



International Space Station Assembly Operations Book

ISS-ULF4

Mission Operations Directorate
Operations Division

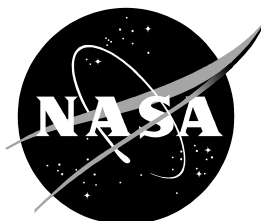
21 APR 10

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
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

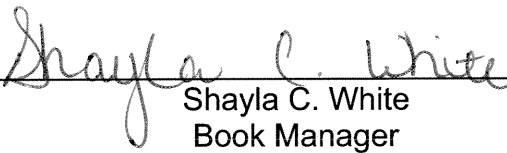


United Space Alliance

**INTERNATIONAL SPACE STATION
ASSEMBLY OPERATIONS BOOK
ISS-ULF4**

21 APR 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-02028	Assy_Ops-02042	Assy_Ops-02061	Assy_Ops-02069
	Assy_Ops-02029	Assy_Ops-02043	Assy_Ops-02062	Assy_Ops-02102
	Assy_Ops-02036	Assy_Ops-02044	Assy_Ops-02063	Assy_Ops-02103
	Assy_Ops-02037	Assy_Ops-02045	Assy_Ops-02064	Assy_Ops-02106
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	Assy_Ops-02040	Assy_Ops-02056	Assy_Ops-02066	Assy_Ops-02108

Uplinked Messages (or Approved Flight Notes) replaced by this revision,
remove from Book:

None

**INTERNATIONAL SPACE STATION
ASSEMBLY OPERATIONS
ISS-ULF4**

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* - Omit from flight book

**INTERNATIONAL SPACE STATION
ASSEMBLY OPERATIONS
ISS-ULF4**

CUE CARD LIST OF EFFECTIVE PAGES

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MRM1

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1.101 MRM1 ACTIVATION ON TCU1

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 1 of 3 pages

OBJECTIVE:

Nominal activation of MRM1 on TCU1 in the Shuttle Payload Bay.

LOCATION:

Shuttle Flight Deck

DURATION:

15 minutes

CREW:

One

NOTE

OIU must be activated and configured to communicate with TCU1, and TFL should be 199 or 212 prior to performing this procedure.

- R1 1. VERIFYING UPSTREAM POWER
 √PL PRI MN C – ctr (tb – ON)
 √CAB – MN A
- SSP2 cb MRM1 CB4 – cl
2. POWERING MRM1
MRM1 PWR – ON (hold no longer than 2 s)
- Verify MRM1 PWR tb – UP
3. MONITOR MODE ACTIVATION
√MRM1 XFR MODE – OFF (tb – bp)
 √INITIAL STATE – OFF (tb – bp)
 √ORBITAL MODE – OFF (tb – bp)
- MRM1 MONITOR MODE – ON (tb – gray)

NOTE

Expect FDA message “224 ONS MRM1” during next step.

4. ACTIVATING TCUs IN ORBITAL MODE (after MONITOR MODE)

NOTE

The nominal TCU configuration is TCU1 - PRIME, TCU-2 B/U. If TCU1 does not activate properly, **MCC-H** will configure the OIU to communicate with TCU2 and the MRM1 will be activated on TCU2 via 3.102 MRM1 ACTIVATION ON TCU2.

- 4.1 MRM1 TCU1 – ON (hold no longer than 2 s)

Verify MRM1 TCU1 tb – gray

1.101 MRM1 ACTIVATION ON TCU1

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 2 of 3 pages

Wait 120 seconds.

CRT

SM 224 MRM1 SYSTEMS

Verify TCU1 – PRIM
Verify TCU2 – NRDY
Verify MODE MON – *
Verify STEP – CMPT
Verify CHANGE – RDY

SSP2

4.2 MRM1 TCU2 – ON (hold no longer than 2 s)

Verify MRM1 TCU2 tb – UP

Wait 120 seconds.

CRT

SM 224 MRM1 SYSTEMS

Verify TCU2 – BU

SSP2

4.3 MRM1 MONITOR MODE – OFF (tb – bp)

Wait 10 seconds.

CRT

SM 224 MRM1 SYSTEMS

Verify CHANGE – CONF

SSP2

4.4 MRM1 ORBITAL MODE – ON (tb – gray)

CRT

5. VERIFYING ORBITAL MODE

SM 224 MRM1 SYSTEMS

Verify MODE ORB – *
Verify STEP - RUN
Verify CHANGE – NRDY

Wait ~90 seconds

Verify MODE ORB – *
Verify STEP – CMPT
Verify CHANGE – RDY

SSP2

6. VERIFYING GOOD MRM1 CONDITION

Verify Spec 224 matches Figure 1.
Notify **MCC-H** of any differences.

Verify MRM1 FANS tb – gray

1.101 MRM1 ACTIVATION ON TCU1
 (ASSY OPS/ULF4/FIN 1/MULTI R) Page 3 of 3 pages

XXXX / 224 / XXX			MRM1 SYSTEMS			DDD / HH : MM : SS		
C & W			TCS			DDD / HH : MM : SS		
FIRE		NO	HX1	ON	OFF	FRAME	CNTR	inc
SMOKE		NO	2	10 *	11			
SD	STAT	OFF	PUMP 1	12 *	13		ON	OFF
1	ON	1	2	14 *	15	SNT 1	*	
2	ON	2	HTR 1	16	17 *	2	*	
3	ON	3	2	18	19 *	SCU	1 / 2	* / *
ALL ON	4		FAIL	20	21 *	ON	26	OFF 27
FAIL		NO						
ONS		NO				SRCS 1	ORB	
FAIL		00				2	ORB	
RESET		5				TCU 1	PRIM	
MODE	STAT	ERR				2	BU	
INIT		00				MU 1	TRAN	
ORB *		EE				2	SW	
XFER		00				SCMU	RESET	28
MON		00						
STEP		CMPT						
CHANGE		RDY						
ERROR		NOER						

Figure 1.- Spec 224 in ORBITAL Mode.

7. ENABLING AUTOMATIC FIRE RESPONSE SOFTWARE (ON MCC-M GO)

MCC-H Uplink DSM 80028 (P49K5028L) (REMOVE_APP_INH)

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1.102 MRM1 PREP FOR TRANSFER
 (ASSY OPS/ULF4/FIN 1/MULTI R) Page 1 of 3 pages

OBJECTIVE:

To put the MRM1 into the proper configuration for transferring it to the ISS.

LOCATION:

Shuttle Flight Deck

DURATION:

15 minutes

CREW:

One

NOTE

OIU must be activated and configured to communicate with the primary TCU and TFL should be 199 or 212 prior to performing this procedure.

1. PRE-TRANSITION SYSTEMS VERIFICATION

CRT

SM 224 MRM1 SYSTEMS

Verify the display matches Figure 1.
 Notify **MCC-H** if any conditions differ.

XXXX / 2 2 4 / XXX				MRM1 SYSTEMS				DDD / HH : MM : SS			
								DDD / HH : MM : SS			
C & W				TCS				FRAME CNTR inc			
FIRE		NO		HX 1	1 0 *	1 1					
SMOKE		NO		2	1 2 *	1 3			ON	OFF	
SD	STAT	OFF		PUMP 1	1 4 *	1 5	SNT 1	*			
1	ON	1		2	1 6	1 7 *	2	*			
2	ON	2		HTR 1	1 8	1 9 *			SCU 1 / 2	* / *	
3	ON	3		2	2 0	2 1 *			ON 2 6	OFF 2 7	
ALL ON	4			FAIL	NO						
FAIL	NO								SRCS 1	ORB	
									2	ORB	
ONS	NO								TCU 1	PRIM	
FAIL	0 0								2	BU	
RESET	5								MU 1	TRAN	
MODE	STAT	ERR							2	SW	
INIT	0 0	0 0							SCMU	RESET	2 8
ORB *	EE	0 0									
XFER	0 0	0 0									
MON	0 0	0 0									
STEP	CMPT										
CHANGE	RDY										
ERROR	NOER										

Figure 1.- Spec 224 in ORBITAL Mode.

CAUTION

MRM1 may remain unpowered for transfer for a maximum of 4 hours.

1.102 MRM1 PREP FOR TRANSFER

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 2 of 3 pages

2. MRM1 ORBITAL MODE DEACTIVATION

SSP2 2.1 MRM1 ORBITAL MODE – OFF (tb – bp)

- √MRM1 XFR MODE – OFF (tb – bp)
- √MONITOR MODE – OFF (tb – bp)
- √INITIAL STATE – OFF (tb – bp)

CRT SM 224 MRM1 SYSTEMS

2.2 Verify CHANGE – CONF

3. MRM1 TRANSFER MODE INITIATION

SSP2 3.1 MRM1 XFR MODE – ON (tb – gray)

CRT SM 224 MRM1 SYSTEMS

- 3.2 Verify MODE XFER – (*)
- Verify STEP – RUN
- Verify CHANGE – NRDY

Wait 6 minutes

SM 224 MRM1 SYSTEMS

Verify FRAME CNTR – not incrementing

- 3.3 Verify the display matches Figure 2.
- Notify **MCC-H** if any conditions differ.

XXXX / 224 / XXX	MRM1 SYSTEMS	XX X	DDD / HH : MM : SS DDD / HH : MM : SS
<p>C & W</p> <p>FIRE NO</p> <p>SMOKE NO</p> <p>SD STAT OFF</p> <p>1 OFF 1</p> <p>2 OFF 2</p> <p>3 OFF 3</p> <p>ALL ON 4</p> <p>FAIL NO</p> <hr/> <p>ONS NO</p> <p>FAIL 00</p> <p>RESET 5</p> <p>MODE STAT ERR</p> <p>INIT 00 00</p> <p>ORB 00 00</p> <p>XFER* FF 00</p> <p>MON 00 00</p> <p>STEP RUN</p> <p>CHANGE NRDY</p> <p>ERROR NOER</p>	<p>TCS</p> <p>HX 1 ON OFF</p> <p>10 11 *</p> <p>2 12 13 *</p> <p>PUMP 1 14 15 *</p> <p>2 16 17 *</p> <p>HTR 1 18 19 *</p> <p>2 20 21 *</p> <p>FAIL NO</p>	<p>FRAME CNTR <u>not inc</u></p> <p>ON OFF</p> <p>SNT 1 *</p> <p>2 *</p> <p>SCU 1 / 2 /</p> <p>ON 26 OFF 27</p> <p>SRCS 1 ISS</p> <p>2 ISS</p> <p>TCU 1 PRIM</p> <p>2 BU</p> <p>MU 1 NRDY</p> <p>2 NRDY</p> <p>SCMU RESET 28</p>	

Figure 2.- Spec 224 in XFR Mode (at time telemetry is lost).

1.102 MRM1 PREP FOR TRANSFER

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 3 of 3 pages

4. MRM1 DEACTIVATION

SSP2 MRM1 PWR – OFF (hold no longer than 2 s)

Verify MRM1 PWR tb – bp

5. POWERING DOWN MRM1 POWER FEEDS

5.1 cb MRM1 CB4 – op

<p style="text-align: center;"><u>NOTE</u></p>
--

<p style="text-align: center;">Expect 'S200 APCU1(2) TRIP' msgs</p>

R1 5.2 PL PRI MN C – OFF (tb – OFF)

SSP2 5.3 MRM1 XFR MODE – OFF

5.4 Notify **MCC-H**.

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3.101 MRM1 DEACTIVATION

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 1 of 3 pages

OBJECTIVE:

To transition MRM1 from Orbital Mode to Initial State as preparation for any MRM1 deactivation other than Prep for Transfer.

LOCATION:

Shuttle Flight Deck

DURATION:

15 minutes

CREW:

One

CAUTION

MRM1 can only be powered down for a maximum of 8 hours.

NOTE

OIU must be activated and configured to communicate with the primary TCU and TFL should be 199 or 212 prior to performing this procedure.

1. PRE-TRANSITION SYSTEMS VERIFICATION

CRT

SM 224 MRM1 SYSTEMS

Verify the display matches Figure 1.
Notify **MCC-H** if any conditions differ.

<pre> XXXXXXXX / 224 / XXX C & W FIRE NO SMOKE NO SD STAT OFF 1 ON 1 2 ON 2 3 ON 3 ALL ON 4 FAIL NO ONS NO FAIL 00 RESET 5 MODE STAT ERR INIT 00 00 ORB * EE 00 XFER 00 00 MON 00 00 STEP CMPT CHANGE RDY ERROR NOER </pre>	<pre> MRM1 SYSTEMS TCS HX1 ON OFF 10 * 11 2 12 * 13 PUMP 1 14 * 15 2 16 17 * HTR 1 18 19 * 2 20 21 * FAIL NO </pre>	<pre> DDD / HH : MM : SS DDD / HH : MM : SS FRAME CNTR inc ON OFF SNT 1 * 2 * SCU 1 / 2 * / * ON 26 OFF 27 SRCS 1 ORB 2 ORB TCU 1 PRIM 2 BU MU 1 TRAN 2 SW SCMU RESET 28 </pre>
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Figure 1.- Spec 224 in ORBITAL Mode.

3.101 MRM1 DEACTIVATION

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 2 of 3 pages

2. DEACTIVATING ORBITAL MODE

- SSP2 2.1 MRM1 ORBITAL MODE – OFF (tb – bp)
- √MRM1 XFR MODE – OFF (tb – bp)
 - √MONITOR MODE – OFF (tb – bp)
 - √INITIAL STATE – OFF (tb – bp)

CRT SM 224 MRM1 SYSTEMS

2.2 Verify CHANGE – CONF

3. MRM1 INITIAL STATE INITIATION

- SSP2 3.1 MRM1 INITIAL STATE – ON (tb – gray)

CRT SM 224 MRM1 SYSTEMS

- 3.2 Verify MODE INIT – (*)
 Verify STEP – RUN
 Verify CHANGE – NRDY

Wait ~90 seconds

SM 224 MRM1 SYSTEMS

- 3.3 Verify the display matches Figure 2.
 Notify **MCC-H** if any conditions differ.

<pre> XXXXXXXX / 224 / XXXX C & W FIRE NO SMOKE NO SD STAT OFF 1 OFF 1 2 OFF 2 3 OFF 3 ALL ON 4 FAIL NO ONS NO FAIL 00 RESET 5 MODE STAT ERR INIT * FC 00 ORB 00 00 XFER 00 00 MON 00 00 STEP C M P T CHANGE RDY ERROR NO ER </pre>	<pre> MRM1 SYSTEMS TCS HX1 10 11 * 2 12 13 * PUMP 1 14 15 * 2 16 17 * HTR 1 18 19 * 2 20 21 * FAIL NO </pre>	<pre> XXXXXXXX DDD / HH : MM : SS XXXXXXXX DDD / HH : MM : SS FRAME CNTR inc ON OFF SNT 1 * 2 * SCU 1 / 2 / ON 26 OFF 27 SRCS 1 ORB 2 ORB TCU 1 PRIM 2 BU MU 1 NRDY 2 NRDY SCMU RESET 28 </pre>
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Figure 2.- Spec 224 in INITIAL Mode.

3.101 MRM1 DEACTIVATION

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 3 of 3 pages

NOTE

Expect FDA message "224 ONS MRM1" during next step.

4. TCU2 DEACTIVATION

SSP2 4.1 MRM1 TCU2 – OFF (hold no longer than 2 s)

Verify MRM1 TCU2 tb – bp

CRT

SM 224 MRM1 SYSTEMS

4.2 TCU2 – NRDY

5. TCU1 DEACTIVATION

SSP2 5.1 MRM1 TCU1 – OFF (hold no longer than 2 s)

Verify MRM1 TCU1 tb – bp

CRT

SM 224 MRM1 SYSTEMS

5.2 FRAME CNTR – not incrementing

6. MRM1 SSP CONFIG

SSP2 6.1 MRM1 INITIAL STATE – OFF (tb – bp)

7. MRM1 POWERDOWN

SSP2 7.1 MRM1 PWR – OFF (hold no longer than 2 s)

Verify MRM1 PWR tb – bp

cb MRM1 CB4 – op

R1

PL PRI MN C – OFF (tb – OFF)

7.2 Notify **MCC-H**.

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3.102 MRM1 ACTIVATION ON TCU2

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 1 of 3 pages

OBJECTIVE:

Off-nominal activation of MRM1 on TCU2 in the Shuttle Payload Bay if TCU1 fails.

LOCATION:

Shuttle Flight Deck

DURATION:

15 minutes

CREW:

One

NOTE

1. OIU must be activated and configured to communicate with TCU 2 by sending the OIU to TCU2 command (P50K5672L) and TFL should be 199 or 212 prior to performing this procedure.
2. If this procedure is being performed after a TCU1 failure during MRM1 Activation, steps 1 to 3 may already be complete.

1. VERIFYING UPSTREAM POWER

R1 √PL PRI MN C – ctr (tb – ON)
 √CAB – MN A

SSP2 cb MRM1 CB4 – cl

2. POWERING MRM1

MRM1 PWR – ON (hold no longer than 2 s)

Verify MRM1 PWR tb – UP

3. MONITOR MODE ACTIVATION

√MRM1 XFR MODE – OFF (tb – bp)
 √INITIAL STATE – OFF (tb – bp)
 √MRM1 ORBITAL MODE – OFF (tb – bp)

MRM1 MONITOR MODE – ON (tb – gray)

NOTE

Expect FDA message “224 ONS MRM1” during next step.

4. ACTIVATING TCUs IN ORB MODE (AFTER MONITOR MODE)

4.1 MRM1 TCU2 – ON (hold no longer than 2 s)

Verify MRM1 TCU2 tb – UP

Wait 120 seconds.

3.102 MRM1 ACTIVATION ON TCU2

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 2 of 3 pages

CRT

SM 224 MRM1 SYSTEMS

Verify TCU1 – NRDY
Verify TCU2 – PRIM
Verify MODE MON – *
Verify STEP – CMPT
Verify CHANGE – RDY

On MCC-H GO

SSP2

4.2 MRM1 TCU1 – ON (hold no longer than 2 s)

Verify MRM1 TCU1 tb – gray

Wait 120 seconds.

CRT

SM 224 MRM1 SYSTEMS

Verify TCU1 – BU

SSP2

4.3 MRM1 MONITOR MODE – OFF (tb – bp)

Wait 10 seconds.

CRT

SM 224 MRM1 SYSTEMS

Verify CHANGE – CONF

SSP2

4.4 MRM1 ORBITAL MODE – ON (tb – gray)

5. VERIFYING ORBITAL MODE

SM 224 MRM1 SYSTEMS

Verify MODE ORB – *
Verify STEP – RUN
Verify CHANGE – NRDY

Wait ~90 seconds

Verify STEP – CMPT
Verify CHANGE – RDY

6. VERIFYING GOOD MRM1 CONDITION

SSP2

Verify MRM1 FANS tb – gray

Verify Spec 224 matches Figure 1.
Notify **MCC-H** of any differences.

3.102 MRM1 ACTIVATION ON TCU2
 (ASSY OPS/ULF4/FIN 1/MULTI R) Page 3 of 3 pages

XXXX / 224 / XXX			MRM1 SYSTEMS			DDD / HH : MM : SS		
C & W			TCS			FRAME CNTR inc		
FIRE		NO	HX1	ON * 10	OFF 11			
SMOKE		NO	2	12 *	13			
SD	STAT	OFF	PUMP 1	14 *	15			
1	ON	1	2	16	17 *	SNT 1	*	
2	ON	2	HTR 1	18	19 *	2	*	
3	ON	3	2	20	21 *	SCU 1 / 2	* / *	
ALL ON	4		FAIL	NO		ON 26	OFF 27	
FAIL		NO						
ONS NO						SRCS 1	ORB	
FAIL		00				2	ORB	
RESET		5				TCU 1	BU ↓	
MODE	STAT	ERR				2	PRIM	
INIT		00 00				MU 1	TRAN	
ORB *		EE 00				2	SW	
XFER		00 00				SCMU	RESET 28	
MON		00 00						
STEP		CMPT						
CHANGE		RDY						
ERROR		NOER						

Figure 1.- Spec 224 in ORBITAL Mode.

7. ENABLING AUTOMATIC FIRE RESPONSE SOFTWARE (ON MCC-M GO)

MCC-H Uplink DSM 80028 (P49K5028L) (REMOVE_APP_INH)

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3.103 MRM1 ACTIVATION IN THE SHUTTLE PAYLOAD BAY AFTER PREP FOR TRANSFER

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 1 of 3 pages

OBJECTIVE:

To activate MRM1 in the Shuttle Payload Bay if docking is not successful. To transition MRM1 from Prep for Transfer to Orbital Mode.

LOCATION:

Shuttle Flight Deck

DURATION:

15 minutes

CREW:

One

NOTE

OIU must be activated and configured to communicate with the primary TCU and TFL should be 199 or 212 prior to performing this procedure.

1. VERIFYING UPSTREAM POWER

R1 √PL PRI MN C – ctr (tb – ON)
 √CAB – MN A

SSP2 cb MRM1 CB4 – cl

2. MONITOR MODE ACTIVATION

√MRM1 XFR MODE – OFF (tb – bp)
 √INITIAL STATE – OFF (tb – bp)
 √ORBITAL MODE – OFF (tb – bp)

MRM1 MONITOR MODE – ON (tb - gray)

3. POWERING MRM1

MRM1 PWR – ON (hold no longer than 2 s)

Verify MRM1 PWR tb – UP

Wait 120 seconds.

CRT SM 224 MRM1 SYSTEMS

Verify MODE MON – *
Verify STEP – CMPT
Verify CHANGE –RDY

4. ACTIVATING ORBITAL MODE

SSP2 4.1 MRM1 MONITOR MODE – OFF (tb – bp)

Wait 10 seconds.

3.103 MRM1 ACTIVATION IN THE SHUTTLE PAYLOAD BAY AFTER PREP FOR TRANSFER

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 2 of 3 pages

CRT SM 224 MRM1 SYSTEMS

Verify CHANGE – CONF

SSP2 4.2 MRM1 ORBITAL MODE – ON (tb – gray)

5. VERIFYING ORBITAL MODE

CRT SM 224 MRM1 SYSTEMS

Verify MODE ORB – *
Verify STEP – RUN
Verify CHANGE – NRDY

Wait ~90 seconds

Verify STEP – CMPT
Verify CHANGE – RDY

6. VERIFYING GOOD MRM1 CONDITION

SSP2 Verify MRM1 FANS tb – gray

Verify Spec 224 matches Figure 1.
Notify **MCC-H** of any differences.

3.103 MRM1 ACTIVATION IN THE SHUTTLE PAYLOAD BAY AFTER PREP FOR TRANSFER

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 3 of 3 pages

XXXX / 2 2 4 / XXX				MRM1 SYSTEMS				DDD / HH : MM : SS			
C & W				TCS				FRAME CNTR inc			
FIRE		NO		HX 1	ON	OFF					
SMOKE		NO		2	10 *	11					
SD	STAT	OFF		PUMP 1	12 *	13			ON	OFF	
1	ON	1		2	14 *	15			SNT 1	*	
2	ON	2		HTR 1	16	17 *			2	*	
3	ON	3		2	18	19 *			SCU	1 / 2	* / *
ALL	ON	4		2	20	21 *			ON	26	OFF 27
FAIL		NO		FAIL		NO			SRCS	1 ORB	
ONS		NO							2	ORB	
FAIL		00							TCU	1 PRIM	
RESET		5							2	BU	
MODE	STAT	ERR							MU	1 TRAN	
INIT	00	00							2	SW	
ORB	*	EE	00						SCMU	RESET	28
XFER		00	00								
MON		00	00								
STEP	CMPT										
CHANGE		RDY									
ERROR		NOER									

Figure1.- Spec 224 in ORBITAL Mode.

7. ENABLING AUTOMATIC FIRE RESPONSE SOFTWARE (ON MCC-M GO)

MCC-H Uplink DSM 80028 (P49K5028L) (REMOVE_APP_INH)

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3.104 MRM1 FIRE RESPONSE

(ASSY OPS/ULF4/FIN 1/MULTI R) Page 1 of 1 page

OBJECTIVE:

Crew steps to recover MRM1 from Fire indication. This is not an emergency procedure, since MRM1 is not environmentally connected to the orbiter.

LOCATION:

Shuttle Flight Deck

DURATION:

5 minutes

CREW:

One

1. VERIFYING MRM1 FIRE CONDITION

CRT

SM 224 MRM1 SYSTEMS

Verify TCS HX1 and HX2 OFF – *
Verify ONS – YES↓

Report ONS FAIL value to **MCC-H**.

NOTE

The MRM1 Automatic Fire Response software is nominally enabled. If the fire response kicked off, step 2 is not required.

2. FAN DEACTIVATION (ON MCC-H GO)

SSP2

If any step 1 conditions are not as written

2.1 MRM1 FANS – OFF (hold no longer than 2 s)

2.2 Verify MRM1 FANS tb – bp

2.3 Record GMT: ____/____:____

2.4 Circulation FAN Reactivation

On MCC-H GO or 30 minutes after FANS were deactivated (if LOS):

2.4.1 MRM1 FANS – ON (hold no longer than 2 s)

2.4.2 Verify MRM1 FANS tb – gray

CRT

SM 224 MRM1 SYSTEMS

2.4.3 TCS HX1 ON – ITEM 10 EXEC
Verify TCS HX1 ON - *

2.4.4 TCS HX2 ON – ITEM 12 EXEC
Verify TCS HX2 ON - *

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DTO 703

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REFLECTIVE ELEMENTS INSTALLATION ONTO DOCKING TARGET

(ASSY OPS/ULF4/FIN 1) 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.

REFLECTIVE ELEMENTS INSTALLATION ONTO DOCKING TARGET

(ASSY OPS/ULF4/FIN 1) 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.

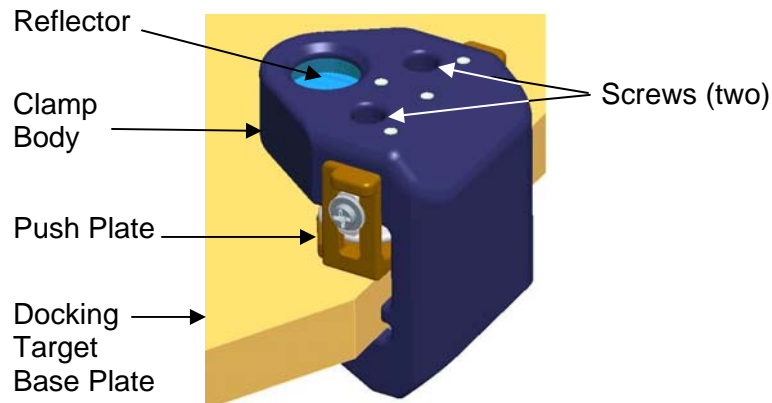


Figure 1.- Edge Clamp Reflective Element.

- 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.

REFLECTIVE ELEMENTS INSTALLATION ONTO DOCKING TARGET

(ASSY OPS/ULF4/FIN 1) Page 3 of 6 pages

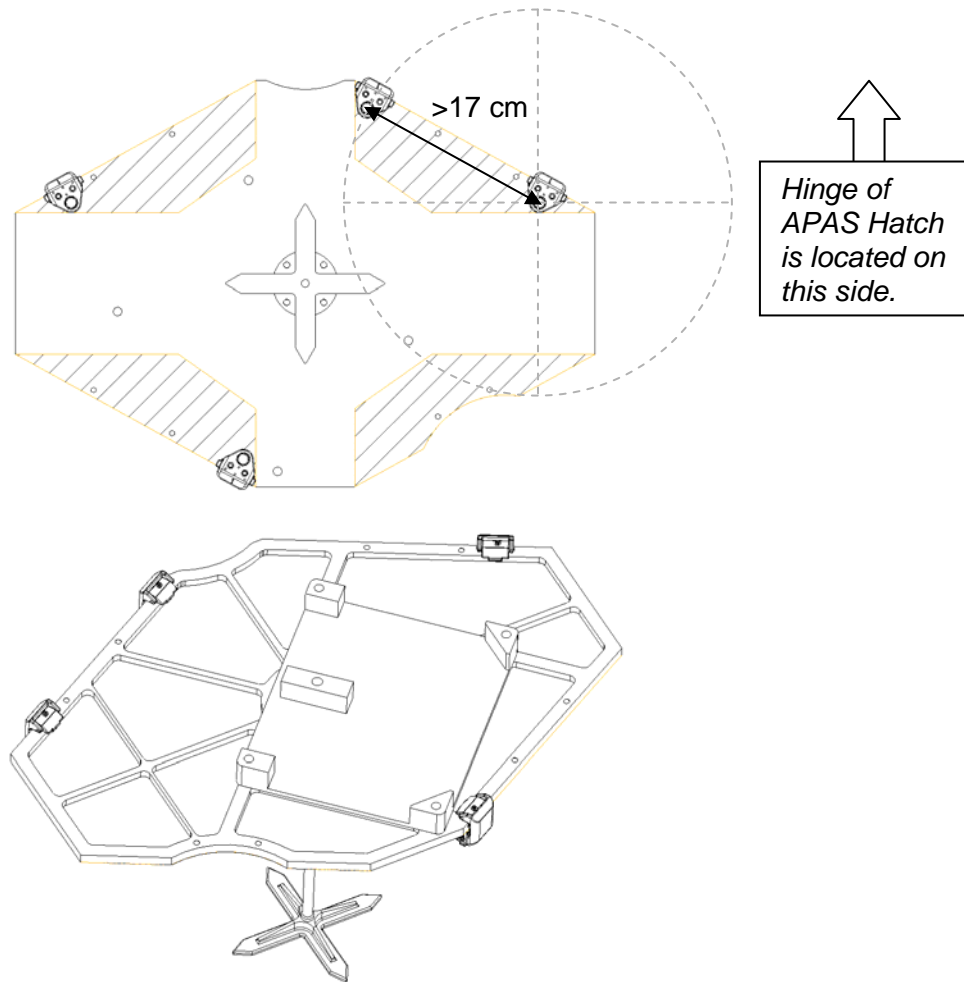


Figure 2.- Placement of Edge Clamp Reflective Elements.

- 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).

REFLECTIVE ELEMENTS INSTALLATION ONTO DOCKING TARGET

(ASSY OPS/ULF4/FIN 1) Page 4 of 6 pages

- 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.

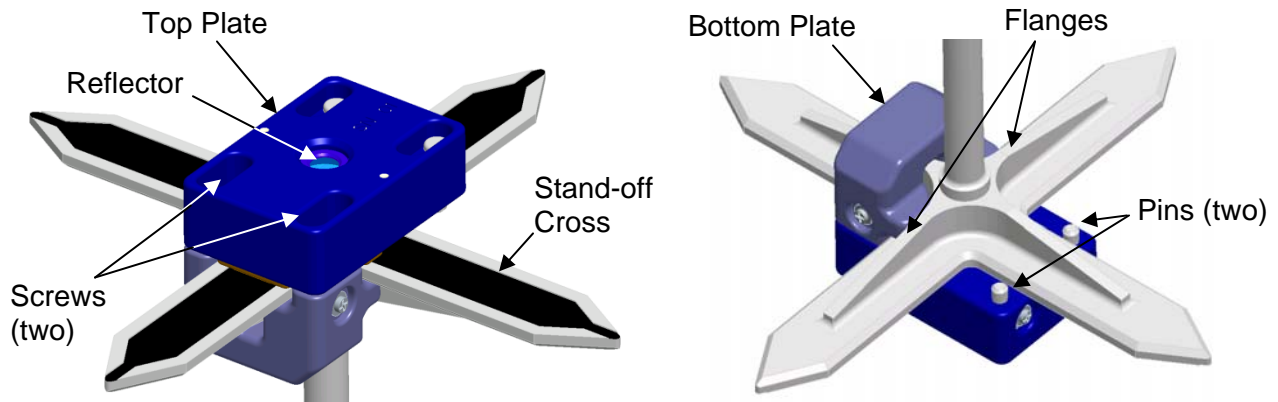


Figure 3.- Cross Clamp Reflective Element.

- 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.

REFLECTIVE ELEMENTS INSTALLATION ONTO DOCKING TARGET

(ASSY OPS/ULF4/FIN 1) Page 5 of 6 pages

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.

REFLECTIVE ELEMENTS INSTALLATION ONTO DOCKING TARGET

(ASSY OPS/ULF4/FIN 1) Page 6 of 6 pages

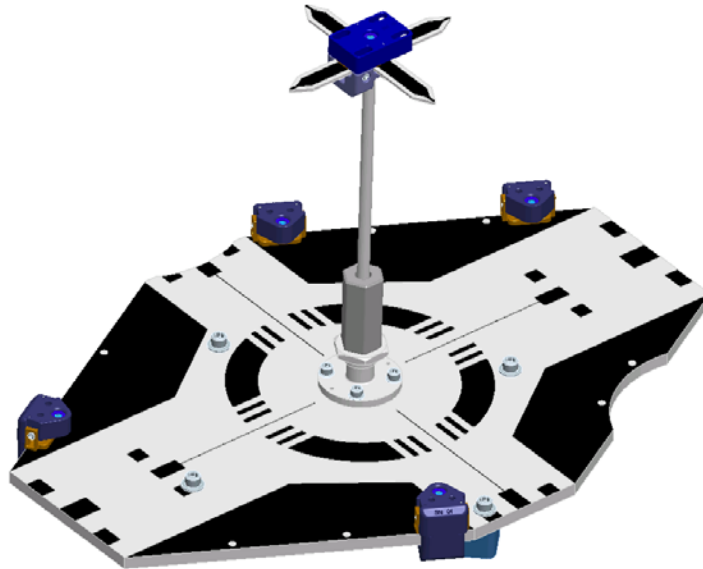


Figure 4.- Reflective Elements Kit Completely Installed.

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**.

PAYLOADS

PAYLOADS

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DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/ULF4/FIN 1)

Page 1 of 5 pages

OBJECTIVE:

This procedure will be used to transfer frozen science samples from both ISS MELFI-1 (JPM1D4) and MELFI-2 (LAB1S2) to Shuttle Glacier. One Double Coldbag will be used to transfer samples from MELFI to Glacier. This activity is performed by ISS and Shuttle crewmembers.

PARTS:

Double Coldbag S/N 1012

LtWt Cryo Gloves (Mechanix Wear)

Coldplate/Wireway-Cover P/N 03000 (if required)

STS IFM TOOLS (MF14H):

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

1/4" to 3/8" Adapter, 1/4" Drive

4" Ext, 1/4" Drive

Ratchet, 1/4" Drive

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

ITEMS TO UNSTOW WITHIN PROCEDURE:

Icepacs -32° C (two) (unstow step 2)

3x5 Mesh Bags, Blood (seven) (unstow step 2)

JAXA Hair (three) (unstow step 2)

JAXA Myolab (four) (unstow step 2)

JAXA Fish Scales (five) (unstow step 2)

JAXA NeuroRad (four) (unstow step 2)

1. UNLOCK GLACIER DOOR

MF28E/G
(Glacier)

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

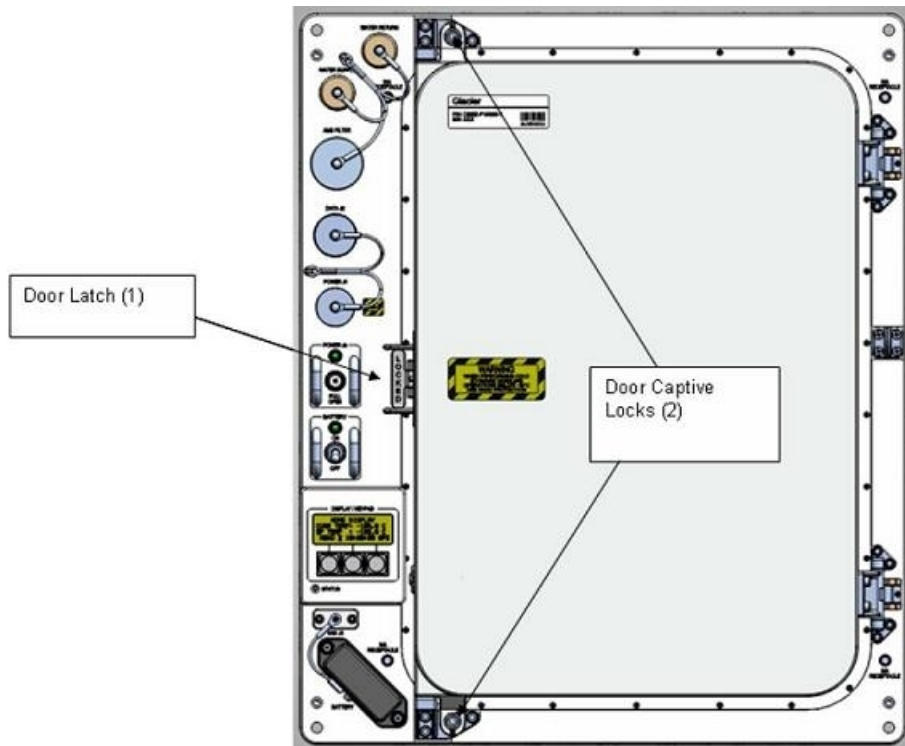


Figure 1. Glacier Configuration.

1.2 Stow tools.

MELFI-1
MELFI-2

2. PACKING MELFI SAMPLES INTO DOUBLE COLDBAG

WARNING

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

CAUTION

1. Minimize exposure of MELFI trays, frozen Icepacs, and samples to ambient air to prevent increased sample temperatures.
2. Double Coldbag lid should remain closed when the internal volume is not being accessed.

NOTE

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

2.1 Don Gloves.

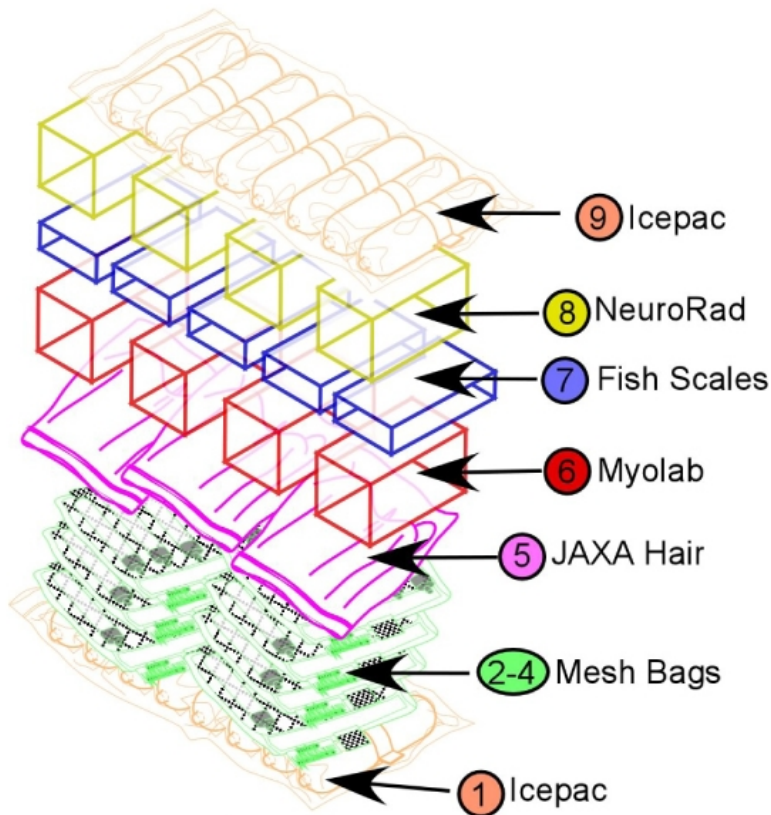
2.2 Pack Double Coldbag with samples from MELFI-1 and MELFI-2 per Figure 2.

DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/ULF4/FIN 1)

```

*****
*
* If Tray is stuck and cannot be removed from Dewar
*
* Insert Small Coldplate/Wireway Cover completely between
* Tray and Dewar wall.
*
* Firmly holding both Small Coldplate/Wireway Cover and
* Tray Handle, remove Tray from Dewar.
*
* Reference: 4.010 MELFI REMOVAL OF A STUCK TRAY,
* (US PODF: MELFI) if needed
*
*****
    
```



Step	From MELFI Location*	Description
1	MELFI-1 2-C-1	Insert Icepac belt -32°C on bottom
2	MELFI-1 1-C-4	Insert HRP Blood mesh bag (two)
3	MELFI-1 2-B-4	Insert HRP Blood mesh bag (two)
4	MELFI-1 2-D-4	Insert HRP Blood mesh bag (three)
5	MELFI-1 3-C-1	Insert Jaxa Hair ziplocks (three)
6	MELFI-2 2-B-3,4	Insert Jaxa Myolab ziplocks (four)
7	MELFI-2 2-D-3,4	Insert Jaxa Fish Scale ziplocks (five)
8	MELFI-2 1-C-3,4	Insert Jaxa NeuroRad ziplocks (four)
9	MELFI-1 2-C-2	Insert Icepac belt -32°C on top

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

Figure 2. Double Coldbag Packing Configuration.

3. TRANSFERRING DOUBLE COLDBAG FROM ISS TO SHUTTLE

DESCENT SAMPLE TRANSFER FROM MELFI TO GLACIER

(ASSY OPS/ULF4/FIN 1)

Page 4 of 5 pages

ISS to Shuttle

3.1 Transfer Double Coldbag to shuttle middeck.

MF28E/G (Glacier)

4. UNPACKING DOUBLE COLDBAG AND INSERTING SAMPLES INTO GLACIER

NOTE

1. First priority is to perform packing as quickly as possible.
2. Packing foam secured to bottom of each tray can be left in place.
3. Loose cushion foam may be left in tray if there is room, or it can be trashed.

Tray D

4.1 Open Glacier Door.

4.2 Insert JAXA NeuroRad ziplocks (four).

Tray C

4.3 Insert JAXA Fish Scale Ziplocks (five).

Tray B

4.4 Insert JAXA Myolab Ziplocks (four) and JAXA Hair Ziplocks (three).

Tray A

4.5 Insert HRP Blood Mesh bags (seven).

5. Close Glacier Door.

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

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

WARNING

Glacier Door Captive Locks (two) must be torqued to 75 in-lbs to prevent door from opening during launch and return.

7. Fasten Glacier Door Captive Locks (two), torque to 75 in-lbs using 3/16" Hex Head, 3/8" Drive; 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.

8. TEMPORARY STOW DOUBLE COLDBAG AND ICEPACS

8.1 Transfer Double Coldbag to location on ISS that allows protection from kick loads.

8.2 Remove Icepac Belt -32° C (two) from Double Coldbag and place in temporary stowage location to air dry.

8.3 Notify **MCC-H** that transfer activities completed and locations of Double Coldbag and Icepacs.

9. GROUND UPDATES FOR IMS

Ground updates IMS for the following parts:

Double Cold Bag S/N 1012 TO: per crew call down (step 8.3)

Icepac Belt -32° C (two) TO: per crew call down (step 8.3)

3x5 Mesh Bags (seven) TO: Middeck Glacier

JAXA Hair (three) TO: Middeck Glacier

JAXA Myolab (four) TO: Middeck Glacier

JAXA Fish Scales (five) TO: Middeck Glacier

JAXA NeuroRad (four) TO: Middeck Glacier

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GAP ACTIVATION

(ASSY OPS/ULF4/FIN 1)

Page 1 of 5 pages

OBJECTIVE:

This procedure will be used for National Laboratory Pathfinder (NLP) Vaccine and Micro-2 activities.

For NLP-Vaccine, only steps 2, 6 and 11 of this procedure will be executed because these GAPs are stowed at ambient.

For Micro-2 the entire procedure will be executed to access the Micro-2 GAPs inside Commercial Generic Bioprocessing Apparatus (CGBA). This includes powering down CGBA, accessing the internal volume of CGBA, and retrieving and activating of Micro-2 GAPs. It also contains the proper steps to close CGBA and restore power.

PARTS:

NLP-Vaccine

Group Activation Packs (GAPs)

Hand Crank

Ziplock Bag (if required)

Micro-2

Group Activation Packs (GAPs)

Hand Crank (located in foam on left side of CGBA unit)

Ziplock Bag (if required)

Science	Location	GAP labels
NLP Vaccine	MA16F	A-H
Micro-2 (CGBA-2)	MF71E	M1-M16

1. If Vaccine activity
| Perform only steps 2,6,11.

If Micro-2 activity, perform all.

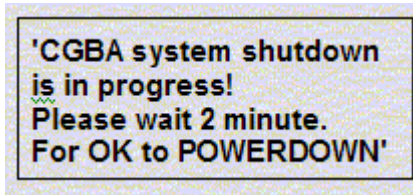
2. Check Flight Plan Detail Page for which GAPs to activate.
Record information in Table 1 in step 6.1

CAUTION

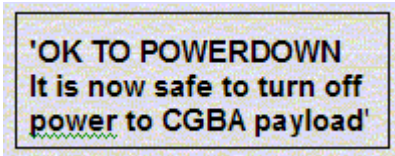
To protect science, the CGBA power off time should not exceed 30 minutes.

MF71E

3. CGBA POWEROFF
 - 3.1 On Keypad:
pb MENU → Press
pb 7 Shutdown → Press
pb ENTER → Press
 - 3.2 On Shutdown CGBA screen:
pb 1 Shutdown System → Press
pb ENTER → Press
 - 3.3 Verify CGBA display indicates the following:



3.4 Verify CGBA display indicates the following:



```
*****  
*  
* If CGBA Computer display does not indicate above information  
* | Notify MCC-H and continue.  
*  
*****
```

3.5 cb MAIN POWER → Open

3.6 ✓LED-MAIN POWER – Off

4. CGBA POWER OFF AND DISCONNECTION

ML85E

4.1 sw DC 10 AMP MNB S4 → OFF
cb DC 10 AMP MNB CB4 → Open

MF71E

4.2 DC JUMPER CGBA ←|→ POWER-IN 28 VDC J1

4.3 Tether Power Cable out of the way as needed.

5. CGBA REMOVAL FROM MIDDECK LOCKER

5.1 Unlatch, open CGBA locker door.

5.2 Grasp CGBA, pull unit out of locker using side handles.
If needed, pull Velcro tabs to deploy CGBA recessed handles (push recessed handles back into place when done).

5.3 Temporarily stow CGBA in a secure location for access operations.

5.4 Open CGBA lid by lifting Velcro tabs on each side (two) of Nomex Cover.

6. ACTIVATING GAP EXPERIMENT

6.1 Record Activation Start MET in Table 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 6, then seal GAP in Ziplock Bag, stow.
* | ✓MCC-H with Glass Barrel and GAP number(s).
*

6.4 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.

6.5 Detach Hand Crank.

6.6 Shake GAP firmly by accelerating in a back and forth motion along the lengthwise axis of the GAP four times.

6.7 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.
*

6.8 Restow GAP in original location.

6.9 Repeat step 6.2 to 6.8 until all GAPs identified in Table 1 are activated.

6.10 Record Activation Stop MET Table 1.

6.11 Restow Hand Crank in original location.

7. INSERTION OF CGBA INTO MIDDECK

7.1 Close CGBA lid, attach Velcro tabs.



7.2 Slide CGBA into locker, close locker door, and latch.

8. CONNECTING POWER TO CGBA

8.1 ✓cb MAIN POWER – Open
✓LED-MAIN POWER – Off

ML85E 8.2 ✓cb DC 10 AMP MNB CB4 – Open
✓sw DC 10 AMP MNB S4 – OFF

MF71E 8.3 Connect Power cable:
DC JUMPER CGBA →|← POWER-IN 28 VDC J1

9. CGBA POWERON

ML85E 9.1 cb DC 10 AMP MNB CB4 → Close
sw DC 10 AMP MNB S4 → ON

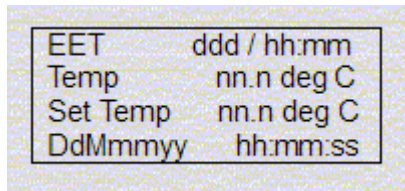
MF71E 9.2 cb MAIN POWER → Close
✓LED-MAIN POWER – On

```
*****
*
* If no LED
* | Perform CGBA INCORRECT (NO) DISPLAY, all (SODF: ASSY
* | OPS: PAYLOADS: CGBA), then:
*
*****
```

10. CGBA CHECKOUT

10.1 Verify CGBA fan is running (check airflow at EXHAUST)

10.2 Verify CGBA display indicates the following:



11. ✓MCC-H and provide METs recorded in Table 1.

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OBJECTIVE:

This procedure will be used for National Laboratory Pathfinder (NLP) Vaccine and Micro-2 activities.

For NLP-Vaccine, only steps 2, 6 and 11 of this procedure will be executed because these GAPs are stowed at ambient.

For Micro-2 the entire procedure will be executed to access the Micro-2 GAPs inside Commercial Generic Bioprocessing Apparatus (CGBA). This includes powering down CGBA, accessing the internal volume of CGBA, and retrieving and terminating of Micro-2 GAPs. It also contains the proper steps to close CGBA and restore power.

PARTS:

NLP-Vaccine

- Group Activation Packs (GAPs)
- Hand Crank
- Ziplock Bag (if required)

Micro-2

- Group Activation Packs (GAPs)
- Hand Crank (located in foam on left side of CGBA unit)
- Ziplock Bag (if required)

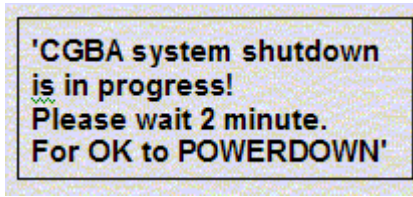
Science	Location	GAP labels
NLP Vaccine	MA16F	A-H
Micro-2 (CGBA-2)	MF71E	M1-M16

1. If Vaccine activity
 | Perform only steps 2, 6, 11.
 If Micro-2 activity, perform all.
2. Check Flight Plan Detail Page for which GAPs to terminate.
 Record information in Table 1 in step 6.1.

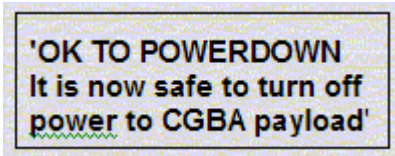
CAUTION
To protect science, the CGBA power off time should not exceed 30 minutes.

MF71E

3. CGBA POWEROFF
 - 3.1 On Keypad:
 pb MENU → Press
 pb 7 Shutdown → Press
 pb ENTER → Press
 - 3.2 On Shutdown CGBA screen:
 pb 1 Shutdown system → Press
 pb ENTER → Press
 - 3.3 Verify CGBA display indicates the following:



3.4 Verify CGBA display indicates the following:



```

*****
*
* If CGBA Computer display does not indicate above information
* | Notify MCC-H and continue.
*
*****

```

3.5 cb MAIN POWER → Open

3.6 ✓LED-MAIN POWER – Off

4. CGBA POWER OFF AND DISCONNECTION

ML85E

4.1 sw DC 10 AMP MNB S4 → OFF
cb DC 10 AMP MNB CB4 → Open

MF71E

4.2 DC JUMPER CGBA ←|→ POWER-IN 28 VDC J1

4.3 Tether Power Cable out of the way as needed.

5. CGBA REMOVAL FROM MIDDECK LOCKER

5.1 Unlatch, open CGBA locker door.

5.2 Grasp CGBA, pull unit out of locker using side handles
If needed, pull Velcro tabs to deploy CGBA recessed handles (push recessed handles back into place when done).

5.3 Temporarily stow CGBA in a secure location for access operations.

5.4 Open CGBA lid by lifting Velcro tabs on each side (two) of Nomex Cover.

6. TERMINATING GAP EXPERIMENT

6.1 Record Termination Start MET in Table 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 6, then seal GAP in Ziplock Bag, stow.
* | ✓ MCC-H with Glass Barrel and GAP number(s).
*

6.4 Unstow Hand Crank and attach to GAP.
Slowly rotate the Hand Crank ↻ until lower edge of pressure plate aligns with lower edge of the first mark labeled "TERMINATION" on the side of GAP housing.

6.5 Detach Hand Crank.

6.6 Shake GAP firmly by accelerating in a back and forth motion along the lengthwise axis of the GAP four times.

6.7 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.
*

6.8 Restow GAP in original location.

6.9 Repeat step 6.2 to step 6.8 until all GAPs identified in Table 1 are terminated.

6.10 Record Termination Stop MET in Table 1.

6.11 Restow Hand Crank in original location.

MF71E 7. INSERTION OF CGBA INTO MIDDECK

7.1 Close CGBA lid, attach Velcro tabs.

WARNING
CGBA must be inserted with both latches closed for safe entry.

7.2 Slide CGBA into locker, close locker door, and latch.

8. CONNECTING POWER TO CGBA

8.1 ✓cb MAIN POWER – Open
✓LED-MAIN POWER – Off

ML85E 8.2 ✓cb DC 10 AMP MNB CB4 – Open
✓sw DC 10 AMP MNB S4 – OFF

MF71E 8.3 Connect Power cable:
DC JUMPER CGBA →|← POWER-IN 28 VDC J1

9. CGBA POWERON

ML85E 9.1 cb DC 10 AMP MNB CB4 → Close
sw DC 10 AMP MNB S4 → ON

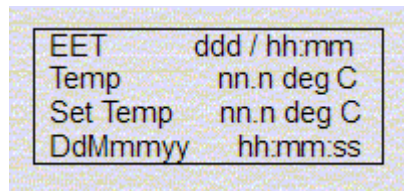
MF71E 9.2 cb MAIN POWER → Close
✓LED-MAIN POWER – On

*
* If no LED
* | Perform CGBA INCORRECT (NO) DISPLAY, all (SODF:
* | ASSY OPS: PAYLOADS: CGBA), then:
*

10. CGBA CHECKOUT

10.1 Verify CGBA fan is running (check airflow at EXHAUST).

10.2 Verify CGBA display indicates the following:



11. ✓MCC-H and provide METs recorded in Table 1.

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CGBA ADJUST SET TEMP

(ASSY OPS/ULF4/FIN 1)

Page 1 of 1 page

OBJECTIVE:

This procedure will direct the crew on the proper steps for adjusting the set temperature on the Commercial Generic Bioprocessing Apparatus (CGBA).

NOTE

If MENU selection is not made within 30 seconds, computer will time out and return to status display.

1. Check Flight Plan Detailed Page for new set temperature.
- MF71E 2. On keypad
pb MENU → Press

pb 4 → Press

pb ENTER → Press
3. Verify display indicates

Enter new Set Temp

Temp: nn.n
4. Enter new Set Temp (nn.n)
pb ENTER → Press
5. Verify display indicates

New Set Temp

nn.n deg C

1 = Save Temp
9 = Reenter Temp

*
* If displayed Set Temp is incorrect
* | pb 9 → Press
* |
* | pb ENTER → Press
* |
* | Repeat steps 4 and 5.
* |

6. pb 1 → Press

pb ENTER → Press
7. Notify **MCC-H** activity is complete

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MYCO BODY SAMPLE COLLECTION

(ASSY OPS/ULF4/FIN)

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)

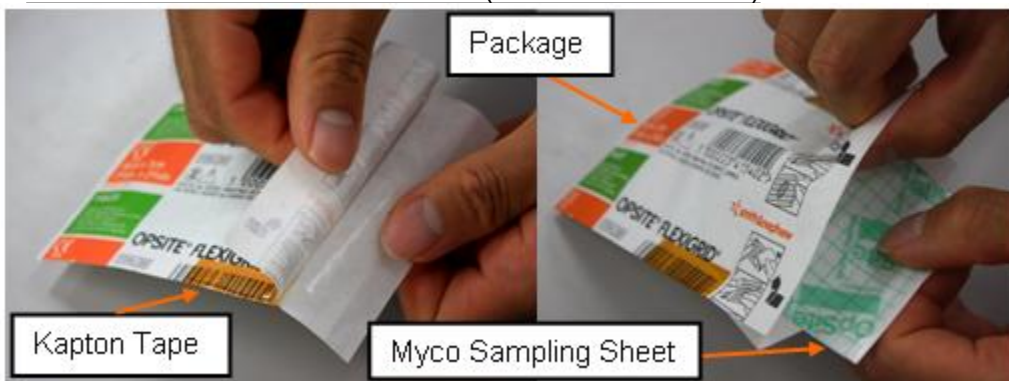


Figure 1. Opening the package of Myco Sampling Sheet

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.
 Tmpy stow the package.
 Refer to Figure 1.

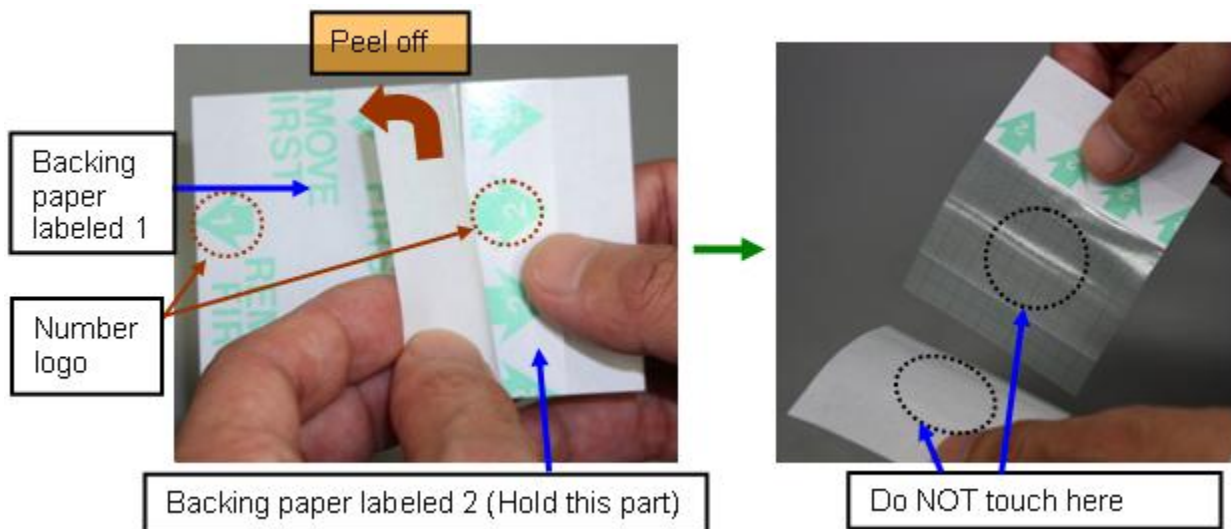


Figure 2. Peeling off backing paper labeled 1

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)
 Tmpy stow the backing paper labeled 1 in the package. (for use in step 2.7)
 Refer to Figure 2.

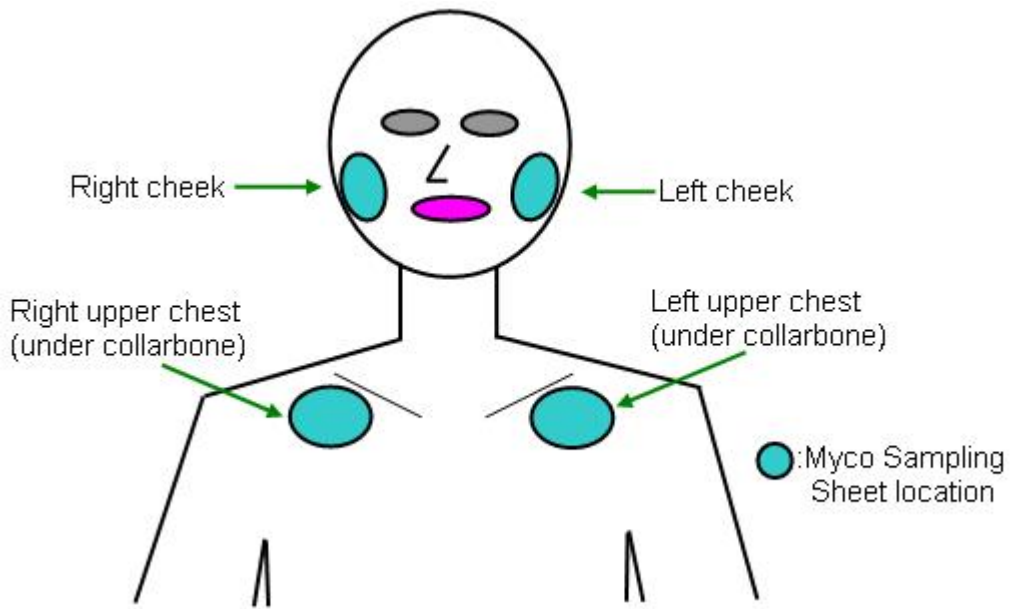


Figure 3. Myco Sampling Sheet location

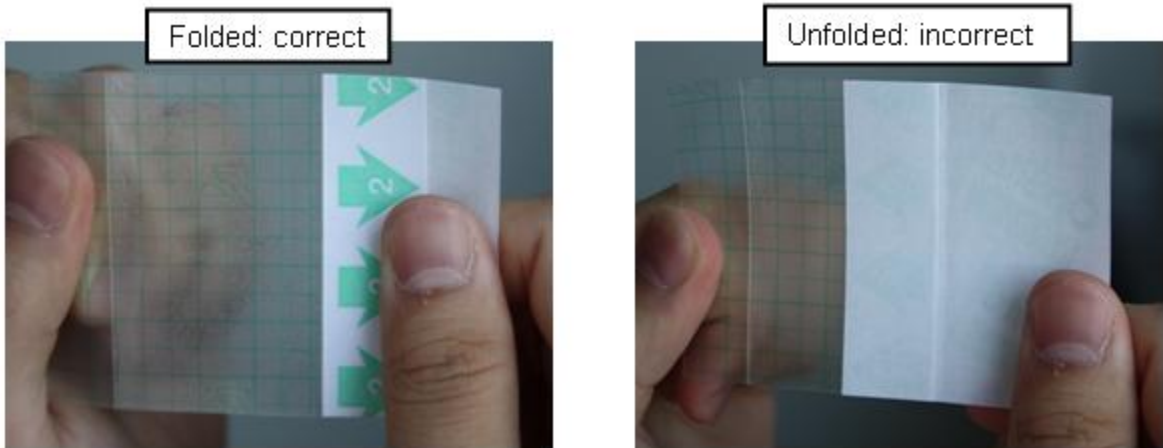
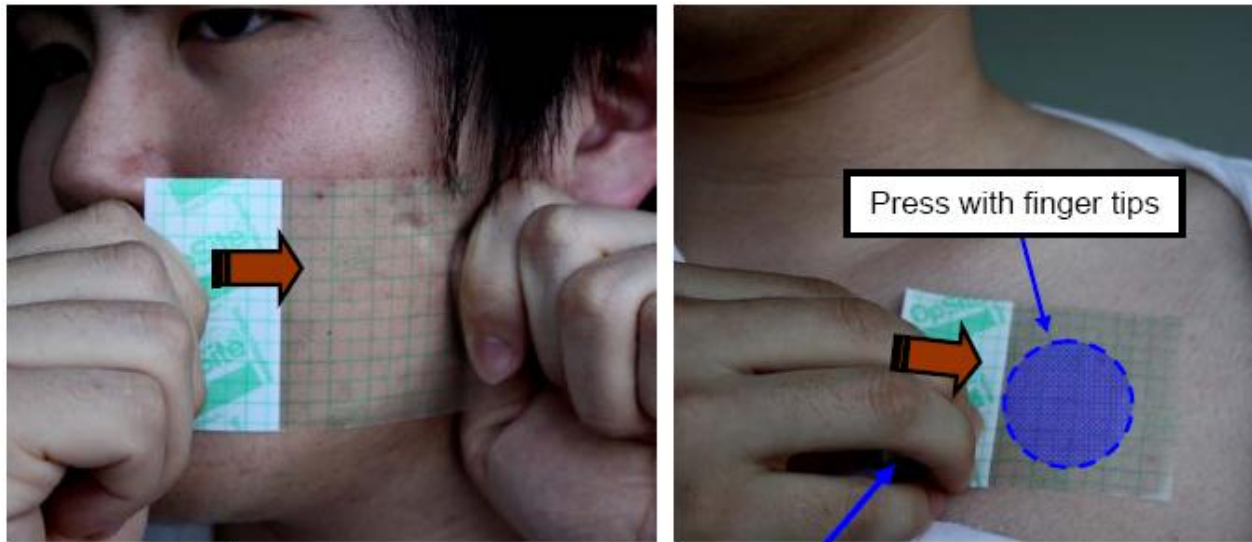


Figure 4. Unfolded and folded backing paper labeled 2



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.

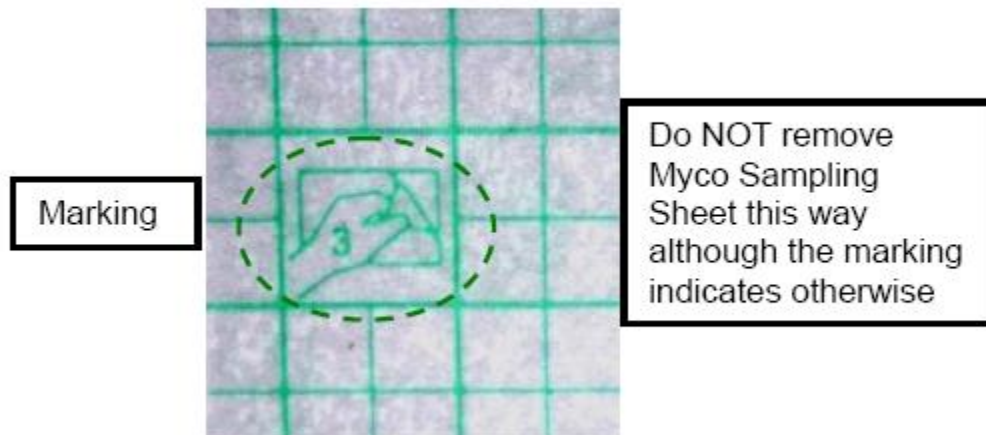


Figure 6. The marking on Myco Sampling Sheet

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.

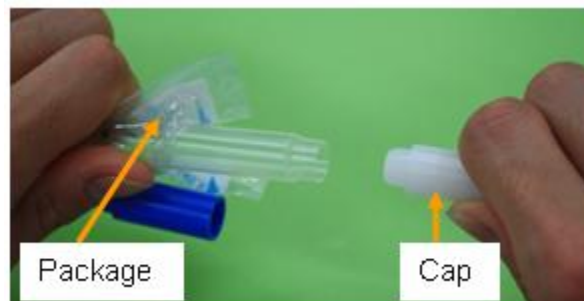


Figure 8. Removing the tube cap

- 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.

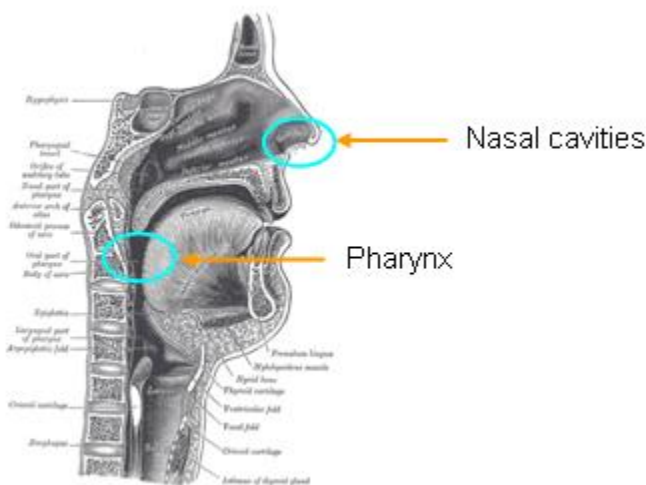


Figure 10. Myco Swab location

- 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.

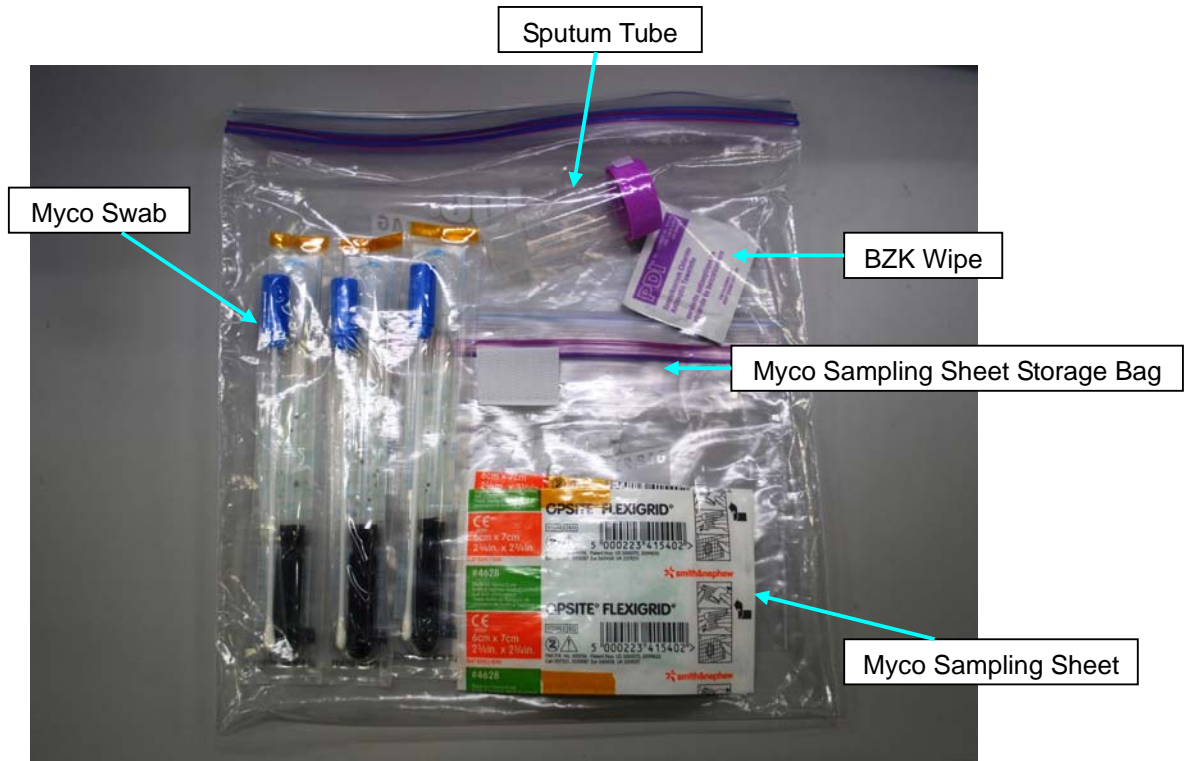
- 4.2 Repeat steps 3.1 to 3.7 for the posterior pharynx. (Use mirror if necessary)
Refer to Figure 10.

5. BODY SAMPLE COLLECTIONS 4 (SPUTUM TUBE)

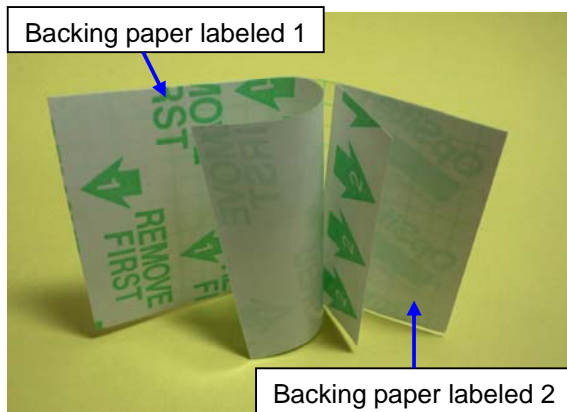
- 5.1 Remove Sputum Tube from Myco Kit.
- 5.2 Remove cap from Sputum Tube. (rotate ccw).
- 5.3 Expectorate sputum into Sputum Tube.
If crew could not expectorate sputum,
| Expectorate saliva into Sputum Tube.
- 5.4 Close Sputum Tube cap.
- 5.5 Stow Sputum Tube in Myco Kit.

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)



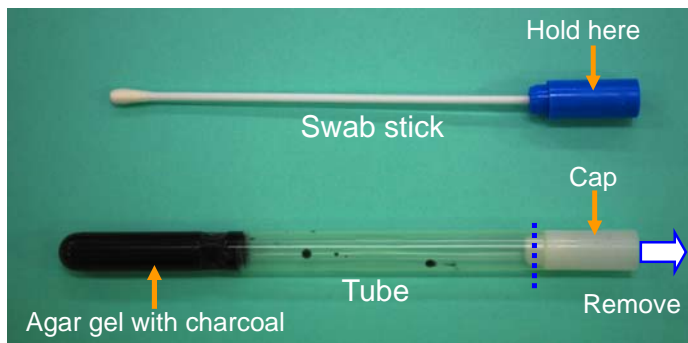
Myco Kit



Myco Sampling Sheet



Myco Sampling Sheet Storage Bag



Myco Swab



Sputum Tube

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF4/FIN)

Page 1 of 14 pages

OBJECTIVE:

This procedure defines the steps needed for an operator to correctly set-up an Anthropometer Base and D2Xs Camera, correctly measure subject data, and then correctly take down and stow Anthropometer Base and D2Xs Camera for the Spinal Elongation investigation.

PARTS:

Spinal Elongation Kit

TOOLS:

12-24mm Lens

4GB EVA Flash Card (empty)

CF Card Adapter

D2Xs Camera

Multi-Use Arm (Shuttle)

SB-800 Flash

Shutter Release Cable (labeled Remote Cord Assembly)

1. UNSTOW HARDWARE

- 1.1 If first session for Spinal Elongation,
|
| Unstow from ISS (consult stowage notes):
| Spinal Elongation Kit
| Retrieve from Shuttle Location:
| Multi-Use Arm

If subsequent session for Spinal Elongation,
|
| Retrieve from tmpiry stow location on Shuttle:
| Spinal Elongation Kit
| Multi-Use Arm

- 1.2 Retrieve from Shuttle:
12-24mm Lens
CF Card Adapter
D2Xs Camera
SB-800 Flash

2. SETUP SPINAL ELONGATION HARDWARE ON CREW SEAT

- 2.1 CDR SEAT PWR BUS SEL - AC 2 (up)
- 2.2 Remove parachute from CDR seat (attached by velcro strap) and tmpiry stow.
- 2.3 Configure CDR seat back in entry configuration and move seat all the way forward.
- 2.4 Raise the seat pan so it is slightly above the center console.

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF4/FIN)

Page 2 of 14 pages

- 2.5 Wrap shoulder harness around back of CDR seat and tie. Remove seat pan cushion and place on top of tied shoulder harness to line up with Velcro on back of seat. Refer to Figure 1.



Figure 1. Shoulder Harness Wrapped Around CDR Seat Back

- 2.6 Remove head rest from top of CDR seat and tmpy stow.

Spinal
Elongation
Kit

- 2.7 Unstow:

Anthropometer Base
Slider Post
Head Bar

Place hardware in CDR seat for setup.

- 2.7.1 Remove seat cover enough that Anthropometer Base will lay flat against the top of the seat.

CAUTION

1. The Anthropometer Base should easily slide into the seat and should not be forced. If forced, the hardware may become jammed, preventing the seat to be configured correctly for entry.
2. Spinal hardware should not be used as a hand-hold to move oneself.

- 2.7.2 To setup Anthropometer Base, hold Anthropometer Base by the anchor point, slide the legs of the Anthropometer Base into the head rest holes on top of the seat. Refer to Figure 2.
- 2.7.3 ✓Anthropometer leg with the hole is oriented closest to the headrest release knob.
- 2.7.4 ✓Anthropometer Base label and lanyard face aft.

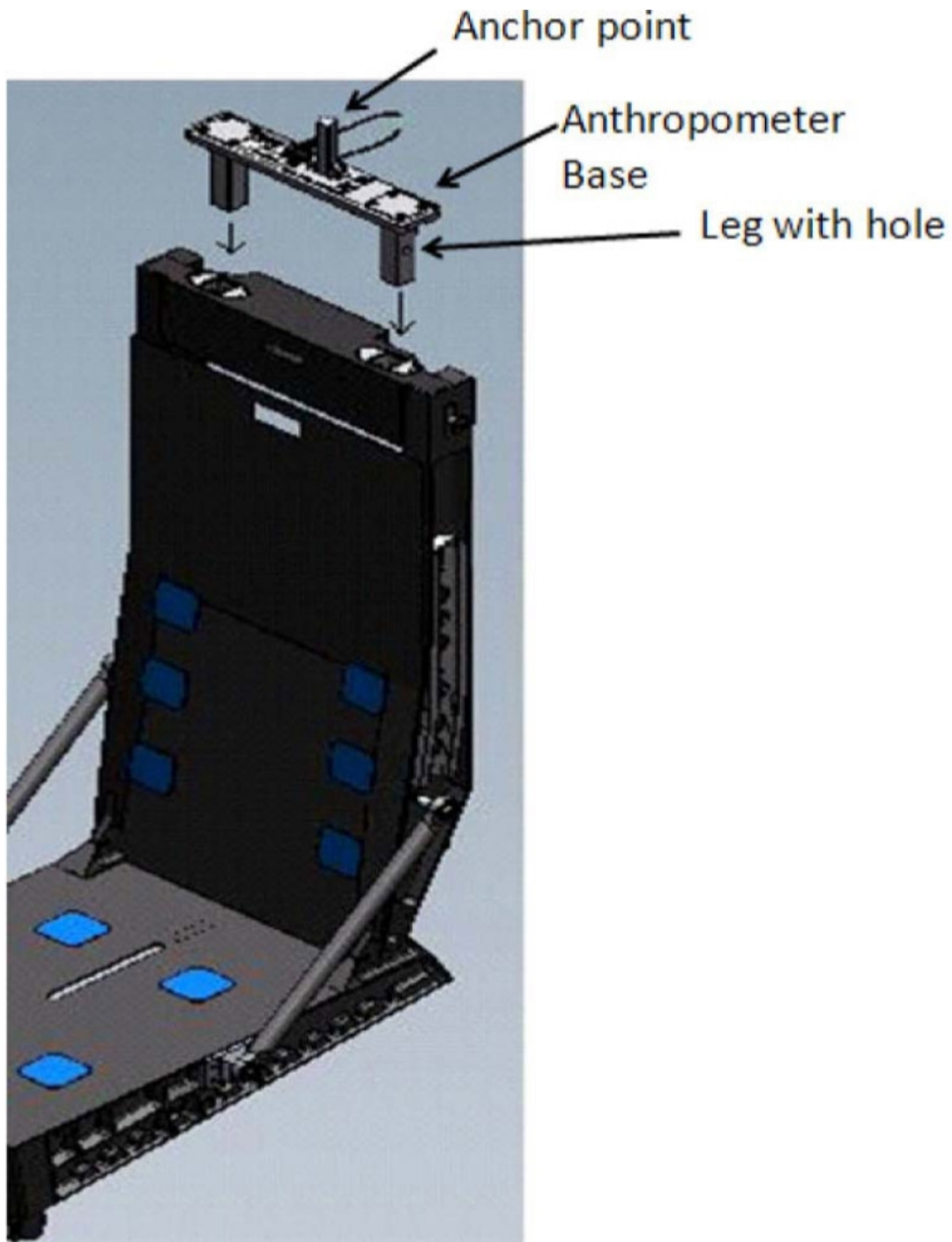


Figure 2. Anthropometer Base on CDR Seat

- 2.7.5 Remove pin from Anthropometer Base.
- 2.7.6 Attach Slider Post onto anchor point of Anthropometer Base (ensure numbers face toward PLT seat).
- 2.7.7 Reinstall pin to secure Slider Post.
- 2.7.8 Insert Head Bar into slot on Slider Post (loosen adjustment screw if necessary to insert Head Bar).

