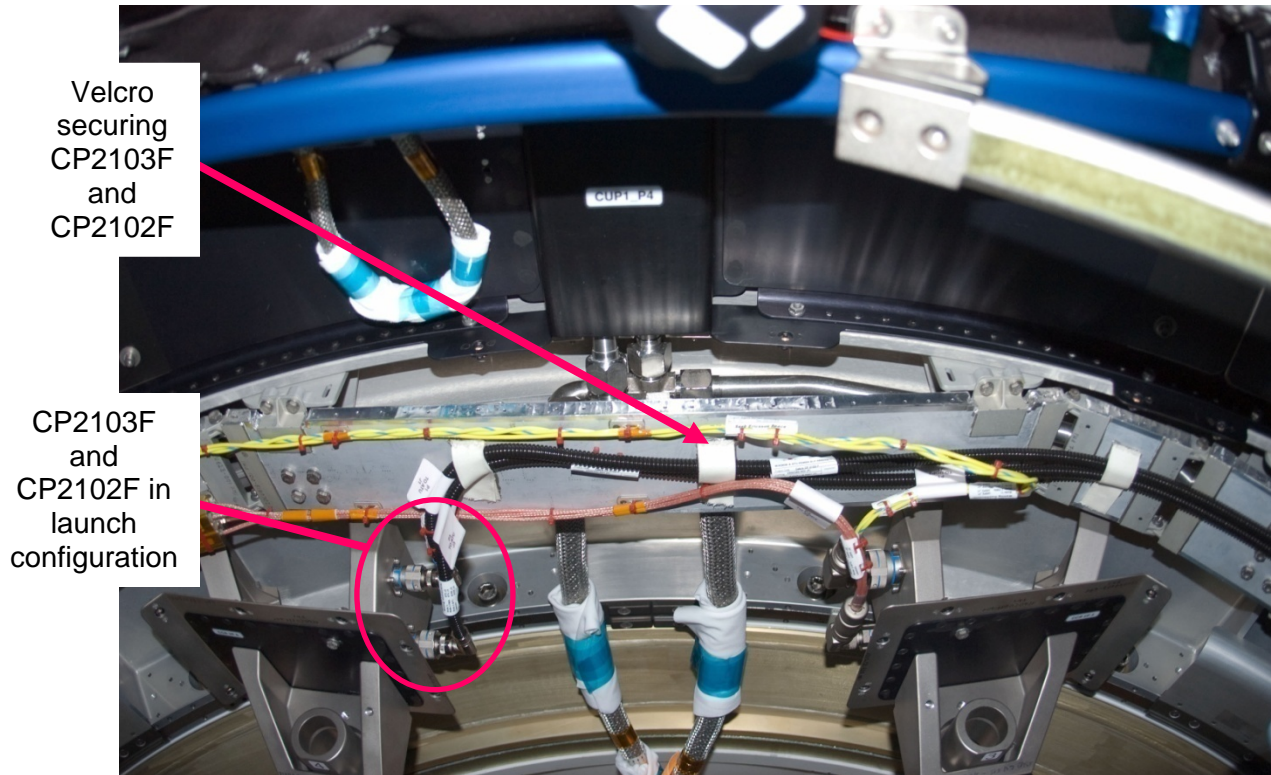


Figure 10. - ATU Power and Fiber Umbilicals in Launch Configuration (CUP1F1 - Vent Panel 2 Removed).

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION (ASSY OPS/20A/FIN 1)

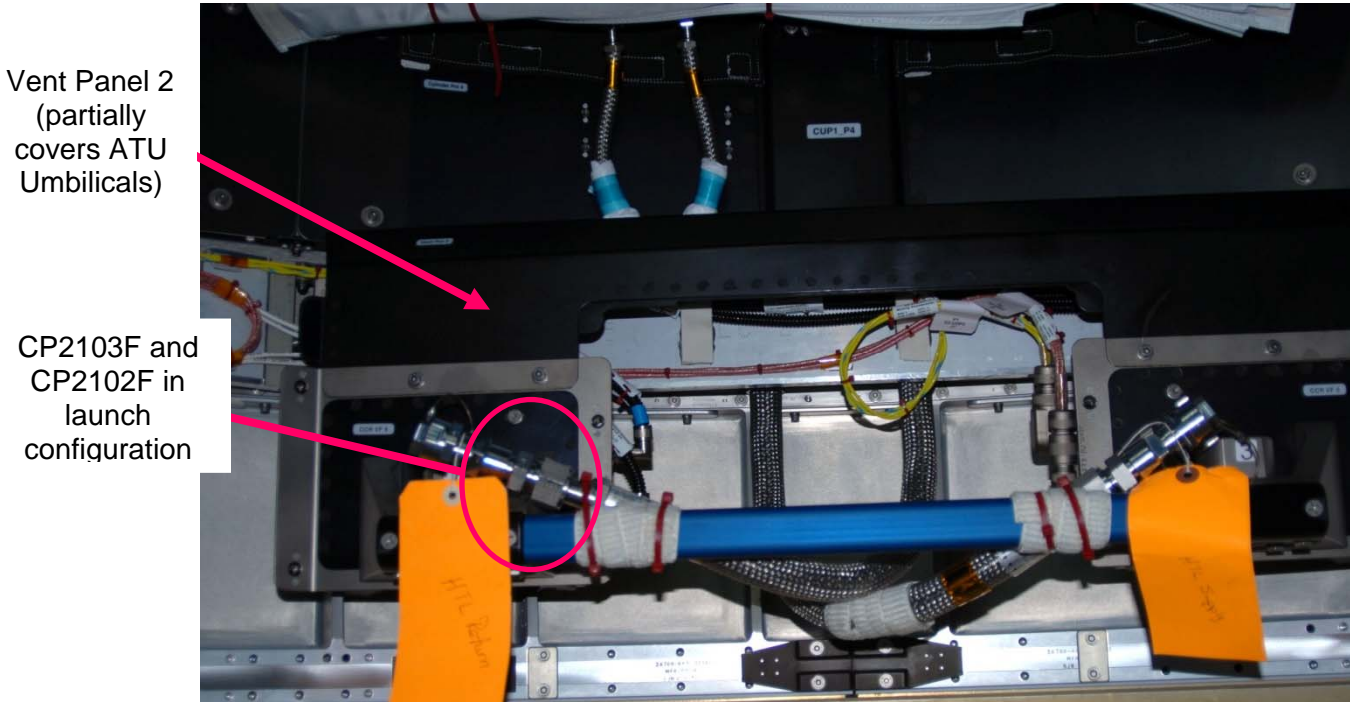


Figure 11. - Launch Configuration of ATU Umbilicals with Vent Panel 2 Installed (CUP1F1).

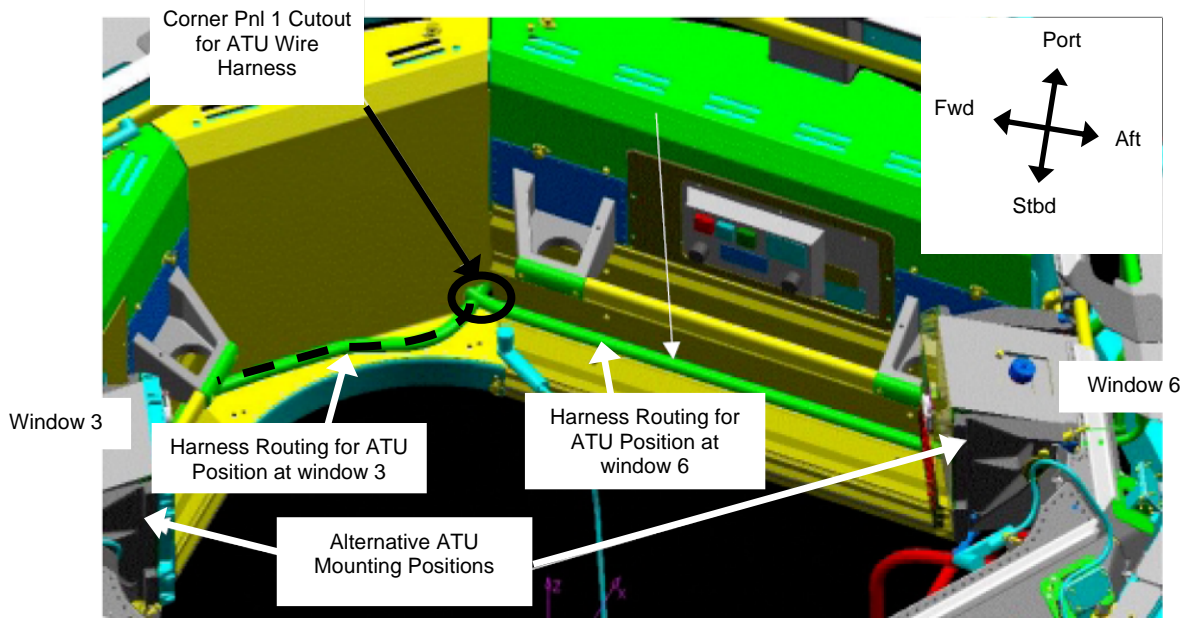


Figure 12.- ATU Wire Harness Routing.

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION (ASSY OPS/20A/FIN 1)

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CAUTION

CP1203F data umbilical contains Fiber Optic lines. Do not expose this umbilical to tension or tight bend radius (less than 2 inches).

NOTE

1. ATU power and data umbilicals are mated to dummy connectors on a bracket for launch. The bracket is located near Window 2 (CUP1F1). The umbilicals are secured to Cupola structure by Velcro from the bracket location all the way around the Cupola circumference to the Window 6 area. In the Window 6 area, the black sheathing on the umbilicals will end where the umbilicals are secured with a P-Clamp. The portion of the umbilicals with the black sheathing is available for in-cabin routing to the ATU installation location. Corner Panel 1, which will be installed later in the Window 6 area, has a cutout for the ATU umbilicals.
Refer to Figures 7, 10, 11, 12.
2. Vent Panels 1 and 3 have eight captive fasteners. Vent Panels 2 and 4 have nine captive fasteners. It may be necessary to remove Vent Panels to deroute ATU umbilicals from their launch position.

- 5.1 CP2103F ←|→ J3 on launch bracket (fiber)
Kapton Tape over CP2103F fiber connection to protect it during cable routing.
CP2102F ←|→ J1 on launch bracket (power)
Refer to Figures 7, 10, 11.
- 5.2 As required to relocate ATU Umbilicals, remove Vent Panels as necessary, fasteners (eight or nine) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
- 5.3 Remove CP2103F and CP2102F from Velcro Restraints until black tubing ends and P-Clamp is reached near ISS Port/Aft quadrant.
- 5.4 Route CP2103F and CP2102F to ATU according to Figure 12 (Corner Panel 1 will not be present at this time).
- 5.5 If removed, replace Vent Panels, fasteners (eight or nine) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

1.162 CUPOLA AUDIO TERMINAL UNIT (ATU) INSTALLATION (ASSY OPS/20A/FIN 1)

Page 12 of 12 pages

- 5.6 Cupola ATU Cnctr →|← J4 on ATU (Address Connector)
CP2103F →|← J3 on ATU (fiber)
CP2102F →|← J1 on ATU (power)
- 5.7 Temporarily restrain ATU Umbilicals away from translation path in Cupola (Velcro Straps).

6. POST-MAINTENANCE

- 6.1 ISS ↓↓ **MCC-H** “Cupola ATU installed”
- 6.2 Photo-document final configuration of Cupola ATU and final umbilical routing (Digital Camera).
- 6.3 Stow tools, materials, Ziplock Bag labeled “Cupola ATU Launch Fasteners.”

1.164 CUPOLA SIDE WINDOW SCRATCH PANE ASSEMBLY R&R

(ASSY OPS/20A/FIN 1) Page 1 of 5 pages

OBJECTIVE:

Remove and replace a Cupola Side Window Scratch Pane Assembly (SPA) (one of six).

LOCATION:

CUP1_W[X] (where [X] = 1, 2, 3, 4, 5, 6)

DURATION:

1 hour

CREW:

One

PARTS:

Cupola Side Window Scratch Pane Assembly P/N 1520CU101-403

MATERIALS:

Gray Tape

Dry Wipes

Ziplock Bag (any small size)

TOOLS:

Digital Camera

Vacuum Cleaner

Deerskin Gloves

Safety Goggles

Portable Breathing Apparatus (PBA)

ISS IVA Toolbox:

Drawer 2:

3/8" Socket, 1/4" Drive

7/16" Socket, 1/4" Drive

Ratchet, 1/4" Drive

10" Ext, 1/4" Drive

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

REFERENCED PROCEDURE(S):

None

1. SAFING

WARNING

Failure to remove power can result in electrical shock hazard.

NOTE

Cupola Window Heaters for Windows 1 to 4 are powered by RPCM N32A2B E2 RPC 04 and Windows 5 to 6 are powered by RPCM N32A2B E2 RPC 05.

1.164 CUPOLA SIDE WINDOW SCRATCH PANE ASSEMBLY R&R
(ASSY OPS/20A/FIN 1) Page 2 of 5 pages

1.1 √SPA RTD/Heater power off

PCS

Cupola: TCS: [X]

Cupola Htr[X]

'Cupola Htr[X]'

√CLC – Inh

sel RPCM N32A2B E2 RPC 04(05)

RPCM N32A2B E2 RPC 04(05)

√Open Cmd – Ena

cmd RPC Position – Open (Verify – Op)

cmd Close Cmd – Inhibit (Verify – Inh)

WARNING

Injury or death to personnel can occur if glass fragments are allowed to escape during SPA removal.

1.2 If broken glass hazard exists

Don protective gear (Deerskin Gloves, Safety Goggles, and PBA).

Tape up broken glass, if required (Gray Tape).

Clean up loose broken glass, if required (Vacuum Cleaner).

2. SPA REMOVAL

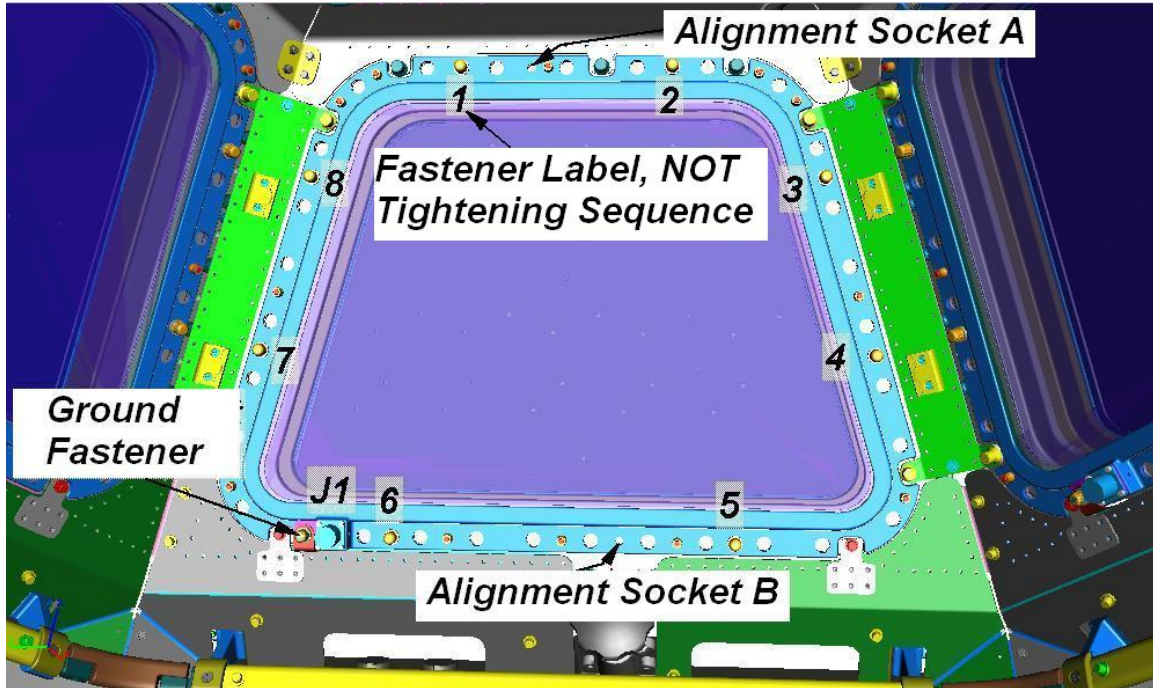


Figure 1.- Cupola Side Window Scratch Pane Assembly.

2.1 Demate heater cable harness (P1 TO WINDOW [X] J1) from J1 on SPA frame.
Refer to Figure 1.

2.2 Secure heater cable harness away from SPA.

NOTE

Ground fastener is non-captive. Loose part should be temp stowed in a Ziplock Bag.

2.3 Unfasten non-captive ground fastener (3/8" Socket, 1/4" Drive, 10" Ext, 1/4" Drive, Ratchet, 1/4" Drive).
Remove non-captive ground fastener from ground strap loop and temp stow in small Ziplock Bag.

2.4 Unfasten SPA fasteners (eight) (7/16" Socket, 1/4" Drive, 10" Ext, 1/4" Drive, Ratchet, 1/4" Drive).

2.5 Carefully remove SPA from Side Window.
Temporarily stow.

3. SPA INSTALLATION

3.1 Inspect Pressure Pane Assembly (PPA) pane for damage and contamination.
If PPA pane is damaged (scratches, cracks, etc) or contaminated (smudges, particulates, etc), $\sqrt{\text{MCC-H}}$.

1.164 CUPOLA SIDE WINDOW SCRATCH PANE ASSEMBLY R&R

(ASSY OPS/20A/FIN 1) Page 4 of 5 pages

- 3.2 Retrieve new SPA.
Inspect new SPA pane for damage and contamination.
If SPA is damaged (scratches, cracks, etc.) or contaminated (smudges, particulates, etc.), **√MCC-H**.
- 3.3 Inspect mating surfaces on PPA and SPA frames.
Clean mating surfaces if required (Dry Wipes).
- 3.4 Position new SPA over Side Window, aligning sockets "A" and "B" with respective pins on PPA frame.
- 3.5 Engage SPA fasteners (eight) onto window frame by hand.

CAUTION

Failure to tighten fasteners in proper sequence may result in damage to SPA. Fasteners are not labeled per the proper tightening sequence.

NOTE

Proper SPA fastener tightening sequence: 1, 5, 2, 6, 3, 7, 4, 8.

- 3.6 Tighten, torque SPA fasteners (eight) to 70 in-lbs following proper sequence (7/16" Socket, 1/4" Drive, 10" Ext, 1/4" Drive, (40-200 in-lbs) Trq Wrench, 1/4" Drive).
- 3.7 Tighten, torque SPA fasteners (eight) to 142 in-lbs following proper sequence (7/16" Socket, 1/4" Drive, 10" Ext, 1/4" Drive, (40-200 in-lbs) Trq Wrench, 1/4" Drive).
- 3.8 Retrieve ground fastener from small Ziplock Bag and insert in ground strap loop.
Engage ground fastener with ground strap onto window frame by hand.
- 3.9 Tighten, torque ground fastener to 35 in-lbs (3/8" Socket, 1/4" Drive, 10" Ext, 1/4" Drive, (40-200 in-lbs) Trq Wrench, 1/4" Drive).
- 3.10 Mate heater cable harness (P1 TO WINDOW [X] J1) to J1 on SPA frame.
- 3.11 SPA RTD/Heater power on:

Cupola: TCS: [X]

Cupola Htr[X]

sel RPCM N32A2B E2 RPC 04(05)

RPCM N32A2B E2 RPC 04(05)

1.164 CUPOLA SIDE WINDOW SCRATCH PANE ASSEMBLY R&R
(ASSY OPS/20A/FIN 1) Page 5 of 5 pages

cmd Close Cmd – Enable (Verify – Ena)
cmd RPC Position – Close (Verify – Cl)

'Cupola Htr[X]'

cmd CLC – Ena (Verify – Ena)

4. POST MAINTENANCE

- 4.1 Stow tools, equipment, old SPA.
- 4.2 Notify **MCC-H** of task completion.

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1.166 CUPOLA TOP WINDOW SCRATCH PANE ASSEMBLY R&R

(ASSY OPS/20A/FIN 1) Page 1 of 4 pages

OBJECTIVE:

Remove and replace the Cupola Top Window Scratch Pane Assembly (SPA).

LOCATION:

CUP1_W7

DURATION:

1 hour

CREW:

One

PARTS:

Cupola Top Window Scratch Pane Assembly P/N 1510CU101-403

MATERIALS:

Gray Tape

Dry Wipes

Ziplock Bag (any small size)

TOOLS:

Digital Camera

Vacuum Cleaner

Deerskin Gloves

Safety Goggles

Portable Breathing Apparatus (PBA)

ISS IVA Toolbox:

Drawer 2:

3/8" Socket, 1/4" Drive

7/16" Socket, 1/4" Drive

Ratchet, 1/4" Drive

10" Ext, 1/4" Drive

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

REFERENCED PROCEDURE(S):

None

1. SAFING

WARNING

Failure to remove power can result in electrical shock hazard.

1.1 √SPA RTD/Heater power off:

PCS

Cupola: TCS: 7: A (or B)

Cupola Htr7

'Cupola Htr7A'

1.166 CUPOLA TOP WINDOW SCRATCH PANE ASSEMBLY R&R

(ASSY OPS/20A/FIN 1) Page 2 of 4 pages

√CLC – Inh

'Cupola Htr7B'

√CLC – Inh

sel RPCM N32A2B E2 RPC 05

RPCM N32A2B E2 RPC 05

√Open Cmd – Ena

cmd RPC Position – Open (Verify – Op)

cmd Close Cmd – Inhibit (Verify – Inh)

WARNING

Injury or death to personnel can occur if glass fragments are allowed to escape during SPA removal.

1.2 If broken glass hazard exists

Don protective gear (Deerskin Gloves, Safety Goggles, and PBA).

Tape up broken glass, if required (Gray Tape).

Clean up loose broken glass, if required (Vacuum Cleaner).

2. SPA REMOVAL

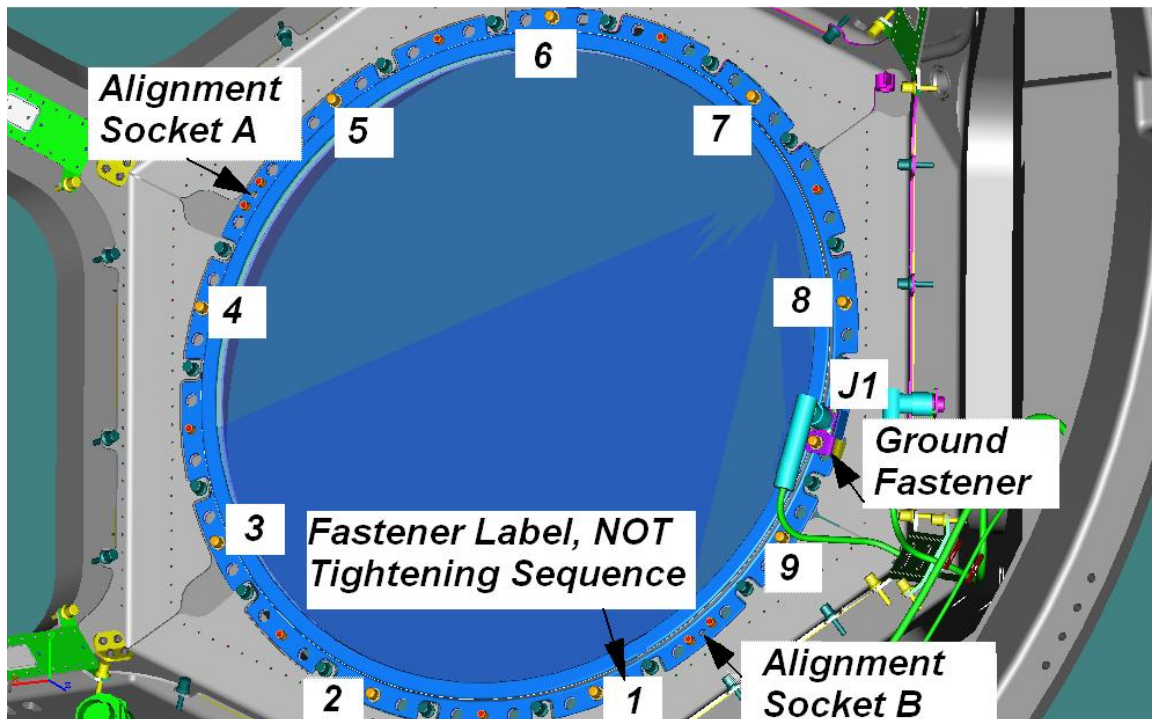


Figure 1.- Cupola Top Window Scratch Pane Assembly.

1.166 CUPOLA TOP WINDOW SCRATCH PANE ASSEMBLY R&R

(ASSY OPS/20A/FIN 1) Page 3 of 4 pages

- 2.1 Demate heater cable harness (P1 TO WINDOW 7 J1) from J1 on SPA frame.
Refer to Figure 1.
- 2.2 Secure heater cable harness away from SPA.

NOTE

Ground fastener is noncaptive. Loose part should be temp stowed in a Ziplock Bag.

- 2.3 Unfasten noncaptive ground fastener (3/8" Socket, 1/4" Drive; 10" Ext, 1/4" Drive; Ratchet, 1/4" Drive).
Remove non-captive ground fastener from ground strap loop and temp stow in small Ziplock Bag.
- 2.4 Unfasten SPA fasteners (nine) (7/16" Socket, 1/4" Drive; 10" Ext, 1/4" Drive; Ratchet, 1/4" Drive).
- 2.5 Carefully remove SPA from Top Window.
Temporarily stow.

3. SPA INSTALLATION

- 3.1 Inspect Pressure Pane Assembly (PPA) pane for damage and contamination.
If PPA pane is damaged (scratches, cracks, etc.) or contaminated (smudges, particulates, etc.), √**MCC-H**.
- 3.2 Retrieve new SPA.
Inspect new SPA pane for damage and contamination.
If SPA is damaged (scratches, cracks, etc.) or contaminated (smudges, particulates, etc.), √**MCC-H**.
- 3.3 Inspect mating surfaces on PPA and SPA frames.
Clean mating surfaces, if required (Dry Wipes).
- 3.4 Position new SPA over Top Window, aligning sockets "A" and "B" with respective pins on PPA frame.
- 3.5 Engage SPA fasteners (nine) onto window frame by hand.

CAUTION

Failure to tighten fasteners in proper sequence may result in damage to SPA. Fasteners are not labeled per the proper tightening sequence.

NOTE

Proper SPA fastener tightening sequence: 1, 5, 9, 4, 8, 3, 7, 2, 6.

1.166 CUPOLA TOP WINDOW SCRATCH PANE ASSEMBLY R&R

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- 3.6 Tighten, torque SPA fasteners (nine) to 70 in-lbs following proper sequence (7/16" Socket, 1/4" Drive; 10" Ext, 1/4" Drive; (40-200 in-lbs) Trq Wrench, 1/4" Drive).
- 3.7 Tighten, torque SPA fasteners (nine) to 142 in-lbs following proper sequence (7/16" Socket, 1/4" Drive; 10" Ext, 1/4" Drive; (40-200 in-lbs) Trq Wrench, 1/4" Drive).
- 3.8 Retrieve ground fastener from small Ziplock Bag and insert in ground strap loop.
Engage ground fastener with ground strap onto window frame by hand.
- 3.9 Tighten, torque ground fastener to 35 in-lbs (3/8" Socket, 1/4" Drive; 10" Ext, 1/4" Drive; (40-200 in-lbs) Trq Wrench, 1/4" Drive).
- 3.10 Mate heater cable harness (P1 TO WINDOW 7 J1) to J1 on SPA frame.
- 3.11 SPA RTD/Heater power on:

Cupola: TCS: 7: A (or B)

sel RPCM N32A2B E2 RPC 05

cmd Close Cmd – Enable (Verify – Ena)

cmd RPC Position – Close (Verify – Cl)

'Cupola Htr7A'

cmd CLC – Ena (Verify – Ena)

'Cupola Htr7B'

cmd CLC – Ena (Verify – Ena)

6. POST MAINTENANCE

- 6.1 Stow tools, equipment, old SPA.
- 6.2 Notify **MCC-H** of task completion.

1.168 CUPOLA CORNER PANEL INSTALLATION

(ASSY OPS/20A/FIN 1) Page 1 of 13 pages

OBJECTIVE:

Install Cupola Corner Panels, Curtain Panels. Remove ACBM/PCBM Alignment Guides and other CBM hardware as required.

LOCATION:

Cupola

DURATION:

2 hours, 40 minutes total

5 minutes for tool gathering

15 minutes for Removing Corner Panels From Launch Configuration (step 1)

20 minutes for Disassembling Corner Panel Stacks (step 2)

90 minutes for CBM Hardware Removal (step 3)

15 minutes for Corner Panel Installation (step 4)

10 minutes for Curtain Panel Installation (step 5)

5 minutes for Labeling Temperature Control, Closeout (step 6, 7)

CREW:

One

PARTS:

Corner Pnl 1 to 4

P/N 1210CU311-403 (one)

P/N 1210CU323-403 (two)

P/N 1210CU327-403 (one)

Curtain Pnl 1 to 4 P/N 1210CU201-403

24 x 24 Ziplock Bags (two) (to stow removed Alignment Guides, RTLs)

MATERIALS:

Sharpie

Kapton Tape

Ziplock Bag (for stowing removed Corner Panel launch hardware)

TOOLS:

Digital Camera

Mini Maglite/Work Light (as required)

Scissors

Portable Fan Assy (MRK Fan) P/N SEG11100291-705

D-Cell Batteries (four) (if required)

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

Driver Handle, 1/4" Drive

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

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

3/8" Socket, 1/4" Drive

4" Ext, 1/4" Drive

1.168 CUPOLA CORNER PANEL INSTALLATION

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1. REMOVING CORNER PANELS FROM LAUNCH CONFIGURATION

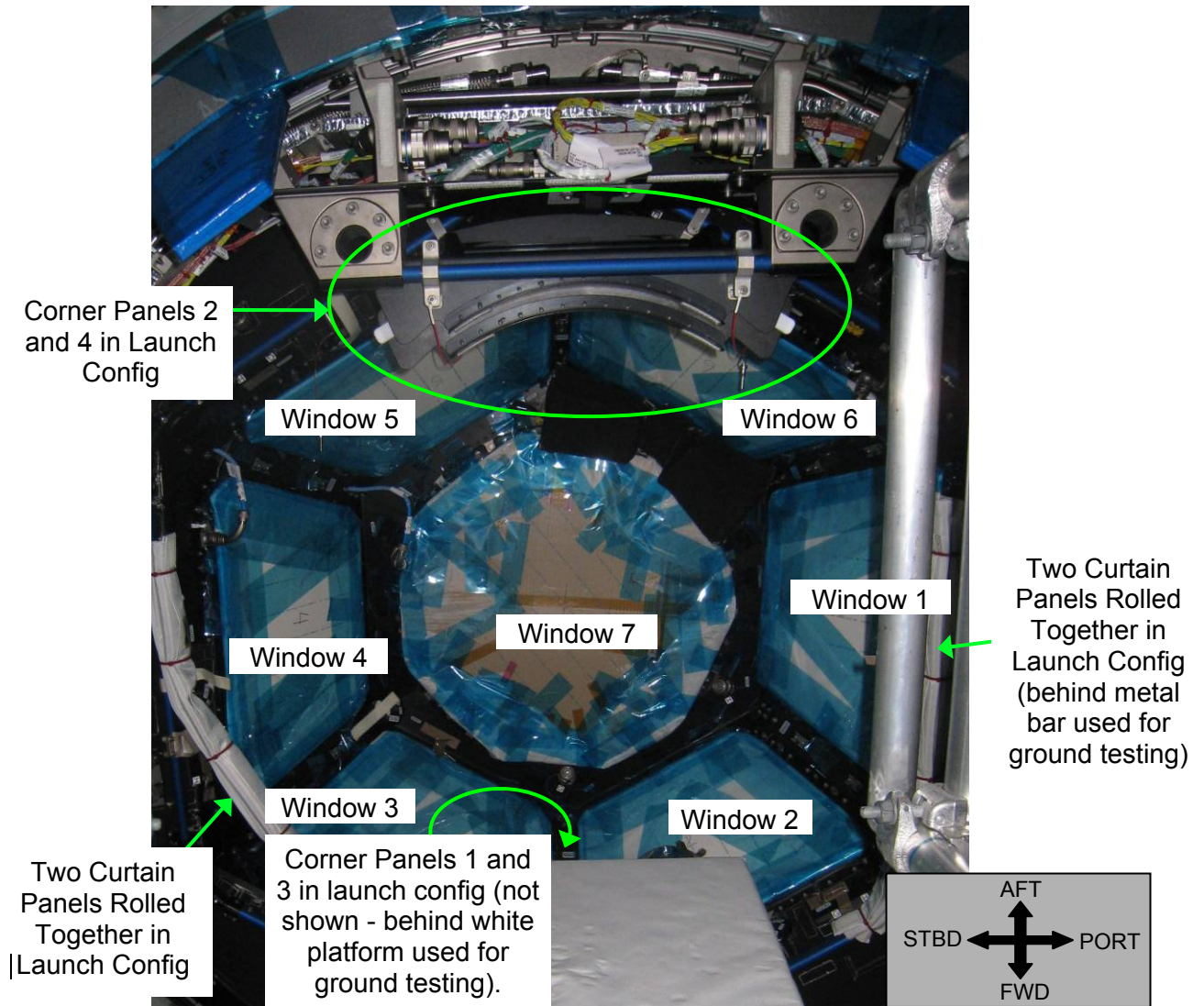


Figure 1.- Corner(Curtain Panel) Launch Configuration (Ground Photo).

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(ASSY OPS/20A/FIN 1) Page 3 of 13 pages

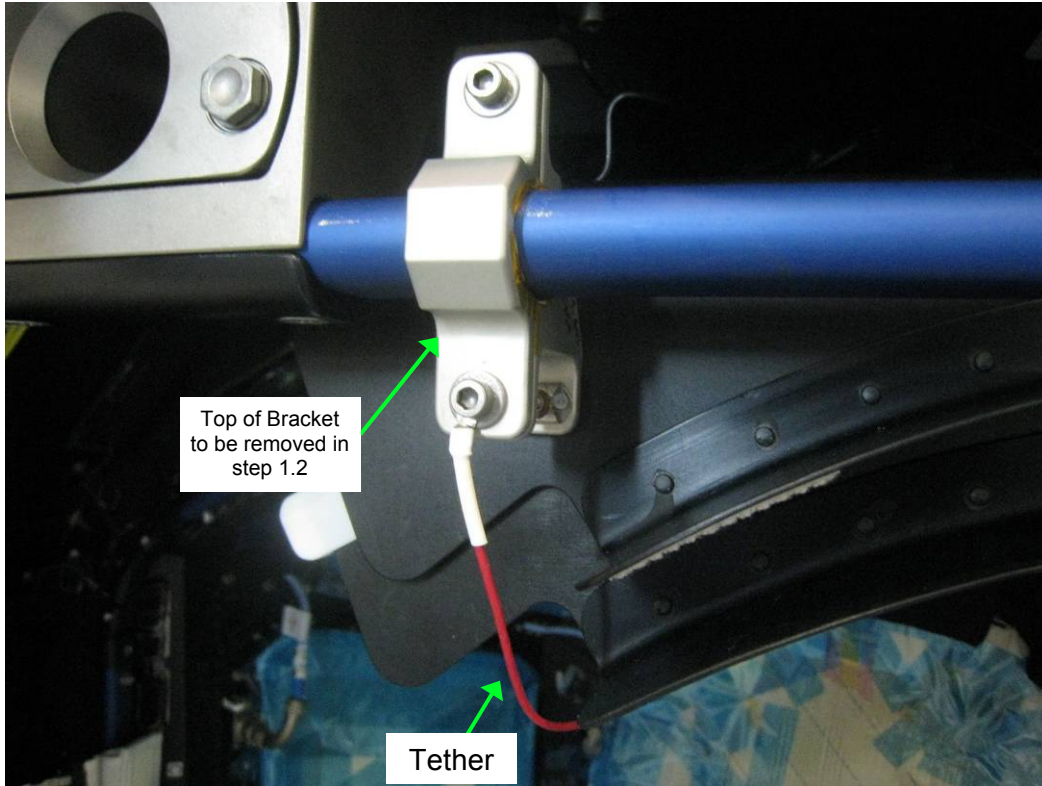


Figure 2.- Corner Panel Bracket (Ground Photo).

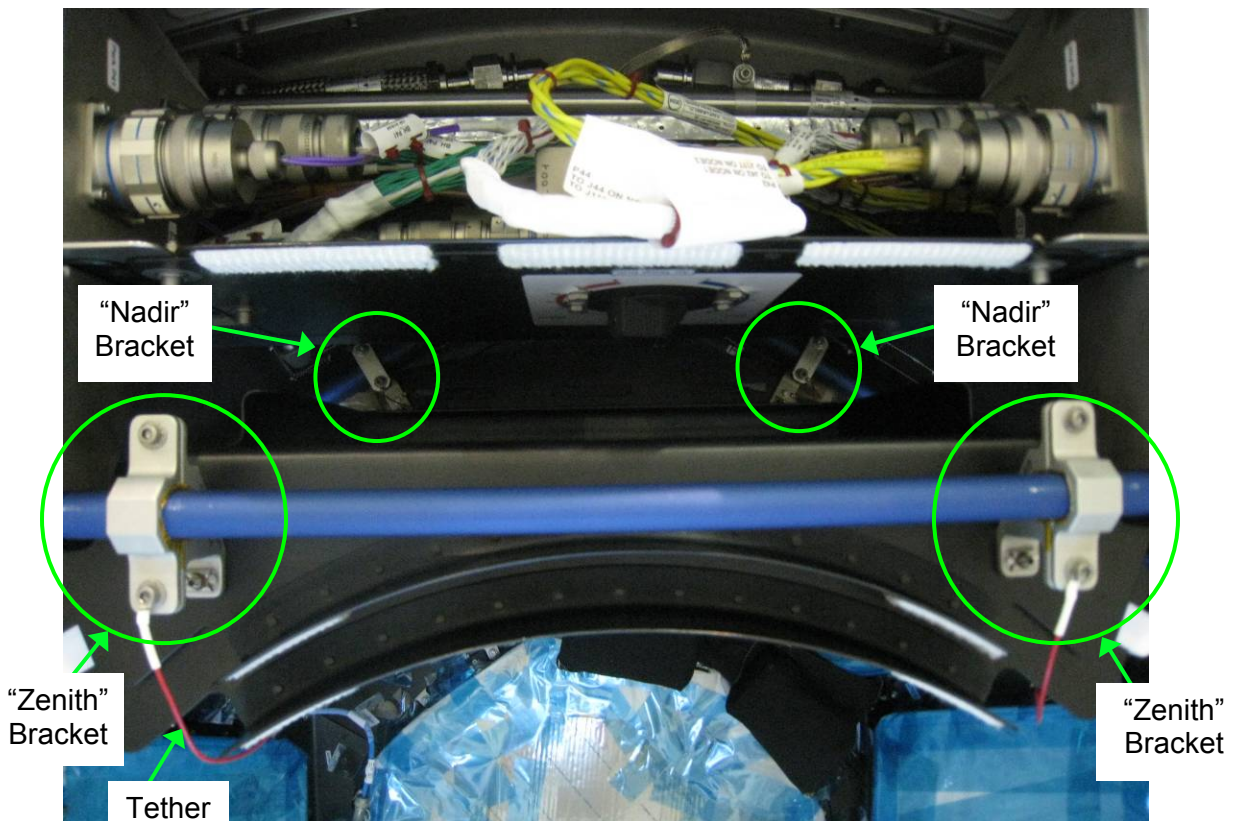


Figure 3.- Corner Panel Brackets (Ground Photo).

1.168 CUPOLA CORNER PANEL INSTALLATION

(ASSY OPS/20A/FIN 1) Page 4 of 13 pages

NOTE

1. Corner Panels are launched in two stacks of two (four total). They are attached to Cupola Handrails with four brackets per stack of Corner Panels.
2. Curtain Panels were launched in two bundles of two (four total). Each bundle was wire-tied to Handrails and the RWS Bracket Adapters.

Cupola

- 1.1 Per crew preference, install Portable Fan Assy (MRK Fan) to increase ventilation during outfitting.
- 1.2 Remove top of bracket attaching Corner Panel stack to Handrails, fasteners (two) (Driver Handle, 1/4" Drive; 5/32" Hex Head). Top of bracket will remain tethered to Corner Panel stack via tether. Refer to Figures 1 to 3.
- 1.3 Repeat step 1.2 for remaining three brackets holding Corner Panel stack to Cupola.
- 1.4 Lift Corner Panel stack off Handrails, temporarily stow nearby in Cupola.
- 1.5 Repeat steps 1.2 to 1.4 for remaining Corner Panel Stack.

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(ASSY OPS/20A/FIN 1) Page 5 of 13 pages

2. DISASSEMBLING CORNER PANEL STACKS

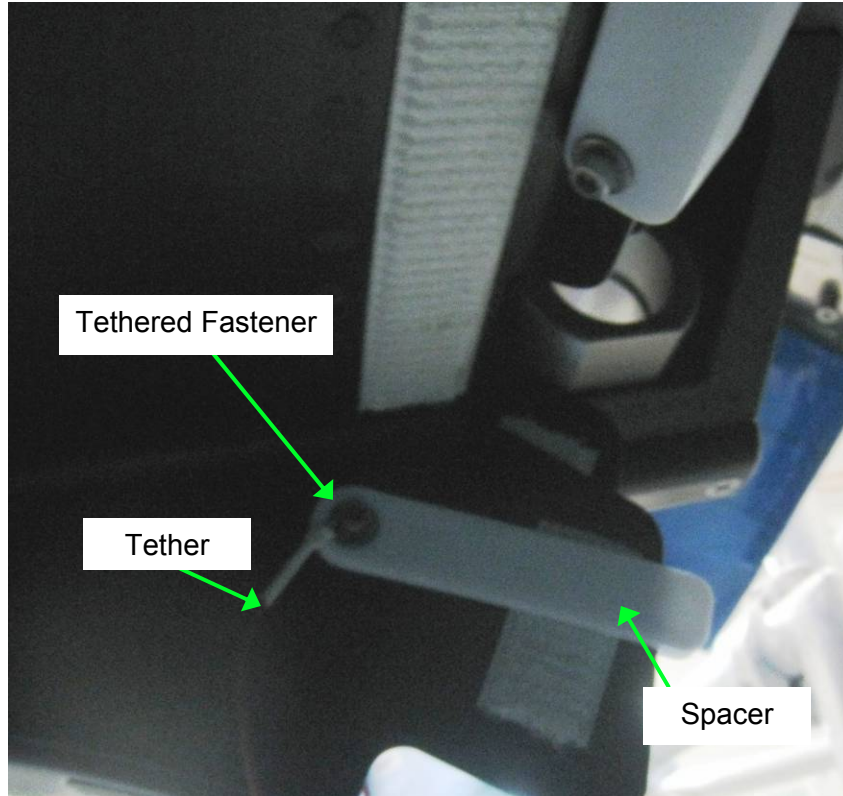


Figure 4.- Corner Panel Bracket Tether/Spacer.

- 2.1 Label Ziplock Bag "Cupola Corner Panel Launch H/W."
Temporarily stow in Cupola.
- 2.2 For two "Zenith" brackets, remove Tethered Fastener (Driver Handle, 1/4" Drive; 5/32" Hex Head).
Stow bracket pieces (two), Spacer in Ziplock Bag labeled "Cupola Corner Panel Launch H/W".
Refer to Figures 3 and 4.
- 2.3 For two "Nadir" brackets, remove fastener securing bracket, spacer to Corner Panels (Driver Handle, 1/4" Drive; 5/32" Hex Head).
Stow bracket pieces (two), white spacer in Ziplock Bag labeled "Cupola Corner Panel Launch H/W".
Refer to Figure 3.

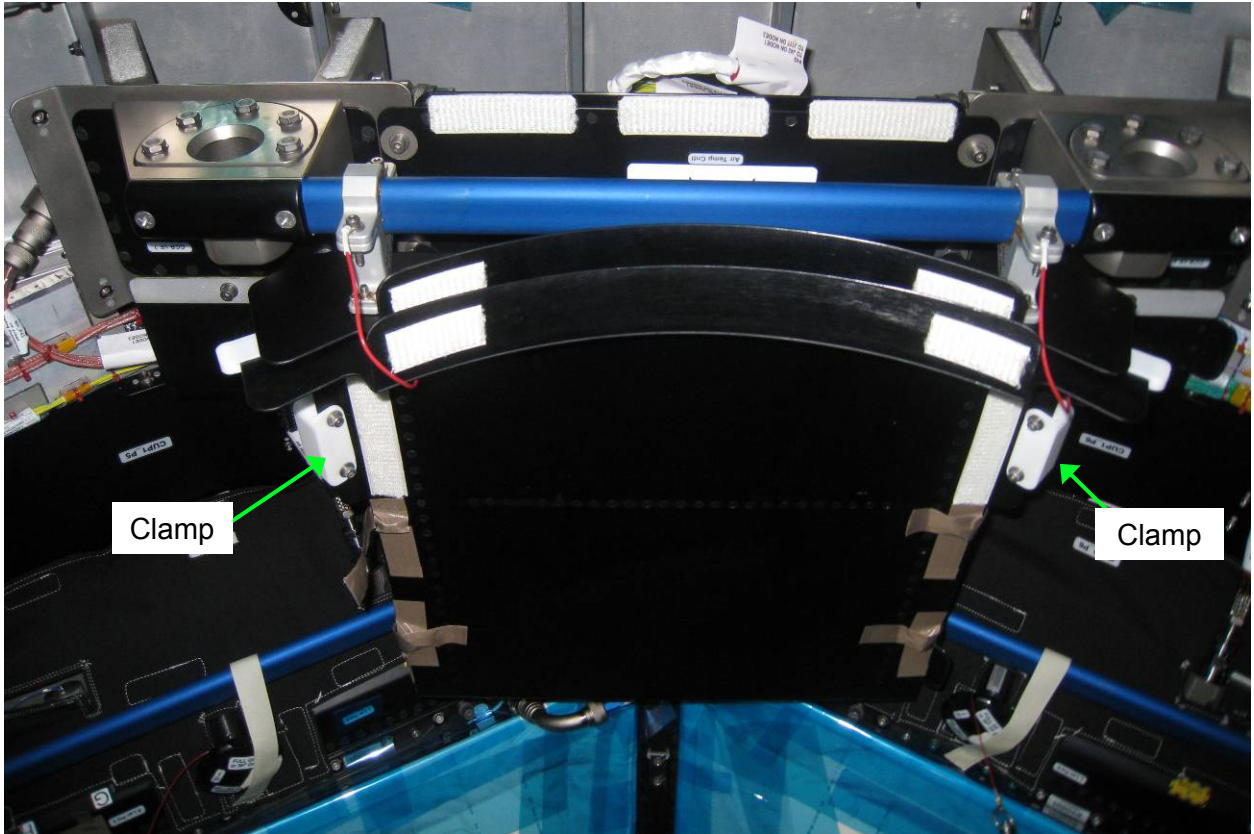


Figure 5.- Corner Panel Clamps.

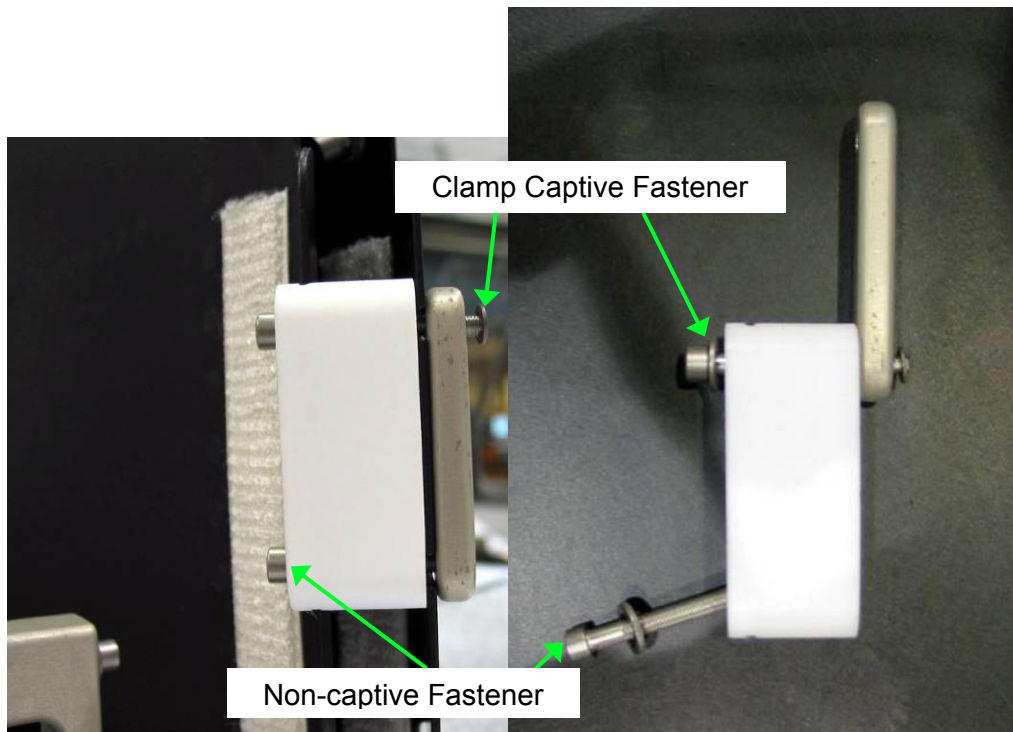


Figure 6.- Corner Panel Clamp Removal.

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- 2.4 Loosen Clamp Captive Fastener on Corner Panel Clamp (Driver Handle, 1/4" Drive; 5/32" Hex Head).
Loosen non-captive fastener on Clamp until Clamp slides off of Corner Panels (Driver Handle, 1/4" Drive; 5/32" Hex Head).
Stow Clamp in Ziplock Bag labeled "Cupola Corner Panel Launch H/W".
Repeat for remaining Clamp on Corner Panel Stack.
Temporarily stow individual Corner Panels.
Refer to Figures 5 and 6.

- 2.5 Repeat steps 2.2 to 2.4 for remaining Corner Panel stack.

3. REMOVING CBM HARDWARE FOR CORNER PANEL INSTALLATION

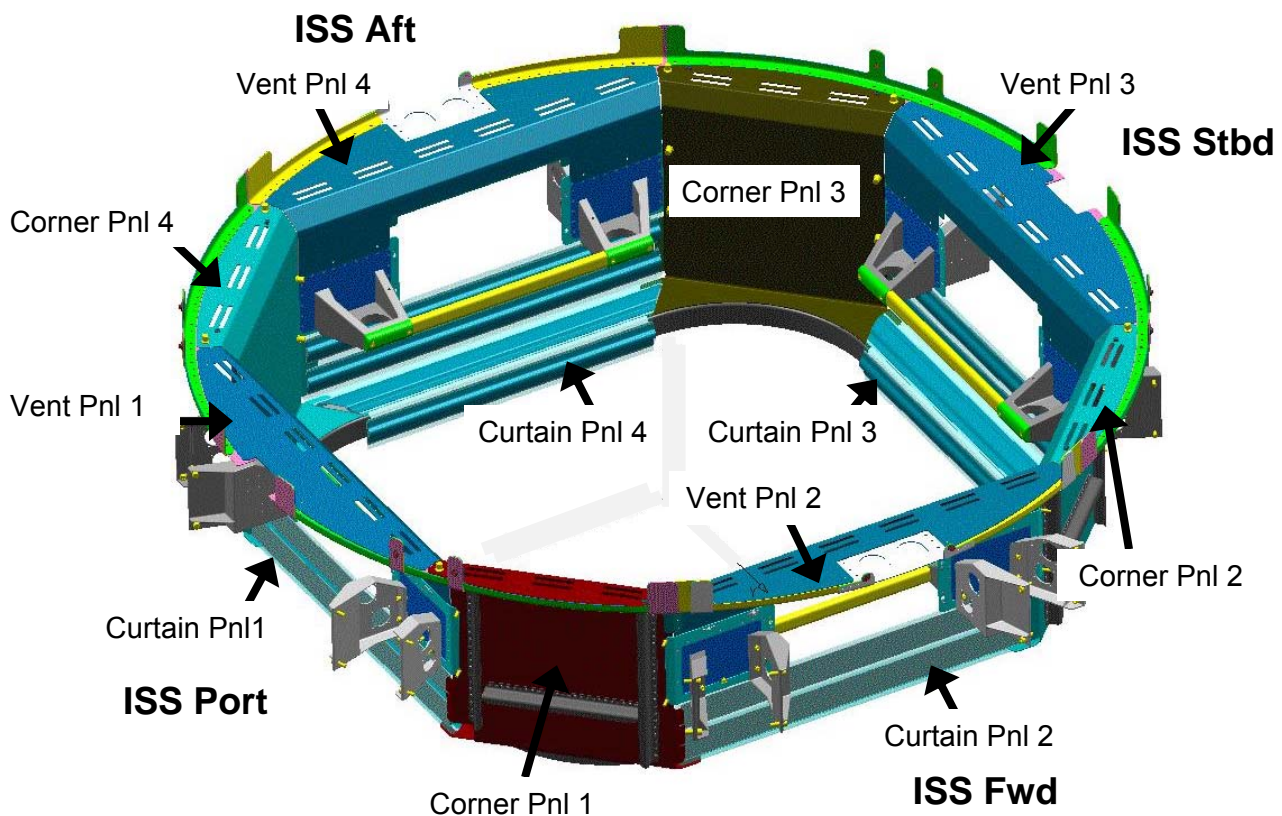


Figure 7.- Corner(Curtain Panel) Installation.

1.168 CUPOLA CORNER PANEL INSTALLATION

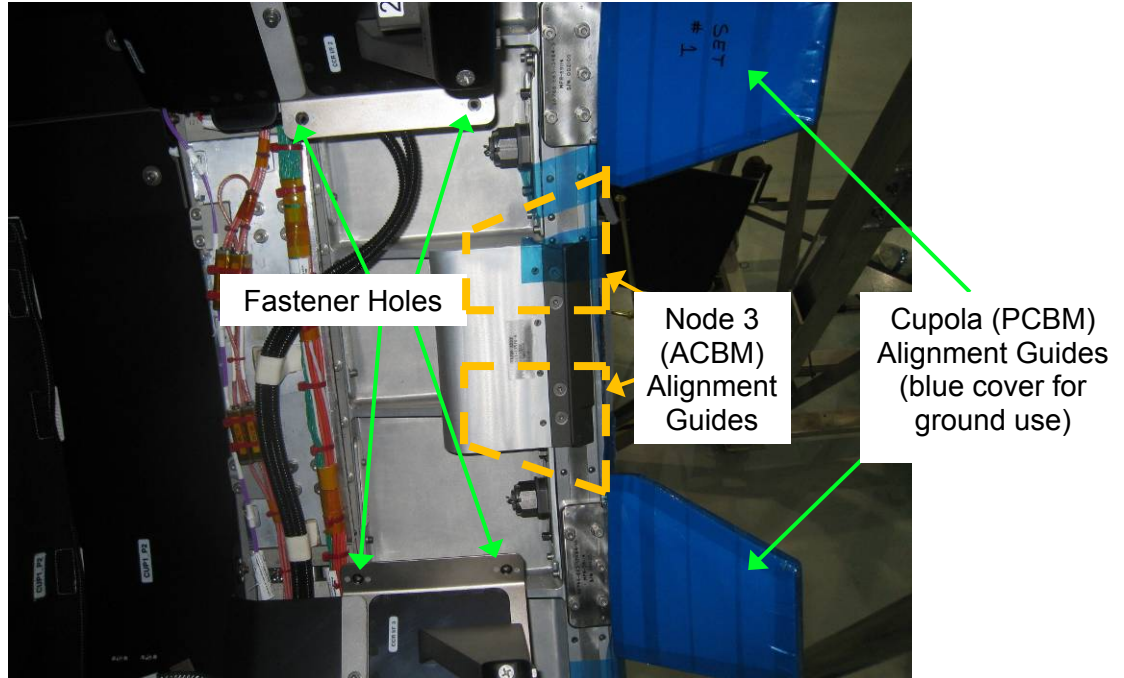


Figure 8.- Corner Panel 4 Installation Location (Ground Photo).

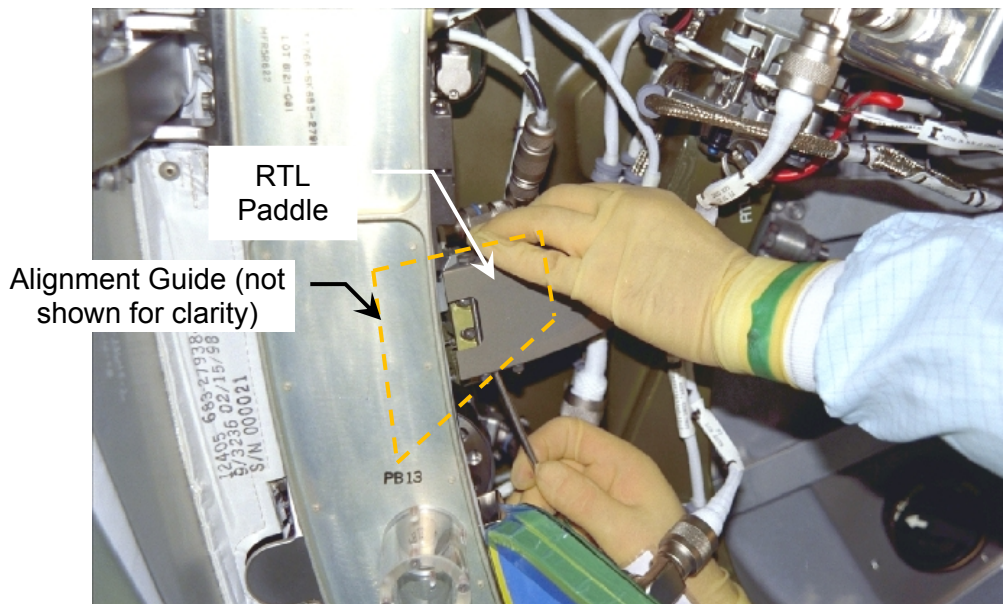
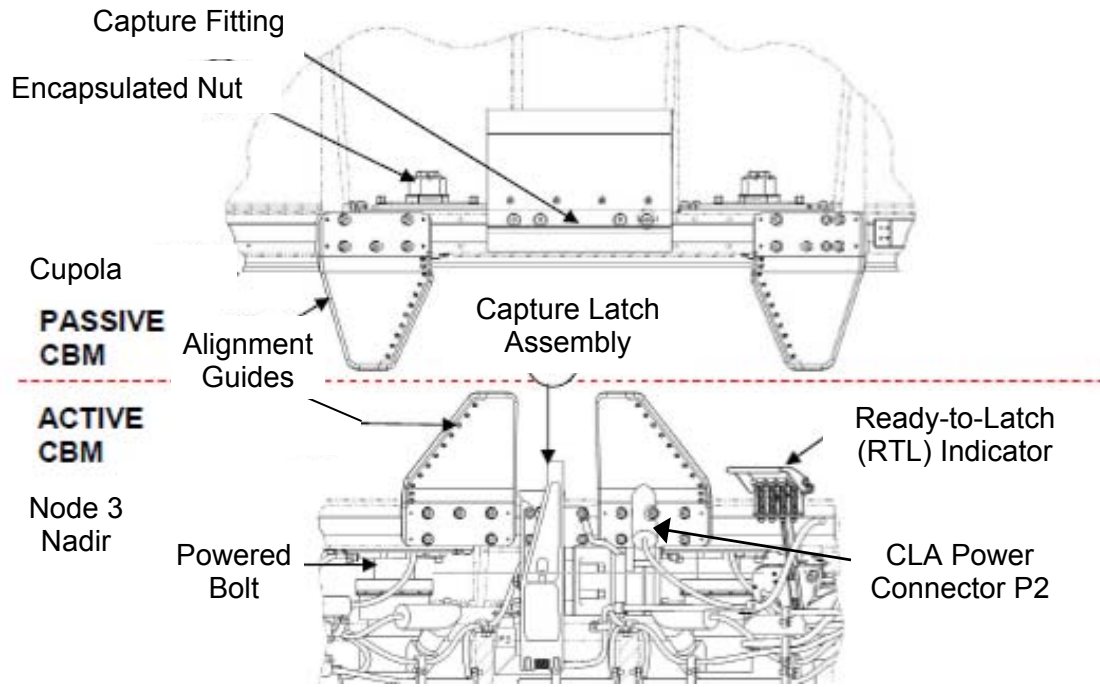


Figure 9.- Depressed RTL Paddle (Alignment Guide not Installed, Ground Photo).

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NOTE

1. Ground visual assessment showed all CBM Alignment Guides need to be removed to install Cupola Corner Panels.
2. Step 3.1 provides a quick assessment to verify that Alignment Guides need to be removed.

- 3.1 Hold Corner Panels up to installation locations to verify that Node 3 (ACBM) and(or) Cupola (PCBM) Alignment Guides need to be removed.
If Alignment Guide removal not required, proceed to step 4.
Refer to Figures 7, 8, 10.

