



International Space Station Assembly Payload

ISS-1E GROUND

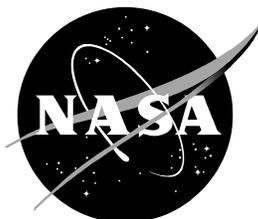
**Mission Operations Directorate
Operations Division**

11 SEP 07

*These procedures are available
electronically on the SODF Homepage
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National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



United Space Alliance

**INTERNATIONAL SPACE STATION
ASSEMBLY PAYLOAD
ISS-1E GROUND**

11 SEP 07

APPROVED BY:



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Book Manager



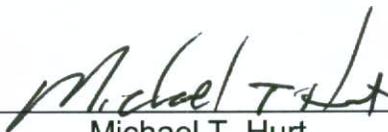
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Incorporates the following:	
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Uplinked Messages (or Approved Flight Notes) replaced by this revision,
remove from Book:

None

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BIOLAB

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1.001 BIOLAB INSPECTION AFTER RACK RELOCATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 4 pages

OBJECTIVE:

To check Life Support Modules gas bottles pressure and GN2 valve setting during commissioning.

Crew:

1 crew member

DURATION:

10 Min.

TOOLS:

Mini-Maglite P/N 528-20084-5

1. [BIOLAB LIFE SUPPORT MODULE O2 AND CO2 BOTTLE PRESSURE CHECKING](#)

COL1A2 C1
(Incubator)

Inc window port → verify no debris using flashlight

Inc port lid on top right of Inc Main Door → open (press latch on lid and turn lid until removable)

Using flashlight, visually inspect Inc Working Volume for damage, loose items



Figure 1. View on O2 pressure gauge (LSM, 3)

Verify Pressure gauge of O2 bottle > 140 bar (ref. fig. 1)

Record time _____ (____ : ____ : ____ UTC) and pressure measurement _____ (____ bar)

Inc port lid → reinstall (press latch and turn until stop)

Inc port lid on bottom left of Inc Main Door → open

Using flashlight, visually inspect Inc Working Volume for damage, loose items



Figure 2. View on CO2 pressure gauge (LSM, 4)

Verify Pressure gauge of CO2 bottle > 40 bar (ref. fig. 2)

Record time _____ (____ : ____ : ____ UTC) and pressure measurement _____ (____ bar)

Inc port interface → reinstall

2. GN2 VALVE SETTING CHECKING

COL1 A2 J2
(Pass
Through
Panel)

√GN2 SHUT OFF hand valve – OFF (ref. fig. 3)

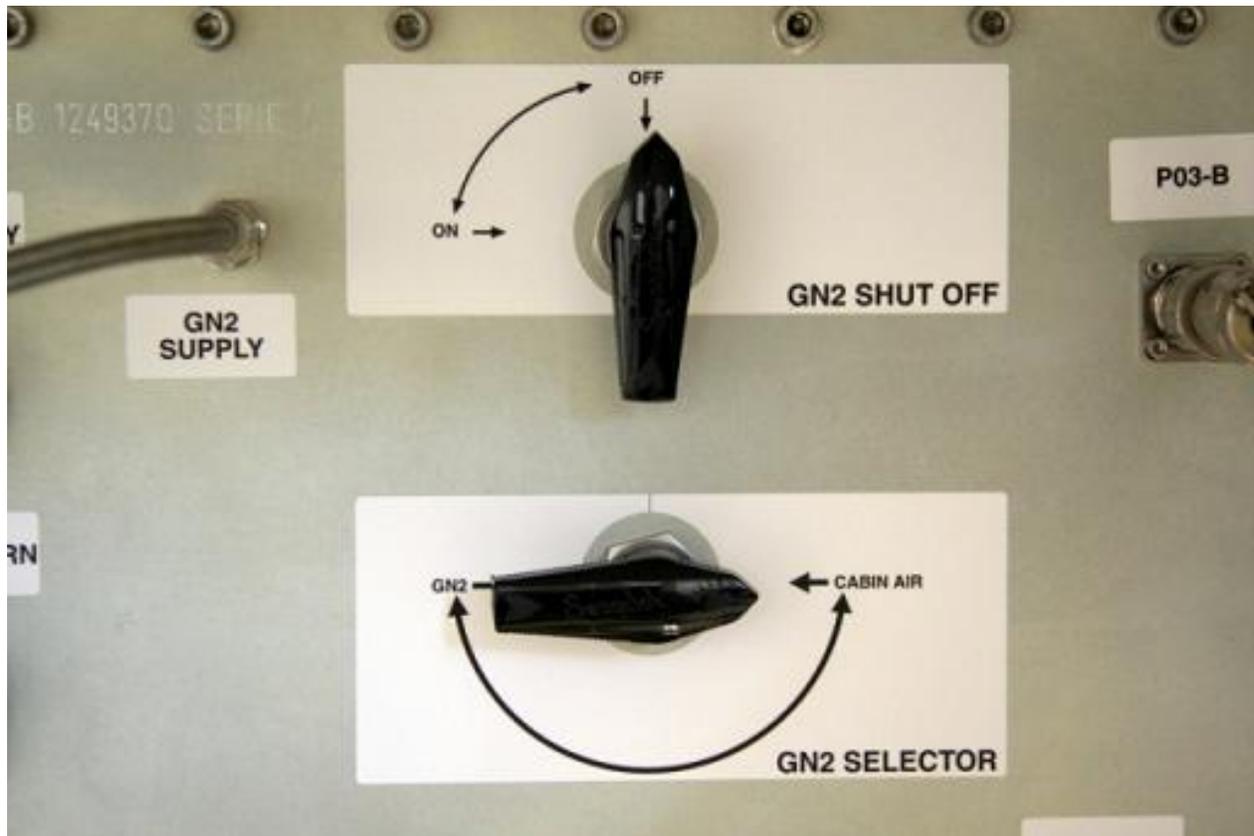


Figure 3. GN2 hand valves on Biolab Pass Through Panel

√GN2 SELECTOR hand valve – CABIN AIR (ref. fig. 3)

Report to Col-CC inspection status

3. [CLEANUP](#)
Stow tools and items according to stowage note and update IMS.

1.103 BIOLAB TCUS LAUNCH FIXATIONS DISENGAGEMENT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 3 pages

OBJECTIVE:

To disengage TCU 1 and 2 Launch Fixations during commissioning before first switch-on of BIOLAB

MANPOWER

1 crew member

DURATION:

10 Min.

TOOLS:

ISS IVA Toolbox:

none

Columbus Tool Kit:

Ratchet wrench 1/4" drive (COL: 415-11110010)

Ratchet tool 1/4" drive (COL: 735/4-582500004)

Extension 1/4" drive; 4" (COL: 405/4-110100006)

Hex head driver 1/4" drive long; 4 mm (COL: 44-01050004)

Hex head driver 1/4" drive long; 5 mm (COL: 44-01050005)

Torque wrench 4-20 Nm (COL: 775/25-51050025)

Biolab Specific Tools:

none

ITEMS:

none

NOTE

This procedure will be only used during commissioning of Biolab, only

- | | |
|---------------|---|
| COL1 A2
G1 | 1. VERIFICATION OF POWER OFF
Verify Biolab Rack POWER sw – OFF

Check Col-CC for power status of TCU. |
| COL1 A2
E2 | 2. REMOVAL OF BRACKETS OF DOOR LATCH SIDE
On Col-CC GO

TCU1 |

1.103 BIOLAB TCUS LAUNCH FIXATIONS DISENGAGEMENT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 3 pages

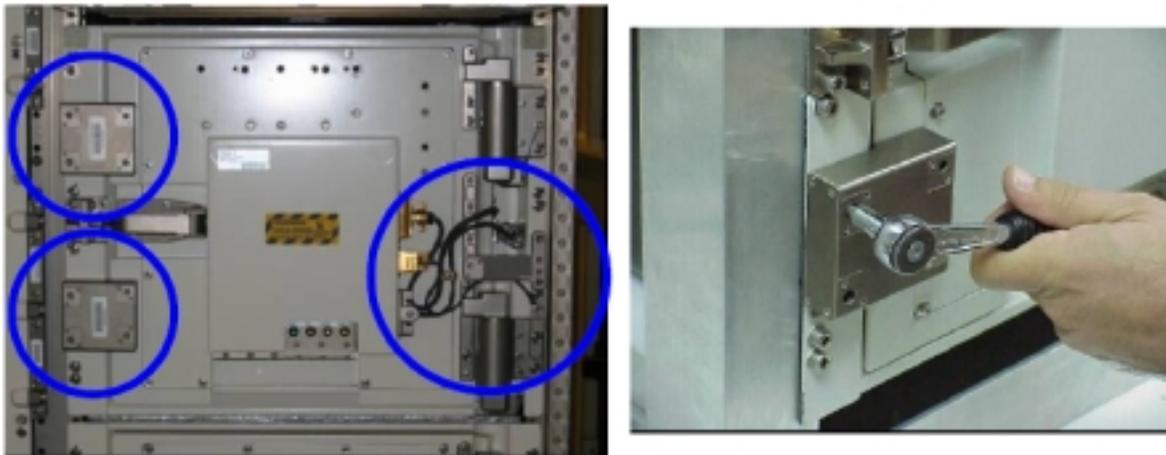


Figure 1. TCU Launch Brackets (launch configuration, left) and dismounting of lower bracket (right)

TCU launch bracket 1 (upper left) → unscrew and remove (4 captive screws, ratchet tool, hex head driver 1/4" drive long; 4 mm for right screws and 5 mm for left screw)



Figure 2. TCU Launch Brackets stowage locations after removal

Bracket → install to stowage location on TCU door (check screw size for correct orientation)

Screws → torque to 4.5 Nm using hex head driver 4mm and 7.5 Nm using hex head driver 5mm (torque wrench)

Repeat substeps above for TCU Launch Bracket 2 (lower left)

1.103 BIOLAB TCUS LAUNCH FIXATIONS DISENGAGEMENT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 3 pages

3. REMOVAL OF BRACKETS OF DOOR HINGE SIDE

TCU Launch Bracket 3 → unscrew and remove (six captive screws, ratchet tool, extension, torque wrench, hex head drivers 4 mm and 5 mm)

Bracket → install to support location TCU door

Screws (four) → torque to 4.5 Nm using hex head driver 4 mm and 7.5 Nm using hex head driver 5mm (torque wrench)

Repeat steps 2 and 3 for TCU 2

4. CLEANUP

Stow tools and items according to stowage note and update IMS or notify COL-CC.

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1.104 BIOLAB TCU STOWAGE ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 7 pages

OBJECTIVE:

The objective is to install the TCU Door Harness Lids, the TCU Trays and the Silica Gel Bags for TCU 1 and 2 during BIOLAB Commissioning.

MANPOWER

1 crew member

DURATION

15 min

TOOLS

ISS IVA Toolbox:

Philips Head screwdriver, #0, 3" long blade

Columbus IVA Toolbox:

Extension 1/4" drive; 4"

Hex head driver 1/4"drive long; 4mm

Hex head driver 1/4"drive long; 5mm

Torque wrench 4-20 Nm

Ratchet tool 1/4" Drive

ITEMS

Biolab TCU Silica Gel Bag (two)

Biolab TCU Tray (two)

TCU Door Harness Lid (two)

1. INSTALLATION OF TCU DOOR HARNESS LID AT TCU1 (2)

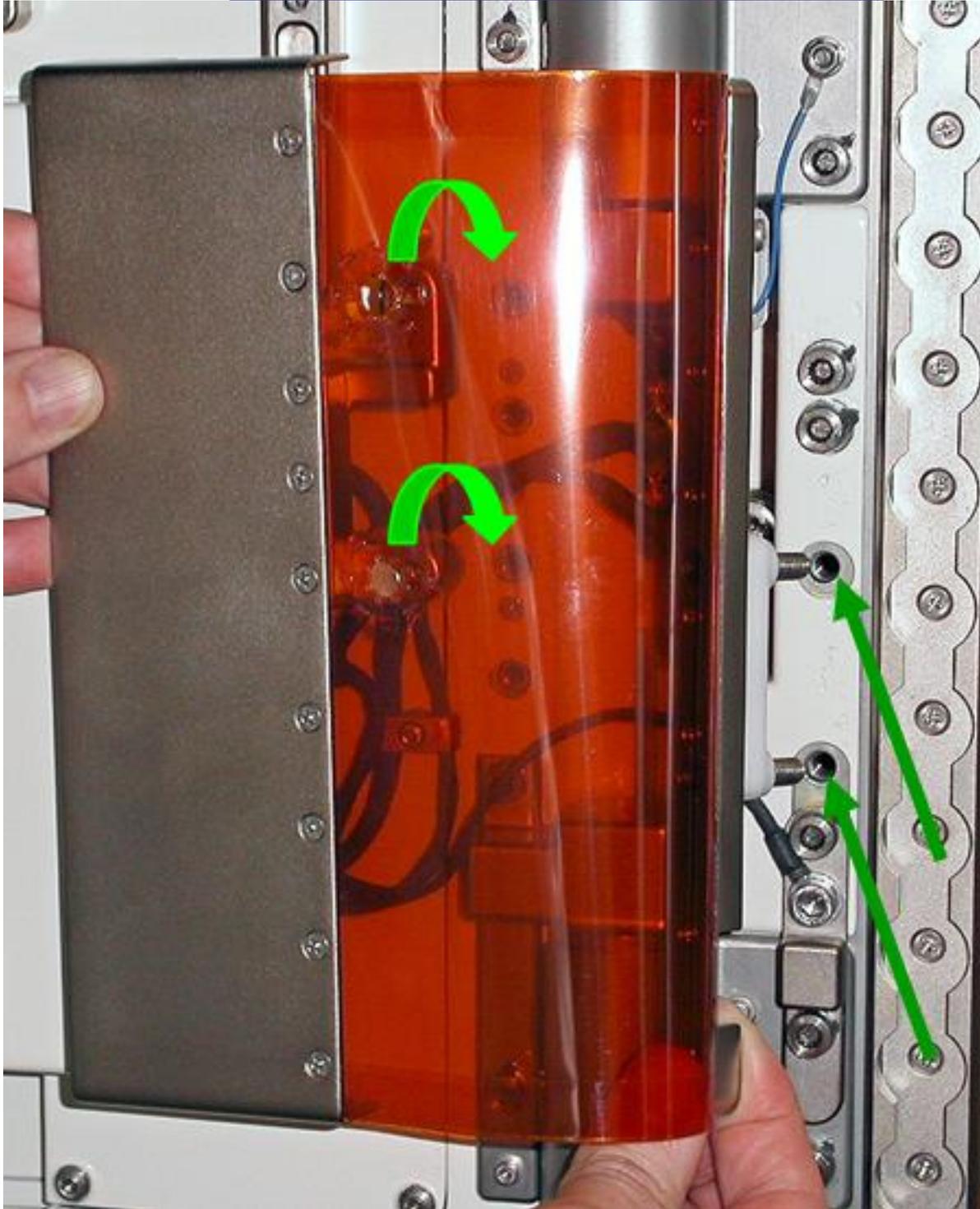


Figure 1. TCU Door Harness Lid Fixation

COL1 A2
G2

TCU Door Harness Lid → position between the two TCU Door hinges
(Figure 1)