Refer to Figure 3.

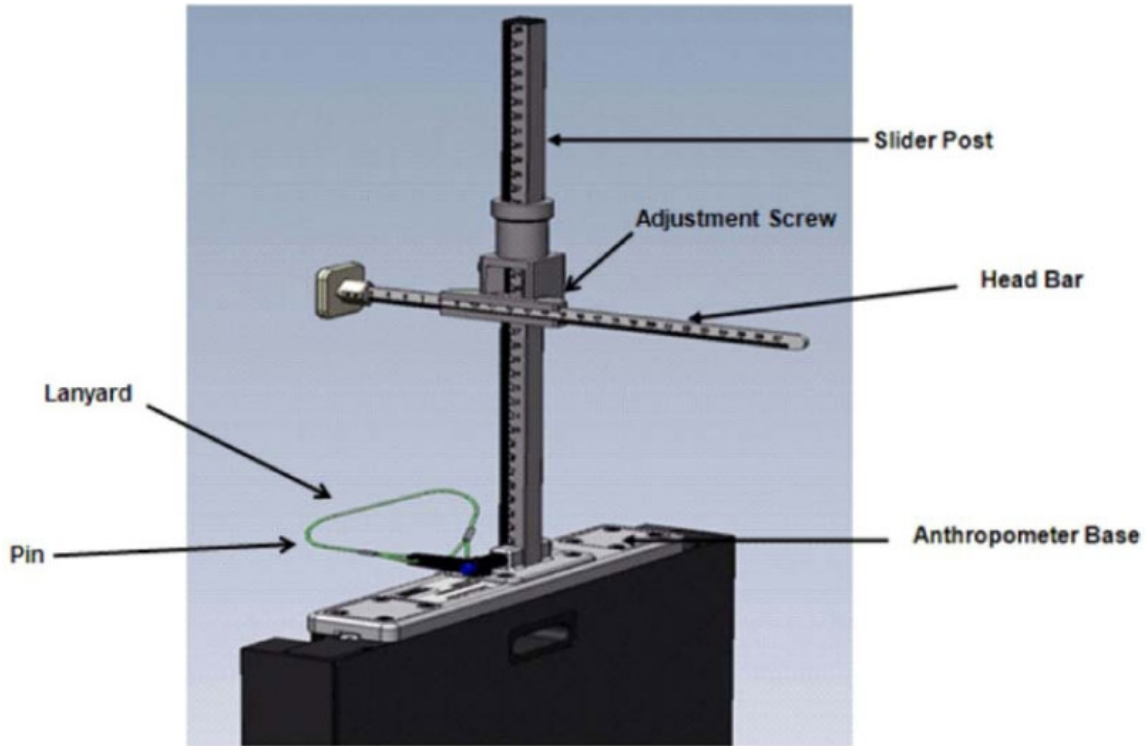


Figure 3. Final Assembly of Anthropometer Base on CDR Seat

3. LAP BELT SETUP

3.1 Lengthen lap belt straps and wrap lap belt straps around the joint between the seat and the seat back (black metal frame) by wrapping from the inside of the frame then around the joint (point A to point B in Figure 4).

3.1.1 Ensure that lap belt adjustment is accessible and possible. Refer to Figures 4 and 5.

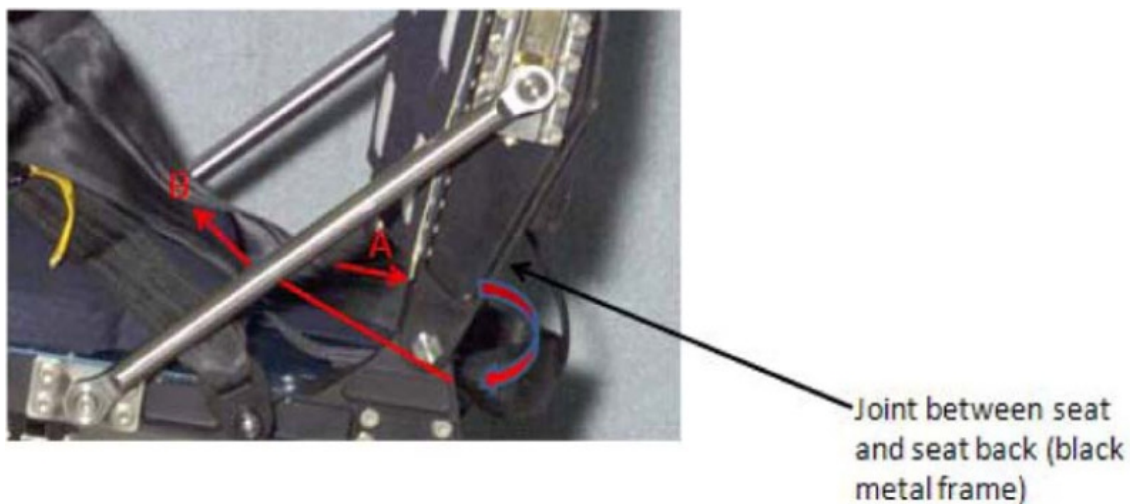


Figure 4. Lap Belt and Seat Back Joint Illustration

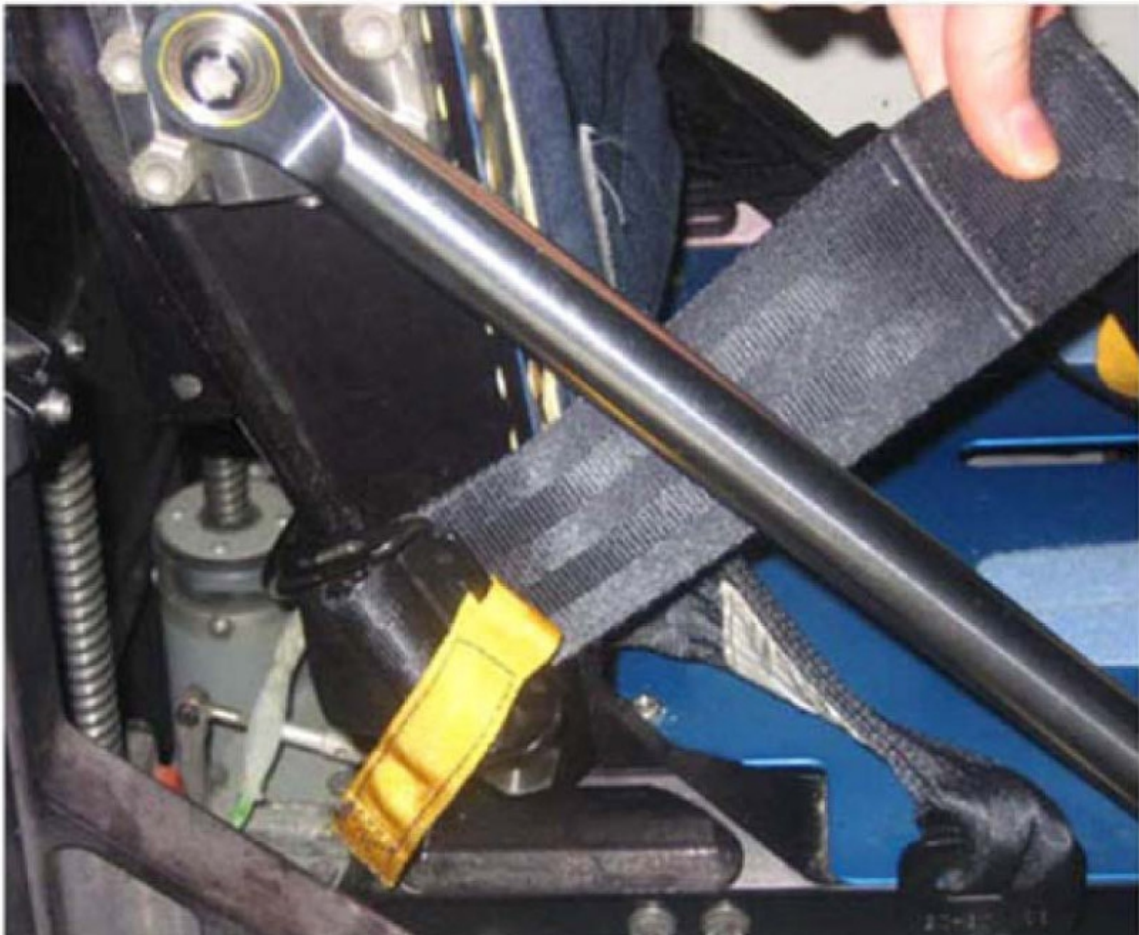


Figure 5. Joint Between Seat and Seat Back (Black Metal Frame)

4. D2XS CAMERA SETUP AND CONFIGURE

- 4.1 Install SB-800 Flash onto D2Xs Camera (if not installed).
Install 12-24mm Lens onto D2Xs Camera (if not installed).
- 4.2 Install Shutter Release Cable onto D2Xs Camera (if not installed).
- 4.3 Check memory of 4GB EVA Flash Card in D2Xs Camera is empty.
If memory of 4GB EVA Flash Card in D2Xs Camera is not empty,

Remove 4GB EVA Flash Card from D2Xs Camera and tmpy stow.
Retrieve 4GB EVA Flash Card with empty memory and install in D2Xs Camera.
- 4.4 D2Xs Camera settings should be as follows:
 Lens - 12-24mm Lens, set at 15mm
 Lens Focus Mode - M/A
 Body Focus Mode - S
 ✓Batt installed
 ✓Flash Card installed
 Pwr - ON

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF4/FIN)

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Top LCD:

- ✓Batt
- ✓Frames remaining sufficient
- Exp Comp - 0.0
- Exp Mode - A
- f/stop - 11
- Meter - Matrix
- Diopter - Adjust
- Frame Rate - S
- ✓BKT disabled - 0F

Rear LCD:

- ✓ISO - 100
- ✓QUAL - RAW
- ✓WB - 0, A
- AF Area Mode - []
- ✓Focus Area - Center
- ✓Focus Selector Lock - L

SB-800 Flash Settings:

- ✓Diffuser Dome installed
- pb ON/OFF → ON
- ✓MODE - TTL BL
- ✓Exp Comp - 0 EV

Tilt - Direct

NOTE

Multi-Use Arm may have to be adjusted to achieve the correct angle.

- 4.5 Position D2Xs Camera on Multi-Use Arm in a vertical orientation (SB-800 Flash towards forward) and install Multi-Use Arm to R6 camera shoe (forward towards window as seen in Figure 6).

Mount D2Xs Camera on Multi-Use Arm such that D2Xs Camera is orthogonal to CDR seat. Refer to Figure 6.

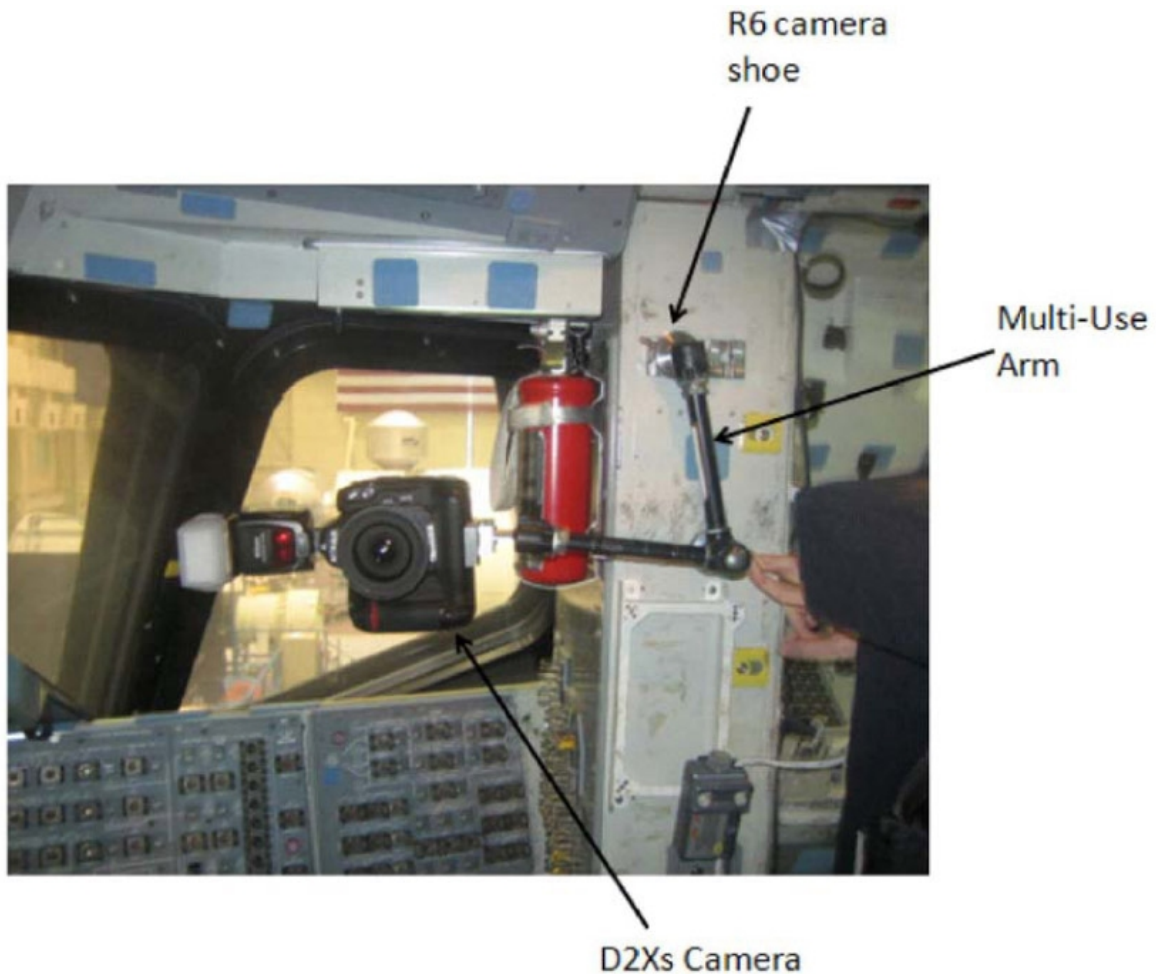


Figure 6. D2Xs Camera Positioned on R6 Camera Shoe

- 4.6 Autofocus on CDR seat (specifically on the side of the seat with the circle as seen in Figure 8).

NOTE

Body Focus Mode - M will eliminate the possibility of the focus shifting to another subject.

- 4.7 After autofocusing on the seat, change Body Focus Mode - M.
- 4.8 Reposition camera to ensure D2Xs Camera is parallel to R6 wall and not pitched to ceiling or deck. Refer to Figure 7.

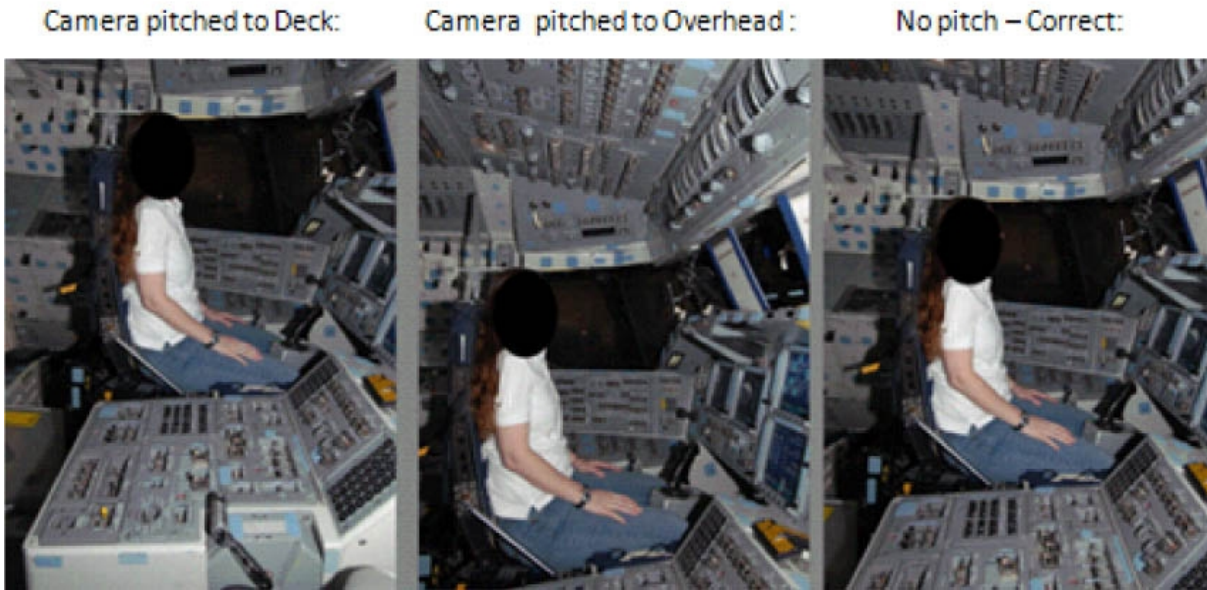


Figure 7. Views based on different camera positions.

- 4.9 Take a test photograph. Entire profile of the CDR seat should appear in the picture. Refer to Figure 8 for an example. (Picture should have the entire edge of the center console, the edge of the seat pan, the back of the CDR seat, the top of the Slider Post and focus should be centered on the black holes within the area circled).

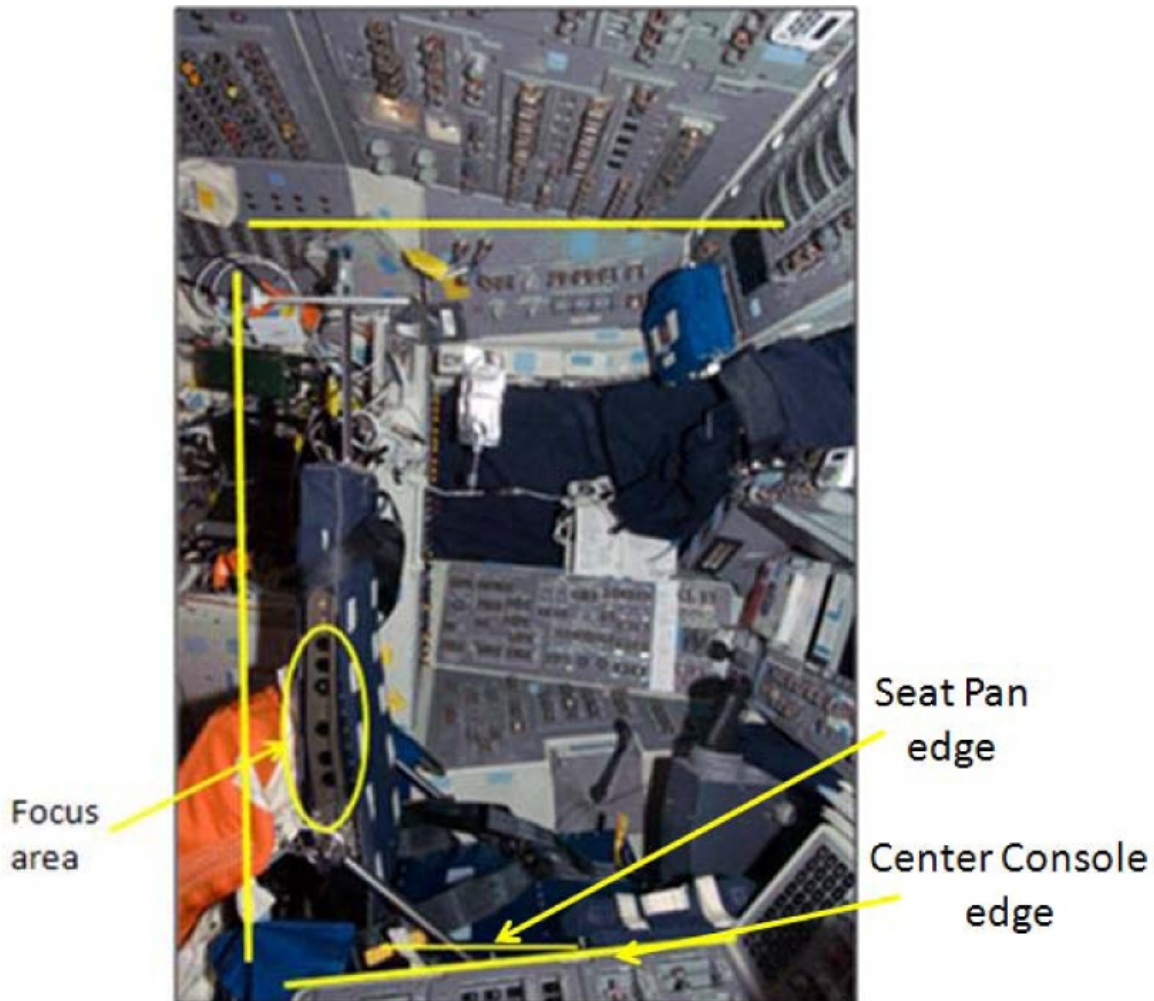


Figure 8. Correct D2Xs Camera Image Capture Area

- 4.10 Remove 4GB EVA Flash Card from D2Xs Camera.
Retrieve CF Card Adapter.
Insert 4GB EVA Flash Card into CF Card Adapter.
Insert CF Card Adapter into any networked PGSC.

- 4.11 ✓MCC-H (specify which PGSC file resides on)

5. SUBJECT POSITIONING

5.1 **On MCC-H GO**

- Remove CF Card Adapter from PGSC and
- Remove 4GB EVA Flash Card from CF Card Adapter.
- Insert 4GB EVA Flash Card into D2Xs Camera.

CAUTION
Do not take nominal Spinal Elongation measurements within one hour of compression exercise or countermeasures (Penguin Suit, EVA, weight exercises, ARED, IRED, etc.) as exercise would adversely affect the measurements being taken in this activity.

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF4/FIN)

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- 5.2 Before proceeding with this step,
| subject should wear light-weight clothing.

- 5.3 Remove and tmpry stow Head Bar.

CAUTION

When adjusting seat height, it is possible to raise the seat high enough for the Slider Post to inadvertently contact the cabin ceiling. Avoid contact between the Slider Post and ceiling.

- 5.4 Subject should sit in CDR seat and fasten lap belt and crotch strap ensuring a tight fit.

Ensure seat height is high enough that subject's thighs are at a 90 degree angle and that the edge of the seat pan is visible.

Feet should be positioned on the floor of deck (not under rudder pedals), ensuring contact with the seat.

Ignore the sensation of not feeling contact with the seat. As long as the subject is restrained tightly per procedure, subject will be in contact with the seat. If additional subject positions are attempted please record on log and note how the new data point differs from nominal procedures.

- 5.5 Operator will ensure subject sits erect and gazes directly ahead (head lines up, not looking at an angle) at the HUD reference object. Operator should also ensure subject is centered between the left and right sides of the seat.
- 5.6 Retrieve Head Bar from tmpry stow and insert into slot on Slider Post, ensuring that numbers on the Head Bar and slot on the Slider Post are facing the D2Xs Camera. Refer to Figure 9.

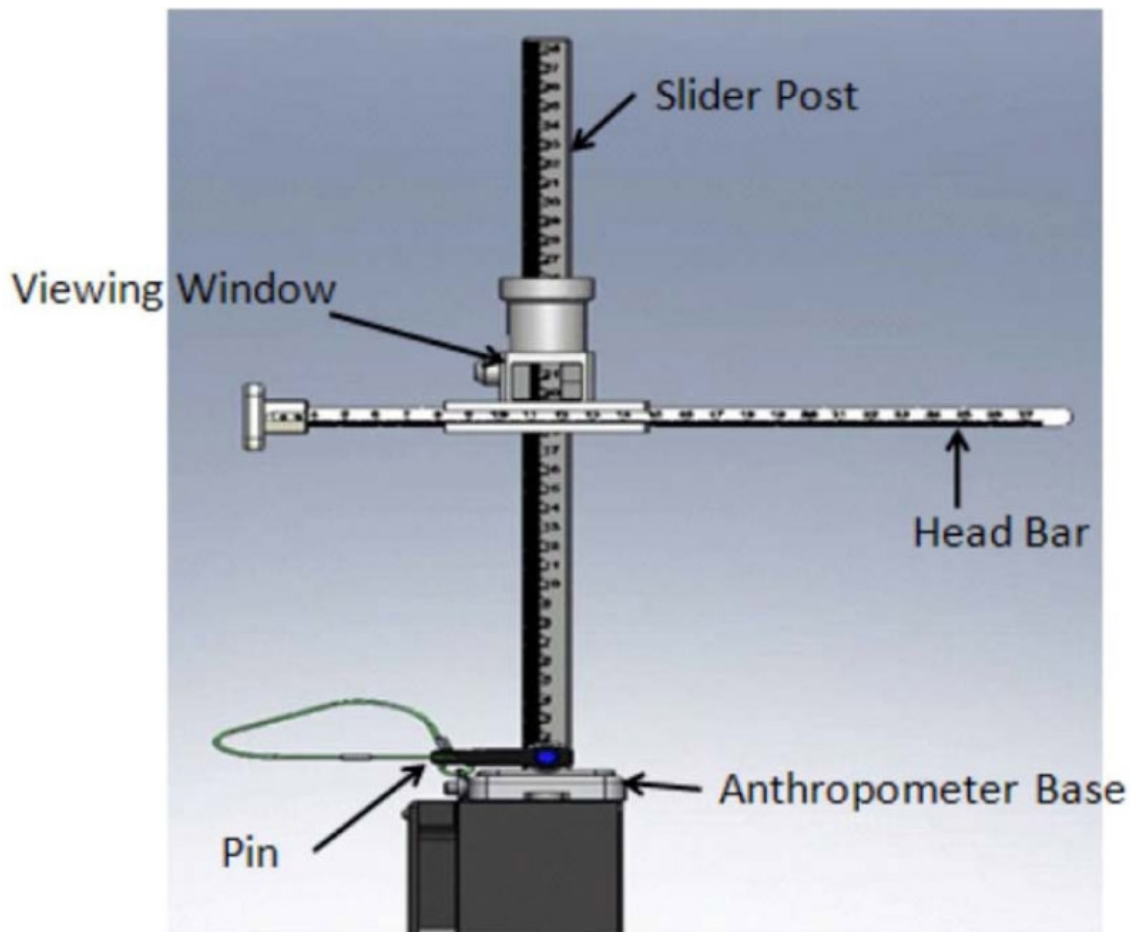


Figure 9. Head Bar Connected to Slider Post

5.7 Ensure Head Bar is in firm contact with the top of subject's head.

6. DATA COLLECTION

6.1 Record measurement on SPINAL ELONGATION LOG.

Measurements should be taken as the number between the marks on the viewing window of the Slider Post.

6.2 Operator should take photograph of subject using D2Xs Camera.

6.3 Remove Head Bar and tmpy stow.

6.4 Subject should exit CDR seat and stretch. Subject should then return to seat.

NOTE

The measurement number might differ between the two measurements. It is more important to have the subject positioned the same for both trials, even though the numbers might vary.

6.5 Repeat step 5.4 through step 6.3 to complete the second measurement (for a total of two measurements per subject).

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF4/FIN)

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- 6.6 Repeat step 5.4 through step 6.5 for each additional subject (ensure new subjects wear light-weight clothing).

7. DISASSEMBLY

- 7.1 Remove D2Xs Camera from Multi-Use Arm.
Remove Multi-Use Arm with D2Xs Camera attached from R6 camera shoe.

Put away Multi-Use Arm to original location.

- 7.2 Remove 4GB EVA Flash Card from D2Xs Camera.
Retrieve CF Card Adapter.
Insert 4GB EVA Flash Card into CF Card Adapter.
Insert CF Card Adapter into any networked PGSC.

✓**MCC-H** (specify which PGSC file resides on)

- 7.3 Disassemble Spinal Elongation hardware from CDR seat.
 - 7.3.1 Remove pin from Anthropometer Base and remove Slider Post from anchor point. Install pin back into Anthropometer Base.
 - 7.3.2 Retrieve Head Bar from tmpry stow,
 - 7.3.3 Remove Anthropometer Base from top of the seat. Restore seat cover to original placement on the top of the seat.
- 7.4 Reconfigure CDR seat to nominal configuration.
 - 7.4.1 Retrieve head rest and seat pan cushion from tmpry stow.
 - 7.4.2 Install head rest on top of CDR seat
 - 7.4.3 Put seat pan cushion back in place. Untie and unwrap shoulder harness from back of CDR seat. Return lap belt to nominal configuration.
 - 7.4.4 Retrieve parachute from tmpry stow and install on back of CDR seat.
 - 7.4.5 CDR SEAT PWR BUS SEL - OFF (ctr)

8. CONCLUDING OPERATIONS

- 8.1 Remove SPINAL ELONGATION LOG from the Assembly Operations book, place in manilla envelope, and place envelope in AOP.
- 8.2 Stow:

Anthropometer Base
Slider Post

Spinal
Elongation
Kit

12 FEB 10

SPINAL ELONGATION OPERATOR PROCEDURE

(ASSY OPS/ULF4/FIN)

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Head Bar

If Spinal Elongation Kit is being tmpy stowed on Shuttle for subsequent sessions,

| Crew should inform ground of tmpy stow location.

8.3 When all sessions for this mission are concluded,

| Spinal Elongation Kit must be restowed on ISS prior to undocking (consult Stowage Notes).

SPINAL ELONGATION LOG

(ASSY OPS/ULF4/FIN)

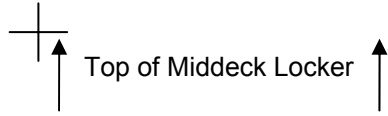
Page 1 of 1 page

	Subject ID	Session #	GMT/MET	Measurement	Notes
1				1st Sitting:	
				2nd Sitting:	
2				1st Sitting:	
				2nd Sitting:	
3				1st Sitting:	
				2nd Sitting:	
4				1st Sitting:	
				2nd Sitting:	
5				1st Sitting:	
				2nd Sitting:	
6				1st Sitting:	
				2nd Sitting:	
7				1st Sitting:	
				2nd Sitting:	
8				1st Sitting:	
				2nd Sitting:	
9				1st Sitting:	
				2nd Sitting:	
10				1st Sitting:	
				2nd Sitting:	
11				1st Sitting:	
				2nd Sitting:	
12				1st Sitting:	
				2nd Sitting:	
13				1st Sitting:	
				2nd Sitting:	
14				1st Sitting:	
				2nd Sitting:	
15				1st Sitting:	
				2nd Sitting:	
16				1st Sitting:	
				2nd Sitting:	

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SPINAL ELONGATION STANDING HEIGHT LOG

(ASSY OPS/ULF4/FIN 1)

**SPINAL ELONGATION STANDING HEIGHT LOG**

- 1) Velcro cue card to the farthest right column of the middeck lockers ensuring that the top of the page lines up with the top of the middeck locker. (If log is placed somewhere else, please note on the log exactly where it was placed.)
- 2) Subject holds self with his/her back against the middeck lockers and holds self down.
- 3) Operator helps to ensure feet are flush with the ground.
- 4) Operator marks height of subject using a cue card as a flat edge on paper with a pen and labels with Subject ID and date.
- 5) Repeat steps 2-4 for each subject.
- 6) After all subjects have been completed, remove Spinal Elongation Height Log from middeck lockers and place in the Spinal Procedure manila envelope for return.



HINGE

ASSY OPS-3a/ULF4/B



SPINAL ELONGATION STANDING HEIGHT LOG
(ASSY OPS/ULF4/FIN 1)



HINGE

ASSY OPS-3b/ULF4/B



TOP
HINGED AT BOTTOM OF
'SPINAL ELONGATION STANDING HEIGHT LOG'
HINGE

SPINAL ELONGATION STANDING HEIGHT LOG
(ASSY OPS/ULF4/FIN 1)



ASSY OPS-3aa/ULF4/B



TOP
HINGED AT BOTTOM OF
BACK OF 'SPINAL ELONGATION STANDING HEIGHT LOG'
HINGE

SPINAL ELONGATION STANDING HEIGHT LOG
(ASSY OPS/ULF4/FIN 1)



ASSY OPS-3bb/ULF4/B



GLACIER INITIAL POWER ON

(ASSY OPS/ULF4/FIN)

OBJECTIVE:

The following steps will activate Glacier and power on the internal fans to dry out the internal volume.

- ML86B 1. cb MNB MAR 1 → Open
- MF28E/G 2. ✓cb POWER Open (It off)
(Glacier)
- 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

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

- MF28E/G 7. cb POWER → Close (It on)
(Glacier)
- 8. sw BATTERY → ON (It on)
- 9. ✓Display 'HOME'

```

*****
*
*   If 'HOME' not shown,
*   |
*   |   Perform GLACIER FAIL TO REPOWER then:
*
*****

```

```

*****
*
*   If Display - '**Error Pending**'
*   |
*   |   Perform GLACIER ERROR MESSAGE, then:
*
*****

```
- 10. Record the following from the front panel:
CURR TEMP _____ °C
GPS _____ : _____ : _____

✓Display Line 3 – IDLE MODE

11. Notify **MCC-H** of Glacier Initial Power On complete and data recorded in Step 10.

GLACIER SET POINT CONTROL MODE

(ASSY OPS/ULF4/FIN)

Page 1 of 4 pages

OBJECTIVE:

This procedure will remove desiccant packs and perform a manual reconfigure of the Glacier System from Idle to Set Point Control Mode using the front panel and display buttons.