NOTE

1. During Cupola vestibule outfitting, all N3 Nadir CBM Alignment Guides were numbered starting at ISS Fwd position and moving clockwise while looking into Cupola.
2. CBM Alignment Guide may be held in place by tight tolerances on guide pins. Gently rocking CBM Alignment Guide while pulling away from CBM Ring may help.

- 3.2 Verify all N3 Nadir CBM Alignment Guides were numbered starting at ISS Fwd position and moving clockwise while looking into Cupola (Kapton Tape, Sharpie).

1.168 CUPOLA CORNER PANEL INSTALLATION

(ASSY OPS/20A/FIN 1) Page 10 of 13 pages

- 3.3 Remove Alignment Guides as required for Corner Panel installation, fasteners (five per Alignment Guide) (Ratchet, 1/4" Drive; 4" Ext; 3/8" Socket).

Stow removed Alignment Guides in 24 x 24 Ziplock Bag labeled "NOD3-Cupola Alignment Guides".

Notify **MCC-H** which Alignment Guides were removed.

Refer to Figure 10.

* If Alignment Guide removal is not possible due to spring forces
* | in RTL applying pressure to Alignment Guide,
* | A second crewmember should hold RTL Paddle away from
* | Alignment Guide during Alignment Guide removal.

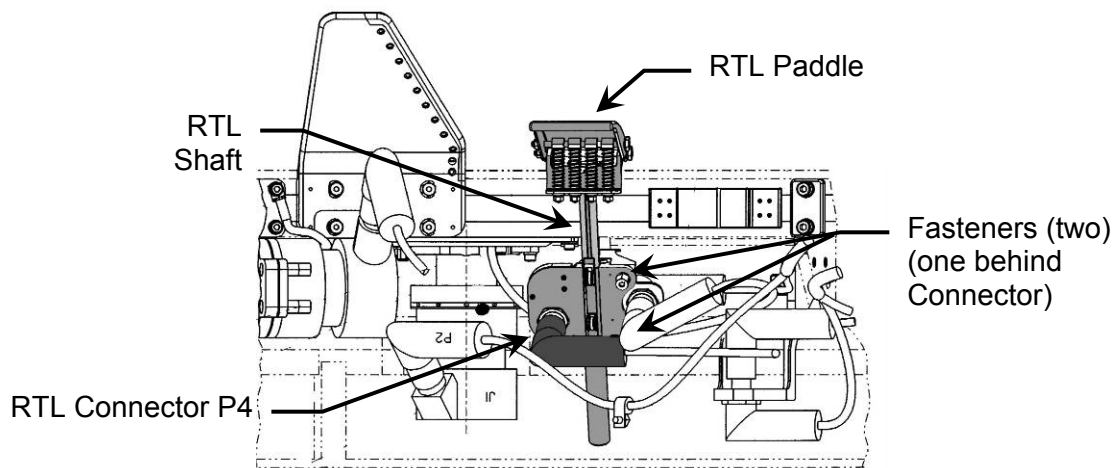


Figure 11.- Ready to Latch (PCBM Alignment Guide not shown).

- 3.4 For all four Node 3 Nadir RTLs,
Label RTL with respect to ISS location coding (e.g. - N3N Fwd-Stbd
RTL) (Kapton Tape, Sharpie)

RTL connection P4 ←|→ RTL

Install Kapton Tape over all exposed connections.

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

Refer to Figure 11.

- 3.5 Stow RTLs in 24 x 24 Ziplock Bag.
Label Ziplock Bag "Node 3 Nadir RTLs."

- 3.6 If Capture Latch Assembly (CLA) connector interferes with Cupola
Corner Panel installation,

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

Install Kapton Tape over all exposed connections.

Notify **MCC-H** which CLA connector demates were required.

Refer to Figure 10.

1.168 CUPOLA CORNER PANEL INSTALLATION

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4. INSTALLING CORNER PANELS

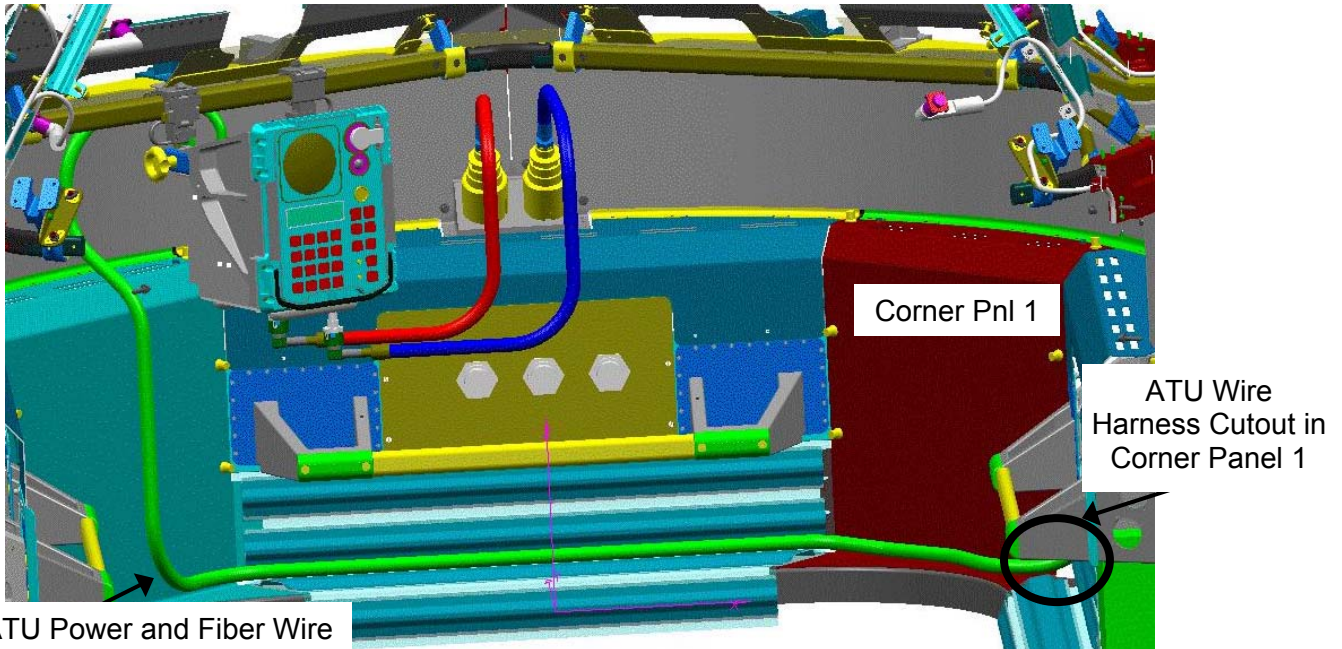


Figure 12.- ATU Wire Harness Routing Through Corner Pnl 1.

- 4.1 Photo document configuration of Cupola/N3 Nadir vestibule before Corner Panel installation including areas with removed CBM hardware.
- 4.2 Install Corner Panels 2, 3 and 4, fasteners (six per panel) (Driver Handle, 1/4" Drive, 3/16" Hex Head). Refer to Figures 7, 8.

CAUTION

ATU Wire Harness CP1203F contains Fiber Optic lines. Do not expose this umbilical to tension or tight bend radius (less than 2 inches).

- 4.3 For Corner Panel 1
 - Ensure ATU Wire Harnesses (CP2102F and CP2103F) are routed through ATU cutout.
 - Release temporary restraints, as required.
 - Install Corner Panel 1, fasteners (six) (Driver Handle, 1/4" Drive, 3/16" Hex Head).
 - Assess if padding is required between Corner Panel and ATU Wire Harness. Pad as required with available foam/towels to maintain bend radius of less than 2 inches.
 - Refer to Figures 7, 8, 12.

5. INSTALLING CURTAIN PANELS

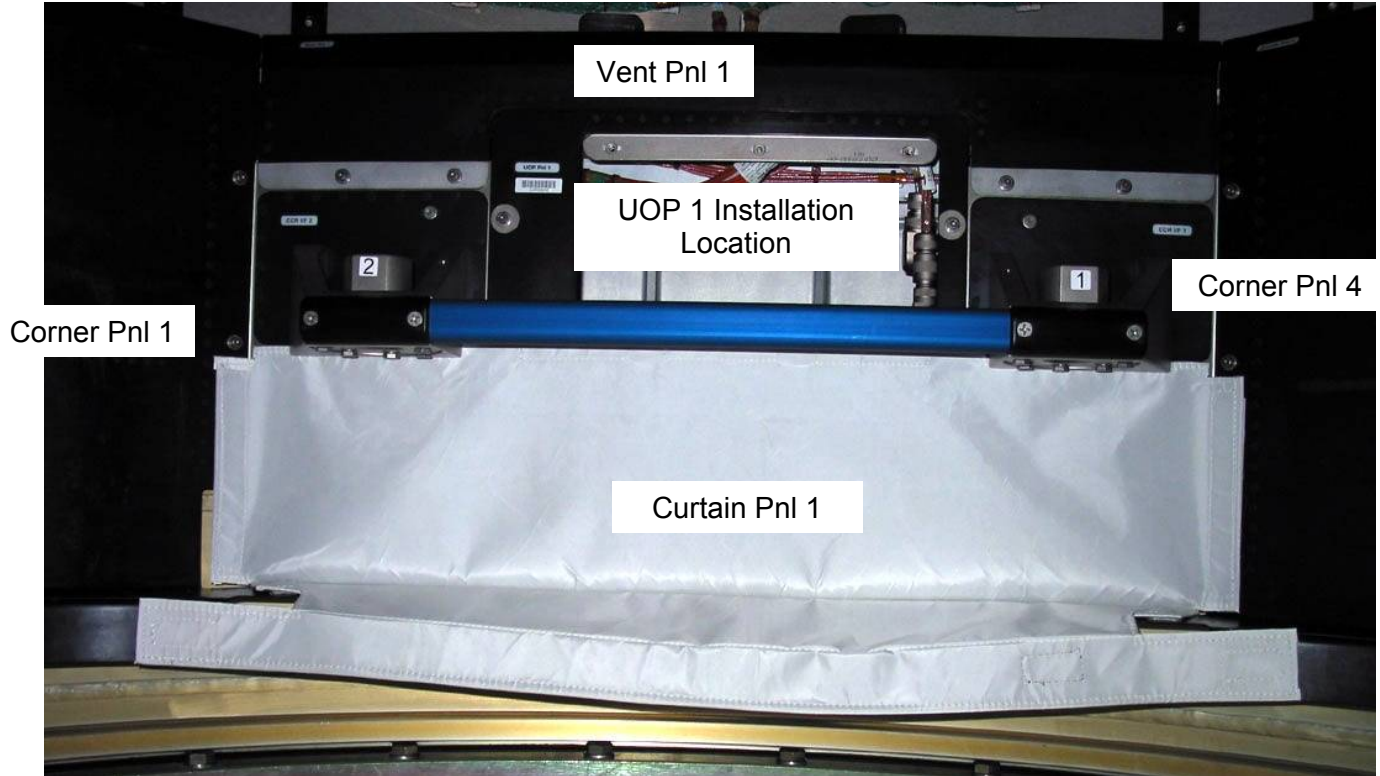


Figure 13.- Curtain Panel 1 Installed (Ground Photo).

- 5.1 Release Curtain Panels from launch locations (two) by cutting Wire-Ties (Scissors).
Discard Wire-Ties in Ziplock Bag labeled "Cupola Corner Panel Launch H/W."
Refer to Figure 1.
- 5.2 Install Curtain Panels (four) with Velcro per Figures 7, 13.

1.168 CUPOLA CORNER PANEL INSTALLATION

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6. LABELING NON-FUNCTIONAL CUPOLA TEMPERATURE CONTROL

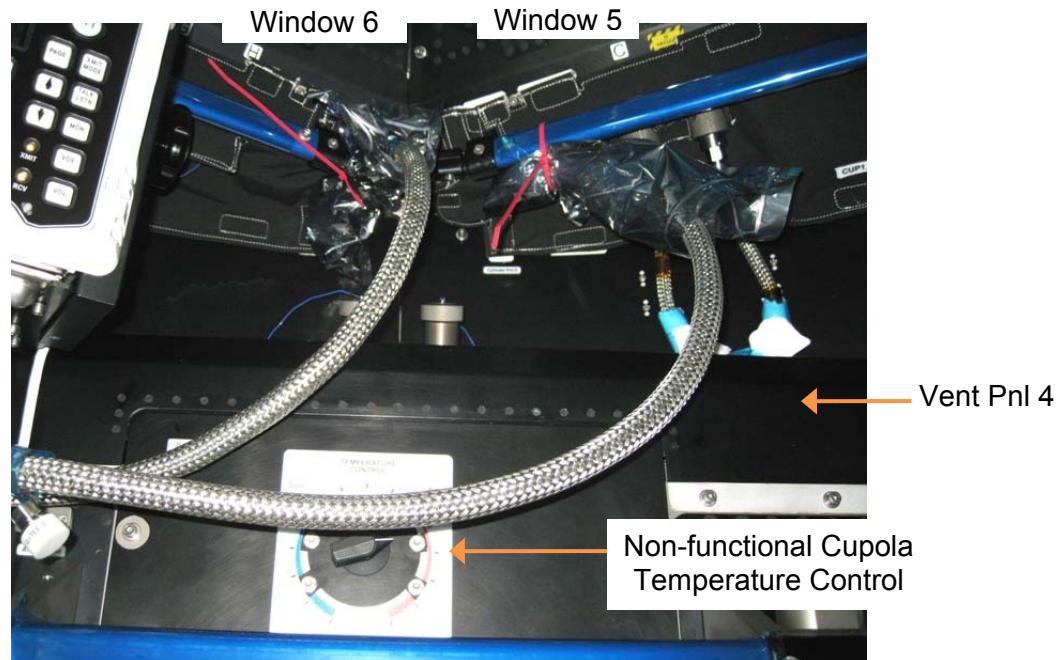


Figure 14.- Non-functional Cupola Temperature Control (CUP1A1).

6.1 Using Gray Tape, Sharpie, apply label adjacent to Cupola Temperature Control that reads “Non-functional. To adjust Cupola temperature, use control on panel NOD3D2-34.” Refer to Figure 14.

6.2 Photo-document newly installed label for Cupola Temperature Control (Digital Camera).

7. CLOSE OUT

7.1 Photo-document installed Corner/Curtain Panels as well as general overview of Cupola with all Closeouts installed (Digital Camera).

Table 1.- Restow Table

1	Ziplock Bag labeled “Cupola Corner Panel Launch H/W”
2	Ziplock Bag labeled “NOD3-Cupola Alignment Guides”
3	Ziplock Bag labeled “Node 3 Nadir RTLs ”

7.2 Stow all tools, materials.
Refer to Table 1 for restow.

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1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

(ASSY OPS/20A/FIN 1/HC) Page 1 of 11 pages

OBJECTIVE:

Utilize Internal Sampling Adapter (ISA), Vacuum Access Jumper (VAJ), Multimeter, ISA Scopemeter Pressure Probe to depress the Cupola in preparation for Cupola unberthing.

LOCATION:

Node 3 Port Hatch

DURATION:

2 hours Total Crew Time

20 minutes for Multimeter, ISA, VAJ Setup

10 minutes for Multimeter, ISA, VAJ Teardown

1 hour, 30 minutes for Depressurization and Leak Check Wait Times

MATERIALS:

9V Alkaline Battery (if Battery changeout required)

Earplugs

Gray Tape

TOOLS:

MPEV Internal Sampling Adapter P/N 97M55830-1

Vacuum Access Jumper 5 ft VAJ-78-1 5 ft

Vacuum Access Jumper 35 ft VAJ-83-1 35 ft

ISA Scopemeter Pressure Probe P/N 1525,760MMHGA/30PSIA

Multimeter Kit: P/N 10118-10018-04

Multimeter

ISS IVA Toolbox:

Drawer 3

#0 Phillips Screwdriver (if Battery changeout required)

1. SETTING UP ISA

NOTE

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

1.1 Gamah Cap ←|→ ISA VAJ Port

1.2 √ISA Scopemeter Pressure Probe →|← ISA

2. SETTING UP MULTIMETER

NOTE

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

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

COM plug →|← COM jack

1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

(ASSY OPS/20A/FIN 1/HC) Page 2 of 11 pages

2.2 √ISA Scopemeter Pressure Probe – OFF

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

2.4 Verify voltage reading > 100 mV DC (good ISA Scopemeter Pressure Probe Battery indication)

If voltage reading < 100 mV DC

ISA Scopemeter Pressure Probe Battery must be replaced.
9V Battery replaced by removing noncaptive screw on back of probe (#0 Phillips Screwdriver).

2.5 ISA Scopemeter Pressure Probe → mmHgA

3. VERIFYING ISA SCOPEMETER PRESSURE PROBE ACCURACY

NOTE

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

Multimeter 3.1 √Rotary Switch – $\overline{\overline{mV}}$

3.2 Record ISA Scopemeter Pressure Probe P₁: _____ mmHgA

PCS 3.3 US Lab: ECLSS
LAB: ECLSS

Record Cab Press P₂: _____ mmHgA

* If $\Delta P |P_2 - P_1| > 20$ mmHg
* | Notify **MCC-H** ISA Scopemeter Pressure Probe inaccurate.
* | √**MCC-H** for further instructions

WARNING

Connecting the 35 ft VAJ to the 5 ft VAJ via the ISA VAJ Port will create a continuous VAJ Hose from the Node 3 Port Hatch to the Airlock PCA VAP. In case of an emergency requiring isolation of USOS modules, demate VAJ Hoses as required at the ISA VAJ Port and stow in Node 3, A/L as needed.

1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

(ASSY OPS/20A/FIN 1/HC) Page 3 of 11 pages

4. CONNECTING VAJ, ISA, MANUAL PRESSURE EQUALIZATION VALVE (MPEV)

Node 3 Port
Hatch

4.1 ✓MPEV – CLOSED

4.2 Gamah Cap ←|→ VAJ-78-1 (5 ft) (both ends)
Inspect seals for any visible damage.

Notify **MCC-H** if any damage noted to seals.

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

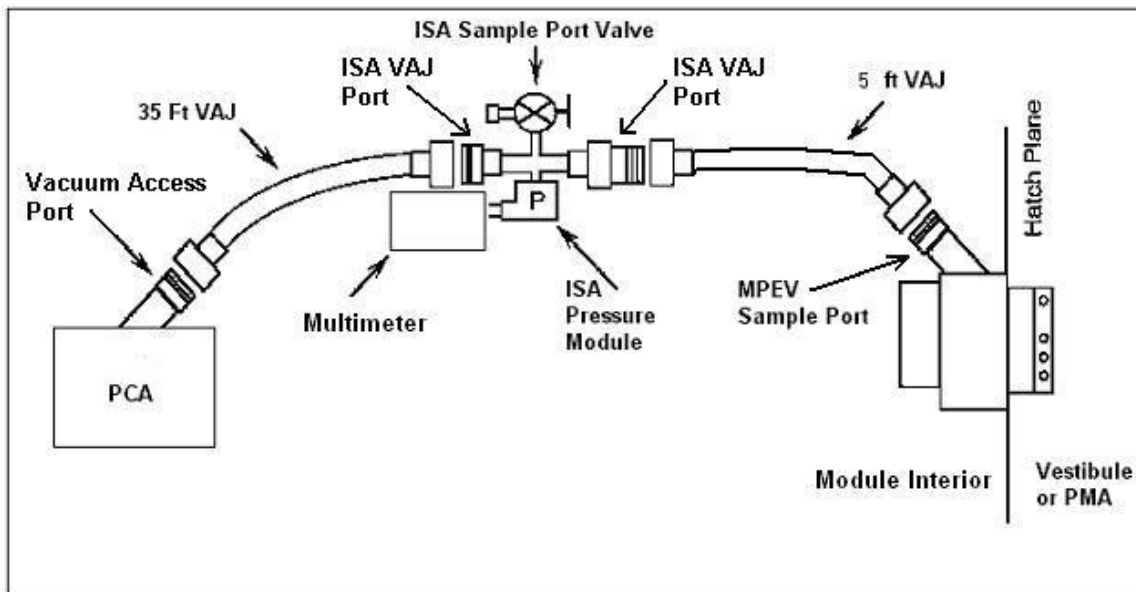


Figure 1.- ISA VAJ MPEV Connection.

4.4 ✓Cap ←|→ MPEV

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

4.5 Verifying Vent Relief Isolation Valve (VRIV) and Vent Relief Control Valve (VRCV) Closed

MCC-H

Airlock: ECLSS: PCA: VRCV

Airlock PCA VRCV

✓Position – Closed

Airlock: ECLSS: PCA: VRIV

Airlock PCA VRIV

✓Position – Closed

1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

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4.6 Disconnecting Airlock VAJ

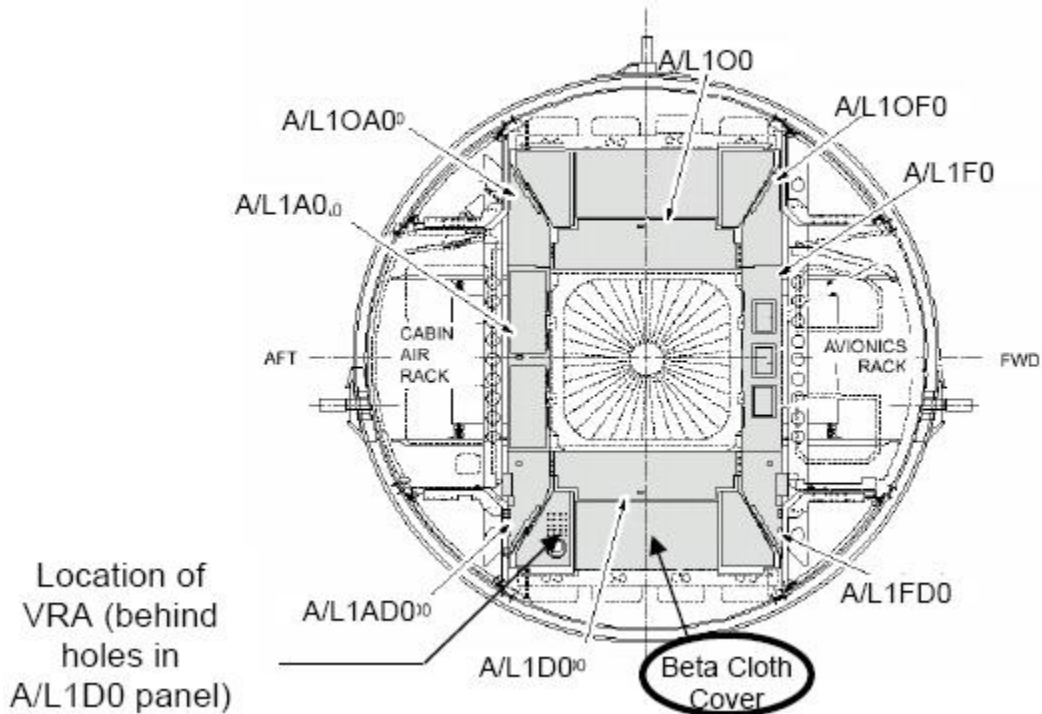


Figure 2.- Airlock Port Closeout Panels.

CAUTION

Use extreme care when removing A/L1D0 beta cloth, stowage items and when accessing the area around the Vent Relief Assembly (VRA). The VRIV J1 connector is damaged and taped in place.

NOTE

1. Expedition 11 and 14 crews indicated access to the disconnection of the VAJ from VRIV was able to be performed by "feel." Expedition 16 crew routed Airlock VAJ above Airlock Deck Platform to provide enough length to make the connection at Node 2 Forward.
2. VAJ installed in Airlock is labeled "VAJ-83-2" (P/N 683-17111-3) and is referred to as "Airlock VAJ" throughout the procedure.

- 4.6.1 Remove A/L1D0 Beta Cloth Cover (Velcro).
Remove, temporarily stow items from behind Closeout.
Refer to Figure 2.

1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

(ASSY OPS/20A/FIN 1/HC) Page 5 of 11 pages

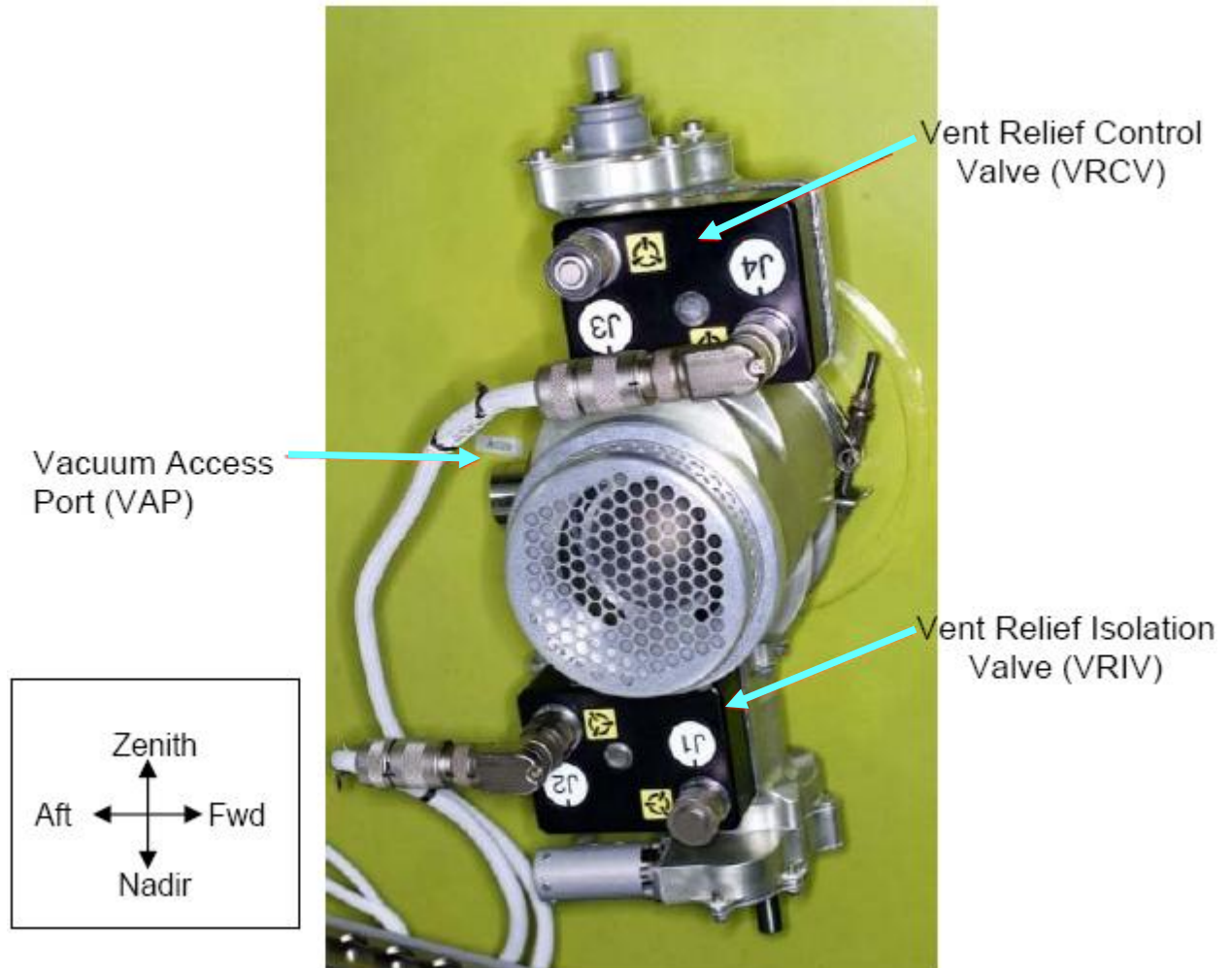


Figure 3.- Vent Relief Assembly (VRA) (VAJ Connection to VAP Not Shown).

A/L1D0

4.6.2 Airlock VAJ (bent end) \leftarrow | \rightarrow VRA Vacuum Access Port (VAP), by hand.

Refer to Figures 2 and 3.

Verify soft seal installed in VAJ Gamah fitting.
Inspect soft seal for damage, debris.

Tethered Cap \rightarrow | \leftarrow Airlock VAJ (Bent end).

4.7 Gamah Cap \leftarrow | \rightarrow VAJ-83-1 (35 ft) (both ends)

Inspect seals for any visible damage.

Notify **MCC-H** if any damage noted to seals.

4.8 VAJ-83-1 (35 ft) (bent end) \rightarrow | \leftarrow PCA VAP

Hand tighten.

Refer to Figure 1.

1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

(ASSY OPS/20A/FIN 1/HC) Page 6 of 11 pages

- 4.9 Gamah Cap ←|→ ISA VAJ Port (capped)
VAJ-83-1 (35 ft) (straight end) →|← ISA VAJ Port
Hand tighten.
Refer to Figure 1.

WARNING

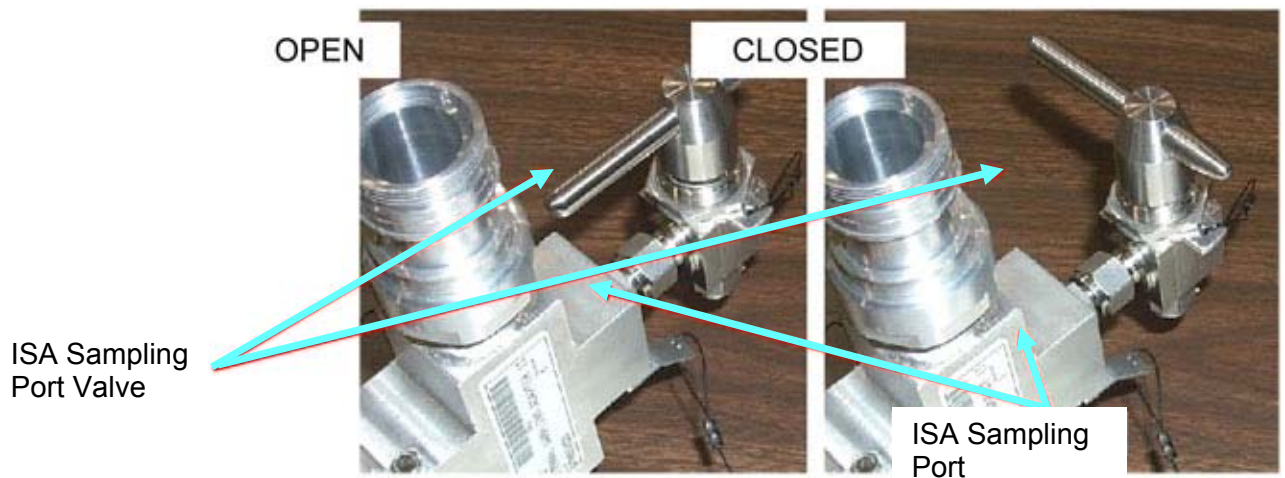
VAJ will move when pressurized or evacuated. Failure to secure ISA VAJ Assembly may result in injury to crew or damage to equipment.

- 4.10 Secure ISA VAJ Assembly.

5. LEAK CHECKING ISA VAJ CONNECTION

ISA

- 5.1 ISA Sampling Port Valve → CLOSED
Refer to Figure 2.



WARNING

Opening the VRIV will vent the ISA and VAJs to space and may cause a loud hissing noise. Crew in the vicinity should don Earplugs.

- 5.2 Don Earplugs.

PCS

- 5.3 Opening PCA VRIV
Airlock: ECLSS: PCA: VRIV
AL PCA VRIV
'Open'

cmd Arm (√Status – Armed)

cmd Open

1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

(ASSY OPS/20A/FIN 1/HC) Page 7 of 11 pages

√Position – Open

√Open Indicator – √

5.4 Wait 10 minutes to depressurize ISA VAJ setup.

5.5 Doff Earplugs.

5.6 Closing PCA VRIV

Airlock: ECLSS: PCA: VRIV

Airlock PCA VRIV

'Close'

cmd Close

√Position – Closed

√Closed Indicator – √

5.7 Wait 3 minutes for thermal stabilization.

Multimeter 5.8 Rotary Switch \odot \overline{mV}

5.9 Record ISA Scopemeter Pressure Probe P₃: _____ mmHg

Record GMT: _____ GMT (___/___:___)

5.10 Wait 5 minutes for leak check.

5.11 Record ISA Scopemeter Pressure Probe P₄: _____ mmHg

Record GMT: _____ GMT (___/___:___)

* If $\Delta P |P_4 - P_3| > 10$ mmHg during monitoring period

* | Notify **MCC-H** of suspected ISA VAJ leak.

*

* | √**MCC-H** for further instructions

6. DEPRESSURIZING CUPOLA

WARNING

Opening the Node 3 Port MPEV will vent the vestibule to space and may cause a loud hissing noise. Crew in the vicinity should don Earplugs.

6.1 Don Earplugs.

1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

(ASSY OPS/20A/FIN 1/HC) Page 8 of 11 pages

- PCS 6.2 Opening PCA VRIV
Airlock: ECLSS: PCA: VRIV
Airlock PCA VRIV
'Open'

cmd Arm (√Status – Armed)
cmd Open

√Position – Open
√Open Indicator – √
- Node 3 Port Hatch 6.3 MPEV → OPEN
6.4 Wait 30 minutes for depressurization or until ISA Press < 1.8 mmHgA.
- Multimeter 6.5 Record ISA Scopemeter Pressure Probe P₅: _____ mmHg
Record GMT: _____ GMT (___/___:___:___)
Notify **MCC-H** of pressure reading.
- Node 3 Port Hatch 6.6 MPEV → CLOSED
6.7 Doff Earplugs.
6.8 Wait an additional 10 minutes for thermal stabilization.
- PCS 6.9 Closing PCA VRIV
Airlock: ECLSS: PCA: VRIV
Airlock PCA VRIV
'Close'

cmd Close

√Position – Closed
√Closed Indicator – √
7. LEAK CHECKING CUPOLA
- Node 3 Port Hatch 7.1 MPEV → OPEN
7.2 Record ISA Scopemeter Pressure Probe P₆: _____ mmHg
Record GMT: _____ GMT (___/___:___:___)
7.3 MPEV → CLOSED
7.4 Wait 30 minutes for leak check.
- PCS 7.5 Opening PCA VRIV
Airlock: ECLSS: PCA: VRIV
Airlock PCA VRIV
'Open'

1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

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cmd Arm (√Status – Armed)

cmd Open

√Position – Open

√Open Indicator – √

7.6 Wait 30 seconds for VAJ to vent.

7.7 Closing PCA VRIV

Airlock: ECLSS: PCA:VRIV

Airlock PCA VRIV

'Close'

cmd Close

√Position – Closed

√Closed Indicator – √

Node 3 Port Hatch 7.8 MPEV → OPEN

7.9 Multimeter

Record ISA Scopemeter Pressure Probe P₇: _____ mmHg

Record GMT: _____ GMT (___/___:__:___)

* If $\Delta P |P_7 - P_6| > 5$ mmHg during monitoring period
* | Notify **MCC-H** of suspected Node 3 Port Hatch leak.
* |
* | √**MCC-H** for further instructions

7.10 MPEV → CLOSED

7.11 At earliest convenience, notify **MCC-H** of pressures and GMT in steps 3, 5, and 7.

1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

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8. VENTING VESTIBULE RESIDUAL

If P₇ reading > 1.8 mmHgA

PCS

8.1 Opening PCA VRIV
Airlock: ECLSS: PCA: VRIV
AL PCA VRIV
'Open'

cmd Arm (√Status – Armed)
cmd Open

√Position – Open
√Open Indicator – √

Node 3 Port Hatch

8.2 MPEV → OPEN
8.3 Wait 5 minutes for vestibule to depressurize.

PCS

8.4 Closing PCA VRIV
Airlock: ECLSS: PCA: VRIV
Airlock PCA VRIV
'Close'

cmd Close

√Position – Closed
√Closed Indicator – √

Multimeter

8.5 Record ISA Scopemeter Pressure Probe P₈: _____ mmHg
Record GMT: _____ GMT (___/___:___:___)
Notify **MCC-H** of pressure reading.

*
* If P₈ > 4.8 mmHg
* √**MCC-H** for further instructions

Node 3 Port Hatch

8.6 MPEV → CLOSED

9. DISASSEMBLING AND STOWING EQUIPMENT

9.1 √MPEV → CLOSED

9.2 ISA Scopemeter Pressure Probe → OFF

Multimeter

9.3 Rotary Switch ↷ OFF

Multimeter ←|→ ISA Scopemeter Pressure Probe

1.172 CUPOLA DEPRESSURIZATION (NODE 3 PORT)

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9.4 Cap ←|→ ISA Sampling Port

ISA Sample Port → OPEN (for pressurization, stowage)

Cap →|← ISA Sampling Port

Refer to Figure 2.

9.5 VAJ-78-1 (5 ft) (straight end) ←|→ ISA VAJ Port

VAJ-78-1 (5 ft) (bent end) ←|→ Node 3 Port MPEV

Gamah Cap →|← VAJ-78-1 (5 ft) (both ends)

Hand tighten.

Gamah Cap →|← ISA VAJ Port

Hand tighten.

9.6 Verify seal on Node 3 Port MPEV Cap has no visible damage.

Cap →|← Node 3 Port MPEV

Hand tighten.

A/L1D0

9.7 VAJ-83-1 (35 ft) ←|→ PCA VAP

VAJ-83-1 (35 ft) ←|→ ISA VAJ Port

Gamah Cap →|← VAJ-83-1 (35 ft) (both ends)

Hand tighten.

Gamah Cap →|← ISA VAJ Port

Hand tighten.

9.8 Airlock VAJ (bent end) →|← AL VRA VAP, hand tighten

9.9 Restow items behind Beta Cloth Cover.

Install A/L1D0 Beta Cloth Cover.

9.10 ISS ↓↓ **MCC-H**, "Cupola depress completed."

9.11 Stow tools and materials.

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1.174 CUPOLA PRESSURIZATION AND LEAK CHECK

(ASSY OPS/20A/FIN 1/HC) Page 1 of 9 pages

OBJECTIVE:

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

LOCATION:

Node 3 Deck

DURATION:

1 hour, 55 minutes Total Crew Time

25 minutes for Multimeter, ISA, VAJ Setup

70 minutes for Equalization and Gross Leak Check Wait Times

20 minutes for Leak Check Term, Multimeter, ISA, VAJ Teardown

CREW:

One

MATERIALS:

9V Alkaline Battery (if Battery changeout required)

Earplugs

TOOLS:

Internal Sampling Adapter (ISA) P/N 97M55830-1

Vacuum Access Jumper-78-1 5 ft P/N 683-17111-1

ISA Scopemeter Pressure Probe P/N 1525,760MMHGA/30PSIA

Digital Multimeter Kit: P/N 10118-10018-04

Multimeter

ISS IVA Toolbox:

Drawer 3

#0 Phillips Screwdriver (if Battery changeout required)

1. SETTING UP ISA

NOTE

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

1.1 Gamah Cap ←|→ ISA VAJ Port

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

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

2. SETTING UP MULTIMETER

NOTE

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

1.174 CUPOLA PRESSURIZATION AND LEAK CHECK

(ASSY OPS/20A/FIN 1/HC) Page 2 of 9 pages

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

2.2 √ISA Scopemeter Pressure Probe – OFF

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

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

If voltage reading < 100 mVDC, ISA Scopemeter Pressure Probe Battery must be replaced.

The 9V Battery is replaced by removing the noncaptive screw on back of probe (#0 Phillips Screwdriver).

2.5 ISA Scopemeter Pressure Probe → mmHgA

3. VERIFYING ISA SCOPEMETER PRESSURE PROBE ACCURACY

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

Multimeter 3.1 √ Rotary Switch - $\overline{\overline{mV}}$

3.2 Record ISA Scopemeter Pressure Probe P₁: _____ mmHg

PCS 3.3 US Lab: ECLSS

LAB: ECLSS

Record Cab Press P₂: _____ mmHgA

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

4. CONNECTING VAJ, ISA, POSITIVE PRESSURE RELIEF VALVE (PPRV)

4.1 Gamah cap ←|→ ISA Sampling Port

ISA Sampling Port Valve → CLOSED
Refer to Figure 1.

1.174 CUPOLA PRESSURIZATION AND LEAK CHECK

(ASSY OPS/20A/FIN 1/HC) Page 3 of 9 pages

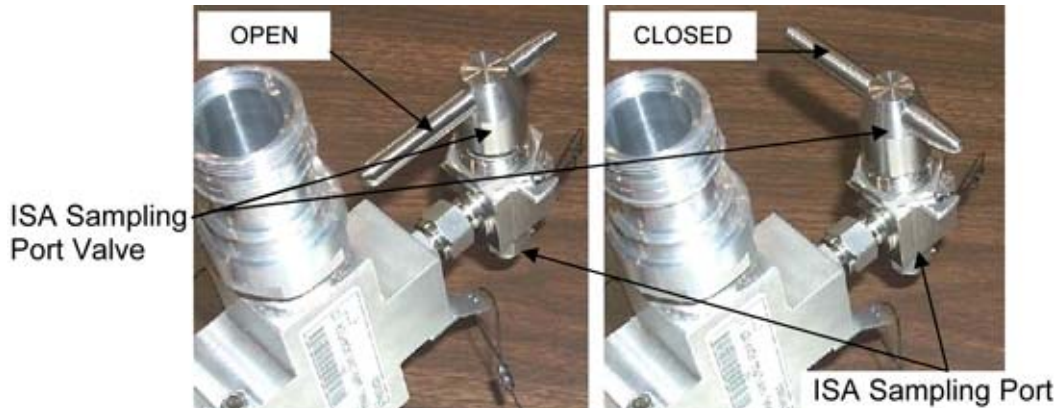


Figure 1.- ISA Sampling Port Valve.

4.2 Gamah Cap \leftarrow | \rightarrow VAJ-78-1 5 ft (both ends)

Verify seals have no visible damage.

4.3 VAJ-78-1 5 ft (straight end) \rightarrow | \leftarrow ISA VAJ Port
Hand tighten.
Refer to Figure 2.

Node 3
Deck Hatch 4.4 \surd PPRV Sample Port Valve – CLOSE
Refer to Figure 3.

4.5 Gamah Cap \leftarrow | \rightarrow PPRV Sample Port

If PPRV Sample Port Cap is torqued, perform [1.120 NODE 3 PPRV SAMPLE PORT CAP REMOVAL](#), cap removal steps (SODF: ASSY OPS: ACTIVATION AND CHECKOUT: OUTFITTING).

VAJ-78-1 5 ft (bent end) \rightarrow | \leftarrow PPRV Sample Port
Hand tighten.
Refer to Figures 2 and 3.

WARNING

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

4.6 Secure ISA/VAJ Assembly.

1.174 CUPOLA PRESSURIZATION AND LEAK CHECK

(ASSY OPS/20A/FIN 1/HC) Page 4 of 9 pages

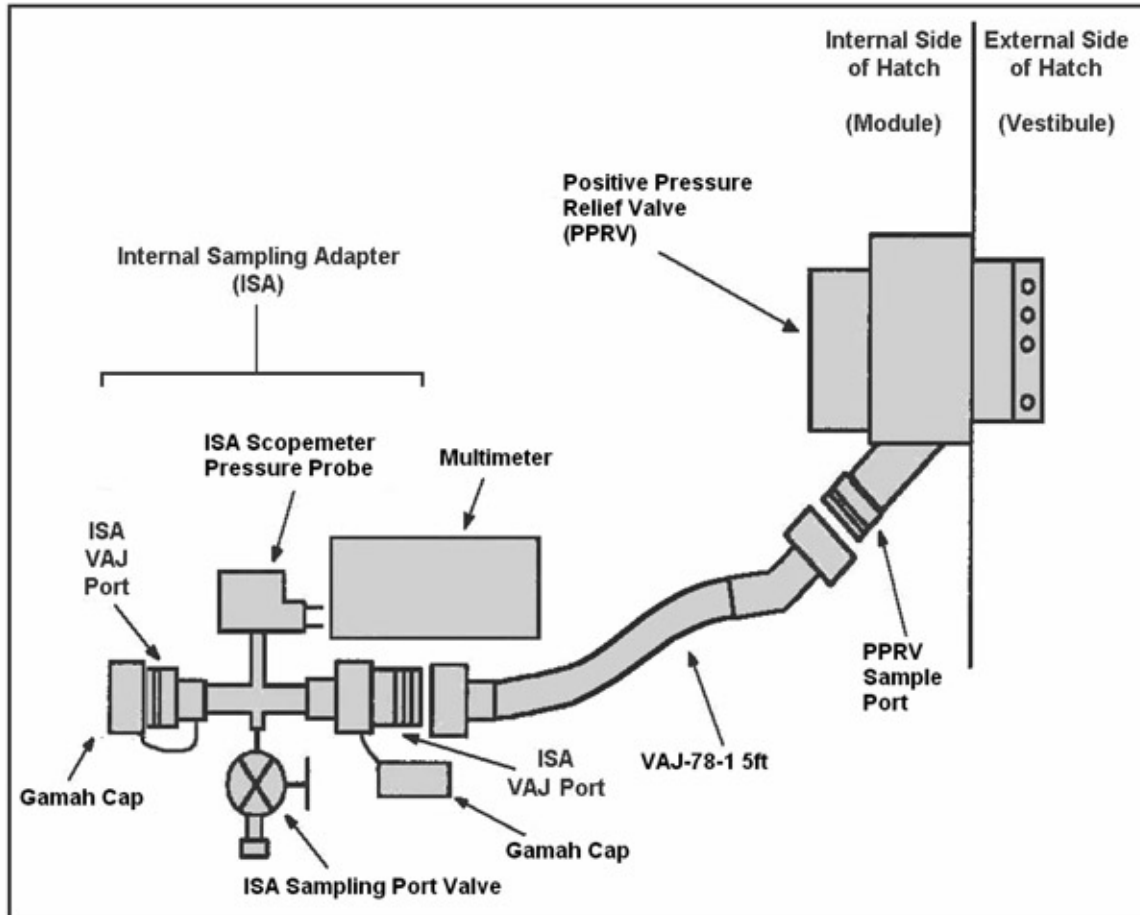


Figure 2.- ISA/VAJ/MPEV/Multimeter Connection.

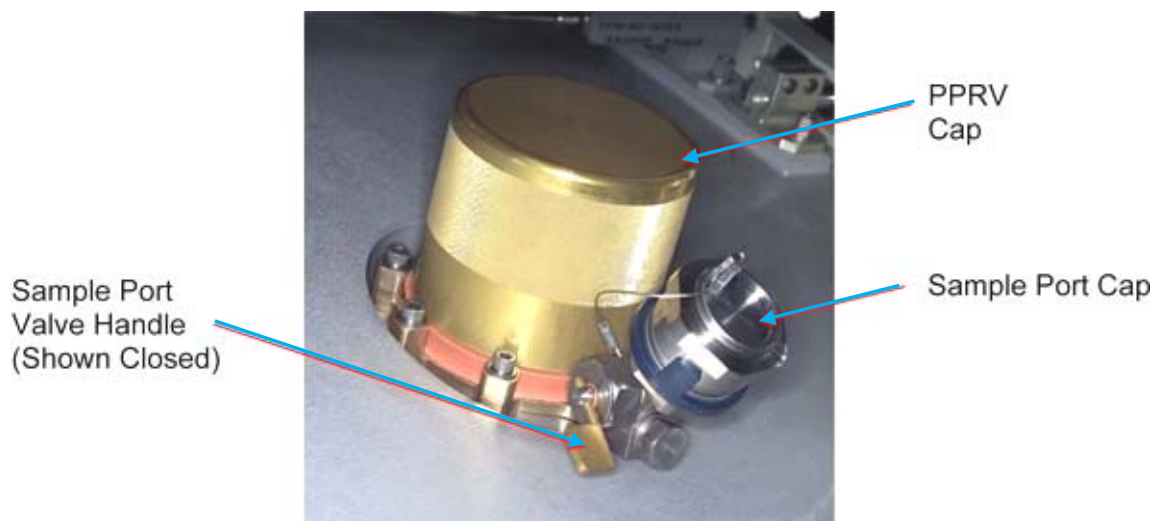


Figure 3.- Hatch PPRV.

1.174 CUPOLA PRESSURIZATION AND LEAK CHECK

(ASSY OPS/20A/FIN 1/HC) Page 5 of 9 pages

5. LEAK CHECKING ISA/VAJ CONNECTION

WARNING
Opening the PPRV Sample Port Valve will start the depressurization of the ISA/VAJ setup and may cause a loud hissing noise. Crew in the vicinity should don Earplugs. Keep clear of inlet of PPRV Sampling Port Valve when opened.

5.1 Don Earplugs.

Node 3 5.2 PPRV Sample Port Valve → OPEN
Deck Hatch

5.3 Wait 5 minutes to depressurize ISA/VAJ setup.

Multimeter 5.4 Rotary Switch ↻ \overline{mV}

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

5.6 PPRV Sample Port Valve → CLOSE

5.7 Doff Earplugs.

5.8 Wait 3 minutes for thermal stabilization.

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

5.10 Wait 5 minutes for ISA/VAJ leak check.

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

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

6. PARTIALLY PRESSURIZING VESTIBULE

WARNING
Opening the ISA Sampling Port Valve, Node 3 Deck PPRV Sample Port Valve will equalize ISS with the ISA/VAJ, Vestibule and may cause a loud hissing noise. Crew in the vicinity should don Earplugs. Keep clear of inlet of ISA Sampling Port Valve when opened.

6.1 Don Earplugs.

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(ASSY OPS/20A/FIN 1/HC) Page 6 of 9 pages

Node 3 6.2 PPRV Sample Port Valve → OPEN
Deck Hatch

NOTE

1. To obtain accurate measurements, pressure readings should be taken only when ISA Sampling Port Valve is closed.
2. Pressure readings should be noted every 2 minutes, but do not need to be recorded or reported to **MCC-H**.
3. Vestibule should pressurize to 260 mmHgA in approximately 4 to 6 minutes.

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

6.4 Wait 2 minutes to begin incremental pressurization of vestibule.

6.5 ISA Sampling Port Valve → CLOSED

Note ISA Scopemeter Pressure Probe reading.

6.6 Repeat steps 6.3 to 6.5 until ISA Scopemeter Pressure Probe P
~260 mmHgA (~6 minutes).

6.7 Doff Earplugs.

7. PERFORMING GROSS LEAK CHECK OF VESTIBULE

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

7.2 Wait 10 minutes for thermal stabilization.

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

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

Node 3 7.4 PPRV Sample Port Valve → CLOSE
Deck Hatch

7.5 Wait 60 minutes for vestibule gross leak check.

7.6 PPRV Sample Port Valve → OPEN

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

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

7.8 PPRV Sample Port Valve → CLOSE

1.174 CUPOLA PRESSURIZATION AND LEAK CHECK

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

8. COMPLETING VESTIBULE PRESSURIZATION

WARNING

Opening the ISA Sampling Port Valve and Node 3 Deck PPRV Sample Port Valve will equalize ISS with the vestibule and may cause a loud hissing noise. Crew in the vicinity should don Earplugs. Keep clear of inlet of ISA Sampling Port Valve when opened.

8.1 Don Earplugs.

8.2 ISA Sampling Port Valve \rightarrow OPEN

Node 3
Deck Hatch 8.3 PPRV Sample Port Valve \rightarrow OPEN

PCS 8.4 Node 3: ECLSS
Node 3: ECLSS

Monitor Node 3 Cab Press for 10 minutes.

If Node 3 Cab Press decreases by more than 2 mmHgA

| ISA Sample Port Valve \rightarrow CLOSED
| PPRV Sample Port Valve \rightarrow CLOSE

| $\sqrt{\text{MCC-H}}$ for instructions, >>

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

8.6 ISA Sampling Port Valve \rightarrow CLOSED

8.7 PPRV Sample Port Valve \rightarrow CLOSE

8.8 Doff Earplugs.

9. INITIALIZING VESTIBULE FINE LEAK CHECK

Node 3
Deck Hatch 9.1 PPRV Sample Port Valve \rightarrow OPEN

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

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

1.174 CUPOLA PRESSURIZATION AND LEAK CHECK

(ASSY OPS/20A/FIN 1/HC) Page 8 of 9 pages

9.3 PPRV Sample Port Valve → CLOSE

9.4 ISA Scopemeter Pressure Probe → OFF

9.5 Rotary Switch ↻ OFF

9.6 Wait 24 hours.

10. PERFORMING VESTIBULE FINE LEAK CHECK

Multimeter

10.1 Rotary Switch ↻ \overline{mV}

10.2 ISA Scopemeter Pressure Probe → mmHgA

10.3 PPRV Sample Port Valve → OPEN

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

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

10.5 PPRV Sample Port Valve → CLOSE

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

11. DISASSEMBLING AND STOWING EQUIPMENT

11.1 ISA Scopemeter Pressure Probe → OFF

11.2 Rotary Switch ↻ OFF

11.3 Multimeter ←|→ ISA Scopemeter Pressure Probe

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

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

Gamah Cap →|← ISA VAJ Port
Hand tighten.

1.174 CUPOLA PRESSURIZATION AND LEAK CHECK

(ASSY OPS/20A/FIN 1/HC) Page 9 of 9 pages

11.6 ISA Sampling Port Valve → OPEN

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

11.7 Check for FOD within 1 m.

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

11.9 Stow tools and materials.

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1.176 CUPOLA WINDOW SHUTTER TEST

(ASSY OPS/20A/FIN)

Page 1 of 3 pages

OBJECTIVE:

Open and Close Cupola Window Shutters one at a time to test functionality.

LOCATION:

Cupola

DURATION:

20 minutes

CREW:

One

TOOLS:

None

1. VERIFYING VIDEO SYSTEM CONFIGURED FOR TEST

√**MCC-H** to verify video system is configured for test (Views of Cupola Window Shutters downlinked or recording on-board.)

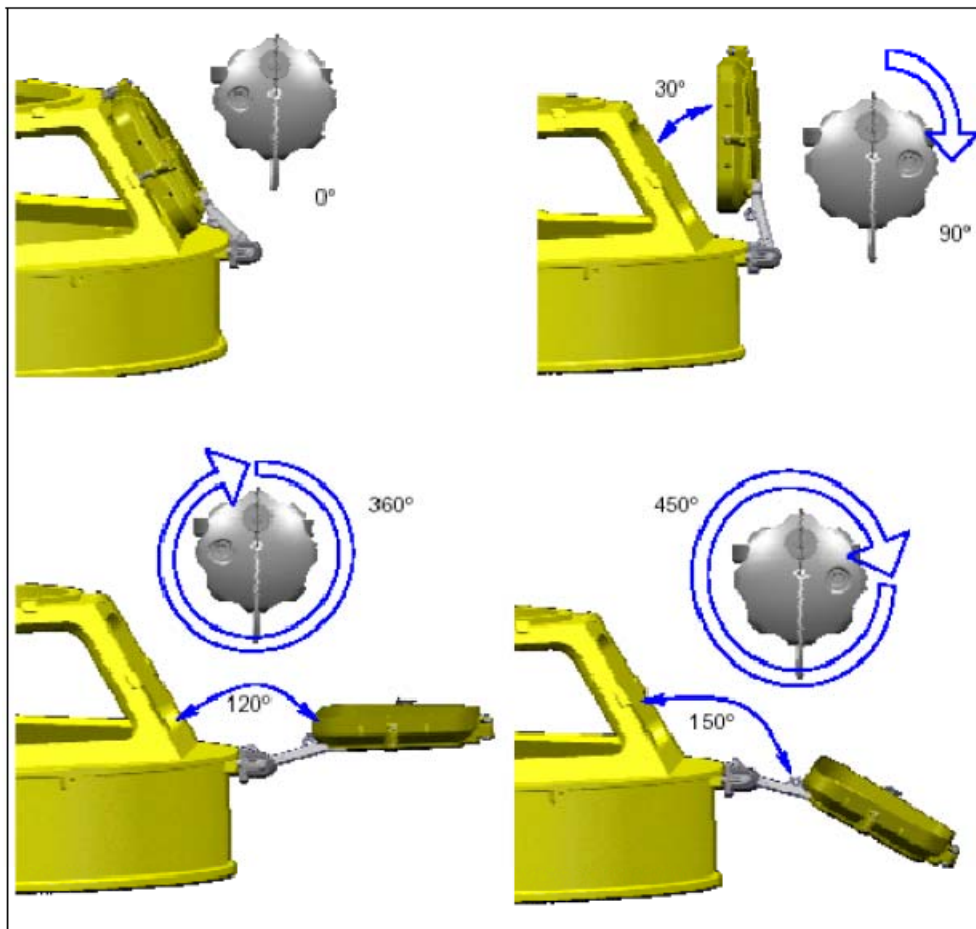


Figure 1.- Window Shutter Handwheel Operations.

1.176 CUPOLA WINDOW SHUTTER TEST

(ASSY OPS/20A/FIN)

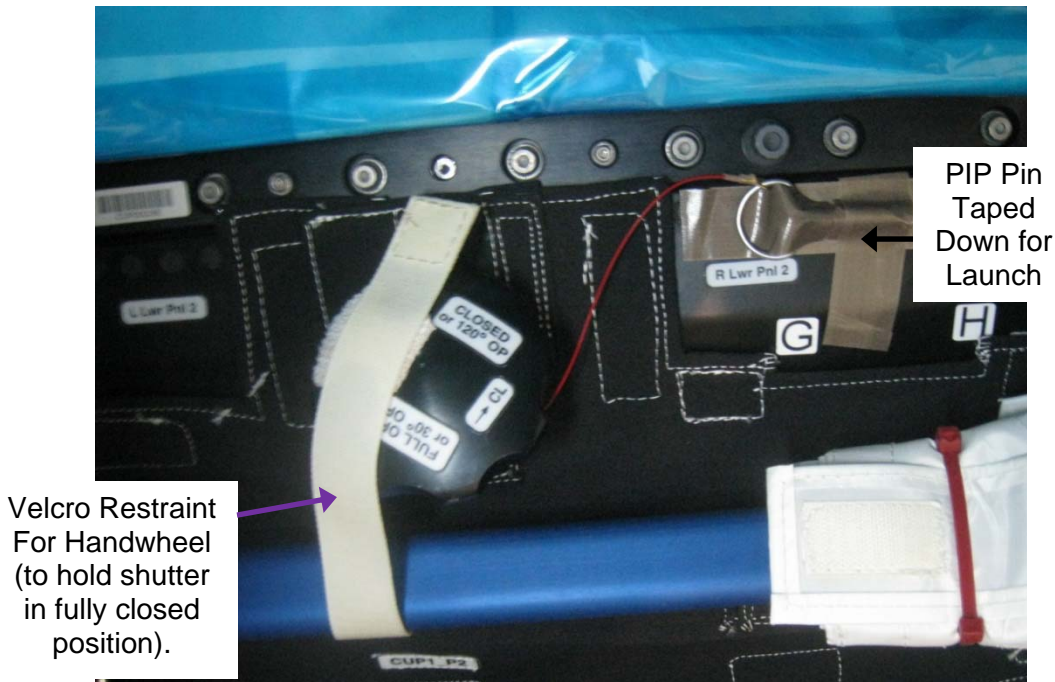


Figure 2.- Launch Configuration of Cupola Window Shutter Handwheels.

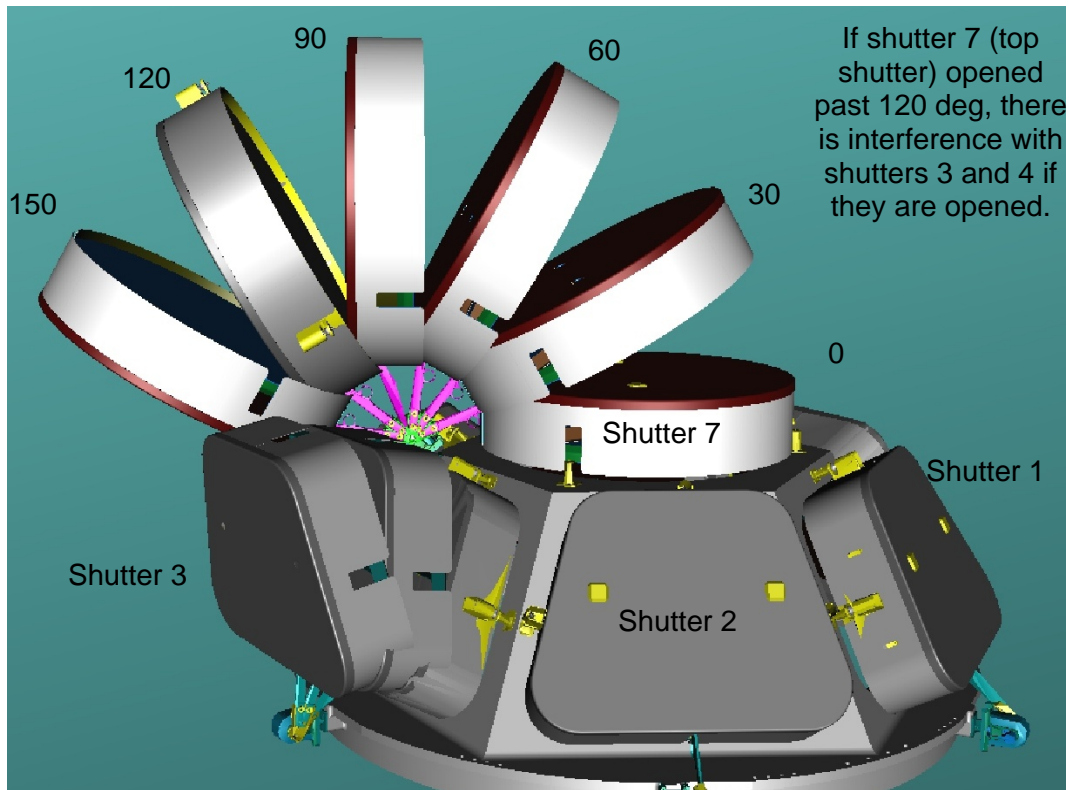


Figure 3.- Window Shutter Structural Conflict Between Shutters 7 and 3/4.