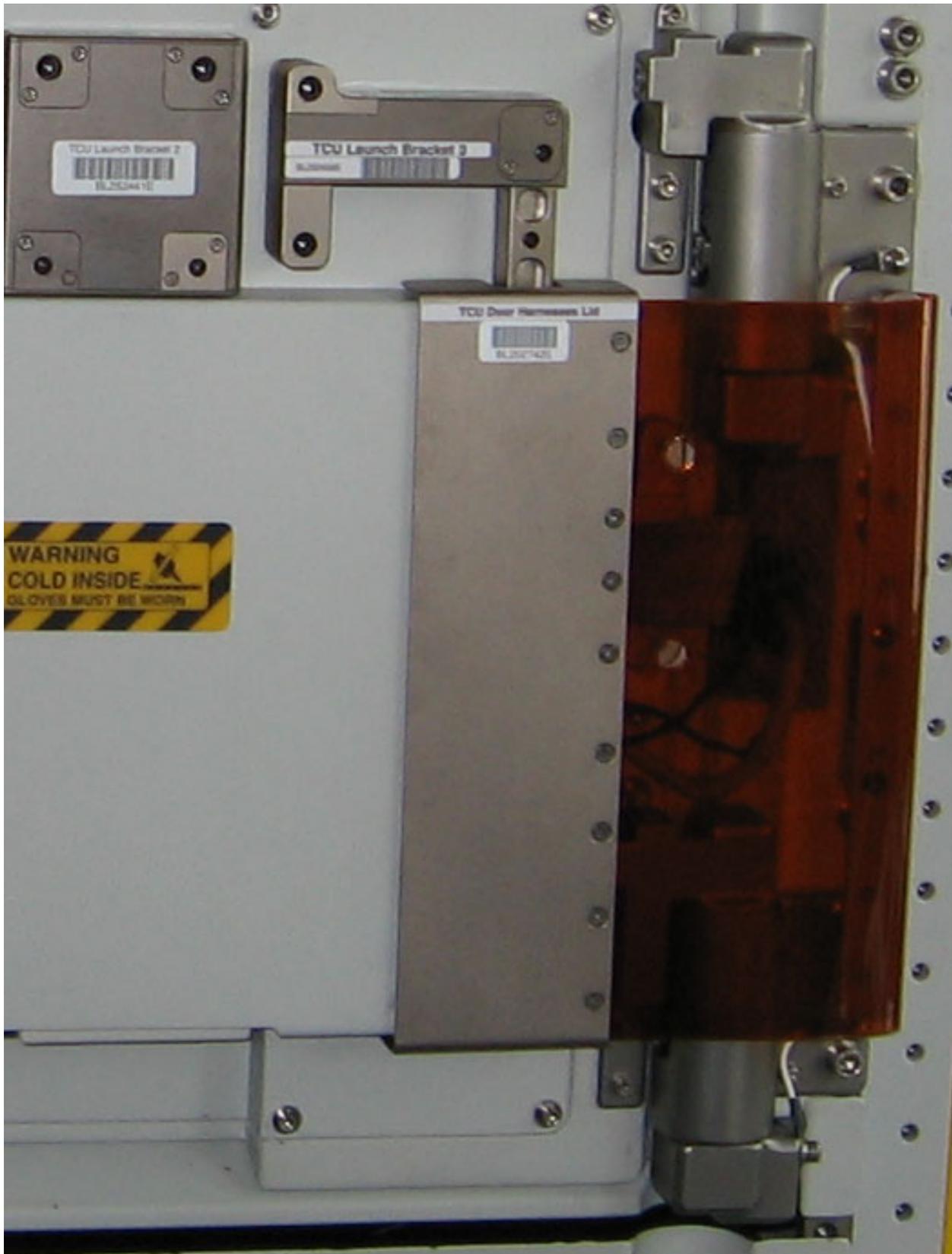


Figure 2. TCU Door Harness Lid in final position

1.104 BIOLAB TCU STOWAGE ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 4 of 7 pages

TCU Door Harness Lid M5 screws (two, captive) → fix and torque to 4,5 Nm (Extension 1/4" drive; 4"; Torque wrench 4-20 Nm; Ratchet tool 1/4" Drive; Hex head driver 1/4" drive long; 4mm (Figure 1 and 2))

TCU Door Harness Lid M6 screws (two, captive) → fix and torque to 7.5 Nm (Extension 1/4" drive; 4"; Torque wrench 4-20 Nm; Ratchet tool 1/4" Drive; Hex head driver 1/4" drive long; 5mm (Figure 1 and 2))

2. OPENING OF TCU 1 (2) DOOR

TCU Door 1 (2) → open

If TCS is cold then

| Unstow and don Lightweight Cryo Gloves

3. INSTALLATION OF TCU TRAY



Figure 3. TCU Tray

TCU 1(2) Tray (Figure 3) → insert into TCU 1(2) (until hard stop)

4. INSTALLATION OF TCU 1 (2) SILICA GEL BAG

4.1 Removal of TCU 1 (2) Fan Lid



Figure 4. Removal of TCU Fan Lid

TCU 1 (2) Fan Lid fasteners (four) → unscrew (1/4 turns) with a Philips Head screwdriver, #0, 3" long blade (Figure 4)

TCU 1 (2) Fan Lid → remove

TCU 1 (2) Fan Lid → place in TCU housing and screw with two fasteners (1/4 turn)

4.2 [Exchange of Biolab TCU 1 \(2\) Silica Gel](#)

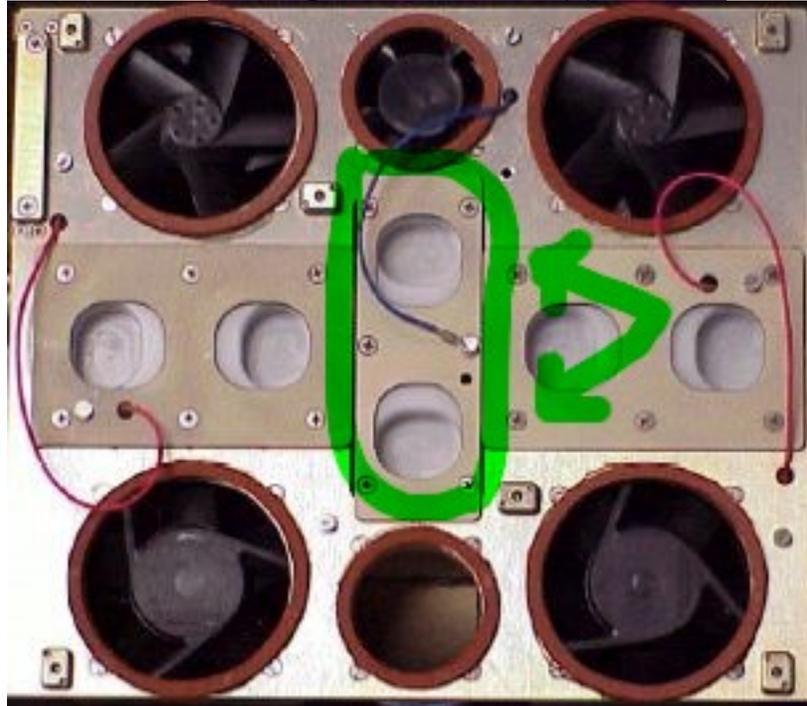


Figure 5. Removing of TCU Silica Gel Bag Lid

Biolab TCU 1 (2) Silica Gel Bag Lid → remove by pinching white knobs and pulling out (Figure 5)

Biolab TCU 1 (2) Silica Gel Bag → extract from plastic bag and install

Biolab TCU 1 (2) Silica Gel Bag Lid → install

4.3 [Re-install TCU 1 \(2\) Fan Lid](#)

TCU 1 (2) Fan Lid → unscrew from TCU housing (two screws, 1/4 turn, Philips screwdriver)

TCU 1 (2) Fan Lid → screw on TCU Door (four fasteners)

5. [CLOSURE OF TCU 1 \(2\) DOOR](#)

Verify Door Seal – for integrity and seat

TCU 1 (2) Door → close

√TCU 1 (2) Door – closed (door handle safing mechanism engaged)

6. [INSTALLATIONS FOR TCU 2](#)

Repeat Steps 1 to 5 for TCU 2

7. [CLEANUP](#)

Stow tools

COL1 A2
E2

1.104 BIOLAB TCU STOWAGE ITEMS INSTALLATION
(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 7 pages

Update IMS with stowage location or notify **Col-CC**

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1.107 BIOLAB ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 11 pages

OBJECTIVE:

This procedure is used to activate the Biolab ISPR located in Position COL1A2 via cold boot to initial mode with RIC, SD and Fire Detection and Suppression (FDS) active.

LOCATION:

COL1A2

DURATION:

30 minutes

CREW:

One

TOOLS:

None

REFERENCED PROCEDURES:

9.214 FINE ADJUSTMENT OF WFSV - OPENING

1.107 BIOLAB ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 11 pages

1. CHECKING BIOLAB ISPR (A2) ISPR FRONT SWITCHES CONFIGURATION

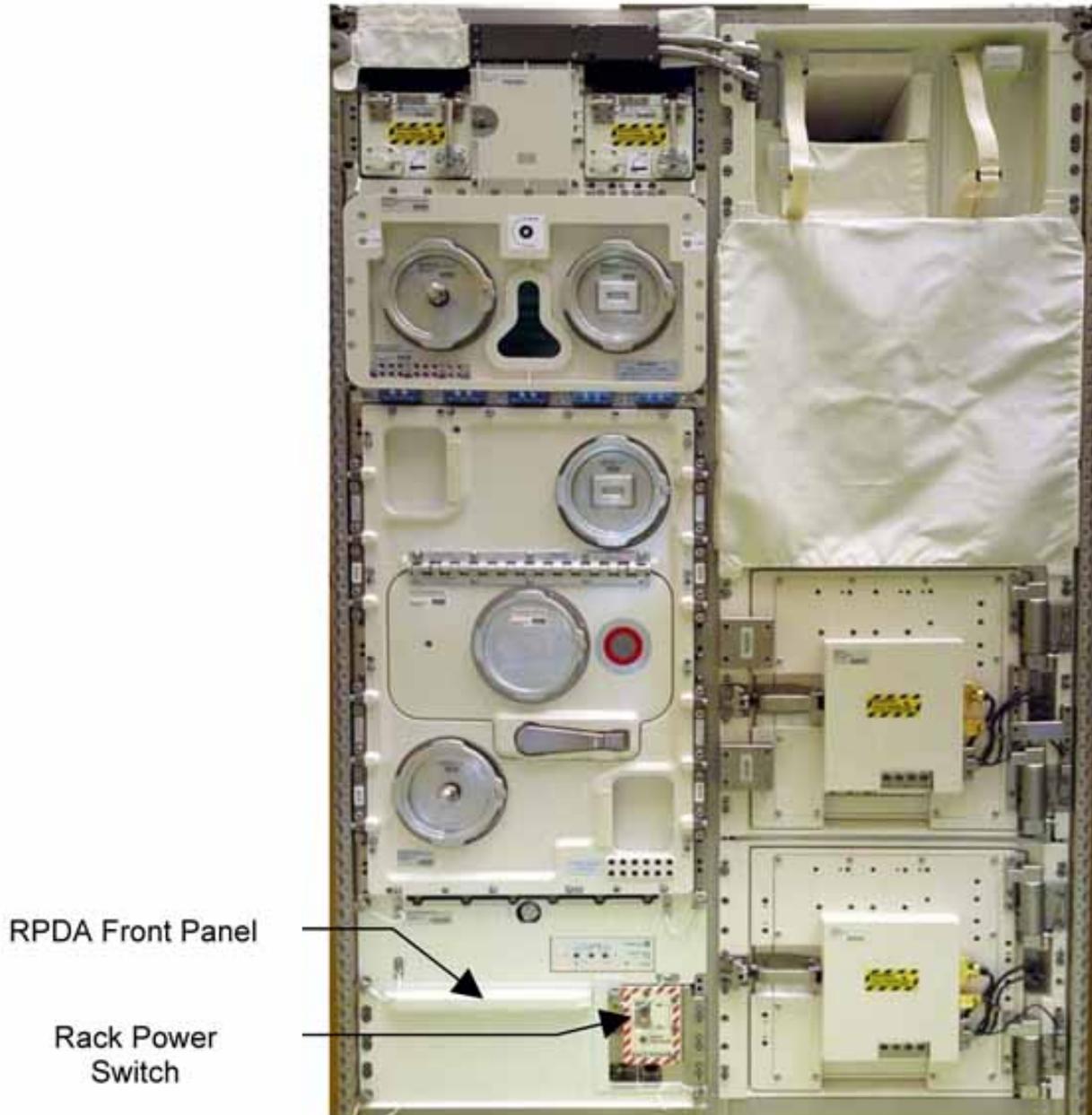


Figure 1. BIOLAB Front Panel View

1.107 BIOLAB ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 11 pages

1.1 [Verifying RACK POWER Switch Position](#)

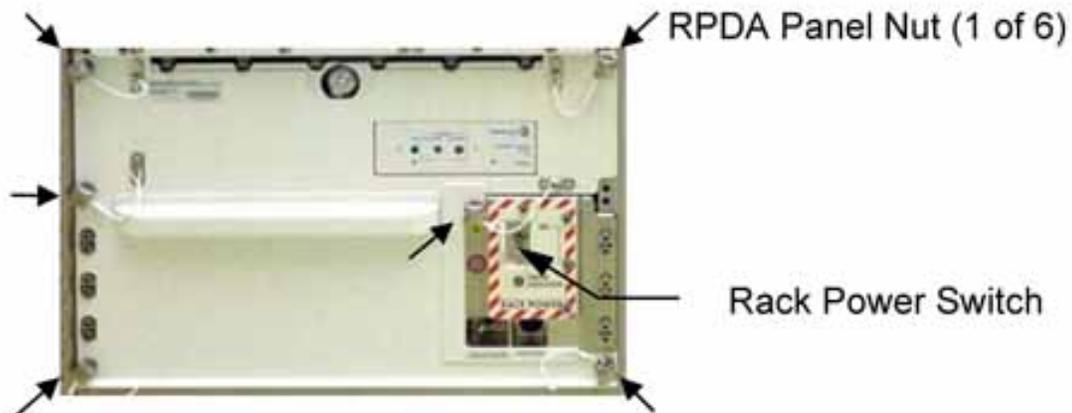


Figure 2. RPDA Front Panel View

BIOLAB

√sw RACK POWER – ON

PWS

1.2 [Verifying RACK POWER Switch Position Data](#)

Payload: ISPR A2

ISPR A2

'EPDS'

Verify Maint Switch – ON

Verify ISPR_A2_Maint_Switch_Stat_DMC – ON (1)

BIOLAB

1.3 [Removing RPDA Front Panel](#)

Manual operated nuts → unscrew from RPDA Front Panel (6 nuts, secured by safing string, refer to Figure 2).

RPDA Front Panel → remove (tmpy stow)

1.107 BIOLAB ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 4 of 11 pages

1.4 Verifying Biolab ISPR RPDA Switch Positions

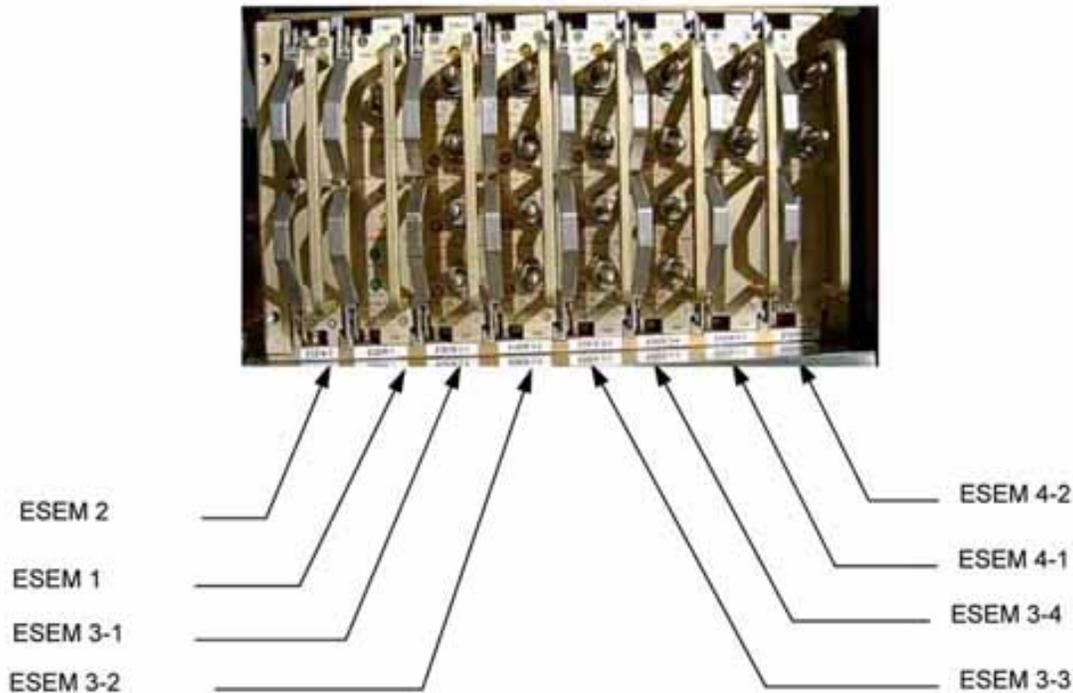


Figure 3. RPDA ESEMs Close View

NOTE

1. The Biolab ISPR RPDA switch positions need to be verified by the crew and manually reconfigured only if directed by COL-CC.
2. All ESEM switch positions except for FIX OFF can and will be overwritten by the RIC during P/L internal initialization sequence. This also applies for the SD, powered by ESEM 3-3, switch 4.
3. The ESEM 4-1, Switch 1 controls the RIC power. Setting to OFF or FIX OFF will result in loss of P/L communication!

