



International Space Station Assembly Operations

ISS-19A

Mission Operations Directorate
Operations Division

18 MAR 10

This publication replaces
all previous publications.
These procedures are available
electronically on the SODF Homepage
at <http://mod.jsc.nasa.gov/do3>

National Aeronautics and
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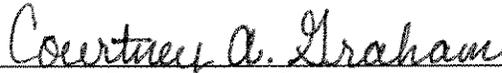


United Space Alliance

**INTERNATIONAL SPACE STATION
ASSEMBLY OPERATIONS
ISS-19A**

18 MAR 10

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This document is under the configuration control of the Systems Operations Data File Control Board (SODFCB).

Incorporates the following:				
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	Assy_Ops-01930	Assy_Ops-01981A	Assy_Ops-01994	Assy_Ops-02025
	Assy_Ops-01931	Assy_Ops-01983	Assy_Ops-01995A	Assy_Ops-02027
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	Assy_Ops-01969	Assy_Ops-01989	Assy_Ops-02000	
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Uplinked Messages (or Approved Flight Notes) replaced by this revision,
remove from Book:

None

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ASSEMBLY OPERATIONS
ISS-19A**

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ACTIVATION AND CHECKOUT

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1.100 S1 ATA REMOVAL AND REPLACEMENT PREP

(ASSY OPS/19A/FIN)

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OBJECTIVE:

Prepares the S1 ATA for removal.

PART 1

NOTE

The following step will manually control the PM accumulator heater so that its temperature matches the ETCS loop setpoint within 2 degrees C. This step will allow a constant temperature to be maintained at the accumulator through all Beta angles. Manual heater control should be performed until the ATA is isolated.

1. CONTROLLING PM ACCUM HEATERS TO LOOP SETPOINT

S1: TCS: PM: Loop A PM Htrs

Loop A PM Htrs

'Commands'

'Accum Htr 1'

cmd Availability Inhibit – Arm (\surd – \surd)

cmd Availability Inhibit – Inh (\surd Availability – Inh)

'Telemetry'

'Accum Htr 1'

Verify RPC Position – Op

'Accum Htr 2'

cmd Availability Inhibit – Arm (\surd – \surd)

cmd Availability Inhibit – Inh (\surd Availability – Inh)

'Telemetry'

'Accum Htr 2'

Verify RPC Position – Op

S1: TCS

S1: Loop A Overview

'PM (Pump Module)'

If N2 Temp < 1.33 deg C

S1: TCS: PM : Loop A PM Htrs: RPCM S12B A RPC 07

RPCM S12B A RPC 07

'Commands'

cmd RPC Position – Close (\surd Posn – Cl)

1.100 S1 ATA REMOVAL AND REPLACEMENT PREP

(ASSY OPS/19A/FIN)

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If N2 Temp > 5.33 deg C

S1: TCS: PM: Loop A PM Htrs: RPCM S12B A RPC 07

RPCM S12B A RPC 07

'Commands'

cmd RPC Position – Open ($\sqrt{\text{Posn}} - \text{Op}$)

Repeat step 1 until the PM accumulator is appropriately pre-conditioned. Manual heater operations will continue until the ATA is ready to be isolated in step 5.

NOTE

The following step should be performed when the pump module inlet pressure is at its peak in the orbit. This will preserve nitrogen.

2. PRESSURIZING ETCS LOOP A AND SUPPRESSING CWA

To suppress Event Code 4477 in the primary C&C MDM

Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS, steps 1 to 4, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL), then:

S1: TCS: PM

Loop A PM

'Telemetry'

'PM'

Verify PM Inlet Press is at its maximum value for the orbit.

Record PM Inlet Press: _____ kPa

If PM Inlet Press = 2688 kPa \pm 10 kPa

Go to step 3.

If PM Inlet Press < 2583 kPa

For Loop A and a pressure of 2688 kPa

Perform 2.506 CHANGE ETCS LOOP A(B) PRESSURE - AUTO, all (SODF: TCS: NOMINAL: ETCS), then:

If PM Inlet Press > 2586 but < 2678 kPa

For Loop A and a pressure of 2688

Perform 2.508 INCREASE ETCS LOOP A(B) PRESSURE - MANUAL, all (SODF: TCS: NOMINAL: ETCS), then:

NOTE

If Suppressed Caution '**ETCS Loop A Pressure High/NH3 Transfer in Progress-S1**' is received, no action is required. FDIR will be inhibited in step 3.

1.100 S1 ATA REMOVAL AND REPLACEMENT PREP

(ASSY OPS/19A/FIN)

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3. INHIBITING NH3 RETURN FDIR

S1: TCS: Loop A Software: Loop A FDIR: Loop A ETCS FDIR Commands

Loop A ETCS FDIR Commands

'Commands'

'ETCS FDIR'

'NH3 Return'

cmd Inhibit – Arm (Verify – Inh Armed)

cmd Inhibit – Inhibit (Verify – Inh)

NOTE

Steps 4 and 5 should be performed at the point in the orbit when the PM Inlet pressure is the highest. This will prevent system overpressurization.

4. TERMINATING MANUAL HEATER OPS

S1: TCS: PM: Loop A PM Htrs: RPCM S12B A RPC 07

RPCM S12B A RPC 07

'Commands'

√RPC Position – Op

5. CLOSING THE PM INLET VALVE

S1: TCS

S1:Loop A Overview

'PM'

Verify PM Inlet Press is at its maximum value for the orbit.

S1: TCS: PM: Loop A PM Valves

Loop A PM Valves

'Commands'

'Inlet Isol Valve'

cmd Inlet Isol Valve Close – Arm (√ – √)

cmd Inlet Isol Valve Close – Close (√Posn – Cl)

6. REENABLING LOOP A PM ACCUM HEATERS

S1: TCS: PM: Loop A PM Htrs

Loop A PM Htrs

'Commands'

'Accum Htr 1'

cmd Availability Enable – Enable (√ – Ena)

'Accum Htr 2'

cmd Availability Enable – Enable (√ – Ena)

1.100 S1 ATA REMOVAL AND REPLACEMENT PREP

(ASSY OPS/19A/FIN)

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CAUTION

The following step should be performed no earlier than 6 minutes after entering eclipse. Performing the isolation before this time could result in an overpressurization of the fluid line. Steps 7 and 8 should be performed in quick succession to minimize the time the fluid line is liquid locked.

7. ISOLATING ATA FROM ETCS LOOP A

Verify that the ISS has been in eclipse for at least 6 minutes.

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Ena PTC Vlv

cmd Set (\surd – Ena PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Both Isol Valves'

cmd Both Isol Valves Close – Arm (\surd – \surd)

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Operate PTC Vlv

cmd Set (\surd – Operate PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Both Isol Valves'

cmd Both Isol Valves Close – Close (\surd Posn – Cl)

NOTE

The vent valve will remain open until prior to EVA 1 to mitigate the hazard associated with the possibility of NH3 leakage across the PM/ATA Isolation Valves after the line is vented.

1.100 S1 ATA REMOVAL AND REPLACEMENT PREP

(ASSY OPS/19A/FIN)

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8. VENTING PRESSURE LOCKED ATA LINE

Loop A ATA Valves

'Commands'

'ATA Valves'

Verify Tank 1 Isol Valve – Closed

Verify Tank 2 Isol Valve – Closed

'Vent Valve'

cmd ATA Vent Valve Open – Arm (\surd – \surd)

cmd ATA Vent Valve Open – Open (\surd Posn – Op)

If Position \neq Open

The open arm and fire commands may be retried for up to 10 minutes.

If Position \neq Open after 10 minutes

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Ena PTC Vlv

cmd Set (\surd – Ena PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Both Isol Valves'

cmd Both Isol Valves Open – Arm (\surd – \surd)

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Operate PTC Vlv

cmd Set (\surd – Operate PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Both Isol Valves'

cmd Both Isol Valves Open – Open (\surd Position – Open)

>>

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NOTE

After the ATA vent valve is closed, PM pressures will be monitored to determine if there is a leak across the PM Inlet Isolation valve. In the event that a leak through the PM inlet valve is determined to exceed a total of 0.45 kg (1 lbm) over a period of 2 days (which would liquid lock the line segment), the rate cannot be determined, or the ATA cannot be replaced in 2 days, then the PM inlet isolation valve should be opened to re-fill the inlet line.

9. CLOSING ATA VENT VALVE

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Vent Valve'

cmd ATA Vent Valve Closed – Arm ($\sqrt{\text{---}}$)

cmd ATA Vent Valve Closed – Closed ($\sqrt{\text{Posn}} - \text{Cl}$)

PART 2

10. DEPRESSURIZING ETCS LOOP A ATA AND NTA

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Commands'

'NTA Valves'

Verify Both Isol Valves Position – Open

NOTE

The following step will vent approximately 30 lbs of N2 overboard.

10.1 Setting GPRV Setpoint to Desired Pressure

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Commands'

'GPRV'

'Setpoint'

sel Press Source – 3: NTA Out

input Setpoint – 6.9 kPa

cmd Set

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NOTE

GPRV software will select a setpoint value that is one step lower than the current pressure (not the commanded setpoint). When the loop pressure reaches the setpoint value, a lower setpoint (the next step value) will be commanded by the software. This process will continue until the commanded setpoint is reached.

10.2 Monitoring Loop Pressure

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Telemetry'

Monitor NTA Outlet Press value as it approaches value entered in step 10.1.

NOTE

When the NTA outlet pressure value reaches the commanded setpoint, the ETCS Manager App Busy flag will clear. Waiting 5 minutes after the App Busy flag clears allows for pressures to stabilize.

S1: TCS: Loop A Software: Loop A ETCS Manager Details

Loop A ETCS Manager Details

'Telemetry'

'ETCS Manager'

'Data'

Verify App Busy – blank

Wait 5 minutes.

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Telemetry'

Verify NTA Out Press: 6.9 ± 96.5 kPa

PART 3

11. FLUID QD DISCONNECTION

Loop depressurization is complete.

Crew is GO to Close(Demate) M1, M2, M3, and M4 QDs.

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PART 4

12. DISABLING ATA HEATERS

S1: TCS: ATA: Loop A ATA Heaters

Loop A ATA Heaters

'Commands'

'Group 1'

cmd Availability Inhibit – Arm (\surd – \surd)

cmd Availability Inhibit – Inh (\surd – Inh)

'Group 2'

cmd Availability Inhibit – Arm (\surd – \surd)

cmd Availability Inhibit – Inh (\surd – Inh)

13. APPLYING RPC INHIBITS TO ATA COMPONENTS

S1: TCS: ATA: Loop A ATA Htrs: RPCM S12B A RPC 12

RPCM S12B A RPC 12

cmd Close Cmd – Inhibit (Verify – Inh)

\surd RPC Position – Open

S1: TCS: ATA: Loop A ATA Htrs: RPCM S11A A RPC 14

RPCM S11A A RPC 14

cmd Close Cmd – Inhibit (Verify – Inh)

\surd RPC Position – Open

P1: EPS: RPCM S11A C: RPC 13

RPCM S11A C RPC 13

cmd Close Cmd – Inhibit (Verify – Inh)

\surd RPC Position – Open

PART 5

14. ELECTRICAL CONNECTOR DISCONNECTION

Electrical inhibits complete.

The crew is GO for electrical connector demate.

PART 6

15. INHIBITING ATA DEPENDENT ETCS FDIR AND SUPPRESSING CWA

S1: TCS: Loop A Software: Loop A FDIR: Loop A ETCS FDIR Addl

Commands

Loop A ETCS FDIR Addl Commands

'Commands'

'ETCS FDIR'

'ATA Overpress'

cmd Inhibit – Arm (Verify – Inh Armed)

cmd Inhibit – Inhibit (Verify – Inh)

'ATA Bellows Overpress'

cmd Inhibit – Arm (Verify – Inh Armed)

cmd Inhibit – Inhibit (Verify – Inh)

For Event Code 4479

Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS,
steps 1 to 4, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL),
then:

For Event Code 4471

Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS,
steps 1 to 4, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL),
then:

16. SUPPRESSING ATA HEATER MESSAGES

For Event Code 3700

Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS,
steps 1 to 4, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL),
then:

For Event Code 3794

Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS,
steps 1 to 4, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL),
then:

For Event Code 3713

Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS,
steps 1 to 4, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL),
then:

For Event Code 3808

Go to 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS,
steps 1 to 4, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL).

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OBJECTIVE:

Activate and checkout the S1 ATA after installation.

PART 1

1. ELECTRICAL CONNECTIONS

Crew is GO for electrical connector mates.

PART 2

PCS

2. CLOSING THE NTA ISOLATION VALVES

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Commands'

'Both Isol Valves'

cmd Both Isol Valves Close – Arm (\surd – \surd)

cmd Both Isol Valves Close – Close (\surd – Closed)

3. VERIFYING ATA VALVE CONFIGURATION

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

Verify Tank 1 Isol Valve – Closed

Verify Tank 2 Isol Valve – Closed

Verify Vent Valve – Closed

PART 3

4. QD CONNECTION

The crew is GO to Mate(Open) the M1, M2, M3, and M4 QD.

PART 4

5. REMOVING RPC INHIBITS FROM ATA COMPONENTS

S1: TCS: ATA: Loop A ATA Htrs: RPCM S12B A RPC 12

RPCM S12B A RPC 12

cmd Close Cmd – Enable (Verify – Ena)

S1: TCS: ATA: Loop A ATA Htrs: RPCM S11A A RPC 14

RPCM S11A A RPC 14

cmd Close Cmd – Enable (Verify – Ena)

S1: EPS: RPCM S11A C: RPC 13

RPCM S11A C RPC 13

cmd Close Cmd – Enable (Verify – Ena)

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NOTE

Prior to pressurization, ATA dP sensors may toggle to values above Bellows Overpress FDIR limit of 69 kPa (PRACA 3333). ATA Bellows Overpress FDIR will remain inhibited until post ATA integration.

6. ENABLING ATA OVERPRESS FDIR AND CWA

S1: TCS: Loop A Software: Loop A FDIR: Loop A ETCS FDIR Addl
Commands

Loop A ETCS FDIR Addl Commands

'Commands'

'ETCS FDIR'

'ATA Overpress'

cmd Enable – Enable (√ – Ena)

For Event Code 4479

Perform [1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS](#),
steps 1 to 3, 6, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL),
then:

CAUTION

Steps 7 to 13 are required to verify a successful pin connection. A bent connector pin could defeat two or more inhibits to a must-not-work function.

7. OVERRIDING ATA HEATER FOR VALVE CHECKOUT

S1: TCS: ATA: Loop A ATA Htrs

Loop A ATA Htrs

'Commands'

'Group 2'

Verify Availability – Inh

'Telemetry'

sel RPCM S11A A RPC 14

RPCM S11A A RPC 14

cmd RPC Position – Close (√Posn – Cl)

8. OPENING ATA ISOLATION VALVE 1

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Ena PTC Vlv

cmd Set (√ – Ena PTC Vlv)

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S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Tank 1 Isol Valve'

cmd Tank 1 Isol Valve Open – Arm (\surd – \surd)

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Operate PTC Vlv

cmd Set (\surd – Operate PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Tank 1 Isol Valve'

cmd Tank 1 Isol Valve Open – Open (\surd Posn – Op)

9. OPENING ATA ISOLATION VALVE 2

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Ena PTC Vlv

cmd Set (\surd – Ena PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Tank 2 Isol Valve'

cmd Tank 2 Isol Valve Open – Arm (\surd – \surd)

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Operate PTC Vlv

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cmd Set (\surd – Operate PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Tank 2 Isol Valve'

cmd Tank 2 Isol Valve Open – Open (\surd Position – Open)

10. CLOSING ATA ISOLATION VALVE 1

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Ena PTC Vlv

cmd Set (\surd – Ena PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Tank 1 Isol Valve'

cmd Tank 1 Isol Valve Close – Arm (\surd – \surd)

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Operate PTC Vlv

cmd Set (\surd – Operate PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Tank 1 Isol Valve'

cmd Tank 1 Isol Valve Close – Close (\surd Position – Close)

11. OPENING ATA ISOLATION VALVE 1

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

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sel ETCS Cmd Override – Ena PTC Vlv

cmd Set (√ – Ena PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Tank 1 Isol Valve'

cmd Tank 1 Isol Valve Open – Arm (√ – √)

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Operate PTC Vlv

cmd Set (√ – Operate PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Tank 1 Isol Valve'

cmd Tank 1 Isol Valve Open – Open (√Position – Open)

12. CLOSING ATA ISOLATION VALVE 2

S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Ena PTC Vlv

cmd Set (√ – Ena PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Tank 2 Isol Valve'

cmd Tank 2 Isol Valve Close – Arm (√ – √)

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S1: TCS: Loop A Software: Loop A Off Nominal Commands

Loop A Off Nominal Commands

'Commands'

'ETCS Cmd Override'

sel ETCS Cmd Override – Operate PTC Vlv

cmd Set ($\sqrt{\quad}$ – Operate PTC Vlv)

S1: TCS: ATA: Loop A ATA Valves

Loop A ATA Valves

'Commands'

'ATA Valves'

'Tank 2 Isol Valve'

cmd Tank 2 Isol Valve Close – Close ($\sqrt{\text{Position}}$ – Close)

13. COMMANDING ATA HEATER RPC OPEN

S1: TCS: ATA: Loop A ATA Htrs: RPCM S11A A RPC 14

RPCM S11A A RPC 14

cmd RPC Position – Open ($\sqrt{\text{Posn}}$ – Op)

14. INITIATING CLOSED LOOP CONTROL OF THE ATA HEATERS

S1: TCS: ATA: Loop A ATA Heaters

Loop A ATA Heaters

'Commands'

'Group 1'

cmd Availability Enable – Ena (Verify – Ena)

Verify Control Mode Status – Closed Loop

'Group 2'

cmd Availability Enable – Ena (Verify – Ena)

Verify Control Mode Status – Closed Loop

15. OPENING N2 SUPPLY VALVE

S1(S1): TCS: NTA: Loop A(B) NTA Valves

Loop A(B) NTA Valves

'Commands'

'NTA Valves'

cmd N2 Supply Valve Open – Arm ($\sqrt{\quad}$ – $\sqrt{\quad}$)

cmd N2 Supply Valve Open – Open ($\sqrt{\text{Posn}}$ – Op)

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16. SETTING NTA GPRV SETPOINT TO EQUAL ATA TANK 1 OUT PRESS READING

16.1 Recording ATA Tank Out Press Readings

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Telemetry'

Record ATA Tank 1 Out Press: _____ kPa

If ATA Tank 1 Out Press = NTA N2 Out Press \pm 96.5 kPa

Go to step 17.

16.2 Verifying Sufficient Supply Pressure

'Telemetry'

'NTA'

Verify N2 Supply Press > ATA Tank 1 Out Press in step 16.1.

16.3 Inputting Appropriate NTA GPRV Setpoint

'Commands'

'GPRV'

'Setpoint'

sel Press Source – 3: NTA Out

input Setpoint – _____ (ATA Tank 1 Out Press recorded in step 16.1)

cmd Set

16.4 Monitoring Pressure Change

'Telemetry'

'NTA'

Monitor N2 Out Press value as it approaches (value entered in step 16.3) kPa.

NOTE

When the N2 NTA Out Press value reaches the commanded setpoint, the ETCS Manager App Busy flag will clear.

16.5 Verifying Application Processing Complete

S1: TCS: Loop A Software: Loop A ETCS Manager Details

Loop A ETCS Manager Details

'Telemetry'

'ETCS Manager'

'Data'

Verify App Busy – blank

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NOTE

The NTA Isol Valves will not open unless the GPRV Out Pressure = highest ATA Tank in pressure \pm 96.5 kPa and the N2 Supply Valve is open.

17. OPENING NTA ISOLATION VALVES

S1: TCS: ATA

Loop A ATA

'Telemetry'

'ATA'

'Valve'

Verify Tank 1 Isol Valve – Open

Verify Tank 2 Isol Valve – Closed

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Commands'

'NTA Valves'

'Both Isol Valves'

cmd Open – Arm (\surd – \surd)

cmd Open – Open

Verify Isol Valve 1 Position – Open

Verify Isol Valve 2 Position – Open

'Telemetry'

Verify ATA Tank 1 and Tank 2 dP < 65 kPa

NOTE

ATA Tank 2 will remain isolated from the ETCS to preserve its reserve in the event of an NH₃ leak to space. **MCC-H** will determine the desired isolation pressure based on Tank 2 temperature.

18. SETTING GPRV SETPOINT TO PRESSURIZE TANK 2

\surd **MCC-H** for desired Tank 2 Isolation Pressure

Record Tank 2 Isolation Pressure: _____ kPa

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Telemetry'

'ATA Tank 1'

Record ATA Tank 1 Out Press: _____ kPa

'ATA Tank 2'

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Record ATA Tank 2 Out Press: _____ kPa

'Commands'

'GPRV'

'Setpoint'

sel Press Source – 1: ATA Tnk2 Out

input Setpoint – [Recorded Tank 2 Isolation Pressure] kPa

cmd Set

NOTE

GPRV Software will select a setpoint value that is one step higher than the current pressure (not the commanded setpoint). When the loop pressure reaches the setpoint value, a higher setpoint (the next step value) will be commanded by software. This process will continue until the commanded setpoint is reached.

19. MONITORING ATA PRESSURE

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Telemetry'

'ATA Tank 2'

Monitor Out Press value as it approaches [Recorded Tank 2 Isolation Pressure] kPa.

NOTE

When the ATA Tank 2 Out Press value reaches the commanded setpoint, the ETCS Manager App Busy flag will clear. Waiting 5 minutes after the App Busy flag clears allows for pressures to stabilize.

S1: TCS: Loop A Software: Loop A ETCS Manager Details

Loop A ETCS Manager Details

'Telemetry'

'ETCS Manager'

'Data'

Verify App Busy – blank

Wait 5 minutes.

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Telemetry'

'ATA Tank 2'

Verify Out Press: [Recorded Tank 2 Isolation Pressure] ± 96.5 kPa

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Loop A NTA Additional Valves

Loop A NTA Additional Valves

'Commands'

'NTA Valves'

'Isol Valve 2'

cmd Isol Valve 2 Close – Arm (\surd – \surd)

cmd Isol Valve 2 Close – Close (Verify Posn – Closed)

NOTE

The desired GPRV setpoint command in the following step should be the PM Inlet Pressure minus 69 kPa. As a result of the ATA integration occurring so quickly, the vapor created when the new ATA Tank Isolation Valves are opened will not have had enough time to cool down and collapse. The size of the vapor pocket is unknown and opening the PM Inlet Valve with equal pressure on each side of the valve could allow the vapor to reach the pump and cause cavitation. Keeping the ATA pressure 69 kPa lower than the PM Inlet pressure ensures any existing vapor bubble will stay within the ATA until it collapses.

20. SETTING GPRV SETPOINT TO DESIRED PRESSURE

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Telemetry'

'PM'

Record PM Inlet Press: _____ kPa

Record ATA Tank 1 Out Press: _____ kPa

'Commands'

'GPRV'

'Setpoint'

sel Press Source – 1: ATA Tnk1 Out

If PM Inlet Press < or = 2756 kPa

input Setpoint – _____ (PM Inlet Press recorded above: 69)
kPa

cmd Set

If PM Inlet Press > 2757 kPa

input Setpoint – 2 6 8 8 kPa

cmd Set

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NOTE

GPRV Software will select a setpoint value that is one step higher than the current pressure (not the commanded setpoint). When the loop pressure reaches the setpoint value, a higher setpoint (the next step value) will be commanded by software. This process will continue until the commanded setpoint is reached.

21. MONITORING LOOP PRESSURE

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Telemetry'

'ATA Tank 1'

Monitor Out Press value as it approaches (value entered in step 18) kPa.

NOTE

When the ATA Tank 1 Out Press value reaches the commanded setpoint, the ETCS Manager App Busy flag will clear. Waiting 5 minutes after the App Busy flag clears allows for pressures to stabilize.

S1: TCS: Loop A Software: Loop A ETCS Manager Details

Loop A ETCS Manager Details

'Telemetry'

'ETCS Manager'

'Data'

Verify App Busy – blank

Wait 5 minutes.

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Telemetry'

'ATA Tank 1'

Verify Out Press: value entered in step 18 \pm 96.5 kPa

22. CLOSING N2 SUPPLY VALVE

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Commands'

'NTA Valves'

'N2 Supply Valves'

cmd N2 Supply Valve Close – Arm (\surd – \surd)

cmd N2 Supply Valve Close – Close (\surd Posn – Cl)

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23. OPENING THE PM INLET VALVE

S1: TCS: PM: Loop A PM Valves

Loop A PM Valves

'Commands'

'Inlet Isol Valve'

cmd Inlet Isol Valve Open – Arm (\surd – \surd)

cmd Inlet Isol Valve Open – Open (\surd Posn – Op)

NOTE

With the NTA Isolation Valves Open, the GPRV will vent nitrogen if thermal fluctuations cause the loop pressure to increase. Since nitrogen should be conserved as much as possible, this is undesirable. Step 22 will set the GPRV at a higher setpoint so that it will not vent in response to normal pressure fluctuations. Because the N2 Supply Valve is Closed, it is unlikely that the higher commanded pressure in step 22 will be attained by the GPRV. If this is the case, an abort command will be sent in step 23.

24. SETTING GPRV PRESSURE

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Telemetry'

'NTA'

Verify N2 Supply Valve = Closed

desired setpt = either N2 Out Press + 137 kPa or 2688 kPa, whichever is smaller

'Commands'

'GPRV'

'Setpoint'

input Setpoint – _____ (desired setpt) kPa

pick Press Source – 3: NTA Out

cmd Setpoint – Set

Verify GPRV CMD Setpt – desired setpt \pm 10 kPa

25. TERMINATING ETCS COMMAND PROCESSING

Wait 5 minutes.

S1: TCS: Loop A Software: Loop A ETCS Manager Details

Loop A ETCS Manager Details

'Telemetry'

'ETCS Manager'

'Data'

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If App Busy – X

S1: TCS: NTA: Loop A NTA Valves

Loop A NTA Valves

'Commands'

'ETCS'

cmd ETCS – Abort

S1: TCS: Loop A Software: Loop A ETCS Manager Details

Loop A ETCS Manager Details

'Data'

Verify App Busy – blank

sel Loop A ETCS PTC Details

Loop A ETCS PTC Details

'Data'

Verify App Busy – blank

26. ENABLING ATA HEATER CAUTIONS

S1: TCS

S1: Loop A Overview

'ATA'

(Ammonia Tank Assembly)

If Htr Group 1 Temp > -38.3° C

For Event Code 3700

Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS, steps 1 to 3, 6, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL), then:

If Htr Group 2 Temp > -38.3° C

For Event Code 3794

Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS, steps 1 to 3, 6, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL), then:

For Event Code 3713

Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS, steps 1 to 3, 6, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL), then:

For Event Code 3808

Perform 1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS, steps 1 to 3, 6, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL), then:

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27. [ENABLING ETCS FDIR AND ASSOCIATED MESSAGES](#)

[S1: Loop A Overview](#)

'PM (Pump Module)'

Verify PM Inlet Press, Byp Press, and Rad Rtn Press < 2800 kPa

S1: TCS: Loop A Software: Loop A FDIR: Loop A ETCS FDIR
Commands

[Loop A ETCS FDIR Commands](#)

'Commands'

'ETCS FDIR'

'NH3 Return'

cmd Enable – Enable (√ – Ena)

Loop A ETCS FDIR Addl Commands

[Loop A ETCS FDIR Addl Commands](#)

'Commands'

'ETCS FDIR'

'ATA Bellows Overpress'

cmd Enable – Enable (√ – Ena)

To enable Event Code 4471 in the primary C&C MDM

Go to [1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS](#),
steps 1 to 3, 6, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL).

To enable Event Code 4477 in the primary C&C MDM

Go to [1.210 SUPPRESS, INHIBIT, AND ENABLE C&W EVENTS](#),
steps 1 to 3, 6, 8 and 9 (SODF: GND AVIONICS: C&DH: NOMINAL).

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)

Page 1 of 11 pages

OBJECTIVE:

Deploy Zero-G Soft Rack (ZSR) in JPM or JLP. This activity modifies the rear of the ZSR to mitigate interference with the JEM Shell Heaters.

LOCATION:

Installed: JPM or JLP Rack Bay

DURATION:

30 minutes per Rack

CREW:

One

MATERIALS:

Velcro Straps (two)

Zip Ties (four)

Gray Tape

TOOLS:

Digital Camera

Leatherman Tool, Original P/N SLZ33112269-003

ISS Toolbox:

Drawer 2:

Ratchet, 3/8" Drive

5/32" Hex Head, 3/8" Drive

Drawer 4:

Wire Cutters P/N 184BCP

REFERENCED PROCEDURE(S):

None

NOTE

All directional references (up, down, left, right) are with respect to front face of Rack, as you face Rack, with feet oriented towards the pivot point.

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)

Page 2 of 11 pages



Figure 1.- PIP Pins on K-BARs.

1. ZSR ROTATION

1.1 If required, remove PIP Pins (two) from K-BARs.
Temporarily stow.
Refer to Figure 1.

1.2 K-BAR Thumb Latches (two) → down position

√Rack rotation path unobstructed

Rotate ZSR down to a controlled stop.

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)

Page 3 of 11 pages

2. MODIFYING ZSR TO PREVENT INTERFERENCE WITH JLP AND JPM SHELL HEATERS

Zip Ties (six) and
Velcro restraints



Figure 2.- ZSR Folded.



Figure 3.- Strap with Velcro and Zip Tie.

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)

Page 4 of 11 pages

- 2.1 Cut Zip Ties (six) with Wire Cutters or Leatherman Tool and release Launch Restraint Straps on back of the fabric envelope, securing strap ends to side Panel Velcro. Refer to Figures 2 and 3.



Figure 4.- Back Panel (Open).

- 2.2 Unzip back Panels. Refer to Figure 4.



Figure 5.- One Petal Pushed Into Position.

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)

Page 5 of 11 pages

- 2.3 Push petal back and to the sides until they rest against the fabric envelope. Refer to Figure 5.

NOTE

There are three Rear Lateral Struts on a ZSR. The center strut will not be installed to avoid contact with the JEM shell heaters.



Figure 6.- Top and Bottom Strut and Socket.

- 2.4 Insert each end of the Rear Lateral Struts (two) into corresponding sockets at rear edge of petal. Refer to Figure 6.

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)

Page 6 of 11 pages



Figure 7.- ZSR to Insert Tab.



Figure 8.- Tabs Between Insert.

- 2.5 Match and secure tabs (red in top and bottom of ZSR and blue in center). Refer to Figures 7 and 8.

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)



Figure 9.- ZSR to Insert Zipper.

- 2.6 Connect rear zippers for both top and bottom inserts.
Refer to Figure 9.

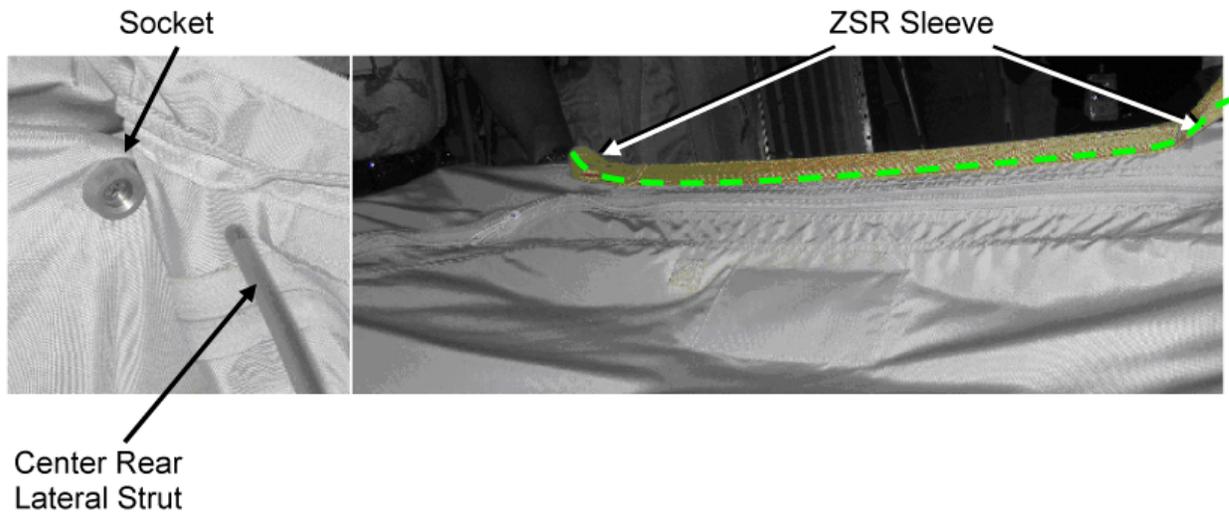


Figure 10.- ZSR Center Rear Lateral Strut, Socket, and ZSR Sleeve.

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)

Page 8 of 11 pages

Zip Tie through zipper and Lower(Upper)
Launch Restraint Loop



Figure 11.- ZSR Rear Stowage Volumes (Empty, Unzipped, in Stowed Configuration).

ZSR
Rear
Launch
Restraint
Loops



Velcro
Straps

Figure 12.- ZSR Rear Launch Restraint Loops Restrained with Velcro Straps.

2.7 Roll up inward, and secure rear ZSR stowage volumes with Zip Ties.
Refer to Figure 11.

2.8 Restrain rear ZSR straps (Velcro Straps).
Refer to Figure 12.

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)

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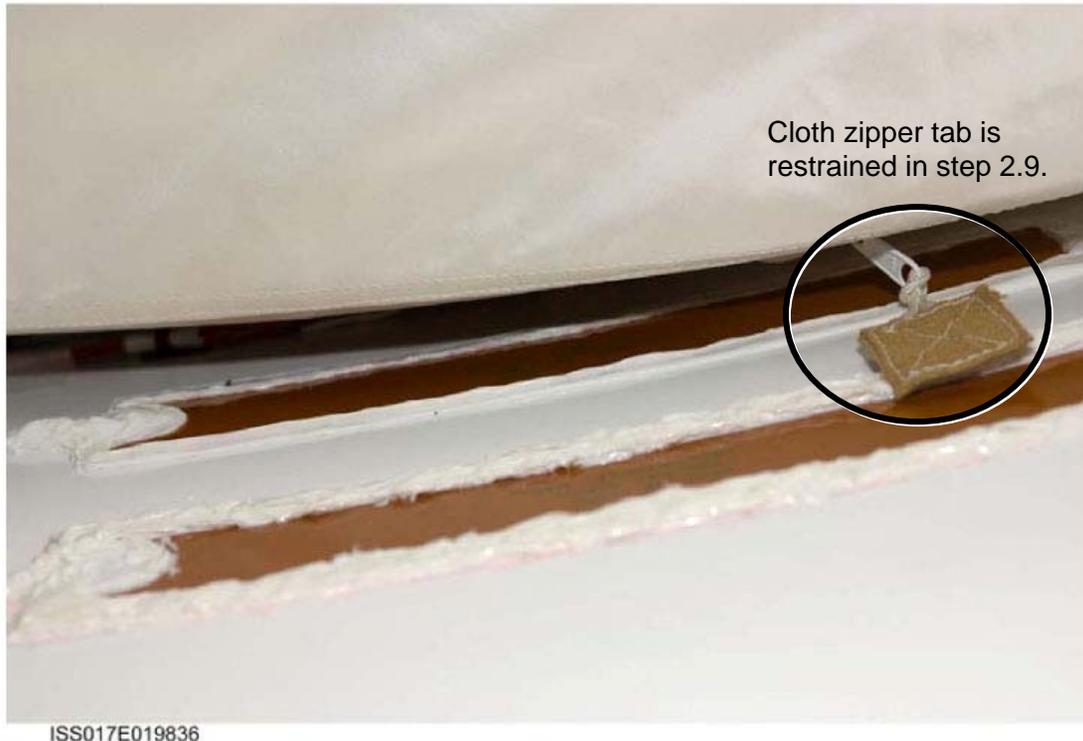


Figure 13.- ZSR Zipper and Cloth Tab Improperly Contacting JEM Shell Heater.

2.9 Restrain zippers and cloth zipper tabs to ZSR to prevent contact with JEM shell heaters (Gray Tape). Refer to Figure 13.

2.10 Photo document ZSR modifications (Digital Camera).

3. INSTALLING ZSR

3.1 ✓ ZSR rotation path unobstructed

NOTE

When rotating ZSR up, the N-Braces in the JLP Rack Bays may interfere with the top of the ZSR. The top and side petals of the ZSR can be pressed down to clear the N-Braces and ARIS Pushrod Fitting.

3.2 ZSR K-BAR Thumb Latches (two) → up position

Tuck both upper rear corners of ZSR into ZSR volume while slowly rotating Rack up to a controlled stop to prevent impingement of ZSR onto GLA, N-Brace, or ARIS Pushrod Fitting.

Engage ZSR K-BAR Thumb Latches (two) into K-BAR Capture Mechanisms.

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)

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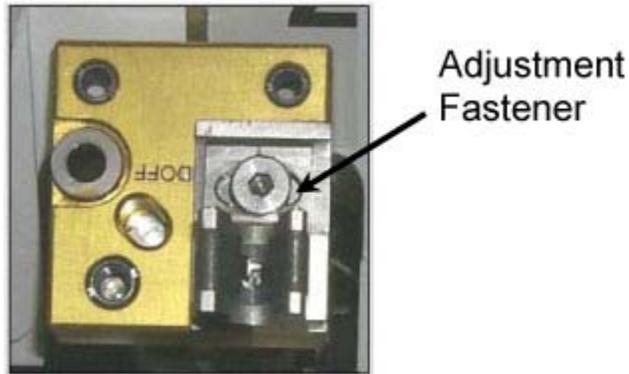


Figure 14.- K-BAR Capture Mechanism, Located on JEM Standoff.

- *****
- * If K-BAR does not align with K-BAR Capture Mechanism
 - * | Loosen Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
 - * | Slide capture clip left or right, as required, to engage K-BAR.
 - * | Once K-BAR engaged, re-tighten Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
 - * |
 - * Refer to Figure 14.
- *****

CAUTION

Shell heaters and their Wire Harness are mounted on JEM Shell behind ZSRs; therefore, the clearance between ZSR Rear and JEM Shell should be controlled properly to avoid damage to Harness and heaters due to rubbing.

- 3.3 If accessible from adjacent Rack Bay
- | Verify ZSR Rear is kept away from the heaters and the harnesses on JEM Shell and over Longerons at ZSR rear bottom.

Notify **SSIPC** of result.

1.115 ZSR RACK DEPLOY IN JPM OR JLP

(ASSY OPS/19A/FIN 1/HC)

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4. SHELF DEPLOY



Figure 15.- Open ZSR Doors.

4.1 Open door(s), as required, to unroll shelf from rear wall.
Align and zip from front to back.
Refer to Figure 15.

4.2 Separate doors, as required, stowing door connector flap by
snapping to back of door.

5. CLOSEOUT

5.1 Photo document overview of the installed ZSRs (Digital Camera).

5.2 Notify **MCC-H** of task completion.
Stow tools, materials.

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1.120 19A CBCS INSTALLATION/REMOVAL

(ASSY OPS/19A/FIN)

Page 1 of 6 pages

OBJECTIVE:

Install Centerline Berthing Camera System (CBCS) and all related avionics.
Perform a Video System Checkout by routing CBCS to RWS and Ground.
Power down or remove Centerline Berthing Camera System.

LOCATION

Node 2, Cupola(LAB)

DURATION:

1 hour for installation
30 minutes for removal

CREW:

One

PARTS:

CBCS String 3
Camera Bag (blue bag that holds the Camera) P/N SEG33112759-301 S/N 1003
CBCS Camera Assembly (stored in Camera Bag) P/N SEG33112576-301 S/N 1003
Hatch Standoff Fitting (installed on all applicable Hatches) P/N 683-13160-1
Ku-Band Power Supply (labeled "For CBCS Use Only") P/N SEG46116711-302 S/N 1012
LED Control Unit P/N SEG33112643-301 S/N 1003
Video Interface Unit P/N SEG33112646-301 S/N 1001
CBCS Camera Cable (violet, gold, orange connectors) P/N SEG33112641-301 S/N 1003
CBCS Electronics Cable (pink, red, yellow, blue connectors) P/N SEG33112638-301 S/N 1003
UOP Power PSA Cable, 120VDC P/N SEG46116745-301 S/N 1009

MATERIALS:

Velcro Straps

TOOLS:

Digital Camera

REFERENCED PROCEDURE(S):

None

1.120 19A CBCS INSTALLATION/REMOVAL

(ASSY OPS/19A/FIN)

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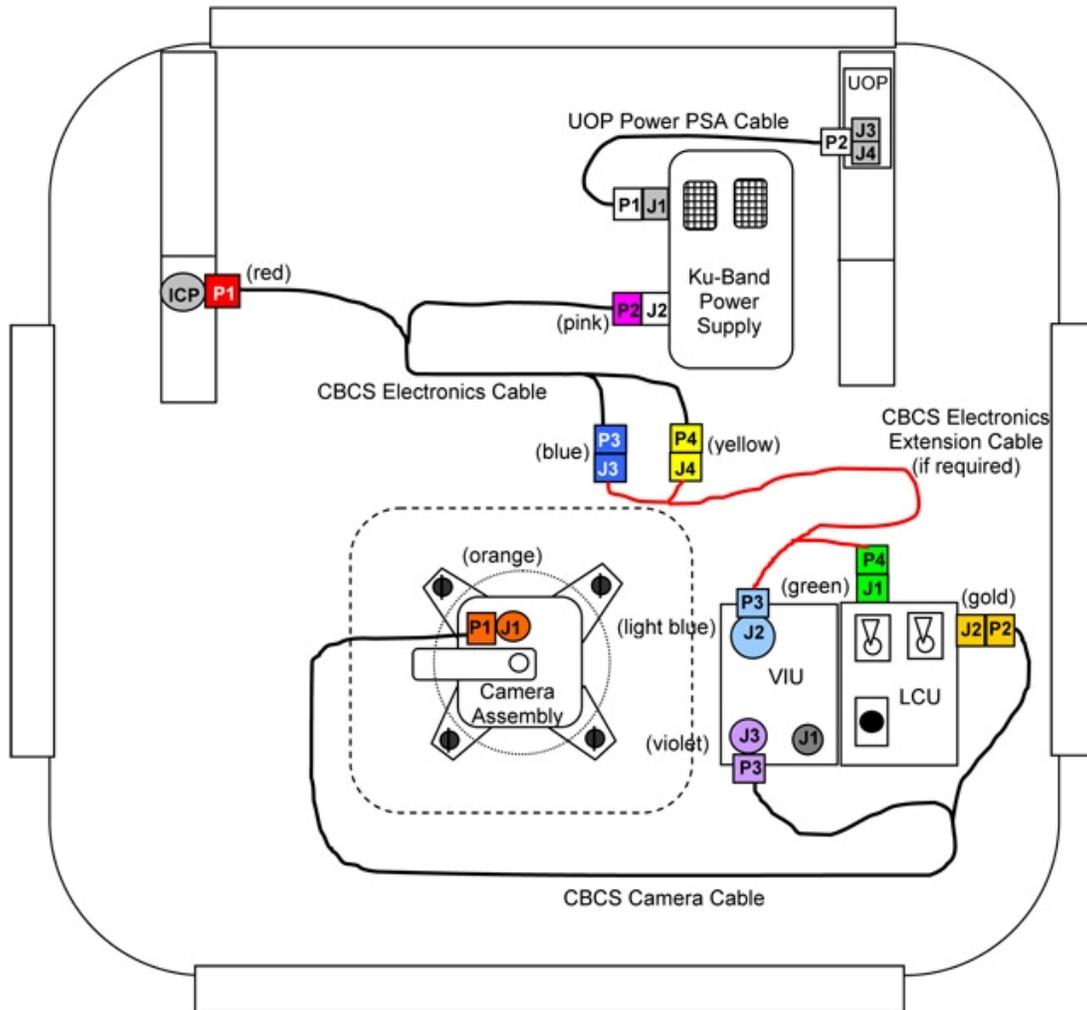


Figure 1.- Example CBCS Installation Diagram.

NOTE

Figure 1 shows an example CBCS installation. Hatch, Camera orientation, use of the CBCS Electronics Extension Cable, ICP, and UOP will vary for each CBCS use.

1. SAFING

Verify no power is applied to NOD2 UOP 3 J3.

√POWER OUT – √ (blue RESET)

√Fault/Test – dark

2. INSTALLING CBCS POWER

2.1 √Ku-Band Power Supply OUTPUT 28V – OFF

2.2 UOP Power PSA Cable, 120VDC P2 →|← NOD2 UOP 3 J3

1.120 19A CBCS INSTALLATION/REMOVAL

(ASSY OPS/19A/FIN)

Page 3 of 6 pages

2.3 UOP Power PSA Cable, 120VDC P1 →|← J1 Ku-Band Power Supply
Restrain Ku-Band Power Supply.

3. INSTALLING CBCS ELECTRONICS CABLE

Refer to Figure 1.

3.1 CBCS Electronics Cable P2 (pink) →|← J2 Ku-Band Power Supply

3.2 CBCS Electronics Cable P1 (red) →|← Node 2 Internal Camera Port (ICP)
at NOD2S4

4. INSTALLING LED CONTROL UNIT, VIDEO INTERFACE UNIT

NOTE

1. Handrail Clamp and/or Multi-use Bracket may be used to secure LED Control Unit, Video Interface Unit if desired.
2. CBCS Electronics Extension Cable is not required.

4.1 Secure LED Control Unit, Video Interface Unit near N2 Nadir Hatch.

4.2 CBCS Electronics Cable P4 (yellow) →|← J1 of LED Control Unit (green)
CBCS Electronics Cable P3 (blue) →|← J2 of Video Interface Unit (light blue)

5. CONFIGURING LED CONTROL UNIT SETTINGS

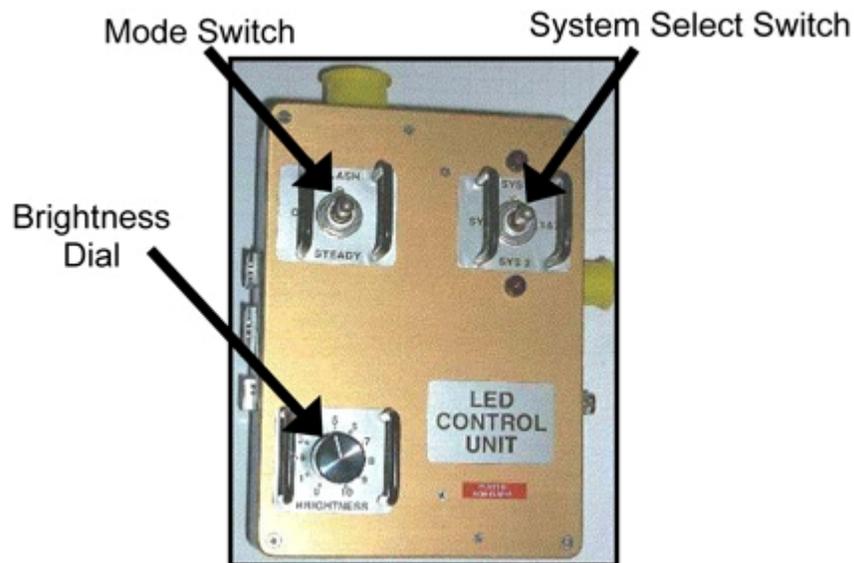


Figure 2.- LED Control Unit.

Brightness Dial → 10
sw Mode Switch → STEADY
sw System Select Switch → SYS 1&2

1.120 19A CBCS INSTALLATION/REMOVAL

(ASSY OPS/19A/FIN)

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6. INSTALLING CAMERA ASSEMBLY

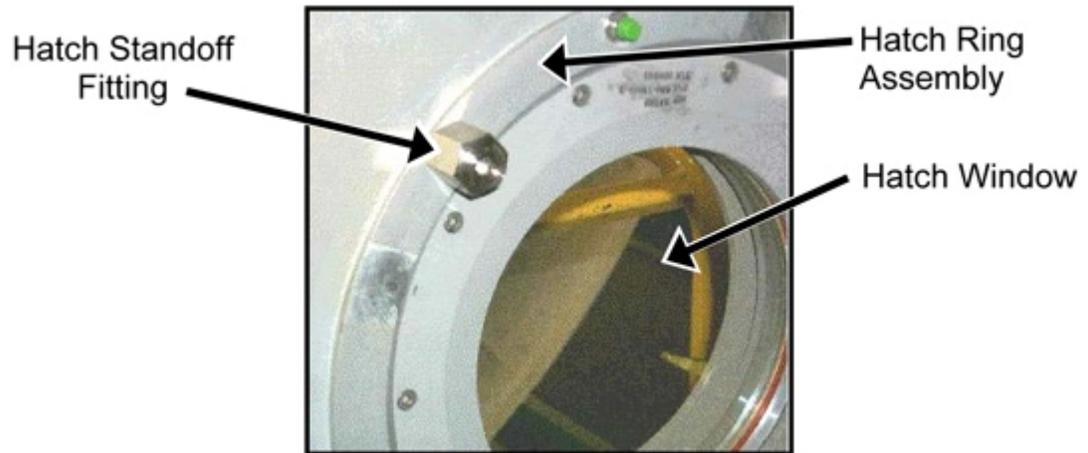


Figure 3.- Hatch Standoff Fitting Installed.

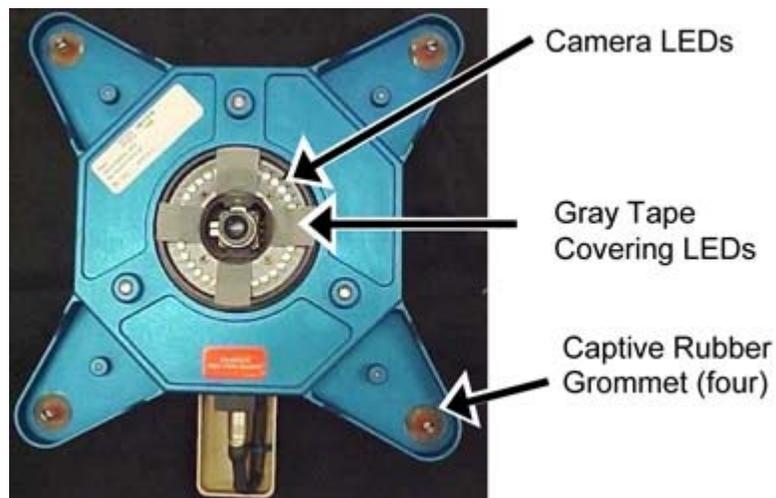


Figure 4.- LEDs Covered with Gray Tape.

NOTE

Outer Hatch Window Cover Assembly installed on Hatch causes Camera LED reflection to interfere with Passive Target cues. Tape should be installed from previous use.

- 6.1 ✓ Gray Tape (four pieces) over Camera LEDs to prevent LED glare interference with Passive Target cues
Refer to Figure 4.

1.120 19A CBCS INSTALLATION/REMOVAL

(ASSY OPS/19A/FIN)

Page 5 of 6 pages

CAUTION

1. Do not let CBCS Camera Assembly impact hatch window glass. Doing so may damage glass anti-reflective coating.
2. Ensure that all 1/4 Turn Fasteners are fully aligned and seated in Hatch Standoff Fitting receptacle before engaging any fasteners. Improper alignment could cause captive rubber grommet to disengage from CBCS Camera Assembly and affect centerline alignment.

N2 Nad

6.2 If Inner Hatch Window Shield is installed on Hatch window, remove Inner Hatch Window Shield, Velcro.
Temporarily stow Inner Hatch Window Shield.

6.3 Mount CBCS Camera Assembly to Hatch Standoff Fittings with Camera tail oriented Forward, 1/4 Turn Fasteners (four).

7. INSTALLING CBCS CAMERA CABLE

Refer to Figure 1.

7.1 CBCS Camera Cable P2 (gold) →|← J2 of LED Control Unit (gold)

7.2 CBCS Camera Cable P3 (violet) →|← J3 of Video Interface Unit (violet)

7.3 CBCS Camera Cable P1 (orange) →|← J1 of CBCS Camera Assembly (orange)

7.4 Photo document CBCS Camera orientation (Digital Camera).

8. APPLYING POWER TO CBCS

8.1 √All CBCS cables mated per Figure 1

8.2 Enabling UOP

√POWER OUT – √ (green ENABLE)

√Fault/Test – OK illuminated (green)

8.3 Ku-Band Power Supply OUTPUT 28V → ON

8.4 √Ku-Band Power Supply Input/Output LEDs (two) – illuminated (green)

9. CBCS VIDEO CHECKOUT ON RWS MONITOR

9.1 √**MCC-H** - Ground has activated Cupola (LAB) RWS being used for checkout,
Ground complete with video routing

9.2 Routing CBCS Video from ICP

cmd MONITOR/CAMERA – 2 / 72

DCP

9.3 Verify CBCS video displayed on RWS.

9.4 Verify **MCC-H** complete with ground video check.

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1.120 19A CBCS INSTALLATION/REMOVAL

(ASSY OPS/19A/FIN)

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10. POWERDOWN

NOTE

Powering off UOP is not required to power off CBCS. If UOP is not powered off, Ku-Band Power Supply will continue to receive power (fans will still turn) but 120 to 28VDC converter will be disabled.

10.1 Ku-Band Power Supply OUTPUT 28 → OFF

√Ku-Band Power Supply Output LED – dark

10.2 Removing Power from UOP

√POWER OUT – √ (blue RESET)

√Fault/Test – dark

10.3 Notify **MCC-H** of task completion.

11. REMOVING CBCS

NOTE

Once CBCS is powered off, cables can be removed in any order.

11.1 Remove, separate all CBCS Avionics Cables and stow in original CBCS Kit (String 3).
Refer to Table 2.

11.2 Remove CBCS Camera Assembly from Hatch Standoff Fittings (1/4 Turn Fasteners).
Leave Gray Tape (four pieces) on LEDs.
Leave Hatch Standoff Fittings installed on Hatch.
Place CBCS Camera Assembly in Camera Bag face down, then temporarily stow in String Three CBCS Kit.
If Inner Hatch Window Shield was installed on Hatch window, replace Inner Hatch Window Shield, Velcro.

11.3 Remove, separate Video Interface Unit and LED Control Unit.
Stow in String Three CBCS Kit.

11.4 Stow Ku-Band Power Supply in String Three CBCS Kit.

12. POST MAINTENANCE

12.1 Notify **MCC-H** of task completion.

12.2 Update IMS with stowage location of CBCS Kit.

1.125 MPLM INSTALL: NODE 2 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/19A/FIN/HC)

Page 1 of 10 pages

OBJECTIVE:

Perform capture and initial bolting of the MPLM following translation into ready-to-latch (RTL) position by the SSRMS. Common Berthing Mechanism (CBM) capture latches are driven through an incremental capture sequence, then all 16 bolts are engaged into their respective nut assemblies. Procedure limits CBM torque, drive time, and capture latch shaft positions to reduce loads on the grapple fixture and SSRMS in case of SSRMS Brakes-On failure.

LOCATION:

LAB PCS

DURATION:

1 hour

NOTE

1. Notation "(AOS/M)" indicates that AOS during execution of step is mandatory. If currently LOS, or expecting LOS prior to completion of an AOS/M step, wait for next AOS to perform. If LOS is more than 20 minutes, consideration may be given to proceeding to safe the system.
2. For any failures or attention symbols that appear after RTLs are achieved, [2.201 CBM MATE MALFUNCTION](#) (SODF: S&M: MALFUNCTION: CBM/MATE) can be referenced.
3. For failures prior to RTL (completion of step 1), [2.101 CBM PREP FOR MATE MALFUNCTION](#) (SODF: S&M: MALFUNCTION: CBM/PREP FOR MATE) can be referenced to verify CBM is still in a good configuration for initiating capture.
4. Four confirmed RTLs, either by telemetry or direct view, are required for capture initiation.
5. Preflight analysis has shown that a CBM latch can be masked due to a latch failure, and CBM capture completed with only three latches operating, without exceeding load limits.

1. VERIFYING READY-TO-LATCH (RTL) INDICATORS CLOSED

SSRMS operator ⇒ CBM operator, "Maneuver to RTL complete, go for first stage capture."

PCS

Node 2: S&M: [XX] CBM

[XX] CBM

'Functional CBM Representation (External View)'

Verify RTL indications (four) – green

1.125 MPLM INSTALL: NODE 2 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/19A/FIN/HC)

```
*****
* If any RTL is not green after repeated attempts to gain
* ready-to-latch indication
* √MCC-H for GO or NO-GO (verifies CBM configuration and
* SSRMS are nominal)
*
* Perform 2.501 CBM CREW RTL VISUAL VERIFICATION, all
* (SODF: S&M: MALFUNCTION: CBM/CONTINGENCY), then:
*****
```

```
*****
* If any latch is not nominal
* √MCC-H for GO or NO-GO (verifies CBM configuration and
* SSRMS are acceptable)
*
* If directed by MCC-H to mask any latch
* 'Functional CBM Representation (External View)'
*
* sel Latch [X] where [X] =    
*
* 
*
* sel Commands
*
* 
*
* cmd Mask Latch [X] Execute
*
* 
* 'Functional CBM Representation (External View)'
*
* Verify Latch [X] – Ø
*****
```

2. [ENABLING MECHANISM AUTOSAFING SOFTWARE](#)

WARNING

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

```

'CBM Status'

sel Mechanism Autosafing


'Autosafing PPL Version IDs – Safing Ccmds'
```

1.125 MPLM INSTALL: NODE 2 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/19A/FIN/HC)

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Verify Primary C&C: 8008

Verify Backup C&C: 8008

'Autosafing PPL Version IDs – Safing Default'

Verify Backup C&C: 8003

'Enable'

cmd Enable Execute

Verify Mechanism Autosafing – Enabled

3. VERIFYING STRUCTURAL CONSTRAINTS

Verify all exercise is halted.

√**MCC-H** for stable attitude control configuration

MCG: MCS Safing

MCS Safing

'Station Configuration'

Verify Auto Att Control Handover US to RS – Inh

'Auto Mode to CMG TA'

Verify Desat Request – Inh

4. PERFORMING FIRST STAGE CAPTURE (AOS/M)

CAUTION

To prevent damage to CBM or other hardware, CMG control (with Desat Request and Auto Att Handover to RS inhibited) and/or Free Drift (DAP: FREE for shuttle control) is required from initiation of CBM capture until at least twelve bolts have completed the ABOLTS command and at least four bolts still indicate load greater than zero. SSRMS shall remain grappled to the MPLM until such time. Also, any crew exercise (isolated and unisolated) must be halted until completion of ABOLTS.

CBM

'Commands by Task'

sel Mate

CBM Mate - SSRMS

'Capture Passive CBM'

1.125 MPLM INSTALL: NODE 2 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/19A/FIN/HC)

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cmd Capture First Stage **Execute**

Execution time expected to be < 15 seconds.

CBM

'CBM Status'

Verify Master Cmd Status – Complete

'Capture Latch Status'

Verify Cmd Code (four) – Capture

Verify Cmd Status (four) – Complete

Verify Posn (four): 185 to 187 deg

'Functional CBM Representation (External View)'

sel RTL Details

CBM RTL Details

Verify Latch [X] Capture Switch – Open where [X] = 1 2 3 4

Repeat

CBM operator ⇒ SSRMS operator, “Go for SSRMS mode to Limp.”

5. PERFORMING SECOND STAGE INCREMENTAL CAPTURE WITH LOW TORQUE (AOS/M)

5.1 Incremental Capture to 130° with Low Torque (AOS/M)

WARNING

Continuation of Second Stage Capture if SSRMS modes to Brakes-On may cause structural failure of SSRMS or primary structure.

1.125 MPLM INSTALL: NODE 2 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/19A/FIN/HC)

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NOTE

1. Following SSRMS Mode to Limp, closed RTLs may open due to RTL spring forces. RTL closed indication is not required prior to execution of second stage capture (used for latches during first stage capture).
2. This procedure incorporates an incremental approach to CBM Second Stage Capture based on EBIT loads analysis of the robotics configuration. Second Stage Capture will be incrementally commanded down to 12° with the use of four Template Commands to: 130°, 90°, 50° and 12°. The torque bias for each template command will be entered as a negative value. The template command window can be left open between steps and modified for each incremental capture command.

SSRMS operator ⇒ CBM operator: "SSRMS Mode to Limp complete, Go for Second-Stage Capture."

CBM

'Commands By Type'

sel Template

CBM Template Commands

'Latch Actuation Templates'

sel Capture (Three Variables)

CBM Capture 3 Variables Template

input Torque Bias - 1 4 2.7 4

input Shaft Position - 1 3 0

input Time Limit 1 - 2

cmd Actuate Execute

'Confirmation Request'

Verify Override _____ Command? – Capture

cmd Yes Execute

Expected execution time < 35 seconds.

CBM

'CBM Status'

1.125 MPLM INSTALL: NODE 2 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/19A/FIN/HC)

Page 6 of 10 pages

Verify Master Cmd Status – Complete

'Capture Latch Status'

Verify Cmd Code (four) – Capture

Verify Cmd Status (four) – Complete

Verify Posn (four): 129 to 131 deg (monitor for backdrive)

- * If any latch Position > 131 degrees due to either latch Cmd Status
- * | – Jammed or Master Cmd Status – Timeout
- * | **cmd Stop Execute** (from any CBM command window) to
- * | clear error
- * |
- *

* Go to step 5.5.

5.2 Incremental Capture to 90° with Low Torque (AOS/M)

CBM Capture 3 Variables Template

input Torque Bias – -1 4 2.7 4

input Shaft Position – 9 0

input Time Limit 1 – 2

cmd Actuate Execute

'Confirmation Request'

Verify Override _____ Command? – Capture

cmd Yes Execute

Expected execution time < 25 seconds.

CBM

'CBM Status'

Verify Master Cmd Status – Complete

'Capture Latch Status'

Verify Cmd Code (four) – Capture

Verify Cmd Status (four) – Complete

Verify Posn (four): 89 to 91 deg (monitor for backdrive)

1.125 MPLM INSTALL: NODE 2 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/19A/FIN/HC)

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* If any latch Position > 91 degrees due to either latch Cmd Status
* | – Jammed or Master Cmd Status – Timeout
* | **cmd Stop Execute** (from any CBM command window) to
* | clear error
*
* Go to step 5.5.

5.3 Incremental Capture to 50° with Low Torque (AOS/M)

CBM Capture 3 Variables Template

input Torque Bias – -1 4 2.7 4
input Shaft Position – 5 0
input Time Limit 1 – 2

cmd Actuate Execute

'Confirmation Request'

Verify Override _____ Command? – Capture

cmd Yes Execute

Expected execution time < 23 seconds.

CBM

'CBM Status'

Verify Master Cmd Status – Complete

'Capture Latch Status'

Verify Cmd Code (four) – Capture

Verify Cmd Status (four) – Complete

Verify Posn (four): 49 to 51 deg (monitor for backdrive)

* If any latch Position > 51 degrees due to either latch Cmd Status
* | – Jammed or Master Cmd Status – Timeout
* | **cmd Stop Execute** (from any CBM command window) to
* | clear error
*
* Go to step 5.5.

**1.125 MPLM INSTALL: NODE 2 NADIR CBM INCREMENTAL
CAPTURE/ABOLT**

(ASSY OPS/19A/FIN/HC)

Page 8 of 10 pages

5.4 Incremental Capture to 12° with Low Torque (AOS/M)

CBM Capture 3 Variables Template

input Torque Bias – -1 4 2.7 4

input Shaft Position – 1 2

input Time Limit 1 – 2

cmd Actuate Execute

'Confirmation Request'

Verify Override _____ Command? – Capture

cmd Yes Execute

Expected execution time < 23 seconds.

CBM

'CBM Status'

Verify Master Cmd Status – Complete

'Capture Latch Status'

Verify Cmd Code (four) – Capture

Verify Cmd Status (four) – Complete

Verify Posn (four): 11 to 12 deg (monitor for backdrive)

If all latch positions are 11 or 12 degrees, go to step 6.

* If any latch Position > 12 degrees due to either latch Cmd Status

* | – Jammed or Master Cmd Status – Timeout

* | **cmd Stop Execute** (from any CBM command window) to

* | clear error

*

* Proceed to step 5.5.

1.125 MPLM INSTALL: NODE 2 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/19A/FIN/HC)

5.5 Performing SSRMS -X Translation (AOS/M), If Required

NOTE

1. In step 5.5, SSRMS is commanded in the -X direction (Robotics coordinates: pulling CBM halves together) in an attempt to redistribute the forces built up in the CBM or SSRMS system. While all forces will not be relieved, the resultant force vector will change its affect on the system, enabling the previous CBM command to be reissued.
2. Step 5.5 will be executed up to four times in an attempt to achieve the commanded shaft position on all four latches. If repeating step 5.5 after two or three attempts and little or no progress is made (less than 5 degrees), **MCC-H** will likely direct the crew to procedure [2.210 CBM MATE - INCREMENTAL CAPTURE - SSRMS](#) (SODF: S&M: MALFUNCTION: CBM/MATE), unless other problems are recognized.

* If step 5.5 has already been executed four times
* | **MCC-H** for GO to repeat step 5.5 additional times or
* | possibly to proceed to [2.210 CBM MATE -](#)
* | [INCREMENTAL CAPTURE - SSRMS](#) (SODF: S&M:
* | MALFUNCTION: CBM/CONTINGENCY), then:

RWS

CBM operator ⇒ SSRMS operator, “Go to perform [2.666 CBM LATCH STALL RECOVERY - SSRMS](#), all (SODF: RBT FS: CONTINGENCY) to pull CBM halves together,” then:

SSRMS operator ⇒ CBM operator, “Go to reattempt Second Stage Capture, SSRMS Mode to Limp complete.”

PCS

If any latch position is > 131 deg
Go to step 5.1.

If any latch position is > 91 deg
Go to step 5.2.

If any latch position is > 51 deg
Go to step 5.3.

If any latch position is > 12 deg
Go to step 5.4.

1.125 MPLM INSTALL: NODE 2 NADIR CBM INCREMENTAL CAPTURE/ABOLT

(ASSY OPS/19A/FIN/HC)

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6. PERFORMING BOLTS ACQUISITION (AOS/M)

CBM Mate - SSRMS

'Engage Passive CBM Nuts'

cmd Acquire Bolts Execute

Execution time expected to be < 7 minutes.

CBM

'CBM Status'

Verify Master Cmd Status – Complete

'Powered Bolt Status'

Verify Cmd Code (sixteen) – ABolts

Verify Cmd Status (sixteen) – Complete

Verify at least four bolts indicate load > 0.00 kN

7. INHIBITING MECHANISM AUTOSAFING SOFTWARE

CBM

'CBM Status'

sel Mechanism Autosafing

Mechanism Autosafing

'Inhibit'

cmd Arm Execute

Verify Arm – √

cmd Inhibit Execute

Verify Mechanism Autosafing – Inhibited

NOTE

MPLM is now ready for ungrapple. Station can return to desired attitude control configuration, as required. Crew exercise can resume as required.

CBM operator ⇒ SSRMS operator, "Go for SSRMS Brakes ON/Safing, can ungrapple element per timeline."

1.135 19A JOINT OPS HRF RACK 2 RECONFIGURATION

(ASSY OPS/19A/FIN)

Page 1 of 4 pages

OBJECTIVE:

This procedure reconfigures HRF Rack 2 by removing one HRF Standard Stowage Drawer, the Workstation 2 payload drawer, and the HRF GASMAP, then replacing with two 8PU Stowage Drawers during 19A docked operations.

STATION TOOLS:

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

Ratchet, 3/8" Drive

STATION PARTS:

HRF GASMAP

HRF Standard Stowage Drawer

Workstation 2

8PU drawer [two] (reference MPLM Resupply Transfer List)

Ziplock Bag (for stowing loose bolts)

CAUTION

Power and data connection pins located at the rear of the HRF GASMAP will be exposed when the unit is removed from HRF Rack 2. Care should be taken to ensure that no pins are bent or otherwise damaged. Contact with any object and the back of any unit should be avoided.

1. CHECK SWITCHES

- | | | |
|-------------------|-----|--|
| COL1A4_A
2 | 1.1 | sw RACK POWER → OFF |
| COL1A4_A
1 | 1.2 | ✓sw LAPTOP POWER OFF
✓LAPTOP POWER Lt Off |
| COL1A4_A
1, A2 | | ✓sw DRAWER B1, C1, D1, G1, H1, J1, C2, D2, E2, F2, H2, J2
POWER (twelve) OFF
sw E1, F1, G2 POWER → OFF |
| COL1A4_A
2 | | ✓sw PAYLOAD POWER OFF |
| HRF
PFM/PAM | | ✓sw POWER OFF |
| HRF
GASMAP | | sw POWER → OFF |
| RC | | ✓sw POWER OFF |
| Workstation
2 | | ✓sw POWER MAIN OFF |

2. REMOVE BOLTS

- | | | |
|---------------|-----|--|
| COL1A4_D
1 | 2.1 | Remove two bolts from the front of the HRF GASMAP and one bolt from the left side handle, (6" Long, 3/16" Hex Head, 3/8" Drive; Ratchet, 3/8" Drive).
Temporarily stow in Ziplock for return. |
|---------------|-----|--|

11 MAR 10

1.135 19A JOINT OPS HRF RACK 2 RECONFIGURATION

(ASSY OPS/19A/FIN)

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Refer to Figure 1.



Figure 1. Bolt Locations.

COL1A4_G
1

2.2 Unfasten captive bolt in the right side handle of the HRF GASMAP (6" Long, 3/16" Hex Head, 3/8" Drive; Ratchet, 3/8" Drive).

2.3 Remove one bolt from the left side handle of Workstation 2 (6" Long, 3/16" Hex Head, 3/8" Drive; Ratchet, 3/8" Drive). Temporarily stow in Ziplock for return. Refer to Figure 1.

2.4 Unfasten captive bolt in the right side handle of Workstation 2 (6" Long, 3/16" Hex Head, 3/8" Drive; Ratchet, 3/8" Drive).

3. REMOVE HRF GASMAP

3.1 Pull Analyzer Module drawer out until fully extended.

3.2 Locate the safety latch on the back left side of HRF GASMAP and push latch up. Refer to Figure 2.

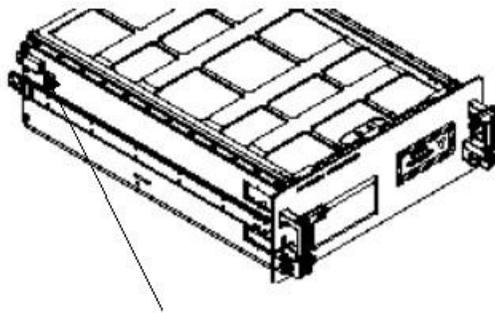


Figure 2. Example of Safety Latch Location.

- 3.3 Remove HRF GASMAP from HRF Rack 2.
Temporarily stow for return.

4. REMOVE WORKSTATION 2

COL1A4_G
1

- 4.1 Open Workstation 2 drawer until fully extended.
- 4.2 Locate the safety latch on the back left side of Workstation2 drawer and push latch up.
- 4.3 Remove Workstation 2 from HRF Rack 2.
Temporarily stow for return.

5. REMOVE HRF STANDARD STOWAGE DRAWER (H1)

COL1A4_H
1

- 5.1 Open HRF Standard Stowage Drawer until fully extended.
- 5.2 Locate the safety latch on the back left side of HRF Standard Stowage Drawer and push latch up.
- 5.3 Pull HRF Standard Stowage Drawer out of HRF Rack 2.
Temporarily stow for return.

6. INSTALL 8PU STOWAGE DRAWERS (D1, G1)

COL1A4_D
1

- 6.1 Retrieve 8PU Drawer (from MPLM) and install in HRF Rack 2.

COL1A4_G
1

- 6.2 Retrieve 8PU Drawer (from MPLM) and install in HRF Rack 2.

7. CONCLUDE OPERATIONS

COL1A4_A
2

- 7.1 sw RACK POWER → ON

COL1A4_A
1, A2

- 7.2 sw DRAWER F1, G1 → ON

COL1A4_A
1

- 7.3 sw LAPTOP POWER → ON

1.135 19A JOINT OPS HRF RACK 2 RECONFIGURATION

(ASSY OPS/19A/FIN)

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8. RESTOW TOOLS, PARTS, MATERIALS AS REQUIRED TO ORIGINAL LOCATIONS EXCEPT FOR:

HRF Standard Stowage Drawer [1] TO: MPLM (reference MPLM Return Transfer List)

Workstation 2 TO: MPLM (reference MPLM Return Transfer List)

GASMAP TO: MPLM (reference MPLM Return Transfer List)

Ziplock of Bolts TO: MPLM (reference MPLM Return Transfer List)

1.140 REFLECTIVE ELEMENTS INSTALLATION ONTO DOCKING TARGET

(ASSY OPS/19A/FIN) Page 1 of 6 pages

OBJECTIVE:

Install five reflective elements onto PMA2 docking target in support of DTO 703, Sensor Test for Orion ReINav Risk Mitigation (STORRM).

LOCATION:

PMA2 (APAS Hatch is not closed during installation)

DURATION:

45 minutes

CREW:

One

PARTS:

STORRM Reflective Elements Kit P/N 1269638-303

Edge Clamp (five) P/N 1269639-301

Cross Clamp (two) P/N 1269640-301

MATERIALS:

Disposable Gloves

TOOLS:

Digital Camera

Docking Target Standoff Cross Bag

Docking Mechanism Accessory Kit:

1-1/2" Open End Wrench

ISS IVA Toolbox:

Drawer 1:

10" Long Adjustable Wrench

Drawer 2:

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

Ratchet, 1/4" Drive

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

Drawer 3:

Steel Ruler

1. WORKSITE PREP

CAUTION

Rubber Gloves should be worn when handling the Docking Target Standoff Cross, Docking Target Base Plate, or STORRM Reflective Elements.

- 1.1 Release Hatch from PMA APAS Hatch Standoff.
Remove, stow APAS Hatch Cover.
Reattach Hatch to PMA APAS Hatch Standoff.

- 1.2 Don Disposable Gloves.

1.140 REFLECTIVE ELEMENTS INSTALLATION ONTO DOCKING TARGET (ASSY OPS/19A/FIN) Page 2 of 6 pages

- 1.3 Remove Docking Target Base Plate Cover from Docking Target Base Plate.
Stow Docking Target Base Plate Cover.

2. INSTALLATION OF EDGE CLAMPS (FOUR)

CAUTION
During the installation of the Edge and Cross Clamp Reflective Elements, avoid damage to the reflectors.

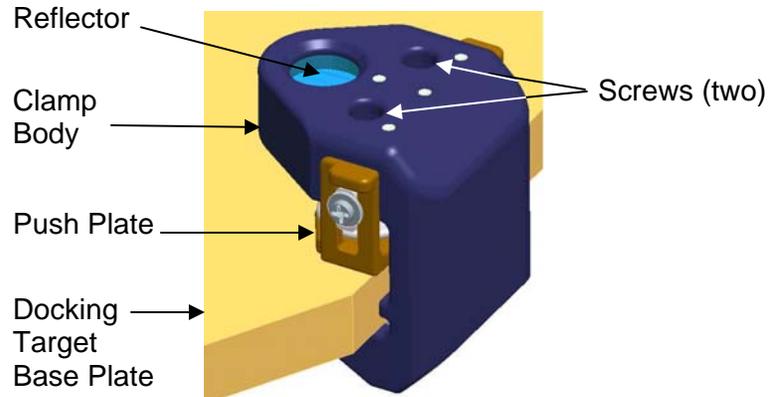


Figure 1.- Edge Clamp Reflective Element.

- 2.1 Retrieve five Edge Clamps from STORRM Reflective Elements Kit.

Through the Kapton Tape, inspect the reflector of each Edge Clamp for damage (cracks) and contamination (dirt, dust). Report any broken glass of reflective target seen under the Kapton Tape to **MCC-H**.

Select four Edge Clamps in best condition for installation.

CAUTION
During retraction of push plates, visually ensure screws are being loosened. Tightening the screws while Edge Clamps are not on docking target could break the push plates.

- 2.2 Retract push plate for each Edge Clamp, loosen screws (two) (Ratchet, 1/4" Drive; 3/32" Hex Head).
Refer to Figure 1.

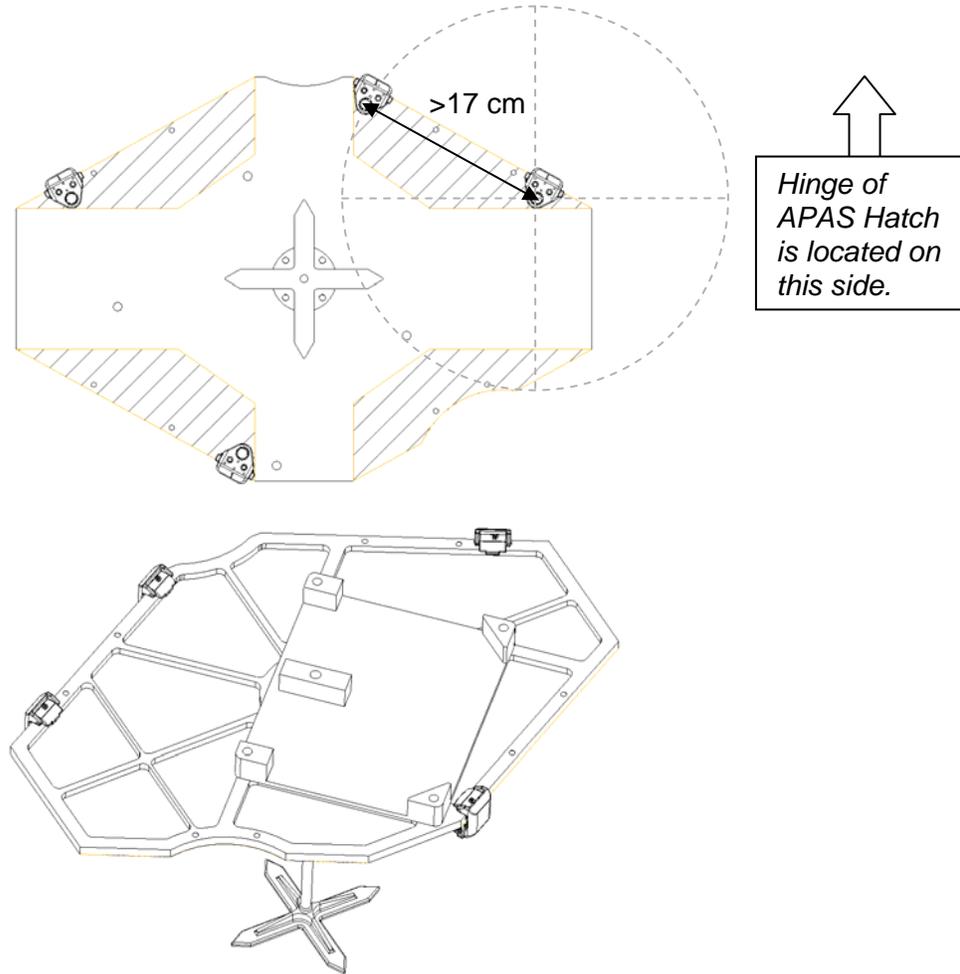


Figure 2.- Placement of Edge Clamp Reflective Elements.