1.176 CUPOLA WINDOW SHUTTER TEST

(ASSY OPS/20A/FIN)

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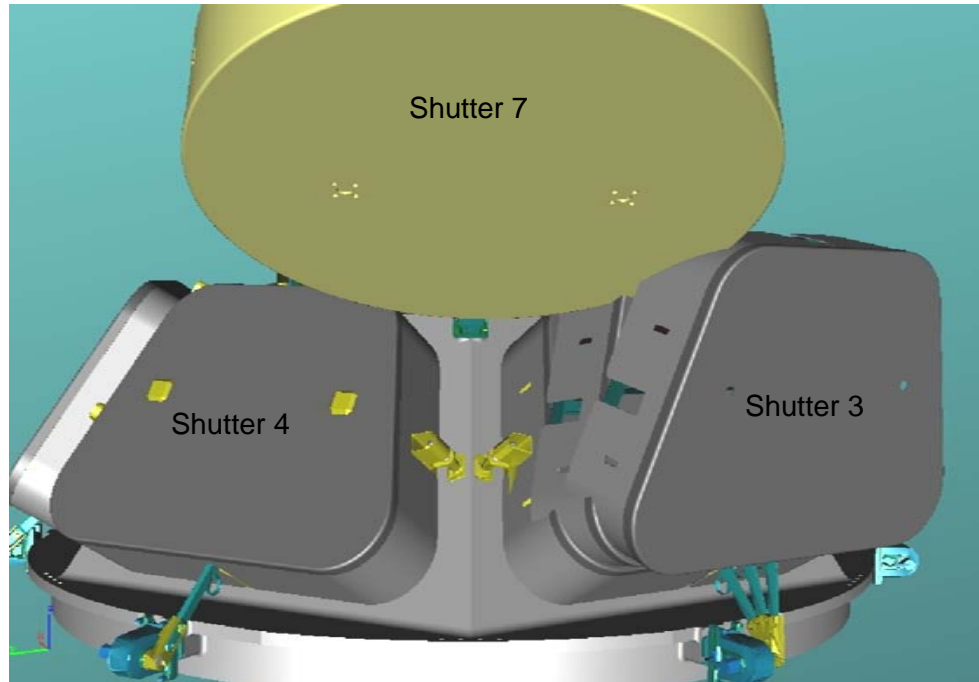


Figure 4.- Window Shutter Structural Conflict.

2. OPENING(CLOSING) WINDOW SHUTTERS

NOTE

The Cupola Window Shutter is designed for a PIP Pin Restraint. This Restraint is designed to keep the shutter closed. However, the shutter does not close fully when PIP restraint is used. Velcro Restraint system was added to hold shutters fully closed. Refer to Figure 2.

- 2.1 IV crew ⇒ EV crew: “Opening Shutter Number #. Verify you are at least 10 feet clear of shutter envelope.”
- 2.2 To test shutter functionality, fully open then fully close a single Cupola Window Shutter.
There is no constraint on Cupola Window Shutter test sequence if shutters are opened one at a time.
Refer to Figures 1 to 4.
- 2.3 Repeat steps 2.1 to 2.2 for remaining Cupola Window Shutters (seven total).
- 2.4 Notify **MCC-H** of task completion.

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1.178 20A CBCS INSTALLATION/REMOVAL - CUPOLA INSTALL

(ASSY OPS/20A/FIN)

Page 1 of 7 pages

OBJECTIVE:

Relocate CBCS Hardware into Node 3 for Cupola Mate to N3 nadir, powerup CBCS/route video to RWS for Cupola Mate, and power down CBCS.

LOCATION:

Node 1, Node 3

DURATION:

Relocating CBCS Hardware to N3 Nadir - 25 minutes (steps 1 to 5)

Powering up CBCS - 10 minutes (steps 6 to 7)

Powerdown/Relocation to N3 Port - 20 minutes (steps 8 to 10)

CREW:

One

PARTS:

NOTE
CBCS Strings One and Two contain identical hardware distinguished by Serial Number (S/N).

Table 1. Parts List

Part	P/N	S/Ns	Notes
Camera Bag	SEG33112759-301	1001 (1002)	Blue bag that holds the camera
CBCS Camera Assembly	SEG33112576-301	1001 (1002)	Stored in Camera Bag
Ku-Band Power Supply	SEG46116711-302	1004 (1008)	Marked "For CBCS Use Only"
LED Control Unit	SEG33112643-301	1001 (1002)	
Video Interface Unit	SEG33112646-301	1003 (1002)	
CBCS Camera Cable	SEG33112641-301	1002 (1001)	13 ft cable; Violet, gold, orange connectors
CBCS Electronics Cable	SEG33112638-301	1002 (1001)	20 ft cable; Pink, red, yellow, blue connectors
UOP Power PSA Cable, 120VDC	SEG46116745-301	1008 (1007)	21 ft cable

MATERIALS:

Velcro Straps (as required for securing cabling)

TOOLS:

Digital Camera

REFERENCED PROCEDURE(S):

None

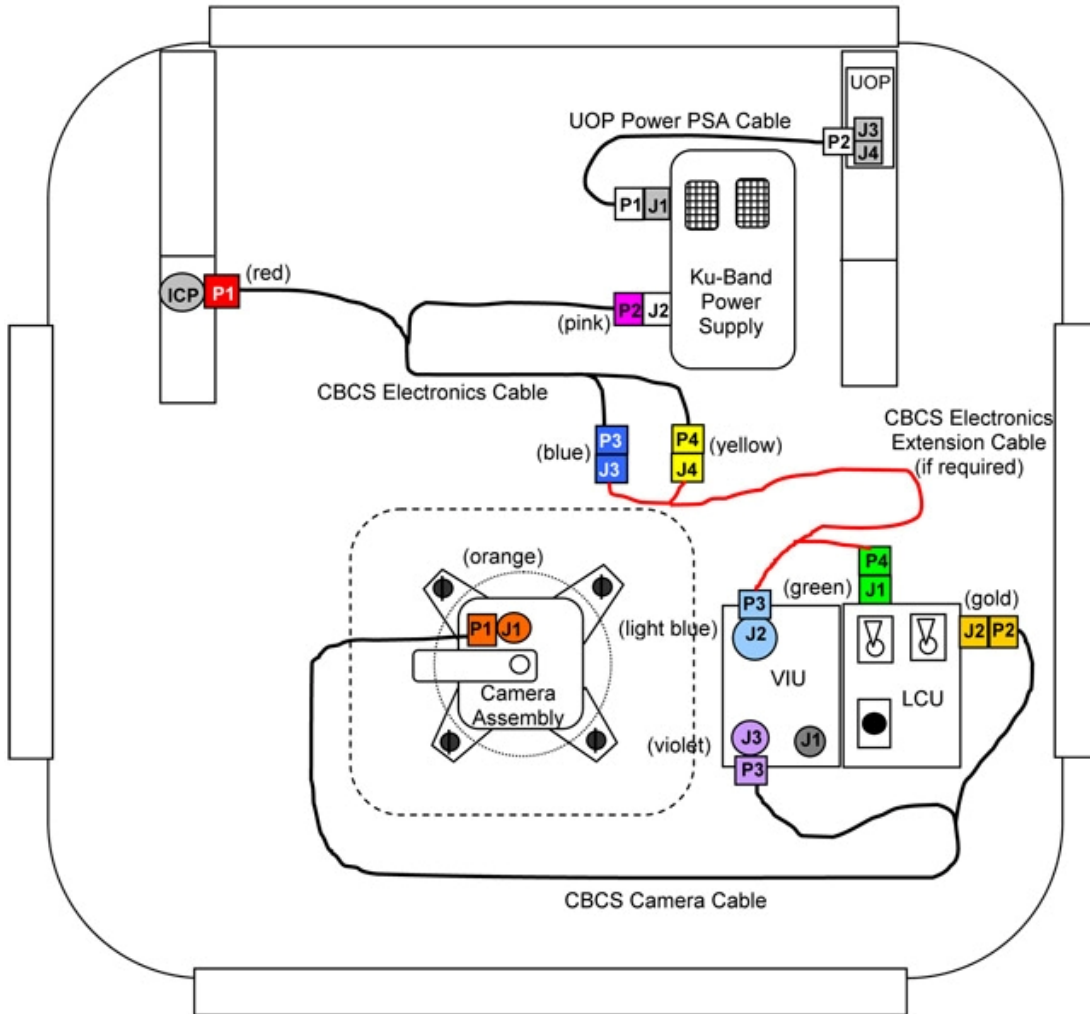


Figure 1.- Example CBCS Installation Diagram.

NOTE

Figure 1 shows an example CBCS installation. For Cupola install, the N3 Internal Camera Port (ICP) will be used along with Node 3 UOP 3. This will also be the set-up for PMA3 relocate.

1. RELOCATING CBCS HARDWARE TO NODE 3

Refer to Figure 1.

1.1 Ku-Band Power Supply OUTPUT 28V → OFF

√Ku-Band Power Supply Output LED – dark

NOD1SD4 1.2 Removing Power from Node 1 UOP 1

√POWER OUT – (blue RESET)

√Fault/Test – dark

1.178 20A CBCS INSTALLATION/REMOVAL - CUPOLA INSTALL

(ASSY OPS/20A/FIN)

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- 1.3 Demating CBCS from Node 1
UOP Power PSA Cable, 120VDC P2 ←|→ J3 on Node 1 UOP 1
CBCS Electronics cable P1 (red) ←|→ Node 1 Internal Camera Port (ICP)
- 1.4 Gather and relocate all CBCS hardware to Node 3.
Ku-Band Power Supply
CBCS Camera Assembly (stowed in blue Camera Bag)
Video Interface Unit (VIU)
LED Control Unit (LCU)
All cabling
- 1.5 Secure LED Control Unit, Video Interface Unit near N3 Nadir Hatch.
2. SAFING
Verifying No Power Applied to Node 3 UOP 3
√POWER OUT – ✓ (blue RESET)
√Fault/Test – dark
3. INSTALLING CBCS CABLING IN NODE 3
 - 3.1 √Ku-Band Power Supply OUTPUT 28V – OFF
 - 3.2 UOP Power PSA Cable, 120VDC P2 →|← J4 on Node 3 UOP 3
 - 3.3 √UOP Power PSA Cable, 120VDC P1 →|← J1 INPUT on Ku-Band Power Supply
Restrain Ku-Band Power Supply.
 - 3.4 Leave CBCS Electronics Cable P1 (red) stowed near Node 3 Internal Camera Port (ICP) at NOD305 (instead of mated) to allow for use of N3 Camcorder.
4. INSTALLING CBCS CAMERA ASSEMBLY

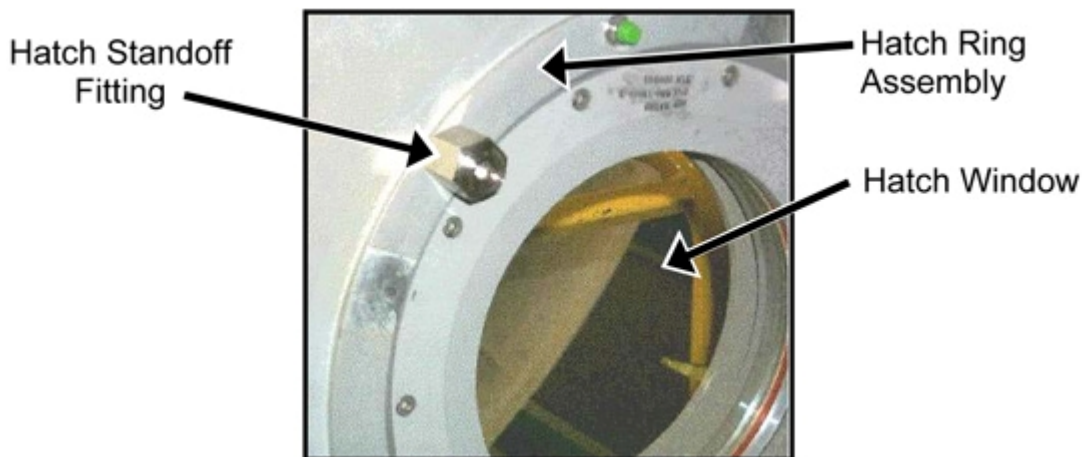


Figure 2.- Hatch Standoff Fitting Installed.

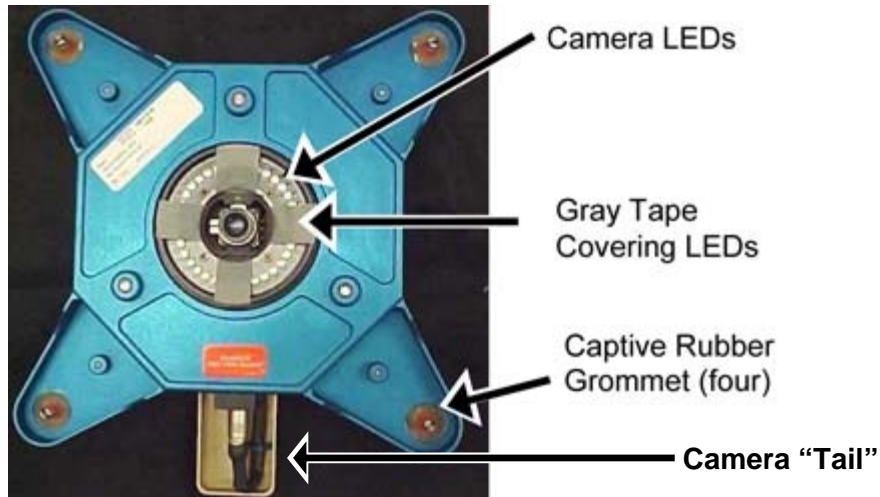


Figure 3.- LEDs Covered with Gray Tape.

CAUTION

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

NOTE

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

- 4.1 If Node 3 Nadir Inner Hatch Window Shield is installed on Hatch window, remove (Velcro).
Temporarily stow.
- 4.2 Mount CBCS Camera Assembly to Hatch Standoff Fittings with Camera tail oriented tail pointing ISS Forward, 1/4 Turn Fasteners (four).
Temporarily stow Camera Bag.
- 4.3 Photo document CBCS Camera orientation, showing complete Hatch in Camera view (Digital Camera).

5. VERIFYING LED CONTROL UNIT SETTINGS

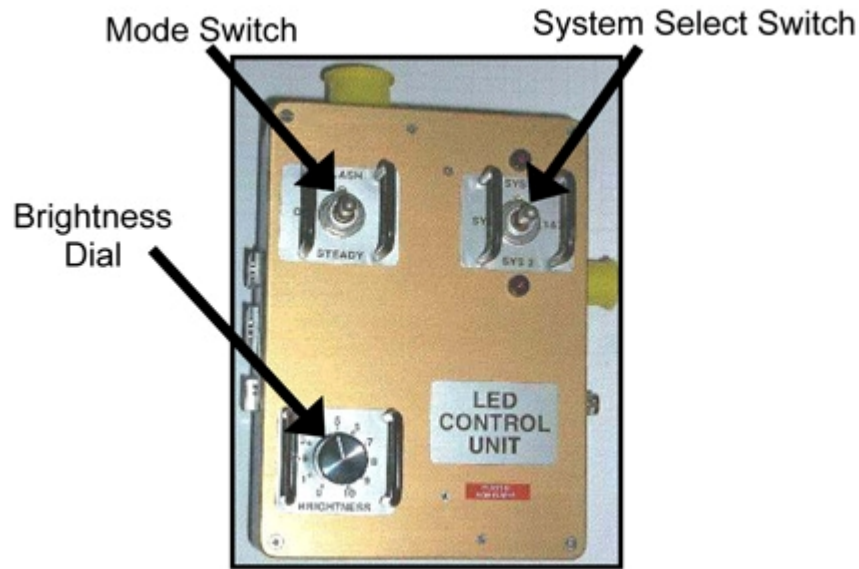


Figure 4.- LED Control Unit.

NOTE

Brightness Dial was set to 10 for Node 3 Install. Since the Cupola CBCS Target has a mirror, it only requires a Brightness Dial setting of 5.

Brightness Dial → 5
sw Mode Switch → STEADY
sw System Select Switch → SYS 1&2
Refer to Figure 4.

6. APPLYING POWER TO CBCS

NOTE

CBCS Extension Cable is not required.

6.1 ICP I/F Cable 22ft ←|→ Node 3 Internal Camera Port (ICP)
CBCS Electronics Cable P1 (red) →|← Node 3 ICP (NOD305)

√All CBCS cables mated per Figure 1

6.2 Enabling Node 3 UOP 3

√POWER OUT – √ (green ENABLE)

√Fault/Test – OK illuminated (green)

6.3 Ku-Band Power Supply OUTPUT 28V → ON

6.4 √Ku-Band Power Supply Input/Output LEDs (two) – illuminated (green)

7. CBCS VIDEO CHECKOUT ON RWS MONITOR

7.1 ISS ↓ **MCC-H** “Ready for video routing to RWS”

7.2 On **MCC-H** Go, verify CBCS video displayed on RWS.

1.178 20A CBCS INSTALLATION/REMOVAL - CUPOLA INSTALL

(ASSY OPS/20A/FIN)

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8. POWERDOWN

8.1 Ku-Band Power Supply OUTPUT 28V → OFF

√Ku-Band Power Supply Output LED – dark

8.2 Removing power from Node 3 UOP 3

√POWER OUT – √ (blue RESET)

√Fault/Test – dark

9. RELOCATING CBCS HARDWARE

9.1 CBCS Electronics cable P1 (red) ←|→ Node 3 Internal Camera Port (ICP)

9.2 ICP I/F Cable 22 ft →|← Node 3 Internal Camera Port (ICP)

9.3 Leave all other CBCS cables, hardware connected for PMA3 CBCS operations.

9.4 Remove CBCS Camera Assembly from Hatch Standoff Fittings (1/4 Turn Fasteners).

Leave Gray Tape (four pieces) on LEDs.

Leave Hatch Standoff Fittings installed on Node 3 Nadir Hatch.

9.5 If N3 Nadir Inner Hatch Window Shield was installed on Hatch window, reinstall (Velcro).

9.6 Leaving cables connected, relocate CBCS Camera Assembly, Video Interface Unit (VIU), and LED Control Unit (LCU) to Node 3 Port Hatch.

9.7 Secure LED Control Unit, Video Interface Unit near N3 Port Hatch.

10. INSTALLING CBCS CAMERA ASSEMBLY AT N3 PORT

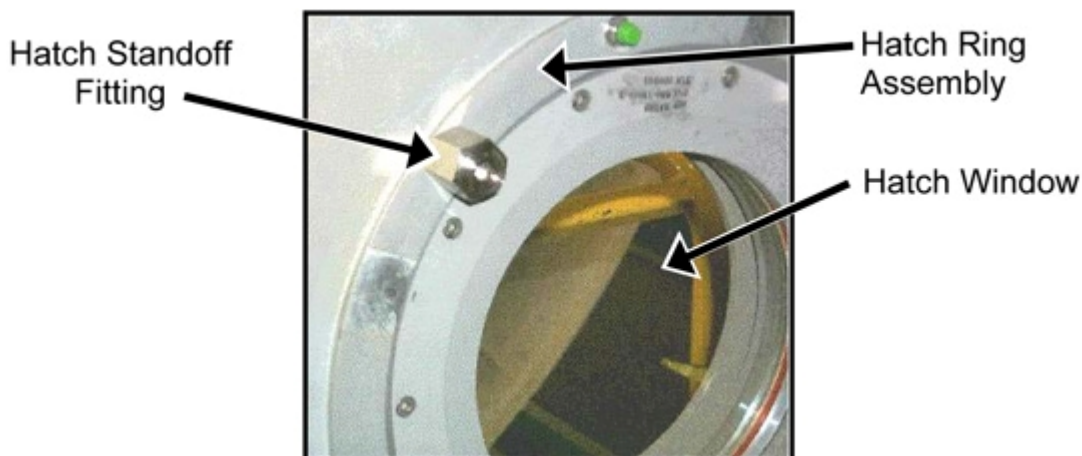


Figure 5.- Hatch Standoff Fitting Installed.

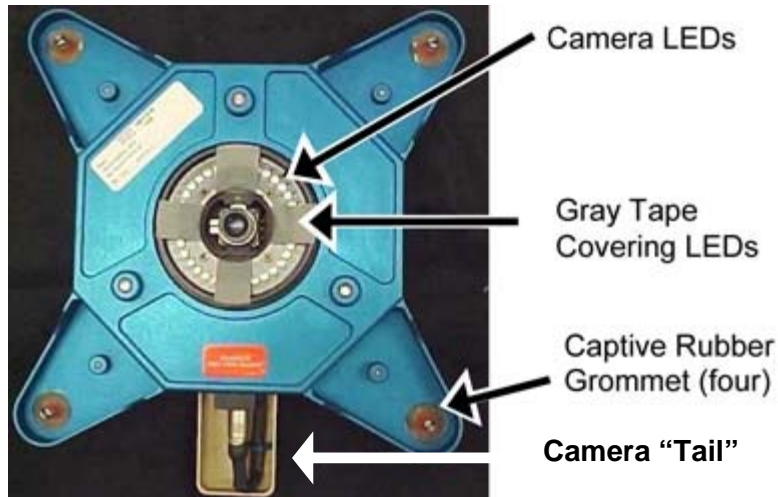


Figure 6.- LEDs Covered with Gray Tape.

CAUTION

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

NOTE

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

- 10.1 If Node 3 Port Inner Hatch Window Shield is installed on Hatch window, remove (Velcro).
Temporarily stow.
- 10.2 Mount CBCS Camera Assembly to Hatch Standoff Fittings with Camera tail oriented tail pointing ISS Zenith, 1/4 Turn Fasteners (four).
Temporarily stow Camera Bag.
- 10.3 Photo document CBCS Camera orientation, showing complete Hatch in Camera view (Digital Camera).

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1.180 20A CBCS INSTALLATION/REMOVAL - PMA3 INSTALL

(ASSY OPS/20A/FIN)

Page 1 of 5 pages

OBJECTIVE:

Powerup CBCS and(or) route video to RWS for PMA3 Mate, and power down and(or) remove CBCS.

LOCATION

Node 3

DURATION:

Powering up CBCS - 10 minutes (steps 1 to 4)

Powerdown/Removal - 30 minutes (steps 5 and 6)

CREW:

One

PARTS:

NOTE

Strings One and Two contain identical hardware distinguished by Serial Number (S/N).

Table 1. Parts List

Part	P/N	S/Ns	Notes
Camera Bag	SEG33112759-301	1001 (1002)	Blue bag that holds the camera
CBCS Camera Assembly	SEG33112576-301	1001 (1002)	Stored in Camera Bag
Ku-Band Power Supply	SEG46116711-302	1004 (1008)	Marked "For CBCS Use Only"
LED Control Unit	SEG33112643-301	1001 (1002)	
Video Interface Unit	SEG33112646-301	1003 (1002)	
CBCS Camera Cable	SEG33112641-301	1002 (1001)	13 ft cable; Violet, gold, orange connectors
CBCS Electronics Cable	SEG33112638-301	1002 (1001)	20 ft cable; Pink, red, yellow, blue connectors
UOP Power PSA Cable, 120VDC	SEG46116745-301	1008 (1007)	21 ft cable

MATERIALS:

Velcro Straps (as required for securing cabling)

TOOLS:

Digital Camera

REFERENCED PROCEDURE(S):

None

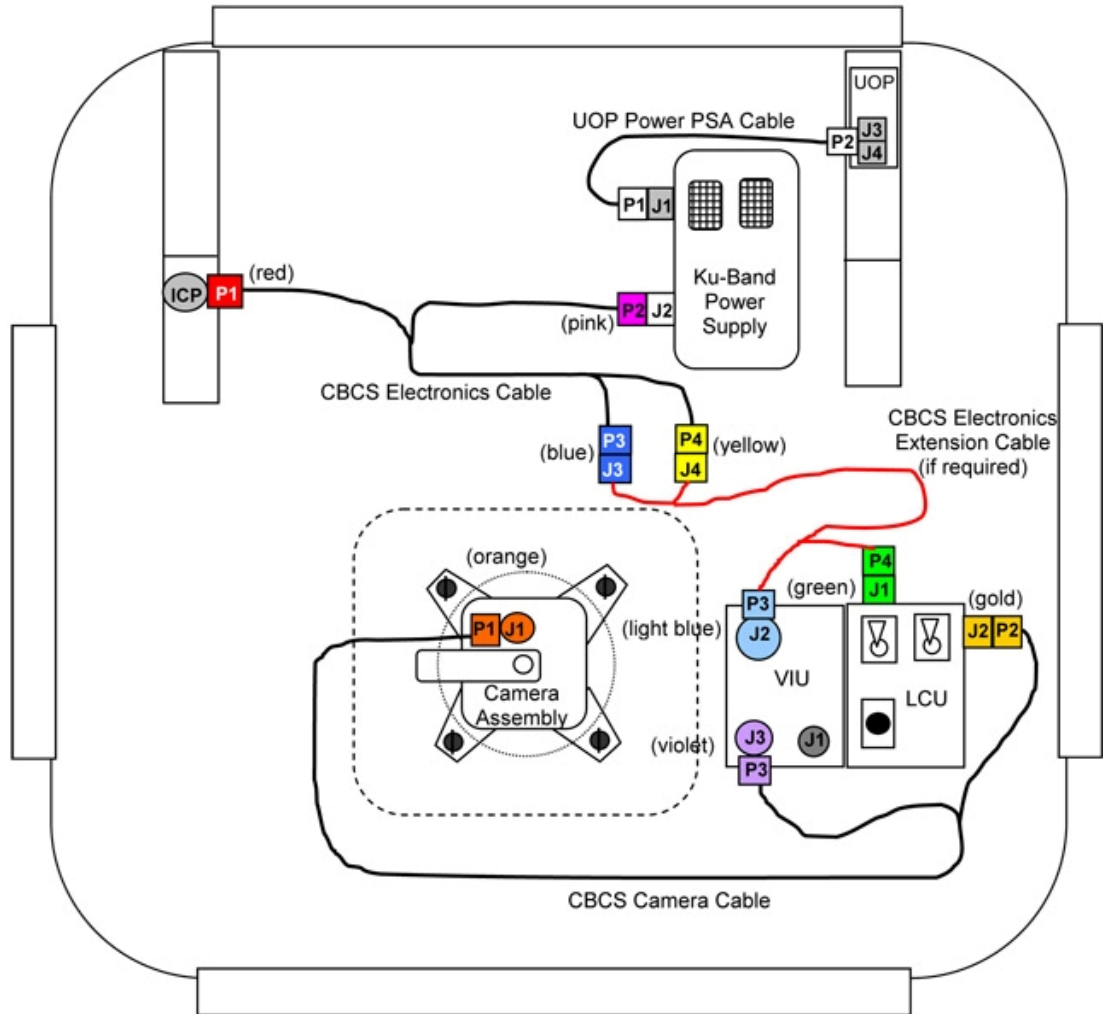


Figure 1.- Example CBCS Installation Diagram.

NOTE

Figure 1 shows an example CBCS installation. For PMA3 install, the N3 Internal Camera Port (ICP) will be used along with Node 3 UOP 3. This was also the set-up for Cupola relocate.

1. INSTALLING CBCS POWER AND DATA CONNECTIONS

- 1.1 UOP Power PSA Cable, 120VDC P2 →|← J4 on Node 3 UOP 3
- 1.2 ICP I/F Cable 22 ft ←|→ Node 3 Internal Camera Port (ICP)
- 1.3 CBCS Electronics cable P1 (red) →|← Node 3 Internal Camera Port (ICP) at NOD3O5

1.180 20A CBCS INSTALLATION/REMOVAL - PMA3 INSTALL

(ASSY OPS/20A/FIN)

Page 3 of 5 pages

2. VERIFYING LED CONTROL UNIT SETTINGS

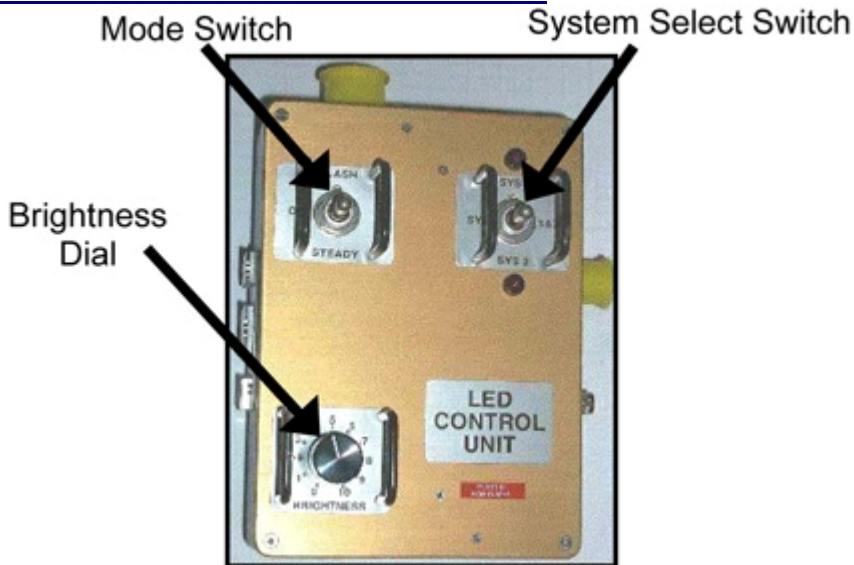


Figure 2.- LED Control Unit.

NOTE

Brightness Dial should have been set to 5 for Cupola relocate. Since the Cupola and PMA CBCS Targets have a mirror, they only require a Brightness Dial setting of 5.

Brightness Dial → 5

sw Mode Switch → STEADY

sw System Select Switch → SYS 1&2

Refer to Figure 2.

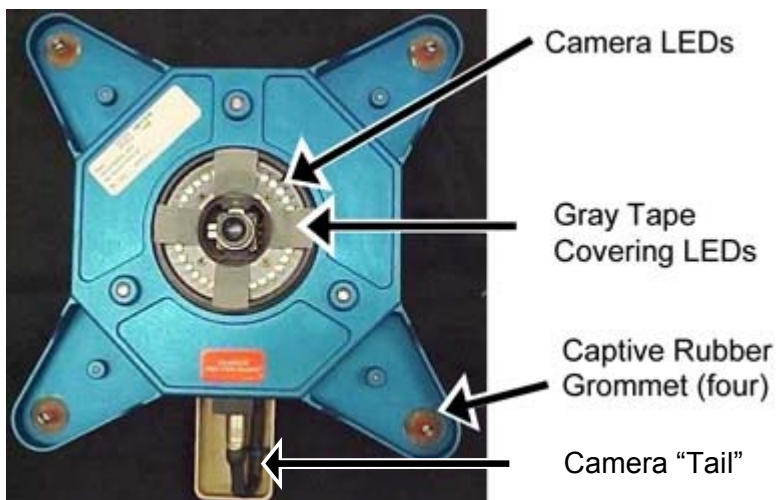


Figure 3. - LEDs Covered with Gray Tape.

1.180 20A CBCS INSTALLATION/REMOVAL - PMA3 INSTALL

(ASSY OPS/20A/FIN)

Page 4 of 5 pages

3. APPLYING POWER TO CBCS

<u>NOTE</u> CBCS Extension Cable is not required.
--

3.1 ✓ CBCS Camera Assembly mounted on Node 3 Port Hatch with camera tail orientation pointing ISS Zenith.
Refer to Figure 3.

3.2 ✓ All CBCS cables mated per Figure 1

3.3 Enabling Node 3 UOP 3

✓ POWER OUT – ✓ (green ENABLE)

✓ Fault/Test – OK illuminated (green)

3.4 Ku-Band Power Supply OUTPUT 28V → ON

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

4. CBCS VIDEO CHECKOUT ON RWS MONITOR

4.1 ISS ↓ **MCC-H** “Ready for video routing to RWS”

4.2 On **MCC-H** Go, verify CBCS video displayed on RWS.

5. POWERDOWN/CAMERA PORT RECONFIG

5.1 Ku-Band Power Supply OUTPUT 28V → OFF

✓ Ku-Band Power Supply Output LED – dark

5.2 Removing Power from Node 3 UOP 3

✓ POWER OUT – ✓ (blue RESET)

✓ Fault/Test – dark

5.3 CBCS Electronics cable P1 (red) ←|→ Node 3 Internal Camera Port (ICP) at NOD305

ICP I/F Cable 22ft →|← Node 3 Internal Camera Port (ICP)

6. REMOVING CBCS

Refer to Figure 1.

<u>NOTE</u> Once CBCS is powered off, cables can be removed in any order.
--

6.1 Remove, separate all CBCS Avionics Cables.
Stow in CBCS Kit.

6.2 Remove CBCS Camera Assembly from Hatch Standoff Fittings (1/4 Turn Fasteners).

Leave Gray Tape (four pieces) on LEDs.

Leave Hatch Standoff Fittings installed on Node 3 Port Hatch.

1.180 20A CBCS INSTALLATION/REMOVAL - PMA3 INSTALL

(ASSY OPS/20A/FIN)

Page 5 of 5 pages

Place CBCS Camera Assembly in Camera Bag face down.
Stow in CBCS Kit.

- 6.3 If Node 3 Port Inner Hatch Window Shield was installed on Hatch window, reinstall (Velcro).
- 6.4 Remove, separate Video Interface Unit (VIU), LED Control Unit (LCU).
Stow in CBCS Kit.
- 6.5 Stow Ku-Band Power Supply in CBCS Kit.

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1.182 CUPOLA DEPRESSURIZATION (NODE 3 PORT) WITH NODE 3 PCA (ASSY OPS/20A/FIN/HC) Page 1 of 11 pages

OBJECTIVE:

Utilize Internal Sampling Adapter (ISA), Vacuum Access Jumper (VAJ), Multimeter, ISA Scopemeter Pressure Probe to depress the Cupola in preparation for Cupola unberthing.

LOCATION:

Node 3 Port Hatch

DURATION:

2 hours Total Crew Time

20 minutes for Multimeter, ISA, VAJ Setup

10 minutes for Multimeter, ISA, VAJ Teardown

1 hour, 30 minutes for Depressurization and Leak Check Wait Times

MATERIALS:

9V Alkaline Battery (if Battery changeout required)

Earplugs

Gray Tape

TOOLS:

MPEV Internal Sampling Adapter P/N 97M55830-1

Vacuum Access Jumper 5 ft VAJ-78-1 5 ft

Vacuum Access Jumper 35 ft VAJ-83-1 35 ft

ISA Scopemeter Pressure Probe P/N 1525,760MMHGA/30PSIA

Multimeter Kit: P/N 10118-10018-04

Multimeter

ISS IVA Toolbox:

Drawer 3

#0 Phillips Screwdriver (if Battery changeout required)

1. SETTING UP ISA

NOTE

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

1.1 Gamah Cap ←|→ ISA VAJ Port

1.2 √ISA Scopemeter Pressure Probe →|← ISA

2. SETTING UP MULTIMETER

NOTE

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

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

COM plug →|← COM jack

1.182 CUPOLA DEPRESSURIZATION (NODE 3 PORT) WITH NODE 3 PCA
(ASSY OPS/20A/FIN/HC) Page 2 of 11 pages

2.2 \checkmark ISA Scopemeter Pressure Probe – OFF

2.3 Rotary Switch \curvearrowright $\overline{\overline{mV}}$

2.4 Verify voltage reading > 100 mV DC (good ISA Scopemeter Pressure Probe Battery indication)

If voltage reading < 100 mV DC

ISA Scopemeter Pressure Probe Battery must be replaced.
9V Battery replaced by removing noncaptive screw on back of probe (#0 Phillips Screwdriver).

2.5 ISA Scopemeter Pressure Probe \rightarrow mmHgA

3. VERIFYING ISA SCOPEMETER PRESSURE PROBE ACCURACY

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

Multimeter 3.1 \checkmark Rotary Switch – $\overline{\overline{mV}}$

3.2 Record ISA Scopemeter Pressure Probe P_1 : _____ mmHgA

PCS 3.3 Node 3: ECLSS
Node 3: ECLSS

Record Cab Press P_2 : _____ mmHgA

* If $\Delta P |P_2 - P_1| > 20$ mmHg
* | Notify **MCC-H** ISA Scopemeter Pressure Probe inaccurate.
* | \checkmark **MCC-H** for further instructions

4. CONNECTING VAJ, ISA, MANUAL PRESSURE EQUALIZATION VALVE (MPEV)

Node 3 Port Hatch 4.1 \checkmark MPEV – CLOSED

4.2 Gamah Cap \leftarrow | \rightarrow VAJ-78-1 (5 ft) (both ends)
Inspect seals for any visible damage.
Notify **MCC-H** if any damage noted to seals.

4.3 VAJ-78-1 (5 ft) (straight end) \rightarrow | \leftarrow ISA VAJ Port
Hand tighten.
Refer to Figure 1.

1.182 CUPOLA DEPRESSURIZATION (NODE 3 PORT) WITH NODE 3 PCA
 (ASSY OPS/20A/FIN/HC) Page 3 of 11 pages

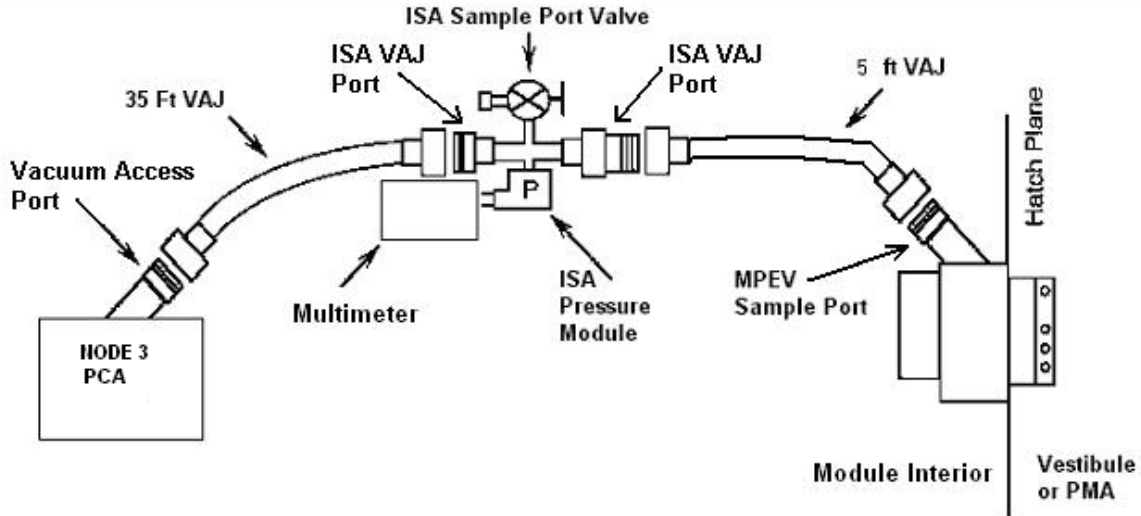


Figure 1.- ISA VAJ MPEV Connection.

- 4.4 $\sqrt{\text{Cap}} \leftarrow | \rightarrow$ MPEV
 VAJ-78-1 (5 ft) (bent end) $\rightarrow | \leftarrow$ MPEV
 Hand tighten.
 Refer to Figure 1.

4.5 Inhibiting Positive Pressure Relief

NOTE

'Positive P Relief Failure - Node 3' Caution will be received after PPR is inhibited. No action required. Message will return to normal once PPR is reenabled.

PCS Node 3: ECLSS: PCA: PCA Commands
Node 3 PCA Commands
 'Positive Press Relief'
 'Inhibit'

cmd Arm ($\sqrt{\text{Status}}$ – Armed)
cmd Inhibit

$\sqrt{\text{Positive Pressure Relief Status}}$ – Inhibited

4.6 Verifying Vent Relief Isolation Valve (VRIV) and Vent Relief Control Valve (VRCV) Closed

MCC-H Node 3: ECLSS: PCA
Node 3 ACS
 'Pressure Control Assembly'

sel VRCV (Icon)

1.182 CUPOLA DEPRESSURIZATION (NODE 3 PORT) WITH NODE 3 PCA
(ASSY OPS/20A/FIN/HC) Page 4 of 11 pages

Node 3 PCA VRCV

√Position – Closed

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV (Icon)

Node 3 PCA VRIV

√Position – Closed

- NOD3FO-11 4.7 Remove Closeout Panel NOD3FO-11, 1/4 Turn Fasteners (fourteen) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Temporarily stow Closeout Panel.
- 4.8 Gamah Cap ←|→ PCA Vacuum Access Port (VAP)
Temporarily stow Gamah Cap on Closeout Panel (Gray Tape).
- 4.9 Gamah Cap ←|→ VAJ-83-1 (35 ft) (both ends)
Inspect seals for any visible damage.
Notify **MCC-H** if any damage noted to seals.
- 4.10 VAJ-83-1 (35 ft) (bent end) →|← PCA VAP
Hand tighten.
Refer to Figure 1.
- 4.11 Gamah Cap ←|→ ISA VAJ Port (capped)
VAJ-83-1 (35 ft) (straight end) →|← ISA VAJ Port
Hand tighten.
Refer to Figure 1.

WARNING

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

- 4.12 Secure ISA VAJ Assembly.

5. LEAK CHECKING ISA VAJ CONNECTION

- ISA 5.1 ISA Sampling Port Valve → CLOSED
Refer to Figure 2.

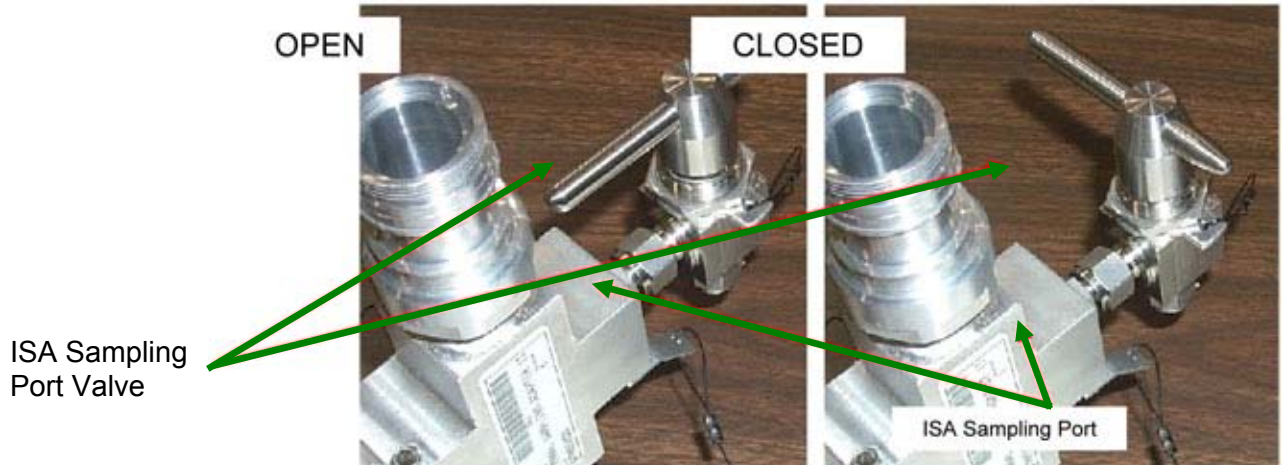


Figure 2.- ISA Sampling Port Valve.

WARNING

Opening the VRIV will vent the ISA and VAJs to space and may cause a loud hissing noise. Crew in the vicinity should don Earplugs.

5.2 Don Earplugs.

PCS

5.3 Opening PCA VRIV
Node 3: ECLSS: PCA
Node 3 ACS
'Pressure Control Assembly'

sel VRIV

Node 3 PCA VRIV
'Open'

cmd Arm (√Status – Armed)
cmd Open

√Position – Open

√Open Indicator – √

5.4 Wait 10 minutes to depressurize ISA VAJ setup.

5.5 Doff Earplugs.

5.6 Closing PCA VRIV
Node 3: ECLSS: PCA
Node 3 ACS
'Pressure Control Assembly'

1.182 CUPOLA DEPRESSURIZATION (NODE 3 PORT) WITH NODE 3 PCA
(ASSY OPS/20A/FIN/HC) Page 6 of 11 pages

sel VRIV

Node 3 PCA VRIV

'Close'

cmd Close

√Position – Closed

√Closed Indicator – √

5.7 Wait 3 minutes for thermal stabilization.

Multimeter

5.8 Rotary Switch ↻ **mV**

5.9 Record ISA Scopemeter Pressure Probe P₃: _____ mmHg

Record GMT: _____ GMT (___/___:___)

5.10 Wait 5 minutes for leak check.

5.11 Record ISA Scopemeter Pressure Probe P₄: _____ mmHg

Record GMT: _____ GMT (___/___:___)

* If $\Delta P |P_4 - P_3| > 10$ mmHg during monitoring period
* | Notify **MCC-H** of suspected ISA VAJ leak.
*
* | √**MCC-H** for further instructions

6. DEPRESSURIZING VESTIBULE

WARNING

Opening the Node 3 Port MPEV will vent the vestibule to space and may cause a loud hissing noise. Crew in the vicinity should don Earplugs.

6.1 Don Earplugs.

PCS

6.2 Opening PCA VRIV

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV

Node 3 PCA VRIV

'Open'

cmd Arm (√Status – Armed)

cmd Open

1.182 CUPOLA DEPRESSURIZATION (NODE 3 PORT) WITH NODE 3 PCA
(ASSY OPS/20A/FIN/HC) Page 7 of 11 pages

√Position – Open
√Open Indicator – √

- Node 3 Port Hatch 6.3 MPEV → OPEN
- 6.4 Wait 30 minutes for depressurization or until ISA Press < 1.8 mmHgA.
- Multimeter 6.5 Record ISA Scopemeter Pressure Probe P₅: _____ mmHg
Record GMT: _____ GMT (___/___:___:___)
Notify **MCC-H** of pressure reading.
- Node 3 Port Hatch 6.6 MPEV → CLOSED
- 6.7 Doff Earplugs.
- 6.8 Wait an additional 10 minutes for thermal stabilization.
- PCS 6.9 Closing PCA VRIV
Node 3: ECLSS: PCA
Node 3 ACS
'Pressure Control Assembly'
- sel VRIV
- Node 3 PCA VRIV
'Close'
- cmd** Close
- √Position – Closed
√Closed Indicator – √

7. LEAK CHECKING VESTIBULE

- Node 3 Port Hatch 7.1 MPEV → OPEN
- 7.2 Record ISA Scopemeter Pressure Probe P₆: _____ mmHg
Record GMT: _____ GMT (___/___:___:___)
- 7.3 MPEV → CLOSED
- 7.4 Wait 30 minutes for leak check.
- PCS 7.5 Opening PCA VRIV
Node 3: ECLSS: PCA
Node 3 ACS
'Pressure Control Assembly'

1.182 CUPOLA DEPRESSURIZATION (NODE 3 PORT) WITH NODE 3 PCA
(ASSY OPS/20A/FIN/HC) Page 8 of 11 pages

sel VRIV

Node 3 PCA VRIV

'Open'

cmd Arm (√Status – Armed)

cmd Open

√Position – Open

√Open Indicator – √

7.6 Wait 30 seconds for VAJ to vent.

7.7 Closing PCA VRIV

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV

Node 3 PCA VRIV

'Close'

cmd Close

√Position – Closed

√Closed Indicator – √

Node 3 Port Hatch 7.8 MPEV → OPEN

7.9 Multimeter

Record ISA Scopemeter Pressure Probe P₇: _____ mmHg

Record GMT: _____ GMT (___/___:___)

- * If $\Delta P |P_7 - P_6| > 5$ mmHg during monitoring period
- * | Notify **MCC-H** of suspected Node 3 Port Hatch leak.
- * |
- * | √**MCC-H** for further instructions

7.10 MPEV → CLOSED

7.11 At earliest convenience, notify **MCC-H** of pressures and GMT in steps 3, 5, and 7.

8. VENTING VESTIBULE RESIDUAL

If P₇ reading > 1.8 mmHgA

PCS

8.1 Opening PCA VRIV
 Node 3: ECLSS: PCA

 'Pressure Control Assembly'

sel VRIV

'Open'

cmd Arm (√Status – Armed)
cmd Open

√Position – Open
 √Open Indicator – √

Node 3 Port Hatch

8.2 MPEV → OPEN

8.3 Wait 5 minutes for vestibule to depressurize.

PCS

8.4 Closing PCA VRIV
 Node 3: ECLSS: PCA

 'Pressure Control Assembly'

sel VRIV

'Close'

cmd Close

√Position – Closed
 √Closed Indicator – √

Multimeter

8.5 Record ISA Scopemeter Pressure Probe P₈: _____ mmHg
 Record GMT: _____ GMT (___/___:___:___)
 Notify **MCC-H** of pressure reading.

 * If P₈ > 4.8 mmHg
 * √**MCC-H** for further instructions
 * *****

1.182 CUPOLA DEPRESSURIZATION (NODE 3 PORT) WITH NODE 3 PCA
(ASSY OPS/20A/FIN/HC) Page 10 of 11 pages

Node 3 Port Hatch 8.6 MPEV → CLOSED

9. DISASSEMBLING AND STOWING EQUIPMENT

9.1 √MPEV → CLOSED

9.2 ISA Scopemeter Pressure Probe → OFF

Multimeter 9.3 Rotary Switch ↷ OFF

Multimeter ←|→ ISA Scopemeter Pressure Probe

9.4 Cap ←|→ ISA Sampling Port

ISA Sample Port → OPEN (for pressurization, stowage)

Cap →|← ISA Sampling Port
Refer to Figure 2.

9.5 VAJ-78-1 (5 ft) (straight end) ←|→ ISA VAJ Port
VAJ-78-1 (5 ft) (bent end) ←|→ Node 3 Port MPEV
Gamah Cap →|← VAJ-78-1 (5 ft) (both ends)
Hand tighten.
Gamah Cap →|← ISA VAJ Port
Hand tighten.

9.6 Verify seal on Node 3 Port MPEV Cap has no visible damage.
Cap →|← Node 3 Port MPEV
Hand tighten.

NOD3FO-11 9.7 VAJ-83-1 (35 ft) ←|→ PCA VAP
VAJ-83-1 (35 ft) ←|→ ISA VAJ Port
Gamah Cap →|← VAJ-83-1 (35 ft) (both ends)
Hand tighten.
Gamah Cap →|← ISA VAJ Port
Hand tighten.

9.8 Verify seal on PCA VAP Gamah Cap has no damage.
Gamah Cap →|← PCA VAP
Hand tighten.

PCS 9.9 Enabling Positive Pressure Relief
Node 3: ECLSS: PCA: PCA Commands
Node 3 PCA Commands
'Positive Press Relief'

cmd Enable (√Positive Pressure Relief Status – Enabled)

1.182 CUPOLA DEPRESSURIZATION (NODE 3 PORT) WITH NODE 3 PCA
(ASSY OPS/20A/FIN/HC) Page 11 of 11 pages

9.10 Check for FOD within 1 m radius.

NOD3FO-11 9.11 Install Closeout Panel NOD3FO-11, fasteners (fourteen) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).

9.12 ISS ↓ **MCC-H**, "Cupola depress completed."

9.13 Stow tools and materials.

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1.184 VACUUM ACCESS JUMPER SETUP FIT CHECK (NODE 3 PORT TO AIRLOCK)

(ASSY OPS/20A/FIN)

Page 1 of 5 pages

OBJECTIVE:

Perform a fit check of the Vacuum Access Jumper setup prior to depressing the Cupola.

LOCATION:

Node 3 Port Hatch and Airlock

DURATION:

30 minutes Total crew time

20 minutes for ISA and VAJ Setup

10 minutes for ISA and VAJ Teardown

MATERIALS:

Gray Tape

TOOLS:

MPEV Internal Sampling Adapter P/N 97M55830-1

Vacuum Access Jumper 5 ft VAJ-78-1 5 ft

Vacuum Access Jumper 35 ft VAJ-83-1 35 ft

WARNING

Connecting the 35 ft VAJ to the 5 ft VAJ via the ISA VAJ Port will create a continuous VAJ Hose from the Node 3 Port Hatch to the Airlock PCA VAP. In case of an emergency requiring isolation of USOS modules, demate VAJ Hoses as required at the ISA VAJ Port and stow in Node 3, A/L as needed.

1. CONNECTING VAJ, ISA, MANUAL PRESSURE EQUALIZATION VALVE (MPEV)

Node 3 Port Hatch 1.1 $\sqrt{}$ MPEV – CLOSED

1.2 Gamah Cap $\leftarrow| \rightarrow$ VAJ-78-1 (5ft) (both ends)
Inspect seals for any visible damage.

Notify **MCC-H** if any damage noted to seals.

1.3 Gamah Cap $\leftarrow| \rightarrow$ ISA VAJ Port

1.4 VAJ-78-1 (5 ft) (straight end) $\rightarrow| \leftarrow$ ISA VAJ Port
Hand tighten.
Refer to Figure 1.

1.184 VACUUM ACCESS JUMPER SETUP FIT CHECK (NODE 3 PORT TO AIRLOCK)

(ASSY OPS/20A/FIN)

Page 2 of 5 pages

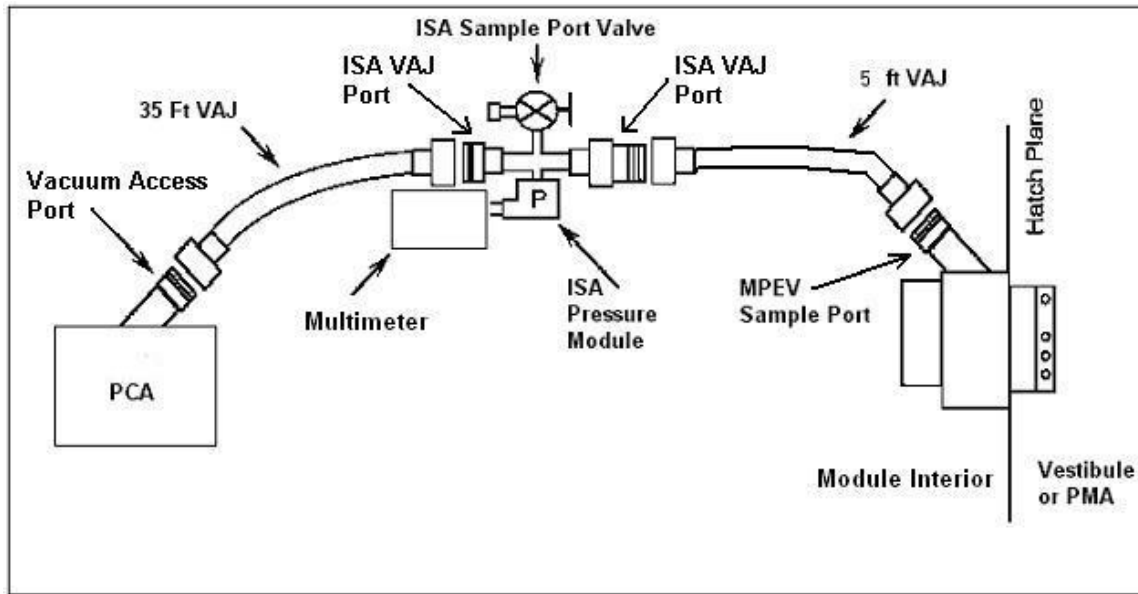


Figure 1.- ISA VAJ MPEV Connection.

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

MCC-H

- 1.6 Verifying Vent Relief Isolation Valve (VRIV) and Vent Relief Control Valve (VRCV) Closed

Airlock: ECLSS: PCA: VRCV
 Airlock PCA VRCV

✓Position – Closed

Airlock: ECLSS: PCA: VRIV
 Airlock PCA VRIV

✓Position – Closed

1.184 VACUUM ACCESS JUMPER SETUP FIT CHECK (NODE 3 PORT TO AIRLOCK)

(ASSY OPS/20A/FIN)

Page 3 of 5 pages

1.7 Disconnecting Airlock VAJ

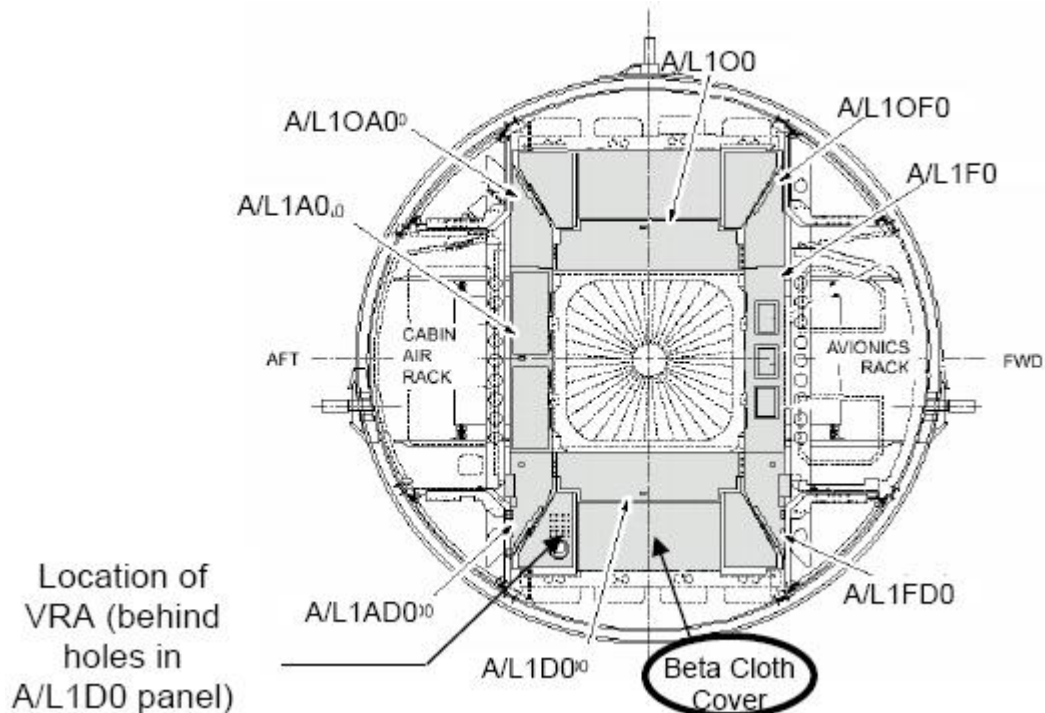


Figure 2.- Airlock Port Closeout Panels.

CAUTION

Use extreme care when removing A/L1D0 beta cloth, stowage items and when accessing the area around the Vent Relief Assembly (VRA). The VRIV J1 connector is damaged and taped in place.

NOTE

1. Expedition 11 and 14 crews indicated access to the disconnection of the VAJ from VRIV was able to be performed by "feel." Expedition 16 crew routed Airlock VAJ above Airlock Deck Platform to provide enough length to make the connection at Node 2 Forward.
2. VAJ installed in Airlock is labeled "VAJ-83-2" (P/N 683-17111-3) and is referred to as "Airlock VAJ" throughout the procedure.

- 1.7.1 Remove A/L1D0 Beta Cloth Cover (Velcro).
Remove, temporarily stow items from behind Closeout.
Refer to Figure 2.