STS IFM TOOLS (MF14H):

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

1/4" to 3/8" Adapter, 1/4" Drive

4" Ext, 1/4" Drive

Ratchet, 1/4" Drive

1. UNLOCK GLACIER DOOR

MF28E/G
(Glacier)

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

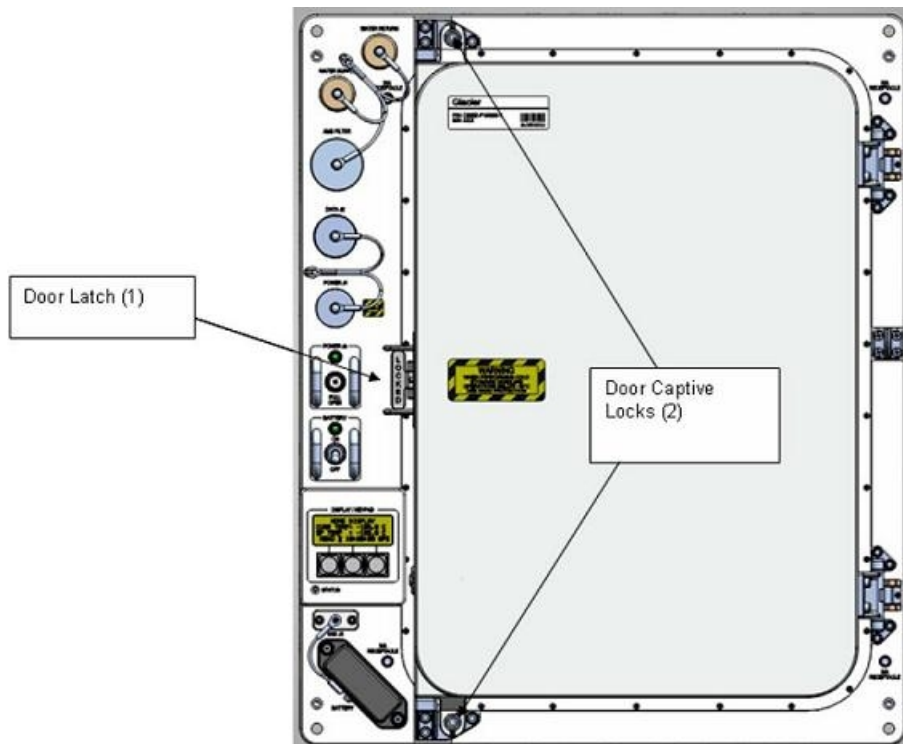


Figure 1. Glacier Configuration

2. ✓Display (Line 1) – '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
*
*****

```

3. Open Glacier door and remove desiccant packs from trays A and D. Return trays and close inner and outer doors. Discard dessicant packs in trash.

4. TEMPERATURE CONTROL MODE

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'
'-095.0 °C'

4.5 pb Left (NEXT) → Press (one time), following appears:
'Temp Control'
'Control Mode 2/18'
'IDLE'

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.

4.6 pb Center (SELECT) → Press (one time), following appears:
'Control Mode'
'IDLE'

4.7 pb Left (NEXT) → Press as required to select the SET POINT Control Mode

4.8 pb Center (APPLY) → Press (one time)

GLACIER SET POINT CONTROL MODE

(ASSY OPS/ULF4/FIN)

Page 3 of 4 pages

- 4.9 ✓Confirm Temp Control
'Old: IDLE'
'New: SETPOINT'
- 4.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Control Mode 2/18'
'SET POINT'
- 4.11 pb Right (EXIT) → Press until 'HOME' appears
5. AIR MANAGEMENT PROCEED MESSAGE
 - 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'
'-095.0 °C'
 - 5.5 pb Left (NEXT) → Press (three times), following appears:
'Temp Control'
'AirMgmt Proceed 4/18'
 - 5.6 pb Center (SELECT) → Press (one time), following appears:
'AirMgmt Proceed'
'PROCEED'
 - 5.7 pb Center (APPLY) → Press (one time)
 - 5.8 ✓Display line 3 – PROCEED
 - 5.9 pb Right (EXIT) → Press until 'HOME' appears
 - 5.10 Verify by listening – the coolers turn on
6. Record the following from the front panel:
CURR TEMP _____ °C
SET POINT _____ °C
GPS _____:_____:_____

GLACIER SET POINT CONTROL MODE

(ASSY OPS/ULF4/FIN)

Page 4 of 4 pages

7. Notify **MCC-H** GLACIER SET POINT CONTROL MODE complete and data recorded in Step 6.

GLACIER CONFIGURATION FOR DESCENT

(ASSY OPS/ULF4/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.

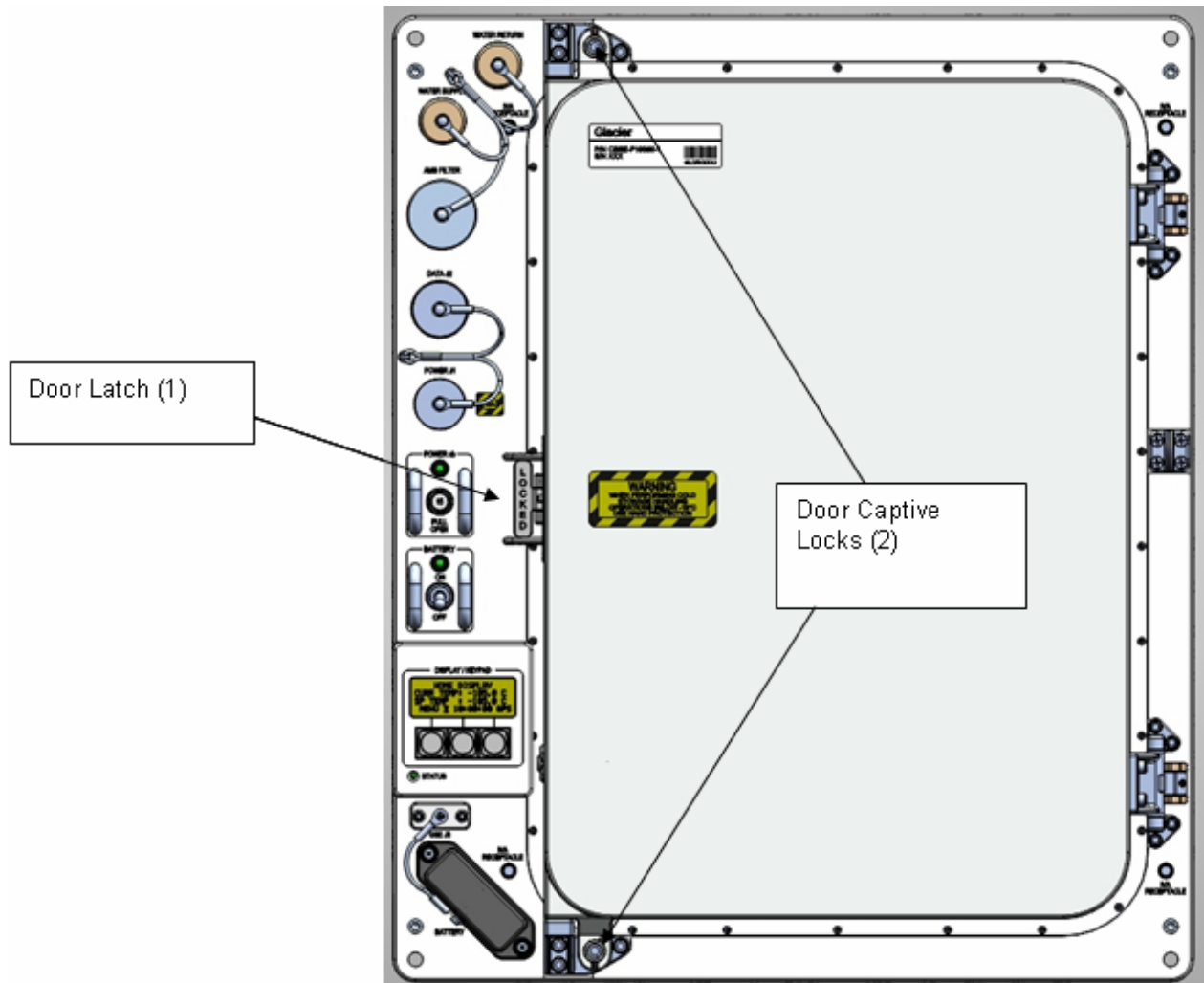


Figure 1. Glacier Configuration

GLACIER COLD HEAD CHECK

(ASSY OPS/ULF4/FIN 1)

Page 1 of 2 pages

OBJECTIVE:

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

Glacier 1. Verify display not indicating "***Error Pending**"

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

2. Verify Display - **'HOME'**

If **'HOME'** not shown:

| pb Right (EXIT) → push until **'HOME'** appears

3. Record from front panel **'CURR TEMP'**, **'SET POINT'**, and **'GPS'** in Table 1 Glacier Cold Head Log

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

'MAIN MENU'
'QUICK STATUS 1/5'

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

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

NOTE

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

6. Record Quick Status data for parameters 1-7 in Table 1 Glacier Cold Head Log

7. pb Center (NEXT) → push until Quick Status data items 1 through 7 have been recorded.

8. pb Right (EXIT) → push until **'HOME'**

9. Notify **MCC-H** to report log values from Table 1 Glacier Cold Head Log

Table 1. Glacier Cold Head 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		

GLACIER HARDWARE PREPARATION

(ASSY OPS/ULF4/FIN)

Page 1 of 1 page

OBJECTIVE:

The following steps will prepare the hardware for sample transfer.

STS IFM TOOLS (MF14H):

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

1/4" to 3/8" Adapter, 1/4" Drive

4" Ext, 1/4" Drive

Ratchet, 1/4" Drive

- MF28E/G (Glacier) 1. Unlock Glacier Door Captive Locks (two) using 3/16" Hex Head, 3/8" Drive; 1/4" to 3/8" Adapter, 1/4" Drive; 4" Extension, 1/4" Drive; Ratchet, 1/4" Drive. See Figure 1 Glacier Configuration

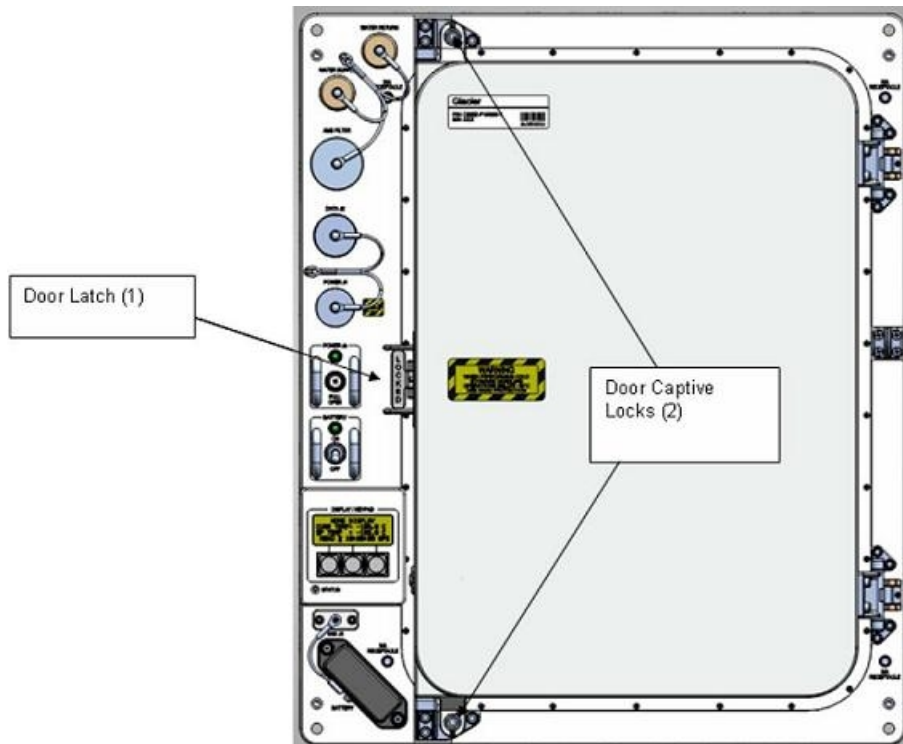


Figure 1. Glacier Configuration

2. Stow tools

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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 when temp set point = +4 ° C (or 120 minutes when temp set point = -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.

NOTE

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

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

NOTE

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

- 13. ✓Display 'HOME'

*
* If 'HOME' not shown,
* | Perform [GLACIER FAIL TO REPOWER](#) (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.

GLACIER MANUAL RECONFIGURE

(ASSY OPS/ULF4/FIN)

Page 1 of 21 pages

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

GLACIER MANUAL RECONFIGURE

(ASSY OPS/ULF4/FIN)

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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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GLACIER

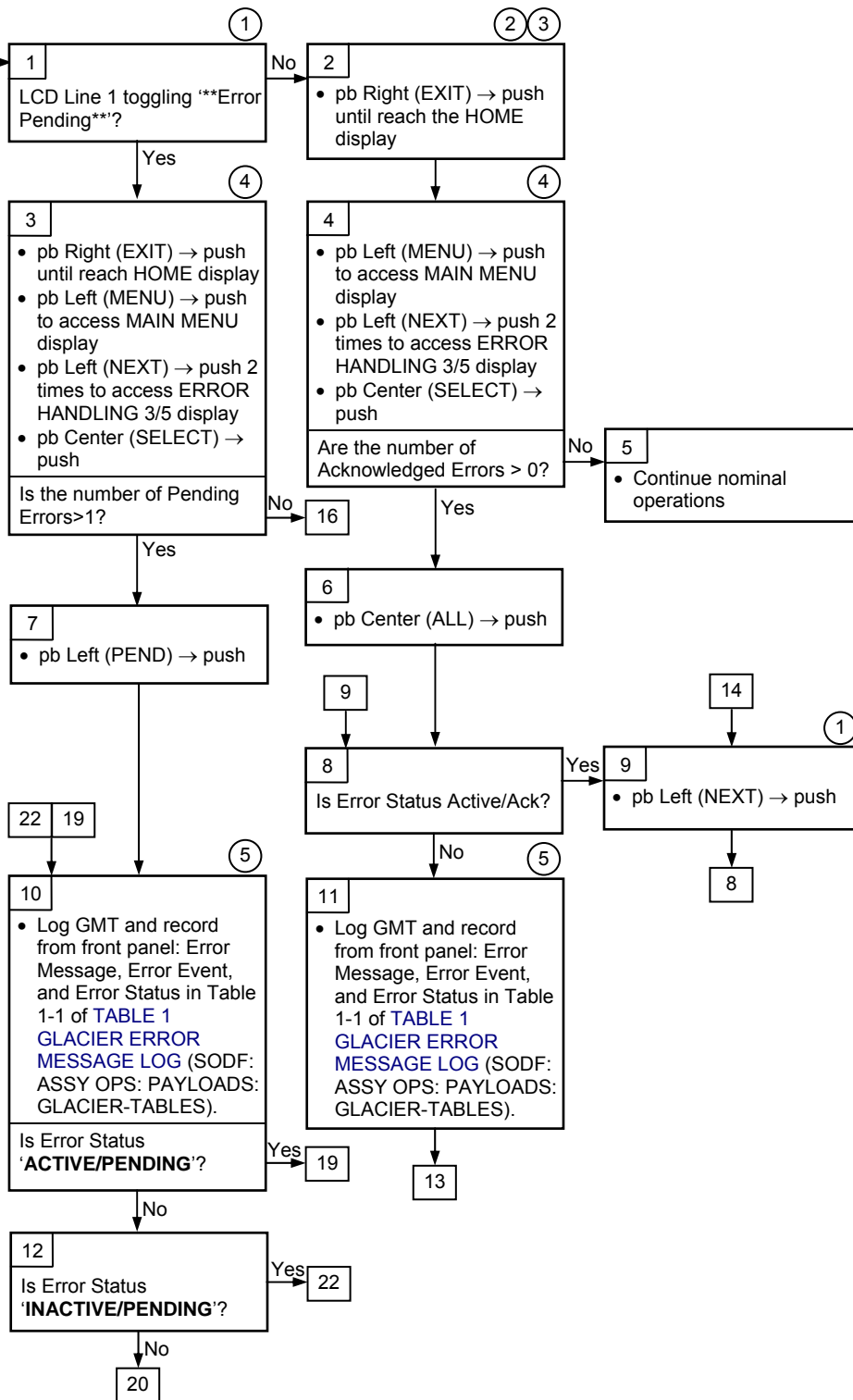
GLACIER ERROR MESSAGE

(ASSY OPS/ULF4/FIN)

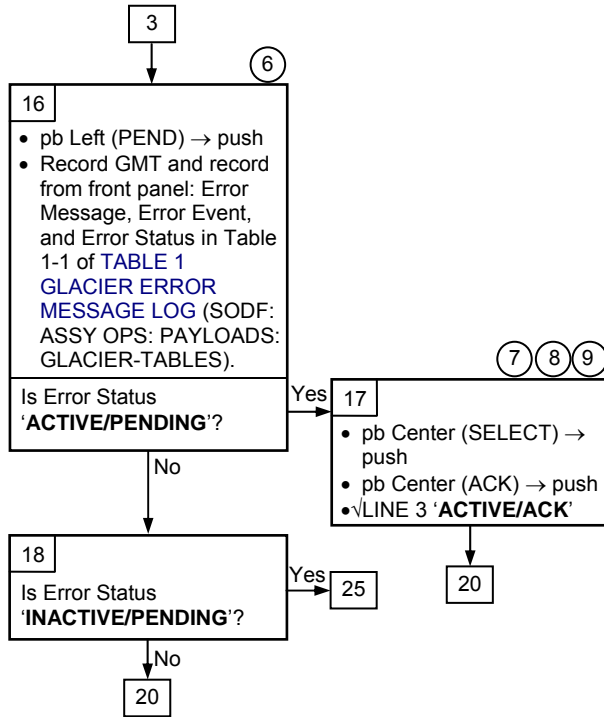
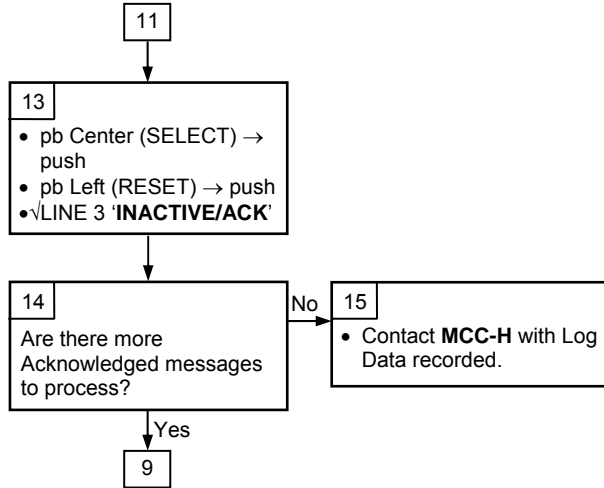
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Glacier System Error

Nominal Config:
 cb POWER – Close (It on)
 sw BATTERY – ON (It on)
 (ML86B)
 cb MNB MAR 1 – Close



- ① Contact **MCC-H** before proceeding.
- ② Operator can always exit sub menus by pressing Right (EXIT) pb until 'HOME' display is reached.
- ③ ERROR HANDLING: display will identify Event on Line 2 and Status on Line 3. 'ACTIVE/PENDING' indicates that error is still occurring and should be acknowledged. 'INACTIVE/PENDING' indicates the Error is no longer occurring and can be Reset.
- ④ Menus are circular. If a display is passed, operator can keep pressing the button until desired display is reached.
- ⑤ GPS is only visible in HOME display. Record GMT from wristwatch.

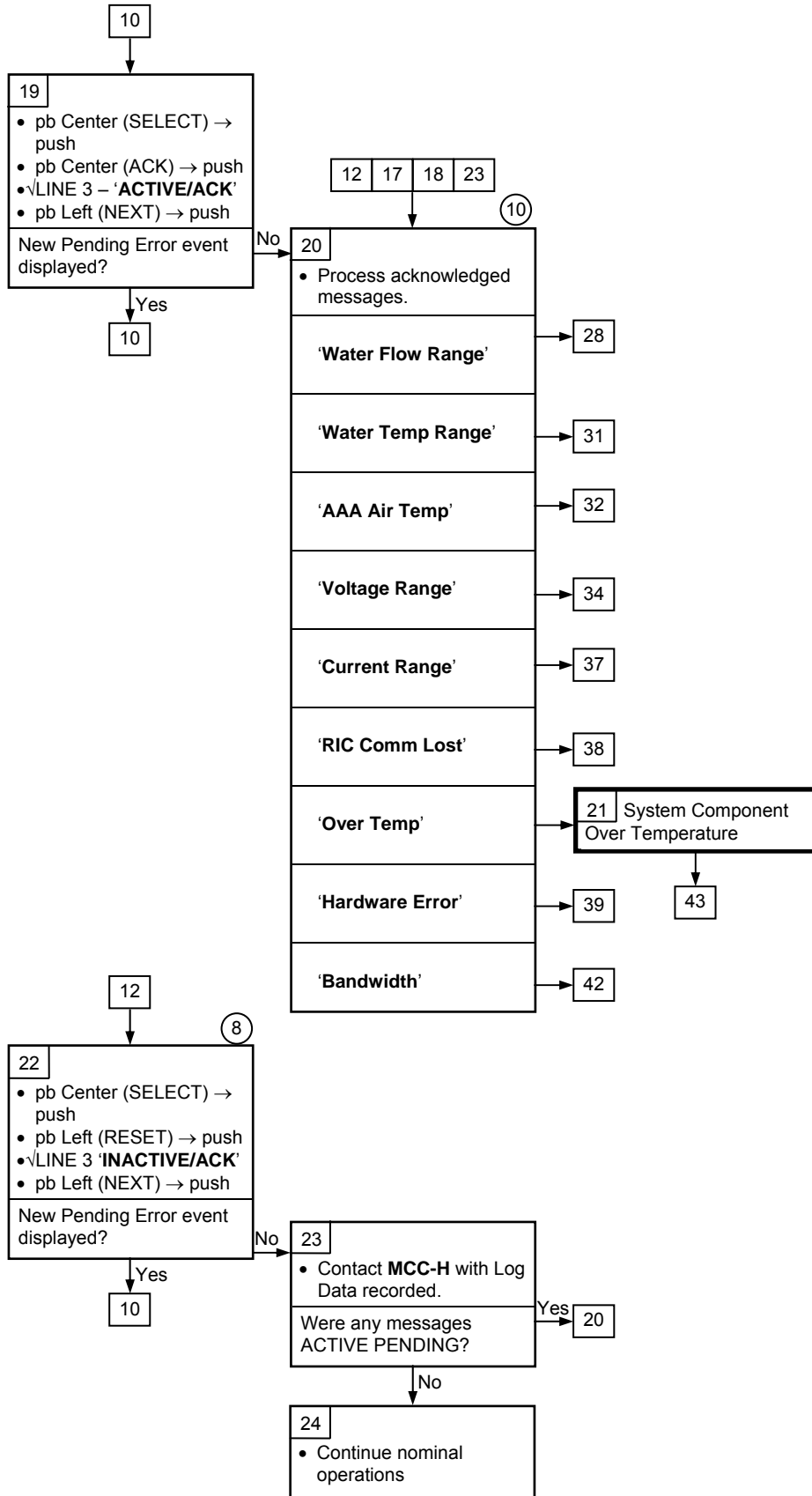


⑥
GLACIER RECORD DIAGNOSTIC DATA procedure may be performed to capture states of key data elements per **MCC-H** direction.

⑦
Power cycle requires **MCC-H** approval. Note: Set Point temperature control mode will require initialization upon restart

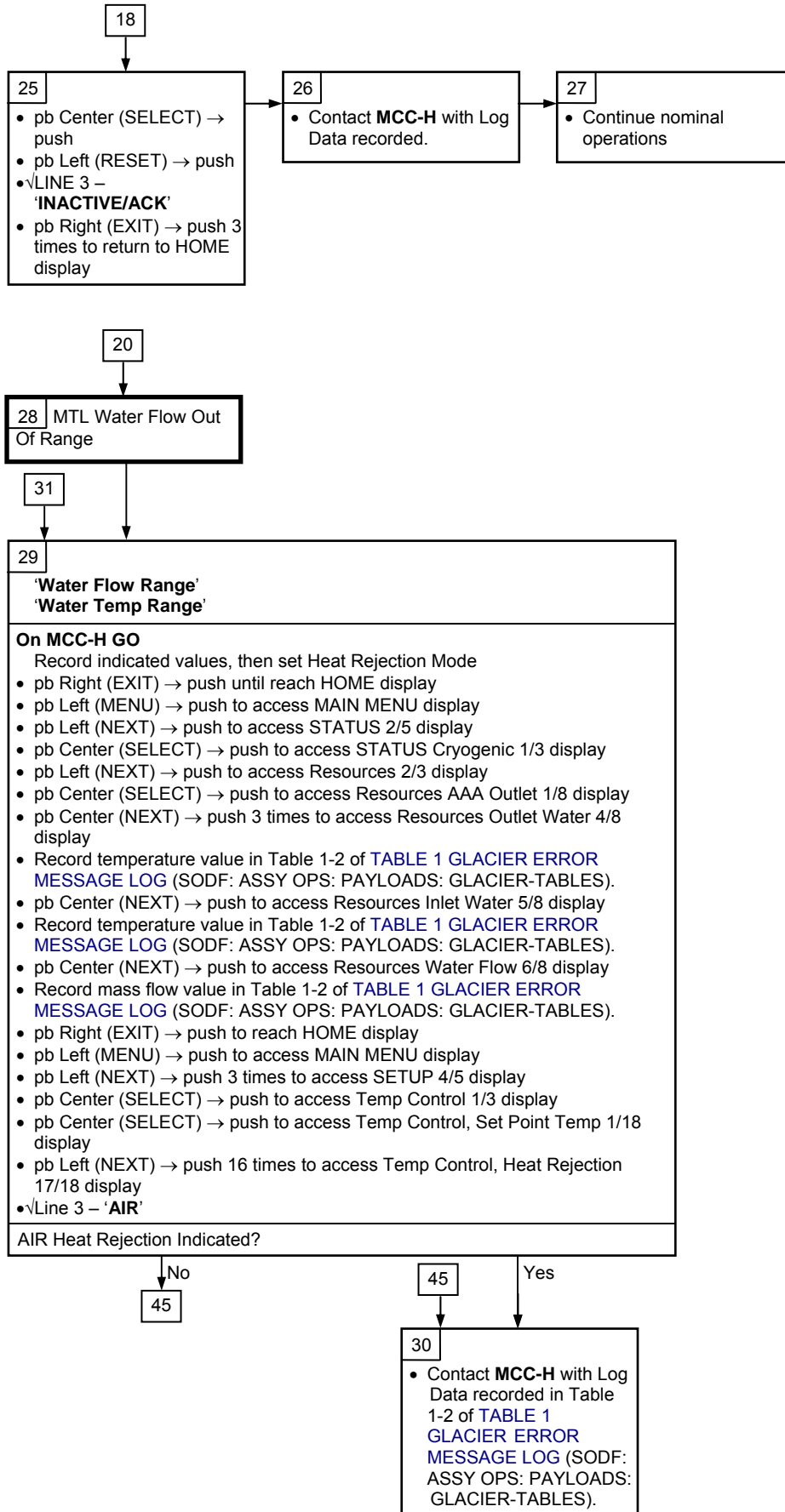
⑧
Software Errors may not reset or may be persistent due to: Frequent intermittent power failure. Single Event Upset. Electromagnetic interference

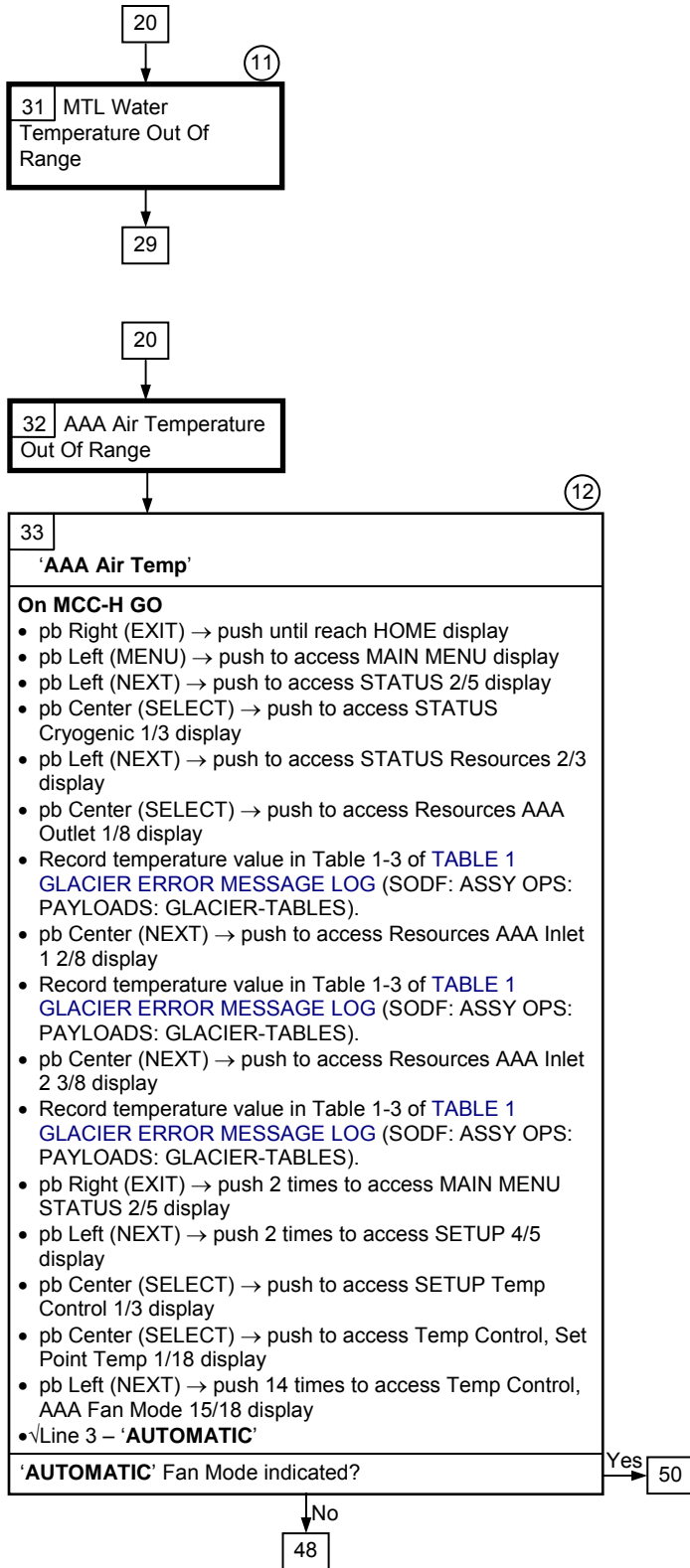
⑨
Internal voltage takes approximately 2 min to dissipate. Power LED will remain dimly illuminated



⑧ Software Errors may not reset or may be persistent due to: Frequent intermittent power failure. Single Event Upset. Electromagnetic interference

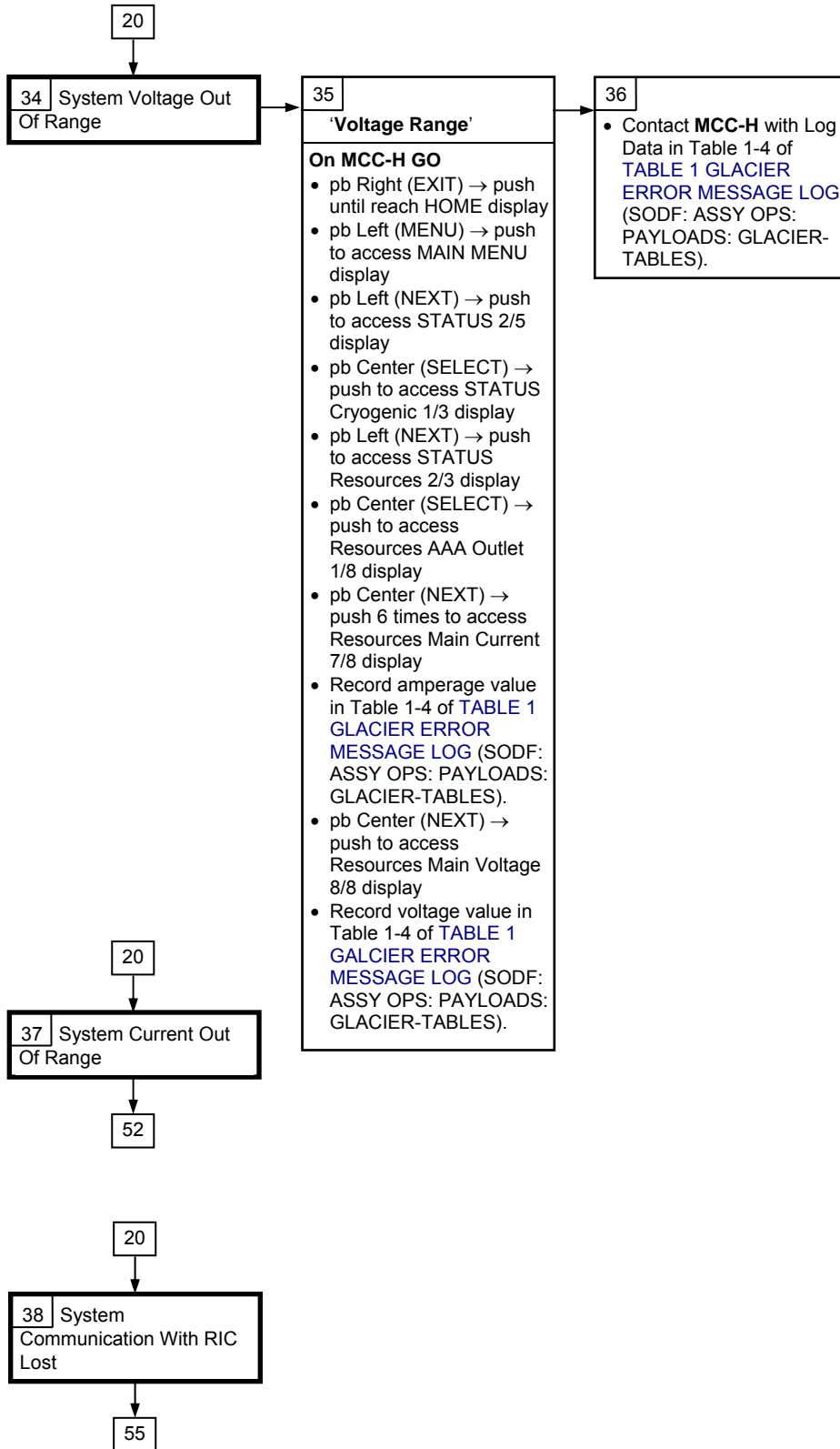
⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'

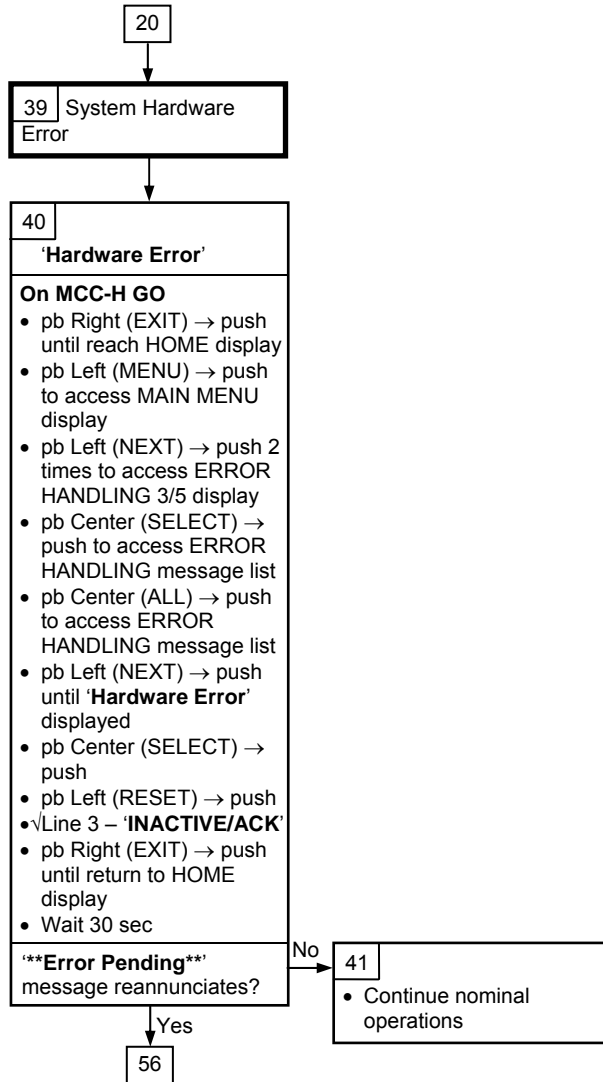




(11) AAA Air Temp value may take a long time to reflect change in fan mode.

(12) MCC-H will evaluate Av Bay temps





20

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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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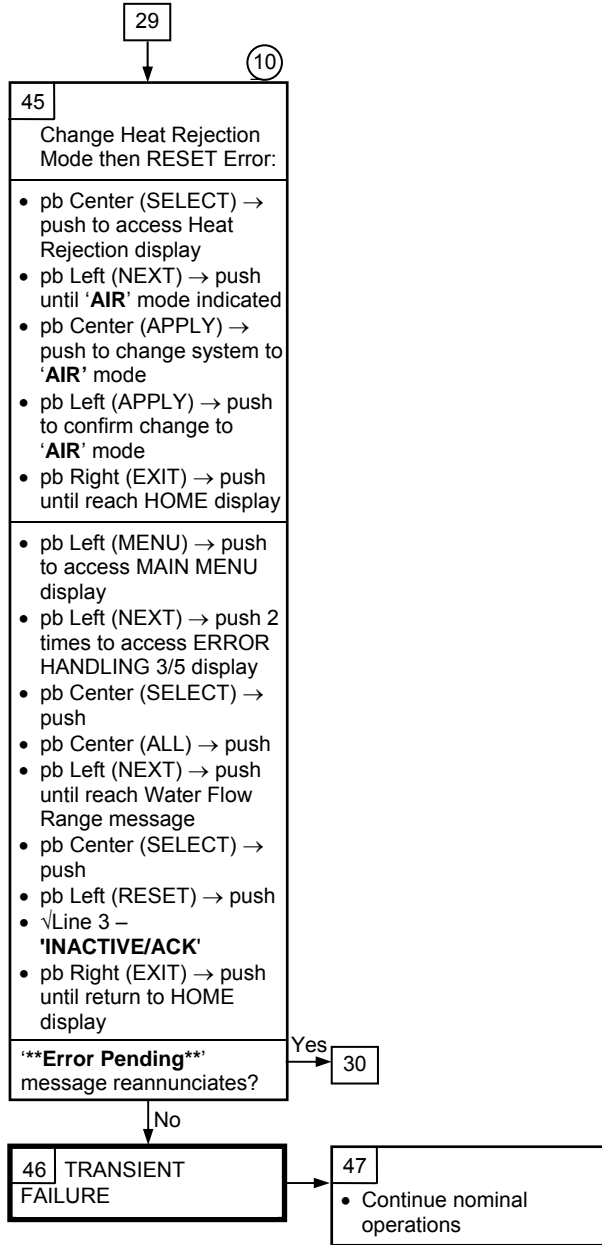
'Over Temp'

On MCC-H GO

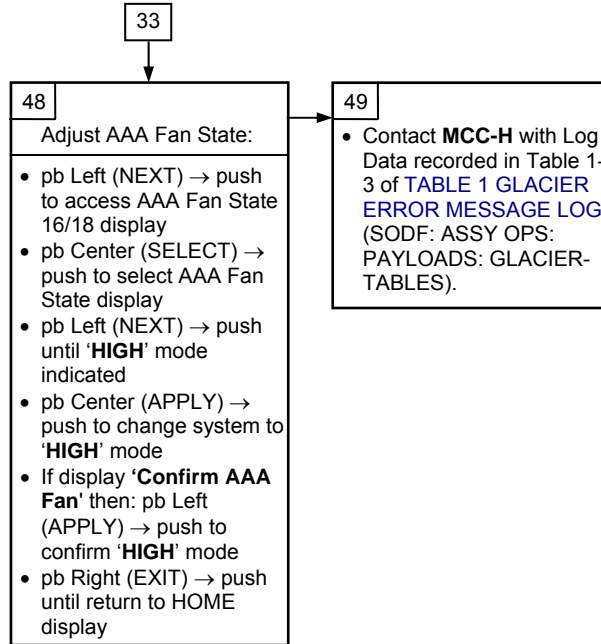
- pb Right (EXIT) → push until reach HOME display
- pb Left (MENU) → push to access MAIN MENU display
- pb Left (NEXT) → push to access STATUS 2/5 display
- pb Center (SELECT) → push to access STATUS Cryogenic 1/3 display
- pb Left (NEXT) → push 2 times to access STATUS System 3/3 display
- pb Center (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).

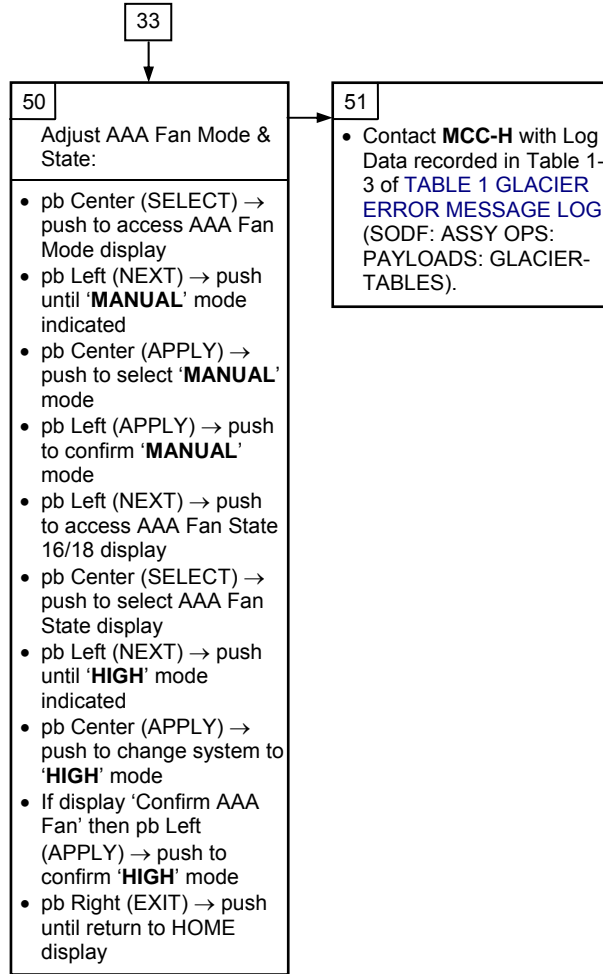
44

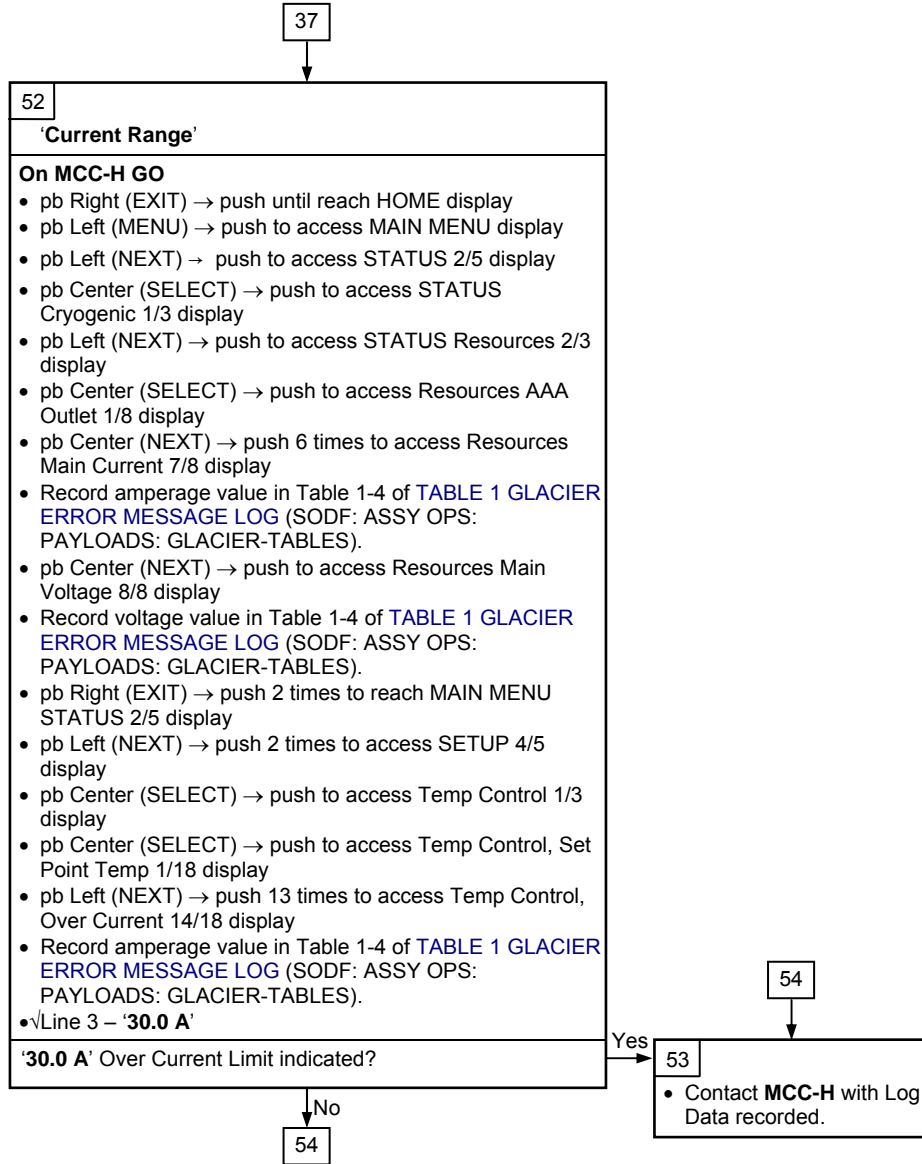
- Contact **MCC-H** with Log Data Recorded in Table 1-5 of [TABLE 1 GLACIER ERROR MESSAGE LOG](#) (SODF: ASSY OPS: PAYLOADS: GLACIER-TABLES).

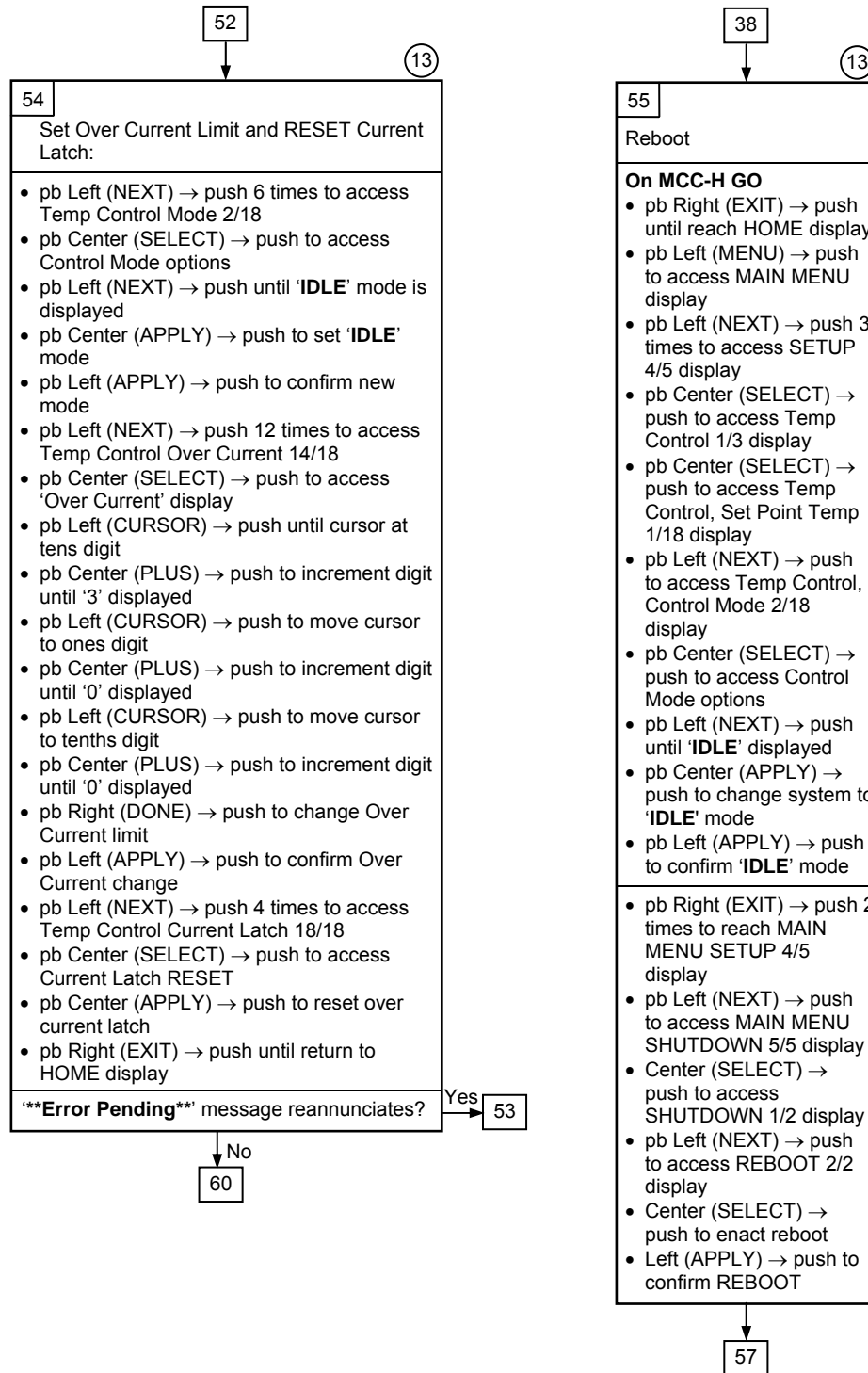


10 Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'

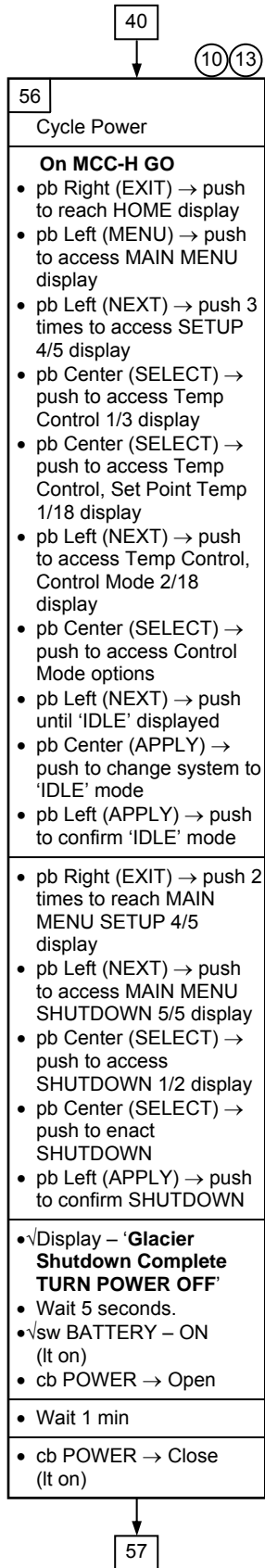






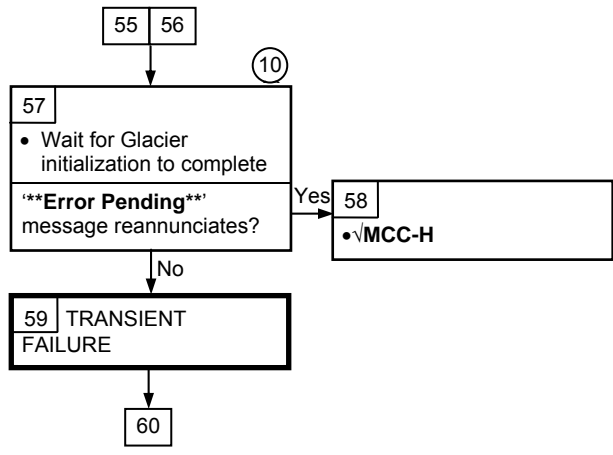


13 If parameters already set, the confirmation screen will not be displayed.

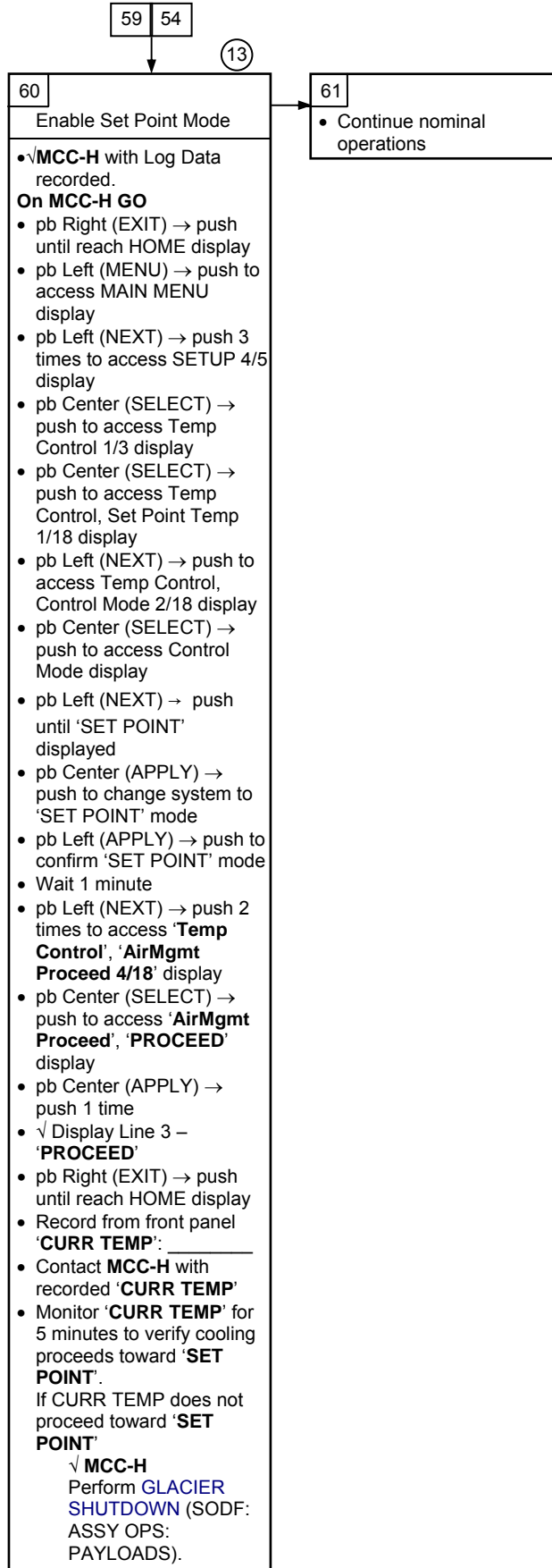


⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'

⑬ If parameters already set, the confirmation screen will not be displayed.



⑩ Initialization takes approximately 3 minutes and is complete when LCD Line 1 reads 'HOME'



(13)
If parameters already set, the confirmation screen will not be displayed.

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GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF4/FIN)

Page 1 of 9 pages

OBJECTIVE:

This procedure is required when the Glacier fails to hold set point. It performs a check of some critical parameters then directs the manual reconfiguration of some key controls as required.

Glacier

1. RECORD DATA

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

1.1 ✓Display – 'HOME'

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

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

2. CHECK STATUS OF KEY PARAMETERS

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

2.2 pb Center (SELECT) → push (one time), following appears:
'QUICK STATUS'
'Cold Head 1A 1/16'

NOTE

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

2.3 Record Cold Head 1A, Cold Head 1B, Cold Head 2A, Cold Head 2B, and CircFan Speed in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)

2.4 pb Center (NEXT) → push until all data has been recorded.

2.5 pb Right (EXIT) → push until 'HOME'

2.6 ✓MCC-H to report log values from Table 3 and get direction.

2.7 Record any ground supplied data in [TABLE 2 GLACIER RESET LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)