- 2.3 Position Edge Clamp at a point around docking target perimeter, adhering to the following installation parameters:
 - Edge Clamp body must be completely in black region of docking target.
 - Edge Clamp body must be tangent to the boundary between black and white regions (maximum of a 3 mm gap).
 - Maintain a minimum of 17 cm separation between center points of reflectors (Steel Ruler).
 - Follow the general pattern shown above in Figure 2.
- 2.4 Lift push plate, slide Edge Clamp onto Docking Target Base Plate. Refer to Figure 1.
- 2.5 Hold Edge Clamp up against edge of Docking Target Base Plate, snug each screw (two) (Ratchet, 1/4" Drive; 3/32" Hex Head).

1.140 REFLECTIVE ELEMENTS INSTALLATION ONTO DOCKING TARGET

(ASSY OPS/19A/FIN)

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- 2.6 Verify installation parameters are met (Steel Ruler).
Refer to step 2.3.
- 2.7 Torque each screw (two) to 11 in-lbs [(5-35 in-lbs) Trq Driver,
1/4" Drive; 3/32" Hex Head].
- 2.8 Repeat this step for remaining three Edge Clamps.
- 2.9 Stow one remaining Edge Clamp back in STORRM Reflective
Elements Kit.

3. INSTALLATION OF STANDOFF CROSS CLAMP

- 3.1 Retrieve two Cross Clamps from STORRM Reflective Elements Kit.

Through the Kapton Tape, inspect the reflector of each Cross Clamp for damage (cracks) and contamination (dirt, dust). Report any broken glass of reflective target seen under the Kapton Tape to **MCC-H**.

Select Cross Clamp in best condition for installation.

- 3.2 Remove Docking Target Standoff Cross from Standoff Cross Bag.
Stow Standoff Cross Bag.

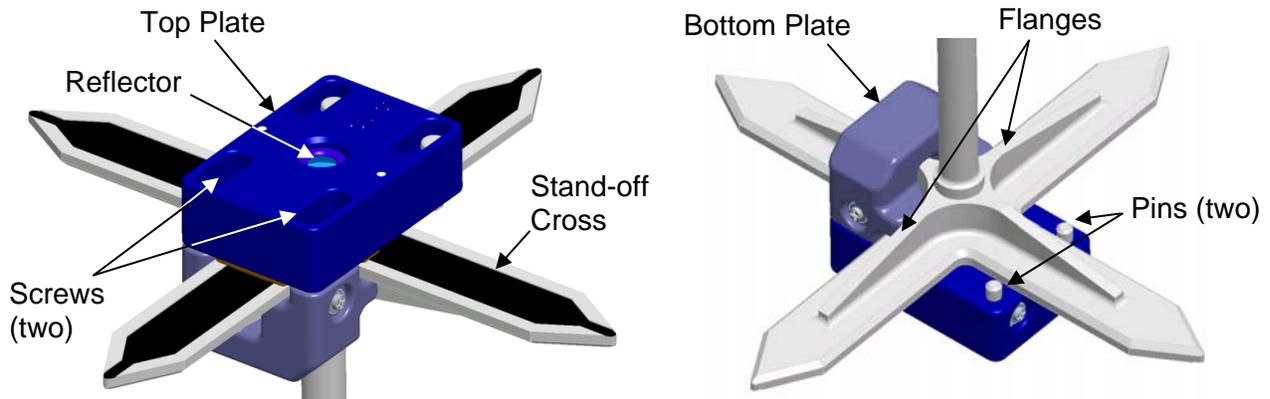


Figure 3.- Cross Clamp Reflective Element.

- 3.3 Lift top plate and slide Cross Clamp onto one of the arms of the Docking Target Stand-off Cross until pins clear opposite side and bottom plate rests against flanges.

√Reflector of Cross Clamp is centered on Stand-off Cross.
Refer to Figure 3.

1.140 REFLECTIVE ELEMENTS INSTALLATION ONTO DOCKING TARGET

(ASSY OPS/19A/FIN)

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NOTE

When tightening the Standoff Cross Clamp, hold Top Plate flat on the cross then snug each screw a little at a time until the clamp starts to cock to one side, then back off that last screw a little until clamp is flat. Finally tighten both screws, ensure clamp is still flat, then apply torque.

- 3.4 Snug each screw (two) (Ratchet, 1/4" Drive; 3/32" Hex Head).
- 3.5 Torque each screw (two) to 5 in-lb [(5-35 in-lbs) Trq Driver, 1/4" Drive; 3/32" Hex Head].
- 3.6 Stow one remaining Cross Clamp back in STORRM Reflective Elements Kit.

4. INSTALLATION OF STANDOFF CROSS

If activity is being performed immediately prior to APAS hatch closure

NOTE

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

- 4.1 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 cap nut (not recessed).

- 4.2 Ensure jam nut is positioned onto smaller, non-threaded diameter of Docking Target Base Plate receptacle.

Rotate cap nut ↻ and tighten very firmly onto receptacle (10" Adjustable Wrench).

Thread jam nut onto receptacle, rotating ↻ until contact with cap nut occurs.

While maintaining a ↻ torque on cap nut, firmly tighten jam nut ↻ against cap nut (1-1/2" Open End Wrench).

- 4.3 Stow 10" Long Adjustable Wrench, 1-1/2" Open End Wrench, and Docking Mechanism Accessory Kit.



Figure 4.- Reflective Elements Kit Completely Installed.

5. PHOTO DOCUMENTATION OF INSTALLED REFLECTIVE ELEMENTS

5.1 Remove Kapton Tape from all installed Clamps (five).

5.2 Photo document installed reflective elements on Docking Target Base and on Standoff Cross (Digital Camera).

6. INSTALLING PROTECTIVE COVERS

If activity is not being performed immediately prior to APAS hatch closure

6.1 Insert Standoff Cross into Docking Target Standoff Cross Bag to protect it from scratches.

Stow in PMA2 so that it is readily available in the event that a Joint Emergency Egress is required.

6.2 Install Docking Target Base Plate Cover to prevent scratches and surface damage.

Install APAS Hatch Cover.

Secure Hatch in open position with PMA APAS Hatch Standoff.

7. POST INSTALLATION

7.1 Doff Disposable Gloves.
Discard.

7.2 Stow tools, downlink photos, report task completion to **MCC-H**.

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

Page 1 of 15 pages

OBJECTIVE:

Reconfigure MARES stowage to reduce the amount of excess hardware and Foam left on ISS.

LOCATION:

COL1F3

CREW:

Two

DURATION:

3 hours 5 minutes

- 25 minutes Remove Front Fences (three total)
- 20 minutes Remove Back Fences (six pieces)
- 20 minutes Remove Launch Struts (four pieces)
- 1 hour Unpack M02 Bag
- 1 hour Unpack M01 Bag

PARTS:

- MARES Rack
- MARES Bolt Return Bag (in MPLM Kit)
- MARES Launch/Stowage Plate Bolt Temp Stow Ziplock Bag (in MPLM Kit)
- MARES Strut Return Bag (two) (in MPLM Kit)
- Empty 1.0 CTB (pre-gathered)
- Jettison Stowage Bag (two) (pre-gathered)

TOOLS:

Tool Bag 2:

- 10" Ext, 3/8" Drive

ISS IVA Toolbox:

Drawer 1:

- 7/16" Combination Wrench
- 9/16" Combination Wrench

Drawer 2:

- Ratchet, 1/4" Drive
- Ratchet, 3/8" Drive
- 3/8" Hex Head, 1/4" Drive
- 1/4" Hex Head, 3/8" Drive
- 3/16" Hex Head, 3/8" Drive
- 5/16" Hex Head, 3/8" Drive
- 7/16" Socket, 3/8" Drive
- 9/16" Socket, 3/8" Drive

Drawer 3:

- #10 Long Torque Driver, 3/8" Drive

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

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DISASSEMBLY OF LAUNCH CONFIGURATION

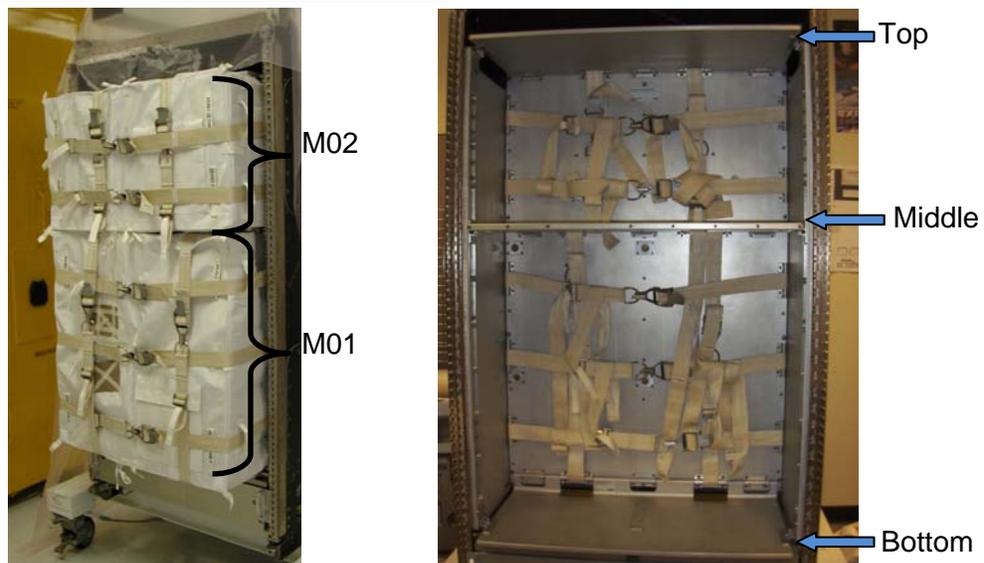


Figure 1.- HRF MARES Rack Assembly.

1. FENCE AND FENCE BRACKET REMOVAL

- 1.1 Remove M01 Bag from MARES Rack.
Refer to Figure 1.
Temporarily stow.
- 1.2 Remove M02 Bag from MARES Rack.
Refer to Figure 1.
Temporarily stow.
- 1.3 Secure loose ends of cargo straps for the remainder of the activity.
Refer to Figure 4.

NOTE

1. The bottom two bolts in the Bottom Fence bracket and top two bolts in the Top Fence bracket are short.
2. When bolts are removed, the Fence will be able to pivot.
3. All bolts are non-captive.

- 1.4 Remove left and right Top horizontal fence hinge bracket bolts (four bolts each bracket) (Ratchet, 3/8" Drive; #10 Long Torque Driver, 3/8" Drive).
Refer to Figures 1 and 2.
Stow in MARES Bolt Return Bag.
- 1.5 Remove MARES Rack Top horizontal Fence by unlatching brackets on the MARES Launch/Stowage Plate.
Refer to Figure 3.
Temporarily stow Fence for return.

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(ASSY OPS/19A/FIN)

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1.6 Repeat steps 1.4 and 1.5 to remove the Bottom Fence.

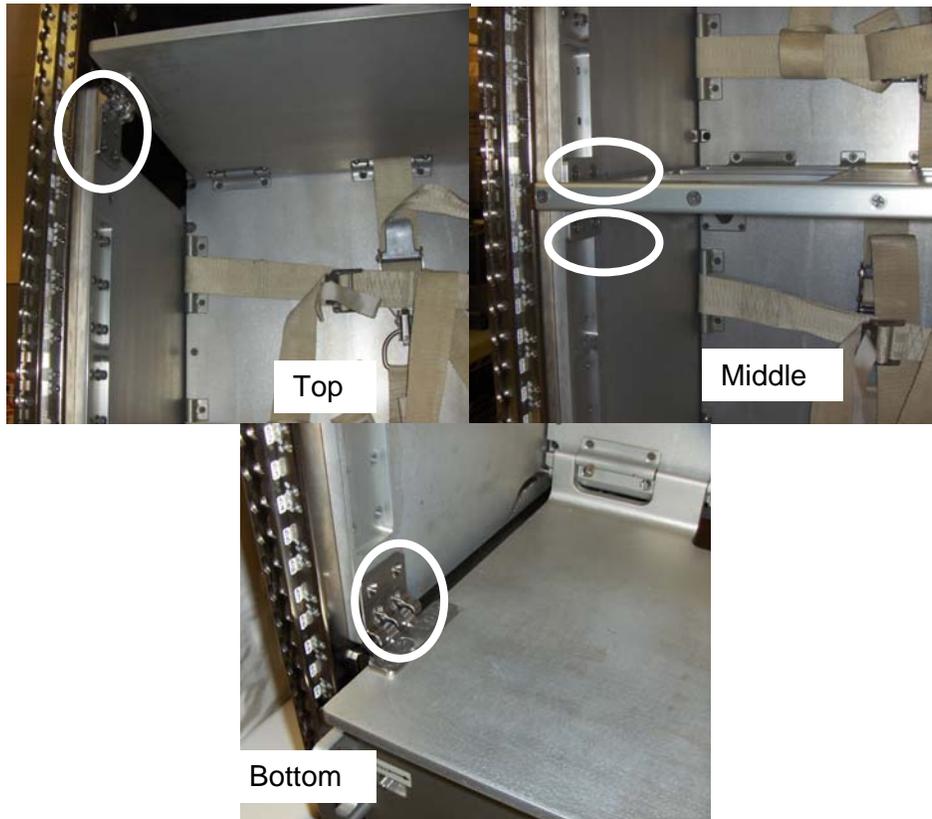


Figure 2.- Fence Bracket Bolt Locations.



Figure 3.- MARES Launch/Stowage Plate Fence Bracket Release Knobs.

- 1.7 Remove bolts (two) holding Middle Fence to Middle Fence brackets (two) (Ratchet, 1/4" Drive; 3/8" Hex Head, 1/4" Drive).
- 1.8 Repeat steps 1.4 and 1.5 to remove the Middle Fence and Middle Fence brackets.

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(ASSY OPS/19A/FIN)

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- 1.9 Reach underneath MARES Launch/Stowage Plate to engage captive Pivot Pins (two).

Refer to Figure 4, Inset 1 and 2.



Figure 4.- MARES Launch/Stowage Plate Guiding Track on MARES Rack.

2. DISASSEMBLY AND ROTATION OF MARES LAUNCH/STOWAGE PLATE

- 2.1 Remove bolts (ten) attaching MARES Launch/Stowage Plate to MARES Rack (Ratchet, 3/8" Drive; 5/16" Hex Head, 3/8" Drive; 10" Ext, 3/8" Drive) per following steps.

Refer to Figure 5 for bolt locations.

- 2.1.1 Four bolts on right side of MARES Launch/Stowage Plate.
- 2.1.2 Four bolts on left side of MARES Launch/Stowage Plate.
- 2.1.3 One bolt on top center of MARES Launch/Stowage Plate.
- 2.1.4 One bolt on bottom center of MARES Launch/Stowage Plate.
- 2.1.5 Temporarily stow any five bolts in MARES Launch/Stowage Plate Bolt Temp.
Stow Ziplock Bag for later use.
- 2.1.6 Stow remaining five bolts in MARES Bolt Return Bag for return.

- 2.2 Pull MARES Launch/Stowage Plate forward on the Guiding Track.
Rotate 90 degrees.

Refer to Figures 4 and 6.

1.145 19A MARES STOWAGE RECONFIGURATION
(ASSY OPS/19A/FIN)

- 2.3 Remove the MARES Launch Bag.
Temporarily stow.
Refer to Figure 7.



Figure 5.- MARES Launch/Stowage Plate Bolt Locations.

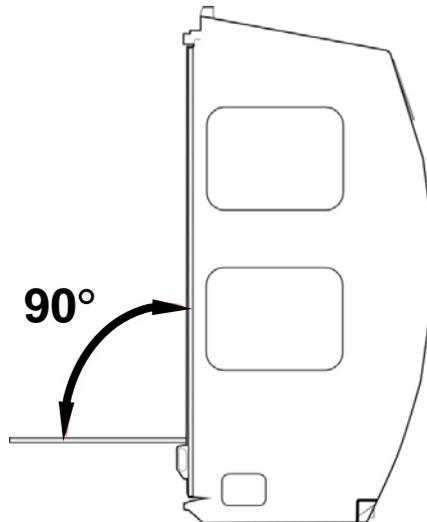


Figure 6.- MARES Launch/Stowage Plate rotated 90°.

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

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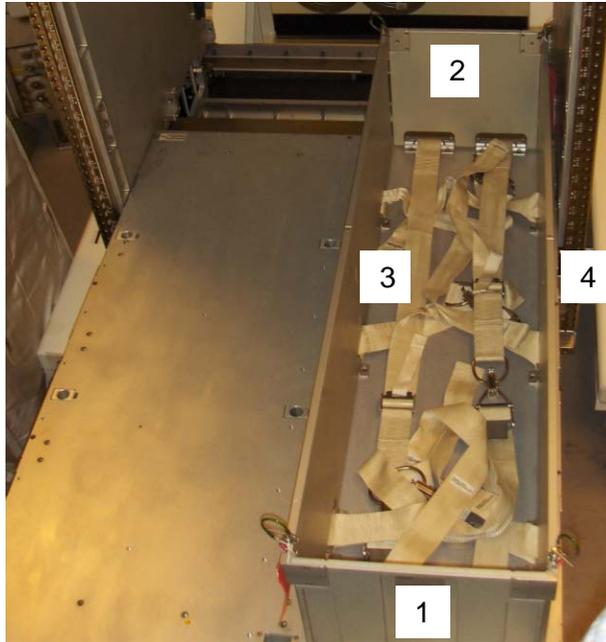


Figure 7.- MARES Launch/Stowage Plate with MARES Launch Bag Fences.

3. MARES LAUNCH BAG FENCE REMOVAL

NOTE

Refer to Figure 7 for steps 3.1 to 3.5.

- 3.1 Remove two PIP Pins holding Fence labeled #1.
- 3.2 Remove fence #1 by unlatching brackets on the MARES Launch/Stowage Plate.
Temporarily stow.
- 3.3 Repeat steps 3.1 and 3.2 for Fence labeled #2.
- 3.4 Remove the two Fences (joined in the middle) labeled #3 by unlatching brackets on the MARES Launch/Stowage Plate.
Temporarily stow.
- 3.5 Remove the two Fences (joined in the middle) labeled #4 by unlatching brackets on the MARES Launch/Stowage Plate.
Temporarily stow.

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

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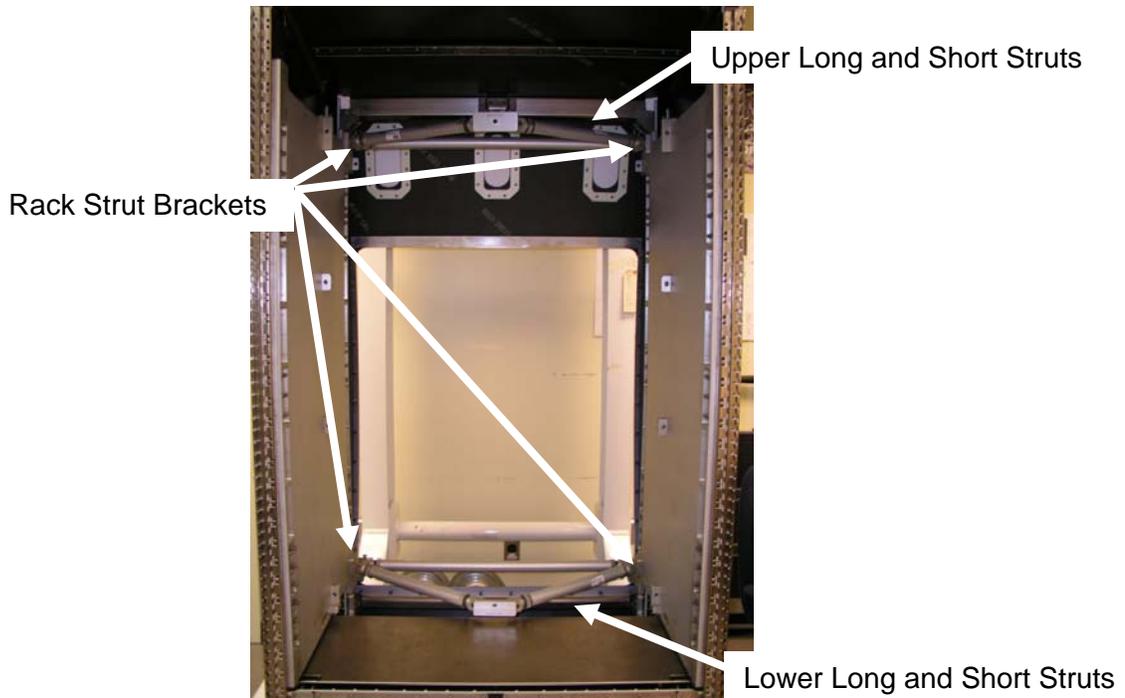


Figure 8.- Location of Launch Support Struts.



Figure 9.- Bolts to be removed on Struts Indicated by Circles.

4. LAUNCH STRUT REMOVAL

- 4.1 Remove bolts (four) at Rack Strut Brackets to remove lower Short Strut and Long Strut (Ratchet, 3/8" Drive; 9/16" Socket, 3/8" Drive). Refer to Figures 8 and 9.

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

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- 4.2 Replace bolts (four) back into the removed struts for stowage. Short struts will collapse together still attached to MARES LSP Strut Bracket.
Stow in MARES Strut Return Bag.
- 4.3 Repeat steps 4.1 and 4.2 to remove the upper Short Strut and Long Strut.
- 4.4 Remove upper and lower MARES Rack Strut brackets (four brackets; four bolts per bracket) (Ratchet, 3/8" Drive; 3/16" Hex Head, 3/8" Drive).
Refer to Figure 8.
Stow brackets and bolts in MARES Bolt Return Bag.

STOWAGE RECONFIGURATION

5. TRANSFERRING OF STOWAGE

- 5.1 Remove MARES Stow Bags 1 to 3 from the MARES Launch Bag.
- 5.2 Remove and temporarily stow MARES Ankle Adapter Bag.
- 5.3 Remove and temporarily stow Battery.
- 5.4 Retrieve and temporarily stow pre-gathered empty 1.0 CTB for stowing MARES electronics.
- 5.5 Deploy MARES Stow Bags 1 to 3 in Columbus.

NOTE

MARES Stow Bag cue cards are located in M01 Bag and will be helpful for this activity.

- 5.6 Transfer hardware from M02 Bag into MARES Stow Bags 1 to 3 and MARES Ankle Adapter Bag.
Use Jettison Stowage Bag to temporarily stow any Foam pieces when unloading M-Bag.
Restow all Foam back in M-Bag for return.
Refer to Table 1 and MARES Stow Bag Cue Cards.

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

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Table 1. Relocation of Hardware from M02 Bag to MARES Stow Bags 1 to 3 and MARES Ankle Adapter Bag

Foam Level	Unstow From:	Hardware	Restow In:
1	M02 Bag	Left Anterior Wrist Pad	MARES Stow Bag 1
	M02 Bag	Right Anterior Wrist Pad	MARES Stow Bag 1
	M02 Bag	Hand Pad	MARES Stow Bag 3
	M02 Bag	Foot Rest Support 2, Foot Rest Support Adapter	MARES Stow Bag 3; Foot Rest Support 1 will be attached with these for final stowage.
	M02 Bag	Adjustable Restraint 2 and Adjustable Restraint 2 Attachment	MARES Stow Bag 1
	M02 Bag	Calf Pad	MARES Stow Bag 1
	M02 Bag	Rear Thigh Pad	MARES Stow Bag 1
2	M02 Bag	Short Lever	MARES Stow Bag 3
	M02 Bag	Foot Rest Support 1	MARES Stow Bag 3; Attach to Foot Rest Support 2 before stowing
3	M02 Bag	Extended Fixing Adapter	MARES Stow Bag 3
	M02 Bag	Foot Rest A, Foot Rest Pad A	MARES Stow Bag 3; reconfig before stowing
	M02 Bag	Ankle Adapter	MARES Ankle Adapter Bag
	M02 Bag	Fixing Adapter	MARES Stow Bag 3
4	M02 Bag	Medium Lever	MARES Stow Bag 3
	M02 Bag	Foot Rest B and Foot Rest Pad B	MARES Stow Bag 3; reconfig before stowing
	M02 Bag	Fixing Adapter	MARES Stow Bag 3
5	M02 Bag	Chest Restraint	MARES Stow Bag 2
	M02 Bag	Fixing Adapter	MARES Stow Bag 3
	M02 Bag	Wrist Pad	MARES Stow Bag 1
	M02 Bag	Waist/Thoracic Belt Support	MARES Stow Bag 1
6	M02 Bag	Trunk Adapter	MARES Stow Bag 2
	M02 Bag	Adjustable Restraint 3	MARES Stow Bag 1
	M02 Bag	Adjustable Restraint 1 and Adjustable Restraint 1 Attachment	MARES Stow Bag 1
	M02 Bag	Long Lever	MARES Stow Bag 3
	M02 Bag	Handgrip Adapter and Handgrip Support	MARES Stow Bag 3
	M02 Bag	Large Handgrip Pad	MARES Stow Bag 3
	M02 Bag	Medium Handgrip Pad	MARES Stow Bag 3
	M02 Bag	Small Handgrip Pad	MARES Stow Bag 3
	M02 Bag	Adjustable Restraint Connector	MARES Stow Bag 1
7	M02 Bag	Dorsal Pad	MARES Stow Bag 2
	M02 Bag	Foot Rest Adapter 1, Foot Rest Adapter 2, Foot Rest Adapter 3	MARES Stow Bag 3
	M02 Bag	Adjustable Restraint Connector	MARES Stow Bag 1

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

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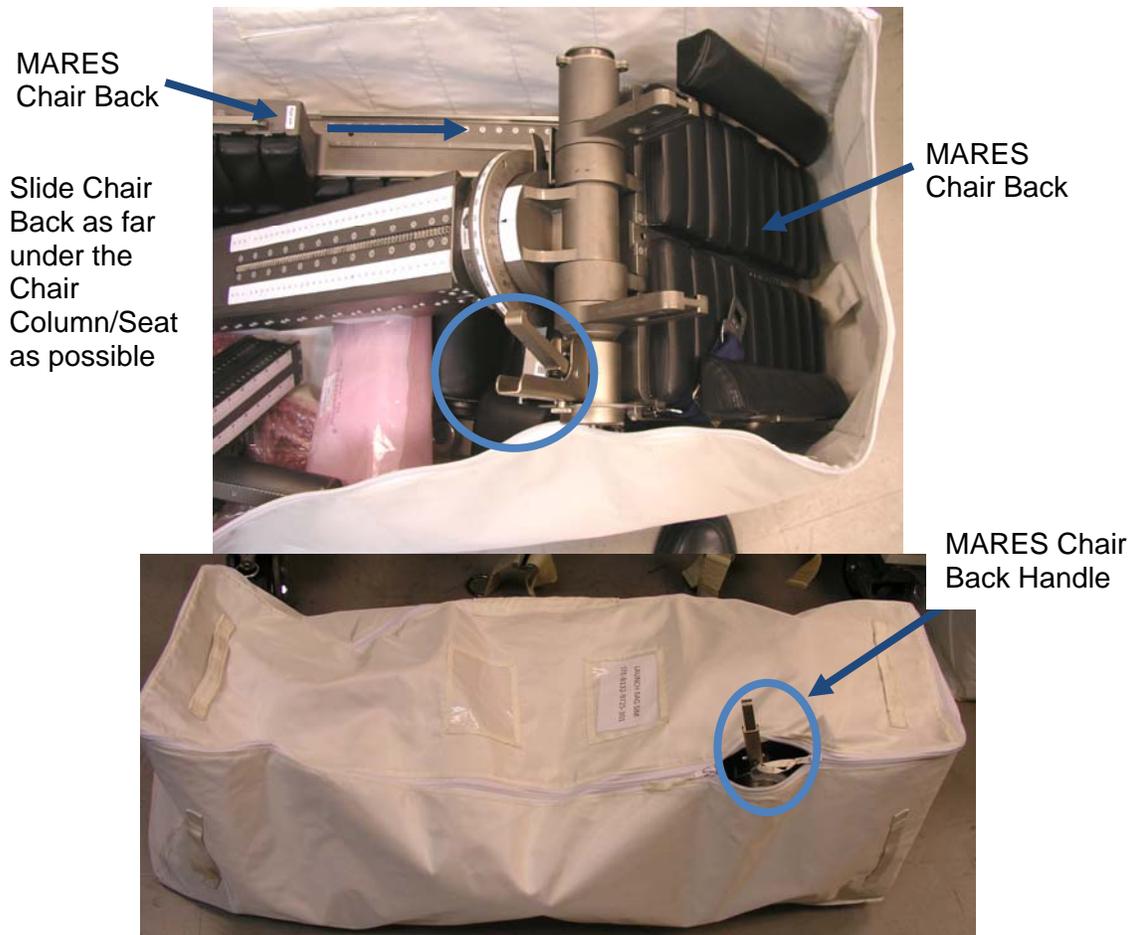


Figure 10.- MARES Chair Seat or Column Orientation in MARES Launch Bag (the circle indicates the Seat handle protruding outside Bag).

- 5.7 Temporarily stow M02 Bag with Foam for return.
- 5.8 Stow Battery in Ankle Adapter Bag.
- 5.9 Transfer hardware from M01 Bag into MARES Stow Bags 1 to 3, empty 1.0 CTB, and MARES Launch Bag. Use Jettison Stowage Bag to temporarily stow any Foam pieces when unloading M-Bag. Restow all Foam back in M-Bag for return. Refer to Table 2 and MARES Stow Bag Cue Cards. Refer to Figure 10.

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

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Table 2. Relocation of Hardware from M01 Bag to MARES Stow Bags 1 to 3 and On-Orbit Stowage Locations.

Foam Level	Unstow From:	Hardware	Restow In:
1	M01 Bag	MARES Stop Button	1.0 CTB (stow components on side)
	M01 Bag	Connector Panel	1.0 CTB
	M01 Bag	Supervision Electronics	1.0 CTB
	M01 Bag	Controller Electronics	1.0 CTB
	M01 Bag	Hip Connector B	MARES Stow Bag 1
2	M01 Bag	Hip Connector A	MARES Stow Bag 1
	M01 Bag	VIF Top Left Bracket	MARES VIF BRACKETS bubble Bag; MARES Launch Bag
	M01 Bag	VIF Top Right Bracket	MARES VIF BRACKETS bubble bag; MARES Launch Bag
3	M01 Bag	Left Shoulder Pad, Left Shoulder Pad Support, and Scapular Pad	MARES Launch Bag
	M01 Bag	Chair Back with all attached Pads	MARES Launch Bag (Refer to Figure 10)
	M01 Bag	Upper Shin Pad	MARES Stow Bag 3
	M01 Bag	Power Electronics	1.0 CTB
	M01 Bag	Chair Column/Seat and Lateral Pads	MARES Launch Bag (Refer to Figure 10)
4	M01 Bag	Head Rest	MARES Launch Bag
	M01 Bag	Right Shoulder Pad, Right Shoulder Pad Support, and Scapular Pad	MARES Launch Bag
	M01 Bag	Hard Drive Bay	1.0 CTB
	M01 Bag	Lumbar Pad	MARES Stow Bag 2
	M01 Bag	Lower Shin Pad	MARES Stow Bag 1
	M01 Bag	Front Thigh Pad	MARES Stow Bag 1
	M01 Bag	Servo Drive Electronics	1.0 CTB
5	M01 Bag	VIF Bottom Right Bracket	MARES VIF BRACKETS bubble Bag; MARES Launch Bag
	M01 Bag	Wrist Connector	MARES Stow Bag 3
	M01 Bag	Angular Connector	MARES Stow Bag 3
6	M01 Bag	Pantograph	Temp stow; ref. step 6.8
7	M01 Bag	VIF Bottom Left Bracket	MARES VIF BRACKETS bubble Bag; MARES Launch Bag
	M01 Bag	Main Box Rear Panel	Temp stow; Refer to step 6.5

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

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- 5.10 Temporarily stow M01 Bag with Foam for return.
- 5.11 Stow the following in spare pocket of MARES Stow Bag 2:
 - MARES Stow Bag 1 Cue Card
 - MARES Stow Bag 2 Cue Card
 - MARES Stow Bag 3 Cue Card
- 5.12 Close all stowage Bags.
 - Fold MARES Stow Bags 1 and 2 in half and MARES Stow Bag 3 in thirds.
- 5.13 Insert Bag labels into pockets on MARES Launch Bag and 1.0 CTB.

6. FINAL STOW

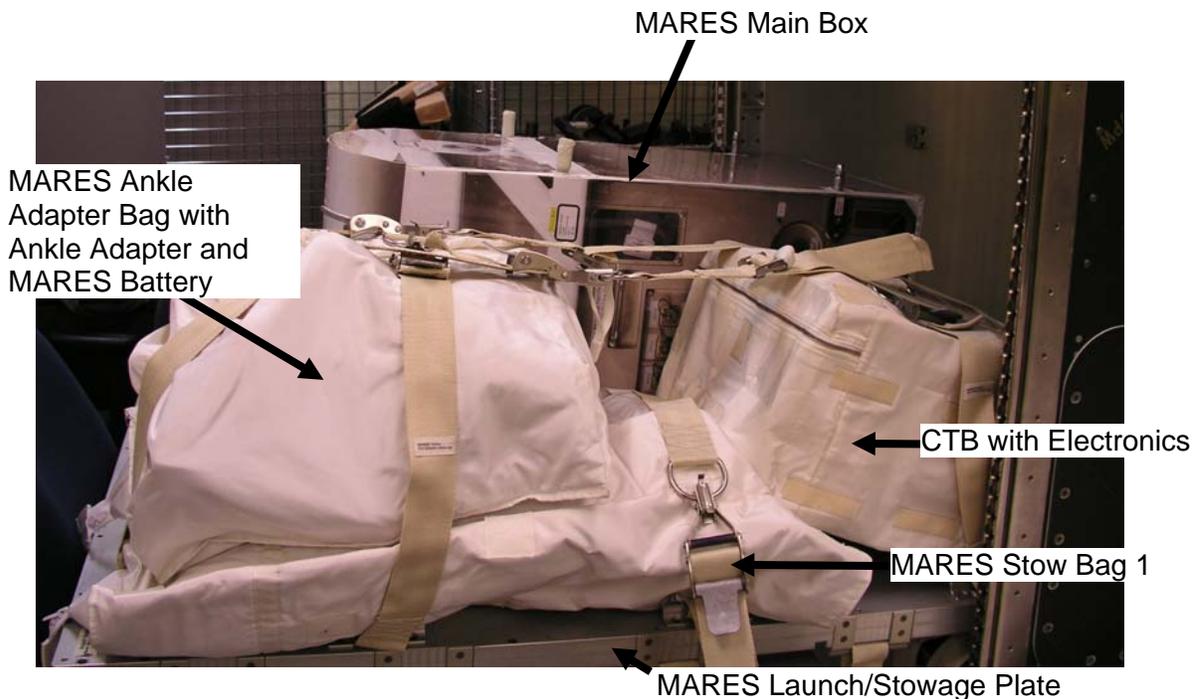


Figure 11.- MARES Temporary Stowage on the back of the MARES Launch/Stowage Plate.

NOTE

Once Bags are strapped to the MARES Launch/Stowage Plate, ensure all portions of the Bags will fit inside the Rack when rotated up.

- 6.1 Strap MARES Stow Bag 1, Ankle Adapter Bag and 1.0 CTB on the back of the MARES Launch/Stowage Plate.
 - Refer to Figure 11.

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

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- 6.2 Rotate MARES Launch/Stowage Plate back up to the launch position.
Ensure no portions of the Stowage Bags block the threaded holes.
Refer to Figure 12.



Figure 12.- MARES Launch/Stowage Plate with Bolt Location Identified.

- 6.3 Retrieve bolts (five) from the MARES Launch/Stowage Plate Bolt Temp Stow Ziplock Bag.
- 6.4 Place bolts (five) into any of the eight available holes on the MARES Launch/Stowage Plate.
Snug bolts (five) (Ratchet, 3/8" Drive; 5/16" Hex Head, 3/8" Drive; 10" Ext, 3/8" Drive).
Refer to Figure 12.

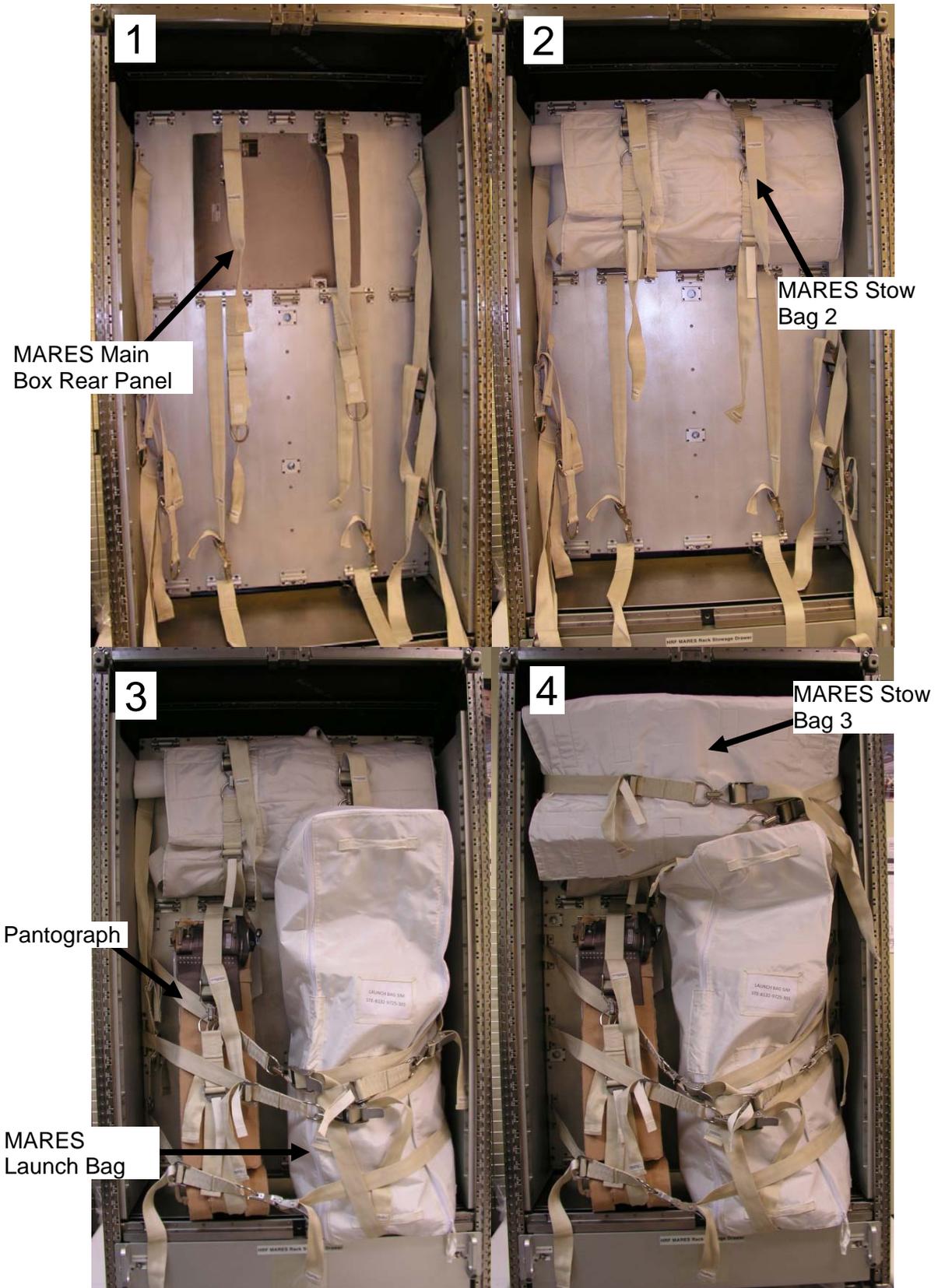


Figure 13.- Packing Order for the Front of the MARES Launch/Stowage Plate.

1.145 19A MARES STOWAGE RECONFIGURATION

(ASSY OPS/19A/FIN)

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NOTE

For steps 6.5 to 6.10, refer to Figure 13.

- 6.5 Stow the MARES Main Box Rear Panel on the upper portion of the MARES Launch/Stowage Plate.
- 6.6 Stow the MARES Stow Bag 2 on the upper portion of the MARES Launch/Stowage Plate over the Main Box Rear Panel.
- 6.7 Stow the MARES Launch Bag on the right side of the MARES Launch/Stowage Plate.
- 6.8 Stow the Pantograph on the left side of the MARES Launch/Stowage Plate.
- 6.9 Stow MARES Stow Bag 3 on the upper portion of the MARES Launch/Stowage Plate on top of MARES Stow Bag 2.
- 6.10 Ensure all items are strapped into the Rack.

7 POST RECONFIGURATION

- 7.1 Transfer the following to the MPLM for return:

- M01 Bag
- M02 Bag
- MARES Strut Return Bag (two)
- MARES Bolt Return Bag
- Top, Middle, and Bottom Fences (three)
- Launch Bag Fences (four fences; six pieces total)

Refer to the MPLM Return Transfer List for return stowage locations.

- 7.2 Notify **MCC-H** MARES stowage activity is complete.
Stow tools and parts.

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TRANSFER

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2.100 ZSR TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

Page 1 of 5 pages

OBJECTIVE:

Transfer Zero-G Soft Rack (ZSR) from MPL1S2(MPL1S4) to JLP1A1(LAB1P4). This transfer activity removes the ZSR from the MPLM and transfers the Rack to Station and structurally attaches the Rack to the Module.

LOCATION:

Stowed: MPL1S2(MPL1S4)

Installed: JLP1A1(LAB1P4)

DURATION:

25 minutes

PARTS:

None

MATERIALS:

None

TOOLS:

Digital Camera

Ratchet, 3/8" Drive (if required)

5/32" Hex Head, 3/8" Drive (if required)

REFERENCED PROCEDURE(S):

None

NOTE

All directional references (up, down, left, right) are with respect to front face of Rack, as you face Rack, with feet oriented towards the pivot point.

1. RACK SAFING

√All unnecessary equipment protruding into rack translation path has been removed, stowed (MPLM, Node 2, JPM, JLP, LAB)

2. REMOVING ZSR FROM MPLM

MPL1S2
(MPL1S4) Remove PIP Pins from ZSR brackets (four).

3. TRANSFERRING ZSR TO JLP(LAB)

3.1 Transfer ZSR to JLP1A1(LAB1P4).

2.100 ZSR TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

Page 2 of 5 pages



Figure 1.- ZSR on Pivot Fitting, Lower Right Side Shown.

- 3.2 Align ZSR onto Standoff until rack Pivot Latches engage Standoff Pivot Fittings.
Keep Rack rotated down.
Refer to Figure 1.

2.100 ZSR TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

Page 3 of 5 pages

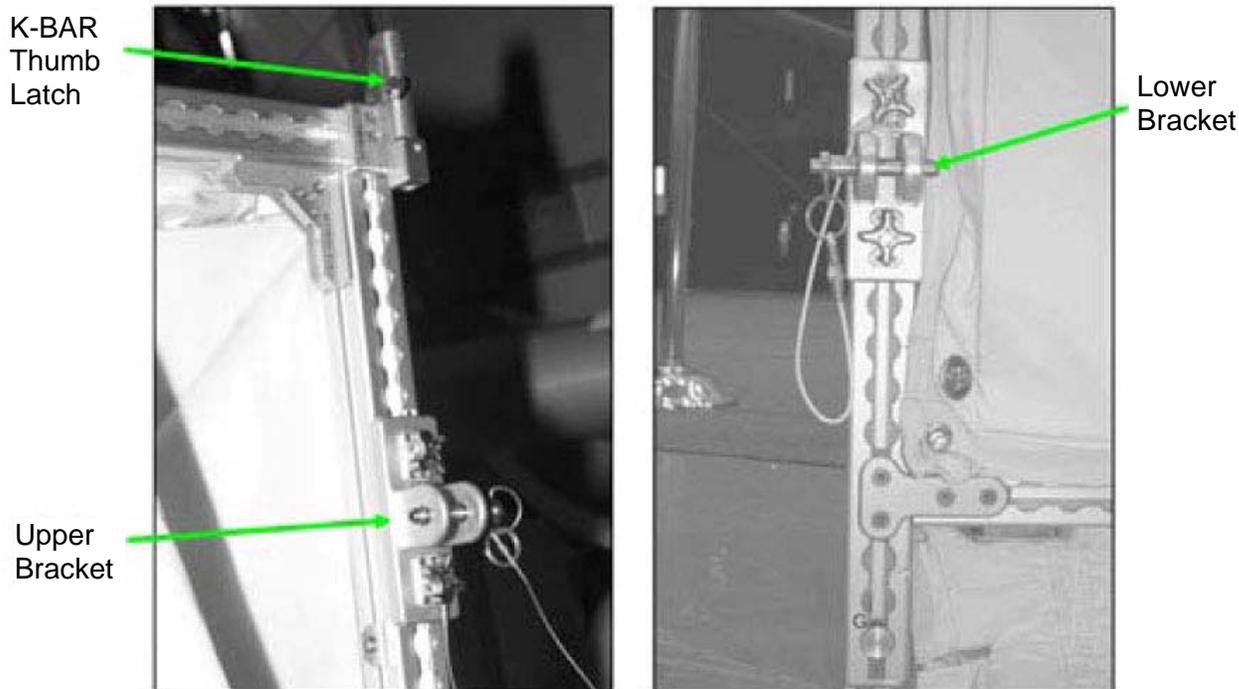


Figure 2.- ZSR with Upper Right K-BAR, Upper Bracket, and Lower Bracket.

4. FINAL INSTALLATION

4.1 ✓Rack rotation path is unobstructed

4.2 K-BAR Thumb Latches (two) → up position
Refer to Figure 2.

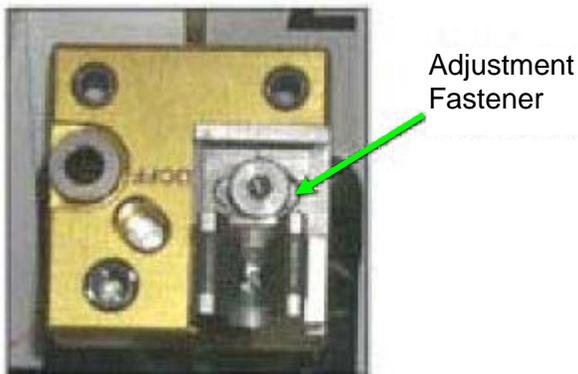


Figure 3.- K-BAR Capture Mechanism, Located on JLP(LAB) Standoff.

4.3 Slowly rotate Rack up to a controlled stop.
Engage Rack K-BAR Thumb Latches (two) in K-BAR Capture Mechanism located on JLP(LAB) Standoff.

2.100 ZSR TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

Page 4 of 5 pages

- *****
- * If K-BAR does not align with K-BAR Capture Mechanism
 - * | Loosen Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" /Drive).
 - * | Slide capture clip left or right, as required, to engage K-BAR.
 - * | Once K-BAR is engaged, re-tighten Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
 - * | Refer to Figure 3.
- *****

5. REMOVING FSE BRACKETS FROM ZSR

NOTE

The seat track attachment plates are noncaptive and will come off the brackets if the knobs are loosened more than approximately six turns.

Remove ZSR right FSE brackets from the right side of the ZSR and ZSR left FSE brackets from the left side of the ZSR (knobs).

Temporarily stow.

Refer to Figure 2.

6. REMOVING FSE BRACKETS FROM RSR



Figure 4.- RSR Upper.



Figure 5.- RSR Lower.

- 6.1 Remove RSR right FSE brackets (two) from the right side of the RSR and RSR left FSE brackets (two) from the left side of the RSR (knobs).

2.100 ZSR TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

Page 5 of 5 pages

- 6.2 Connect FSE Brackets removed from ZSR in step 5 with FSE Brackets removed from RSR in step 6.1 (PIP Pins).
Stow assembled FSE Brackets per Stowage Note.

7. POST TRANSFER

- 7.1 Photo document newly installed hardware (Digital Camera).
- 7.2 Notify **MCC-H** transfer activity for ZSR is complete.
Stow tools, parts.

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2.104 RACK TRANSFER FROM MPLM TO ISS (ER7, CQ2, MARES)

(ASSY OPS/19A/FIN/HC)

Page 1 of 9 pages

OBJECTIVE:

Transfer EXPRESS-7 Rack, Crew Quarters 2, and Muscle Atrophy Resistive Exercise System (MARES) Rack from the MPLM to ISS. This transfer activity disengages all launch restraints, transfers each Rack from the MPLM, and then structurally attaches the Racks to their designated ISS Rack Bay location.

LOCATION:

EXPRESS-7 Installed: LAB1P2, Stowed: MPL1P3
Crew Quarters 2 Installed: NOD2O5, Stowed: MPL1P2
MARES Installed: COL1F3, Stowed: MPL1S3

DURATION:

1 hour per Rack

CREW:

Two

PARTS:

K-Bar Assy, Left (three) P/N 683-62201-33
K-Bar Assy, Right (three) P/N 683-62201-34
ISPR Bonding Strap P/N 3000CA001-001

MATERIALS:

Dry Wipes

TOOLS:

Digital Camera
ARIS Tool Page P/N PERS3400M
Populate ARIS Tool Page with the following tools.

ISS IVA Toolbox:

Drawer 2:

- Ratchet, 3/8" Drive
- 7/16" Socket, 3/8" Drive
- 9/16" Socket, 3/8" Drive
- 1/2" Socket, 3/8" Drive
- 5/32" Hex Head, 3/8" Drive
- (40-200 in-lbs) Trq Wrench, 3/8" Drive

Drawer 3:

- 6" Long, 3/8" Hex Head, 3/8" Drive
- 5" Long, 3/8" Ball Tip Hex Head, 3/8" Drive

Drawer 4:

- Adjustable Joint Pliers, Straight Jaw

REFERENCED PROCEDURE(S):

None

2.104 RACK TRANSFER FROM MPLM TO ISS (ER7, CQ2, MARES)

(ASSY OPS/19A/FIN/HC)

Page 2 of 9 pages

NOTE

All directional references (up, down, left, right) are with respect to front face of Rack, as you face Rack, with feet oriented towards the pivot point.

1. RACK SAFING

- 1.1 ✓ All unnecessary equipment protruding into Rack translation path has been removed, stowed (MPLM, Node 2, US LAB, COLUMBUS)

CAUTION

Disengagement sequence must be followed exactly to allow any induced loads to be released safely back into structure.

2. DISENGAGING LOWER LAUNCH RESTRAINTS

Refer to Figures 1 and 2.

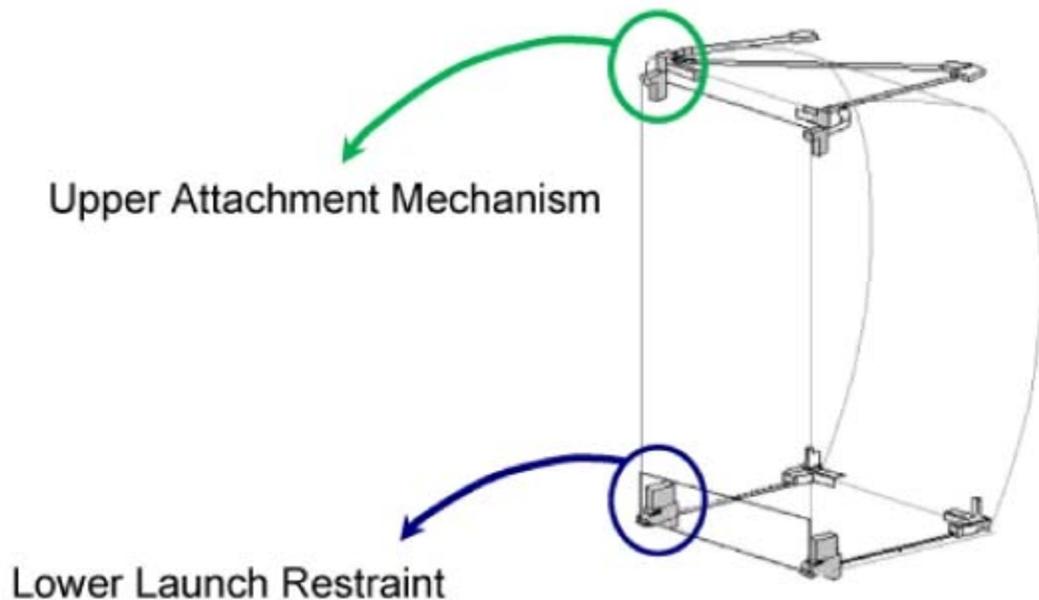


Figure 1.- Location of Rack Launch Restraint Hardware.

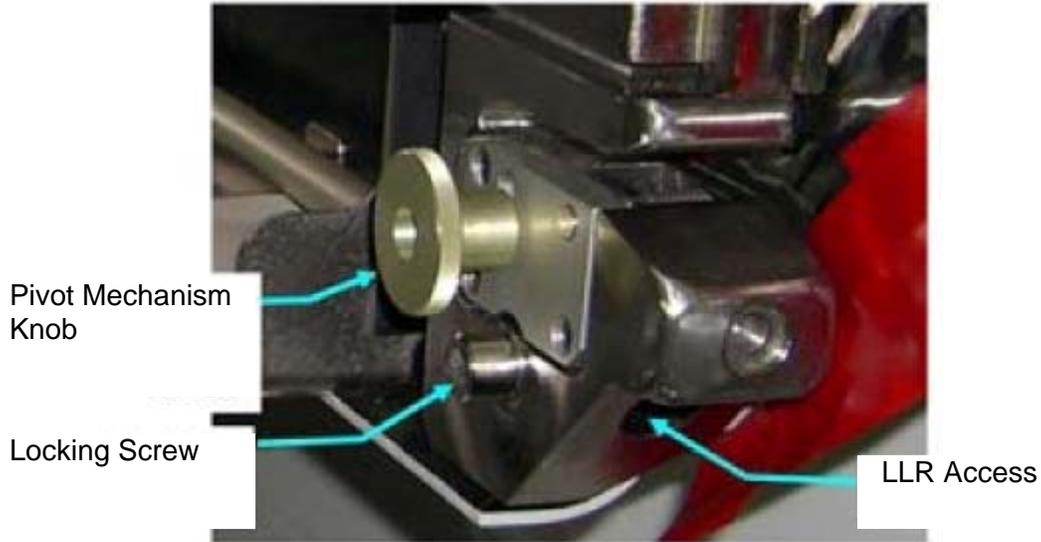


Figure 2.- USOS Rack Lower Launch Restraint, Right Side.

NOTE

Loud “pop” may occur during release of first Lower Launch Restraint.

- 2.1 Remove left Locking Screw (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
 - 2.2 Disengage left Lower Launch restraint 10 to 12 turns until hard stop (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
 - 2.3 Reinstall left Locking Screw, two to three turns.
 - 2.4 Loosen left Pivot Mechanism Knob one turn, so latch is free to move.
 - 2.5 Repeat for right side.
3. [DISENGAGING UPPER ATTACH MECHANISMS](#)
Refer to Figures 1 and 3.

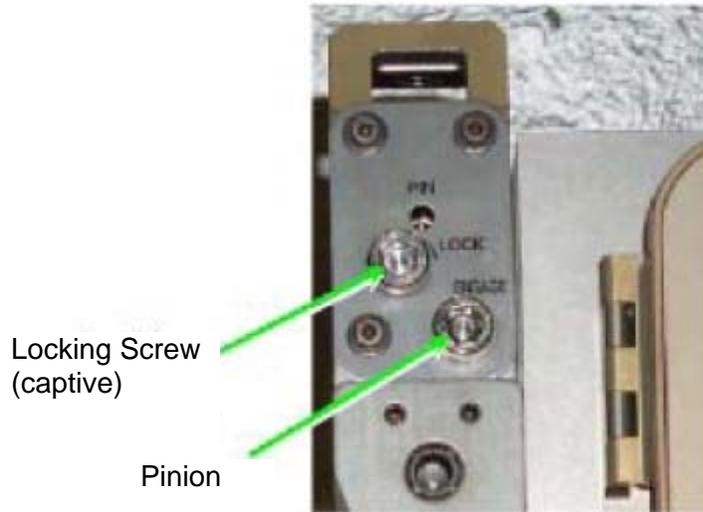


Figure 3.- USOS Rack Upper Attach Mechanism, Left Side.

- 3.1 Loosen left Locking Screw 10 to 12 turns or until threads completely disengage (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).

NOTE

1. To disengage left Pinion, turn ↺.
2. To disengage right Pinion, turn ↻.

- 3.2 Disengage left Pinion one full turn until hard stop (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 3.3 Repeat for right side.

4. K-BAR INSTALLATION

Refer to Figure 4.

2.104 RACK TRANSFER FROM MPLM TO ISS (ER7, CQ2, MARES)

(ASSY OPS/19A/FIN/HC)

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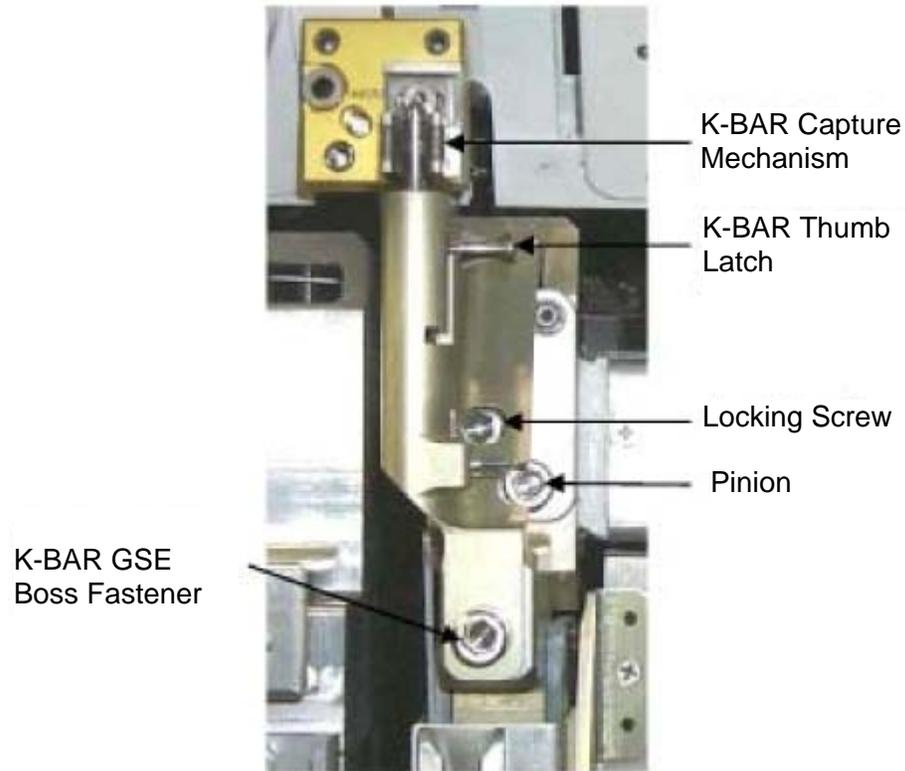


Figure 4.- USOS Rack Left K-BAR (Shown Installed).

- 4.1 Record S/N of K-BAR Assy, Left: _____
Record S/N of K-BAR Assy, Right: _____

- 4.2 Rotate Rack down only ~15 cm (~5 in).

CAUTION

Do not force Upper Attach Mechanism Pinions. Mechanism should easily engage K-BAR.

NOTE

1. To engage left Pinion, turn ↺.
2. To engage right Pinion, turn ↻.

- 4.3 Install K-BAR, Left (P/N 683-62201-33), in left Upper Attach Mechanism.
- 4.4 Check Locking Screw fully unlocked.
- 4.5 Engage Pinion, one full turn, into K-BAR (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 4.6 Snug Locking Screw and K-BAR GSE Boss Fastener (Ratchet, 3/8" Drive; 5" Long, 3/8" Ball Tip Hex Head, 3/8" Drive).
- 4.7 K-BAR Thumb Latch → down position

2.104 RACK TRANSFER FROM MPLM TO ISS (ER7, CQ2, MARES)

(ASSY OPS/19A/FIN/HC)

Page 6 of 9 pages

4.8 Repeat for K-BAR Assy, Right (P/N 683-62201-34)

5. RACK TRANSLATION PREPARATION

5.1 Remove any Handrails from the front of the Rack.
Slowly rotate Rack down to a controlled stop.



Figure 5.- MPLM Knee Brace Retention Devices.

5.2 Install Knee Brace Struts (two) into MPLM “KNEE BRACES RETEN DEVICE” Locking Clips (two).
Snug Adjustment Fasteners (two) (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive).
Refer to Figure 5.

6. TRANSFERRING RACK TO ISS

Table 1. Rack Transfer Locations.

Rack	Stowed	Installed
EXPRESS-7	MPL1P3	LAB1P2
Crew Quarters 2	MPL1P2	NOD2O5
MARES	MPL1S3	COL1F3

6.1 Transfer Rack from MPLM to ISS.

Refer to Table 1 for ISS Rack Locations.

6.2 Align Rack onto Standoff until Rack Pivot Latches engage Standoff Pivot Fittings.

Keep Rack rotated down.

6.3 Tighten both Pivot Mechanism Knobs in latched, up position.

2.104 RACK TRANSFER FROM MPLM TO ISS (ER7, CQ2, MARES)

(ASSY OPS/19A/FIN/HC)

Page 7 of 9 pages

7. GROUND STRAP INSTALLATION

7.1 If transferring EXPRESS-7 Rack, go to step 9.

If transferring MARES Rack, go to step 8.

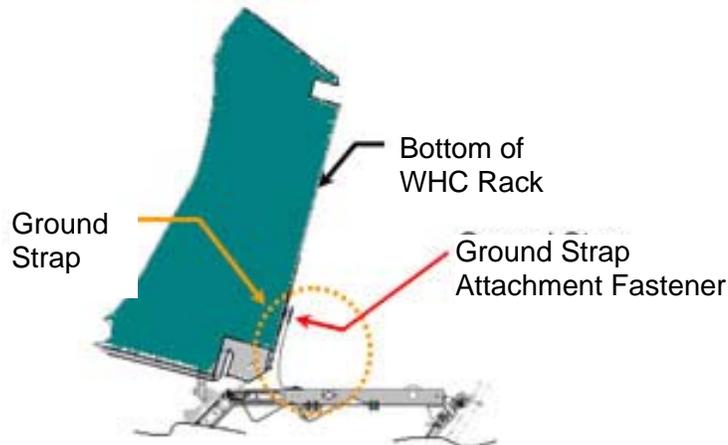


Figure 6.- Side View of Rotated Rack, Showing Rack Ground Strap Location.

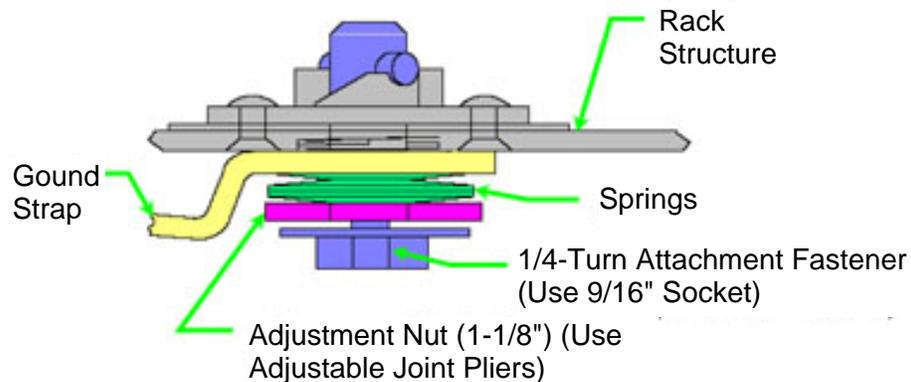


Figure 7.- Rack Ground Strap Cross-Section.

7.2 Inspect Ground Strap contact surfaces for debris and clean if required (Dry Wipes).

Refer to Figure 6.

7.3 Fully retract Adjustment Nut ↶ (towards head of Attachment Fastener) by hand.

Refer to Figure 7.

7.4 Ground Strap →|← WHC Rack, 1/4-Turn Attachment Fastener (Ratchet, 3/8" Drive; 9/16" Socket, 3/8" Drive)

2.104 RACK TRANSFER FROM MPLM TO ISS (ER7, CQ2, MARES)

(ASSY OPS/19A/FIN/HC)

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- 7.5 Snug Adjustment Nut ↻ until firm against Springs.
- 7.6 Tighten Adjustment Nut an additional 1/2 to 3/4 turn ↻ (Adjustable Joint Pliers, Straight Jaw).
- 7.7 Photo document installed Ground Strap (Digital Camera).

8. ISPR BONDING STRAP INSTALLATION

WARNING

Improper installation of Ground Strap may result in electrical shock hazard.

- 8.1 Verify ISPR Bonding Strap installed on COL Standoff.

```
*****
* If ISPR Bonding Strap not installed on COL Standoff
* | √COL-CC for stowage location of ISPR Bonding Strap and required
* | tools
* |
* | Retrieve ISPR Bonding Strap (P/N 3000CA001-001).
* | Record S/N of ISPR Bonding Strap:_____
* | Inspect ISPR Bonding Strap contact surfaces for debris and clean
* | if required (Dry Wipes).
* |
* | ISPR Bonding Strap →|← COL Standoff ISPR Bonding Strap
* | interface, 1/4-Turn Fastener (one) (9/16" Combination Wrench)
*****
```

- 8.2 Inspect ISPR Bonding Strap contact surfaces for debris and clean if required (Dry Wipes).
- 8.3 Fully retract Adjustment Nut (towards head of Attachment Fastener) by hand.
Refer to Figure 7.
- 8.4 ISPR Bonding Strap →|← HRF-2 Rack, 1/4-Turn Attachment Fastener (Ratchet, 3/8" Drive; 9/16" Socket, 3/8" Drive).
Refer to Figures 6, 7.
- 8.5 Snug Adjustment Nut , until firm against Springs.
- 8.6 Tighten Adjustment Nut an additional 1/2 to 3/4 turn (Adjustable Joint Pliers, Straight Jaw).
- 8.7 Photo document installed ISPR Bonding Strap (Digital Camera).

2.104 RACK TRANSFER FROM MPLM TO ISS (ER7, CQ2, MARES)

(ASSY OPS/19A/FIN/HC)

Page 9 of 9 pages

9. FINAL INSTALLATION

9.1 ✓ Rack rotation path is unobstructed

9.2 K-BAR Thumb Latches (two) → up position
Refer to Figure 4.

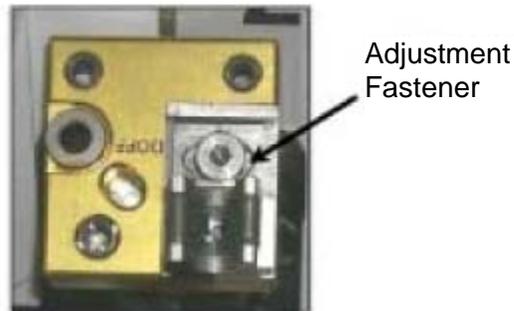


Figure 8.- K-BAR Capture Mechanism, Located on LAB Standoff.

9.3 Slowly rotate Rack up to a controlled stop.
Engage Rack K-BAR Thumb Latches (two) in Capture Mechanism located on Standoff.
Refer to Figure 8.

- * If K-BAR does not align with Capture Mechanism
- * | Loosen Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- * | Slide capture clip left or right, as required, to engage K-BAR.
- * | Once K-BAR is engaged, re-tighten Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- * |
- * Refer to Figure 8.

10. CLOSEOUT, POST TRANSFER

10.1 Photo document newly installed hardware in ISS module (Digital Camera).

10.2 Notify **MCC-H** transfer activity for Rack is complete, S/Ns of K-BAR Assy(s).
Stow tools, materials, parts.

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2.106 RACK TRANSFER FROM MPLM TO ISS (MELFI-3)

(ASSY OPS/19A/FIN 1/HC)

Page 1 of 8 pages

OBJECTIVE:

Transfer Minus Eighty Laboratory Freezer for ISS (MELFI-3) from the MPLM to ISS. This transfer activity disengages all launch restraints, transfers MELFI-3 Rack from the MPLM, and then structurally attaches it to the ISS Rack Bay location.

LOCATION:

MELFI-3 Installed: JPM1A1, Stowed: MPL1A1

DURATION:

1 hour

CREW:

Two

PARTS:

IHI K-Bar Assy, Left (one) P/N 683-62201-3

IHI K-Bar Assy, Right (one) P/N 683-62201-4

JEM Ground Strap JAXA Rack (two) P/N 80AS89113-105

MATERIALS:

Dry Wipes

TOOLS:

Digital Camera

ARIS Tool Page P/N PERS3400M

Populate ARIS Tool Page with the following tools.

ISS IVA Toolbox:

Drawer 2:

- Ratchet, 3/8" Drive
- 1/8" Hex Head, 3/8" Drive
- 9/16" Socket, 3/8" Drive
- 5/32" Hex Head, 3/8" Drive
- 5/16" Hex Head, 3/8" Drive
- 13 mm 6 Pt Socket, 3/8" Drive
- 7/16" Socket, 3/8" Drive
- 1/2" Socket, 3/8" Drive
- 4" Ext, 3/8" Drive

Drawer 3:

- 6" Long, 3/8" Hex Head, 3/8" Drive

Drawer 4:

- Adjustable Joint Pliers, Straight Jaw

REFERENCED PROCEDURE(S):

None

NOTE

All directional references (up, down, left, right) are with respect to front face of Rack, as you face Rack, with feet oriented towards the pivot point.

2.106 RACK TRANSFER FROM MPLM TO ISS (MELFI-3)

(ASSY OPS/19A/FIN 1/HC)

Page 2 of 8 pages

1. RACK SAFING

√All unnecessary equipment protruding into Rack translation path has been removed, stowed (MPLM, Node 2, JPM)

2. ADJUSTING KNEE BRACE

NOTE

The Center Knee Brace is adjusted to remove its preload in order to make it easier to disengage the Upper Attachment Mechanism.

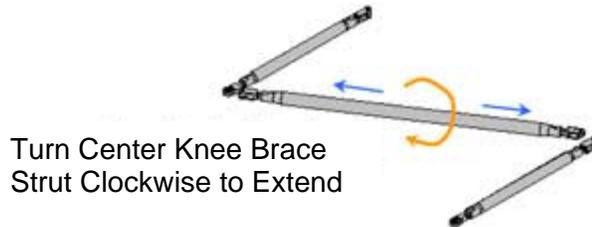


Figure 1.- Knee Brace Hardware.

2.1 Adjust Center Knee Brace Strut one to two turns \curvearrowright , until loose. Refer to Figure 1.

3. DISENGAGING LOWER LAUNCH RESTRAINTS

CAUTION

Disengagement sequence must be followed exactly to allow any induced loads to be released safely back into structure.

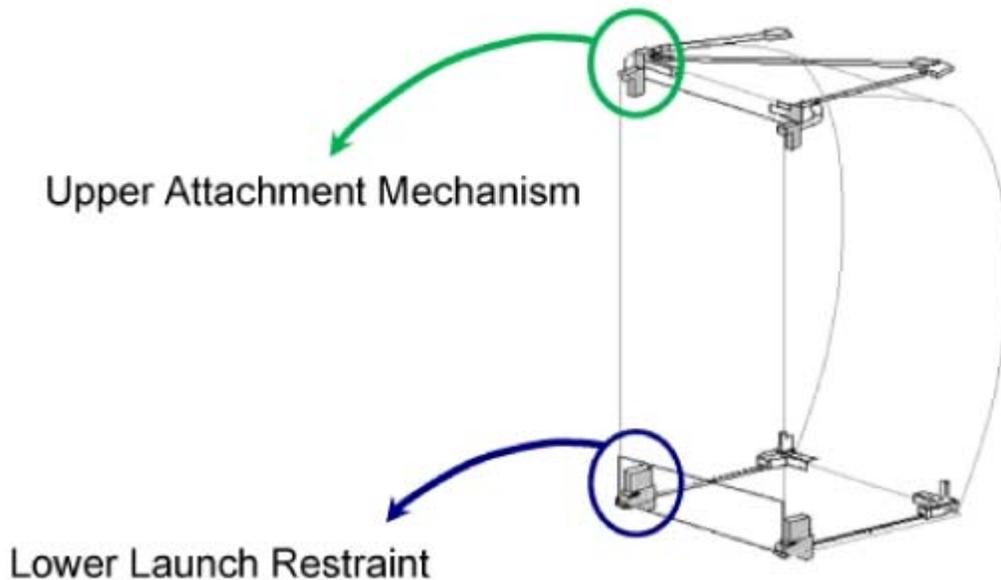


Figure 2.- Location of Rack Launch Restraint Hardware.

2.106 RACK TRANSFER FROM MPLM TO ISS (MELFI-3)

(ASSY OPS/19A/FIN 1/HC)

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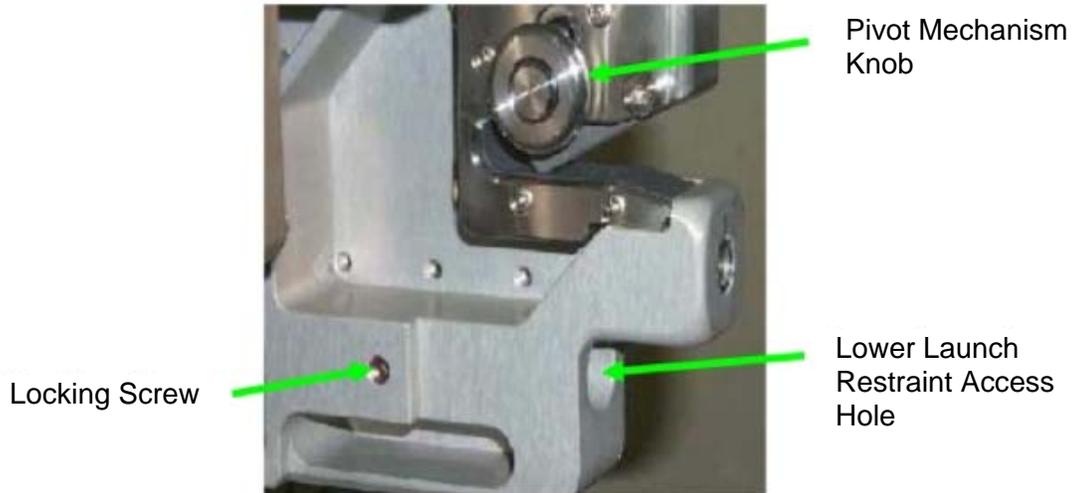


Figure 3.- MELFI-3 Lower Launch Restraint, Right Side.

NOTE

1. Locking Screw is fully disengaged when top of screw is flush with surrounding structure.
2. A loud “pop” may occur during release of first Lower Launch Restraint.

Refer to Figures 2 and 3.

- 3.1 Disengage left Locking Screw until hard stop, approximately four to five turns (Ratchet, 3/8" Drive; 1/8" Hex Head, 3/8" Drive).
- 3.2 Disengage left Lower Launch Restraint 10 to 12 turns until hard stop (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 3.3 Tighten left Locking Screw (Ratchet, 3/8" Drive; 1/8" Hex Head, 3/8" Drive).
- 3.4 Loosen Pivot Mechanism Knob so Pivot Latch is free to move.
- 3.5 Repeat steps 3.1 to 3.4 for right side of MELFI-3 Rack.

4. DISENGAGING UPPER ATTACH MECHANISMS

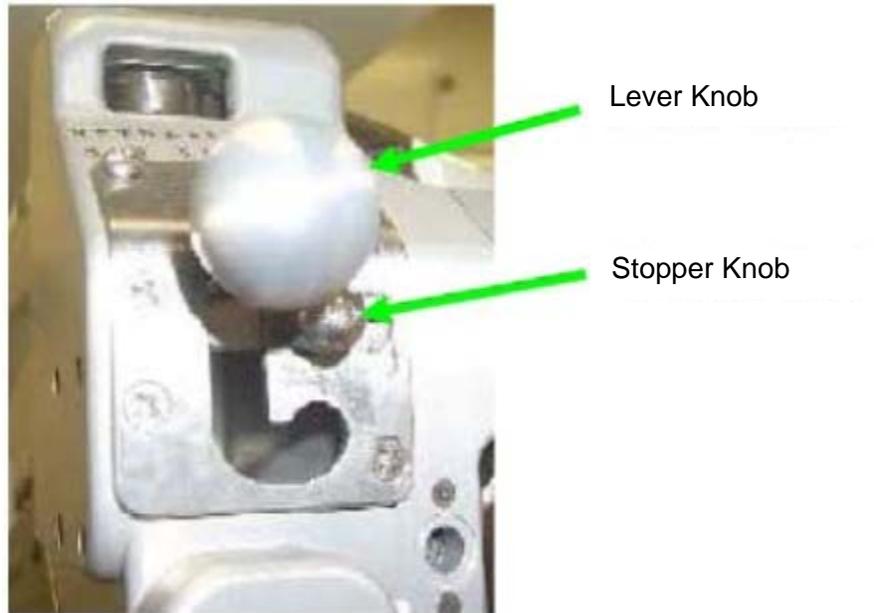


Figure 4.- MELFI-3 Upper Attach Mechanism, Left Side.

Refer to Figures 2 and 4.

- 4.1 Disengage left Stopper Knob and slide away from Lever Knob
(Ratchet, 3/8" Drive; 4" Ext, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- 4.2 Move Lever Knob down until knob is positioned at end of slot.
- 4.3 Repeat steps 4.1 and 4.2 for right side of MELFI-3 Rack.