1.184 VACUUM ACCESS JUMPER SETUP FIT CHECK (NODE 3 PORT TO AIRLOCK)

(ASSY OPS/20A/FIN)

Page 4 of 5 pages

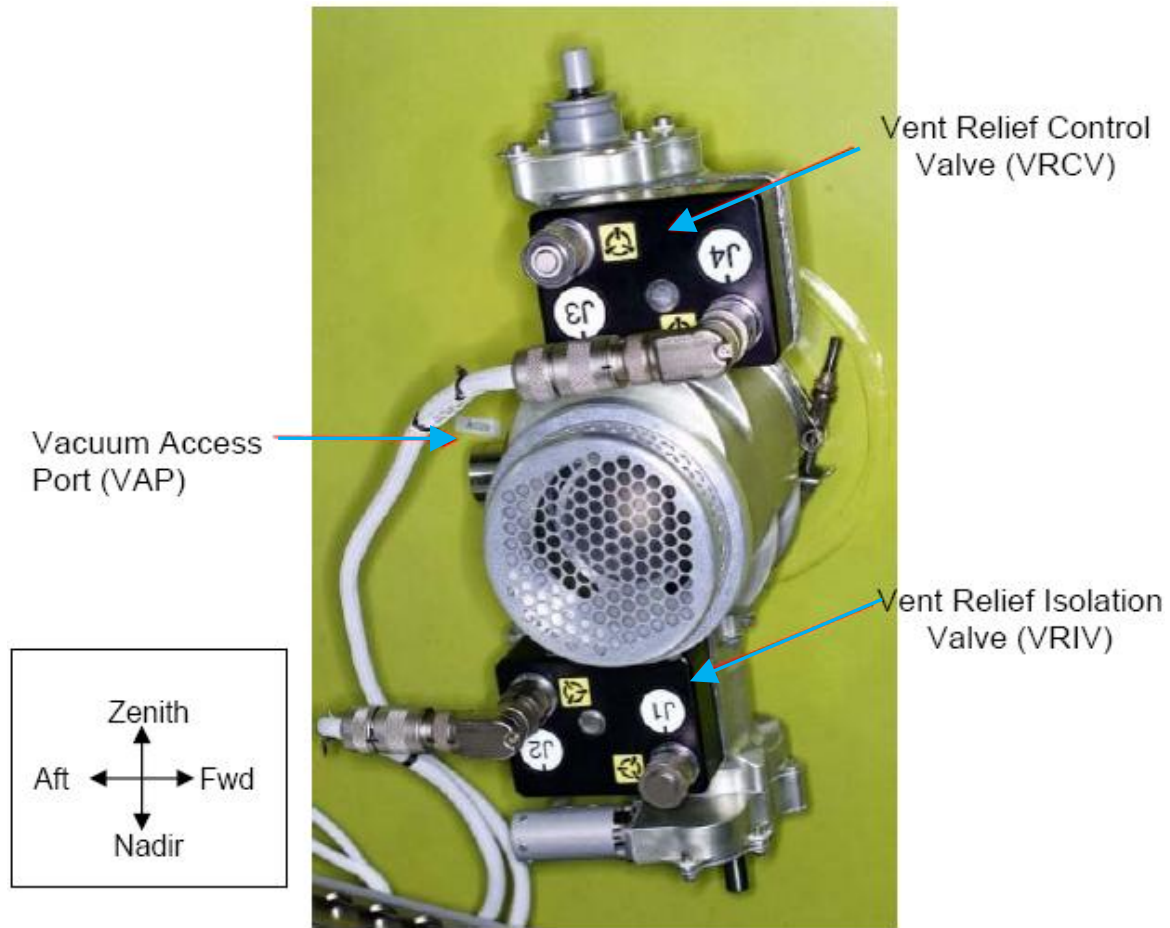


Figure 3.- Vent Relief Assembly (VRA) (VAJ Connection to VAP Not Shown).

A/L1D0

- 1.7.2 Airlock VAJ (bent end) ←|→ VRA Vacuum Access Port (VAP), by hand
Refer to Figures 2, 3.
Verify soft seal installed in VAJ Gamah fitting.
Inspect soft seal for damage, debris.

Tethered Cap →|← Airlock VAJ (Bent end)

- 1.8 Gamah Cap ←|→ VAJ-83-1 (35 ft) (both ends)
Inspect seals for any visible damage.

Notify **MCC-H** if any damage noted to seals.

- 1.9 VAJ-83-1 (35 ft) (bent end) →|← PCA VAP
Hand tighten.
Refer to Figure 1.

1.184 VACUUM ACCESS JUMPER SETUP FIT CHECK (NODE 3 PORT TO AIRLOCK)

(ASSY OPS/20A/FIN)

Page 5 of 5 pages

- 1.10 Gamah Cap ←|→ ISA VAJ Port (capped)
VAJ-83-1 (35 ft) (straight end) →|← ISA VAJ Port
Hand tighten.
Refer to Figure 1.
- 1.11 Notify **MCC-H** that VAJ setup will or will not reach from Node 3 Port Hatch MPEV to Airlock PCA VAP.

2. DISASSEMBLING AND STOWING EQUIPMENT

Node 3 Port
Hatch

- 2.1 √MPEV → CLOSED
- 2.2 ISA Scopemeter Pressure Probe → OFF
- 2.3 VAJ-78-1 (5 ft) (bent end) ←|→ Node 3 Port MPEV
Gamah Cap →|← VAJ-78-1 (5 ft)
Hand tighten.
Gamah Cap →|← ISA VAJ Port
Hand tighten.
- 2.4 Verify seal on Node 3 Port MPEV Cap has no visible damage.
Cap →|← Node 3 Port MPEV
Hand tighten.

A/L1D0

- 2.6 VAJ-83-1 (35 ft) ←|→ PCA VAP
Gamah Cap →|← VAJ-83-1 (35 ft)
Hand tighten.
- 2.7 Airlock VAJ (bent end) →|← AL VRA VAP, hand tighten
- 2.8 Restow items behind Beta Cloth Cover.
Install A/L1D0 Beta Cloth Cover.
- 2.9 Temporarily stow VAJ/ISA setup for use in Cupola Depress.
- 2.10 Notify **MCC-H** VAJ Fit Check Complete and identify temporary stowage location of VAJ/ISA setup.

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1.186 RWS VIDEO MONITOR ORU BUMPER INSTALLATION

(ASSY OPS/20A/FIN)

Page 1 of 6 pages

OBJECTIVE:

Install the Corner and Connector Bumpers on one RWS Video Monitor ORU. All Monitor bumpers must be installed before the Cupola RWS can be relocated to the Cupola.

LOCATION:

Robotic Workstation

DURATION:

15 minutes per RWS Video Monitor

CREW:

One

PARTS:

RWS Monitor Bumper Kit (P/N 843442-551):

Corner Bumper (x2)	P/N 842836-551
3" Long "Loop" Velcro (x2)	Cut to required size from P/N 2538251-7002
1" Square "Loop" Velcro (x2)	Cut to required size from P/N 2538251-7002
Connector Bumper (x2)	P/N 842837-551

MATERIALS:

None

TOOLS:

Digital Camera

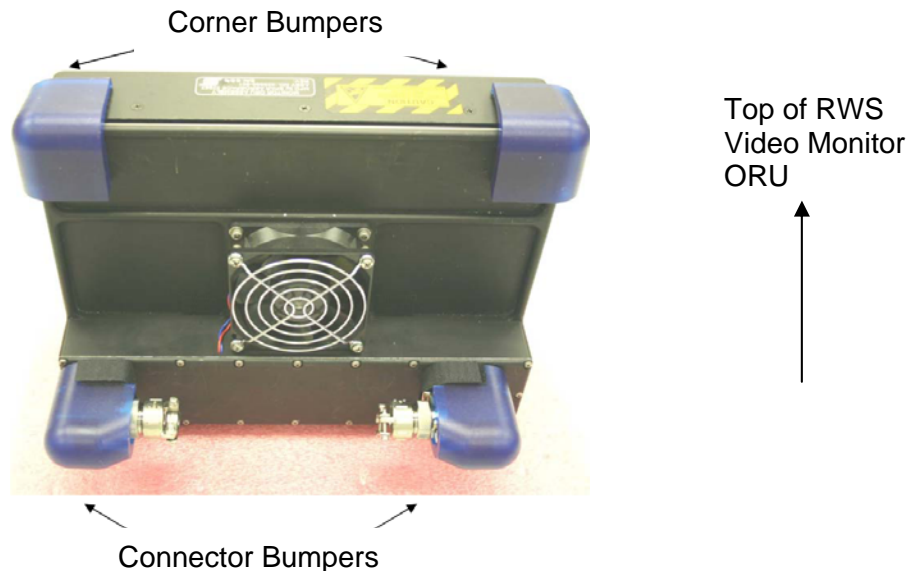


Figure 1.- Final Configuration of RWS Video Monitor ORU with Bumpers Installed.

1. PREPARING CORNER BUMPERS

- 1.1 3" Long Velcro "Loop" side →|← 3" Long Velcro "Hook" side already installed inside both Corner Bumpers

√Loop Velcro is properly aligned and adhered to Hook Velcro

1.186 RWS VIDEO MONITOR ORU BUMPER INSTALLATION

(ASSY OPS/20A/FIN)

Page 2 of 6 pages

1.2 1" Square Velcro "Loop" side →|← 1" Square Velcro "Hook" side
already installed inside both Corner Bumpers

√Loop Velcro is properly aligned and adhered to Hook Velcro



Figure 2.- RWS Video Monitor ORUs.

2. INSTALLING CORNER BUMPERS

2.1 Orient RWS Video Monitor ORU to gain access to back of monitor.
Refer to Figure 2.

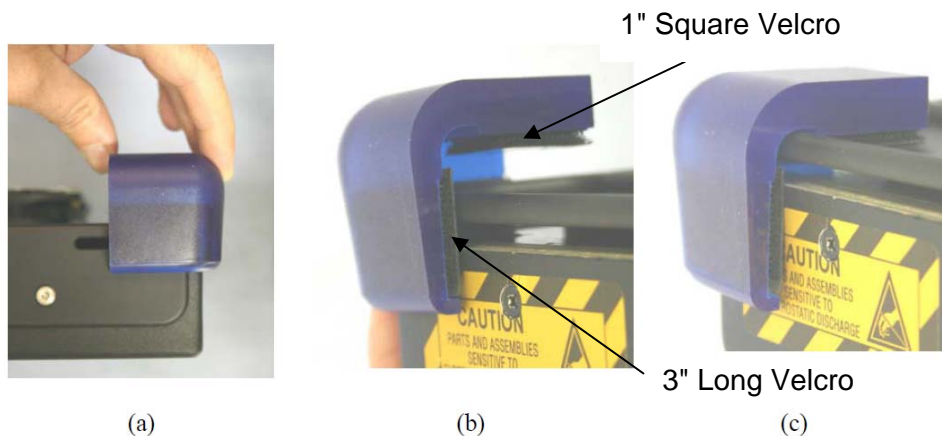


Figure 3.- 1" Square Velcro Installation on RWS Video Monitor ORU.

2.2 √3" Long Velcro "Loop" side, 1" Square Velcro "Loop" Side protective
film installed on adhesive backing

1.186 RWS VIDEO MONITOR ORU BUMPER INSTALLATION

(ASSY OPS/20A/FIN)

Page 3 of 6 pages

- 2.3 Perform a fitcheck of Corner Bumper to determine installation surface area.
Refer to Figures 1, 3.
- 2.4 If required, clean installation surface.
- 2.5 Installing 1" Square Velcro
 - 2.5.1 Remove, discard protective film from adhesive backing on 1" Square Velcro.

NOTE

Bending the top or side of the Corner Bumper can result in Velcro adhering unevenly.

- 2.5.2 Except for surface with 1" Square Velcro, hold Corner Bumper flush to RWS Video Monitor ORU.
Refer to Figures 1, 3(a), 3(b).
 - 2.5.3 While refraining from bending Corner Bumper, slowly slide Connector Bumper onto RWS Video Monitor ORU to adhere 1" Square Velcro to Monitor.
Refer to Figure 3(b), 3(c).
 - 2.5.4 Apply pressure to back of Corner Bumper to ensure adhesive is secure.
 - 2.5.5 Carefully separate newly installed 1" Square Velcro "Loop" side from 1" Square Velcro "Hook" side on inside of Corner Bumper.
Apply pressure to newly installed 1" Square Velcro.
If required, adjust alignment.
- 2.6 Installing 3" Long Velcro
 - 2.6.1 3" Long Velcro "Loop" side ←|→ 3" Long Velcro "Hook" side already installed inside Corner Bumper
Peel back ~1" of the adhesive's protective film on the 3" Long Velcro "Loop" side.

1.186 RWS VIDEO MONITOR ORU BUMPER INSTALLATION

(ASSY OPS/20A/FIN)

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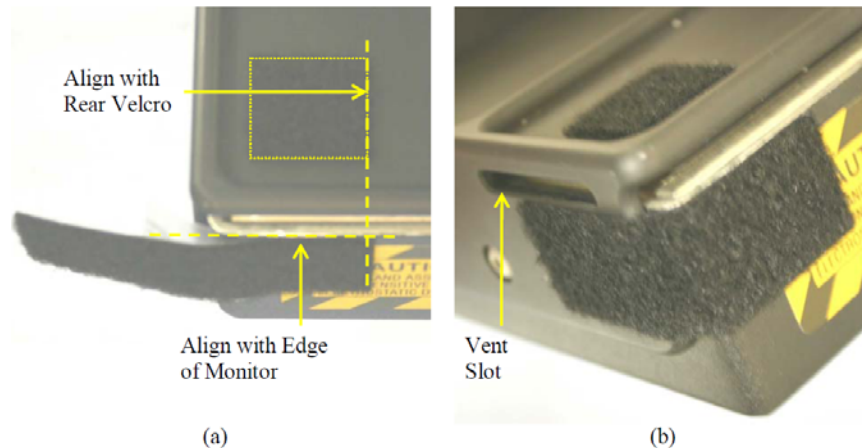


Figure 4.- 3" Long Velcro Installation.

2.6.2 Align edge of 3" Long Velcro "Loop" side with edge of newly installed 1" Square Velcro according to Figure 4(a). Align top edge of 3" Long Velcro with back edge of the display portion of the RWS Video Monitor ORU according to Figure 4(a).

2.6.3 Remove remaining protective film from the adhesive backing. Retain removed protective film for subsequent steps.

2.6.4 Align edge of 3" Long Velcro "Loop" side with edge of vent slot. Apply pressure to adhere 3" Long Velcro to RWS Video Monitor ORU. Refer to Figure 4(b).

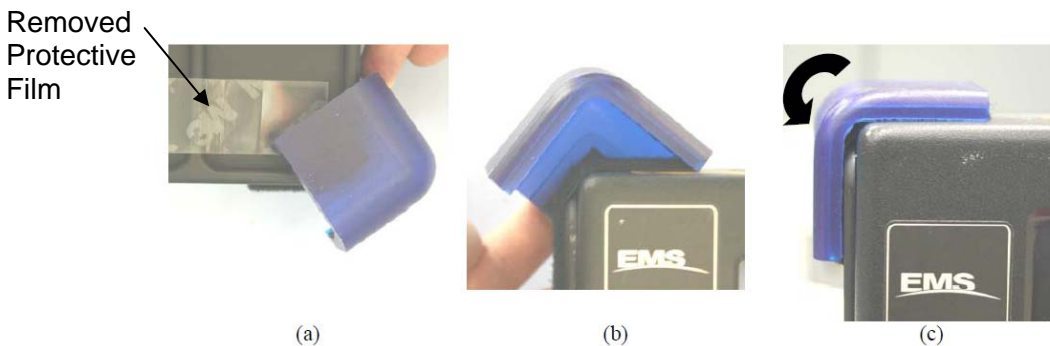


Figure 5.- Corner Bumper Installation.

2.7 Place removed protective film from previous step over newly installed 1" Square Velcro "Loop" side to prevent mating. Refer to Figure 5(a).

2.8 Position top of Corner Bumper such that 3" Velcro just begins to attach (~45°). Refer to Figure 5(b).

1.186 RWS VIDEO MONITOR ORU BUMPER INSTALLATION

(ASSY OPS/20A/FIN)

Page 5 of 6 pages

- 2.9 Rotate Corner Bumper until 3" Long Velcro fully mated.
Refer to Figure 5(c).
- 2.10 Apply pressure to top and side of Corner Bumper to secure it to the RWS Video Monitor ORU.

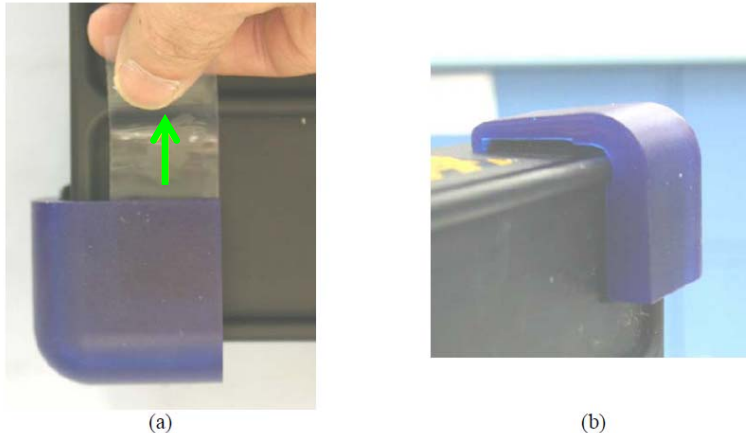


Figure 6.- Installed Corner Bumper.

- 2.11 Remove, discard protective film.
Apply pressure to Corner Bumper above 1" Square Velcro to verify it is secured properly.
Refer to Figure 6.

NOTE

Velcro adhesive requires at least 72 hours to fully cure. Corner Bumper should not be removed before then.

- 2.12 Repeat steps 2.2 to 2.11 for other Corner Bumper.

3. INSTALLING CONNECTOR BUMPERS

NOTE

Access to RWS Video Monitor ORU connector fasteners is lost once Connector Bumpers are installed. It is not possible to mate(demate) connectors to RWS Video Monitor ORU without first removing Connector Bumpers.

- 3.1 Verify that RWS Video Monitor ORU Connectors are mated to RWS Video Monitor ORU.
If connectors are not mated, notify **MCC-H**.

1.186 RWS VIDEO MONITOR ORU BUMPER INSTALLATION

(ASSY OPS/20A/FIN)

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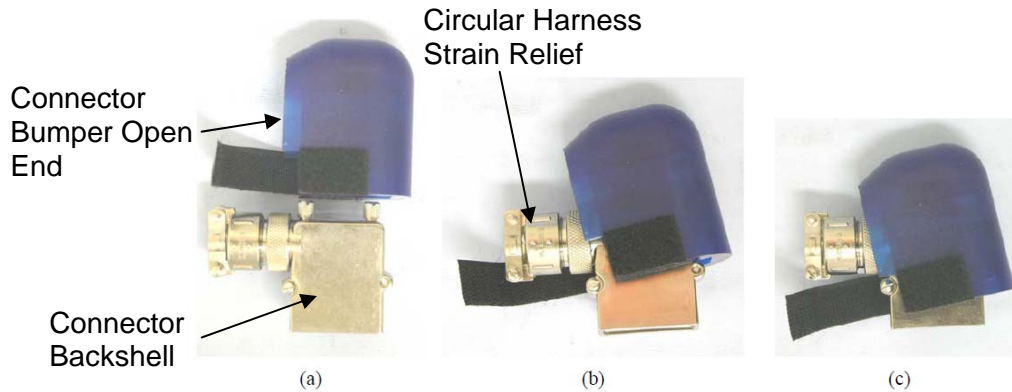


Figure 7.- Connector Bumper Installation.

- 3.2 Demate Velcro strap from Connector Bumper.
Orient open end of Connector Bumper with circular harness strain relief on connector backshell.
Refer to Figure 7.
- 3.3 Rotate Connector Bumper $\sim 15^\circ$ towards circular harness strain relief and move Connector Bumper along backshell until contact is made with circular harness strain relief.
Refer to Figures 7(b), 7(c).

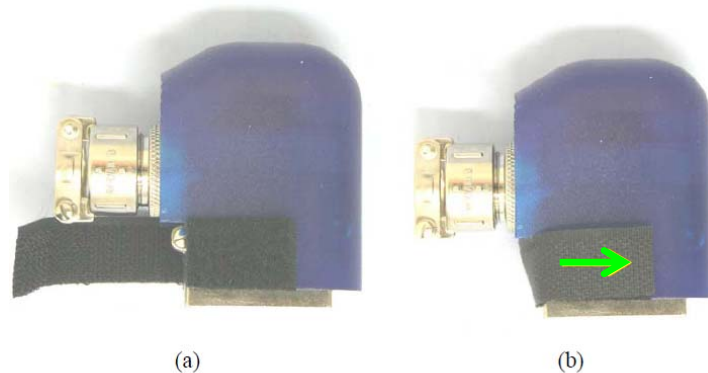


Figure 8.- Connector Bumper Secured to Connector Backshell.

- 3.4 Rotate Connector Bumper until it encompasses connector backshell fasteners.
Mate Velcro Strap to Connector Bumper.
Verify Connector Bumper is securely installed.
Refer to Figure 8.
- 3.5 Repeat steps 3.2 to 3.4 for other Connector Bumper.
- 3.6 Photo document installed bumpers (Digital Camera).

1.188 CUPOLA FINE LEAK CHECK ON NODE 3 DECK

(ASSY OPS/20A/FIN) Page 1 of 9 pages

OBJECTIVE:

To depress and perform a fine leak check of the Cupola after being moved to the Node 3 Deck and the MPEV and IMV Valves are installed.

LOCATION:

Node 3 Deck Hatch

DURATION:

2 hours Total Crew Time

20 minutes for Multimeter, ISA, VAJ Setup

10 minutes for Multimeter, ISA, VAJ Teardown

1 hour, 30 minutes for Depressurization and Leak Check Wait Times

MATERIALS:

9V Alkaline Battery (if Battery changeout required)

Earplugs

Gray Tape

TOOLS:

MPEV Internal Sampling Adapter P/N 97M55830-1

Vacuum Access Jumper 5 ft VAJ-78-1 5 ft

Vacuum Access Jumper 35 ft VAJ-83-1 35 ft

ISA Scopemeter Pressure Probe P/N 1525,760MMHGA/30PSIA

Multimeter Kit: P/N 10118-10018-04

Multimeter

ISS IVA Toolbox:

Drawer 2:

Ratchet, 1/4" Drive

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

Drawer 3

#0 Phillips Screwdriver (if Battery changeout required)

1. SETTING UP ISA

NOTE

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

1.1 Gamah Cap ←|→ ISA VAJ Port

1.2 √ISA Scopemeter Pressure Probe →|← ISA

2. SETTING UP MULTIMETER

NOTE

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

1.188 CUPOLA FINE LEAK CHECK ON NODE 3 DECK

(ASSY OPS/20A/FIN)

Page 2 of 9 pages

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

2.2 √ISA Scopemeter Pressure Probe – OFF

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

2.4 Verify voltage reading > 100 mV DC (good ISA Scopemeter Pressure Probe Battery indication)

If voltage reading < 100 mV DC

ISA Scopemeter Pressure Probe Battery must be replaced.
9V Battery replaced by removing noncaptive screw on back of probe (#0 Phillips Screwdriver).

2.5 ISA Scopemeter Pressure Probe → mm HgA

3. VERIFYING ISA SCOPEMETER PRESSURE PROBE ACCURACY

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

Multimeter

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

3.2 Record ISA Scopemeter Pressure Probe P₁: _____ mmHgA

PCS

3.3 Node 3: ECLSS
Node 3: ECLSS

Record Cab Press P₂: _____ mmHgA

* If $\Delta P |P_2 - P_1| > 20$ mmHg
* | Notify **MCC-H** ISA Scopemeter Pressure
* | Probe inaccurate.
* | √**MCC-H** for further instructions

4. CONNECTING VAJ, ISA, MANUAL PRESSURE EQUALIZATION VALVE (MPEV)

Node 3 Deck Hatch

4.1 Close Node 3 Nadir Hatch per decal.

4.2 √MPEV – CLOSED

1.188 CUPOLA FINE LEAK CHECK ON NODE 3 DECK

(ASSY OPS/20A/FIN)

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- 4.3 Gamah Cap ←|→ VAJ-78-1 (5 ft) (both ends)
Inspect seals for any visible damage.

Notify **MCC-H** if any damage is noted to seals.

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

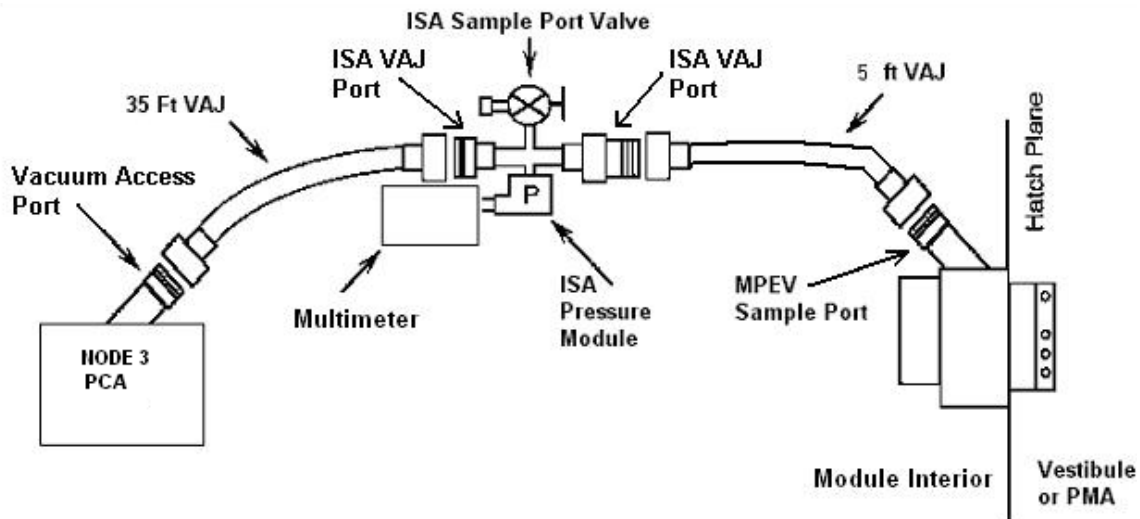


Figure 1.- ISA VAJ MPEV Connection.

- 4.5 √Cap ←|→ MPEV

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

- 4.6 Inhibiting Positive Pressure Relief

NOTE
'Positive P Relief Failure - Node 3' Caution will be received after PPR is inhibited. No action required. Message will return to normal once PPR is reenabled.

PCS

Node 3: ECLSS: PCA: PCA Commands

Node 3 PCA Commands

'Positive Press Relief'

'Inhibit'

cmd Arm (√Status – Armed)

cmd Inhibit

√Positive Pressure Relief Status – Inhibited

1.188 CUPOLA FINE LEAK CHECK ON NODE 3 DECK

(ASSY OPS/20A/FIN)

Page 4 of 9 pages

MCC-H

4.7 Verifying Vent Relief Isolation Valve (VRIV) and Vent Relief Control Valve (VRCV) Closed

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRCV (Icon)

Node 3 PCA VRCV

√Position – Closed

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV (Icon)

Node 3 PCA VRIV

√Position – Closed

NOD3FO-11 4.8 Remove Closeout Panel NOD3FO-11, fasteners (fourteen) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
Temporarily stow Closeout Panel.

4.9 Gamah Cap ←|→ PCA Vacuum Access Port (VAP)
Temporarily stow Gamah Cap on Closeout Panel (Gray Tape).

4.10 Gamah Cap ←|→ VAJ-83-1 (35 ft) (both ends)
Inspect seals for any visible damage.
Notify **MCC-H** if any damage noted to seals.

4.11 VAJ-83-1 (35 ft) (bent end) →|← PCA VAP
Hand tighten.
Refer to Figure 1.

4.12 Gamah Cap ←|→ ISA VAJ Port (capped)
VAJ-83-1 (35 ft) (straight end) →|← ISA VAJ Port
Hand tighten.
Refer to Figure 1.

WARNING

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

4.13 Secure ISA VAJ Assembly.

1.188 CUPOLA FINE LEAK CHECK ON NODE 3 DECK

(ASSY OPS/20A/FIN)

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5. LEAK CHECKING ISA VAJ CONNECTION

ISA

5.1 ISA Sampling Port Valve → CLOSED

Refer to Figure 2.

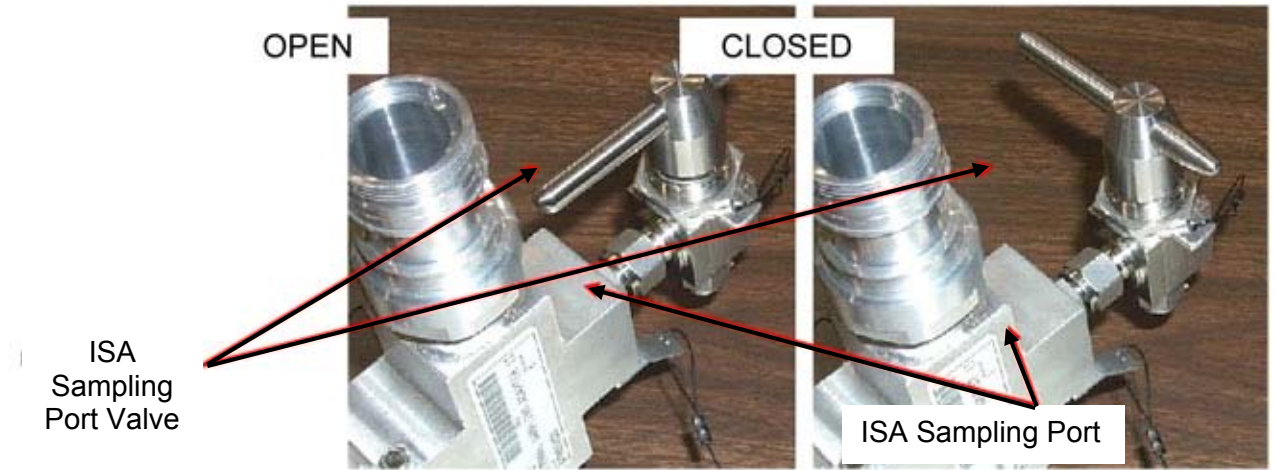


Figure 2.- ISA Sampling Port Valve.

WARNING

Opening the VRIV will vent the ISA and VAJs to space and may cause a loud hissing noise. Crew in the vicinity should don Earplugs.

5.2 Don Earplugs.

PCS

5.3 Opening PCA VRIV

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV

Node 3 PCA VRIV

'Open'

cmd Arm (√Status – Armed)

cmd Open

√Position – Open

√Open Indicator – √

5.4 Wait 10 minutes to depressurize ISA VAJ setup.

5.5 Doff Earplugs.

5.6 Closing PCA VRIV

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

1.188 CUPOLA FINE LEAK CHECK ON NODE 3 DECK

(ASSY OPS/20A/FIN) Page 6 of 9 pages

sel VRIV

Node 3 PCA VRIV

'Close'

cmd Close

√Position – Closed

√Closed Indicator – √

5.7 Wait 3 minutes for thermal stabilization.

Multimeter

5.8 Rotary Switch ↻ **mV**

5.9 Record ISA Scopemeter Pressure Probe P₃: _____ mmHg
Record GMT: _____ GMT (___/___:___:___)

5.10 Wait 5 minutes for leak check.

5.11 Record ISA Scopemeter Pressure Probe P₄: _____ mmHg
Record GMT: _____ GMT (___/___:___:___)

* If $\Delta P | P_4 - P_3 | > 10$ mmHg during monitoring period
* | Notify **MCC-H** of suspected ISA VAJ leak.
* |
* | √**MCC-H** for further instructions

6. DEPRESSURIZING CUPOLA

WARNING

Opening the Node 3 Deck MPEV will vent the vestibule to space and may cause a loud hissing noise. Crew in the vicinity should don Earplugs.

6.1 Don Earplugs.

PCS

6.2 Opening PCA VRIV
Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV

Node 3 PCA VRIV

'Open'

cmd Arm (√Status – Armed)

cmd Open

√Position – Open

√Open Indicator – √

1.188 CUPOLA FINE LEAK CHECK ON NODE 3 DECK

(ASSY OPS/20A/FIN)

Page 7 of 9 pages

Node 3 Deck 6.3 MPEV → OPEN
Hatch

6.4 Wait 8 minutes for depressurization or until ISA Press
< 258 mmHgA.

Multimeter 6.5 Record ISA Scopemeter Pressure Probe P₅: _____ mmHg
Record GMT: _____ GMT (___/___:___:___)
Notify **MCC-H** of pressure reading.

Node 3 Deck 6.6 MPEV → CLOSED
Hatch

6.7 Doff Earplugs.

6.8 Wait an additional 10 minutes for thermal stabilization.

PCS 6.9 Closing PCA VRIV
Node 3: ECLSS: PCA
Node 3 ACS
'Pressure Control Assembly'

sel VRIV

Node 3 PCA VRIV

'Close'

cmd Close

√Position – Closed

√Closed Indicator – √

7. LEAK CHECKING VESTIBULE

Node 3 Deck 7.1 MPEV → OPEN
Hatch

7.2 Record ISA Scopemeter Pressure Probe P₆: _____ mmHg
Record GMT: _____ GMT (___/___:___:___)

7.3 MPEV → CLOSED

7.4 Wait overnight for leak check.

PCS 7.5 Opening PCA VRIV
Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV

Node 3 PCA VRIV

'Open'

cmd Arm (√Status – Armed)

cmd Open

1.188 CUPOLA FINE LEAK CHECK ON NODE 3 DECK

(ASSY OPS/20A/FIN) Page 8 of 9 pages

√Position – Open
√Open Indicator – √

7.6 Wait 30 seconds for VAJ to vent.

7.7 Closing PCA VRIV

Node 3: ECLSS: PCA

Node 3 ACS

'Pressure Control Assembly'

sel VRIV

Node 3 PCA VRIV

'Close'

cmd Close

√Position – Closed
√Closed Indicator – √

Node 3 Deck Hatch 7.8 MPEV → OPEN

7.9 Multimeter

Record ISA Scopemeter Pressure Probe P₇: _____ mmHg

Record GMT: _____ GMT (___/___:___:___)

* If $\Delta P \quad |P_7 - P_6| > 30$ mmHg during the overnight monitoring
* | period
* | Notify **MCC-H** of suspected MPEV(IMV) Valve leak.
* |
* | √**MCC-H** for further instructions

7.10 MPEV → CLOSED

7.11 At earliest convenience
Notify **MCC-H** of pressures, GMT in steps 3, 5, and 7.

8. DISASSEMBLING AND STOWING EQUIPMENT

8.1 √MPEV → CLOSED

8.2 ISA Scopemeter Pressure Probe → OFF

Multimeter 8.3 Rotary Switch ↷ OFF

Multimeter ←|→ ISA Scopemeter Pressure Probe

1.188 CUPOLA FINE LEAK CHECK ON NODE 3 DECK

(ASSY OPS/20A/FIN)

Page 9 of 9 pages

- 8.4 Cap ←|→ ISA Sampling Port
ISA Sample Port → OPEN (for pressurization, stowage)
Cap →|← ISA Sampling Port
Refer to Figure 2.
- 8.5 VAJ-78-1 (5 ft) (straight end) ←|→ ISA VAJ Port
VAJ-78-1 (5 ft) (bent end) ←|→ Node 3 Deck MPEV
Gamah Cap →|← VAJ-78-1 (5 ft) (both ends)
Hand tighten.
Gamah Cap →|← ISA VAJ Port
Hand tighten.
- NOD3FO-11 8.6 VAJ-83-1 (35 ft) ←|→ PCA VAP
VAJ-83-1 (35 ft) ←|→ ISA VAJ Port
Gamah Cap →|← VAJ-83-1 (35 ft) (both ends)
Hand tighten.
Gamah Cap →|← ISA VAJ Port
Hand tighten.
- 8.7 Verify seal on PCA VAP Gamah Cap has no damage.
Gamah Cap →|← PCA VAP
Hand tighten.
- PCS 8.8 Enabling Positive Pressure Relief
Node 3: ECLSS: PCA: PCA Commands
Node 3 PCA Commands
'Positive Press Relief'

cmd Enable (√Positive Pressure Relief Status – Enabled)
- 8.9 Check for FOD within 1 m radius.
- NOD3FO-11 8.10 Install Closeout Panel NOD3FO-11, fasteners (fourteen) (Ratchet, 1/4" Drive; 5/32" Hex Head, 1/4" Drive).
- 8.11 Stow tools and materials.
9. INGRESSING CUPOLA
- 9.1 MPEV → OPEN
- 9.2 Wait ~2 minutes
- 9.3 Open Node 3 Deck Hatch per decal.
- 9.4 ISS ↓↓ **MCC-H**, "Cupola leak check completed."

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TCS

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2.100 ETCS LOOP A(B) LAB/NODE 3 BYPASS VALVE CLOSE

(ASSY OPS/20A/FIN)

Page 1 of 1 page

OBJECTIVE:

Closes the LAB/Node 3 Bypass Valve in preparation for integration of Node 3 into ETCS Loop A(B).

NOTE

1. The respective ETCS loop must be shutdown in order to meet software command validation requirements to close the LAB/Node 3 Bypass Valve.
2. Failure to close the LAB/Node 3 Bypass valve may result in insufficient external cooling to Node 3.
3. Valve commanding commands do not presently exist via PCS/CDDT and will be performed from **MCC-H**.

1. VERIFYING ETCS LOOP SHUTDOWN
PCS S1(P1): TCS: Loop A(B) Software: Loop A(B) ETCS PTC DETAILS
Loop A(B) ETCS PTC DETAILS
'Telemetry'
'Data'

Verify Subsystem Mode – Shutdown
2. ENABLING ETCS LOOP A(B) LAB/NODE 3 BYPASS VALVE
Cmd Prepare Command Instances for S0TX96IM0110K(S0TX96IM0214K):
Inventory sel Close/Bypass

cmd S0TX96IM0110K(S0TX96IM0214K)
ETCS_LoopA(B)_Lab_MTL(LTL)_Hab_Byv_Vlv_Pos_Ena_Tmplt
- MSK THOR DNAV: MSKs: ETCS: IFHXs
ETCS IFHXs

Verify Loop A(B) Lab/Hab Bypass Valve Cntl – ENA
3. CLOSING ETCS LOOP A(B) LAB/NODE 3 BYPASS VALVE
Cmd Prepare Command Instances for S0TE96IM0010K(S0TE96IM0042K):
Inventory sel Close/Bypass

cmd S0TE96IM0010K(S0TE96IM0042K)
ETCS_LoopA(B)_Lab_MTL(LTL)_Hab_Byv_Vlv_Pos_Tmplt
- MSK THOR DNAV: MSKs: ETCS: IFHXs
ETCS IFHXs

Verify Loop A(B) Lab/Hab Bypass Valve Position – CLSD

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4.100 NODE 3 IATCS STARTUP WITH N3-1 MDM FAILED

(ASSY OPS/20A/FIN 1/SPN) Page 1 of 7 pages

OBJECTIVE:

Perform a manual Node 3 IATCS startup using only the LTL pump due to a failure of the N3-1 MDM.

NOTE

This procedure requires crew action in manipulating IATCS Valves connected to the MTL loop.

1. VERIFYING MDM N3-2 STATUS

Node 3: CDH: N3-2 MDM

N3-2 MDM

Verify Frame Count – incrementing

Verify Processing State – Operational

√Sync Status – In Sync

2. APPLYING POWER TO LTL IATCS COMPONENTS

Node 3: EPS

Node 3:EPS

√RPC Posn – CI for all RPCs in Table 1

Table 1. Node 3 LTL RPCs

Load	Navigation from Node 3: EPS	RPC
LCA Vlv 2	RPCM N32A2B E2 icon	RPCM N32A2B E2 RPC 12
LTL NIA Vent Valve	RPCM N32A2B F2 icon	RPCM N32A2B F2 RPC 1
LTL NIA Iso Valve		RPCM N32A2B F2 RPC 2
LTL TWMV		RPCM N32A2B F2 RPC 4
LTL SFCA SOV		RPCM N32A2B F2 RPC 6
LTL SFCA Mod Vlv		RPCM N32A2B F2 RPC 7
LTL PPA		RPCM N32A2B F2 RPC 18

NOTE

1. The commands in step 3 perform no hardware actions, they only synchronize software for water leak detection.
2. The MTL PPA Accum Qty is not available to ITCS software due to the N3-1 MDM failure. Because of this, ITCS Leak software will operate using Degraded Leak Limits which are set via PPL (Default = 42 % for action limit). If LTL avg accum qty is < 46 %, **MCC-H** will configure FDIR as necessary following pump activation to regain automated leak detection, possibly by operating software in dual mode.
3. System average accumulator leak limits will need to be relatched before reinitialization of the failed Tier 3 MDM to avert a possible false leak shutdown.

PCS

4.100 NODE 3 IATCS STARTUP WITH N3-1 MDM FAILED

(ASSY OPS/20A/FIN 1/SPN) Page 2 of 7 pages

3. CONFIGURING SOFTWARE MODE

Node 3: TCS

Node 3: TCS

'PPA'

Record LTL Avg Accum Qty: _____ %

Node 3: TCS: LTL Software

Node 3 LTL Software Commands

'LTL IATCS'

'Mode Transition'

cmd Contingency – Arm ($\sqrt{\text{Mode Armed – Contingency}}$)

cmd Contingency – Contingency ($\sqrt{\text{Mode – Contingency}}$)

'LTL IATCS'

If either LTL Avg Accum Qty recorded above is < 46 % or '**Node 3 Loss of MTL Rack Control-NODE3**' (E/C 15871) Advisory Msg is not in Alarm

Node 3 LTL Software Commands

'LTL IATCS'

'Leak Recovery'

cmd System Auto Shutdown Inhibit – Arm ($\sqrt{\text{Arm – Arm}}$)

cmd System Auto Shutdown Inhibit – Inh ($\sqrt{\text{System Auto Shutdown – Inh}}$)

Expect the following messages:

'**Node 3 IATCS System Leak Auto Shutdown - NODE3**' (E/C 15868)
Warning message

'**Node 3 IATCS System Leak Auto Shutdown Inhibited - NODE3**'
(E/C 15869) Warning message

'**Node 3 IATCS System Accum Qty Low - NODE3**' (E/C 15867)
Caution Message

If IATCS Status \neq Oper

cmd Startup

Verify IATCS Status – Oper

4. CONFIGURING LCA VALVE 2 TO SINGLE

Node 3: TCS: LCA icon

Node 3 LCA Commands

'Commands'

'LCA'

$\sqrt{\text{Vlv2 Posn – Sngl}}$

4.100 NODE 3 IATCS STARTUP WITH N3-1 MDM FAILED

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- * If Vlv 2 Posn ≠ Single
 - * Expect 'Node 3 LCA Valve 2 Failure - Node 3' Caution message.
 - * Remove Panel NOD3O1-01 for LCA access.
 - * Remove Beta Cloth (Velcro), if necessary.
 - * Fold out Handle on LCA Valve 2.
 - * Rotate Valve 2 counter-clockwise from Isolated to Cross-Connected.
 - * Fold in Handle on LCA Valve 2.
 - * Do not reinstall Panel; access to the Overhead Alcove will be required later in the procedure.
- NOTE

The following is required to inform the IATCS software of the LCA Valve 2 position change. Caution will clear if command is successful. Clearing the Caution is not required to continue IATCS startup.
- * **cmd Vlv 2 Posn – Sngl Execute**
 - * $\sqrt{\text{Vlv 2 Posn – Sngl}}$

5. CONFIGURING MTL SFCA FOR STARTUP

NOTE

The MTL SOV and SFCA Mod Valve scale markings and open(close) indication lines do not line up exactly with the actual valve positions.

Over Alcove
(O1)

5.1 Closing MTL SOV

Remove Panel NOD3O1-01 for MTL SFCA access.

Pull out MTL SFCA Pump Inlet Shutoff Handle.
Turn Pump Inlet Shutoff Valve ☱ (close).
Push in Pump Inlet Shutoff Valve Handle.

5.2 Opening MTL SFCA Mod Valve

CAUTION

Both SFCA Modulation Valves must be placed in the open position to prevent dP sensor damage during pump startup or when increasing pump speed.

Pull out MTL SFCA Header Pressure Valve Handle.
Turn Header Pressure Valve Handle ☱ (open).
Push in Header Pressure Valve Handle.

Do not reinstall Panel; access to the MTL SFCA Header Pressure Valve will be required later in the procedure.

4.100 NODE 3 IATCS STARTUP WITH N3-1 MDM FAILED

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6. CONFIGURING MTL/REGEN TWMV

Deck Alcove
(D1)

6.1 Setting MTL TWMV to Full Flowthru
Remove Panel NOD3D1-02 for access to the MTL TWMV.

Pull out MTL TWMV Handle.
Turn MTL TWMV ↻ to PORT B.
Push in MTL TWMV Handle.

Reinstall Closeout Panel NOD3D1-02.

Over Midbay
(O3)

6.2 Setting Regen TWMV to Full Flowthru
Remove Panel NOD3O2-33 for access to the Regen TWMV.

Pull out Regen MTL TWMV Handle.
Turn Regen MTL TWMV ↻ to PORT A.
Push in Regen MTL TWMV Handle.

Do not reinstall Panel; access to the Regen TWMV will be required later in the procedure.

7. CONFIGURING LTL SFCA

CAUTION

Both SFCA Modulation Valves must be placed in the open position to prevent dP sensor damage during pump startup or when increasing pump speed.

Node 3: TCS: LTL SFCA

Node 3 LTL SFCA Commands

'Commands'

'LTL SFCA'

√Software – Started

√Shutoff Vlv Posn – Open

4.100 NODE 3 IATCS STARTUP WITH N3-1 MDM FAILED

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```
*****
* If Shutoff Vlv Posn ≠ Open
*   Expect 'Node 3 LTL SFCA Shutoff Valve Failure - Node 3'
*   Caution message.
*
*   Remove Panel NOD3F1-03.
*
*   Pull out LTL SFCA Pump Inlet Shutoff Handle.
*   Turn Pump Inlet Shutoff Handle ↻ to the Open position.
*   Push in LTL SFCA Pump Inlet Shutoff Handle.
*
*   Reinstall Panel NOD3F1-03.
*
*   

|                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NOTE</b>                                                                                                                                    |
| The following is required to inform the IATCS software of the SFCA Shutoff Valve position change. Caution will clear if command is successful. |


*
*   cmd Open – Open
*
*   Verify Shutoff Vlv Posn – Open
*****
```

√CLC – Inh

'Mod Vlv'
'Direct Vlv'

input drive voltage – 5 V
input drive duration – 2 1 s

cmd Set

8. [CONFIGURING LTL TWMV](#)

Node 3: TCS: LTL TWMV

Node 3 LTL TWMV Commands

'Commands'
'LTL TWMV'

√Software – Started

input Temp Setpt – 4.5 deg C

cmd Set **Execute**

Verify Temp Setpt: 4.4 deg C

√CLC – Ena

4.100 NODE 3 IATCS STARTUP WITH N3-1 MDM FAILED

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9. ENABLING I/O TO THE LTL PPA

CDH: Primary HCZ MDM: LB SYS N3 2: RT Status

LB SYS N3 2 RT Status

√19 PPA N3 LTL RT Status – Enable

10. STARTING LTL PPA

Node 3: TCS: LTL PPA

Node 3 LTL PPA Commands

'Commands'

'LTL PPA'

cmd Pump Software – Startup (Verify – Started)

input Set Pump Speed Arm – 1 8 9 0 2 rpm

cmd Set Pump Speed Arm – Arm (√ – √)

input Set Pump Speed Set – 1 8 9 0 2 rpm

cmd Set Pump Speed Set – Set

Node 3: TCS

Node3:TCS

'PPA'

Verify LTL Pmp dP: 482 ± 56 kPa

Verify LTL HR Flow: 1069 ± 136 kg/hr

Verify LTL Pmp Spd: 18902 ± 1250 rpm

NOTE

1. Loop differential pressures while operating in Contingency Mode are set differently than in Dual Mode to support Regen ECLSS loads.
2. Due to SCR 38317, SFCA Mod Vlv dP Setpt is displayed in improper units (mmHg rather than kPa). **MCC-H** will be able to verify the proper setpoint by ground tools. If **MCC-H** is not available, setpoint can be verified by loop telemetry.

11. RESETTING LTL SFCA MOD VLV SETPOINT

Node 3: TCS: LTL SFCA

Node 3 LTL SFCA Commands

√CLC – Ena

If **MCC-H** is running procedure

MCC-H will verify 100 kPa LTL SFCA setpoint via Node 3 ITCS MSK.

If setpoint is 100 kPa and Mod Vlv dP is 100 ± 7 kPa, go to step 12.

4.100 NODE 3 IATCS STARTUP WITH N3-1 MDM FAILED

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input Mod Vlv dP Setpt – 1 0 0 kPa

cmd Set – Set

Wait 30 seconds.

Verify Mod Vlv dP – 100 ± 7 kPa

```
*****
* If Mod Vlv dP  $\neq 100 \pm 7$  kPa
* | Remove Panel NOD3F1-03 for LTL SFCA access.
* |
* | Pull out SFCA Header Pressure Valve Handle.
* | Turn Header Pressure on tick mark and repeat until
* | Mod Vlv dP reading is  $100 \pm 7$  kPa.
* |
* | Reinstall Panel NOD3F1-03.
*****
```

12. [CONFIGURING MTL SFCA MOD VLV](#)

Over Alcove (O1) Pull out MTL SFCA Header Pressure Valve Handle.
Turn Header Pressure Valve Handle to 15 % open (approximately 93.1 kPa).
Push in Header Pressure Valve Handle.
Reinstall Panel NOD3O1-01.

13. [CONFIGURING REGEN TWMV](#)

Over Midbay (O3) Pull out Regen TWMV Handle.
Turn Regen TWMV to 60 % towards PORT B.
Push in Regen TWMV Handle.

Do not reinstall Cover Panel; adjustments may be required to achieve desired MTL loop temps.

MCC-H will determine if adjustments are required based on Rack temperatures.

14. [Enabling FDIR for the LTL PPA](#)

CDH: Primary HCZ MDM: LB SYS N3 2: RT Status
LB SYS N3 2 RT Status

cmd 19 PPA N3 LTL Enable FDIR **Execute** (Verify – Ena)

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4.102 NODE 3 IATCS STARTUP WITH N3-2 MDM FAILED

(ASSY OPS/20A/FIN 1/SPN) Page 1 of 7 pages

OBJECTIVE:

Perform a manual Node 3 IATCS startup using only the MTL pump due to a failure of the N3-2 MDM.

NOTE

Procedure requires crew action in manipulating IATCS Valves connected to the LTL loop.

1. VERIFYING MDM N3-1 STATUS

Node 3: CDH: N3-1 MDM

N3-1 MDM

Verify Frame Count – incrementing
Verify Processing State – Operational

√Sync Status – In Sync

2. APPLYING POWER TO MTL IATCS COMPONENTS

PCS

Node 3: EPS

Node 3:EPS

√RPC Posn – CI for all RPCs in Table 1

Table 1. Node 3 MTL RPCs

Load	Navigation from Node 3: EPS	RPC
LCA Vlv 1	RPCM N31B4A E2 icon	RPCM N31B4A E2 RPC 12
MTL NIA Vent Valve	RPCM N31B4A F2 icon	RPCM N31B4A F2 RPC 1
MTL NIA Iso Valve		RPCM N31B4A F2 RPC 2
MTL TWMV		RPCM N31B4A F2 RPC 4
MTL SFCA SOV		RPCM N31B4A F2 RPC 6
MTL SFCA Mod Vlv		RPCM N31B4A F2 RPC 7
MTL Regen TWMV		RPCM N31B4A F2 RPC 8
MTL PPA		RPCM N31B4A F2 RPC 18

NOTE

- The commands in step 3 perform no hardware actions, they only synchronize software for water leak detection.
- The LTL PPA Accum Qty is not available to ITCS software due to the N3-2 MDM failure. Because of this, ITCS Leak software will operate using Degraded Leak Limits, which are set via PPL (Default = 42 % for action limit). If MTL avg accum qty is < 46 %, **MCC-H** will configure FDIR as necessary following pump activation to regain automated leak detection, possibly by operating software in dual mode.
- System average accumulator leak limits will need to be relatched before reinitialization of the failed Tier 3 MDM to avert a possible false leak shutdown.

4.102 NODE 3 IATCS STARTUP WITH N3-2 MDM FAILED

(ASSY OPS/20A/FIN 1/SPN) Page 2 of 7 pages

3. CONFIGURING SOFTWARE MODE

Node 3: TCS

Node 3: TCS

'PPA'

Record MTL Avg Accum Qty: _____ %

Node 3: TCS: MTL Software

Node3 MTL Software Commands

'MTL IATCS'

'Mode Transition'

cmd Contingency – Arm ($\sqrt{\text{Mode Armed – Contingency}}$)

cmd Contingency – Contingency ($\sqrt{\text{Mode – Contingency}}$)

'MTL IATCS'

If either MTL Avg Accum Qty recorded above is < 46 % or '**Node 3 Loss of LTL Rack Control-NODE3**' (E/C 15870) Advisory Msg is not in Alarm

Node 3 LTL Software Commands

'MTL IATCS'

'Leak Recovery'

cmd System Auto Shutdown Inhibit – Arm ($\sqrt{\text{Arm – Arm}}$)

cmd System Auto Shutdown Inhibit – Inh ($\sqrt{\text{System Auto Shutdown – Inh}}$)

Expect the following messages:

'**Node 3 IATCS System Leak Auto Shutdown - NODE3**' (E/C 15868)
Warning message

'**Node 3 IATCS System Leak Auto Shutdown Inhibited - NODE3**'
(E/C 15869) Warning message

'**Node 3 IATCS System Accum Qty Low - NODE3**' (E/C 15867)
Caution Message

If IATCS Status \neq Oper

cmd Startup

Verify IATCS Status – Oper

4. CONFIGURING LCA VALVE 1 TO SINGLE

Node 3: TCS: LCA icon

Node 3 LCA Commands

'Commands'

'LCA'

$\sqrt{\text{Vlv1 Posn – Sngl}}$

4.102 NODE 3 IATCS STARTUP WITH N3-2 MDM FAILED

(ASSY OPS/20A/FIN 1/SPN) Page 3 of 7 pages

```
*****
* If Vlv 1 Posn ≠ Single
*   Expect 'Node 3 LCA Valve 1 Failure - Node 3' Caution message.
*
*   Remove Panel NOD3O1-01 for LCA access.
*
*   Remove Beta Cloth (Velcro), if necessary.
*   Fold out Handle on LCA Valve 1.
*   Rotate Valve 1 ↻ from Isolated to Cross-Connected.
*   Fold in Handle on LCA Valve 1.
*
*   

|                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>NOTE</u>                                                                                                                                                                                             |
| The following is required to inform the IATCS software of the LCA Valve 1 position change. Caution will clear if command is successful. Clearing the Caution is not required to continue IATCS startup. |


*
*   cmd Vlv 1 Posn – Sngl Execute
*
*   ↻Vlv 1 Posn – Sngl
*****
```

5. [CONFIGURING LTL SFCA FOR STARTUP](#)

5.1 [Closing LTL SOV](#)

Fwd Alcove
(F1)

Remove Panel NOD3F1-03 for LTL SFCA access.

Pull out LTL SFCA Pump Inlet Shutoff Handle.
Turn Pump Inlet Shutoff Valve ↻ (close).
Push in Pump Inlet Shutoff Valve Handle.

5.2 [Opening LTL SFCA Mod Valve](#)

CAUTION

Both SFCA Modulation Valves must be placed in the open position to prevent dP sensor damage during pump startup or when increasing pump speed.

Pull out LTL SFCA Header Pressure Valve Handle.
Turn Header Pressure Valve Handle ↻ (open).
Push in Header Pressure Valve Handle.

Do not reinstall Panel; access to the LTL SFCA Header Pressure Valve will be required later in the procedure.

6. [CONFIGURING LTL TWMV](#)

6.1 [Setting LTL TWMV to Full Bypass](#)

Fwd Alcove
(F1)

Closeout Panel NOD3F1-03 should be removed per step 4.

Pull out LTL TWMV Handle.
Turn LTL TWMV ↻ to PORT A.
Push in LTL TWMV Handle.

4.102 NODE 3 IATCS STARTUP WITH N3-2 MDM FAILED

(ASSY OPS/20A/FIN 1/SPN) Page 4 of 7 pages

Do not reinstall Panel; access to the LTL SFCA Header Pressure Valve will be required later in the procedure.

7. CONFIGURING MTL SFCA

CAUTION

Both SFCA Modulation Valves must be placed in the open position to prevent dP sensor damage during pump startup or when increasing pump speed.

Node 3: TCS: MTL SFCA

Node 3 MTL SFCA Commands

'Commands'

'MTL SFCA'

√Software – Startup

√Shutoff Vlv Posn – Open

* If Shutoff Vlv Posn ≠ Open

* Expect '**Node 3 MTL SFCA Shutoff Valve Failure - Node 3**'
* Caution message.

* Open Panel NOD3O1-01.

* Pull out MTL SFCA Pump Inlet Shutoff Handle.
* Turn Pump Inlet Shutoff Handle ↶ to the Open position.
* Push in MTL SFCA Pump Inlet Shutoff Handle.

* Close Panel NOD3O1-01.

NOTE

The following is required to inform the IATCS software of the SFCA Shutoff Valve position change. Caution will clear if command is successful.

* **cmd** Open – Open

* Verify Shutoff Vlv Posn – Open

√CLC – Inh

'Mod Vlv'

'Direct Vlv'

input drive voltage – 5 V

input drive duration – 2 1 s

cmd Set

4.102 NODE 3 IATCS STARTUP WITH N3-2 MDM FAILED

(ASSY OPS/20A/FIN 1/SPN) Page 5 of 7 pages

8. [CONFIGURING MTL/REGEN TWMV](#)

Node 3: TCS: MTL TWMV

[Node 3 MTL TWMV Commands](#)

'Commands'

'MTL TWMV'

√Software – Startup (Verify – Started)

input Temp Setpt – 4.5 deg C (LTL setpoint)

cmd Set Execute

Verify Temp Setpt: 4.4 deg C (LTL setpoint)

√CLC – Ena

Node 3: TCS: MTL Regen TWMV

[Node 3 MTL Regen TWMV Commands](#)

'Commands'

'MTL Regen TWMV'

√Software – Startup (Verify – Started)

√Temp Setpt: 17.3 deg C

√CLC – Ena

9. [ENABLING I/O TO THE MTL PPA](#)

CDH: Primary HCZ MDM: LB SYS N3 1: RT Status

[LB SYS N3 1 RT Status](#)

√19 PPA N3 MTL RT Status – Enable

10. [STARTING MTL PPA](#)

Node 3: TCS: MTL PPA

[Node 3 MTL PPA Commands](#)

'Commands'

'MTL PPA'

cmd Pump Software – Startup (Verify – Started)

input Set Pump Speed Arm – 1 8 9 0 2 rpm

cmd Set Pump Speed Arm – Arm (√ – √)

input Set Pump Speed Set – 1 8 9 0 2 rpm

cmd Set Pump Speed Set – Set

4.102 NODE 3 IATCS STARTUP WITH N3-2 MDM FAILED

(ASSY OPS/20A/FIN 1/SPN) Page 6 of 7 pages

Node 3: TCS

Node3:TCS

'PPA'

Verify MTL Pmp dP: 483 ± 56 kPa

Verify MTL HR Flow: 1069 ± 136 kg/hr

Verify MTL Pmp Spd: 18902 ± 1250 rpm

NOTE

1. Loop differential pressures while operating in Contingency Mode are set differently than in Dual Mode to support Regen ECLSS loads.
2. Due to SCR 38317, SFCA Mod Vlv dP Setpt is displayed in improper units (mmHg rather than kPa). **MCC-H** will be able to verify the proper setpoint by ground tools. If **MCC-H** is not available, setpoint can be verified by loop telemetry.

11. RESETTING MTL SFCA MOD VLV SETPOINT

Node 3: TCS: MTL SFCA

Node 3 MTL SFCA Commands

√CLC – Ena

If **MCC-H** is running procedure

MCC-H will verify 93.1 kPa MTL SFCA setpoint via Node 3 ITCS MSK.
 If setpoint is 93.1 kPa and Mod Vlv dP is 93.1 ± 7 kPa, go to step 12.

input Mod Vlv dP Setpt – 9 3.1 kPa

cmd Set – Set

Wait 30 seconds.

Verify Mod Vlv dP: 93.1 ± 7 kPa