3. SET TEMPERATURE CONTROL MODE TO IDLE

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

NOTE

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

- 3.6 pb Center (SELECT) → Press (one time), following appears:
'Control Mode'
'XXXX'
- 3.7 pb Left (NEXT) → press as required to select desired Temperature Control Mode to **IDLE**
- 3.8 pb Center (APPLY) → push (one time)
- 3.9 ✓Confirm New Control Mode = **IDLE**
- 3.10 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Control Mode 2/18'
- 3.11 ✓Control Mode = **IDLE**
- 3.12 pb Right (EXIT) → Press until '**HOME**' appears
4. SET SETPOINT TEMP
- 4.1 pb Left (MENU) → push (one time) following appears:
'MAIN MENU'
'QUICK STATUS 1/5'

- 4.2 pb Left (NEXT) → push (three times) following appears:
'MAIN MENU'
'SETUP 4/5'
- 4.3 pb Center (SELECT) → push (one time) following appears:
'SETUP'
'Temp Control 1/3'
- 4.4 pb Center (SELECT) → push (one time) following appears:
'Temp Control'
'Set Point Temp 1/18'
- 4.5 pb Center (SELECT) → push (one time) following appears:
'Set Point Temp'

'XXXX.X °C'
'-160.0 to +004.0'

NOTE

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

- 4.6 Enter desired Set Point temperature per **MCC-H**.
- 4.7 pb Right (DONE) → push (one time)
- 4.8 ✓Confirm New Set Point = desired Set Point
- 4.9 pb Left (APPLY) → Press (one time), following appears:
'Temp Control'
'Set Point Temp 1/18'
- 4.10 ✓Set Point Temp = desired Set Point
- 4.11 pb Right (EXIT) → push until '**HOME**' appears
- 5. SET TEMP CONTROL SENSORS
 - 5.1 pb Left (MENU) → push (one time) following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
 - 5.2 pb Left (NEXT) → push (three times) following appears:
'MAIN MENU'
'SETUP 4/5'
 - 5.3 pb Center (SELECT) → push (one time) following appears:
'SETUP'
'Temp Control 1/3'
 - 5.4 pb Center (SELECT) → push (one time) following appears:
'Temp Control'

GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF4/FIN)

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'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:

GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF4/FIN)

Page 5 of 9 pages

'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 A'
'00.0 to 30.0'

GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF4/FIN)

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NOTE

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

- 9.7 Enter desired Over Current Limit per **MCC-H**.
 - 9.8 pb Right (DONE) → push (one time)
 - 9.9 ✓Confirm New Over Current = desired Over Current
 - 9.10 pb Left (APPLY) → push (one time), following appears:
'Temp Control'
'Over Current 14/18'
 - 9.11 ✓Over Current = desired Over Current
 - 9.12 pb Right (EXIT) → Press until **'HOME'** appears
10. SET TEMPERATURE CONTROL MODE
- 10.1 pb Left (MENU) → push (one time) following appears:
'MAIN MENU'
'QUICK STATUS 1/5'
 - 10.2 pb Left (NEXT) → push (three times) following appears:
'MAIN MENU'
'SETUP 4/5'
 - 10.3 pb Center (SELECT) → push (one time) following appears:
'SETUP'
'Temp Control 1/3'
 - 10.4 pb Center (SELECT) → push (one time) following appears:
'Temp Control'
'Set Point Temp 1/18'
 - 10.5 pb Left (NEXT) → push (one time) following appears:
'Temp Control'
'Control Mode 2/18'
 - 10.6 pb Center (SELECT) → push (one time), following appears:
'Control Mode'
'XXXX'

NOTE

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

GLACIER FAIL TO HOLD SET POINT

(ASSY OPS/ULF4/FIN)

- 10.7 pb Left (NEXT) → push as required to selected desired Temperature Control Mode per **MCC-H**.
- 10.8 pb Center (APPLY) → push one time
- 10.9 ✓Confirm New Control Mode = desired Control Mode
- 10.10 pb Left (APPLY) → push (one time), following appears:
 Temp Control
 Control Mode 2/18'
- 10.11 ✓Control Mode = desired Control Mode
- 10.12 pb Right (EXIT) → push until 'HOME' appears.

11. CHECK GLACIER STATUS

- 11.1 ✓cb POWER – Close (It on)
- 11.2 ✓sw BATTERY – ON (It on)
- 11.3 ✓Display – 'HOME'

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

- 11.4 ✓Display – 'CURR TEMP: XXXX.X °C' ±5.0°C or ramping toward expected temperature.

12. RECORD END DATA

- 12.1 Record from front panel end 'CURR TEMP', 'SETPOINT', 'GPS' in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)
- 12.2 Notify **MCC-H** of logged values in [TABLE 3 GLACIER DIAGNOSTIC LOG FILE](#) (SODF: ASSY OPS: PAYLOADS: GLACIER)

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- 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 initialization not successfully completed when power applied during Glacier POWER UP procedure

Nominal Config:
cb POWER- Close (It on)
sw BATTERY-ON (It on)
(ML86B)
cb MNB MAR 1- Close

① ②

1	Switch to Alternate Power Source <ul style="list-style-type: none"> Contact MCC-H for alternate power source (fill in data below). _____
	(Glacier) <ul style="list-style-type: none"> cb POWER → Open (It off)
	(ML86B) <ul style="list-style-type: none"> cb MNB MAR 1 → Open
	(ML85E) <ul style="list-style-type: none"> A/E PAYLOAD DC PWR (20') → J11
	(Alternate Power Source J_) <ul style="list-style-type: none"> ✓cb _____ - Open ✓sw _____ - OFF A/E PAYLOAD DC PWR (20') → Alternate Power Source J

③

2	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)
	After Initialization does display read 'HOME'?

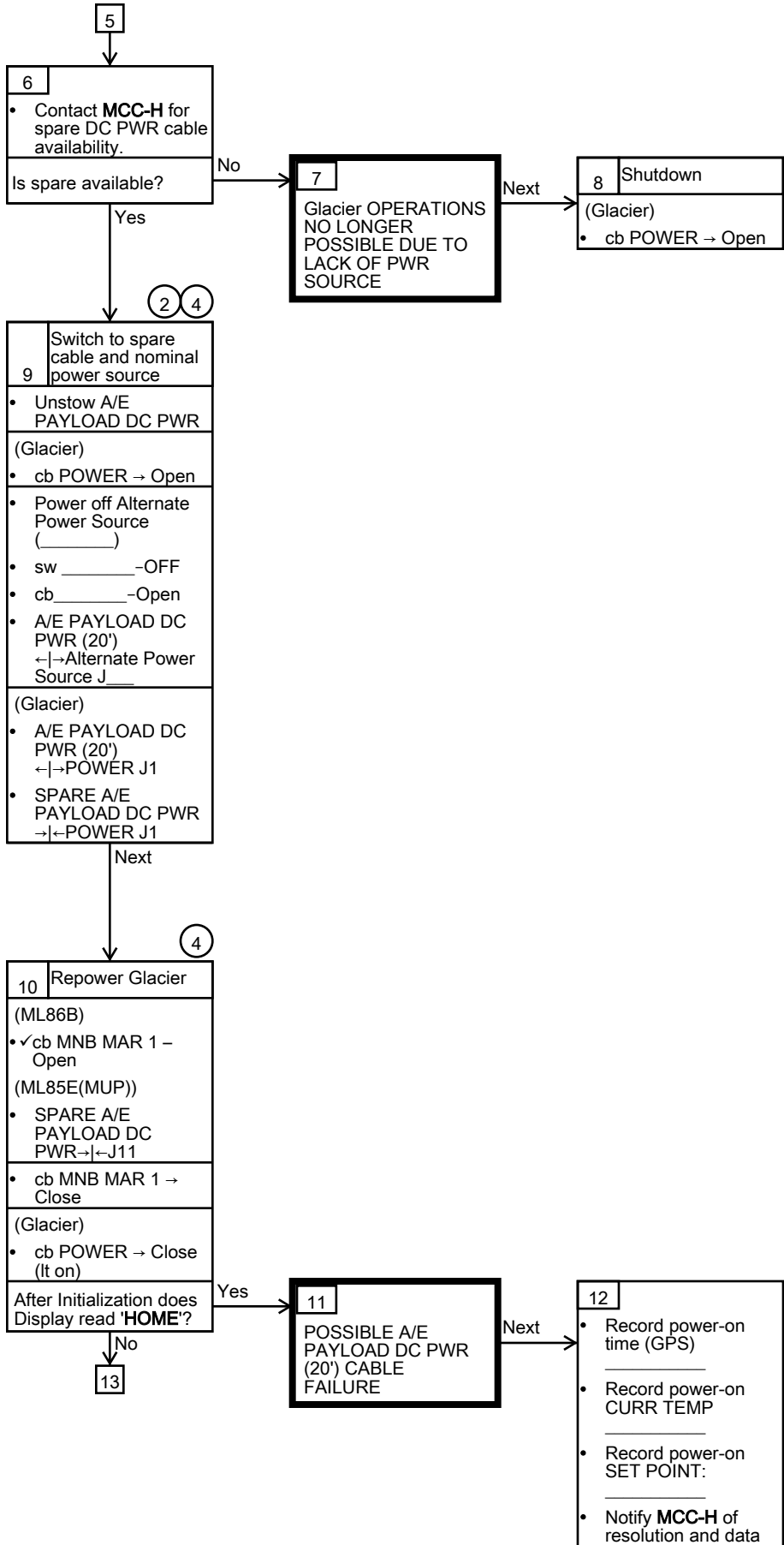
3	PRIMARY OUTLET FAILURE
---	-------------------------------

4	<ul style="list-style-type: none"> Record power-on time (GPS): _____ Record power-on CURR TEMP: _____ Record power-on SET POINT: _____ Notify MCC-H of resolution and data
---	---

5	POSSIBLE DOWNSTREAM FAILURE
---	------------------------------------

⑥

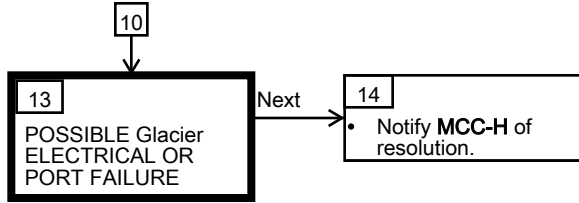
GLACIER FAIL TO REPOWER
(ASSY OPS/ULF4/FIN) Page 2 of 3 pages



2
Verify connectors are properly mated and seated securely when switching to alternate power source

4
Alternate power source is detailed in block 1.

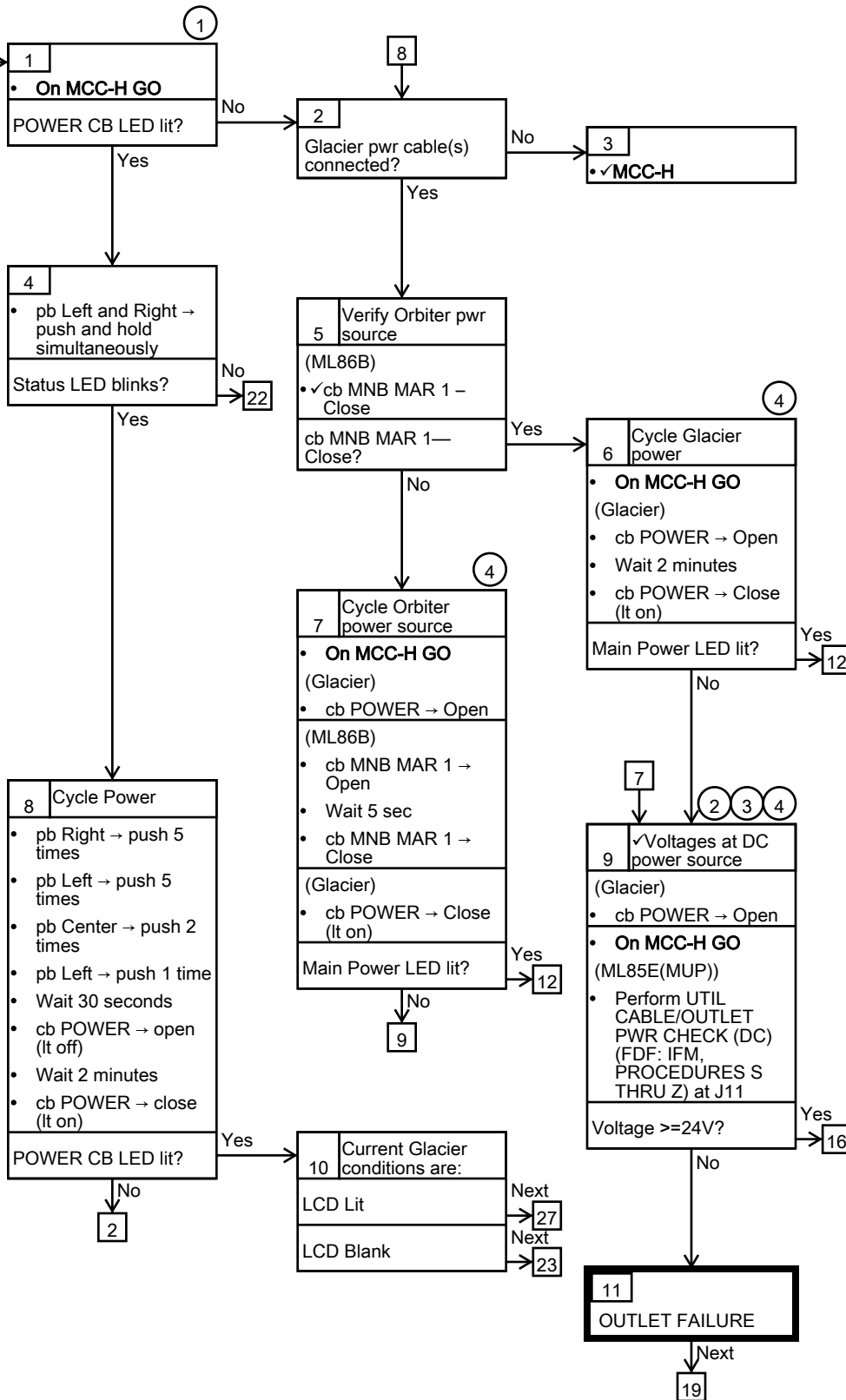
GLACIER FAIL TO REPOWER
(ASSY OPS/ULF4/FIN) Page 3 of 3 pages



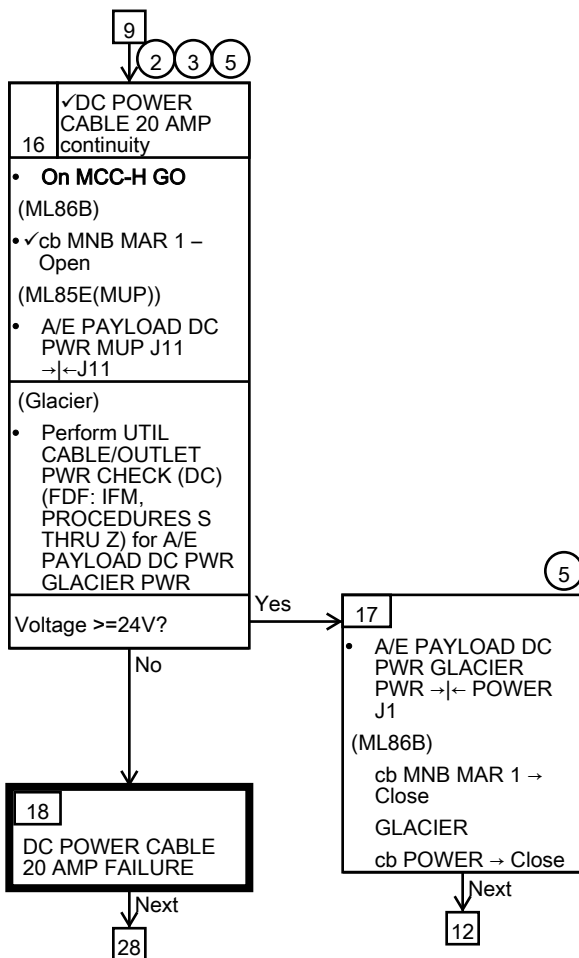
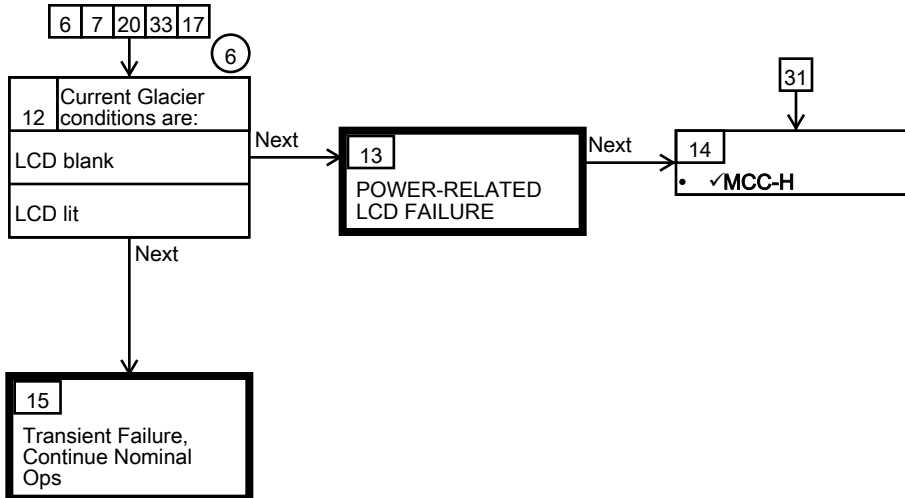
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LCD Blank

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

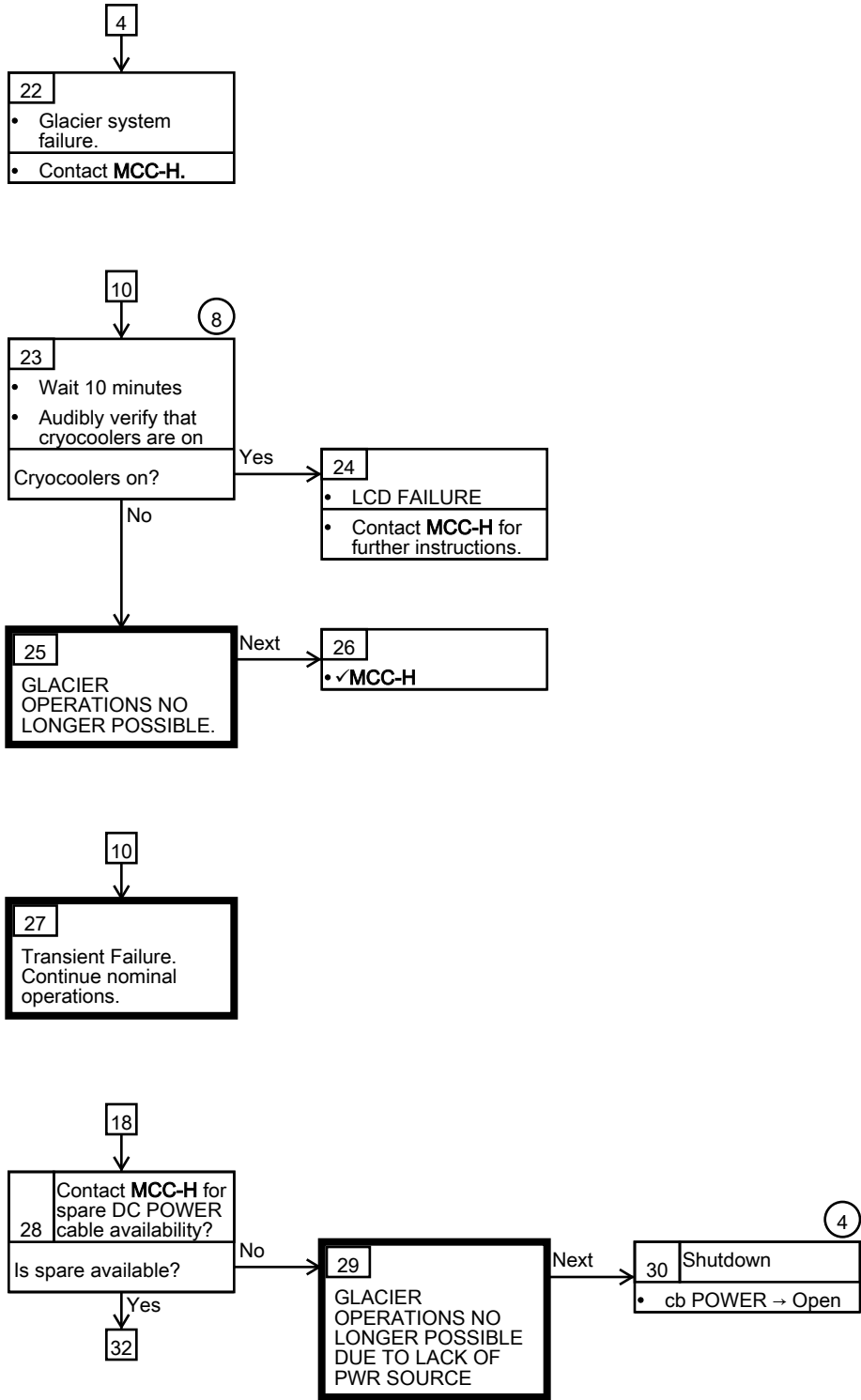
Verify connectors are properly mated and seated securely.

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

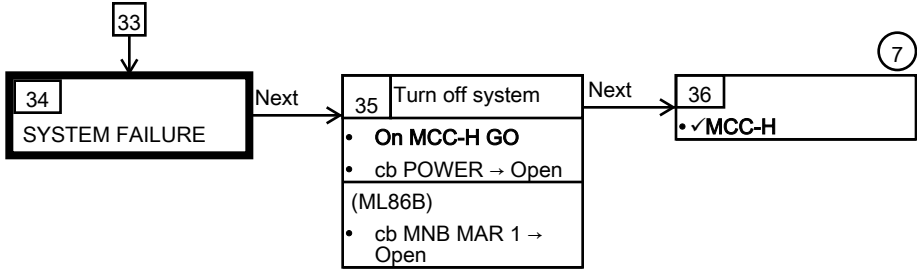
Always deadface DC Power source when disconnecting/ connecting power cable.

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.

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).

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).

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/ULF4/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/ULF4/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/ULF4/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/ULF4/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/ULF4/FIN) Page 2 of 5 pages

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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/ULF4/FIN) Page 3 of 5 pages

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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/ULF4/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	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"/>	<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	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"/>	<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	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"/>	<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/ULF4/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/ULF4/FIN) Page 1 of 3 pages

Parameter		Definition	Event 1	Event 2	Event 3	Event 4
HOME MENU (Front panel)						
1	CURR TEMP	Current Temperature °C	Start: End:	Start: End:	Start: End:	Start: End:
2	SET POINT	Set Point °C	Start: End:	Start: End:	Start: End:	Start: End:
3	GPS	Hours: Minutes: Seconds	Start: __ : __ : __ End: __ : __ : __	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				

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TABLE 3 GLACIER DIAGNOSTIC LOG FILE

(ASSY OPS/ULF4/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/ULF4/FIN) Page 3 of 3 pages

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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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OBJECTIVE

Commercial Generic Bioprocessing Apparatus (CGBA). This procedure resets the internal clock's GMT time.

NOTE
Menu option will time out after 30 seconds and return to status display.

MF71E
(MA16D)

1. On keypad:

pb MENU → Press

pb 3 → Press

pb ENTER → Press
2. Verify display indicates the following:
'Enter GMT month'
'(mm:dd:yy)'

'XX/dd/yy'
3. Enter GMT month.
pb ENTER → Press

Enter GMT day.
pb ENTER → Press

Enter GMT year.
pb ENTER → Press
4. Verify Display indicates the following:
'GMT date is now'

'mm/dd/yy'

'1 = Update GMT date'
'9 = Reenter date'

*
*
* If displayed GMT is incorrect
*
* | pb 9 → Press
* |
* | pb ENTER → Press
* |
* | Repeat steps 3 to 4.
* |
* |

5. pb 1 → Press
pb ENTER → Press
6. Verify display indicates the following:

'Enter GMT hour'
'(hh:mm) (24-hour format)'

'XX:mm'

7. Enter GMT hour.
pb ENTER → Press

Enter GMT minute.
pb ENTER → Press

8. Verify display indicates the following:
'GMT time is now'

'hh:mm:00'

'1 = Update Time'

'9 = Reenter Time'