2.106 RACK TRANSFER FROM MPLM TO ISS (MELFI-3)

(ASSY OPS/19A/FIN 1/HC)

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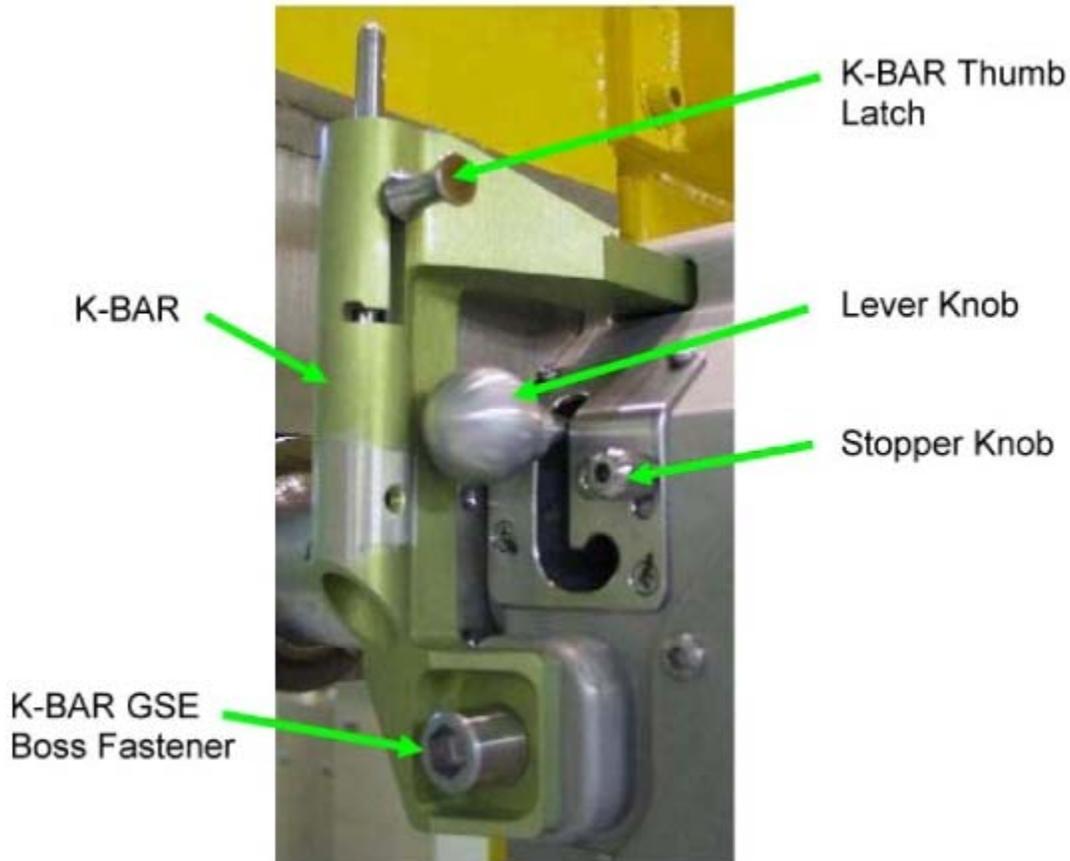


Figure 5.- MELFI-3 Rack Left K-BAR (Shown Installed).

5. INSTALLING K-BAR

Refer to Figure 5.

5.1 Record S/N of IHI K-BAR Assy, Left: _____

Record S/N of IHI K-BAR Assy, Right: _____

5.2 ✓ Rack rotation path is unobstructed

5.3 Rotate Rack down only ~15 cm (~5 in).

CAUTION

Do not force Upper Attach Mechanism Pinions. Mechanism should easily engage K-BAR.

5.4 Install IHI K-BAR, Left (P/N 683-62201-3) in left Upper Attach Mechanism.

5.5 Slide Lever Knob to top position of slot to engage K-BAR.

2.106 RACK TRANSFER FROM MPLM TO ISS (MELFI-3)

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- 5.6 Slide Stopper Knob under Lever Knob to lock Lever Knob in place. Tighten Stopper Knob (Ratchet, 3/8" Drive; 4" Ext, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
- 5.7 Tighten left K-BAR GSE Boss fastener (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 5.8 K-BAR Thumb Latch → down position
- 5.9 Repeat for IHI K-BAR Assy, Right (P/N 683-62201-4).

6. PREPARING RACK TRANSLATION

- 6.1 Remove any Handrails from the front of the Rack. Slowly rotate Rack down to a controlled stop.



Figure 6.- MPLM Knee Brace Retention Devices.

- 6.2 Install Knee Brace Struts (two) into MPLM "KNEE BRACES RETEN DEVICE" Locking Clips (two). Snug Adjustment Fasteners (two) (Ratchet, 3/8" Drive; 7/16" Socket, 3/8" Drive). Refer to Figure 6.

7. TRANSFERRING RACK TO ISS

- 7.1 Transfer MELFI-3 from MPL1A1 to JPM1A1.
- 7.2 Align Rack onto Standoff until Rack Pivot Latches engage Standoff Pivot Fittings. Keep Rack rotated down.
- 7.3 Tighten both Pivot Mechanism Knobs in latched, down position.

2.106 RACK TRANSFER FROM MPLM TO ISS (MELFI-3)

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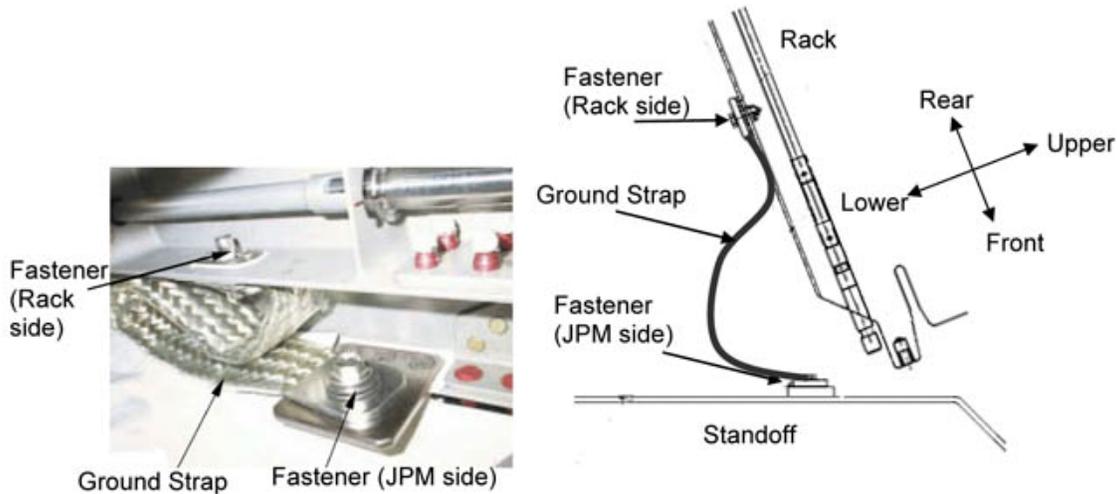


Figure 7. - Ground Strap Installation.

8. INSTALLING GROUND STRAP

WARNING

Improper installation of Ground Strap may result in electrical shock hazard.

CAUTION

JEM Ground Strap for JAXA Rack (P/N 80AS89113-105) should be used for MELFI. Installing improper P/N of Ground Strap may cause damage to Ground Strap, Rack or JEM Standoff.

- 8.1 Record Barcodes of JEM Ground Strap JAXA Rack (two).
B/C1: _____
B/C2: _____
- 8.2 Inspect JEM Ground Strap JAXA Rack (two) contact surfaces for debris and clean if required (Dry Wipes).
- 8.3 JEM Ground Strap JAXA Rack →|← Standoff, 1/4 Turn Attachment fastener (Ratchet, 3/8" Drive; 13 mm 6 Pt Socket, 3/8" Drive). Refer to Figure 7.
- 8.4 JEM Ground Strap JAXA Rack →|← Rack, 1/4 Turn Attachment Fasteners (Ratchet, 3/8" Drive; 13 mm 6 Pt Socket, 3/8" Drive). Refer to Figure 7.
- 8.5 Repeat steps 8.2 and 8.3 for JEM Ground Strap JAXA Rack on other side of Rack bay.
- 8.6 Photo document installed Ground Straps (two) (Digital Camera).

2.106 RACK TRANSFER FROM MPLM TO ISS (MELFI-3)

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9. FINAL INSTALLATION

9.1 ✓ Rack rotation path unobstructed

9.2 K-BAR Thumb Latches (two) → up position
Refer to Figure 5.

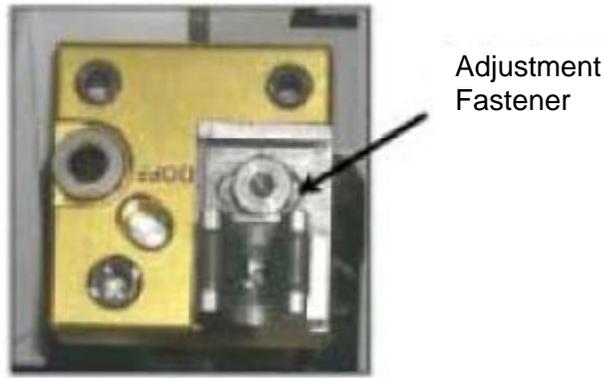


Figure 9.- K-BAR Capture Mechanism, Located on Standoff.

9.3 Slowly rotate Rack up to a controlled stop.
Engage Rack K-BAR Thumb Latches (two) in Capture Mechanism located on Standoff.

* If K-BAR does not align with Capture Mechanism
* | Loosen Adjustment Fastener (Ratchet, 3/8" Drive; 5/32" Hex Head,
* | 3/8" Drive).
* | Slide capture clip left or right, as required, to engage K-BAR.
* | Once K-BAR is engaged, re-tighten Adjustment Fastener
* | (Ratchet, 3/8" Drive; 5/32" Hex Head, 3/8" Drive).
* | Refer to Figure 9.

10. POST TRANSFER

10.1 If removed, attach MELFI UIP Closeout to Rack (Velcro).

10.2 Photo document newly installed hardware in ISS module (Digital Camera).

10.3 Notify **MCC-H** transfer activity for MELFI-3 is complete, S/Ns of K-BAR Assy(s), and B/Cs of JEM Ground Strap JAXA Rack. Stow tools, materials, parts.

2.110 WORF TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

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OBJECTIVE:

To transfer Window Observational Research Facility (WORF) Rack from MPLM to ISS (LAB). This transfer activity releases MPLM Rack Launch Restraints, installs Grounding Strap and Knee Braces in the LAB, and then structurally attaches WORF into the LAB.

LOCATION:

Stowed: MPL1P2

Installed: LAB1D3

DURATION:

2 hour 30 minutes

CREW:

Two

PARTS:

K-BAR Assy, Left P/N 683-62201-33

K-BAR Assy, Right P/N 683-62201-34

Corner Closeout Seal (one) P/N 683-83696-12, "UPPER RIGHT"

Corner Closeout Seal (one) P/N 683-83696-13, "LOWER LEFT"

Corner Closeout Seal (one) P/N 683-83696-14, "UPPER LEFT"

Corner Closeout Seal (one) P/N 683-83696-15, "LOWER RIGHT"

Side, Closeout Seal (one) P/N 683-83696-16, "LEFT SIDE"

Side, Closeout Seal (one) P/N 683-83696-17, "RIGHT SIDE"

MATERIALS:

Dry Wipes

Gray Tape

Sharpie

10" x 10" Ziplock Bag (one)

Ziplock Bag (small)

TOOLS:

Digital Camera

Worklight

ISS IVA Toolbox:

Drawer 2:

Ratchet, 3/8" Drive

3/8" Socket, 3/8" Drive

7/16" Socket, 3/8" Drive

9/16" Socket, 3/8" Drive

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

6" Ext, 3/8" Drive

11" Ext, 3/8" Drive

Drawer 3:

6" Long, 3/8" Hex Head, 3/8" Drive

5" Long, 3/8" Ball Tip Hex Head, 3/8" Drive

Drawer 4:

Adjustable Joint Pliers, Straight Jaw

REFERENCED PROCEDURE(S):
None

NOTE
All directional references (up, down, left, right) are with respect to front face of Rack, as you face Rack, with feet oriented towards the pivot point.

1. RACK PREPARATION

1.1 Remove any Handrails from the front of the WOLF Rack.

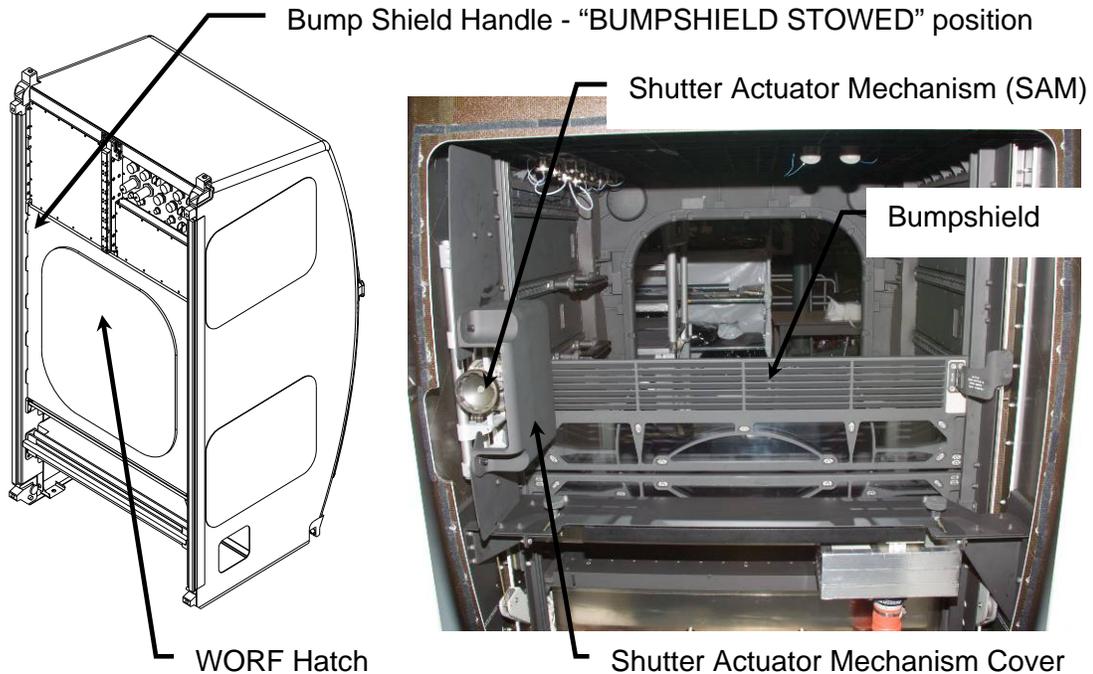


Figure 1.- WOLF Rack Front and Rear.

CAUTION

Remove wristwatches, rings, etc, when working within WOLF payload volume to prevent scratching black interior surfaces. Scratches in black painted surface will degrade experiment results due to glare.

NOTE
WORF Hatch Launch restraint bolts are non-captive and have washers that are captive to the bolts. The bolt threads will be covered in Braycote.

MPL1P2 1.2 Using Sharpie, label 10" x 10" Ziplock Bag, "WORF LAUNCH BOLTS, 19A RETURN."

2.110 WOLF TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

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- 1.3 Remove non-captive launch restraint bolts/washers (eight) from WORF Hatch (Ratchet, 3/8" Drive; 6" Ext, 3/8" Drive; 3/16" Hex Head, 3/8" Drive).
Stow bolts(washers) in Ziplock Bag
Temporarily stow Ziplock Bag.
- 1.4 ✓All watches, rings, and other metallic objects are removed while working in WORF Rack volume
- 1.5 Remove WORF Hatch, 1/4 Turn Fasteners (eight).
Temporarily stow.
- 1.6 Install Worklight in WORF Rack volume as required.

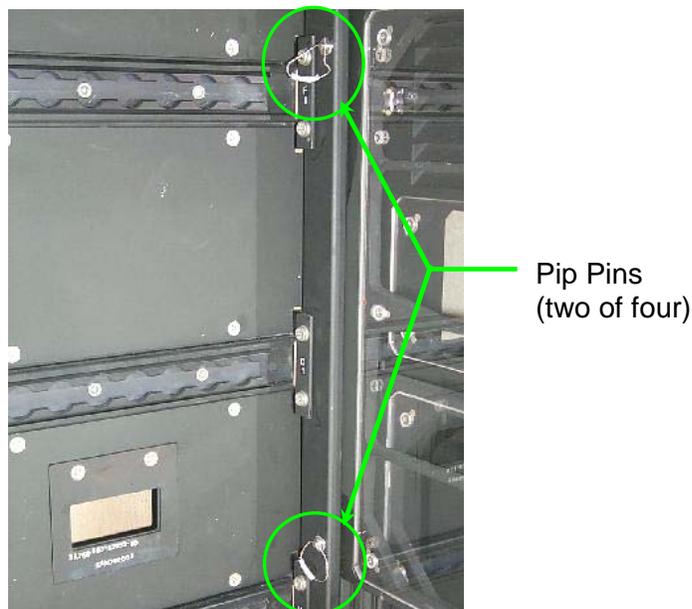


Figure 2.- Bumpshield Launch Restraint Pip Pins.

- 1.7 Remove Bumpshield launch restraint Pip Pins (four).
Refer to Figure 2.
- 1.8 Stow Pip Pins in 10" x 10" Ziplock Bag labeled, "WOLF LAUNCH BOLTS, 19A RETURN."
- 1.9 Bump Shield Handle → BUMPSHIELD STOWED
Refer to Figure 1.
- 1.10 Remove Shutter Actuator Mechanism (SAM) Cover, fasteners (four) (Ratchet, 3/8" Drive; 6" Ext, 3/8" Drive; 3/8" Socket, 3/8" Drive).
Temporarily stow.

2.110 WORF TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

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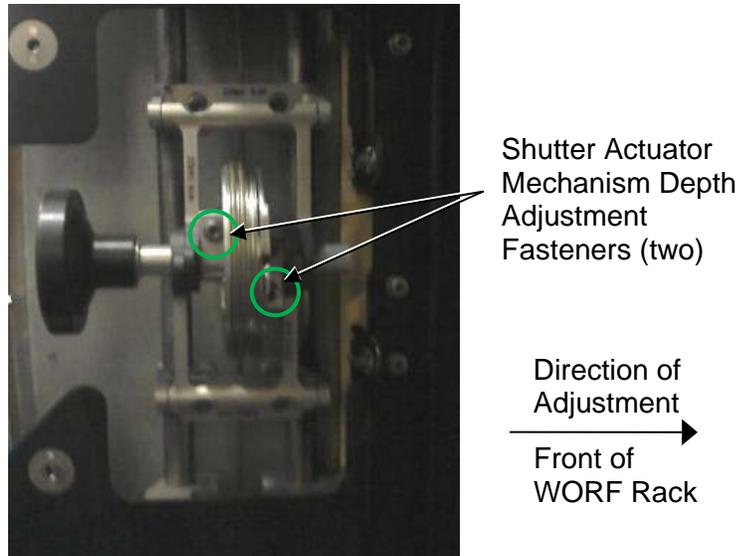


Figure 3.- Shutter Actuator Mechanism.

Refer to Figure 3 for steps 1.12 to 1.14.

- 1.11 Remove Velcro Straps (two) from SAM Cover and Pip Pin. Leave SAM Pip Pin installed at this time.

Stow Velcro Straps (two) in 10" x 10" Ziplock Bag labeled "WORF LAUNCH BOLTS, 19A RETURN."
- 1.12 Loosen, but do not remove, SAM depth adjustment fasteners (two) (Ratchet, 3/8" Drive; 6" Ext, 3/8" Drive; 3/16" Hex Head, 3/8" Drive).
- 1.13 Slide WORF Handwheel Mechanism toward the front of the WORF Rack until hard stop.
- 1.14 Snug SAM depth adjustment fasteners (two) (Ratchet, 3/8" Drive; 6" Ext, 3/8" Drive; 3/16" Hex Head, 3/8" Drive).
- 1.15 Reinstall SAM Cover, fasteners (four) (Ratchet, 3/8" Drive; 6" Ext, 3/8" Drive; 3/8" Socket, 3/8" Drive).
- 1.16 ✓ All unnecessary equipment (worklight, etc) removed from inside of WORF Payload Volume
- 1.17 Install WORF Hatch, 1/4 Turn Fasteners (eight).
- 1.18 ✓ All unnecessary equipment protruding into Rack translation path has been removed, stowed (MPLM, Node 2, LAB)

2.110 WOLF TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

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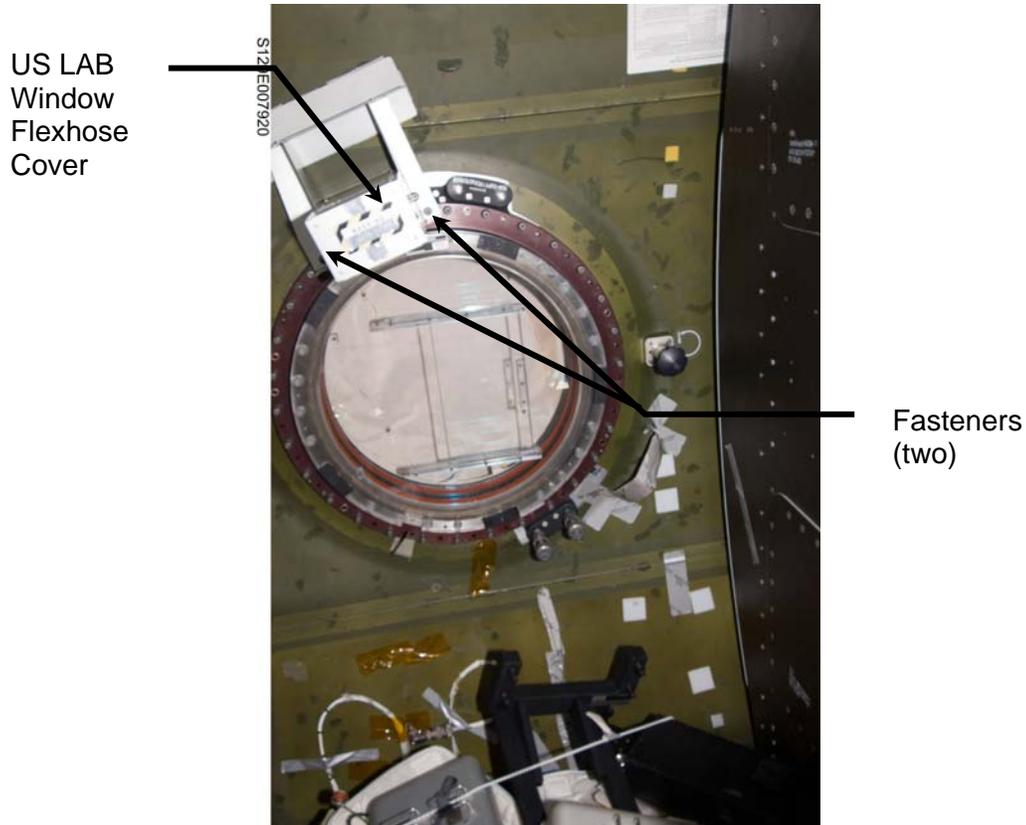


Figure 4.- LAB1D3 Rack Bay Configuration - LAB Window Flexhose Cover.

CAUTION

Using the LAB Window Flexhose as a hand-hold may damage the Flexhose and cause a cabin leak. Do not use the Flexhose as a hand-hold (avoid side or bending loads).

NOTE

Protection Cover bolts (two) are non-captive. Each will also have an associated washer. These loose parts will be stowed in a Ziplock Bag.

- LAB1D3
- 1.19 Using Sharpie, label small Ziplock Bag, "LAB Window Flexhose Cover Bolts/Washers."
 - 1.20 Unfasten Flexhose Cover non-captive bolts (two) (Ratchet, 3/8" Drive; 11" Ext, 3/8" Drive; 7/16" Socket, 3/8" Drive).
 - 1.21 Stow bolts (two) and washers (two) in small Ziplock Bag. Tape Ziplock Bag to Flexhose Cover (Gray Tape).
 - 1.22 Remove Flexhose Cover from LAB Window and module wall (Velcro).

2.110 WORF TRANSFER MPLM TO ISS

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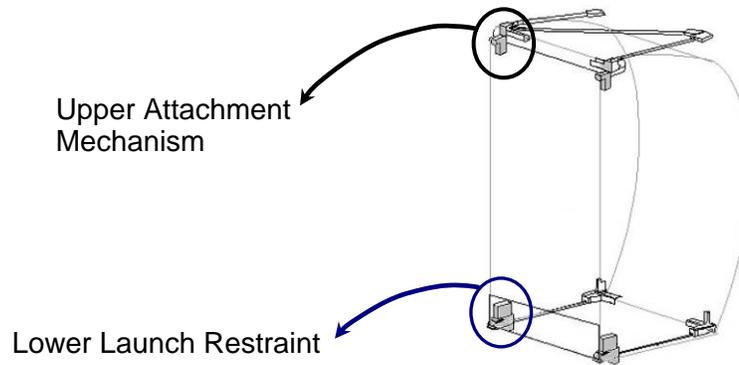


Figure 5.- Location of Rack Launch Restraint Hardware.

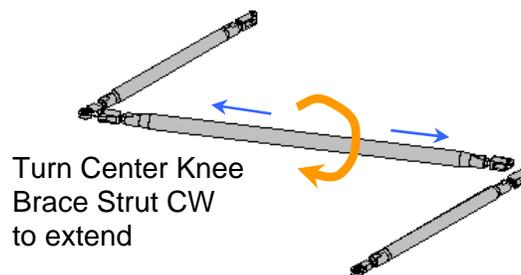


Figure 6.- Knee Brace Hardware.

NOTE

KSC personnel preload Center Knee Brace Strut by turning strut ↻ to shorten. In order to help Upper Attachment Mechanism disengagement, this strut should be readjusted ↻ on-orbit prior to Rack removal.

2. ADJUSTING KNEE BRACE

MPL1P2

- 2.1 Adjust Center Knee Brace Strut 1 to 2 turns ↻, until loose. Refer to Figures 5 and 6.

2.110 WOLF TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

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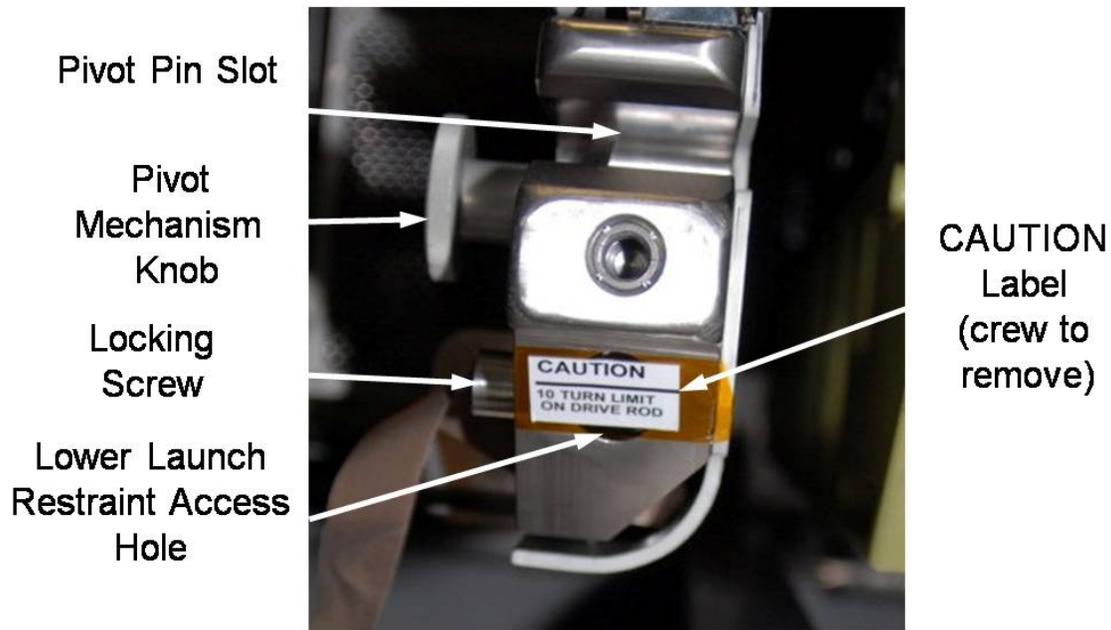


Figure 7.- WOLF Lower Launch Restraint, Right Side.

3. DISENGAGING LOWER LAUNCH RESTRAINTS

Refer to Figure 7.

CAUTION

Disengagement sequence must be followed exactly to allow any induced loads to be released safely back into structure.

NOTE

Loud “pop” may occur during release of first Lower Launch Restraint.

- 3.1 Remove left Locking Screw (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 3.2 Disengage left Lower Launch restraint 10 to 12 turns (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 3.3 Reinstall left Locking Screw, two to three turns.
- 3.4 Loosen left Pivot Mechanism Knob one turn, so latch is free to move.
- 3.5 Remove Kapton Caution Label from right Lower Launch Restraint Access Hole.
Temporarily stow.
- 3.6 Remove right Locking Screw (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).

2.110 WOLF TRANSFER MPLM TO ISS

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CAUTION

Disengaging right Lower Launch Restraint more than 10 turns can cause damage to AAA ducting internal to WOLF. Do not disengage more than 10 turns.

- 3.7 Disengage right Lower Launch Restraint 10 turns (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 3.8 Reinstall right Locking Screw, two to three turns.
- 3.9 Install Kapton Caution Label back on right Lower Launch Restraint Access Hole.
Refer to Figure 7.

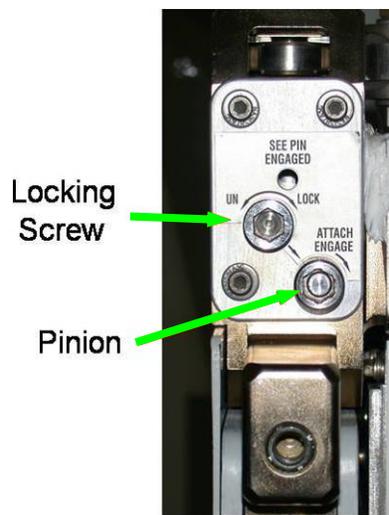


Figure 8.- Upper Attach Mechanism, Left Side.

4. DISENGAGING UPPER ATTACH MECHANISMS

Refer to Figure 8 for step 4.

- 4.1 Loosen left Locking Screw 10 to 12 turns or until threads completely disengage (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).

NOTE

To disengage left Pinion, turn ⤴.
To disengage right Pinion, turn ⤵.

- 4.2 Disengage left Pinion one turn until hard stop (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 4.3 Repeat steps 4.1 and 4.2 for right side.

2.110 WORF TRANSFER MPLM TO ISS

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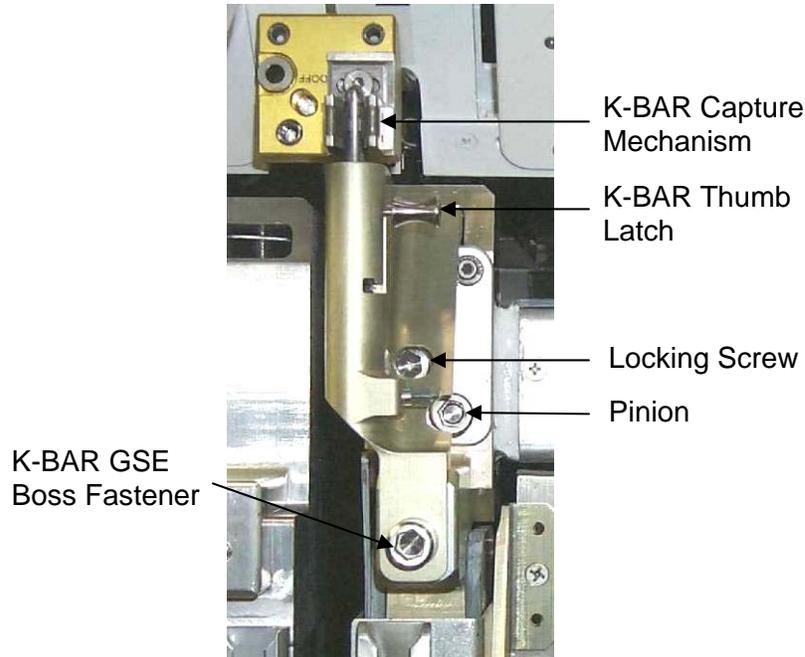


Figure 9.- Left K-BAR (shown installed).

5. INSTALLING K-BARS

- 5.1 Record S/N of K-BAR Assy, Left: _____
Record S/N of K-BAR Assy, Right: _____

- 5.2 Rotate Rack down only ~15 cm (~5 in).
Refer to Figures 8 and 9.

CAUTION

Do not force Upper Attach Mechanism Pinions.
Mechanism should easily engage K-BAR.

NOTE

To engage left Pinion, turn ↺.
To engage right Pinion, turn ↻.

- 5.3 Install K-BAR, Left (P/N 683-62201-33), in left Upper Attach Mechanism.
- 5.4 Verify Locking Screw fully unlocked.
- 5.5 Engage Pinion, one turn, into K-BAR (Ratchet, 3/8" Drive; 6" Long, 3/8" Hex Head, 3/8" Drive).
- 5.6 Snug Locking Screw and K-BAR GSE Boss Fastener (Ratchet, 3/8" Drive; 5" Long, 3/8" Ball Tip Hex Head, 3/8" Drive).

2.110 WOLF TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

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5.7 K-BAR Thumb Latch → down position

5.8 Repeat steps 5.3 to 5.7 for K-BAR, Right (P/N 683-62201-34).

6. TRANSFERRING WOLF RACK TO LAB1D3

6.1 Slowly rotate Rack down to a complete stop.

6.2 Transfer WOLF to LAB1D3.

LAB1D3

6.3 Align WOLF Rack onto Standoff until Rack Pivot Latches engage Standoff Pivot Fittings.
Keep Rack rotated down.

6.4 Tighten both Pivot Mechanism Knobs in latched, up position.

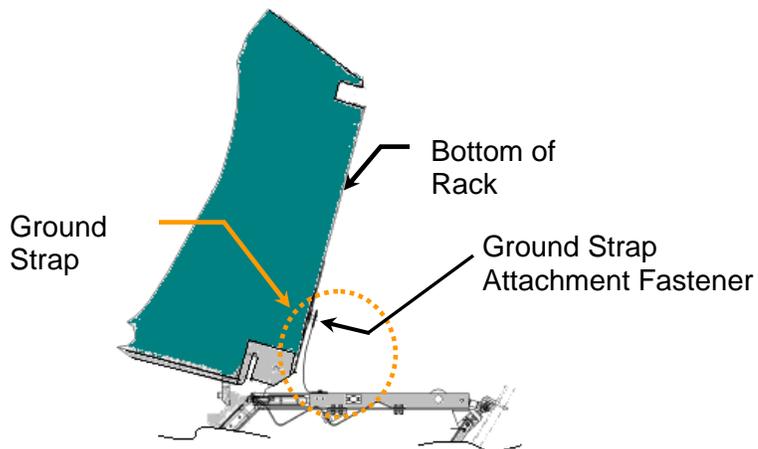


Figure 10.- Side View of Rotated Rack, Showing Rack Ground Strap Location.

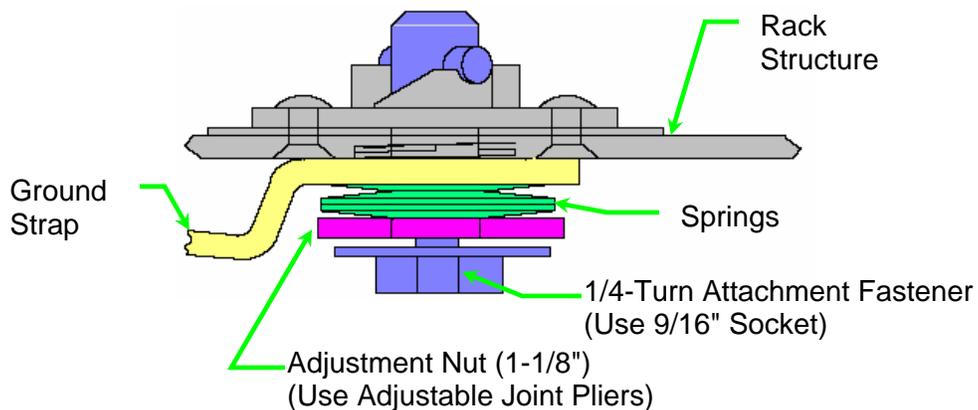


Figure 11.- Rack Ground Strap Cross-Section.

2.110 WOLF TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

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7. INSTALLING GROUND STRAP

7.1 Inspect Ground Strap contact surfaces for debris, clean if required (Dry Wipes).

Refer to Figure 10.

7.2 Fully retract Adjustment Nut ↺ (towards head of Attachment Fastener) by hand.

Refer to Figure 11.

WARNING

Improper installation of Ground Strap may result in electrical shock hazard.

7.3 Ground Strap →|← WOLF Rack, 1/4-Turn Attachment Fastener (Ratchet, 3/8" Drive; 9/16" Socket, 3/8" Drive).

7.4 Snug Adjustment Nut ↻, until firm against Springs.

7.5 Tighten Adjustment Nut an additional 1/2 to 3/4 turn ↻ (Adjustable Joint Pliers, Straight Jaw).

7.6 Photo document installed Ground Strap (Digital Camera).

8. WOLF REAR CLOSEOUT SEAL INSTALLATION

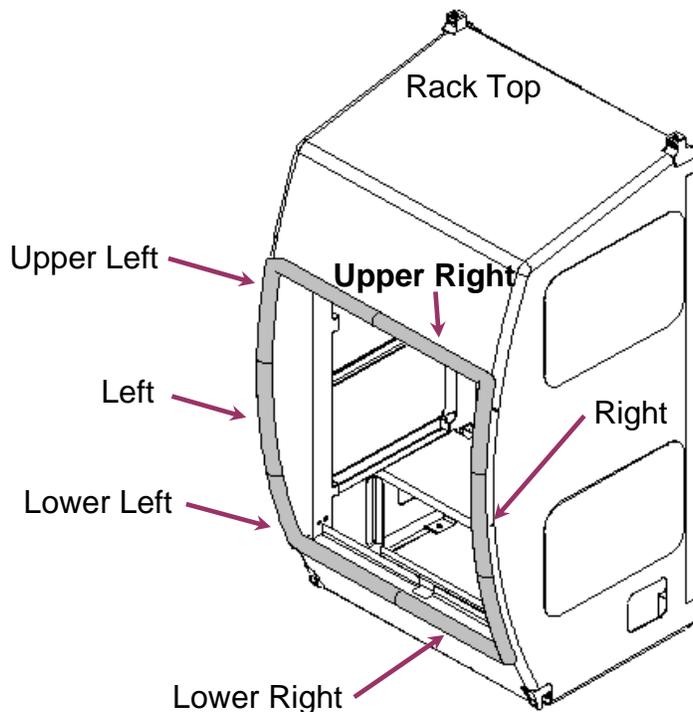


Figure 12.- WOLF Rear Closeout Seal Segments.

2.110 WORF TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

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NOTE

1. Do not bend Rear Closeout Seal Segments more than 45 degrees during handling and installation.
2. "Left," "Right" labels are with respect to rear of WORF.

- 8.1 Attach Rear Closeout Seal Segments (six) to WORF (Velcro). Refer to Figure 12 for specific installation location of each Seal Segment.
- 8.2 Photo document Rear Closeout Seal installation configuration (Digital Camera).

WARNING

Do not allow WORF to impact Window QD's. Port D QD is a direct feedthrough to vacuum (refer to Figure 11). Monitor rear of WORF and Window QD's from inside of WORF while WORF is rotated up.

CAUTION

All equipment, tools must be removed from space behind, around WORF to prevent equipment damage.

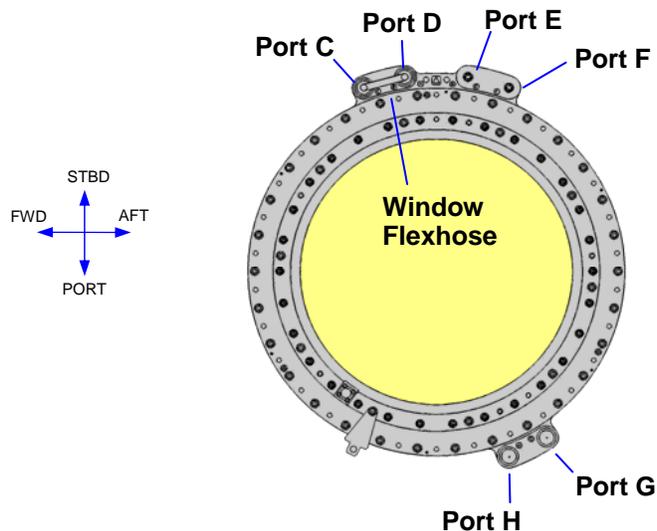


Figure 13.- US LAB Window.

9. FINAL INSTALLATION

- 9.1 ✓WORF rotation path unobstructed
- 9.2 Remove WORF Hatch, 1/4 Turn Fasteners (eight). Temporarily stow.
- 9.3 K-BAR Thumb Latches (two) → up position

2.110 WORF TRANSFER MPLM TO ISS

(ASSY OPS/19A/FIN)

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- 9.4 Slowly rotate WORF up until left and right K-BARs engage K-BAR Capture Mechanisms on LAB Standoff.
Verify WORF will not impact Window QD's, hoses, window structure, etc. during rotation.
Refer to Figure 13.

- 9.5 Reinstall WORF Hatch, 1/4 Turn Fasteners (eight).

10. KNEE BRACE TRANSFER

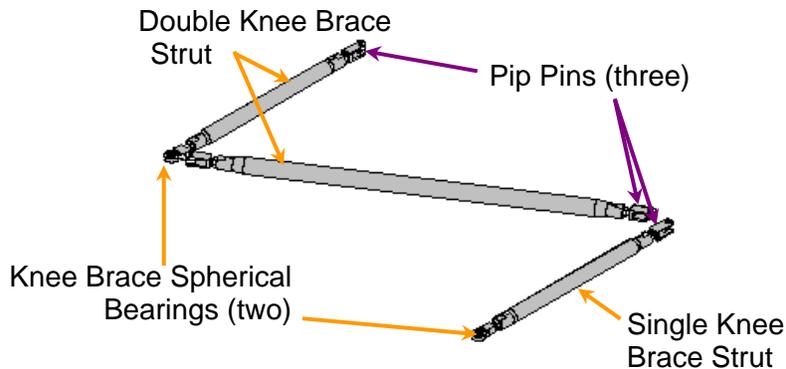


Figure 14.- WORF Knee Brace Struts.

- MPL1P2 10.1 Remove Single, Double Knee-Brace Struts from MPLM Standoff, Pip Pins (three).
Label "For WORF Use Only" (Gray Tape, Sharpie).
Refer to Figure 14.
- 10.2 Transfer Single, Double Knee-Brace Sections to LAB1D3.
Stow on ISS per stowage note.

11. CLOSEOUT OR POST TRANSFER

- 11.1 Photo document newly installed hardware (Digital Camera).
- 11.2 Notify **MCC-H** transfer activity for WORF is complete.
Stow tools, materials, parts.

Table 1. Restow Matrix

Item #	Name	P/N	Qty
1	10" x 10" Ziplock Bag "WORF LAUNCH BOLTS, 19A RETURN"		1
	WORF Hatch Launch Bolts		8
	Velcro Straps		2
	Bumpshield Launch Restraint PIP Pins	57461-1 & -2	4
2	Knee Brace Assembly, labeled "For WORF Use Only"	SEG33117350-301	1
3	US LAB Window Flex Hose Cover Assembly	SEG33117350-301	1
	Ziplock Bag with two each; washers and fasteners		1

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2.120 TESS TRANSFER FROM ISS TO MPLM

(ASSY OPS/19A/FIN)

Page 1 of 5 pages

OBJECTIVE:

To fold MPL1A3 Resupply Stowage Platform (RSP) Fences and transfer the Temporary Sleep Station (TeSS) from LAB1S1 to MPL1A3 Rack Front. This transfer activity installs Foam between the MPL1A3 Fences, folds the Fences, transfers the pre-packed TeSS pieces from LAB1S1 to the MPLM, and straps them to the RSP for return. This activity assumes TeSS removal is complete.

LOCATION:

Stowed: LAB1S1

Installed: MPL1A3 Rack Front

DURATION:

2 hours

PARTS:

TeSS Side Panel

TeSS Bumpout/Door

Fence Foam (four pieces)

TeSS Foam (two pieces)

MATERIALS:

Gray Tape (as necessary)

TRANSFERRING TESS

LAB1S1 1. Transfer TeSS Side Panel and TeSS Bumpout/Door from ISS to MPLM. Temporarily stow.

GLA SCAVENGE

MPL1PA3 2. √GLA has been removed prior to stowing TeSS for return

RETRIEVING FOAM

MPL1F4 3. Retrieve Fence Foam pieces (four) and TeSS Foam pieces (two) from M-03 Bag.

2.120 TESS TRANSFER FROM ISS TO MPLM

(ASSY OPS/19A/FIN)

Page 2 of 5 pages

FOLDING FENCES

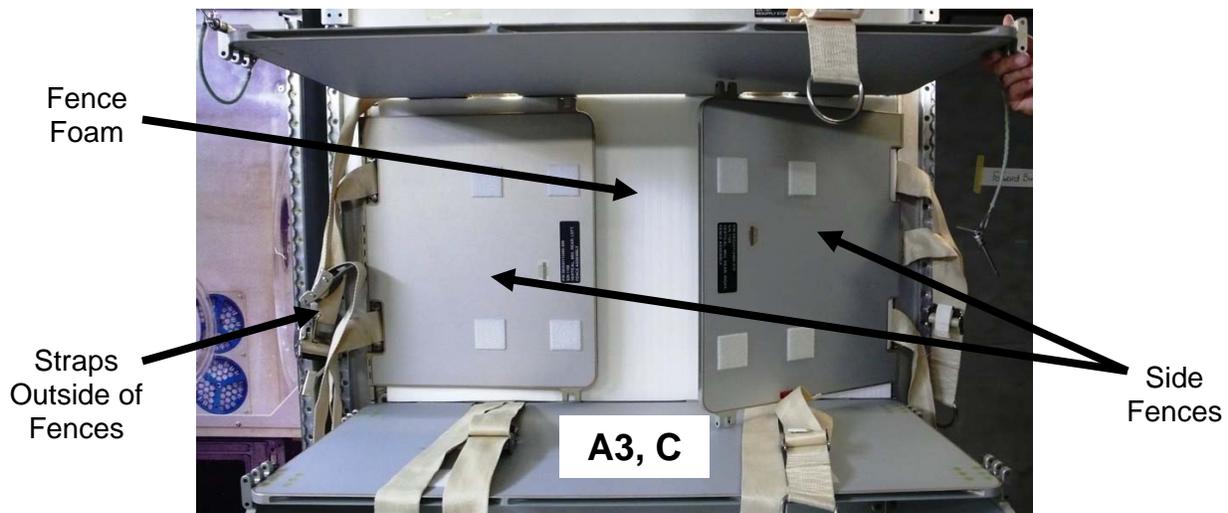


Figure 1.- Fence Foam installed in "A" Location against RSP; Side Fences Folded.

- MPL1A3
Rack
Front
4. Relocate all RSP straps from inside of Fences to outside. Refer to Figure 1.
 5. Remove PIP Pins (eight) to release Fences. Reinstall PIP Pins once Fences are free to secure for entry.
 6. Place Fence Foam piece (one) in the "A" location against the RSP. Refer to Figure 1.
 7. Fold "A" location side Fences (two). Refer to Figure 1.

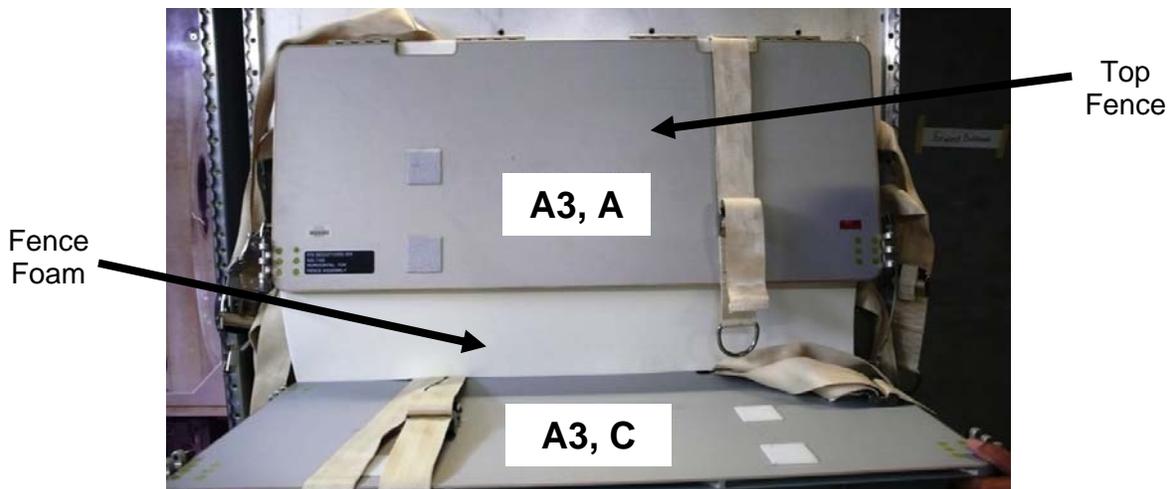


Figure 2.- Fence Foam Installed in "A" Location against Side Fences; Top Fence Folded.

2.120 TESS TRANSFER FROM ISS TO MPLM

(ASSY OPS/19A/FIN)

Page 3 of 5 pages

8. Place Fence Foam piece (one) in the "A" location against folded Side Fences.
Refer to Figure 2.
9. Fold "A" location top Fence (one).
Refer to Figure 2.
10. Place Fence Foam piece (one) in the "C" location against the RSP.
11. Fold "C" location Side Fences (two).
12. Place Fence Foam piece (one) in the "C" location against the folded Side Fences.

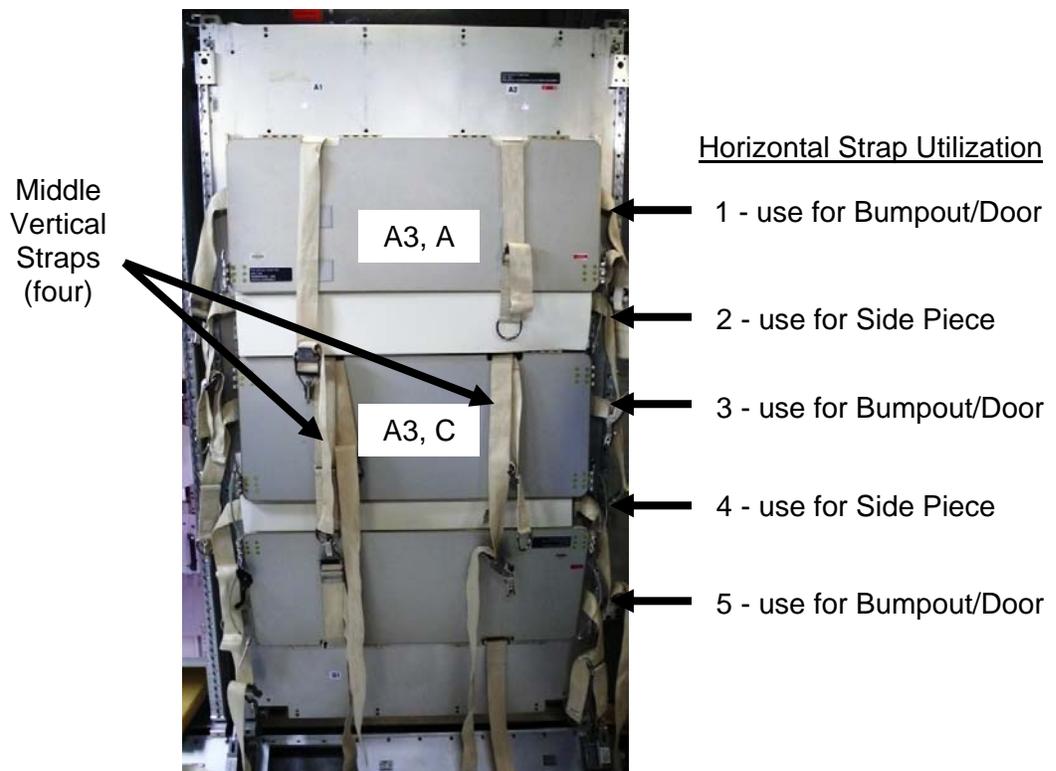


Figure 3.- All Fence Foam Pieces (four) Installed; Fences Folded.

13. Fold "C" location top and bottom Fences (two).
Refer to Figure 3.

NOTE

The middle vertical RSP Straps are not needed to secure the TeSS for return.

14. Roll or fold up middle vertical RSP Straps (four) as required.
Secure with Gray Tape.
Refer to Figure 3.

2.120 TESS TRANSFER FROM ISS TO MPLM

(ASSY OPS/19A/FIN)

Page 4 of 5 pages

STRAPPING TESS TO RSP

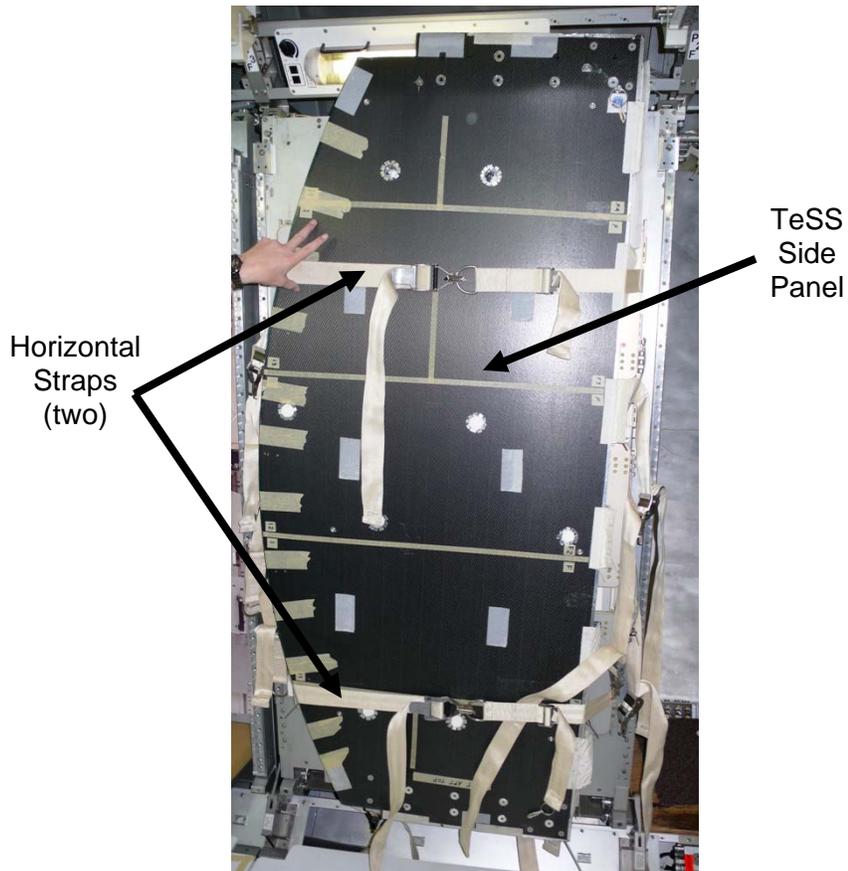


Figure 4.- TeSS Side Panel Strapped to RSP.

15. Unfold and place TeSS Foam piece (one) against folded Fences.
16. Place TeSS Side Panel on top of Foam.

√TeSS does not interfere with adjacent RSP Fences

Secure using second and fourth horizontal RSP Straps (two).
Refer to Figures 3 and 4.

17. Unfold and place TeSS Foam piece (one) against TeSS Side Panel.

2.120 TESS TRANSFER FROM ISS TO MPLM

(ASSY OPS/19A/FIN)

Page 5 of 5 pages

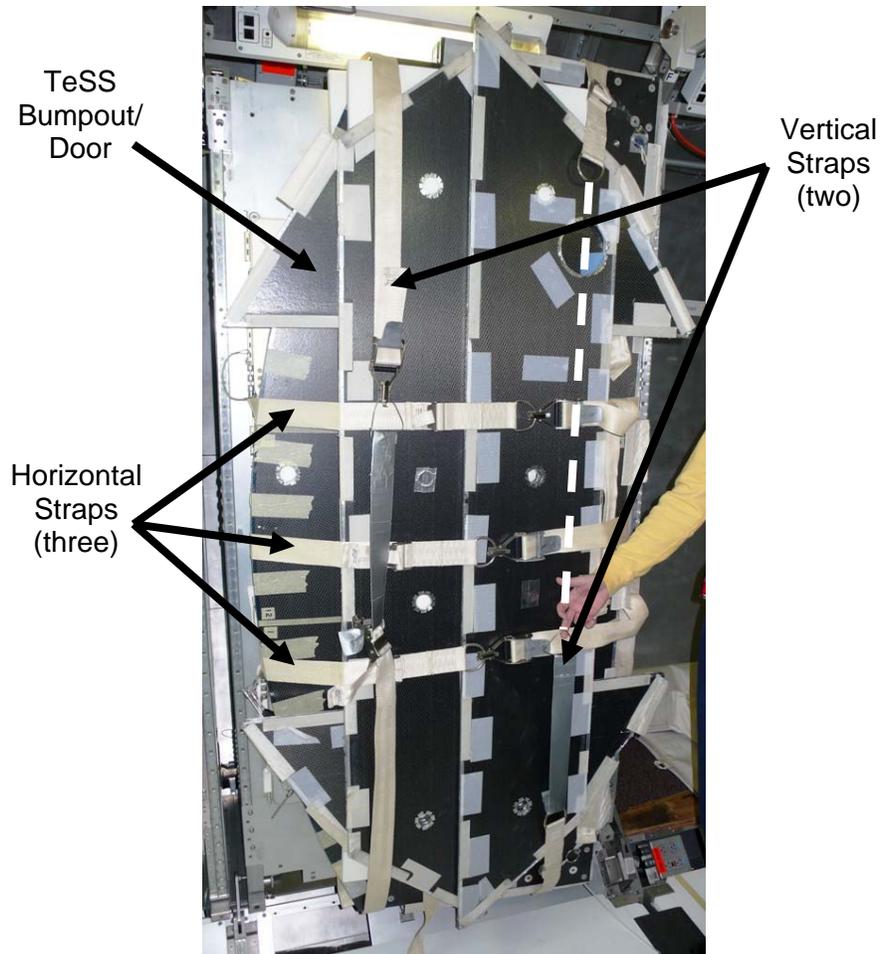


Figure 5.- TeSS Bumpout/Door Strapped to RSP.

18. Place TeSS Bumpout/Door on top of Foam.

√TeSS does not interfere with adjacent RSP Fences

Secure using first, third, and fifth horizontal RSP Straps (three) and vertical RSP Straps (two).
Refer to Figures 3 and 5.

POST TRANSFER

19. Notify **MCC-H** transfer activity for TeSS is complete.
Stow materials.

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PAYLOADS

PAYLOADS

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OBJECTIVE:

Check the status of the Animal Enclosure Module Unit #1 and Unit #2 and visually monitor mice well-being

TOOLS

Tissues

Gray Tape

- MF57H
1. Log Begin MET and Observer for appropriate Flight Day in Table 2. AEM Unit #1 Check Log.
 2. Remove muffler from locker door, temporarily stow. Unlatch, open locker door.
 3. ✓FANS A&D, FANS B&C lts (two) – on (green)
✓AEM fans operating (audible)
✓Fan airflow with Tissue, temporarily stow Tissue

*
*
* If lts off or fans not operating,
* | Perform [AEM FAN\(S\) FAILURE](#), all (SODF: ASSY OPS:
* | PAYLOADS), then:
*

 4. ✓AEM air inlet screens (two) free of debris, clean if required (gray tape).
 5. Using straps, pull AEM ~3/4 out of locker
 6. ✓cb LIGHTS B&C – close (lt on)
✓AEM interior lts (two) – illuminated

*
*
* If lts off
* | Perform [AEM LIGHT CYCLE INCORRECT \(OFF\) DURING](#)
* | [OPERATIONS](#), all (SODF: ASSY OPS: PAYLOADS), then:
*

 7. Log water level in Table 2. AEM Unit #1 Check Log.

*
*
* If water leaking in AEM
* | Perform [WATER LEAKING IN AEM](#), all (SODF: ASSY OPS:
* | PAYLOADS), then
*

 8. Log Rodent Observation in Table 2. AEM Check Log.

*
*
* If rodents appear distressed,
* |
* | ✓MCC-H, talk to NASA Chief Vet
*

9. Push AEM into locker
 - ✓LIGHTS sw – AUTO
 - ✓cb LIGHTS A&D – open (lt off)
 - ✓FANS sw – ON
10. Close, latch locker door
Reattach Muffler to locker door.
- MF43K 11. Repeat steps 1-10, for AEM Unit #2, logging data in Table 3. AEM Unit #2
Check Log.
12. Discard used Tissue in Trash
Temporarily stow Tissues.
13. Notify **MCC-H** (AEM CHECK complete, any off-nominal rodent conditions).

AEM LIGHT TIMER CYCLE RESET

(ASSY OPS/19A/FIN)

Page 1 of 1 page

OBJECTIVE:

To correct light timer cycle in the event lights are on/off at the incorrect time.

MF57H,
MF43K

1. ✓MCC-H for correct Day/Night It cycle

	HH	:MM
ON/D	_____	_____
OF/N	_____	_____

NOTE

1. Pen can be used for Timer pushbuttons. If more than 2 min. pass after the most recent pb press, display reverts to current settings without saving changes.
2. On GMT display, first two characters reflect current timer It status and do not change when MENU pb pressed.

2. MENU pb – push until correct Day/Night indicator ('D' or 'N') appears on GMT display
3. HOURS pb – push to set correct hours

NOTE

Minutes can only be set in 15 min. increments.

4. MIN pb – push to set correct minutes
5. MENU pb – push
6. Repeat steps 3-5 to reset other It cycle.

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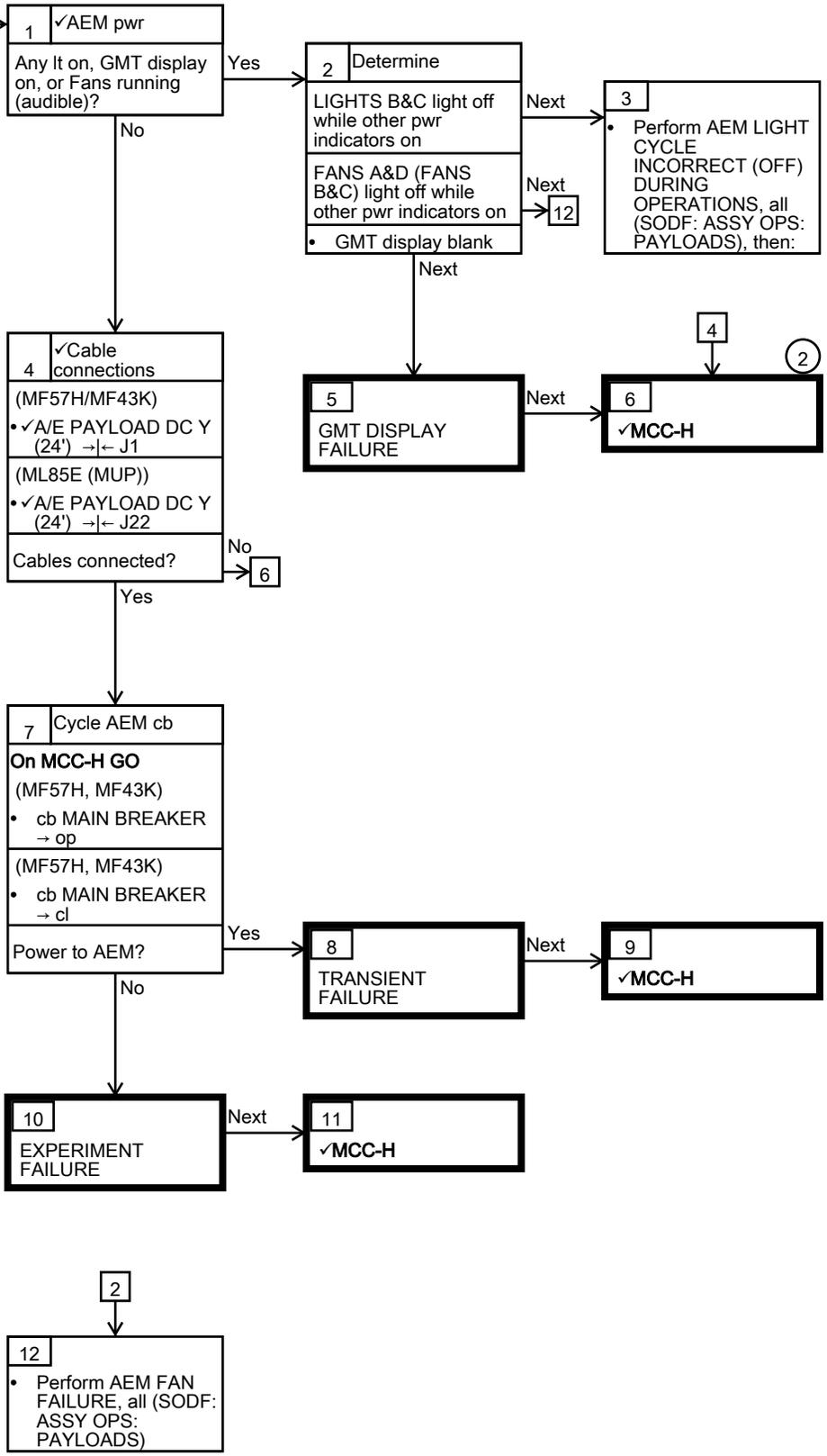
AEM

AEM ANY PWR INDICATOR OFF

(ASSY OPS/19A/FIN) Page 1 of 1 page

1
Any pwr indicator - Off

Nominal Config:
(MF57H, MF43K)
cb PUMP BKR - op
cb MAIN BREAKER - cl
cb FANS A&D - cl (It on)
cb FANS B&C - cl (It on)
FANS - ON
cb LIGHTS A&D - op (It off)
cb LIGHTS B&C - cl (It on)
LIGHTS - AUTO
(ML86B)
cb MNB MAR 2 - cl
(ML85E(MUP))
cb DC 10 AMP MNB CB4 - cl
DC 10 AMP MNB S4 - ON



1
This malfunction procedure only supports troubleshooting one Animal Enclosure.

2
Both AEMs are powered off the same MUP power port (J22) via the Y-cable. In order to reconfigure the Y-cable, power will need to be removed from both AEMs. **MCC-H** will direct crew if further action is required.

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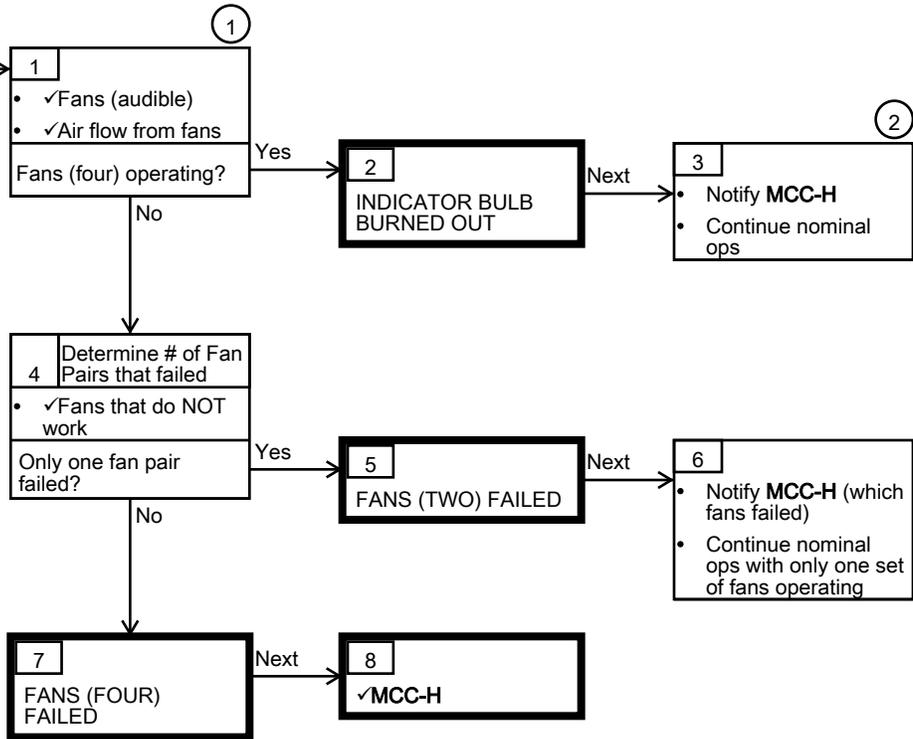
AEM

AEM FAN(S) FAILURE
(ASSY OPS/19A/FIN)

Page 1 of 1 page

Inaudible Fan(s)/Indicator Bulb(s) Off

Nominal Config:
(MF57H, MF43K)
cb PUMP BKR - op
cb MAIN BREAKER - cl
cb FANS A&D - cl (It on)
cb FANS B&C - cl (It on)
FANS - ON
cb LIGHTS A&D - op (It off)
cb LIGHTS B&C - cl (It on)
LIGHTS - AUTO
(ML86B)
cb MNB MAR 2 - cl
(ML85E (MUP))
cb DC 10 AMP MNB CB4 - cl
DC 10 AMP MNB S4 - ON



- 1** Hold Tissue in front of fan outlet to determine existence of air flow.
- 2** AEM can function with one set of fans operating.

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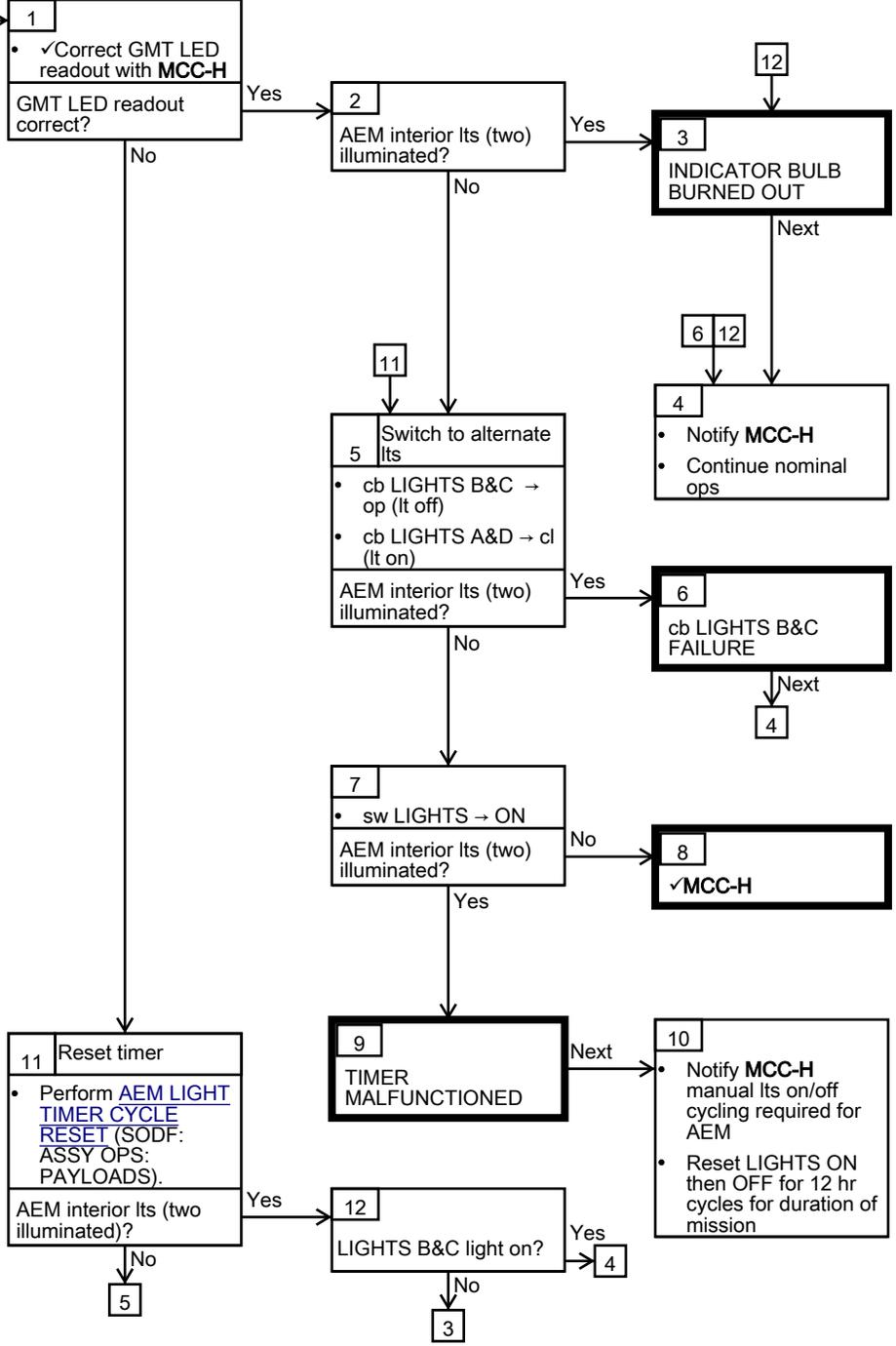
AEM

AEM LIGHT CYCLE INCORRECT (OFF) DURING OPERATIONS

(ASSY OPS/19A/FIN) Page 1 of 1 page

AEM light cycle incorrect (off) during operations

Nominal Config:
 (MF57H, MF43K)
 cb PUMP BKR – op
 cb MAIN BREAKER – cl
 cb FANS A&D – cl (lt on)
 cb FANS B&C – cl (lt on)
 FANS – ON
 cb LIGHTS A&D – op (lt off)
 cb LIGHTS B&C – cl (lt on)
 LIGHTS – AUTO
 (ML86B)
 cb MNB MAR 2 – cl
 (ML85E(MUP))
 cb DC 10 AMP MNB CB4 – cl
 DC 10 AMP MNB S4 – ON



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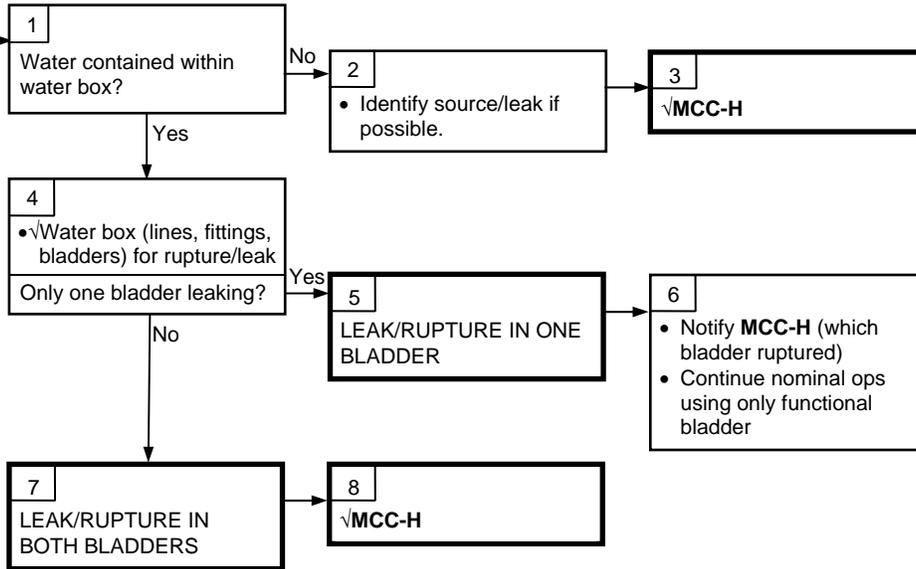
AEM

WATER LEAKING IN AEM

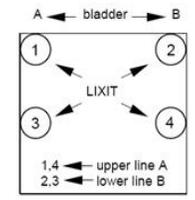
(ASSY OPS/19A/FIN)

①
Water Leaking in AEM

Nominal Config:
(MF57H, MF43K)
Bladder A,B – spring plates 1-4
cb PUMP BKR – op
cb MAIN BREAKER – cl
cb FANS A&D – cl (lt on)
cb FANS B&C – cl (lt on)
FANS sw – ON
cb LIGHTS A&D – op (lt off)
cb LIGHTS B&C – cl (lt on)
LIGHTS sw – AUTO



①
Water box is crossed plumbed. Lixits 1, 4 are fed from bladder A. Lixits 2, 3 are fed from bladder B. Both sides of cage have water as long as one bladder remains.



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OBJECTIVE:

To introduce additives to the BRIC-16 experiment Canisters.

TOOLS:

BRIC Actuator Tool (MF710)

BRIC Actuator Rod Kit (MF710)

1. BRIC HARDWARE SET UP

1.1 Check Flight Plan Detail Page for which BRIC Canisters to actuate.

1.2 Log Start MET: ___/___:___

MF28K

1.3 Open locker door.

1.4 Using pull-strap on BRIC Tray front panel, pull Tray partially out of locker.

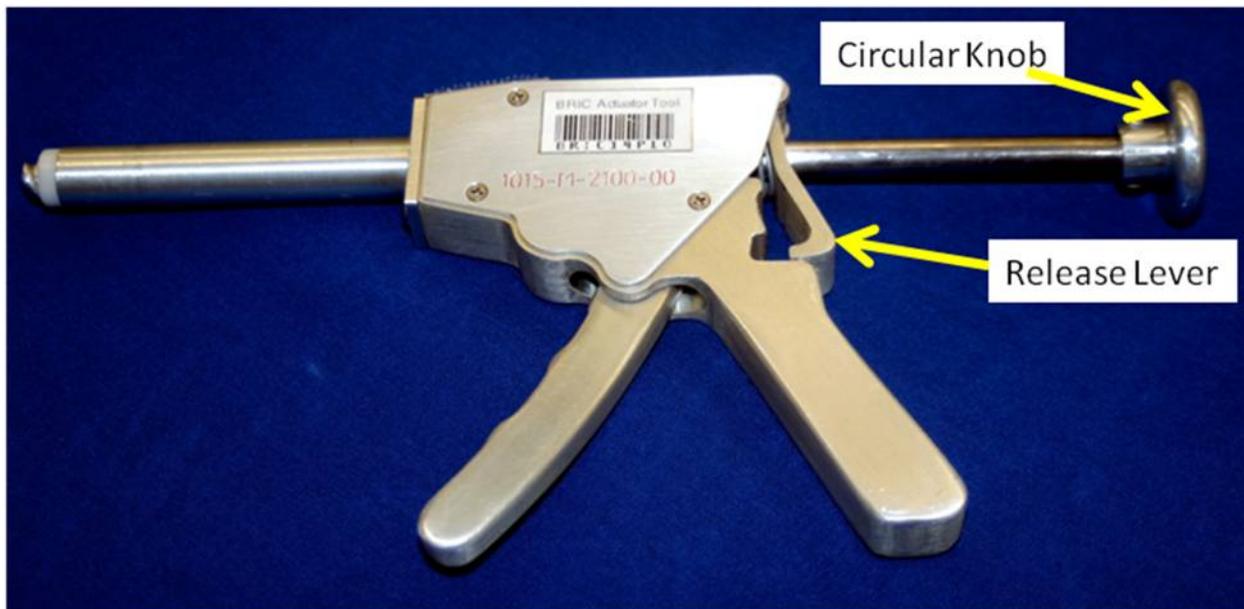


Figure 1. Actuator Tool.

MF710

1.5 Unstow BRIC Actuator Tool (shown in Figure 1) and BRIC Actuator Rod kit.

2. BRIC Actuation

2.1 Remove BRIC Canister A(B-H) from foam per the Flight Plan Detail Page.

2.2 Press release lever of BRIC Actuator Tool.

2.3 Pull circular knob away from body of BRIC Actuator Tool.

2.4 Retrieve Rod (one) from BRIC Actuator Rod Kit.

- 2.5 Insert flat end of Rod into hole at barrel end of BRIC Actuator Tool.
- 2.6 ✓Pointed end (not flat end) of Rod is facing outward.
- 2.7 Push Rod completely into BRIC Actuator Tool.
- 2.8 Gently insert BRIC Actuator Tool through guard on Canister/dish A(B-H) location per Flight Plan Detail Page.
- 2.9 Attach BRIC Actuator Tool by threading tip cw into dish location.



