



International Space Station ISS/Shuttle Joint Operations Book

ISS-3A

Mission Operations Directorate
Operations Division

Final, Revision A
September 20, 2000

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National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



**INTERNATIONAL SPACE STATION
ISS/SHUTTLE JOINT OPERATIONS BOOK
ISS-3A**

FINAL, REVISION A
September 20, 2000

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Incorporates the following:				
CR:	Joint_OpsU2	Joint_OpsU17	Joint_OpsU39	Multi_FileU48A
	Joint_OpsU3	Joint_OpsU18	Joint_OpsU40	Multi_FileU49A
	Joint_OpsU4	Joint_OpsU19	Joint_OpsU42	Multi_FileU76
	Joint_OpsU5	Joint_OpsU20	Joint_OpsU43	Multi_FileU77
	Joint_OpsU9	Joint_OpsU21	Joint_OpsU44	Multi_FileU79
	Joint_OpsU10	Joint_OpsU23	Joint_OpsU45	Multi_FileU84
	Joint_OpsU12	Joint_OpsU24	Joint_OpsU46	
	Joint_OpsU13	Joint_OpsU25	Joint_OpsU47	
	Joint_OpsU14	Joint_OpsU26	Joint_OpsU48	
	Joint_OpsU15	Joint_OpsU28	Joint_OpsU49	
	Joint_OpsU16	Joint_OpsU29	Joint_OpsU54	

**INTERNATIONAL SPACE STATION
JOINT OPERATIONS BOOK - 3A**

LIST OF EFFECTIVE PAGES

FINAL 23 JUN 00
REV A 20 SEP 00

Sign Off	* 20 SEP 00	37	18 SEP 00
ii	* 20 SEP 00	38	18 SEP 00
iii	* 20 SEP 00	39	18 SEP 00
iv	* 20 SEP 00	40	19 SEP 00
v	20 SEP 00	41	17 SEP 00
vi	20 SEP 00	42	17 SEP 00
1	20 SEP 00	43	16 SEP 00
2	20 SEP 00	44	16 SEP 00
3	19 SEP 00	45	16 SEP 00
4	19 SEP 00	46	19 SEP 00
5	17 SEP 00	47	19 SEP 00
6	19 SEP 00	48	19 SEP 00
7	21 JUN 00	49	19 SEP 00
8	19 SEP 00	50	19 SEP 00
9	17 SEP 00	51	20 SEP 00
10	19 SEP 00	52	20 SEP 00
11	21 JUN 00	53	18 SEP 00
12	21 JUN 00	54	18 SEP 00
13	22 JUN 00	55	18 SEP 00
14	19 SEP 00	56	18 SEP 00
15	17 SEP 00	57	18 SEP 00
16	17 SEP 00	58	18 SEP 00
17	17 SEP 00	59	18 SEP 00
18	19 SEP 00	60	18 SEP 00
19	22 JUN 00	61	18 SEP 00
20	19 SEP 00	62	18 SEP 00
21	17 SEP 00	63	18 SEP 00
22	17 SEP 00	64	18 SEP 00
23	17 SEP 00	65	16 SEP 00
24	19 SEP 00	66	16 SEP 00
25	17 SEP 00	67	20 SEP 00
26	17 SEP 00	68	20 SEP 00
27	17 SEP 00	69	22 JUN 00
28	17 SEP 00	70	19 SEP 00
29	18 SEP 00	71	22 JUN 00
30	18 SEP 00	72	19 SEP 00
31	18 SEP 00	73	22 JUN 00
32	18 SEP 00	74	22 JUN 00
33	18 SEP 00	75	22 JUN 00
34	19 SEP 00	76	19 SEP 00
35	18 SEP 00	77	22 JUN 00
36	18 SEP 00	78	19 SEP 00

* - Omit from flight book

79	20 SEP 00
80	20 SEP 00
81	17 SEP 00
82	17 SEP 00
83	17 SEP 00
84	19 SEP 00
85	18 SEP 00
86	18 SEP 00
87	17 SEP 00
88	17 SEP 00
89	17 SEP 00
90	17 SEP 00
91	17 SEP 00
92	19 SEP 00
93	22 JUN 00
94	19 SEP 00
95	18 SEP 00
96	18 SEP 00
97	18 SEP 00
98	18 SEP 00
99	18 SEP 00
100	18 SEP 00
101	18 SEP 00
102	19 SEP 00
103	17 SEP 00
104	17 SEP 00
105	23 JUN 00
106	19 SEP 00
107	20 SEP 00
108	20 SEP 00
109	16 SEP 00
110	16 SEP 00
111	16 SEP 00
112	16 SEP 00
113	16 SEP 00
114	19 SEP 00
115	20 SEP 00
116	20 SEP 00
117	19 SEP 00
118	19 SEP 00
119	16 SEP 00
120	16 SEP 00

CONTENTS

<u>INGRESS STATION PROCEDURES</u>	1
PRE-INGRESS EQUIPMENT SETUP	3
ODS VOLUME PREPARATION FOR DOCKING	5
POST DOCKING HATCH LEAK CHECK	7
ODS VOLUME PREPARATION FOR INGRESS	9
CONFIGURE C&W FOR INGRESS/DEPRESS/REPRESS	11
ODS VESTIBULE/PMA2 PRESSURIZATION	13
NODE 1 CABIN FAN ACTIVATION	15
NODE 1 CABIN FAN SPEED CHANGE	19
PMA2 INGRESS #1	21
NODE 1 IMV VALVE RECONFIGURATION	25
NODE 1 IMV FAN ACTIVATION/DEACTIVATION	27
NODE 1 INGRESS #1	29
Z1 PRESSURE DOME INGRESS	35
PMA1 INGRESS	41
PMA2 INGRESS #2	43
NODE 1 INGRESS #2	47
<u>POC PROCEDURES</u>	51
EPCS SETUP	53
EPCS DEACTIVATION	65
<u>MATED OPERATIONS PROCEDURES</u>	67
CMG CHECKOUT USING DATA ANALYSIS TOOL (DAT)	TBD
HANDOVER ATTITUDE CONTROL RS THRUSTERS TO ORBITER	69
HANDOVER ATTITUDE CONTROL ORBITER TO RS THRUSTERS	71
O2 REPRESS	73
GENERIC DEPRESS	75
GENERIC REPRESS	77
<u>EGRESS STATION PROCEDURES</u>	79
Z1 PRESSURE DOME EGRESS	81
NODE 1 EGRESS #1	85
NODE 1 CABIN FAN DEACTIVATION	87
PMA2 EGRESS #1	89
NODE 1 AND PMA 1 MOISTURE REMOVAL KIT SETUP	93
FGB HATCH LEAK CHECK	95
NODE 1 EGRESS #2	97
PMA2 EGRESS #2	103
ODS VESTIBULE/PMA2 DEPRESSURIZATION AND HATCH LEAK CHECK	105
<u>EMERGENCY RESPONSE PROCEDURES</u>	107
JOINT LEAK RESPONSE	TBD
ISS LEAK ISOLATION	TBD
ORBITER LEAK ISOLATION	TBD
UTILIZE ISS ATMOSPHERE	TBD
JOINT EXPEDITED UNDOCKING AND SEPARATION	109

<u>CUE CARD PROCEDURES</u>	115
ISS CONTINGENCY EGRESS	117
EMERGENCY ISS EGRESS	119
FIRE/SMOKE IN NODE 1.....	TBD
FIRE/SMOKE IN FGB	TBD
FIRE/SMOKE IN SERVICE MODULE	TBD
FIRE/SMOKE IN PROGRESS.....	TBD

INGRESS STATION PROCEDURES

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PRE-INGRESS EQUIPMENT SETUP

(JNT OPS/3A/FIN A)

Page 1 of 2 pages

I

1. TOOLS AND EQUIPMENT PREP FOR INGRESS

MF57M
MA16F

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

MF43K

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

MA16D

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

PRE-INGRESS EQUIPMENT SETUP

(JNT OPS/3A/FIN A)

Page 2 of 2 pages

Towels
Dry Wipes
Ziplock Bag for ESA Stowage

Middeck Ceiling
(Upper Port Small Bag)

1-1/2" Open End Wrench
Docking Mechanism Accessory Kit
APAS Hatch Tool
Cleaning Pads
Docking Target Base Plate Cover
Docking Target Standoff Cross Bag

MF28O

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

MF71E

Atmosphere Sampling Bottles (2)

MF57E/
MA16G

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

EXT Airlock Floor Bag

Jettison Stowage Bag

Personal Items

Marking Pens
Scissors
Laundry to wrap CLAs for stowage
Flashlight

Timers (2) for Z1 procedures

ODS VOLUME PREPARATION FOR DOCKING

(JNT OPS/3A/FIN A)

Page 1 of 1 page

- EXT A/L 1. ✓ ODS Upper Hatch closed
Equal vlv caps (two) → installed
- Unstrap Centerline Camara Diffuser flex duct from EXT A/L wall.
Attach flex duct to camera bracket to direct air flow to window.
If required, tape diffuser open.
- AW18A 2. LTG FLOOD 1(3,4) – OFF
- MO13Q 3. AIRLK FAN A(B) – OFF
- EXT A/L 4. Disconnect airlock flex duct from booster fan muffler, rotate into middeck,
and secure.
- MO13Q 5. AIRLK FAN A(B) – ON
6. AIRLK 2 – OFF/ON
7. If Tunnel Adapter Flown
TNL ADAPT 1 – OFF/ON
8. ✓ Airflow at muffler
- Middeck 9. Close Inner Hatch per decal.
10. Equal vlv (two) – OFF, install caps

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POST DOCKING HATCH LEAK CHECK

(JNT OPS/3A/FIN)

Page 1 of 1 page

1. Notify **MCC**, "Beginning initial hatch leak checks."

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

SM 177 EXTERNAL AIRLOCK

3. Record A/L-VEST ΔP : _____ psid.
Record EXT A/L PRESS: _____ psia.

SM 220 NODE 1-2N

4. Record NODE 1 CAB PRESS: _____ psia.
5. Wait 20 minutes.

If A/L-VEST $\Delta P \leq$ previously recorded - 0.16 psid
| Notify **MCC-H** (possible leakage through Hatches).

If EXT A/L Press \leq previously recorded - 0.16 psia
Notify **MCC-H** (possible leakage from EXT A/L).

If NODE PRESS \leq previously recorded - 0.02 psia
Notify **MCC-H** (possible leakage from NODE 1/PMA 2).

6. Notify **MCC**: "Initial hatch leak checks complete. Ready for vestibule/PMA pressurization."

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ODS VOLUME PREPARATION FOR INGRESS

(JNT OPS/3A/FIN A)

Page 1 of 1 page

- A6L
 - 1. LT VEST PORT, STBD (two) – OFF
 - 2. LT TRUSS FWD, AFT (two) – OFF
- Inner Hatch
 - 3. Equal vlv caps (two) – remove
 - 4. Equal vlv (two) – NORM
 - 5. $\sqrt{\text{Hatch } \Delta P} < 0.2 \text{ psid}$
 - 6. Open Hatch per decal.
 - 7. Equal vlv (two) – OFF, reinstall caps
- MO13Q
 - 8. If Tunnel Adapter Flown
TNL ADAPT 1 – ON/OFF
 - 9. AIRLK 2 – ON/OFF
 - 10. AIRLK FAN A(B) – OFF
- Middeck
 - 11. Remove diffuser cap from floor fitting.
Stow.
Mark stowage location (will be reused).
- EXT A/L/
Middeck
 - 12. Unstrap airlock flex duct.
Connect to middeck floor fitting and to booster fan muffler inlet.
- MO13Q
 - 13. AIRLK FAN A(B) – ON
- AW18A
 - 14. As required, LTG FLOOD 1(3,4) – ON
 - 15. $\sqrt{\text{Airflow at top of external airlock halo}}$
- EXT A/L
 - 16. Unstrap centerline camera diffuser flex duct from camera bracket.
Stow duct along Stbd top of EXT A/L wall (in straps).
 - 17. Remove, stow Centerline Camera.

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CONFIGURE C&W FOR INGRESS/DEPRESS/REPRESS

(JNT OPS/3A/FIN)

Page 1 of 2 pages

NOTE

1. Tables below provide parameter FDA that will be changed prior to Orbiter Depress/Repress.
2. **MCC** will reset software limits via TMBU.

C&W CONFIGURATION

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

PARAMETER NAME	C&W CHL	ENA/INH
CABIN PRESS	4	INH
CABIN O2 FLOW 1	14	INH
CABIN O2 FLOW 2	24	INH
CABIN PPO2 A	34	INH
CABIN PPO2 B	44	INH
CABIN N2 FLOW 1	54	INH
CABIN N2 FLOW 2	64	INH
CABIN FAN Δ P	74	INH

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

B/U C&W	PARAM ID	VALUE
CABIN PRESS	0612405	
CABIN O2 FLOW 1	0612105	
CABIN O2 FLOW 2	0612205	
CABIN PPO2 A	0612511	
CABIN PPO2 B	0612513	
CABIN N2 FLOW 1	0612553	
CABIN N2 FLOW 2	0612554	
CABIN FAN Δ P	0612556	
SM ALERT		
AV BAY FAN Δ P 1	0612642	
AV BAY FAN Δ P 2	0612647	
AV BAY FAN Δ P 3	0612658	
IMU FAN Δ P	0612869	
CABIN AIRLK P	0640101	
EXT AIRLK P	0640126	
CABIN O2 CONC	0922104	

If Spacehab present

B/U C&W	PARAM ID	VALVE
SH CAB PRESS	0472008	
SH CAB PPO2 - 1	0472012	
SH CAB PPO2 - 2	0472113	

CONFIGURE C&W FOR INGRESS/DEPRESS/REPRESS

(JNT OPS/3A/FIN)

Page 2 of 2 pages

C&W RESET

3. Reset H/W C&W.

PARAMETER NAME	C&W CHL	ENA/INH
CABIN PRESS	4	ENA
CABIN O2 FLOW 1	14	ENA
CABIN O2 FLOW 2	24	ENA
CABIN PPO2 A	34	ENA
CABIN PPO2 B	44	ENA
CABIN N2 FLOW 1	54	ENA
CABIN N2 FLOW 2	64	ENA
CABIN FAN Δ P	74	ENA

4. Contact **MCC** to TMBU the following parameters to the appropriate values.

B/U C&W	PARAM ID	VALUE
CABIN PRESS	0612405	
CABIN O2 FLOW 1	0612105	
CABIN O2 FLOW 2	0612205	
CABIN PPO2 A	0612511	
CABIN PPO2 B	0612513	
CABIN N2 FLOW 1	0612553	
CABIN N2 FLOW 2	0612554	
CABIN FAN Δ P	0612556	
SM ALERT		
AV BAY FAN Δ P 1	0612642	
AV BAY FAN Δ P 2	0612647	
AV BAY FAN Δ P 3	0612658	
IMU FAN Δ P	0612869	
CABIN AIRLK P	0640101	
EXT AIRLK P	0640126	
CABIN O2 CONC	0922104	

If Spacehab present

B/U C&W	PARAM ID	VALVE
SH CAB PRESS	0472008	
SH CAB PPO2 - 1	0472012	
SH CAB PPO2 - 2	0472113	

ODS VESTIBULE/PMA2 PRESSURIZATION

(JNT OPS/3A/FIN)

Page 1 of 1 page

NOTE

Expect possible dP/dt klaxon 'S66 CABIN PRES' and 'S66 CABIN PPO2' alarms during pressurization.

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

NOTE

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

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

NOTE

Pressurization will take 15 minutes.