Verify RPDA Switch Positions

Refer to Figure 3 and Table 1

1.107 BIOLAB ISPR RACK ACTIVATION

Table 1. RPDA ESEM Default Switch Positions

Slot (left to right)	ESEM Number	Switch location (top-down)	Switch position
1	ESEM 2	N/A	N/A
2	ESEM 1	1	ON
3	ESEM 3-1	1	OFF
3	ESEM 3-1	2	OFF
3	ESEM 3-1	3	OFF
3	ESEM 3-1	4	OFF
4	ESEM 3-2	1	OFF
4	ESEM 3-2	2	FIX OFF
4	ESEM 3-2	3	OFF
4	ESEM 3-2	4	OFF
5	ESEM 3-3	1	OFF
5	ESEM 3-3	2	OFF
5	ESEM 3-3	3	OFF
5	ESEM 3-3	4	OFF
6	ESEM 3-4	1	OFF
6	ESEM 3-4	2	FIX OFF
6	ESEM 3-4	3	OFF
6	ESEM 3-4	4	OFF
7	ESEM 4-1	1	ON
7	ESEM 4-1	2	OFF
7	ESEM 4-2	1	OFF
7	ESEM 4-2	2	OFF

1.5 [Installing RPDA Front Panel](#)

RPDA Front Panel → unstow from Tmptry stow

RPDA Front Panel → insert (match with screws of rack side)

Manual operated nuts (6, secured by safing string) → screw onto their respective screw (hand tight)

2. [VERIFYING TCS STATUS](#)

2.1 [Verifying Water Flow Selection Valve \(WFSV\) ISPR \(A2\) is in Closed Position](#)

PWS

TCS: Plenum: WFSV ISPR A2

WFSV ISPR A2

Verify POSN – Closed

Verify POSN Ind < 7 %

Verify WFSV_ISPR_A2_Close_Stat_DMC – CLOSED (1)

1.107 BIOLAB ISPR RACK ACTIVATION

Verify WFSV_ISPR_A2_Posn_Ind_DMC < 7 %

2.2 [Verifying the Columbus Water Pump Assembly Status](#)

TCS

TCS Functional Overview

'Water Pump Assemblies'

Identify Active WPA

If Active WPA - WPA1

Record Mass Flow WPA1: _____ kg/h

If Active WPA - WPA2

Record Mass Flow WPA2: _____ kg/h

'Delta Pressure Sensor Blocks'

'DBSB1 Plenum'

Verify Nom dP - 40 to 45 kPa

'DBSB2 Plenum'

Verify Redun dP - 40 to 45 kPa

If WPA_Active_Pump_SW - WPA1

Record WPA1_Massflow_DMC: _____
kg/h

If WPA_Active_Pump_SW - WPA2

Record WPA2_Massflow_DMC: _____
kg/h

(For calculation later on in section 3.3)

Verify DPSB1_Nom_Plenum_DP_MVD - 40 to 45 kPa

Verify DPSB2_Redun_Plenum_DP_MVD - 40 to 45 kPa

3. [ACTIVATING BIOLAB ISPR \(A2\) COOLING](#)

3.1 [Configuring WFSV A2 to Open Position \(GROUND ONLY\)](#)

NOTE

This step configures the WFSV A2 for Biolab Maximum Flow Rate (Ops-Mode 3). Any other WFSV position can only be commanded from Ground.

1.107 BIOLAB ISPR RACK ACTIVATION

To open the WFSV of ISPR A2, perform [{9.214 FINE ADJUSTMENT OF WFSV - OPENING}](#) (ESA SODF: GND: TCS: NOMINAL).

Wait one minute for valve to fully open

Verify WFSV_ISPR_A2_Open_Stat_DMC – OPEN (1)
Verify WFSV_ISPR_A2_Posn_Ind_DMC – > 97 %
Verify WFSV_ISPR_A2_Act_Stat_DMC – INACTIVE (0)
Verify WFSV_ISPR_A2_Current_Ovld_Stat_DMC – OK (0)

3.2 [Verifying the ISPR \(A2\) Maximum Flow Rate ON COL-CC GO](#)

TCS

[TCS Functional Overview](#)

'Water Pump Assemblies'

If Active WPA – WPA1

| Record Mass Flow WPA1: _____ kg/h

If Active WPA – WPA2

| Record Mass Flow WPA2: _____ kg/h

Crew

Subtract WPA Mass flow obtained in step 2.2 from WPA Mass flow obtained in step 3.3

Record result of subtraction: _____ kg/h

Verify result of subtraction – 155 to 189 kg/h

PWS

[TCS Functional Overview](#)

'Delta Pressure Sensor Blocks'

'DBSB1 Plenum'

Verify Nom dP – 40 to 45 kPa

'DBSB2 Plenum'

Verify Redun dP – 40 to 45 kPa

If WPA_Active_Pump_SW – WPA1

| Record WPA1_Massflow_DMC: _____ kg/h

If WPA_Active_Pump_SW – WPA2

1.107 BIOLAB ISPR RACK ACTIVATION

Record WPA1_Massflow_DMC: _____
kg/h

Subtract WPA Mass flow obtained in step 2.2 from
WPA Mass flow obtained in step 3.3

Record result of subtraction: _____ kg/h

Verify result of subtraction – 155 to 189 kg/h

Verify DPSB1_Nom_Plenum_DP_MVD – 40 to 45 kPa
Verify DPSB2_Redun_Plenum_DP_MVD – 40 to 45
kPa

4. [ACTIVATING BIOLAB ISPR \(A2\) POWER SUPPLY](#)

4.1 [Enabling ISPR \(A2\) Main Power Bus System Control \(Ground only\)](#)

If
PDU1_ISPR_A2_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
– DISABLED (0)

cmd
PDU1 ISPR A2 Main Pwr Bus Svs Cntl Ena VTC
data SW_CMD – VTC_Disc_Out_Cmd_Cmd_SW
data Onboard_Node – SYS_CCSDS_End_Point_VTC1

Verify
PDU1_ISPR_A2_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
– ENABLED (1)

4.2 [Activating the ISPR \(A2\) Main Power Bus](#)

NOTE ISPR RIC boots automatically if power supplied.
--

On COL-CC GO

EPDS

[EPDS Functional Overview](#)

'PDU1'

sel PDU1 120V Payload

[PDU1-2 120V Payload](#)

"PDU1 Outlets"

sel 2

[PDU1 Outlet 2](#)

Verify SSPC1 Sys Bus Cntrl Stat – ENABLED

1.107 BIOLAB ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 9 of 11 pages

'commands'

cmd Pwr On **Execute** [OK]

'Pwr'

Verify SSPC1 Pwr – ON

Verify SSPC2 Pwr – ON

Verify SSPC3 Pwr – ON

Verify SSPC4 Pwr – ON

Wait 2 minutes to allow current value to stabilize

Verify Current – 0.7 to 1.7 A

cmd PDU1_ISPR_A2_Main_Pwr_Bus_On_AP

data ONBOARD_RECEPTION_NODE –
SYS CCSDS End Point PLCU DMS SERV

data ONBOARD_EXECUTION_NODE –
USM SW DMC USS Swop Instance

Verify

PDU1_ISPR_A2_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
ON (1)

Verify

PDU1_ISPR_A2_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC –
ON (1)

Verify

PDU1_ISPR_A2_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC –
ON (1)

Verify

PDU1_ISPR_A2_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC –
ON (1)

Wait 2 minutes to allow current value to stabilize

Verify PDU1_ISPR_A2_Main_Pwr_Bus_Current_DMC – 0.7 to
1.7 A

5. [STARTING BIOLAB ISPR \(A2\) MIL BUS DATA ACQUISITION \(GROUND ONLY\)](#)

cmd DMS_RT_Start_RT_Acquisition_Cmd_SW

prm REMOTE_TERMINAL_ID –

MIL 1553B Bus RT Payload Bus ISPR A2

data ONBOARD_NODE – SYS_CCSDS_End_Point_PLCU_DMS_SERV

Verify ISPR_A2_PL_Bus_No_Resp_SW – NO_ERROR (0)

Verify ISPR_A2_PL_Bus_Msg_Error_SW – NO_ERROR (0)

Verify ISPR_A2_PL_Bus_Busy_Flag_SW – NO_ERROR (0)

Verify ISPR_A2_PL_Bus_Erroneous_Msg_SW – NO_ERROR (0)

1.107 BIOLAB ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 10 of 11 pages

Verify ISPR_A2_PL_Bus_Terminal_Flag_SW – NO_ERROR (0)
Verify ISPR_A2_PL_Bus_Ena_Stat_SW – ENABLED (1)
Verify ISPR_A2_PL_Bus_Unit_Error_Flag_SW – NO_ERROR (0)

6. [VERIFYING BIOLAB ISPR \(A2\) MIL BUS DATA](#)

On COL-CC GO

PAYLOAD: BIOLAB

[BIOLAB Health and Status Data](#)

'Status'

Verify Caution – NO_ALARM

Verify Warning – NO_ALARM

'Update Counter'

Verify SA#09 – incrementing

Verify SA#10 – incrementing

Verify BLB_Caution_Stat – NO_ALARM (0)
Verify BLB_Warning_Stat – NO_ALARM (0)
Verify BLB_SA9_Counter – incrementing
Verify BLB_SA10_Counter – incrementing

Additional ground verification:

Verify BLB_RPDA_ESEM3_4_OHD_Safety_Pwr_Stat – ON

Verify BLB_RPDA_ESEM3_2_Smoke_Sensor_Pwr_Stat – ON

7. [ACTIVATING ISPR MONITORING SERVICE AND FDS WARNING](#)

7.1 [Verifying ISPR \(A2\) Warning Flag Status \(Ground only\)](#)

Verify ISPR_A2_Warning_Flag_VTC_PP – NO_ALARM (0)

7.2 [Enabling Biolab FDS Vital Monitoring](#)

On COL-CC GO

PCS

COL: ECLSS: COL P/L Warning Safing

[COL P/L Warning Safing](#)

'ISPR A2 (VTC1)'

'Warning Flag Monitoring'

cmd Enable (Verify Status – Ena)

cmd VTC_Monitoring_Ena_Cmd_SW

prm MONITORED_ITEM_ID – ISPR_A2_Warning_Flag_VTC

prm ACTION – 1(ENABLE)

data ONBOARD_NODE – SYS_CCSDS_End_Point_VTC1

1.107 BIOLAB ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 11 of 11 pages

Verify ISPR_A2_Warning_Flag_Monitoring_Ena_VTC_PP –
ENABLED (1)
Verify ISPR_A2_Warning_Flag_VTC_PP – NO_ALARM (0)

7.3 [Activating BIOLAB ISPR \(A2\) Caution and Warning BITs monitoring \(Ground only\)](#)

cmd DMS_MONIT_Ena_Monitoring_Cmd_SW
prm MT_ID – PL_PLCU_MON_PL_Health_Stat1
prm EI_ID – BLB_Caution_Stat
prm LIMIT_SET_ID – 0
data ONBOARD_NODE –
SYS CCSDS End Point PLCU DMS SERV

Verify BLB_Caution_Stat_MS – NORMAL_1

cmd DMS_MONIT_Ena_Monitoring_Cmd_SW
prm MT_ID – PL_PLCU_MON_PL_Health_Stat1
prm EI_ID – BLB_Warning_Stat
prm LIMIT_SET_ID – 0
data ONBOARD_NODE –
SYS CCSDS End Point PLCU DMS SERV

Verify BLB_Warning_Stat_MS – NORMAL_1

7.4 [Verifying BIOLAB ISPR \(A2\) Caution & Warning Status On COL-CC GO](#)

PWS

PAYLOAD: BIOLAB

BIOLAB Health and Status Data

'Status'

Verify Caution – NO_ALARM

Verify Warning – NO_ALARM

Verify BLB_Caution_Stat – NO_ALARM

Verify BLB_Warning_Stat – NO_ALARM

COL-CC to announce completion of BIOLAB ISPR Activation to
MUSC

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1.201 BIOLAB AUTOMATIC TEMPERATURE CONTROLLED STOWAGE ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 3 pages

OBJECTIVE:

The objective is to install the Electronic Box of the Automatic Temperature Controlled Stowage 1 and 2 during commissioning.

MANPOWER

1 crew member

DURATION

5 min

TOOLS:

ISS IVA Toolbox:

Torque wrench 1/4" drive 10-50 in-lbs / 1.3-6.6 Nm

Columbus IVA Toolbox:

Extension 1/4" drive; 4"

Hex head driver 1/4"drive short; 5mm

ITEMS

Biolab Auto Temp Cntl Stow 1 E-Box

Biolab Auto Temp Cntl Stow 2 E-Box

1. [INSTALLATION OF E-BOX AT AUTOMATIC TEMPERATURE CONTROLLED STOWAGE 1 \(2\)](#)

COL1 A2 J1 Verify Biolab sw RACK POWER – OFF

PWS

ISPR A2

ISPR A2

'PDU 1'

Verify Main Pwr Bus – OFF

'PDU 2'

Verify Aux Pwr Bus – OFF

1.201 BIOLAB AUTOMATIC TEMPERATURE CONTROLLED STORAGE ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 3 pages



Figure 1. Biolab Auto Temperature Control Stowage 1 and 2 without E-box

Remove protection caps of E-box connectors

Verify by inspection Biolab Auto Temp Cntl Stow 1 (2) E-Box – not damaged

1.201 BIOLAB AUTOMATIC TEMPERATURE CONTROLLED STORAGE ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 3 pages



Figure 2. Automatic Temperature Controlled Stowage E-Box insertion

COL1 A2
A1

Biolab Auto Temp Cntl Stow 1 (2) E-Box → insert above Auto Temp Cntl Stow 1 (Figure 2) until mechanical stop

Screw sequentially (one turn at a time) the front screws of the Biolab Auto Temp Cntl Stow 1 (2) E-Box (two) until a torque of 22 in-lbs (2.5 Nm) is reached

2. [INSTALLATION OF E-BOX AT AUTOMATIC TEMPERATURE CONTROLLED STORAGE 2](#)

Repeat step 1 for Auto Temp Cntl Stow 2

3. [CLEANUP](#)

Stow tools

Update IMS with stowage location or notify Col-CC

ISS↓Col-CC for task completion

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1.202 BIOLAB AUTOMATIC TEMPERATURE CONTROLLED STOWAGE COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 4 pages

OBJECTIVE:

The objective of this procedure is to install the Lower Insulation and Test Insert of the Automatic Temperature Controlled Stowage 1 and 2 during Biolab commissioning.

MANPOWER

1 crew member

DURATION

5 min

TOOLS:

none

ITEMS

Auto Temp Cntl Stow Test Insert (two): BLBREFT1E and BLBREFT2E

Biolab Auto Temp Cntl Stow Standard Insert Lower Insulation (two)

1. [OPENING OF AUTOMATIC TEMPERATURE CONTROLLED STOWAGE 1\(2\) DOOR](#)
ISS↓ **Col-CC** for permission to access Auto Temp Cntl Stow 1 and 2 without protective gloves

1.202 BIOLAB AUTOMATIC TEMPERATURE CONTROLLED STORAGE COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 2 of 4 pages



Figure 1. Automatic Temperature Controlled Stowage 1

ATCS 1
(COL1 A2
A1)

Disengage latching mechanism by pressing the black knob of the handle (green arrow in Figure 1) while moving handle slightly (~30°) forward

Handle → ↶ (almost 90°), and engage into the latched position by releasing knob

Auto Temp Cntl Stow Door → open by pulling handle up

1.202 BIOLAB AUTOMATIC TEMPERATURE CONTROLLED STORAGE COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 3 of 4 pages

2. INSERTION OF STANDARD TEST INSERT AND LOWER INSULATION



Figure 2. Automatic Temperature Controlled Storage Lower Insulation

1.202 BIOLAB AUTOMATIC TEMPERATURE CONTROLLED STOWAGE COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 4 of 4 pages

Lower Insulation → install by pressing first to the rear side, then downwards until it clicks into its end position (see Figure 2 for correct insertion direction, latch on door side)



Figure 3. Auto Temp Cntl Stow Test Insert Installation

Auto Temp Cntl Stow Test Insert BLBREFT1E (Figure 3) → install and push until end stop

3. [CLOSING OF AUTOMATIC TEMPERATURE CONTROLLED STOWAGE 1\(2\) DOOR](#)

Verify by inspection Auto Temp Cntl Stow Seal for integrity, visual damage and correct seat

Auto Temp Cntl Stow Door → close and lock by engaging handle in upper latching mechanism

4. [INSTALLATION OF TEST INSERT AND LOWER INSULATION FOR AUTOMATIC TEMPERATURE CONTROLLED STOWAGE 2](#)

Repeat Steps 1-3 for Auto Temp Cntl Stow 2, Installing Auto Temp Cntl Stow Test Insert BLBREFT2E

5. [CLEANUP](#)

Update IMS with stowage location or notify Col-CC

ISS↓ Col-CC for task completion

1.216 BIOLAB UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 11 pages

OBJECTIVE:

Mate all Biolab ISPR-to-COL Utility Interface Panel (UIP) umbilicals, with the Biolab readily installed at its assigned location COL1A2 and all required Columbus systems operating nominally.