Figure 2. Actuation

- 2.10 Squeeze trigger of BRIC Actuator Tool until circular knob meets BRIC Actuator Tool body. Resistance may be felt.
- 2.11 Remove BRIC Actuator Tool (ccw) from Canister. Rod will remain in Canister.
Gently slide BRIC Actuator Tool off of Rod and out of guard.
- 2.12 Check off each Canister as it is completed in Table 1.
- 2.13 Repeat steps 2.2 -2.12 for remaining Canister dish locations and restow each Canister in foam when complete. Retrieve next Canister.

Table 1. Actuation

Canister	Dish location	Verify (✓ as performed)
A	1 2 3 4 5	
B	1 2 3 4 5	
C	1 2 3 4 5	
D	1 2 3 4 5	
E	1 2 3 4 5	
F	1 2 3 4 5	
G	1 2 3 4 5	
H	1 2 3 4 5	

3. RESTOW BRIC HARDWARE

- 3.1 Stow BRIC Actuator Rod Kit and BRIC Actuator Tool in original location.
- 3.2 Push BRIC Tray back into locker.
- 3.3 Close, latch locker door.
- 3.4 Log Stop MET: ___/___:___
- 3.5 Notify **MCC-H** BRIC ACTUATION complete, MET from step 1.2 and 3.4, and any off-nominal conditions.

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GLACIER PREPARATION FOR SAMPLE TRANSFER

(ASSY OPS/19A/FIN)

Page 1 of 2 pages

OBJECTIVE:

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

TOOLS

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

4" Ext, 3/8" Drive

Ratchet, 3/8" Drive

MF28E/G (Glacier) 1. ✓cb POWER – Close (It on)

2. ✓sw BATTERY – ON (It on)

3. ✓Display – 'HOME'

```

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

4. ✓Display – 'CURR TEMP:' is +4.0°C ± 2.0°C.

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

Table 1. Glacier Log

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

6. If first time opening Glacier door since launch,

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

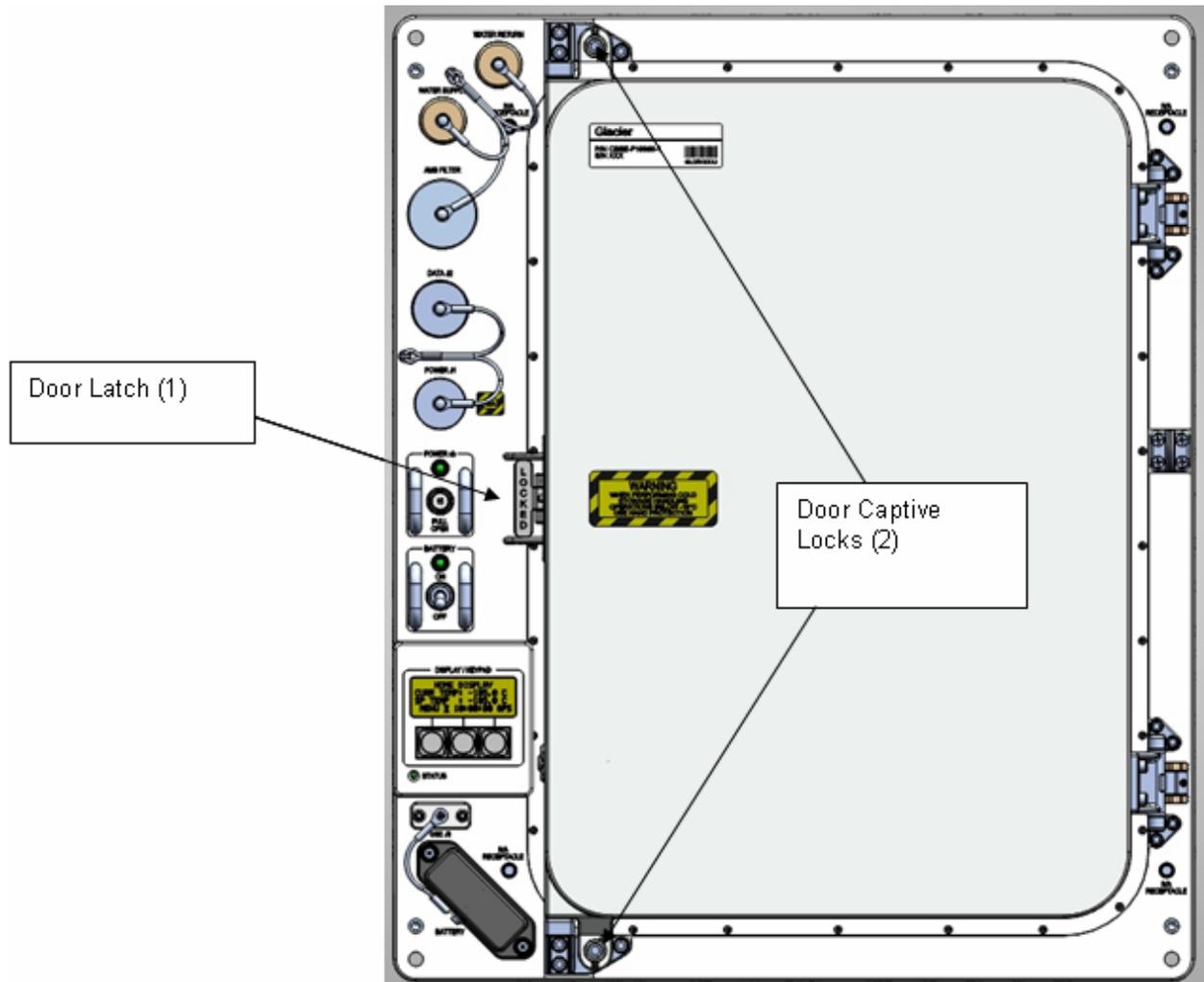


Figure 1. Glacier Configuration

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

19A GLACIER TRANSFER AND INSTALLATION

(ASSY OPS/19A/FIN 1)

Page 1 of 3 pages

OBJECTIVE:

This procedure transfers the unpowered Glacier unit from the MPLM to ISS. The Cryocooler Launch Locks are unlocked and Glacier is installed in EXPRESS-2 Rack and left unpowered.

PARTS:

Glacier IVA Handle

TOOLS:

High Torque Locker Tool (LAB1O1_M1)

ISS IVA Toolbox:

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

Driver Handle, 1/4" Drive

1/4" Socket, 3/8" Drive

Ratchet, 1/4" Drive

1/4" Socket, 1/4" Drive

(40-200 in-lbs) Trq Wrench, 3/8" Drive

- LAB1O1_G 1. Remove Lockers (two), from G1 and J1 locations and temp stow –per
1, _J1 Transfer List (Ratchet, 1/4" Drive; 1/4" Socket, 1/4" Drive; High Torque
Locker Tool).
- MPLM 2. Verify front door locking flap is positioned between finger latches.
(Glacier)
3. Connect Glacier IVA Handle diagonally to front face of Glacier at locations
marked IVA Receptacle (two of four). Refer to Figures 1 and 2.

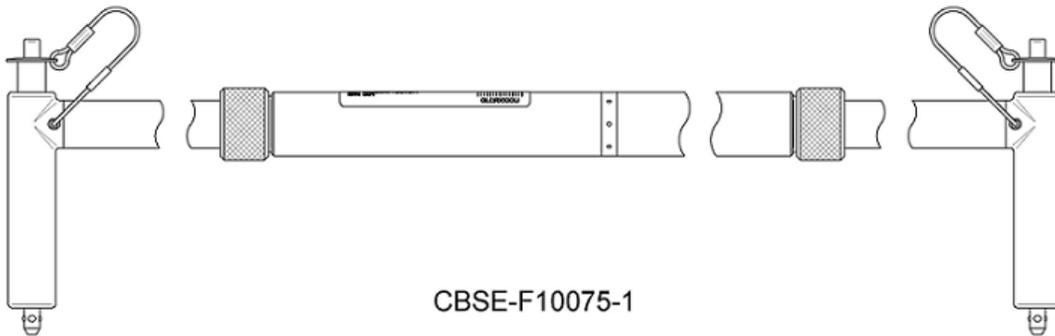


Figure 1. Glacier IVA Handle.

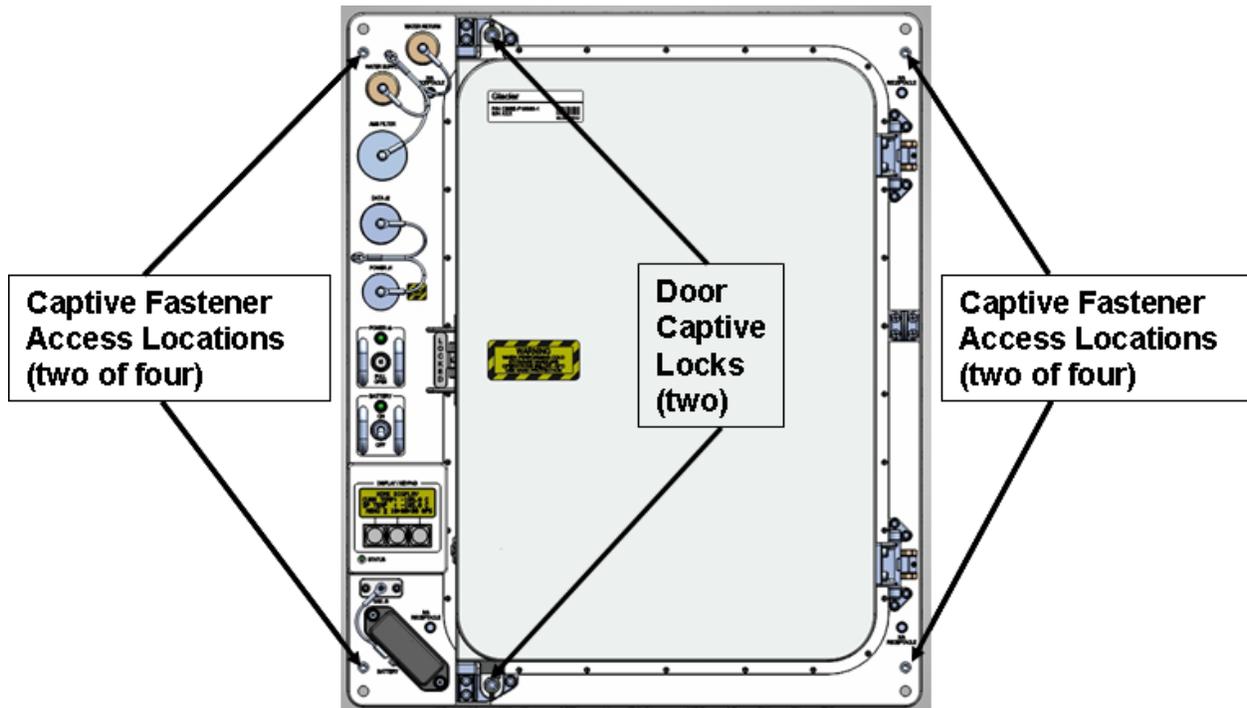


Figure 2. Glacier Configuration.

- LAB101_G 4. Transfer Glacier from MPLM to EXPRESS-2 Rack.
1
5. Push in and rotate counterclockwise cryocooler launch locks (four) at rear of Ascent Glacier until locking pin is disengaged (OPEN) (3/16" Hex Head, 1/4" Drive; Driver Handle, 1/4" Drive). Refer to Figure 3.

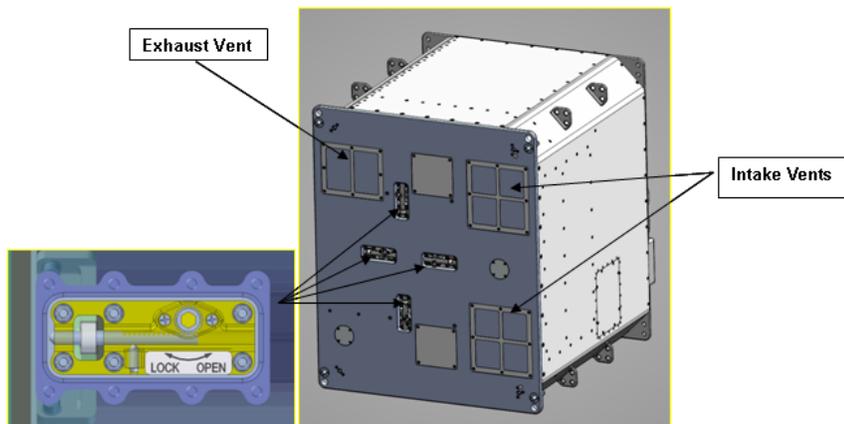


Figure 3. Cryocooler Launch Locks and Vents on Rear of Glacier.

6. Carefully slide the Glacier unit into the locker position.

19A GLACIER TRANSFER AND INSTALLATION

(ASSY OPS/19A/FIN 1)

Page 3 of 3 pages

- LAB1O1_G
1
7. Fasten Glacier fasteners (four) in a diagonal pattern into EXPRESS-2 Rack, torque to 75 in-lbs [High Torque Locker Tool; 1/4" Socket, 3/8" Drive; (40-200 in-lbs) Trq Wrench, 3/8" Drive].
 8. Disconnect Glacier IVA Handle from Glacier front face and stow per Stowage note.
 9. Stow:
All IVA Tools
 10. GROUND UPDATES FOR IMS

Ground updates IMS for the following parts:

Glacier TO: LAB1O1_G1 (step 4)

Locker from LAB1O1_G1 TO: MPLM

Locker from LAB1O1_J1 TO: MPLM

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19A ASCENT SAMPLE TRANSFER FROM GLACIER TO MELFI

(ASSY OPS/19A/FIN 1)

Page 1 of 7 pages

OBJECTIVE:

This procedure will be used to unlock the Glacier door and transfer +4°C science samples from the STS Glacier to ISS MELFI, using a Double Coldbag. The crew will change the Glacier temperature setpoint from +4°C to -95°C. This activity is performed by ISS and shuttle crewmembers.

IFM TOOL LOCKER:

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

1/4" - 3/8" Adapter

4" Ext, 1/4" Drive

Ratchet, 1/4" Drive

PARTS:

Double Coldbag S/N 1009

Small Coldplate/Wireway Cover P/N SEG33111361-301

White Gloves

ITEMS TO UNSTOW WITHIN PROCEDURE:

Ice Brick +4° C (two) (unstow step 2)

Apex Cambium Replant Kit (unstow step 4)

JAXA Myolab (four cassettes) (unstow step 4)

3x5 Mesh Bags (two Ziplocks) (unstow step 4)

MF28E/G
(Glacier) 1. UNLOCK GLACIER DOOR

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

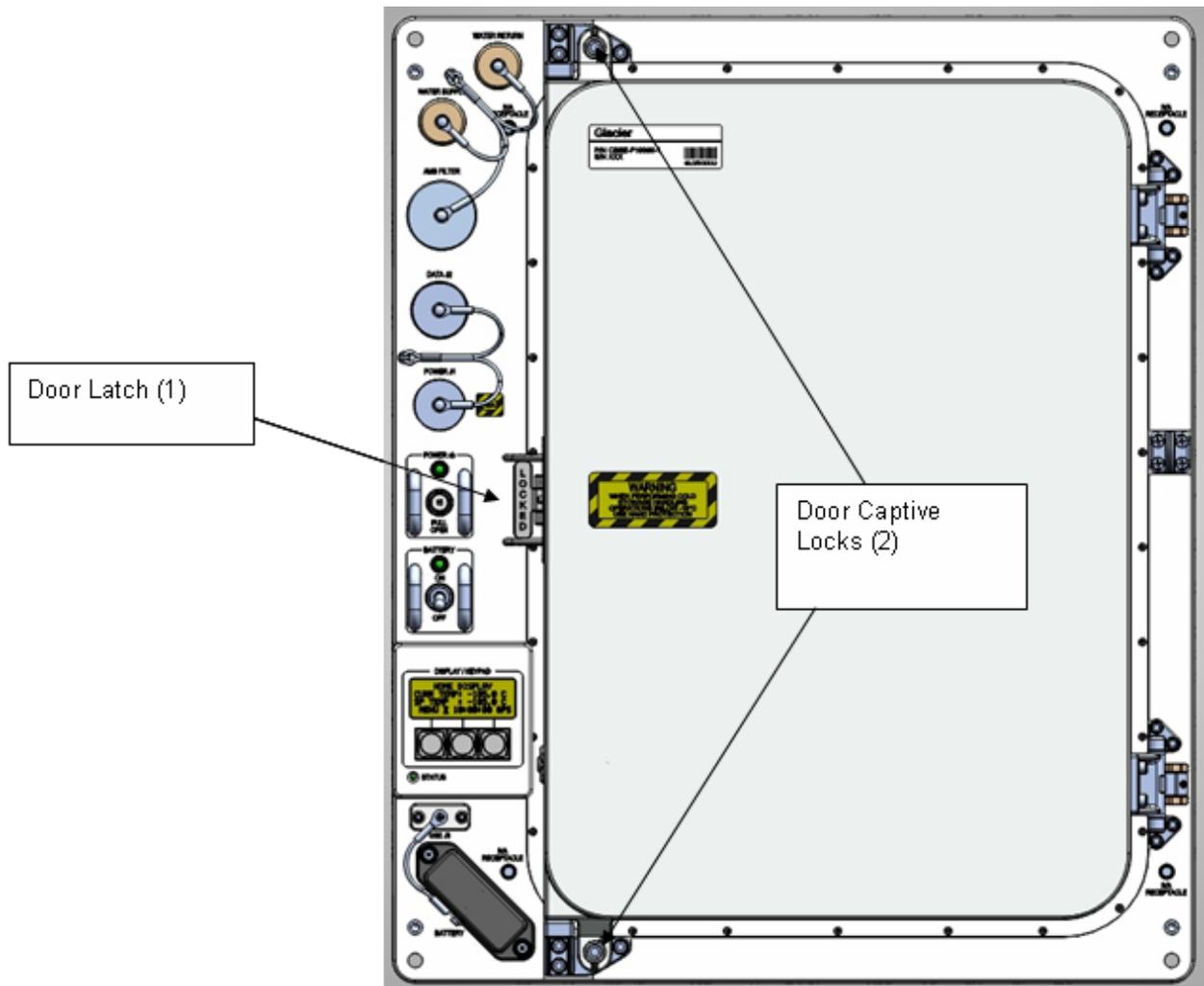


Figure 1. Glacier Configuration

1.2 Stow Tools.

LAB1S2
(MELFI 2)

2. REMOVE ICE BRICK FROM MELFI

2.1 Retrieve Double Coldbag (S/N 1009) and temp stow near MELFI.

WARNING

Protective Gloves must be worn when manipulating MELFI trays or samples to prevent injury to exposed skin.

2.2 Don Gloves.

CAUTION

Minimize exposure of MELFI trays, frozen Icepacs, and samples to ambient air to prevent increased sample temperatures.

```

*****
*
* If MELFI Tray is stuck
*
* |
* |   Insert Small Coldplate/Wireway Cover completely between
* |   |   Tray and Dewar wall.
* |
* |   Firmly holding both Coldplate/Wireway Cover and Tray
* |   |   Handle, remove Tray from Dewar.
*
*****
    
```

- 2.3 Remove Ice Bricks (two) +4 °C from MELFI 2, Dewar 3, Tray D, Section 2.
- 2.4 Unfold Ice Bricks (two) and lay them flat in the bottom of the Double Coldbag.

3. TRANSFERRING DOUBLE COLDBAG FROM ISS TO SHUTTLE

ISS to Shuttle

- 3.1 Transfer Double Coldbag to shuttle middeck.

Middeck

4. PACKING GLACIER SAMPLES INTO DOUBLE COLDBAG

WARNING
Protective gloves must be worn when handling frozen samples or manipulating inner doors, cold trays or samples in Glacier to prevent injury to exposed skin.

CAUTION
1. Minimize exposure of Glacier trays and samples to ambient air to prevent increased sample temperatures.
2. Glacier inner doors should remain closed when the internal volume is not being accessed.
3. Double Coldbag lid should remain closed when the internal volume is not being accessed.

MF28E/G (Glacier)

- 4.1 Open Glacier door.
- 4.2 Remove Ziplock bags (two) containing Mesh Bags from Tray A and temporarily stow. (Desiccant packs in Tray A can be removed and trashed).
- 4.3 Quickly remove Apex Cambium Replant Kit from Glacier Tray B and place in Double Coldbag between two Ice Bricks. (Desiccant packs in Tray B can be removed and trashed).
- 4.4 Quickly remove JAXA Myolab cassettes (two) from Glacier Tray C and place in the Double Coldbag between two Ice Bricks. (Desiccant packs in Tray C can be removed and trashed).

- 4.5 Quickly remove JAXA Myolab cassettes (two) from Glacier Tray D and place in the Double Coldbag between two Ice Bricks. (Desiccant packs in Tray D can be removed and trashed).

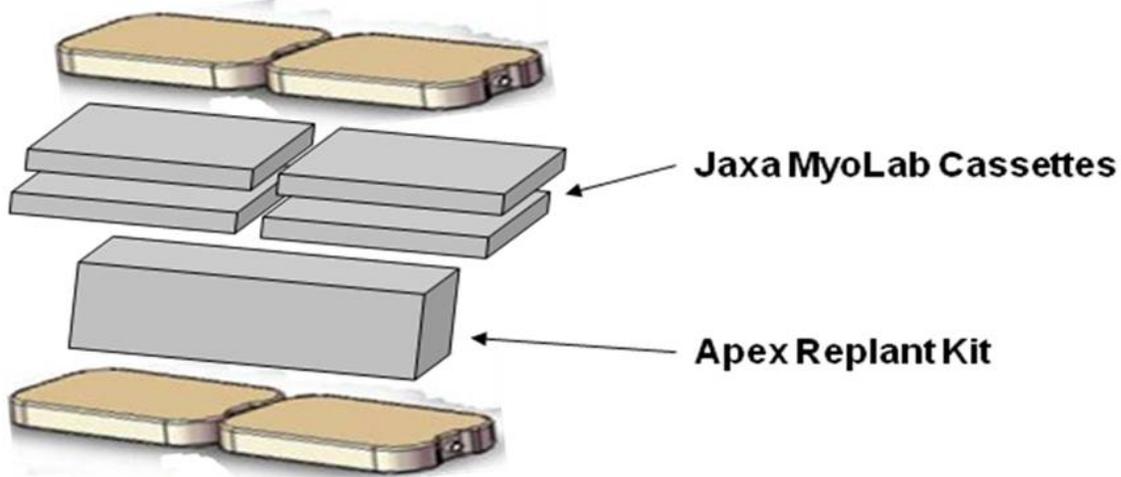


Figure 2. Double Coldbag Configuration.

- 4.6 ✓Glacier door – Closed

 *
 * If Glacier outer door does not close,
 * | Press on top left corner and bottom left corner of door to
 * | assist with closure.
 *

- 4.7 ✓Glacier door latch – Locked (finger latches fully spread apart and locking flap positioned between finger latches)

5. TRANSFERRING DOUBLE COLDBAG FROM SHUTTLE TO ISS

LAB1S2
(MELFI 2)

- 5.1 Transfer Double Coldbag to MELFI 2.

6. UNPACK DOUBLE COLDBAG AND INSERTING SAMPLES INTO MELFI 2

NOTE

The 60 seconds and 45 minute MELFI Dewar opening rules do not apply during unpacking of the Coldbag.

WARNING

Protective gloves must be worn when handling frozen samples or manipulating inner doors, cold trays or samples in Glacier to prevent injury to exposed skin.

- 6.1 Don Gloves.

```

*****
*
* If MELFI Tray is stuck
*
* |
* |   Insert Small Coldplate/Wireway Cover completely between
* |   Tray and Dewar wall.
* |
* |   Firmly holding both Coldplate/Wireway Cover and Tray
* |   Handle, remove Tray from Dewar.
*
*****

```

6.2 Insert JAXA Myolab cassettes (four) in MELFI 2, Dewar 4, Tray D, Section 3,4.

6.3 Insert Apex Replant Kit in MELFI 2, Dewar 3, Tray A, Section 3,4.

7. DRYING OUT DOUBLE COLDBAG AND ICE BRICK

7.1 Remove Ice Brick +4° C (two) from Double Coldbag and place in temporary stowage location to air dry.

Temporarily stow Double Coldbag near MELFI in a location protected from kick loads.

Stow Ziplock bags (two) containing Mesh Bags in JPM1F6_G.

MF28E/G
(Glacier)

8. CHANGING GLACIER SETPOINT TEMPERATURE

8.1 ✓Display – 'HOME'

```

*****
*
* If display -'***Error Pending**'
*
* |
* |   Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* |   PAYLOADS), then:
* |
* |   If 'HOME' not shown:
* |   |
* |   |   pb Right (EXIT) → Press until 'HOME' appears
* |
*
*****

```

8.2 Record front panel display:

'CURR TEMP': _____
'SET POINT': _____
'GPS': _____:_____:_____

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

8.4 pb Left (NEXT) → Press (three times), following appears:

'MAIN MENU'

'SETUP 4/5'

- 8.5 pb Center (SELECT) → Press (one time), following appears:
'Setup'
'Temp Control 1/3'
- 8.6 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 8.7 pb Center (SELECT) → Press (one time), following appears:
'Set Point Temp'
'XXXX °C'
'-160.0 to +004.0'

NOTE

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

- 8.8 Enter new Set Point Temperature -095.0
- 8.9 pb Right (DONE) → Press (one time)
- 8.10 ✓Confirm New Set Point = -95.0
- 8.11 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 8.12 ✓Set Point Temp = -95.0°C
- 8.13 pb Left (NEXT) → Press (two times), following appears:
'Temp Control'
'Control Sensors 3/18'
- 8.14 pb Center (SELECT) → Press (one time), following appears:
'Control Sensors'
'INNER OUTLET INLET'
'0 0 1'

NOTE

- 1. '0' indicates the Control Sensor is not selected and '1' indicates the Control sensor is selected.
- 2. The left pushbutton (CURSOR) moves cursor between Control Sensor fields. The default cursor position will be blinking.
- 3. The center pushbutton (PLUS) changes the value of the Control Sensor field from 0 to 1 and vice versa

- 8.15 Change the OUTLET sensor to 1.

- 8.16 pb Right (DONE) → Press (one time)
- 8.17 ✓New Control Sensors = 'New: 011'
- 8.18 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Control Sensors 3/18'
- 8.19 ✓Control Sensors = OUTLET and INLET
- 8.20 pb Right (EXIT) → Press until 'HOME' appears
- 8.21 Notify **MCC-H** that transfer activity completed, dry out location for Ice Brick and location of Double Coldbag.

9. GROUND UPDATES FOR IMS

Ground updates IMS for the following parts:
Double Cold Bag S/N 1009 TO: per crew call down (step 8.21)
Ice Brick +4° C (two) TO: per crew call down (step 8.21)
Apex Cambium Replant Kit TO: MELFI 2 (step 6.3)
Myolab (four cassettes) TO: MELFI 2 (step 6.2)
3x5 Mesh Bags (two Ziplocks) TO: JPM1F6_G (step 7.1)

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19A DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/19A/FIN 1)

Page 1 of 5 pages

OBJECTIVE:

This procedure will be used to unlock the Glacier door and swap frozen science samples between ISS MELFI and Shuttle Glacier. One Double Coldbag will be used to transfer samples from MELFI to Glacier. This activity is performed by ISS and shuttle crewmembers.

IFM TOOL LOCKER:

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

1/4" - 3/8" Adapter

4" Ext, 1/4" Drive

Ratchet, 1/4" Drive

PARTS:

Double Coldbag S/N 1007

Light Duty Cryo Gloves (Mechanix Wear)

Small Coldplate/Wiretray Cover P/N SEG33111361-301

ITEMS TO UNSTOW WITHIN PROCEDURE:

Icepac Belt -21° C (one) (unstow step 2)

Icepac Belt -32° C (one) (unstow step 2)

TROPI (eight EMCS Bags with eighty seed cassettes) (unstow step 2)

HRP blood (four vial bags) (unstow step 2)

HRP urine (mesh bags) (unstow step 2)

CSA Vascular blood (two blood mesh bags) (unstow step 2)

LADA VPU Samples (two Ziplocks)

MF28E/G
(Glacier)

1. UNLOCK GLACIER DOOR

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

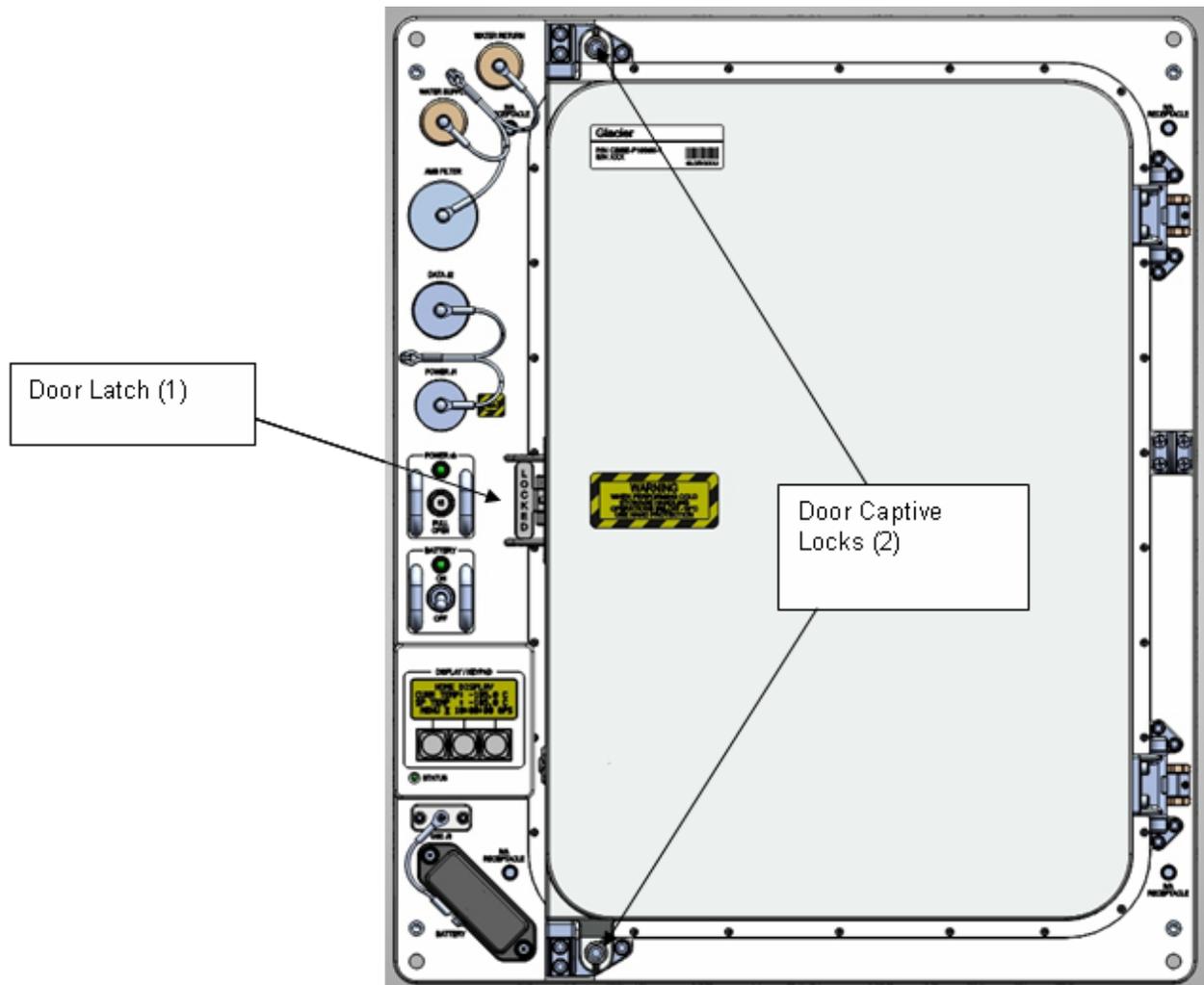


Figure 1. Glacier Configuration.

1.2 Stow Tools.

MELFI 2. PACKING MELFI SAMPLES INTO DOUBLE COLDBAG

WARNING

Protective Gloves must be worn when manipulating MELFI trays or samples to prevent injury to exposed skin.

CAUTION
1. Minimize exposure of MELFI trays, frozen Ice Bricks, and samples to ambient air to prevent increased sample temperatures.
2. Tropi samples (in EMCS Bags) are particularly sensitive to any temperature rise, and the time these samples are exposed to ambient air should be limited to a maximum of 3 minutes to avoid significant science loss
3. Double Coldbag lid should remain closed when the internal volume is not being accessed.

NOTE
The 60 seconds and 45 minutes MELFI Dewar opening rules do not apply during packing of the Coldbag.

2.1 Don Light Duty Cryo Gloves (Mechanix Wear).

2.2 Pack Double Coldbag per Figure 2.

 *
 * If MELFI Tray is stuck
 *
 * | Insert Small Coldplate/Wireway Cover completely between
 * | Tray and Dewar wall.
 * |
 * | Firmly holding both Coldplate/Wireway Cover and Tray
 * | Handle, remove Tray from Dewar.
 * |
 *

Step	From MELFI Location*	Description
1	MELFI-1 2-C-3	Insert Icepac belt -21°C on bottom
2	MELFI-1 3-A-1	Insert HRP Urine Mesh Bag (all)
3	MELFI-1 2-D-3	Insert HRP Urine Mesh Bag (all)
4	MELFI-1 2-D-4	Insert HRP Urine Mesh Bag (all)
5	MELFI-1 2-D-2	Insert HRP Blood Vial Bags (two)
6	MELFI-1 3-C-3	Insert HRP Blood Vial Bags (two)
7	MELFI-1 1-C-4	Insert CSA Vascular Blood Mesh Bags (two)
8	MELFI-1 2-A-2,3	Insert LADA VPU Ziplocks (two) and TROPI EMCS bags (four)
9	MELFI-1 2-B-2,3	Insert TROPI EMCS bags (four)
10	MELFI-1 2-C-4	Insert Icepac belt -32°C on top

* Dewar-Tray-Tray Section (3-A-1 = Dewar 3, Tray A, Tray Section 1)

Figure 2. Sample Locations in MELFI.

3. TRANSFERRING DOUBLE COLDBAGS FROM ISS TO SHUTTLE

ISS to Shuttle

3.1 Transfer Double Coldbag to shuttle middeck.

19A DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/19A/FIN 1)

Page 4 of 5 pages

MF28E/G
(Glacier)

4. UNPACKING DOUBLE COLDBAG AND INSERTING SAMPLES INTO GLACIER

WARNING

Protective gloves must be worn when handling frozen samples or manipulating inner doors, cold trays or samples in Glacier to prevent injury to exposed skin.

CAUTION

1. Minimize exposure of Glacier trays and samples to ambient air to prevent increased sample temperatures.
2. Tropi Samples (in EMCS Bags) are particularly sensitive to any temperature rise, and the time these samples are exposed to ambient air should be limited to a maximum of 3 minutes to avoid significant science loss
3. Glacier inner doors should remain closed when the internal volume is not being accessed.

- 4.1 Don Light Duty Cryo Gloves (Mechanix Wear).
- 4.2 Open Glacier.
- 4.3 Insert into Tray A: TROPI (four EMCS Bags).
- 4.4 Insert into Tray B: TROPI (four EMCS Bags).
- 4.5 Insert into Tray C: HRP Blood (four vial bags), CSA Vascular blood (two mesh bags) and LADA VPU samples (two Ziplocks).
- 4.6 Insert into Tray D: All HRP Urine mesh bags.

5. DRYING OUT ICEPAC BELTS

- 5.1 Remove Icepac Belt -21° C (one) and Icepac Belt -32° C (one) from Double Coldbag and place in temporary stowage location to air dry. Temporarily stow Double Coldbag in a location protected from kick loads
- 5.2 Return Light Duty Cryo Gloves to original location on ISS.
- 5.3 Notify **MCC-H** that transfer activity completed, dry out location for Icepac Belts and Double Coldbag location.

6. GROUND UPDATES FOR IMS

Ground updates IMS for the following parts:

Double Cold Bag S/N 1007 TO: per crew call down (step 5.3)

Icepac Belt -21° C (one) TO: per crew call down (step 5.3)

Icepac Belt -32° C (one) TO: per crew call down (step 5.3)

TROPI (eight EMCS Bags with eighty seed cassettes) TO: Middeck Glacier

19A DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/19A/FIN 1)

Page 5 of 5 pages

CSA Vascular (two mesh bags) TO: Middeck Glacier
HRP blood (four vial bags) TO: Middeck Glacier
HRP urine (mesh bags) TO: Middeck Glacier
LADA VPU Samples (two Ziplocks) TO: Middeck Glacier

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GLACIER COLD HEAD CHECK

(ASSY OPS/19A/FIN)

Page 1 of 2 pages

OBJECTIVE:

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

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

Glacier

1. ✓Display – 'HOME'

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

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

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

```
'MAIN MENU'
'QUICK STATUS 1/5'
```

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

```
'QUICK STATUS'
'Cold Head 1A 1/16'
```

NOTE

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

5. Record Quick Status data for parameters 1 to 7 in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
6. pb Center (NEXT) → push until Quick Status data items 1 through 7 have been recorded.
7. pb Right (EXIT) → push until 'HOME'
8. Notify **MCC-H** to report log values from Table 1 Glacier Diagnostic Log.

Table 1. Glacier Diagnostic Log

Parameter	Definition	Event 1	Event 2	Event 3
HOME MENU (Front panel)				
1	CURR TEMP	Current Temperature °C		
2	SET POINT	Set Point °C		
3	GPS	Hours: Min: Sec	__ : __ : __	__ : __ : __
QUICK STATUS				
1	Cold Head 1A	Temperature °C		
2	Cold Head 1B	Temperature °C		
3	Cold Head 2A	Temperature °C		
4	Cold Head 2B	Temperature °C		
5	Cold Vol Outlet	Temperature °C		
6	Cold Vol Inlet	Temperature °C		
7	Cold Vol Inner	Temperature °C		

LOCKING GLACIER DOOR

(ASSY OPS/19A/FIN)

Page 1 of 2 pages

OBJECTIVE:

The following steps will secure the Glacier Door fasteners to ensure Glacier is in the proper configuration for descent.

TOOLS

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

1/4" to 3/8" Adapter (1/4" Drive)

4" Ext, 1/4" Drive

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

MF28E/G (Glacier) 1. ✓Glacier door is fully closed

```
*****  
*  
* If Outer Door does not close  
* | Press on top left corner or bottom left corner of door to assist with  
* | closure.  
*  
*****
```

2. ✓Door Latch – Locked (Finger latches fully spread apart and locking flap positioned between finger latches.)

3. Fasten Glacier Door Captive Locks (two), torque to 75 in-lbs using 3/16" Hex Head, 3/8" Drive, 1/4" to 3/8" Adapter (1/4" Drive), 4" Ext, 1/4" Drive, (40-200 in-lbs) Trq Wrench, 1/4" Drive.

Refer to Figure 1.

4. Stow tools as required, to original locations.

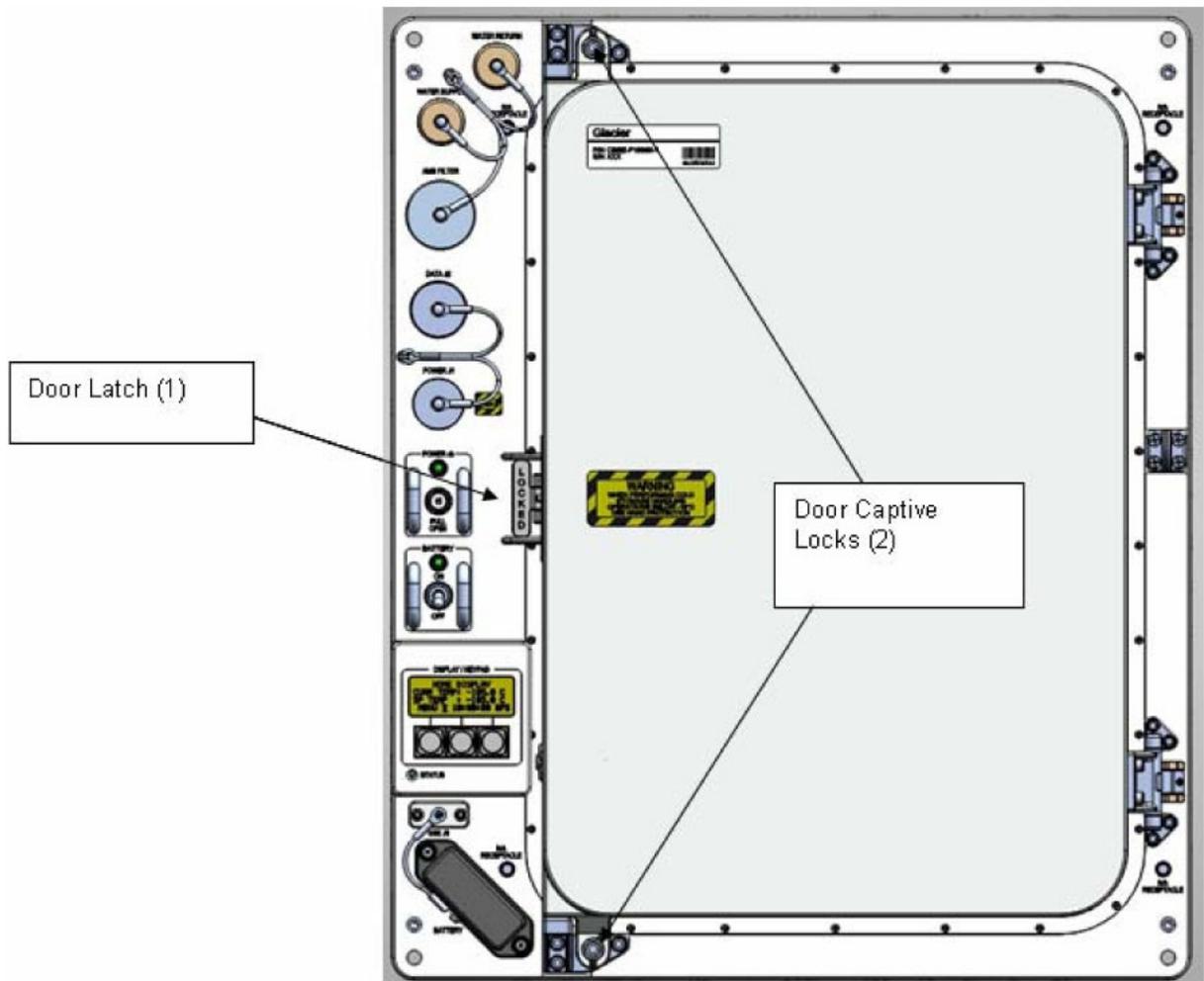


Figure 1. Glacier Configuration.

5. Notify MCC-H Glacier door is locked.

OBJECTIVE:

The following steps will activate Glacier Systems.

On MCC-H GO

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

NOTE

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

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

NOTE

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

- 9. ✓Display 'HOME'
- *****
- * If 'HOME' not shown,
- * | Perform [GLACIER FAIL TO REPOWER](#) (SODF: ASSY OPS:
- * | PAYLOADS), then:
- * |
- *****

* If Display - *****Error Pending*****

* | Perform [GLACIER ERROR MESSAGE](#) (SODF: ASSY OPS:

* | PAYLOADS), then:

* |

- 10. Log from Glacier front panel:
- GPS:** _____:_____:

CURR TEMP:_____._____ °C

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

OBJECTIVE:

The following steps will perform a reboot of Glacier Systems.

- Glacier
1. ✓Display 'HOME'

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

 2. Log from Glacier front panel:
GPS: _____:_____:_____
CURR TEMP: _____.____ °C
 3. pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
 4. pb Left (NEXT) → Press (four times), following appears:
'MAIN MENU'
'SHUTDOWN 5/5'
 5. pb Center (SELECT) → Press (one time), following appears:
'SHUTDOWN'
'SHUTDOWN 1/2'
 6. pb Left (NEXT) → Press (one time), following appears:
'SHUTDOWN'
'REBOOT 2/2'
 7. pb Center (SELECT) → Press (one time), following appears:
'Confirm Shutdown'
'REBOOT'
 8. pb Left (APPLY) → Press (one time), following appears:
'Glacier'
'System'
'Shutting Down'
'Please wait...'
 9. Verify Display—
'Glacier'
'System'
'Rebooting'
'Please wait...'

NOTE

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

10. ✓Display 'HOME'
- *****
*
*
* If 'HOME' not shown:
* |
* | ✓MCC-H
*

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

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

OBJECTIVE:

The following steps will perform a shutdown of Glacier Systems. Commanded shutdowns prevent loss of data and system errors and are the desired nominal method of shutdown.

CAUTION
Due to possible loss of experiment payload(s), Glacier should not be shutdown for more than 30 minutes at +4 ° C (or 120 minutes at -95° C), unless necessary for Orbiter contingency operations.

Glacier

1. ✓Display 'HOME'
 - *****
 - * If Display - '**Error Pending**'
 - * | Perform [GLACIER ERROR MESSAGE](#) (SODF: ASSY OPS: PAYLOADS), then:
 - *****
 - * |
 - * If 'HOME' not shown:
 - * | pb Right (EXIT) → push until 'HOME' appears
 - *****
2. Log Glacier front panel:
 - GPS: _____:_____:
 - CURR TEMP: _____.____°C
3. pb Left (MENU) → Press (one time), following appears:
 - 'MAIN MENU'
 - 'QUICK STATUS 1/5'
4. pb Left (NEXT) → Press (four times), following appears:
 - 'MAIN MENU'
 - 'SHUTDOWN 5/5'
5. pb Center (SELECT) → Press (one time), following appears:
 - 'SHUTDOWN'
 - 'SHUTDOWN 1/2'
6. pb Center (SELECT) → Press (one time), following appears:
 - 'Confirm Shutdown'
 - 'SHUTDOWN'
7. pb Left (APPLY) → Press (one time), following appears:
 - 'Glacier'
 - 'System'
 - 'Shutting Down'
 - 'Please wait...'
8. Verify—
 - 'Glacier'

'Shutdown Complete'
'TURN POWER OFF'

9. Wait 5 seconds before proceeding.
10. sw BATTERY → OFF (It off)

NOTE

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

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

OBJECTIVE:

The following steps will perform a power cycle of the Glacier System.

On MCC-H GO

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

- Glacier
1. ✓Display 'HOME'

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

 2. pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
 3. pb Left (NEXT) → Press (four times), following appears:
'MAIN MENU'
'SHUTDOWN 5/5'
 4. pb Center (SELECT) → Press (one time), following appears
'SHUTDOWN'
'SHUTDOWN 1/2'
 5. pb Center (SELECT) → Press (one time), following appears:
'Confirm Shutdown'
'SHUTDOWN'
 6. pb Left (APPLY) → Press (one time), following appears:
'Glacier'
'System'
'Shutting Down'
'Please wait...'
 7. Verify –
'Glacier'
'Shutdown Complete'
'TURN POWER OFF'
 8. Wait 5 seconds.
 9. ✓BATTERY – ON (It on)

NOTE

Power light can take up to 2 minutes to fully extinguish. Once main power has been removed, the battery light will start to flash.

- 10. cb POWER → Open (It off)
- 11. Wait 1 minute. (No need to wait for POWER light to extinguish)
- 12. cb POWER → Close (It on)

NOTE

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

- 13. ✓Display 'HOME'

*
* If 'HOME' not shown,
* | Perform [GLACIER FAIL TO REPOWER](#) (SODF: ASSY OPS:
* | PAYLOADS), then:
*

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

- 14. Log from Glacier front panel:
CURR TEMP: _____ °C
GPS: _____/_____:_____
- 15. Notify MCC-H of Power Cycle completion and data recorded in step 14.

OBJECTIVE:

This procedure will perform a manual reconfigure of the Glacier System using the front panel and display buttons.

Glacier

1. ✓Display – 'HOME'