```
*****
*   If Mod Vlv dP  $\neq$   $93.1 \pm 7$  kPa
*   |   Remove Panel NOD3O1-01 for MTL SFCA access.
*   |
*   |   Pull out SFCA Header Pressure Valve Handle.
*   |   Turn Header Pressure on tick mark and repeat until Mod Vlv dP
*   |   reading is  $93.1 \pm 7$  kPa.
*   |
*   |   Reinstall Panel NOD3O1-01.
*****
```

4.102 NODE 3 IATCS STARTUP WITH N3-2 MDM FAILED

(ASSY OPS/20A/FIN 1/SPN) Page 7 of 7 pages

12. CONFIGURING LTL SFCA MOD VLV

Closeout Panel NOD3F1-03 should be removed per step 4.

Pull out MTL SFCA Header Pressure Valve Handle.

Turn Header Pressure Valve Handle to 35 % open (whatever is approximately 100 kPa).

Push in Header Pressure Valve Handle.

Reinstall Panel NOD3F1-03.

13. Enabling FDIR for the MTL PPA

CDH: Primary HCZ MDM: LB SYS N3 1: RT Status

LB SYS N3 1 RT Status

cmd 19 PPA N3 MTL Enable FDIR **Execute** (Verify – Ena)

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PAYLOADS

PAYLOADS

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MYCO BODY SAMPLE COLLECTION

(ASSY OPS/20A/FIN 1)

Page 1 of 8 pages

OBJECTIVE:

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

PARTS:

Myco Kit P/N MK-1

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

Myco Sampling Sheet Storage Bag P/N MK-6

Myco Swab (3) P/N MK-2

Sputum Tube P/N MK-4

BZK Wipe P/N MK-5

MATERIALS:

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

Towel (Crew Preference)

Mirror (Crew Preference)

TOOLS:

Sharpie Flight Pen

1. CLEANING HANDS

NOTE

1. Body sample collection should be performed first thing in the morning.
2. If needed, refer to pictures of Myco Kit in MYCO KIT (SODF: ASSY OPS REFERENCE)

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

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

2. BODY SAMPLE COLLECTIONS 1 (SAMPLING SHEET)

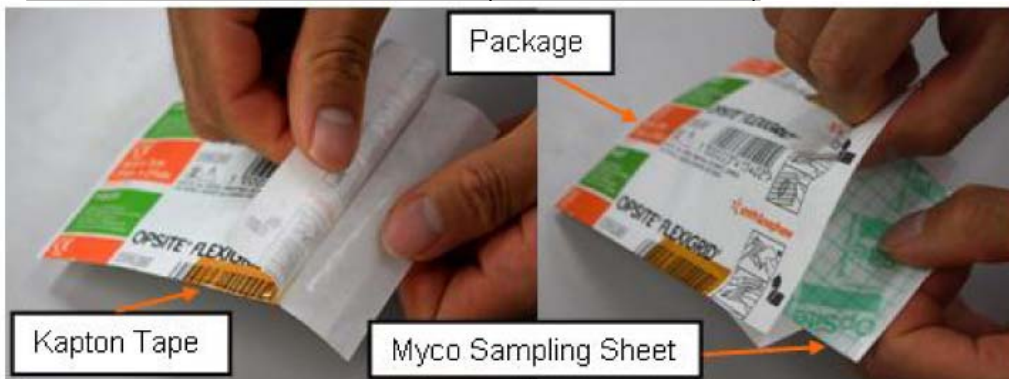


Figure 1. Opening the package of Myco Sampling Sheet

MYCO BODY SAMPLE COLLECTION

(ASSY OPS/20A/FIN 1)

Page 2 of 8 pages

NOTE

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

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

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

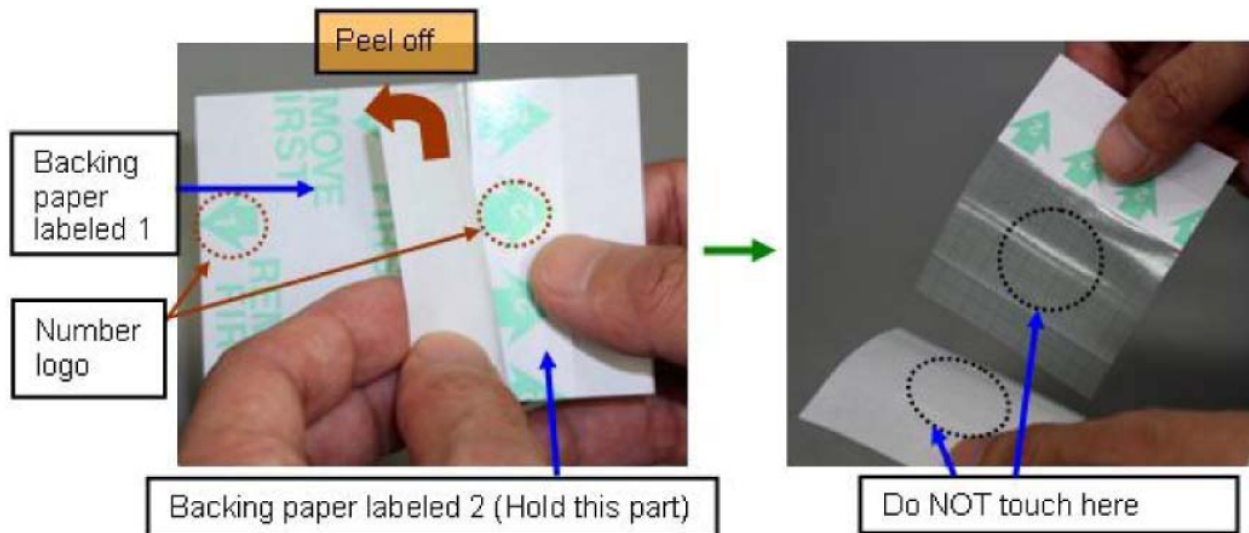


Figure 2. Peeling off backing paper labeled 1.

CAUTION

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

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

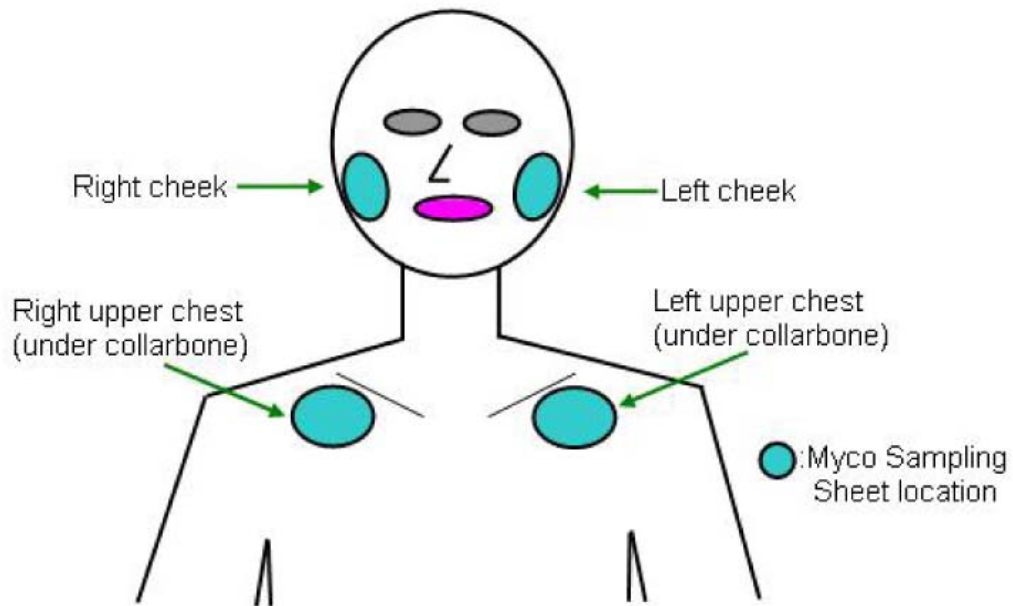


Figure 3. Myco Sampling Sheet location

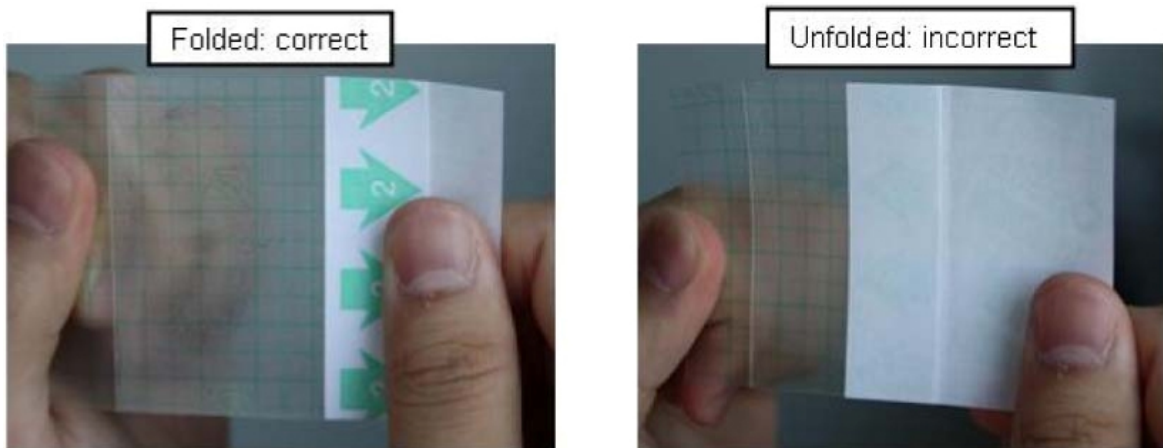


Figure 4. Unfolded and folded backing paper labeled 2.

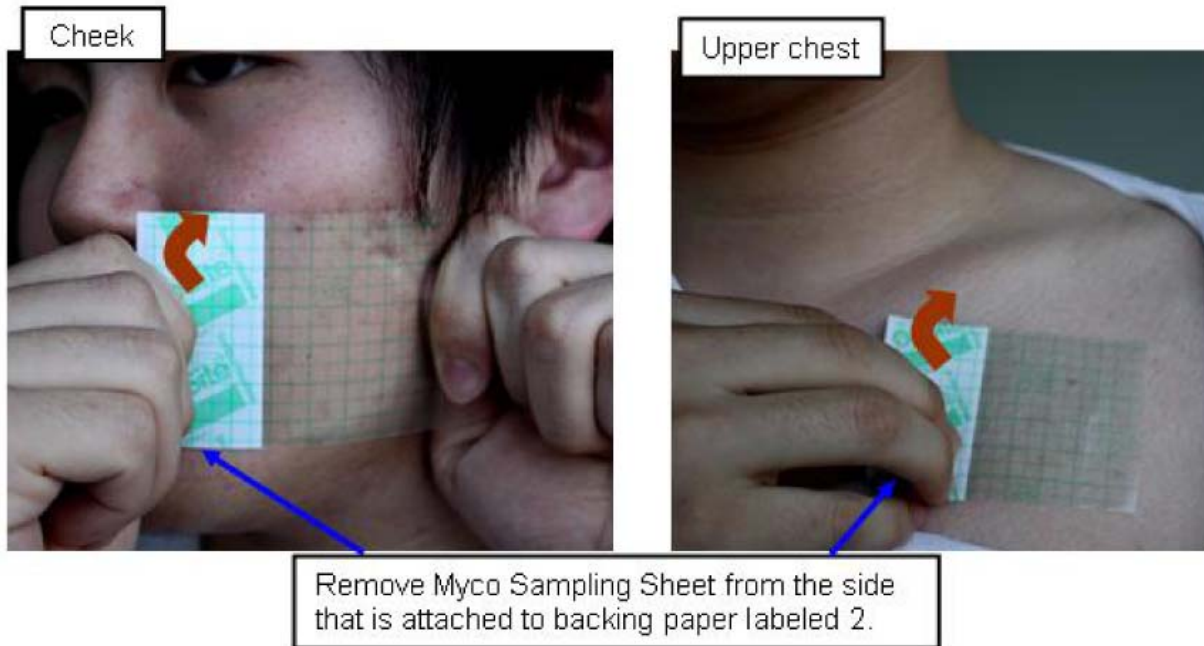


Figure 5. Applying and removing Myco Sampling Sheet

NOTE

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

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

Refer to Figures 3, 4 and 5.

If sampling location is cheek,

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

Refer to Figure 5.

If sampling location is upper chest,

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

Refer to Figure 5.

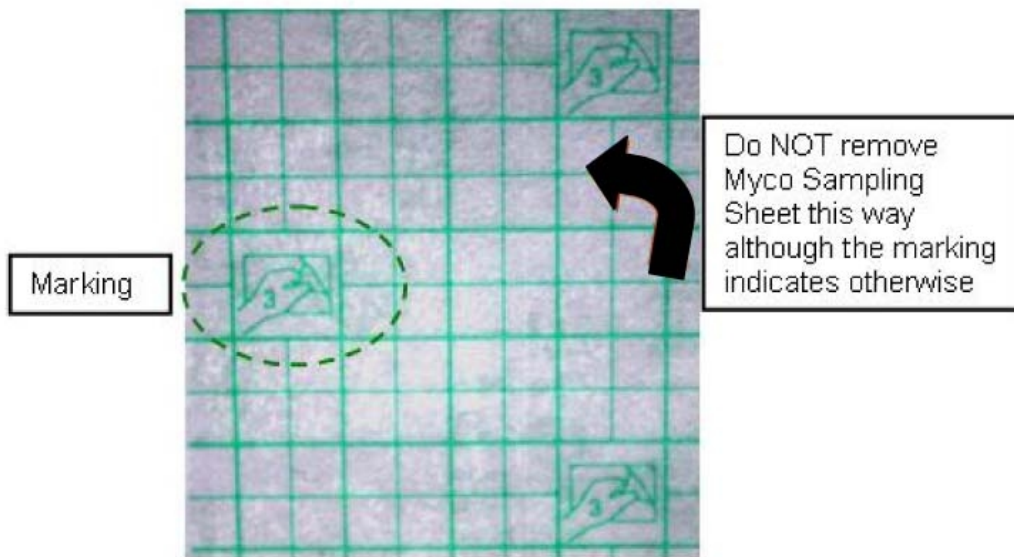


Figure 6. The marking on Myco Sampling Sheet.

CAUTION

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

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

NOTE

Myco Sampling Sheet must be applied three times to the sampling location to ensure good sampling.

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

If no touch sample area inadvertently touched with something other than the Myco Sampling Sheet location,
 Use spare Myco Sampling Sheet.
 Label the white side of the package with the sampling location. (Sharpie Flight Pen)

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

Refer to Figure 2.

- 2.8 Put Myco Sampling Sheet back in the package.

Fold the opening of the package.

2.9 Stow the package in Myco Sampling Sheet Storage Bag.

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

Refer to Figure 3.

2.11 Stow Myco Sampling Sheet Storage Bag in Myco Kit.

3. BODY SAMPLE COLLECTIONS 2 (NASAL CAVITY SWAB)



Figure 7. Myco Swab

NOTE

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

3.1 Remove Myco Swab for right nasal cavity from Myco Kit.

Refer to Figure 7.

CAUTION

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

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

Refer to Figure 7.

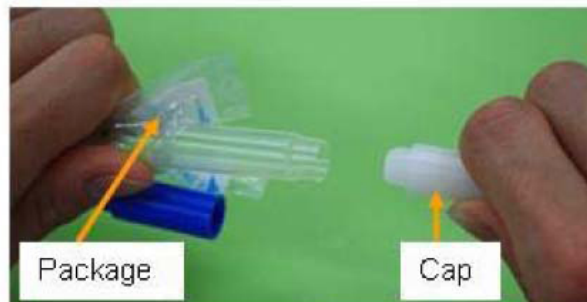


Figure 8. Removing the tube cap

3.3 Remove and trash cap from tube.

Refer to Figure 8.



Figure 9. Swab stick.

CAUTION
Tip or stick must not be touched to avoid contamination. Refer to Figure 9.

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

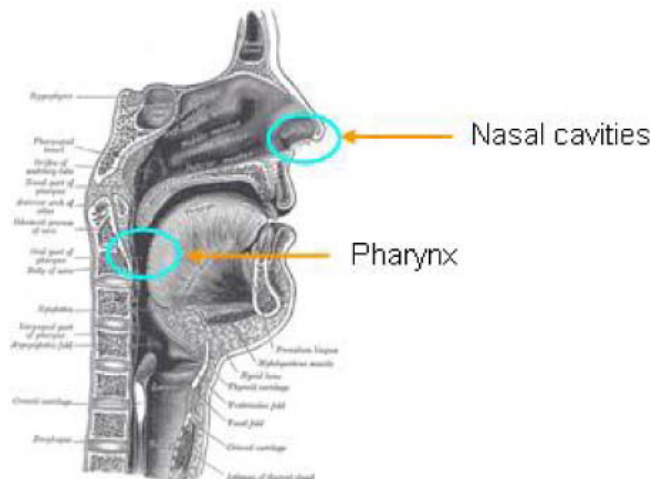


Figure 10. Myco Swab location.

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

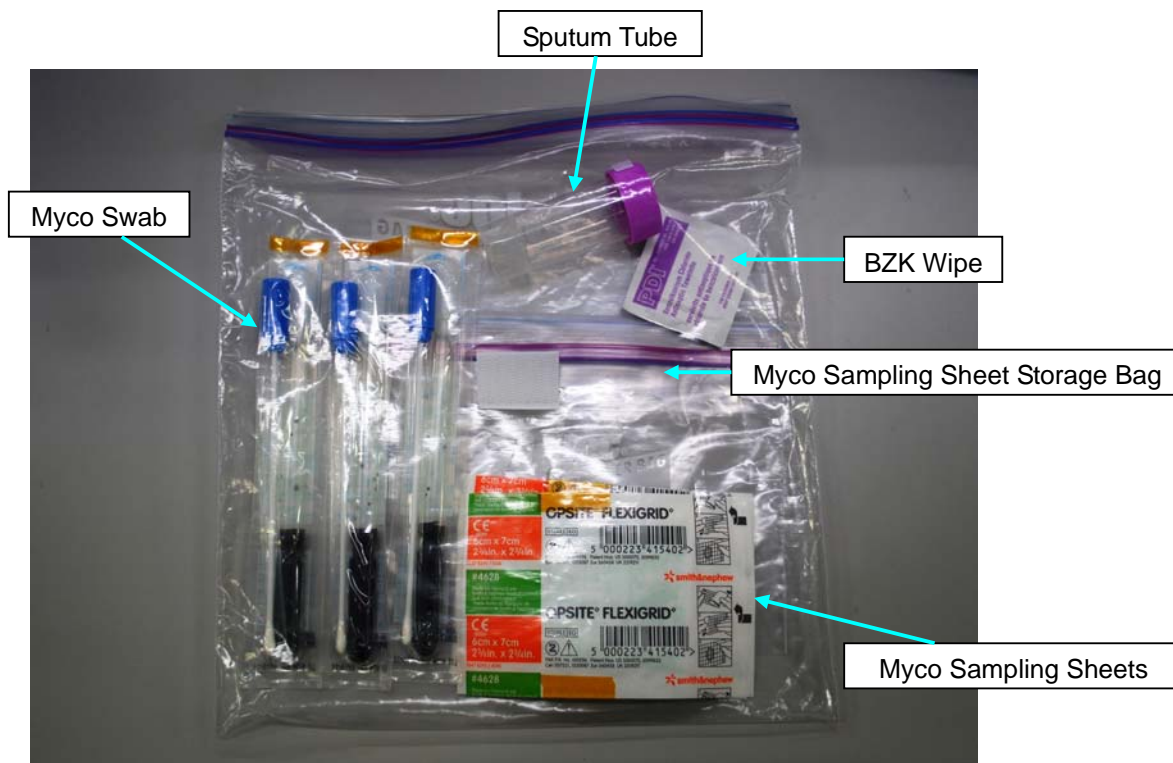
- 4.2 Repeat steps 3.1 to 3.7 for the posterior pharynx. (Use mirror if necessary)
Refer to Figure 10.

5. BODY SAMPLE COLLECTIONS 4 (SPUTUM TUBE)

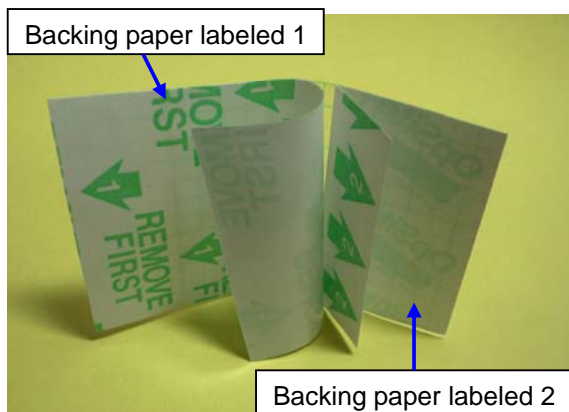
- 5.1 Remove Sputum Tube from Myco Kit.
- 5.2 Remove cap from Sputum Tube. (rotate ccw)
- 5.3 Expectorate sputum into Sputum Tube.
If crew could not expectorate sputum,
| Expectorate saliva into Sputum Tube.
- 5.4 Close Sputum Tube cap.
- 5.5 Stow Sputum Tube in Myco Kit.

6. CLOSE OUT

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



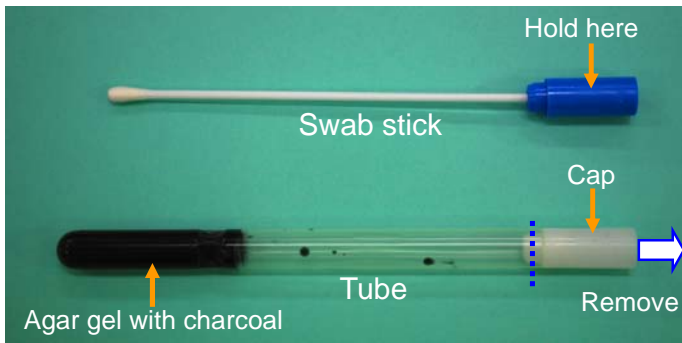
Myco Kit



Myco Sampling Sheet



Myco Sampling Sheet Storage Bag



Myco Swab



Sputum Tube

OBJECTIVE:

This procedure will be used for National Laboratory Pathfinder (NLP) Vaccine activities. The crew removes a Group Activation Pack (GAP) from a foam block, inspects the GAP for leakage, installs handle and turns it until plate aligns with Activation Line, shakes GAP, inspects it for leakage, places GAP back in foam block.

PARTS:

NLP-Vaccine

Group Activation Packs (GAPs)

Hand Crank

Ziplock Bag (if required)

1. Check Flight Plan Detail Page for which GAPs to activate. Record information in Table 1 in step 2.1.

MF57K

2. ACTIVATING NLP EXPERIMENT

- 2.1 Record Activation Start MET in Table 1.

Table 1.

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

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

- 2.2 Remove one GAP listed in Table 1 from Foam.

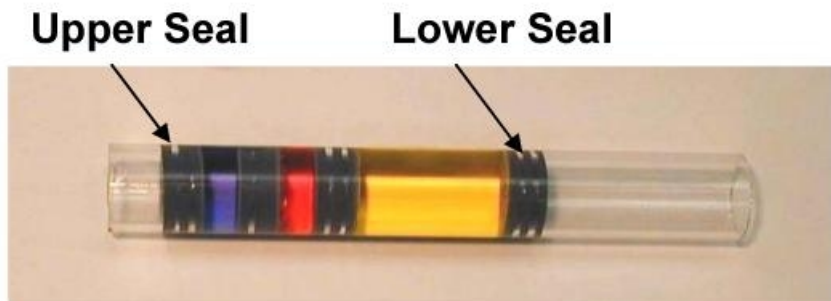


Figure 1. Loaded Glass Barrel.

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

*
* If any external leakage is evident
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with GAP number.
*

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

* If any leakage is evident in two or fewer Glass Barrel(s)
* | Complete step 2, then seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with Glass Barrel and GAP number(s).
*

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

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

- 2.8 Restow GAP in original location.
- 2.9 Repeat step 2.2 to 2.8 until all GAPs identified in Table 1 are activated.
- 2.10 Record Activation Stop MET in Table 1.
- 2.11 Restow Hand Crank in original location.
- 3. ✓**MCC-H** and provide METs recorded in Table 1.

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OBJECTIVE:

This procedure will be used for National Laboratory Pathfinder (NLP) Vaccine activities. The crew removes a Group Activation Pack (GAP) from a foam block, inspects GAP for leakage, installs handle and turns it until plate aligns with Termination Line, shakes GAP, inspects it for leakage, and places GAP back in foam block.

PARTS:

NLP-Vaccine

Group Activation Packs (GAPs)

Hand Crank

Ziplock Bag (if required)

1. Check Flight Plan Detail Page for which GAPs to terminate. Record information in Table 1 in step 2.1.

MF57K

2. TERMINATING NLP EXPERIMENT

- 2.1 Record Termination Start MET in Table 1.

Table 1.

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

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

- 2.2 Remove one GAP listed in Table 1 from Foam.

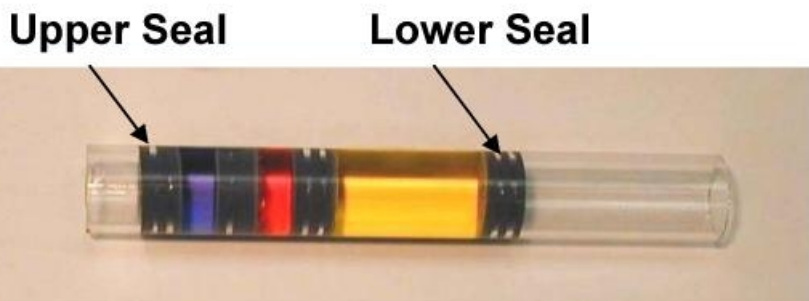


Figure 1. Loaded Glass Barrel

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

*
* If any external leakage is evident
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with GAP number.
*

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

* If any leakage is evident in two or fewer Glass Barrel(s)
* | Complete step 2, then seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with Glass Barrel and GAP number(s).
*

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


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

- 2.8 Restow GAP in original location.
- 2.9 Repeat step 2.2 to step 2.8 until all GAPs identified in Table 1 are terminated.
- 2.10 Record Termination Stop MET in Table 1.
- 2.11 Restow Hand Crank in original location.
- 3. ✓**MCC-H** and provide METs recorded in Table 1.

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SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/20A/FIN 1)

Page 1 of 14 pages

OBJECTIVE:

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

PARTS:

Spinal Elongation Kit

TOOLS:

12-24mm Lens

4GB EVA Flash Card (empty)

CF Card Adapter

D2Xs Camera

Multi-Use Arm (Shuttle)

SB-800 Flash

Shutter Release Cable (labeled Remote Cord Assembly)

1. UNSTOW HARDWARE

1.1 If first session for Spinal Elongation,

Unstow from ISS (consult stowage notes):
Spinal Elongation Kit
Retrieve from Shuttle Location:
Multi-Use Arm

If subsequent session for Spinal Elongation,

Retrieve from tmpiry stow location on Shuttle:
Spinal Elongation Kit
Multi-Use Arm

1.2 Retrieve from Shuttle:

12-24mm Lens
CF Card Adapter
D2Xs Camera
SB-800 Flash

2. SETUP SPINAL ELONGATION HARDWARE ON CREW SEAT

2.1 CDR SEAT PWR BUS SEL - AC 2 (up)

2.2 Remove parachute from CDR seat (attached by velcro strap) and tmpiry stow.

2.3 Configure CDR seat back in entry configuration and move seat all the way forward.

2.4 Raise the seat pan so it is slightly above the center console.

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/20A/FIN 1)

Page 2 of 14 pages

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



Figure 1. Shoulder Harness Wrapped Around CDR Seat Back

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

Spinal
Elongation
Kit

- 2.7 Unstow:

Anthropometer Base
Slider Post
Head Bar

Place hardware in CDR seat for setup.

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

CAUTION

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

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

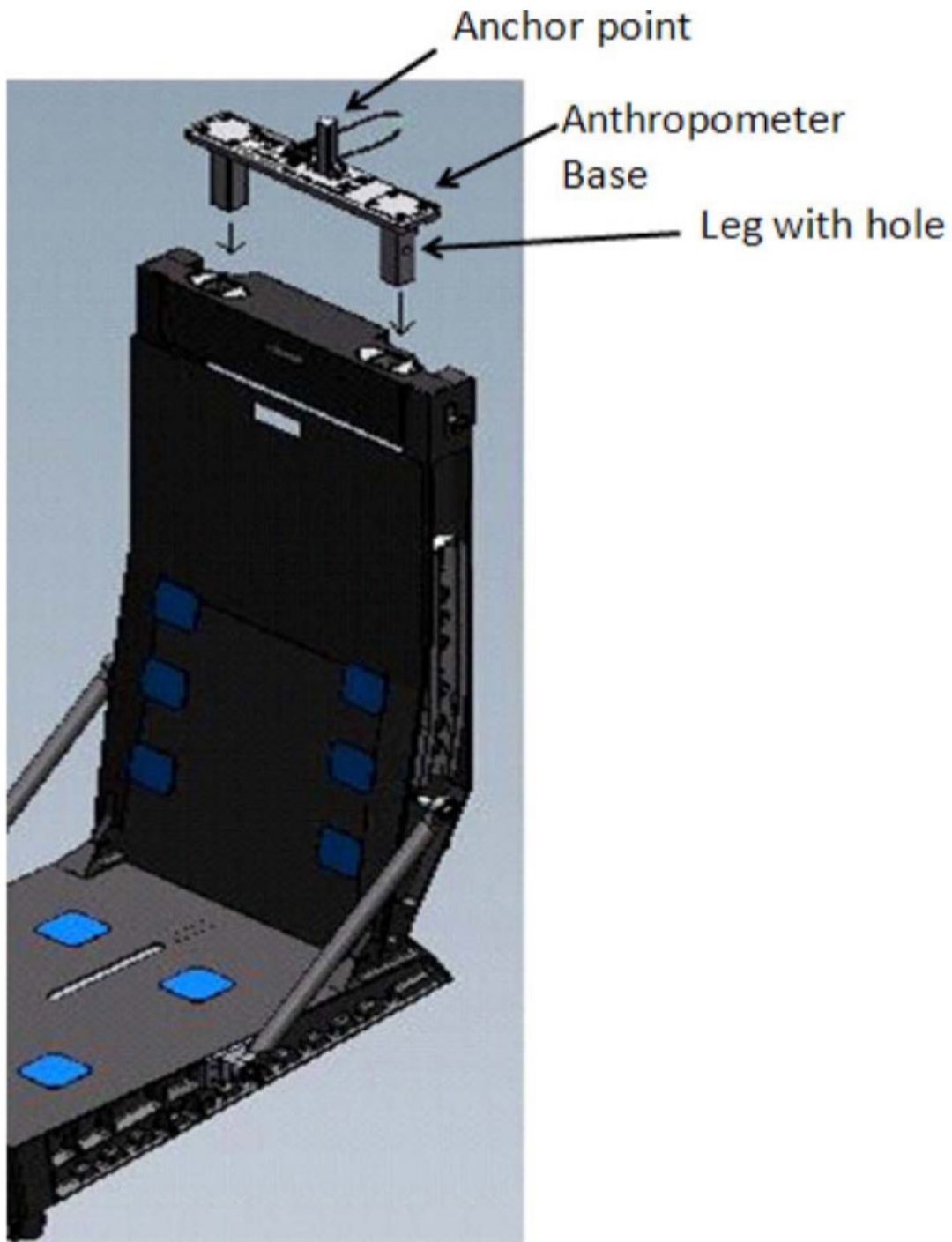


Figure 2. Anthropometer Base on CDR Seat

- 2.7.5 Remove pin from Anthropometer Base.
- 2.7.6 Attach Slider Post onto anchor point of Anthropometer Base (ensure numbers face toward PLT seat).
- 2.7.7 Reinstall pin to secure Slider Post.
- 2.7.8 Insert Head Bar into slot on Slider Post (loosen adjustment screw if necessary to insert Head Bar).

Refer to Figure 3.

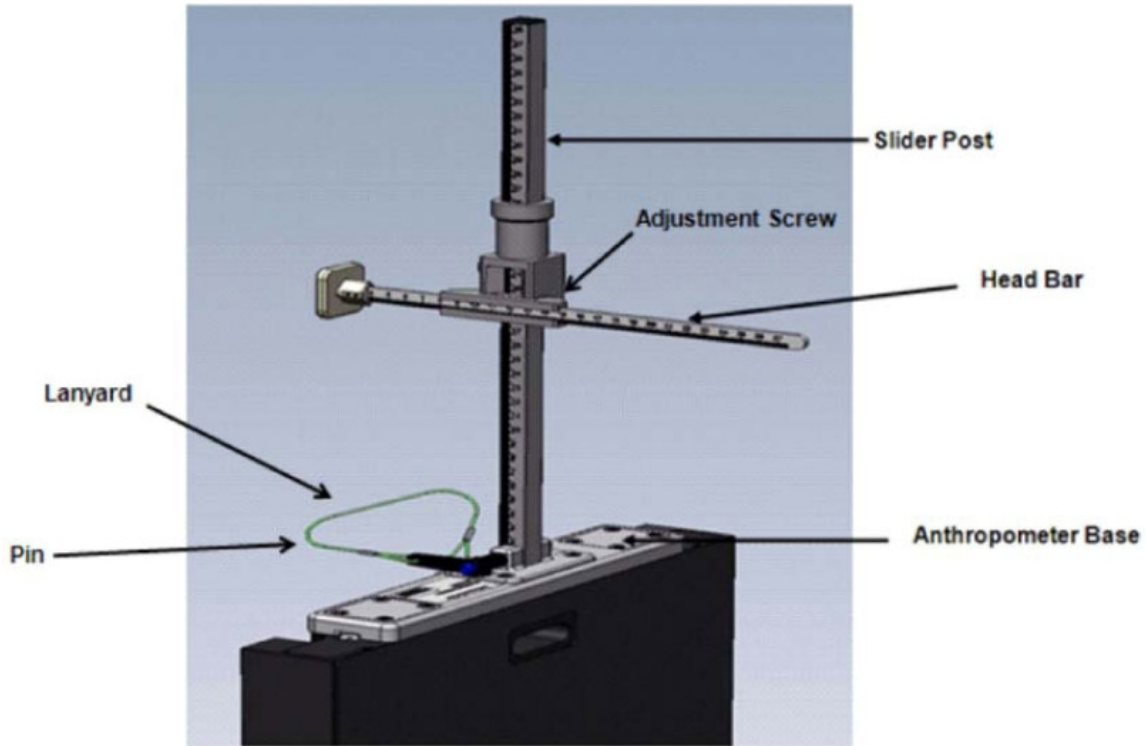


Figure 3. Final Assembly of Anthropometer Base on CDR Seat

3. LAP BELT SETUP

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

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

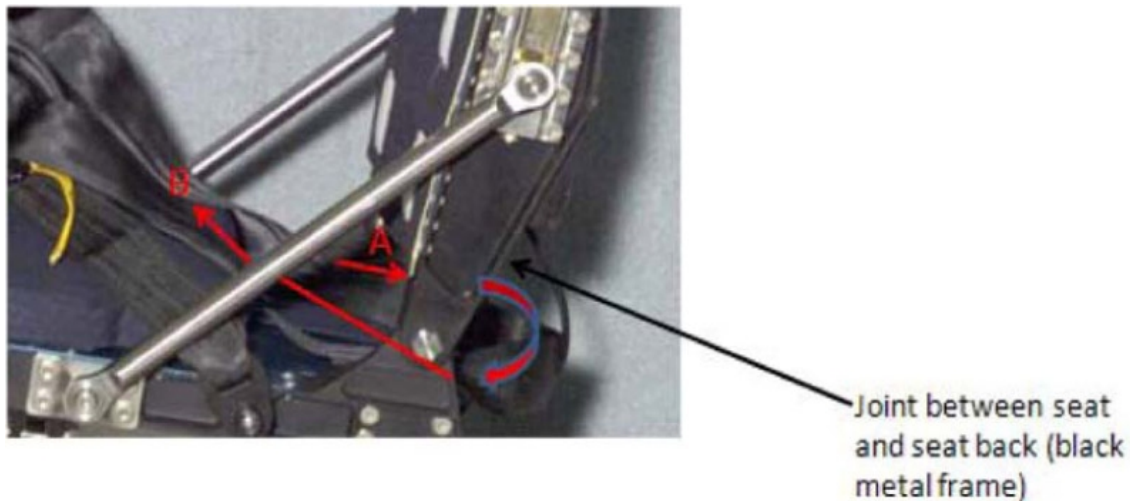


Figure 4. Lap Belt and Seat Back Joint Illustration

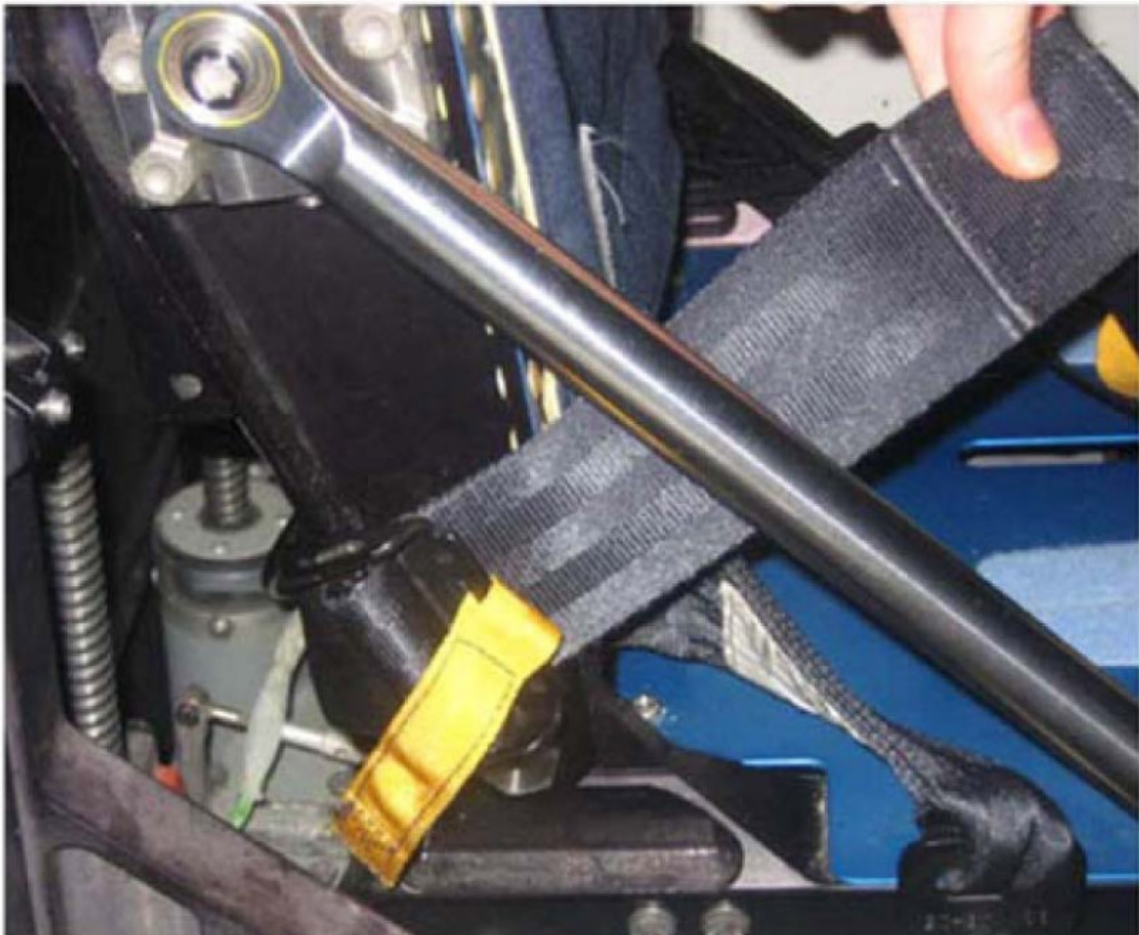


Figure 5. Joint Between Seat and Seat Back (Black Metal Frame)

4. D2XS CAMERA SETUP AND CONFIGURE

- 4.1 Install SB-800 Flash onto D2Xs Camera (if not installed).
Install 12-24mm Lens onto D2Xs Camera (if not installed).
- 4.2 Install Shutter Release Cable onto D2Xs Camera (if not installed).
- 4.3 Check memory of 4GB EVA Flash Card in D2Xs Camera is empty.
If memory of 4GB EVA Flash Card in D2Xs Camera is not empty,
 - Remove 4GB EVA Flash Card from D2Xs Camera and tmpy stow.
 - Retrieve 4GB EVA Flash Card with empty memory and install in D2Xs Camera.
- 4.4 D2Xs Camera settings should be as follows:
 Lens - 12-24mm Lens, set at 15mm
 Lens Focus Mode - M/A
 Body Focus Mode - S
 ✓Batt installed
 ✓Flash Card installed
 Pwr - ON
 Top LCD:

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/20A/FIN 1)

Page 7 of 14 pages

- ✓Batt
- ✓Frames remaining sufficient
 - Exp Comp - 0.0
 - Exp Mode - A
 - f/stop - 11
 - Meter - Matrix
 - Diopter - Adjust
 - Frame Rate - S
- ✓BKT disabled - 0F
- Rear LCD:
 - ✓ISO - 100
 - ✓QUAL - RAW
 - ✓WB - 0, A
 - AF Area Mode - []
- ✓Focus Area - Center
- ✓Focus Selector Lock - L

- SB-800 Flash Settings:
 - ✓Diffuser Dome installed
 - pb ON/OFF → ON
 - ✓MODE - TTL BL
 - ✓Exp Comp - 0 EV

Tilt - Direct

NOTE

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

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

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

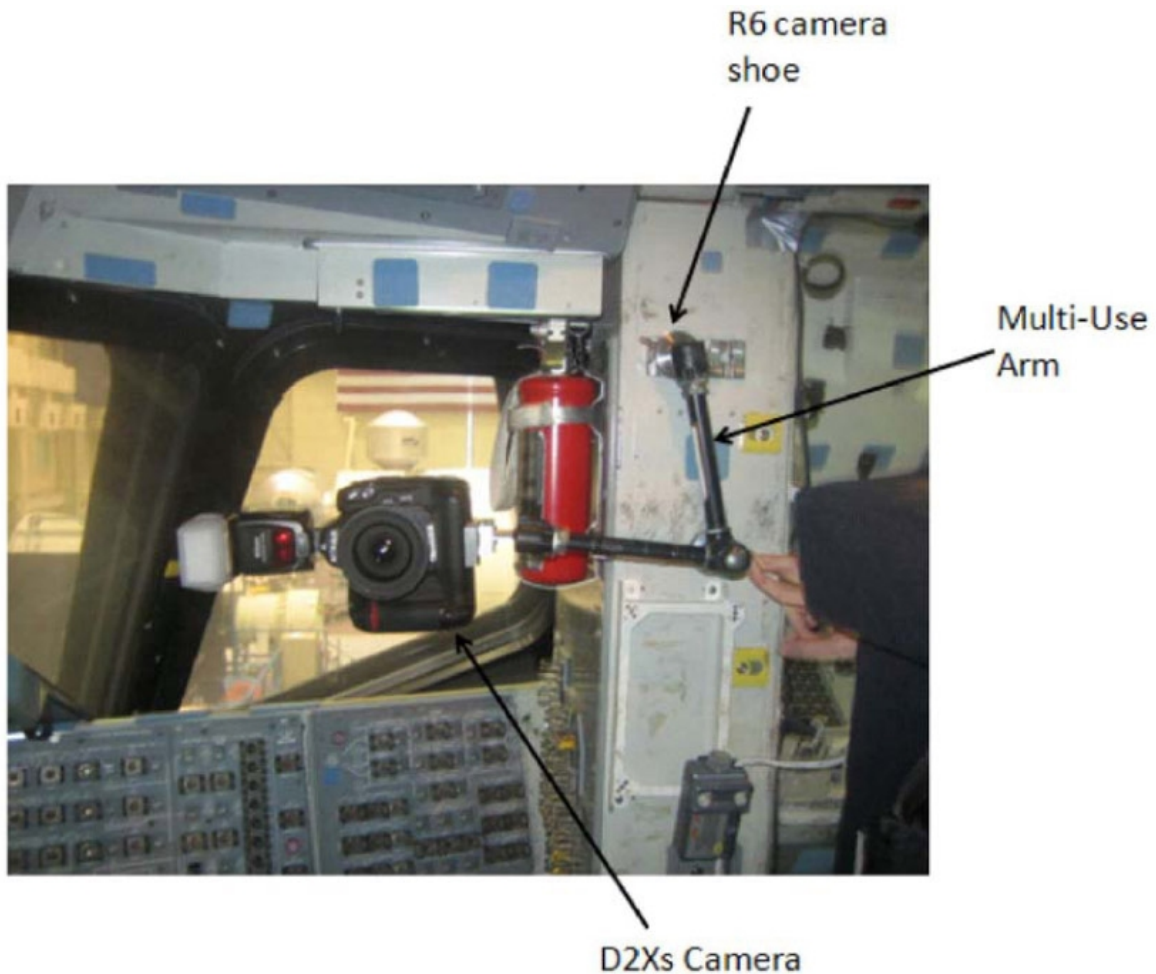


Figure 6. D2Xs Camera Positioned on R6 Camera Shoe

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

NOTE

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

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

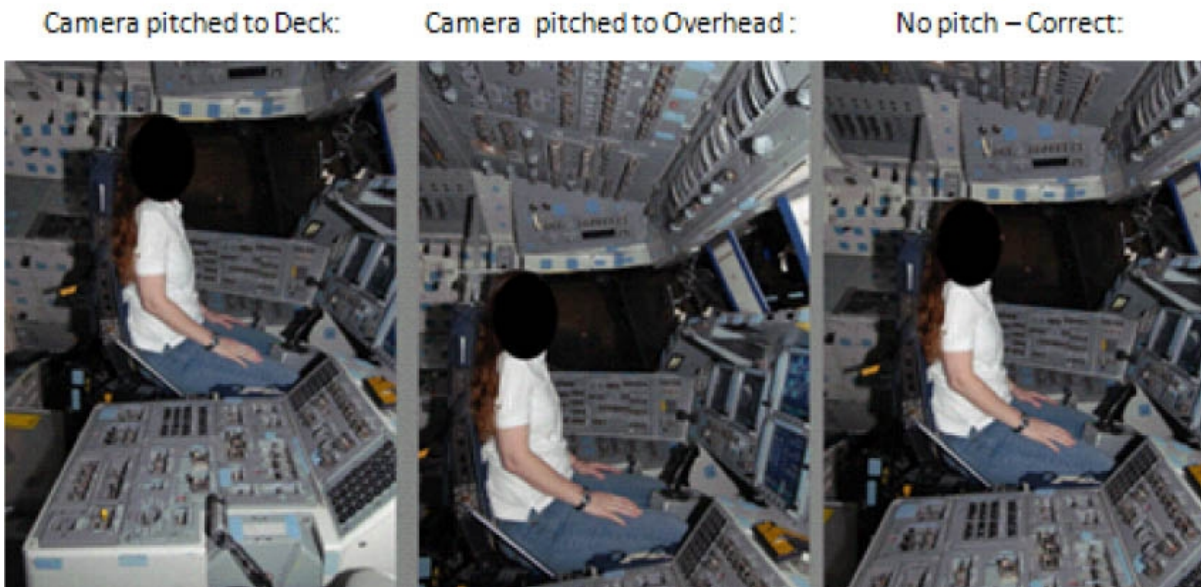


Figure 7. Views based on different camera positions.

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

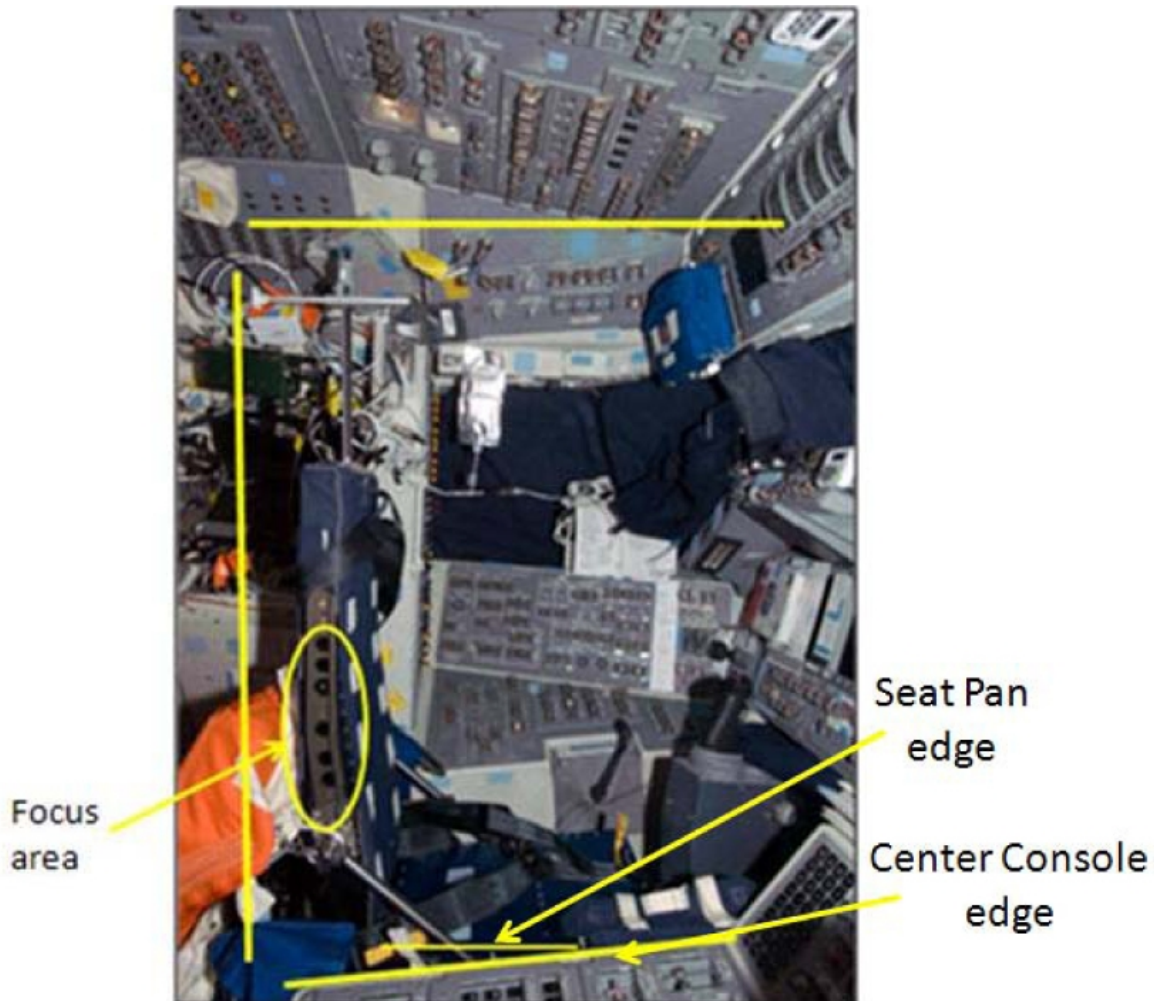


Figure 8. Correct D2Xs Camera Image Capture Area

- 4.10 Remove 4GB EVA Flash Card from D2Xs Camera. Retrieve CF Card Adapter. Insert 4GB EVA Flash Card into CF Card Adapter. Insert CF Card Adapter into any networked PGSC.

- 4.11 ✓MCC-H (specify which PGSC file resides on)

5. SUBJECT POSITIONING

5.1 **On MCC-H GO**

Remove CF Card Adapter from PGSC and Remove 4GB EVA Flash Card from CF Card Adapter. Insert 4GB EVA Flash Card into D2Xs Camera.

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

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

- 5.3 Remove and tmpy stow Head Bar.

CAUTION

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

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

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

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

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

- 5.5 Operator will ensure subject sits erect and gazes directly ahead (head lines up, not looking at an angle) at the HUD reference object. Operator should also ensure subject is centered between the left and right sides of the seat.

- 5.6 Retrieve Head Bar from tmpy stow and insert into slot on Slider Post, ensuring that numbers on the Head Bar and slot on the Slider Post are facing the D2Xs Camera. Refer to Figure 9.

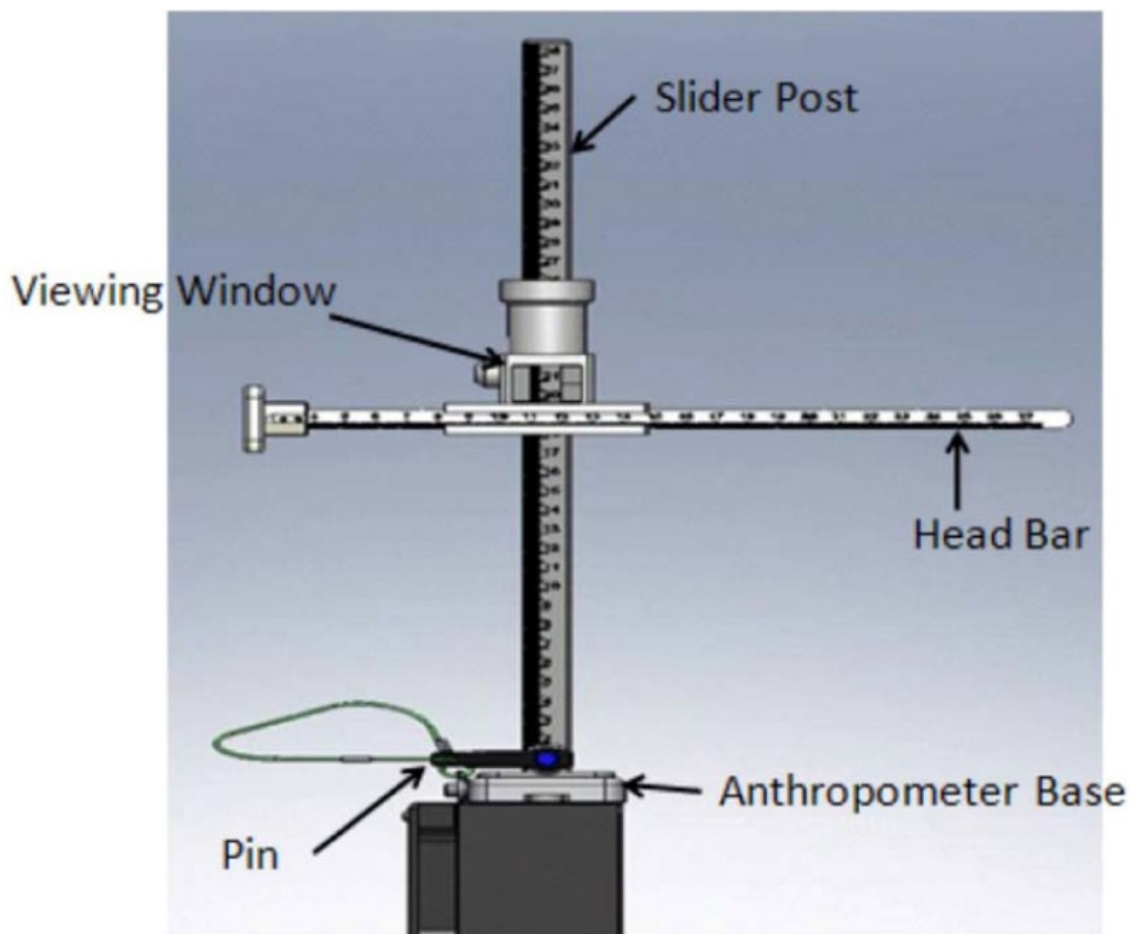


Figure 9. Head Bar Connected to Slider Post

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

6. DATA COLLECTION

6.1 Record measurement on SPINAL ELONGATION LOG. Measurements should be taken as the number between the marks on the viewing window of the Slider Post.

6.2 Operator should take photograph of subject using D2Xs Camera.

6.3 Remove Head Bar and tmpy stow.

6.4 Subject should exit CDR seat and stretch. Subject should then return to seat.

NOTE

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

6.5 Repeat step 5.4 through step 6.3 to complete the second measurement (for a total of two measurements per subject).

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/20A/FIN 1)

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6.6 Repeat step 5.4 through step 6.5 for each additional subject (ensure new subjects wear light-weight clothing).

7. DISASSEMBLY

7.1 Remove D2Xs Camera from Multi-Use Arm.

Remove Multi-Use Arm with D2Xs Camera attached from R6 camera shoe.

Put away Multi-Use Arm to original location.

7.2 Remove 4GB EVA Flash Card from D2Xs Camera.
Retrieve CF Card Adapter.
Insert 4GB EVA Flash Card into CF Card Adapter.
Insert CF Card Adapter into any networked PGSC.

✓**MCC-H** (specify which PGSC file resides on)

7.3 Disassemble Spinal Elongation hardware from CDR seat.

7.3.1 Remove pin from Anthropometer Base and remove Slider Post from anchor point. Install pin back into Anthropometer Base.

7.3.2 Retrieve Head Bar from tmpy stow,

7.3.3 Remove Anthropometer Base from top of the seat. Restore seat cover to original placement on the top of the seat.

7.4 Reconfigure CDR seat to nominal configuration.

7.4.1 Retrieve head rest and seat pan cushion from tmpy stow.

7.4.2 Install head rest on top of CDR seat

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

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

7.4.5 CDR SEAT PWR BUS SEL - OFF (ctr)

8. CONCLUDING OPERATIONS

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

8.2 Stow:

Anthropometer Base
Slider Post
Head Bar

Spinal
Elongation
Kit

11 JAN 10

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/20A/FIN 1)

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

Crew should inform ground of tmpry stow location.

8.3 When all sessions for this mission are concluded,

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

SPINAL ELONGATION LOG

(ASSY OPS/20A/FIN)

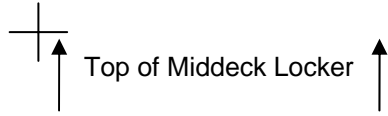
Page 1 of 1 page

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

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SPINAL ELONGATION STANDING HEIGHT LOG

(ASSY OPS/20A/FIN 1)



SPINAL ELONGATION STANDING HEIGHT LOG

- 1) Velcro cue card to the farthest right column of the middeck lockers ensuring that the top of the page lines up with the top of the middeck locker. (If log is placed somewhere else, please note on the log exactly where it was placed.)
- 2) Subject holds self with his/her back against the middeck lockers and holds self down.
- 3) Operator helps to ensure feet are flush with the ground.
- 4) Operator marks height of subject using a cue card as a flat edge on paper with a pen and labels with Subject ID and date.
- 5) Repeat steps 2-4 for each subject.
- 6) After all subjects have been completed, remove Spinal Elongation Height Log from middeck lockers and place in the Spinal Procedure manila envelope for return.



HINGE

ASSY OPS-3a/20A/B



SPINAL ELONGATION STANDING HEIGHT LOG
(ASSY OPS/20A/FIN 1)



HINGE

ASSY OPS-3b/20A/B



TOP
HINGED AT BOTTOM OF
'SPINAL ELONGATION STANDING HEIGHT LOG'
HINGE

SPINAL ELONGATION STANDING HEIGHT LOG
(ASSY OPS/20A/FIN 1)



ASSY OPS-3aa/20A/B



683

TOP
HINGED AT BOTTOM OF
BACK OF 'SPINAL ELONGATION STANDING HEIGHT LOG'
HINGE

SPINAL ELONGATION STANDING HEIGHT LOG
(ASSY OPS/20A/FIN 1)



ASSY OPS-3bb/20A/B



ASCENT SAMPLE TRANSFER FROM GLACIER TO MELFI

(ASSY OPS/20A/FIN 1)

Page 1 of 4 pages

OBJECTIVE:

This procedure will be used to transfer frozen science samples from Shuttle Glacier to ISS MELFI-2 using one Double Coldbag. This activity is performed by ISS and shuttle crewmembers.

PARTS:

Double Coldbag S/N 1004

Light Duty Cryo Gloves

TOOLS

Ratchet, 1/4" Drive

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

4" Ext, 1/4" Drive

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

ITEMS TO UNSTOW WITHIN PROCEDURE:

Icepac Belt -32° C (two) (unstow steps 2)

Nanoskeleton Cartridge (unstow step 4)

- MF28E/G (Glacier)
1. Unlock Glacier Door Captive Locks (two) using 3/16" Hex Head, 3/8" Drive, 4" Ext, 1/4" Drive, 1/4" to 3/8" Adapter (1/4" Drive), Ratchet, 1/4" Drive.

Refer to Figure 1.

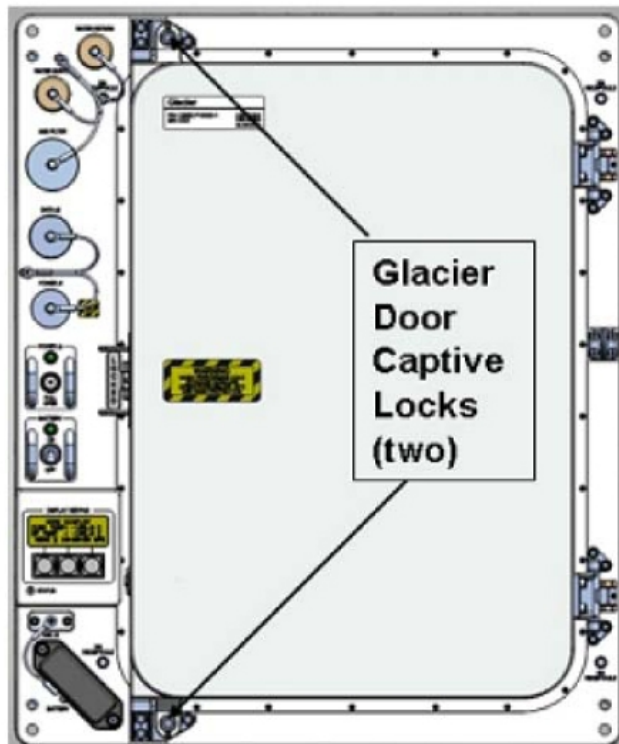


Figure 1. Glacier Door Captive Locks.

2. PACKING ICEPACS INTO DOUBLE COLDBAG

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

CAUTION
1. Minimize exposure of MELFI trays and frozen Icepacs to ambient air to prevent increased sample temperatures.
2. Double Coldbag lid should remain closed when the internal volume is not being accessed.

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

2.1 Don Gloves.

MELFI-1
(JPM1D4)

2.2 Open MELFI-1, Dewar 1, Tray A, Section1 and Section 2
Remove Icepac Belt (two) and put in Double Coldbag.

*
* If Tray is stuck and cannot be removed from Dewar
* | Insert Small Coldplate/Wireway Cover completely between
* | Tray and Dewar wall
* | Firmly holding both Small Coldplate/Wireway Cover and Tray
* | Handle, remove Tray from Dewar.
* | Reference: [4.010 MELFI REMOVAL OF A STUCK TRAY](#),
* | steps 5 to 13 (US PODF: MELFI) if needed.
*

ISS to
Shuttle

3. Transfer Double Coldbag to shuttle middeck.

Middeck

4. PACKING GLACIER SAMPLES INTO DOUBLE COLDBAG

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

ASCENT SAMPLE TRANSFER FROM GLACIER TO MELFI

(ASSY OPS/20A/FIN 1)

Page 3 of 4 pages

CAUTION

1. Minimize exposure of Glacier trays and samples to ambient air to prevent increased sample temperatures.
2. Glacier inner doors should remain closed when the internal volume is not being accessed. Glacier doors should not be open for longer than 2 minutes.

Glacier
MF28E/G

- 4.1 Don Gloves.
- 4.2 Remove Nanoskeleton Cartridge from Glacier Tray A and pack in Double Coldbag per Figure 2, close lid.

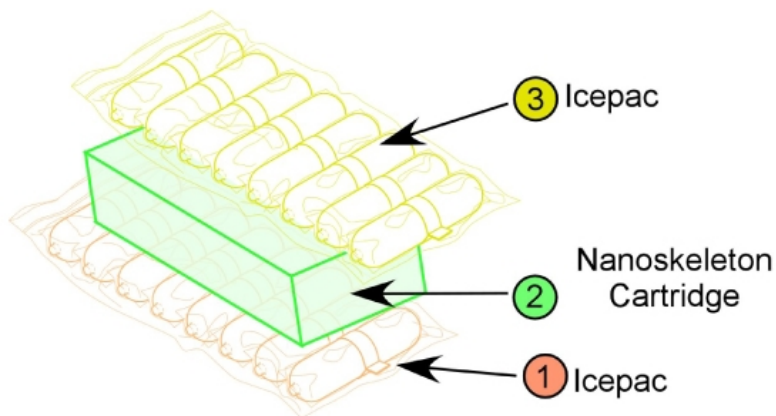


Figure 2. Double Coldbag Configuration.

5. Transfer Double Coldbag to ISS MELFI-2.
6. UNPACKING DOUBLE COLDBAG AND INSERTING SAMPLE INTO MELFI

WARNING

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

MELF-2
(LAB1S2)

- 6.1 Don Gloves.
- 6.2 Insert Nanoskeleton Cartridge in Dewar 1, Tray A, Section 3-4.