LOCATION:

COL1A2

DURATION:

30 minutes

CREW:

One

PARTS:

QD Sealing Cap P/N TBD(2)

MATERIALS:

Gray Tape

Trash Bag

Dry Wipe

Cleaning Cloth

TOOLS:

DCS 760 Camera

ISS IVA Toolbox:

Drawer 5:

Static Wrist Tether

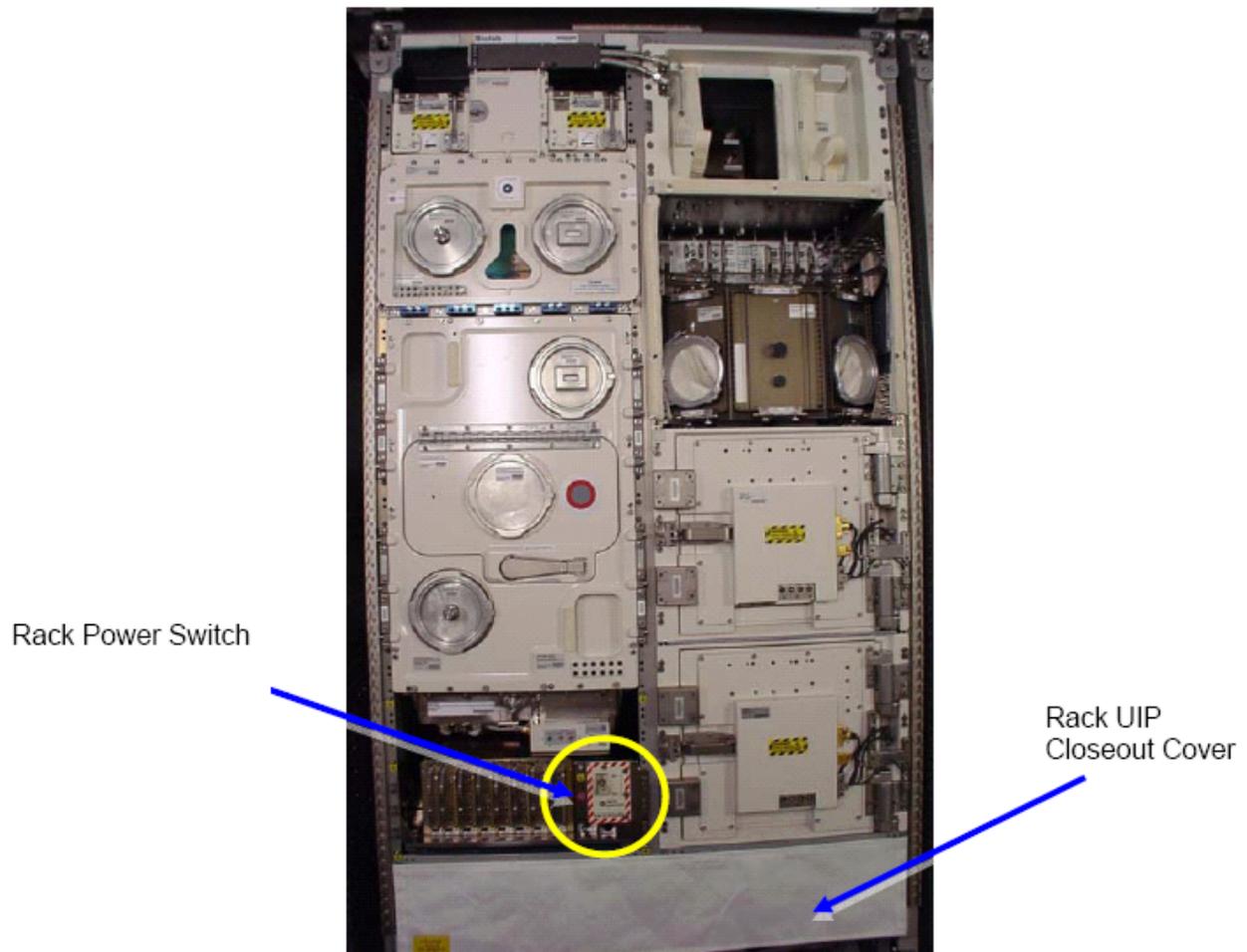


Figure 0-1 Biolab
 (Launch Configuration, Installed at COL1A2)

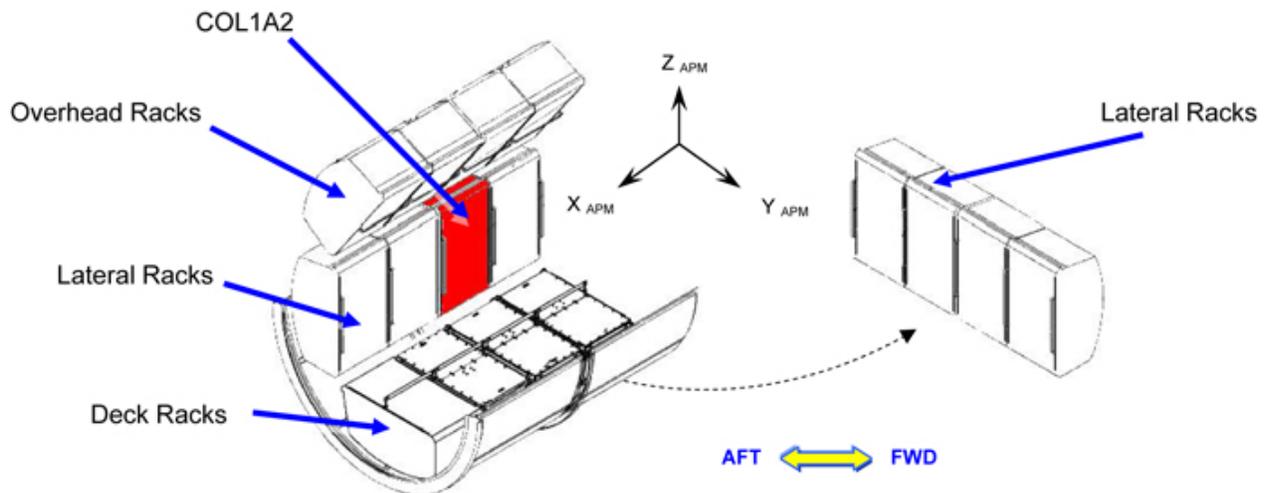


Figure 0-2 Biolab On-Orbit Installation Location (COL1A2)

1. [VERIFYING COL1A2 UIP MAIN POWER / AUX POWER IS OFF](#)

1.216 BIOLAB UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 11 pages

- PWS
- 1.1 COL: EPDS: EPDS Functional Overview: PDU1: 120V Payload
PDU1-2 120V Payload
'PDU1 Outlets'
sel 'Outlet 2'
PDU1 Outlet 2

Verify SSPC (all) – OFF

Verify Current (all) – < 0.1 A

Verify Sys Bus Cntl (all) – OFF

sel 'close'
PDU1-2 120V Payload

'PDU2 Outlets'

sel 'Outlet 7'
PDU2 Outlet 7

Verify SSPC (all) – OFF

Verify Current (all) – < 0.1 A

Verify Sys Bus Cntl (all) – OFF
- 1.2 Verifying WFSV A2 is CLOSED

COL: ISPR A2
ISPR A2
'TCS'

Verify WFSV Posn – CLOSED

Verify WFSV Posn Ind – < 8%
- 1.3 √Rack Power Switch – OFF.
Refer to Figure 0-1.
- 1.4 Check Combined Output of String 1 Parallel DDCUs

NOTE

If total output current is not reduced to less than 52A, there is a risk that when 1 DDCU is turned off, the other DDCU will trip due to an overcurrent condition.

1.216 BIOLAB UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 4 of 11 pages

PCS

Node 2: EPS: DDCU N21B4B Dist

DDCU N21B4B Dist

'Power Sharing, %'

Record DDCU N2D1B: _____

Record DDCU N2D4B: _____

Record DDCU N2D1B Output Current, A: _____

Record DDCU N2D4B Output Current, A: _____

Total Output Current, A (sum of two DDCUs): _____

If Total Output Current > 52 A

√**MCC-H**. Loads must be powered down until total output current < 52 A

1.5 Powering Off String 1 Parallel DDCU (Required for BIOLAB Main Power)

NOTE

1. One of the parallel DDCUs must be turned off to limit potential circuit currents to less than 65A per power connection inhibit requirements.
2. The decision regarding which DDCU to turn off will be made real time based on power channel loading.

DDCU N21B4B Dist

If powering off DDCU N2D1B

sel DDCU N2D1B

DDCU N2D1B

'DDCU N2D1B'

sel Converter

DDCU N2D1B Converter

'Converter Off'

cmd Off (command is 1-step, arm not required)

If powering off DDCU N2D4B

sel DDCU N2D4B

DDCU N2D4B

'DDCU N2D4B'

sel Converter

1.216 BIOLAB UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E)

DDCU N2D4B Converter

'Converter Off'

cmd Off (command is 1-step, arm not required)

DDCU N21B4B Dist

'Power Sharing, %'

Verify that the DDCU which was truned off is 0 % and the operating DDCU is 100%.

1.6 Checking NLSOVs are Closed

PWS

COL: ECLSS: Payload N2:

Payload N2

'Nitrogen Line Shut Off Valves'

√NLSOV1 Position – CLOSED

√NLSOV2 Position – CLOSED

Check NLSOV1_Vlv_Open_Stat_DMC – CLOSED

Check NLSOV2_Vlv_Open_Stat_DMC – CLOSED

2. ACCESSING

2.1 Remove rack UIP closeout cover, tmpry stow.
Refer to Figure 0-1.

3. RACK UIP INSPECTION

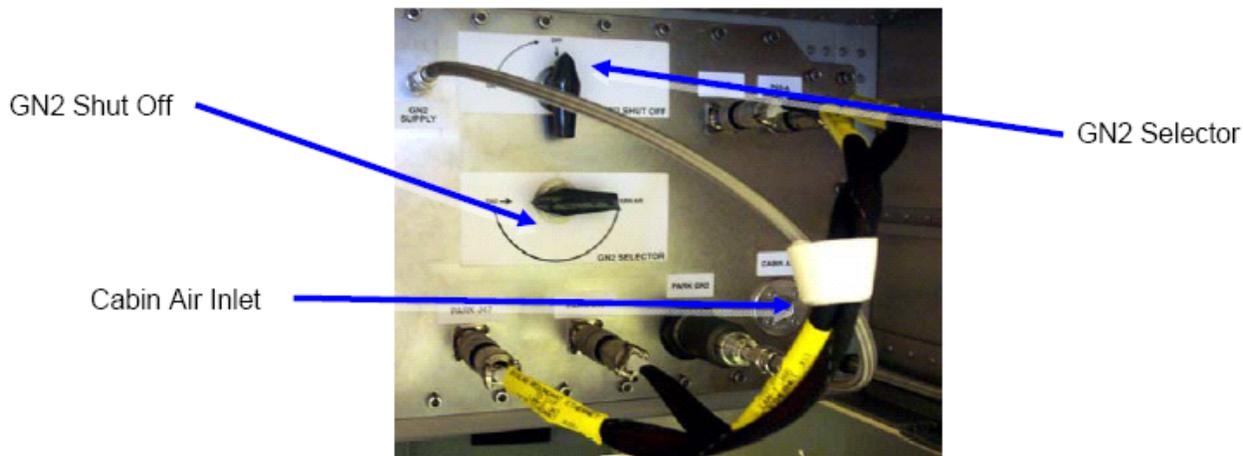


Figure 3-1 Biolab Pass Through Panel (Detail Right Side)

3.1 Inspect Cabin Air Inlet for FOD, clean if necessary (Dry Wipe, Cleaning Cloth).
Refer to Figure 3-1.

3.2 √GN2 SHUT OFF – Closed

1.216 BIOLAB UMBILICAL MATE

Refer to Figure 3-1.

3.3 √GN2 Selector – GN2

Refer to Figure 3-1.

EWACS UMBILICAL MATING

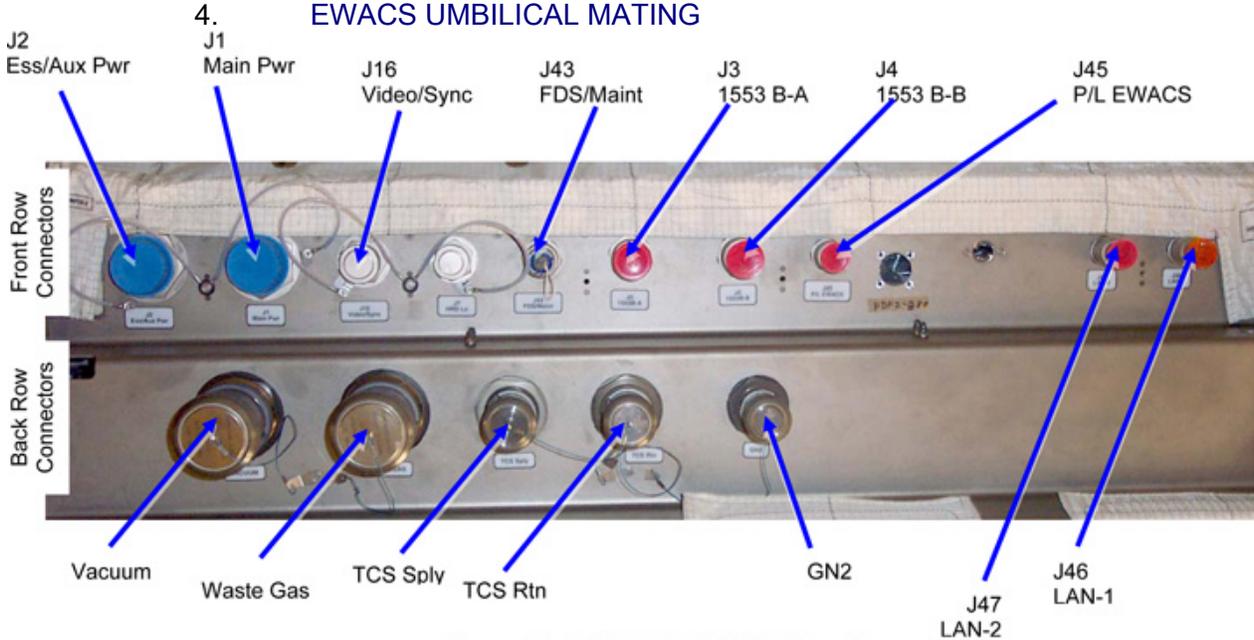


Figure 4-1 COL UIP at COL1A2 Location

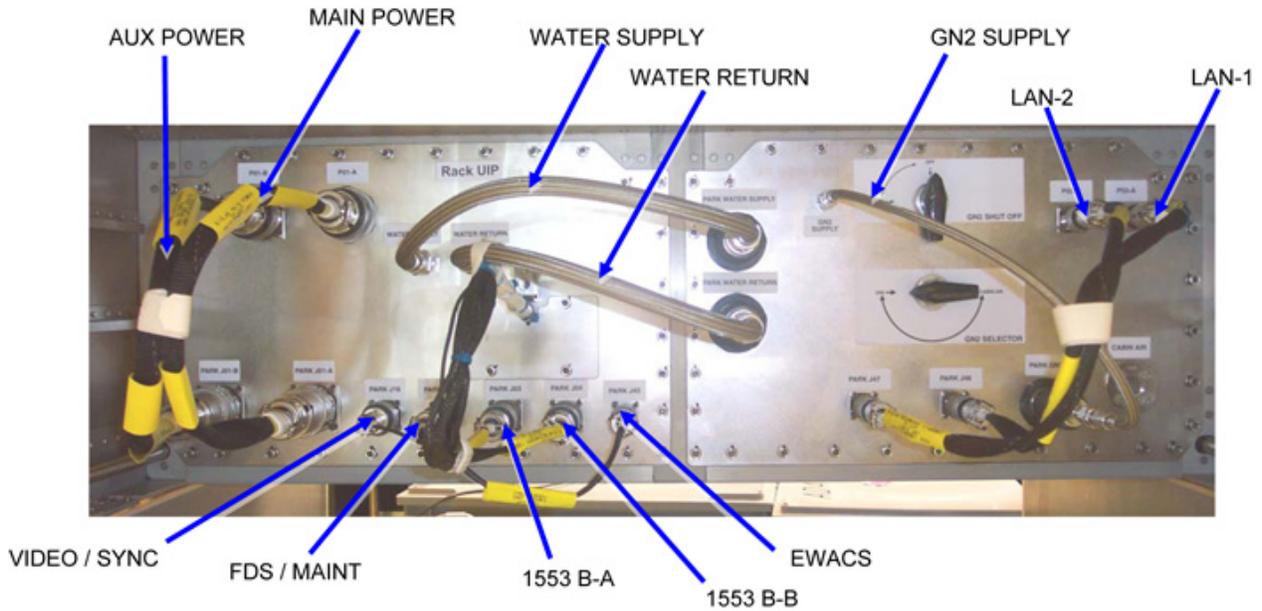


Figure 4-2 Biolab Umbilicals Launch Configuration.