```

*****
*
* If display —'***Error Pending***'
* |   Perform GLACIER ERROR MESSAGE (SODF: ASSY OPS:
* |   PAYLOADS), then:
*
*
* If 'HOME'not shown:
* |   pb Right (EXIT) → Press until 'HOME' appears
*
*****

```

2. Record front panel display 'CURR TEMP', 'SET POINT', and 'GPS' and any ground supplied data in [TABLE 2 GLACIER RESET LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

3. SET CONTROL MODE TO IDLE

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

NOTE

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

- 3.7 pb Left (NEXT) → Press as required to select desired Temperature Control Mode to Idle
- 3.8 pb Center (APPLY) → Press (one time)
- 3.9 ✓Confirm New Control Mode = Idle
- 3.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Control Mode 2/18'
- 3.11 ✓Control Mode = Idle
- 3.12 pb Right (EXIT) → Press until 'HOME' appears
- 4. SETPOINT TEMPERATURE
 - 4.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
 - 4.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
 - 4.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
 - 4.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
 - 4.5 pb Center (SELECT) → Press (one time), following appears:
'Set Point Temp'
'XXXXX °C'
'-160.0 to +004.0'

NOTE

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

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

4.10 ✓Set Point Temp = desired Set Point

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

5. TEMPERATURE CONTROL SENSORS

5.1 pb Left (MENU) → Press (one time), following appears:
'**MAIN MENU**'
'**QUICK STATUS 1/5**'

5.2 pb Left (NEXT) → Press (three times), following appears:
'**MAIN MENU**'
'**SETUP 4/5**'

5.3 pb Center (SELECT) → Press (one time), following appears:
'**SETUP**'
'**Temp Control 1/3**'

5.4 pb Center (SELECT) → Press (one time), following appears:
'**Temp Control**'
'**Set Point Temp 1/18**'

5.5 pb Left (NEXT) → Press (two times), following appears:
'**Temp Control**'
'**Control Sensors 3/18**'

5.6 pb Center (SELECT) → Press (one time), following appears:
'**Control Sensors**'
'**INNER OUTLET INLET**'

NOTE

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

5.7 Enter desired combination of Control Sensors per **MCC-H**

5.8 pb Right (DONE) → Press (one time)

5.9 ✓Confirm New Control Sensors = desired Control Sensors

5.10 pb Left (APPLY) → Press (one time), following appears:
'**Temp Control**'
'**Control Sensors 3/18**'

5.11 ✓Control Sensors = desired Control Sensors

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

6. AIR MANAGEMENT PROCEED MESSAGE

6.1 pb Left (MENU) → Press (one time), following appears:
'**MAIN MENU**'

'QUICK STATUS 1/5'

- 6.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 6.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 6.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 6.5 pb Left (NEXT) → Press (three times), following appears:
'Temp Control'
'AirMgmt Proceed 4/18'
- 6.6 pb Center (SELECT) → Press (one time), following appears:
'AirMgmt Proceed'
'PROCEED'
- 6.7 pb Center (APPLY) → Press (one time)
- 6.8 ✓Display line 3 – PROCEED
- 6.9 pb Right (EXIT) → Press until **'HOME'** appears

7. TEMPERATURE CONTROL BANDWIDTH

- 7.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 7.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 7.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 7.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 7.5 pb Left (NEXT) → Press (four times), following appears:
'Temp Control'
'Bandwidth 5/18'
'XX.X °C'
- 7.6 pb Center (SELECT) → Press (one time), following appears:
'Bandwidth'
'XX.X °C'
'00.1 to 25.5'

NOTE

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

7.7 Enter desired Bandwidth per **MCC-H**

7.8 pb Right (DONE) → Press (one time)

7.9 ✓Confirm New Bandwidth = desired Bandwidth

7.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Bandwidth 5/18'

7.11 ✓Bandwidth = desired Bandwidth

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

8. PRIMARY COOLER

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

8.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'

8.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

8.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'

8.5 pb Left (NEXT) → Press (five times), following appears:
'Temp Control'
'Primary Cooler 6/18'

8.6 pb Center (SELECT) → Press (one time), following appears:
'Primary Cooler'
'COOLER X'

NOTE

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

- 8.7 pb Left (NEXT) → Press as required to select desired Primary Cooler per **MCC-H**
- 8.8 pb Center (APPLY) → Press (one time)
- 8.9 ✓Confirm New Primary Cooler = desired Cooler
- 8.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Primary Cooler 6/18'
- 8.11 ✓Primary Cooler = desired Cooler
- 8.12 pb Right (EXIT) → Press until '**HOME**' appears
9. COOLER 1 STROKE
- 9.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 9.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 9.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 9.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 9.5 pb Left (NEXT) → Press (six times), following appears:
'Temp Control'
'Cooler 1 Stroke 7/18'
- 9.6 pb Center (SELECT) → Press (one time), following appears:
'Cooler 1 Stroke'
'XX'
'03 to 63'

NOTE

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

- 9.7 Enter desired Cooler 1 Stroke value per **MCC-H**
- 9.8 pb Right (DONE) → Press (one time)
- 9.9 ✓Confirm New Cooler 1 Stroke = desired Cooler 1 Stroke

- 9.10 pb Left (APPLY) → Press (one time), following appears:
 'Temp Control'
 'Cooler 1 Stroke 7/18'
- 9.11 ✓Cooler 1 Stroke = desired Cooler 1 Stroke
- 9.12 pb Right (EXIT) → Press until 'HOME' appears
10. COOLER 1 STATE
- 10.1 pb Left (MENU) → Press (one time), following appears:
 'MAIN MENU'
 'QUICK STATUS 1/5'
- 10.2 pb Left (NEXT) → Press (three times), following appears:
 'MAIN MENU'
 'SETUP 4/5'
- 10.3 pb Center (SELECT) → Press (one time), following appears:
 'SETUP'
 'Temp Control 1/3'
- 10.4 pb Center (SELECT) → Press (one time), following appears:
 'Temp Control'
 'Set Point Temp 1/18'
- 10.5 pb Left (NEXT) → Press (seven times), following appears:
 'Temp Control'
 'Cooler 1 State 8/18'
- 10.6 pb Center (SELECT) → Press (one time), following appears:
 'Cooler 1 State'
 'XX'

NOTE

1. There are 2 options for Cooler 1 State (ON and OFF).
2. The left pushbutton (NEXT) changes the Cooler 1 State, the center pushbutton (APPLY) selects the State, and the right pushbutton (CANCEL) returns to the previous display.

- 10.7 pb Left (NEXT) → Press as required to select desired Cooler 1 State per **MCC-H**
- 10.8 pb Center (APPLY) → Press (one time)
- 10.9 ✓Confirm New Cooler 1 State = desired State
- 10.10 pb Left (APPLY) → Press (one time), following appears:
 'Temp Control'
 'Cooler 1 State 8/18'
- 10.11 ✓Cooler 1 State = desired Cooler 1 State
- 10.12 pb Right (EXIT) → Press until 'HOME' appears

11. COOLER 2 STROKE

- 11.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 11.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 11.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 11.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 11.5 pb Left (NEXT) → Press (eight times), following appears:
'Temp Control'
'Cooler 2 Stroke 9/18'
- 11.6 pb Center (SELECT) → Press (one time), following appears:
'Cooler 2 Stroke'
'XX'
'03 to 63'

NOTE

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

- 11.7 Enter desired Cooler 2 Stroke value per **MCC-H**
- 11.8 pb Right (DONE) → Press (one time)
- 11.9 ✓Confirm New Cooler 2 Stroke = desired Cooler 2 Stroke
- 11.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Cooler 2 Stroke 9/18'
- 11.11 ✓Cooler 2 Stroke = desired Cooler 2 Stroke
- 11.12 pb Right (EXIT) → Press until '**HOME**' appears

12. COOLER 2 STATE

- 12.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 12.2 pb Left (NEXT) → Press (three times), following appears:

'MAIN MENU'

'SETUP 4/5'

- 12.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 12.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 12.5 pb Left (NEXT) → Press (nine times), following appears:
'Temp Control'
'Cooler 2 State 10/18'
- 12.6 pb Center (SELECT) → Press (one time), following appears:
'Cooler 2 State'
'XX'

NOTE

1. There are 2 options for Cooler 2 State (ON and OFF).
2. The left pushbutton (NEXT) changes the Cooler 2 State, the center pushbutton (APPLY) selects the State, and the right pushbutton (CANCEL) returns to the previous display.

- 12.7 pb Left (NEXT) → Press as required to select desired Cooler 2 State per **MCC-H**
- 12.8 pb Center (APPLY) → Press (one time)
- 12.9 ✓Confirm New Cooler 2 State = desired State
- 12.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Cooler 2 State 10/18'
- 12.11 ✓Cooler 2 State = desired Cooler 2 State
- 12.12 pb Right (EXIT) → Press until '**HOME**' appears
13. MAXIMUM POWER DRAW
- 13.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 13.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 13.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

- 13.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 13.5 pb Left (NEXT) → Press (twelve times), following appears:
'Temp Control'
'Max Power Draw 13/18'
- 13.6 pb Center (SELECT) → Press (one time), following appears:
'Max Power Draw'
'XXX W'
'000 to 420'

NOTE

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

- 13.7 Enter desired Max Power Draw value per **MCC-H**
- 13.8 pb Right (DONE) → Press (one time)
- 13.9 ✓Confirm New Max Power = desired Max Power Draw
- 13.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Max Power Draw 13/18'
- 13.11 ✓Max Power Draw = desired Max Power Draw
- 13.12 pb Right (EXIT) → Press until '**HOME**' appears
- 14. OVER CURRENT
 - 14.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
 - 14.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
 - 14.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
 - 14.4 pb Center (SELECT) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
 - 14.5 pb Left (NEXT) → Press (thirteen times), following appears:
'Temp Control'
'Over Current 14/18'

- 14.6 pb Center (SELECT) → Press (one time), following appears:
 'Over Current'
 'XX.X A'
 '00.0 to 30.0'

NOTE

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

- 14.7 Enter desired Over Current value per **MCC-H**
- 14.8 pb Right (DONE) → Press (one time)
- 14.9 ✓Confirm New Over Current = desired Over Current
- 14.10 pb Left (APPLY) → Press (one time), following appears:
 'Temp Control'
 'Over Current 14/18'
- 14.11 ✓Over Current = desired Over Current
- 14.12 pb Right (EXIT) → Press until 'HOME' appears

15. AIR MANAGEMENT MODE

- 15.1 pb Left (MENU) → Press (one time), following appears:
 'MAIN MENU'
 'QUICK STATUS 1/5'
- 15.2 pb Left (NEXT) → Press (three times), following appears:
 'MAIN MENU'
 'SETUP 4/5'
- 15.3 pb Center (SELECT) → Press (one time), following appears:
 'SETUP'
 'Temp Control 1/3'
- 15.4 pb Left (NEXT) → Press (one time), following appears:
 'SETUP'
 'Air Management 2/3'
- 15.5 pb Center (SELECT) → Press (one time), following appears:
 'Air Management'
 'Air Mgmt Mode 1/6'
- 15.6 pb Center (SELECT) → Press (one time), following appears:
 'Air Mgmt Mode'
 'XXXXX'

NOTE

1. There are 2 options for Air Mgmt Mode (MANUAL and AUTOMATIC).
2. The left pushbutton (NEXT) changes the Mode, the center pushbutton (APPLY) selects the Mode, and the right pushbutton (CANCEL) returns to the previous display.

- 15.7 pb Left (NEXT) → Press as required to select desired Air Mgmt Mode per **MCC-H**
- 15.8 pb Center (APPLY) → Press (one time)
- 15.9 ✓Confirm New Air Mgmt Mode = desired Air Mgmt Mode
- 15.10 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'
- 15.11 ✓Air Mgmt Mode = desired Air Mgmt Mode
- 15.12 pb Right (EXIT) → Press until **'HOME'** appears
16. AIR MANAGEMENT HUMIDITY
- 16.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 16.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 16.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 16.4 pb Left (NEXT) → Press (one time), following appears:
'SETUP'
'Air Management 2/3'
- 16.5 pb Center (SELECT) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'
- 16.6 pb Left (NEXT) → Press (one time), following appears:
'Air Management'
'Humidity Config 2/6'
- 16.7 pb Center (SELECT) → Press (one time), following appears:
'Humidity Config'
'Pump: 12 Valve: 1234'
'XX XXXX'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) toggles the selected Pump (1 or 2) or Valve (1-4) between 0 and 1 (OFF/ON).

- 16.8 Enter desired Humidity Config per **MCC-H**
- 16.9 pb Right (DONE) → Press (one time)
- 16.10 ✓ Confirm New Humidity Config = desired Humidity Config
- 16.11 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Humidity Config 2/6'
- 16.12 ✓ Humidity Config = desired Humidity Config
- 16.13 pb Right (EXIT) → Press until **'HOME'** appears
17. AIR MANAGEMENT PRESSURE CONFIGURATION
- 17.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 17.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 17.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 17.4 pb Left (NEXT) → Press (one time), following appears:
'SETUP'
'Air Management 2/3'
- 17.5 pb Center (SELECT) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'
- 17.6 pb Left (NEXT) → Press (two times), following appears:
'Air Management'
'Pressure Config 3/6'
- 17.7 pb Center (SELECT) → Press (one time), following appears:
'Pressure Config'
'Pump: 12 Valve: 1234'
'XX XXXX'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) toggles the selected Pump (1 or 2) or Valve (1-4) between 0 and 1 (OFF/ON).

- 17.8 Enter desired Pressure Config per **MCC-H**
- 17.9 pb Right (DONE) → Press (one time)
- 17.10 ✓ Confirm New Pressure Config = desired Pressure Config
- 17.11 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Pressure Config 3/6'
- 17.12 ✓ Pressure Config = desired Pressure Config
- 17.13 pb Right (EXIT) → Press until **'HOME'** appears
18. AIR MANAGEMENT MANUAL CONFIGURATION
- 18.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 18.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 18.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 18.4 pb Left (NEXT) → Press (one time), following appears:
'SETUP'
'Air Management 2/3'
- 18.5 pb Center (SELECT) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'
- 18.6 pb Left (NEXT) → Press (three times), following appears:
'Air Management'
'Manual Config 4/6'
- 18.7 pb Center (SELECT) → Press (one time), following appears:
'Manual Config'
'Pump: 12 Valve: 1234'
'XX XXXX'

NOTE

1. The left pushbutton (CURSOR) moves cursor between fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) toggles the selected Pump (1 or 2) or Valve (1-4) between 0 and 1 (OFF/ON).

18.8 Enter desired Manual Config per **MCC-H**

18.9 pb Right (DONE) → Press (one time)

18.10 ✓ Confirm New Manual Config = desired Manual Config

18.11 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Manual Config 4/6'

18.12 ✓ Manual Config = desired Manual Config

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

19. START HUMIDITY MONITORING TIME

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

19.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'

19.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

19.4 pb Left (NEXT) → Press (one time), following appears:
'SETUP'
'Air Management 2/3'

19.5 pb Center (SELECT) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'

19.6 pb Left (NEXT) → Press (four times), following appears:
'Air Management'
'Start Humidity 5/6'

19.7 pb Center (SELECT) → Press (one time), following appears:
'Start Humidity'
'XXXXX seconds'
'00000 to 65535'

NOTE

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

19.8 Enter desired Start Humidity per **MCC-H**

19.9 pb Right (DONE) → Press (one time)

19.10 ✓ Confirm New Start Humidity = desired Start Humidity

19.11 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Start Humidity 5/6'

19.12 ✓ Start Humidity = desired Start Humidity

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

20. START PRESSURE MONITORING TIME

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

20.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'

20.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

20.4 pb Left (NEXT) → Press (one time), following appears:
'SETUP'
'Air Management 2/3'

20.5 pb Center (SELECT) → Press (one time), following appears:
'Air Management'
'Air Mgmt Mode 1/6'

20.6 pb Left (NEXT) → Press (five times), following appears:
'Air Management'
'Start Pressure 6/6'

20.7 pb Center (SELECT) → Press (one time), following appears:
'Start Pressure'
'XXXXX seconds'
'00000 to 65535'

NOTE

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

20.8 Enter desired Start Pressure per **MCC-H**

20.9 pb Right (DONE) → Press (one time)

20.10 ✓ Confirm New Start Pressure = desired Start Pressure

20.11 pb Left (APPLY) → Press (one time), following appears:
'Air Management'
'Start Pressure 6/6'

20.12 ✓ Start Pressure = desired Start Pressure

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

21. CIRCULATION FAN MODE

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

21.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'

21.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'

21.4 pb Left (NEXT) → Press (two times), following appears:
'SETUP'
'Auxiliary 3/3'

21.5 pb Center (SELECT) → Press (one time), following appears:
'Auxiliary'
'Circ Fan Mode 1/7'

21.6 pb Center (SELECT) → Press (one time), following appears:
'Circ Fan Mode'
'XXXXX'

NOTE

1. There are 2 options for Circ Fan Mode (MANUAL and AUTOMATIC).
2. The left pushbutton (NEXT) changes the Mode, the center pushbutton (APPLY) selects the Mode, and the right pushbutton (CANCEL) returns to the previous display.

- 21.7 pb Left (NEXT) → Press as required to select desired Circ Fan Mode per **MCC-H**
- 21.8 pb Center (APPLY) → Press (one time)
- 21.9 ✓Confirm New Circ Fan Mode = desired Circ Fan Mode
- 21.10 pb Left (APPLY) → Press (one time), following appears:
'Auxiliary'
'Circ Fan Mode 1/7'
- 21.11 ✓Circ Fan Mode = desired Circ Fan Mode
- 21.12 pb Right (EXIT) → Press until '**HOME**' appears

22. CIRCULATION FAN POWER

- 22.1 pb Left (MENU) → Press (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 22.2 pb Left (NEXT) → Press (three times), following appears:
'MAIN MENU'
'SETUP 4/5'
- 22.3 pb Center (SELECT) → Press (one time), following appears:
'SETUP'
'Temp Control 1/3'
- 22.4 pb Left (NEXT) → Press (two times), following appears:
'SETUP'
'Auxiliary 3/3'
- 22.5 pb Center (SELECT) → Press (one time), following appears:
'Auxiliary'
'Circ Fan Mode 1/7'
- 22.6 pb Left (NEXT) → Press (one time), following appears:
'Auxiliary'
'Circ Fan Power 2/7'
- 22.7 pb Center (SELECT) → Press (one time), following appears:
'Circ Fan Power'
'XXX %'
'000 to 090'

NOTE

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

- 22.8 Enter desired Circ Fan Power per **MCC-H**

22.9 pb Right (DONE) → Press (one time)

22.10 ✓ Confirm New Circ Fan Power = desired Circ Fan Power

22.11 pb Left (APPLY) → Press (one time), following appears:
 'Auxiliary'
 'Circ Fan Power 2/7'

22.12 ✓ Circ Fan Power = desired Circ Fan Power

22.13 pb Right (EXIT) → Press until 'HOME' appears

23. DATA STORAGE INTERVAL

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

23.2 pb Left (NEXT) → Press (three times), following appears:
 'MAIN MENU'
 'SETUP 4/5'

23.3 pb Center (SELECT) → Press (one time), following appears:
 'SETUP'
 'Temp Control 1/3'

23.4 pb Left (NEXT) → Press (two times), following appears:
 'SETUP'
 'Auxiliary 3/3'

23.5 pb Center (SELECT) → Press (one time), following appears:
 'Auxiliary'
 'Circ Fan Mode 1/7'

23.6 pb Left (NEXT) → Press (two times), following appears:
 'Auxiliary'
 'Data Storage 3/7'

23.7 pb Center (SELECT) → Press (one time), following appears:
 'Data Storage'
 'XXXX seconds'
 '0000 to 3600'

NOTE

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

23.8 Enter desired Data Storage per **MCC-H**

23.9 pb Right (DONE) → Press (one time)

23.10 ✓ Confirm New Store Period = desired Store Period

- 23.11 pb Left (APPLY) → Press (one time), following appears:
 'Auxiliary'
 'Data Storage 3/7'
- 23.12 ✓Data Storage = desired Data Storage
- 23.13 pb Right (EXIT) → Press until 'HOME' appears
24. TEMPERATURE CONTROL MODE
- 24.1 pb Left (MENU) → Press (one time), following appears:
 'MAIN MENU'
 'QUICK STATUS 1/5'
- 24.2 pb Left (NEXT) → Press (three times), following appears:
 'MAIN MENU'
 'SETUP 4/5'
- 24.3 pb Center (SELECT) → Press (one time), following appears:
 'SETUP'
 'Temp Control 1/3'
- 24.4 pb Center (SELECT) → Press (one time), following appears:
 'Temp Control'
 'Set Point Temp 1/18'
- 24.5 pb Left (NEXT) → Press (one time), following appears:
 'Temp Control'
 'Control Mode 2/18'
- 24.6 pb Center (SELECT) → Press (one time), following appears:
 'Control Mode'
 'XXXX'
- NOTE

 1. There are 3 options for setting the Control Mode (IDLE, SET POINT, and MANUAL).
 2. The left pushbutton (NEXT) changes the Mode, the center pushbutton (APPLY) selects the Mode, and the right pushbutton (CANCEL) returns to the previous Mode.
- 24.7 pb Left (NEXT) → Press as required to select desired Temperature Control Mode per **MCC-H**
- 24.8 pb Center (APPLY) → Press (one time)
- 24.9 ✓Confirm New Control Mode = desired Control Mode
- 24.10 pb Left (APPLY) → Press (one time), following appears:
 'Temp Control'
 'Control Mode 2/18'
- 24.11 ✓Control Mode = desired Control Mode

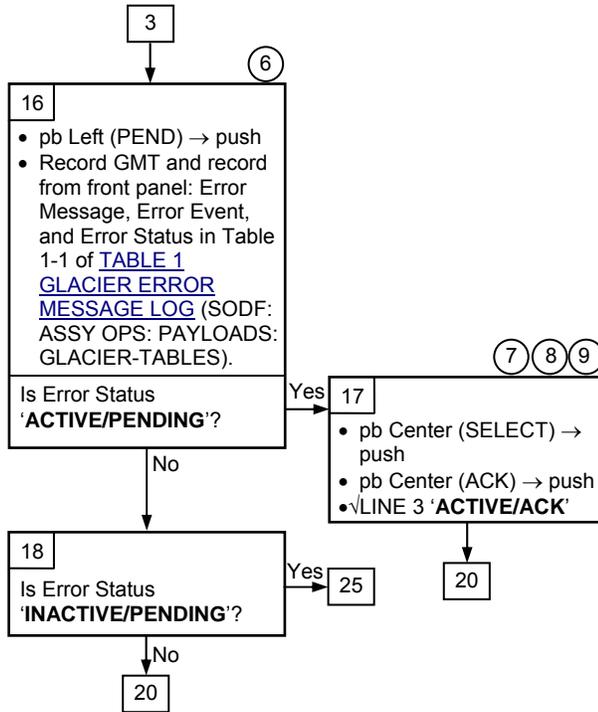
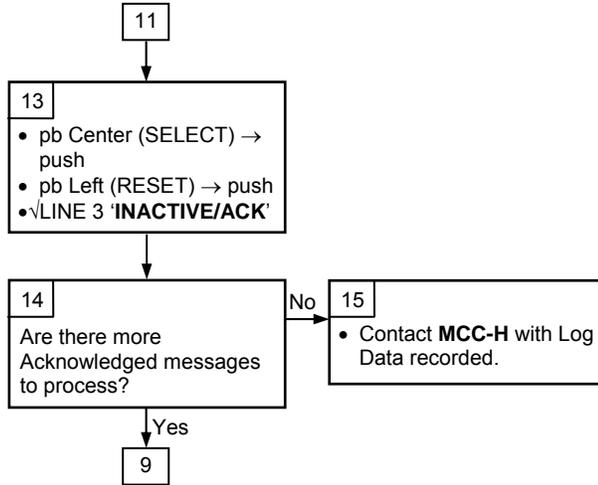
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- 24.12 pb Right (EXIT) → Press until '**HOME**' appears
25. Notify **MCC-H** GLACIER MANUAL RECONFIGURATION is complete.

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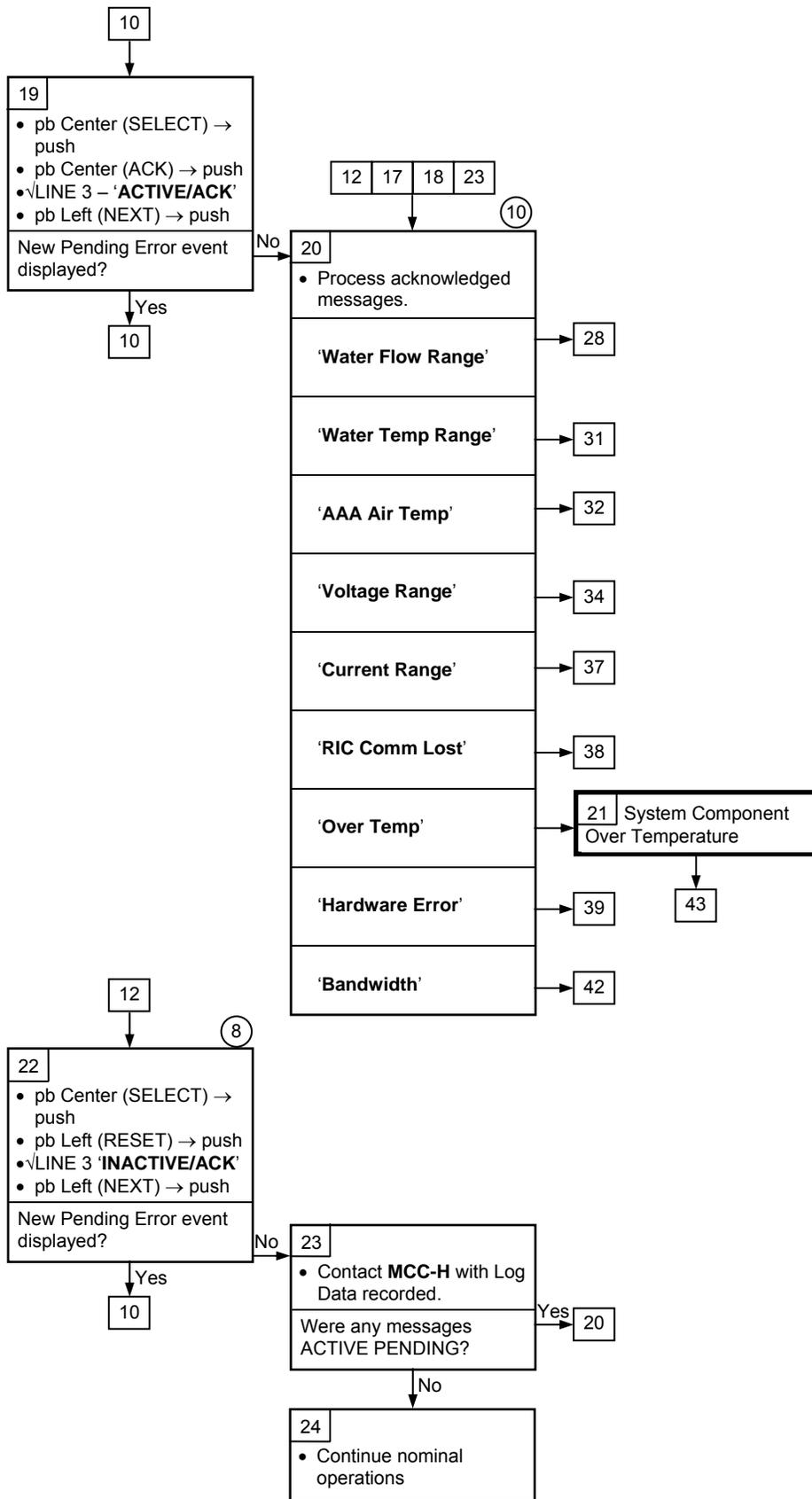


⑥
GLACIER RECORD DIAGNOSTIC DATA procedure may be performed to capture states of key data elements per MCC-H direction.

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

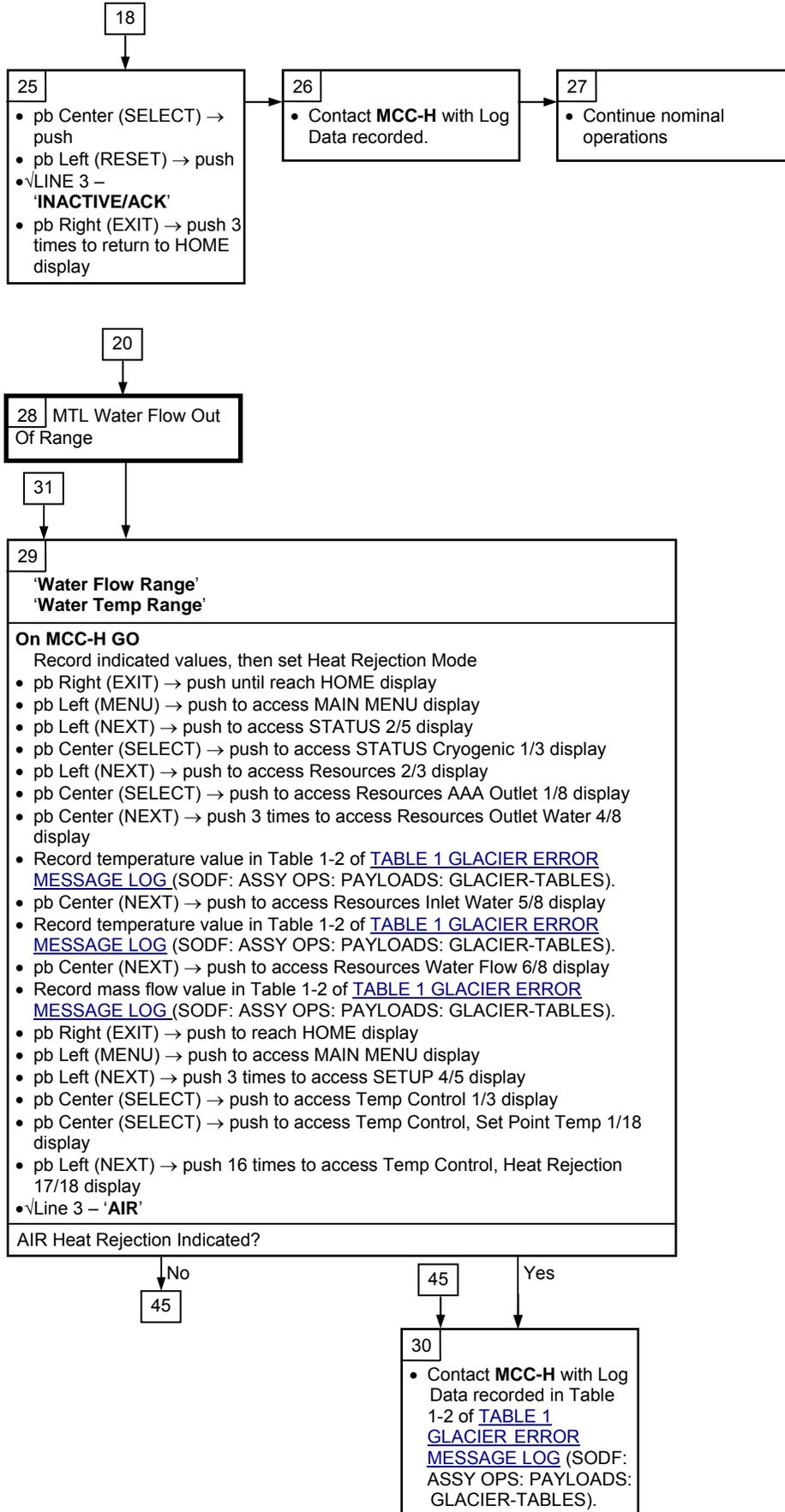
⑧
Software Errors may not reset or may be persistent due to: Frequent intermittent power failure. Single Event Upset. Electromagnetic interference

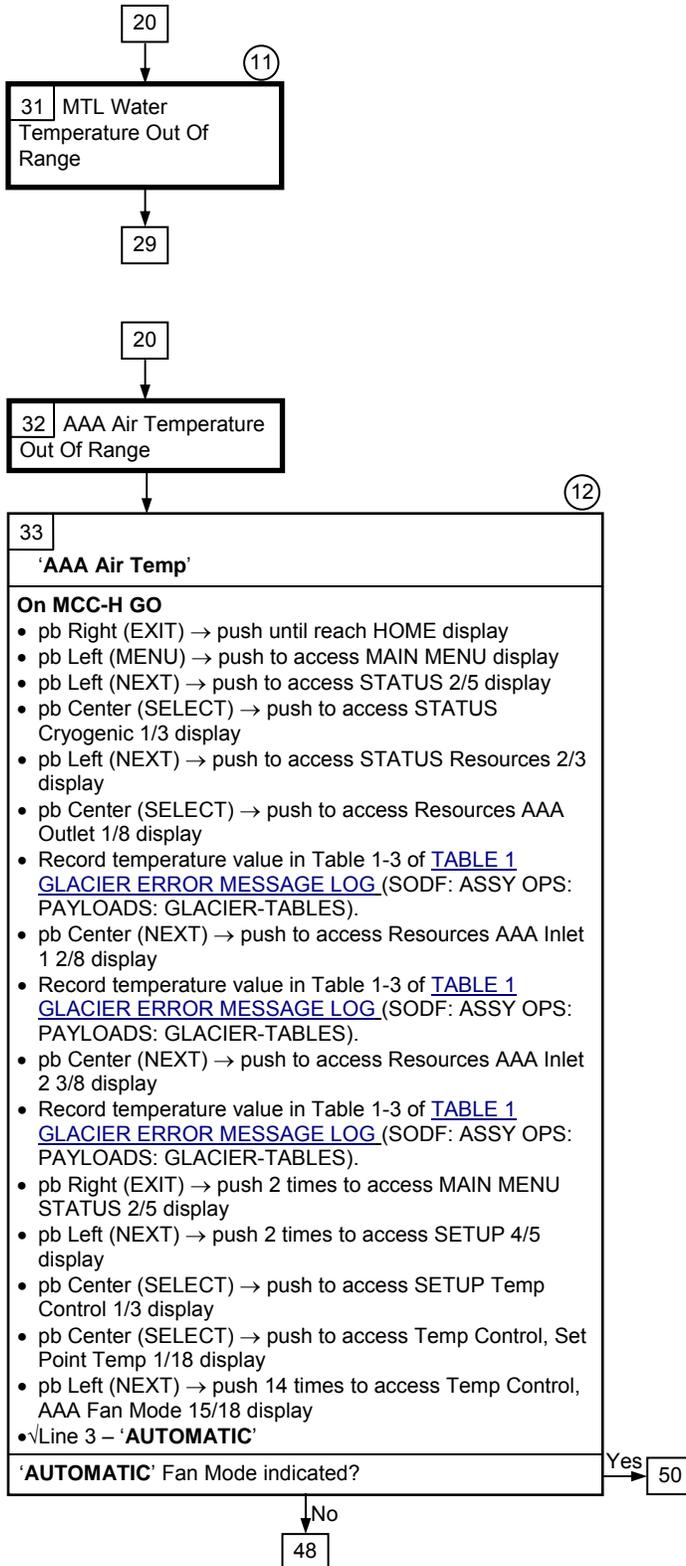
⑨
Internal voltage takes approximately 2 min to dissipate. Power LED will remain dimly illuminated



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

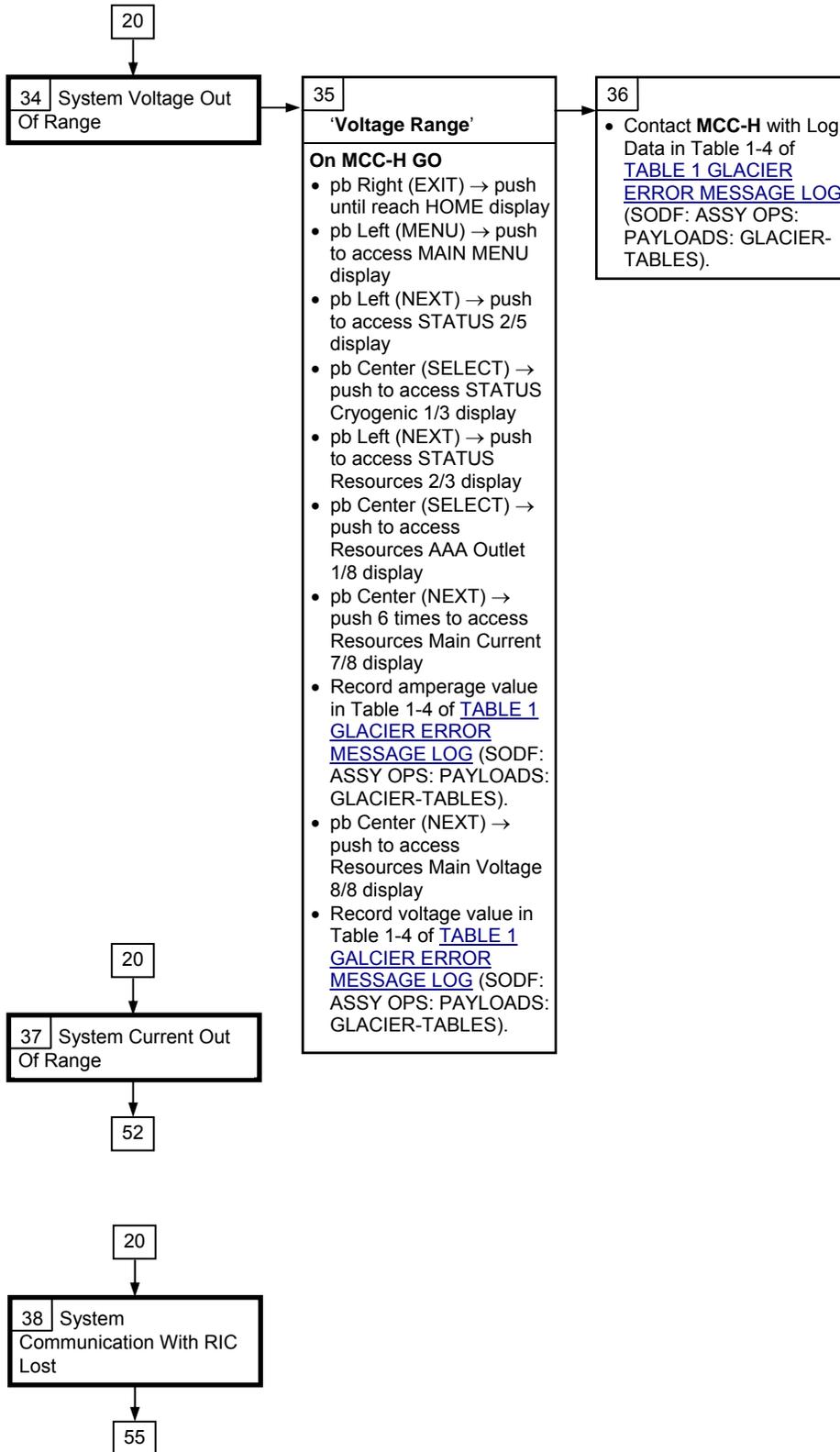
⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'

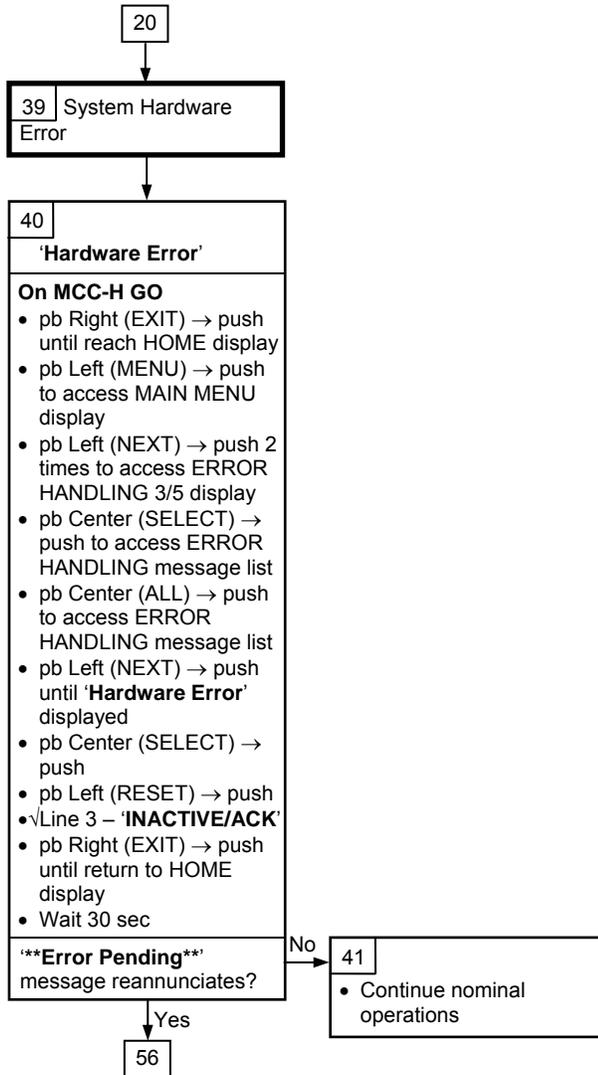




(11) AAA Air Temp value may take a long time to reflect change in fan mode.

(12) MCC-H will evaluate Av Bay temps





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'Bandwidth'

Record indicated values

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

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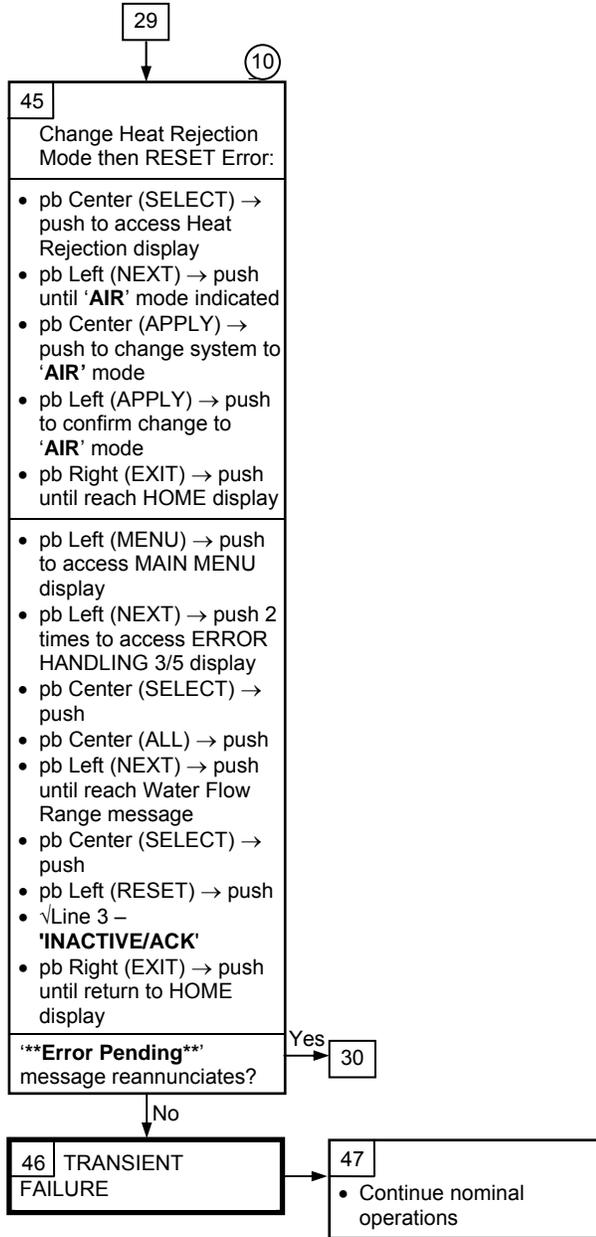
'Over Temp'

On MCC-H GO

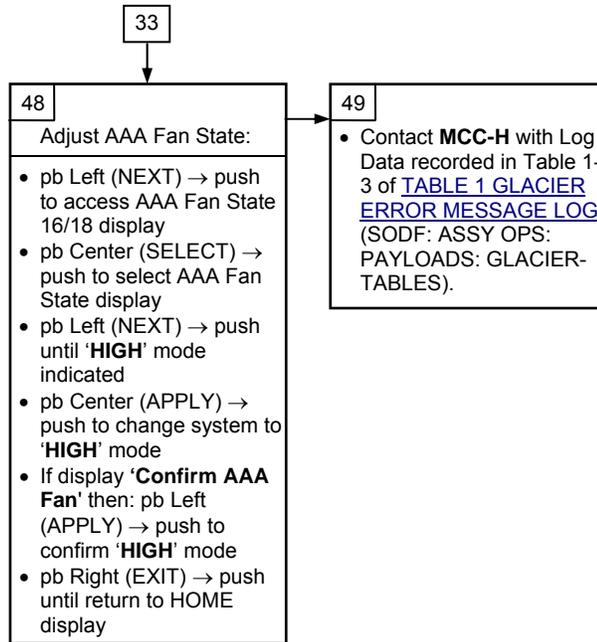
- pb Right (EXIT) → push until reach HOME display
- pb Left (MENU) → push to access MAIN MENU display
- pb Left (NEXT) → push to access STATUS 2/5 display
- pb Center (SELECT) → push to access STATUS Cryogenic 1/3 display
- pb Left (NEXT) → push 2 times to access STATUS System 3/3 display
- pb Center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

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



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



33

50

Adjust AAA Fan Mode & State:

- pb Center (SELECT) → push to access AAA Fan Mode display
- pb Left (NEXT) → push until **'MANUAL'** mode indicated
- pb Center (APPLY) → push to select **'MANUAL'** mode
- pb Left (APPLY) → push to confirm **'MANUAL'** mode
- pb Left (NEXT) → push to access AAA Fan State 16/18 display
- pb Center (SELECT) → push to select AAA Fan State display
- pb Left (NEXT) → push until **'HIGH'** mode indicated
- pb Center (APPLY) → push to change system to **'HIGH'** mode
- If display 'Confirm AAA Fan' then pb Left (APPLY) → push to confirm **'HIGH'** mode
- pb Right (EXIT) → push until return to HOME display

51

- Contact **MCC-H** with Log Data recorded in Table 1-3 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).

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'Current Range'

On MCC-H GO

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

'30.0 A' Over Current Limit indicated?

Yes

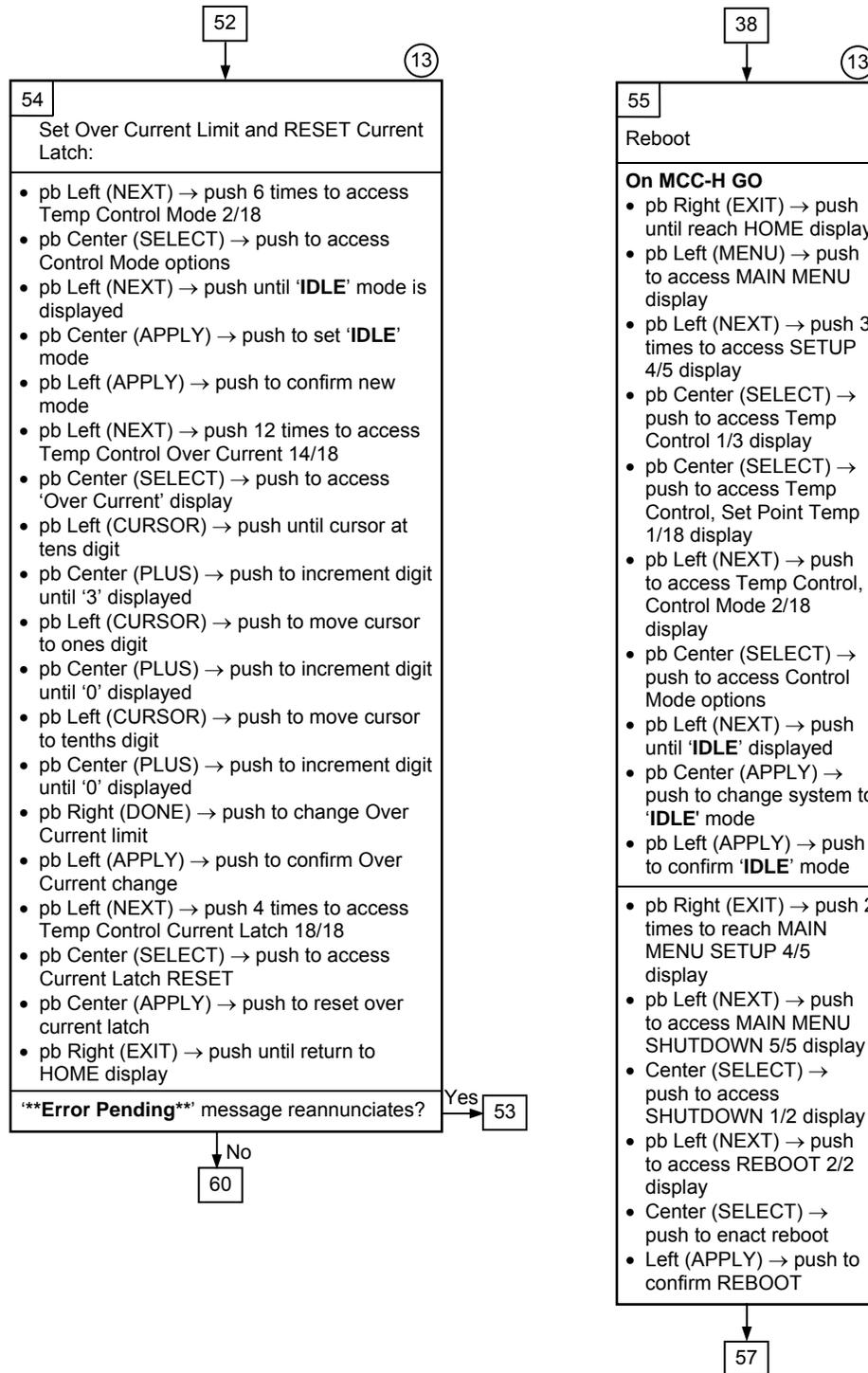
53

- Contact MCC-H with Log Data recorded.

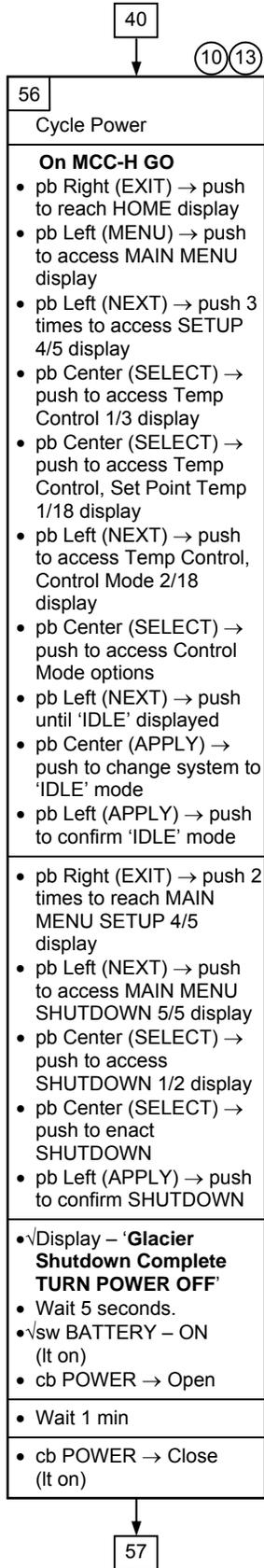
No

54

54

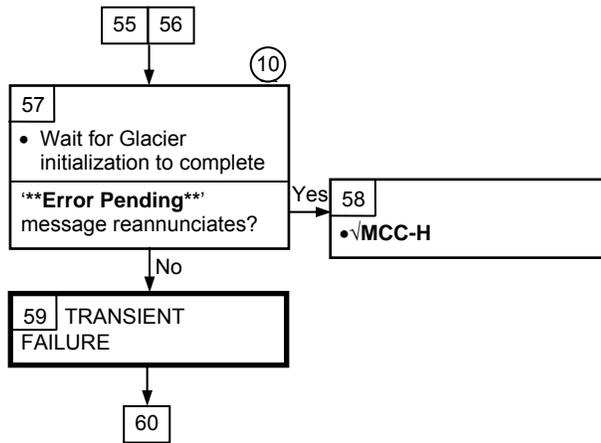


13 If parameters already set, the confirmation screen will not be displayed.



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

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



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

59 | 54

13

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Enable Set Point Mode

- √ MCC-H with Log Data recorded.

On MCC-H GO

- pb Right (EXIT) → push until reach HOME display
- pb Left (MENU) → push to access MAIN MENU display
- pb Left (NEXT) → push 3 times to access SETUP 4/5 display
- pb Center (SELECT) → push to access Temp Control 1/3 display
- pb Center (SELECT) → push to access Temp Control, Set Point Temp 1/18 display
- pb Left (NEXT) → push to access Temp Control, Control Mode 2/18 display
- pb Center (SELECT) → push to access Control Mode display
- pb Left (NEXT) → push until 'SET POINT' displayed
- pb Center (APPLY) → push to change system to 'SET POINT' mode
- pb Left (APPLY) → push to confirm 'SET POINT' mode
- Wait 1 minute
- pb Left (NEXT) → push 2 times to access 'Temp Control', 'AirMgmt Proceed 4/18' display
- pb Center (SELECT) → push to access 'AirMgmt Proceed', 'PROCEED' display
- pb Center (APPLY) → push 1 time
- √ Display Line 3 – 'PROCEED'
- pb Right (EXIT) → push until reach HOME display
- Record from front panel 'CURR TEMP':
- Contact MCC-H with recorded 'CURR TEMP'
- Monitor 'CURR TEMP' for 5 minutes to verify cooling proceeds toward 'SET POINT'.

If CURR TEMP does not proceed toward 'SET POINT'

√ MCC-H
Perform [GLACIER SHUTDOWN](#).
(SODF: ASSY OPS: PAYLOADS).

61

- Continue nominal operations

13

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

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GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/19A/FIN)

Page 1 of 9 pages

OBJECTIVE:

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

Glacier 1. RECORD DATA

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

1.1 ✓Display – 'HOME'

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

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

2. CHECK STATUS OF KEY PARAMETERS

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

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

NOTE

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

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

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

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

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

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

3. SET TEMPERATURE CONTROL MODE TO IDLE

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

NOTE

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

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

GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/19A/FIN)

Page 3 of 9 pages

- 4.2 pb Left (NEXT) → push (three times) following appears:
'MAIN MENU'
'SETUP 4/5'
- 4.3 pb Center (SELECT) → push (one time) following appears:
'SETUP'
'Temp Control 1/3'
- 4.4 pb Center (SELECT) → push (one time) following appears:
'Temp Control'
'Set Point Temp 1/18'
- 4.5 pb Center (SELECT) → push (one time) following appears:
'Set Point Temp'

'XXXX.X °C'
'-160.0 to +004.0'

NOTE

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

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

5. SET TEMP CONTROL SENSORS

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

GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/19A/FIN)

Page 4 of 9 pages

'Set Point Temp 1/18'

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

NOTE

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

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

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

'Bandwidth'
'XX.X°C'
'00.1 TO 25.5'

NOTE

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

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

6.8 pb Right (DONE) → push (one time)

6.9 ✓Confirm New Bandwidth = desired Bandwidth

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

'Temp Control'
'Bandwidth 5/18'

6.11 ✓Bandwidth = desired Bandwidth

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

7. SET PRIMARY COOLER

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

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

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

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

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

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

NOTE

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

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

NOTE

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

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

GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/19A/FIN)

Page 8 of 9 pages

NOTE

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

- 9.7 Enter desired Over Current Limit per **MCC-H**.
 - 9.8 pb Right (DONE) → push (one time)
 - 9.9 ✓Confirm New Over Current = desired Over Current
 - 9.10 pb Left (APPLY) → push (one time), following appears:
'Temp Control'
'Over Current 14/18'
 - 9.11 ✓Over Current = desired Over Current
 - 9.12 pb Right (EXIT) → Press until '**HOME**' appears
10. SET TEMPERATURE CONTROL MODE
- 10.1 pb Left (MENU) → push (one time) following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
 - 10.2 pb Left (NEXT) → push (three times) following appears:
'MAIN MENU'
'SETUP 4/5'
 - 10.3 pb Center (SELECT) → push (one time) following appears:
'SETUP'
'Temp Control 1/3'
 - 10.4 pb Center (SELECT) → push (one time) following appears:
'Temp Control'
'Set Point Temp 1/18'
 - 10.5 pb Left (NEXT) → push (one time) following appears:
'Temp Control'
'Control Mode 2/18'
 - 10.6 pb Center (SELECT) → push (one time), following appears:
'Control Mode'
'XXXX'

NOTE

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

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

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

1 2

1 Switch to Alternate Power Source

- Contact **MCC-H** for alternate power source (fill in data below).
- _____

(Glacier)

- cb POWER → Open (It off)

(ML86B)

- cb MNB MAR 1 → Open

(ML85E)

- A/E PAYLOAD DC PWR (20') → J11

(Alternate Power Source J_)

- ✓ cb _____ - Open
- ✓ sw _____ - OFF
- A/E PAYLOAD DC PWR (20') → Alternate Power Source J

Next

3

2 Repower from Alternate Power Source

- (_____)
- cb _____ - Close
- sw _____ -ON

(Glacier)

- cb POWER → Close (It on)

After Initialization does display read 'HOME'?

Yes

3 PRIMARY OUTLET FAILURE

Next

4

- Record power-on time (GPS): _____
- Record power-on CURR TEMP: _____
- Record power-on SET POINT: _____
- Notify **MCC-H** of resolution and data

No

5 POSSIBLE DOWNSTREAM FAILURE

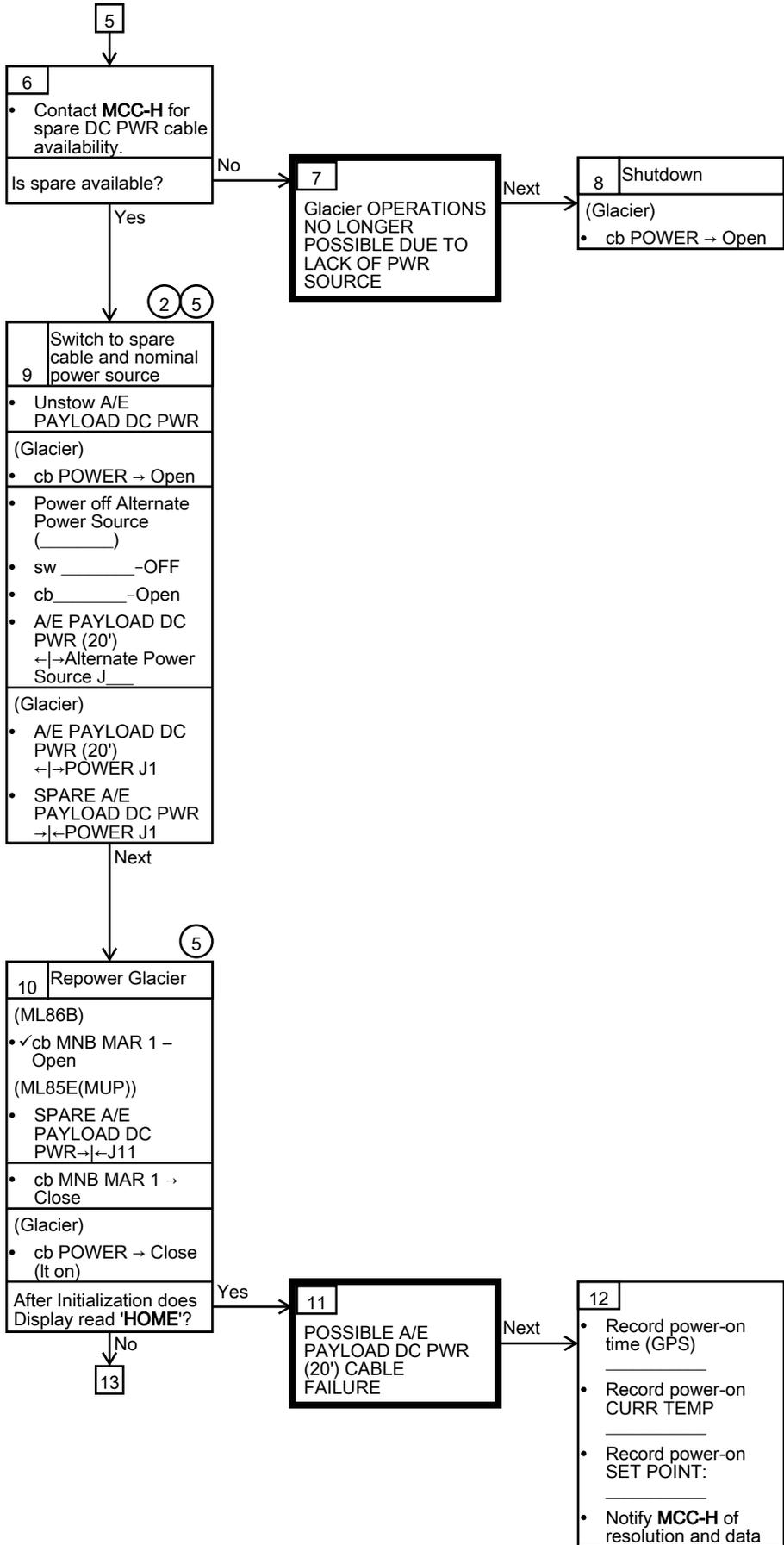
Next

6

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

GLACIER FAIL TO REPOWER

(ASSY OPS/19A/FIN)



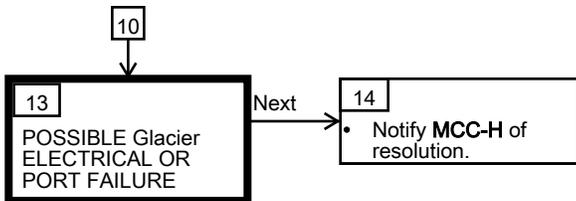
2
Verify connectors are properly mated and seated securely when switching to alternate power source

5
Alternate power source is detailed in block 1.

GLACIER FAIL TO REPOWER

(ASSY OPS/19A/FIN)

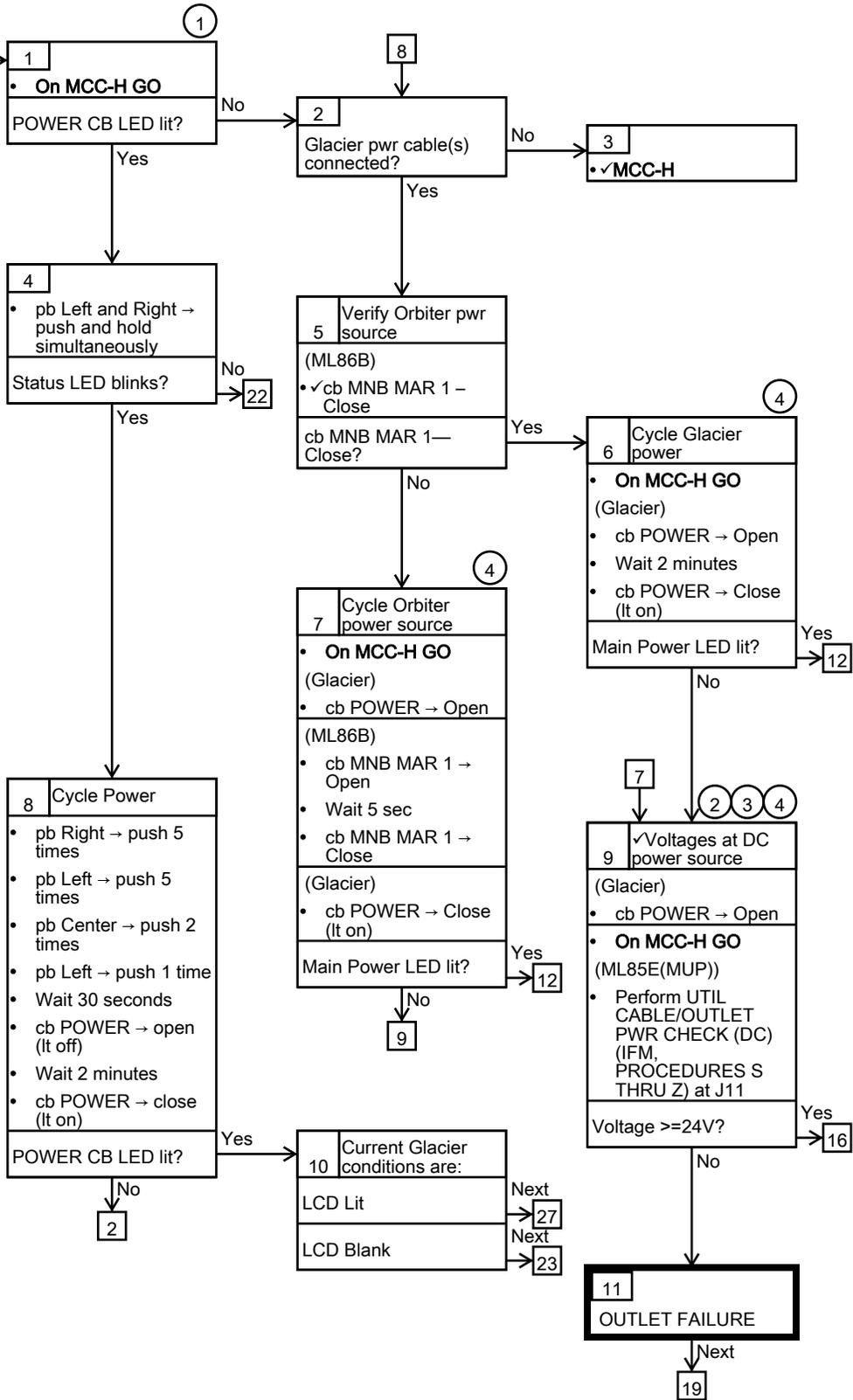
Page 3 of 3 pages



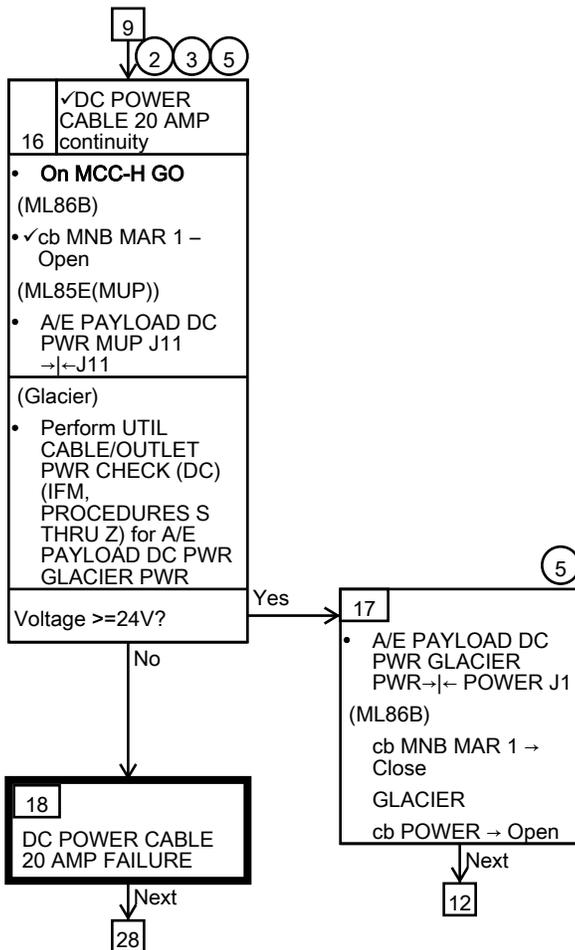
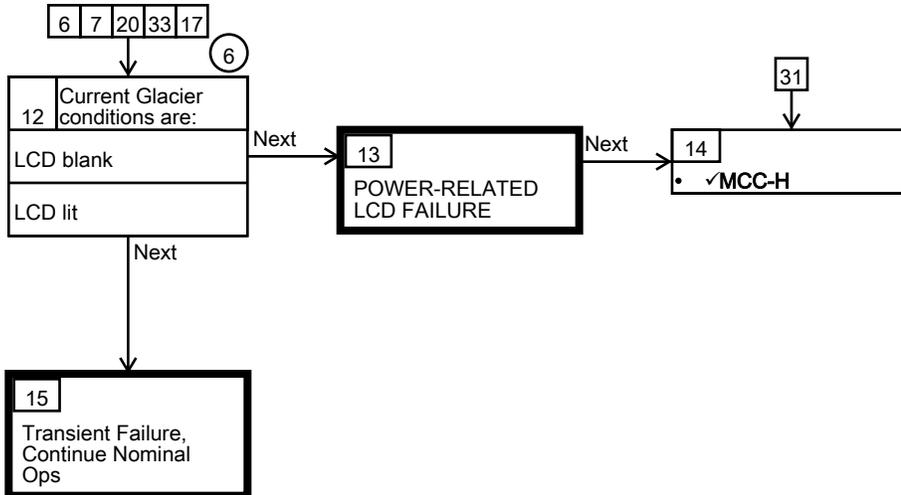
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LCD Blank

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



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



- ② Always deadface DC Power source when disconnecting/connecting power cable.
- ③ Verify connectors are properly mated and seated securely.
- ⑤ Verify connectors are properly mated and seated securely when reconnecting.
- ⑥ Initialization takes approximately 2 min. Initialization is complete when LCD Line 1 reads 'HOME'.

11
2 3 4 5

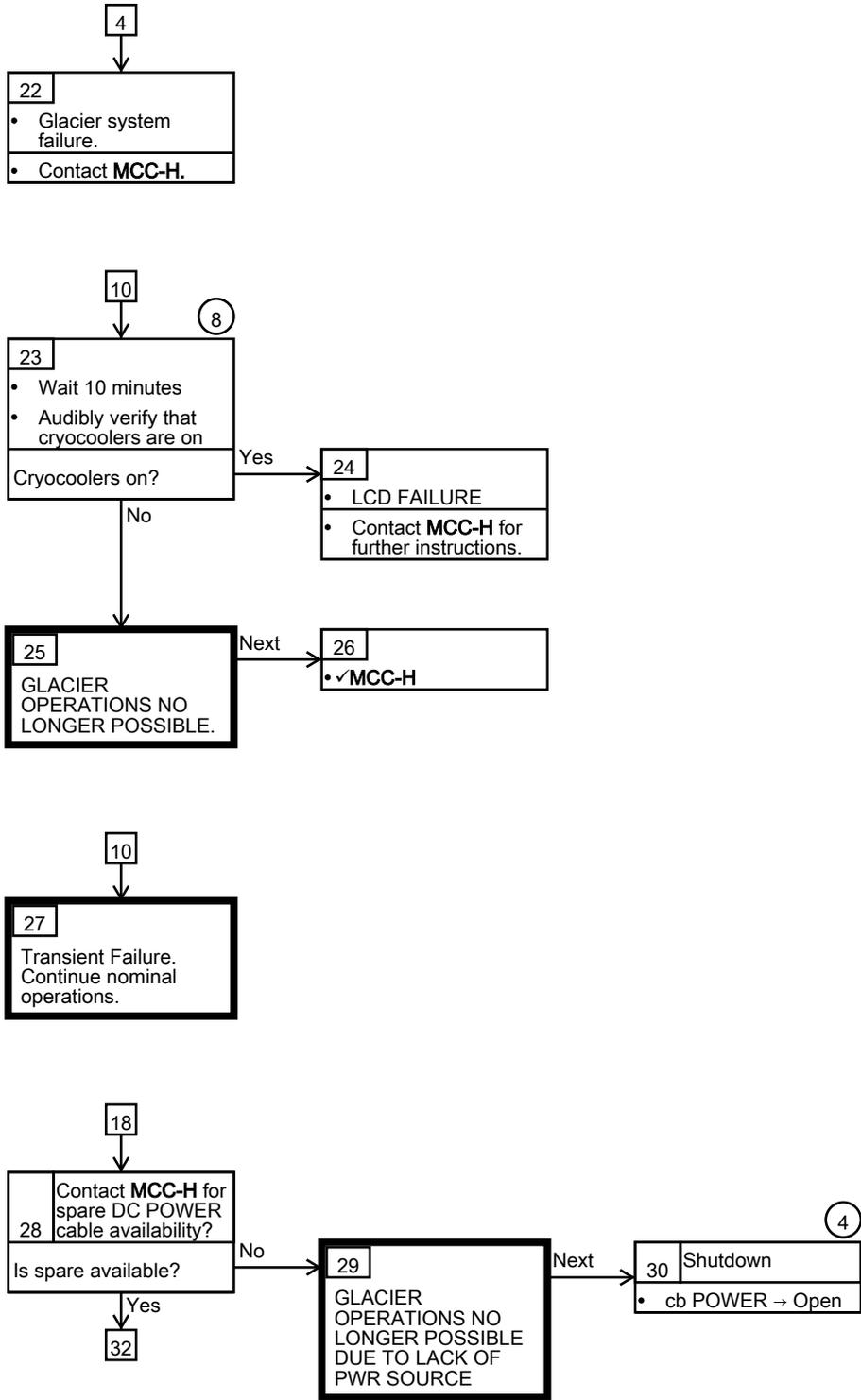
19	Switch to Alternate Power Source
<ul style="list-style-type: none"> Contact MCC-H for alternate power source (Fill in data below) 	
(Glacier)	
<ul style="list-style-type: none"> cb POWER → Open 	
(ML86B)	
<ul style="list-style-type: none"> ✓cb MNB MAR 1 – Open 	
(ML85E(MUP))	
<ul style="list-style-type: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

Next

2 5

20	Repower from Alternate Power Source
<ul style="list-style-type: none"> (_____) cb _____ Close sw _____ ON 	
(Glacier)	
<ul style="list-style-type: none"> cb POWER → Close (It on) 	
Main Power LED lit?	
	Yes → 12
No	
↓	
21	
SYSTEM FAILURE	
↓	
Next	
31	

- ② Always deadface DC Power source when disconnecting/connecting power cable.
- ③ Verify connectors are properly mated and seated securely.
- ④ Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.
- ⑤ Verify connectors are properly mated and seated securely when reconnecting.



4 Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.

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

21

31	Turn off system
<ul style="list-style-type: none"> • On MCC-H GO • cb POWER → Open (It off) 	
<ul style="list-style-type: none"> • Alternate Power source () J_ • ✓cb Open • ✓sw —OFF 	

Next

14

28

2 3 4

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

Next

33	Repower Glacier
(ML86B)	
<ul style="list-style-type: none"> • cb MNB MAR 1 → Close 	
(Glacier)	
<ul style="list-style-type: none"> • cb POWER → Close (It on) 	
Main Power LED lit?	

Yes

12

No

34

2

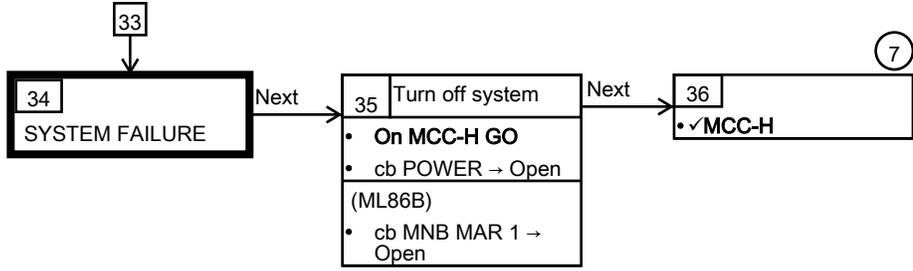
Always deadface DC Power source when disconnecting/ connecting power cable.

3

Verify connectors are properly mated and seated securely.

4

Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.



7
The Glacier payload may continue to function if LCD fails.

GLACIER RECORD CRYOGENIC DIAGNOSTIC DATA

(ASSY OPS/19A/FIN)

Page 1 of 2 pages

OBJECTIVE:

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

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

1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

Glacier

- 1.2 ✓DISPLAY – 'HOME'

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

2. RECORDING CRYOGENIC STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.2 pb Left (MENU) → push (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 2.3 pb Left (NEXT) → push (one time), following appears:
'MAIN MENU'
'STATUS 2/5'
- 2.4 pb Center (SELECT) → push (one time), following appears:
'STATUS'
'Cryogenic 1/3'
- 2.5 pb Center (SELECT) → push (one time), following appears:
'Cryogenic'
'Cooler 1 Stroke 1/21'
'XX'

NOTE

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

- 2.6 Record Cryogenic data per **MCC-H** direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.7 pb Center (NEXT) → press until all Cryogenic Status data has been recorded per **MCC-H** direction
- 2.8 pb Right (EXIT) → push until '**HOME**'
- 2.9 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

GLACIER RECORD QUICK DIAGNOSTIC DATA

(ASSY OPS/19A/FIN)

Page 1 of 2 pages

OBJECTIVE:

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

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

1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

Glacier

- 1.2 ✓Display – 'HOME'

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

2. RECORDING QUICK STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.2 pb Left (MENU) → push (one time), following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
- 2.3 pb Center (SELECT) → push (one time), following appears:
'QUICK STATUS'
'Cold Head 1A 1/16'

NOTE

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

- 2.4 Record Quick Status data per MCC-H direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

GLACIER RECORD QUICK DIAGNOSTIC DATA

(ASSY OPS/19A/FIN)

Page 2 of 2 pages

- 2.5 pb Center (NEXT) → push until all Quick Status data has been recorded per **MCC-H** direction.
- 2.6 pb Right (EXIT) → push until '**HOME**'
- 2.7 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

OBJECTIVE:

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

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

1. RECORDING DATA

1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

Glacier

1.2 ✓DISPLAY – 'HOME'

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

2. RECORDING RESOURCES STATUS

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

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

2.3 pb Left (NEXT) → push (one time), following appears:
 'MAIN MENU'
 'STATUS 2/5'

2.4 pb Center (SELECT) → push (one time), following appears:
 'STATUS'
 'Cryogenic 1/3'

2.5 pb Left (NEXT) → push (one time), following appears:
 'STATUS'
 'Resources 2/3'

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

'AAA Outlet 1/8'
'XX.X° C'

NOTE

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

- 2.7 Record Resource data per **MCC-H** direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.8 pb Center (NEXT) → push until all Resource data has been recorded per **MCC-H** direction.
- 2.9 pb Right (EXIT) → push until '**HOME**'
- 2.10 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

OBJECTIVE:

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

```

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

1. RECORDING DATA

- 1.1 ✓MCC-H for parameters to record in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

Glacier

- 1.2 ✓DISPLAY – 'HOME'


```

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

2. RECORDING SYSTEM STATUS

- 2.1 Record from front panel 'CURR TEMP', 'SET POINT', and 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.2 pb Left (MENU) → push (one time), following appears:
 'MAIN MENU'
 'QUICK STATUS 1/5'
- 2.3 pb Left (NEXT) → push (one time), following appears:
 'MAIN MENU'
 'STATUS 2/5'
- 2.4 pb Center (SELECT) → push (one time), following appears:
 'STATUS'
 'Cryogenic 1/3'
- 2.5 pb Left (NEXT) → push (two times), following appears:
 'STATUS'

'System 3/3'

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

'System'

'CPU 1/9'

'XX.X° C'

NOTE

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

- 2.7 Record System Status data per **MCC-H** direction in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).
- 2.8 pb Center (NEXT) → push until all System Status data has been recorded per **MCC-H** direction.
- 2.9 pb Right (EXIT) → push until '**HOME**'
- 2.10 Notify **MCC-H** to report log values from [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS).

TABLE 1 GLACIER ERROR MESSAGE LOG

(ASSY OPS/19A/FIN) Page 1 of 3 pages

Table 1-1 Glacier Error Log File

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

TABLE 1 GLACIER ERROR MESSAGE LOG

(ASSY OPS/19A/FIN) Page 2 of 3 pages

Possible Glacier Error Messages:

- (1) '**N/A**' (Ground Message Only)
- (2) '**Water Flow Range**'
- (3) '**Water Temp Range**'
- (4) '**AAA Air Temp**'
- (5) '**Voltage Range**'
- (6) '**Current Range**'
- (7) '**RIC Comm Loss**'
- (8) '**Over Temp**'
- (9) '**Hardware Error**'
- (10) '**Bandwidth**'

Table 1-2 (002) Water Flow Range/(003) Water Temp Range Error Data

Sensor	Value	Units
Outlet Water		°C
Inlet Water		°C
Flow Rate		kg/h

Table 1-3 (004) AAA Air Temp Error Data

Sensor	Value	Units
AAA Outlet		°C
AAA Inlet 1		°C
AAA Inlet 2		°C

Table 1-4 (005) Voltage Range/(006) Current Range Error Data

Sensor	Value	Units
Main Current		Amperes
Main Voltage		Volts
Over Current		Amperes

TABLE 1 GLACIER ERROR MESSAGE LOG

(ASSY OPS/19A/FIN) Page 3 of 3 pages

Table 1-5 (008) Over Temp Error Data

Sensor	Value	Units
CPU		°C
Capacitors A		°C
Capacitors B		°C
Data Logger		°C

Table 1-6 Bandwidth Error Data

Parameter	Value	Units
CURR TEMP		°C
SET POINT		°C
GPS		HH:MM:SS
Cold Head 1A		°C
Cold Head 1B		°C
Cold Head 2A		°C
Cold Head 2B		°C
Circ Fan Speed		RPM

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TABLE 2 GLACIER RESET LOG FILE

(ASSY OPS/19A/FIN) Page 1 of 5 pages

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

TABLE 2 GLACIER RESET LOG FILE
 (ASSY OPS/19A/FIN) Page 2 of 5 pages

250

Parameter		Event 1	Event 2	Definition or Options
7	Control Mode	IDLE <input type="checkbox"/> SET POINT <input type="checkbox"/> MANUAL <input type="checkbox"/>	IDLE <input type="checkbox"/> SET POINT <input type="checkbox"/> MANUAL <input type="checkbox"/>	
8	Control Sensors	INNER <input type="checkbox"/> OUTLET <input type="checkbox"/> INLET <input type="checkbox"/>	INNER <input type="checkbox"/> OUTLET <input type="checkbox"/> INLET <input type="checkbox"/>	
9	AirMgmt Proceed	PROCEED <input type="checkbox"/>	PROCEED <input type="checkbox"/>	
10	Bandwidth	____. ____ °C	____. ____ °C	00.1 to 25.5° C
11	Primary Cooler	COOLER 1 <input type="checkbox"/> COOLER 2 <input type="checkbox"/>	COOLER 1 <input type="checkbox"/> COOLER 2 <input type="checkbox"/>	
12	Cooler 1 Stroke	____	____	03 to 63

TABLE 2 GLACIER RESET LOG FILE
 (ASSY OPS/19A/FIN) Page 3 of 5 pages

251

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

TABLE 2 GLACIER RESET LOG FILE

(ASSY OPS/19A/FIN)

Page 4 of 5 pages

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

TABLE 2 GLACIER RESET LOG FILE
 (ASSY OPS/19A/FIN) Page 5 of 5 pages

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Parameter		Event 1	Event 2	Definition or Options
27	Start Humidity	_____ Seconds	_____ Seconds	00000 to 65535 Seconds
28	Start Pressure	_____ Seconds	_____ Seconds	00000 to 65535 Seconds
29	Circ Fan Mode	AUTOMATIC <input type="checkbox"/> MANUAL <input type="checkbox"/>	AUTOMATIC <input type="checkbox"/> MANUAL <input type="checkbox"/>	
30	Circ Fan Power	_____ %	_____ %	000 to 100 %
31	Data Storage	_____ Seconds	_____ Seconds	0 to 3600 seconds
32	Ethernet Addr	____ . ____ . ____ . ____	____ . ____ . ____ . ____	TCP IP Address
33	Function Code	_____ Hex Value	_____ Hex Value	0x000A to 0xFFFE Hex Value
34	RIC Port	_____	_____	6212 to 6999
35	Remote Command	ENABLE <input type="checkbox"/> INHIBIT <input type="checkbox"/>	ENABLE <input type="checkbox"/> INHIBIT <input type="checkbox"/>	

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

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TABLE 3 GLACIER DIAGNOSTIC LOG FILE

(ASSY OPS/19A/FIN)

Page 1 of 3 pages

255

Parameter		Definition	Event 1	Event 2	Event 3	Event 4
HOME MENU (Front panel)						
1	CURR TEMP	Current Temperature °C		Start: End:	Start: End:	Start: End:
2	SET POINT	Set Point °C		Start: End:	Start: End:	Start: End:
3	GPS	Hours: Minutes: Seconds		Start: ____:____:____ End: ____:____:____	Start: ____:____:____ End: ____:____:____	Start: ____:____:____ End: ____:____:____
QUICK STATUS						
1	Cold Head 1A	Temperature °C				
2	Cold Head 1B	Temperature °C				
3	Cold Head 2A	Temperature °C				
4	Cold Head 2B	Temperature °C				
5	Cold Vol Outlet	Temperature °C				
6	Cold Vol Inlet	Temperature °C				
7	Cold Vol Inner	Temperature °C				
8	Cold Vol DeltaP	psi				
9	Outlet Water	Temperature °C				
10	Inlet Water	Temperature °C				
11	Humidity 1	% Humidity				
12	Humidity 2	% Humidity				
13	Circ Fan Speed	RPM				
14	Battery	0 to greater than 9 Volts				
15	Main Current	0 to 20 Amps				
16	Total Run Time	Hours: Minutes: Seconds				

TABLE 3 GLACIER DIAGNOSTIC LOG FILE

(ASSY OPS/19A/FIN)

Page 2 of 3 pages

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Parameter	Definition	Event 1	Event 2	Event 3	Event 4
STATUS: Cryogenic					
1	Cooler 1 Stroke				
2	Cooler 2 Stroke				
3	HX 1	Heat Exchanger Temperature °C			
4	HX 2	Heat Exchanger Temperature °C			
5	Cold Head 1A	Temperature °C			
6	Cold Head 1B	Temperature °C			
7	Cold Head 2A	Temperature °C			
8	Cold Head 2B	Temperature °C			
9	Cold Vol Outlet	Temperature °C			
10	Cold Vol Inlet	Temperature °C			
11	Cold Vol Outer	Temperature °C			
12	Cold Vol Inner	Temperature °C			
13	Vac Jacket 1	Torr			
14	Vac Jacket 2	Torr			
15	Heat Sink	Temperature °C			
16	Col Vol Vac 1	Torr			
17	Col Vol Vac 2	Torr			
18	Circ Fan Speed	RPM			
19	Heater 1 Power	%			
20	Heater 2 Power	%			
21	Circ Fan Power	%			

TABLE 3 GLACIER DIAGNOSTIC LOG FILE

(ASSY OPS/19A/FIN)

Page 3 of 3 pages

257

Parameter	Definition	Event 1	Event 2	Event 3	Event 4
STATUS: Resources					
1	AAA Outlet	Temperature °C			
2	AAA Inlet 1	Temperature °C			
3	AAA Inlet 2	Temperature °C			
4	Outlet Water	Temperature °C			
5	Inlet Water	Temperature °C			
6	Water Flow	kg/h			
7	Main Current	Amps			
8	Main Voltage	Volts			
STATUS: System					
1	CPU	Temperature °C			
2	Capacitors A	Temperature °C			
3	Capacitors B	Temperature °C			
4	Data Logger	Temperature °C			
5	Battery	Volts			
6	Total Run Time	Hours: Minutes: Seconds			
7	Glacier Version	##.## Day/Month/Year Hour: Minutes			
8	Logger Version	##.## Day/Month/Year Hour: Minutes			
9	Circ Fan Version	##.## Day/Month/Year Hour: Minutes			

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MERLIN 19A PACK FOR RETURN

OBJECTIVE:

One Double Coldbag will be used to transfer JAXA samples from MELFI to Shuttle middeck MERLIN. The samples will be packed in the MERLIN Pouch Assembly, which will be installed in MERLIN. This activity is performed by ISS and Shuttle crewmembers.

PARTS:

Double Coldbag S/N 1009

White Gloves

ITEMS TO UNSTOW WITHIN PROCEDURE:

Ice Brick +4° C (unstow step 2)

Space Seed (six KFTs) with plant chambers (four) (unstow step 3)

Myco Collection Kits (five) (unstow step 3)

LADA VPU (unstow step 3)

NOTE

During or following this procedure, an *****Error Pending***** message may be annunciated on the MERLIN Display due to a **'PIDT Bandwidth'** error which is an internal temperature drift from opening the MERLIN door and/or inserting the samples.

MF71E
(MERLIN)

1. CHECKING MERLIN STATUS

```
*****  
*  
* If Display - ***Error Pending*** prior to step 4.1  
* | Perform MERLIN ERROR MESSAGE, all (SODF: ASSY OPS:  
* | MERLIN - MALFUNCTION), then:  
*  
* If Display ***Error Pending*** after step 4.1  
* | Complete procedure, then  
* | Perform MERLIN ERROR MESSAGE, all (SODF: ASSY OPS:  
* | MERLIN - MALFUNCTION), then:  
*  
*****
```

1.1 Verify 'CURR TEMP' +3.0 ±2° C.

MERLIN 19A PACK FOR RETURN

*
* If 'HOME DISPLAY' not shown
* | pb Right (EXIT) → Press until appears
*

CAUTION

Minimize exposure of MELFI trays, frozen Icepacs, and samples to ambient air to prevent increased sample temperatures.

LAB1S2
(MELFI 2)

2. REMOVE ICE BRICK FROM MELFI

- 2.1 Retrieve Double Coldbag (S/N 1009) and temp stow near MELFI.
- 2.2 Don White Gloves.

WARNING

White Gloves must be worn when manipulating cold trays or samples.

- 2.3 Remove Ice Bricks (two) +4°C from MELFI 2, Dewar 4, Tray D, Section 2.
Unfold Ice Bricks and lay them flat in Double Coldbag.

NOTE

Sample exposure to ambient environment, in steps 3 and 4, should be no greater than five minutes. This time interval begins when the first sample is exposed to ambient temperature and ends with the last sample being placed inside the Double Coldbag. For protection during transfer, place all samples between the two ice bricks within the Double Coldbag.

JPM1D4
(MELFI 1)

3. MELFI SAMPLE REMOVAL

- 3.1 Remove Myco Collection Kits (five) from MELFI 1, Dewar 4, Tray B, Section 3, 4, placing them in the Double Coldbag.
- 3.2 Remove Space Seed KFT (six) from MELFI 1, Dewar 4, Tray D, Section 3, 4, placing them in the Double Coldbag.
- 3.3 Remove Space Seed plant chambers (four) from MELFI 1, Dewar 4, Tray C, Section 4, placing them in the Double Coldbag.
- 3.4 Remove LADA VPU Sample from MELFI 1, Dewar 4, Tray A, Section 4 and place in Double Coldbag.
- 3.5 Close Double Coldbag lid and transfer to Shuttle middeck MERLIN.

MF71E
(MERLIN)

4. POUCH/TRAY PACKING AND CONFIGURE FOR DESCENT

- 4.1 Record MET for MERLIN door open:

MERLIN 19A PACK FOR RETURN

(ASSY OPS/19A/FIN 1/MULTI E) Page 3 of 7 pages

(MET): _____

- 4.2 Open MERLIN locker door.
- 4.3 Remove MERLIN Pouch/Tray Assembly.
- 4.4 Close MERLIN locker door.
- 4.5 Open MERLIN Pouch Assembly, leaving the Pouch and D-ring assemblies attached to the Tray with Velcro.
- 4.6 Remove samples from Double Coldbag and pack in MERLIN Pouch Assembly. Refer to Figure 1.

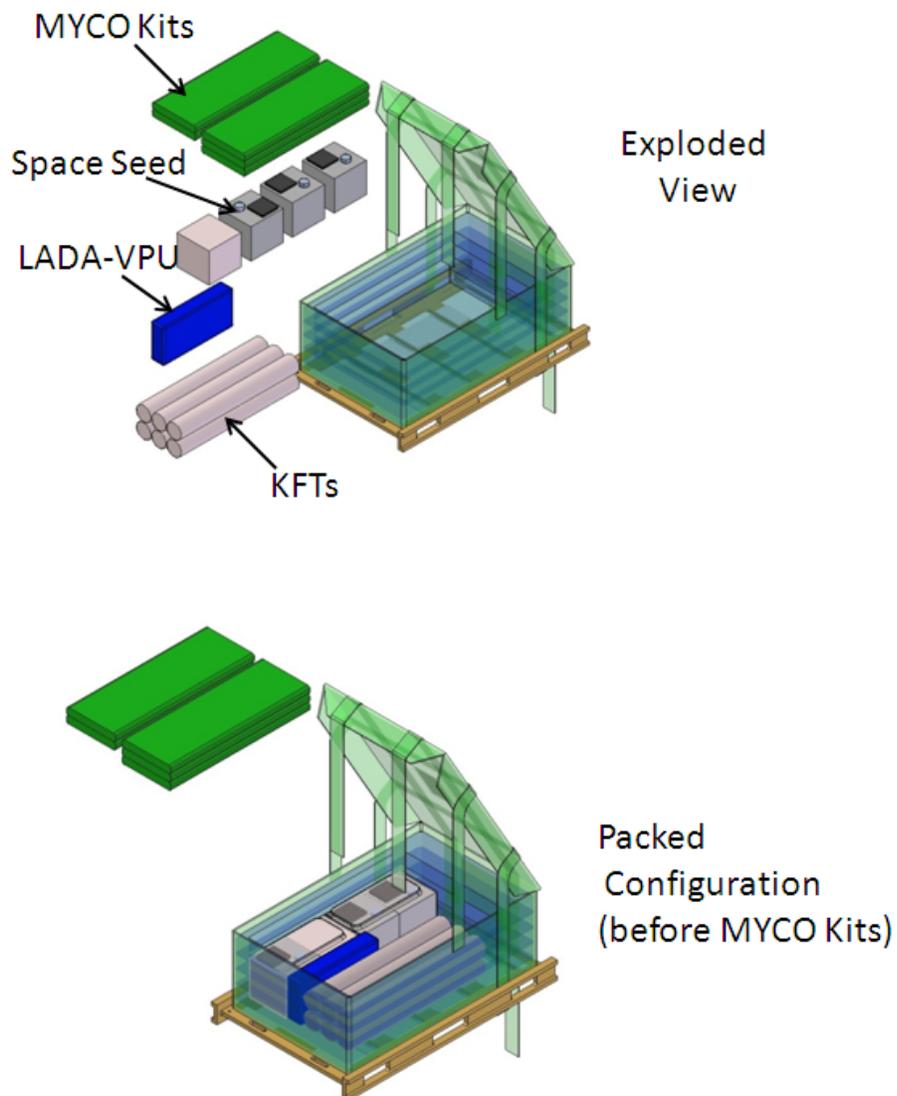


Figure 1. MERLIN Descent Packing Configuration.

- 4.7 Doff White Gloves.

MERLIN 19A PACK FOR RETURN

(ASSY OPS/19A/FIN 1/MULTI E) Page 4 of 7 pages

- 4.8 Temporarily stow Double Coldbag.
- 4.9 Secure pouch to the tray using the straps and D-ring assembly.
Thread straps through the slots in the Tray as shown in Figure 2.



Figure 2. MERLIN Pouch Assembly Strapped.

MF71E
(MERLIN)

- 4.10 Open MERLIN locker door.
- 4.11 Push in on the sides of the MERLIN Pouch Assembly to enable air flow around the sides of the pouch inside MERLIN.
- 4.12 Slide Pouch/Tray Assembly into MERLIN using bottom slider rails of internal volume, with label facing outward. Refer to Figure 3.

MERLIN 19A PACK FOR RETURN

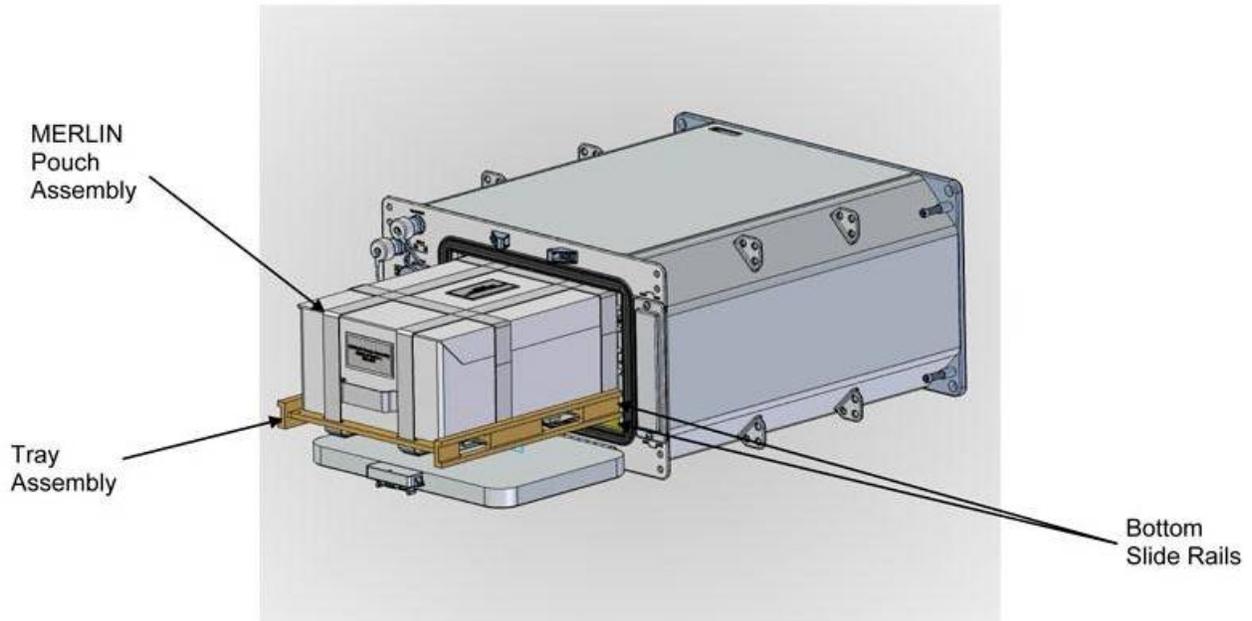


Figure 3. MERLIN Pouch Assembly Installed into MERLIN.

- 4.13 Lock tray in place by using MERLIN restraint mechanisms on both sides of internal volume. Refer to Figures 4 and 5. Press restraint button flush on each side of internal volume. Verify each slide lever went to up locked position. Press down on each slide lever. Verify restraint button out position.

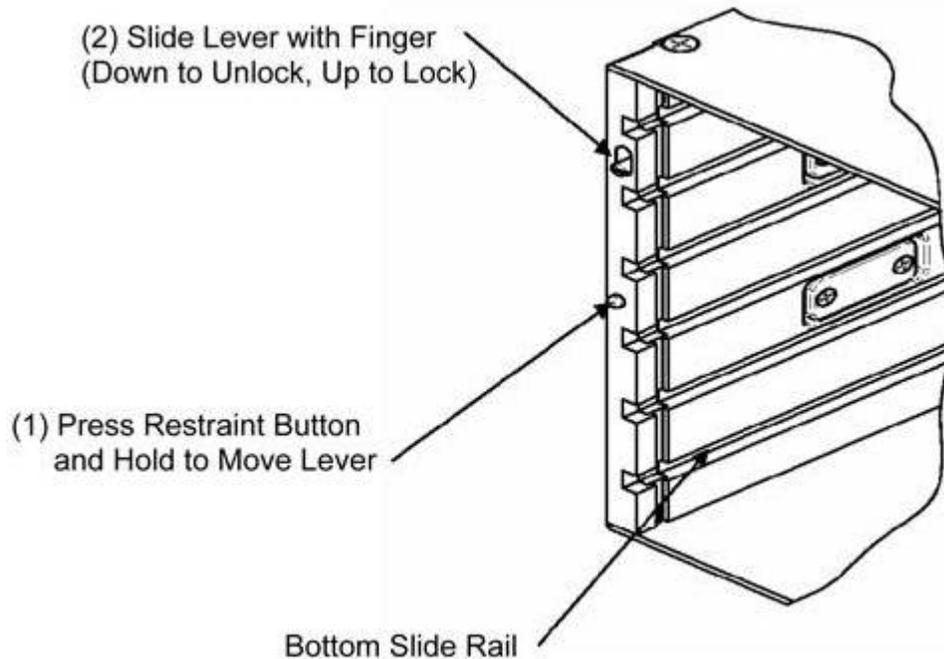


Figure 4. Payload Retainer.



Unlocked

Interim Locked
Restraint Button Flush

Locked
Restraint Button Out

Figure 5. MERLIN Payload Retainer Latch.

- 4.14 Close MERLIN locker door.
- 4.15 Verify locker door finger latches are fully spread apart and locking flap is positioned between finger latches. Refer to Figure 6.

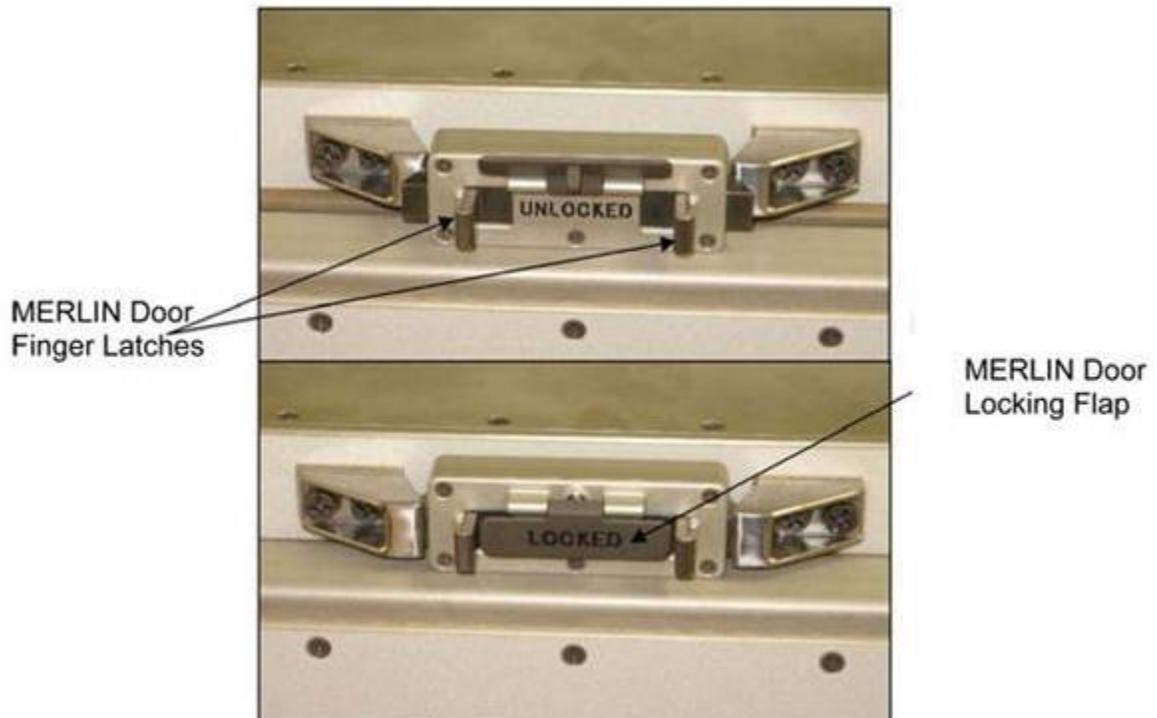


Figure 6. MERLIN Door Lock Mechanism.

MERLIN 19A PACK FOR RETURN

4.16 Record insertion of Pouch Assembly into MERLIN:

(MET): _____

4.17 ✓Display - 'HOME DISPLAY'

```
*****  
*  
* If 'HOME DISPLAY' not shown  
* | pb Right (EXIT) → Press until appears  
*  
* If Display - '**Error Pending**'  
* | Perform MERLIN ERROR MESSAGE, all (SODF: ASSY OPS:  
* | MERLIN - MALFUNCTION), then:  
*  
*****
```

4.18 Verify 'SP TEMP:' = '+03.0 C'

4.19 Record 'CURR TEMP': _____

JPM1D4
(MELFI)

4.20 Remove Ice Bricks (two) from Double Coldbag and place in temp stowage location to dry. Temporarily stow Double Coldbag in a location protected from kick loads.

4.21 Notify **MCC-H** of recorded MET in step 4.1 and step 4.16, CURR TEMP from step 4.19, dry out location for Ice Bricks, location of Double Coldbag, and any off-nominal conditions.

4.22 Stow materials and discard excess foam in trash.

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MERLIN 19A UNPACK

(ASSY OPS/19A/FIN 1/MULTI E) Page 1 of 7 pages

OBJECTIVE:

Remove MERLIN POUCH ASSEMBLY from MERLIN and transport to CBEF. Remove Neuro Rad samples and provide to ISS crew for installation into the CBEF. Remove MERLIN Harness and transfer to EXPRESS-6 Rack Utility drawer for stow. Transfer and install MERLIN POUCH ASSEMBLY back into MERLIN and reprogram the MERLIN to +3 °C.

PARTS:

White Gloves

NOTE

During or following this procedure, an *****Error Pending***** message may be annunciated on the MERLIN Display due to a **'PIDT Bandwidth'** error which is an internal temperature drift from opening the MERLIN door.