3. When ODS Hatch $\Delta P < 0.2$ psid
ODS Equal vlv → OFF
Wait 5 minutes for thermal stabilization.

SM 177 EXTERNAL AIRLOCK

- CRT
4. Record A/L-VEST ΔP : _____ psid.
Wait 30 minutes.

If A/L-VEST $\Delta P \geq$ previously recorded + 0.16 psid
Notify **MCC-H** (Vestibule/PMA 2 Leak).

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

- ODS
6. ODS Equal valve → OFF, Install Cap

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NODE 1 CABIN FAN ACTIVATION

(JNT OPS/3A/FIN A)

Page 1 of 3 pages

1. POWER SOURCE VERIFICATION

CRT

If APCU 2 powering N14B power bus

SM 200 APCU Status

√APCU 1,2 OUT VOLTS RES LOW \geq 121 Volts

√APCU 2 (CONV A OUT AMPS + CONV B OUT AMPS) < 2 Amps

If RACU 6 powering N14B power bus (Node 1 Internal Y Cable Installed)

SM 200 APCU Status

√APCU 1 OUT VOLTS RES LOW \geq 121 Volts

SM 224 FGB-2N

√RACU 6 – On

√RACU 6 Output Current > 1.7 Amps

2. SMOKE DETECTOR SD 1 ACTIVATION

PCS

Node 1: ECLSS: SD1

Node 1 Smoke Detector 1

2.1 sel RPCM N14B C RPC 03

RPCM N14B C RPC 03

cmd RPC Position – Close (Verify – CI)

NOTE

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

2.2 Node 1 Smoke Detector 1

'Monitoring'

cmd Enable

'Active Bit'

√Status – In Progress

Wait 3 seconds, then

√Status – Complete

√Failure – blank

'Monitoring'

√Status – Enabled

NODE 1 CABIN FAN ACTIVATION

(JNT OPS/3A/FIN A)

Page 2 of 3 pages

PCS 3. SMOKE DETECTOR SD 2 ACTIVATION

Node 1: ECLSS: SD2

Node 1 Smoke Detector 2

3.1 sel RPCM N13B A RPC 16

RPCM N13B A RPC 16

cmd RPC Position – Close (Verify – CI)

NOTE

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

3.2 Node 1 Smoke Detector 2

'Monitoring'

cmd Enable

'Active Bit'

√Status – In Progress

Wait 3 seconds, then

√Status – Complete

√Failure – blank

'Monitoring'

√Status – Enabled

PCS 4. ENABLING FDIR

Node 1: ECLSS: FDIR

Node 1 FDIR

'Node 1-1 MDM'

4.1 **cmd** IMV FDIR – Enable

√Status – Enabled

4.2 **cmd** Fire Isolation – Enable

√Status – Enabled

'Node 1-2 MDM'

NODE 1 CABIN FAN ACTIVATION

(JNT OPS/3A/FIN A)

Page 3 of 3 pages

4.3 cmd IMV FDIR – Enable

√Status – Enabled

4.4 cmd Fire Isolation – Enable

√Status – Enabled

PCS 5. NODE 1 CABIN FAN ACTIVATION

Node 1: ECLSS: Cab Fan

Node 1 Cabin Fan

NOTE

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

5.1 sel RPCM N14B B RPC 17

RPCM N14B B RPC 17

cmd RPC Position – Close (Verify – CI)

Node 1 Cabin Fan

5.2 cmd State – On

√State – On

√Speed, rpm: 3549 --- 4251

√dP, mmHg ≤ 5.0

'Speed Limiting'

√Status – Enabled

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NODE 1 CABIN FAN SPEED CHANGE

(JNT OPS/3A/FIN)

Page 1 of 1 page

NOTE

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

PCS

1. CHANGING NODE 1 CABIN FAN SPEED

Node 1: ECLSS: Cab Fan

Node 1 Cabin Fan

√State – On

'Speed'

NOTE

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

Enter new speed in Set, rpm field.

cmd Set

√Speed, rpm: New commanded speed ± 9 %

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TOOLS AND EQUIPMENT REQUIRED:

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

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

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

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

1. SETTING UP EXTERNAL AIRLOCK FOR ODS AND PMA INGRESS

- 1.1 Relocate Tool Bag, Jettison Stowage Bag to Ext A/L.

- ODS 1.2 Temporary stow EMUs, Centerline Camera Bracket.

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

$\sqrt{\text{ODS Hatch } \Delta P} \leq 0.2 \text{ psid}$

2. ODS VESTIBULE INGRESS

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

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

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

3. DOCKING EQUIPMENT REMOVAL

- ODS 3.1 For each docking light
- Vest Disconnect cables.
- Install caps on outlet.
- Remove the locking pin.
- Remove docking light.
- Reinstall locking pin.

- 3.2 Mark crosshairs with appropriate identification.
- 3.3 Remove crosshairs.
Stow lights and crosshairs in post insertion locker.

4. INGRESS OPERATIONS PREPARATION

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

- 4.1. Remove Docking Target Standoff Cross from Docking Target Base Plate (10" Adjustable Wrench and 1-1/2" Open End Wrench)
Temporarily stow jamnut by continuing to rotate it ↻ onto smaller, non-threaded diameter of receptacle.
- 4.2. Insert cross into Docking Target Standoff Cross Bag.
Temporarily stow in Jettison Stowage Bag.
- 4.3. Install Docking Target Base Plate Cover.
- 4.4. Stow tools.

5. PMA2 INGRESS OPERATIONS

APAS
Hatch

- 5.1 Select 'РАБОЧЕЕ ПОЛОЖЕНИЕ' (Working Position) torque setting on APAS Hatch Tool.

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

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

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

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

PMA2 INGRESS #1

(JNT OPS/3A/FIN A)

Page 3 of 3 pages

- MO13Q 5.2. AIRLK FAN A(B) – OFF
- Ext A/L 5.3. Halo Inlet Flex Duct ←|→ Halo
- 5.4. Obtain PMA/ODS Interface Duct from PMA2.
 PMA/ODS Interface Duct →|← Halo Inlet Flex Duct
 (Use T-handle clamp.)
- ODS 5.5. Stow Centerline Camera Diffuser Duct along starboard top of Hatch
 External Airlock wall (in straps).
- PMA2 5.6 PMA2 Hard Duct Grille Cover → Open
- MO13Q 5.7 AIRLK FAN A(B) – ON
- PMA2 5.8 ✓ Airflow from grille

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NODE 1 IMV VALVE RECONFIGURATION

(JNT OPS/3A/FIN A)

Page 1 of 2 pages

NOTE

This procedure is not necessarily to be executed in its entirety. Execute only those steps required for the desired valve reconfiguration.

Table 1. Node 1 IMV Valve Information

X (LOCATION)	Y (RPCM/RPC)
Aft Port	RPCM N14B C RPC 05
Aft Stbd	RPCM N14B C RPC 04
Fwd Port	RPCM N13B C RPC 14
Fwd Stbd	RPCM N13B C RPC 13

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

PCS

1. NODE 1 IMV FDIR VERIFICATION

Node 1: ECLSS: Node 1 FDIR

Node 1 FDIR

'Node 1-1 MDM – IMV FDIR'

√Status – Enabled

If Status – Inhibited
cmd Enable

√Status – Enabled

'Node 1-2 MDM – IMV FDIR'

√Status – Enabled

If Status – Inhibited
cmd Enable

√Status – Enabled

2. NODE 1 IMV X VALVE ACTIVATION

Node 1: ECLSS: Node 1 IMV X Vlv

NOTE

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

sel RPCM/RPC Y

RPCM/RPC Y

cmd RPC Position – Close (Verify – Cl)

NODE 1 IMV VALVE RECONFIGURATION

(JNT OPS/3A/FIN A)

Page 2 of 2 pages

cmd Enable

√Status – Enabled

3. OPENING NODE 1 IMV X VALVE

Node 1: ECLSS: IMV X Vlv

cmd Open – Arm

cmd Open

Wait 20 seconds.

√Position – Open

4. NODE 1 IMV X VALVE CLOSURE

PCS

Node 1: ECLSS: IMV X Vlv

cmd Close – Arm

cmd Close

Wait 20 seconds.

√Position – Closed

5. NODE 1 IMV X VALVE DEACTIVATION

PCS

Node 1: ECLSS: Node 1 IMV X Vlv

√Status – Enabled

cmd Inhibit

√Status – Inhibited

NOTE

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

sel RPCM/RPC Y

cmd RPC Position – Open (Verify – Op)

NODE 1 IMV FAN ACTIVATION/DEACTIVATION

(JNT OPS/3A/FIN A)

Page 1 of 2 pages

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

Table 1. Node 1 IMV Fan Information

X (LOCATION)	Y (RPCM/RPC)
Aft Port	RPCM N14B C RPC 12
Port Fwd	RPCM N13B C RPC 16
Stbd Aft	RPCM N13B A RPC 04

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

1. NODE 1 IMV X FAN ACTIVATION

PCS

Node 1: ECLSS: IMV X Fan

Node 1 IMV X Fan

NOTE

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

1.1 sel RPCM/RPC Y

RPCM/RPC Y

cmd RPC Position – Close (Verify – Cl)

Node 1 IMV X Fan

1.2 **cmd** On

√Status – In Transit

Wait 15 seconds.

√Status – On

√Speed, rpm: 7745 --- 9278

2. NODE 1 IMV X FAN DEACTIVATION

NOTE

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

PCS

Node 1: ECLSS: IMV X Fan

Node 1 IMV X Fan

NODE 1 IMV FAN ACTIVATION/DEACTIVATION

(JNT OPS/3A/FIN A)

Page 2 of 2 pages

2.1 **cmd** Off – Arm
cmd Off

√Status – Off

√Speed, rpm: 7164 ± 50

NOTE

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

2.2 **sel** RPCM/RPC Y

RPCM/RPC Y

cmd RPC Position – Open (Verify – Op)

NODE 1 INGRESS #1

(JNT OPS/3A/FIN A)

Page 1 of 5 pages

TOOLS REQUIRED:

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

Ingress ISS Cue Cards
Equip Atmosphere Sampling Bottle (two)
Bag General Purpose Tape, 2"
Jettison/Stowage Bag

1. PROVIDING POWER TO NODE 1 INTERNAL LIGHTS

PCS 1.1 Node 1: EPS: RPCM N13B A
RPCM N13B A

```
sel RPC [X] where [X] = 5 13  
  
cmd RPC Position – Close (Verify – Cl)  
  
Repeat
```

1.2 Node 1: EPS: RPCM N13B B
RPCM N13B B

```
sel RPC 1  
cmd RPC Position – Close (Verify – Cl)
```

1.3 Node 1: EPS: RPCM N13B C
RPCM N13B C

```
sel RPC 1  
cmd RPC Position – Close (Verify – Cl)
```

1.4 Node 1: EPS: RPCM N14B B
RPCM N14B B

```
sel RPC 1  
cmd RPC Position – Close (Verify – Cl)
```

1.5 Node 1: EPS: RPCM N14B C
RPCM N14B C

```
sel RPC [X] where [X] = 2 15 16  
  
cmd RPC Position – Close (Verify – Cl)  
  
Repeat
```

CAUTION

It may take 30 minutes for cold lights to come up full bright.
Lights must come up to full bright before turning them off.

2. SETTING UP QDMS FOR INGRESS CONTINGENCY SUPPORT

- 2.1 QDMs (two) ←|→ existing LEH O2 lines
Obtain two HIUs.
Install HIU and QDM to each of the two 70-ft O2 Hoses.

L2 2.2 √O2 XOVR SYS 1, SYS 2 (two) – OP

C7 2.3 √LEH O2 SPLY 1,2 vlv (two) – OP

MO32M 2.4 LEH O2 5,6 vlv (two) → CL
Free end of 70-ft O2 Hoses (two) →|← LEH O2 5,6 vlv outlet
LEH O2 5,6 vlv (two) → OP

MO39M 2.5 MIDDECK COMM CCU PWR → OFF
Comm cables →|← MHA

MO42F CCU PWR → ON (HIU control volume, as required)
XMIT/ICOM MODE – PTT/PTT (to alleviate comm noise)

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

2.7 Mask O2 Control → NORM

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

3. SETTING UP EXTERNAL AIRLOCK FOR NODE 1 INGRESS

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

3.2 Collect one air sample inside the External Airlock and label location
and MET on bottle.
Stow bottle in Jettison Stowage Bag.

4. OPENING NODE 1 FWD HATCH

4.1 √MCC-H, “Go for Node Ingress.”

Node 1 4.2 √ESA Handle – CLOSED
Fwd √ESA Sample Valve – CLOSED
Hatch

Completely loosen ESA captive screws (four).
Remove ESA from MPEV and place it inside Ziplock Bag.
Stow in Jettison Stowage Bag.

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

4.3 MPEV → OPEN

CRT

SPEC 78 SYS SUMM 1

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

Node 1

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

5. DUCT CONFIGURATION

Node 1
Fwd

5.1 Node 1 IMV Fwd Stbd Vlv → OPEN

PMA2

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

MO13Q

5.3 AIRLK FAN A(B) – OFF

PMA2

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

MO13Q

5.5 AIRLK FAN A(B) – ON

PMA2

5.6 ✓ Airflow at PMA2 grille

Node 1
Fwd

5.7 Node 1 IMV Fwd Port Vlv → OPEN

PMA2

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

PMA2

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

NODE 1 INGRESS #1

(JNT OPS/3A/FIN A)

Page 4 of 5 pages

5.10 PMA2 Hard Duct Grille Cover → Closed

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

6. CREW INGRESS

6.1 Relocate Tool Bag, Jettison Stowage Bag, and Ingress Equipment Bag to ISS.

Set up necessary ISS cue cards.

Node 1

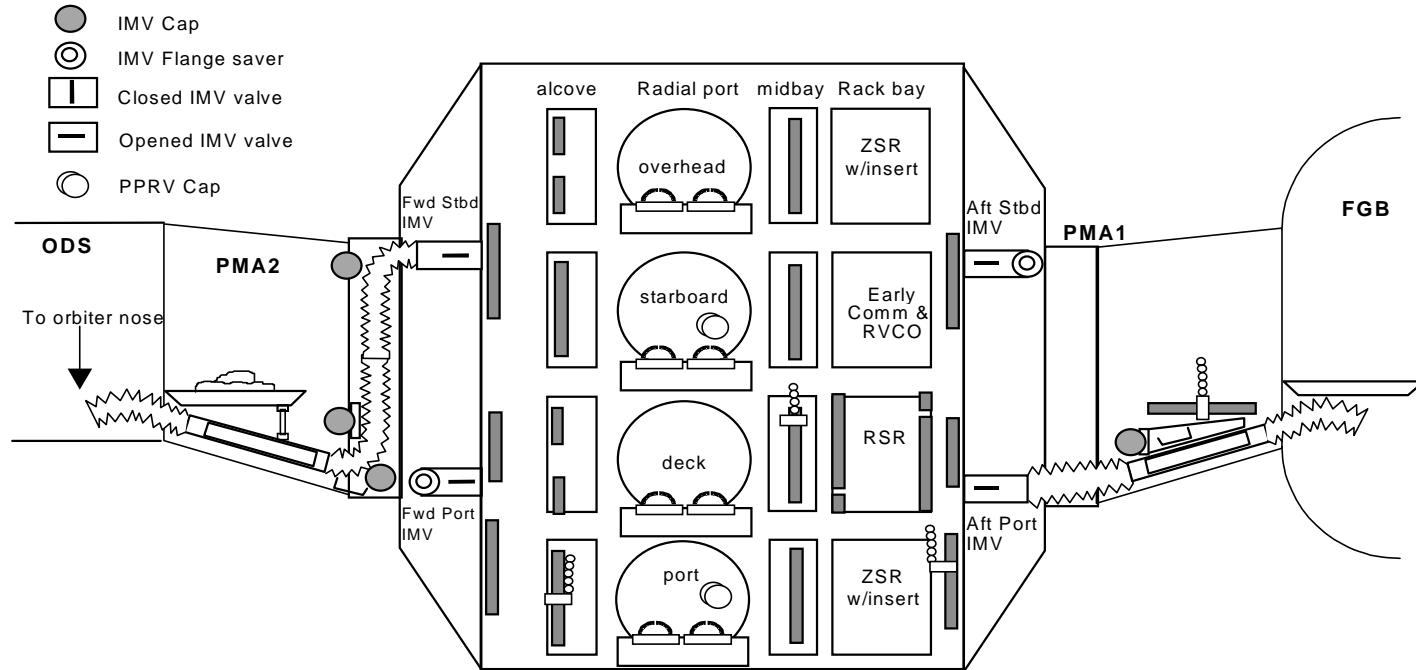
6.2 ✓ Node 1 Interior Lights (eight) – Full Bright

CAUTION

It may take 30 minutes for cold lights to come up full bright.
Lights must come up to full bright before turning them off.