```

*****
*
* If Tray is stuck and cannot be removed from Dewar
*   | Insert Small Coldplate/Wireway Cover completely between
*   | Tray and Dewar wall
*   | Firmly holding both Small Coldplate/Wireway Cover and Tray
*   | Handle, remove Tray from Dewar.
*   | Reference: 4.010 MELFI REMOVAL OF A STUCK TRAY,
*   | steps 5 to 13 (US PODF: MELFI) if needed.
*
*****

```

7. TEMPORARILY STOW DOUBLE COLDBAG AND ICEPACS

7.1 Transfer Double Coldbag to temporary stowage location that allows for protection from kick loads.

7.2 Remove Icepac Belt -32° C (two) from Double Coldbag and place in temporary stowage location to air dry.

8. Notify **MCC-H** that transfer activities completed and locations for Double Coldbag and Icepacs.

9. GROUND UPDATES FOR IMS

Ground updates IMS for the following parts:

Double Cold Bag S/N 1004 TO: per crew call down (step 8.2)

Icepac Belt -32° C (two) TO: per crew call down (step 8.2)

Nanoskeleton Cartridge TO: MELFI-2

DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/20A/FIN 1)

Page 1 of 5 pages

OBJECTIVE:

This procedure will be used to transfer frozen science samples from both ISS MELFIs to Shuttle Glacier. One Double Coldbag will be used to transfer samples from both MELFIs to Glacier.

This activity is performed by ISS and shuttle crewmembers.

PARTS:

Double Coldbag S/N 1004

Light Duty Cryo Gloves

TOOLS:

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

4" Ext, 1/4" Drive

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

Ratchet, 1/4" Drive

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

ITEMS TO UNSTOW WITHIN PROCEDURE:

Icepac Belt -32° C (two) (unstow step 2)

Mesh Bags (nine) (unstow step 2)

APEX-Cambium KFT (seven) (unstow step 2)

JAXA CERISE CBH (four) (unstow step 2)

MF28E/G (Glacier) 1. Unlock Glacier Door Captive Locks (two) using 3/16" Hex Head, 1/4" Drive, 4" Ext, 1/4" Drive, 1/4" to 3/8" Adapter (1/4" Drive), Ratchet, 1/4" Drive.

Refer to Figure 1.

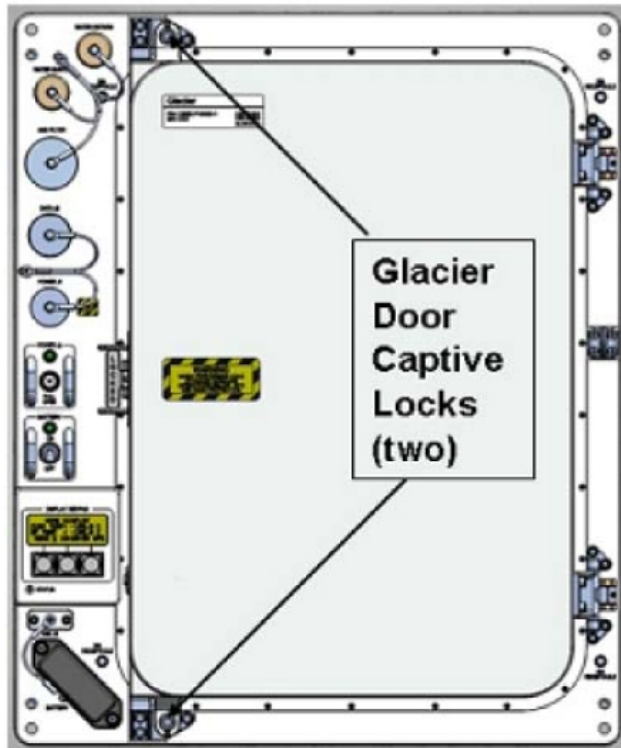


Figure 1. Glacier Door Captive Locks.

MELFI 2. PACKING MELFI SAMPLES INTO DOUBLE COLDBAG

WARNING

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

CAUTION

1. Minimize exposure of MELFI trays, frozen Icepacs, and samples to ambient air to prevent increased sample temperatures.
2. Double Coldbag lid should remain closed when the internal volume is not being accessed.

NOTE

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

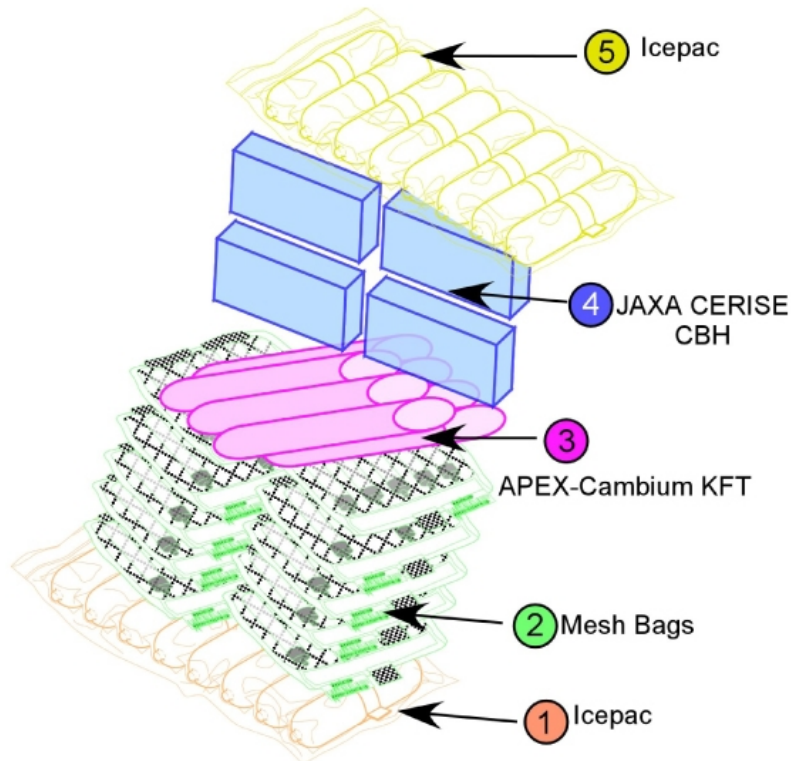
- 2.1 Don Gloves.
- 2.2 Pack Double Coldbag per Figure 2.

DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/20A/FIN 1)

Page 3 of 5 pages

 *
 * If Tray is stuck and cannot be removed from Dewar
 * | Insert Small Coldplate/Wireway Cover completely between
 * | Tray and Dewar wall
 * | Firmly holding both Small Coldplate/Wireway Cover and Tray
 * | Handle, remove Tray from Dewar.
 * | Reference: [4.010 MELFI REMOVAL OF A STUCK TRAY](#),
 * | steps 5 to 13 (US PODF: MELFI) if needed.
 *



Order	From	Description
1	MELFI-1 3-D-2	Install Icepac Belt -32°C on bottom
2a	MELFI-1 3-D-1	Install Mesh bag, Urine Pro-K (three)
2b	MELFI-1 3-A-2	Install Mesh bag, Blood (one)
2c	MELFI-1 2-D-2	Install Mesh bag, Blood Pro-K (three)
2d	MELFI-1 2-A-1	Install Mesh bag, Blood (two)
3	MELFI-2 2-A-3-4	Install APEX-Cambium KFT (seven)
4a	MELFI-2 2-C-3-4	Install JAXA CERISE CBH (two)
4b	MELFI-2 2-D-3-4	Install JAXA CERISE CBH (two)
5	MELFI-1 2-A-4	Install Icepac Belt -32°C on top

Figure 2. Double Coldbag Packing Configuration.

3. Transfer Double Coldbag to shuttle middeck.

DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/20A/FIN 1)

Page 4 of 5 pages

4. UNPACKING DOUBLE COLDBAG AND INSERTING SAMPLES INTO GLACIER

NOTE

1. First priority is to perform packing as quickly as possible.
2. Packing foam secured to bottom of each tray can be left in place.
3. Loose cushion foam may be left in tray if there is room, or it can be trashed.

MF28E/G
(Glacier)

- 4.1 Insert JAXA CERISE CBH (two) into Tray A.
 - 4.2 Insert JAXA CERISECBH (two) in to Tray B.
 - 4.3 Insert APEX-Cambium KFT (seven) in Tray C
 - 4.4 Insert Mesh Bags (nine) in Tray D
5. ✓Glacier Door is closed.

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

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

WARNING

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

7. Fasten Glacier Door Captive Locks (two), torque to 75 in-lbs using 3/16" Hex Head, 3/8" Drive, 4" Ext, 1/4" Drive, 1/4" to 3/8" Adapter (1/4" Drive), (40-200 in-lbs) Trq Wrench, 1/4" Drive. Refer to Figure 1.
8. TEMPORARY STOW DOUBLE COLDBAG AND ICEPACS ON ISS
 - 8.1 Temporary stow Double Coldbag on ISS in location that protects from kick loads.
 - 8.2 Remove Icepac Belt -32° C (two) from Double Coldbag and place in temporary stowage location to air dry.
 - 8.3 Notify **MCC-H** that transfer activities completed and locations for Double Coldbag and Icepacs.

9. GROUND UPDATES FOR IMS

Ground updates IMS for the following parts:

Double Cold Bag S/N 1004 TO: per crew call down (step 8.3)

Icepac Belt -32° C (two) TO: per crew call down (step 8.3)

Mesh Bag (nine) TO: Middeck Glacier

APEX-Cambium KFT (seven) TO: Middeck Glacier

JAXA CERISE CBH (four) TO: Middeck Glacier

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20A CGBA SWAP - UNPOWERED

(ASSY OPS/20A/FIN)

Page 1 of 2 pages

OBJECTIVE:

To swap the ascent soft-stowed Commercial Generic Bioprocessing Apparatus (CGBA-6) with returning CGBA-4 in EXPRESS-1 Rack.

PARTS:

CGBA (two) - reference Transfer List

1. Retrieve CGBA-6 from middeck and transfer to LAB1O2.
2. DISCONNECT CABLES

LAB1O2_A
1

2.1 ✓sw LOCKER-1 POWER-J1 – OFF

CGBA-4

2.2 ✓LED-MAIN POWER – Off

2.3 ✓cb MAIN POWER – Open

2.4 Remove CGBA-4 mufflers and temporarily stow

2.5 EXPRESS Rack Power Cable ←|→POWER-IN 28 VDC J1

2.6 EXPRESS Rack Data Cable ←|→EXPRESS DATA J4

2.7 Tether Cables out of the way as needed

3. CGBA-4 REMOVAL FROM EXPRESS LOCKER

3.1 Unlatch, open locker door.

3.2 Grasp CGBA-4, pull unit out of locker using side handles. If needed, pull Velcro tabs to deploy CGBA recessed handles (push recessed handles back into place when done).

3.3 Remove CGBA-4 Restraint System from left side, inside Nomex cover. Temporarily stow CGBA-4.

3.4 Stow CGBA-4 Restraint System inside CGBA-6 Nomex cover, left side.

4. INSERTION OF CGBA-6 INTO EXPRESS-1 RACK

4.1 Slide CGBA-6 into locker, close locker door, and latch.

- 4.2 CONNECT CABLES

LAB1O2_A
1

4.2.1 ✓sw LOCKER-1 POWER-J1 – OFF

CGBA-6

4.2.2 ✓cb MAIN POWER – Open

4.2.3 EXPRESS Rack Power Cable →|←POWER-IN 28 VDC J1

4.2.4 EXPRESS Rack Data Cable →|←EXPRESS DATA J4

4.2.5 Attach CGBA-6 mufflers

5. APPLY POWER TO CGBA-6

LAB1O2_A
1

5.1 sw LOCKER-1 POWER-J1 → ON

CGBA-6

5.2 cb MAIN POWER → Close
✓LED-MAIN POWER – On

```

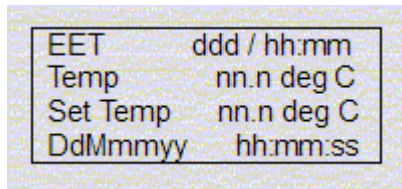
*****
*
* If no LED,
* |
* | Perform CGBA INCORRECT (NO) DISPLAY, all (SODF:
* | ASSY OPS: PAYLOADS: CGBA - MALFUNCTION), then:
* |
*****

```

6. CGBA-6 CHECK OUT

6.1 Verify CGBA-6 fan running (check airflow at EXHAUST)

6.2 Verify CGBA-6 display Indicates as follows (any values acceptable):



7. Transfer CGBA-4 to middeck per Transfer List, Return Tab.

8. Notify **MCC-H** that transfer is complete.

OBJECTIVE:

To swap the ascent middeck powered Commercial Generic Bioprocessing Apparatus-6 (CGBA-6) with returning powered CGBA-4 in EXPRESS-1 Rack. This procedure is performed in parallel with the 20A CGBA Swap -STS procedure. This procedure is used by ISS Crew to power down CGBA-4 in EXPRESS-1 Rack, transfer unit to middeck, remove GAPs from middeck Glacier-6 and place GAPs in ISS CGBA-4. ISS crew will then transfer CGBA-6 to EXPRESS-1 Rack, installs it in locker, mates cables, applies power.

NOTE

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

1. Verify transfer path between vehicles is clear.
Verify STS crew is ready to power down CGBA.

LAB102_B
1 (CGBA-4)

2. CGBA-4 POWER DOWN

- 2.1 On Keypad:
pb MENU → Press
pb 7 (Shutdown) → Press
pb ENTER → Press
- 2.2 On Shutdown CGBA-4 screen:
pb 1 (Shutdown system) → Press
pb ENTER → Press

Record GMT: _____
- 2.3 Verify CGBA-4 display indicates:

**'CGBA system shutdown
is in progress!
Please wait 2 minute
for OK To POWERDOWN'**

- 2.4 ✓CGBA-4 display indicates:

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

```

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

```

2.5 Remove mufflers (see Figure 1) and temporarily stow.

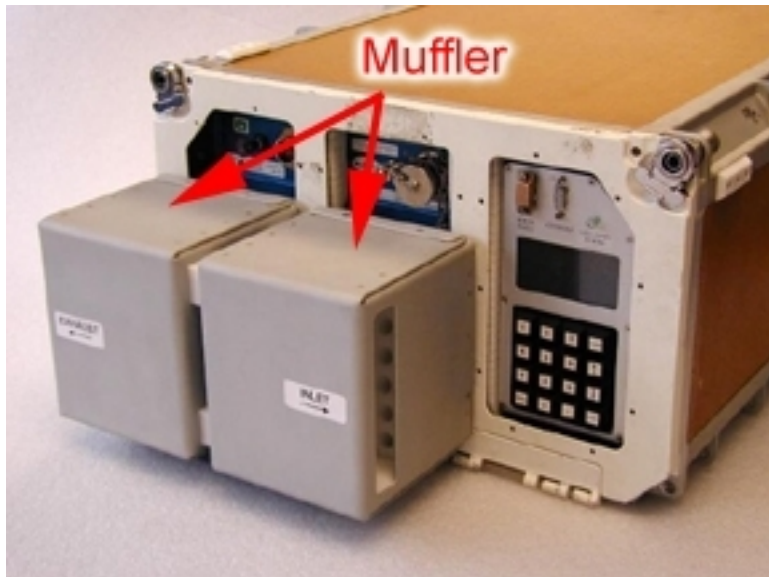


Figure 1. CGBA Muffler

3. CGBA-4 CIRCUIT BREAKER AND LOCKER SWITCH POWER OFF

LAB102_A
1

3.1 cb MAIN POWER → Open
✓LED-MAIN POWER – Off

3.2 sw LOCKER-1 POWER → OFF
✓LOCKER-1 POWER Lt – Off

CGBA-4

3.3 EXPRESS Rack Power Cable (38")←|→POWER-IN 28 VDC J1
EXPRESS Rack Data Cable (38")←|→EXPRESS DATA J4

3.4 Unlatch, open CGBA-4 locker door.

3.5 Pull Velcro tabs to deploy CGBA-4 recessed handles.
Grasp CGBA-4, pull unit out of locker (push recessed handles back into place when done).

MF71E

4. Transfer CGBA-4 to Middeck

5. TRANSFER GAPS BETWEEN CGBA UNITS

5.1 Temporarily stow CGBA-4 in a secure location for access operations.

5.2 Open CGBA-4 lid by lifting Velcro tabs on each side of Nomex cover.

5.3 Relocate GAP (nine) from CGBA-6 and place inside CGBA-4.

- 5.4 Close CGBA-4 lid, attach Velcro tabs.
- 5.5 Remove CGBA-4 Restraint System from left side, inside Nomex cover.
Hand Restraint System to STS Crew.
- 5.6 Exchange CGBA-4 unit for CGBA-6 from STS crew.
- LAB102_B 6. Transfer CGBA-6 to EXPRESS-1 Rack
1
- 6.1 Slide CGBA-6 into locker, close locker door and latch.
- 7. CGBA-6 CONNECT TO EXPRESS RACK
- 7.1 ✓cb MAIN POWER – Open
✓LED-MAIN POWER – Off
- LAB102_A 7.2 ✓sw LOCKER-1 – OFF
1 ✓LOCKER-1 POWER Lt – Off
- CGBA-6 7.3 EXPRESS Rack Power Cable (38")→|←POWER-IN 28 VDC J1
EXPRESS Rack Data Cable (38")→|←EXPRESS DATA J4
- 8. CGBA-6 POWER ON
- LAB102_A 8.1 sw LOCKER-1 POWER → ON
1 ✓LOCKER-1 POWER Lt – On
- CGBA-6 8.2 cb MAIN POWER → Close
✓LED-MAIN POWER – On
- Record Power On GMT: _____

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

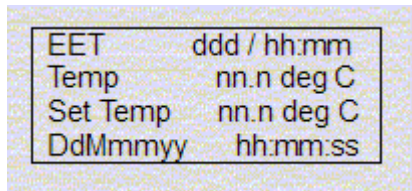
8.3 ✓CGBA-6 fan running (sound, feel airflow)

```
*****  
*  
* If CGBA-6 fan not running,  
* |  
* | ✓POIC  
* |  
*  
*****
```

8.4 Replace CGBA-6 mufflers.

<p><u>NOTE</u></p> <p>Display goes into sleep mode if keypad is not pressed within 10 minutes. Pressing any key will reactivate display.</p>
--

8.5 ✓CGBA-6 display indicates:



```
*****  
*  
* If GMT incorrect or no display,  
* |  
* | Notify POIC  
* |  
*  
*****
```

9. Notify **MCC-H** that transfer is complete and provide Power Off (step 2.2) and Power On (step 8.2) times.

OBJECTIVE:

To swap the ascent middeck powered Commercial Generic Bioprocessing Apparatus-6 (CGBA-6) with returning powered CGBA-4 in EXPRESS-1 Rack. This procedure is performed in parallel with the 20A CGBA Swap -ISS procedure. This procedure is used by STS Crew to power down CGBA-6 in the middeck, and remove GAPS from middeck Glacier and place GAPS in ISS CGBA-4. STS crew will also install CGBA-4 from ISS in a middeck locker, mates cables and apply power.

NOTE

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

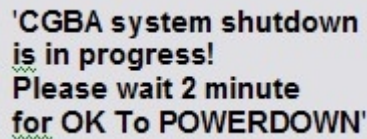
MF71E
(CBGA-6)

1. CGBA-6 POWERDOWN

- 1.1 On Keypad:
pb MENU → Press
pb 7 (Shutdown) → Press
pb ENTER → Press
- 1.2 On Shutdown CGBA-6 screen:
pb 1 (Shutdown system) → Press
pb ENTER → Press

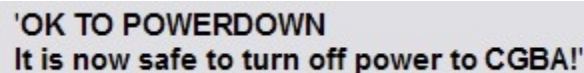
Record GMT: _____

- 1.3 Verify CGBA-6 display indicates:



'CGBA system shutdown
is in progress!
Please wait 2 minute
for OK To POWERDOWN'

- 1.4 ✓CGBA-6 display indicates:



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

*
*
* If CGBA-6 display does not indicate above information
*
* | Notify MCC-H and continue
*

2. CGBA-6 CIRCUIT BREAKER AND LOCKER SWITCH POWER OFF

- 2.1 cb MAIN POWER → Open
 ✓LED-MAIN POWER – Off
- MO63P 2.2 sw 10A J4 → OFF
 cb CB4/J4 → Open
- CGBA-6 2.3 DC JUMPER CGBA←|→POWER-IN 28 VDC J1
 Tether Power Cable out of the way as needed.

3. CGBA-6 REMOVAL FROM MIDDECK LOCKER

- CGBA-6 3.1 Unlatch, open CGBA-6 locker door.
- 3.2 Grasp CGBA-6, pull unit out of locker using side handles.
 If needed, pull Velcro tabs to deploy CGBA-6 recessed handles (push
 recessed handles back into place when done).
- 3.3 Temporarily stow CGBA-6 in a secure location for access operations.
- 3.4 When ISS crew arrives with CGBA-4, open CGBA-6 lid by lifting
 Velcro tabs on each side of Nomex cover.

4. TRANSFER GAPS

- 4.1 Remove GAP (nine) from middeck CGBA-6 and place inside ISS
 CGBA-4 unit.
- 4.2 Close CGBA-6 lid, attach Velcro tabs.
- 4.3 Receive CGBA-4 Restraint System from ISS Crew. Insert Restraint
 System inside Nomex cover on left side of CGBA-6
- 4.4 Exchange CGBA-6 unit for CGBA-4 unit from ISS Crew.

5. INSTALL CGBA-4 IN MIDDECK

WARNING

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

- MF71E 5.1 Slide CGBA-4 into locker, close locker door and latch.

6. CGBA-4 POWER ON

- CGBA-4 6.1 ✓cb MAIN POWER – Open

- MO63P 6.2 ✓cb CB/J4 – Open
 ✓sw 10A J4 – OFF

- CGBA-4 6.3 DC JUMPER CGBA→|←POWER-IN 28 VDC J1

- MO63P 6.4 cb CB/J4 → Closed
 sw 10A J4 → ON

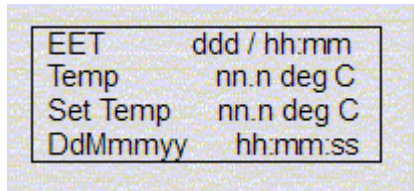
- CGBA-4 6.5 cb MAIN POWER → Close
 ✓LED-MAIN POWER – On

Record POWER ON GMT: _____

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

- 6.6 Verify CGBA-4 fan running (sound, feel airflow)

- 6.7 Verify CGBA-4 display indicates:



Where Set Temp = 37 and GMT is current GMT.

```
*****  
*  
* If GMT or Set Temp incorrect or no display,  
* |  
* |     Notify MCC-H  
* |  
*  
*****
```

- 7. Notify **MCC-H** that transfer is complete and provide Power Off (step 1.2) and Power On (step 6.5) times.

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GLACIER RECORD QUICK DIAGNOSTIC DATA (NOMINAL)

(ASSY OPS/20A/FIN)

Page 1 of 1 page

OBJECTIVE:

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

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

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

2. Verify Display - 'HOME'

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

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

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

'MAIN MENU'
'QUICK STATUS 1/5'

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

'QUICK STATUS'
'Cold Head 1A 1/16'

NOTE

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

6. Record Quick Status data for parameters 1-7 in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

7. pb Center (NEXT) → push until Quick Status data items 1 through 7 have been recorded.

8. pb Right (EXIT) → push until 'HOME'

9. Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

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GLACIER CONFIGURATION FOR DESCENT

(ASSY OPS/20A/FIN)

Page 1 of 2 pages

OBJECTIVE:

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

TOOLS

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

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

4" Ext, 1/4" Drive

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

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

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

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

GLACIER CONFIGURATION FOR DESCENT

(ASSY OPS/20A/FIN)

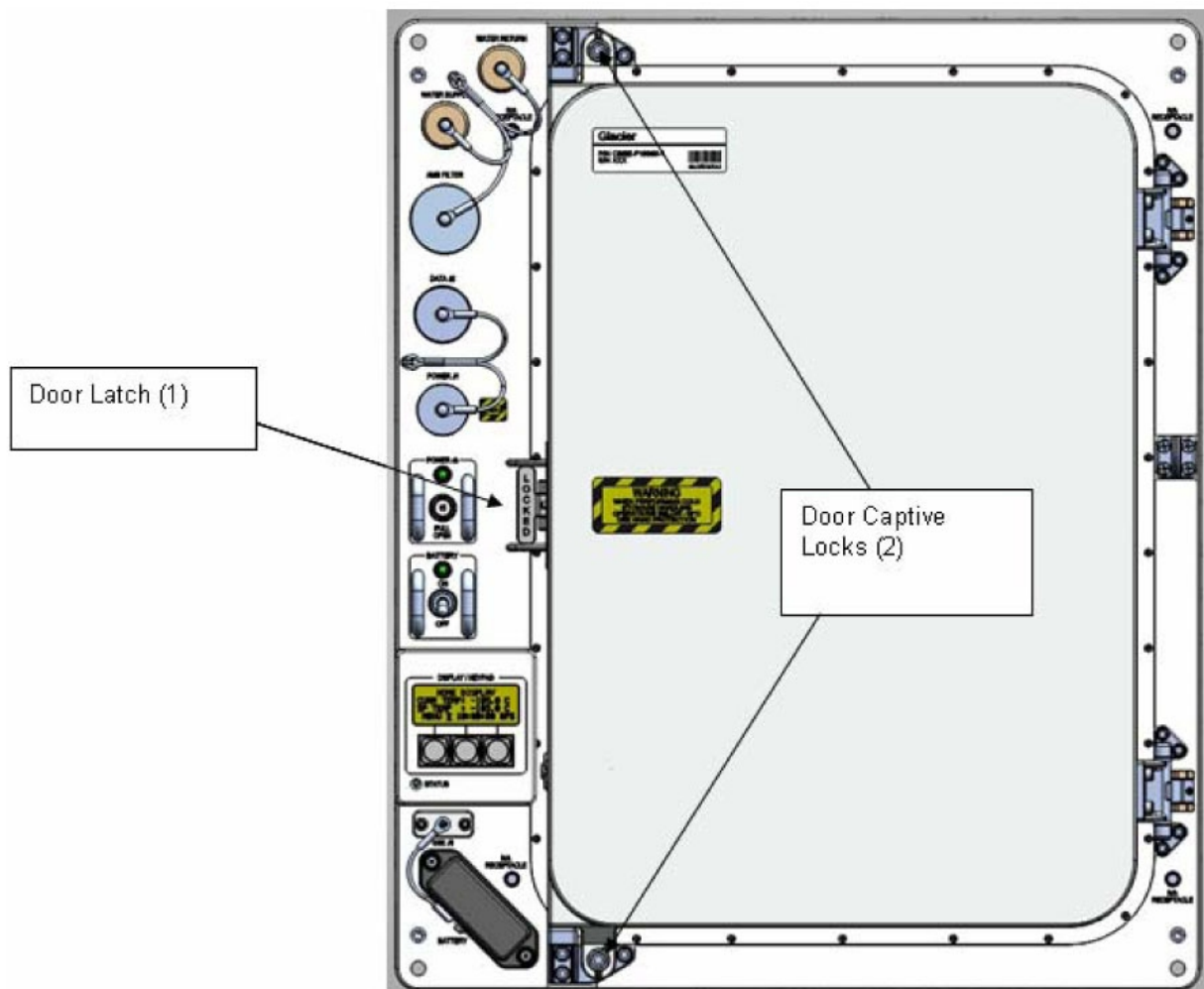


Figure 1. Glacier Configuration.

OBJECTIVE:

The following steps will activate Glacier Systems.

On MCC-H GO

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

NOTE

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

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

NOTE

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

- 9. ✓Display 'HOME'
- ```

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

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

```

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

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



OBJECTIVE:

The following steps will perform a reboot of Glacier Systems.

Glacier

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

NOTE

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

10. ✓Display 'HOME'

```

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

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

```

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

OBJECTIVE:

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

|                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>                                                                                                                                               |
| Due to possible loss of experiment payload(s), Glacier should not be shutdown for more than 30 minutes, unless necessary for Orbiter contingency operations. |

Glacier

1. ✓Display 'HOME'
 

```

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

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

```
2. Log Glacier front panel:
 

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

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

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

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

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

'Confirm Shutdown'  
'SHUTDOWN'

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

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

8. Verify—  
'Glacier'  
'Shutdown Complete'  
'TURN POWER OFF'

9. Wait 5 seconds before proceeding.

10. sw BATTERY → OFF (It off)

NOTE

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

11. cb POWER → Open (It off)

ML86B

12. cb MNB MAR 1 → Open

13. Notify **MCC-H** of recorded data and time in step 2.

OBJECTIVE:

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

On MCC-H GO

```

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

```

Glacier

1. ✓Display 'HOME'  
\*\*\*\*\*  
\*  
\* If 'HOME' not shown:  
\* |  
\* | pb Right (EXIT) → Press until 'HOME' appears  
\* |  
\* |  
\*\*\*\*\*
2. pb Left (MENU) → Press (one time), following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
3. pb Left (NEXT) → Press (four times), following appears:  
'MAIN MENU'  
'SHUTDOWN 5/5'
4. pb Center (SELECT) → Press (one time), following appears  
'SHUTDOWN'  
'SHUTDOWN 1/2'
5. pb Center (SELECT) → Press (one time), following appears:  
'Confirm Shutdown'  
'SHUTDOWN'
6. pb Left (APPLY) → Press (one time), following appears:  
'Glacier'  
'System'  
'Shutting Down'  
'Please wait...'
7. Verify –  
'Glacier'  
'Shutdown Complete'  
'TURN POWER OFF'
8. Wait 5 seconds.

NOTE

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

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

NOTE

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

- 13. ✓Display 'HOME'  
\*\*\*\*\*  
\*  
\* If 'HOME' not shown,  
\* |  
\* | Perform GLACIER FAIL TO REPOWER, then;  
\* |  
\*\*\*\*\*  
\*\*\*\*\*  
\*  
\* If Display —'\*\*Error Pending\*\*'  
\* |  
\* | Perform GLACIER ERROR MESSAGE, then;  
\* |  
\*\*\*\*\*

- 14. Log from Glacier front panel:  
CURR TEMP: \_\_\_\_\_ °C  
GPS: \_\_\_\_\_/\_\_\_\_\_:\_\_\_\_\_
- 15. Notify MCC-H of Power Cycle completion and data recorded in Step 14.

OBJECTIVE:

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

Glacier

1. ✓Display – 'HOME'

```

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

```

2. Record front panel display 'CURR TEMP', 'SET POINT', and 'GPS' and any ground supplied data in TABLE 2 GLACIER RESET LOG FILE.

---

3. SET CONTROL MODE TO IDLE

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

NOTE

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

- 3.7 pb Left (NEXT) → Press as required to select desired Temperature Control Mode to Idle
  - 3.8 pb Center (APPLY) → Press (one time)
  - 3.9 ✓Confirm New Control Mode = Idle
  - 3.10 pb Left (APPLY) → Press (one time), following appears:  
'Temp Control'  
'Control Mode 2/18'
  - 3.11 ✓Control Mode = Idle
  - 3.12 pb Right (EXIT) → Press until 'HOME' appears
4. SETPOINT TEMPERATURE
- 4.1 pb Left (MENU) → Press (one time), following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
  - 4.2 pb Left (NEXT) → Press (three times), following appears:  
'MAIN MENU'  
'SETUP 4/5'
  - 4.3 pb Center (SELECT) → Press (one time), following appears:  
'SETUP'  
'Temp Control 1/3'
  - 4.4 pb Center (SELECT) → Press (one time), following appears:  
'Temp Control'  
'Set Point Temp 1/18'
  - 4.5 pb Center (SELECT) → Press (one time), following appears:  
'Set Point Temp'  
'XXXXX °C'  
'-160.0 to +004.0'

NOTE

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

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



4.10 ✓Set Point Temp = desired Set Point

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

## 5. TEMPERATURE CONTROL SENSORS

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

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

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

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

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

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

### NOTE

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

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

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

5.9 ✓Confirm New Control Sensors = desired Control Sensors

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

5.11 ✓Control Sensors = desired Control Sensors

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

## 6. AIR MANAGEMENT PROCEED MESSAGE

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

**'QUICK STATUS 1/5'**

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

7. TEMPERATURE CONTROL BANDWIDTH

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

**NOTE**

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

- 7.7 Enter desired Bandwidth per **MCC-H**
- 7.8 pb Right (DONE) → Press (one time)
- 7.9 ✓Confirm New Bandwidth = desired Bandwidth
- 7.10 pb Left (APPLY) → Press (one time), following appears:  
**'Temp Control'**  
**'Bandwidth 5/18'**
- 7.11 ✓Bandwidth = desired Bandwidth
- 7.12 pb Right (EXIT) → Press until **'HOME'** appears
8. PRIMARY COOLER
  - 8.1 pb Left (MENU) → Press (one time), following appears:  
**'MAIN MENU'**  
**'QUICK STATUS 1/5'**
  - 8.2 pb Left (NEXT) → Press (three times), following appears:  
**'MAIN MENU'**  
**'SETUP 4/5'**
  - 8.3 pb Center (SELECT) → Press (one time), following appears:  
**'SETUP'**  
**'Temp Control 1/3'**
  - 8.4 pb Center (SELECT) → Press (one time), following appears:  
**'Temp Control'**  
**'Set Point Temp 1/18'**
  - 8.5 pb Left (NEXT) → Press (five times), following appears:  
**'Temp Control'**  
**'Primary Cooler 6/18'**
  - 8.6 pb Center (SELECT) → Press (one time), following appears:  
**'Primary Cooler'**  
**'COOLER X'**

**NOTE**

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

- 8.7 pb Left (NEXT) → Press as required to select desired Primary Cooler per **MCC-H**
- 8.8 pb Center (APPLY) → Press (one time)
- 8.9 ✓Confirm New Primary Cooler = desired Cooler
- 8.10 pb Left (APPLY) → Press (one time), following appears:  
'Temp Control'  
'Primary Cooler 6/18'
- 8.11 ✓Primary Cooler = desired Cooler
- 8.12 pb Right (EXIT) → Press until '**HOME**' appears
9. COOLER 1 STROKE
- 9.1 pb Left (MENU) → Press (one time), following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
- 9.2 pb Left (NEXT) → Press (three times), following appears:  
'MAIN MENU'  
'SETUP 4/5'
- 9.3 pb Center (SELECT) → Press (one time), following appears:  
'SETUP'  
'Temp Control 1/3'
- 9.4 pb Center (SELECT) → Press (one time), following appears:  
'Temp Control'  
'Set Point Temp 1/18'
- 9.5 pb Left (NEXT) → Press (six times), following appears:  
'Temp Control'  
'Cooler 1 Stroke 7/18'
- 9.6 pb Center (SELECT) → Press (one time), following appears:  
'Cooler 1 Stroke'  
'XX'  
'03 to 63'

NOTE

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

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

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

NOTE

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

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

11. COOLER 2 STROKE

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

NOTE

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

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

12. COOLER 2 STATE

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

'MAIN MENU'  
'SETUP 4/5'

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

NOTE

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

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

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

NOTE

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

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



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

NOTE

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

- 14.7 Enter desired Over Current value per **MCC-H**

- 14.8 pb Right (DONE) → Press (one time)

- 14.9 ✓Confirm New Over Current = desired Over Current

- 14.10 pb Left (APPLY) → Press (one time), following appears:  
'Temp Control'  
'Over Current 14/18'

- 14.11 ✓Over Current = desired Over Current

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

15. AIR MANAGEMENT MODE

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

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

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

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

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

- 15.6 pb Center (SELECT) → Press (one time), following appears:  
'Air Mgmt Mode'  
'XXXXX'

**NOTE**

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

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

NOTE

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

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

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

16.10 ✓ Confirm New Humidity Config = desired Humidity Config

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

16.12 ✓ Humidity Config = desired Humidity Config

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

17. AIR MANAGEMENT PRESSURE CONFIGURATION

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

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

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

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

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

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

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

NOTE

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

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

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

17.10 ✓ Confirm New Pressure Config = desired Pressure Config

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

17.12 ✓ Pressure Config = desired Pressure Config

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

18. AIR MANAGEMENT MANUAL CONFIGURATION

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

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

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

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

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

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

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

**NOTE**

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

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

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

18.10 ✓ Confirm New Manual Config = desired Manual Config

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

18.12 ✓ Manual Config = desired Manual Config

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

19. START HUMIDITY MONITORING TIME

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

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

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

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

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

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

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

**NOTE**

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

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

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

19.10 ✓ Confirm New Start Humidity = desired Start Humidity

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

19.12 ✓ Start Humidity = desired Start Humidity

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

20. START PRESSURE MONITORING TIME

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

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

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

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

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

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

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

NOTE

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

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

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

20.10 ✓ Confirm New Start Pressure = desired Start Pressure

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

20.12 ✓ Start Pressure = desired Start Pressure

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

21. CIRCULATION FAN MODE

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

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

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

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

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

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

NOTE

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

21.7 pb Left (NEXT) → Press as required to select desired Circ Fan Mode per **MCC-H**

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

21.9 ✓Confirm New Circ Fan Mode = desired Circ Fan Mode

21.10 pb Left (APPLY) → Press (one time), following appears:  
'Auxiliary'  
'Circ Fan Mode 1/7'

21.11 ✓Circ Fan Mode = desired Circ Fan Mode

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

22. CIRCULATION FAN POWER

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

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

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

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

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

22.6 pb Left (NEXT) → Press (one time), following appears:  
'Auxiliary'  
'Circ Fan Power 2/7'

22.7 pb Center (SELECT) → Press (one time), following appears:  
'Circ Fan Power'  
'XXX %'  
'000 to 090'

NOTE

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

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



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

23. DATA STORAGE INTERVAL

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

NOTE

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

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

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

23.12 ✓Data Storage = desired Data Storage

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

#### 24. TEMPERATURE CONTROL MODE

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

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

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

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

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

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

#### NOTE

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

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

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

24.9 ✓Confirm New Control Mode = desired Control Mode

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

24.11 ✓Control Mode = desired Control Mode

## GLACIER MANUAL RECONFIGURE

(ASSY OPS/20A/FIN)

Page 21 of 21 pages

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

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# GLACIER

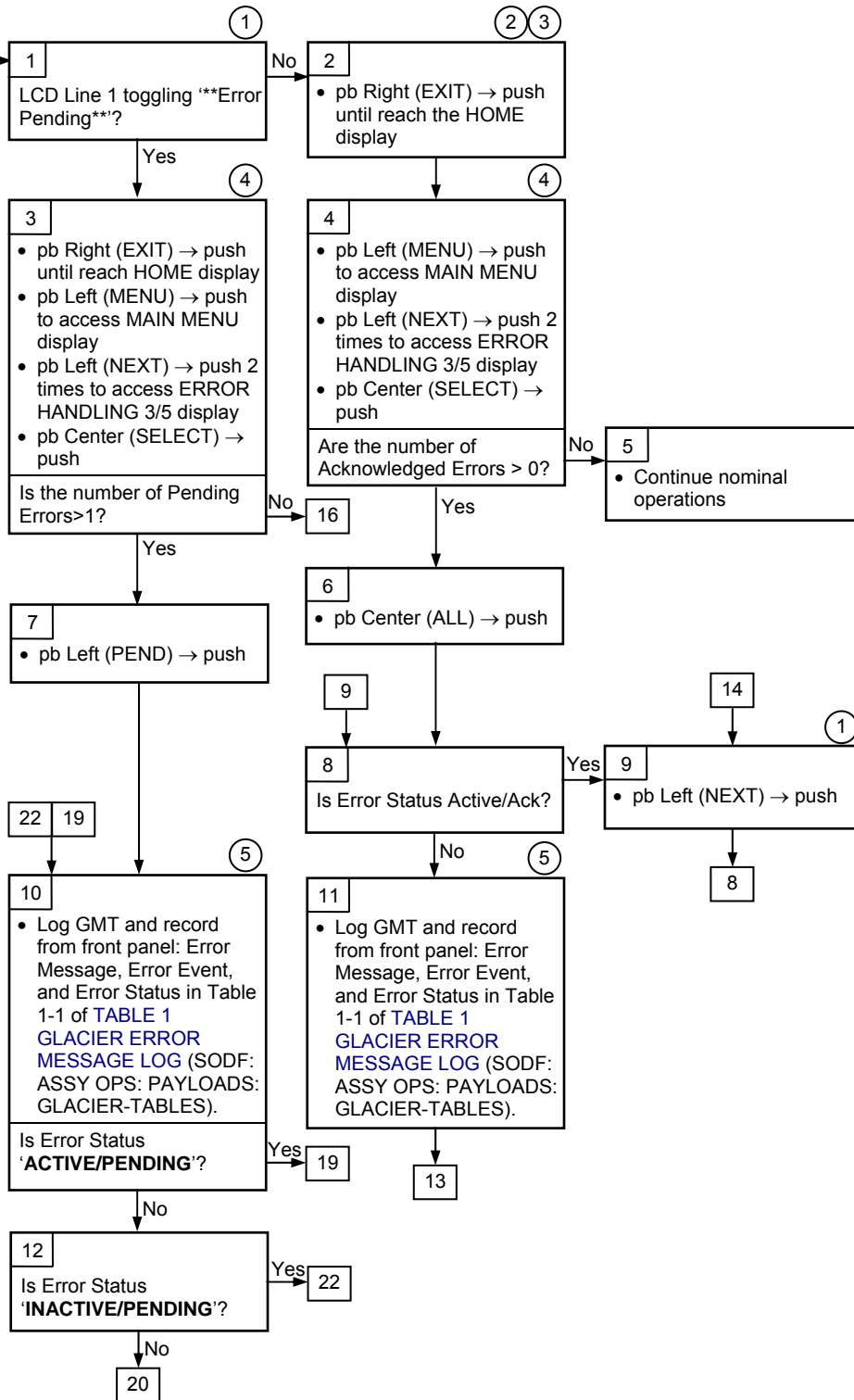
## GLACIER ERROR MESSAGE

(ASSY OPS/20A/FIN)

Page 1 of 17 pages

Glacier System Error

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



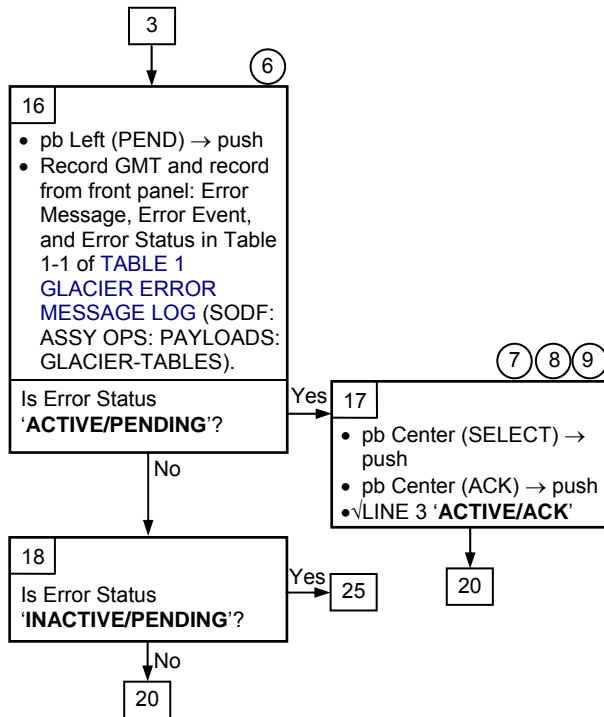
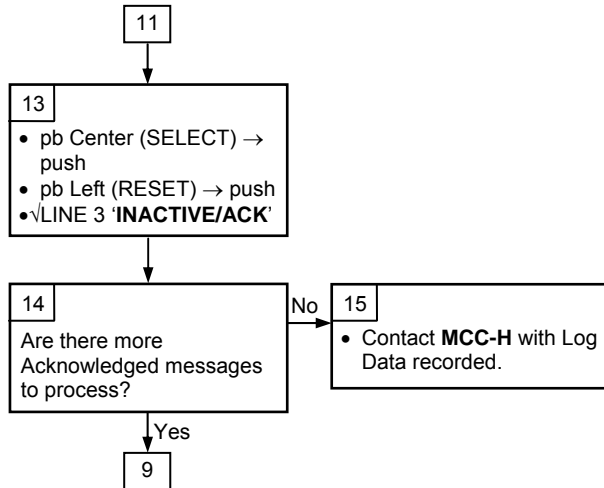
① Contact **MCC-H** before proceeding.

② Operator can always exit sub menus by pressing Right (EXIT) pb until 'HOME' display is reached.

③ **ERROR HANDLING:** display will identify Event on Line 2 and Status on Line 3. 'ACTIVE/PENDING' indicates that error is still occurring and should be acknowledged. 'INACTIVE/PENDING' indicates the Error is no longer occurring and can be Reset.

④ Menus are circular. If a display is passed, operator can keep pressing the button until desired display is reached.

⑤ GPS is only visible in HOME display. Record GMT from wristwatch.

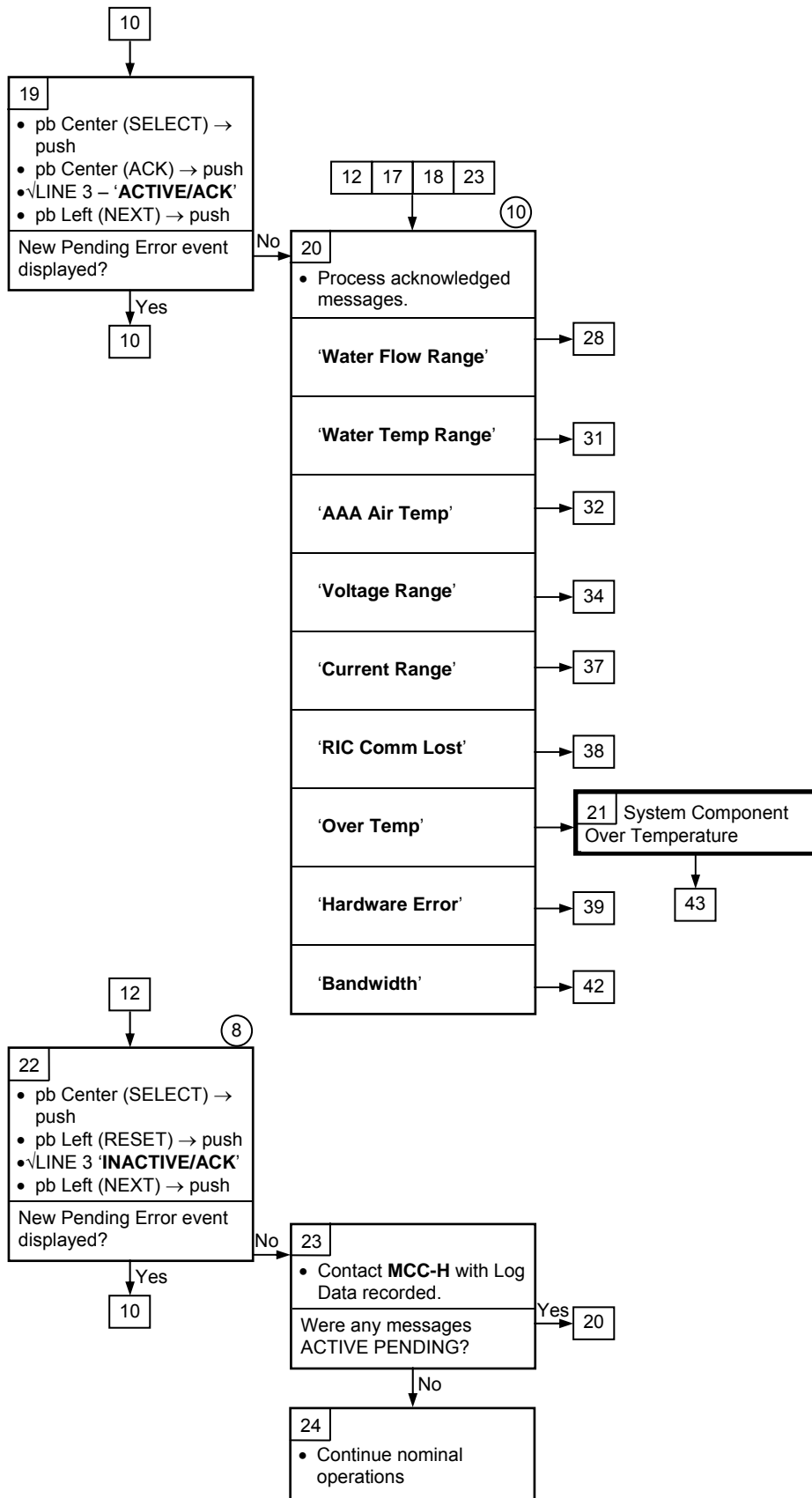


6  
GLACIER RECORD DIAGNOSTIC DATA (SODF: ASSY OPS: PAYLOADS) procedure may be performed to capture states of key data elements per MCC-H direction.

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

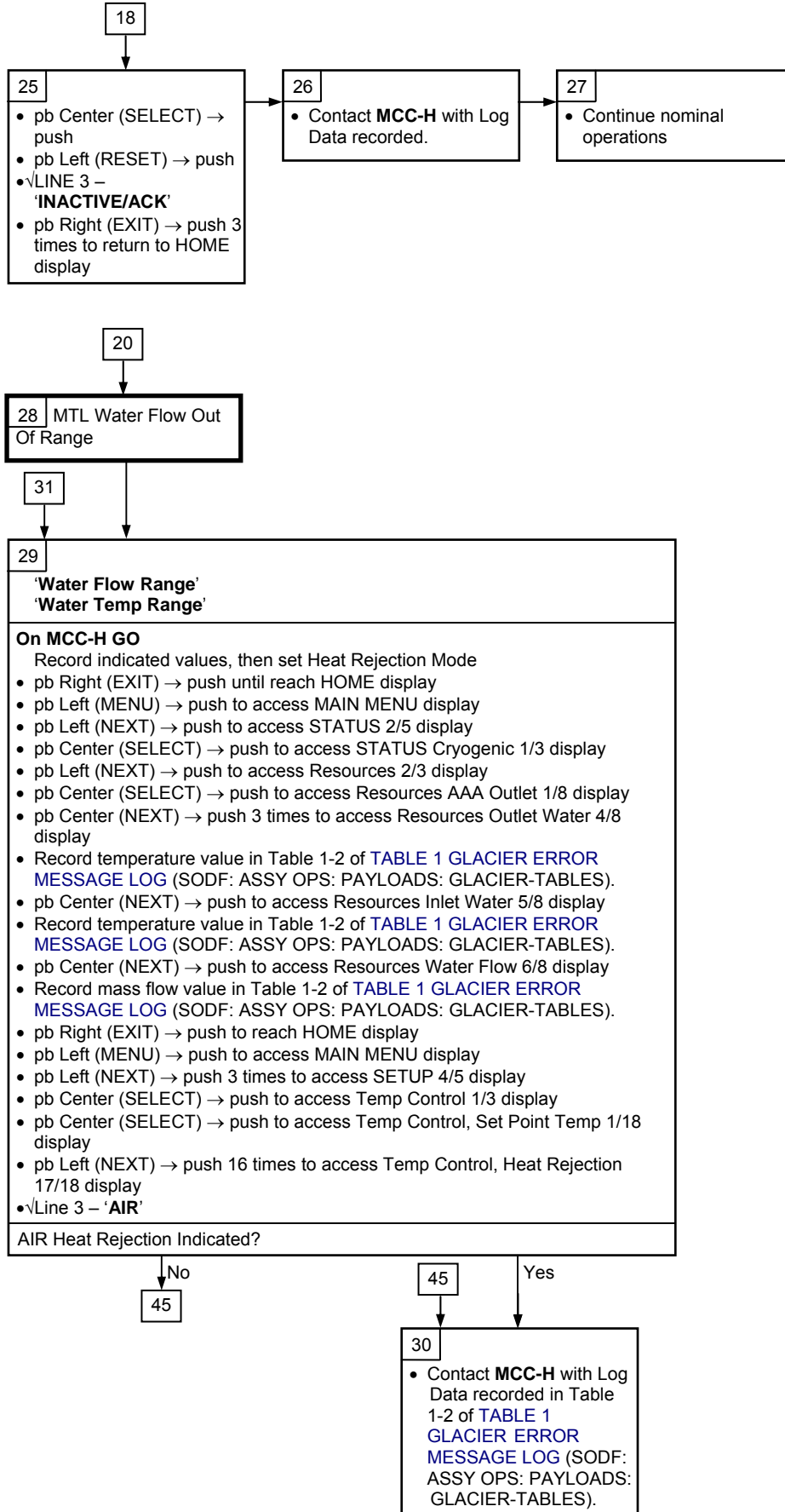
8  
Software Errors may not reset or may be persistent due to: Frequent intermittent power failure. Single Event Upset. Electromagnetic interference

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

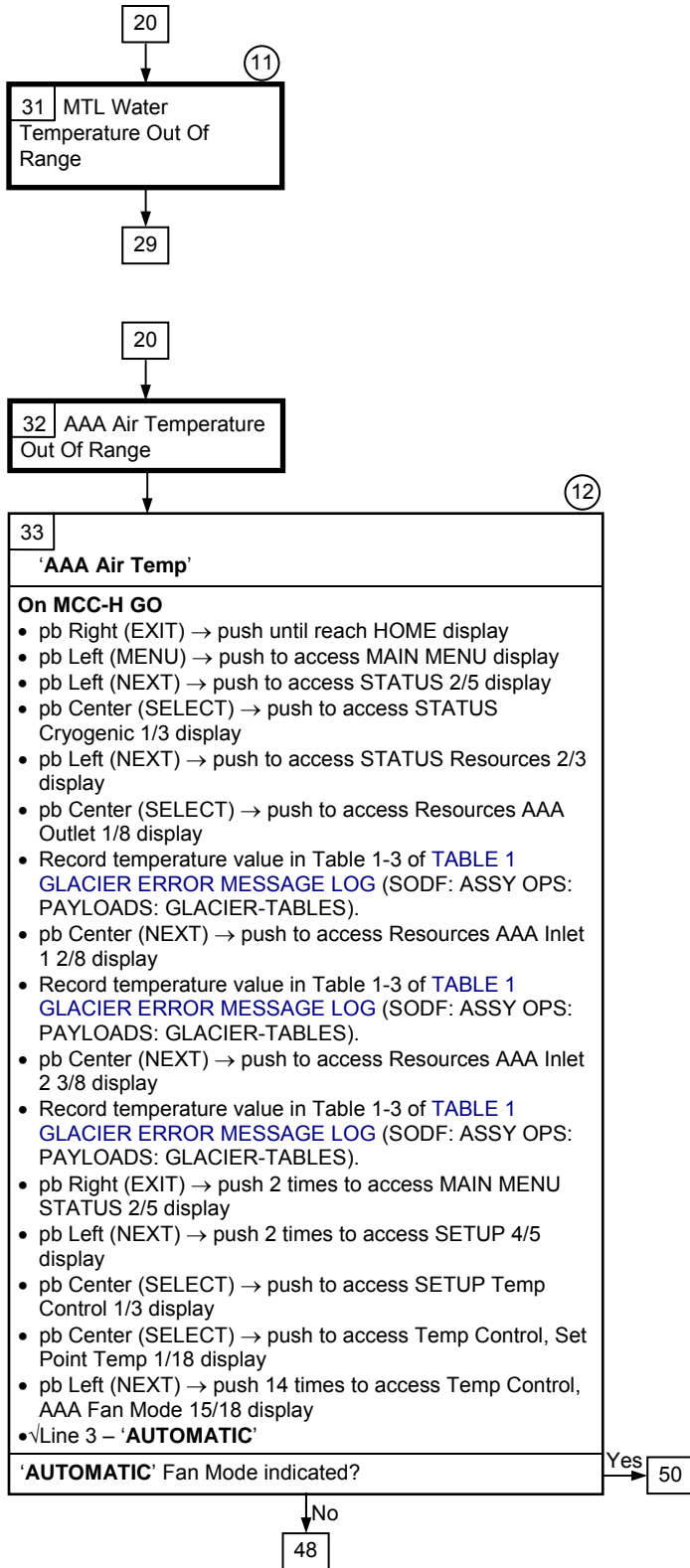


8 Software Errors may not reset or may be persistent due to: Frequent intermittent power failure. Single Event Upset. Electromagnetic interference

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

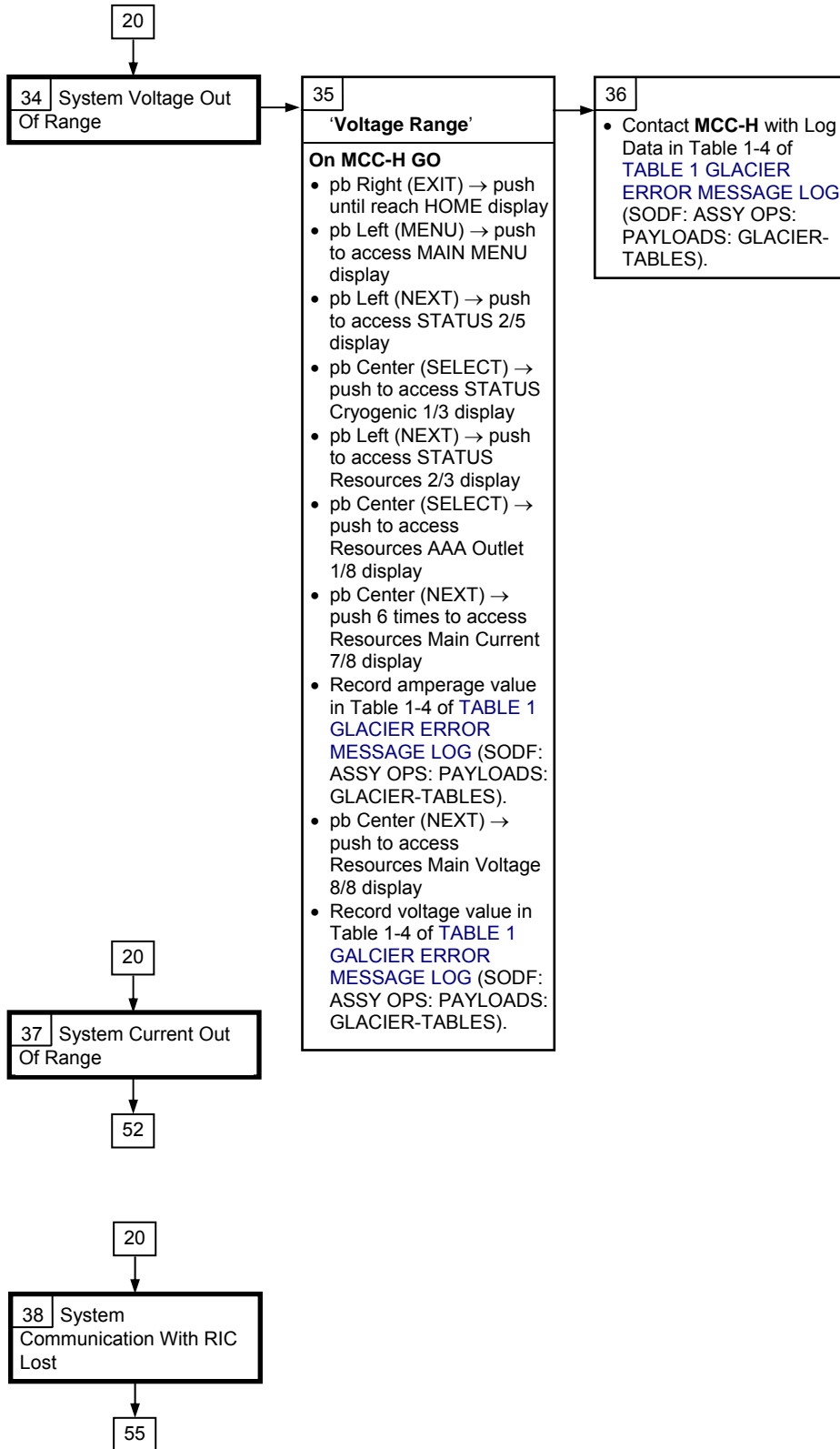


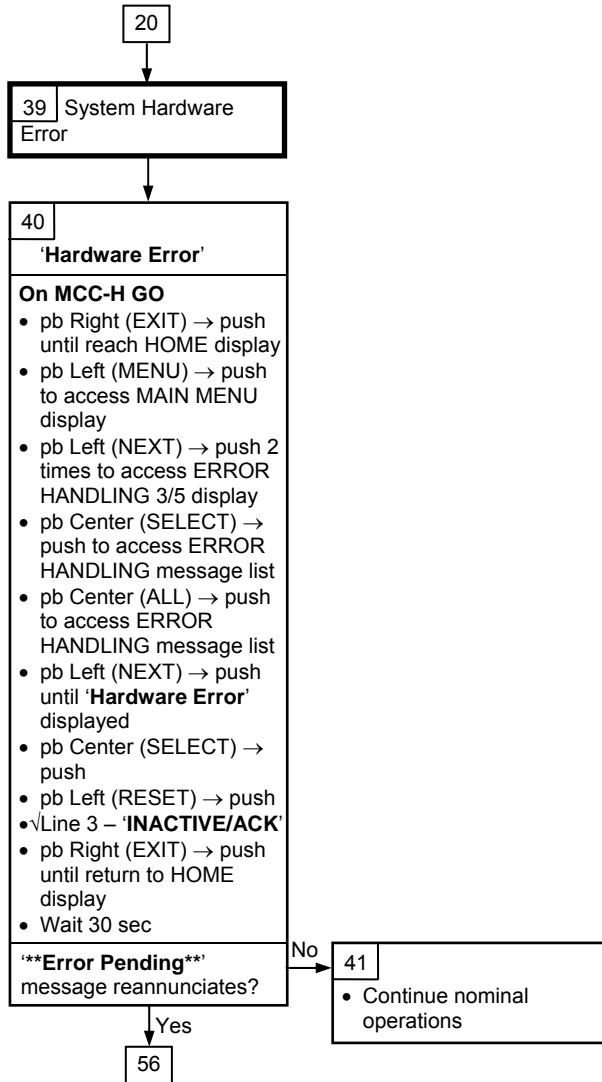




①  
AAA Air Temp value may take a long time to reflect change in fan mode.

②  
MCC-H will evaluate Av Bay temps





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**'Bandwidth'**

Record indicated values

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

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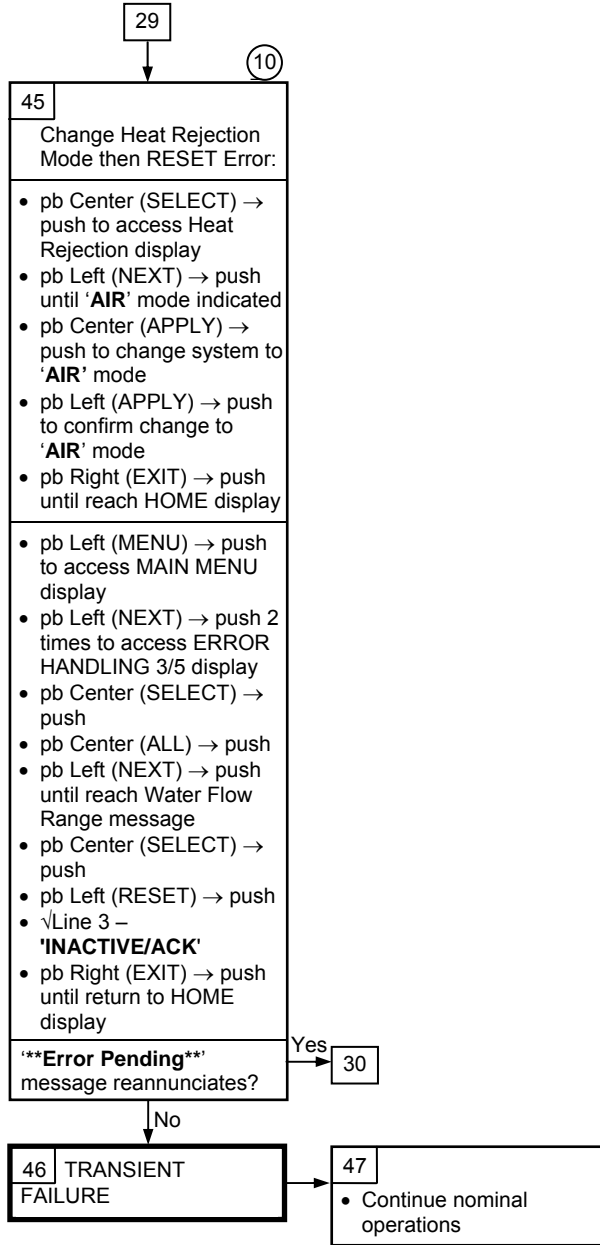
'Over Temp'

**On MCC-H GO**

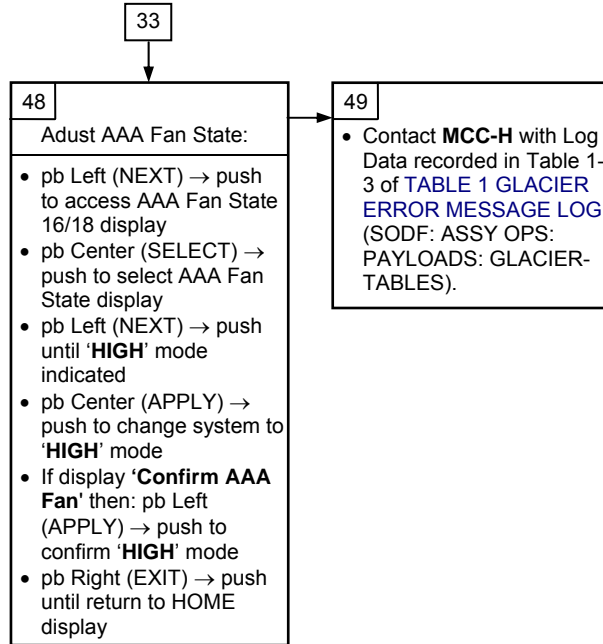
- pb Right (EXIT) → push until reach HOME display
- pb Left (MENU) → push to access MAIN MENU display
- pb Left (NEXT) → push to access STATUS 2/5 display
- pb Center (SELECT) → push to access STATUS Cryogenic 1/3 display
- pb Left (NEXT) → push 2 times to access STATUS System 3/3 display
- pb Center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

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



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



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Adust AAA Fan Mode & State:

- pb Center (SELECT) → push to access AAA Fan Mode display
- pb Left (NEXT) → push until '**MANUAL**' mode indicated
- pb Center (APPLY) → push to select '**MANUAL**' mode
- pb Left (APPLY) → push to confirm '**MANUAL**' mode
- pb Left (NEXT) → push to access AAA Fan State 16/18 display
- pb Center (SELECT) → push to select AAA Fan State display
- pb Left (NEXT) → push until '**HIGH**' mode indicated
- pb Center (APPLY) → push to change system to '**HIGH**' mode
- If display 'Confirm AAA Fan' then pb Left (APPLY) → push to confirm '**HIGH**' mode
- pb Right (EXIT) → push until return to HOME display

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- Contact **MCC-H** with Log Data recorded in Table 1-3 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).



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'Current Range'

**On MCC-H GO**

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

'30.0 A' Over Current Limit indicated?

Yes

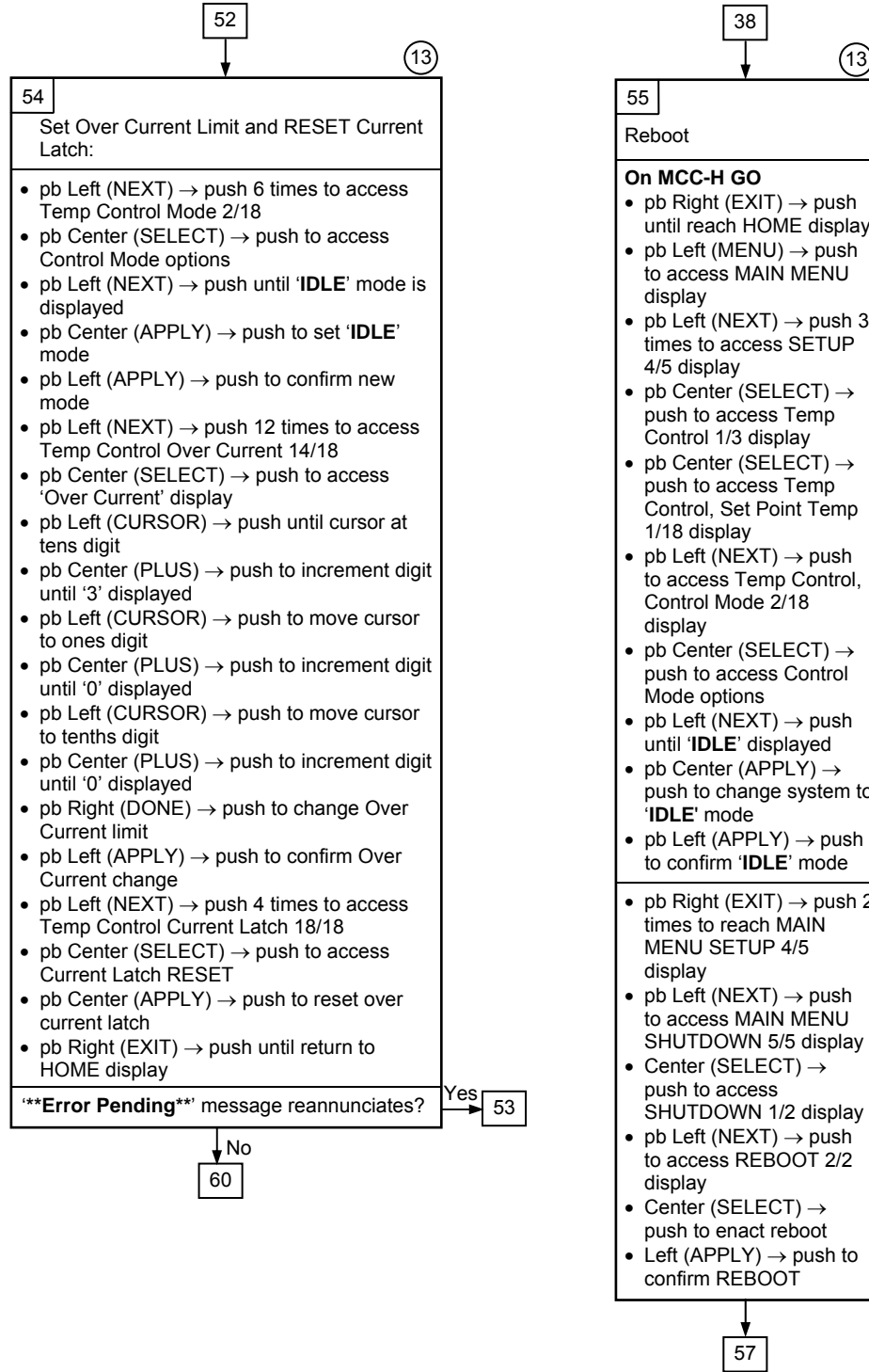
53

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

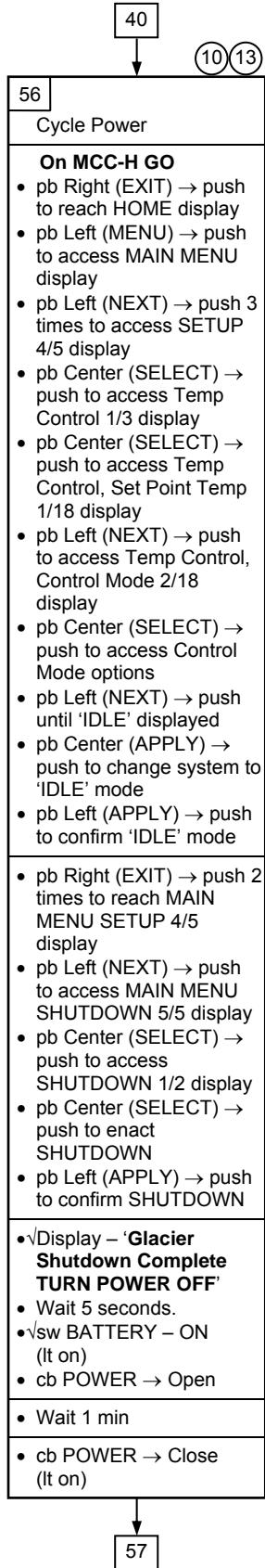
No

54

54

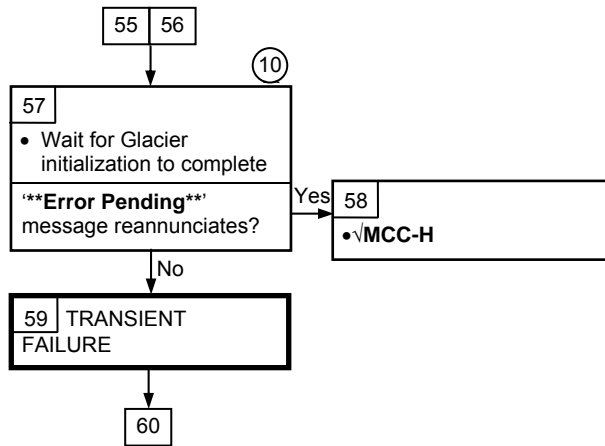


13 If parameters already set, the confirmation screen will not be displayed.

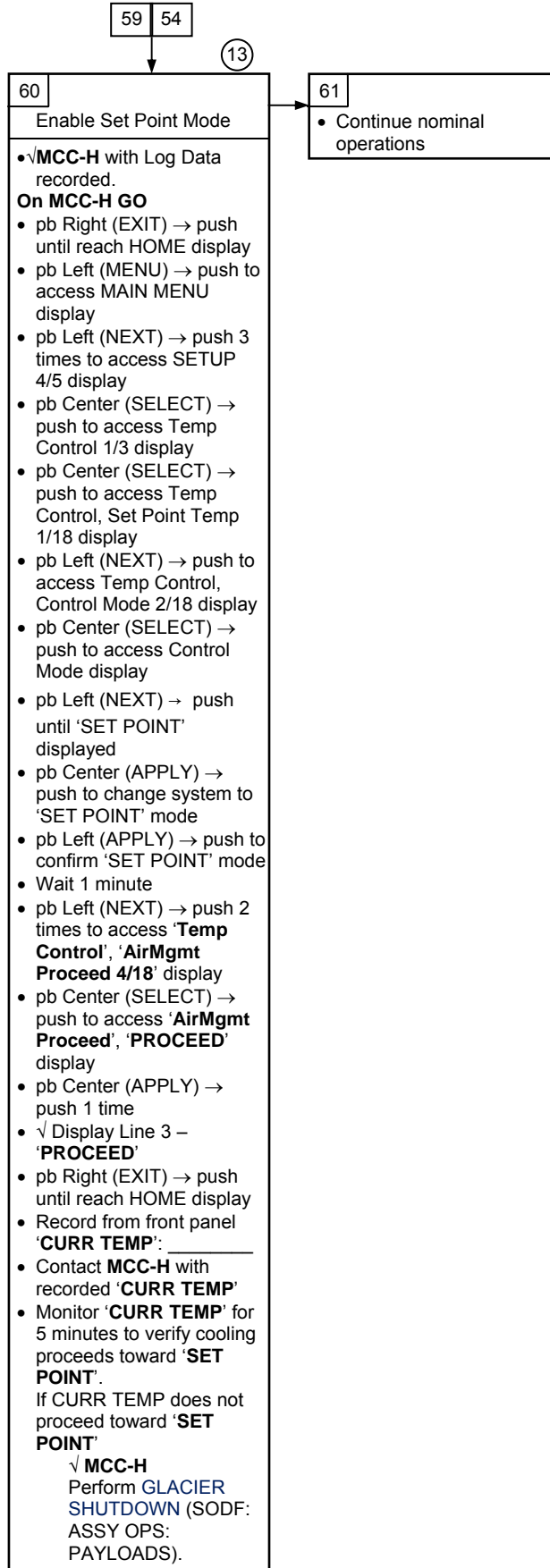


⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'

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



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



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

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# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/20A/FIN)

Page 1 of 9 pages

## OBJECTIVE:

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

Glacier

### 1. RECORD DATA