```
*****
*
* If Display - ***Error Pending*** prior to step 1.3
* |   Perform MERLIN ERROR MESSAGE, all (SODF: ASSY OPS:
* |   MERLIN - MALFUNCTION), then:
*
*
* If Display ***Error Pending*** after step 1.3
* |   Complete procedure, then
* |   Perform MERLIN ERROR MESSAGE, all (SODF: ASSY OPS:
* |   MERLIN - MALFUNCTION), then:
*
*****
```

MF71E
(MERLIN)

1. REMOVING MERLIN POUCH ASSEMBLY

1.1 Verify **'CURR TEMP'** between +39.0 ±2 °C.

*
* If 'HOME DISPLAY' not shown
* | pb Right (EXIT) → Press until appears
*

- 1.2 Record MET for MERLIN door open:
(MET): _____
- 1.3 Open MERLIN locker door.
- 1.4 Unlock MERLIN payload retainer on each side.
Refer to figures 1 and 2.

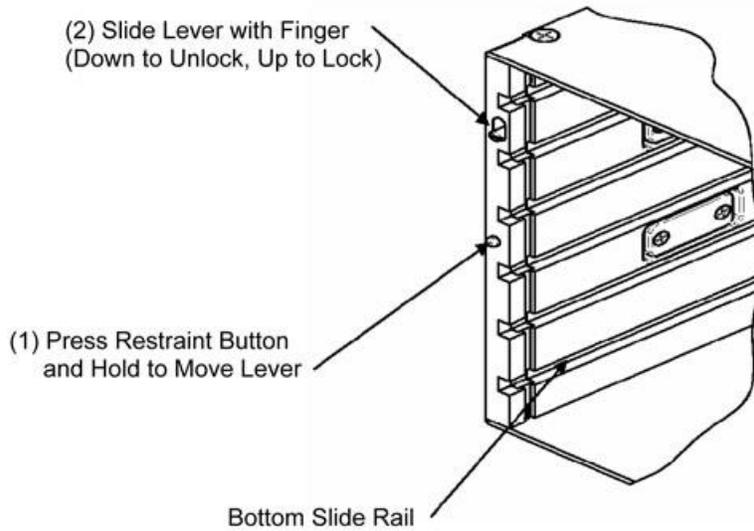


Figure 1. Payload Retainer



Unlocked Interim Locked Locked
 Restraint Button Flush Restraint Button Out

Figure 2. MERLIN Payload Retainer Latch

- 1.5 Remove MERLIN Pouch/Tray Assembly.

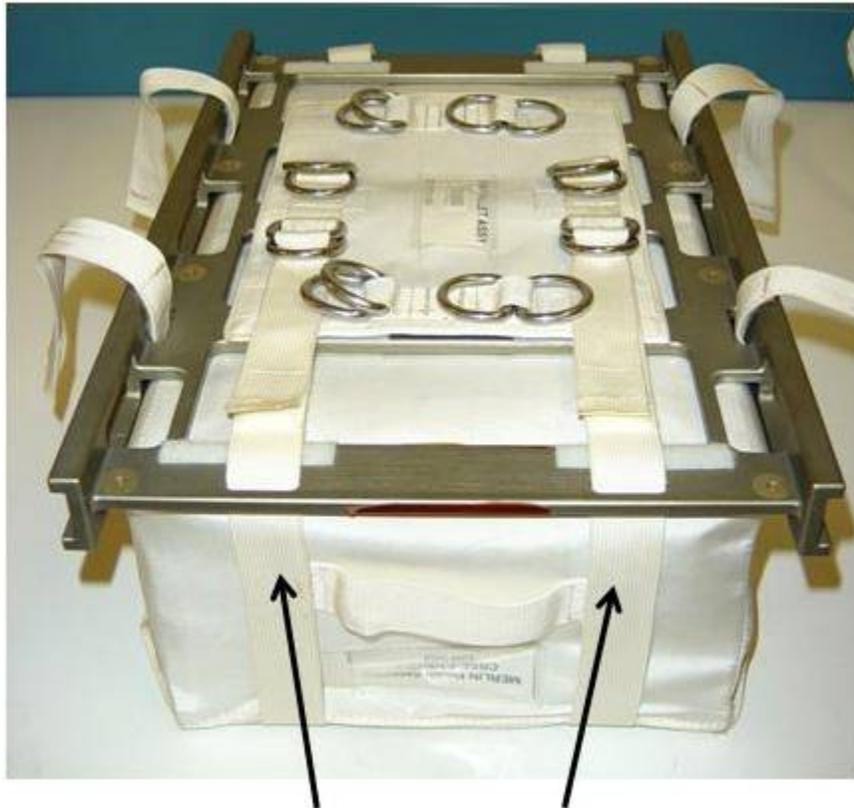
MERLIN 19A UNPACK

(ASSY OPS/19A/FIN 1/MULTI E)

Page 3 of 7 pages

JPM1A2
(CBEF)

- 1.6 Close MERLIN locker door.
- 1.7 Transfer MERLIN Pouch/Tray Assembly to CBEF.
- 1.8 Open MERLIN Pouch Assembly by removing straps secured to D-Ring.
Straps near labeled end can be left connected to D-Ring for quicker packing later.
Leave Pouch and D-Ring secured to Tray.
Refer to Figure 3.



Straps near the labeled end

Figure 3. MERLIN Pouch Assembly With Straps Removed from D-Ring

NOTE

1. Sample exposure to ambient environment, in step 2, should be no greater than 5 minutes. This time interval begins when the first sample is removed from the Pouch and ends with the last sample being inserted into the CBEF.
2. Packing material should remain in Pouch Assembly for descent packing.

- 1.9 Don gloves.
- 1.10 Remove the MERLIN Harness from the MERLIN Pouch Assembly and temporarily stow.

11 MAR 10

2. CBEF SAMPLE INSERTION

- 2.1 Quickly remove Neuro Rad (4) from MERLIN Pouch Assembly (Figure 4), leaving packing material in Pouch.

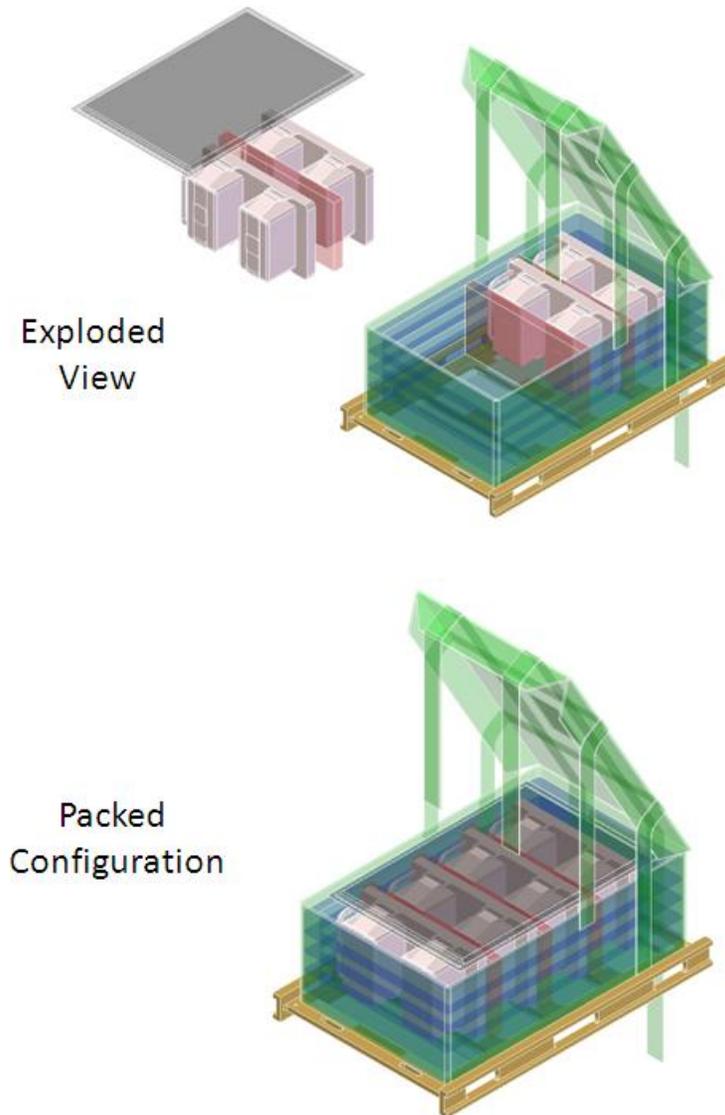


Figure 4. MERLIN Pouch Assembly Containing the MERLIN Harness Neuro Rad.

- 2.2 Hand samples to ISS crewmember for installation in CBEF.
2.3 Doff gloves.



Figure 5. MERLIN Pouch Assembly With Straps Tucked In.

2.4 Close MERLIN Pouch Assembly while tucking straps inside Pouch Assembly to save time during 3° C packing scheduled later in the flight (refer to Figure 5).

LAB104_M
1

2.5 Transfer MERLIN Harness to EXPRESS-6 Rack and stow in the Utility drawer.

3. POUCH/TRAY INSTALLATION

MF71E
(MERLIN)

3.1 Transfer MERLIN Pouch/Tray Assembly back to MERLIN.

3.2 Open MERLIN locker door.

3.3 Slide Pouch/Tray Assembly into MERLIN using bottom slider rails of internal volume. Refer to Figure 6.

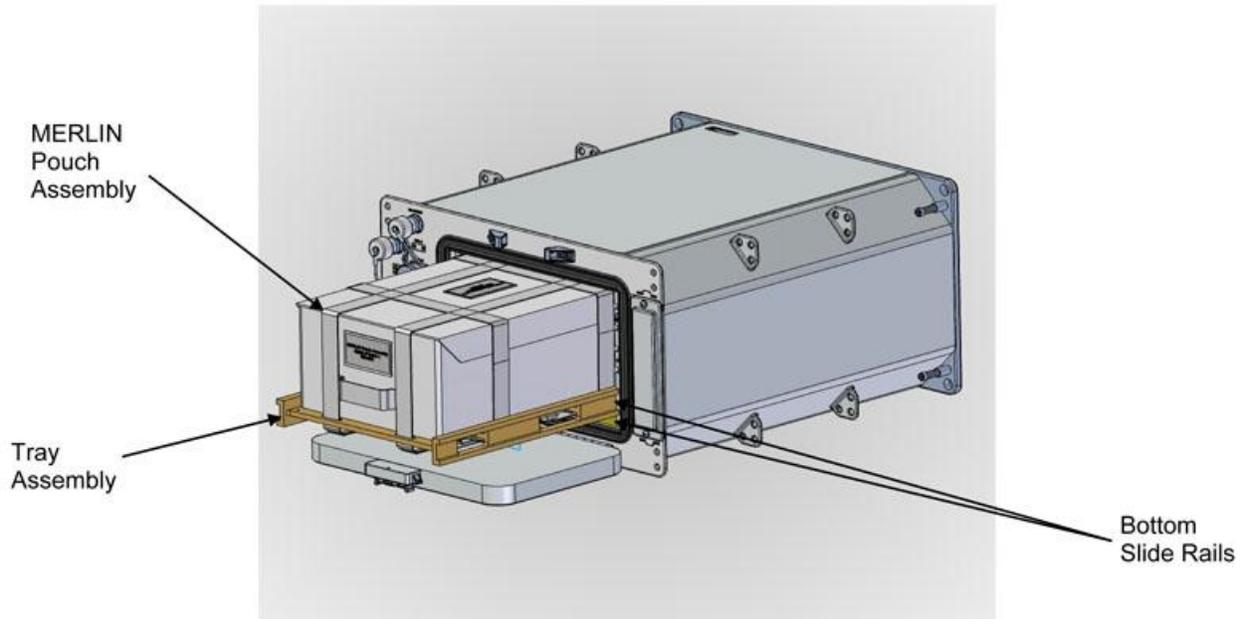


Figure 6. MERLIN Pouch Assembly Pulled Partially out of MERLIN

- 3.4 Close MERLIN locker door.
- 3.5 Verify locker door finger latches are fully spread apart and locking flap is positioned between finger latches.
- 3.6 Record insertion of Pouch Assembly into MERLIN:
 (MET): _____
- 3.7 ✓Display – 'HOME DISPLAY'
 *
 *
 * If 'HOME DISPLAY' not shown
 * | pb Right (EXIT) → Press until appears
 *

4. CHANGING TEMPERATURE SET POINT

- 4.1 pb Left (MENU) → Press (one time), the following appears:
 'MAIN MENU'
 'Quick Status 1/8'
- 4.2 pb Left (NEXT) → Press (three times), the following appears:
 'MAIN MENU'
 'Temp Control 4/8'
- 4.3 pb Center (SELECT) → Press (one time), the following appears:
 'MAIN: TEMP CONTROL'
 'Mode 1/3'
- 4.4 pb Left (NEXT) → Press (one time), the following appears:
 'MAIN: TEMP CONTROL'

'SP Mode Options 2/3'

- 4.5 pb Center (SELECT) → Press (two times), the following appears:
'SET PT TEMPERATURE'
'Old SP Temp: ±xx.xC'
'New SP Temp: ±xx.xC'

<u>NOTE</u>
1. The left pushbutton (CURSOR) moves cursor between NEW SP TEMP fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases NEW SP TEMP selected digit field value by 1.
3. NEW SP TEMP Range (-20.0 to +48.5° C).

- 4.6 Enter new Set Point temperature of +3.0°C.
- 4.7 pb Right (DONE) → Press
If Display - **'ARE YOU SURE?'**
|
pb Left (APPLY) → Press (one time)
- 4.8 Verify line 3 reads = **'+03.0 C'**
- 4.9 pb Right (EXIT) → press until **'HOME DISPLAY'** appears
- 4.10 Record **'CURR TEMP':** _____
- 4.11 Notify **MCC-H** of recorded MET in step 1.2 and step 3.6, CURR TEMP from step 4.10, and any off-nominal conditions. Confirm that MERLIN Harness stowed in LAB1O4_M1.
- 4.12 Stow materials.

5. GROUND UPDATES FOR IMS

Ground updates IMS for the following parts:
MERLIN Harness TO: LAB1O4_M1 (step 3)

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OBJECTIVE:

The following steps will activate MERLIN Systems.

- MO63P 1. ✓10A J4 – OFF
✓cb CB4/J4 – op
- MF71E (MERLIN) 2. ✓cb MAIN – op (It off)
- 3. ✓cb PAYLOAD – op (It off)
- 4. ✓DC Jumper →|← POWER J1
- 5. ✓DC Jumper →|← A/E PAYLOAD DC PWR CABLE
- MO63P 6. ✓A/E PAYLOAD DC PWR CABLE →|← J4
- 7. cb CB4/J4 → cl
10A J4 → ON

<p><u>NOTE</u> System initialization may take up to 2 minutes.</p>
--

- MF71E (MERLIN) 8. cb MAIN – cl (It on)

*
* If MERLIN does not successfully complete initialization
* | Perform [MERLIN FAIL TO REPOWER](#), all (SODF: ASSY OPS:
* | PAYLOADS), then:
*

- 9. ✓Display Line 1 – '**HOME DISPLAY**'

<p><u>NOTE</u> 1. While in the launch configuration, SP TEMP expected to be +37.0°C 2. While in the landing configuration, SP TEMP expected to be +04.0°C</p>

- 10. ✓Display Line 3 - '**SP TEMP : xx.xC**'
- 11. Record from front panel:

'GPS': _____

'CURR TEMP': _____
- 12. Notify **MCC-H** MERLIN Powerup complete and report values recorded in step 11.

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OBJECTIVE:

The following steps will perform a reboot of MERLIN Systems.

```
*****  
*  
* If Display – ***Error Pending***:  
* | Perform MERLIN ERROR MESSAGE, all (SODF: ASSY OPS:  
* | PAYLOADS), then:  
*  
*****
```

On MCC-H GO

1. ✓Display – 'HOME DISPLAY'

*
* If 'HOME DISPLAY' not shown
* | pb Right (EXIT) → Press until appears
*

2. pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
3. pb Left (NEXT) → Press (seven times), the following appears:
'MAIN MENU'
'Shutdown 8/8'
4. pb Center (SELECT) → Press, (one time), the following appears:
'MAIN: SHUTDOWN'
'Shutdown 1/2'
5. pb Left (NEXT) → Press (one time), the following appears:
'MAIN: SHUTDOWN'
'Reboot 2/2'
6. pb Center (SELECT) → Press (one time), the following appears:
'ARE YOU SURE?'
'Reboot System'

<p><u>NOTE</u></p> <p>After Reboot begins, the display will read 'System Rebooting...' for approximately 10 seconds and then will scroll through initialization screens before getting to 'HOME DISPLAY'. Initialization may take up to 2 minutes.</p>
--

7. pb Left (APPLY) → Press (one time), the following appears:
'System Rebooting...'
8. ✓Display – 'HOME DISPLAY'
9. Record from front panel:
'GPS': ____:____

'CURR TEMP':____.____ °C

10. Notify **MCC-H** MERLIN Reboot complete and report values recorded in step 9.

MERLIN WARM SHUTDOWN

(ASSY OPS/19A/FIN)

OBJECTIVE:

The following steps will perform a warm shutdown of MERLIN Systems.

Warm shutdowns prevent loss of data and system errors and are the desired nominal method of shutdown.

MF71E
(MERLIN)

1. ✓Display – '**HOME DISPLAY**'

```
*****
*
* If 'HOME DISPLAY' not shown:
* |   pb Right (EXIT) → Press until appears
*
*****
```
2. Record from front panel MERLIN '**GPS**': _____
3. pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
4. pb Left (NEXT) → Press (seven times) until the following appears:
'MAIN MENU'
'Shutdown 8/8'
5. pb Center (SELECT) → Press (one time), the following appears:
'MAIN: SHUTDOWN'
'Shutdown 1/2'
6. pb Center (SELECT) → Press (one time), the following appears:
'SHUTDOWN'
'Select Mode 1 of 2:'
'WARM SHUTDOWN'
7. pb Center (APPLY) → Press (one time), the following appears:
'ARE YOU SURE?'
8. pb Left (APPLY) → Press (one time) the following appears:
'Shutdown Done'
'TURN POWER OFF'
9. cb MAIN – op (It off)
10. ✓cb PAYLOAD – op (It off)

MO63P

11. 10A J4 – OFF
cb CB4/J4 – op
12. Notify **MCC-H** of recorded '**GPS**' time in step 2.

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OBJECTIVE:

The following steps will perform a power cycle to the MERLIN System.

Warm shutdowns prevent loss of data and system errors.

```
*****  
*  
* If Display – ***Error Pending***:  
* | Perform MERLIN ERROR MESSAGE, all (SODF: ASSY OPS:  
* | PAYLOADS), then:  
*  
*****
```

On MCC-H GO

1. ✓Display – **'HOME DISPLAY'**

*
* If **'HOME DISPLAY'** not shown
* | pb Right (EXIT) → Press until appears
*

2. pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
3. pb Left (NEXT) → Press (seven times), the following appears:
'MAIN MENU'
'Shutdown 8/8'
4. pb Center (SELECT) → Press (one time), the following appears:
'MAIN: SHUTDOWN'
'Shutdown 1/2'
5. pb Center (SELECT) → Press (one time), the following appears:
'SHUTDOWN'
'Select Mode 1 of 2:'
'WARM SHUTDOWN'
6. pb Center (APPLY) → Press (one time), the following appears:
'ARE YOU SURE?'
7. pb Left (APPLY) → Press (one time), the following appears:
'Shutdown Done'
'TURN POWER OFF'
8. cb MAIN – op (It off)
9. ✓cb PAYLOAD – op (It off)

NOTE

System Initialization may take up to 2 minutes.

10. cb MAIN - cl (lt on)
11. ✓Display - 'HOME DISPLAY'
12. Record from front panel:
'CURR TEMP': _____
'GPS': _____
13. Notify **MCC-H** MERLIN Power Cycle complete and report values recorded in step 12.

OBJECTIVE:

The following steps will reconfigure various control modes within MERLIN System.

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

RECORDING DATA

1. ✓Display – 'HOME DISPLAY'

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

2. Record start 'CURR TEMP', start 'GPS', and any callup data in Table 5-I of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).
3. SETTING TEMPERATURE CONTROL MODE
 - 3.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
 - 3.2 pb Left (NEXT) → Press (three times), the following appears:
'MAIN MENU'
'Temp Control 4/8'
 - 3.3 pb Center (SELECT) → Press (one time), the following appears:
'MAIN: TEMP CONTROL'
'Mode 1/3'
 - 3.4 pb Left (NEXT) → Press (one time), the following appears:
'MAIN: TEMP CONTROL'
'SP Mode Options 2/3'
 - 3.5 pb Center (SELECT) → Press (two times), the following appears:
'SET PT TEMPERATURE'
'Old SP Temp: ±xx.xC'
'New SP Temp: ±xx.xC'

NOTE

1. The left pushbutton (CURSOR) moves cursor between NEW SP TEMP fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases NEW SP TEMP selected digit field value by 1.
3. NEW SP TEMP Range (-20.0 to +48.5° C).

3.6 Enter desired Set Point temperature per **MCC-H**.

3.7 pb Right (DONE) → Press

If Display - '**ARE YOU SURE?**'

| pb Left (APPLY) → Press (one time)

3.8 ✓Display – desired Set Point temperature per **MCC-H**

3.9 pb Right (EXIT) → press until '**HOME DISPLAY**' appears

4. CHANGING RAMP RATE

4.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'

4.2 pb Left (NEXT) → Press (three times), the following appears:
'MAIN MENU'
'Temp Control 4/8'

4.3 pb Center (SELECT) → Press (one time), the following appears:
'MAIN: TEMP CONTROL'
'Mode 1/3'

4.4 pb Left (NEXT) → Press (one time), the following appears:
'MAIN: TEMP CONTROL'
'SP Mode Options 2/3'

4.5 pb Center (SELECT) → Press (one time), the following appears:
'TEMP CONTROL: SP'
'Set Point Temp 1/4'

4.6 pb Left (+PARAM) → Press (one time), the following appears:
'TEMP CONTROL: SP'
'Ramp Rate 2/4'

4.7 pb Center (SELECT) → Press (one time), the following appears:
'SET PT RAMP RATE'
'Old Ramp: xx.xC/hr'
'New Ramp: xx.xC/hr'

NOTE

1. The left pushbutton (CURSOR) moves cursor between New Ramp Rate digit fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases New selected digit field value by 1.
3. New Ramp Rate must be greater than zero.

4.8 Enter desired Ramp Rate per **MCC-H**.

4.9 pb Right (DONE) → Press (one time)

If Display - '**ARE YOU SURE?**'

| pb Left (APPLY) → Press (one time)

4.10 ✓Display – desired Ramp Rate per **MCC-H**

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

5. CHANGING SYSTEM STORAGE INTERVAL

5.1 pb Left (MENU) → Press (one time), the following appears:
'**MAIN MENU**'
'**Quick Status 1/8**'

5.2 pb Left (NEXT) → Press (three times), the following appears:
'**MAIN MENU**'
'**Temp Control 4/8**'

5.3 pb Center (SELECT) → Press (one time), the following appears:
'**MAIN: TEMP CONTROL**'
'**Mode 1/3**'

5.4 pb Left (NEXT) → Press (one time), the following appears:
'**MAIN: TEMP CONTROL**'
'**SP Mode Options 2/3**'

5.5 pb Center (SELECT) → Press (one time), the following appears:
'**TEMP CONTROL: SP**'
'**Set Point Temp 1/4**'

5.6 pb Left (+PARAM) → Press (two times), the following appears:
'**TEMP CONTROL: SP**'
'**Sys Sto Interval 3/4**'

5.7 pb Center (SELECT) → Press (one time), the following appears:
'**SP SYS STO INTERVAL**'
'**Old: xx:xx:xx**'
'**New: xx:xx:xx**'

NOTE

1. The left pushbutton (CURSOR) moves the cursor between New digit fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases New selected digit field value by 1.
3. New System Storage Interval must be greater than zero.

5.8 Enter desired System Storage Interval per **MCC-H**

5.9 pb Right (DONE) → Press (one time)

If Display - '**ARE YOU SURE?**'

| pb Left (APPLY) → Press (one time)

5.10 ✓Display – desired System Storage Interval per **MCC-H**

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

6. CHANGING EXPERIMENT STORAGE INTERVAL

6.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'

6.2 pb Left (NEXT) → Press (three times), the following appears:
'MAIN MENU'
'Temp Control 4/8'

6.3 pb Center (SELECT) → Press (one time), the following appears:
'MAIN: TEMP CONTROL'
'Mode 1/3'

6.4 pb Left (NEXT) → Press (one time), the following appears:
'MAIN: TEMP CONTROL'
'SP Mode Options 2/3'

6.5 pb Center (SELECT) → Press (one time), the following appears:
'TEMP CONTROL: SP'
'Set Point Temp 1/4'

6.6 pb Left (+PARAM) → Press (three times), the following appears:
'TEMP CONTROL: SP'
'Exp Sto Interval 4/4'

6.7 pb Center (SELECT) → Press (one time), the following appears:
'SP EXP STO INTERVAL'
'Old: xx:xx:xx'
'New: xx:xx:xx'

NOTE

1. The left pushbutton (CURSOR) moves the cursor between New digit fields. The default cursor position will be blinking.
2. The center pushbutton (PLUS) increases New selected digit field value by 1.
3. New Experiment Storage Interval must be greater than zero.

6.8 Enter desired Experiment Storage Interval per **MCC-H**

6.9 pb Right (DONE) → Press (one time)

If Display - '**ARE YOU SURE?**'

| pb Left (APPLY) → Press (one time)

6.10 ✓Display – desired Experiment Storage Interval per **MCC-H**

6.11 pb Right (EXIT) → Press until '**HOME DISPLAY**' appears.

7. SELECTING HEAT REMOVAL MODE

7.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'

7.2 pb Left (NEXT) → Press (six times), the following appears:
'MAIN MENU'
'Setup 7/8'

7.3 pb Center (SELECT) → Press (two times), the following appears:
'SETUP: GENERAL'
'HeatRemoval Mode 1/8'

7.4 pb Center (SELECT) → Press (one time), the following appears:
'HEAT REMOVAL MODE'
'Select Mode x of 2'

NOTE

The left pushbutton (NEXT) toggles between AIR and WATER.

7.5 Select desired Heat Removal Mode per **MCC-H**.

7.6 pb Center (APPLY) → Press (one time)

7.7 pb Right (EXIT) → Press until '**HOME DISPLAY**' appears.

8. SELECTING MEMORY FULL MODE

8.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'

8.2 pb Left (NEXT) → Press (six times), the following appears:
'MAIN MENU'

'Setup 7/8'

- 8.3 pb Center (SELECT) → Press (two times), the following appears:
'SETUP: GENERAL'
'HeatRemoval Mode 1/8'
- 8.4 pb Left (NEXT) → Press (one time), the following appears:
'SETUP: GENERAL'
'Memory Full Mode 2/8'
- 8.5 pb Center (SELECT) → Press (one time), the following appears:
'MEMORY FULL MODE'
'Select Mode x of 2'

NOTE

The left pushbutton (NEXT) toggles between OVERWRITE OLD DATA and STOP DATA RECORDING.

- 8.6 Select desired Memory Full Mode per **MCC-H**
- 8.7 pb Center (APPLY) → Press (one time)
- 8.8 pb Right (EXIT) → Press until **'HOME DISPLAY'** appears.
9. SELECTING EXTERNAL FAN MODE
- 9.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
- 9.2 pb Left (NEXT) → Press (six times), the following appears:
'MAIN MENU'
'Setup 7/8'
- 9.3 pb Center (SELECT) → Press (two times), the following appears:
'SETUP: GENERAL'
'HeatRemoval Mode 1/8'
- 9.4 pb Left (NEXT) → Press (two times), the following appears:
'SETUP: GENERAL'
'ExternalFan Mode 3/8'
- 9.5 pb Center (SELECT) → Press (one time), the following appears:
'EXTERNAL FAN MODE'
'Select Mode x of 3'

NOTE

The left pushbutton (NEXT) toggles between OFF, ON and AUTOMATIC

- 9.6 Select desired External Fan Mode per **MCC-H**
- 9.7 pb Center (APPLY) → Press (one time)
- 9.8 pb Right (EXIT) → Press until **'HOME DISPLAY'** appears.

10. SELECTING POWER RECOVERY MODE

- 10.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
- 10.2 pb Left (NEXT) → Press (six times), the following appears:
'MAIN MENU'
'Setup 7/8'
- 10.3 pb Center (SELECT) → Press (two times), the following appears:
'SETUP: GENERAL'
'HeatRemoval Mode 1/8'
- 10.4 pb Left (NEXT) → Press (three times), the following appears:
'SETUP: GENERAL'
'PwrRecovery Mode 4/8'
- 10.5 pb Center (SELECT) → Press (one time), the following appears:
'POWER RECOVERY MODE'
'Select Mode x of 4'

NOTE

The left pushbutton (NEXT) toggles between RETURN TO SP TEMP, HOLD PRESENT TEMP, CONT RAMP LAST SP, or CONT RAMP PRES TEMP

- 10.6 Select desired Power Recovery Mode per **MCC-H**
- 10.7 pb Center (APPLY) → Press (one time)
- 10.8 pb Right (EXIT) → Press until '**HOME DISPLAY**' appears.

11. SELECTING DOOR DETECTION MODE

- 11.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
- 11.2 pb Left (NEXT) → Press (six times), the following appears:
'MAIN MENU'
'Setup 7/8'
- 11.3 pb Center (SELECT) → Press (two times), the following appears:
'SETUP: GENERAL'
'HeatRemoval Mode 1/8'
- 11.4 pb Left (NEXT) → Press (four times), the following appears:
'SETUP: GENERAL'
'Door Detection 5/8'
- 11.5 pb Center (SELECT) → Press (one time), the following appears:
'DOOR DETECTION MODE'
'Select Mode x of 2'

NOTE

The left pushbutton (NEXT) toggles between DISABLE and ENABLE.

- 11.6 Select desired Door Detection Mode per **MCC-H**.
- 11.7 pb Center (APPLY) → Press (one time)
- 11.8 pb Right (EXIT) → Press until '**HOME DISPLAY**' appears.

12. SELECTING EXPERIMENT VOLUME FAN MODE

- 12.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
- 12.2 pb Left (NEXT) → Press (six times), the following appears:
'MAIN MENU'
'Setup 7/8'
- 12.3 pb Center (SELECT) → Press (two times), the following appears:
'SETUP: GENERAL'
'HeatRemoval Mode 1/8'
- 12.4 pb Left (NEXT) → Press (five times), the following appears:
'SETUP: GENERAL'
'Expt Vol Fan Mode 6/8'
- 12.5 pb Center (SELECT) → Press (one time), the following appears:
'EXP VOLUME FAN MODE'
'Select Mode x of 2'

NOTE

The left pushbutton (NEXT) toggles between DISABLE and ENABLE.

- 12.6 Select desired Experiment Volume Fan Mode per **MCC-H**.
- 12.7 pb Center (APPLY) → Press (one time)
- 12.8 pb Right (EXIT) → Press until '**HOME DISPLAY**' appears.

13. CHANGING TEMPERATURE BANDWIDTH

- 13.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
- 13.2 pb Left (NEXT) → Press (six times), the following appears:
'MAIN MENU'
'Setup 7/8'
- 13.3 pb Center (SELECT) → Press (two times), the following appears:
'SETUP: GENERAL'
'HeatRemoval Mode 1/8'

13.4 pb Left (NEXT) → Press (six times), the following appears:
 'SETUP: GENERAL'
 'Temp Bandwidth 7/8'

13.5 pb Center (SELECT) → Press (one time), the following appears:
 'TEMP BANDWIDTH'
 'Bandwidth xx.xC'

NOTE

1. The left pushbutton (CURSOR) moves the cursor between Bandwidth digit fields. The default cursor position will be blinking.

2. The center pushbutton (PLUS) increases Bandwidth selected digit field value by 1.

13.6 Enter desired Temp Bandwidth per **MCC-H**.

13.7 pb Right (DONE) → Press (one time)
 If Display - 'ARE YOU SURE?'
 | pb Left (APPLY) → Press

13.8 ✓Display – desired Temperature Bandwidth per **MCC-H**.

13.9 pb Right (EXIT) → Press until '**HOME DISPLAY**' appears.

14. SELECTING PID SENSORS FOR THERMAL CARRIER CONTROL

14.1 pb Left (MENU) → Press (one time), the following appears:
 'MAIN MENU'
 'Quick Status 1/8'

14.2 pb Left (NEXT) → Press (six times), the following appears:
 'MAIN MENU'
 'Setup 7/8'

14.3 pb Center (SELECT) → Press (one time), the following appears:
 'MAIN: SETUP'
 'General 1/4'

14.4 pb Left (NEXT) → Press (one time), the following appears:
 'MAIN: SETUP'
 'PID 2/4'

14.5 pb Center (SELECT) → Press (one time), the following appears:
 'SETUP: PID'
 'PID Sensors 1/2'

14.6 pb Center (SELECT) → Press (one time), the following appears:
 'PID SENSORS'
 'S: LRE: E: 123456789AB'

NOTE

1. The left pushbutton (CURSOR) moves the cursor between PID SENSORS fields.
2. The center pushbutton (TOGGLE) toggles the '*' on/off indicator on row 3.
3. If a '*' character is under any of the PID SENSORS fields then this sensor is selected for use in the control of the thermal carrier.

14.7 Select desired active PID Sensors per **MCC-H**.

14.8 pb Right (DONE) → Press (one time)

If Display 'SET LRE123456789AB', 'Old:', and 'New':

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

14.9 pb Right (EXIT) → Press until '**HOME DISPLAY**' appears.

15. RESETTING POWER LOSS FLAG

15.1 pb Left (MENU) → Press (one time), the following appears:
 'MAIN MENU'
 'Quick Status 1/8'

15.2 pb Left (NEXT) → Press (six times), the following appears:
 'MAIN MENU'
 'Setup 7/8'

15.3 pb Center (SELECT) → Press (one time), the following appears:
 'MAIN: SETUP'
 'General 1/4'

15.4 pb Left (NEXT) → Press (three times), the following appears:
 'MAIN: SETUP'
 'Alternate 4/4'

15.5 pb Center (SELECT) → Press (one time), the following appears:
 'SETUP: ALTERNATE'
 'TE Power 1/8'

15.6 pb Left (NEXT) → Press (four times), the following appears:
 'SETUP: ALTERNATE'
 'Power Loss Reset 5/8'

15.7 pb Center (SELECT) → Press (one time), the following appears:
 'POWER LOSS RESET'
 'RESET PWR LOSS FLAG'

15.8 pb Left (RESET) → Press one time

15.9 pb Right (EXIT) → Press until '**HOME DISPLAY**' appears.

16. CHANGING PAYLOAD FUNCTION CODE

- 16.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
- 16.2 pb Left (NEXT) → Press (six times), the following appears:
'MAIN MENU'
'Setup 7/8'
- 16.3 pb Center (SELECT) → Press (one time), the following appears:
'MAIN: SETUP'
'General 1/4'
- 16.4 pb Left (NEXT) → Press (three times), the following appears:
'MAIN: SETUP'
'Alternate 4/4'
- 16.5 pb Center (SELECT) → Press (one time), the following appears:
'SETUP: ALTERNATE'
'TE Power 1/8'
- 16.6 pb Left (NEXT) → Press (six times), the following appears:
'SETUP: ALTERNATE'
'Function Code 7/8'
- 16.7 pb Center (SELECT) → Press (one time), the following appears:
'FUNCTION CODE'
'Old: XxXXXX'
'New: XxXXXX'

NOTE

1. The left pushbutton (CURSOR) moves the cursor between FUNCTION CODE digits.
2. The center pushbutton (PLUS) increases FUNCTION CODE selected digit field value by 1.
3. The values are in hexadecimal.

- 16.8 Enter desired Function Code per **MCC-H**
- 16.9 pb Right (DONE) → Press (one time)
If Display - '**ARE YOU SURE?**'
| pb Left (APPLY) → Press (one time)
- 16.10 ✓Display – desired Function Code per **MCC-H**
- 16.11 pb Right (EXIT) → Press until '**HOME DISPLAY**' appears
- 17. SELECTING TEMPERATURE CONTROL MODE FOR THERMAL CARRIER
 - 17.1 pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'

17.2 pb Left (NEXT) → Press (three times), the following appears:
 'MAIN MENU'
 'Temp Control 4/8'

17.3 pb Center (SELECT) → Press (two times), the following appears:
 'TEMP CONTROL: MODE'
 'Select Mode x of 5:'

NOTE

The left pushbutton (NEXT) toggles between SET POINT, PROG TEMP PROFILE, SET POINT TO PROFILE, OFF, and OVERRIDE.

17.4 pb Left (NEXT) → Press until reaching desired Temp Control Mode per **MCC-H**

17.5 pb Center (APPLY) → Press (one time)

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

18. CHECKING STATUS OF THERMAL CARRIER FROM HOME DISPLAY

18.1 pb Left (MENU) → Press (one time), the following appears:
 'MAIN MENU'
 'Quick Status 1/8'

18.2 pb Center (SELECT) → Press (one time), the following appears:
 'MAIN: QUICK STATUS'
 'ECW 01/19'

18.3 ✓Display (Line 3) – '**NOMINAL**'

NOTE

The MERLIN may take several minutes to achieve its command temperature once parameters have been reconfigured.

18.4 pb Right (EXIT) → press until '**HOME DISPLAY**' appears

19. CHECKING CONTROL TEMPERATURE AT HOME DISPLAY

19.1 ✓Display – '**CURR TEMP:**' expected current temperature ± bandwidth in °C per **MCC-H**

19.2 ✓Display – '**SP TEMP:**' expected Set Point temperature in °C per **MCC-H**

19.3 ✓Display – '**GPS**' incrementing

NOTE

The STATUS LED is on for approximately 2/3 of a sec and then is turned off for approximately 1/3 of a sec when an off-nominal situation is present, and continues until off-nominal situation is acknowledged.

19.4 ✓STATUS LED – Nominal (It off)

19.5 ✓Display – continuously reads 'HOME DISPLAY'

*
* If Display, STATUS LED, ECW, CURR TEMP or SP TEMP are not in
* nominal state
* | ✓MCC-H
*

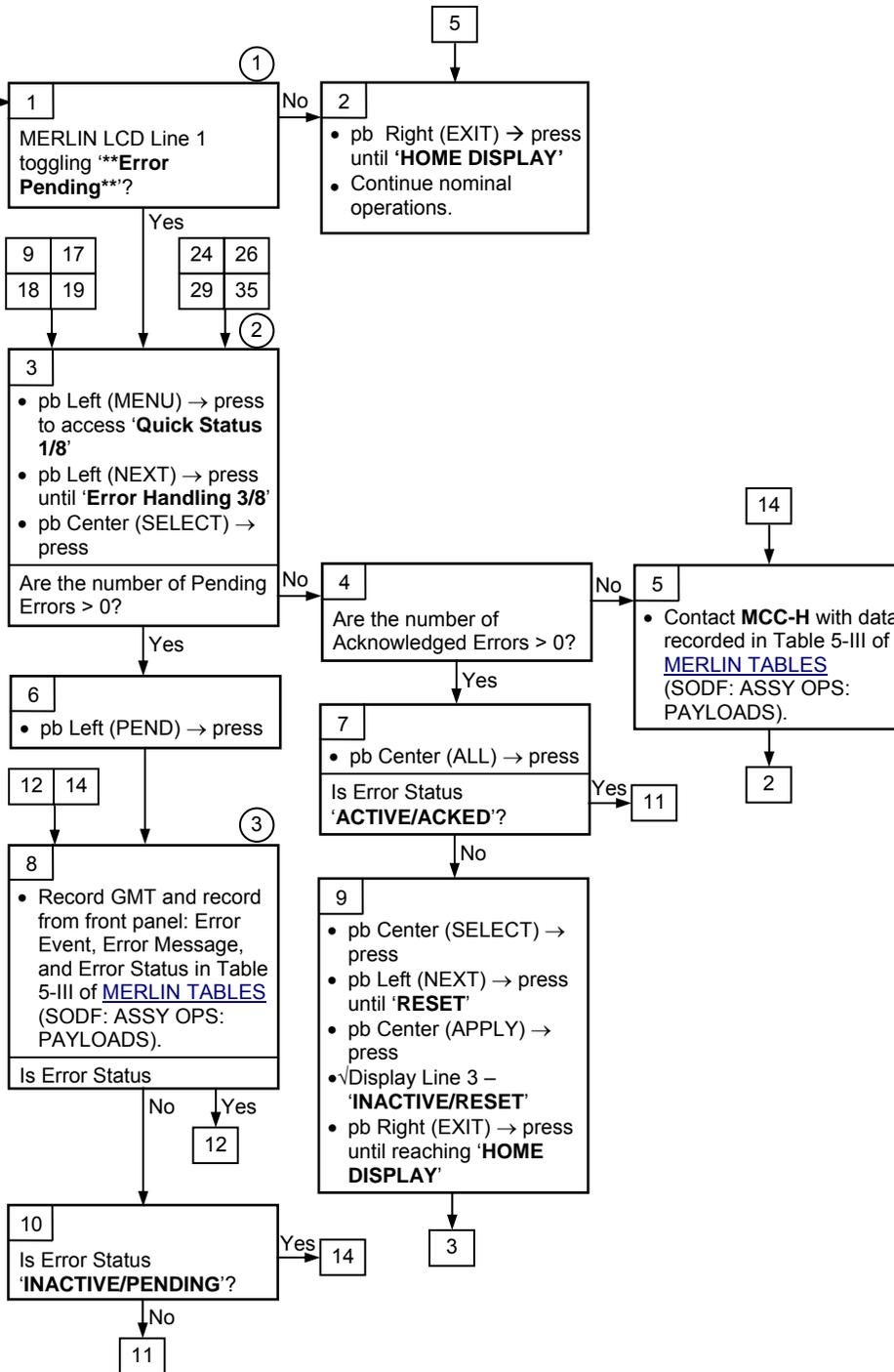
20. RECORDING END DATA

- 20.1 Record End 'CURR TEMP' and End 'GPS' in Table 5-I of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).
- 20.2 Notify MCC-H and report log values for log file Table 5-I of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).

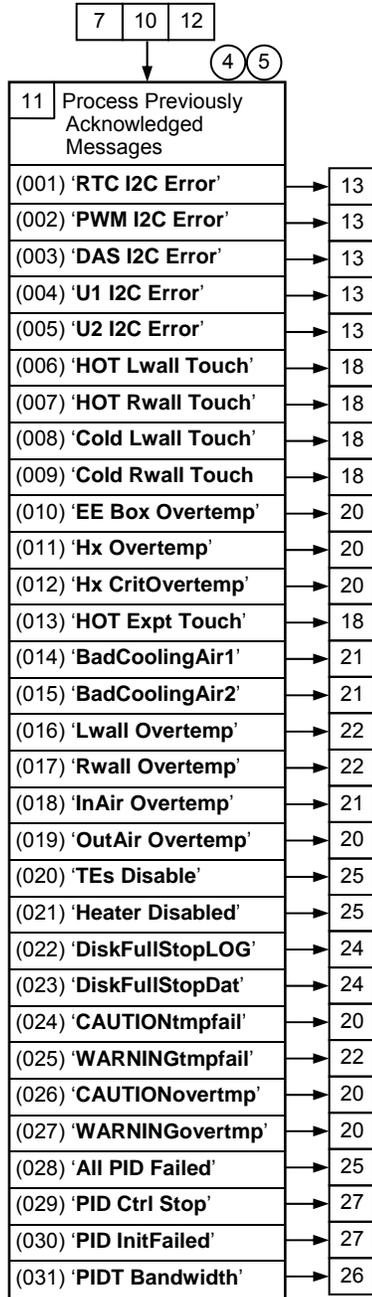
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MERLIN System Error

Nominal Config:
(MF71E)
cb MAIN - cl (lt on)
cb PAYLOAD - op (lt off)
(MO63P)
cb CB4/J4 - cl
10A J4 - ON

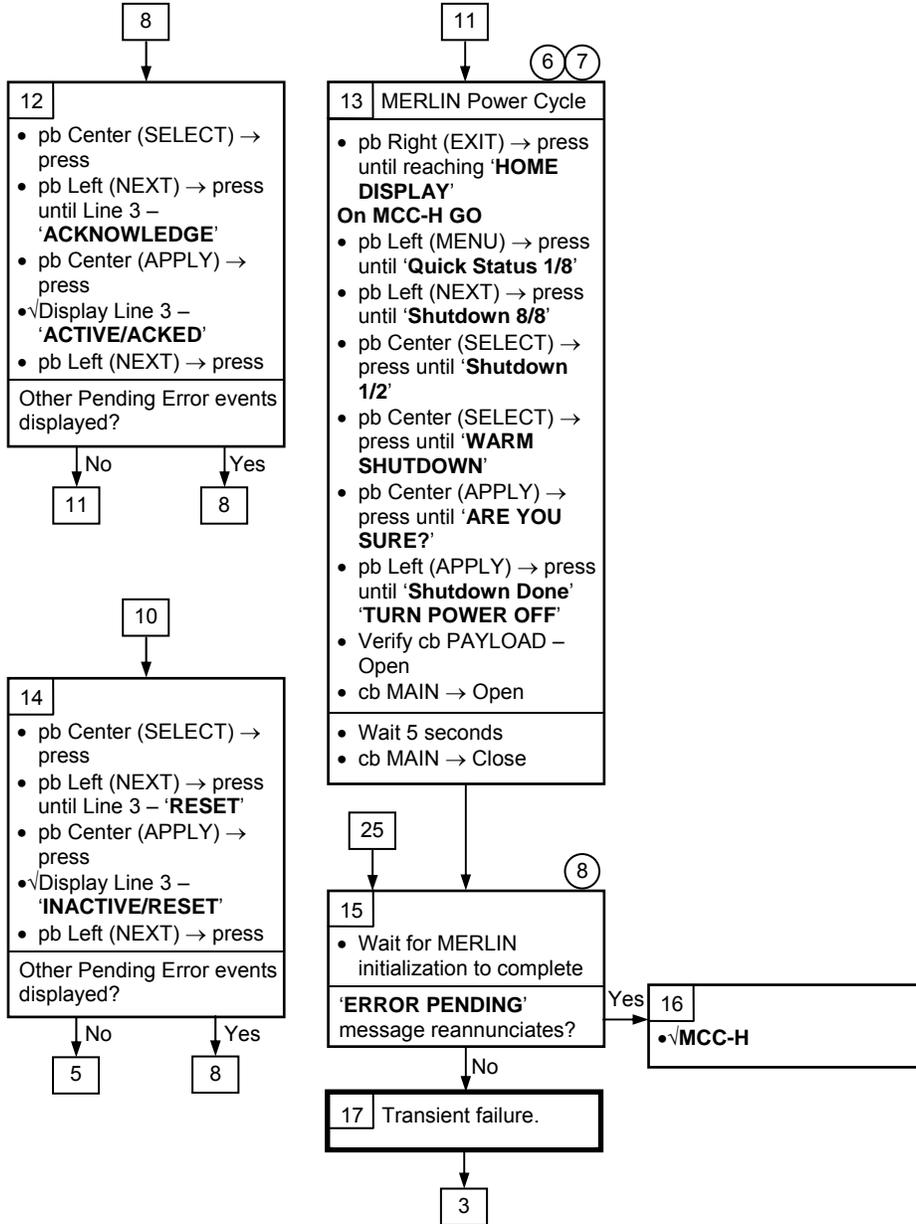


- ① Contact **MCC-H** before proceeding.
- ② Operator can always exit sub menus by pressing pb Right until '**HOME DISPLAY**' is reached.
- ③ '**ERR HANDLING PEND**' display will identify the Event on Display (Line 2) and the Status on Display (Line 3). '**ACTIVE/PENDING**' indicates that error is still occurring and should be acknowledged. '**INACTIVE/PENDING**' indicates the Error is no longer occurring and can be Reset.



④ The following sequence of steps list all possible MERLIN error messages.

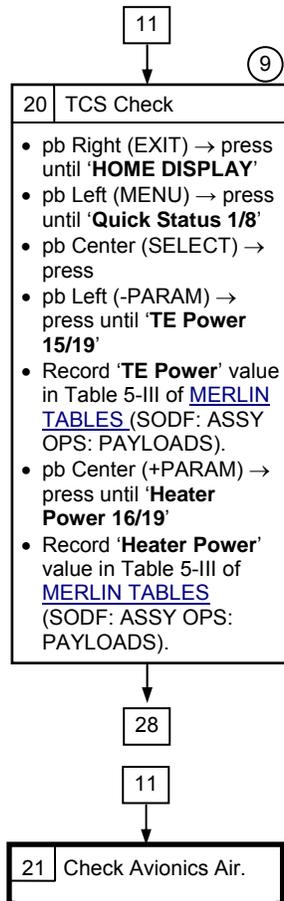
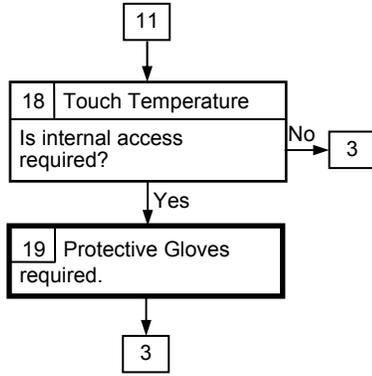
⑤ The MERLIN Manual Record Diagnostic Data procedure may be performed to capture the state of key data elements per **MCC-H** direction.



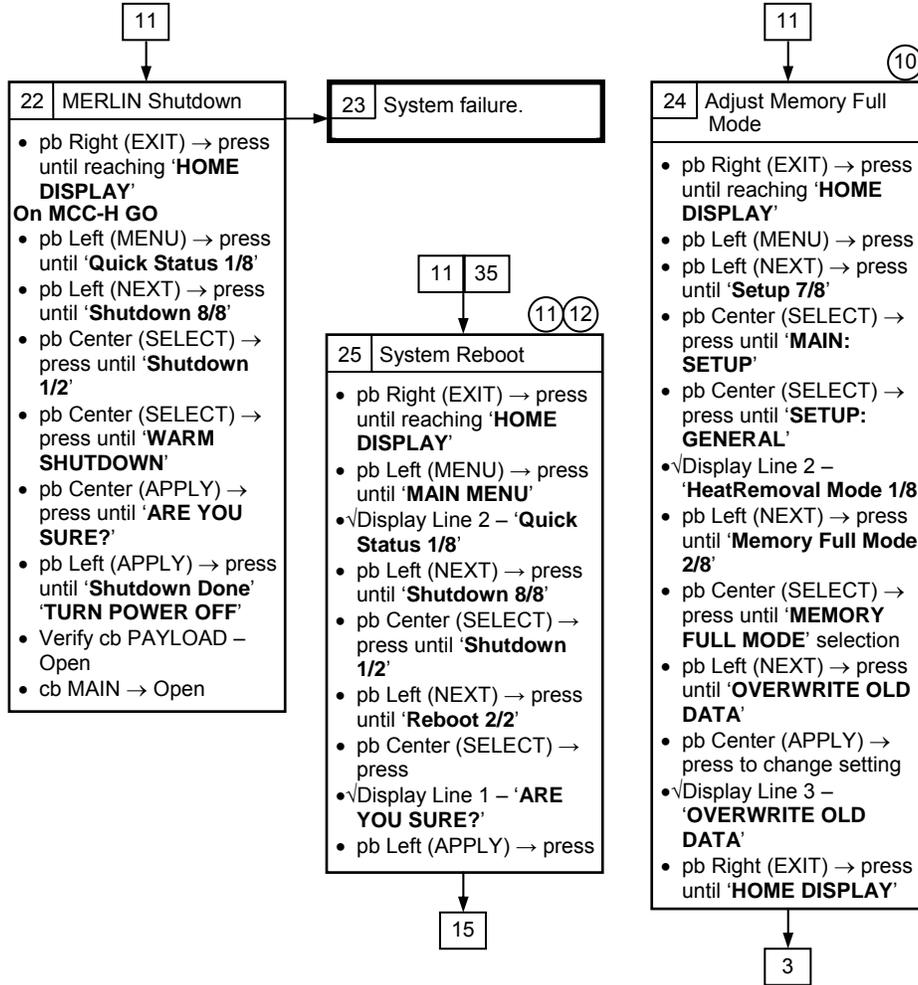
⑥ Power cycle requires **MCC-H** approval.

⑦ Some Possible causes of Software Errors not resetting: Frequent intermittent power failure, Single Event Upset, Watchdog Timer failure.

⑧ Initialization takes approximately 1 minute. Initialization is complete when Display (Line 1) reads **HOME DISPLAY**.



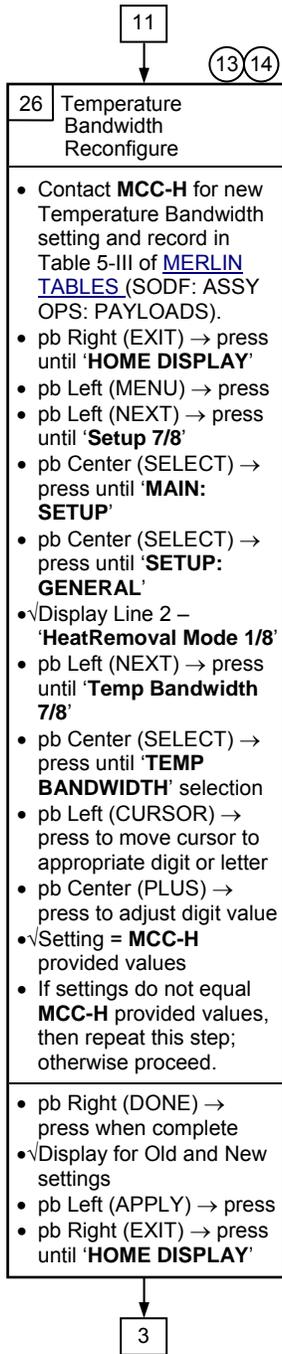
⑨ Thermal Control System (TCS) consists of Thermal Electric Devices and Heater strips.



⑩ Memory Full Mode Errors occur when the system is programmed to stop recording certain data files when memory is 95% full. Changing the system to over-write the oldest data will eliminate this error.

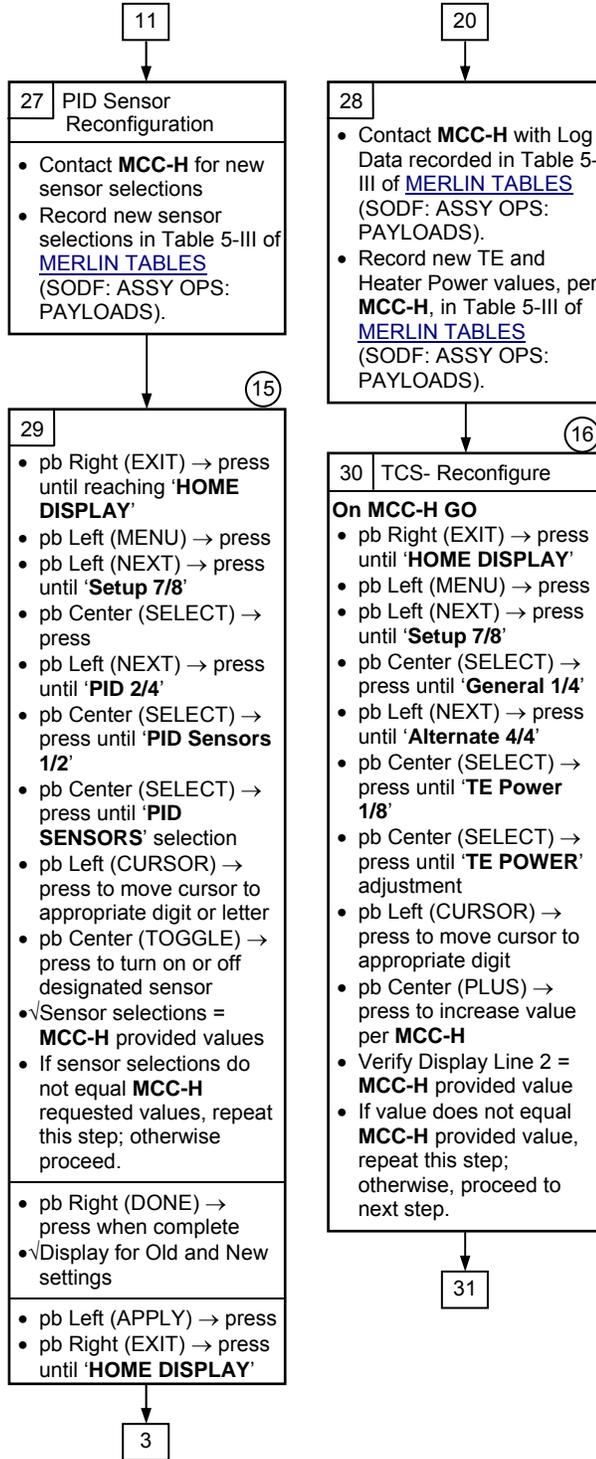
⑪ Errors 012,016, 017, 019, 020, 021 will automatically disable the TED devices; the system must be rebooted in order to re-enable them.

⑫ System reboot takes approximately 1 minute. System will initiate to 'HOME DISPLAY'



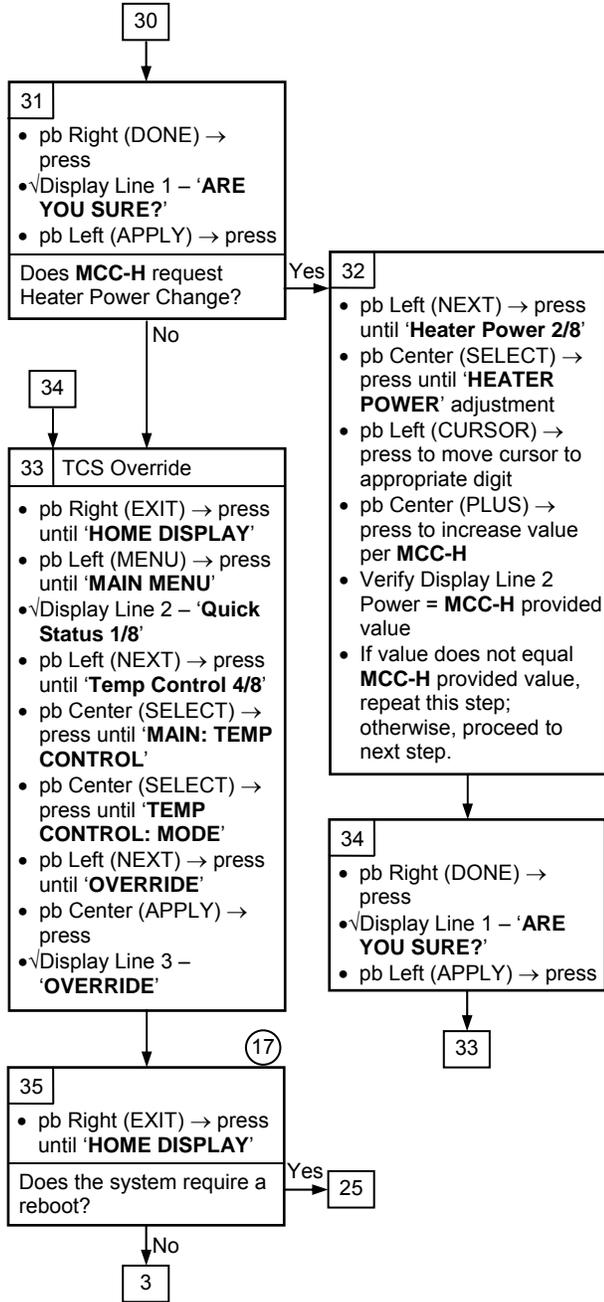
13
The thermal control bandwidth setting is used to annunciate an error when feedback experiment temperature reading exceeds desired values. Changing this setting should only be performed with PI concurrence.

14
Bandwidth setting can be adjusted from 00.1 C to 25.0 C.



(15) Sensor selection is displayed in the following order. An * symbol under the designated letter or numeral indicates selected sensor. (Example) M:LRE E:123456789AB.

(16) TCS and Heater Reconfigurations will set fixed power values to these devices. Setting system to Override will inhibit responsive thermal control.



17
Errors 012,016, 017, 019, 020, 021 will automatically disable the TED devices; the system must be rebooted in order to re-enable them.

MERLIN FAIL TO HOLD SETPOINT

(ASSY OPS/19A/FIN 1)

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OBJECTIVE:

The following steps allow reconfiguration of Temperature Control Mode, Ramp Rate, Heat Removal Mode and Fan Modes.

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

RECORDING DATA

1. ✓Display – 'HOME DISPLAY'

*
* If 'HOME DISPLAY' not shown
* | pb Right (EXIT) → Press until 'HOME DISPLAY' appears
*

2. Record start 'CURR TEMP', start 'GPS', and any callup data in Table 5-I of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).

SETTING TEMPERATURE CONTROL MODE

3. pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
4. pb Left (NEXT) → Press (three times), the following appears:
'MAIN MENU'
'Temp Control 4/8'
5. pb Center (SELECT) → Press (one time), the following appears:
'MAIN: TEMP CONTROL'
'Mode 1/3'
6. pb Left (NEXT) → Press (one time), the following appears:
'MAIN: TEMP CONTROL'
'SP Mode Options 2/3'
7. pb Center (SELECT) → Press (two times), the following appears:
'SET PT TEMPERATURE'
'Old SP Temp: ±xx.xC'

MERLIN FAIL TO HOLD SETPOINT

(ASSY OPS/19A/FIN 1)

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'New SP Temp: $\pm xx.xC$ '

NOTE

1. The left pushbutton (CURSOR) moves the cursor between NEW SP Temp fields (default cursor position will be blinking).
2. The center pushbutton (PLUS) increases New SP Temp selected digit field value by 1.
3. SP Temp Range (-20.0 to +48.5° C).

8. Input desired Set Point temperature per **MCC-H**
9. pb Right (DONE) → Press (one time)
If Display - '**ARE YOU SURE?**'
| pb Left (APPLY) → Press (one time)
10. ✓Display – desired Set Point temperature per **MCC-H**

SETTING RAMP RATE

11. pb Left (+PARAM) → Press (one time), the following appears:
'TEMP CONTROL: SP'
'Ramp Rate 2/4'
12. pb Center (SELECT) → Press (one time), the following appears:
'SET PT RAMP RATE'
'Old Ramp: $xx.xC/hr$ '
'New Ramp: $xx.xC/hr$ '

NOTE

1. The left pushbutton (CURSOR) moves the cursor between New Ramp fields (default cursor position will be blinking).
2. The center pushbutton (PLUS) increases New Ramp selected digit field value by 1.
3. Ramp Range (+0.1 to +20.0° C/hr)
New value must be greater than zero.

13. Input desired Set Point Ramp Rate per **MCC-H**
14. pb Right (DONE) → Press (one time)
If Display - '**ARE YOU SURE?**'
| pb Left (APPLY) → Press (one time)
15. ✓Display – desired Ramp Rate per **MCC-H**
16. pb Right (EXIT) → Press (two times), the following appears:
'MAIN MENU'

'Temp Control 4/8'

SELECTING HEAT REMOVAL MODE

17. pb Left (NEXT) → Press (three times), the following appears:

'MAIN MENU'

'Setup 7/8'

18. pb Center (SELECT) → Press (three times)

'HEAT REMOVAL MODE'

'Select Mode x of 2:'

NOTE

The left pushbutton (NEXT) toggles between AIR and WATER.

19. pb Left (NEXT) → Press until desired Heat Removal Mode per **MCC-H**

20. pb Center (APPLY) → Press (one time), the following appears:

'SETUP: GENERAL'

'HeatRemoval Mode 1/8'

SELECTING EXTERNAL FAN MODE

21. pb Left (NEXT) → Press (two times), the following appears:

'SETUP: GENERAL'

'ExternalFan Mode 3/8'

22. pb Center (SELECT) → Press (one time), the following appears:

'EXTERNAL FAN MODE'

'Select Mode x of 3:'

NOTE

The left pushbutton (NEXT) toggles between OFF, ON and AUTOMATIC.

23. pb Left (NEXT) → Press until desired External Fan Mode per **MCC-H**

24. pb Center (APPLY) → Press (one time), the following appears:

'SETUP: GENERAL'

'ExternalFan Mode 3/8'

SELECTING EXPERIMENT VOLUME FAN MODE

25. pb Left (NEXT) → Press (three times), the following appears:

'SETUP: GENERAL'

'Exp Vol Fan Mode 6/8'

MERLIN FAIL TO HOLD SETPOINT

(ASSY OPS/19A/FIN 1)

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26. pb Center (SELECT) → Press (one time), the following appears:
'EXP VOLUME FAN MODE'
'Select Mode x of 2:'

NOTE

The left pushbutton (NEXT) toggles between DISABLE and ENABLE.

27. pb Left (NEXT) → Press until desired Exp Vol Fan Mode per **MCC-H**
28. pb Center (APPLY) → Press (one time), the following appears:

'SETUP: GENERAL'
'Exp Vol Fan Mode 6/8'

SETTING TEMPERATURE BANDWIDTH

29. pb Left (NEXT) → Press (one time), the following appears:
'SETUP: GENERAL'
'Temp Bandwidth 7/8'

30. pb Center (SELECT) → Press (one time), the following appears:
'TEMP BANDWIDTH'
'Bandwidth: xx.xC'
'(00.1C-25.0C)'

NOTE

1. The left pushbutton (CURSOR) moves cursor between Bandwidth digit fields.
2. The center pushbutton (PLUS) increases Bandwidth selected digit field value by 1.

31. Input desired Temp Bandwidth per **MCC-H**

32. pb Right (DONE) → Press (one time)

If Display - '**ARE YOU SURE?**', then:

| pb Left (APPLY) → Press (one time)

33. ✓Display – desired Temp Bandwidth per **MCC-H**

34. pb Right (EXIT) → Press until reaching '**HOME DISPLAY**'

SELECTING PID SENSORS FOR THERMAL CARRIER CONTROL

35. pb Left (MENU) → Press (one time), the following appears:

'MAIN MENU'
'Quick Status 1/8'

MERLIN FAIL TO HOLD SETPOINT

(ASSY OPS/19A/FIN 1)

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36. pb Left (NEXT) → Press (six times), the following appears:
'MAIN MENU'
'Setup 7/8'
37. pb Center (SELECT) → Press (one time), the following appears:
'MAIN: SETUP'
'General 1/4'
38. pb Left (NEXT) → Press (one time), the following appears:
'MAIN: SETUP'
'PID 2/4'
39. pb Center (SELECT) → Press (two times), the following appears:
'PID SENSORS'
'S:LRE E:123456789AB'

NOTE

1. The left pushbutton (CURSOR) moves the cursor between PID SENSORS fields.
2. The center pushbutton (TOGGLE) toggles the '*' on/off indicator on row 3.
3. If a '*' character is under any of the PID SENSORS fields then this sensor is selected for use in the control of the thermal carrier.

40. Select desired active PID Sensors per **MCC-H**.
41. pb Right (DONE) → Press (one time)
42. ✓New PID Sensors = desired active PID sensors
43. pb Left (APPLY) → Press (one time), the following appears
'SETUP: PID'
'PID Sensors 1/2'
44. pb Right (EXIT) → Press (two times), the following appears:
'MAIN MENU'
'Setup 7/8'

SELECTING TEMPERATURE CONTROL MODE FOR THERMAL CARRIER

45. pb Left (NEXT) → Press (five times), the following appears:
'MAIN MENU'
'Temp Control 4/8'
46. pb Center (SELECT) → Press (two times), the following appears:
'TEMP CONTROL: MODE'
'Select Mode x of 5:'

NOTE

The left pushbutton (NEXT) toggles between SET POINT, PROG TEMP PROFILE, SET POINT TO PROFILE, OFF, and OVERRIDE.

- 47. pb Left (NEXT) → Press until desired TEMP CONTROL:MODE per **MCC-H**
- 48. pb Center (APPLY) → Press (one time)
- 49. pb Right (EXIT) → Press until reaching '**HOME DISPLAY**'

CHECKING STATUS OF THERMAL CARRIER

- 50. pb Left (MENU) → Press (one time), the following appears:

'MAIN MENU'
'Quick Status 1/8'

- 51. pb Center (SELECT) → Press (one time), the following appears:

'MAIN: QUICK STATUS'
'ECW 01/19'

- 52. ✓Display line 3 – '**NOMINAL**'

- 53. pb Right (EXIT) → Press until reaching '**HOME DISPLAY**'

CHECKING CONTROL TEMPERATURE

- 54. ✓Display – '**CURR TEMP:**' expected Set Point temperature ± bandwidth in degrees C per **MCC-H**

- 55. ✓Display – '**SP TEMP:**' expected Set Point temperature in degrees C per **MCC-H**

- 56. ✓Display – '**GPS**' incrementing

NOTE

The STATUS LED is on for approximately 2/3 of a second then is turned off for approximately 1/3 of a second when an off-nominal situation is present, and will toggle until off-nominal situation is acknowledged.

- 57. ✓STATUS LED – Nominal (It off)

- 58. ✓Display – continuously reads '**HOME DISPLAY**'