6.3 Configure lighting per crew preference.

6.4 Retrieve two IMV Fan Outlet Grille Covers from NOD1O4_A1 and place over Node 1 IMV Aft Port IMV Fan outlet grilles NOD1OP3 and NOD1OP4 using Gray Tape.



33

Post ISS Ingress Configuration

- Docking Target Standoff Cross removed and bagged, Docking Target covered.
- APAS Hatch open and covered, Hatch secured with Hatch Standoff.
- ESA removed from Hatch stowed in Jettison/Stowage Bag.
- QDMs/O2 Hoses stowed in PMA2.
- PMA/ODS interface duct segment attached to Halo inlet flex duct.
- Node IMV Fwd Stbd Valve opened.
- Node IMV Fwd Stbd Cap removed and temporary stowed.
- Node IMV Fwd Port Valve opened
- Node IMV Fwd Port Flange Saver Cap Installed
- PMA2 IMV Flex Duct installed on Node Fwd Stbd IMV Flange.
- PMA2 Grille Cover closed.
- Node Cabin Fan activated.
- Node lights on.
- Air sample collected, ISS PFE installed.

Post ISS Ingress Configuration (cont)

- Used Desiccant Bags and Fans removed from flex brackets.
- New Fans installed with Batteries.
- New Desiccant Bags temporarily stowed in Node 1.
- FGB Hatches open, lights on, air sample collected.
- ПГО-ГА Hatch Frame Ring installed.
- Alarm Control Panel activated.
- Node IMV Aft Port Valve opened.
- Node IMV Aft Port Cap removed and temporary stowed.
- Node IMV Aft Stbd Valve opened
- Node IMV Aft Stbd Flange Saver Cap Installed
- PMA2 IMV Flex Duct installed on Node Aft Port IMV Flange.
- PMA1 Hard Duct Cap removed and stowed on Velcro, and ducts retrieved from FGB and installed on PMA1 Hard Duct.
- Node Aft Port IMV Fan and FGB Fans activated.

Figure1.- Post ISS Ingress #1 Configuration. (FD04)

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Z1 PRESSURE DOME INGRESS

(JNT OPS/3A/FIN A)

Page 1 of 5 pages

TOOLS AND EQUIPMENT REQUIRED:

NOD101 Internal Sampling Adapter (ISA)

Stbd

CTB

NOD104 Vacuum Access Jumper (VAJ) 35 ft

A1

NOD104 Vacuum Access Jumper (VAJ) 5 ft

C2

Ingress Fluke 87 Multimeter

Equip Thermal Protective Gloves (Deerskin)

Bag Bungees and Anchors

NOTE

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

1. Z1 PRESSURE DOME PRESSURIZATION AND GROSS LEAK CHECK

SM 78 SYS SUMM 1

1.1 Record CABIN dP/dt; $R_1 = \underline{\hspace{2cm}}$.

Node 1

Overhead

1.2 Uncap Overhead MPEV.

WARNING

1. Perform the following step only when all one-way Hatches are protected against negative pressure.
2. Don Earplugs prior to equalization. Doff Earplugs when equalization is complete.
3. Expect dP/dt alarm upon equalization.

1.3 Overhead MPEV → OPEN

1.4 Wait 60 seconds.

SM 78 SYS SUMM 1

CRT

1.5 Record CABIN dP/dt; $R_2 = \underline{\hspace{2cm}}$ ($dR = R_2 - R_1 = \underline{\hspace{2cm}}$)
If $dR \geq 0.01$, pressure dome gross leak check failed
Overhead MPEV → CLOSED

√**MCC-H** >>

Z1 PRESSURE DOME INGRESS

(JNT OPS/3A/FIN A)

Page 2 of 5 pages

Node 1
Overhead 1.6 Overhead MPEV → CLOSED
Record MET, $T_1 =$ _____

1.7 Start 15 minute timer to allow for thermal stabilization.

2. ISA/VAJ/MPEV SETUP

2.1 ISA Sample Port Valve → CLOSED, capped
Refer to Figure 1.



Figure 1. - ISA Sample Valve.

Node 1
Deck

2.2 Deck MPEV – CLOSED

2.3 Uncap Deck MPEV.

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

WARNING

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

2.5 Secure VAJs to seat track with bungees and anchors.

Z1 PRESSURE DOME INGRESS

(JNT OPS/3A/FIN A)

Page 3 of 5 pages

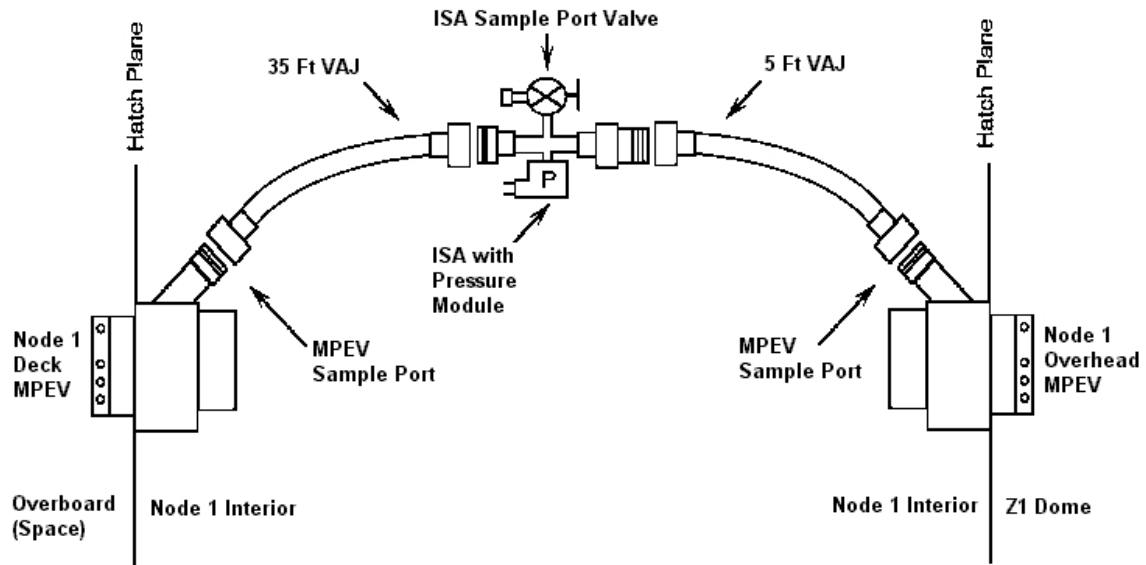


Figure 2. - ISA/VAJ/MPEV Configuration.

3. MULTIMETER SETUP

3.1 ISA Pressure Module – OFF

3.2 Multimeter – OFF

3.3 Plug ISA Pressure Module into Multimeter COM to COM, V to $V\Omega \rightarrow | -$ _____

3.4 ISA Pressure Module \rightarrow mmHgA

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

NOTE

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

4. CHECKING VAJ LEAK

4.1 Record Multimeter reading, $P_1 =$ _____ V (0.6500 --- 0.7200 V expected)

Node 1 Overhead 4.2 Overhead MPEV – CLOSED

Node 1 Deck 4.3 Deck MPEV \rightarrow OPEN
Wait 15 seconds.

4.4 If air flow/whistling sound coming from VAJ
Deck MPEV \rightarrow CLOSED

MCC-H >>

Z1 PRESSURE DOME INGRESS

(JNT OPS/3A/FIN A)

Page 4 of 5 pages

- 4.5 Record:
Multimeter reading, $P_2 =$ _____ V (< 0.0200 V expected)
MET, $T_2 =$ _____

Node 1
Deck

- 4.6 Deck MPEV → CLOSED
4.7 Verify Multimeter reading is not increasing.

5. Z1 PRESSURE DOME FINE LEAK CHECK

Node 1
Overhead

- 5.1 When MET > $T_1 + 15$ minutes
Overhead MPEV → OPEN
5.2 Record:
Multimeter reading, $P_3 =$ _____ V (0.6500 --- 0.7200 V expected) MET, $T_3 =$ _____
5.3 Overhead MPEV → CLOSED
5.4 Start 15 minute timer.
5.5 When MET = $T_3 + 15$ minutes
Overhead MPEV → OPEN
Record multimeter reading $P_4 =$ _____ V
Overhead MPEV → CLOSED
 $dP = P_3 - P_4 =$ _____ V
If $dP > 0.0450$ V, fine leak check failed, √**MCC-H** >>

NOTE

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

6. Z1 PRESSURE DOME INGRESS

- 6.1 Multimeter → OFF
6.2 ISA Pressure Module → OFF
6.3 Uncap ISA Sample Port Valve
6.4 ISA Sample Port Valve → OPEN
6.5 Disconnect 5 ft VAJ from Overhead MPEV.
Temporarily stow per crew preference.

WARNING

Z1 Pressure dome temps can range from -11° F to 48° F, which can damage human skin. Don Thermal Protective Gloves prior to ingress.

Z1 PRESSURE DOME INGRESS

(JNT OPS/3A/FIN A)

Page 5 of 5 pages

6.6 Open Node 1 Overhead Hatch per decal.

6.7 Inform **MCC-H**, "Z1 Vestibule Ingress Complete."

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TOOLS AND EQUIPMENT REQUIRED:

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

NODE 1 AFT HATCH OPENING

Node 1 Aft 1. MPEV → Open

CRT SM 78 SYS SUMM 1

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

NODE 1 AFT IMV CONFIGURATION FOR INGRESS

Node 1 Aft 3. Node1 IMV Aft Port Valve → Open

4. Node1 IMV Aft Stbd Valve → Open

PMA1 5. √PMA1 Grille Cover – Open

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

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

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

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

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

DESICCANT INSTALLATION AND PORTABLE FAN DISASSEMBLY

- PMA1/
Node 1
11. Desiccant Bag Assemblies (four) ←|→ used Portable Fans (one in PMA, three in Node).
Stow used Desiccant Bag Assemblies in old wrappers located on Handrail, seal with Gray Tape.
Stow on NOD1S4.

WARNING

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

12. Portable Fan Assemblies (one in PMA, three in Node) ←|→ flexible brackets.
Put used Portable Fan Assemblies in plastic bags (four) taped to Handrail.
Stow them in Jettison/Stowage Bag.
13. Retrieve four replacement Portable Fan Assemblies from NOD1P4_E3 and four Desiccant Bag Assemblies from NOD1S4.

CAUTION

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

14. As necessary, temporarily stow Desiccant Bag Assemblies in Node 1 using Duct Tape.
15. For each Portable Fan Assembly (four)
√Fan Pwr – OFF

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

Portable Fan Assemblies (three in Node 1 one in PMA1) →|← flexible brackets
16. Report to **MCC**, “PMA1 Ingress complete.”

TOOLS AND EQUIPMENT REQUIRED:

- Tool Bag Tool Table Cloth
10" Adjustable Wrench
1-1/2" Open End Wrench
4" Ratchet Wrench, 1/4" Drive
7/16" Deep Socket, 1/4" Drive
- Ingress Equip Bag Flashlight
Jettison/Stowage Bag
Rubber Gloves (two pair)
Towel
Docking Target Base Plate Cover
Docking Target Standoff Cross Bag
- PMA2 APAS Hatch Docking Mechanism Accessory Kit
APAS Hatch Tool
Cleaning Pads
- MF43M Photo TV Flood Lighting

1. SETTING UP EXTERNAL AIRLOCK FOR ODS AND PMA INGRESS

- 1.1 Relocate Tool Bag, Jettison Stowage Bag to Ext A/L.
- ODS 1.2 Temporarily stow EMUs.
- 1.3 $\sqrt{\text{MCC-H}}$, "Go for PMA2 Ingress."
- ODS Hatch 1.4 ODS Equal vlv (one) – remove cap, stow
Equal vlv (one) → NORM
 $\sqrt{\text{ODS Hatch } \Delta P \leq 0.2 \text{ psid}}$

2. ODS VESTIBULE INGRESS

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

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

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

3. INGRESS OPERATIONS PREPARATION

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

- 3.1 Remove Docking Target Standoff Cross from Docking Target Base Plate (10" Adjustable Wrench, 1-1/2" Open End Wrench).
Temporary stow jamnut by continuing to rotate it ↻ onto smaller, non-threaded diameter of receptacle.
- 3.2 Insert cross into Docking Target Standoff Cross Bag.
Temporarily stow in Jettison Stowage Bag.
- 3.3 Install Docking Target Base Plate Cover.
- 3.4 Stow tools.

4. PMA2 INGRESS OPERATIONS

APAS
Hatch

- 4.1 Select 'РАБОЧЕЕ ПОЛОЖЕНИЕ' (Working Position) torque setting on APAS hatch tool.

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

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

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

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

MO13Q

- 4.2 AIRLK FAN A(B) – OFF

Ext A/L

- 4.3 Halo Inlet Flex Duct ←|→ Halo

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

- | | | | |
|-------|-----|------------------------------------------------------------------------------------------------------|--|
| ODS | 4.5 | Stow Centerline Camera Diffuser Duct along starboard top of Hatch External Airlock wall (in straps). | |
| MO13Q | 4.6 | AIRLK FAN A(B) – ON | |
| PMA2 | 4.7 | √Airflow from PMA2 Duct Grille | |

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NODE 1 INGRESS #2

(JNT OPS/3A/FIN A)

Page 1 of 3 pages

TOOLS REQUIRED:

Tool Bag 10" Adjustable Wrench

1. SETTING UP FOR NODE 1 INGRESS

- 1.1 QDMs (two) ←|→ existing LEH O2 lines
Obtain two HIUs.
Install HIU and QDM to each of the two 70-ft O2 Hoses.

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

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

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

MO39M 1.5 MIDDECK COMM CCU PWR → OFF

MO42F Comm cables →|← MHA
CCU PWR → ON (HIU control volume, as required)
XMIT/ICOM MODE – PTT/PTT (to alleviate comm noise)

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

1.7 Mask O2 Control → NORM

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

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

2. OPENING NODE1 FWD HATCH

Node1 Node1 Fwd MPEV → Open

Fwd Hatch

CRT SPEC 78 SYS SUMM 1

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

NODE 1 INGRESS #2

(JNT OPS/3A/FIN A)

Page 2 of 3 pages

3. CREW INGRESS

- Node1 3.1 Position Photo TV Flood Lighting as necessary
- 3.2 Node1 Fwd Stbd IMV vlv → Open
Node1 Fwd Port IMV vlv → Open
Handle stowed. |
- PMA2 3.3 PMA2 Duct Grille Cover → Closed |
- 3.4 Relocate Tool Bag and Ingress Equipment Bag to ISS.
Set up necessary ISS cue cards. |
- NOD1 3.5 Unstow PPRV caps (two) and install on Node1 Port, Starboard
D4_D1 Hatches.