CAUTION

To prevent damage to EMI rings, hold connector back shell with one hand while using other hand to rotate connector collar.

1.216 BIOLAB UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 11 pages

- 4.1 Remove white Velcro cable tie, tmpry stow.
Refer to Figure 4-2.
- 4.2 BIOLAB WARNING SIGNAL TO UIP EWACS J45 ←|→ PARK J45
Refer to Figure 4-2.
- 4.3 BIOLAB WARNING SIGNAL TO UIP EWACS J45 →|← J45 P/L EWACS
Restrain COL UIP protection cap to umbilical (Gray tape).
Refer to Figure 4-1.

5. FLUIDS UMBILICAL MATING

Table 1. Fluid Umbilicals (recommended installation order)

Order Number [X]	BLB Rack Umbilical Function	Fluid Umbilical Label	Rack UIP Label	COL UIP Label
1	TCS Supply	NO LABEL IS PROVIDED ON THIS UMBILICAL	PARK WATER SUPPLY	TCS Sply
2	TCS Supply	NO LABEL IS PROVIDED ON THIS UMBILICAL	PARK WATER SUPPLY	TCS Rtn
3	GN2 Supply	NO LABEL IS PROVIDED ON THIS UMBILICAL	PARK GN2	GN2

- 5.1 Mate umbilical [X] to COL UIP where [X] = [1][2][3]
 Refer to Table 1
 Remove protective cap from COL UIP jack, tmpry stow if untethered.
 Refer to Figure 4-1.
 Disconnect umbilical from launch restraint (park) connector on rack UIP.
 Mate umbilical to COL UIP jack, restrain tethered protection cap to umbilical (Gray Tape) where possible.
 √No leakage from QD, remove droplets (Dry Wipe) as necessary.
 Repeat

1.216 BIOLAB UMBILICAL MATE

5.2 QD Sealing Cap →|← PARK WATER RETURN

6. POWER / DATA UMBILICAL MATING

CAUTION

Handle fiber optic cables by connector only. Do not bend, or apply pressure to cable during mating.

NOTE

1. Tethered caps shall always be fixed to the corresponding umbilical using gray tape.
2. Do not remove blue cable ties bundling umbilicals.

Place unthethered protection caps removed from COL UIP jacks on empty launch restraint (park) connectors on rack UIP.

Caps can be additionally fixed using gray tape.

Table 2. Power / Data Umbilicals (recommended installation order)

Order Number [X]	Biolab Rack Umbilical Function	Rack Umbilical Label	Rack UIP Label	COL UIP Label
1	MAIN POWER	BIOLAB MAIN POWER TO UIP MAIN POWER J01	PARK J01-A	J1 MAIN PWR
2	ESS / AUX POWER	BIOLAB AUX POWER TO UIP ESSENTIAL/AUXILIARY POWER J02	PARK J01-B	J2 ESS/AUX PWR
3	MIL-BUS-A (1553B-A)	BIOLAB NOMINAL 1553B TO UIP 1553B-A J3	PARK J03	J3 1553 B-A
4	MIL-BUS-B (1553B-B)	BIOLAB REDUNDANT 1553B TO UIP 1553B-B J4	PARK J04	J4 1553 B-B
5	ETHERNET (LAN-1)	BIOLAB NOMINAL ETHERNET TO UIP LAN -1 J46	PARK J46	J46 LAN-1

1.216 BIOLAB UMBILICAL MATE

Continuation of Table ...

6	ETHERNET (LAN-2)	BIOLAB REDUNDANT ETHERNET TO UIP LAN-2 J47	PARK J47	J47 LAN-2
7	FDS / MAINT	BIOLAB FDS/MAINTENANCE TO UIP FDS/MAINTENANCE J43	PARK J43	J43 FDS/MAINT
8	VIDEO / SYNC	NO LABEL IS PROVIDED ON THIS UMBILICAL	PARK J16	J16 VIDEO/SYNC

- 6.1 Don Static Wrist Tether.
Attach clip to unpainted, unanodized metal structure.
- 6.2 Open and remove white velcro ties (4) from umbilicals, temporary stow.
- 6.3 Mate umbilical [X] to COL UIP where [X] = [1][2][3][4][5][6][7][8]
 - Refer to Table 1.
 - Remove protective cap from COL UIP jack, tmpry stow if untethered.
Refer to Figure 4-1.
 - Disconnect umbilical from launch restraint (park) connector on rack UIP.
Refer to Figure 4-2.
 - Mate umbilical to COL UIP jack, restrain tethered protection cap to umbilical (Gray Tape) where possible.
 - √Red Indicator Ring – not visible.
 - Repeat

7. CLOSEOUT

- 7.1 ISS ↓ **COL-CC** of completing umbilical mating, wait for **GO** to closeout worksite.
- 7.2 ISS ↓ **MCC-H**, 'Go for DDCU Powerup'. **MCC-H** will perform Step 8.

- 7.3 Doff Static Wrist Tether.
- 7.4 Photo-document all installed umbilicals (DCS 760 Camera).
- 7.5 Check for FOD around work area.
- 7.6 Attach rack UIP closeout cover.
Cover is attached by Velcro only.
- 7.7 Stow tools and equipment.
Update IMS or report to **COL-CC**.

8. MCC-H ONLY - DDCU POWERUP

PCS

8.1 Powering on String 1 Parallel DDCU

Node 2: EPS: DDCU N21B4B Dist

DDCU N21B4B Dist

If powering on DDCU N2D1B

sel DDCU N2D1B

DDCU N2D1B

'DDCU N2D1B'

sel Converter

DDCU N2D1B Converter

'Converter On'

cmd Arm

cmd On

If powering on DDCU N2D4B

sel DDCU N2D4B

DDCU N2D4B

'DDCU N2D4B'

sel Converter

DDCU N2D4B Converter

'Converter On'

cmd Arm

cmd On

NOTE

After the DDCU is repowered, the power sharing ratio will default back to its previously commanded values.

1.216 BIOLAB UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E)

Page 11 of 11 pages

DDCU N21B4B Dist

'Power Sharing, %'

Verify DDCU N2D1B = _____ <value recorded in Step 1.4>

Verify DDCU N2D4B = _____ <value recorded in Step 1.4>

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1.301 BIOLAB GLOVEBOX LAUNCH BRACKETS DISENGAGEMENT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 6 pages

OBJECTIVE:

The objective of this procedure is to remove the Glovebox Launch Brackets during Biolab Commissioning.

MANPOWER:

1 crew member

DURATION:

60 min

TOOLS:

Glovebox Launch Bracket Tool

ISS IVA Toolbox:

Drawer 2:

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

6" Long Flex Extension, 1/4" Drive

Columbus Tool Kit:

Tool Bag 1

102mm Extension. 1/4" Drive

Ratchet wrench 1/4"

Tool Bag 2

M5 (4mm) Hex Head Driver, 1/4" Drive

M6 (5mm) Hex Head Driver, 1/4" Drive

1. REMOVAL OF BIOLAB GLOVEBOX FUSE BOX AND CONNECTOR CAPS

Biolab
(COL1 A2
J1)

Verify Biolab sw RACK POWER – OFF

COL1 A2
B2

Biolab Glovebox Nylon Cover → remove

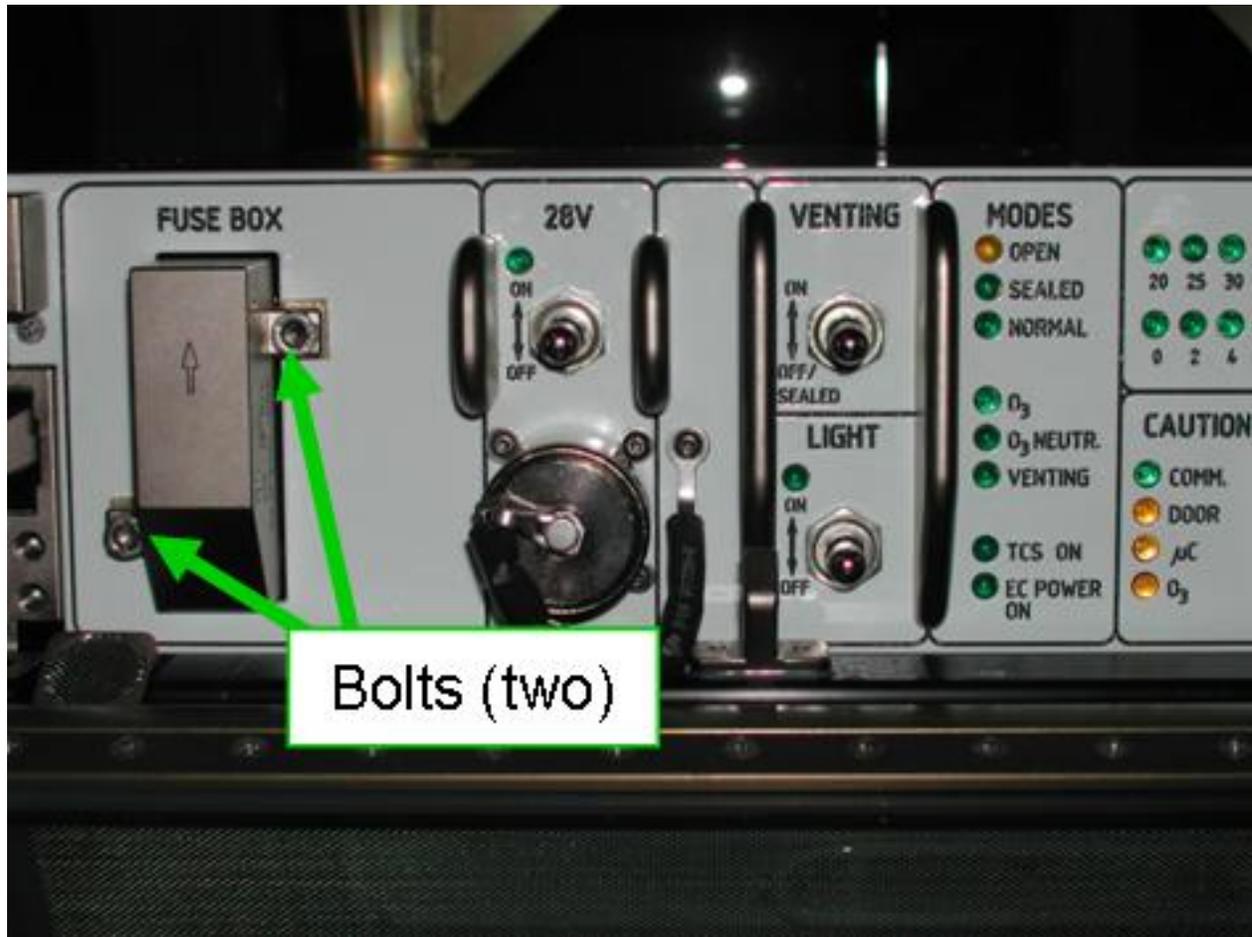


Figure 1. Glovebox CMP with Biolab Glovebox Fuse Box

Captive bolts at Biolab Glovebox fuse box (Figure 1) → remove, tmpry stow (Ratchet wrench 1/4"; 102mm Extension, 1/4" Drive; M5 (4mm) Hex Head Driver, 1/4" Drive)

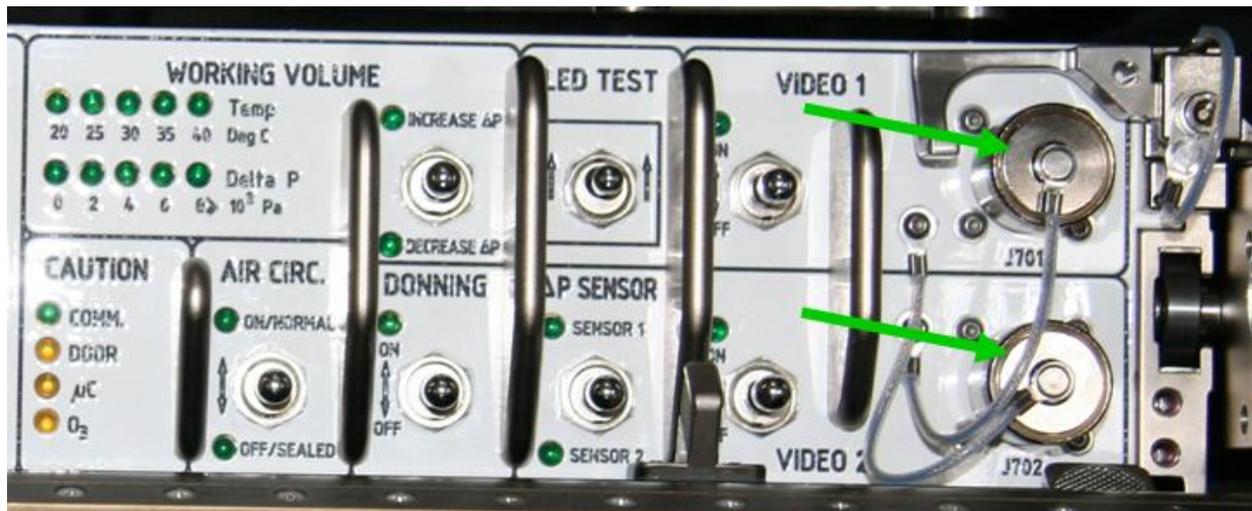


Figure 2. Glovebox CMP with connectors J701 and J702

Remove connector caps J701 and J702 (Figure 2)