```

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

```

#### 1.1 ✓Display – 'HOME'

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

```

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

### 2. CHECK STATUS OF KEY PARAMETERS

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

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

#### NOTE

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

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

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

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

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

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

3. SET TEMPERATURE CONTROL MODE TO IDLE

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

**NOTE**

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

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



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

NOTE

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

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

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/20A/FIN)

Page 4 of 9 pages

## 'Set Point Temp 1/18'

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

### NOTE

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

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

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

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

NOTE

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

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

6.8 pb Right (DONE) → push (one time)

6.9 ✓Confirm New Bandwidth = desired Bandwidth

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

'Temp Control'  
'Bandwidth 5/18'

6.11 ✓Bandwidth = desired Bandwidth

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

## 7. SET PRIMARY COOLER

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

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

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

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

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

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

NOTE

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

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

**NOTE**

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

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

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/20A/FIN)

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## NOTE

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

- 9.7 Enter desired Over Current Limit per **MCC-H**.
  - 9.8 pb Right (DONE) → push (one time)
  - 9.9 ✓Confirm New Over Current = desired Over Current
  - 9.10 pb Left (APPLY) → push (one time), following appears:  
**'Temp Control'**  
**'Over Current 14/18'**
  - 9.11 ✓Over Current = desired Over Current
  - 9.12 pb Right (EXIT) → Press until **'HOME'** appears
10. SET TEMPERATURE CONTROL MODE
- 10.1 pb Left (MENU) → push (one time) following appears:  
**'MAIN MENU'**  
**'QUICK STATUS 1/5'**
  - 10.2 pb Left (NEXT) → push (three times) following appears:  
**'MAIN MENU'**  
**'SETUP 4/5'**
  - 10.3 pb Center (SELECT) → push (one time) following appears:  
**'SETUP'**  
**'Temp Control 1/3'**
  - 10.4 pb Center (SELECT) → push (one time) following appears:  
**'Temp Control'**  
**'Set Point Temp 1/18'**
  - 10.5 pb Left (NEXT) → push (one time) following appears:  
**'Temp Control'**  
**'Control Mode 2/18'**
  - 10.6 pb Center (SELECT) → push (one time), following appears:  
**'Control Mode'**  
**'XXXX'**

## NOTE

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

# GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/20A/FIN)

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

## 11. CHECK GLACIER STATUS

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

```

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

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

```

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

## 12. RECORD END DATA

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

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

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

① ②

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

③

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

③

|   |                        |
|---|------------------------|
| 3 | PRIMARY OUTLET FAILURE |
|---|------------------------|

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

|   |                             |
|---|-----------------------------|
| 5 | POSSIBLE DOWNSTREAM FAILURE |
|---|-----------------------------|

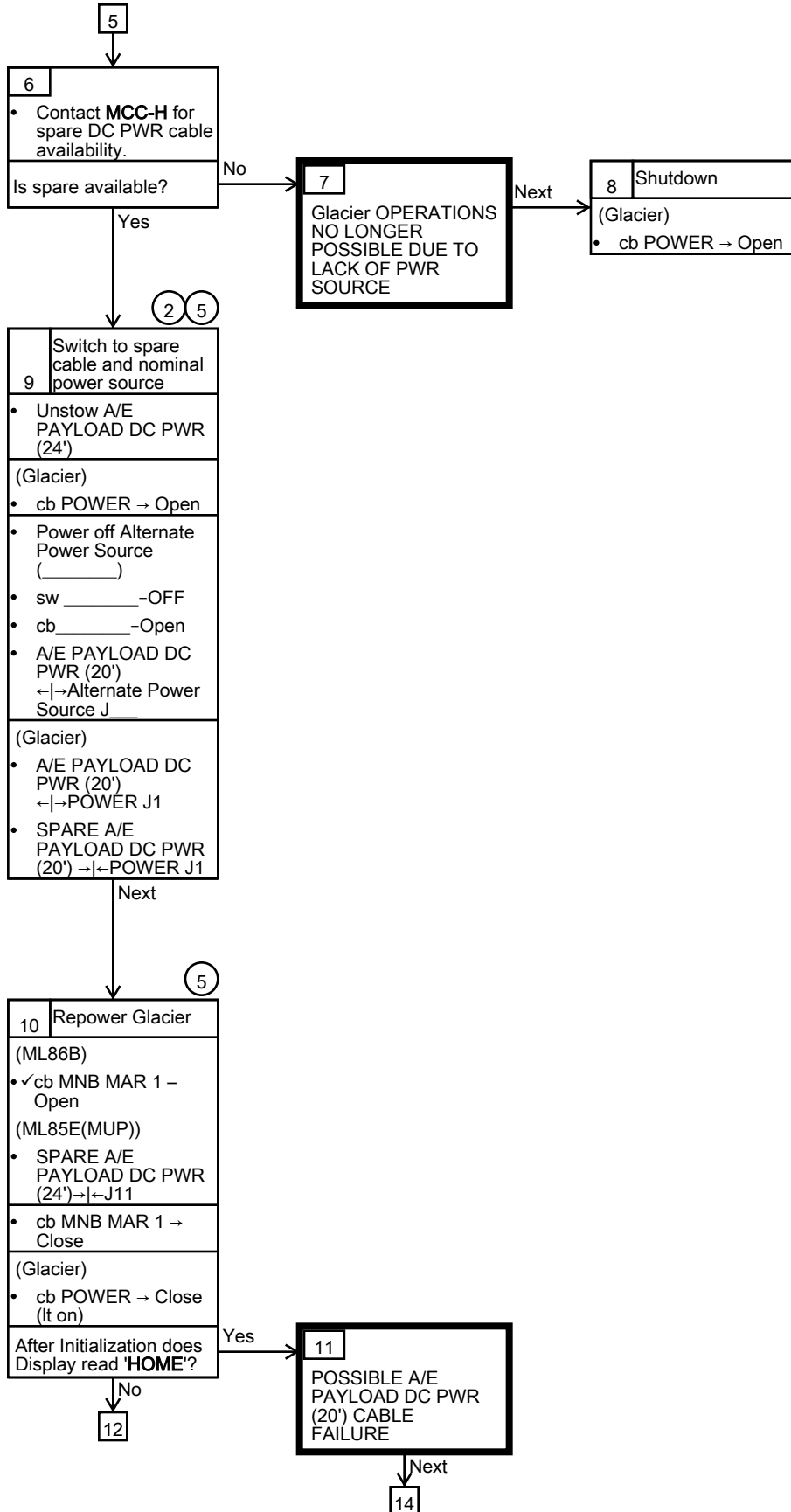
⑥

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

**GLACIER FAIL TO REPOWER**

(ASSY OPS/20A/FIN)

Page 2 of 3 pages

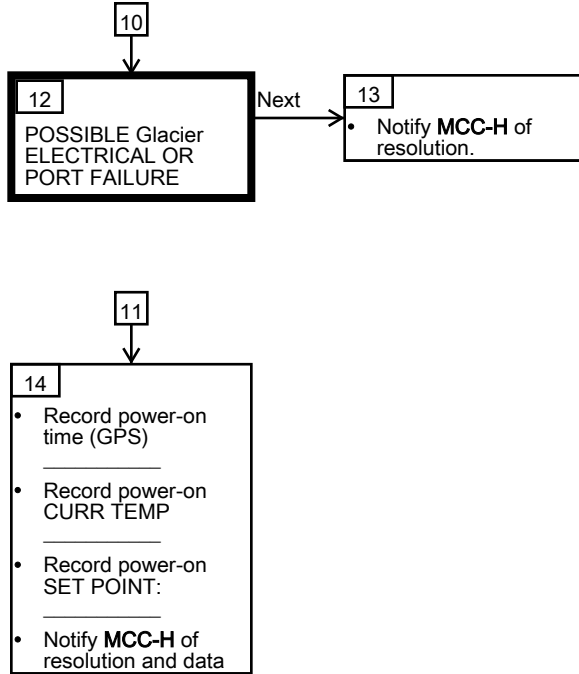


**2**  
Verify connectors are properly mated and seated securely when switching to alternate power source

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

### GLACIER FAIL TO REPOWER

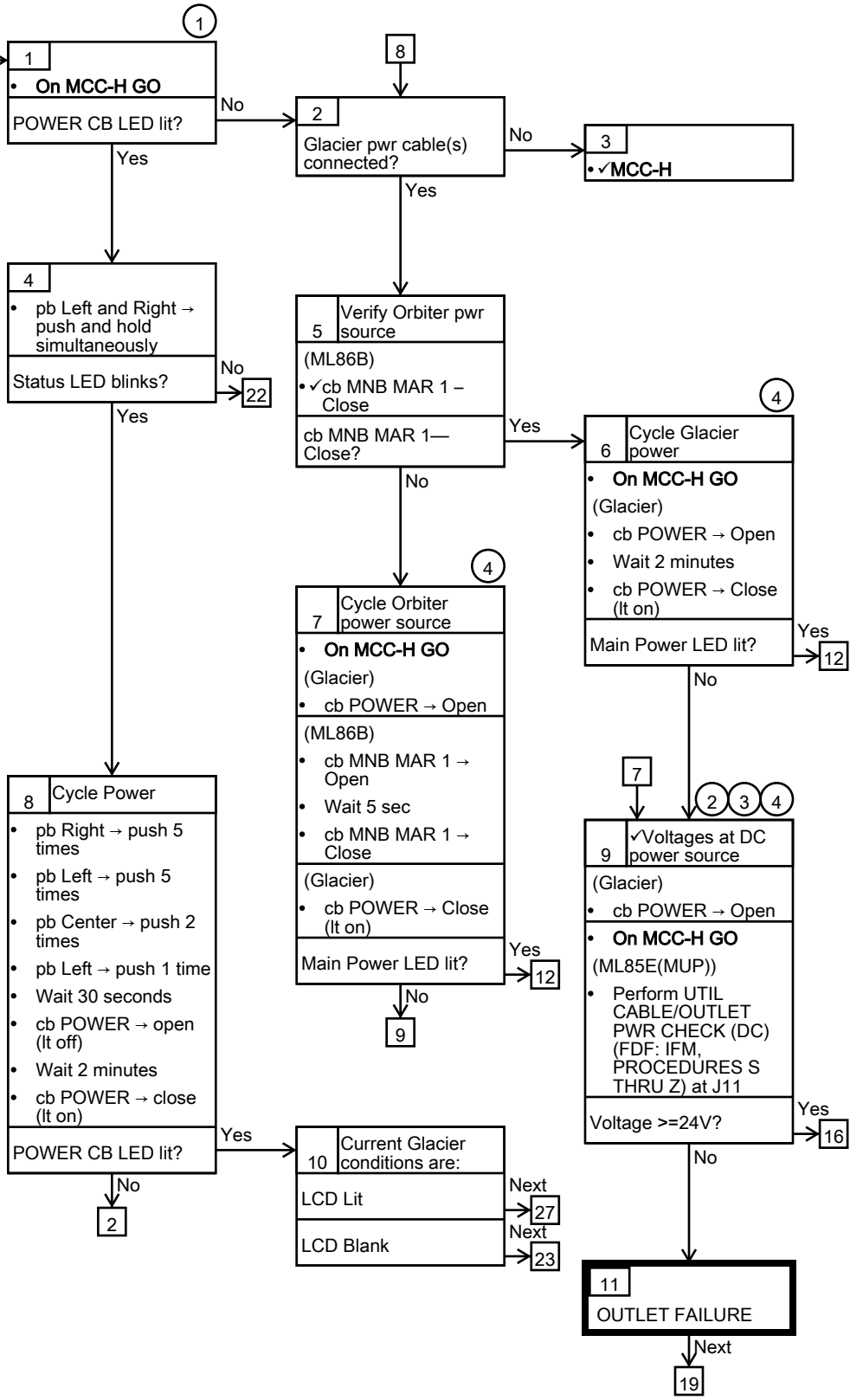
(ASSY OPS/20A/FIN)



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LCD Blank

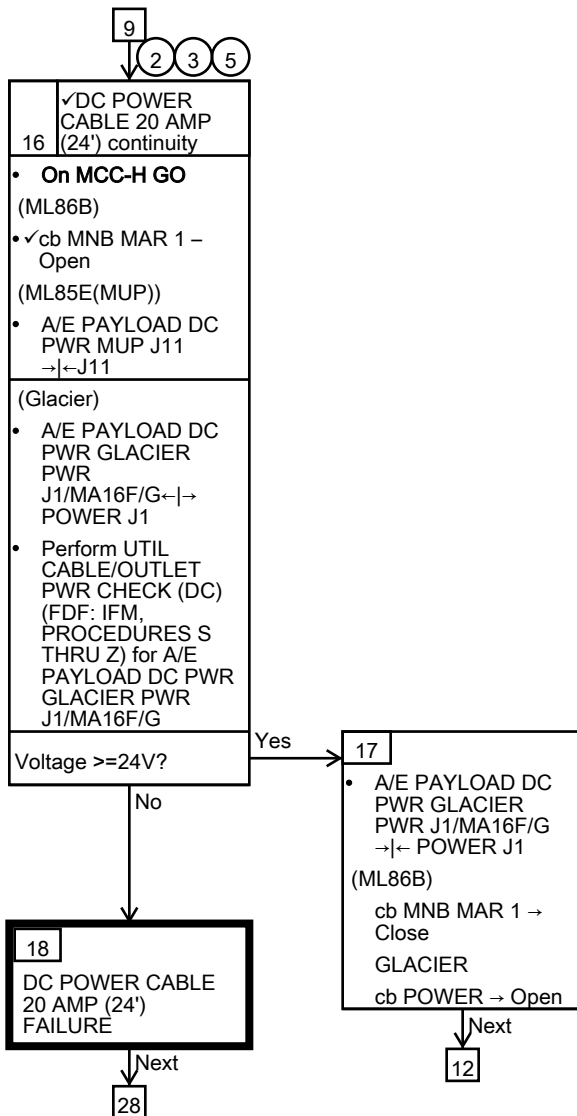
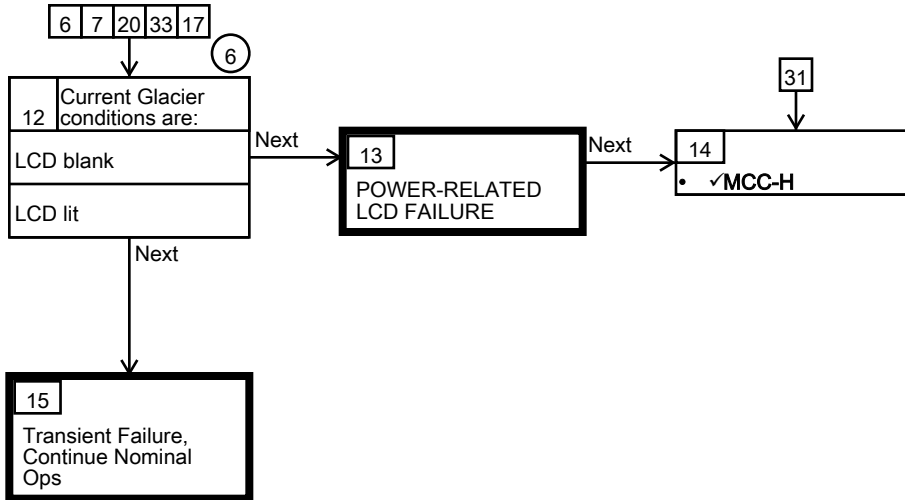
**Nominal Config:**  
 (MA16F/G)  
 cb POWER – Close (It on)  
 sw BATTERY – ON (It on)  
 (ML86B)  
 cb MNB MAR 1 – Close



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

**GLACIER LCD BLANK**

(ASSY OPS/20A/FIN 1) Page 2 of 6 pages



- ② Always deadface DC Power source when disconnecting/connecting power cable.
- ③ Verify connectors are properly mated and seated securely.
- ⑤ Verify connectors are properly mated and seated securely when reconnecting.
- ⑥ Initialization takes approximately 2 min. Initialization is complete when LCD Line 1 reads 'HOME'.

11  
2 3 4 5

|                                                                                                                                                                                          |                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 19                                                                                                                                                                                       | Switch to Alternate Power Source |
| <ul style="list-style-type: none"> <li>Contact <b>MCC-H</b> for alternate power source (Fill in data below)</li> </ul>                                                                   |                                  |
| (Glacier)                                                                                                                                                                                |                                  |
| <ul style="list-style-type: none"> <li>cb POWER → Open</li> </ul>                                                                                                                        |                                  |
| (ML86B)                                                                                                                                                                                  |                                  |
| <ul style="list-style-type: none"> <li>✓cb MNB MAR 1 – Open</li> </ul>                                                                                                                   |                                  |
| (ML85E(MUP))                                                                                                                                                                             |                                  |
| <ul style="list-style-type: none"> <li>✓A/E PAYLOAD DC PWR MUP J11<br/>← →J11</li> </ul>                                                                                                 |                                  |
| <ul style="list-style-type: none"> <li>Alternate Power source ( )<br/>J_</li> <li>✓cb _____<br/>Open</li> <li>✓sw _____<br/>—OFF</li> </ul>                                              |                                  |
| <ul style="list-style-type: none"> <li>✓A/E PAYLOAD DC PWR GLACIER PWR J1/MA16F/G→ ← POWER J1</li> <li>A/E PAYLOAD DC PWR GLACIER PWR J1/MA16F/G → ←Alternate Power Source J_</li> </ul> |                                  |

Next

2 5

|                                                                                                            |                                     |
|------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 20                                                                                                         | Repower from Alternate Power Source |
| <ul style="list-style-type: none"> <li>( )</li> <li>cb _____<br/>Close</li> <li>sw _____<br/>ON</li> </ul> |                                     |
| (Glacier)                                                                                                  |                                     |
| <ul style="list-style-type: none"> <li>cb POWER → Close (It on)</li> </ul>                                 |                                     |
| Main Power LED lit?                                                                                        |                                     |
| No                                                                                                         | Yes → 12                            |

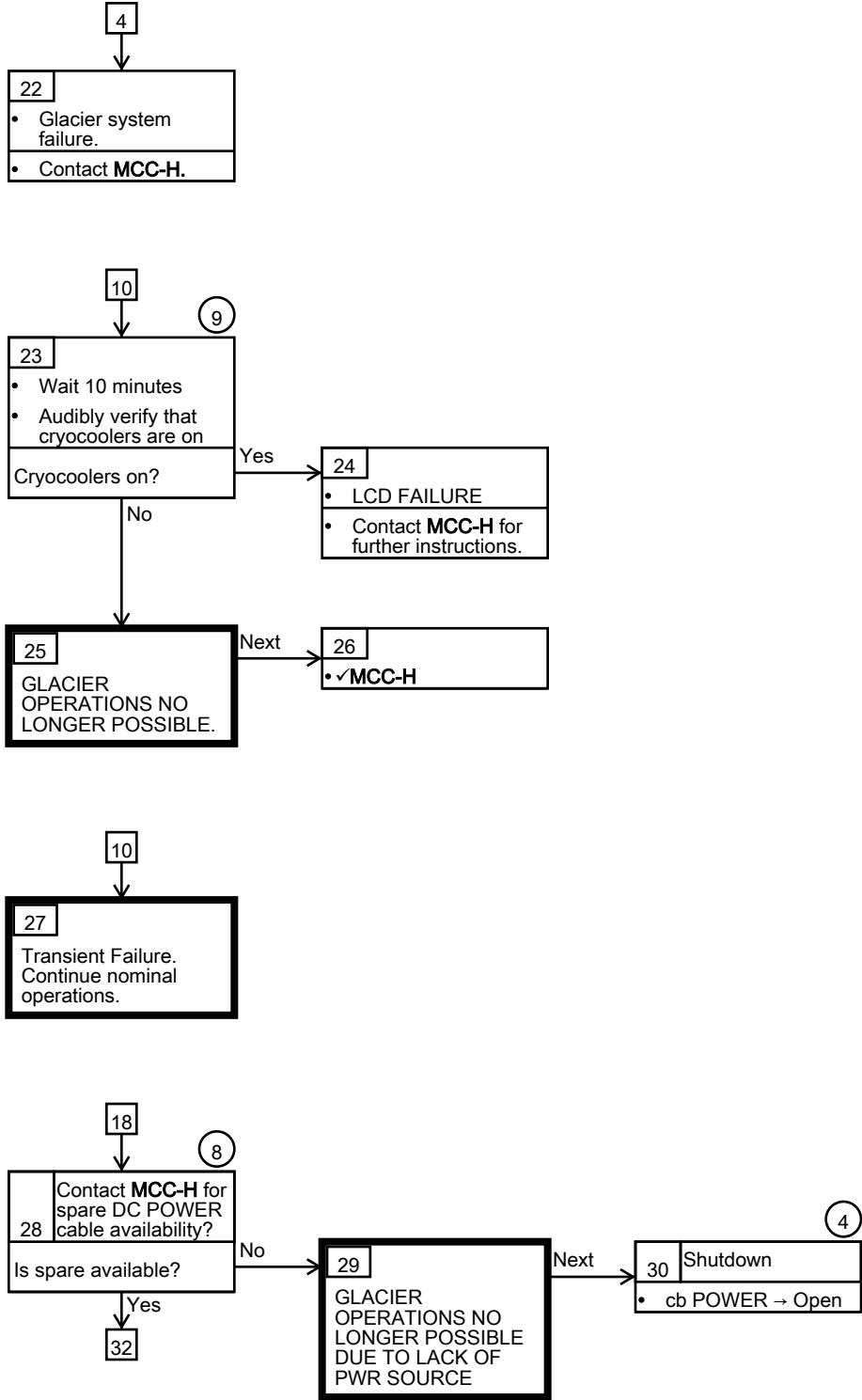
21

|                |
|----------------|
| SYSTEM FAILURE |
|----------------|

Next

31

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



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

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

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



21

|                                                                                                                                                      |                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 31                                                                                                                                                   | Turn off system |
| <ul style="list-style-type: none"> <li>• On MCC-H GO</li> <li>• cb POWER → Open (It off)</li> </ul>                                                  |                 |
| <ul style="list-style-type: none"> <li>• Alternate Power source ( )</li> <li>J_</li> <li>• ✓cb</li> <li>Open</li> <li>• ✓sw</li> <li>—OFF</li> </ul> |                 |

Next

14

28

2 3 4

|                                                                                                                                                      |                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 32                                                                                                                                                   | Switch to spare cable |
| <ul style="list-style-type: none"> <li>• Unstow spare DC POWER cable</li> </ul>                                                                      |                       |
| (Glacier)                                                                                                                                            |                       |
| <ul style="list-style-type: none"> <li>• cb POWER → Open</li> </ul>                                                                                  |                       |
| (ML86B)                                                                                                                                              |                       |
| <ul style="list-style-type: none"> <li>• ✓cb MNB MAR 1 – Open</li> </ul>                                                                             |                       |
| (ML85E(MUP))                                                                                                                                         |                       |
| <ul style="list-style-type: none"> <li>• A/E PAYLOAD DC PWR MUP J11 → ←J11</li> <li>• SPARE DC POWER CABLE → ←J11</li> </ul>                         |                       |
| (Glacier)                                                                                                                                            |                       |
| <ul style="list-style-type: none"> <li>• ✓A/E PAYLOAD DC PWR GLACIER PWR J1/MA16F/G → ←POWER J1</li> <li>• SPARE DC PWR CABLE → ←POWER J1</li> </ul> |                       |

Next

|                                                                              |                 |
|------------------------------------------------------------------------------|-----------------|
| 33                                                                           | Repower Glacier |
| (ML86B)                                                                      |                 |
| <ul style="list-style-type: none"> <li>• cb MNB MAR 1 → Close</li> </ul>     |                 |
| (Glacier)                                                                    |                 |
| <ul style="list-style-type: none"> <li>• cb POWER → Close (It on)</li> </ul> |                 |
| Main Power LED lit?                                                          |                 |
| Yes                                                                          | → 12            |

No

34

2

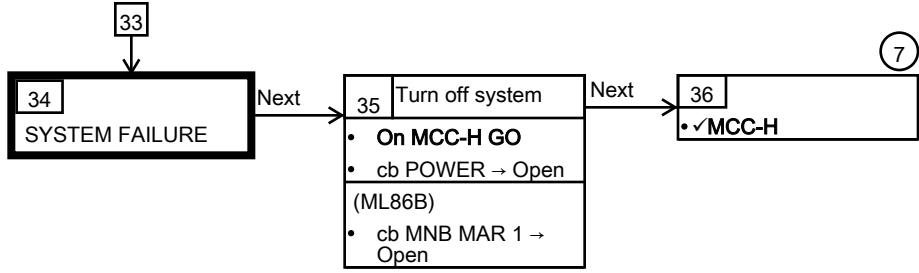
Always deadface DC Power source when disconnecting/ connecting power cable.

3

Verify connectors are properly mated and seated securely.

4

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



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

OBJECTIVE:

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

```

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

```

1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:

Glacier

- 1.2 ✓DISPLAY – 'HOME'

```

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

```

2. RECORDING CRYOGENIC STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:
- 2.2 pb Left (MENU) → push (one time), following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
- 2.3 pb Left (NEXT) → push (one time), following appears:  
'MAIN MENU'  
'STATUS 2/5'
- 2.4 pb Center (SELECT) → push (one time), following appears:  
'STATUS'  
'Cryogenic 1/3'
- 2.5 pb Center (SELECT) → push (one time), following appears:  
'Cryogenic'  
'Cooler 1 Stroke 1/21'  
'XX'

NOTE

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

- 2.6 Record Cryogenic data per **MCC-H** direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:
- 2.7 pb Center (NEXT) → press until all Cryogenic Status data has been recorded per **MCC-H** direction
- 2.8 pb Right (EXIT) → push until '**HOME**'
- 2.9 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

# GLACIER RECORD QUICK DIAGNOSTIC DATA

(ASSY OPS/20A/FIN)

Page 1 of 2 pages

## OBJECTIVE:

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

```

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

```

### 1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:

Glacier

- 1.2 ✓Display – 'HOME'  
\*\*\*\*\*  
\*  
\* If 'HOME' not shown:  
\*  
\* | pb Right (EXIT) → push until 'HOME' appears  
\*  
\*\*\*\*\*

### 2. RECORDING QUICK STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:
- 2.2 pb Left (MENU) → push (one time), following appears:  
**'MAIN MENU'**  
**'QUICK STATUS 1/5'**
- 2.3 pb Center (SELECT) → push (one time), following appears:  
**'QUICK STATUS'**  
**'Cold Head 1A 1/16'**

#### NOTE

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

- 2.4 Record Quick Status data per MCC-H direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:

## GLACIER RECORD QUICK DIAGNOSTIC DATA

(ASSY OPS/20A/FIN)

Page 2 of 2 pages

- 2.5 pb Center (NEXT) → push until all Quick Status data has been recorded per **MCC-H** direction.
- 2.6 pb Right (EXIT) → push until '**HOME**'
- 2.7 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

OBJECTIVE:

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

```

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

```

1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:

Glacier

- 1.2 ✓DISPLAY – 'HOME'

```

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

```

2. RECORDING RESOURCES STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:
- 2.2 pb Left (MENU) → push (one time), following appears:  
'MAIN MENU'  
'QUICK STATUS 1/5'
- 2.3 pb Left (NEXT) → push (one time), following appears:  
'MAIN MENU'  
'STATUS 2/5'
- 2.4 pb Center (SELECT) → push (one time), following appears:  
'STATUS'  
'Cryogenic 1/3'
- 2.5 pb Left (NEXT) → push (one time), following appears:  
'STATUS'  
'Resources 2/3'
- 2.6 pb Center (SELECT) → push (one time), following appears:

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

NOTE

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

- 2.7 Record Resource data per **MCC-H** direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:
- 2.8 pb Center (NEXT) → push until all Resource data has been recorded per **MCC-H** direction.
- 2.9 pb Right (EXIT) → push until '**HOME**'
- 2.10 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).



OBJECTIVE:

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

```

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

```

1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:

Glacier

- 1.2 ✓DISPLAY – 'HOME'
 

```

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

```

2. RECORDING SYSTEM STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:
- 2.2 Left (MENU) pb → push (one time), following appears:  
 'MAIN MENU'  
 'QUICK STATUS 1/5'
- 2.3 Left (NEXT) pb → push (one time), following appears:  
 'MAIN MENU'  
 'STATUS 2/5'
- 2.4 Center (SELECT) pb → push (one time), following appears:  
 'STATUS'  
 'Cryogenic 1/3'
- 2.5 Left (NEXT) pb → push (two times), following appears:  
 'STATUS'

'System 3/3'

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

'System'

'CPU 1/9'

'XX.X° C'

NOTE

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

- 2.7 Record System Status data per **MCC-H** direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS), then:
- 2.8 Center (NEXT) pb → push until all System Status data has been recorded per **MCC-H** direction.
- 2.9 Right (EXIT) pb → push until '**HOME**'
- 2.10 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

**TABLE 1 GLACIER ERROR MESSAGE LOG**

(ASSY OPS/20A/FIN) Page 1 of 3 pages

Table 1-1 Glacier Error Log File

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

## TABLE 1 GLACIER ERROR MESSAGE LOG

(ASSY OPS/20A/FIN) Page 2 of 3 pages

Possible Glacier Error Messages:

- (1) '**N/A**' (Ground Message Only)
- (2) '**Water Flow Range**'
- (3) '**Water Temp Range**'
- (4) '**AAA Air Temp**'
- (5) '**Voltage Range**'
- (6) '**Current Range**'
- (7) '**RIC Comm Loss**'
- (8) '**Over Temp**'
- (9) '**Hardware Error**'
- (10) '**Bandwidth**'

Table 1-2 (002) Water Flow Range/(003) Water Temp Range Error Data

| Sensor       | Value | Units |
|--------------|-------|-------|
| Outlet Water |       | °C    |
| Inlet Water  |       | °C    |
| Flow Rate    |       | kg/h  |

Table 1-3 (004) AAA Air Temp Error Data

| Sensor      | Value | Units |
|-------------|-------|-------|
| AAA Outlet  |       | °C    |
| AAA Inlet 1 |       | °C    |
| AAA Inlet 2 |       | °C    |

Table 1-4 (005) Voltage Range/(006) Current Range Error Data

| Sensor       | Value | Units   |
|--------------|-------|---------|
| Main Current |       | Amperes |
| Main Voltage |       | Volts   |
| Over Current |       | Amperes |

**TABLE 1 GLACIER ERROR MESSAGE LOG**

(ASSY OPS/20A/FIN) Page 3 of 3 pages

Table 1-5 (008) Over Temp Error Data

| Sensor       | Value | Units |
|--------------|-------|-------|
| CPU          |       | °C    |
| Capacitors A |       | °C    |
| Capacitors B |       | °C    |
| Data Logger  |       | °C    |

Table 1-6 Bandwidth Error Data

| Parameter      | Value | Units    |
|----------------|-------|----------|
| CURR TEMP      |       | °C       |
| SET POINT      |       | °C       |
| GPS            |       | HH:MM:SS |
| Cold Head 1A   |       | °C       |
| Cold Head 1B   |       | °C       |
| Cold Head 2A   |       | °C       |
| Cold Head 2B   |       | °C       |
| Circ Fan Speed |       | RPM      |

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**TABLE 2 GLACIER RESET LOG FILE**

(ASSY OPS/20A/FIN) Page 1 of 5 pages

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

**TABLE 2 GLACIER RESET LOG FILE**

(ASSY OPS/20A/FIN)

Page 2 of 5 pages

| Parameter |                 | Event 1                                                                                                | Event 2                                                                                                | Definition or Options |
|-----------|-----------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------|
| 7         | Control Mode    | IDLE <input type="checkbox"/><br>SET POINT <input type="checkbox"/><br>MANUAL <input type="checkbox"/> | IDLE <input type="checkbox"/><br>SET POINT <input type="checkbox"/><br>MANUAL <input type="checkbox"/> |                       |
| 8         | Control Sensors | INNER <input type="checkbox"/><br>OUTLET <input type="checkbox"/><br>INLET <input type="checkbox"/>    | INNER <input type="checkbox"/><br>OUTLET <input type="checkbox"/><br>INLET <input type="checkbox"/>    |                       |
| 9         | AirMgmt Proceed | PROCEED <input type="checkbox"/>                                                                       | PROCEED <input type="checkbox"/>                                                                       |                       |
| 10        | Bandwidth       | ____. ____ °C                                                                                          | ____. ____ °C                                                                                          | 00.1 to 25.5° C       |
| 11        | Primary Cooler  | COOLER 1 <input type="checkbox"/><br>COOLER 2 <input type="checkbox"/>                                 | COOLER 1 <input type="checkbox"/><br>COOLER 2 <input type="checkbox"/>                                 |                       |
| 12        | Cooler 1 Stroke | ____                                                                                                   | ____                                                                                                   | 03 to 63              |



**TABLE 2 GLACIER RESET LOG FILE**  
 (ASSY OPS/20A/FIN) Page 3 of 5 pages

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

**TABLE 2 GLACIER RESET LOG FILE**

(ASSY OPS/20A/FIN)

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

**TABLE 2 GLACIER RESET LOG FILE**

(ASSY OPS/20A/FIN)

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| Parameter |                | Event 1                                                               | Event 2                                                               | Definition or Options      |
|-----------|----------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------|
| 27        | Start Humidity | _____ Seconds                                                         | _____ Seconds                                                         | 00000 to 65535 Seconds     |
| 28        | Start Pressure | _____ Seconds                                                         | _____ Seconds                                                         | 00000 to 65535 Seconds     |
| 29        | Circ Fan Mode  | AUTOMATIC <input type="checkbox"/><br>MANUAL <input type="checkbox"/> | AUTOMATIC <input type="checkbox"/><br>MANUAL <input type="checkbox"/> |                            |
| 30        | Circ Fan Power | _____ %                                                               | _____ %                                                               | 000 to 100 %               |
| 31        | Data Storage   | _____ Seconds                                                         | _____ Seconds                                                         | 0 to 3600 seconds          |
| 32        | Ethernet Addr  | ____ . ____ . ____ . ____                                             | ____ . ____ . ____ . ____                                             | TCP IP Address             |
| 33        | Function Code  | _____ Hex Value                                                       | _____ Hex Value                                                       | 0x000A to 0xFFFE Hex Value |
| 34        | RIC Port       | _____                                                                 | _____                                                                 | 6212 to 6999               |
| 35        | Remote Command | ENABLE <input type="checkbox"/><br>INHIBIT <input type="checkbox"/>   | ENABLE <input type="checkbox"/><br>INHIBIT <input type="checkbox"/>   |                            |

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

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**TABLE 3 GLACIER DIAGNOSTIC LOG FILE**

(ASSY OPS/20A/FIN) Page 1 of 3 pages

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

**TABLE 3 GLACIER DIAGNOSTIC LOG FILE**

(ASSY OPS/20A/FIN) Page 2 of 3 pages

| Parameter         |                 | Definition                    | Event 1 | Event 2 | Event 3 | Event 4 |
|-------------------|-----------------|-------------------------------|---------|---------|---------|---------|
| STATUS: Cryogenic |                 |                               |         |         |         |         |
| 1                 | Cooler 1 Stroke |                               |         |         |         |         |
| 2                 | Cooler 2 Stroke |                               |         |         |         |         |
| 3                 | HX 1            | Heat Exchanger Temperature °C |         |         |         |         |
| 4                 | HX 2            | Heat Exchanger Temperature °C |         |         |         |         |
| 5                 | Cold Head 1A    | Temperature °C                |         |         |         |         |
| 6                 | Cold Head 1B    | Temperature °C                |         |         |         |         |
| 7                 | Cold Head 2A    | Temperature °C                |         |         |         |         |
| 8                 | Cold Head 2B    | Temperature °C                |         |         |         |         |
| 9                 | Cold Vol Outlet | Temperature °C                |         |         |         |         |
| 10                | Cold Vol Inlet  | Temperature °C                |         |         |         |         |
| 11                | Cold Vol Outer  | Temperature °C                |         |         |         |         |
| 12                | Cold Vol Inner  | Temperature °C                |         |         |         |         |
| 13                | Vac Jacket 1    | Torr                          |         |         |         |         |
| 14                | Vac Jacket 2    | Torr                          |         |         |         |         |
| 15                | Heat Sink       | Temperature °C                |         |         |         |         |
| 16                | Col Vol Vac 1   | Torr                          |         |         |         |         |
| 17                | Col Vol Vac 2   | Torr                          |         |         |         |         |
| 18                | Circ Fan Speed  | RPM                           |         |         |         |         |
| 19                | Heater 1 Power  | %                             |         |         |         |         |
| 20                | Heater 2 Power  | %                             |         |         |         |         |
| 21                | Circ Fan Power  | %                             |         |         |         |         |

**TABLE 3 GLACIER DIAGNOSTIC LOG FILE**

(ASSY OPS/20A/FIN) Page 3 of 3 pages

| Parameter         |                  | Definition                            | Event 1 | Event 2 | Event 3 | Event 4 |
|-------------------|------------------|---------------------------------------|---------|---------|---------|---------|
| STATUS: Resources |                  |                                       |         |         |         |         |
| 1                 | AAA Outlet       | Temperature °C                        |         |         |         |         |
| 2                 | AAA Inlet 1      | Temperature °C                        |         |         |         |         |
| 3                 | AAA Inlet 2      | Temperature °C                        |         |         |         |         |
| 4                 | Outlet Water     | Temperature °C                        |         |         |         |         |
| 5                 | Inlet Water      | Temperature °C                        |         |         |         |         |
| 6                 | Water Flow       | kg/h                                  |         |         |         |         |
| 7                 | Main Current     | Amps                                  |         |         |         |         |
| 8                 | Main Voltage     | Volts                                 |         |         |         |         |
| STATUS: System    |                  |                                       |         |         |         |         |
| 1                 | CPU              | Temperature °C                        |         |         |         |         |
| 2                 | Capacitors A     | Temperature °C                        |         |         |         |         |
| 3                 | Capacitors B     | Temperature °C                        |         |         |         |         |
| 4                 | Data Logger      | Temperature °C                        |         |         |         |         |
| 5                 | Battery          | Volts                                 |         |         |         |         |
| 6                 | Total Run Time   | Hours: Minutes: Seconds               |         |         |         |         |
| 7                 | Glacier Version  | ##.## Day/Month/Year Hour:<br>Minutes |         |         |         |         |
| 8                 | Logger Version   | ##.## Day/Month/Year Hour:<br>Minutes |         |         |         |         |
| 9                 | Circ Fan Version | ##.## Day/Month/Year Hour:<br>Minutes |         |         |         |         |

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CONTINGENCY EVA PL CONFIG

CONTINGENCY EVA  
PL CONFIG

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**PRE-EVA PL CONFIGURATION**

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**POST-EVA PL CONFIGURATION**