4. PORTABLE FAN ASSEMBLY SETUP

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

Per work site as necessary

- 4.2 Fan Power → High

NOTE

Low power position setting has been disabled.

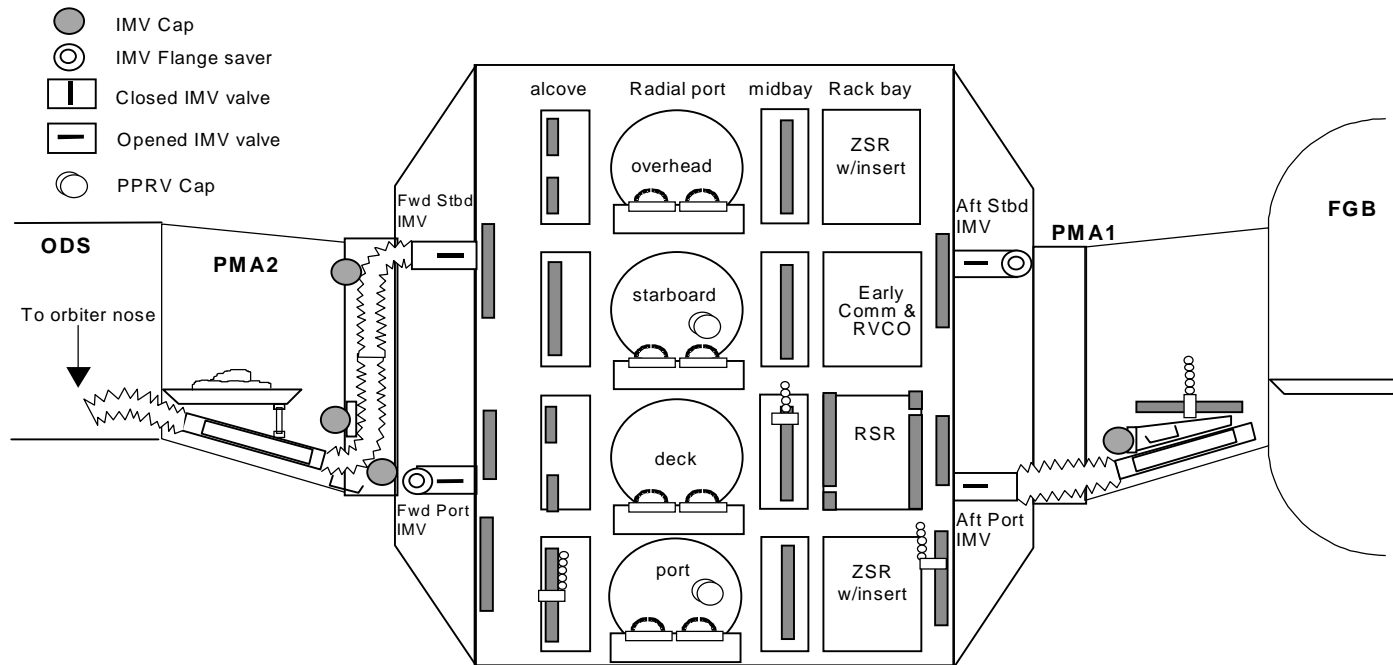
- 4.3 ✓ Fan RPM control position – Full CW ↻

- 4.4 ✓ Fan is running

NODE 1 INGRESS #2

(JNT OPS/3A/FIN A)

Page 3 of 3 pages



Changes:

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

Figure 1.- Post ISS Ingress #2 Configuration (FD09).

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POC PROCEDURES

POC

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If Setting up in the Shuttle AFD

1. UNSTOWING PCS

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

2. POWER OFF VERIFICATION

- Pwr Sply √PCS1 28V DC PWR SPLY switch – Off
 √PCS2 28V DC PWR SPLY switch – Off

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

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

3. PCS POWER AND DATA CABLE CONNECTIONS

Refer to Figure 1.

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

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

- A15 Connect PCS 1 Power Supply Adapter Cable 10' to MNC DC UTIL power outlet (J2) and to 28V DC power supply outlet (J1).

- O19 Connect PCS 2 ORB DC Power Cable 6' to DC UTIL PWR MNA outlet (J2) and to 28V DC power supply outlet (J1).

- L12/A3 Connect PCS 1 ORB 1553 Data Cable 8' to N1-1 (J103) outlet and to 1553 PC Card Adapter Cable.

Connect PCS 2 ORB 1553 Data Cable 8' to N1-2 (J107) outlet and to 1553 PC Card Adapter Cable.

NOTE

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

EPCS SETUP

(JNT OPS/3A/FIN A/MULTI) Page 2 of 12 pages

4. TURNING ON PCS

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

~1 minute into bootup, user will see

Screen title: '<<<< **Current Boot Parameters** >>>>'

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

Type "b -r" at the prompt within 5 seconds.

If the command prompt missed

Wait 2 minutes for the desktop to appear with
the taskbar at the bottom of the display.

sel Exit

Wait for '**type any key to continue**'.

PCS Thinkpad PWR switch → Off, then On

Wait for command prompt.

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

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

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

NOTE

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

Do not iconify PCSCDS Main Control Panel Window.

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

NOTE

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

NOTE

1. PCS connection to MDM is indicated by green in the Status Box and '**Connected**' message displayed in the PCSCDS Main Control Panel Window only when the associated Node MDM is up and running as the Primary MDM.
2. If MDMs are not up and running and step 5 is executed, expect a PCS '**CW Server Error Msg**' and a '**CDS Signon Fail**'.

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

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

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

6. PCS CONFIGURATION FOR DISPLAYS (AS REQUIRED)

NOTE

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

sel Arrow above PCS logo
 sel Start PCS CDDF display

After approx 1 minute, √'**Increment 3A Home Page**' is displayed.

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

Displays may now be selected as desired.

Inform **MCC-H** when complete. >>

EPCS SETUP

(JNT OPS/3A/FIN A/MULTI) Page 4 of 12 pages

If Setting up in the FGB

7. UNSTOWING PCS

PCS Thinkpad

ORB Power Supply Adapter Cable 10'

KIT, IBM THINKPAD (one 1553 Card and 22-inch Adapter Cable in each Kit)

RS DC Power and 1553 Data Cable 8'

RS/ORB DC Power Supply

8. POWER OFF VERIFICATION

If N1-2 is Primary, use switches and connectors on Panel 427.

If N1-1 is Primary, use switches and connectors on Panel 227.

427(227) On panel OUTLET PWR-10/3 AMPS (P5C-10/3)

√Switch – Off

Pwr Sply √PCS 28V DC PWR SPLY switch – Off

9. PCS POWER AND DATA CABLE CONNECTIONS

Refer to Figure 2.

Connect 22" Adapter cable to the 1553 PC Card

Insert 1553 PC Card into either PCS PCMCIA slot

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

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

427(227) Connect the cable protruding from the GNC 2/RS Bus 8 (GNC 1/RS
Bus 7) panel (cables are labeled 77KM-2120-1670 and
77KM-2120-2190 respectively) to the 10A connector on panel
OUTLET PWR-10/3 AMPS (P5C-10/3).

NOTE

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

10. TURNING ON PCS

427(227) On panel OUTLET PWR-10/3 AMPS (P5C-10/3)

Switch → ON

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

PCS PCS Thinkpad PWR switch → On

~1 minute into bootup, user will see

Screen title: '<<<< **Current Boot Parameters** >>>>'

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

EPCS SETUP

(JNT OPS/3A/FIN A/MULTI) Page 5 of 12 pages

Type "b -r" at the prompt within 5 seconds.

If the command prompt missed

Wait 2 minutes for the desktop to appear with
the taskbar at the bottom of the display.

sel Exit

Wait for '**type any key to continue**'.

PCS Thinkpad PWR switch → Off, then On

Wait for command prompt.

PCS2 11. CONNECTING PCS TO MDM DATA (IF MDMs ARE UP AND RUNNING)

After bootup when taskbar appears at bottom of display

sel Arrow directly above PCS logo (as required)

sel Start/Restart PCS CDS (as required)

sel Icon to open PCSCDS Main Control Panel Window (as required)

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

NOTE

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

Do not iconify PCSCDS Main Control Panel Window.

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

NOTE

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

<p><u>NOTE</u></p> <p>1. PCS connection to MDM is indicated by green in the Status Box and 'Connected' message displayed in the PCSCDS Main Control Panel Window only when the associated Node MDM is up and running as the Primary MDM.</p> <p>2. If MDMs are not up and running and step 5 is executed, expect a PCS 'CW Server Error Msg' and a 'CDS Signon Fail'.</p>

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

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

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

12. PCS CONFIGURATION FOR DISPLAYS (AS REQUIRED)

<p><u>NOTE</u></p> <p>After PCSCDS has been selected, wait 30 seconds before starting CDDF displays.</p>

sel Arrow above PCS logo
sel Start PCS CDDF display

After approx 1 minute, √**'Increment 3A Home Page'** is displayed.

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

Displays may now be selected as desired.

Inform **MCC-H** when complete. >>

If Setting up in the Service Module

13. UNSTOWING PCS

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

14. POWER OFF VERIFICATION

Pwr Sply √PCS 28V DC PWR SPLY switch – Off

EPCS SETUP

(JNT OPS/3A/FIN A/MULTI) Page 7 of 12 pages

15. PCS POWER AND DATA CABLE CONNECTIONS

Refer to Figure 3.

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

Aft of 209
Pwr Sply
PCS

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

Pwr Sply

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

NOTE

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

16. TURNING ON PCS

Pwr Sply
PCS

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

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

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

Type "b -r" at the prompt within 5 seconds

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

sel Exit

Wait for '**type any key to continue**'.

PCS Thinkpad PWR switch → Off, then On

Wait for command prompt.

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

PCS2

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

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

NOTE

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

Do not iconify PCSCDS Main Control Panel Window.

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

NOTE

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

NOTE

1. PCS connection to MDM is indicated by green in the Status Box and **'Connected'** message displayed in the PCSCDS Main Control Panel Window only when the associated Node MDM is up and running as the Primary MDM.
2. If MDMs are not up and running and step 5 is executed, expect a PCS **'CW Server Error Msg'** and a **'CDS Signon Fail'**.

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

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

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

18. PCS CONFIGURATION FOR DISPLAYS (AS REQUIRED)

NOTE

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

sel Arrow above PCS logo
sel Start PCS CDDF display

After approx 1 minute, **'Increment 3A Home Page'** is displayed.

EPCS SETUP

(JNT OPS/3A/FIN A/MULTI)

Page 9 of 12 pages

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

Displays may now be selected as desired.

Inform **MCC-H** when complete. >>

EPCS SETUP

(JNT OPS/3A/FIN A/MULTI)

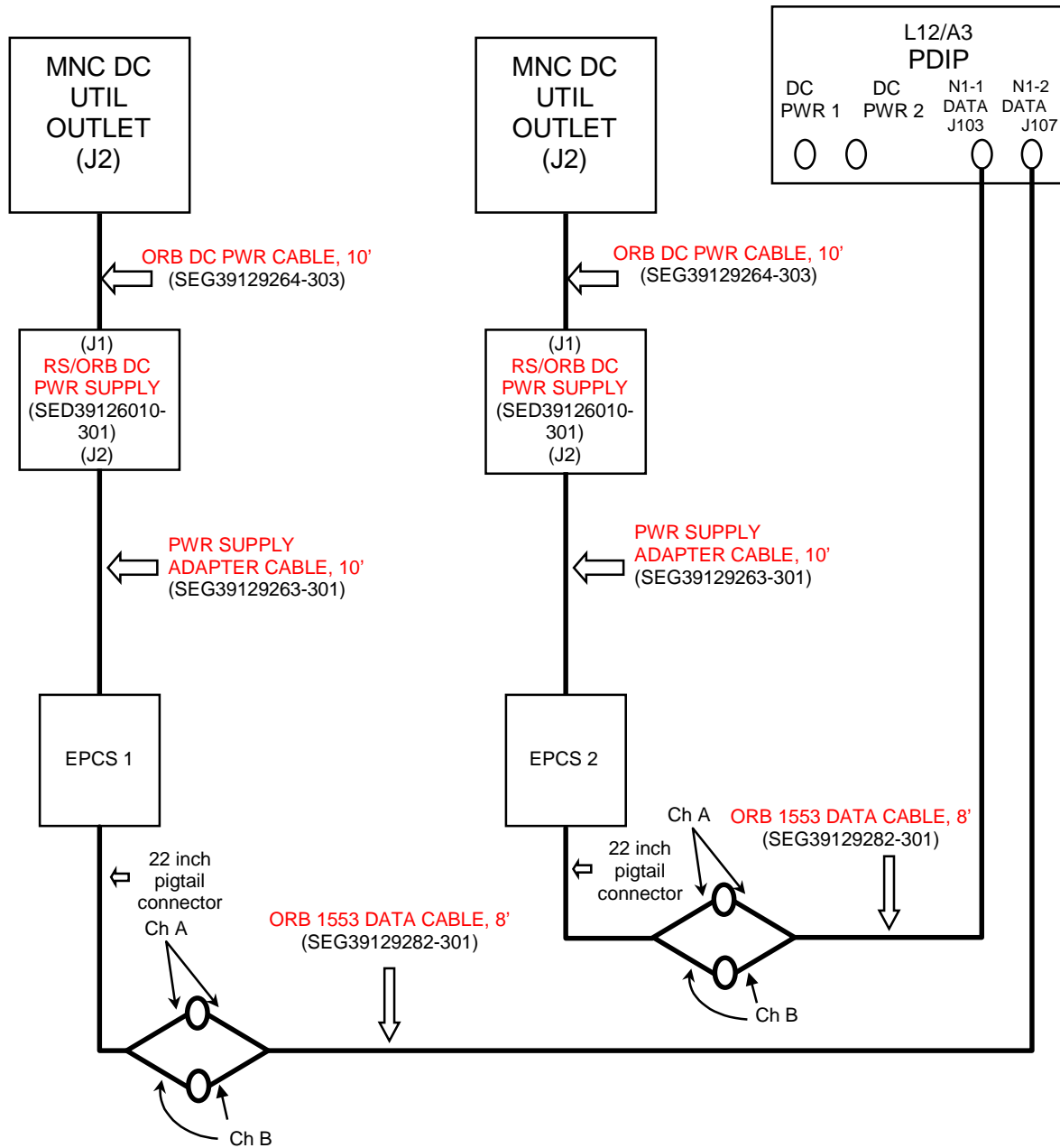


Figure 1.- AFD PCS Configuration.