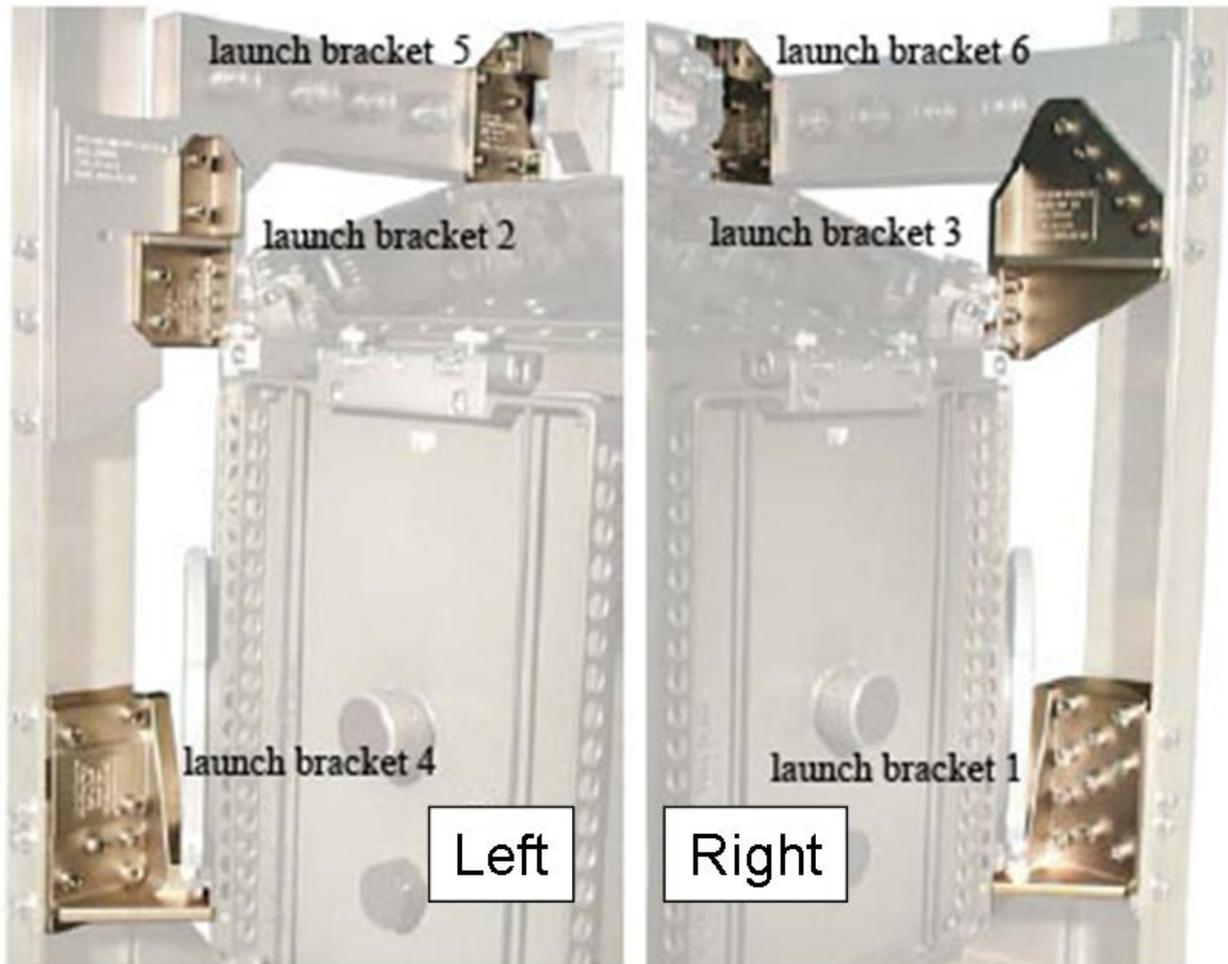


Figure 3. Glovebox Launch Brackets: left and right side

2. [REMOVAL OF GLOVEBOX LAUNCH BRACKET 6 \(RIGHT CMP\)](#)
Glovebox Launch Bracket 6 → remove, stow (Ratchet wrench 1/4", M5 (4mm) Hex Head Driver, 1/4" Drive) (Figure 3, captive bolts (seven))



Figure 4. Launch position of captive bolt on the locking mechanism

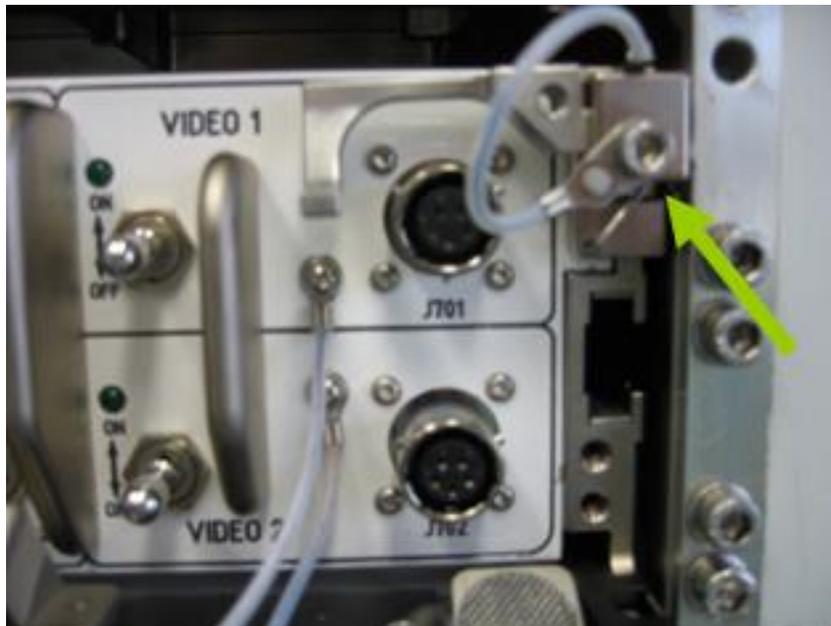


Figure 5. Final position of captive bolt on the locking mechanism

Unscrew captive bolt on the locking mechanism (Figure 4)

Install the captive bolt from the hinge of the locking mechanism to final position (Figure 5) and torque to 35 in-lbs (4 Nm) ((10-50 in-lbs) Trq Wrench 1/4" Drive, M5 (4mm) Hex Head Driver, 1/4" Drive)

3. [REMOVAL OF GLOVEBOX LAUNCH BRACKET 5 \(LEFT CMP\)](#)
Glovebox Launch Bracket 5 → remove, stow (Ratchet wrench 1/4", M5 (4mm) Hex Head Driver, 1/4" Drive, 6" Long Flex Extension, 1/4" Drive) (Figure 3, captive bolts (seven))

1.301 BIOLAB GLOVEBOX LAUNCH BRACKETS DISENGAGEMENT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 5 of 6 pages

4. [REMOVAL OF GLOVEBOX LAUNCH BRACKET 3 \(RIGHT TOP WORKING VOLUME\)](#)
Glovebox Launch Bracket 3 → remove, stow (Ratchet wrench 1/4", M5 (4mm) Hex Head Driver, 1/4" Drive) (Figure 3, captive bolts (eight))
5. [REMOVAL OF GLOVEBOX LAUNCH BRACKET 2 \(LEFT TOP WORKING VOLUME\)](#)
Glovebox Launch Bracket 2 → remove, stow (Ratchet wrench 1/4", M5 (4mm) Hex Head Driver, 1/4" Drive) (Figure 3, captive bolts (seven))
6. [REMOVAL OF GLOVEBOX LAUNCH BRACKET 1 AND 4 \(RIGHT AND LEFT BOTTOM WORKING VOLUME\)](#)
 - 6.1 [Unscrewing of bolts at rack post](#)

Unscrew the captive bolts (ten) located at the right rack post of Glovebox Launch Bracket 1 (Glovebox launch bracket tool; Ratchet wrench 1/4"; M6 (5mm) Hex Head Driver, 1/4" Drive)

Unscrew the captive bolts (seven) located at the mid rack post of Glovebox Launch Bracket 4 (Glovebox launch bracket tool; Ratchet wrench 1/4"; M6 (5mm) Hex Head Driver, 1/4" Drive)
 - 6.2 [Glovebox Extraction from Biolab Manual Section](#)

Replace connector caps J701 and J702

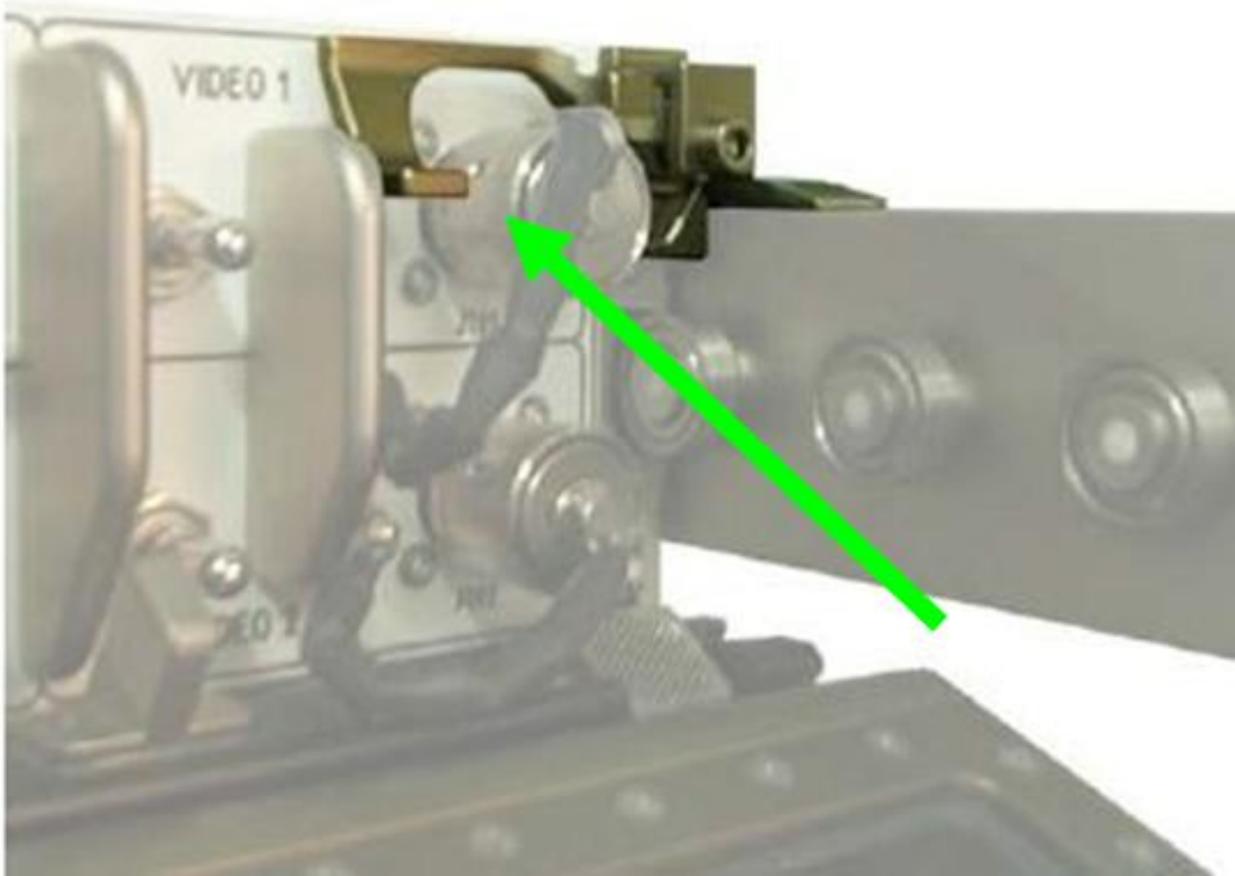


Figure 6. Glovebox Cantilever for Release and Lock

1.301 BIOLAB GLOVEBOX LAUNCH BRACKETS DISENGAGEMENT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 6 pages

Glovebox → slide-out to fully extracted position, lock (CMP nearly flush with rack face)

6.3 [Installation of Biolab Glovebox Fuse Box](#)

Biolab Glovebox Fuse Box → install (arrow pointing up) and screw bolts (two) with torque 32 in-lbs (3.6 Nm) ((10-50 in-lbs) Trq Wrench 1/4" Drive; 102mm Extension, 1/4" Drive; M5 (4mm) Hex Head Driver, 1/4" Drive)

6.4 [Removal of Glovebox Launch Bracket 1 \(right bottom Working Volume\)](#)

Glovebox Launch Bracket 3 → remove, stow (Ratchet wrench 1/4", M5 (4mm) Hex Head Driver, 1/4" Drive) (Figure 3, captive bolts (four))



Figure 7. Glovebox Glove Door locking pins

Bottom right locking pin on Glovebox Glove Door R → intermediate then locked position (push downwards, Figure 7)

6.5 [Removal of Glovebox Launch Bracket 4 \(left bottom Working Volume\)](#)

Glovebox Launch Bracket 4 → remove, stow (Ratchet wrench 1/4", M5 (4mm) Hex Head Driver, 1/4" Drive) (Figure 3, captive bolts (seven))

Bottom left locking pin on Glovebox Glove Door L → intermediate then locked position (push downwards)

7. [GLOVEBOX RE-INSERTION INTO MANUAL SECTION](#)

Glovebox → slide-in to full inner position, lock

Glovebox Nylon Cover → re-install

8. [CLEANUP](#)

Stow tools

Update IMS with stowage location or notify COL-CC

ISS↓COL-CC for task completion

1.302 BIOLAB GLOVEBOX STOWAGE ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 9 pages

OBJECTIVE:

The objective is to remove the protective Kapton Tape on the Glovebox Rear Filters and install the Glovebox Front Filters (four) during Biolab Commissioning.

MANPOWER

1 crew member

TOOLS:

ISS IVA Toolbox:

Drawer 2:

(10-50 In-Lbs) Trq Wrench, 1/4" Drive

Columbus Tool Kit:

Tool Bag 1:

102 mm Extension, 1/4" Drive

Ratchet wrench 1/4"

Tool Bag 3:

M6 (5mm) Hex Head Driver, 1/4" Drive

Materials

Glovebox Front Filters (four)

1. [GLOVEBOX EXTRACTION](#)
On Col-CC GO

√All operator rings, watch removed

COL1 A2 Remove Glovebox Nylon Cover, if installed
B2

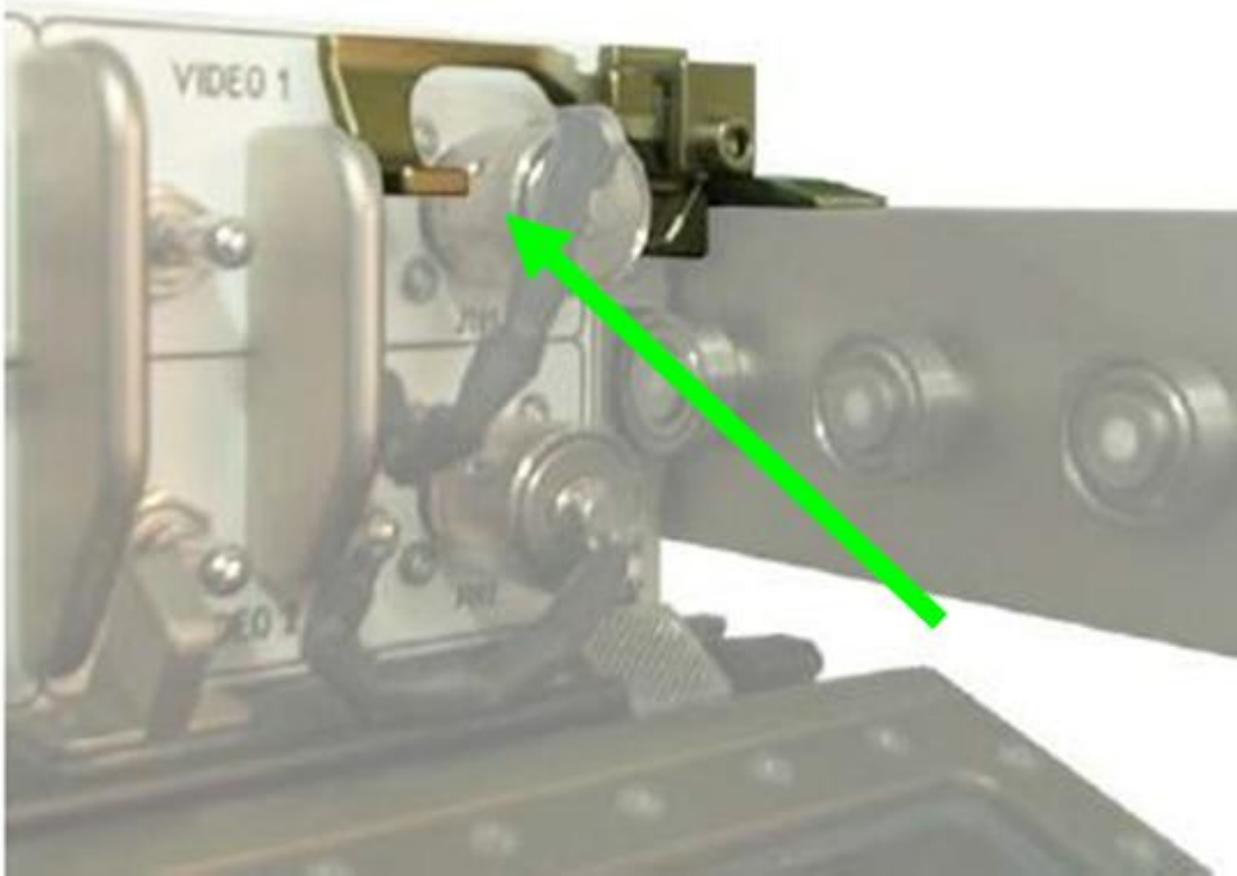


Figure 1. Glovebox Cantilever for Release and Lock

Glovebox → slide out to fully extracted position, lock (CMP nearly flush with rack face)