```

*****
*
* If Display, STATUS LED, ECW, CURR TEMP or SP TEMP are not in the
* nominal configuration,
* | ✓MCC-H
*
*****

```

MERLIN FAIL TO HOLD SETPOINT

(ASSY OPS/19A/FIN 1)

Page 7 of 7 pages

RECORDING END DATA

59. Record End '**CURR TEMP**' and End '**GPS**' in Table 5-I of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).
60. Notify **MCC-H** Fail to Hold Setpoint complete and report log values for log file Table 5-I of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).

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MERLIN

MERLIN FAIL TO REPOWER

(ASSY OPS/19A/FIN 1) Page 1 of 4 pages

MERLIN initialization not successfully completed when power applied during **MERLIN POWER UP** (SODF: ASSY OPS: PAYLOADS) procedure

Nominal Config:
 (MF71E)
 cb MAIN-cl (It on)
 cb PAYLOAD-op (It off)
 (MO63P)
 cb CB4/J4-cl
 10A J4-ON

① ② ③

1	Switch to Alternate Power Source
<ul style="list-style-type: none"> Contact MCC-H for alternate power source (fill in data below). _____ 	
(MERLIN)	
<ul style="list-style-type: none"> ✓ cb PAYLOAD op (It off) cb MAIN → op (It off) 	
(MO63P)	
<ul style="list-style-type: none"> 10A J4-OFF cb CB4/J4 → op A/E PAYLOAD DC PWR (20') ← J4 	
(Alternate Power Source J__)	
<ul style="list-style-type: none"> ✓ cb _____ - op ✓ sw _____ - OFF 	
<ul style="list-style-type: none"> A/E PAYLOAD DC PWR (20') → ← Alternate Power Source J__ 	

Next

① ④ ⑥

2	Repower from Alternate Power Source
<ul style="list-style-type: none"> (_____) cb _____ -cl sw _____ -ON 	
(MERLIN)	
<ul style="list-style-type: none"> cb MAIN → cl (It on) 	
After Initialization does display read 'HOME DISPLAY'?	

Yes

3	PRIMARY OUTLET FAILURE
---	------------------------

Next

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

No

5	POSSIBLE DOWNSTREAM FAILURE
---	-----------------------------

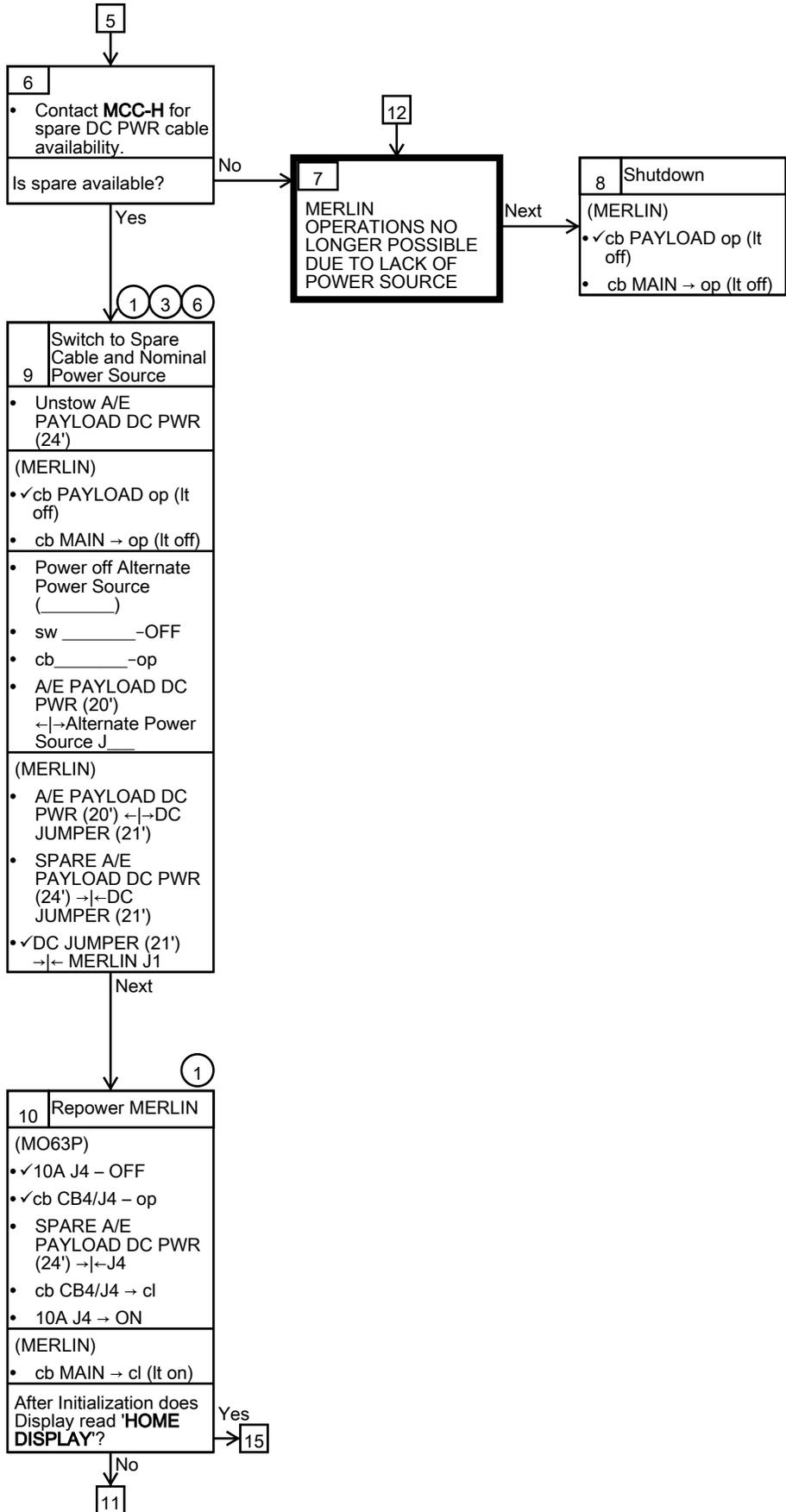
Next

6

- ① **MCC-H** may instruct crew to an alternate power source that is not 10 AMP service. The ISS DC JUMPER cable is only reqd if the Orbiter power source is 10 amps. MO63P is 10 amp service.
- ② Always deadface DC power source when disconnecting/connecting power cable
- ③ Verify connectors are properly mated and seated securely when switching to alternate power source
- ④ MERLIN will take approximately 2 min to initialize after power on; after initialization is successfully completed, LCD Line 1 will read 'HOME DISPLAY'
- ⑥ Alternate power source is detailed in block 1.

MERLIN FAIL TO REPOWER

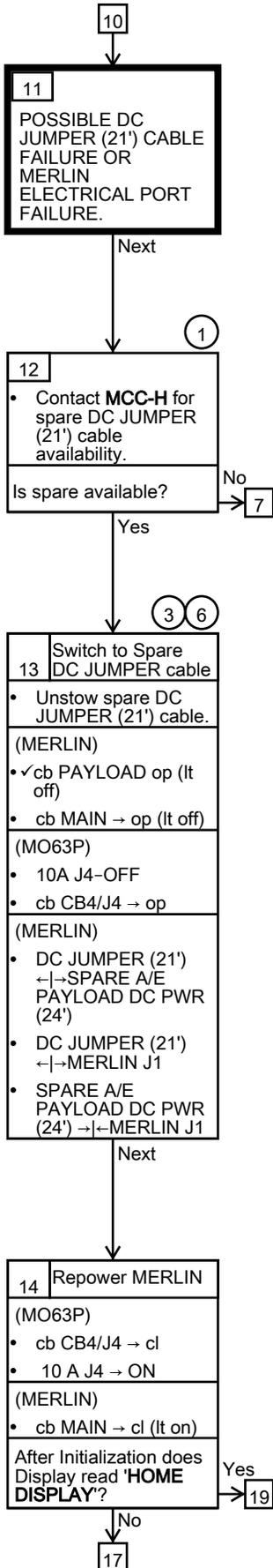
(ASSY OPS/19A/FIN 1) Page 2 of 4 pages



1 MCC-H may instruct crew to an alternate power source that is not 10 AMP service. The ISS DC JUMPER cable is only reqd if the Orbiter power source is 10 amps. MO63P is 10 amp service.

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

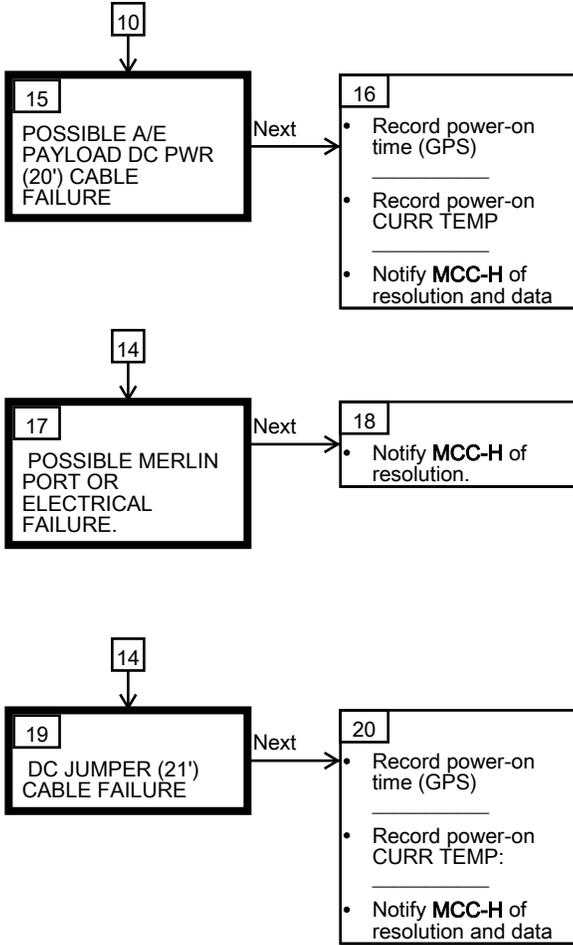
6 Alternate power source is detailed in block 1.



1 MCC-H may instruct crew to an alternate power source that is not 10 AMP service. The ISS DC JUMPER cable is only reqd if the Orbiter power source is 10 amps. MO63P is 10 amp service.

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

6 Alternate power source is detailed in block 1.

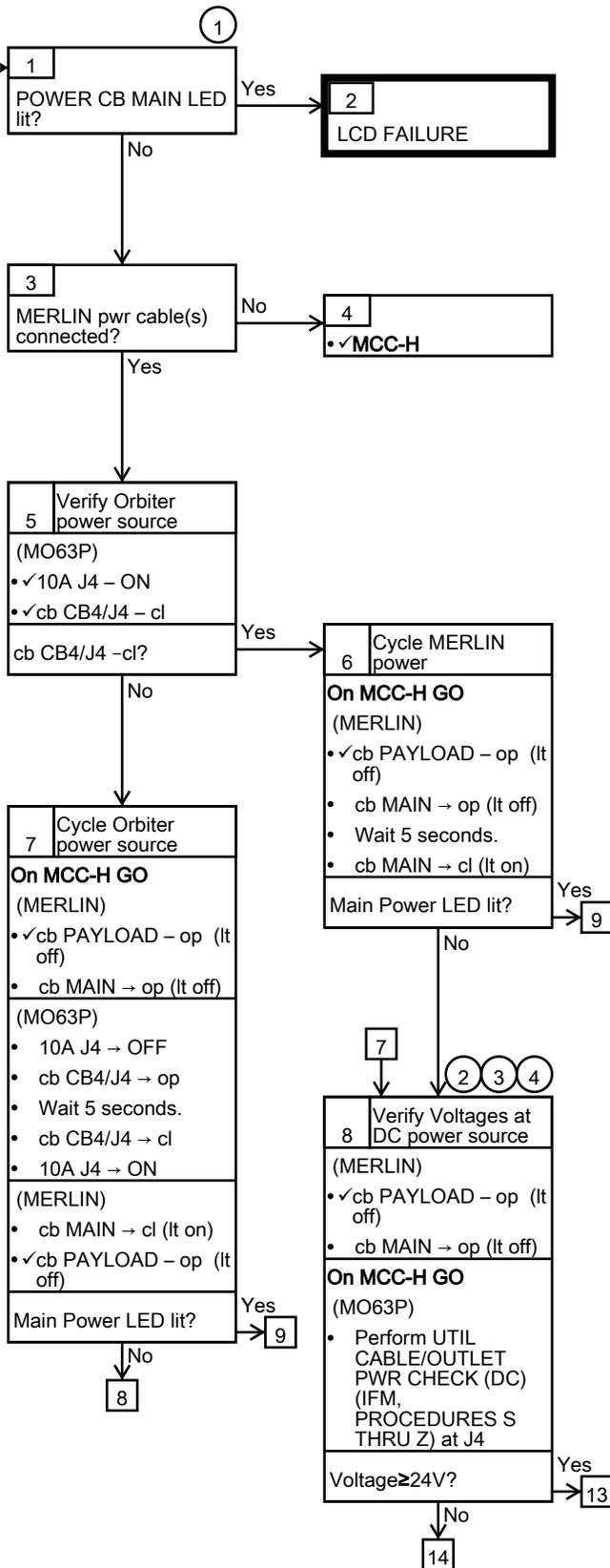


MERLIN

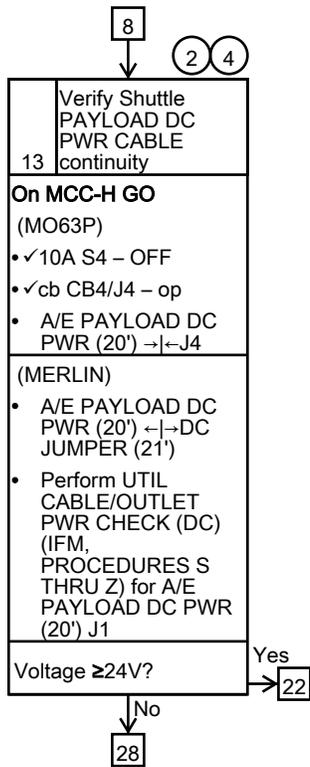
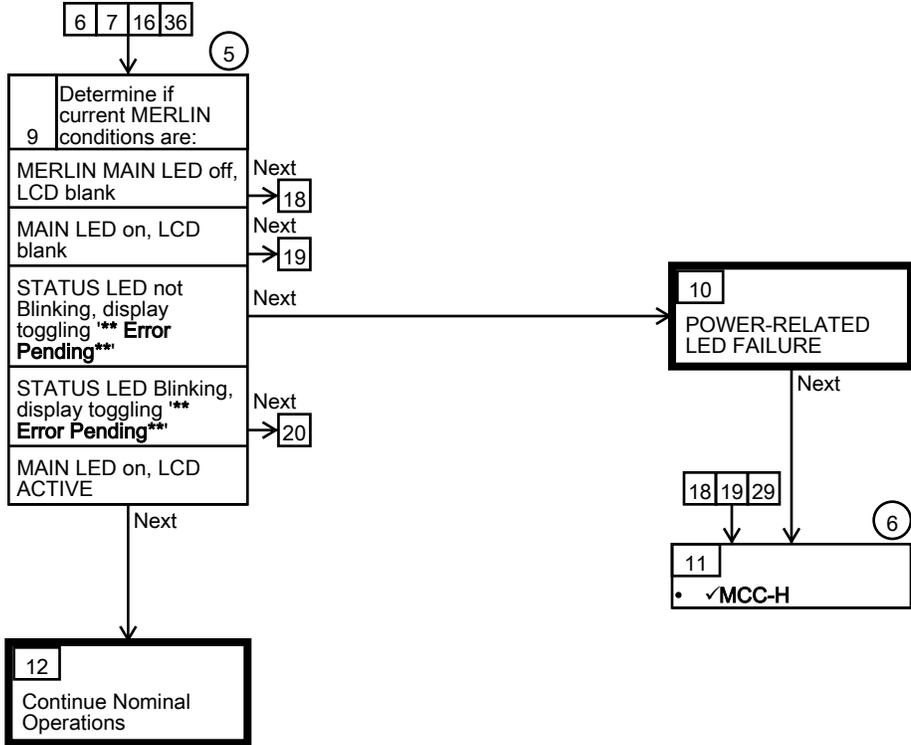
MERLIN LCD BLANK
(ASSY OPS/19A/FIN 2)

LCD Blank

Nominal Config:
(MF71E)
cb MAIN – cl (It on)
cb PAYLOAD – op (It off)
(MO63P)
cb CB4/J4 – cl
10A J4 – ON
MNC-DC UTIL
PWR SEL – 10A



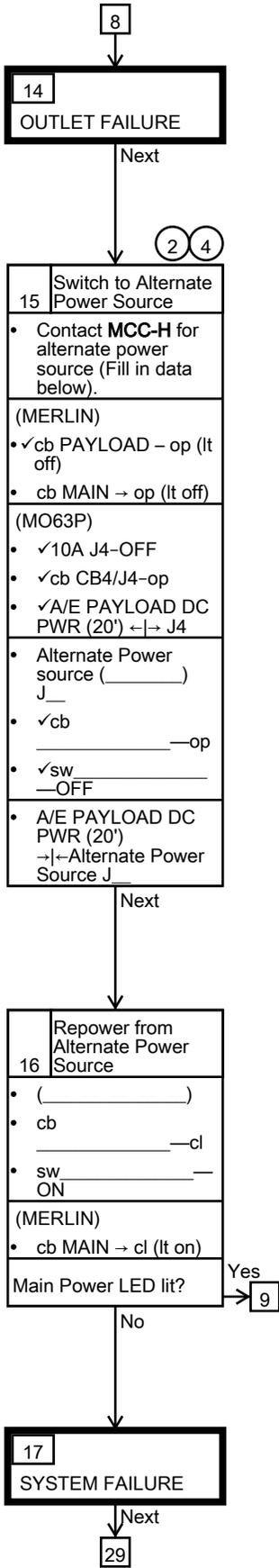
- ① Fan running indicates MERLIN on STS or EXPRESS power.
- ② Always deadface DC Power source when disconnecting or connecting power cable.
- ③ Path from block 6 checks MO63P outlet, from block 7 checks MERLIN cb. Internal voltages require approximately 2 min to dissipate upon cb open. Dissipation complete when Power LED extinguishes.
- ④ Verify connectors are properly mated and seated securely when reconnecting.

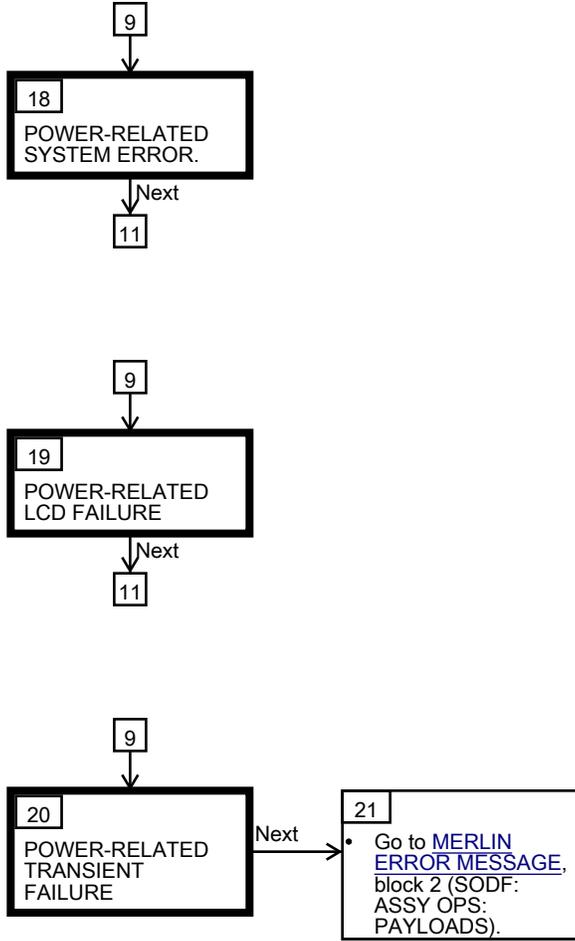


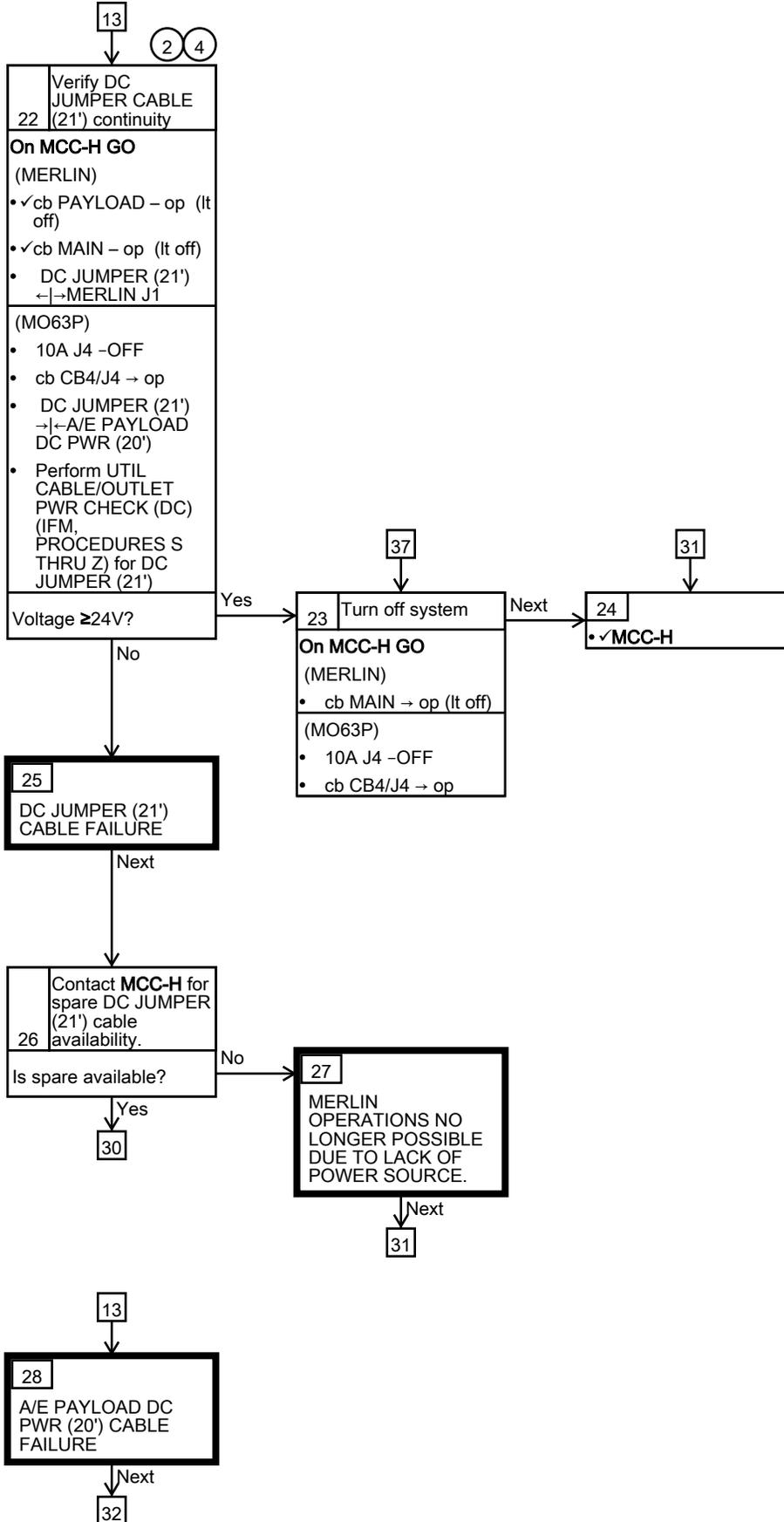
- ② Always deadface DC Power source when disconnecting or connecting power cable.
- ④ Verify connectors are properly mated and seated securely when reconnecting.
- ⑤ Initialization takes approximately 2 minutes. Initialization is complete when LCD Line 1 reads 'HOME DISPLAY'.
- ⑥ The MERLIN payload may continue to function if LCD fails.

② Always deadface DC Power source when disconnecting or connecting power cable.

④ Verify connectors are properly mated and seated securely when reconnecting.







2 Always deadface DC Power source when disconnecting or connecting power cable.

4 Verify connectors are properly mated and seated securely when reconnecting.

17

29	Turn off system
On MCC-H GO (MERLIN)	
• cb POWER → op (lt off)	
• Alternate Power source (_____) J__	
• ✓cb _____—op	
• ✓sw _____—OFF	

Next

11

26

30	Switch to spare DC JUMPER (21') cable
• Unstow Spare DC JUMPER (21') Cable	
(MERLIN)	
• ✓cb PAYLOAD – op (lt off)	
• cb MAIN → op (lt off)	
(MO63P)	
• ✓10A J4 – OFF	
• ✓cb CB4/J4 – op	
(MERLIN)	
• DC JUMPER (21') ← →A/E PAYLOAD DC POWER (20')	
• ✓DC JUMPER (21') ← →MERLIN J1	
• A/E PAYLOAD DC PWR (20') → ←Spare DC JUMPER (21')	
• Spare DC JUMPER (21') → ←MERLIN J1	

Next

36

27

31	Shutdown
On MCC-H GO	
(MERLIN)	
• cb MAIN → op (lt off)	
(MO63P)	
• 10A J4-OFF	
• cb CB4/J4 → op	

Next

24

28

32	Contact MCC-H for spare DC PWR cable availability?
Is spare available?	

7

No

Yes

33	MERLIN OPERATIONS NO LONGER POSSIBLE DUE TO LACK OF PWR SOURCE
----	--

Next

34	Shutdown
(MERLIN)	
• ✓cb PAYLOAD – op (lt off)	
• cb MAIN → op (lt off)	

2 4

35	Switch to spare cable
• Unstow A/E PAYLOAD DC PWR (24')	
(MERLIN)	
• ✓cb PAYLOAD – op (lt off)	
• cb MAIN → op (lt off)	
(MO63P)	
• ✓10A J4 – OFF	
• ✓cb CB4/J4 – op	
• A/E PAYLOAD DC PWR (20') ← →J4	
• SPARE A/E PAYLOAD DC PWR (24') → ←J4	
(MERLIN)	
• ✓A/E PAYLOAD DC PWR (20') ← →DC JUMPER (21')	
• SPARE A/E PAYLOAD DC PWR (24') → ←DC JUMPER (21')	
• ✓DC JUMPER (21') → ←MERLIN J1	

Next

36

2

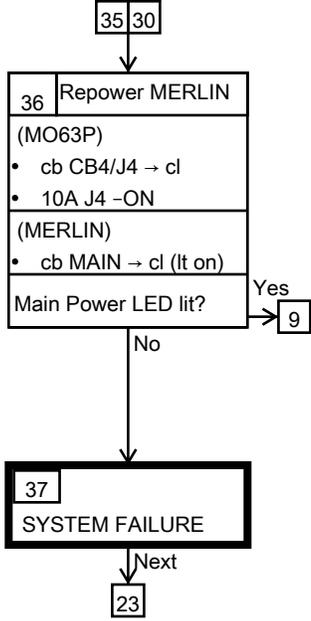
Always deadface DC Power source when disconnecting or connecting power cable.

4

Verify connectors are properly mated and seated securely when reconnecting.

7

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



MERLIN RECORD DIAGNOSTIC DATA

(ASSY OPS/19A/FIN 1)

Page 1 of 3 pages

OBJECTIVE:

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

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

RECORDING HOME DISPLAY DATA

1. ✓ **MCC-H** for parameters to record in Table 5-II of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).
2. ✓ Display – **'HOME DISPLAY'**

*
* If **'HOME DISPLAY'** not shown
* | pb Right (EXIT) → Press until **'HOME DISPLAY'** appears
*

3. Record **'CURR TEMP'**, **'GPS'** in Table 5-II of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).

RECORDING QUICK STATUS

4. pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
5. pb Center (SELECT) → Press (one time), the following appears:
'MAIN: QUICK STATUS'
'ECW 01/19'

NOTE

1. The left pushbutton (-PARAM) moves to previous parameter display.
2. The center pushbutton (+PARAM) moves to next parameter display.

6. Record Quick Status data per **MCC-H** in Table 5-II of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).
7. pb Center (+PARAM) → Press until all Quick Status data has been recorded per **MCC-H**
8. pb Right (EXIT) → Press until **'HOME DISPLAY'** appears

MERLIN RECORD DIAGNOSTIC DATA

(ASSY OPS/19A/FIN 1)

Page 2 of 3 pages

9. Contact **MCC-H** to report log values from log file

RECORDING THERMAL GENERAL

10. pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
11. pb Left (NEXT) → Press (one time), the following appears:
'MAIN MENU'
'Status 2/8'
12. pb Center (SELECT) → Press (one time), the following appears:
'MAIN: STATUS'
'Thermal 1/6'
13. pb Center (SELECT) → Press (one time), the following appears:
'STATUS:THERMAL'
'General 1/4'
14. pb Center (SELECT) → Press (one time), the following appears:
'THERMAL: GENERAL'
'Temp Control 01/12'

NOTE

1. The left pushbutton (-PARAM) moves to previous parameter display.
2. The center pushbutton (+PARAM) moves to the next parameter display.

15. Record Thermal General data per **MCC-H** in Table 5-II of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).
16. pb Center (+PARAM) → Press until all Thermal General data has been recorded per **MCC-H**
17. pb Right (EXIT) → Press until '**HOME DISPLAY**' appears
18. Contact **MCC-H** to report log values from log file

RECORDING ANCILLARY GENERAL

19. pb Left (MENU) → Press (one time), the following appears:
'MAIN MENU'
'Quick Status 1/8'
20. pb Left (NEXT) → Press (one time), the following appears:
'MAIN MENU'
'Status 2/8'
21. pb Center (SELECT) → Press (one time), the following appears:

MERLIN RECORD DIAGNOSTIC DATA

(ASSY OPS/19A/FIN 1)

Page 3 of 3 pages

'MAIN: STATUS'

'Thermal 1/6'

22. pb Left (NEXT) → Press (two times), the following appears:
'MAIN: STATUS'
'Ancillary 3/6'
23. pb Center (SELECT) → Press (one time), the following appears:
'STATUS: ANCILLARY'
'General 1/4'
24. pb Center (SELECT) → Press (one time), the following appears:
'ANCILLARY: GENERAL'
'Boot Count 01/06'

NOTE

1. The left pushbutton (-PARAM) moves to previous parameter display.
2. The center pushbutton (+PARAM) moves to next parameter display.

25. Record Ancillary General data per **MCC-H** in Table 5-II of [MERLIN TABLES](#) (SODF: ASSY OPS: PAYLOADS).
26. pb Center (+PARAM) → Press until all Ancillary General data has been recorded per **MCC-H**
27. pb Right (EXIT) → Press until '**HOME DISPLAY**' appears.
28. Contact **MCC-H** to report log values from log file

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Table 5-I. MERLIN Reset Log File

Parameter	Event 1	Event 2	Definition or Options
CURR TEMP	Start ____ . ____ °C End ____ . ____ °C	Start ____ . ____ °C End ____ . ____ °C	MERLIN Current Temperature XX.XX °C
GPS	Start ____ : ____ : ____ (Day) ____ : ____ : ____ GPS End ____ : ____ : ____ (Day) ____ : ____ : ____ GPS	Start ____ : ____ : ____ (Day) ____ : ____ : ____ GPS End ____ : ____ : ____ (Day) ____ : ____ : ____ GPS	Day Month-Abbreviation Year Hours: Min: S
Expected CURR TEMP	____ . ____ °C	____ . ____ °C	Expected MERLIN Current Temperature per MCC-H (-20.0 to +48.5° C)
Expected SP TEMP	____ . ____ °C	____ . ____ °C	Expected Set Point Temperature per MCC-H (-20.0 to +48.5° C)
Set Point Temperature	____ . ____ °C	____ . ____ °C	-20.0 to +48.5° C
Ramp Rate	____ . ____ °C / Hour	____ . ____ °C / Hour	0.1 to 20.0° C / Hour

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Continuation of Table 5-I. MERLIN Reset Log File

Parameter	Event 1	Event 2	Definition or Options
System Data Storage Interval	: : : : :	: : : : :	Hours: Min: S (Interval must be greater than 0)
Experiment Data Storage Interval	: : : : :	: : : : :	Hours: Min: S (Interval must be greater than 0)
Heat Removal Mode	Air <input type="checkbox"/> Water <input type="checkbox"/>	Air <input type="checkbox"/> Water <input type="checkbox"/>	Air or Water
Memory Full Mode	Overwrite Oldest Data <input type="checkbox"/> Terminate Data Recording <input type="checkbox"/>	Overwrite Oldest Data <input type="checkbox"/> Terminate Data Recording <input type="checkbox"/>	Overwrite Oldest Data or Terminate Data Recording
External Fan Mode	Off <input type="checkbox"/> On <input type="checkbox"/> Automatic <input type="checkbox"/>	Off <input type="checkbox"/> On <input type="checkbox"/> Automatic <input type="checkbox"/>	Off or On or Automatic

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Continuation of Table 5-I. MERLIN Reset Log File

Parameter	Event 1	Event 2	Definition or Options
Power Recovery Mode	Return to Set Point Temperature <input type="checkbox"/>	Return to Set Point Temperature <input type="checkbox"/>	Return to Set Point Temperature
	Hold Present Temperature <input type="checkbox"/>	Hold Present Temperature <input type="checkbox"/>	Hold Present Temperature
	Continue Ramp from Last Set Point <input type="checkbox"/>	Continue Ramp from Last Set Point <input type="checkbox"/>	Continue Ramp from Last Set Point
	Continue Ramp from Present Set Point <input type="checkbox"/>	Continue Ramp from Present Set Point <input type="checkbox"/>	Continue Ramp from Present Set Point
Door Detection Mode	Enabled <input type="checkbox"/>	Enabled <input type="checkbox"/>	Enabled or Disabled
	Disabled <input type="checkbox"/>	Disabled <input type="checkbox"/>	
Experiment Volume Fan Mode	Enabled <input type="checkbox"/>	Enabled <input type="checkbox"/>	Enabled or Disabled
	Disabled <input type="checkbox"/>	Disabled <input type="checkbox"/>	
Temperature Bandwidth	____. ____ °C	____. ____ °C	00.1 to 25.0° C
Downlink Mode	Enabled <input type="checkbox"/>	Enabled <input type="checkbox"/>	Enabled or Disabled
	Disabled <input type="checkbox"/>	Disabled <input type="checkbox"/>	

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Continuation of Table 5-I. MERLIN Reset Log File

Parameter	Event 1	Event 2	Definition or Options
PID Temperature Sensors	Left Wall <input type="checkbox"/>	Left Wall <input type="checkbox"/>	System Left Wall
	Right Wall <input type="checkbox"/>	Right Wall <input type="checkbox"/>	Right Wall
	Experiment volume air <input type="checkbox"/>	Experiment volume air <input type="checkbox"/>	Experiment volume air
	Experiment 1-11	Experiment 1-11	
	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/>	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/>	Experiment 1-11
	7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/>	7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/>	
Temperature Control Mode	Set Point <input type="checkbox"/>	Set Point <input type="checkbox"/>	Set Point
	Programmable Temperature Profile (PTP) <input type="checkbox"/>	Programmable Temperature Profile (PTP) <input type="checkbox"/>	Programmable Temperature Profile (PTP)
	Set Point to PTP <input type="checkbox"/>	Set Point to PTP <input type="checkbox"/>	Set Point to PTP
	Override <input type="checkbox"/>	Override <input type="checkbox"/>	Override
	Off <input type="checkbox"/>	Off <input type="checkbox"/>	Off

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Continuation of Table 5-I. MERLIN Reset Log File

Parameter	Event 1	Event 2	Definition or Options
FILE Cleanup Directories	DIRECTORIES	DIRECTORIES	DIRECTORIES
	L (Log Directory) <input type="checkbox"/>	L (Log Directory) <input type="checkbox"/>	L (Log Directory)
	M (System Data Directory) <input type="checkbox"/>	M (System Data Directory) <input type="checkbox"/>	M (MERLIN System Data Directory)
	E (Experiment Data Directory) <input type="checkbox"/>	E (Experiment Data Directory) <input type="checkbox"/>	E (Experiment Data Directory)
	U (Uplink Directory) <input type="checkbox"/>	U (Uplink Directory) <input type="checkbox"/>	U (Uplink Directory)

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

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Table 5-II. MERLIN Diagnostic Log File

Parameter	Definition	Event 1	Event 2	Event 3	Event 4
MAIN MENU					
1	CURR TEMP	Current Temperature °C			
2	GPS	Day Month-Abbreviation Year Hours: Min: S (> 0) (12Apr06 20:24:34)	____ _ __ : __ : __	____ _ __ : __ : __	____ _ __ : __ : __
QUICK STATUS					
1	ECW	Nominal Status Indicator			
2	Left Wall	Sensor Temperature °C			
3	Exp Volume Air	Sensor Temperature °C			
4	Right Wall	Sensor Temperature °C			
5	Duct Inlet	Sensor Temperature °C			
6	Hot HX Surface	Sensor Temperature °C			
7	Duct Outlet	Sensor Temperature °C			
8	Electronics Bay	Sensor Temperature °C			
9	Ambient	Sensor Temperature °C			
10	HX Humidity	% Humidity			
11	Temp Bandwidth	Bandwidth °C			
12	Exp Volume Fan	Enabled/Disabled			
13	External Fan	On/Off			
14	Memory Used	% Memory			
15	TE Power	0 to 127			
16	Heater Power	0 to 100			
17	Function Code	Hex Value			
18	IP Address	Ethernet Address			
19	Usage Meter	Days:Hours:Minutes			

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Continuation of Table 5-II. MERLIN Diagnostic Log File

Parameter		Definition	Event 1	Event 2	Event 3	Event 4
THERMAL: GENERAL						
1	Temp Control	SET POINT OFF OVERRIDE PROG TEMP PROFILE SET POINT TO PROFILE				
2	Current Temp	Sensor Temperature °C				
3	Interim Set Pt	Sensor Temperature °C				
4	End Set Point	Sensor Temperature °C				
5	Ramp Rate	Rate °C/Hour				
6	Heater Power	0 to 127				
7	TE Power	0 to 100				
8	Temp Bandwidth	Bandwidth °C				
9	B/W Status	Inside/Outside				
10	Curr Prof Line	Current profile line				
11	Prof Start GPS	Profile start time				
12	Line Time Left	Profile time left				
ANCILLARY: GENERAL						
1	Boot Count	Number of times the system had rebooted				

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Table 5-III. MERLIN Error Message Log File

GMT	MERLIN Error Message	MERLIN Error Event	MERLIN Error Status
Day Month - Abbreviation Year Hours: Min: S (12 Apr 06 20:24:34)	Text	X of Total Number (1 / 5)	(IP) INACTIVE / PENDING (AP) ACTIVE / PENDING (IA) INACTIVE / ACKED (AA) ACTIVE / ACKED (R) RESET
____ : ____ : ____ ____ : ____ : ____	_____	____ / ____	_____
____ : ____ : ____ ____ : ____ : ____	_____	____ / ____	_____
____ : ____ : ____ ____ : ____ : ____	_____	____ / ____	_____
____ : ____ : ____ ____ : ____ : ____	_____	____ / ____	_____
____ : ____ : ____ ____ : ____ : ____	_____	____ / ____	_____
____ : ____ : ____ ____ : ____ : ____	_____	____ / ____	_____
____ : ____ : ____ ____ : ____ : ____	_____	____ / ____	_____
____ : ____ : ____ ____ : ____ : ____	_____	____ / ____	_____
____ : ____ : ____ ____ : ____ : ____	_____	____ / ____	_____
____ : ____ : ____ ____ : ____ : ____	_____	____ / ____	_____

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Continuation of Table 5-III. MERLIN Error Message Log File

GPS	MERLIN Error Message	MERLIN Error Event	MERLIN Error Status
__ : __ : __	_____	__ / __	_____
__ : __ : __	_____	__ / __	_____
__ : __ : __	_____	__ / __	_____
__ : __ : __	_____	__ / __	_____
__ : __ : __	_____	__ / __	_____
__ : __ : __	_____	__ / __	_____
__ : __ : __	_____	__ / __	_____
__ : __ : __	_____	__ / __	_____

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Continuation of Table 5-III. MERLIN Error Message Log File

Possible MERLIN Error Messages:

- | | | |
|----------------------|-------------------------|-------------------------|
| (1) RTC I2 ERROR | (12) HX CRIT OVERTEM | (23) DISK FULL STOP DAT |
| (2) PWM I2 ERROR | (13) HOT EXPT TOUCH | (24) CAUTION TMPFAIL |
| (3) DAS I2C ERROR | (14) BAD COOLING AIR1 | (25) WARNING TMPFAIL |
| (4) U1 I2C ERROR | (15) BAD COOLING AIR2 | (26) CAUTION OVERTEMP |
| (5) U2 IC2 ERROR | (16) LWALL OVERTEMP | (27) WARNING OVERTEMP |
| (6) HOT LWALL TOUCH | (17) RWALL OVERTEMP | (28) ALL PID FAILD |
| (7) HOT RWALL TOUCH | (18) IN AIR OVERTEMP | (29) PID CTRL STOP |
| (8) COLD LWALL TOUCH | (19) OUT AIR OVERTEMP | (30) PID INIT FAILED |
| (9) COLD RWALL TOUCH | (20) TEs DISABLED | (31) PIDT BANDWIDTH |
| (10) EE BOX OVERTEMP | (21) HEATER DISABLED | |
| (11) HX OVERTEMP | (22) DISK FULL STOP LOG | |

Note: Errors 12, 16, 17, 19, 20, 21 and 28 can not be reset from front panel.
The system must be rebooted to clear error.

Continuation of Table 5-III. MERLIN Error Message Log File

PID Temperature Control Sensors	Left Wall	<input type="checkbox"/>	System Left Wall										
	Right Wall	<input type="checkbox"/>		Right Wall									
	Experiment volume air	<input type="checkbox"/>		Experiment Volume Air									
	Experiment 1 to 11			Experiment 1 to 11									
	1	<input type="checkbox"/>		2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>	6	<input type="checkbox"/>
	7	<input type="checkbox"/>		8	<input type="checkbox"/>	9	<input type="checkbox"/>	10	<input type="checkbox"/>	11	<input type="checkbox"/>		

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Continuation of Table 5-III. MERLIN Error Message Log File

Temperature Bandwidth	____. ____ °C	00.1 to 25.0 °C
-----------------------	---------------	-----------------

MYCO BODY SAMPLE COLLECTION

(ASSY OPS/19A/FIN 1)

Page 1 of 8 pages

OBJECTIVE:

This procedure is used to collect body samples for mycological evaluation. The activity must be performed first thing in the morning. In-flight sample collection will be performed during the joint operation period, and within 60 hours before closing the vehicle hatch.

PARTS:

Myco Kit P/N MK-1

Myco Sampling Sheet (5) P/N MK-3 (including 1 spare)

Myco Sampling Sheet Storage Bag P/N MK-6

Myco Swab (3) P/N MK-2

Sputum Tube P/N MK-4

BZK Wipe P/N MK-5

MATERIALS:

Drinking Water Container (filled with water (about 100cc))

Towel (Crew Preference)

Mirror (Crew Preference)

TOOLS:

Sharpie Flight Pen

1. CLEANING HANDS

NOTE

Body sample collection should be performed first thing in the morning.

If needed, refer to pictures of Myco Kit in [MYCO KIT](#) (SODF: ASSY OPS: REFERENCE).

1.1 Do not eat anything (drinking water is OK), wash the face, brush teeth, or gargle (until step 4.1) after waking up.

1.2 Clean hands (especially finger tips) with BZK Wipe.

2. BODY SAMPLE COLLECTIONS 1 (SAMPLING SHEET)

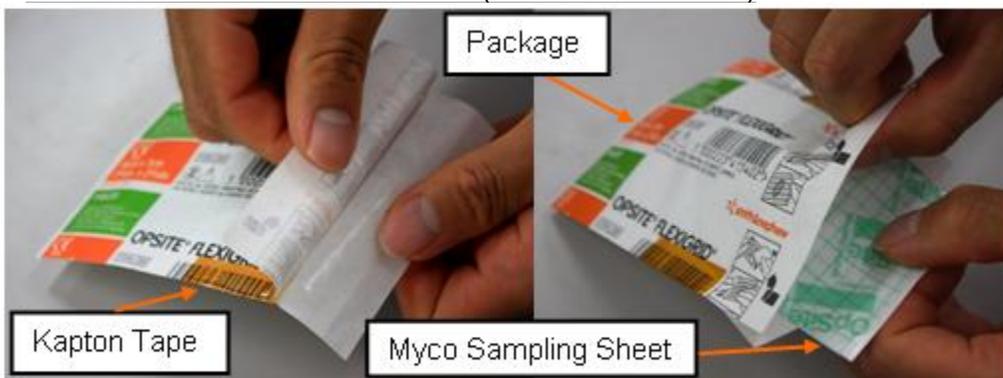


Figure 1. Opening the package of Myco Sampling Sheet

MYCO BODY SAMPLE COLLECTION

(ASSY OPS/19A/FIN 1)

Page 2 of 8 pages

NOTE

Use specified Myco Sampling Sheet for each sampling location (see the label).

- 2.1 Remove Myco Sampling Sheet package for left cheek from Myco Kit.
Refer to Figure 1.
- 2.2 Peel and open the package halfway. (Do NOT open the package past the kapton tape since it will be used to stow used Myco Sampling Sheet.)

Remove Myco Sampling Sheet from the package.
Temporarily stow the package.
Refer to Figure 1.

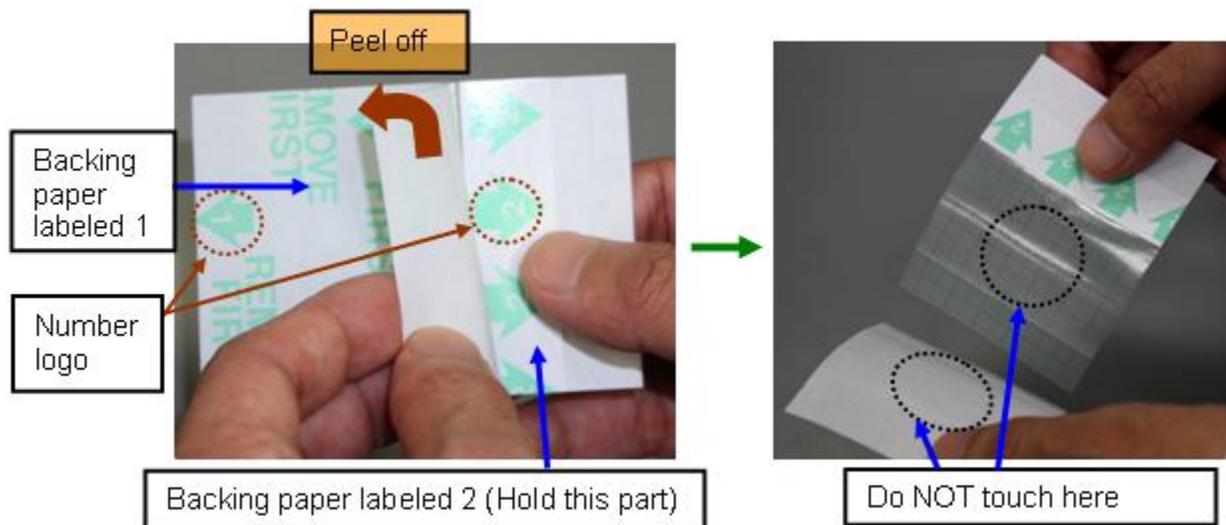


Figure 2. Peeling off backing paper labeled 1

CAUTION

Do NOT touch the center of adhesive face of Myco Sampling Sheet or the white glossy side of the backing paper labeled 1 to avoid contamination.
Refer to Figure 2.

- 2.3 Hold the part of Myco Sampling Sheet labeled 2 with the number logo facing up.
Peel off the backing paper labeled 1. (Keep the white glossy side clean to avoid contamination)
Temporarily stow the backing paper labeled 1 in the package. (for use in step 2.7)
Refer to Figure 2.

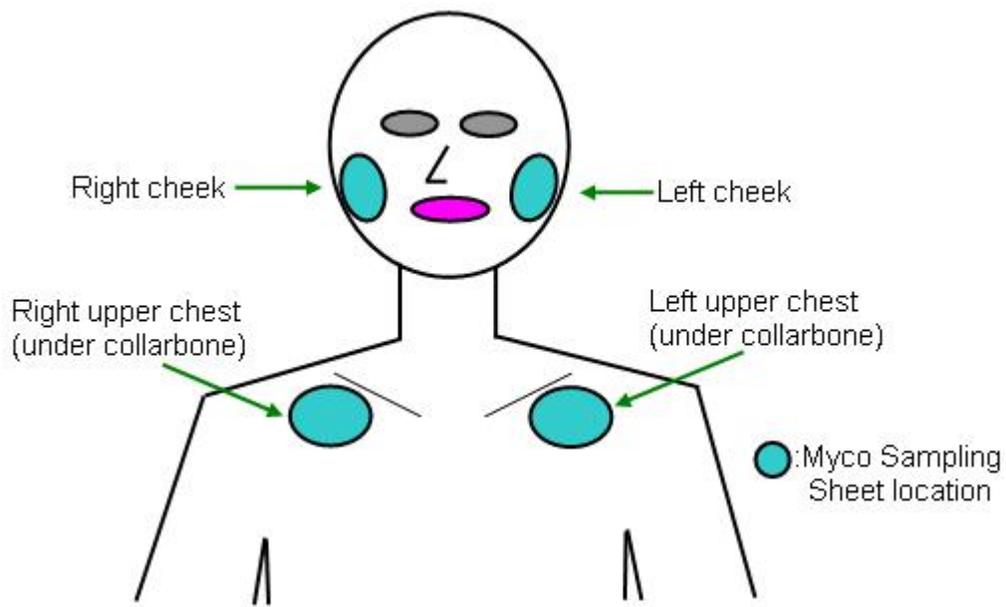


Figure 3. Myco Sampling Sheet location

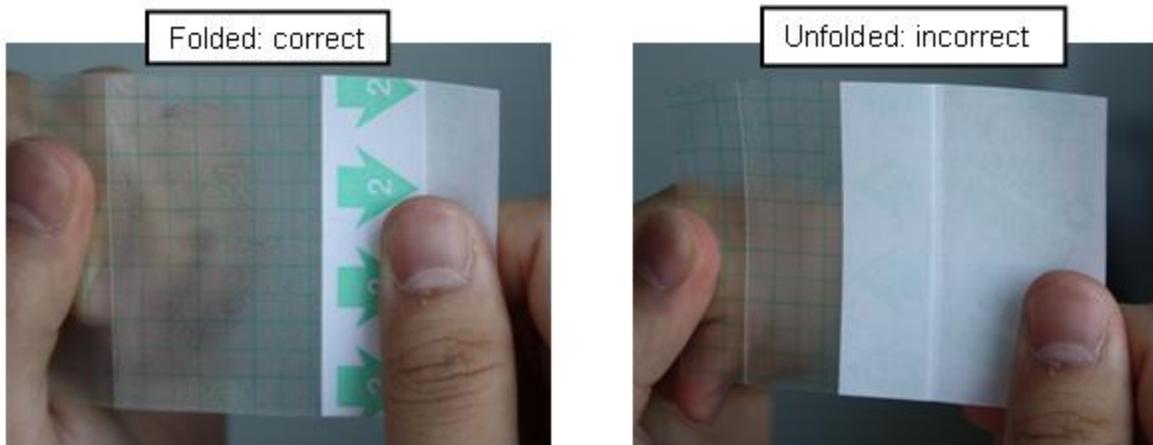
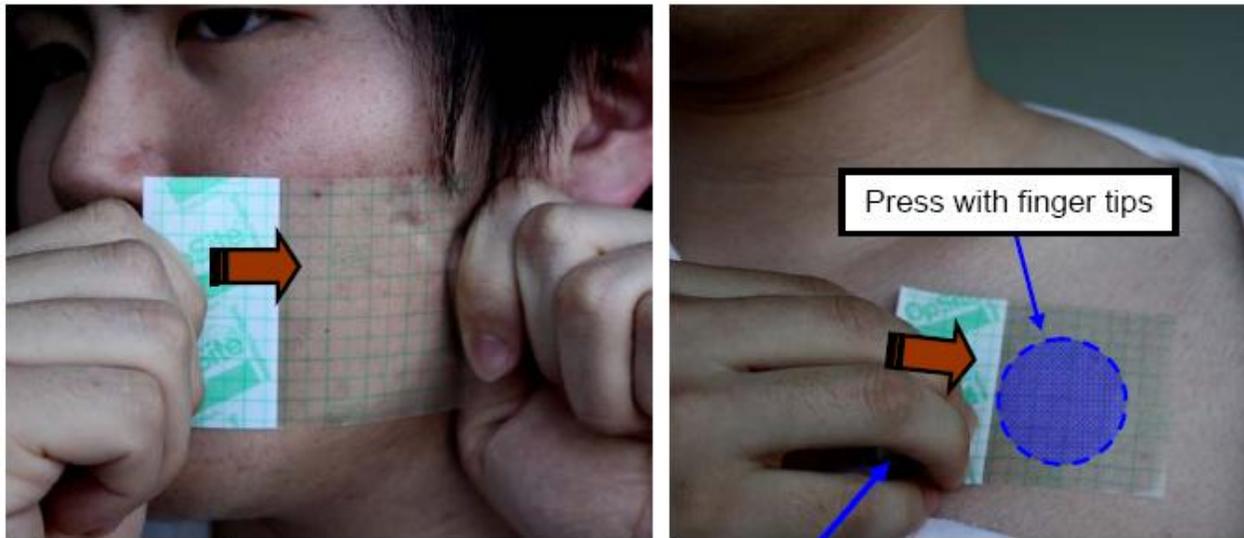


Figure 4. Unfolded and folded backing paper labeled 2



Remove Myco Sampling Sheet from the side that is attached to backing paper labeled 2.

Figure 5. Applying and removing Myco Sampling Sheet

NOTE

Unfolding the backing paper labeled 2 will significantly reduce the adhesive sampling area of Myco Sampling Sheet. Refer to Figure 4.

- 2.4 Apply the transparent part of Myco Sampling Sheet on the left cheek firmly with the adhesive side touching the skin. (Do not remove or unfold the backing paper labeled 2)

Refer to Figures 3, 4 and 5.

If sampling location is cheek,

Pull both ends of Myco Sampling Sheet and apply it firmly with both hands.

Refer to Figure 5.

If sampling location is upper chest,

Apply Myco Sampling Sheet with one hand and press on it thoroughly with finger tips. (apply it right below the collarbone)

Refer to Figure 5.

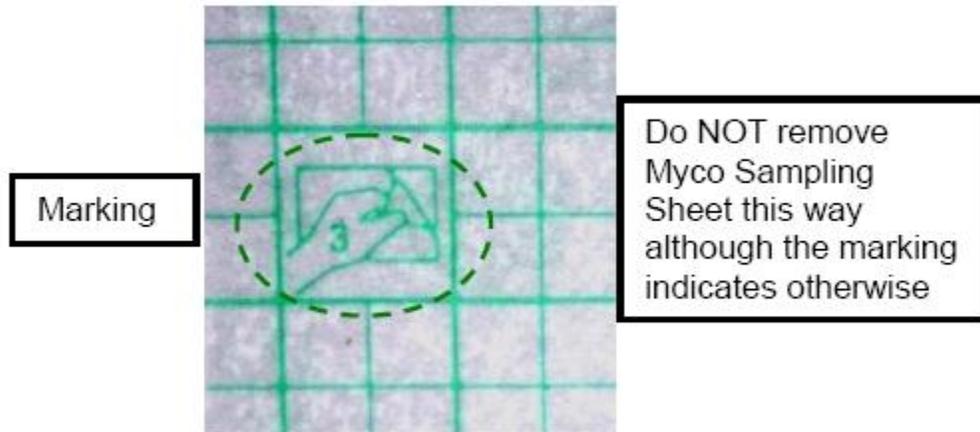


Figure 6. The marking on Myco Sampling Sheet

CAUTION

Removing Myco Sampling Sheet in the direction the marking indicates will separate the upper layer with the grid from the adhesive layer. Refer to Figures 6.

- 2.5 Hold Myco Sampling Sheet's edge that is attached to the backing paper labeled 2 and remove Myco Sampling Sheet from the skin as shown in Figure 5. (Do not remove it in the direction depicted on the backing, shown in Figure 6)

NOTE

Myco Sample sheet must be applied three times to the sampling location to ensure good sampling.

- 2.6 Apply and remove Myco Sampling Sheet two more times on the same place. Refer to Figure 5.

If no touch sample area inadvertently touched with something other than the Myco Sampling Sheet location,

Use spare Myco Sampling Sheet.
Label the white side of the package with the sampling location. (Sharpie Flight Pen)

- 2.7 Put Myco Sampling Sheet back on the white glossy side (no labeling) of the backing paper labeled 1 with the non-adhesive side facing up.

Refer to Figure 2.

- 2.8 Put Myco Sampling Sheet back in the package.

Fold the opening of the package.

- 2.9 Stow the package in Myco Sampling Sheet Storage Bag.

- 2.10 Repeat steps 2.1 to 2.9 for [x] where [x] = right cheek left upper-chest
right upper-chest

Refer to Figure 3.

- 2.11 Stow Myco Sampling Sheet Storage Bag in Myco Kit.

3. BODY SAMPLE COLLECTIONS 2 (NASAL CAVITY SWAB)



Figure 7. Myco Swab

NOTE

Use specified Myco Swab for each sampling location (see the label).

- 3.1 Remove Myco Swab for right nasal cavity from Myco Kit.
Refer to Figure 7.

CAUTION

Keep Swab stick in the package until step 3.4 to avoid contamination of the tip.

- 3.2 Tear and open package of Myco Swab. (Trash the tab. Do not remove Myco Swab from package until Step 3.4.)

Refer to Figure 7.

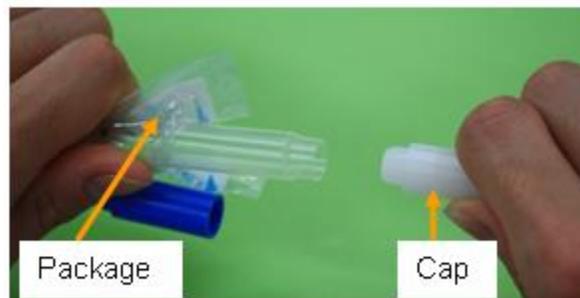


Figure 8. Removing the tube cap

- 3.3 Remove and trash cap from tube.

Refer to Figure 8.



Figure 9. Swab stick

CAUTION

Do NOT touch tip or stick to avoid contamination.
Refer to Figure 9.

- 3.4 Remove Swab stick from the package. (Hold blue finger grip)
Tm pry stow package. (for use in step 3.6)
Refer to Figure 9.

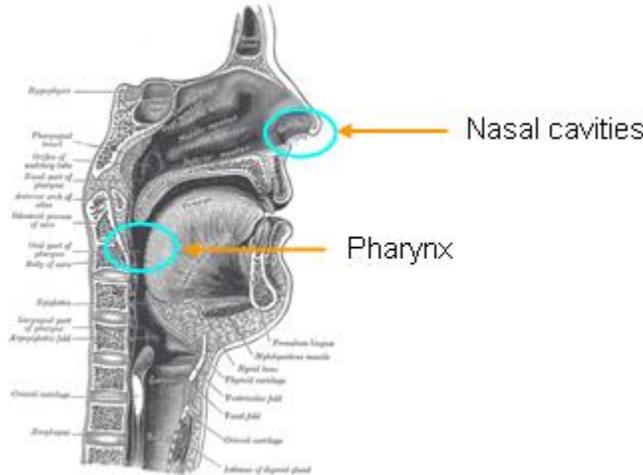


Figure 10. Myco Swab location

- 3.5 Swab the vestibule of the right nasal cavity slowly in circles 5 times with Swab Stick. (Do NOT insert Swab stick deeply into the vestibule.)

Refer to Figure 10.

- 3.6 Fully stow Swab stick into tube (Push the blue finger grip down).

- 3.7 Stow Myco Swab contained in the package in Myco Kit.

- 3.8 If posterior pharynx swab has been completed

Go to step 5

- 3.9 Repeat steps 3.1 to 3.7 for the left nasal cavity.

4. BODY SAMPLE COLLECTIONS 3 (POSTERIOR PHARYNX SWAB)

- 4.1 Rinse your mouth thoroughly with water, and swallow or spit on towel.

- 4.2 Repeat steps 3.1 to 3.7 for the posterior pharynx. (Use mirror if necessary)
Refer to Figure 10.

5. BODY SAMPLE COLLECTIONS 4 (SPUTUM TUBE)

- 5.1 Remove Sputum Tube from Myco Kit.
- 5.2 Remove cap from Sputum Tube. (rotate ccw).
- 5.3 Expectorate sputum into Sputum Tube.
If crew could not expectorate sputum,
| Expectorate saliva into Sputum Tube.
- 5.4 Close Sputum Tube cap.
- 5.5 Stow Sputum Tube in Myco Kit.

6. CLOSE OUT

- 6.1 Hand Myco Kit to ISS crew member for MELFI insertion.
- 6.2 Trash the following items:
Trash:
BZK Wipe
Myco Sampling Sheet (1)
Myco Swab package tab (3)
Myco Swab cap (3)

NLP-VACCINE-8 ACTIVATION

(ASSY OPS/19A/FIN)

Page 1 of 2 pages

OBJECTIVE:

Up to sixteen Group Activation Packs (GAPs) containing microbial experiments will be activated, one at a time, for the National Lab Pathfinder (NLP) - Vaccine-8 payload. Prior to activating, the Glass Barrels will be inspected for any signs of leakage. During activation, microbes will be injected into the growth media chamber so that growth may occur.

PARTS:

NLP-Vaccine-8

Group Activation Packs (GAPs) (sixteen)

Hand Crank

Ziplock Bag (if required)

1. Check Flight Plan Detail Page for which GAPs to activate. Record information in Table 1 in step 2.1

MA16D

2. ACTIVATING NLP-VACCINE-8 EXPERIMENT

- 2.1 Record Activation Start MET in Table 1.

Table 1. Activation Times

GAPs	Activation Start MET	Activation Stop MET
_____	_____	_____
_____	_____	_____
_____	_____	_____

WARNING

GAP cannot be processed if external leakage is evident. GAP will remain in Ziplock Bag.

- 2.2 Remove one GAP listed in Table 1 from Foam.

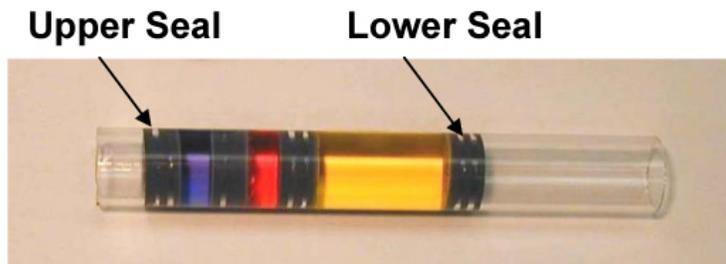


Figure 1. Loaded Glass Barrel.

- 2.3 Verify visually:

No leakage from GAP.

No fluid outside of the upper or lower seals within the Glass Barrels (Figure 1).

*
* If any external leakage is evident
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with GAP number.
*

* If any leakage is evident in more than two Glass Barrels
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with Glass Barrel and GAP number(s).
*

* If any leakage is evident in two or fewer Glass Barrel(s)
* | Complete step 2, then seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with Glass Barrel and GAP number(s).
*

2.4 Unstow Hand Crank and attach to GAP.
Slowly rotate the Hand Crank ↻ until lower edge of pressure plate aligns with lower edge of the first mark labeled "ACTIVATION" on the side of GAP housing.

2.5 Detach Hand Crank.

2.6 Shake GAP firmly by accelerating in a back and forth motion along the lengthwise axis of the GAP four times.

2.7 Verify visually:
No leakage from GAP.
No fluid outside of the upper or lower seals within the Glass Barrels (Figure 1).

*
* If any leakage from GAP or leakage within the Glass Barrel(s) is evident,
* | Immediately seal GAP in Ziplock Bag, stow.
* | ✓ **MCC-H** with GAP number.
*

2.8 Restow GAP in original location.

2.9 Repeat steps 2.2 to step 2.8 until all GAPS identified in Table 1 are activated.

2.10 Record Activation Stop MET in Table 1.

2.11 Restow Hand Crank in original location.

3. ✓ **MCC-H** with METs recorded in Table 1 (step 2.1).

NLP GAP TERMINATION

(ASSY OPS/19A/FIN 1)

Page 1 of 2 pages

OBJECTIVE:

Group Activation Packs (GAPs) containing microbial experiments will be terminated, one at a time, for the National Lab Pathfinder (NLP) payload. Prior to terminating, the Glass Barrels will be inspected for any signs of leakage. During termination, reagent will be injected into the growth chamber to stop the growth.

PARTS:

Group Activation Packs (GAPs)

Hand Crank

Ziplock Bag (if required)

1. Check Flight Plan Detail Page for which GAPs to terminate and location. Record information in Table 1 in step 2.1

2. TERMINATING GAPS

- 2.1 Record Termination Start MET in Table 1.

Table 1. Termination Times

GAPs	Termination Start MET	Termination Stop MET
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

WARNING

GAP cannot be processed if external leakage is evident. GAP will remain in Ziplock Bag.

- 2.2 Remove one GAP listed in Table 1 from Foam.

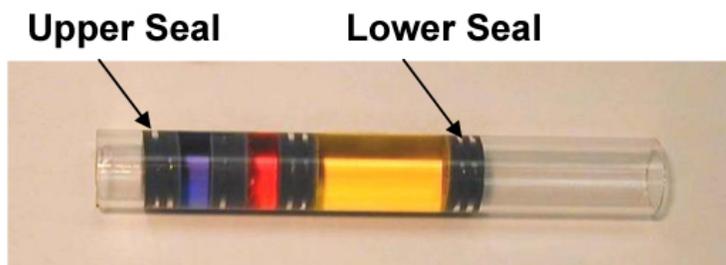


Figure 1. Loaded Glass Barrel.

- 2.3 Verify visually:
No leakage from GAP.
No fluid outside of the upper or lower seals within the Glass Barrels (Figure 1).

```

*****
*
* If any external leakage is evident
* |   Immediately seal GAP in Ziplock Bag, stow.
* |   ✓ MCC-H with GAP number.
*
*
* If any leakage is evident in more than two Glass Barrels
* |   Immediately seal GAP in Ziplock Bag, stow.
* |   ✓ MCC-H with Glass Barrel and GAP number(s).
*
*
* If any leakage is evident in two or fewer Glass Barrel(s)
* |   Complete step 2, then seal GAP in Ziplock Bag, stow.
* |   ✓ MCC-H with Glass Barrel and GAP number(s).
*
*****

```

2.4 Unstow Hand Crank and attach to GAP.
Slowly rotate the Hand Crank \curvearrowright until lower edge of pressure plate aligns with lower edge of the first mark labeled "TERMINATION" on the side of GAP housing.

2.5 Detach Hand Crank.

2.6 Shake GAP firmly by accelerating in a back and forth motion along the lengthwise axis of the GAP four times.

2.7 Verify visually:
No leakage from GAP.
No fluid outside of the upper or lower seals within the Glass Barrels (Figure 1).