NOTE

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

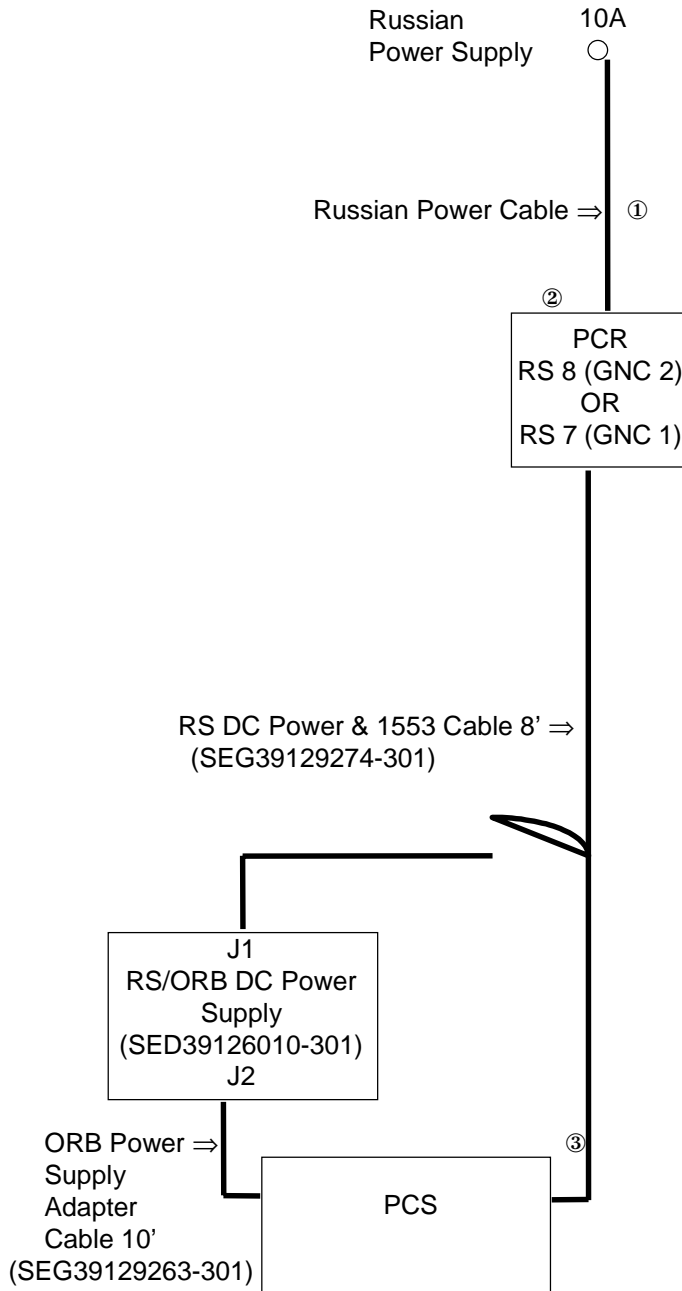


Figure 2.- FGB PCS Configuration.

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

NOTE

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

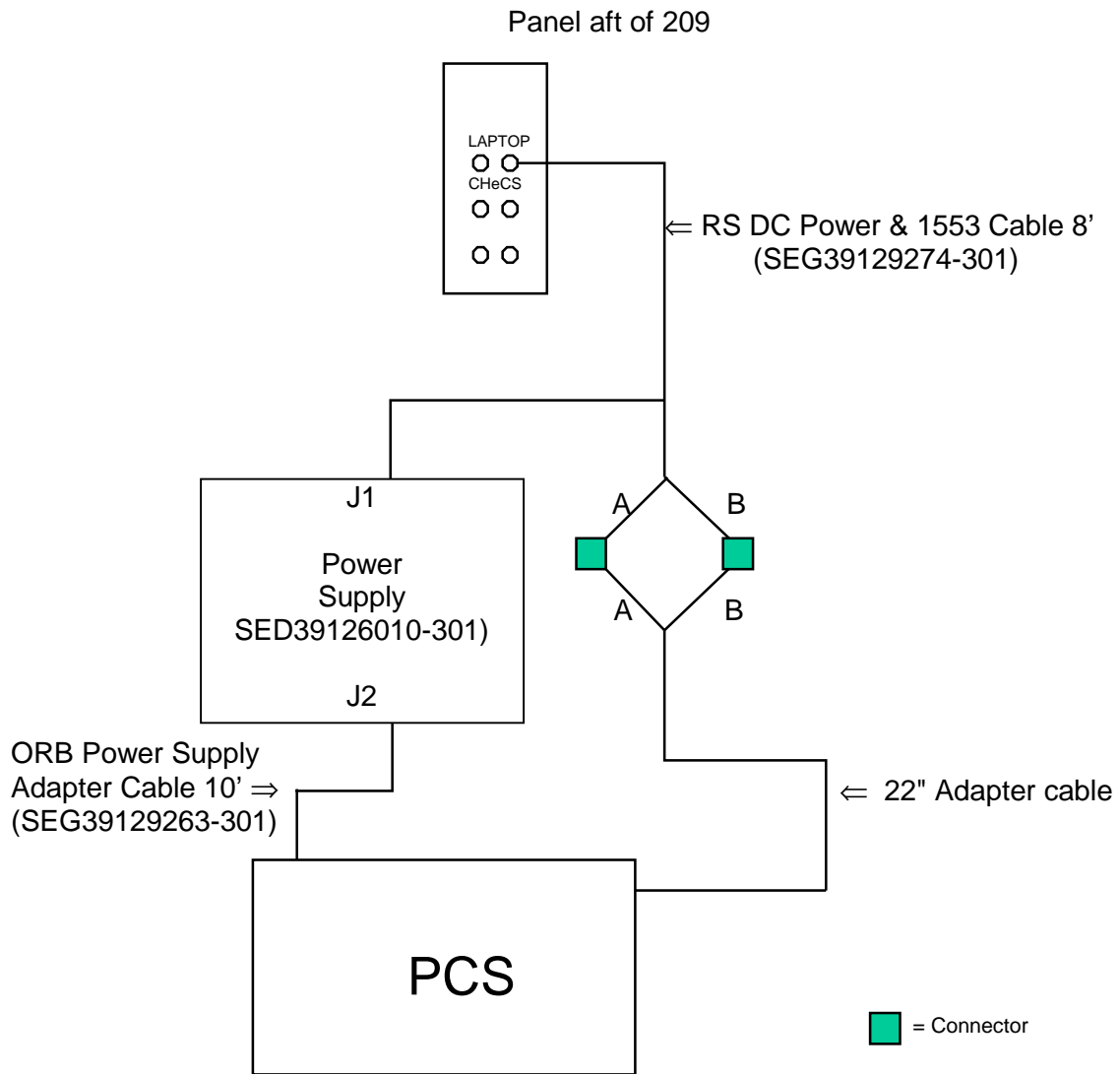


Figure 3.- SM PCS Configuration.

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

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

NOTE

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

EPCS DEACTIVATION

(JNT OPS/3A/FIN A/MULTI) Page 1 of 2 pages

1. PCS POWERDOWN

Close all display windows.
Disconnect CDS from MDM.
Close CDS Window.

At the taskbar on bottom of display,
sel EXIT

On '**Logout Confirmation**' window,
sel OK

When '**Type any key to continue**' appears,

	If shuttle AFD
PCS	PCS 1,2 Thinkpad PWR switches → Off
Pwr Sply	PCS1 28V DC PWR SPLY switch → Off (Lt Off) PCS2 28V DC PWR SPLY switch → Off (Lt Off)
O19	DC UTIL PWR MNA – OFF (J1)
A15	DC UTIL PWR MNC – OFF (J2)
L12/A3	DC PWR 2 CAB PL – OFF
	If ISS RS
PCS	PCS Thinkpad PWR switch → Off
Pwr Sply	PCS 28V DC PWR SPLY switch → Off (Lt Off)
P5C-10/3	RS Power switch → Off

2. EPCS POWER AND DATA CABLE DISCONNECT

	If shuttle AFD
L12/A3	Disconnect both ORB 1553 Data Cables 8' from N1-1 (J103) and N1-2 (J107) from the 1553 PC Card Adapter Cables. Disconnect both the ORB DC Power Cable 6' and ORB DC Power Cable 10' from the RS/ORB DC power supply (J1) and the ORB DC (J2) outlets, A15 MNC, and O19 MNA. Disconnect both the ORB Power Supply Adapter Cable 10' from the PCS DC power outlet and the RS/ORB DC Power Supply (J2).
	If ISS RS
P5C -10/3	Disconnect RS Power Cable. Disconnect RS DC Power and 1553 Data Cable 8' to PCR outlet and the RS/ORB DC power supply outlet (J1) and the 1553 PC Card Adapter Cable.
Pwr Sply	Disconnect the ORB Power Supply Adapter Cable 10' from the RS/ORB DC power supply outlet (J2) and from the PCS.

EPCS DEACTIVATION

(JNT OPS/3A/FIN A/MULTI)

Page 2 of 2 pages

3. STOWING PCS

MF71C

PCS Thinkpads (two)

20V DC Power Cables 10' (two)

PCS KITS, IBM THINKPAD (two) (One 1553 card and 22-inch Adapter Cable in each Kit)

If shuttle AFD

Stow:

ORB DC Power Cable 6' (one)

ORB DC Power Cable 10' (one)

ORB 1553 Data Cable 8' (two)

RS/ORB DC Power Supply (two)

If ISS RS

Stow:

RS DC PWR and 1553 Data Cable 8' in the FGB

RS/ORB DC Power Supply (one)

MATED OPERATIONS PROCEDURES

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HANDOVER ATTITUDE CONTROL RS THRUSTERS TO ORBITER

(JNT OPS/3A/FIN)

Page 1 of 1 page

NOTE

ISS steps should be performed by appropriate crew, but may be performed by **MCC-H** or **MCC-M**.

- C3 1. VERIFYING ORBITER NOT IN CONTROL
√DAP: A/FREE/VERN(ALT)

GNC 20 DAP CONFIG

√DAP A12, B12 loaded

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

2. CONFIGURING ISS TO FREE DRIFT

If this step is being performed by ground

MCC-H ⇒ **MCC-M**, "Perform Russian steps to mode Thrusters to Indicator."

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

ISS (**MCC-H**) ⇒ Orbiter, "ISS is in Free Drift."

3. ASSUMING CONTROL WITH ORBITER

O14,
O15,
O16:F

If ALT DAP required

PRI RJD DRIVER, LOGIC (sixteen) – ON

If required attitude per Flight Plan is LVLH,

DAP – A/LVLH/VERN(ALT)

If required attitude per Flight Plan is Inertial,

DAP – A/INRTL/VERN(ALT)

GNC UNIV PTG

When rates are damped < 0.1 deg/sec/axis,

DAP – A/AUTO/VERN(ALT)

Shuttle ⇒ ISS, **MCC-H**, "Orbiter has established attitude control."

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HANDOVER ATTITUDE CONTROL ORBITER TO RS THRUSTERS

(JNT OPS/ 3A/FIN)

Page 1 of 1 page

NOTE

ISS steps should be performed by appropriate crew, but may be performed by **MCC-H** or **MCC-M**.

PCS

1. VERIFYING ISS NOT IN CONTROL

SM: MCS

SM: MCS

'MCS Status'

Verify RS GNC Mode – Indicator

2. PREPARING ISS TO TAKE CONTROL

If this step is being performed by ground,

MCC-H ⇒ **MCC-M**, "Perform preparatory Russian steps to mode Indicator to Thrusters."

If this step is being performed by ISS crew,

Perform preparatory Russian steps to mode Indicator to Thrusters.

ISS(**MCC-H**) ⇒ Orbiter, "ISS ready to begin controlling attitude of Mated Stack."

C3(A6)

3. PLACING ORBITER INTO FREE DRIFT

DAP: FREE

Orbiter ⇒ ISS, **MCC-H**, "Orbiter is in Free Drift."

4. ASSUMING CONTROL WITH ISS

If this step is being performed by ground, Russian

MCC-H ⇒ **MCC-M**, "Perform Russian steps to mode Indicator to Thrusters."

If this step is being performed by ISS crew,

Perform Russian steps to mode Indicator to Thrusters.

ISS(**MCC-H**) ⇒ Orbiter, "ISS has assumed attitude control."

5. RETURNING ORBITER TO NOMINAL CONFIGURATION

If ALT DAP, return to Group B powerdown

PRI RJD DRIVER, LOGIC (sixteen) – OFF

RJDA-1A L2/R2 MANF DRIVER – ON

O14,

O15,

O16:F

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

FDA, C/W LIMITS RESET

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

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

B/U C&W	PARAM ID	ENA/INH	HI EU
CABIN PRESS	0612405		14.96
PPO2 A	0612511	INH	
PPO2 B	0612513	INH	
SH PPO2-1	0472012	INH	
SH PPO2-2	0472113	INH	
H2O LOOP 1 ICH OUT T	0612724	INH	
H2O LOOP 2 ICH OUT T	0612744	INH	

H/W C&W	CHANNEL	ENA/INH
PPO2 A	34	INH
PPO2 B	44	INH

2. ✓ **MCC-H** for repress Cryo configuration

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

O2 REPRESS INITIATION

OCAC 4. Perform OCAC filter cleaning
OCAC PWR → OFF

C5 5. DIRECT O2 vlv – OP

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

O2 REPRESS

(JNT OPS/3A/FIN)

Page 2 of 2 pages

7. **MCC-H** may ask for another cycle.
Wait for O2 to mix and O2 concentration to stabilize.

On call from **MCC-H**, repeat steps 5 --- 7.

OCAC 8. OCAC PWR → ON

9. ✓ **MCC-H** for post-repress cryo configuration

GENERIC DEPRESS

(JNT OPS/3A/FIN)

Page 1 of 1 page

NOTE

1. **MCC** will provide MET/EVENT and desired pressure values for use in this procedure.
2. Expect possible dP/dT Klaxon alarm during depress.

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

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

SM 66 ENVIRONMENT

CRT 3. If PPO2 < 2.7 at anytime during depress
C5 DIRECT O2 vlv – OP

CRT 4. When CABIN PRESS = desired pressure
C5 DIRECT O2 vlv – CL
AW82B AIRLK DEPRESS vlv – CL
Install AIRLK DEPRESS vlv cap

MET/EVENT	DESIRED PRESSURE

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GENERIC REPRESS

(JNT OPS/3A/FIN)

Page 1 of 1 page

NOTE
MCC will provide MET/EVENT and desired pressure values for use in this procedure.

WARNING
Terminate all WCS activity during repress.

- L2 1. O2/N2 CNTLR VLV SYS 1 – OP (N2)
2 – AUTO
- MO10W 2. O2 REG INLET SYS 2 – OP
- 3. 14.7 CAB REG INLET SYS 1 vlv – OP
- 4. **On MCC GO**
14.7 CABIN REG INLET SYS 2 vlv – OP

SM 66 ENVIRONMENT

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

MET/EVENT	DESIRED PRESSURE

- 6. If required
Go to PCS 1(2) CONFIG (ORB OPS, ECLS).
- If not required
- MO10W O2 REG INLET SYS 2 – CL
- L2 O2/N2 CNTLR VLV SYS 2 – CL (O2)

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EGRESS STATION PROCEDURES

**EGRESS
STATION**

**EGRESS
STATION**

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Z1 PRESSURE DOME EGRESS

(JNT OPS/3A/FIN A)

Page 1 of 3 pages

TOOLS AND EQUIPMENT REQUIRED:

NOD101 Internal Sampling Adapter (ISA)
Stbd CTB

NOD104 Vacuum Access Jumpers (VAJ) 35 ft
A1

NOD104 Vacuum Access Jumpers (VAJ) 5 ft
C2

Ingress Equip Bag
Fluke 87 Multimeter

1. Z1 PRESSURE DOME EGRESS

Node 1 Overhead 1.1 Inspect Z1 Dome Hatch Seals and seal surfaces for condensation, contamination, or damage (nicks, cuts, etc.).
If hatch seal damage is found, $\sqrt{\text{MCC-H}}$.
If condensate present, dry Hatch Seals with Dry Wipe (using blotting technique).

1.2 $\sqrt{\text{All returning items removed from Z1 Dome}}$

1.3 Close Node1 Overhead Hatch per decal.

2. ISA/VAJ/MPEV SETUP

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

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



Figure 1.- ISA Sample Valve.