2. GLOVEBOX MAIN DOOR OPENING

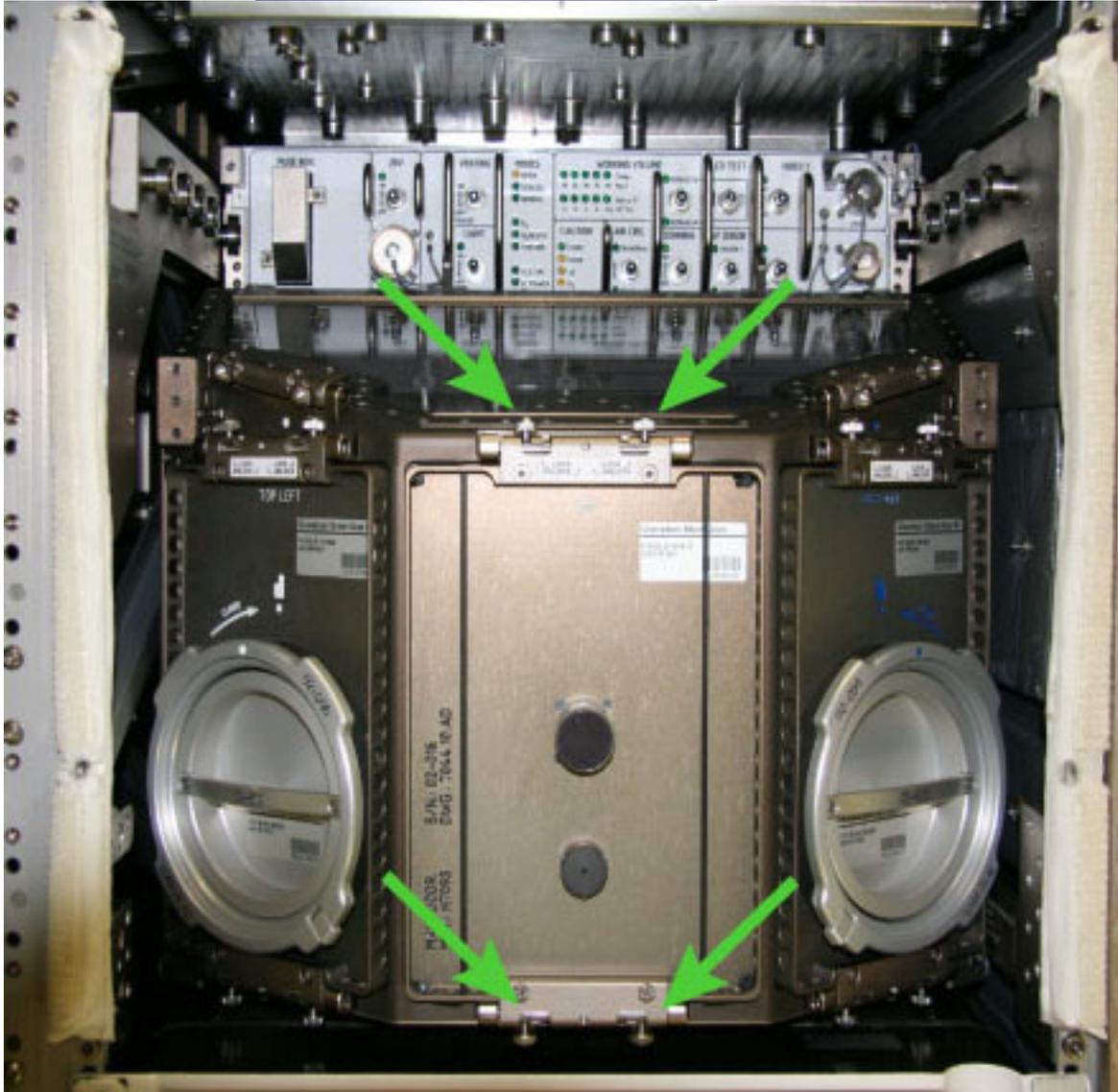


Figure 2. Glovebox Main Door

Glovebox Main Door → remove, tmpry stow (Figure 2)

3. GLOVEBOX AIRLOCK CAPS REMOVAL

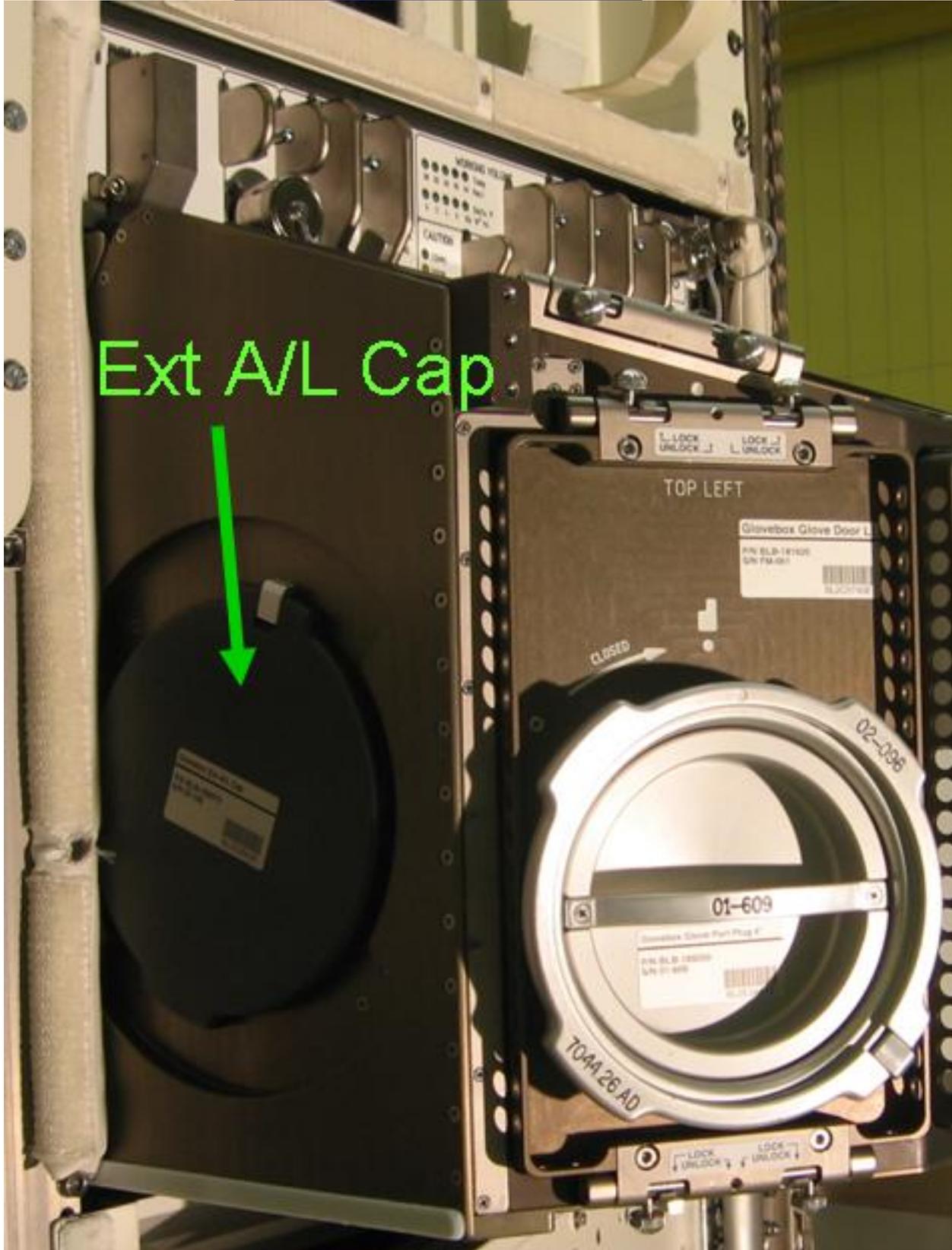


Figure 3. Glovebox External Airlock Cap (Ext A/L Cap)

Glovebox Ext A/L Cap → remove, tmpy stow
Glovebox Int A/L Cap → remove, tmpy stow

4. **GLOVEBOX TOP WINDOW REMOVAL**

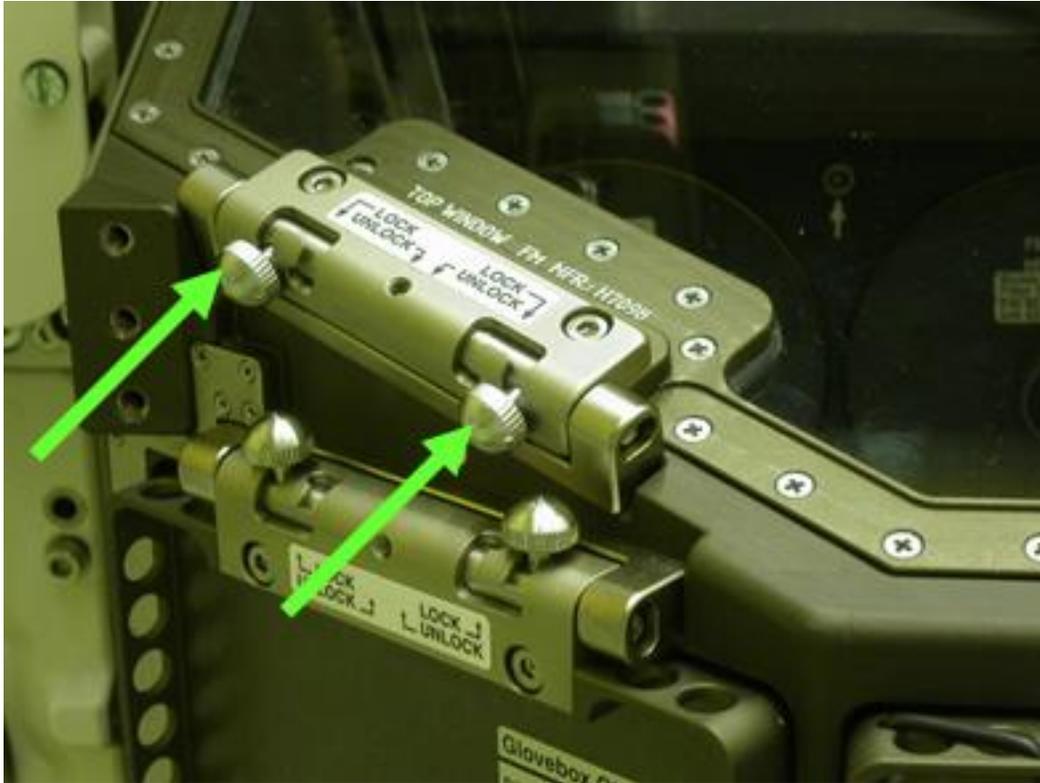


Figure 4. Glovebox Top Window Left

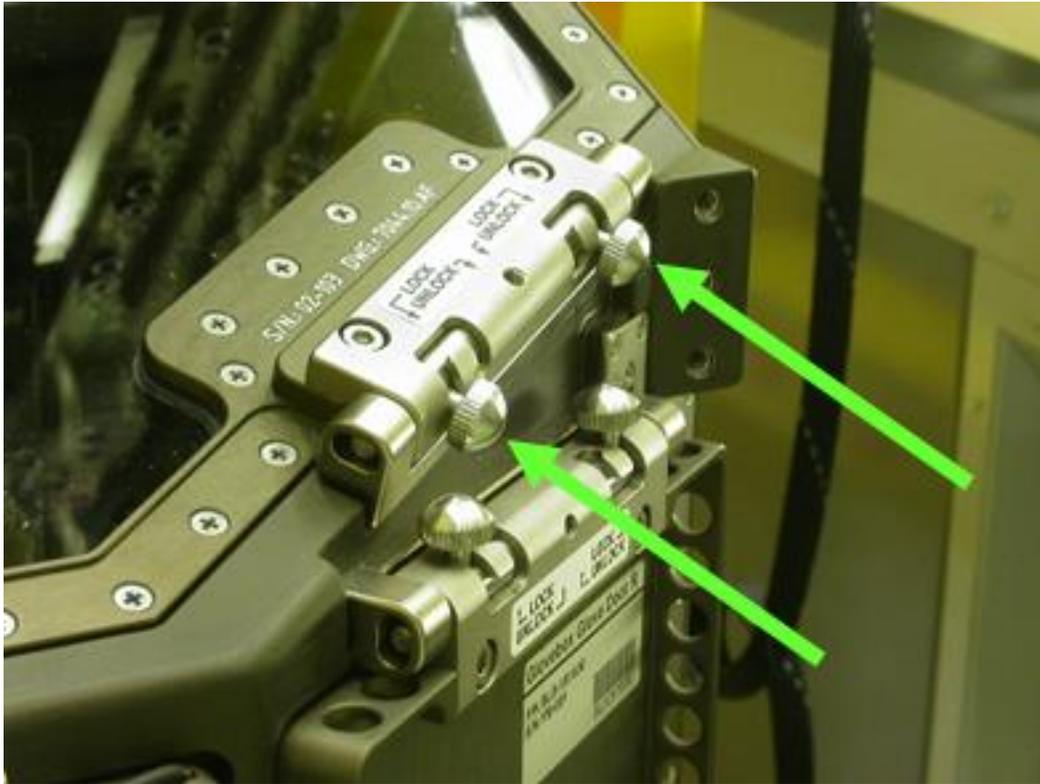


Figure 5. Glovebox Top Window Right

Glovebox Top Window → remove, tmpry stow (tilt up slightly while pulling forward) (Figure 4 and 5)

5. [REMOVAL OF KAPTON TAPE AND GLOVEBOX FRONT FILTER INSTALLATION](#)

5.1 Removal of Glovebox Front Filter Plate



Figure 6. Glovebox Front Filter Plate (for launch the four Glovebox Front Filters will be removed)

Captive bolts marked with white arrow (eight, Figure 6) →
unscrew

Glovebox Front Filter Plate → remove from Working Volume via
Glovebox Top Window, tmpy stow

5.2 [Removal of Kapton Tape from Glovebox Rear Filters](#)

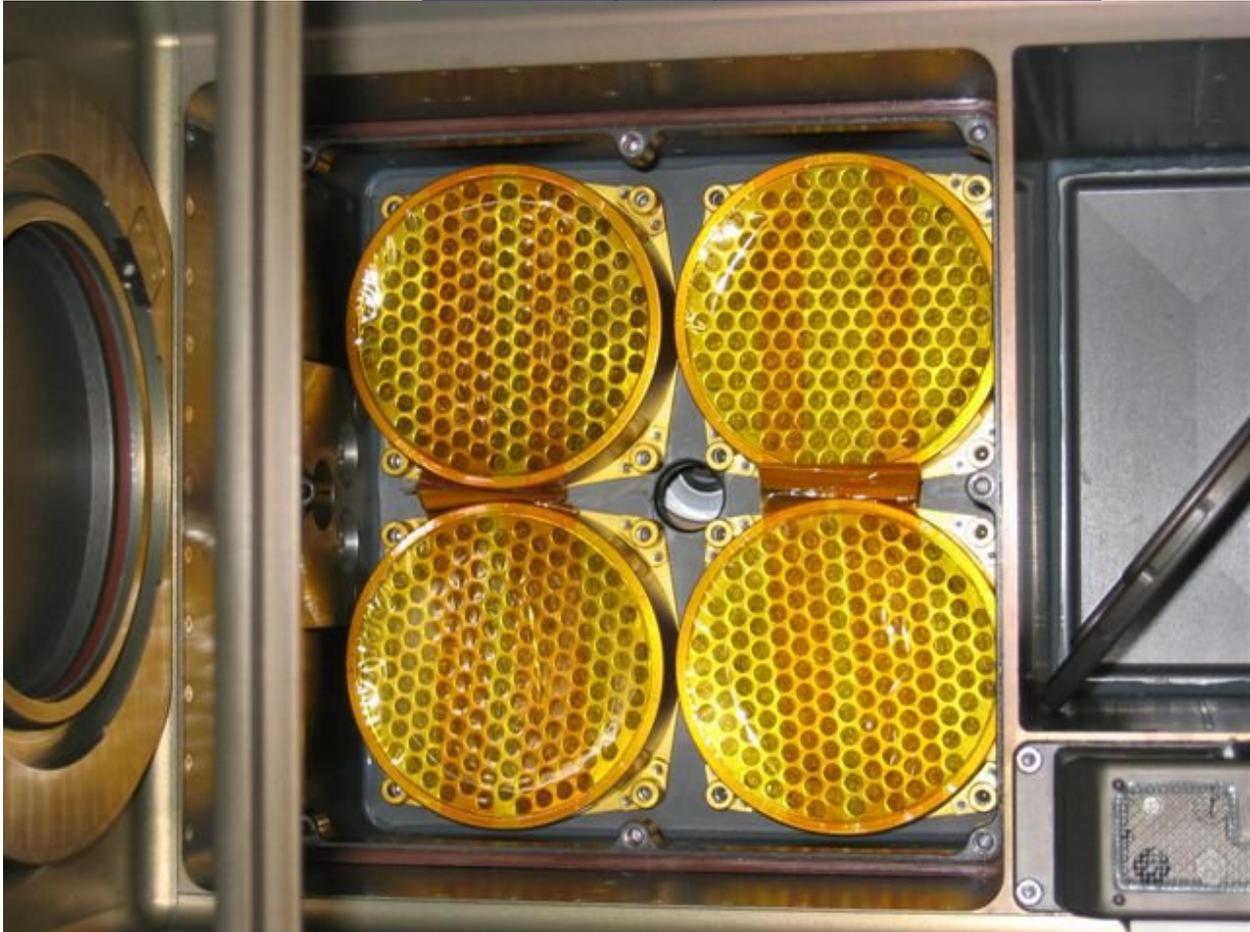


Figure 7. Rear Filters with kapton tape

Remove the Kapton tape from the Glovebox Rear Filters, trash (Figure 7)