```
*****  
*  
* If displayed time is incorrect  
* |  
* | pb 9 → Press  
* |  
* | pb ENTER → Press  
* |  
* | Repeat steps 6 to 8.  
* |  
*  
*****
```

9. pb 1 → Press
pb ENTER → Press

CGBA

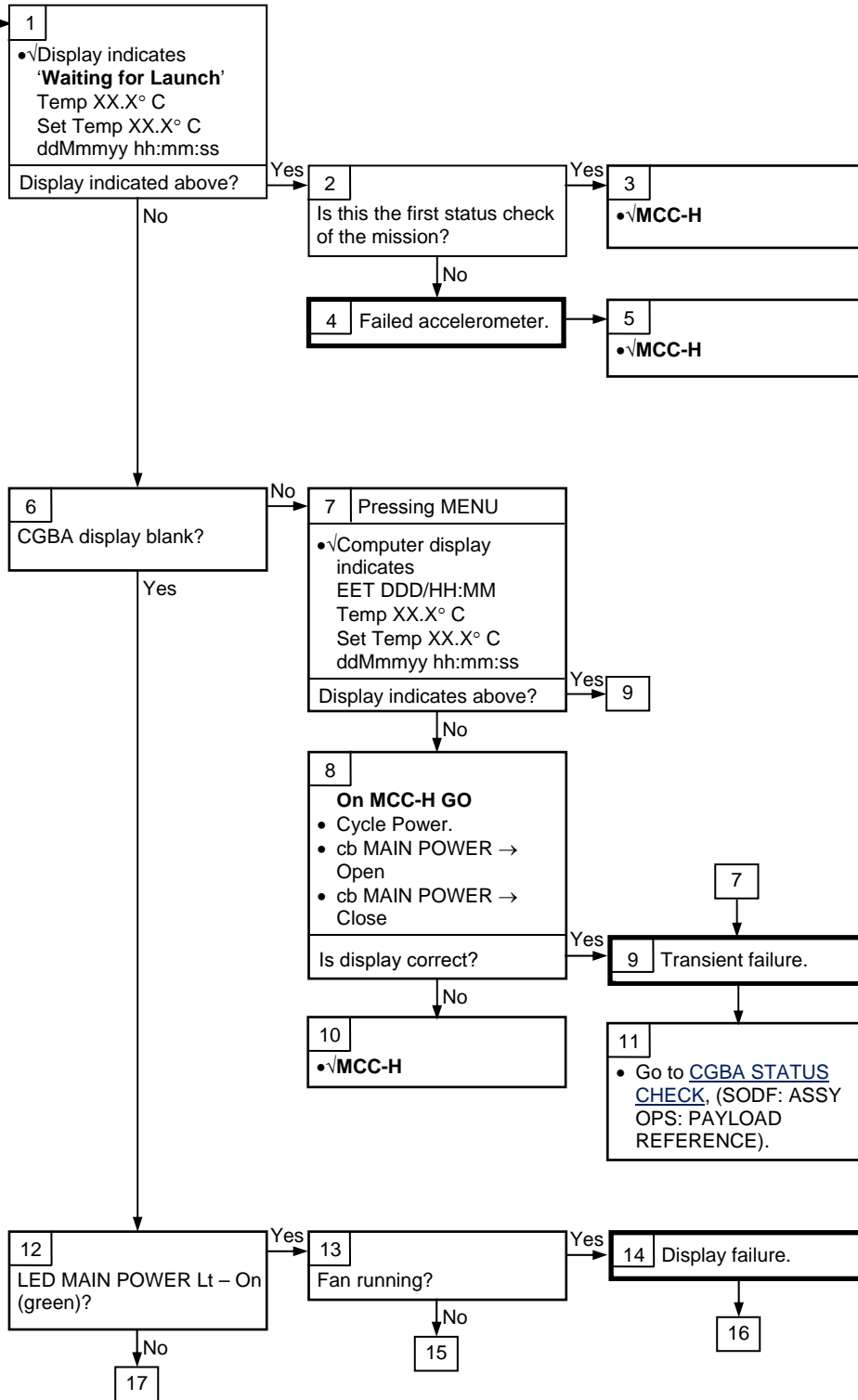
CGBA INCORRECT (NO) DISPLAY

(ASSY OPS/ULF4/FIN 1) Page 1 of 2 pages

Incorrect or No Computer Display

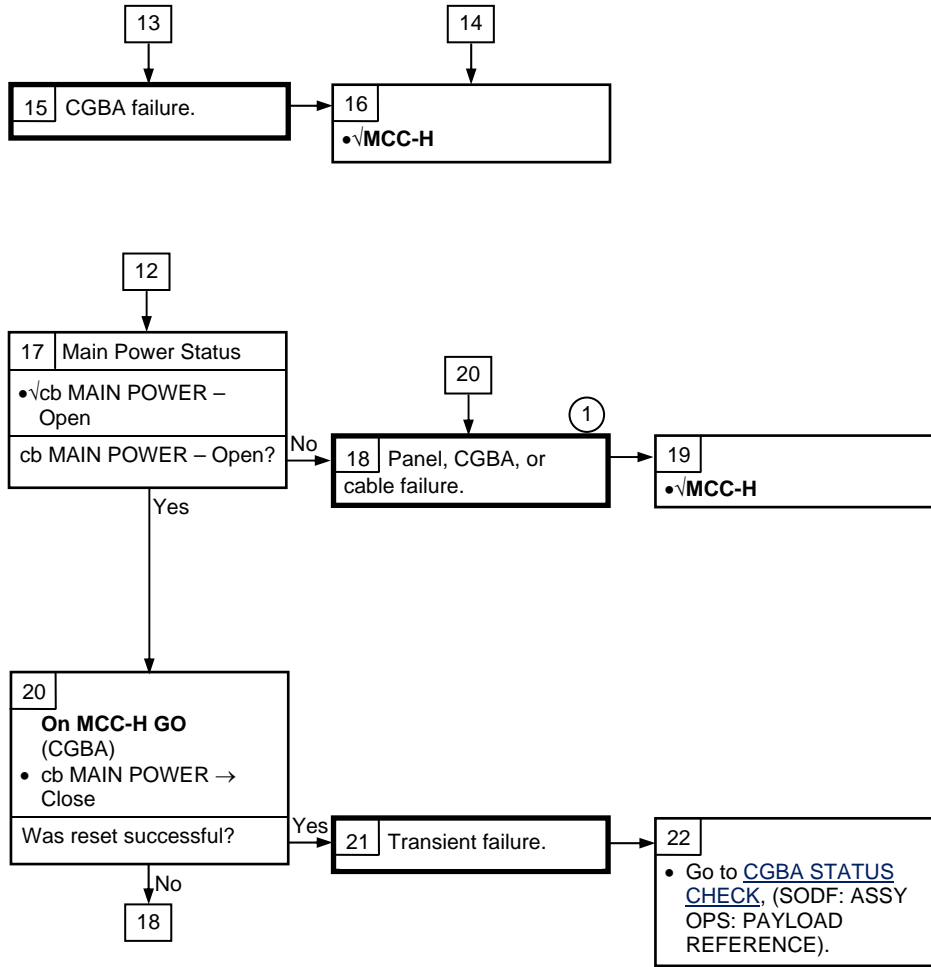
Nominal Config:
(ML85E)

DC 10 Amp MNB S4 – ON
cb DC 10 Amp MNB CB4 – Close
(CGBA – MICRO-2)
cb MAIN POWER – Close
LED MAIN POWER Lt - On

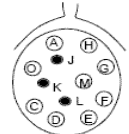


CGBA INCORRECT (NO) DISPLAY

(ASSY OPS/ULF4/FIN 1) Page 2 of 2 pages



① Cable can be checked via UTIL CABLE/OUTLET PWR CHECK (DC), (FDR: IFM: IFM PROCEDURES, STEPS S-Z)



J = +28 VDC
K = Return
L = GND

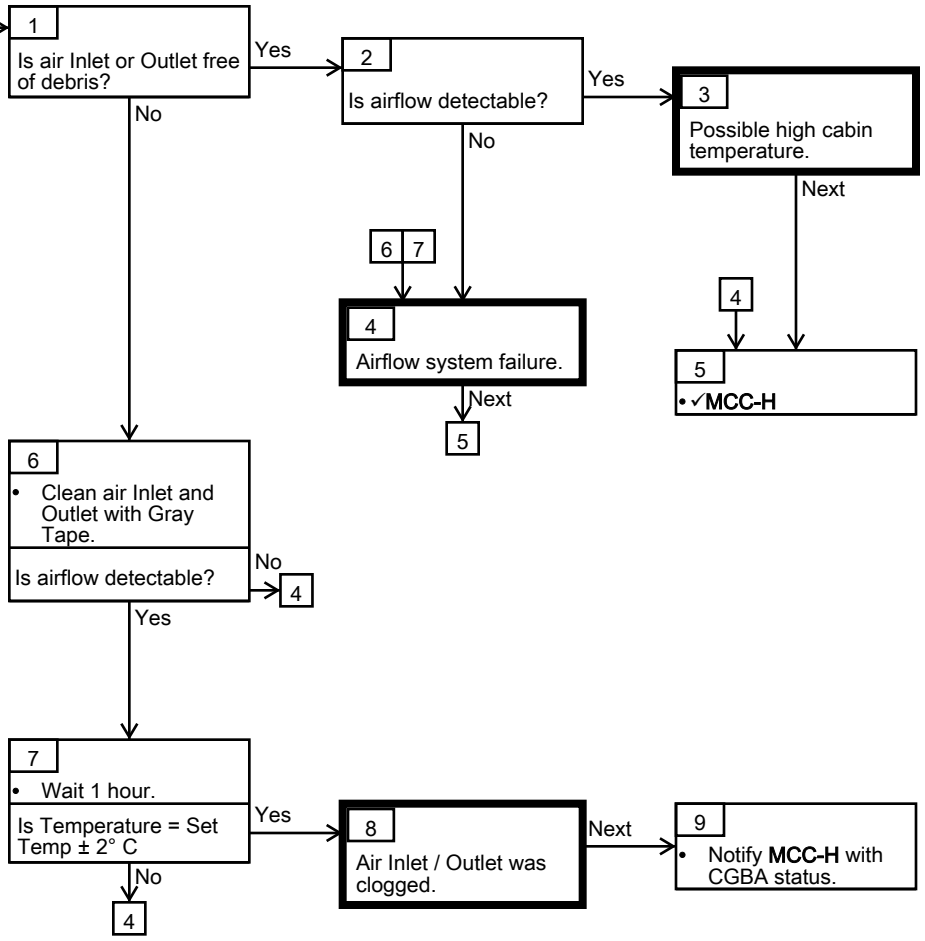
CGBA

CGBA INCORRECT TEMP

(ASSY OPS/ULF4/FIN 1) Page 1 of 1 page

Temperature is \neq to Set TEMP $\pm 2^{\circ}\text{C}$

Nominal Config:
 (ML85E)
 DC 10 Amp
 MNB S4 - ON
 cb DC 10 Amp
 MNB CB4 - Close
 (CGBA - MICRO-2)
 cb MAIN POWER - Close
 LED MAIN POWER Lt - On



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PAYLOAD REFERENCE

**PAYLOAD
REFERENCE**

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HOOK
VELCROHOOK
VELCRO**GLACIER STATUS CHECK**

(ASSY OPS/ULF4/FIN 1) Page 1 of 2 pages

OBJECTIVE:

The following steps will perform a status check on the Glacier.

1. GLACIER STATUS CHECKMF28E/G
(Glacier)

1.1 √cb POWER – Close (It on)

1.2 √sw BATTERY – ON (It on)

1.3 √Display – ‘HOME’

* If Display – ‘**Error Pending**’

* | Perform [GLACIER ERROR MESSAGE](#), all (SODF: ASSY
* | OPS: PAYLOADS: GLACIER: MALFUNCTION), then:

*

* If ‘HOME’ not shown

* pb Right (EXIT) → Press until ‘HOME’ appears

NOTE

After door openings, CURR TEMP may be out of range ramping toward set point.

1.4 √Display – ‘CURR TEMP:’ is $-95.0^{\circ}\text{C} \pm 5.0^{\circ}\text{C}$

1.5 Record from Glacier front panel ‘GPS’, ‘CURR TEMP’ in Table 1 (Glacier Log).

1.6 Notify **MCC-H** of data recorded in Table 1 and any off-nominal conditions.

HOOK
VELCRO

HOOK
VELCRO

CGBA STATUS CHECK

(ASSY OPS/ULF4/FIN 1) Page 1 of 2 pages

OBJECTIVE:

The following steps will perform a status check on the Micro-2 Commercial Generic Bioprocessing Apparatus (CGBA) unit.

1. CGBA STATUS CHECK

<u>NOTE</u>
1. MENU Option will time out after 30 seconds and return to status display.
2. Keypad goes into sleep mode if not pressed within 10 minutes. Pressing any key when display is in sleep mode will reactivate keypad to receive input.

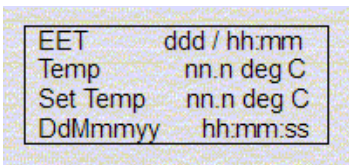
MF71E 2. ✓LED-MAIN POWER – On (green)

* If no LED

* | Perform CGBA INCORRECT (NO) DISPLAY, all (SODF:

* | ASSY OPS: PAYLOADS: CGBA - MALFUNCTION), then:

- 3. ✓CGBA fan running and airflow at AIR OUTLET
- 4. Clean Air Inlet Screen with Gray Tape, as required.
- 5. pb ENTER → Press (to disable screen saver)
- 6. ✓CGBA display indicates the following:



* If data incorrect or no display

* | Perform CGBA INCORRECT (NO) DISPLAY, all (SODF:

* | ASSY OPS: PAYLOADS: CGBA - MALFUNCTION), then:

7. ✓Temp = Set Temp ± 2° C

* If Temp incorrect, then

* | Perform CGBA INCORRECT TEMP, all (SODF: ASSY OPS:

* | PAYLOADS: CGBA - MALFUNCTION), then:

8. ✓Time is incrementing

HOOK
VELCRO

HOOK
VELCRO

CGBA STATUS CHECK

(ASSY OPS/ULF4/FIN 1) Page 2 of 2 pages

9. Record CGBA MET and Temp in Table 1 CGBA Log MF71E(Micro-2).
10. $\sqrt{\text{MCC-H}}$ and report data recorded in Table 1 and any off-nominal conditions.

Table 1. CGBA Log MF71E(Micro-2)

MET	Temp	MET	Temp	MET	Temp
___/___:___	___	___/___:___	___	___/___:___	___
___/___:___	___	___/___:___	___	___/___:___	___
___/___:___	___	___/___:___	___	___/___:___	___
___/___:___	___	___/___:___	___	___/___:___	___
___/___:___	___	___/___:___	___	___/___:___	___
___/___:___	___	___/___:___	___	___/___:___	___
___/___:___	___	___/___:___	___	___/___:___	___
___/___:___	___	___/___:___	___	___/___:___	___
___/___:___	___	___/___:___	___	___/___:___	___
___/___:___	___	___/___:___	___	___/___:___	___

CONTINGENCY EVA PL CONFIGURATION

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N/A

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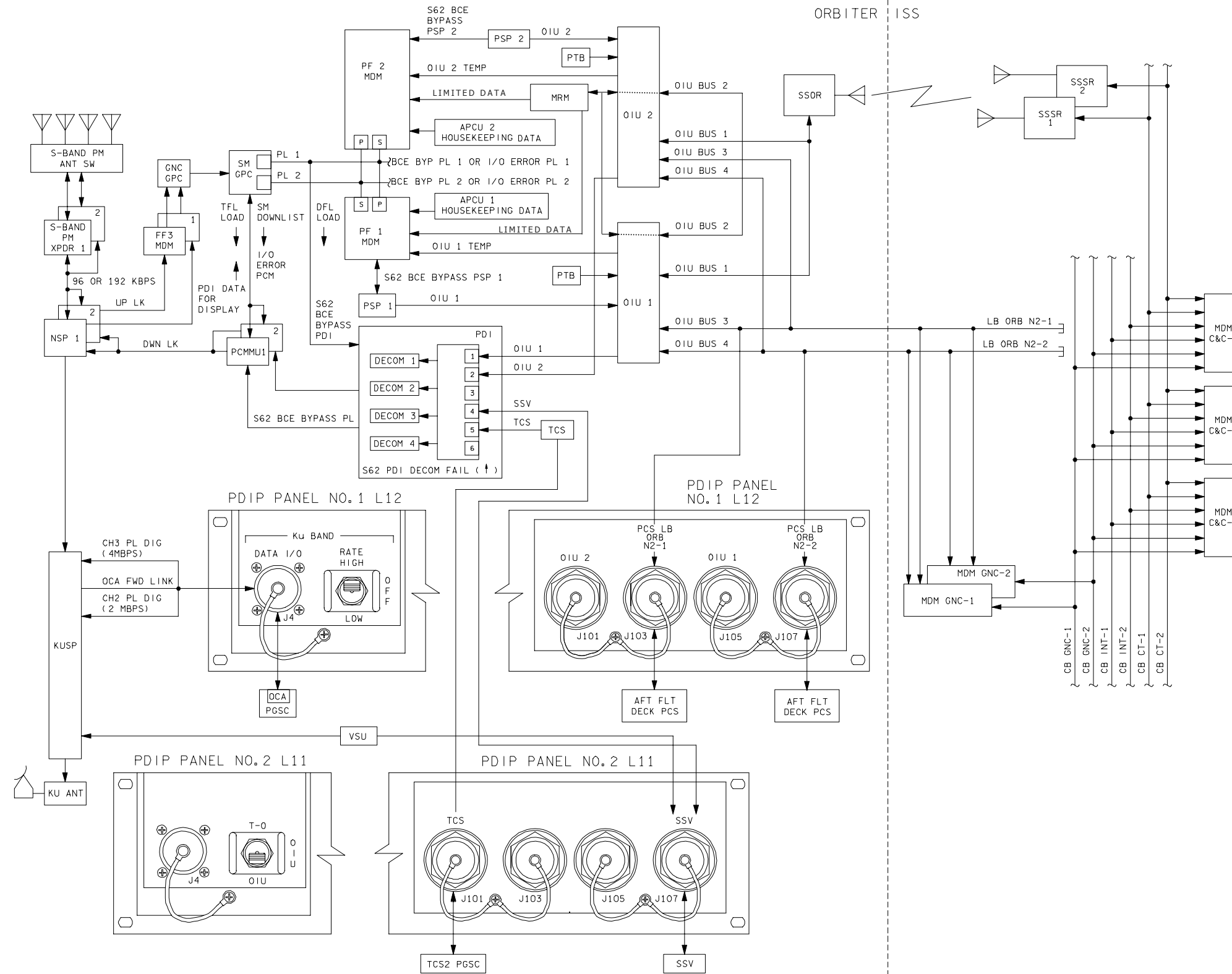
POST-EVA PL CONFIGURATION
(ASSY OPS/ULF4/FIN) Page 1 of 1 pages

N/A

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MALFUNCTION

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4850201_127, SCH# 1

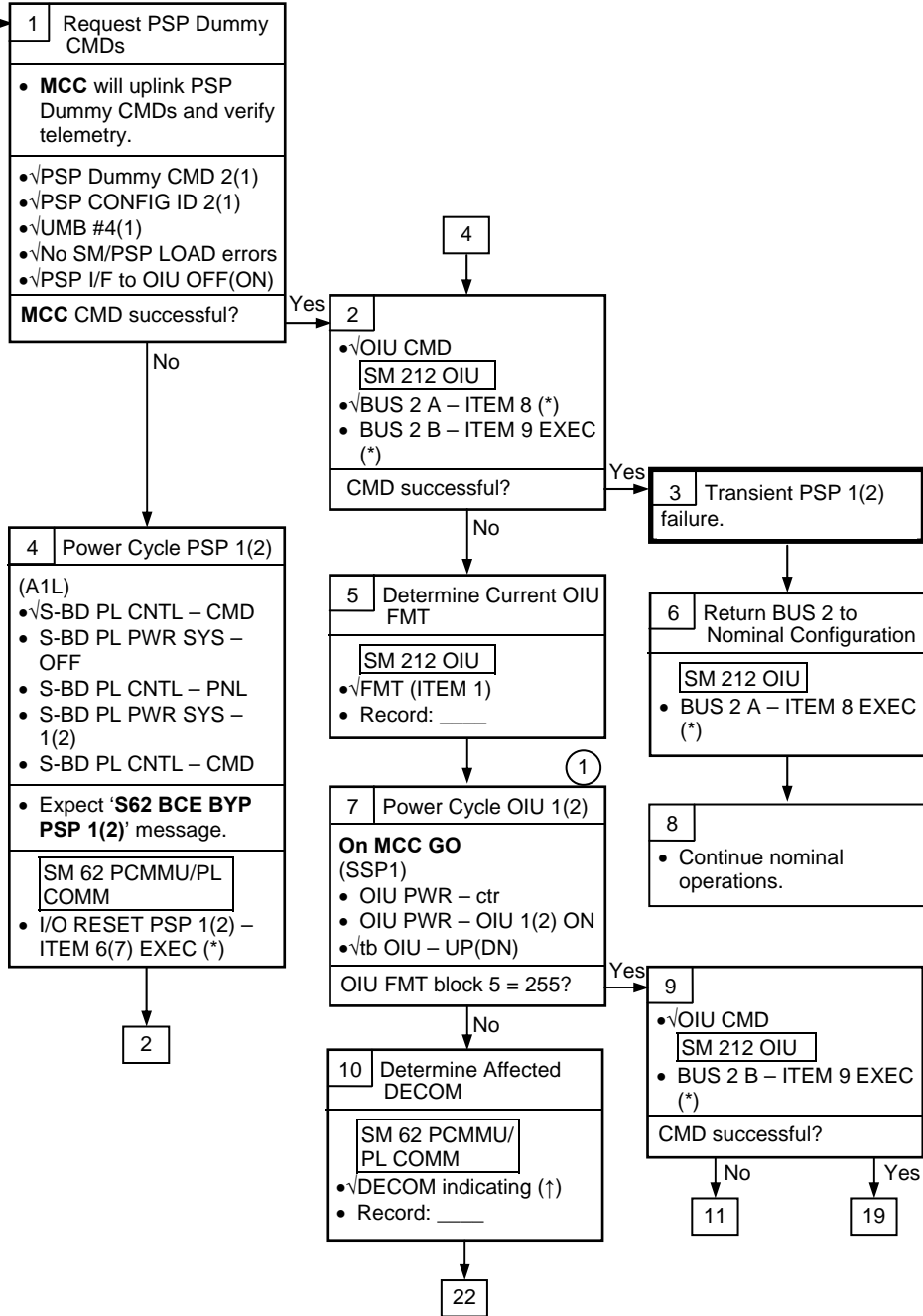
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COMM

OIU FAIL TO COMMAND
(ASSY OPS/ULF4/FIN) Page 1 of 3 pages

No Response to OIU Configuration or Routed Commands

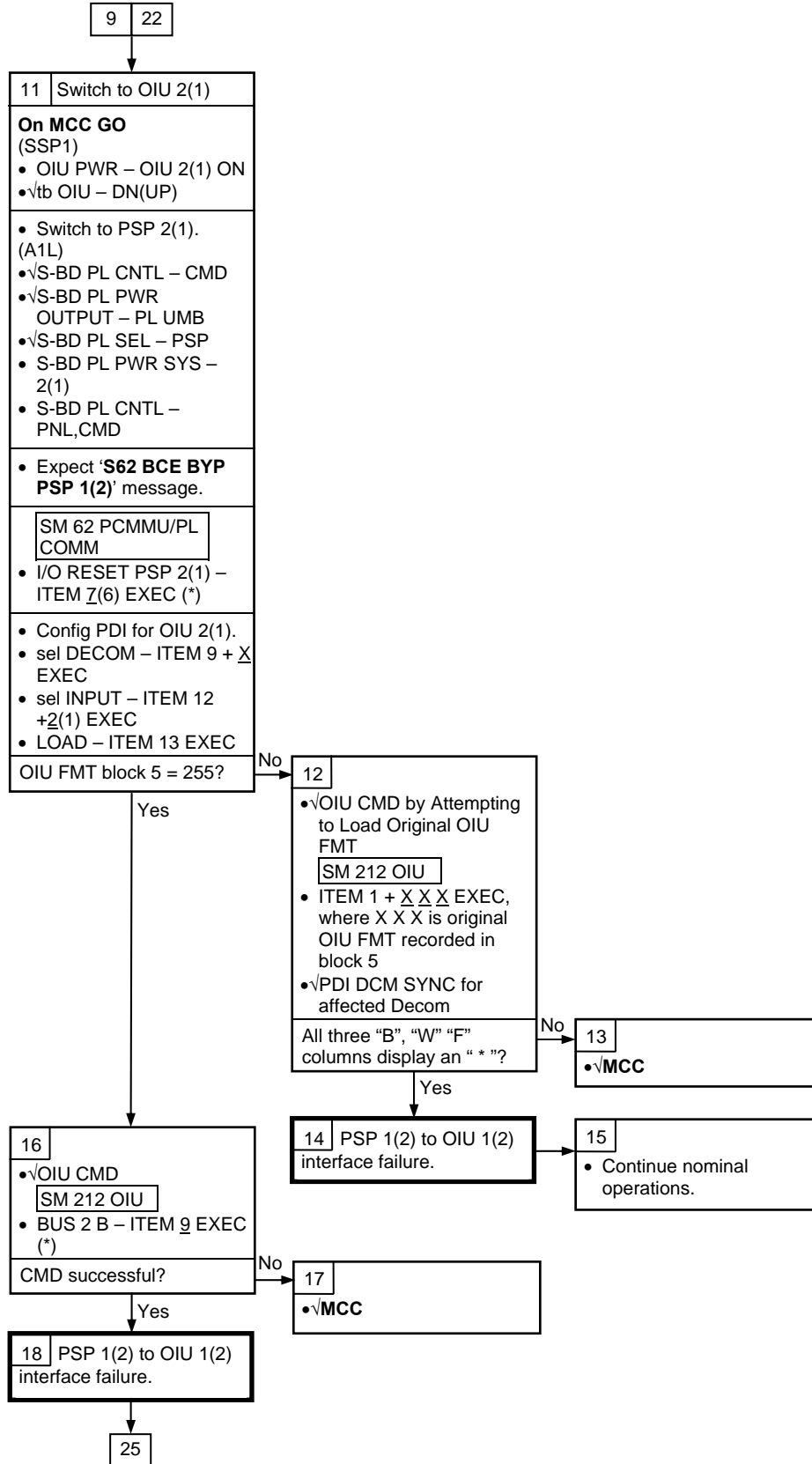
Nominal Config:
(A1L)
S-BD PL
CNTL – CMD
PWR SYS – 1
PWR SEL – PSP
PSP OUTPUT – PL
UMB
(SSP1)
OIU PWR – OIU 1(2)
ON
tb OIU – UP(DN)
(R1)
PL CAB –
MNA(MNB)
PL AUX – ON

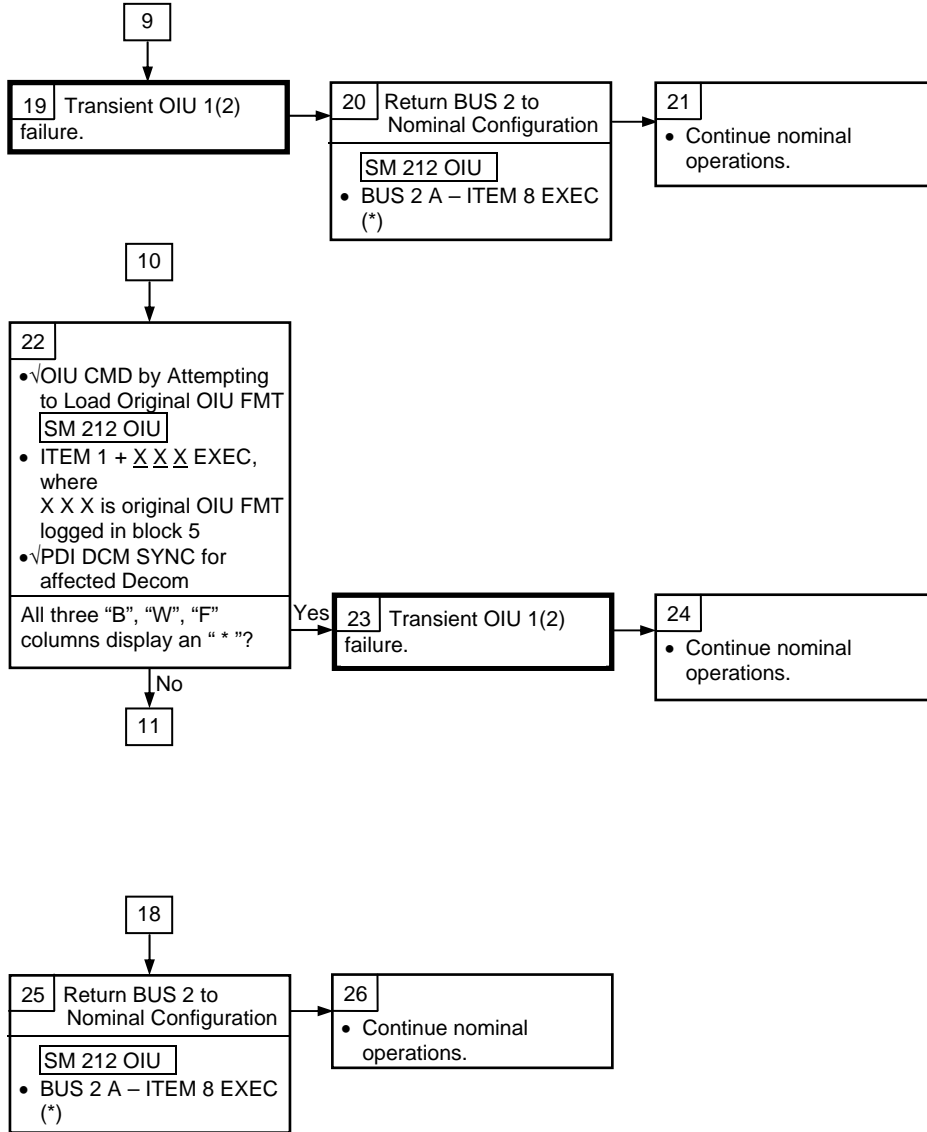


① Power cycle will place OIU in Format 255. OIU Station or MRM1 TLM will be lost until OIU CMD is recovered. OIU H&S TLM will also be lost if PDI is not configured for OIU FMT 255.

OIU FAIL TO COMMAND

(ASSY OPS/ULF4/FIN) Page 2 of 3 pages





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ASSY OPS

OIU TEMP HIGH MALFUNCTION

(ASSY OPS/ULF4/FIN)

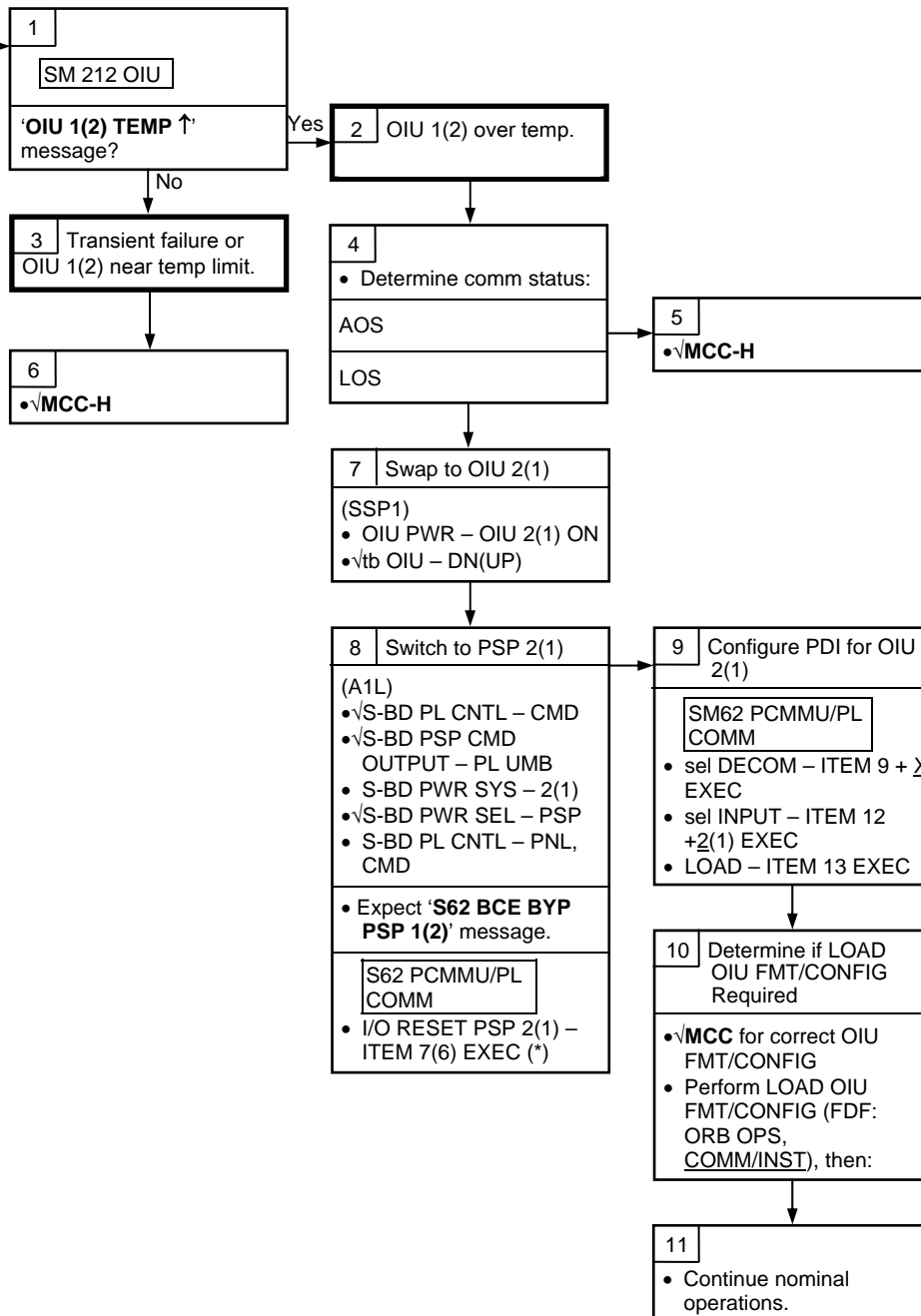
Page 1 of 1 page

SM 212 OIU
TEMP

OIU message: 'OIU
TEMP > 212'

Nominal Config:

(R1)
PL CAB –
MNA(MNB)
PL AUX – ON
(SSP 1)
OIU PWR – OIU 1(2)
ON
tb OIU – UP(DN)



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COMM

S212 OIU AD 1 NOLK/LOSS OF ISS OR SSOR TELEMETRY

(ASSY OPS/ULF4/FIN)

Page 1 of 3 pages

SM ALERT

S212 OIU AD1 NOLK

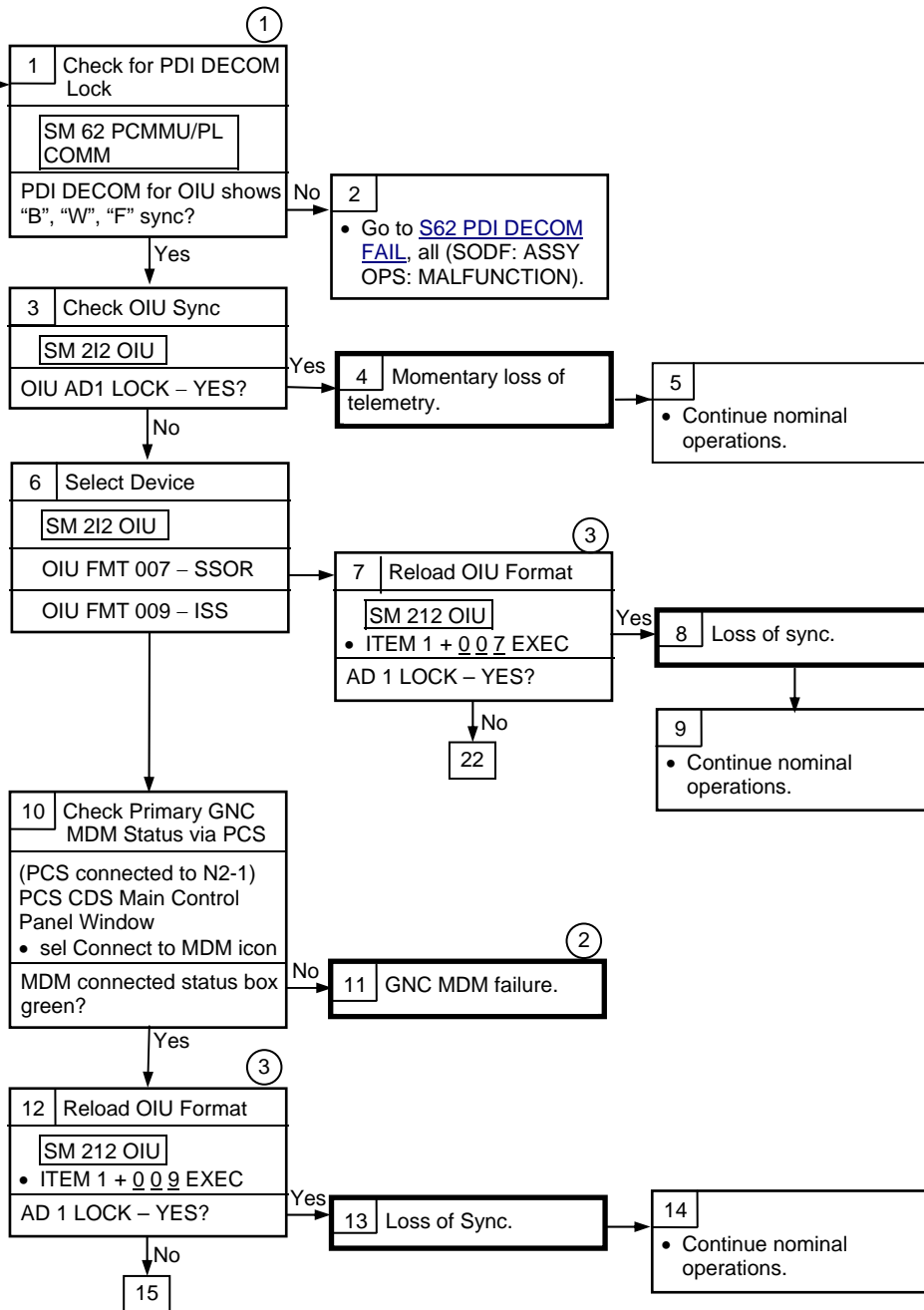
Loss of Data on SPEC 205 during Undocking

MCC-H Reports Loss of ISS Data to Ground via OIU

Nominal Config:
(R1)
PL CAB – MNA(MNB)
PL AUX – ON (SSP1)
OIU PWR – OIU 1(2) ON
tb OIU – UP(DN)

For ISS:
One PCS connected to Primary GNC MDM
SM 212 OIU
OIU FMT – 009

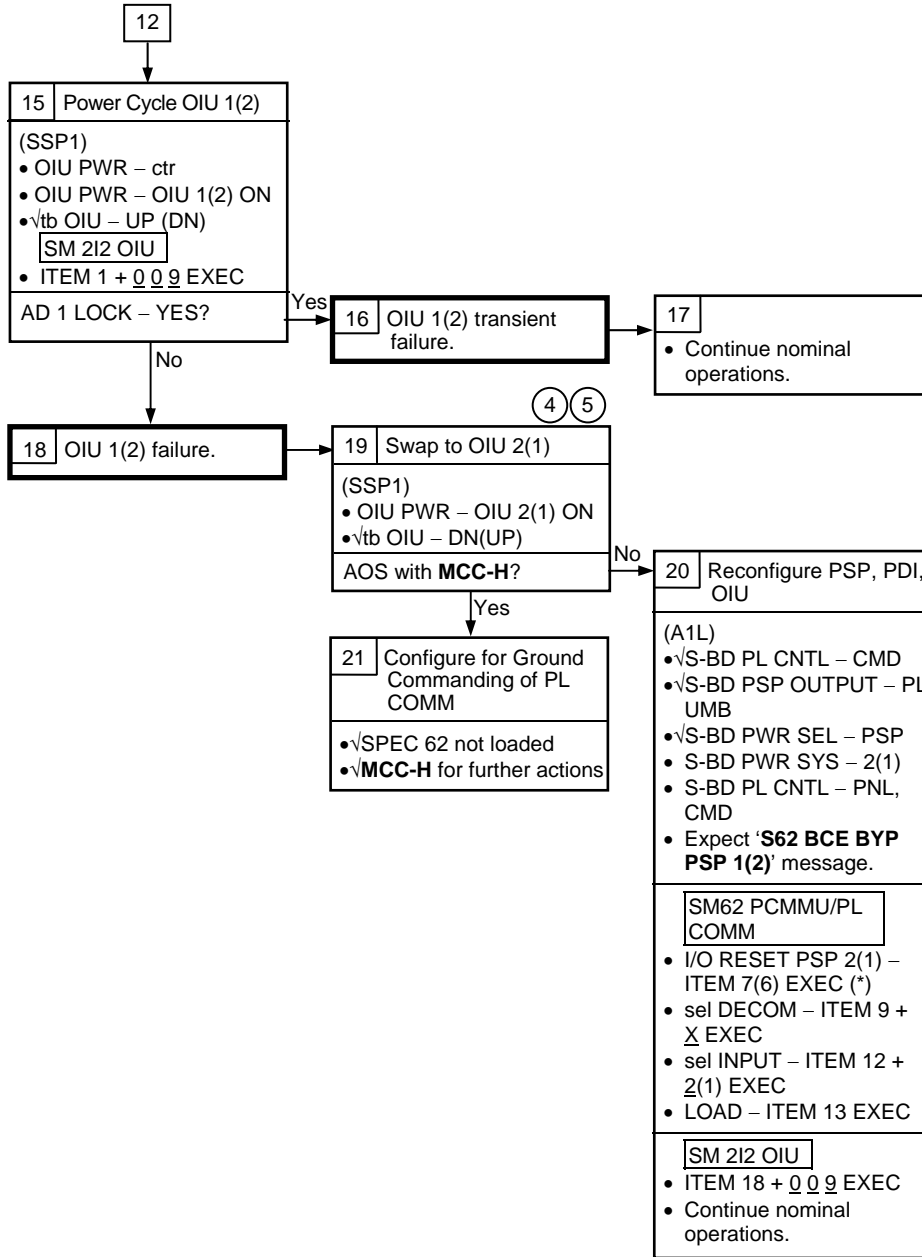
For SSOR:
(R14)
cb MNA UHF EVA – cl
cb MNC UHF EVA – cl (O6)
EVA STRING: 1(2)
UHF MODE – EVA
SM 212 OIU
OIU FMT – 007



① OIU to PDI problems would announce a 'S62 PDI DECOM FAIL' message if FDA enabled.

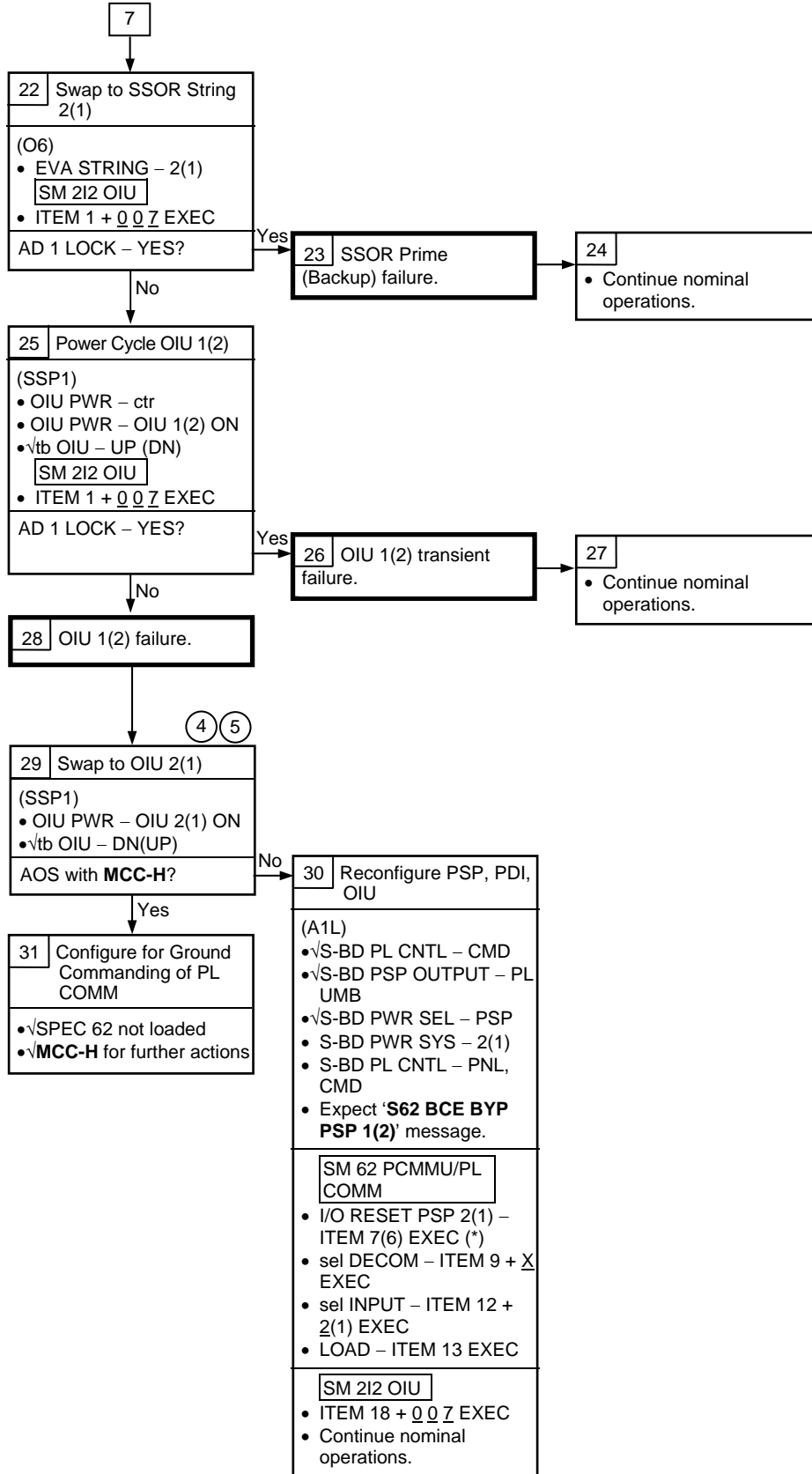
② MCC-H will likely direct STS or ISS crew to perform 3.301 LOSS OF PCS TELEMETRY (SODF: POC: MALFUNCTION).

③ Reloading the OIU format forces a resync with the GNC MDM or SSOR.



④ Restores operational capability; additional troubleshooting to determine BIA failure may be performed later.

⑤ OIU powerup config on OIU BUS 3 is RT on ch A.



④ Restores operational capability; additional troubleshooting to determine BIA failure may be performed later.

⑤ OIU powerup config on OIU BUS 3 is RT on ch A.

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COMM

S62 PDI DECOM FAIL
(ASSY OPS/ULF4/FIN) Page 1 of 3 pages

SM
ALERT

①

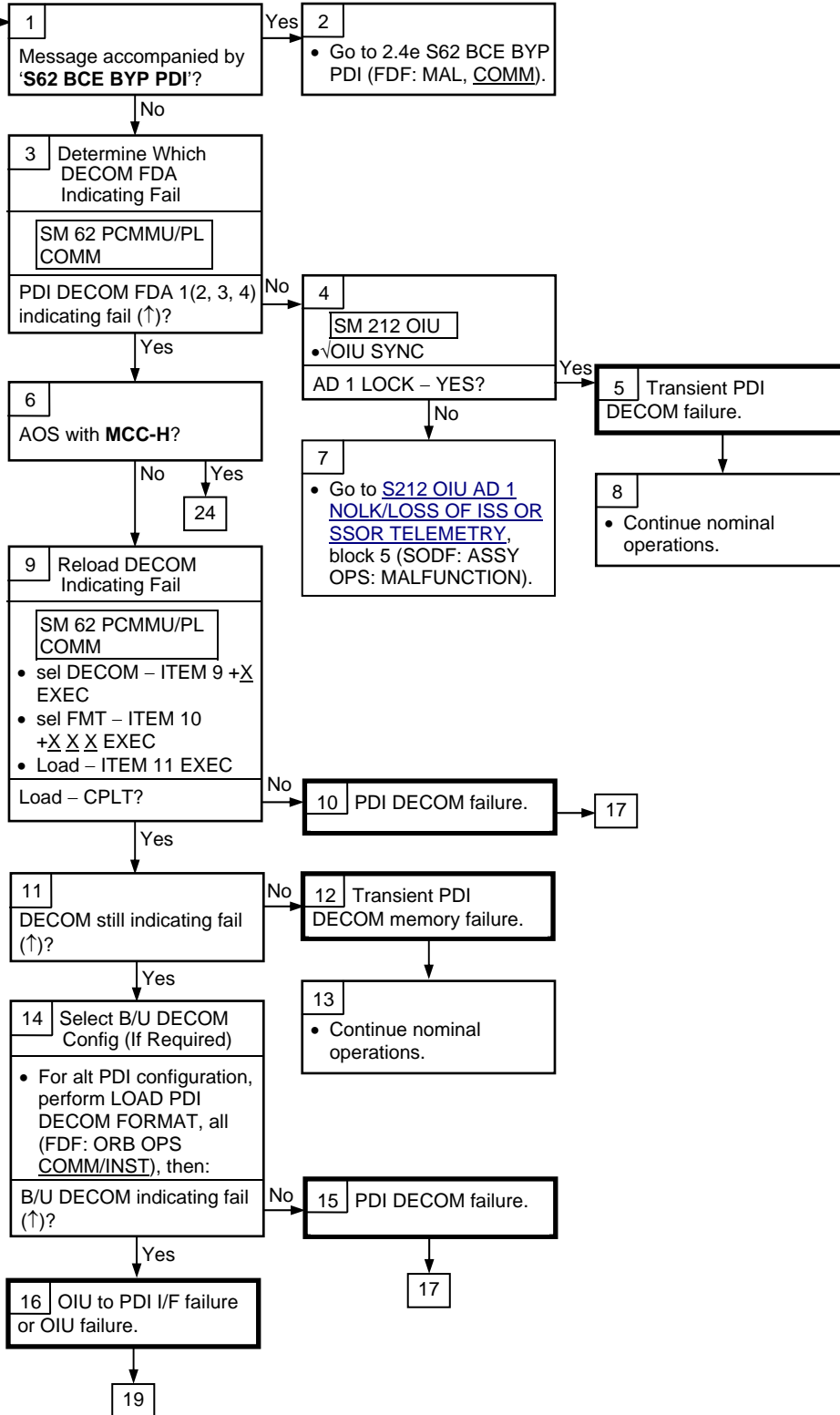
S62 PDI
DECOM FAIL

[S212 OIU AD 1 NOLK/LOSS OF ISS or SSOR TELEMETRY](#), block 1 (SODF: ASSY OPS: MALFUNCTION) or 2.4g S62 PDI DECOM FAIL (FDF: MAL, COMM)

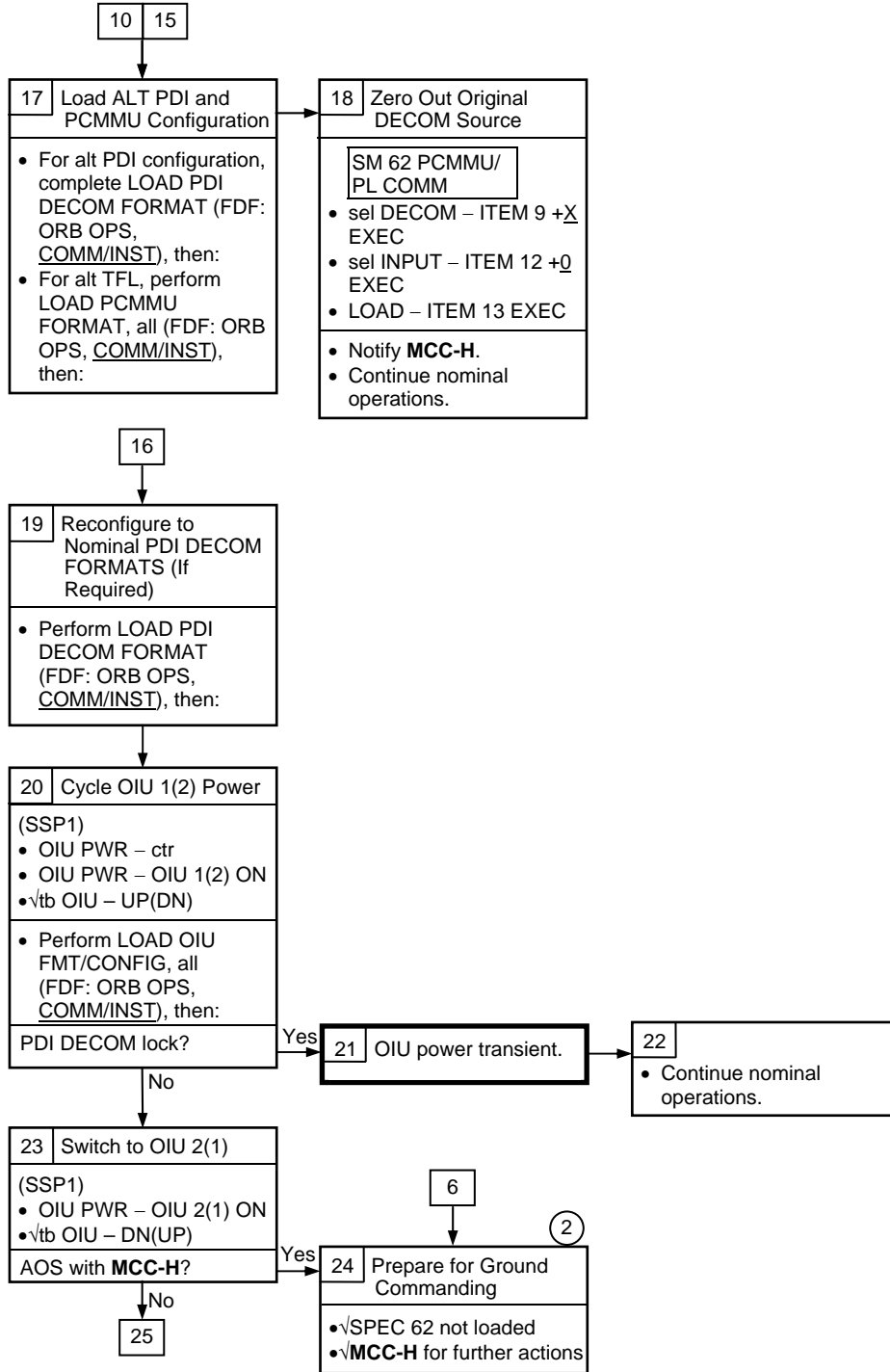
Nominal Config:
(A1L)
PL DATA INTLVR
PWR – ON

(R1)
PL CAB – MNA(MNB)
PL AUX – ON

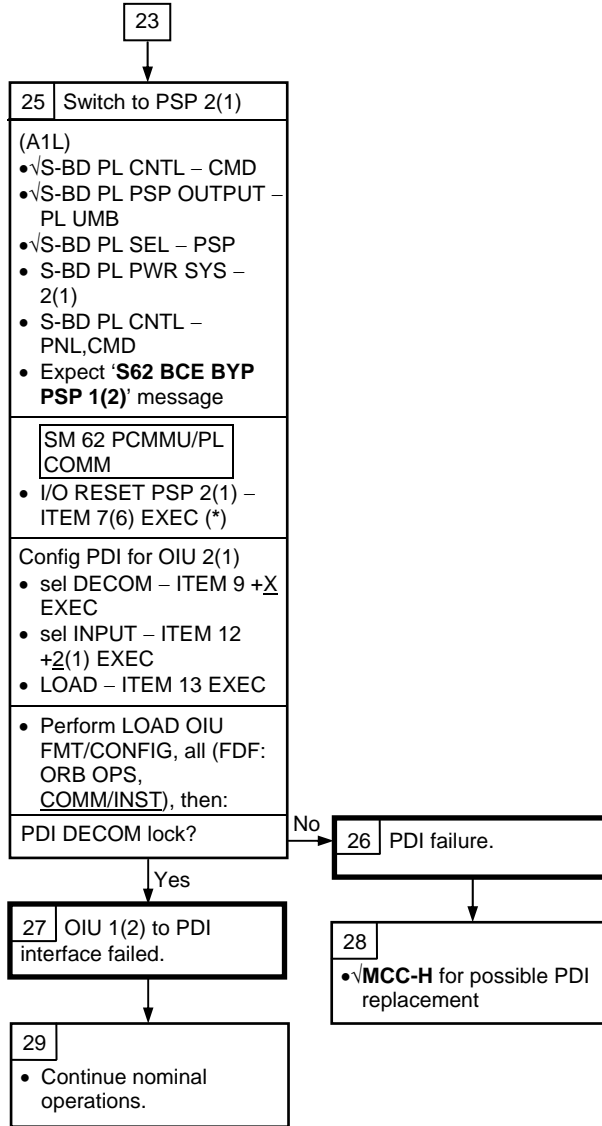
(SSP1)
OIU PWR – OIU 1(2)
ON tb-UP(DN)



①
TCS and SSV not
addressed in MAL;
FDA not nominally
enabled.



② **MCC-H** can perform all PL COMM reconfig, except OIU PWR cycle and swap steps.



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PL/DPS RECONFIGURATION

(ASSY OPS/ULF4/FIN)

Page 1 of 2 pages

PROCEDURE	SECURE ACTION	RECOVERY ACTION	INFO
PL 1(2) MDM I/O ERROR; PL 1(2) MDM OUTPUT (FDF: ORB PKT, <u>DPS</u>)	N/A	N/A	A
5.3c I/O ERROR PL 1(2); MDM OUTPUT PL 1(2) (FDF: MAL, <u>DPS</u>)	N/A*	N/A	A
PASS SM GPC FAIL (FDF: ORB PKT, <u>DPS</u>)	N/A	D	B
GNC RECOVERY VIA G2FD (FDF: ORB PKT, <u>DPS</u>)	N/A	C,D	B
5.1a CS SPLIT(FDF: MAL, <u>DPS</u>)	N/A	C,D,E**	B
5.3g BCE BYP PL1(2) (FDF: MAL, <u>DPS</u>)	N/A*	N/A	A
GPC FRP-4 PASS RECOVERY AFTER BFS ENGAGE (ASCENT/ORBIT/ENTRY) (FDF: MAL, <u>DPS</u>)	N/A*	C,D	B
GPC FRP-7 DPS RECONFIG FOR LOSS OF AV BAY COOLING (FDF: MAL, <u>DPS</u>)	N/A*	C,D	B
DPS SSR-3 GNC REASSIGNMENT (FDF: MAL, <u>DPS</u>)	N/A	N/A	B
DPS SSR-4 SM REASSIGNMENT (FDF: MAL, <u>DPS</u>)	N/A	C,D	B
ECLSS SSR-10 H2O PUMP OPS VIA GPC (FDF: MAL, <u>ECLSS</u>)	N/A	C,D,E**	B

*NOTE: Procedure does not call out PL/DPS RECONFIG, Secure

**NOTE: Procedure does not call out PL/DPS RECONFIG, Recovery

INFO A

If '**I/O ERROR PL1**' message:

- Loss of ground and orbiter MEDS command interface to ISS via PSP 1/OIU 1
- Loss of ground and orbiter MEDS command interface to MRM1 via PSP 1/OIU 1
- Loss of redundant MRM1 telemetry via PL1 to ground
- For additional impacts, refer to [ORBITER MDM LOSS IMPACTS](#)
(SODF: ASSY OPS: MALFUNCTION: CRITICAL EQUIPMENT LOSS)

If '**I/O ERROR PL2**' message:

- Loss of ground and orbiter MEDS command interface to ISS via PSP 2/OIU 2
- Loss of ground and orbiter MEDS command interface to MRM1 via PSP 2/OIU 2
- Loss of redundant MRM1 telemetry via PL2 to ground
- For additional impacts, refer to [ORBITER MDM LOSS IMPACTS](#)
(SODF: ASSY OPS: MALFUNCTION: CRITICAL EQUIPMENT LOSS)

PL/DPS RECONFIGURATION

(ASSY OPS/ULF4/FIN)

Page 2 of 2 pages

INFO B

If SM GPC affected:

Note PL/ISS commanding via SM GPC (ground and 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 complete

ACTION D

Reload PDI DECOM FORMAT (FDF: ORB OPS FS, COMM/INST)

As required, reenable PDI DECOM FDA

Resume SPEC 62

ACTION E

Reload PCMMU TFLs, load PCMMU FORMAT (FDF: ORB OPS, COMM/INST)

ORBITER ELECTRICAL BUS LOSS MATRIX

(ASSY OPS/ULF4/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			MPC2			FPC2	APC5	PNL O15	MAR2	MAR1	(R)	(R)	P	PNL O16	APC 6	MO63P
								AUX PLA	P	(R)	AUX PLB	AC2	APC2	ΦA	AFT PLB				PRI PL	AFT PLC				
ORBITER EQUIPMENT								PL1	PL2	PL3														
APCU1										XC										R	R	P		
APCU2 (LCS)												XC								R	R	P		
OIU1											X													
OIU2												X												
TCS												X												
Video Processing Unit (VPU)																		X						
Primary C/L Camera												X												
Secondary C/L Camera									X															
ICC-VLD2 Keel Cam Power										X														
ICC-VLD2 Keel Cam Illuminator Power										X														
PDIP 1 (Ku-Band relay, PCS-to-OIU interface)										X														
PDIP 2 (TCS/SSV)										X														
Payload Timing Buffer											X													
Orbiter PCS										X														
MIDDECK PAYLOADS																								
Glacier																								
CGBA-2 (MICRO-2)																	X							
CGBA-2 (NLP-Cells4)																								X

(1) 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 tb Monitor Power