Node1 Deck 2.3 $\sqrt{\text{Deck MPEV – CLOSED}}$

2.4 $\sqrt{\text{Multimeter COM to COM, V to } V\Omega \rightarrow | - \text{_____}}$

Z1 PRESSURE DOME EGRESS

(JNT OPS/3A/FIN A)

Page 2 of 3 pages

2.5 ISA Pressure Module → mmHgA

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

2.7 Verify Multimeter reading 0.6700 --- 0.7600

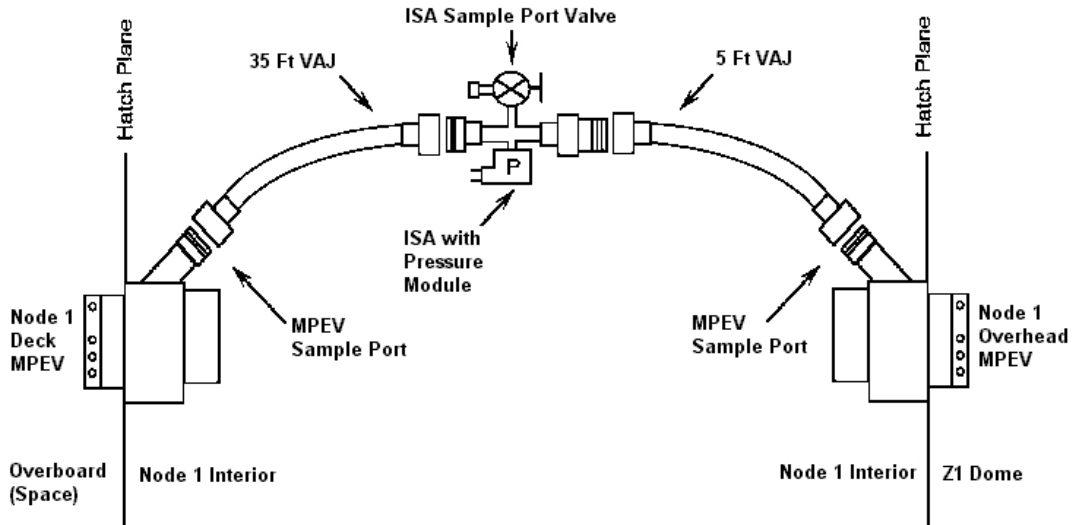


Figure 2.- ISA/VAJ/MPEV Configuration.

3. Z1 PRESSURE DOME DEPRESS

Node 1
Deck

3.1 Deck MPEV → OPEN

Node 1
Overhead

3.2 Overhead MPEV → OPEN

Node 1
Deck

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

3.4 Verify Multimeter reading is not increasing.

4. NODE1 OVERHEAD HATCH FINE LEAK CHECK

Node 1
Overhead

4.1 Record Multimeter reading: $P_1 = \text{_____ V}$

4.2 Overhead MPEV → CLOSED

4.3 Start 30 minute timer.

Node 1
Deck

4.4 When timer expires
Deck MPEV → OPEN

4.5 Wait 30 seconds, then
Deck MPEV → CLOSED

Z1 PRESSURE DOME EGRESS

(JNT OPS/3A/FIN A)

Page 3 of 3 pages

Node 1
Overhead 4.6 Overhead MPEV → OPEN

4.7 Record multimeter reading: $P_2 = \text{_____ V}$
($dP = P_2 - P_1 = \text{_____ V}$)
If $dP > 0.0005 \text{ V}$, hatch leak check failed
Overhead MPEV → CLOSE

√**MCC-H** >>

NOTE

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

5. DISMANTLE AND STOW EQUIPMENT

Node 1
Overhead

- 5.1 Overhead MPEV → CLOSE
- 5.2 Multimeter → OFF
- 5.3 ISA Pressure Module → OFF
- 5.4 Disconnect and stow Multimeter in Ingress Equipment Bag.
- 5.5 Uncap ISA Sample Port Valve
- 5.6 ISA Sample Port Valve → OPEN
- 5.7 Wait 30 seconds, then
ISA Sample Port Valve → CLOSED, capped
- 5.8 Disconnect VAJs, cap ends.
Stow 5 ft VAJ in NOD1O4_C2.
Stow 35 ft VAJ in NOD1O4_A1.
- 5.9 Cap all ISA ports and stow in NOD1O1 Stbd CTB.

6. CAP DECK AND OVERHEAD MPEV

Node 1
Deck

6.1 Hand tighten Deck MPEV Cap.

Node 1
Overhead

6.2 Hand tighten Overhead MPEV Cap.

6.3 Inform **MCC-H**, "Z1 Vestibule Egress Complete."

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NODE 1 EGRESS #1

(JNT OPS/3A/FIN A)

Page 1 of 2 pages

TOOLS AND EQUIPMENT REQUIRED:

Ingress Equip Bag	Flashlight Dry Wipes Gray Tape	I
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1. VERIFYING PMA1 EGRESS CONFIGURATION

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

PMA1	1.2 ✓All equipment bags and returning items removed from PMA1	
------	---------------------------------------------------------------	--

2. CONFIGURING FOR NODE 1 EGRESS

NOD1 D4_G1	2.1 Stow Docking Mechanism Accessory Kit (used during FGB Ingress) APAS Hatch Tool Cleaning Pads	I
------------	--------------------------------------------------------------------------------------------------------	---

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

Node 1 Deck	2.3 MPEV → uncapped	
-------------	---------------------	--

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

2.5 ✓MPEV – CLOSED (not capped)

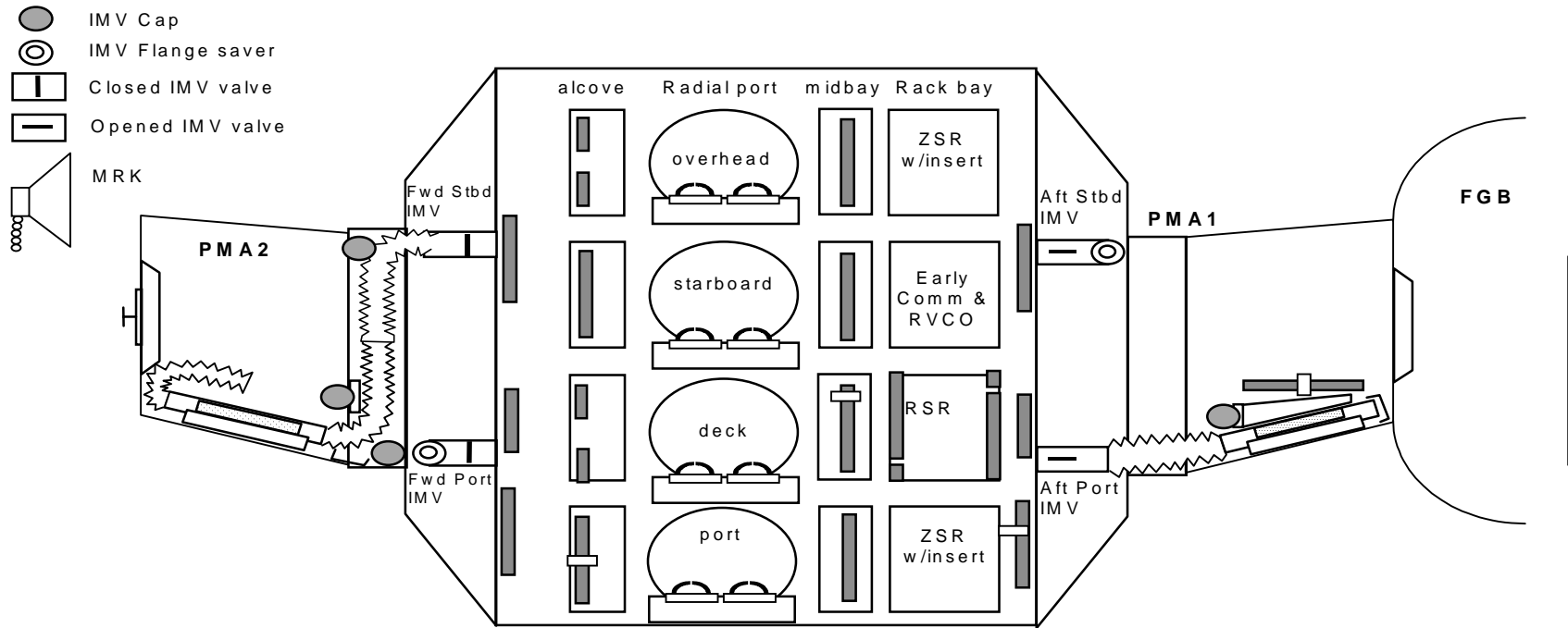
PMA2	2.6 PMA2 Duct Grille Cover → Open	I
------	-----------------------------------	---

Node 1	2.7 Node1 Fwd Stbd IMV Vlv → (deploy handle) Close (stow handle) Node1 Fwd Port IMV Vlv → (deploy handle) Close (stow handle)	I
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NOD1 P1_01	2.8 General Lighting Master Switch pb → On	
------------	--------------------------------------------	--

Node 1 Fwd Hatch	2.9 Close Node 1 Forward Hatch per decal.	
------------------	-------------------------------------------	--

NODE 1 EGRESS #1
(JNT OPS/3A/FIN A)



98

Post Egress Configuration

- Node Aft Port IMV Fan deactivated; FGB Fans deactivated.
- PMA 1 to FGB duct removed from PMA 1 hard duct and stowed in FGB.
- PMA 1 hard duct cap installed on hard duct; PMA 1 grille cover opened.
- Node Aft Port IMV fan deactivated;
- FGB alarm control panel deactivated; ПГО lights off.
- ГА-PMA 1 Hatch closed.
- QDMs, and ingress equipment removed
- PMA 2 grille cover opened.
- Node Fwd Port & Stbd IMV valve closed, not capped
- Node Fwd Hatch closed (MPEV closed, not capped).
- PMA/ODS interface duct removed from Halo Inlet Flex Duct and stowed in PMA 2 (restrained to handrail).
- APAS Hatch Standoff disengaged from Hatch and restrained to handrail.
- APAS Hatch cover removed and stowed in PMA 2.
- APAS Hatch closed.
- Docking target uncovered and standoff cross reinstalled.
- ODS Hatch closed.

Figure 1.- Post ISS Egress Configuration (FD04).

NODE 1 CABIN FAN DEACTIVATION

(JNT OPS/3A/FIN A)

Page 1 of 2 pages

1. POWER BUS STATUS VERIFICATION
√**MCC-H** to verify proper loads on power bus

PCS

2. NODE 1 CABIN FAN DEACTIVATION

Node 1: ECLSS: Cab Fan

Node 1 Cabin Fan

- 2.1 **cmd** Off – Arm
cmd Off

√State – Off

√Speed, rpm: 2000 ± 50

NOTE

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

- 2.2 sel RPCM N14B B RPC 17

RPCM N14B B RPC 17

cmd RPC Position – Open (Verify – Op)

3. SMOKE DETECTOR 1 DEACTIVATION

Node 1: ECLSS: SD1

Node 1 Smoke Detector 1

'Monitoring'

- 3.1 √Status – Enabled

cmd Inhibit

√Status – Inhibited

- 3.2 sel RPCM N14B C RPC 03

RPCM N14B C RPC 03

cmd RPC Position – Open (Verify – Op)

4. SMOKE DETECTOR 2 DEACTIVATION

Node 1: ECLSS: SD2

Node 1 Smoke Detector 2

'Monitoring'

- 4.1 √Status – Enabled

NODE 1 CABIN FAN DEACTIVATION

(JNT OPS/3A/FIN A)

Page 2 of 2 pages

cmd Inhibit

√Status – Inhibited

4.2. sel RPCM N13B A RPC 16

RPCM N13B A RPC 16

cmd RPC Position – Open (Verify – Op)

PMA2 EGRESS #1

(JNT OPS/3A/FIN A)

Page 1 of 3 pages

TOOLS AND EQUIPMENT REQUIRED:

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

1. OXYGEN EQUIPMENT RELOCATION

- 1.1 Relocate QDMs and 70-ft O2 Hoses to shuttle.
- MO32M 1.2 LEH O2 5, 6 vlv (two) – CL
- 1.3 70-ft O2 Hoses (two) ←|→ LEH O2 5, 6 vlv outlet
- Middeck 1.4 QDM (two) ←|→ 70-ft O2 Hoses and comm cables
QDM (two) →|← existing LES O2 lines and comm cables
Stow 70-ft O2 Hoses.
- MO32M 1.5 LEH O2 5, 6 vlv (two) – OP

2. CONFIGURING IMV AND HATCH FOR EGRESS

- MO13Q 2.1 AIRLK FAN A(B) – OFF
- Ext A/L 2.2 PMA/ODS Interface Duct ←|→ Halo Inlet Flex Duct
(Leave T-handle clamp attached to Halo Inlet Flex Duct).
- PMA2 2.3 Stow free end of PMA/ODS Interface Duct into PMA2 on port side Handrail.
- Ext A/L 2.4 Halo Inlet Flex Duct →|← Halo (Use T-handle clamp)
- MO13Q 2.5 AIRLK FAN A(B) – ON
√Airflow at halo
- 2.6 √All equipment bags and returning items removed from PMA2
Jettison Stowage Bag
Tool Bag
Ingress Equipment Bag
Docking Mechanism Accessory Kit
APAS Hatch Tool
Cleaning Pads

3. APAS HATCH CLOSURE

CAUTION

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

ODS

- 3.1 Disconnect Hatch from PMA APAS Hatch Standoff.
Secure Hatch Standoff to PMA handrail.
Remove APAS Hatch Cover and stow it securely in PMA2.
Inspect Hatch Seals and seal surfaces for debris/damage.
Clean APAS Hatch Seals and surface with Cleaning Pads.
Stow used pads in Docking Mechanisim Accessory Kit.
Close APAS Hatch.

Select 'РАБОЧЕЕ ПОЛОЖЕНИЕ' (Working Position) torque setting on Hatch Tool.

Insert tool in hatch socket (ensure fully seated).

Rotate tool 3 --- 4 turns in direction of 'ЗАТЯЖИТЬ' (Close) arrow until tool clicks.

- 3.2 ✓ APAS EQUAL VLV – OP

CAUTION

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

- 3.3 Remove Docking Target Base Plate Cover from Target Base Plate.
Stow Cover in Ingress Equipment Bag. |
- 3.4 Obtain Docking Target Standoff Cross from Standoff Cross Bag.
Stow Standoff Cross Bag in Ingress Equipment Bag. |

NOTE

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

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

NOTE

When all mating parts are correctly assembled, a groove on docking target standoff cross shaft should be visible above capnut (not recessed).

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

- 3.7 Stow tools. I

4. **ODS HATCH CLOSURE**

- 4.1 Close ODS Hatch per decal.
- 4.2 √Equal vlv (two) – OFF, capped

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NODE 1 AND PMA 1 MOISTURE REMOVAL KIT SETUP

(JNT OPS/3A/FIN)

Page 1 of 1 page

TOOLS REQUIRED:

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

NODE 1 AND PMA 1 PORTABLE FAN CONFIGURATION

NOTE

1. The exact locations of portable fans in Node 1 and PMA 1 are not critical.
2. Do not deploy Desiccant Bag Assemblies until just prior to Hatch closure.

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

DESICCANT INSTALLATION AND PORTABLE FAN ACTIVATION

2. √Fan Pwr – Off

If required, replace Batteries.

If required, stow used Batteries in Jettison/Stowage Bag.