(ASSY OPS/20A/FIN) Page 1 of 1 pages

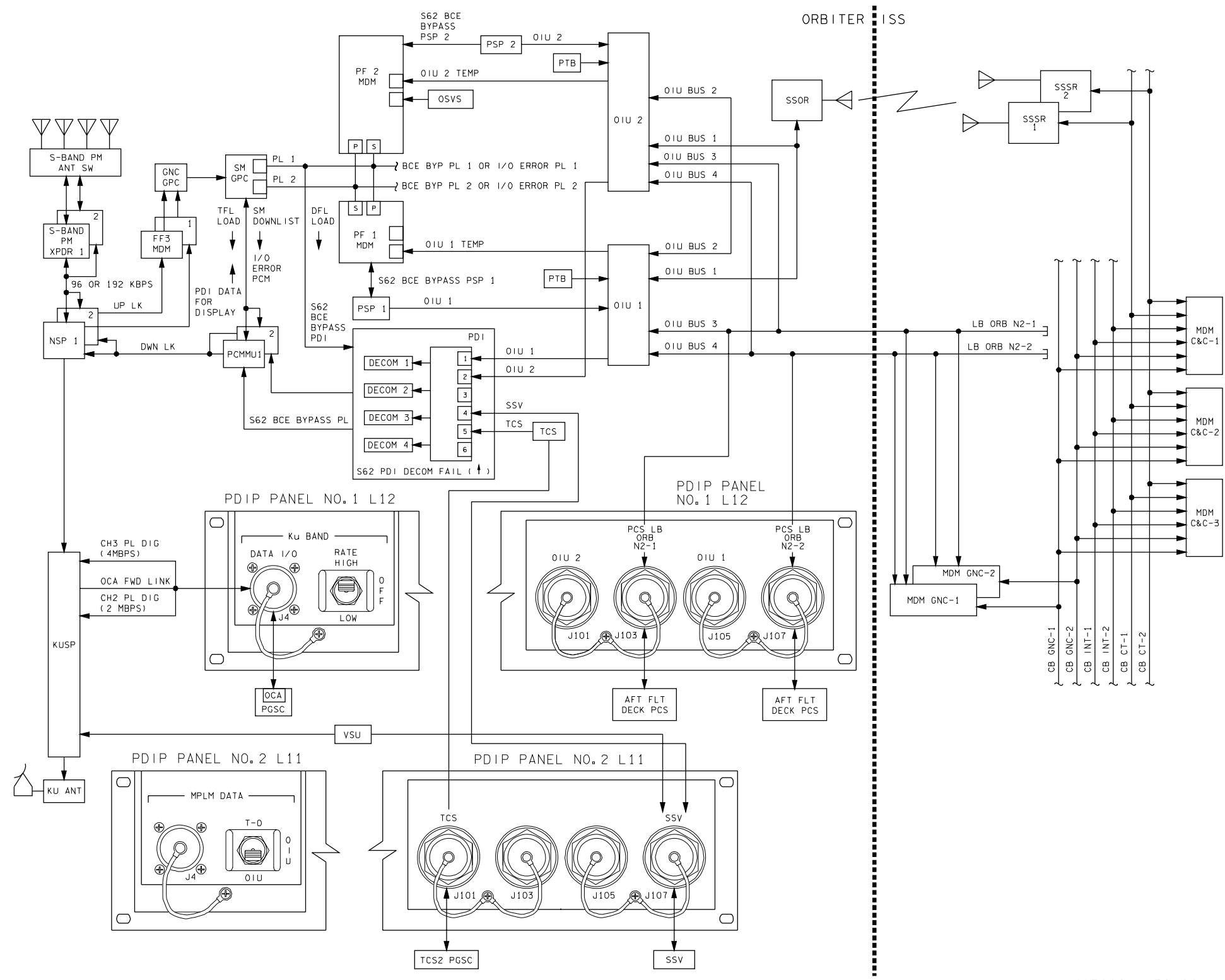
N/A

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MALFUNCTION

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**COMM**

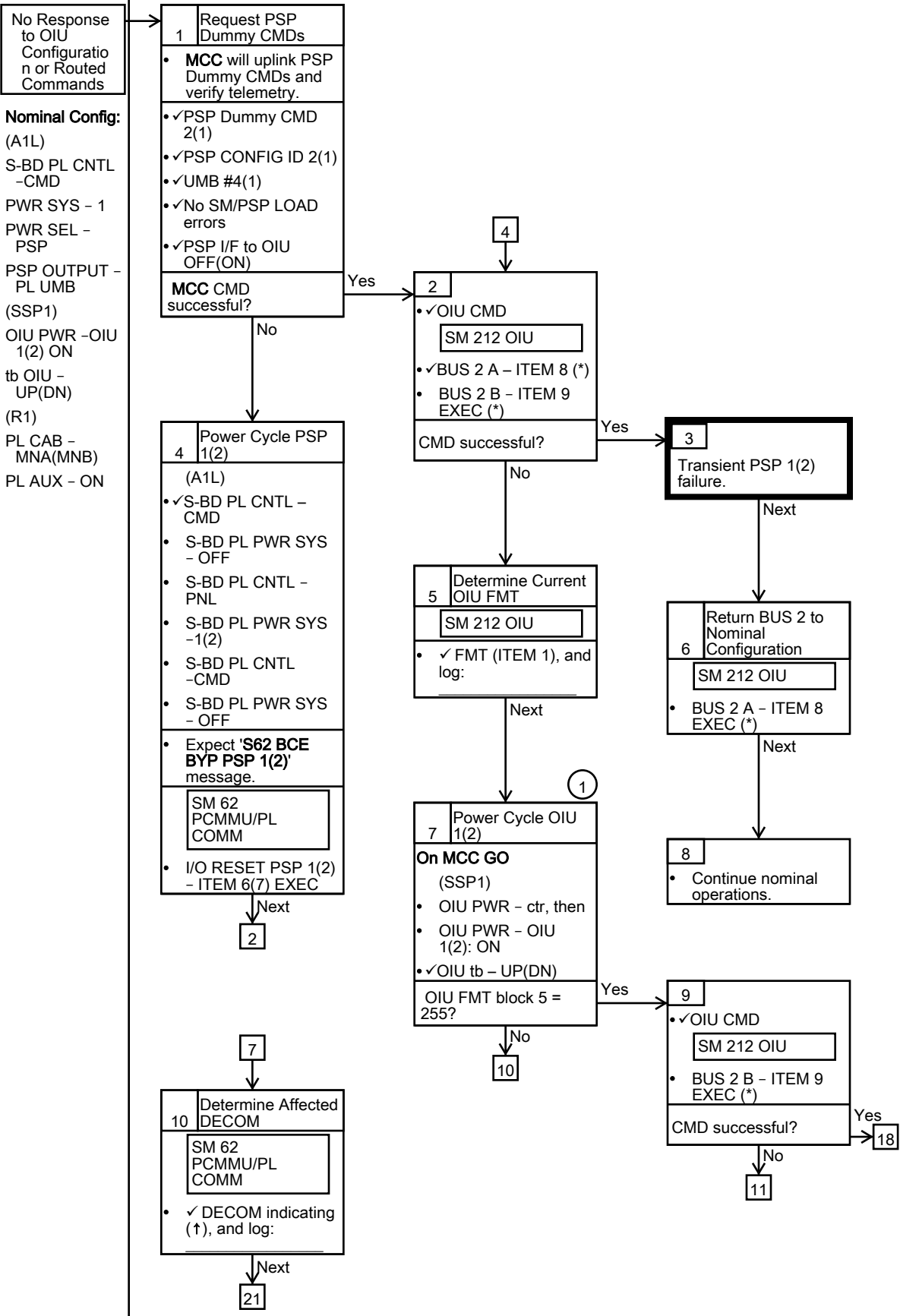
**OIU FAIL TO COMMAND**

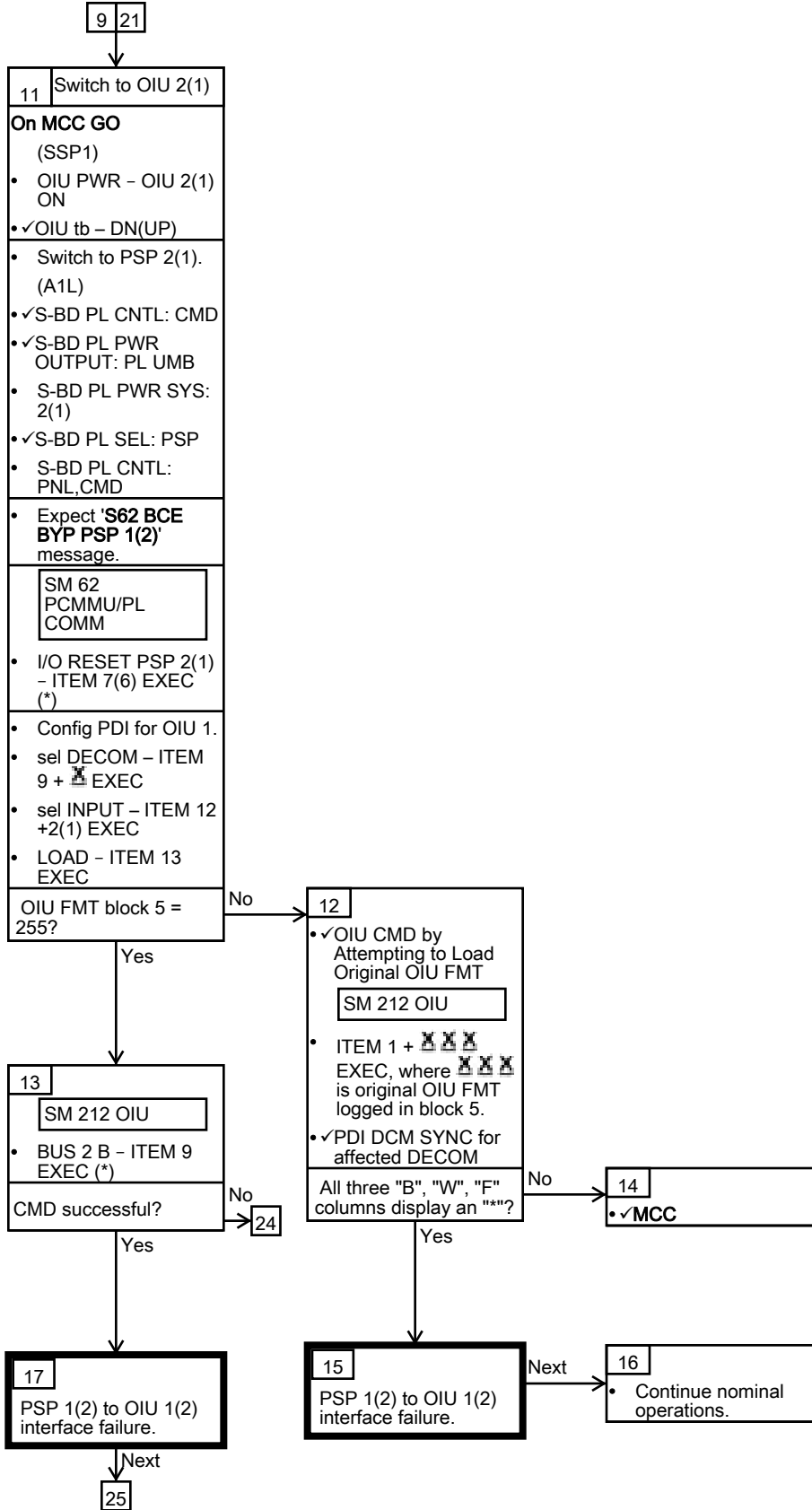
(ASSY OPS/20A/FIN)

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①

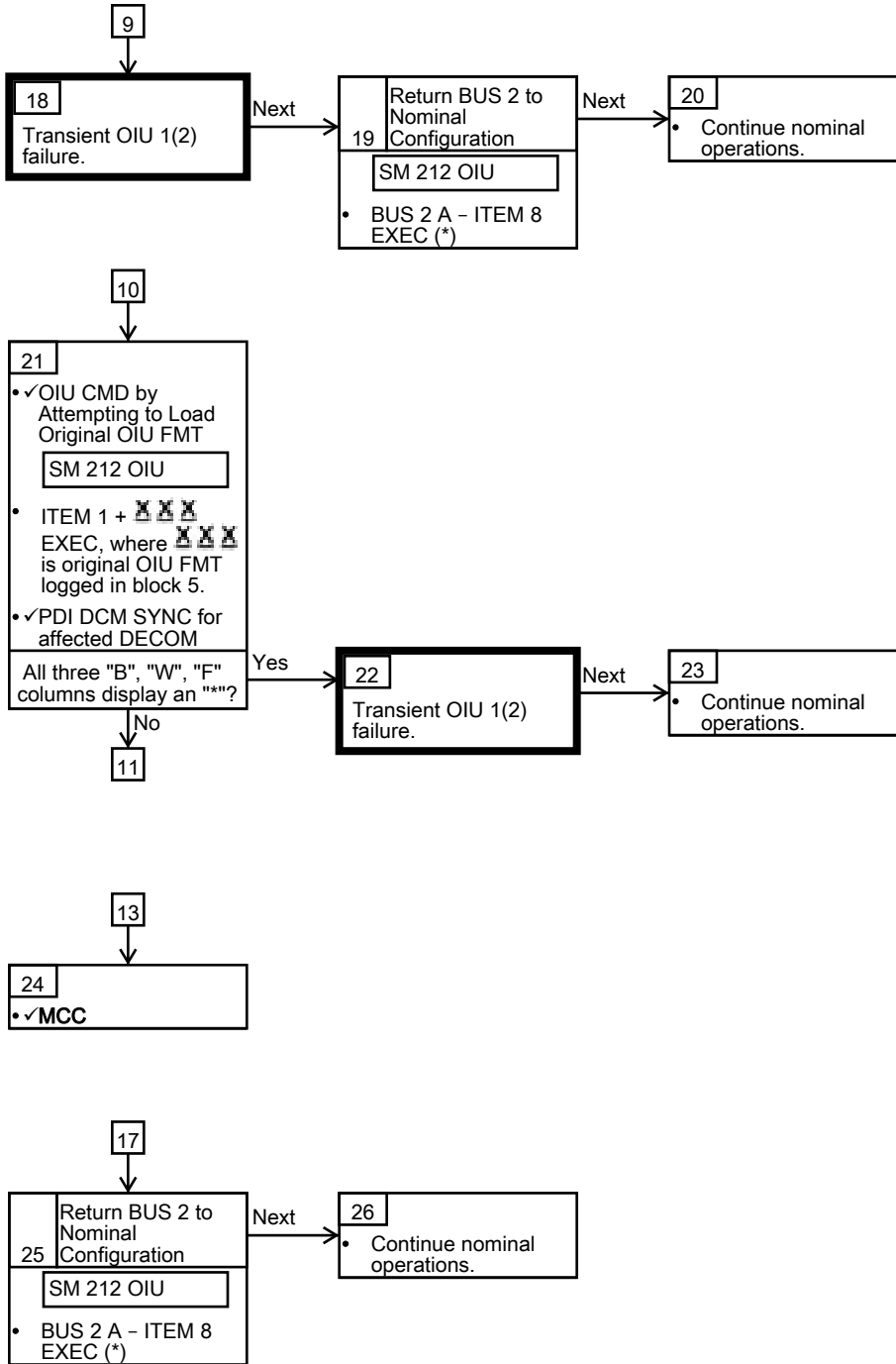
Power cycle will place OIU in Format 255. OIU Station TLM will be lost until OIU CMD is recovered. OIU H&S TLM will also be lost if PDI is not configured for OIU FMT 255.





OIU FAIL TO COMMAND

(ASSY OPS/20A/FIN)

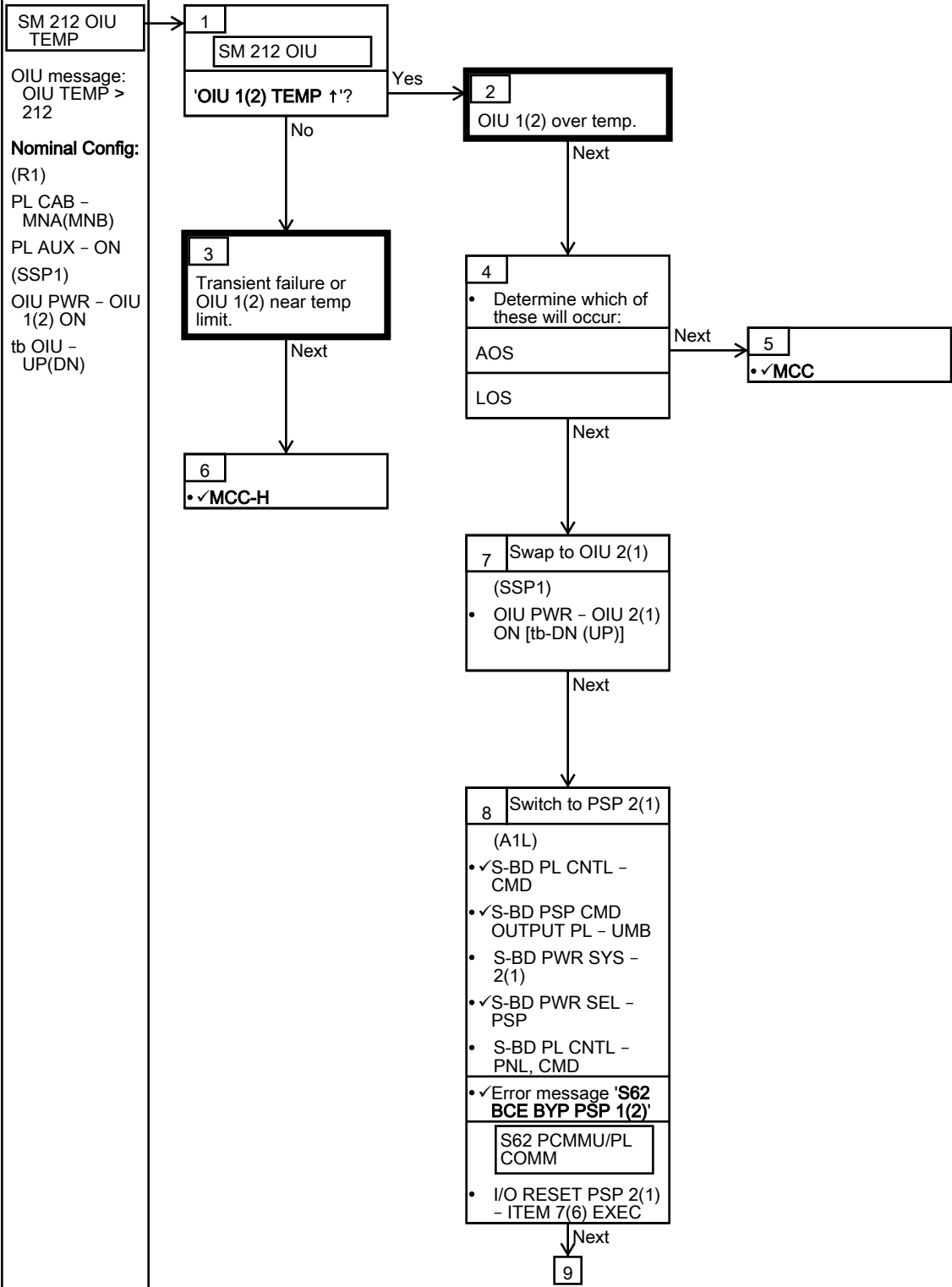


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**ASSY OPS**

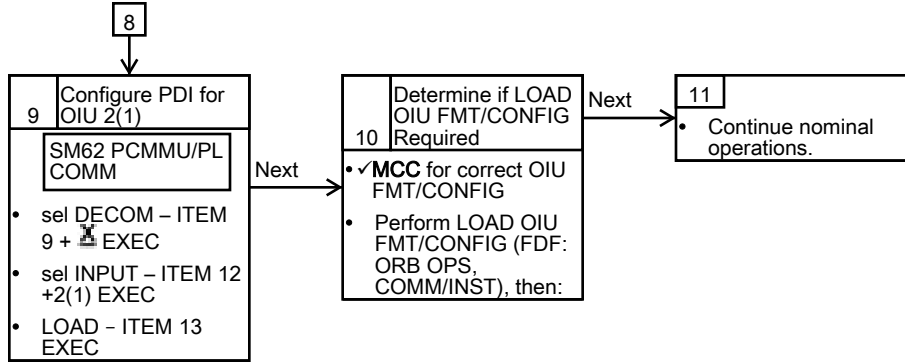
**OIU TEMP HIGH**

(ASSY OPS/20A/FIN 1) Page 1 of 2 pages



OIU TEMP HIGH

(ASSY OPS/20A/FIN 1)





**COMM**

**S212 OIU AD 1 NOLK/LOSS OF ISS OR SSOR TELEMETRY**  
(ASSY OPS/20A/FIN) Page 1 of 3 pages

**SM ALERT**

S212 OIU AD1 NOLK

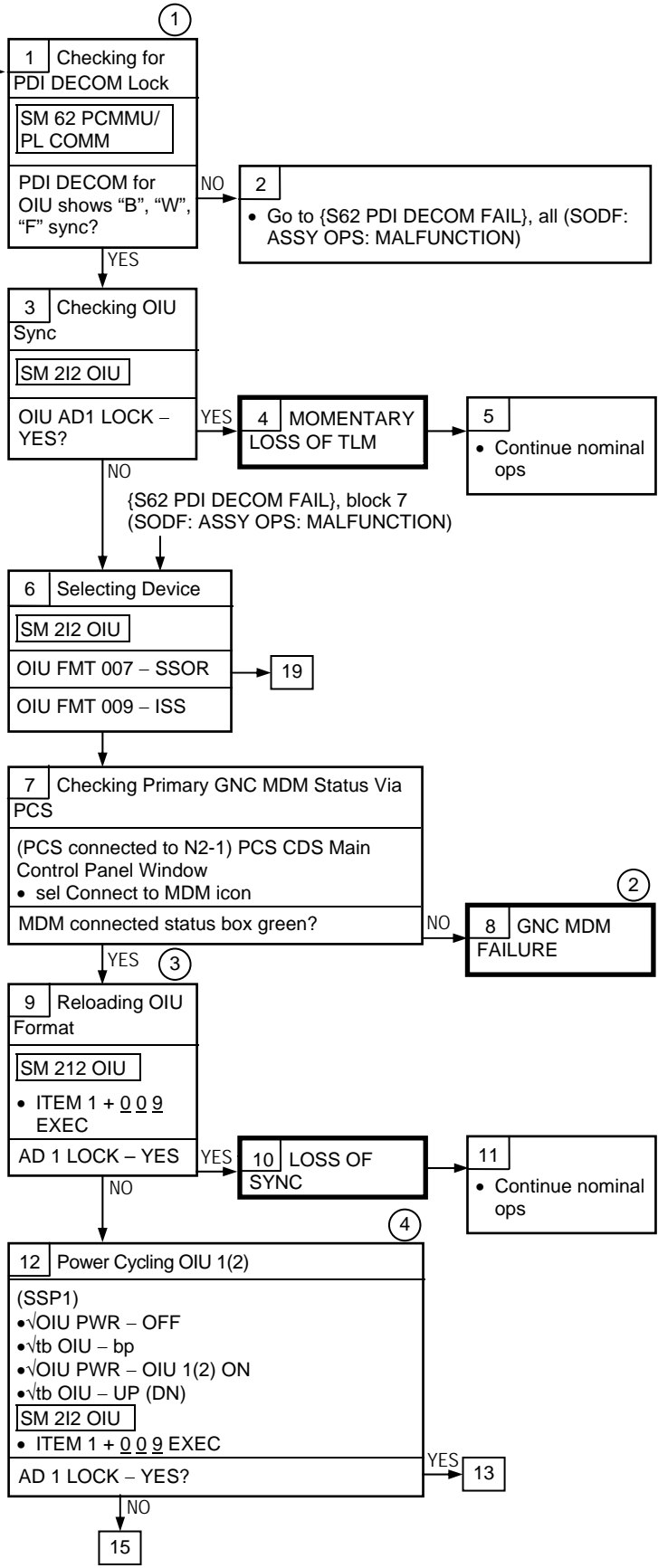
Loss of Data On SPEC 205 During Undocking

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

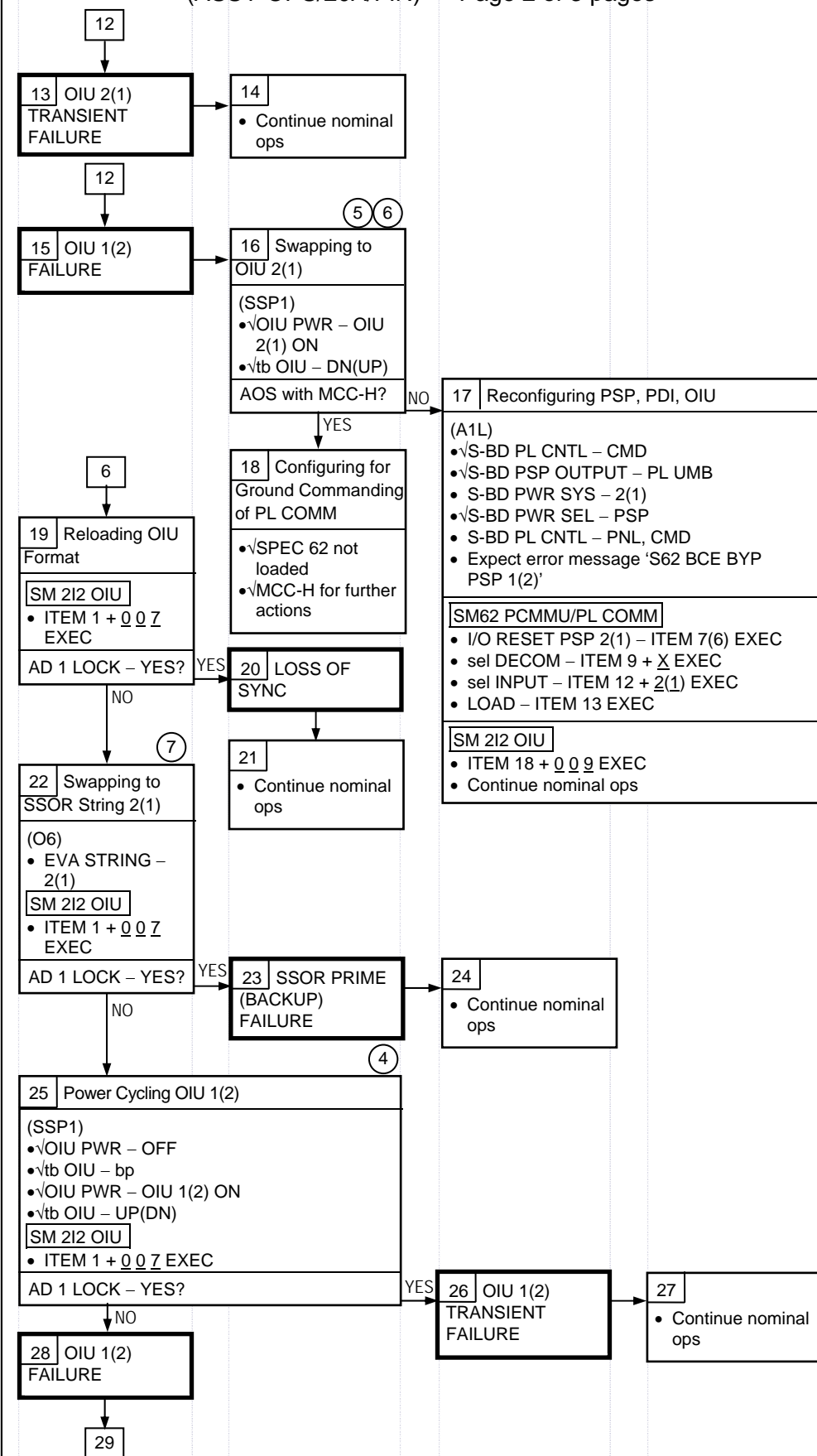
**Nominal Config:**  
(R1)  
PL CAB – MNA(MNB)  
PL AUX – ON (SSP1)  
OIU PWR – OIU 1(2) ON  
tb OIU – UP(DN)

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

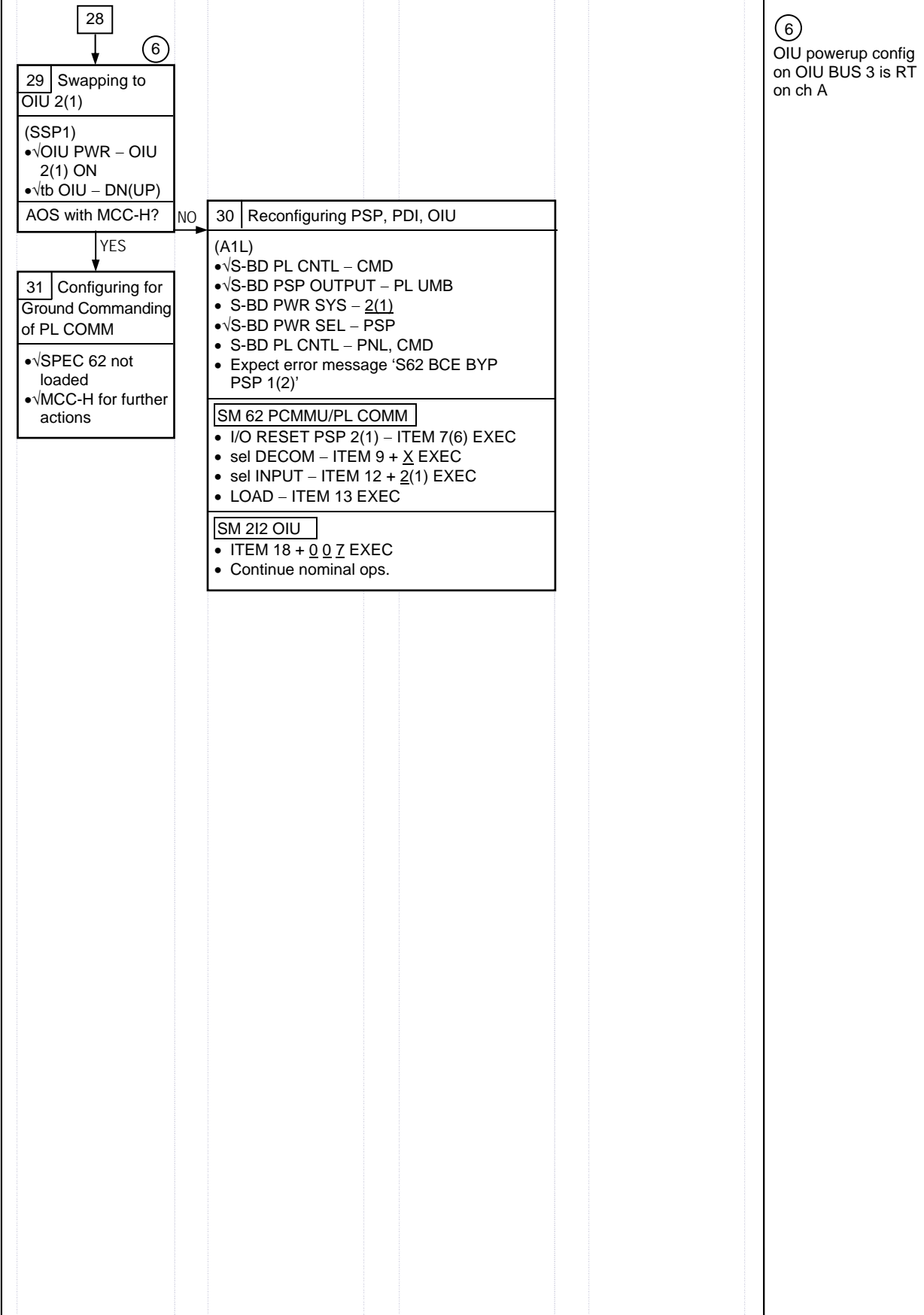
For SSOR:  
(R14)  
cb MNA UHF EVA – cl  
cb MNC UHF EVA – cl  
(O6)  
EVA STRING: 1(2)  
UHF MODE – EVA  
SM 212 OIU  
OIU FMT – 007



- ① OIU to PDI problems would announce a 'S62 PDI DECOM FAIL' message if FDA enabled
- ② MCC-H will likely direct STS or ISS crew to perform {3.301 LOSS OF PCS TELEMETRY}; (SODF: POC: MALFUNCTION)
- ③ Reloading the OIU format forces a resync with the GNC MDM or SSOR
- ④ OIU active device mapping occurs with format load



- ④ OIU active device mapping occurs with format load
- ⑤ Malfunction restores operational capability; additional troubleshooting to determine BIA failure may be performed later
- ⑥ OIU powerup config on OIU BUS 3 is RT on ch A
- ⑦ Reloading the OIU format forces a resync with the SSOR



⑥  
OIU powerup config  
on OIU BUS 3 is RT  
on ch A

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**COMM**

SM  
ALERT

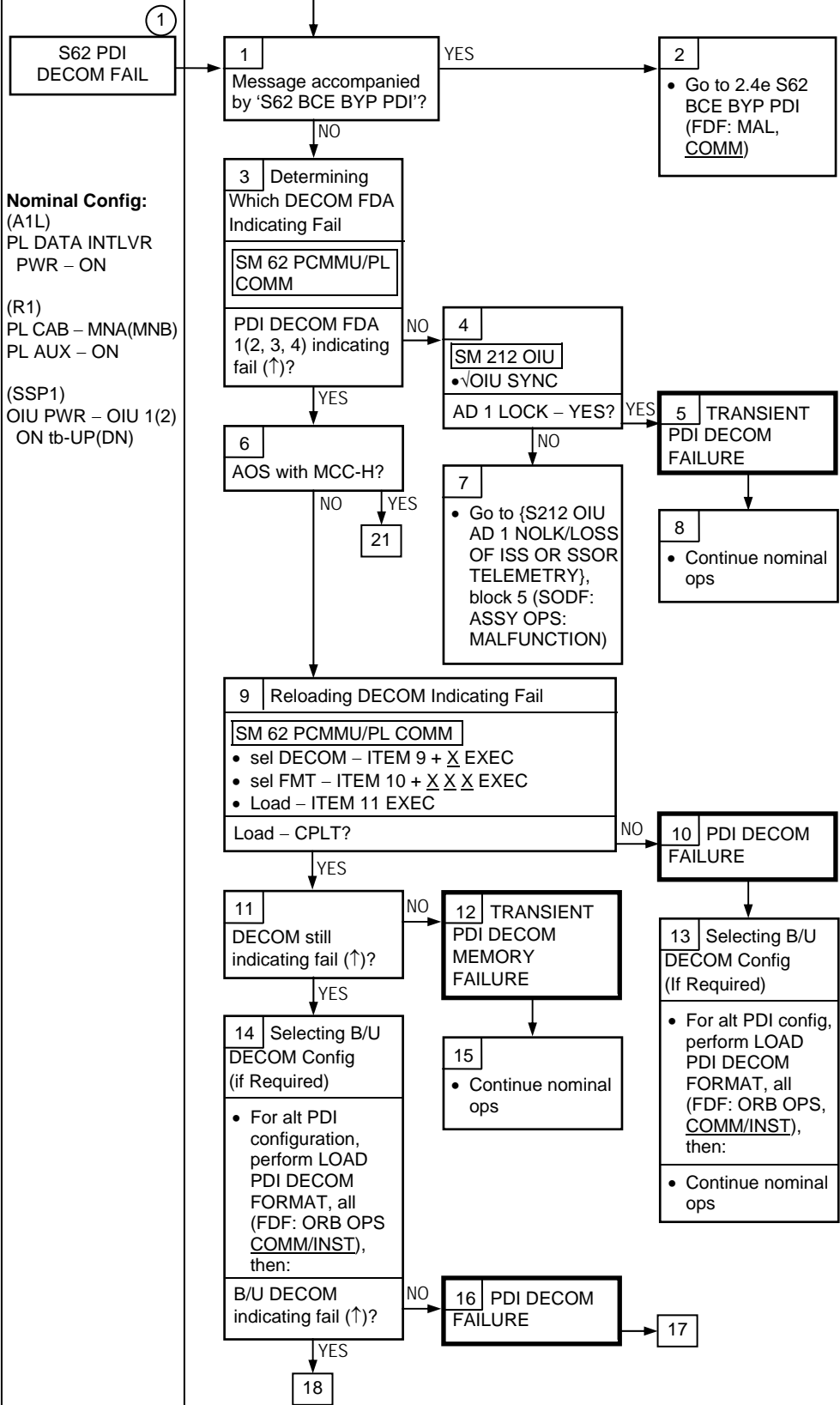
**S62 PDI DECOM FAIL**

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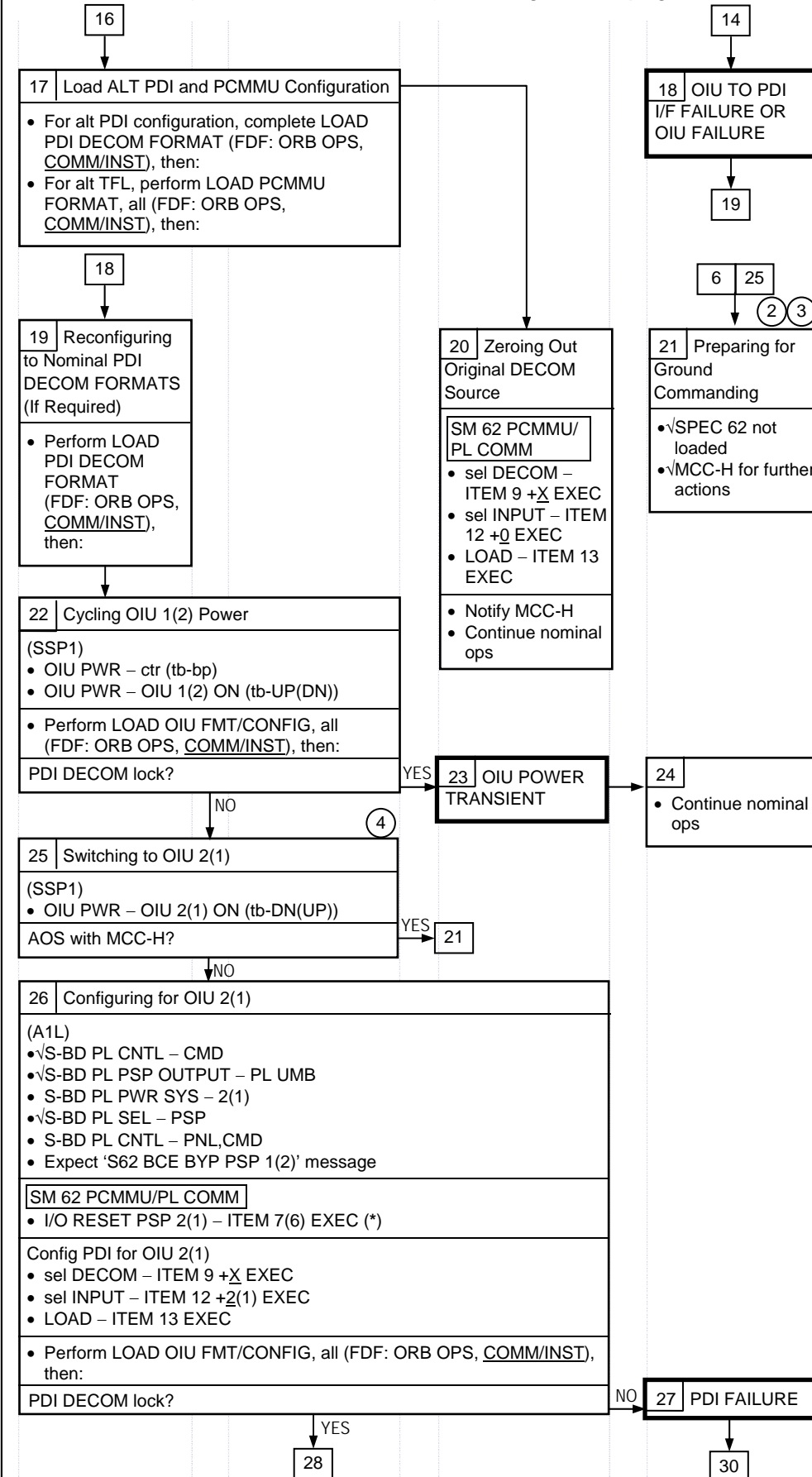
{S212 OIU AD 1 NOLK/LOSS OF ISS or SSOR TELEMETRY}, block 1  
(SODF: ASSY OPS: MALFUNCTION) or 2.4g S62 PDI DECOM FAIL  
(MAL, COMM)

**Nominal Config:**

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



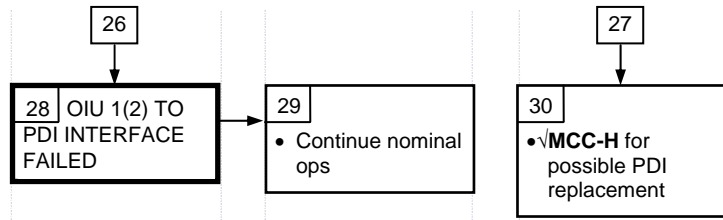
①  
TCS and SSV not  
addressed in MAL;  
FDA not nominally  
enabled



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

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

④ Alternate (OIU 1) requires PSP 1



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# PL/DPS RECONFIGURATION

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

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

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

## ACTION A

If 'I/O ERROR PL1' message:

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

If failure at IOP XMTR/RCVR at SM GPC:

If PL2 interface with SM GPC failed:

√MCC for SM GPC reassignment

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

If 'I/O ERROR PL2' message:

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

If failure at IOP XMTR/RCVR at SM GPC:

If PL1 interface with SM GPC failed:

√MCC for SM GPC reassignment

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

## PL/DPS RECONFIGURATION

(ASSY OPS/20A/FIN 1) Page 2 of 2 pages

### **ACTION B**

If SM GPC affected:

Note PL/ISS commanding via SM GPC (ground and orbiter MCDS) not possible until SM machine is restored and PL 1(2) MDM I/F is restored

If GNC GPC affected:

Ground commanding not possible until GNC machine is restored

### **ACTION C**

If PSP I/O reset not previously performed

SM 62 PCMMU/PL COMM

I/O RESET PSP 1(2) – ITEM 6(7) EXEC

Notify MCC when complete

### **ACTION D**

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

As required, reenable PDI DECOM FDA

Resume SPEC 62

### **ACTION E**

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

**ORBITER ELECTRICAL BUS LOSS MATRIX**  
(ASSY OPS/20A/FIN 1) Page 1 of 2 pages

| ORBITER EPS BUSES                       | FC1         |            | FC2        |             | FC3     | MNA DA1  |          |          |         |         |      |      |            |        |         | MNB DA2 |     |         |  |  |      |            |      |      |          | FC3      | MNC DA3 |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
|-----------------------------------------|-------------|------------|------------|-------------|---------|----------|----------|----------|---------|---------|------|------|------------|--------|---------|---------|-----|---------|--|--|------|------------|------|------|----------|----------|---------|---------|------------|------------|-----|-----|---|---------|---------|-------|------|----------|----------|----------|--|--|--|--|--|
|                                         | ESS 1BC     |            | ESS 2CA    |             | ESS 3AB | CNTL BC1 | CNTL BC2 | CNTL BC3 | PNL R14 | PNL O14 | MCA1 | MCA3 | PNL A6&A14 | FPC1   | MPC1    |         |     | MPC2    |  |  | MCA3 | PNL A6&A14 | APC5 | FPC2 | CNTL CA1 | CNTL CA2 | PNL O15 | PNL R14 | MAR1 ML86B | MAR2 ML86B | (R) | (R) | P | PNL O16 | PNL R14 | APC 6 | FPC3 | CNTL AB1 | CNTL AB2 | CNTL AB3 |  |  |  |  |  |
|                                         | PNL O13&R14 | ESS 1BC FD | ESS 2CA FD | PNL O13&R14 | PNL O13 |          |          |          |         |         |      |      |            | AC1 3φ | AUX PLA | P       | (R) | AUX PLB |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
|                                         |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         | PL1     | PL2 | PL3     |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| <b>ORBITER EQUIPMENT</b>                |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| PTU1                                    | XRC         |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| APCU1 Conv / Output (Node 3)            |             |            |            |             |         |          |          |          |         | X       |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| OPCU1                                   |             |            |            |             |         |          |          |          |         | X       |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| PTU2                                    |             |            |            | XRC         |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| APCU2 Conv / Output (Node 3, LCS)       |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| OPCU2                                   |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| PRLA                                    |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| PL Sel 1 / 2 / 3                        |             |            |            |             |         | R        |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Sys 1 Relays                            |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Mech Pwr Ena 1                          |             |            |            |             |         |          |          |          |         |         | X    |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Mech Pwr Ena 2                          |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Logic Pwr                               |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Sys 2 Relays                            |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Mech Pwr Ena 1 / 2                      |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Logic Pwr                               |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| OIU1                                    |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| OIU2                                    |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| ODS X1 Connector Mate Tim/Pwr           |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| ODS X2 Connector Mate Tim/Pwr           |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| ODS TCS                                 |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Primary C/L Camera                      |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Secondary C/L Camera                    |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| PDIP 1 (Ku-Band relay / PCS-to-OIU I/F) |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| PDIP 2 (TCS / SSV)                      |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Video Processing Unit (VPU)             |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Payload Timing Buffer                   |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Orbiter PCS                             |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| SSV                                     |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| <b>CARGO EQUIPMENT</b>                  |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |
| Glacier                                 |             |            |            |             |         |          |          |          |         |         |      |      |            |        |         |         |     |         |  |  |      |            |      |      |          |          |         |         |            |            |     |     |   |         |         |       |      |          |          |          |  |  |  |  |  |

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

**ORBITER ELECTRICAL BUS LOSS MATRIX**  
(ASSY OPS/20A/FIN 1) Page 2 of 2 pages

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

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

## ORBITER MDM LOSS IMPACTS

(ASSY OPS/20A/FIN)

Page 1 of 2 pages

|         |                                                                                                                                                                                                                                                                                                                                                                                              |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FF1     | Uplink through NSP 1 (secondary)                                                                                                                                                                                                                                                                                                                                                             |
| FF3     | Uplink through NSP 2 (primary)<br>FRCS Vernier RJD command path (loss of verns)                                                                                                                                                                                                                                                                                                              |
| FA1     | LRCS Vernier RJD command path (loss of verns)                                                                                                                                                                                                                                                                                                                                                |
| FA2     | RRCS Vernier RJD command path (loss of verns)                                                                                                                                                                                                                                                                                                                                                |
| PF1     | ISS Primary command path (via PSP 1 – UMB 1/OIU 1)<br>OIU 1 tlm (PDI TELEMETRY 1)<br>Ku-Band command and tlm                                                                                                                                                                                                                                                                                 |
| PF2     | ISS Redundant command path (via PSP 2 – UMB 1/OIU 2)<br>OIU 2 tlm (PDI TELEMETRY 2)<br>CCTV Command Path from <b>MCC</b> (crew still has control from PNL A7)<br>C/W Annunciation (PL Caution, B/U C/W Alarm)                                                                                                                                                                                |
| OF1     | PCMMU 1 – mode select tlm<br>PCMMU 1,2 – ON/OFF power tlm<br>PCMMU 1,2 – RPC A tlm<br>PL AUX A – RPC ON/OFF tlm<br>MID MCA 1 OP STATUS 1, 2, 3, 4 tlm<br>MID MCA 3 OP STATUS 1, 2, 3, 4 tlm<br>PL BAY MECH PWR SYS 1, 2 tlm<br>PL RETEN LOGIC PWR SYS 1, 2 tlm                                                                                                                               |
| OF2     | PSP 1,2 – bit and frame sync<br>PCMMU 2 – mode select tlm<br>PCMMU 2 RPC B tlm<br>PL AUX B – RPC ON/OFF tlm<br>MID MCA 1 OP STATUS 5, 6 tlm<br>MID MCA 3 OP STATUS 5, 6, 7, 8 tlm                                                                                                                                                                                                            |
| DSC OF2 | FRCS Vernier Inj Temps (loss of verns)                                                                                                                                                                                                                                                                                                                                                       |
| OF3     | Orbiter Comm system tlm (refer to OI MDM/DSC Failure Impacts)<br>PL PRI MNC, MNB, FC3 – ON/OFF tlm<br>PCMMU 1 RPC B tlm                                                                                                                                                                                                                                                                      |
| OF4     | Ku-Band – RADAR mode and output power<br>S-Band, Ku-Band – PNL/CMD switch position<br>PSP, GCIL – ON/OFF tlm<br>Orbiter Comm system tlm (refer to OI MDM/DSC Failure Impacts)<br>CAB PL (MNA, MNB), PL AUX – ON/OFF tlm<br>APCU 1 and 2 Converters/Outputs switch position tlm<br>PTU1 and 2 OPCU Converter switch position tlm<br>ROEU MATE/DEMATE tlm (Sys 1)<br>ROEU LAT, REL tlm (Sys 1) |

## ORBITER MDM LOSS IMPACTS

(ASSY OPS/20A/FIN)

Page 2 of 2 pages

- OA1 ODS X4/PMA X3 connector mate tlm  
PMA 2/3 GRP 1 passive hooks (1,3,5,7,9,11) Close tlm  
PTU 1/APCU 1 voltage/trip status/temperature tlm  
ODS X1 Connector mate A/B tlm
- DSC OA1 ODS X4/PMA X3 connector mate tlm  
PMA 2/3 GRP 1 passive hooks (1,3,5,7,9,11) Close tlm
- OA2 AFT PL MNB PWR ON tlm  
AFT PL MNB amps  
ODS X3/PMA X4 connector mate tlm  
PMA 2/3 GRP 2 passive hooks (2,4,6,8,10,12) Close tlm  
PTU 2/APCU 2 voltage/trip status/temperature tlm  
ODS X2 Connector mate A/B tlm
- DSC OA2 ODS X3/PMA X4 connector mate tlm  
PMA 2/3 GRP 2 passive hooks (2,4,6,8,10,12) Close tlm  
Vernier R5D Inj Temps (loss of verns)
- OA3 AFT PL MNC PWR ON tlm  
AFT PL MNC amps
- DSC OL1 LRCS Vernier Inj Temps (loss of verns)
- DSC OR1 RRCS Vernier Inj Temps (loss of verns)

DEORBIT PREP

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## PAYLOAD DEACTIVATION

(ASSY OPS/20A/FIN) Page 1 of 1 pages

- |                 |    |                                                            |
|-----------------|----|------------------------------------------------------------|
| L12U<br>(SSP 1) | 1. | cb SW PWR 1 – op<br>PDIP 1 PWR 2/KuBAND RLY – op<br>1 – op |
| L12L<br>(SSP 2) | 2. | cb PDIP 2 PWR 2 – op<br>1 – op                             |
| L12<br>(PDIP 1) | 3. | Ku BAND RATE – OFF                                         |
| R1              | 4. | PL CAB – OFF                                               |

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**PAYLOAD REACTIVATION**

(ASSY OPS/20A/FIN) Page 1 of 1 pages

N/A

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# PAYLOAD ENTRY SWITCH LIST/VERIFICATION

(ASSY OPS/20A/FIN 1)

Page 1 of 1 pages

## PAYLOAD PWR CONFIG

|          |                                 |    |                                                                                                                                                                   |
|----------|---------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TIG-1:55 | R1                              | 1. | √PL CAB – OFF<br>√PL PRI MNC – ctr (tb-OFF)<br>√PL PRI MNB – ctr (tb-OFF)<br>√PL PRI FC3 – ctr (tb-OFF)<br>√PL AUX – ON<br>√PL AFT MNB – OFF<br>√PL AFT MNC – OFF |
|          | L12U<br>(SSP1)                  | 2. | √cb SW PWR 1 – op<br>√cb PDIP 1 PWR 2/KuBAND RLY – op<br>√TCS PWR – OFF (tb-bp)<br>√cb PDIP 1 PWR 1 – op<br>√OIU PWR – OFF (tb-bp)                                |
|          | L12L<br>(SSP2)                  | 3. | √cb PDIP 2 PWR 2 – op<br>√C/L CAM PWR – OFF<br>√cb PDIP 2 PWR 1 – op                                                                                              |
|          | L12<br>(PDIP1)                  | 4. | √Ku BAND RATE – OFF<br>√DC POWER 1 – OFF<br>√DC POWER 2 – OFF                                                                                                     |
|          | L11<br>(PDIP2)                  | 5. | √DC POWER 1 – OFF<br>√DC POWER 2 – OFF                                                                                                                            |
|          | MF28E/G<br>(GLACIER)<br>ML86B:E | 6. | √cb POWER – cl (lt on)<br>√BATTERY – ON (lt on)<br>√cb MNB MAR 1 - cl                                                                                             |

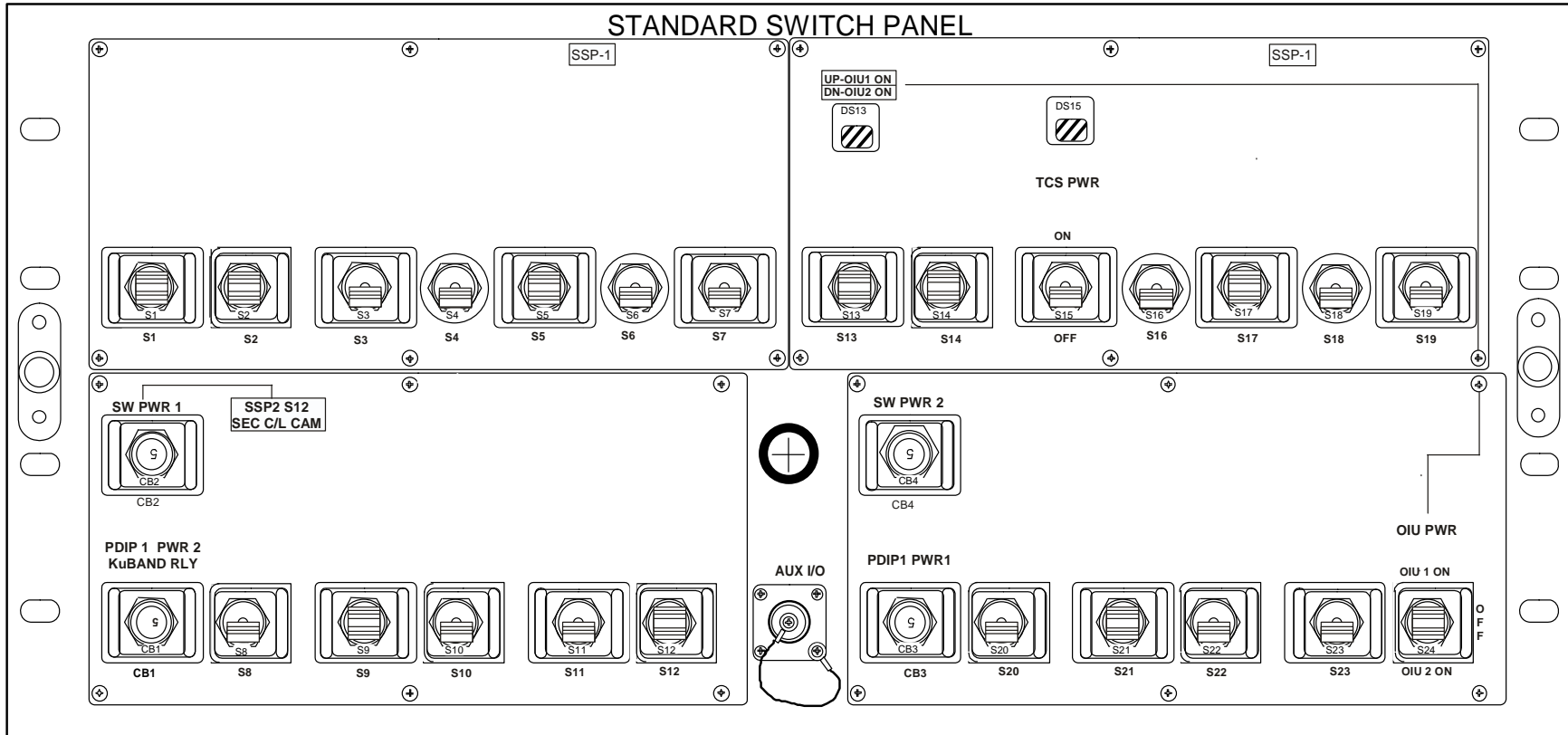
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**STANDARD SWITCH PANEL 1 LAYOUT**  
 (ASSY OPS/20A/FIN) Page 1 of 2 pages



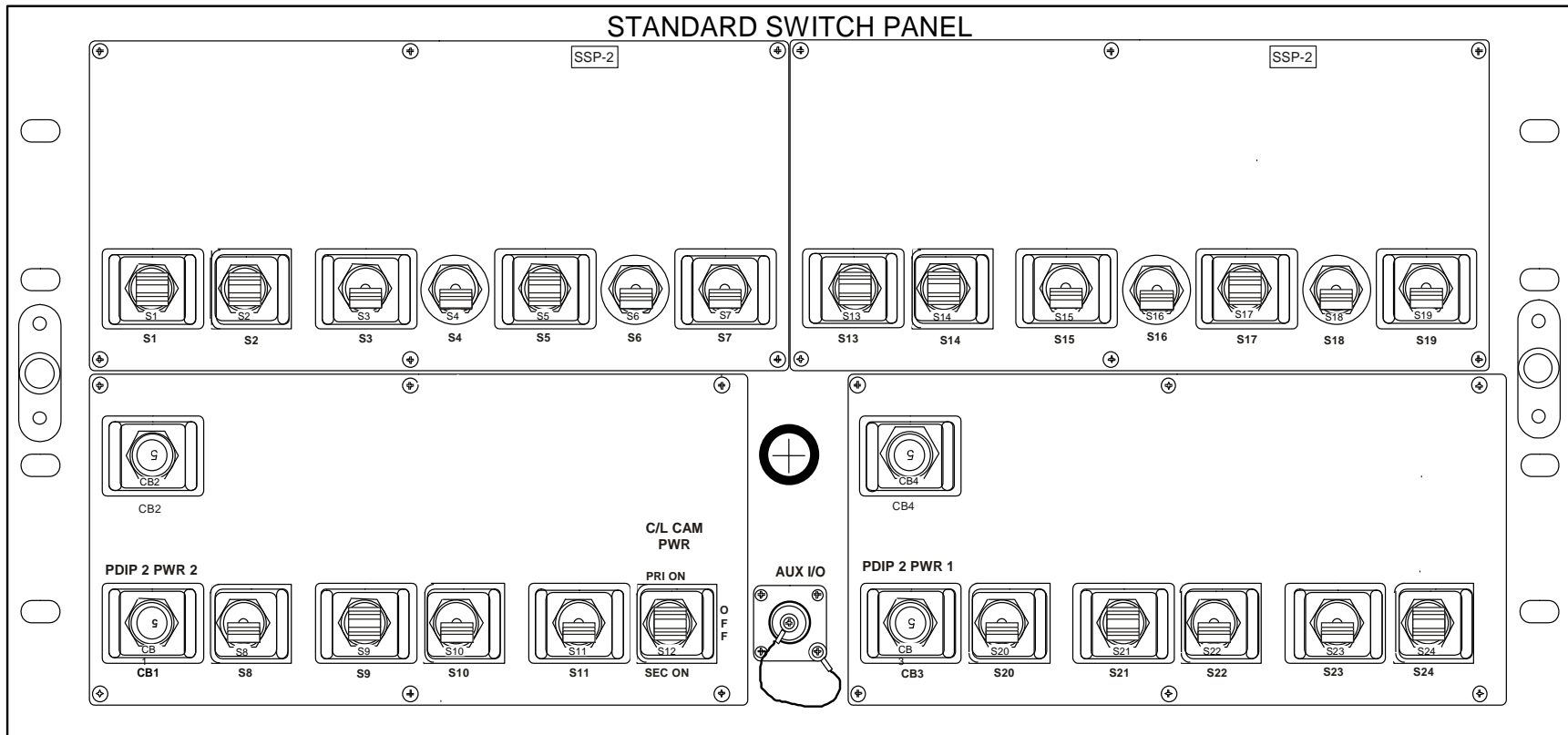
**STANDARD SWITCH PANEL 1 LAYOUT**

(ASSY OPS/20A/FIN)

Page 2 of 2 pages

|                                      | Device Type                                                                        | Function                                                                                                                                                                                        |
|--------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CB1<br>PDIP 1<br>PWR2/<br>KuBAND RLY | Circuit breaker,<br>5 amp                                                          | closed (in) – Applies orbiter CAB PL2 power to the PDIP DC PWR 2 switch outlet, and KuBAND RATE switch.<br><br>open (out) – Removes power from PDIP DC PWR 2 outlet and KuBAND RATE switch.     |
| CB 2<br>SW PWR 1                     | Circuit breaker,<br>5 amp                                                          | closed (in) – Applies orbiter CAB PL1 power to SSP2 S12.<br><br>open (out) – Removes power from SSP2 S12.                                                                                       |
| DS13                                 | Event indicator,<br>three-position                                                 | UP – Indicates that CAB PL3 power is being supplied to OIU 1.<br><br>bp – Indicates power is removed from OIU 1 and OIU 2.<br><br>DN – Indicates that AUX PLB power is being supplied to OIU 2. |
| S15<br>TCS PWR                       | Two-position toggle switch:<br><br>Maintained –<br>Maintained                      | ON (up) – Once power enabled, applies PL AUX MNB power to TCS.<br><br>OFF (dn) – Removes power to TCS.                                                                                          |
| DS15                                 | Event indicator,<br>two-position                                                   | gray – Indicates power is applied to TCS<br><br>bp – Indicates power is removed from TCS                                                                                                        |
| CB 3<br>PDIP1 PWR 1                  | Circuit breaker,<br>5 amp                                                          | closed (in) – Applies CAB PL2 to PDIP DC PWR 1 outlet.<br><br>open (out) – Removes power from PDIP DC PWR 1 outlet.                                                                             |
| CB4<br>SW PWR 2                      | Circuit breaker,<br>5 amp                                                          | No function on this flight.                                                                                                                                                                     |
| S24<br>OIU PWR                       | Toggle switch,<br>three-position<br><br>Maintained –<br>Maintained –<br>Maintained | OIU 1 ON (up) – Provides CAB PL3 power to OIU 1.<br><br>OFF (ctr) – Removes power from OIU 1 and OIU 2.<br><br>OIU 2 ON (dn) – Provides AUX PLB power to OIU 2.                                 |

**STANDARD SWITCH PANEL 2 LAYOUT**  
 (ASSY OPS/20A/FIN) Page 1 of 2 pages



**STANDARD SWITCH PANEL 2 LAYOUT**

(ASSY OPS/20A/FIN)

Page 2 of 2 pages

|                     | Device Type                                                                        | Function                                                                                                                                                 |
|---------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| CB1<br>PDIP 2 PWR 2 | Circuit breaker,<br>5 amp                                                          | closed (in) – Applies orbiter power to PDIP DC PWR 2.<br><br>open (out) – Removes orbiter power from PDIP DC PWR 2.                                      |
| S12<br>C/L CAM PWR  | Three-position<br>toggle switch:<br><br>Maintained –<br>Maintained –<br>Maintained | PRI ON – Applies CAB PL3 power to PRI C/L CAM.<br><br>center – Removes power from PRI/SEC C/L CAM.<br><br>SEC ON – Applies CAB PL1 power to SEC C/L CAM. |
| CB3<br>PDIP 2 PWR 1 | Circuit breaker,<br>5 amp                                                          | closed (in) – Applies CAB PL2 power to PDIP DC PWR 1 outlet.<br><br>open (out) – Removes CAB PL2 power from PDIP DC PWR 1 outlet.                        |

PAYLOAD CUE CARDS

PAYLOAD  
CUE CARDS

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HOOK  
VELCROHOOK  
VELCRO**GLACIER STATUS CHECK**

(ASSY OPS/20A/FIN) Page 1 of 2 pages

OBJECTIVE:

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

1. GLACIER STATUS CHECKMF28E/G  
(Glacier) 1.1 √cb POWER – Close (It on)

1.2 √sw BATTERY – ON (It on)

1.3 √Display – ‘HOME’

\*\*\*\*\*

\* If Display – ‘\*\*Error Pending\*\*’

\* | Perform [GLACIER ERROR MESSAGE](#), all (SODF: ASSY  
\* | OPS: PAYLOADS: GLACIER: MALFUNCTION), then:

\*

\* If ‘HOME’ not shown

\* pb Right (EXIT) → Press until ‘HOME’ appears

\*\*\*\*\*

**NOTE**

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

1.4 √Display – ‘CURR TEMP:’ is  $-95.0^{\circ}\text{C} \pm 5.0^{\circ}\text{C}$ 

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

1.6 √**MCC-H** and report data recorded in Table 1 and any off-nominal conditions.

TOP  
BACK OF 'GLACIER STATUS CHECK'

HOOK  
VELCRO

HOOK  
VELCRO

**GLACIER STATUS CHECK**

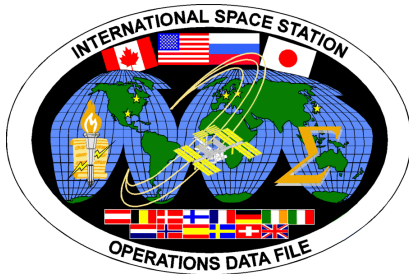
(ASSY OPS/20A/FIN)

Page 2 of 2 pages

Table 1. Glacier Log

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

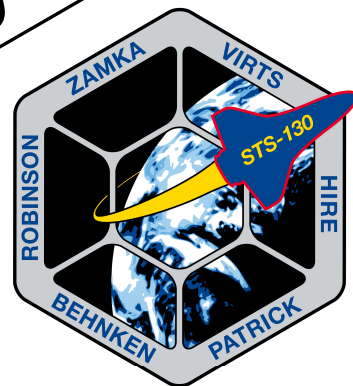
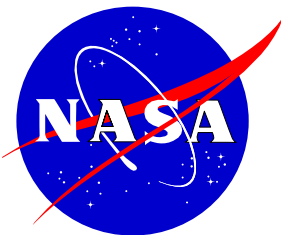




# INTERNATIONAL SPACE STATION

## ASSEMBLY OPERATIONS

Return on  
STS-130







# INTERNATIONAL SPACE STATION

## ASSEMBLY OPERATIONS

Return on  
STS-130