- P - Primary Power Source
- (R) - Redundant Power Source (requires crew action to use)

ORBITER MDM LOSS IMPACTS

(ASSY OPS/ULF4/FIN 1)

Page 1 of 2 pages

- FF1 Uplink through NSP 1 (secondary)
- FF3 Uplink through NSP 2 (primary)
FRCS Vernier command path (loss of verns)
- FA1 LRCS Vernier command path (loss of verns)
- FA2 RRCS Vernier command path (loss of verns)

NOTE

The fire indication parameters sent from the MRM1 Smoke Detectors to the PF1 MDM do not annunciate orbiter FDAs. (Orbiter FDAs are generated by OIU/PDI stream-data.)

- PF1 ISS Primary command path (via PSP 1 – UMB 1/OIU 1)
Five redundant MRM1 tlm parameters to ground
(MRM1 Pwr, TCU1 Pwr, MRM1 SD #s 1 & 3 Failure, MRM1 Fire SD 1)
OIU 1 tlm
Ku-Band command and tlm
APCU 1 tlm

NOTE

The fire indication parameters sent from the MRM1 Smoke Detectors to the PF2 MDM do not annunciate orbiter FDAs. (Orbiter FDAs are generated by OIU/PDI stream-data.)

- PF2 ISS Redundant command path (via PSP 2 – UMB 1/OIU 2)
Four redundant MRM1 tlm parameters to ground
(TCU2 Pwr, MRM1 SD #2 Failure, MRM1 Fire SD 2 & 3)
OIU 2 tlm
CCTV Command Path from **MCC** (crew still has control from PNL A7)
C/W Annunciation (PL Caution, B/U C/W Alarm)
APCU 2 tlm
- OF1 PCMMU 1 – mode select tlm
PCMMU 1,2 – RPC A tlm
PDI – RPC A tlm
PL AUX A – RPC ON/OFF tlm
MID MCA 1 OP STATUS 1, 2, 3, 4 tlm
MID MCA 3 OP STATUS 1, 2, 3, 4 tlm
PL BAY MECH PWR SYS 1, 2 tlm
PL RETEN LOGIC PWR SYS 1, 2 tlm
MRM1 LATCH 1,2,3,4,5 (LAT/REL/RDY-TO-LAT) Sys B tlm (PL SEL 3)
MRM1 ROEU (LAT/REL/MATE/DEMATE) Sys B tlm (PL SEL 2)

ORBITER MDM LOSS IMPACTS

(ASSY OPS/ULF4/FIN 1)

Page 2 of 2 pages

- OF2 PSP 1,2 – bit and frame sync
PCMMU 2 – mode select tlm
PCMMU 2 RPC B tlm
PL AUX B – RPC ON/OFF tlm
MID MCA 1 OP STATUS 5, 6 tlm
MID MCA 3 OP STATUS 5, 6, 7, 8 tlm
MRM1 LATCH 1,2,3,4,5 (LAT/REL/RDY-TO-LAT) Sys A tlm (PL SEL 3)
PRLA LATCH 1,2,3,4,5 (LAT/REL) Sys A Cmds
ROEU LAT/REL Sys A Cmds
ICC-VLD2 LATCH 1,2,3,4,5 (LAT/REL/RDY-TO-LA) Sys B tlm (PL SEL 1)
MRM1 ROEU (RELAX) Sys B tlm (PL SEL 2)
- DSC OF2 FRCS Vernier Inj Temps (loss of verns)
- OF3 Orbiter Comm system tlm (refer to OI MDM/DSC Failure Impacts)
PL PRI MNC, MNB, FC3 – ON/OFF tlm
PCMMU 1 RPC B tlm
PDI – RPC B tlm
- OF4 Ku-Band – RADAR mode and output power
S-Band, Ku-Band – PNL/CMD switch position
PSP, GCIL – ON/OFF tlm
PDI Power Switch position indication
Orbiter Comm system tlm (refer to OI MDM/DSC Failure Impacts)
CAB PL (MNA, MNB), PL AUX – ON/OFF tlm
P/L SEL posn tlm System A
MRM1 ROEU (LAT/REL/MATE/DEMATE/ELEC CONN) Sys A tlm (PL SEL 2)
- OA1 ODS X4/PMA X3 connector mate tlm
PMA 2/3 GRP 1 passive hooks (1,3,5,7,9,11) Close tlm
- DSC OA1 ODS X4/PMA X3 connector mate tlm
PMA 2/3 GRP 1 passive hooks (1,3,5,7,9,11) Close tlm
- OA2 AFT PL MNB PWR ON tlm
AFT PL MNB amps
ODS X3/PMA X4 connector mate tlm
PMA 2/3 GRP 2 passive hooks (2,4,6,8,10,12) Close tlm
- DSC OA2 ODS X3/PMA X4 connector mate tlm
PMA 2/3 GRP 2 passive hooks (2,4,6,8,10,12) Close tlm
Vernier R5D Inj Temps (loss of verns)
- OA3 AFT PL MNC PWR ON tlm
AFT PL MNC amps
MRM1 ROEU (RELAX) Sys A tlm (PL SEL 2)
ICC-VLD2 LATCH 1,2,3,4,5 (LAT/REL/RDY-TO-LA) Sys A tlm (PL SEL 1)
- DSC OL1 LRCS Vernier Inj Temps (loss of verns)
- DSC OR1 RRCS Vernier Inj Temps (loss of verns)

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DEORBIT PREP

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PAYLOAD DEACTIVATION

(ASSY OPS/ULF4/FIN)

Page 1 of 1 pages

- | | | |
|-----------------|----|---|
| L12U
(SSP 1) | 1. | cb SW PWR 1– op
cb PDIP 1 PWR 2/KuBAND RLY – op
cb PDIP1 PWR 1 – op |
| L12L
(SSP 2) | 2. | cb PDIP 2 PWR 2/MRM1 RLY/KEEL CAM PWR – op
cb PDIP 2 PWR 1 – op |
| L12 (PDIP 1) | | Ku BAND RATE – OFF |
| R1 | 3. | PL CAB – OFF |

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PAYLOAD REACTIVATION

(ASSY OPS/ULF4/FIN)

Page 1 of 1 pages

- R1
1. PL CAB – MNA
- L12L
(SSP 2)
2. cb PDIP 2 PWR 2/MRM1 RLY/KEEL CAM PWR - cl
 3. KEEL CAM ILL PWR - ON

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PAYLOAD ENTRY SWITCH LIST/VERIFICATION

(ASSY OPS/ULF4/FIN 1)

Page 1 of 2 page

PAYLOAD PWR CONFIG

TIG-1:55 R1

1. PL CAB – OFF
 PL PRI MNC – ctr (tb-OFF)
 PL PRI MNB – ctr (tb-OFF)
 PL PRI FC3 – ctr (tb-OFF)
 PL AUX – ON
 PL AFT MNB – OFF
 PL AFT MNC – OFF

L12U
(SSP1)

2. cb SW PWR 1 – op
 cb PDIP 1 PWR 2/KuBAND RLY – op
 TCS PWR – OFF (tb-bp)
 cb PDIP 1 PWR 1 – op
 OIU PWR – OFF (tb-bp)

L12L
(SSP2)

3. KEEL CAM PWR – OFF
 ILL PWR – OFF
 cb PDIP 2 PWR 2/MRM1 RLY/KEEL CAM PWR – op
 C/L CAM PWR – OFF
 MRM1 PWR – (ctr) (tb-bp)
 TCU2 – (ctr) (tb-bp)
 PL PRI SSP PWR – ENA
 FANS – (ctr) (tb-bp)
 ORBITAL MODE – OFF (tb-bp)
 cb MRM1 – op
 cb PDIP 2 PWR 1 – op
 MRM1 XFR MODE – OFF (tb-bp)
 TCU1 – (ctr) (tb-bp)
 MONITOR MODE – OFF (tb-bp)
 INITIAL STATE - OFF (tb-bp)
 MLM HTRS – (ctr) (tb-bp)

L12
(PDIP1)

4. Ku BAND RATE – OFF
 DC POWER 1 – OFF
 DC POWER 2 – OFF

L11
(PDIP2)

5. MRM1 – OIU
 DC POWER 1 – OFF
 DC POWER 2 – OFF

MF28E/G
(GLACIER)
ML86B

6. cb POWER – cl (lt on)
 BATTERY – ON (lt on)
 cb MNB MAR 1 – cl

PAYLOAD ENTRY SWITCH LIST/VERIFICATION

(ASSY OPS/ULF4/FIN 1)

Page 2 of 2 page

MF71E 7. ✓cb MAIN POWER – cl (lt on)
 (CGBA – MICRO-2)
ML85E ✓DC 10 AMP MNB S4 – ON
 ✓cb DC 10 AMP MNB CB4 – cl

APCU

APCU

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APCU ACTIVATION

(ASSY OPS/ULF4/FIN 1) Page 1 of 1 page

- R1 1. VERIFYING ORBITER PAYLOAD BUS CONFIGURATION
 √PL PRI MNC tb – ON
 √PL CAB – MNA(MNB)
 √PL AUX – ON
- SSP 1 2. VERIFYING SWITCH POWER
 √cb SW PWR 1 – cl
3. CLOSING APCU OUTPUT RELAY
 √APCU 1(2) CONV tb – bp

 APCU 1(2) OUTPUT RLY – CL
4. TURNING APCU CONVERTER(S) ON
 APCU 1(2) CONV – ON

 √APCU 1(2) CONV tb – gray
 √APCU 1(2) OUTPUT RLY tb – gray
- CRT SM 200 APCU Status

 √APCU 1(2) OUT VOLTS RES HIGH: 122 to 126.5 V

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APCU DEACTIVATION

(ASSY OPS/ULF4/FIN 1) Page 1 of 1 page

NOTE

Expect '**S200 APCU 1(2) VOLT LMT**' message when APCU Converters are powered OFF.

CRT

SM 200 APCU Status

- SSP 1
1. TURNING APCU CONVERTER(S) OFF
APCU 1(2) CONV – OFF

√APCU 1(2) CONV tb – bp
√APCU 1(2) OUTPUT RLY tb – bp
 2. OPENING APCU OUTPUT RELAY
APCU 1(2) OUTPUT RLY – OP

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APCU

APCU AMPS ↑ (ASSY OPS/ULF4/FIN)

SM
ALERT

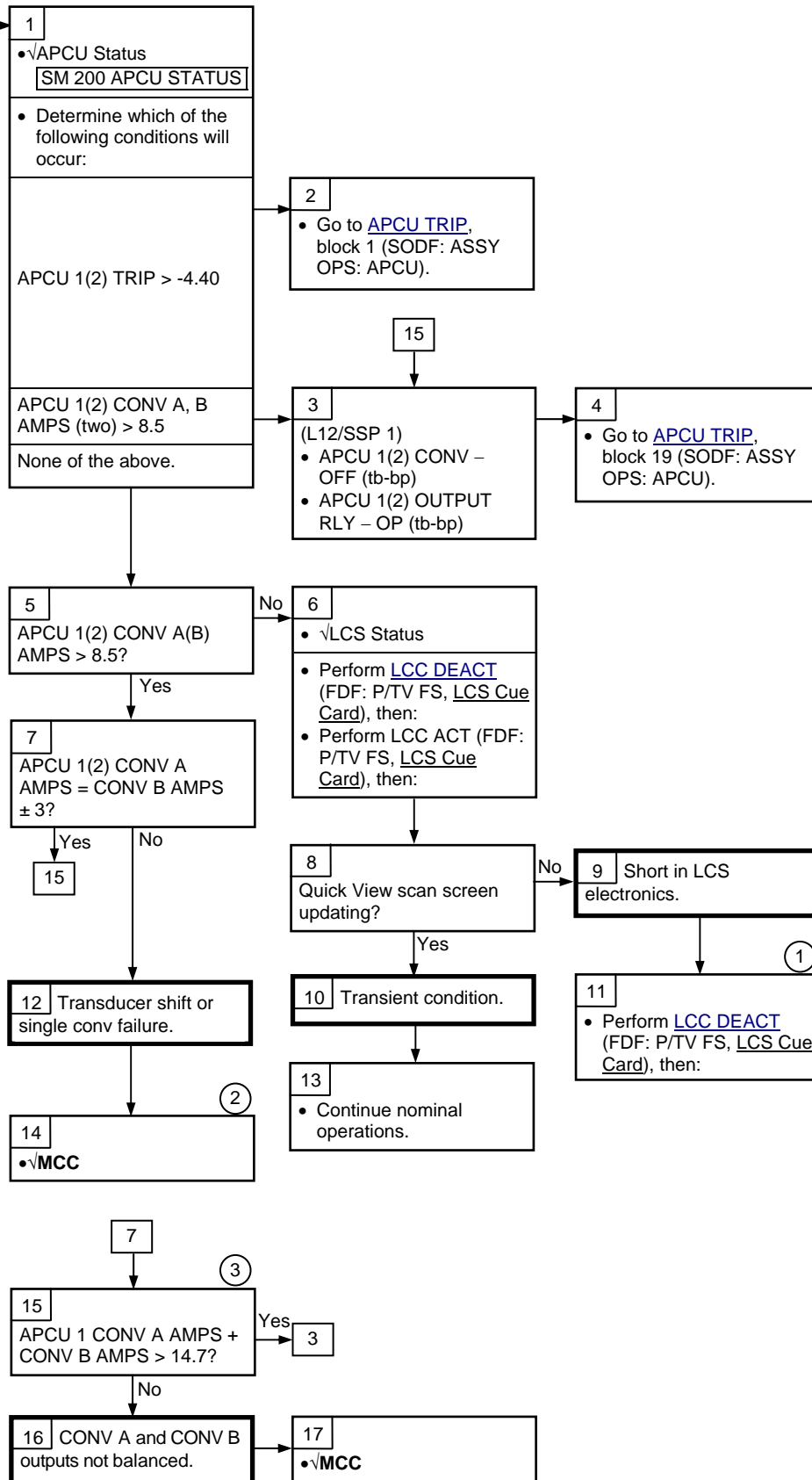
- S200 APCU 1(2)
AMPS HIGH
- APCU TEMP ↓↑,
block 3 (SODF:
ASSY OPS:
APCU)
- APCU VOLTS
↑↓, block 3
(SODF: ASSY
OPS: APCU)

If any APCU
CONV AMPS ≥ 8.5

Nominal Config:
R1
PRI PL MNC – ON
(tb-ON)
PL CAB –
MNA(MNB)
PL AUX – ON
(L12/SSP 1)
cb SW PWR 1 – cl

**Nominal APCU
Activated Config:**
L12 (SSP 1)

APCU 2 CONV –
ON (tb-gray)
APCU 2 OUTPUT
RLY – CL
(tb-gray)



①
APCU 2 provides power to LCS when OBSS is on the RMS.

②
MCC will determine between a transducer shift and a real single converter failure.

③
Total output for each APCU must be maintained less than 14.7 amps and each CONV output must be maintained less than 8.5 amps.

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APCU

APCU TEMP ↓↑

(ASSY OPS/ULF4/FIN 1) Page 1 of 1 page

SM ALERT

S200 APCU 1(2)
TEMP HIGH

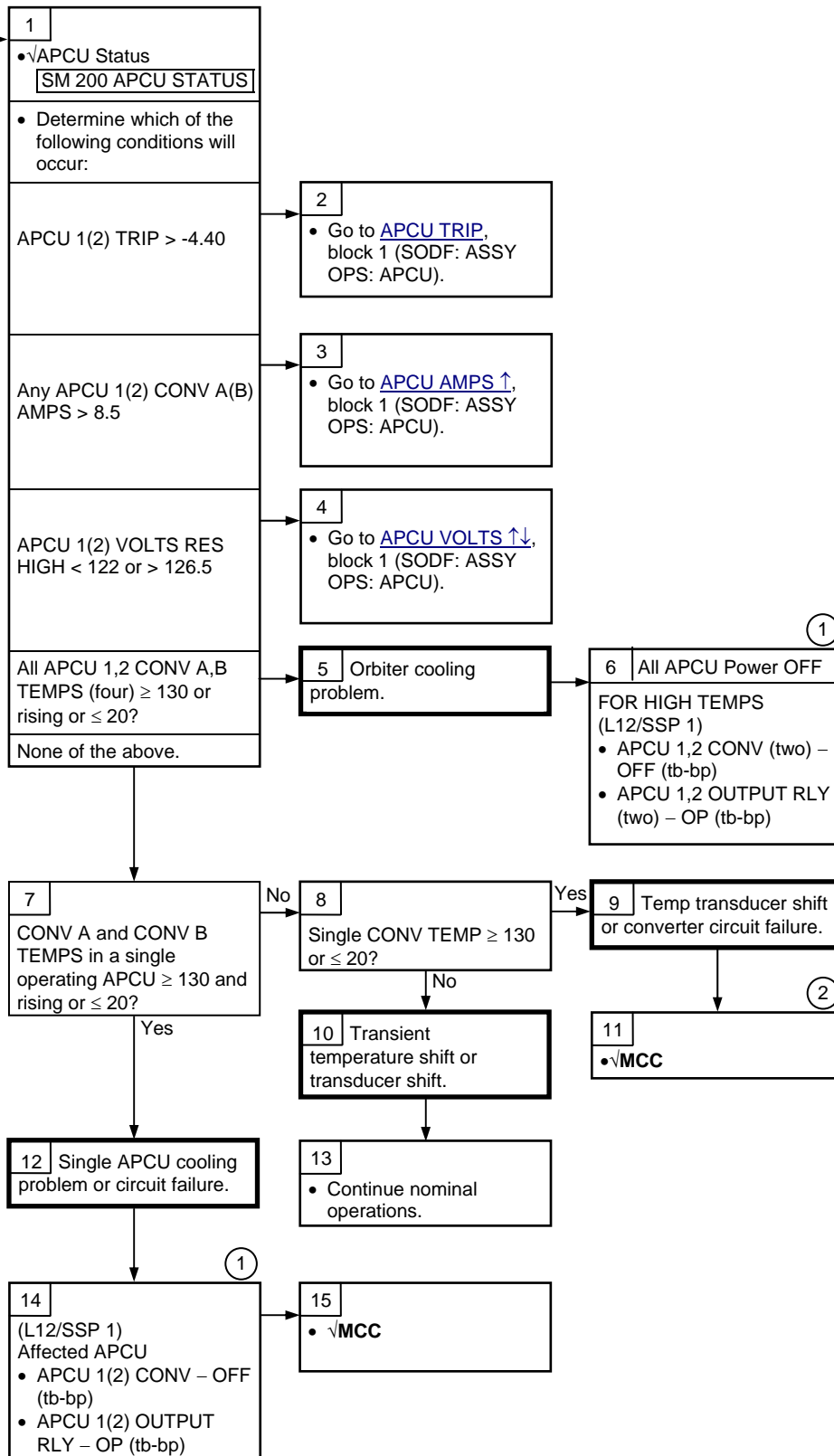
If: APCU 1(2)
CONV TEMP A(B)
≤ 20 or ≥ 130

Nominal Config:
(R1)
PRI PL MNC – ON
(tb-ON)
PL CAB
– MNA(MNB)
PL AUX – ON
L12 (SSP 1)
cb SW PWR 1 – cl

**Nominal APCU
Activated Config:**
L12 (SSP 1)

APCU 2 CONV
– ON (tb-gray)

APCU 2 OUTPUT
RLY – CL
(tb-gray)



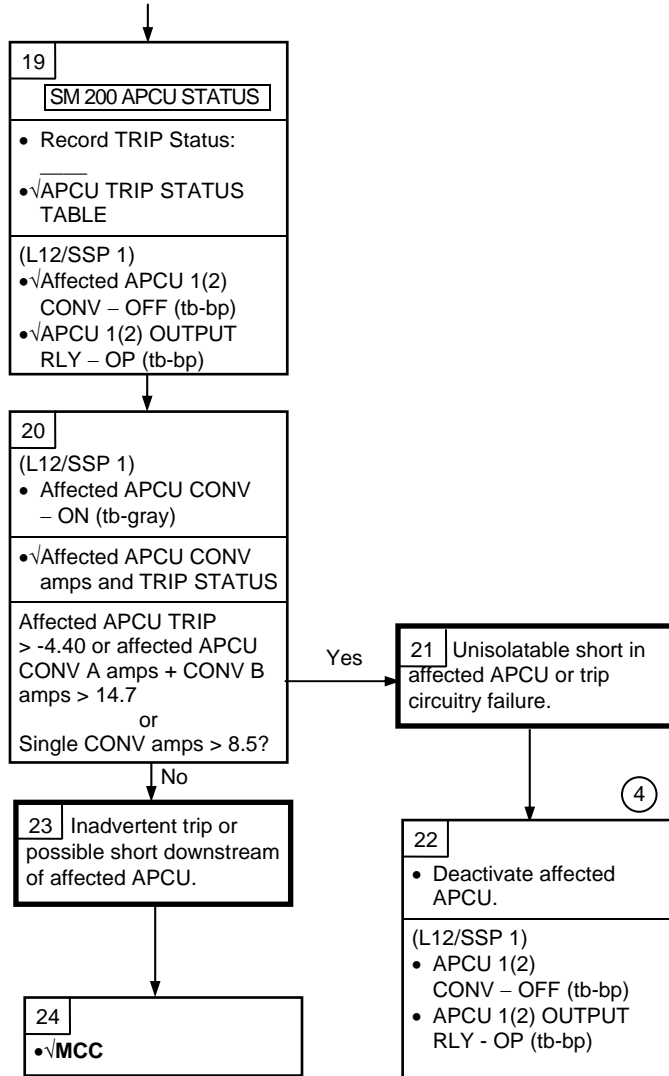
① Loss of APCU 2 results in loss of orbiter 120 V power to LCS/IDC.

② MCC will determine between a transducer shift and a real circuitry failure.

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On **MCC GO** Only: Recovery Attempt with APCU Power Cycle

[APCU AMPS ↑](#), block 4 (SODF: ASSY OPS: APCU)



④
Loss of APCU 2 results in loss of 120 V power to LCS/IDC.

Table 1. APCU Trip Status

TRIP (STATUS VOLTAGE)	TRIP CAUSE(S)			
	OV	OUV	OC	IUV
+4.88	X	X	X	X
+4.23	X	X	X	
+3.59	X	X		X
+2.95	X	X		
+2.27	X		X	X
+1.62	X		X	
+0.98	X			X
+0.34	X			
-0.30		X	X	X
-0.95		X	X	
-1.59		X		X
-2.23		X		
-2.91			X	X
-3.56			X	
-4.20				X
-4.86 (no trip)				

NOTE
 OV: Output Overvoltage
 OUV: Output Undervoltage
 OC: Output Overcurrent
 IUV: Input Undervoltage
 Tolerance for all reported voltages is $\pm 0.20V$

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APCU

APCU VOLTS \updownarrow (ASSY OPS/ULF4/FIN)

SM ALERT

S200 APCU 1(2) VOLT LMT

APCU TEMP \updownarrow , block 4 (SODF: ASSY OPS: APCU)

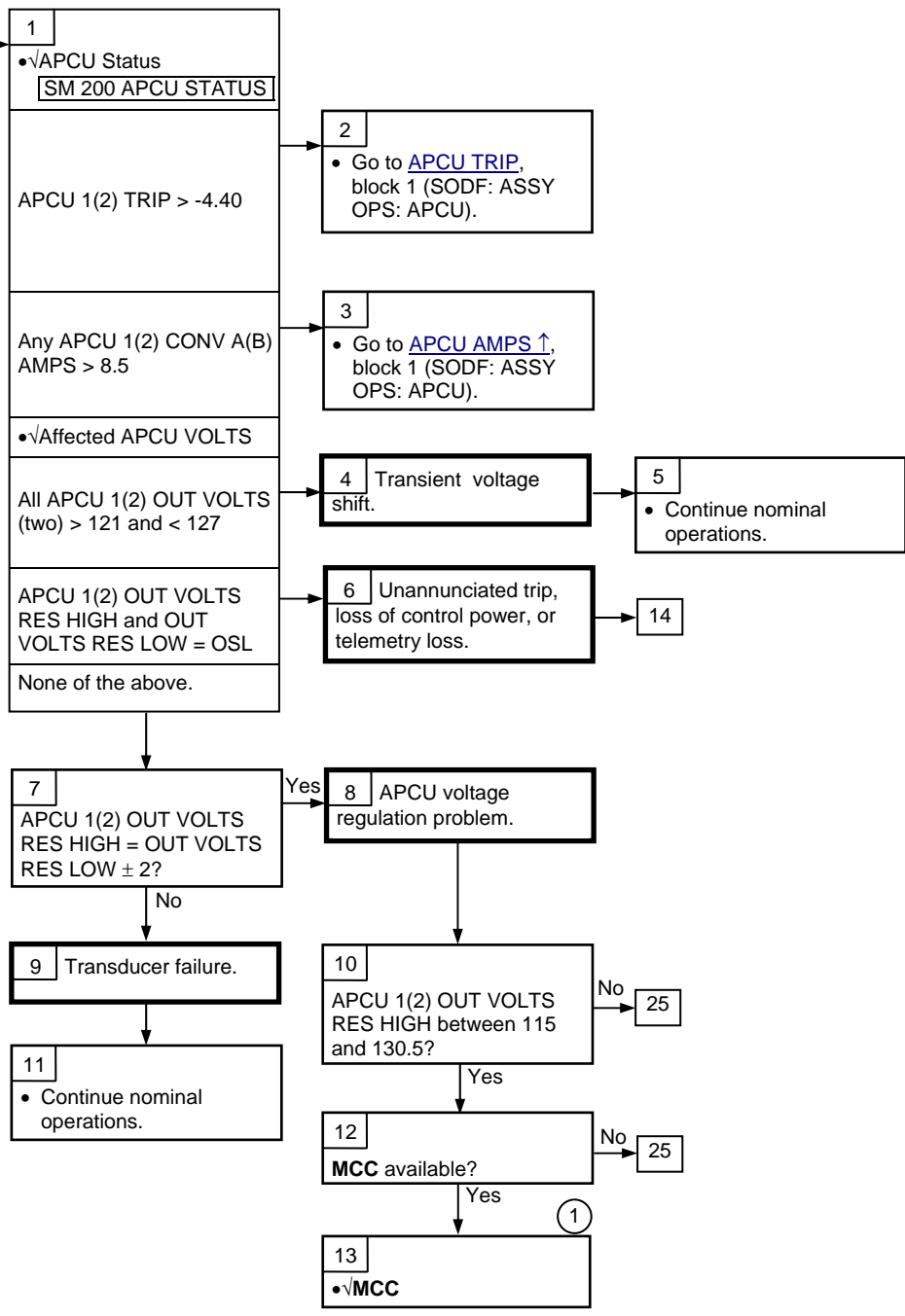
If: APCU VOLTS RES HIGH \geq 126.5 or \leq 122

Nominal Config:
R1
PRI PL MNC – ON (tb-ON)
PL CAB – MNA(MNB)
PL AUX – ON
L12 (SSP 1)
cb SW PWR 1 – cl

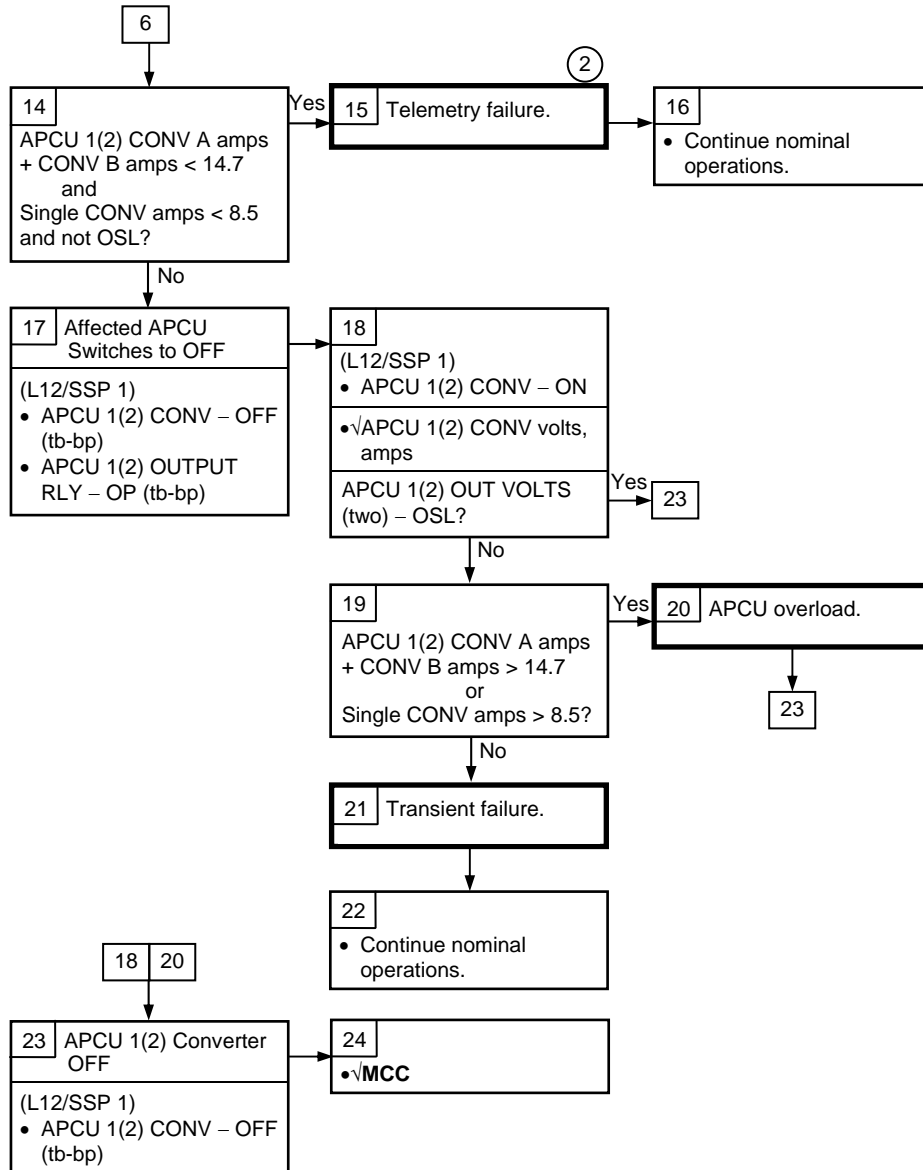
Nominal APCU Activated Config:
L12 (SSP 1)

APCU 2 CONV – ON (tb-gray)

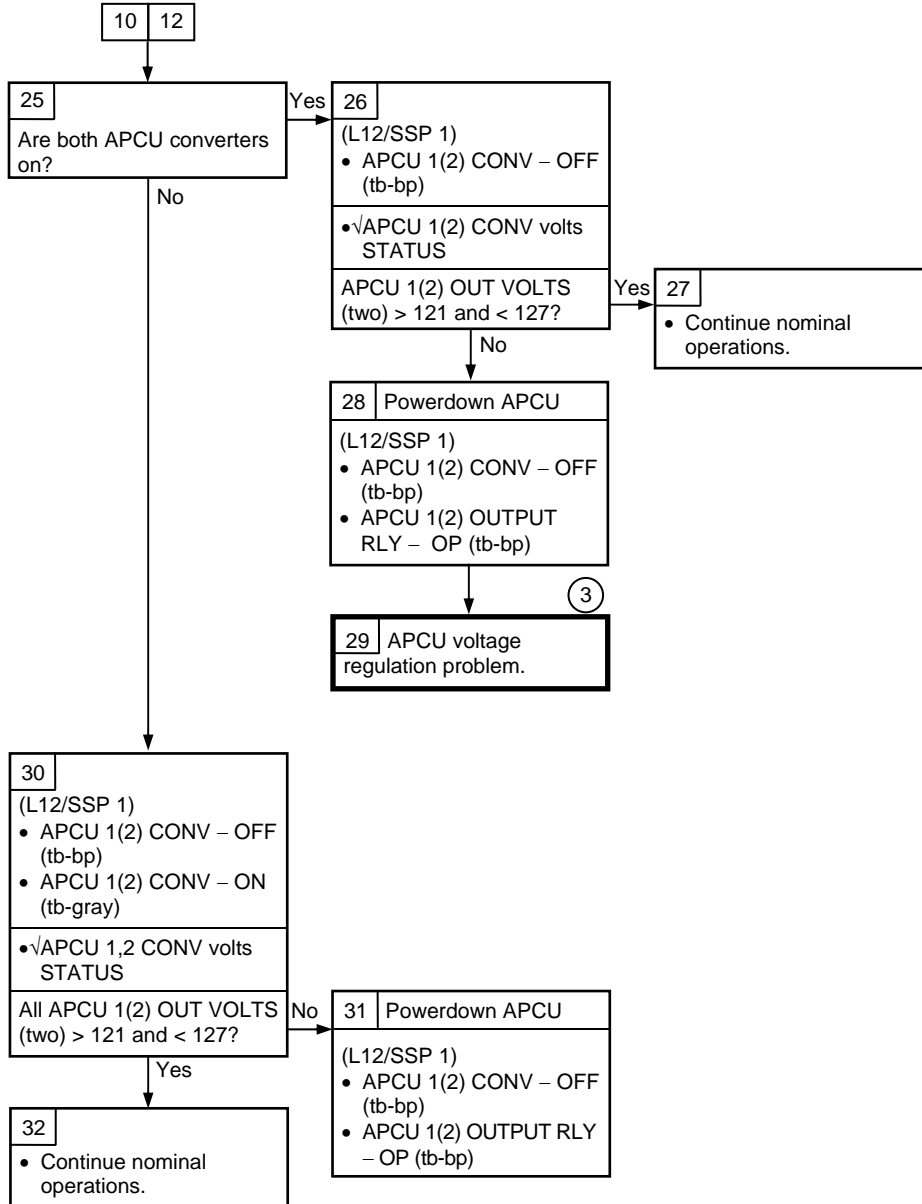
APCU 2 OUTPUT RLY – CL (tb-gray)



① SPEC voltage for APCU is 122 to 126.5 volts. If APCU volts are outside this range but stable and usable, consideration will be given to continuing APCU operation.



②
There is a single point failure that will cause both the HIGH and LOW RES VOLTS to read low (broken wire).



③
Loss of APCU 2 results in loss of 120 V orbiter power to LCS/IDC.

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SPEC 200 APCU STATUS

(ASSY OPS/ULF4/FIN)

Page 1 of 3 pages

OBJECTIVE:

This display monitors health and status of the two APCUs and is available in SM OPS 2. The APCUs are used to power OBSS heaters. The display is generic and has been used on several missions. Figure 1 is a view of this display.

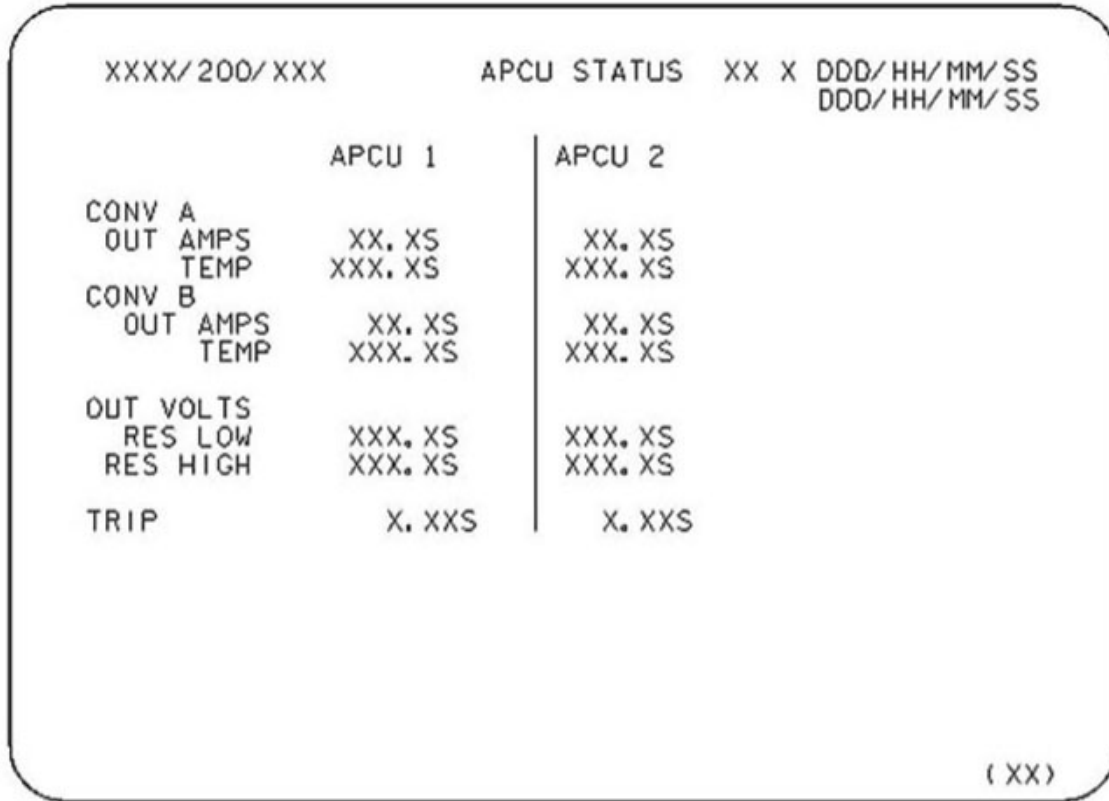


Figure 1.- APCU Status - MCDS Display.

TITLE: APCU STATUS

TYPE: SPEC 200

SPEC 200 APCU STATUS

PARAMETER CHARACTERISTICS

Table 1. Parameter Characteristics

CRT Name		MSID	UNITS	DISPLAY RANGE	STATUS IND [3]					FDA LIMITS	
					M	H	L	↑	↓	LO	HI
APCU 1 CONV A OUT AMPS		P50C9003V	amps	0 to 12.0	M	H	L	↑			8.5
APCU 1 CONV A TEMP		P50T9002V	deg F	0 to 212.0	M	H	L	↑	↓	20	130
APCU 1 CONV B OUT AMPS		P50C9004V	amps	0 to 12.0	M	H	L	↑			8.5
APCU 1 CONV B TEMP		P50T9005V	deg F	0 to 212.0	M	H	L	↑	↓	20	130
APCU 1 OUT VOLTS RES LOW	[1]	P50V9001V	volts	0 to 180.0	M	H	L				
APCU 1 OUT VOLTS RES HIGH	[1]	P50V9000V	volts	110 to 160.0	M	H	L	↑	↓	122	126.5
APCU 1 TRIP	[2]	P50V9006V	volts	-5.00 to 5.00	M	H	L	↑			-4.40
APCU 2 CONV A OUT AMPS		P50C9009V	amps	0 to 12.0	M	H	L	↑			8.5
APCU 2 CONV A TEMP		P50T9010V	deg F	0 to 212.0	M	H	L	↑	↓	20	130
APCU 2 CONV B OUT AMPS		P50C9011V	amps	0 to 12.0	M	H	L	↑			8.5
APCU 2 CONV B TEMP		P50T9012V	deg F	0 to 212.0	M	H	L	↑	↓	20	130
APCU 2 OUT VOLTS RES LOW	[1]	P50V9007V	volts	0 to 180.0	M	H	L				
APCU 2 OUT VOLTS RES HIGH	[1]	P50V9008V	volts	110 to 160.0	M	H	L	↑	↓	122	126.5