3. Remove Desiccant Bag Assembly from plastic bag.
Secure plastic bag to handrail with tape.
4. Desiccant Bag Assembly →|← Fan
5. Fan Power → High

NOTE

Low power position setting has been disabled.

6. √Fan RPM control position – Full CW ↻
7. √Fans are running

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FGB HATCH LEAK CHECK

(JNT OPS/3A/FIN A/MULTI)

Page 1 of 2 pages

I

1. ΠΓΟ-ΓΑ HATCH LEAK CHECK CONFIGURATION

PCS

FGB: ECLSS

FGB: ECLSS

'FGB'

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

1.2 Desired pressure: _____ mmHg

2. FIRST PARTIAL DEPRESS

On MCC GO

NOTE

Estimated time for depress is ~1 minute.

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

2.2 Record time and FGB-ΠΓΟ pressure.

'FGB'

Cab Press: _____ mmHg

GMT: ____/____:____:____

3. CONFIGURATION FOR FGB ΓΑ-PMA1 HATCH LEAK CHECK

PCS

FGB: ECLSS

FGB: ECLSS

'Docking Adapter'

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

3.2 Desired pressure: _____ mmHg

4. SECOND PARTIAL DEPRESS

On MCC GO

NOTE

Estimated time for depress is ~1 minute.

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

FGB HATCH LEAK CHECK

(JNT OPS/3A/FIN A/MULTI)

Page 2 of 2 pages

I

4.2 Record time and FGB-ΓA pressure.

'Docking Adapter'

Cab Press: _____ mmHg

GMT: ____/____:____:____

PCS

5. FGB ΠΓΟ-ΓΑ HATCH LEAK CHECK

FGB: ECLSS

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

5.2 Record time and FGB-ΠΓΟ pressure.

'FGB'

Cab Press: _____ mmHg

GMT: ____/____:____:____

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

PCS

6. FGB ΓΑ-PMA1 HATCH LEAK CHECK

FGB: ECLSS

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

6.2 Record time and FGB-ΓA pressure.

'Docking Adapter'

Cab Press: _____ mmHg

GMT: ____/____:____:____

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

NODE 1 EGRESS #2

(JNT OPS/3A/FIN A)

Page 1 of 5 pages

TOOLS AND EQUIPMENT REQUIRED:

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

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

1. CONFIGURING FOR PMA1 EGRESS

Node 1 Aft 1.1 ✓ Node1 Aft Port IMV Valve – Open
Handle stowed.

1.2 ✓ Node1 Aft Stbd IMV Valve – Open
Handle stowed.

1.3 PMA1 IMV Grille cover → Open

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

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

2. CONFIGURING FOR NODE 1 EGRESS

CAUTION

Verification that caps are removed from each PPRV is required in order to provide fault tolerance to an overpressure relief condition of Node1/PMA1 structure.

Node 1 Port, Stbd Hatch 2.1 Remove PPRV caps (two).

2.2 Stow caps in Rack NOD1D4_D1.

2.3 Collect air sample (one) from inside Node 1.
Label location and MET on bottle.
Stow bottle (one) in Ingress Equipment Bag.

NODE 1 EGRESS #2

(JNT OPS/3A/FIN A)

Page 2 of 5 pages

- NOD1
D4_G1
- 2.4 Stow Docking Mechanism Accessory Kit (used during FGB Ingress)
APAS Hatch Tool
Cleaning Pads
- 2.5 ✓ All equipment bags, ISS cue cards and returning items removed from
Node 1
Photo TV Lights
Ingress Equipment Bag
Jettison/Stowage Bag
- Node 1
Fwd
- 2.6 Inspect Hatch Seals and seal surfaces for condensation,
contamination, or damage (nicks, cuts, etc.)
If condensate present, dry Hatch Seals with Dry Wipes (using a
blotting technique).
- 2.7 ✓ MPEV – CLOSED (capped)
- NOD1
P1-01
- 2.8 General Lighting Master Switch pb → On
- 2.9 Remove covers from Node 1 IMV Aft Port Fan outlet grilles,
NOD1OP3 and NOD1OP4 and stow in NOD1O4_A1.

3. CONFIGURING PMA2 IMV FOR EGRESS

- MO13Q
- 3.1 AIRLK FAN A(B) – OFF
- Node 1
Fwd
- 3.2 Node 1 Fwd Stbd IMV Vlv → (deploy handle) Close (stow handle)
Node 1 Fwd Port IMV Vlv → (deploy handle) Close (stow handle)
- PMA2
- 3.3 PMA2 IMV Duct Extension ←|→ Node 1 Fwd Stbd IMV Valve
Flange, using Ratchet and Deep Socket, leave V-band clamp on
flange.

NOTE

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

- 3.4 Retrieve Fwd Stbd IMV Cap from temporary stow location.
Remove bore and face O-rings from IMV Cap and discard.
Using Alcohol Wipes, clean IMV flange and grooves on IMV Cap.
Inspect cap grooves for nicks or burrs.
Report any damage to **MCC**.
Lubricate new O-rings with a thin film of Braycote.
Cap Braycote Tube and stow back in Ziplock Bag.
Install IMV Cap Bore O-rings and Face O-rings.
- 3.5 IMV Cap →|← Node 1 Fwd Stbd IMV Valve Flange
(Use Ratchet and Deep Socket)
Torque V-band clamp to 34-36 in-lbf [3.8 to 4.1 N•m].
(Use Torque Wrench)

NODE 1 EGRESS #2

(JNT OPS/3A/FIN A)

Page 3 of 5 pages

- 3.6 IMV Cap (Flang Saver) ←|→ Node 1 Fwd Port IMV Valve Flange, using Ratchet and Deep Socket, leave V-band clamp on flange. Stow in PMA2 with White Velcro Strap.
- 3.7 Retrieve Fwd Port IMV Cap from temporary stow location. Remove bore and face O-rings from IMV Cap and discard. Using Alcohol Wipes, clean IMV flange and grooves on IMV Cap. Inspect cap grooves for nicks or burrs. Report any damage to **MCC**. Lubricate new O-rings with a thin film of Braycote. Cap Braycote Tube and stow back in Ziplock Bag. Install IMV Cap Bore O-Rings and Face O-Rings. Dispose of used gloves in Dry Trash. Dispose of used Alcohol Wipes in Ziplock Bags then place in Dry Trash.
- 3.8 IMV Cap →|← Node 1 Fwd Port IMV Valve Flange (Use Ratchet and Deep Socket) Torque V-band clamp to 34-36 in-lbf [3.8 to 4.1 N•m]. (Use Torque Wrench)
- 3.9 PMA2 IMV Duct Extension ←|→ PMA2 IMV Duct Jumper Stow Duct Extension, V-band clamp, Velcro ties in orbiter MDK (Ceil) Upper Port Small Bag.
- 3.10 IMV Cap ←|→ PMA2 IMV Duct Jumper launch restraint Stow IMV Cap in Jettison Stowage Bag, leave V-band clamp on flange.
- 3.11 PMA2 IMV Duct Jumper →|← PMA2 IMV Duct Jumper launch restraint. Secure with V-band clamp.

CAUTION

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

4. CONFIGURING STATION/SHUTTLE IMV FOR EGRESS

- Ext A/L
- 4.1 PMA/ODS Interface Duct ←|→ Halo Inlet Flex Duct (Leave T-handle clamp attached to Halo Inlet Flex Duct).
 - 4.2 Secure to PMA Handrail with Velcro Straps.
 - 4.4 Halo Inlet Flex Duct →|← Halo (Use T-handle clamp)

NODE 1 EGRESS #2

(JNT OPS/3A/FIN A)

Page 4 of 5 pages

MO13Q 4.5 AIRLK FAN A(B) – ON
√Airflow at halo

CAUTION

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

Node 1 5. MOISTURE REMOVAL ACTIVATION AND NODE 1 EGRESS
5.1 For each of the four Node 1/PMA1 fans, perform {NODE 1 AND PMA1 MOISTURE REMOVAL KIT SETUP}, step 2 --- 7 (SODF: JNT OPS: EGRESS STATION), then:

5.2 Close Node 1 Forward Hatch per decal.

6. NODE 1 LIGHTING POWER REMOVAL

6.1 Node 1: EPS: RPCM N14B B
RPCM N14B B

sel RPC 1

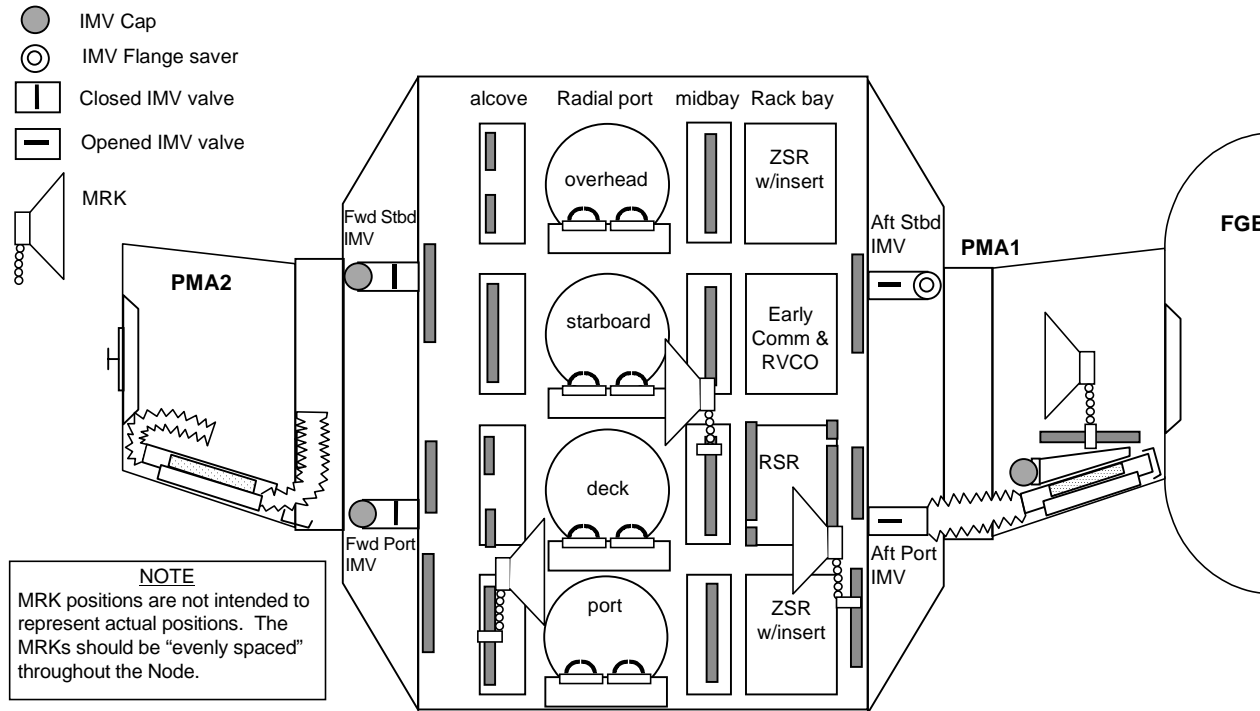
cmd RPC Position – Open (Verify – Op)

6.2 Node 1: EPS: RPCM N14B C
RPCM N14B C

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

cmd RPC Position – Open (Verify – Op)

Repeat



101

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;">Post ISS Egress Configuration</p> <ul style="list-style-type: none"> • Node Aft Port IMV Fan deactivated. • ПГО-ГА Hatch Frame Ring removed and stowed. • FGB air sample collected, alarm control panel deactivated, ПГО lights off. • ПГО-ГА Hatch closed, leak check conducted, 1st partial depress. • ГА-PMA1 Hatch closed, leak check conducted 2nd partial depress. • Desiccant Bag/Portable Fan installed and activated in PMA1. • PPRV Caps removed and stowed in Node Stowage Rack (NOD1D4_D1). • QDMs, and ingress equipment removed; Node air sample collected. • Node Fwd Stbd & Port IMV Valve closed, capped. • Desiccant Bags/Portable Fans installed and activated in Node. • Node Fwd Hatch closed (MPEV closed, not capped). • PMA IMV flex duct extension removed from PMA 2. • PMA/ODS Interface Duct removed from Halo Inlet Flex Duct & stowed in PMA 2. • APAS Hatch Standoff disengaged from Hatch and restrained to handrail. • APAS Hatch Cover removed and stowed in PMA2. | <p style="text-align: center;">Post ISS Egress Configuration (cont.)</p> <ul style="list-style-type: none"> • APAS Hatch closed. • Docking Target uncovered and Standoff Cross reinstalled. • ODS Hatch closed. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Figure 1.- Post ISS Egress Configuration (FD09).

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TOOLS AND EQUIPMENT REQUIRED:

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

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

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

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

1. OXYGEN EQUIPMENT RELOCATION

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

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

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

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

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

2. APAS HATCH CLOSURE

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

- ODS Vest 2.2 Disconnect Hatch from PMA APAS Hatch Standoff.
Secure Hatch Standoff to PMA Handrail.
Remove APAS Hatch Cover and return to earth.
Inspect Hatch Seals and seal surfaces for debris/damage.
Clean APAS Hatch Seals and surface with Cleaning Pads.
Close APAS Hatch.

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

2.3 ✓ APAS EQUAL VLV – OP

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

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

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

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

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

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

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

2.8 Stow tools. |

3. ODS HATCH CLOSURE

ODS Hatch

3.1 Close ODS Hatch per decal.

3.2 ✓ Equal vlv (two) – OFF, capped

ODS VESTIBULE/PMA2 DEPRESSURIZATION AND HATCH LEAK CHECK

(JNT OPS/3A/FIN/MULTI) Page 1 of 1 page

1. √ ODS Hatch closed
2. √ ODS Hatch Equal vlv (two) – OFF, caps installed
- A6L 3. √ cb ESS 1BC(2CA) SYS PWR CNTL SYS 1(2) – cl
4. √ SYS PWR MNA(MNB) – ctr (tb-ON)
5. cb ESS 1BC(2CA) DEP SYS 1(2) VENT ISOL – cl
6. cb MNA(B) DEP SYS 1(2) VENT – cl
7. VEST DEP VLV SYS 1(SYS 2) VENT ISOL – OP (tb-OP)
8. VEST DEP VLV SYS 1(SYS 2) VENT – OP (tb-OP)
Wait 15 minutes.
9. VEST DEP VLV SYS 1(SYS 2) VENT – CL (tb-CL)

NOTE

MCC-H will perform ODS Hatch, Node Fwd Hatch, and IMV leak check overnight.

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EMERGENCY RESPONSE PROCEDURES

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JOINT EXPEDITED UNDOCKING AND SEPARATION

(JNT OPS/3A/FIN A)

Page 1 of 5 pages

NOTE

1. This Expedited undocking should be used for the following failures
 - Non-isolatable prop leak (shuttle)
 - Cabin Leak (shuttle)
 - Loss of cooling (two cabin fans, water coolant loops, Freon coolant loops (shuttle))
2. Entrance to this procedure based on Cabin Leak or Loss of Cooling scenario assumes that this procedure will be worked concurrently with the associated FDF ORB PKT and ENTRY PKT powerdown.
3. At least 20 minutes are required to perform mandatory activities through physical separation. An additional 45 minutes required for ANY ATTITUDE SEPARATION, or an additional 18 minutes required for SHUTTLE EMERGENCY SEPARATION (to OMS TIG).
4. Highly desirable steps are listed beginning with step 21. These steps should be performed as time permits.