```

*****
*
* If any leakage from GAP or leakage within the Glass Barrel(s) is evident
* |   Immediately seal GAP in Ziplock Bag, stow.
* |   ✓ MCC-H with GAP number.
*
*****

```

2.8 Restow GAP in original location.

2.9 Repeat steps 2.2 to step 2.8 until all GAPs identified in Table 1 are terminated.

2.10 Record Termination Stop MET in Table 1.

2.11 Restow Hand Crank in original location.

3. ✓ MCC-H of METs recorded in Table 1 (step 2.1).

OBJECTIVE:

The following steps will initialize the STL System.

MA9G
(STL)

1. ✓POWER It – on

✓F1 It – off

*
* If POWER It off or F1 It on,
* | Perform [STL FAILURE](#), all (SODF: ASSY OPS: PAYLOADS).
*

2. ✓Display shows cycling status information including 'PRESS BUTTON FOR ORBIT TIME REF'

NOTE
Complete step 4 within 5 sec of step 3.
3. PULSE pb–push, hold until display reads 'PRESS BUTTON TO CONFIRM SIGNAL'

*
* If Display –'THE ACTION HAS BEEN CANCELED'
* |
* | wait at least 2 sec; then return to step 2
*

4. PULSE pb–push, hold until display reads 'THE ACTION HAS BEEN CONFIRMED' (2 sec)

✓Display shows cycling status information including 'PRESS BUTTON FOR LANDING PREP'
5. Photograph STL, including LCD display, Ops Item 4 (P/TV, SCENES, P/TV09 MIDDECK PAYLOADS)
6. Record MET ____:____ and Rail temps ____.

✓Rail temps (four) within nominal range 36-39 °C

*
* If temps out of range
* |
* | Perform [STL TEMP OUT OF RANGE ON LCD](#), all (SODF: ASSY OPS: PAYLOADS), then:
*

7. Notify **MCC-H** activity complete and report values recorded in step 6.

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OBJECTIVE:

The following steps will initialize the STL System.

TOOLS

Digital Camera

MA9G
(STL)

1. ✓POWER It – on

✓F1 It – off

*
* If POWER It off or F1 It on,
* | Perform [STL FAILURE](#), all (SODF: ASSY OPS: PAYLOADS).
*

2. ✓Display shows cycling status information including 'PRESS BUTTON FOR LANDING PREP'

NOTE

Complete step 4 within 5 sec of step 3.
3. PULSE pb–push, hold until display reads 'PRESS BUTTON TO CONFIRM SIGNAL'

*
* If Display –'THE ACTION HAS BEEN CANCELED'
* |
* wait at least 2 sec; then return to step 2
*

4. PULSE pb–push, hold until display reads 'THE ACTION HAS BEEN CONFIRMED'(2 sec)
5. Photograph STL, including LCD display, Ops Item 4 (P/TV, SCENES, P/TV09 MIDDECK PAYLOADS)
6. Record MET ____:____ and Rail temps ____.
✓Rail temps (four) within nominal range 36-39 °C

*
* If temps out of range
* |
* Perform [STL TEMP OUT OF RANGE ON LCD](#), all (SODF: ASSY OPS: PAYLOADS), then:
*

7. Notify **MCC-H** activity complete and report values recorded in step 6.

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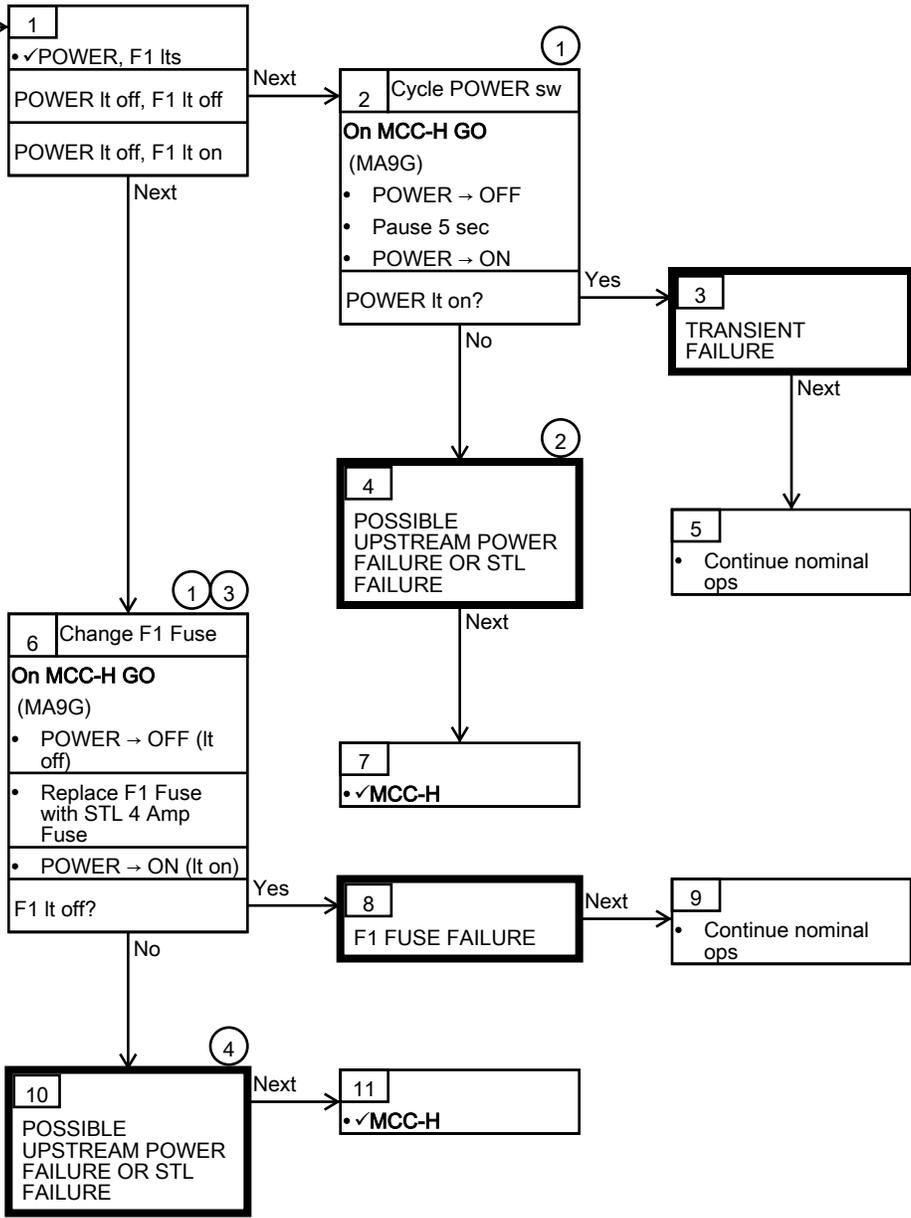
STL

STL FAILURE

(ASSY OPS/19A/FIN 1) Page 1 of 1 page

POWER It ON
- nominal F1
It Off -
nominal

Nominal Config:
(MA9G)
POWER It- on
F1 It-off
(MO13Q)
DC UTIL PWR
MNB-ON



1 Do not leave STL pwr off for >15 min.

2 MCC-H may direct crew to switch to alternate power source or replace A/E payload DC PWR (24') cable (P/N 10108-10082-07) with spare cable stowed in IFM Contingency Hose & Cable Kit (CHCK).

3 STL 4 Amp Fuse (two) located in MF71C.

4 MCC-H may direct crew to switch to alternate power source, or replace A/E payload DC PWR (24') cable (P/N 10108-10082-07) with spare stowed in IFM Contingency Hose & Cable Kit (CHCK), or replace F1 Fuse using STL 4 Amp Fuse in MF71C.

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STL

STL LCD FROZEN, BLANK, OR SCRAMBLED

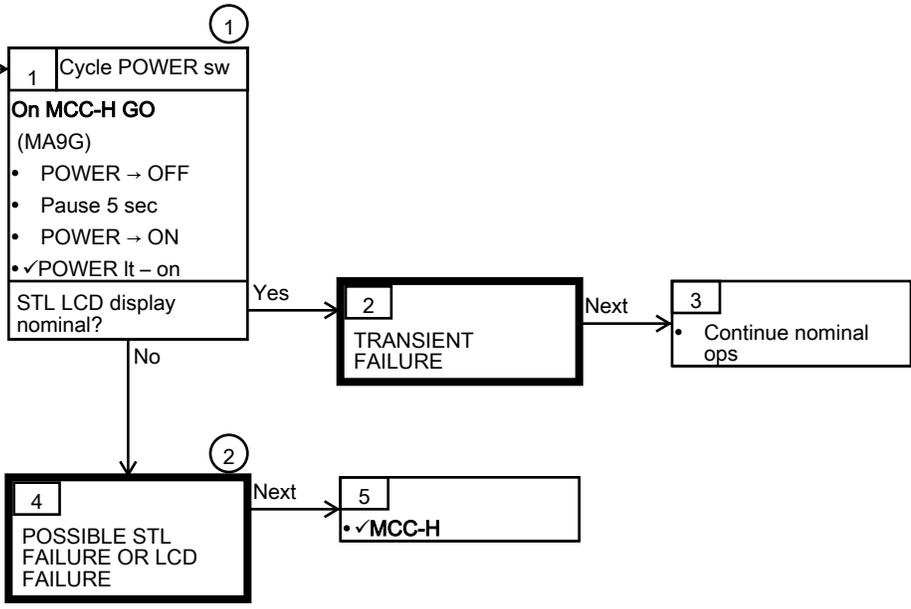
(ASSY OPS/19A/FIN 1) Page 1 of 1 page

①
Do not leave STL pwr off for >15 min.

②
The STL payload may continue to function if LCD fails.

LCD Display Frozen, Blank, or Scrambled

Nominal Config:
(MA9G)
POWER It- on
F1 It-off
LCD display-scrolling thru rail status 1-4 and system status msgs
(O15:C)
cb MNB UTIL PWR F1/MO13Q-cl
(MO13Q)
DC UTIL PWR MNB-ON



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STL

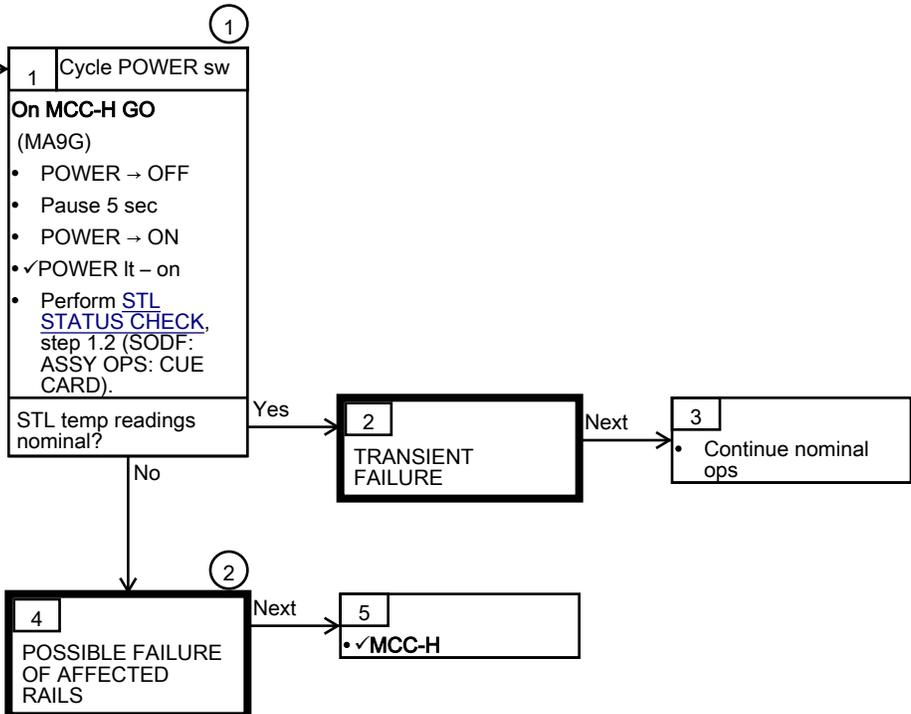
STL TEMP OUT OF RANGE ON LCD
(ASSY OPS/19A/FIN 1) Page 1 of 1 page

①
Do not leave
STL pwr off for
>15 min.

②
If any rails
continue to
display nominal
temp readings,
the payload may
continue to
operate for
remaining
functional rails

STL Temp
Readings
Off-Nominal

Nominal Config:
(MA9G)
POWER It- on
F1 It-off
(O15:C)
cb MNB UTIL
PWR
F1/MO13Q-cl
(MO13Q)
DC UTIL PWR
MNB-ON



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CONTINGENCY EVA PL CONFIGURATION

CONTINGENCY EVA
PL CONFIGURATION

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N/A

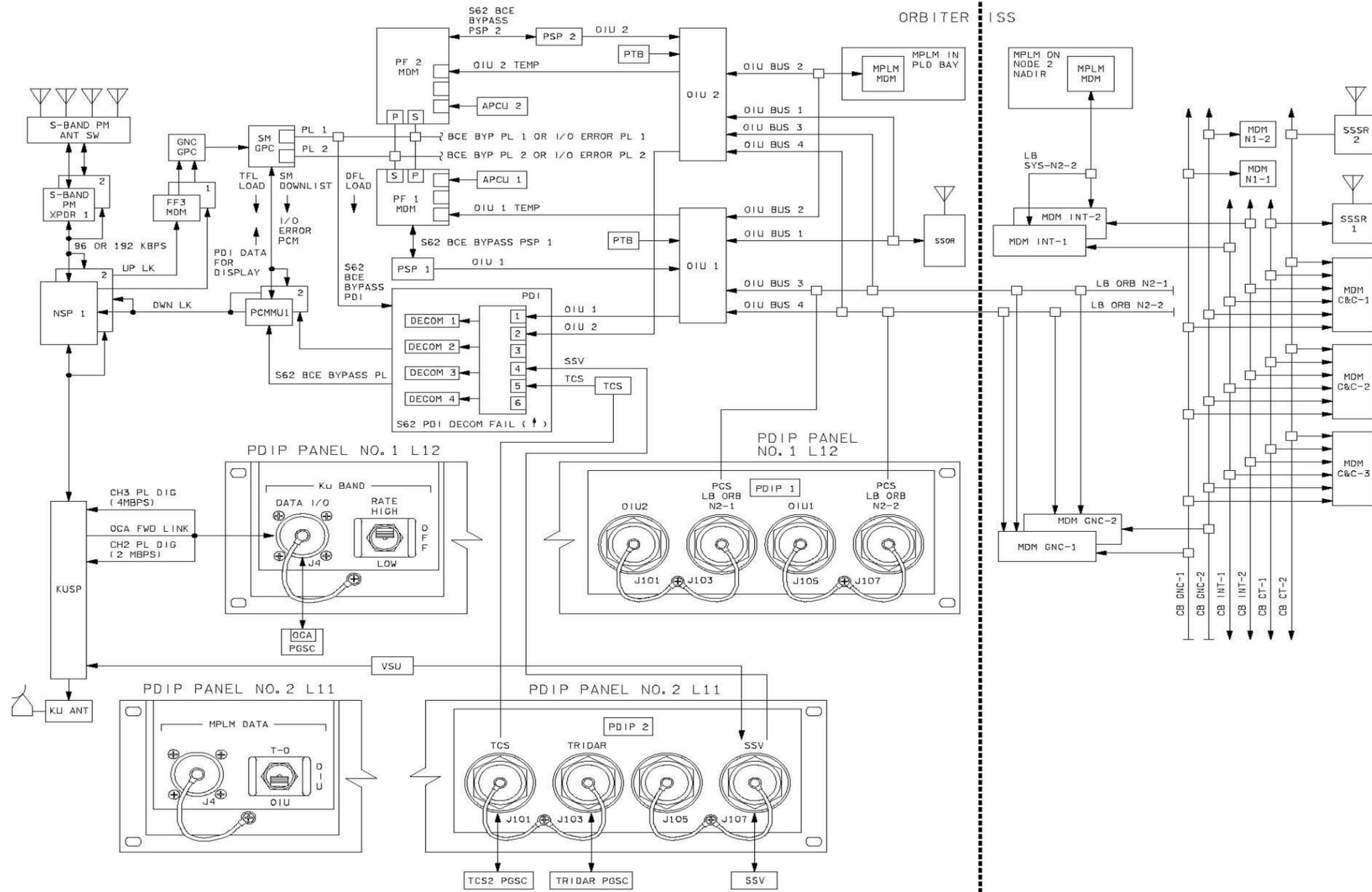
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N/A

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MALFUNCTION

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4850201_131. SCH 2

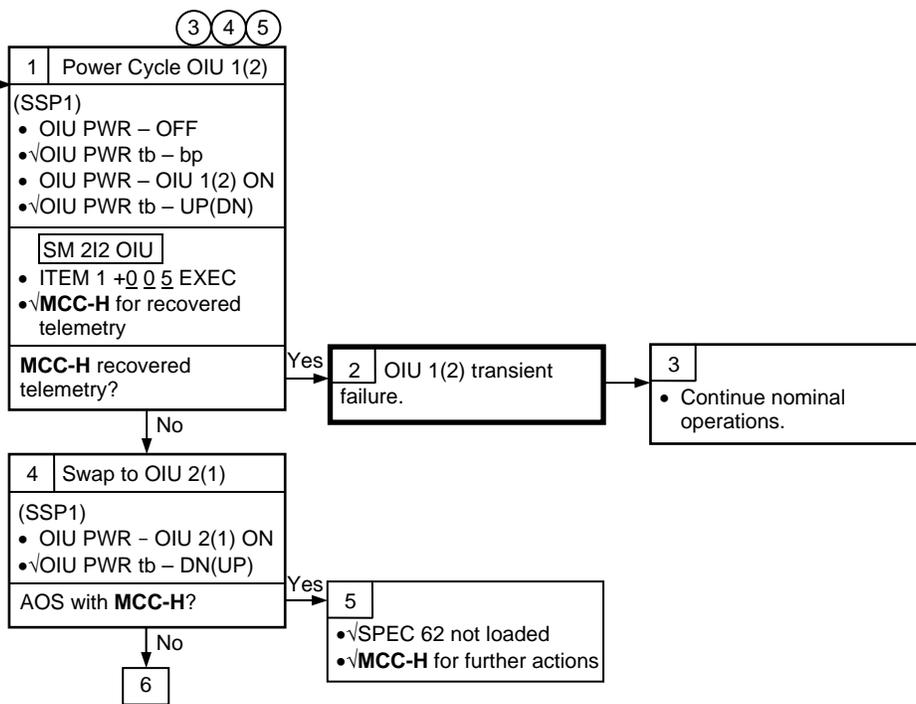
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ASSY OPS

LOSS OF MPLM TELEMETRY (ASSY OPS/19A/FIN 1) Page 1 of 2 pages

① ②
MCC-H Reports
 No or Loss of MPLM Telemetry While MPLM in Payload Bay

Nominal Config:
 (R1)
 PL CAB – MNA(MNB)
 PL AUX – ON (SSP1)
 OIU PWR – OIU 1(2) ON
 OIU PWR tb – UP(DN) (A15)
 PTU/MAIN BUS A – ON (tb-ON)
 APCU 1 CONV – ON
 APCU 1 OUTPUT – ON



① This malfunction only treats OIU to MPLM interface problems and MPLM interface problems. OIU to PDI problems would announce an 'S62 PDI DECOM FAIL' message.

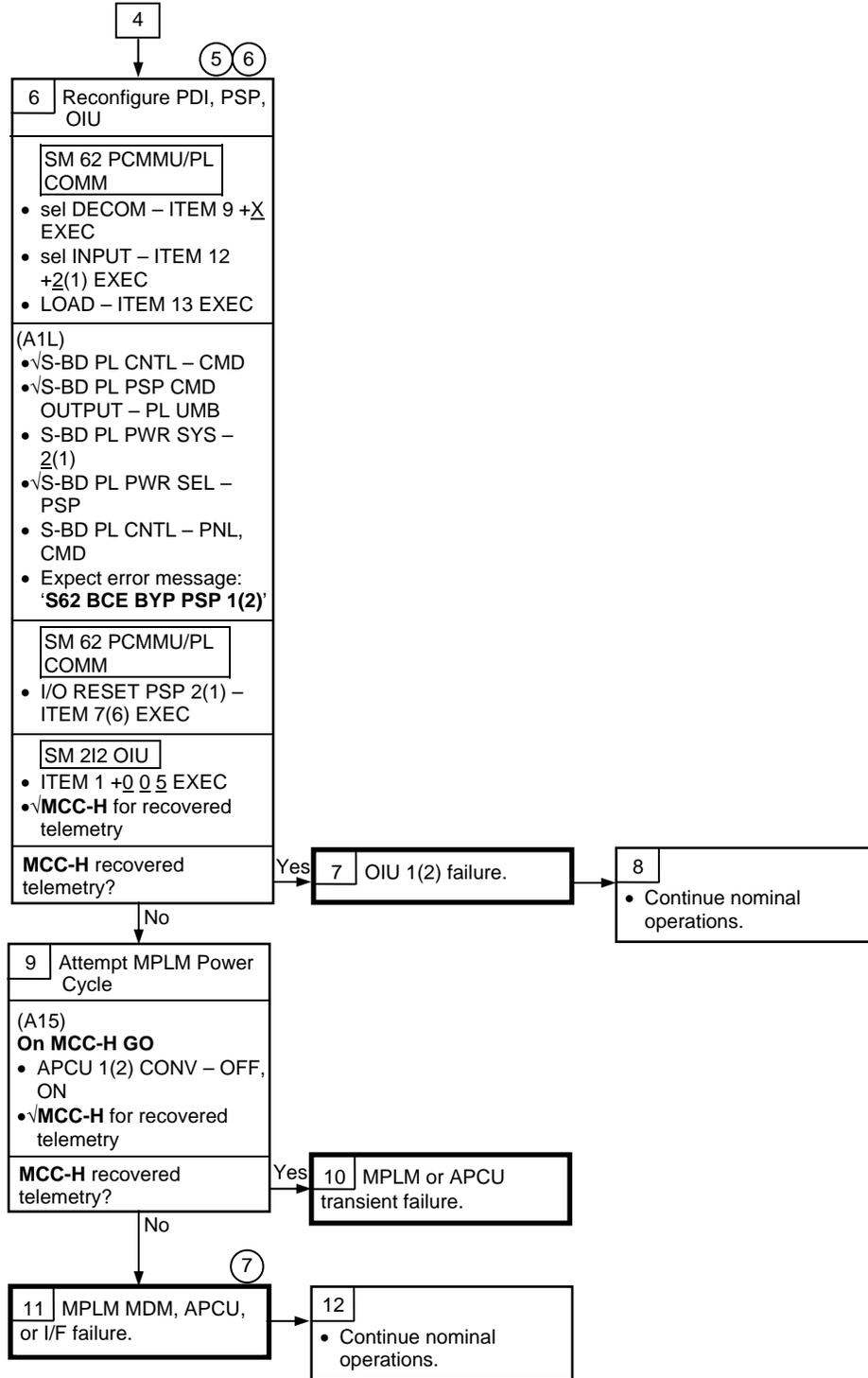
② Loss of MPLM telemetry does not announce S212 OIU AD NOLK, because OIU is BC.

③ Reloading OIU format does not force a resync when OIU is BC.

④ MCC-H may recommend starting in block 4, depending on the error signature.

⑤ OIU powerup config on OIU BUS 2 (MPLM via ROEU) is BC on ch A.

LOSS OF MPLM TELEMETRY
(ASSY OPS/19A/FIN 1) Page 2 of 2 pages



⑤
OIU powerup config on OIU BUS 2 (MPLM via ROEU) is BC on ch A.

⑥
PSP swap must be performed prior to sending format command to OIU.

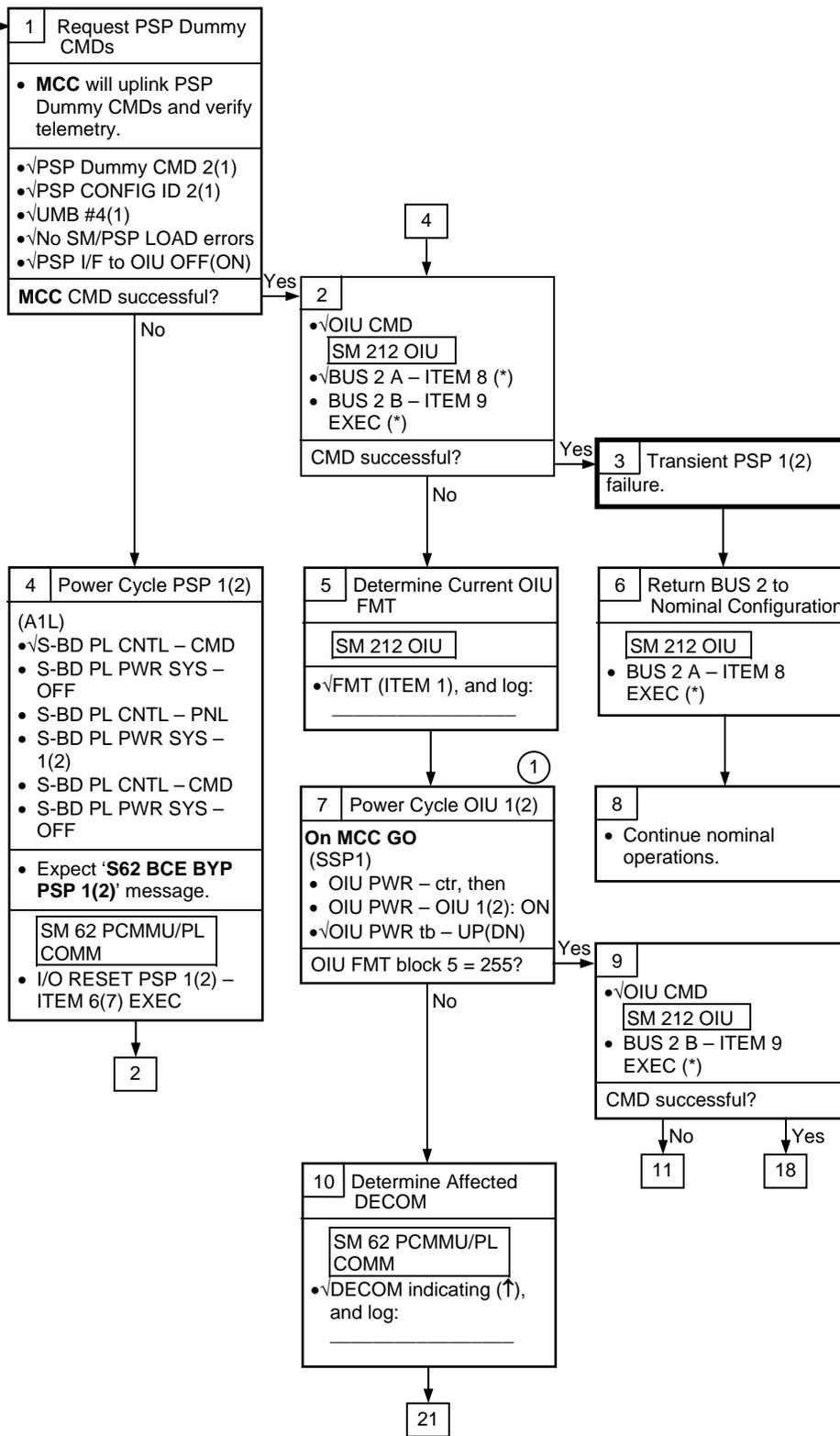
⑦
If unable to verify MPLM pressure and temperature, MPLM is still GO for unberthing from payload bay.

COMM

OIU FAIL TO COMMAND
(ASSY OPS/19A/FIN 1) Page 1 of 3 pages

No Response to OIU Configuration or Routed Commands

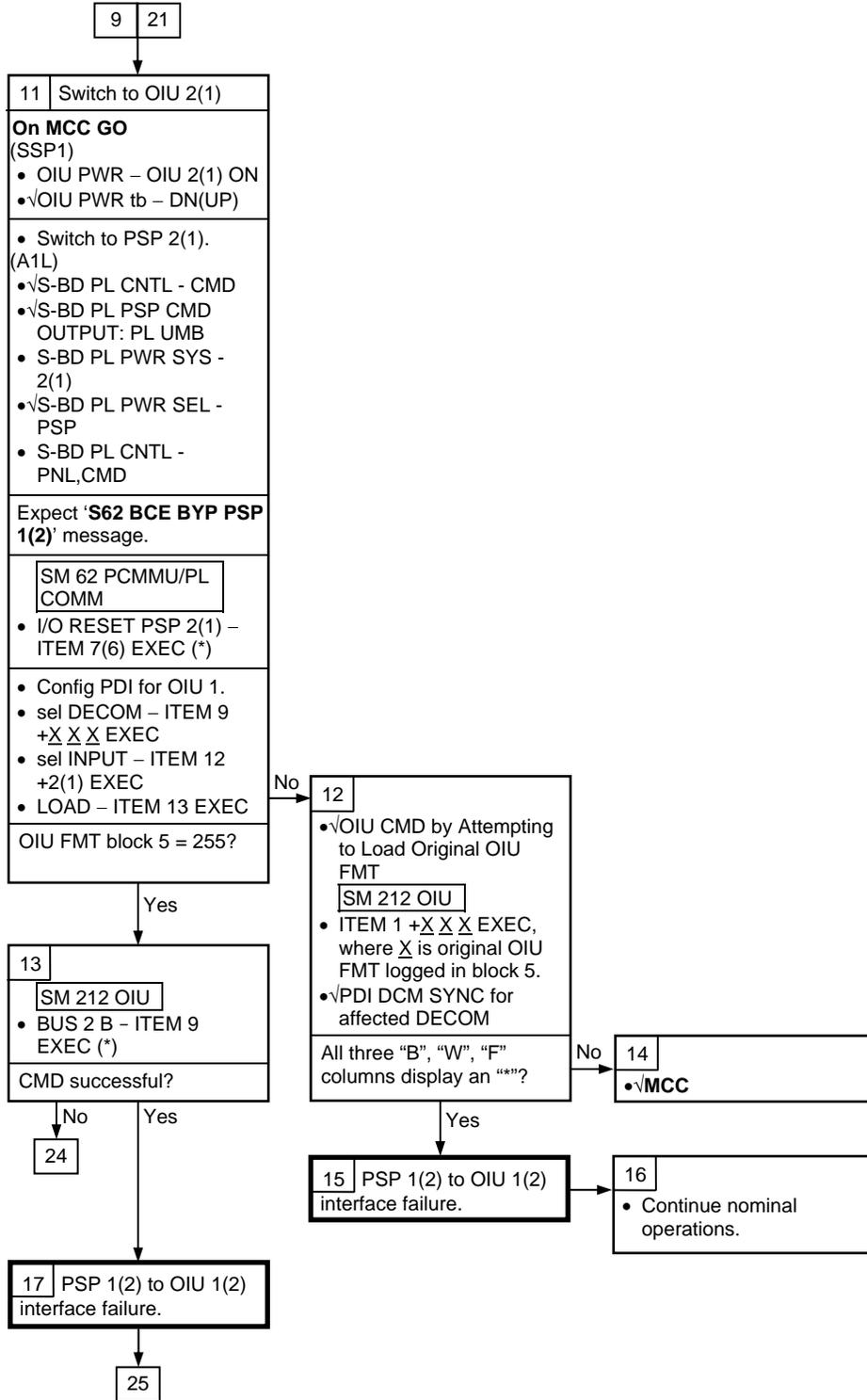
Nominal Config:
(A1L)
S-BD PL CNTL – CMD
S-BD PL PWR SYS – 1
S-BD PL PWR SEL – PSP
S-BD PL PSP CMD OUTPUT – PL UMB (SSP1)
OIU PWR – OIU 1(2) ON
OIU PWR tb – UP(DN) (R1)
PL CAB – MNA(MNB)
PL AUX – ON



① Power cycle will place OIU in Format 255. OIU Station TLM will be lost until OIU CMD is recovered. OIU H&S TLM will also be lost if PDI is not configured for OIU FMT 255.

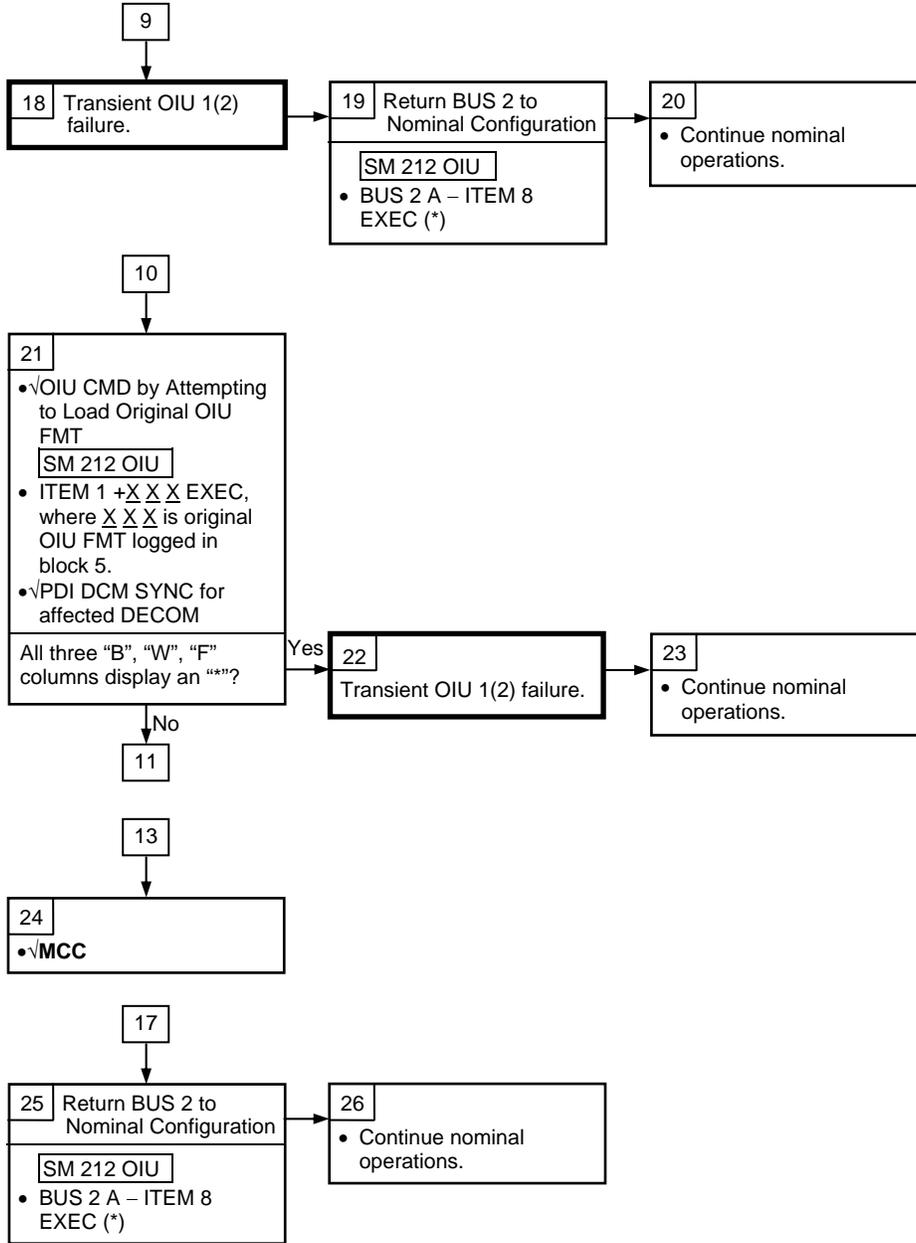
OIU FAIL TO COMMAND

(ASSY OPS/19A/FIN 1) Page 2 of 3 pages



OIU FAIL TO COMMAND

(ASSY OPS/19A/FIN 1) Page 3 of 3 pages



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ASSY OPS

OIU TEMP (UP ARROW)

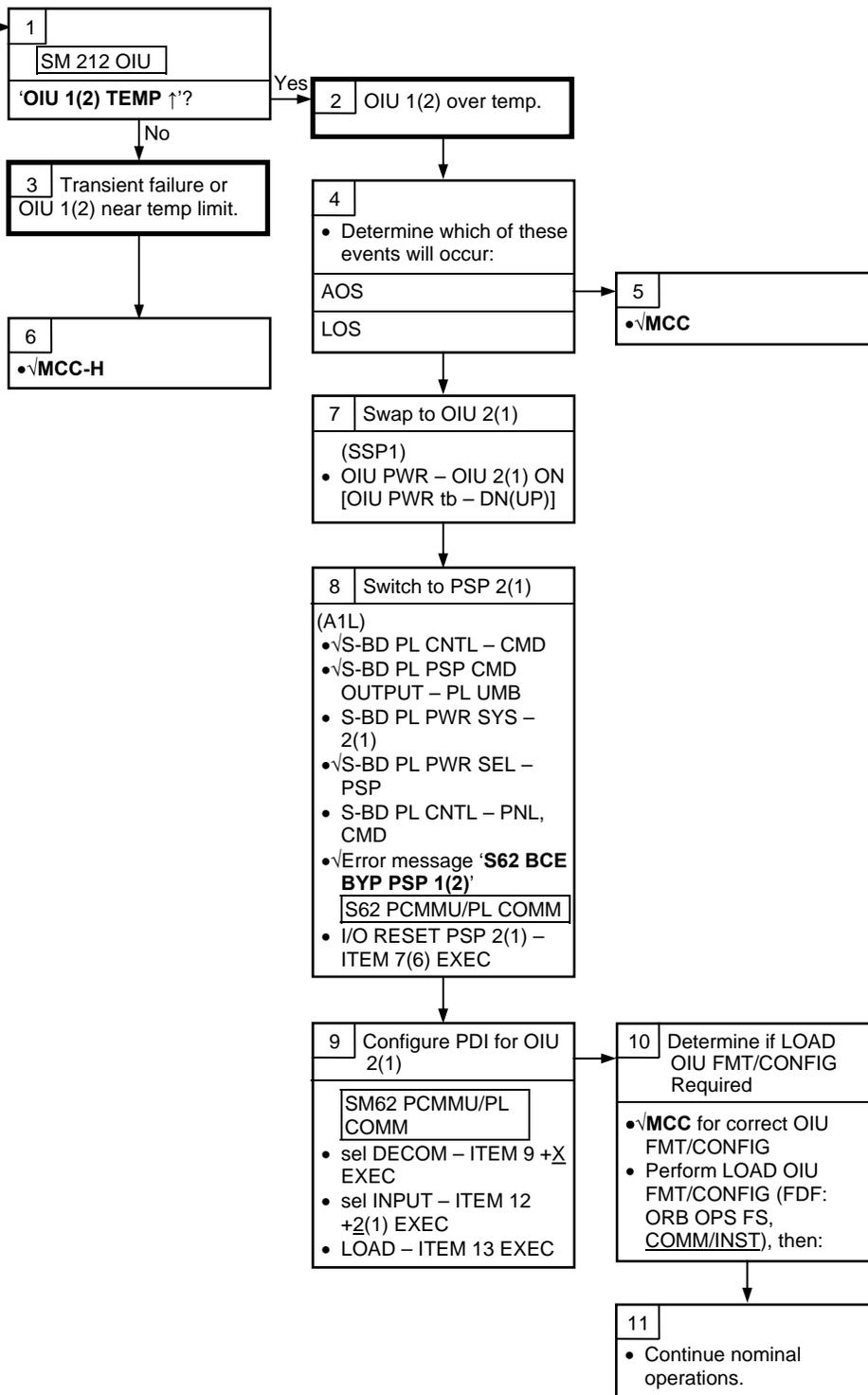
(ASSY OPS/19A/FIN 2)

SM 212 OIU TEMP

OIU message: OIU TEMP > 212

Nominal Config:

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



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COMM

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

(ASSY OPS/19A/FIN 2) Page 1 of 3 pages

SM ALERT

S212 OIU AD1 NOLK

Loss of Data On SPEC 205 During Undocking

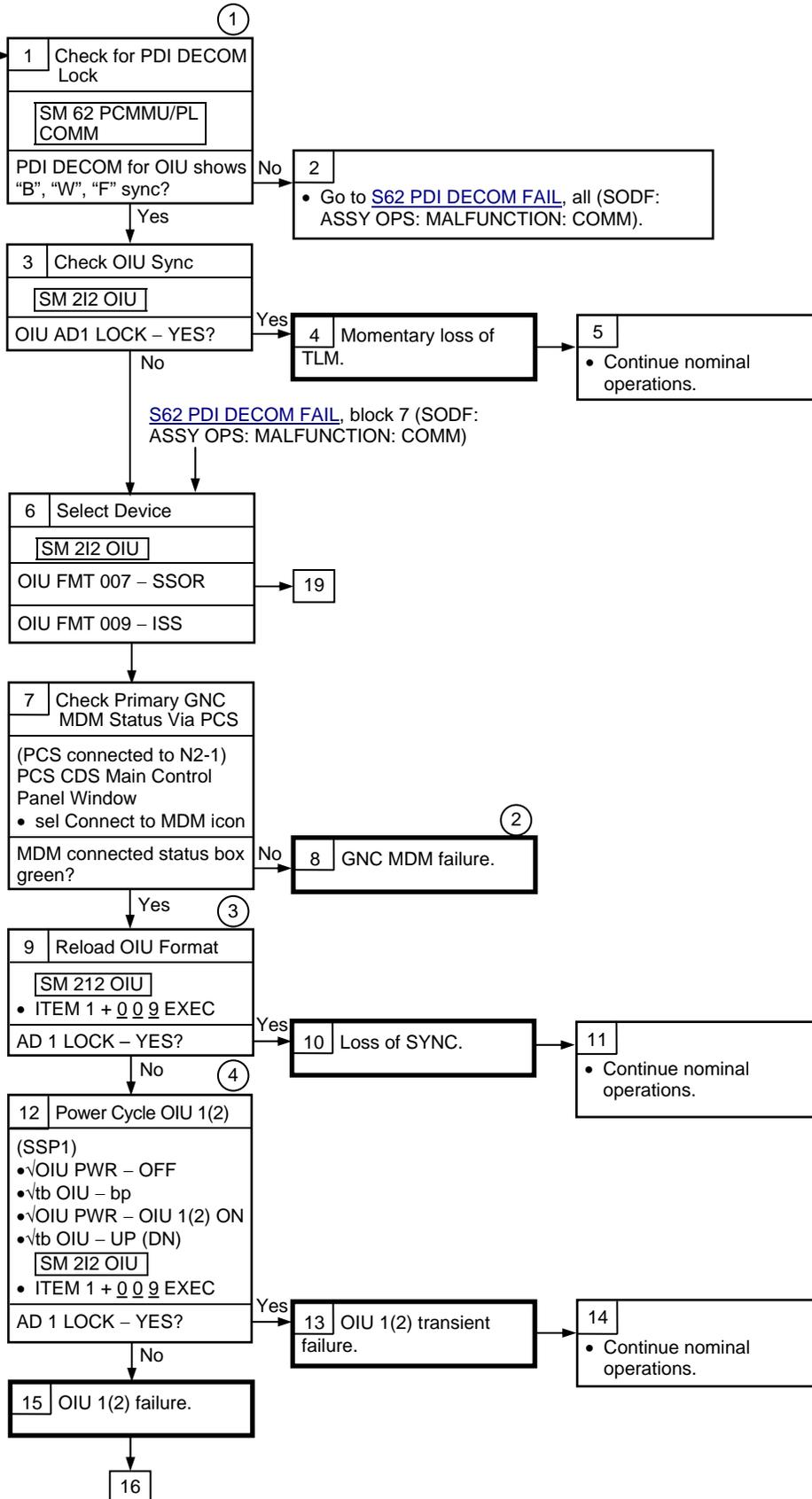
MCC-H Reports Loss of ISS Data To Ground Via OIU

Nominal Config:

(R1)
 PL CAB
 - MNB(MNA)
 PL AUX - ON (SSP1)
 OIU PWR
 - OIU 1(2) ON
 OIU PWR tb - UP(DN)

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

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

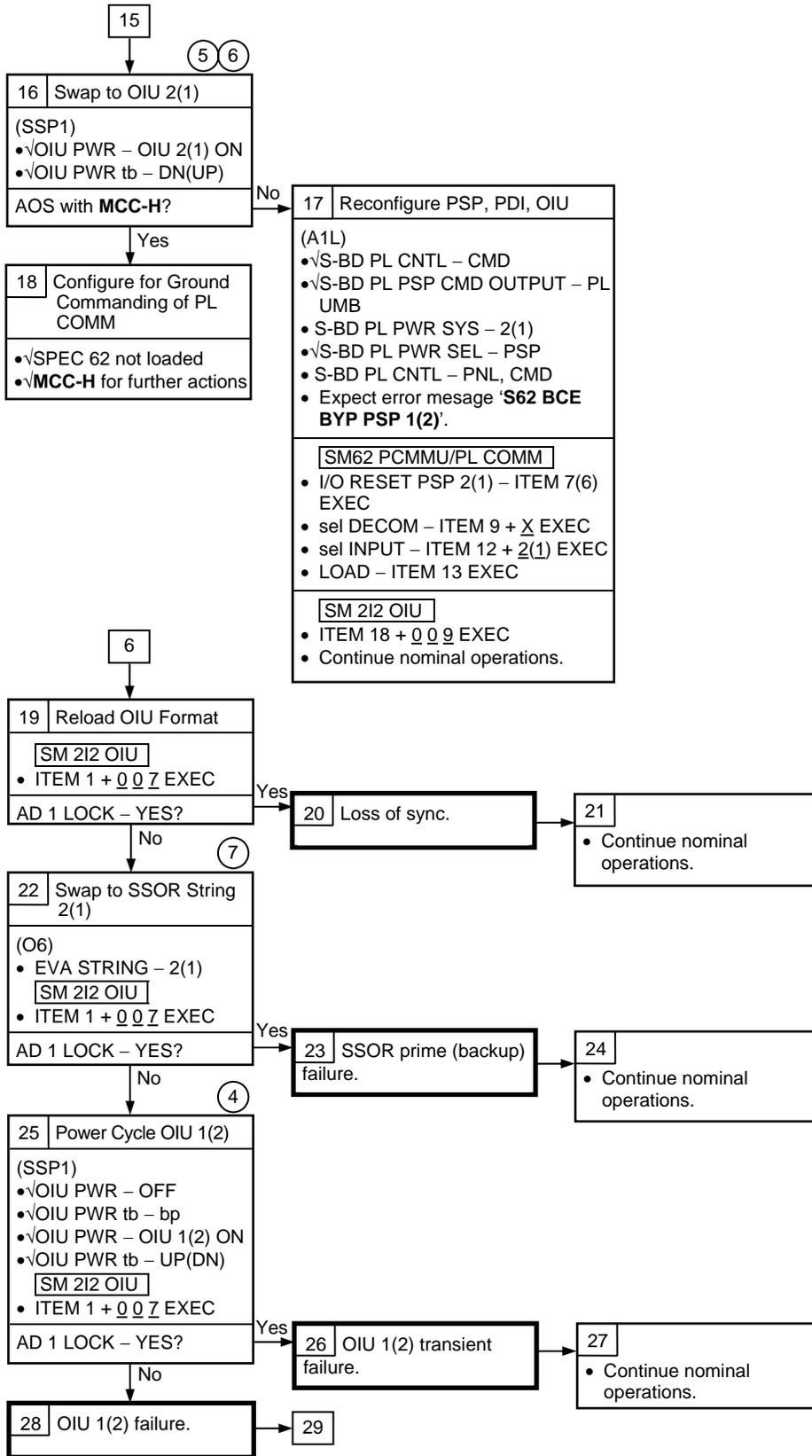


① OIU to PDI problems would announce a 'S62 PDI DECOM FAIL' message if FDA enabled.

② MCC-H will likely direct STS or ISS crew to perform 3.301 LOSS OF PCS TELEMETRY (SODF: POC: MALFUNCTION).

③ Reloading the OIU format forces a resync with the GNC MDM or SSOR.

④ OIU active device mapping occurs with format load.

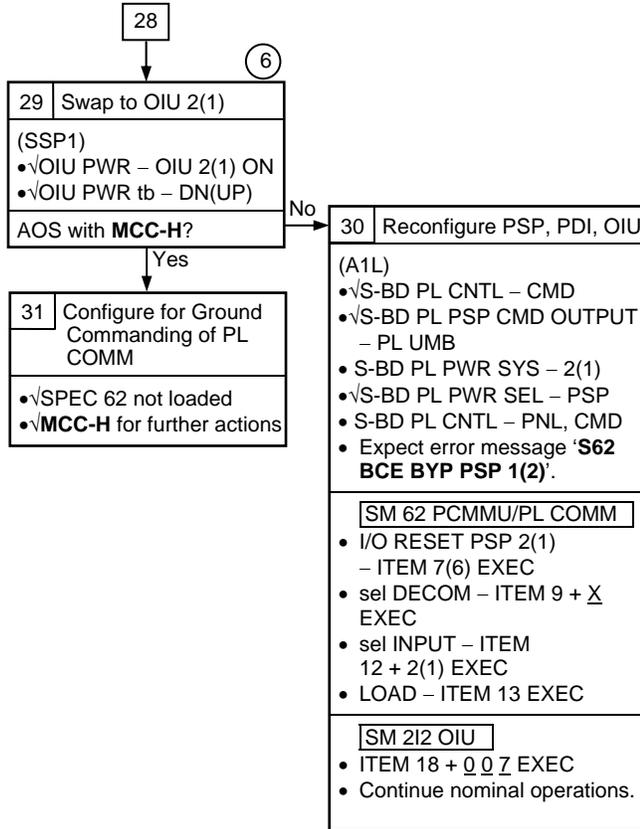


④ OIU active device mapping occurs with format load.

⑤ Malfunction restores operational capability; additional troubleshooting to determine BIA failure may be performed later.

⑥ OIU powerup config on OIU BUS 3 is RT on ch A.

⑦ Reloading the OIU format forces a resync with the SSOR.



⑥
 OIU powerup config
 on OIU BUS 3 is RT
 on ch A.

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S62 PDI DECOM FAIL

(ASSY OPS/19A/FIN 2)

Page 1 of 3 pages

[S212 OIU AD 1 NOLK/LOSS OF ISS OR SSOR TELEMETRY](#),
block 2 (SODF: ASSY OPS: MALFUNCTION: COMM)

SM
ALERT

S62 PDI
DECOM FAIL

Nominal Config:

(A1L)
PL DATA INTLVR
PWR – ON

(R1)
PL CAB MNA(MNB)
PL AUX – ON

(SSP1)
OIU PWR – OIU 1(2)
ON
OIU PWR tb –
UP(DN)

SM 62 PCMMU/
PLCOMM

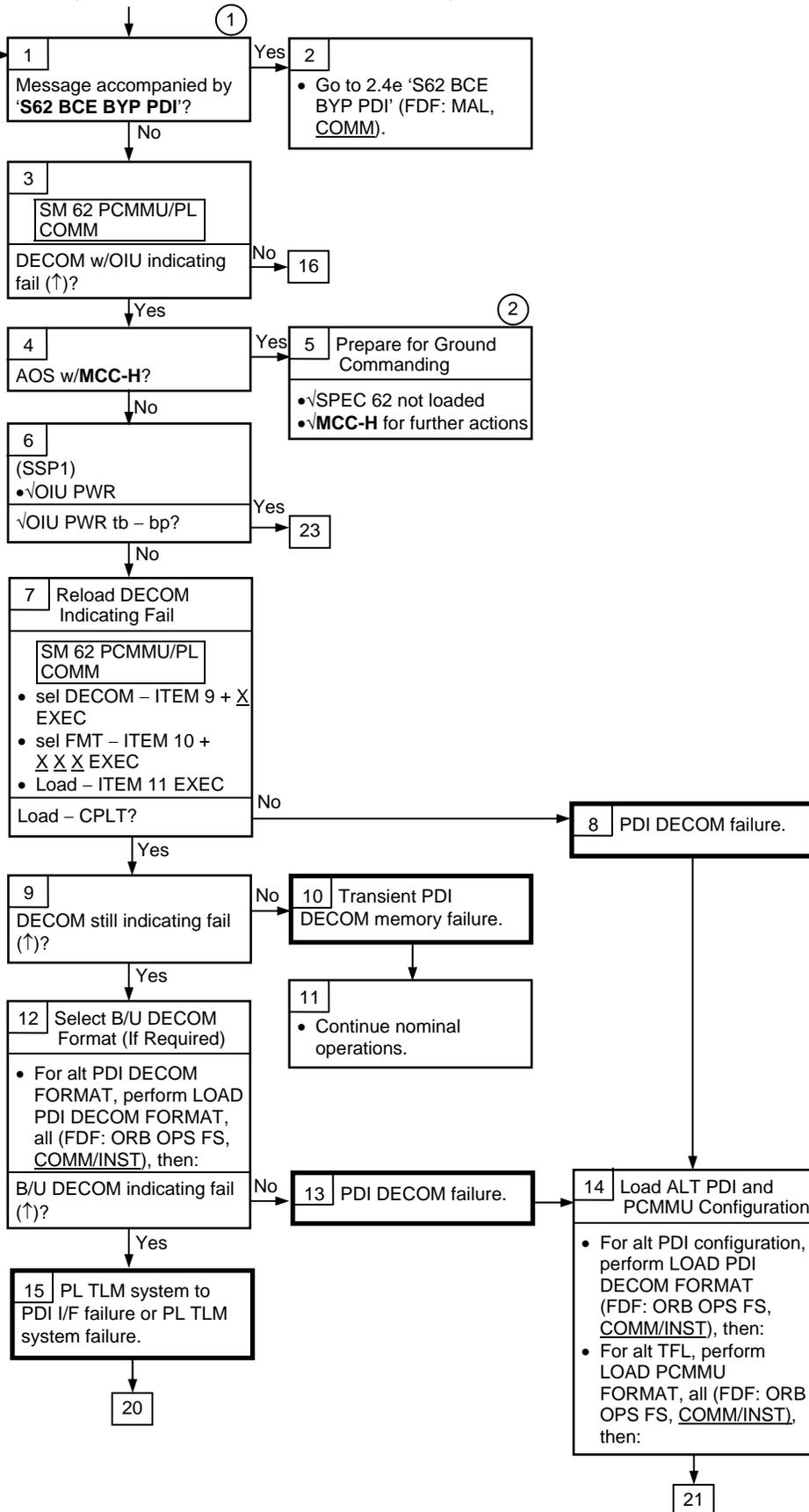
DECOM FDA ENA
ITEM 14 (15, 16,
17) = ENA (*)

SM212 OIU

OIU FMT 5 = MPLM
OIU FMT 7 = RNDZ
OIU FMT 9 = ISS

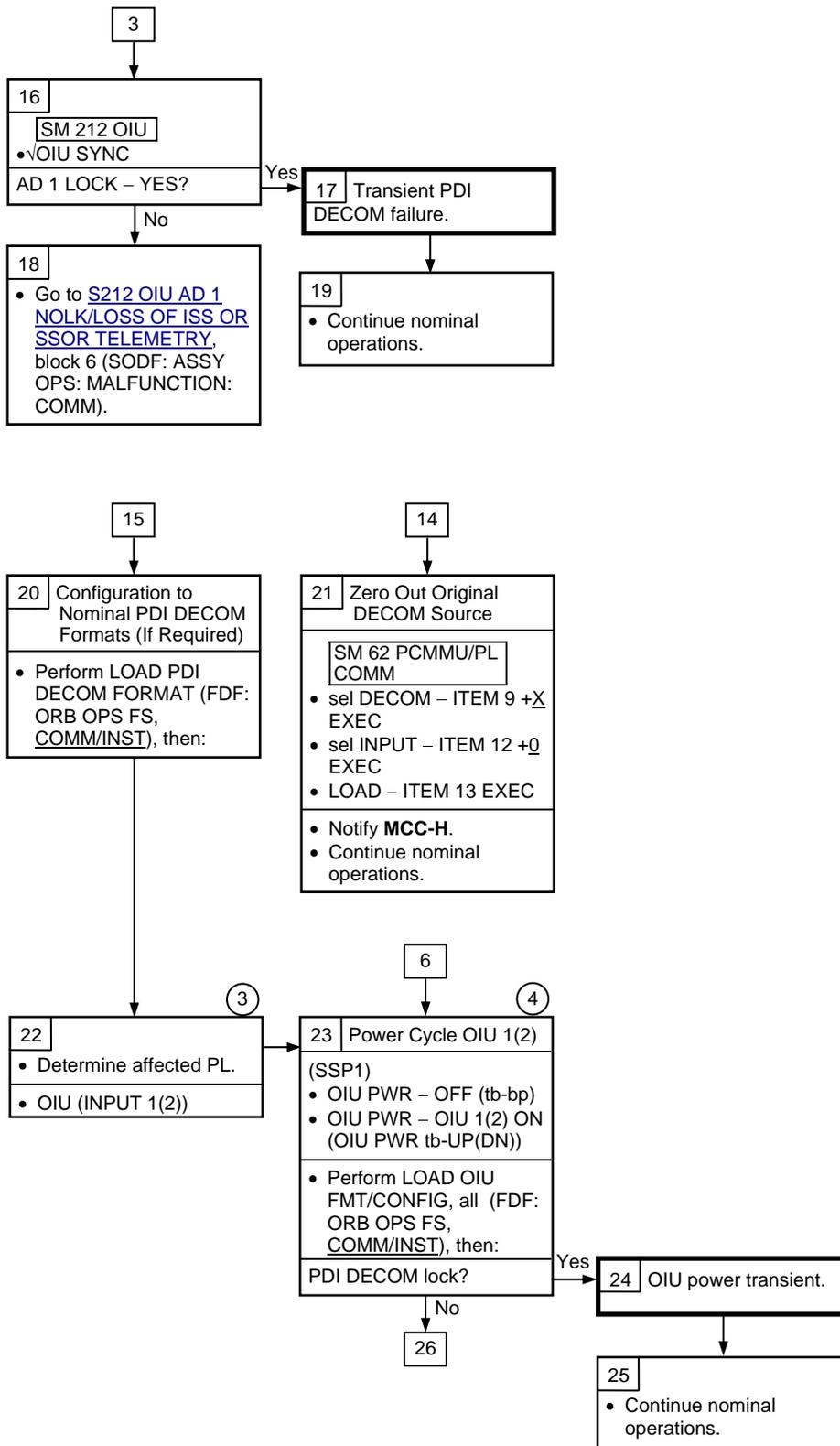
ISS Config:
GNC – 1 prime on
LB ORB N2-1.

OIU FMT 255 = H&S



①
'S212 OIU AD 1 NOLK' indicates OIU active device lock = NO.

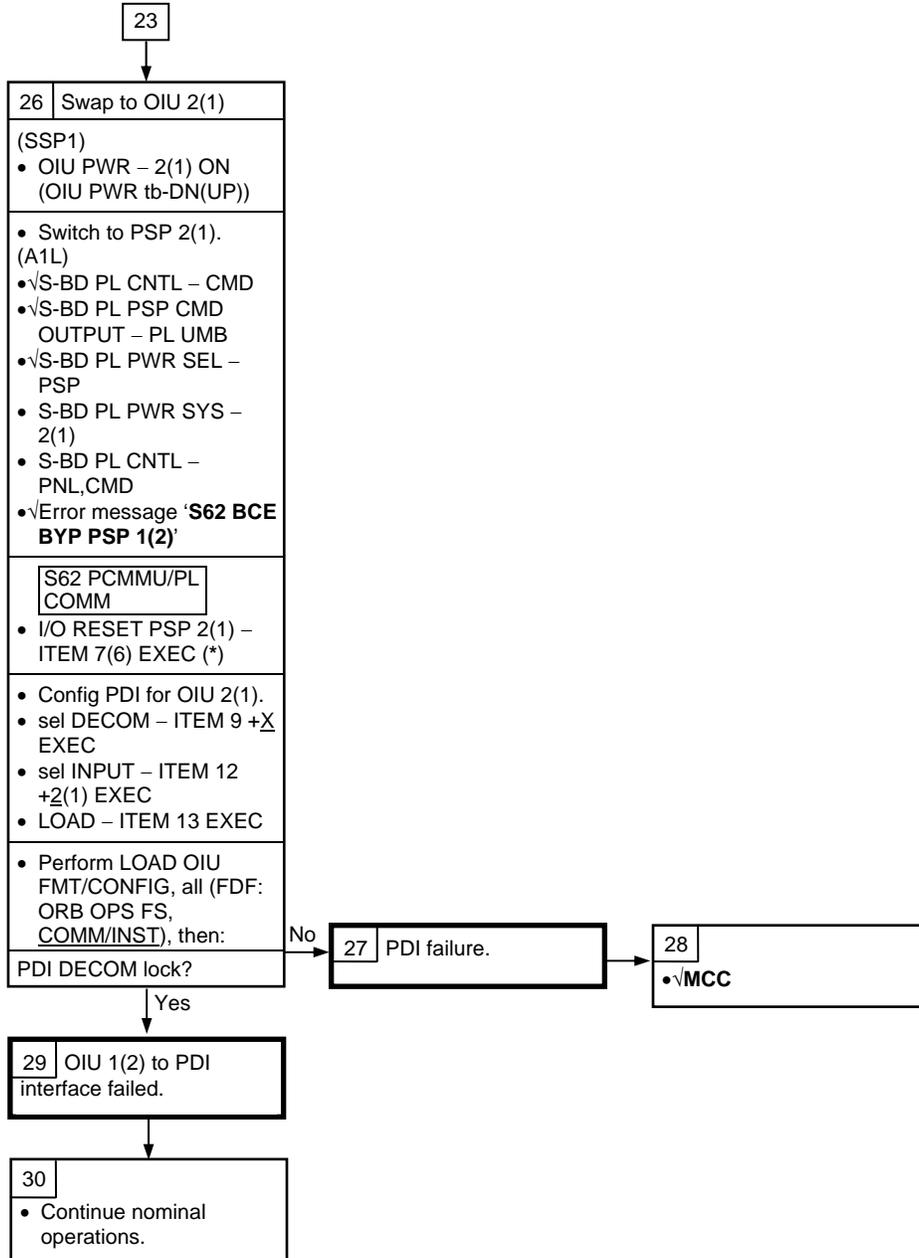
②
MCC-H can perform all PL COMM reconfig, except OIU PWR cycle and swap steps.



③ TCS/SSV is not addressed in malfunction; FDA is not enabled.

④ If a config other than GNC-1 prime on N2-1 is active, √MCC.

S62 PDI DECOM FAIL
(ASSY OPS/19A/FIN 2)



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PL/DPS RECONFIG

(ASSY OPS/19A/FIN 1)

Page 1 of 2 pages

Procedure	Secure Action	Recovery Action	Info
PL1(2) MDM I/O ERROR; PL1(2) MDM OUTPUT (FDF: ORB PKT, <u>DPS</u>)	N/A	N/A	A
5.3c I/O ERROR PL1(2); MDM OUTPUT PL1(2) (FDF: MAL, <u>DPS</u>)	N/A*	N/A	A
PASS SM GPC FAIL (FDF: ORB PKT, <u>DPS</u>)	N/A	D	B
5.1a CS SPLIT (FDF: MAL, <u>DPS</u>)	N/A*	C,D,E**	B
GNC RECOVERY VIA G2FD (FDF: ORB PKT, <u>DPS</u>)	N/A*	C,D	B
5.3e I/O ERROR FLEX (FDF: MAL, <u>DPS</u>)	N/A	N/A	N/A
5.3f BCE BYP FLEX (FDF: MAL, <u>DPS</u>)	N/A	N/A	N/A
5.3g BCE BYP PL1(2) (FDF: MAL, <u>DPS</u>)	N/A*	N/A	A
GPC FRP-4 PASS RECOVERY AFTER BFS ENGAGE (FDF: MAL, <u>DPS</u>)	N/A*	C,D	B
GPC FRP-7 DPS RECONFIG FOR LOSS OF AV BAY COOLING (FDF: MAL, <u>DPS</u>)	N/A*	C,D	B
DPS SSR-3 GNC REASSIGNMENT (FDF: MAL, <u>DPS</u>)	N/A	N/A	B
DPS SSR-4 SM REASSIGNMENT (FDF: MAL, <u>DPS</u>)	N/A	C,D	B
ECLSS SSR-10 H2O PUMP OPS VIA GPC (FDF: MAL, ECLS)	N/A	C,D,E**	B

* Procedure does not call out PL/DPS RECONFIG, Secure.

** Procedure does not call out PL/DPS RECONFIG, Recovery.

INFO A

If '**I/O ERROR PL1**' message

Loss of ground and orbiter MEDS command interface to ISS via PSP 1/OIU 1.

For additional impacts, refer to [ORBITER MDM LOSS IMPACTS](#) (SODF: ASSY OPS: MALFUNCTION: CRITICAL EQUIPMENT LOST).

If '**I/O ERROR PL2**' message

Loss of ground and orbiter MEDS command interface to ISS via PSP 2/OIU 2.

For additional impacts, refer to [ORBITER MDM LOSS IMPACTS](#) (SODF: ASSY OPS: MALFUNCTION: CRITICAL EQUIPMENT LOST).

INFO B

If SM GPC affected

Note PL commanding via SM GPC (ground and/or orbiter MEDS) not possible until SM machine is restored and PL 1(2) MDM I/F is restored.

If GNC GPC affected

Ground commanding not possible until GNC machine is restored.

ACTION C

If PSP I/O reset not previously performed

SM 62 PCMMU/PL COMM

I/O RESET PSP 1(2) – ITEM 6(7) EXEC

Notify **MCC-H** when completed.

Resume SPEC 62.

ACTION D

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

As required, reenable PDI DECOM FDA.

Resume SPEC 62.

ACTION E

Reload PCMMU TFLs, LOAD PCMMU FORMAT (FDF: ORB OPS FS, COMM/INST).

ORBITER ELECTRICAL BUS LOSS MATRIX

(ASSY OPS/19A/FIN 1) Page 1 of 2 pages

ORBITER EPS BUSES	ESS 1BC		ESS 2CA		ESS 3AB	CNT AB2	MNA DA1						MNB DA2				FC3	MNC DA3			CNT CA1	
	PNL O13, R14	ESS 1BC FD	ESS 2CA FD	PNL O13, R14	PNL O13		PNL O14	MPC1 AUX PLA	P	(R)	AUX PLB	APC5 APC2 AFT PLB	MO13Q	PNL O15	ML86B MAR2 MAR1	(R)	(R)	P	PNL O16	APC 6 APC 3	AFT PLC	MO63P
ORBITER EQUIPMENT																						
PTU1	XRC																					
APCU1 (MPLM)							XC	X														
OPCU							XC	X														
PTU2				XRC																		
APCU2 (LCS)																						
OPCU																						
OIU1																						
OIU2																						
TCS																						
Video Processing Unit (VPU)																						
Keel Camera/Illuminator (Bay 10)																						
Primary C/L Camera																						
Secondary C/L Camera																						
PDIP 1 (Ku-Band relay, PCS-to-OIU interface)																						
PDIP 2 (MPLM relay, TCS/SSV)																						
Payload Timing Buffer																						
Orbiter PCS																						
TRIDAR (electronics)																						
TRIDAR (hts)																						
MIDDECK PAYLOADS																						
Glacier																						
MERLIN																						
AEM #1																						
AEM #2																						
STL (Space Tissue Loss)																						

(1) Redundant MPLM MDM/PDB pwr is available from APCU2 through the interconnect cable (the power still must go through APCU1's output relay).
 (2) Redundant LCS pwr is available from APCU1 through the interconnect cable (the power still must go through APCU2's output relay).
 X - Total Loss of Operational Power
 XR - Loss of Redundant Power
 XC - Total Loss of Control Power
 XRC - Loss of Redundant Control Power
 XRM - Loss of Redundant Monitor Power
 P - Primary Power Source
 (R) - Redundant Power Source (requires crew action to use)

ORBITER ELECTRICAL BUS LOSS MATRIX

(ASSY OPS/19A/FIN 1) Page 2 of 2 pages

ORBITER EPS BUSES	ESS 1BC		ESS 2CA		ESS 3AB	CNT AB2	MNA DA1						MNB DA2				FC3	MNC DA3		CNT CA1	
	PNL O13, R14	ESS 1BC FD	ESS 2CA FD	PNL O13, R14	PNL O13		PNL O14	MPC1 AUX PLA	P	(R)	AUX PLB	APC5 APC2 AFT PLB	MO13Q	PNL O15	ML86B MAR2 MAR1	(R)	(R)	P	PNL O16 APC 6 APC 3	AFT PLC	MO63P
ISS EQUIPMENT																					
MPLM Shell Htr Pwr (+28 VDC)																				X	
MPLM MDM/PDB Pwr (+124 VDC via APCU 1) (1)																					
PMA 2 Hooks - Group 1, 2 - Sys A	XRC																				
PMA 2 Hooks - Group 1, 2 - Sys B																					
OBSS																					
LCS (+124 VDC via APCU 2) (2)																					
LDRI, ITVC, PTU (on SRMS)																					
LDRI, ITVC, PTU, LCS HTRS (In MPMs)																					
RSC																					
RSC Illuminator																					
DTV MUX & VTR																					
PAYLOAD BUS CONTROL POWER																					
Cabin P/L Bus - MNA Cntl Pwr (nominal source)																					
Cabin P/L Bus - MNB Cntl Pwr (backup source)																					
Aux P/L Bus B - MNB Cntl Pwr																					
Aux P/L Bus A - MNA Cntl Pwr																					
PL AFT - MNB Cntl Pwr																					
PL AFT - MNC Cntl Pwr																					
P/L PRI - MNC DA3 Cntl Pwr (nominal source)																					
P/L PRI - MNB DA2 Cntl Pwr (backup source)																					
P/L PRI - FC3 Cntl Pwr (backup source)																					

(1) Redundant MPLM MDM/PDB pwr is available from APCU2 through the interconnect cable (the power still must go through APCU1's output relay).
 (2) Redundant LCS pwr is available from APCU1 through the interconnect cable (the power still must go through APCU2's output relay).
 X - Total Loss of Operational Power
 XR - Loss of Redundant Power
 XC - Total Loss of Control Power
 XRC - Loss of Redundant Control Power
 XRM - Loss of Redundant Monitor Power
 P - Primary Power Source
 (R) - Redundant Power Source (requires crew action to use)

ORBITER MDM LOSS IMPACTS

(ASSY OPS/19A/FIN)

Page 1 of 2 pages

MDM FF1	Uplink through NSP 1
MDM FF3	Uplink through NSP 2 FRCS Vernier command path (loss of verns)
MDM FA1	LRCS Vernier command path (loss of verns)
MDM FA2	RRCS Vernier command path (loss of verns)
MDM PF1 (PL1)	ISS OIU Command Path (via PSP 1 – UMB 1 and OIU 1) OIU 1 telemetry (health and status)
MDM PF2 (PL2)	ISS OIU Command Path (via PSP 2 – UMB 1 and OIU 2) OIU 2 telemetry (health and status)
MDM OF1	PCMMU 1, 2 – ON/OFF power select, BFS auto TFL PL Bay MECH System 1, 2 power switch telemetry ROEU Latch 2, 3 (MATE/DEMATE, LAT/REL, ELEC CONT) Sys B – telemetry MID MCAs 1, 3 – operational status telemetry for ROEU PL AUX A – RPC ON discrete telemetry
MDM OF2	PL AUX B – RPC ON discrete telemetry Payload Retention System – System Redundancy Telemetry for LAT/R-F-L/REL (PL SEL 1,2,3) MID MCA 1 OP STATUS 5,6 telemetry MID MCA 3 OP STATUS 5,7,8 telemetry
DSC OF2	FRCS Vernier Inj Temps (loss of verns)
MDM OF3	Insight into orbiter S-Band command path PL PRI (MNC, MNB, FC3) – ON discrete telemetry
MDM OF4	Ku-Band – loss of insight to RADAR mode and RADAR output power telemetry only S-Band, Ku-Band – PNL/CMD switch – position telemetry only PSP, GCIL – ON/OFF telemetry S-Band P/L control telemetry PDI Power Switch position indication CAB P/L (MNA, MNB), PL AUX – ON discrete telemetry ROEU Latch 2,3 (MATE/DEMATE, LAT/REL, ELEC CONT) System A telemetry APCU-1 telemetry APCU-2 telemetry
DSC OM1	MNC bus voltage telemetry
DSC OM2	MNA, MNB bus voltage telemetry

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ORBITER MDM LOSS IMPACTS

(ASSY OPS/19A/FIN)

Page 2 of 2 pages

MDM OA1	ODS X4/PMA2 X3 connector mate telemetry PMA2 Group 1 passive hooks (1,3,5) closed telemetry PMA2 Group 1 passive hooks (7,9,11) closed telemetry DIH ODS X1 CONN MATE (A) DIH ODS X1 CONN MATE (B)
DSC OA1	ODS X4/PMA2 X3 connector mate power telemetry PMA2 Group 1 passive hooks (1,3,5) closed power telemetry PMA2 Group 1 passive hooks (7,9,11) closed power telemetry
MDM OA2	ODS X3/PMA2 X4 connector mate telemetry PMA2 Group 2 passive hooks (2,4,6) closed telemetry PMA2 Group 2 passive hooks (8,10,12) closed telemetry PL AFT MNB Amps and PWR ON discrete telemetry DIH ODS X2 CONN MATE (A) DIH ODS X2 CONN MATE (B)
DSC OA2	ODS X3/PMA2 X4 connector mate power telemetry PMA2 Group 2 passive hooks (2,4,6) closed power telemetry PMA2 Group 2 passive hooks (8,10,12) closed power telemetry Vernier R5D Inj Temps (loss of verns)
MDM OA3	ROEU Latch 1 (RELAX) System A telemetry P/L SEL 1,2 (latch 1) Primary LAT/R-F-L/REL – latch status telemetry PL AFT MNC Amps and PWR ON telemetry
DSC OL1	LRCS Vernier Inj Temps (loss of verns)
DSC OR1	RRCS Vernier Inj Temps (loss of verns)

DEORBIT PREP

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PAYLOAD DEACTIVATION

(ASSY OPS/19A/FIN)

Page 1 of 1 pages

- | | | |
|-----------------|----|--|
| L12U
(SSP 1) | 1. | cb SW PWR 1 – op
cb PDIP 1 PWR 2/KuBAND RLY – op
MPLM CHAN 1 HTR PWR – OFF (tb-bp)
MPLM CHAN 2 HTR PWR – OFF (tb-bp)
cb PDIP1 PWR 1 – op |
| L12L
(SSP 2) | 2. | MPLM KEEL CAM PWR – OFF
MPLM KEEL CAM HTR/ILLUM PWR – OFF
cb SW PWR 3 – op
cb PDIP 2 PWR 2/MPLM RLY – op
cb PDIP 2 PWR 1 – op |
| L12 (PDIP 1) | | Ku BAND RATE – OFF |
| R1 | 3. | PL CAB – OFF
PRI MNC – OFF (tb-OFF)
AFT MN B – OFF |

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PAYLOAD REACTIVATION

(ASSY OPS/19A/FIN) Page 1 of 1 pages

- | | | |
|-----------------|----|--|
| R1 | 1. | PL CAB – MNA
PL PRI MNC – ON (tb-ON)
PL AFT MN B – ON |
| L12U
(SSP 1) | 2. | MPLM CHAN 1 HTR PWR – ON (tb-gray)
MPLM CHAN 2 HTR PWR – ON (tb-gray) |
| L12L
(SSP 2) | 3. | cb SW PWR 3 – cl
MPLM KEEL CAM HTR/ILLUM PWR – ON |

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PAYLOAD ENTRY SWITCH LIST/VERIFICATION

(ASSY OPS/19A/FIN)

Page 1 of 2 pages

OBJECTIVE:

The purpose of this procedure is to verify the configuration of payload related switches in the shuttle prior to re-entry to earth.

- R1 1. √PL CAB – OFF
 √PRI MNC – ctr (tb-OFF)
 √MNB – ctr (tb-OFF)
 √FC3 – ctr (tb-OFF)
 √AUX – ON
 √AFT MNB – OFF
 √MNC – OFF
- L12U (SSP1) 2. √cb SW PWR 1 – op
 √cb PDIP 1 PWR 2/KuBAND RLY – op
 √MPLM CHAN 1 HTR PWR – OFF (tb-bp)
 √MPLM CHAN 2 HTR PWR – OFF (tb-bp)
 √TCS PWR – OFF (tb-bp)
 √cb PDIP 1 PWR 1 – op
 √OIU PWR – OFF (tb-bp)
- L12L (SSP2) 3. √cb SW PWR 3 – op
 √MPLM KEEL CAM PWR – OFF
 √MPLM KEEL CAM HTR/ILLUM PWR – OFF
 √cb PDIP 2 PWR 2/MPLM RLY – op
 √C/L CAM PWR – OFF
 √cb PDIP 2 PWR 1 – op
 √TRIDAR PWR – OFF (tb-bp)
- L12 (PDIP1) 4. √Ku BAND RATE – OFF
 √DC PWR 1 – OFF
 √DC PWR 2 – OFF
- L11 (PDIP2) 5. √MPLM DATA – OIU
 √DC PWR 1 – OFF
 √DC PWR 2 – OFF
- MF28E/G 6. (GLACIER)
 √cb POWER – cl (It on)
 √BATTERY – ON (It on)
- MF57H 7. (AEM-1)
 √cb PUMP BKR – op { }
 √MAIN BREAKER – cl { }
 √FANS A&D, B&C (two) – cl { }
 √FANS A&D, B&C (two) – It on
 √FANS – ON (audible fan operation)
 √LIGHTS – AUTO
 √cb LIGHTS B&C – cl { }
 √A&D – op { }
 √LIGHTS B&C – It on (off during night cycle)

PAYLOAD ENTRY SWITCH LIST/VERIFICATION

(ASSY OPS/19A/FIN)

Page 2 of 2 pages

- √A&D – lt off
- √LED Display – showing GMT time

- MF43K 8. (AEM-2)
 - √cb PUMP BKR – op { }
 - √MAIN BREAKER – cl { }
 - √FANS A&D, B&C (two) – cl { }
 - √FANS A&D, B&C (two) – lt on
 - √FANS – ON (audible fan operation)
 - √LIGHTS – AUTO
 - √cb LIGHTS B&C – cl { }
 - √A&D – op { }
 - √LIGHTS B&C – lt on (off during night cycle)
 - √A&D – lt off
 - √LED Display – showing GMT time

- MF71E 9. (MERLIN)
 - √STATUS LED – lt off
 - √cb MAIN – cl (lt on)
 - √PAYLOAD – op (lt off)

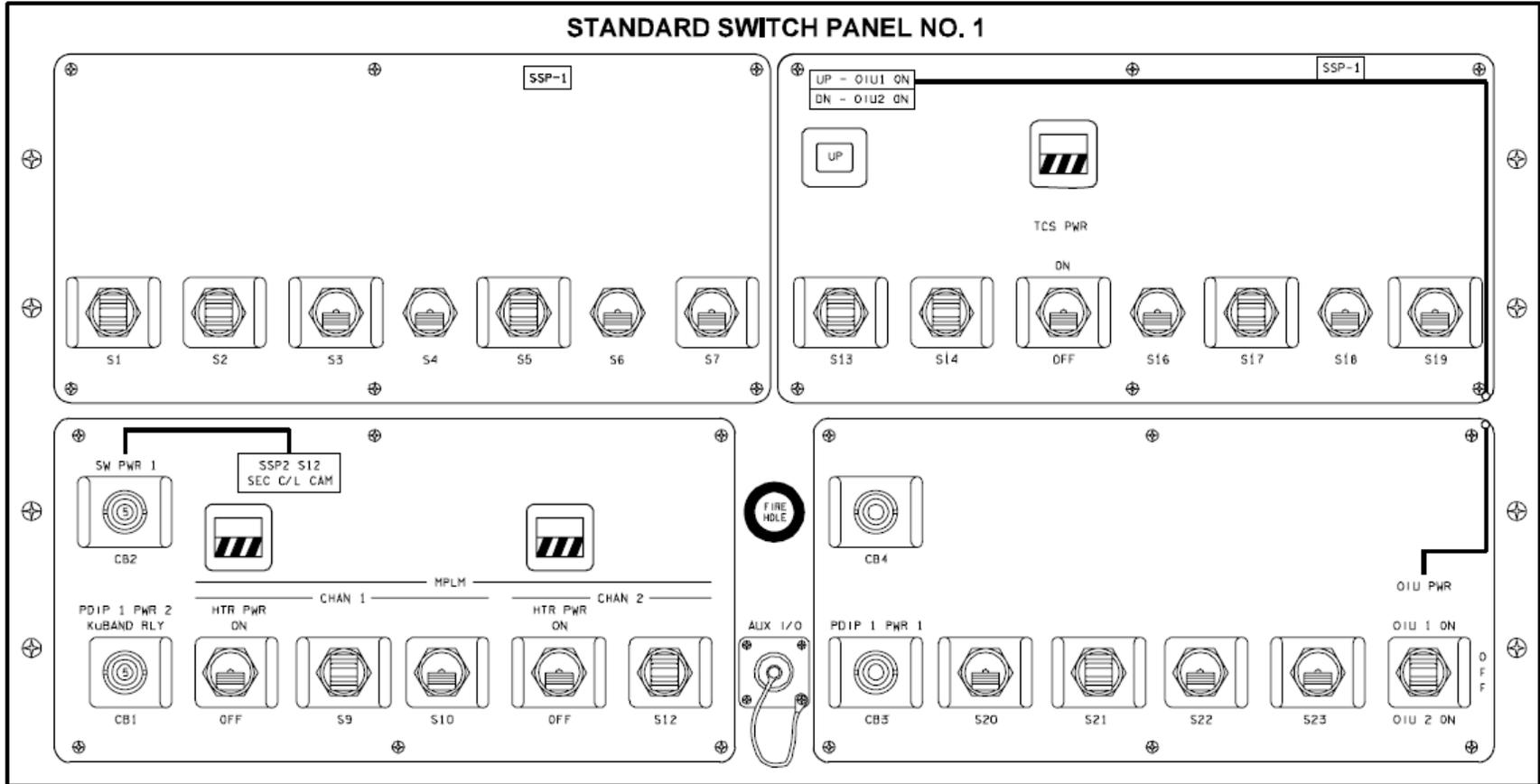
- MA9G 10. (STL)
 - √POWER lt – on
 - √F1 lt – off

REFERENCE

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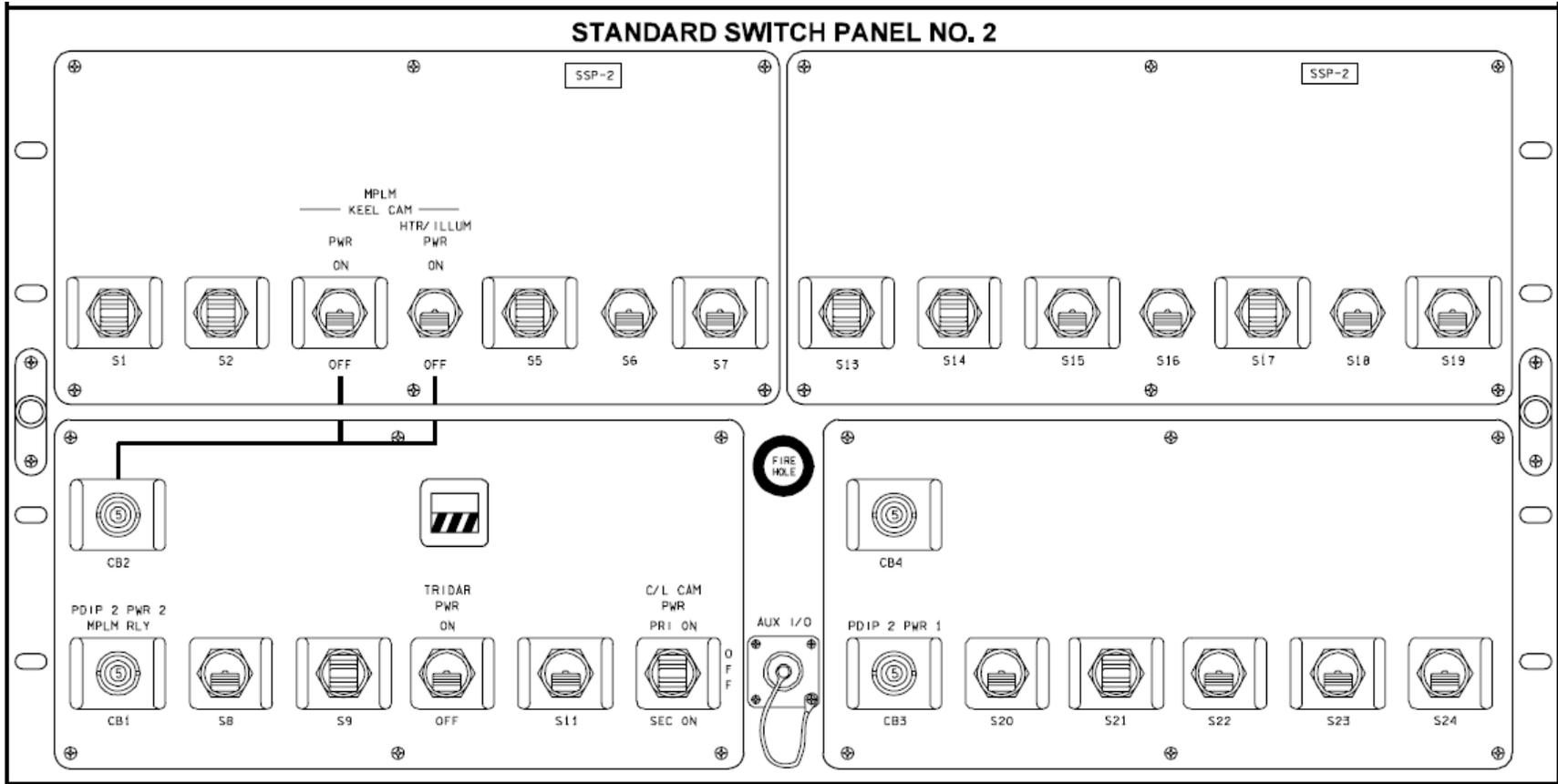
STANDARD SWITCH PANEL 1
 (ASSY OPS/19A/FIN 1) Page 1 of 1 page

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STANDARD SWITCH PANEL 2
 (ASSY OPS/19A/FIN 1) Page 1 of 1 page



407

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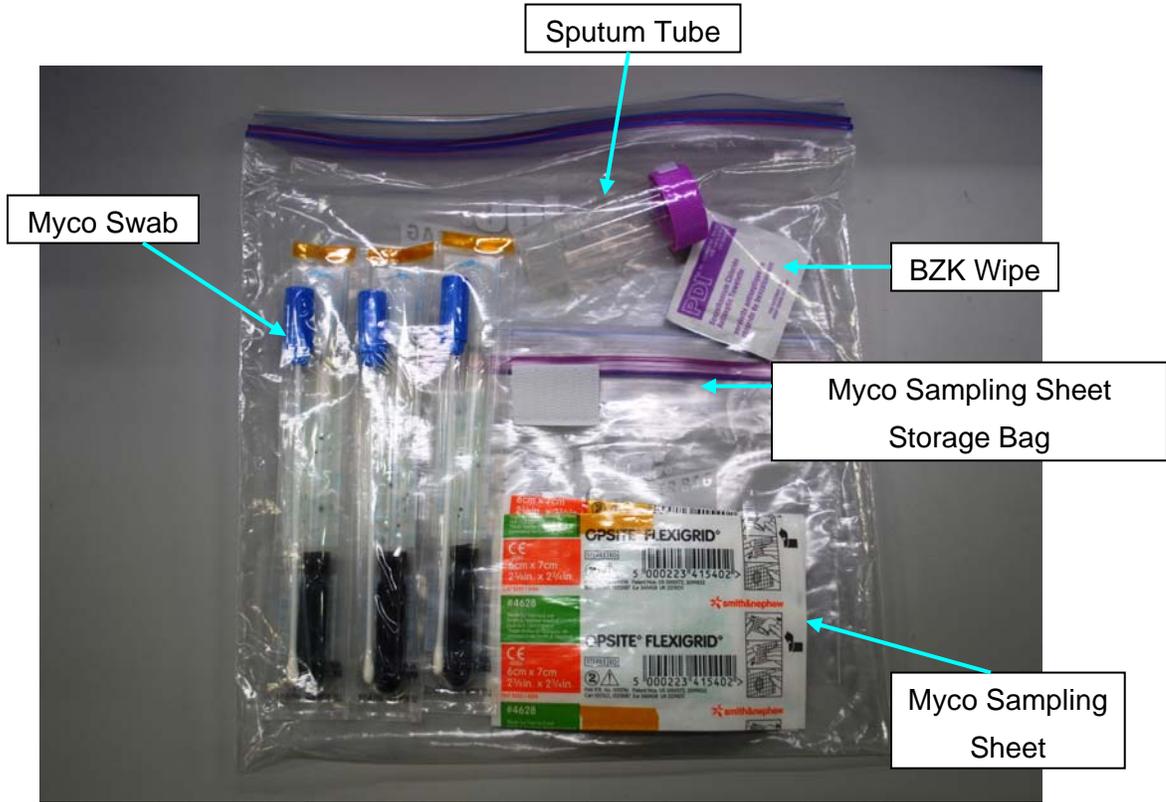


Figure 1.- Myco Kit.

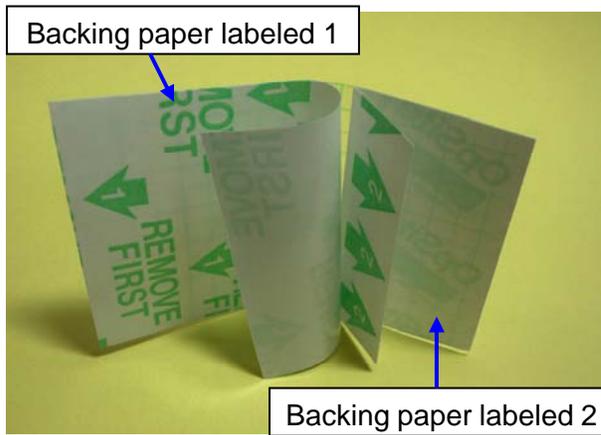


Figure 2.- Myco Sampling Sheet.



Figure 3.- Myco Sampling Sheet Storage Bag.

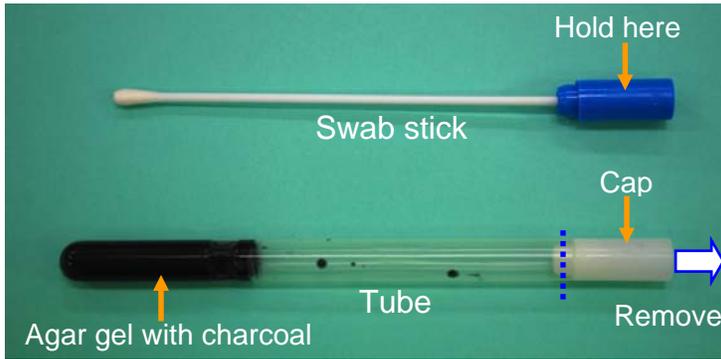


Figure 4.- Myco Swab.



Figure 5.- Sputum Tube.

CUE CARD

CUE CARD

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HOOK
VELCROHOOK
VELCRO**MERLIN STATUS CHECK**

(ASSY OPS/19A/FIN 1) Page 1 of 2 pages

OBJECTIVE:

The following steps will perform a status check on MERLIN.

1. MERLIN STATUS CHECK (TWICE DAILY)MF71E
(MERLIN)

1.1 √cb PAYLOAD – op (lt off)

1.2 √cb MAIN – cl (lt on)

```

*****
* POWER CB MAIN LED – lt off and cb MAIN closed
*
* √Display – active
*
* If Display is not active,
* | Perform MERLIN LCD BLANK, all (SODF: ASSY OPS:
* | MERLIN-MALFUNCTION), then:
* |
*****

```

1.3 √Display – ‘HOME DISPLAY’

```

*****
* If Display – ‘**Error Pending**’,
* | Perform MERLIN ERROR MESSAGE, all (SODF: ASSY
* | OPS: MERLIN-MALFUNCTION), then:
* |
* If ‘HOME DISPLAY’ not shown,
* | pb Right (EXIT) – press until ‘HOME DISPLAY’ appears.
* |
*****

```

NOTE

1. While in the launch configuration,
CURR TEMP expected to be +39.0°C
2. During the ramp period for descent configuration prep,
CURR TEMP may be out of range, approaching +03.0°C
3. While in the landing configuration,
CURR TEMP expected to be +03.0°C

- 1.4 If prior to 19A MERLIN Unpack Activity,
√Display – ‘**CURR TEMP: +39.0C**’ ± 2.0°C
Log CURR TEMP and front panel GPS data in Table 1. MERLIN
LOG

ASSY OPS-1a/19A/B

HOOK
VELCROHOOK
VELCRO**GLACIER STATUS CHECK**

(ASSY OPS/19A/FIN 1) Page 1 of 2 pages

OBJECTIVE:

The following steps will perform a status check on Glacier.

1. GLACIER STATUS CHECKMF28E/G
(Glacier)

- 1.1 √cb POWER – cl (lt on)
- 1.2 √sw BATTERY – ON (lt on)
- 1.3 √Display – ‘HOME’

- * If Display – ‘**Error Pending**’
- * | Perform [GLACIER ERROR MESSAGE](#), all (SODF: ASSY
- * | OPS: PAYLOADS), then:
- *
- * If ‘HOME’ not shown
- * pb Right (EXIT) → Press until ‘HOME’ appears

NOTE

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

- 1.4 If ascent Glacier
 - √Display – ‘CURR TEMP:’ is $+4.0^{\circ}\text{C} \pm 5.0^{\circ}\text{C}$
- If descent Glacier
 - √Display – ‘CURR TEMP:’ is $-95.0^{\circ}\text{C} \pm 5.0^{\circ}\text{C}$
- 1.5 Record from Glacier front panel ‘GPS’, ‘CURR TEMP’ in Table 1 Glacier Log.
- 1.6 √MCC-H with data recorded in Table 1. Glacier Log and any off-nominal conditions.

HOOK
VELCRO

HOOK
VELCRO

STL STATUS CHECK

(ASSY OPS/19A/FIN 1)

Page 1 of 2 pages

OBJECTIVE:

The following steps will perform a status check on STL.

1. STL STATUS CHECK

MA9G 1.1 √POWER It – on
(STL)

√F1 It – off

```

*****
* If POWER It off or F1 It on,
* | Perform STL FAILURE, all (SODF: ASSY OPS:
* | PAYLOADS), then:
*****

```

1.2 Record MET and Rail temps

√Rail temps (four) within nominal range 36-39 °C.

```

*****
* If temps out of range,POWER It off or F1 It on,
* | Perform STL TEMP OUT OF RANGE ON LCD, all (SODF:
* | ASSY OPS: PAYLOADS), then:
*****

```

1.3 √Fan filter and clean if required.

1.4 √**MCC-H** with data recorded in Table 1. STL Log and any off-nominal conditions.

HOOK
VELCRO

HOOK
VELCRO

AEM UNIT #1 CHECK

(ASSY OPS/19A/FIN)

Page 1 of 2 pages

Observe conditions in first column and write code in appropriate Flight Day column.

Table 1. Codes for Daily Status Check

Water Lft/Rt	1-4					
Respiration:	(N)ormal (3/sec)	(R)apid	(S)hallow	(L)abored		(U)nable to determine
Skin: (ears, toes, tail)	(N)ormal: Dark	(D)ry/Scaly	(S)crapes/Cuts	(S)wollen/Red		(U)nable to determine
Coat/Fur:	(N)ormal: Smooth/shiny	(R)ough spiky, clump	(D)iscolored	(D)ull or (W)et	(H)air Loss	(U)nable to determine
Nose:	(N)ormal: Clear	(D)ischarge: Red/Brown	(B)leeding	(O)ther		(U)nable to determine
Eyes:	(N)ormal: Shiny/clear	(D)ischarge: Red/Brown	(S)wollen	(O)ther		(U)nable to determine
Appetite:	(N)ormal Intake Food/water	(A)bnormal intake				(U)nable to determine
Activity:	(N)ormal: Bright/Alert	(L)istless (decreased)	Un(R)esponsive	(D)ead		(U)nable to determine
Extremities:	(N)ormal	(D)eformity or fracture	(A)mputated limb or digits	(B)leeding		(U)nable to determine
Comments:						

Table 2. AEM Unit #1 Check Log

	FD1	FD2	FD3	FD4	FD5	FD6	FD7	FD8
MET								
Observer								
Water Lft/Rt								
Respiration								
Skin								
Coat/Fur								
Nose								
Eyes								
Appetite								
Activity								
Extremities								
Comments								

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AEM UNIT #1 CHECK
(ASSY OPS/19A/FIN)

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Table 1. Codes for Daily Status Check

Water Lft/Rt	1-4					
Respiration:	(N)ormal (3/sec)	(R)apid	(S)hallow	(L)abored		(U)nable to determine
Skin: (ears, toes, tail)	(N)ormal: Dark	(D)ry/Scaly	(S)crapes/Cuts	(S)wollen/Red		(U)nable to determine
Coat/Fur:	(N)ormal: Smooth/shiny	(R)ough spiky, clump	(D)iscolored	(D)ull or (W)et	(H)air Loss	(U)nable to determine
Nose:	(N)ormal: Clear	(D)ischarge: Red/Brown	(B)leeding	(O)ther		(U)nable to determine
Eyes:	(N)ormal: Shiny/clear	(D)ischarge: Red/Brown	(S)wollen	(O)ther		(U)nable to determine
Appetite:	(N)ormal Intake Food/water	(A)bnormal intake				(U)nable to determine
Activity:	(N)ormal: Bright/Alert	(L)istless (decreased)	Un(R)esponsive	(D)ead		(U)nable to determine
Extremities:	(N)ormal	(D)eformity or fracture	(A)mputated limb or digits	(B)leeding		(U)nable to determine
Comments:						

Continuation of Table 2. AEM Unit #1 Check Log

	FD9	FD10	FD11	FD12	FD13	FD14	FD15	FD16
MET								
Observer								
Water Lft/Rt								
Respiration								
Skin								
Coat/Fur								
Nose								
Eyes								
Appetite								
Activity								
Extremities								
Comments								

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AEM UNIT #2 CHECK

(ASSY OPS/19A/FIN)

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Observe conditions in first column and write code in appropriate Flight Day column.

Table 1. Codes for Daily Status Check

Water Lft/Rt	1-4					
Respiration:	(N)ormal (3/sec)	(R)apid	(S)hallow	(L)abored		(U)nable to determine
Skin: (ears, toes, tail)	(N)ormal: Dark	(D)ry/Scaly	(S)crapes/Cuts	(S)wollen/Red		(U)nable to determine
Coat/Fur:	(N)ormal: Smooth/shiny	(R)ough spiky, clump	(D)iscolored	(D)ull or (W)et	(H)air Loss	(U)nable to determine
Nose:	(N)ormal: Clear	(D)ischarge: Red/Brown	(B)leeding	(O)ther		(U)nable to determine
Eyes:	(N)ormal: Shiny/clear	(D)ischarge: Red/Brown	(S)wollen	(O)ther		(U)nable to determine
Appetite:	(N)ormal Intake Food/water	(A)bnormal intake				(U)nable to determine
Activity:	(N)ormal: Bright/Alert	(L)istless (decreased)	Un(R)esponsive	(D)ead		(U)nable to determine
Extremities:	(N)ormal	(D)eformity or fracture	(A)mputated limb or digits	(B)leeding		(U)nable to determine
Comments:						

Table 3. AEM Unit #2 Check Log

	FD1	FD2	FD3	FD4	FD5	FD6	FD7	FD8
MET								
Observer								
Water Lft/Rt								
Respiration								
Skin								
Coat/Fur								
Nose								
Eyes								
Appetite								
Activity								
Extremities								
Comments								

ASSY OPS-5a/19A/A

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AEM UNIT#2 CHECK
(ASSY OPS/19A/FIN)

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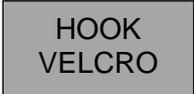
Table 1. Codes for Daily Status Check

Water Lft/Rt	1-4					
Respiration:	(N)ormal (3/sec)	(R)apid	(S)hallow	(L)abored		(U)nable to determine
Skin: (ears, toes, tail)	(N)ormal: Dark	(D)ry/Scaly	(S)crapes/Cuts	(S)wollen/Red		(U)nable to determine
Coat/Fur:	(N)ormal: Smooth/shiny	(R)ough spiky, clump	(D)iscolored	(D)ull or (W)et	(H)air Loss	(U)nable to determine
Nose:	(N)ormal: Clear	(D)ischarge: Red/Brown	(B)leeding	(O)ther		(U)nable to determine
Eyes:	(N)ormal: Shiny/clear	(D)ischarge: Red/Brown	(S)wollen	(O)ther		(U)nable to determine
Appetite:	(N)ormal Intake Food/water	(A)bnormal intake				(U)nable to determine
Activity:	(N)ormal: Bright/Alert	(L)istless (decreased)	Un(R)esponsive	(D)ead		(U)nable to determine
Extremities:	(N)ormal	(D)eformity or fracture	(A)mputated limb or digits	(B)leeding		(U)nable to determine
Comments:						

Continuation of Table 3. AEM Unit #2 Check Log

	FD9	FD10	FD11	FD12	FD13	FD14	FD15	FD16
MET								
Observer								
Water Lft/Rt								
Respiration								
Skin								
Coat/Fur								
Nose								
Eyes								
Appetite								
Activity								
Extremities								
Comments								

ASSY OPS-5b/19A/A



TRIDAR ACTIVATION
(ASSY OPS/19A/FIN 1)

- 1. TriDAR Control Computer PGSC Setup
 PDIP2 √Pre-routed TriDAR DATA cable connected to PDIP2 TriDAR port (J103)
 A31p Connect pre-routed TriDAR DATA cable to RJ45 Ethernet port on PGSC

- 2. TriDAR Control Software Startup
 If PGSC not already powered:
 A31p PGSC Pwr – ON

NOTE

After Network setup script is executed, the PGSC onboard network adapter cannot be used for standard ops until Network Setup script is executed to reconfigure the RJ45 port in the TRIDAR DEACTIVATION procedure

Shutdown KFX Software if running

Sel 'Shuttle Apps'>'TRIDAR'> TRIDAR RJ45 Network Setup 'Network'
Enter '1' in the box
Click 'OK'
'TRIDAR'
Click 'OK'

√Yellow 'RJ-45 Port Configured for TRIDAR Ops' displayed on desktop crew patch

NOTE

Wait for the network config script to complete and command text box to close.

Sel 'Shuttle Apps' > 'TRIDAR' > 'TRIDAR'

NOTE

Status items on 'TRIDAR Control' GUI will be yellow or gray until TriDAR hardware is powered on

√'TRIDAR DTO' GUI displayed

- 3. TriDAR Hardware Powerup
 SSP2 √cb SW PWR 3 – cl
 TRIDAR PWR – ON (tb – gray)

A31p After approx 3 mins
√System Active – gray
√Comms – green
√Log Space – green
√Sensor Health – green

- 4. Select TriDAR Operation
 A31p If Docking:
 Sel Operation drop down item 'Dock'
 If Undocking:
 Sel Operation drop down item 'Undock'

- 5. Start Active Operations
 A31p Press 'Start' (Start Button button turns gray)
 √System Active – green

- 6. Monitor TriDAR Operations
 A31p Check status approximately every 15 minutes:
 √System Active – Green
 √Comms – Green
 √Log Space – Green
 √Sensor Health – Green

* If check items are yellow or gray: *
* √MCC *

ASSY OPS-7a/19A/B

Fab instruction: fabricate cue cards 7a and 8a back to back

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TOP
BACK OF 'TRIDAR ACTIVATION'

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TRIDAR DEACTIVATION
(ASSY OPS/19A/FIN 1)

1. Stop Operations

A31p 'TRIDAR DTO'
 Press 'Stop'
 √System Active – gray

2. TriDAR Hardware Powerdown

SSP2 TRIDAR PWR – OFF (tb – bp)

A31p √Comms – yellow
 √Sensor Health – gray

3. TriDAR Software Shutdown

A31p Sel 'Exit...' from the 'File' menu

4. Restore Network

A31p Disconnect TriDAR DATA Cable from RJ45 Port
 Reconnect Ethernet Cable to TriDAR PGSC RJ45 Port
 Sel 'Shuttle Apps' > 'TRIDAR'> TRIDAR RJ45 Network Setup
 'Network'
 Enter '2' in the box
 Click 'OK'
 'PGSC'
 Click 'OK'

√Yellow 'RJ-45 Port Configured for TRIDAR Ops' not displayed
on desktop crew patch

If required restart KFX Software.

5. PGSC Shutdown

PGSC If PGSC not required:
 Sel 'Start'
 Sel 'Shutdown'
 Sel 'OK'

TRIDAR TROUBLESHOOTING

NOTE

Refer to descriptions below for appropriate
troubleshooting procedure

1. 'Sensor Health' Status - Yellow

A31p Expand 'Sensor Health' category
 Report items and values backlit in yellow to **MCC**.

2. 'Comm' Status - Yellow

PDIP2 Verify TRIDAR DATA cable connected to PDIP2 TRIDAR port
(J103) and verify TriDAR DATA cable connected to PGSC
ethernet port.

A31p Verify Yellow 'RJ-45 Port Configured for TRIDAR Ops'
displayed on desktop crew patch

3. If requested, restart TriDAR Software

A31p Close TriDAR Software
 Press 'Stop'
 Sel 'Exit...' from the 'File' menu

A31p Start TriDAR Software:
 Sel 'Shuttle Apps' > 'TRIDAR' > 'TRIDAR'
 √Comms - Green
 √Sensor Health – Green
 √Log Space – Green

A31p If Docking:
 Sel Operation drop down item 'Dock'
 If Undocking:
 Sel Operation drop down item 'Undock'

A31p Press 'Start' (Start Button turns gray)
 √System Active – green

4. If requested, reboot TRIDAR System

Perform TRIDAR DEACTIVATION
Perform TRIDAR ACTIVATION

ASSY OPS-8a/19A/B

Fab instruction: fabricate cue cards 7a and 8a back to back

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INTERNATIONAL SPACE STATION

ASSEMBLY OPERATIONS

Return on
STS-131