APCU 2 TRIP	[2]	P50V9013V	volts	-5.00 to 5.00	M	H	L	↑			-4.40

SPEC 200 APCU STATUS

(ASSY OPS/ULF4/FIN)

Page 3 of 3 pages

REMARKS

- [1] OUT VOLTS LOW displays the measurements from the low-resolution voltage sensor. OUT VOLTS HIGH displays the measurements from the high-resolution voltage sensor.
- [2] APCU TRIP indicates the status of the APCU shutdown logic. This status can be interpreted using Table 2.

Table 2. APCU TRIP Status

TRIP (STATUS VOLTAGE)	TRIP CAUSE (S)			
	OV	OUV	OC	IUV
+4.88	X	X	X	X
+4.23	X	X	X	
+3.59	X	X		X
+2.95	X	X		
+2.27	X		X	X
+1.62	X		X	
+0.98	X			X
+0.34	X			
-0.30		X	X	X
-0.95		X	X	
-1.59		X		X
-2.23		X		
-2.91			X	X
-3.56			X	
-4.20				X
-4.86 (no trip)				
NOTES				
OV: Output Overvoltage				
OUV: Output Undervoltage				
OC: Output Overcurrent				
IUV: Input Undervoltage				
Tolerance for all reported voltages is 0.20 V.				

- [3] The parameter status field for all parameters will be blank for normal operation or will display an "M" for missing data. For analog parameters, this field will also display an "H" or "L" for offscale data. Some parameters displayed will be limit-sensed for SM alerts or C&W alarms. For discretes that are limit-sensed, the undesirable state is defined in the FDA low limit field and the FDA high limit field is left blank. Satisfaction of the undesirable state triggers a "↓" indication. For analogs that are limit-sensed, an "↑" or a "↓" will be displayed when the parameter exceeds either an upper or lower limit. The symbols driven in the parameter status field have the following display priority from highest to lowest: "M", "H", "L", "↑", "↓". All symbols driven in the parameter status column will be displayed four times the normal intensity.

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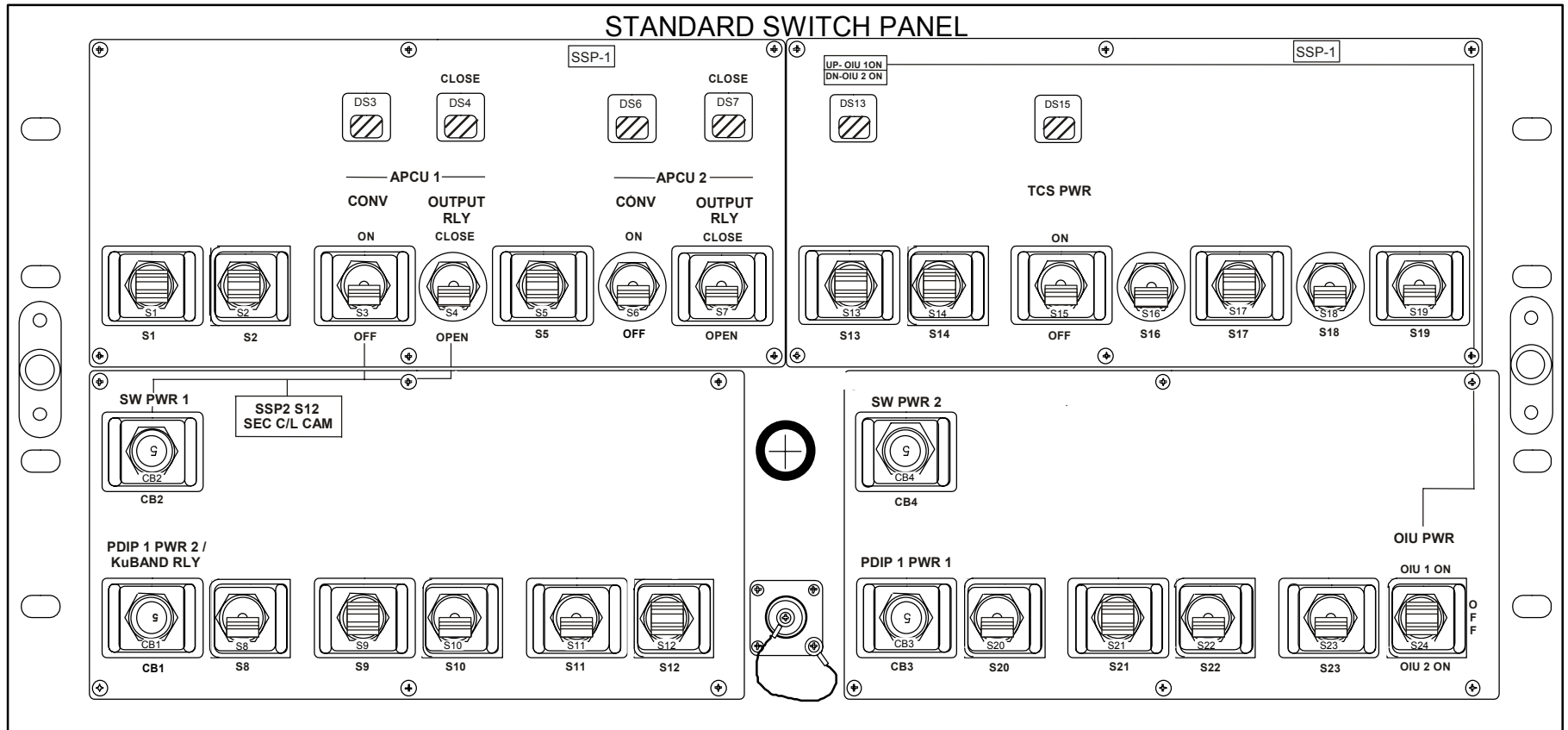
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REFERENCE

STANDARD SWITCH PANEL 1
(ASSY OPS/ULF4/FIN)

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STANDARD SWITCH PANEL 1

(ASSY OPS/ULF4/FIN)

Page 2 of 3 pages

ITEM	DEVICE TYPE	FUNCTION
CB1 PDIP 1 PWR2/ KuBAND RLY	Two-position circuit breaker (5 amp): In Out	Closed (in) – Applies orbiter CAB PL2 Power to the PDIP1 DC PWR 2 switch outlet and KuBAND RATE switch. Open (out) – Removes power from PDIP1 DC PWR 2 outlet and KuBAND RATE switch.
CB2 SW PWR 1	Two-position circuit breaker (5 amp): In Out	Closed (in) – Applies orbiter power to SSP1 S3 and S4, and SSP2 S12. Open (out) – Removes power from SSP1 S3 and S4, and SSP2 S12.
S3 APCU 1 CONV	Two-position toggle switch: ON OFF	ON(up) – Applies power to the APCU 1 converter. OFF(dn) – Removes power from the APCU 1 converter.
DS3 APCU 1 CONV	Talkback – two-position Gray Barberpole	gray – Indicates APCU 1 converter powered. bp – Indicates APCU 1 converter not powered.
S4 APCU 1 OUTPUT RLY	Two-position toggle switch: CLOSE OPEN	CLOSE(up) – Closes the APCU 1 output relay. OPEN(dn) – Opens the APCU 1 output relay.
DS4 APCU 1 OUTPUT RLY	Talkback – two-position Gray Barberpole	gray – Indicates APCU 1 output relay is closed. bp – Indicates APCU 1 output relay is open.
S6 APCU 2 CONV	Two-position toggle switch: ON OFF	ON(up) – Applies power to the APCU 2 converter. OFF(dn) – Removes power from the APCU 2 converter.
DS6 APCU 2 CONV	Talkback – two-position Gray Barberpole	gray – Indicates APCU 2 converter powered. bp – Indicates APCU 2 converter not powered.
S7 APCU 2 OUTPUT RLY	Two-position toggle switch: CLOSE OPEN	CLOSE(up) – Closes the APCU 2 output relay. OPEN(dn) – Opens the APCU 2 output relay.
DS7 APCU 2 OUTPUT RLY	Talkback – two-position Gray Barberpole	gray – Indicates APCU 2 output relay is closed. bp – Indicates APCU 2 output relay is open.

STANDARD SWITCH PANEL 1

(ASSY OPS/ULF4/FIN)

Page 3 of 3 pages

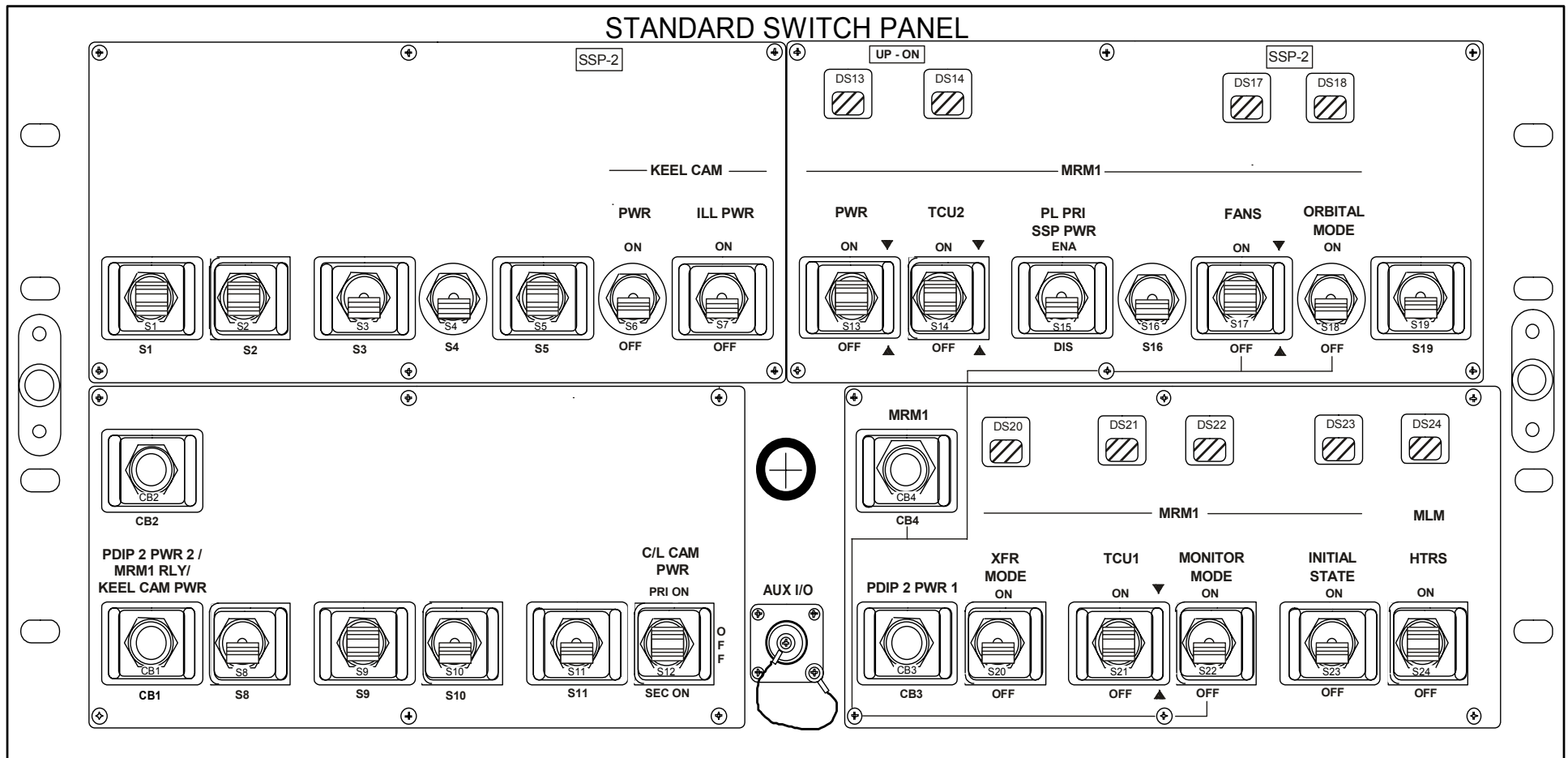
ITEM	DEVICE TYPE	FUNCTION
DS13	Talkback – three-position:	UP – OIU 1 is powered On.
OIU PWR	UP – OIU 1 Barberpole – Off DN – OIU 2	BP – OIU 1 and OIU 2 powered Off. DN – OIU 2 is powered On.
S15	Two-position toggle switch:	ON – Applies power to TCS.
TCS PWR	ON OFF	OFF – Removes power from TCS.
DS15	Talkback - two-position:	Gray – Indicates TCS is powered.
TCS PWR	Gray Barberpole	BP – Indicates TCS is not powered.
CB3	Two-position circuit breaker (5 amp):	Closed (in) – Applies orbiter CAB PL2 to PDIP1 DC PWR 1 outlet.
PDIP1 PWR 1	In Out	Open (out) – Removes power from PDIP1 DC PWR1 outlet.
S24	Three-position toggle switch:	OIU 1 ON – Provides CAB PL3 power to OIU 1.
OIU PWR	OIU 1 ON OFF OIU 2 ON	OFF – Removes power from OIU 1 and OIU 2. OIU 2 ON – Provides AUX PLB power to OIU 2.

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STANDARD SWITCH PANEL 2

(ASSY OPS/ULF4/FIN 1)

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STANDARD SWITCH PANEL 2

(ASSY OPS/ULF4/FIN 1)

Page 2 of 5 pages

ITEM	DEVICE TYPE	FUNCTION
CB1 PDIP2 PWR2 / MRM1 RLY ⁽¹⁾ / KEEL CAM PWR	Two-position circuit breaker (5 amp): In Out	Closed (in) – Enables CAB PL2 power to PDIP2 DC PWR 2 outlet and the S6 & S7 switches to the keel camera and keel camera illuminator Open (out) – Disables CAB PL2 power to PDIP2 DC PWR 2 outlet and the S6 and S7 switches to the keel camera and keel camera illuminator.
S6 KEEL CAM PWR	Two-position toggle switch: ON OFF	ON (up) – Applies CAB PL2 power to ICC-VLD2 Keel Camera. OFF (dn) – Removes CAB PL2 power from the ICC-VLD2 Keel Camera.
S7 KEEL CAM ILL PWR	Two-position toggle switch: ON OFF	ON (up) – Applies CAB PL2 power to ICC-VLD2 Keel Camera Illuminator. OFF (dn) – Removes CAB PL2 power from the ICC-VLD2 Keel Camera Illuminator.
S12 C/L CAM PWR	Three-position toggle switch: PRI ON (Not Connected) OFF SEC ON	PRI ON (up) – Not functional – second C/L camera not installed. OFF (ctr) – Removes power from centerline Camera. SEC ON (dn) – Applies CAB PL 1 power to centerline Camera.
S13 MRM1 PWR	Two-position momentary switch: ON OFF	ON (up) – Applies PL PRI and CAB PL 3 power to MRM1 to enable operational power to MRM1. OFF (dn) – Applies PL PRI and CAB PL 3 power to MRM1 to disable operational power to MRM1.
DS13 MRM1 PWR	Three-position talkback UP Barberpole DN (Not wired)	UP – Indicates reception of MRM1 Power ON signal. Barberpole – Indicates reception of MRM1 Power OFF signal. DN – No function – not wired.

STANDARD SWITCH PANEL 2

(ASSY OPS/ULF4/FIN 1)

Page 3 of 5 pages

ITEM	DEVICE TYPE	FUNCTION
S14 MRM1 TCU2	Two-position momentary ON OFF	ON (up) – Applies PL PRI power to MRM1 to enable power to TCU #2. OFF (dn) – Applies PL PRI power to MRM1 to disable power to TCU #2.
DS14 MRM1 TCU2	Three-position talkback UP Barberpole DN (Not wired)	UP – Indicates TCU 2 power enabled. Barberpole – Indicates TCU 2 power not enabled. DN – No function – not wired
S15 MRM1 PL PRI SSP PWR ⁽²⁾	Two-position toggle switch: ENA DIS	ENA (up) – Enables PL PRI power to the MRM1 +W bus (+W bus powers all MRM switches and talkbacks on the SSP). DIS (dn) – Disables PL PRI power to the MRM1 +W bus.
S17 MRM1 FANS	Two-position momentary toggle switch: ON OFF	ON (up) – Applies CAB PL 3 power to MRM1 to enable operational power to MRM1 Fans. OFF (dn) – ON (up) – Applies CAB PL 3 power to MRM1 to enable operational power to MRM1 Fans.
DS17 MRM1 FANS	Two-position talkback UP Barberpole	UP – Indicates power is being supplied to the fan unit. Barberpole – Indicates power is not being supplied to the fan unit.
S18 MRM1 ORBITAL MODE	Two-position toggle switch: ON OFF (not wired)	ON (up) – Send CAB PL 3 power to the active TCU to command the TCU to start the Orbital Mode algorithm. OFF (dn) – No function – not wired.
DS18 MRM1 ORBITAL MODE	Two-position talkback UP Barberpole	UP – Indicates Orbital Mode algorithm has been commanded to initiate. Barberpole – Indicates Orbital Mode is not selected.
CB3 PDIP2 PWR1	Two-position circuit breaker (5 amp): In Out	Closed (in) – Enables CAB PL 2 power to PDIP2 DC PWR 1 outlet. Open (out) – Disables CAB PL 2 power to the PDIP2 DC PWR 1 outlet.

STANDARD SWITCH PANEL 2

(ASSY OPS/ULF4/FIN 1)

Page 4 of 5 pages

ITEM	DEVICE TYPE	FUNCTION
CB4 MRM1	Two-position circuit breaker (5 amp): In Out	Closed (in) – Enables CAB PL3 power to all MRM1 switches and talkbacks. Open (out) – Disables CAB PL3 power to all MRM1 switches and talkbacks.
S20 MRM1 XFR MODE	Two-position toggle switch ON OFF (not wired)	ON (up) – Send CAB PL 3 power to the active TCU to command the TCU to start the Transfer Mode algorithm. OFF (dn) – No function – not wired.
DS20 MRM1 XFR MODE	Two-position talkback UP Barberpole	UP – Indicates Transfer Mode algorithm has been commanded to initiate. Barberpole – Indicates Transfer Mode is not selected.
S21 MRM1 TCU1	Two-position momentary toggle switch ON OFF	ON (up) – Enables power to TCU #1. OFF (dn) – Disables power from TCU #1.
DS21 MRM1 TCU1	Two-position talkback Gray Barberpole	Gray – Indicates TCU#1 has been powered, booted up, and passed self test. Barberpole – Indicates TCU#1 has not been powered.
S22 MRM1 MONITOR MODE	Two-position toggle switch ON OFF	ON (up) – Send CAB PL 3 power to the active TCU to command the TCU to start the Monitor Mode algorithm. OFF (dn) – No function – not wired.
DS22 MRM1 MONITOR MODE	Two-position talkback UP Barberpole	UP – Indicates Monitor Mode algorithm has been commanded to initiate. Barberpole – Indicates Monitor Mode is not selected.
S23 MRM1 INITIAL STATE	Two-position toggle switch ON OFF	ON (up) – Send CAB PL 3 power to the active TCU to command the TCU to start the Initial State Mode algorithm. OFF (dn) – No function – not wired.

STANDARD SWITCH PANEL 2

(ASSY OPS/ULF4/FIN 1)

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ITEM	DEVICE TYPE	FUNCTION
DS23 MRM1 INITIAL STATE	Two-position talkback UP Barberpole	UP – Indicates Initial State Mode algorithm has been commanded to initiate. Barberpole – Indicates Initial State Mode is not selected.
S24 MLM HTRS	Three-position toggle switch ON (up) (center) OFF (down)	ON (up) – Sends PL PRI and CAB PL 3 power to the active TCU to command the MLM Heaters ON. (center) – Disables power – No MLM Heater signal sent to TCU. OFF (dn) – Sends PL PRI and CAB PL 3 power to the active TCU to command the MLM Heaters OFF.
DS24 MLM HTRS	Two-position talkback Gray Barberpole	Gray – Indicates heater circuits ON signal being issued by the TCU. Barberpole – Indicates heater circuits ON signal not being issued by the TCU.

(1) The MRM1 RLY switch on PDIP2 switches 1553 bus access to MRM1 between the OIUs and the T0 Umbilical. There is no planned use of this function.

(2) The MRM1 PL PRI SSP PWR switch will be left in the ENA position and a switch guard installed.

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INTERNATIONAL SPACE STATION

ASSEMBLY OPERATIONS

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