JOINT EXPEDITED UNDOCKING AND SEPARATION

(JNT OPS/3A/FIN A)

Page 2 of 5 pages

110

CREW ABOARD ISS	MS	CDR/PLT
<p>MS1/MS4 1. <u>IF COMM.</u> <input checked="" type="checkbox"/> MCC</p> <p>If not using ISS atmosphere Perform EMERGENCY ISS EGRESS Cue Card, all (SODF: JNT OPS: CUE CARD), then:</p>	<p>MS3 2. If time available, <u>PERFORMING ISS LOADSHED</u> Node 1 Loadshed <input type="checkbox"/> SM_220_NODE_1-2N ITEM 4 +9 9 EXEC</p> <p>MS2/3 4. Perform ISS SAFING (FDF,ORB PKT, PL <u>PWRDN</u>) as required, then MS reports to CDR "Pre-Undock ISS Safing complete."</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">NOTE</p> <p>If time available, perform steps 21 --- 24 for ECS powerup and EPCS shutdown.</p> </div>	<p>CDR 3. <u>PREPARING FOR UNDOCKING</u></p> <p>A6U <input checked="" type="checkbox"/> SENSE: -Z <input checked="" type="checkbox"/> DAP: LO Z</p> <p>O14, 5. Pri RJD DRIVER, LOGIC (sixteen) – ON O15, O16:F O14, All DDU cbs (six) – cl O15, O16:E</p> <p>6. If ISS controlling stack, Perform HANOVER ATTITUDE CONTROL RS THRUSTERS TO ORBITER (SODF: JNT OPS: MATED OPERATIONS), then:</p> <p>7. <input type="checkbox"/> GNC_23_RCS Reselect manually deselected jets.</p>
<p>If performing UTILIZE ISS ATMOSPHERE procedure for orbiter cabin leak, hold until procedure cplt and GO from CDR.</p>	<p>If performing UTILIZE ISS ATMOSPHERE procedure for orbiter cabin leak, hold until procedure cplt and GO from CDR.</p>	<p>After applicable pre-undocking ISS SAFING complete, UTILIZE ISS ATMOSPHERE cplt (if performed) and "ISS Egress complete," CDR give "GO TO DEPRESS VESTIBULE AND GO TO DEACT APCU."</p>
	<p>MS3 8. <u>PERFORMING APCU DEACT</u> L12U APCU 1,2 CONV – OFF <input checked="" type="checkbox"/> CONV tb – bp <input checked="" type="checkbox"/> OUTPUT tb – bp OUTPUT – OFF</p> <p>MS1 9. <u>DEPRESSURIZING SHUTTLE VESTIBULE</u> <input checked="" type="checkbox"/> ODS Hatch closed ODS <input checked="" type="checkbox"/> ODS HATCH EQUAL VLVS (two) – Hatch OFF, caps installed A6L cb ESS 1BC SYS PWR CNTL SYS 1 – cl cb ESS 2CA SYS PWR CNTL SYS 2 – cl cb ESS 1BC DEP SYS 1 VENT ISOL – cl cb ESS 2CA DEP SYS 2 VENT ISOL – cl cb ESS MNA DEP SYS 1 VENT – cl cb ESS MNB DEP SYS 2 VENT – cl SYS PWR MN A, MN B (two) – on (hold 5 seconds) <input checked="" type="checkbox"/> SYS PWR SYS 1, SYS 2 tb (two) – ON VEST DEP VLV SYS 1(2) VENT ISOL (two) – OP (tb-OP) VEST DP VLV SYS 1(2) VENT (two) – OP (tb- OP)</p>	<p>Do not perform next two steps until ready for undock.</p> <p>PLT 10. <u>FLT CNTLR PWRUP</u> <input type="checkbox"/> GNC_25_RM_ORBIT SW RM INH – ITEM 16 (*) A6U FLT CNTLR PWR – ON CRT SW RM INH – ITEM 16 (*)</p>

JOINT EXPEDITED UNDOCKING AND SEPARATION

(JNT OPS/3A/FIN A)

Page 3 of 5 pages

	<p>MS1</p> <p>12. <u>ODS PREPARATION FOR UNDOCKING</u> If required, perform PMA-2 HOOKS OPEN (FDF, RNDZ, <u>APDS</u>), then:</p> <p>Perform DOCKING MECHANISM PWRUP (FDF, RNDZ, <u>APDS</u>), then:</p> <p>If Airlock Pressure < 8.0 PSIA If time permits, terminate EVA & repress airlock If time not available, expect hooks motor drive to fail during drive operation</p> <p>Perform UNDOCKING PREP (FDF, RNDZ, <u>APDS</u>), then:</p>	<p>PLT</p> <p>11. <u>CONFIGURING DAP</u> <u>GNC_UNIV_PTG</u> √Rates < 0.1 %/second DAP: FREE</p> <p>A6U</p> <p><u>GNC_20_DAP_CONFIG</u> CONFIG DAP A,B to A7,B7 √DAP A CNTL ACC – ITEM 28 +0 EXEC √DAP B CNTL ACC – ITEM 48 +0 EXEC</p>
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111

JOINT EXPEDITED UNDOCKING AND SEPARATION

(JNT OPS/3A/FIN A)

Page 4 of 5 pages

112

MS		CDR/PLT
Hold until given "GO TO UNDOCK" from CDR.		CDR give MS "GO for COMMAND UNDOCKING."
A7L MS1	<p>13. <u>COMMAND UNDOCKING</u> After DAP configured, and On MCC GO (if Comm),</p> <p>***** If HOOKS 1(2) OP It failed ON APDS PWR A_{DS} – OFF √A_{DS}, failed Its off *****</p> <p>pb APDS CIRC PROT OFF – push (√It on)</p>	<p>14. After separation cplt</p> <p>If OMS TIG < 1 hour Go to SHUTTLE EMERGENCY SEPARATION (FDF, RNDZ, CONTINGENCY OPS).</p> <p>If OMS TIG ≥ 1 hour Unstow HHL. Go to ANY ATTITUDE SEPARATION (FDF, RNDZ, CONTINGENCY OPS).</p>
-2:20	<p>15. pb UNDOCKING – push √HOOKS 1, HOOKS 2 CL It (two) – off √HOOKS 1, HOOKS 2 POS < 92 % and decr</p>	MS CDR
CRT	<p>***** If HOOKS 1(2) fail to drive (HOOKS 1(2) DRV CMD – OFF), pb OPEN HOOKS – push If HOOKS 1(2) appear to stop before reaching end-of-travel (HOOKS 1(2) POS > 4 % and not decr), allow for single motor drive time (~4:40) before performing pnl A7L pwr cycle. *****</p>	
-1:30	<p>A7L 16. √INTERF SEALED It – off √RDY to HK It – off (HOOKS 1, HOOKS 2 POS ~30 %)</p>	
0:00	<p>CRT 17. √HOOKS 1, HOOKS 2 OP Its (two) – on √HOOKS 1, HOOKS 2 POS = 4 % √UNDOCK COMPLETE It – on</p>	
(+2:20)	<p>***** If HOOKS 1(2) fail to open (confirmed by no physical separation) pb PWR OFF – push √MCC (if time permits)</p>	
A6L A7L	<p><u>FIRE PYROS:</u> PYRO PWR MN A, MN C (two) – ON PYROS Ap, Bp, Cp (three) – ON (√Its on) pb PYRO CIRC PROT OFF – push (√It on) ACT HOOKS FIRING – push</p>	
A6L	<p>After Separation: pb PYRO CIRC PROT ON – push (√OFF It off) PYROS Ap, Bp, Cp (three) – OFF (√Its off) PYRO PWR MN A, MN C (two) – OFF</p> <p>*****</p>	
MS1 A7L	<p>18. <u>POST UNDOCKING</u> pb PWR OFF – push STATUS It (eighteen) – off</p>	

JOINT EXPEDITED UNDOCKING AND SEPARATION

(JNT OPS/3A/FIN A)

Page 5 of 5 pages

MS1 19. Perform DOCKING MECHANISM PWRDN (FDF, RNDZ, APDS), then:

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

NOTE

Steps 21 --- 24 are preformed if time available after step 4.

MS 21. ECS POWERUP

SM_223_EARLY COMM-2N

N1RS2A RPC 11 CL - ITEM 15 EXEC (*)

N1RS2A RPC 10 CL - ITEM 13 EXEC (*)

N1RS2A RPC 5 CL - ITEM 9 EXEC (*)

N1RS1C RPC 5 CL - ITEM 1 EXEC (*)

N1RS1C RPC 12 CL - ITEM 5 EXEC (*)

MS2 22. INHIBITING RT FDIR

Node 1: C&DH: MDM N1-2(1): UB ORB N1-2(1): RT Status

UB_ORB_N1_2(1)_RT_Status

cmd 08 OIU Inhib FDIR Execute

Verify 08 OIU RT FDIR Status – Inh

23. TAKING EPCS OFF ORB BUS

When EPCS no longer required

PCS CDS Main Control panel window

sel "Terminate to MDM" icon

24. ECS TRANSMITTER ON

NOTE:

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

SM 223 EARLY COMM-2N

XMIT ON - ITEM 17 EXEC (*)

113

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CUE CARD PROCEDURES

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HOOK
VELCROHOOK
VELCRO**ISS CONTINGENCY EGRESS**

(JNT OPS/3A/FIN A/MULTI) (HC) Page 1 of 2 pages

- If Progress Hatch open
- SM ПpK-CY 1. Clear hatchway and close Progress Hatch with hatch tool.
2. Remove cap from vestibule depressurization valve.
3. Report, "Progress 1 Egress Complete."
- If SM Hatches open
- SM ПpK-CY 4. Remove tools and equipment from SM.
5. Clear hatchway and close SM ПpK-CY Hatch with hatch tool.
- SM ПpK 6. √KBД ПpK-CY – ELECTRICAL CONTROL
SM PO 7. Deactivate lights.
Panels 466,
434, 417
- SM ПxO 8. √KBД ПxO-CY – ELECTRICAL CONTROL
FGB ПГО-CY 9. Clear hatchway and close SM ПxO-CY Hatch with hatch tool.
10. Report, "SM Egress Complete."
- If FGB Hatches open
- FGB ПГО 11. Remove tools and equipment from FGB.
12. Clear hatchway and close FGB ПГО-CY Hatch with hatch tool.
13. √KBД ПГО-CY – ELECTRICAL CONTROL
Panels 14. Deactivate lights.
430, 414
- FGB ГА 15. √KBД ГА-PMA1 – ELECTRICAL CONTROL
16. Clear hatchway and close FGB ГА-PMA1 Hatch with hatch tool.
17. Report, "FGB Egress Complete."
- If Z1 Vestibule pressurized
- Node 1 18. Remove tools and equipment from Z1.
19. Close Node 1 Ovhd hatch per decal.
20. Hand tighten free end of ISA/VAJ Hose Assembly to Node 1
Overhead MPEV.
21. ISA Sample Port Valve → CLOSED
22. Node 1 Deck MPEV → OPEN
23. Node 1 Ovhd MPEV → OPEN
24. Wait 20 Seconds
25. Node 1 Deck MPEV → CLOSED
26. Node 1 Ovhd MPEV → CLOSED
27. ISA Sample Port Valve → OPEN
28. Disconnect VAJs from both Ovhd and Deck MPEVs, cap both
MPEVs.
29. Report, "Z1 Egress Complete."

TOP
BACK OF "ISS CONTINGENCY EGRESS"

HOOK
VELCRO

HOOK
VELCRO

ISS CONTINGENCY EGRESS

(JNT OPS/3A/FIN A/MULTI) (HC) Page 2 of 2 pages

- If Node 1 open
- Node 1
Port, Stbd
Hatches
- Node 1 Fwd
PMA2
- MO13Q
PMA2
- Ext A/L
- ODS
Vestibule
- Ext A/L
30. Remove tools and equipment from Node 1.
 31. Remove two PPRV Caps.
Stow in NOD1D4_D1.
 32. Remove two IMV Grille covers from NOD1OP3 and NOD1OP4.
Stow in NOD1O4_A1.
 33. Install and activate four Moisture Removal Kits.
 34. Node 1 Fwd Port, Stbd IMV vlvs (two) → CLOSED
 35. Clear hatchway and close Node 1 Fwd Hatch per decal
(Use 10" Adjustable Wrench if CPAs installed).
 36. √MPEV – CLOSED
 37. Report, "Node 1 Egress Complete."
- If PMA2 open
38. AIRLK FAN A(B) → OFF
 39. Disconnect PMA/Node extension duct from starboard IMV flange.
(Use Ratchet and Deep Well Socket. Leave V-band clamp on
flange.)
 40. Install IMV Cap to starboard IMV flange.
Tighten V-band clamp 34 --- 36 in-lbf (3.8 to 4.1 N•m).
 41. Remove Flange Saver Cap from port IMV flange.
(Use Ratchet and Deep Well Socket. Leave V-band clamp on
flange.)
Stow Flange Saver Cap in PMA2 cap stowage location.
 42. Install IMV Cap to port IMV flange.
Tighten V-band clamp 34 --- 36 in-lbf (3.8 to 4.1 N•m).
 43. Disconnect Station/Shuttle Extension ducting.
Stow in PMA2.
 44. Clear hatchway and close PMA2 APAS Hatch with APAS hatch
tool.
 45. √APAS EQUAL VLV → OPEN
 46. Remove Docking Target baseplate cover, then
Install Docking Cross by hand on PMA2 APAS Hatch.
 47. Report, "PMA2 Egress Complete."
 48. Clear hatchway and close ODS Hatch per decal.
√Equal Vlvs (two) – OFF, capped
 49. Report, "ODS Hatch Closed, ISS Egress Complete."

JNT OPS-1b/3A/A

EMERGENCY ISS EGRESS

(JNT OPS/3A/FIN A/MULTI) (HC) Page 1 of 2 pages

- If Progress 1 Hatch open
- SM ПpK-CY 1. Clear hatchway and close Progress Hatch with hatch tool.
2. Remove cap from vestibule depressurization valve.
3. Clear hatchway and close SM ПpK-CY Hatch with hatch tool.
- SM ПpK 4. √KBД ПpK-CY – ELECTRICAL CONTROL
5. Report, "Progress 1 Egress Complete."
- If FGB Hatches open
- FGB ГA 6. √KBД ГA-PMA1 – ELECTRICAL CONTROL
7. Clear hatchway and close FGB ГA-PMA1 Hatch with hatch tool.
8. Report, "Russian Segment Egress Complete."
- If Z1 Vestibule pressurized
- Node 1 9. Open Node 1 Ovhd Hatch per decal.
- If Node 1 open
- Node 1 Fwd PMA2 10. Node 1 Fwd Port, Stbd IMV vlvs (two) → CLOSED
11. Clear hatchway and close Node 1 Fwd Hatch using 10" adjustable wrench.
12. √MPEV – CLOSED
13. Report, "Node 1 Egress Complete."
- If PMA2 open
- Ext A/L 14. Disconnect Station/Shuttle Extension ducting.
Stow in PMA2.
- ODS Vest 15. Clear hatchway and close PMA2 APAS Hatch with APAS hatch tool
16. √APAS EQUAL VLV → OPEN
17. Remove Docking Target baseplate cover, then install Docking Cross by hand on PMA2 APAS Hatch.
18. Report, "PMA2 Egress Complete."
- Ext A/L 19. Clear hatchway and close ODS Hatch per decal.
√Equal Vlvs (two) – OFF, capped
20. Report, "ODS Hatch Closed, ISS Egress Complete."

JNT OPS-2a/3A/A

TOP
BACK OF "EMERGENCY ISS EGRESS"



HOOK
VELCRO

EMERGENCY ISS EGRESS
(JNT OPS/3A/FIN A/MULTI) (HC)

Page 2 of 2 pages



HOOK
VELCRO

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JNT OPS-2b/3A/A