5.3 [Re-insertion of Glovebox Front Filter Plate](#)

Unstow and re-insert the Glovebox Front Filter Plate via Glovebox Top Window

Captive bolts marked with white arrow (eight) → torque in crossover pattern to 32 in-lbs

5.4 [Installation of Glovebox Front Filters](#)

Glovebox Front Filters (four) → unstow

Grasp filter by tri-point grip on the front side

Line up tri-point with slots at the filter plate and insert filter so that rear pins enter the slots

Glovebox Front Filter → install by rotating ↷

1.302 BIOLAB GLOVEBOX STOWAGE ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 9 of 9 pages

6. [GLOVEBOX TOP WINDOW RE-INSERTION](#)

Retrieve Glovebox Top Window

Verify Glovebox Top Window Seal integrity and seat – OK

Bring left and right locking pins on Glovebox Top Window in most inward position

Glovebox Top Window → re-install

Lock hinges

7. [GLOVEBOX AIRLOCK CAPS INSTALLATION](#)

Glovebox Int A/L Cap → insert in Glovebox Working Volume and install

Glovebox Ext A/L Cap → install and lock on external side of A/L

8. [GLOVEBOX MAIN DOOR RE-INSTALLATION](#)

Retrieve Glovebox Main Door

Verify Glovebox Main Door Seal integrity and Seat – OK

Bring bottom and top locking pins on Glovebox Main Door in most inward position

√Marking "TOP" on Glovebox Main Door – in upward position

Insert the main door into the Glovebox Main Door frame

Lock hinges

Glovebox
CMP

√CAUTION LED "DOOR" – ■

9. [GLOVEBOX RE-INSERTION INTO MANUAL SECTION](#)

Glovebox → slide-in to inner position, lock (audible click when locked)

Reinstall Glovebox Nylon Cover

10. [CLEANUP](#)

Stow tools

Update IMS with with stowage location or notify **COL-CC**

ISS ↓ **COL-CC** for task completion

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1.303 BIOLAB GLOVEBOX COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 7 pages

OBJECTIVE:

The objective of this procedure is to install the Biolab Glovebox EC Mount Plate, two Ref EC and the Glovebox Spotlight into the Glovebox during Commissioning.

MANPOWER

1 crew member

DURATION

15 min

TOOLS:

none

ITEMS:

Biolab Glovebox EC Mount Plate

Biolab Ref EC (two) (REC SN5: BLBREC05E and REC SN11: BLBREC03E)

Glovebox Spotlight

1. [GLOVEBOX EXTRACTION FROM BIOLAB MANUAL SECTION](#)

COL1 A2
B2 Remove Nylon Cover, if installed

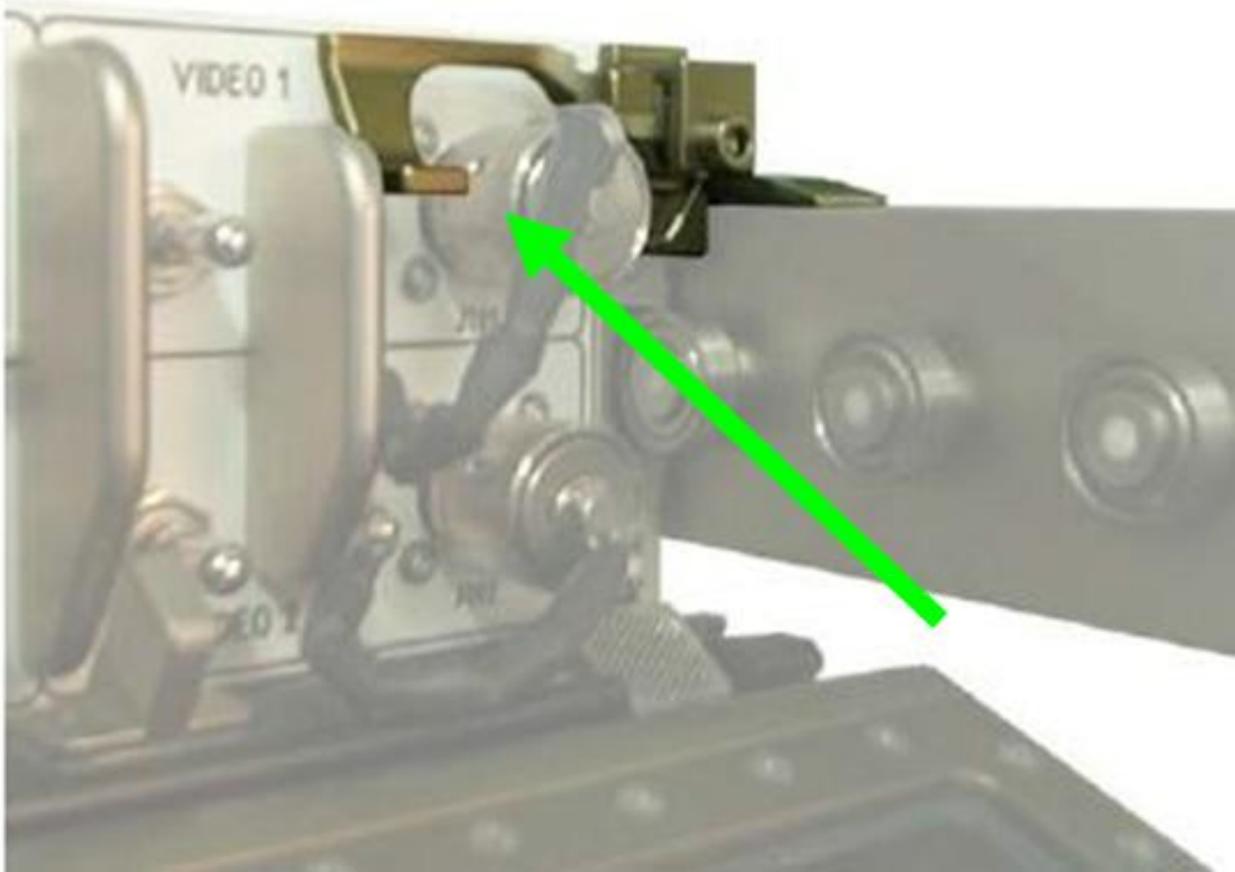


Figure 1. Glovebox Cantilever for Release and Lock

Glovebox → slide out to fully extracted position, lock (CMP nearly flush with rack face)

2. GLOVEBOX GLOVE DOOR R (L) REMOVAL

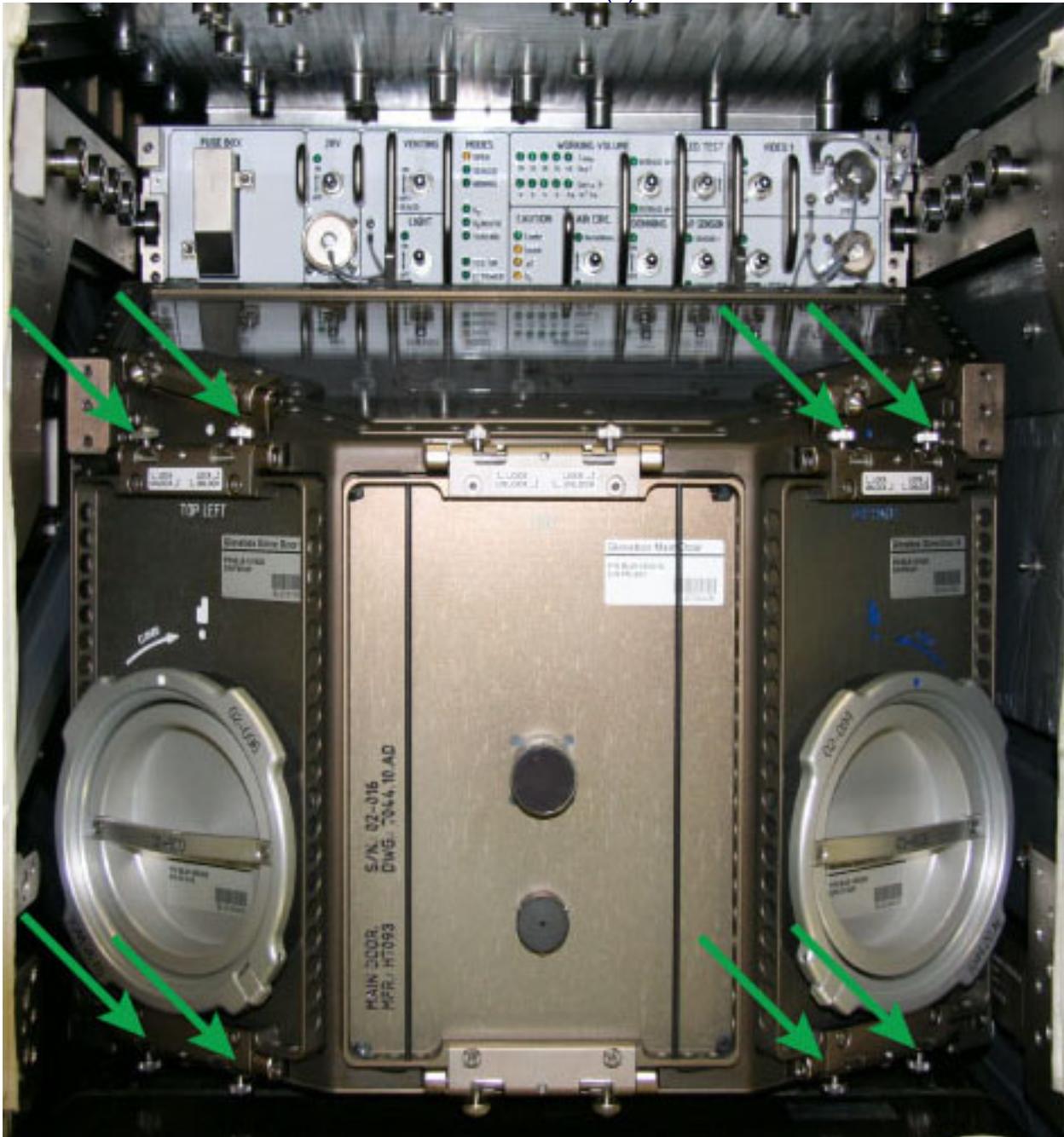


Figure 2. Glovebox Glove Door Opening

Glovebox Glove Door R (L) → remove, tmpy stow

Repeat for other Glovebox Glove Door L

3. [BIOLAB GLOVEBOX EC MOUNT PLATE INSTALLATION](#)



Figure 3. Biolab Glovebox EC Mount Plate

EC Mount Plate (Figure 3) → insert in Glovebox Working Volume
(connecting cable shall be on the right)

EC Mount Plate → position on Glovebox Working Volume floor (plate will
be magnetically fixed to floor)

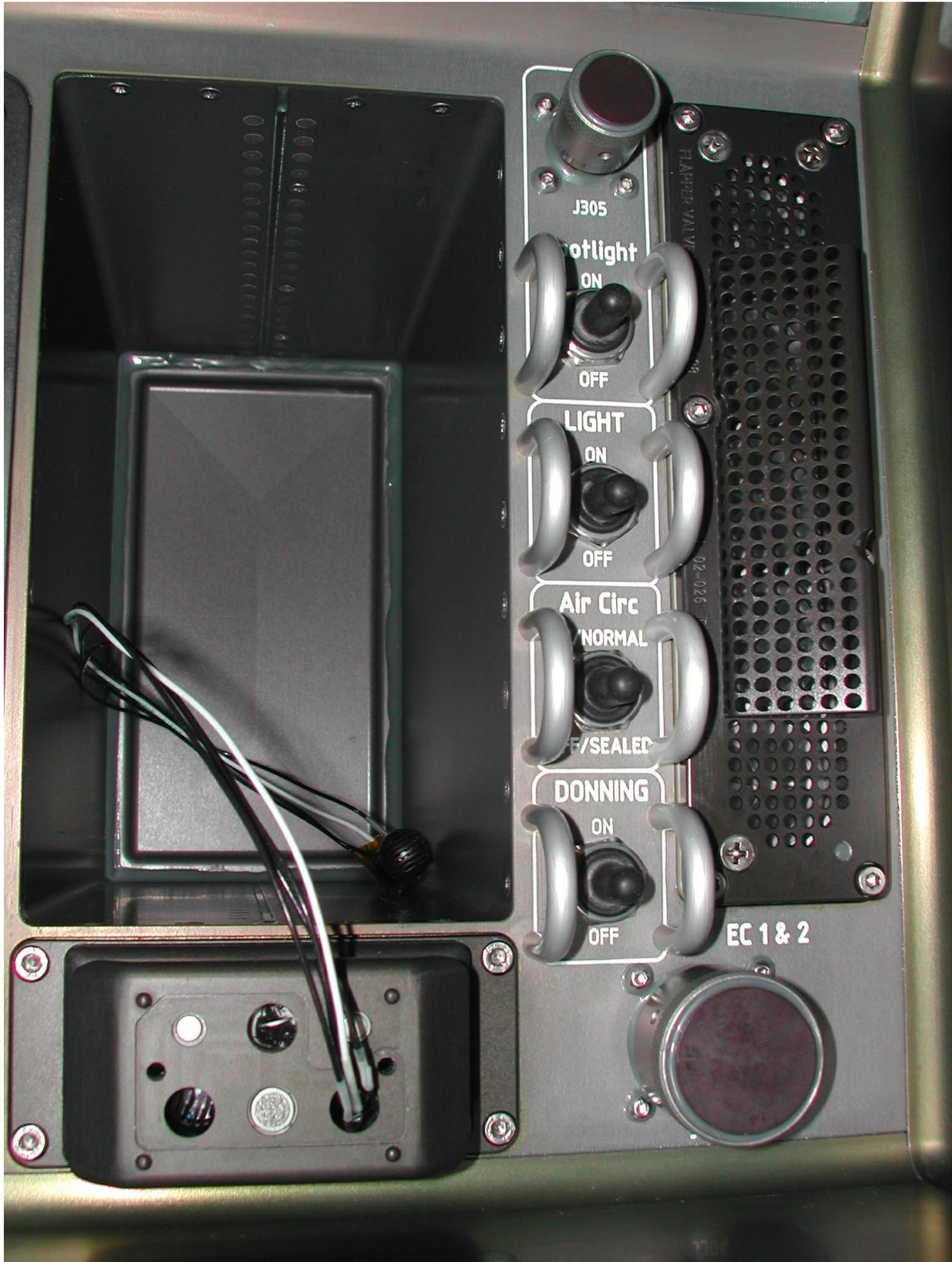


Figure 4. Glovebox ICP

1.303 BIOLAB GLOVEBOX COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 5 of 7 pages

Remove the connector protection cap (P304) (bayonet type) from the EC Mount Plate connector

Remove the connector protection cover (bayonet type) of the Glovebox connector EC1&2 at the ICP and store the protection cover on the Glovebox floor (magnetic)

EC Mount Plate connector →|←ICP EC1&2 (Figure 4)

4. [REFERENCE EC INSTALLATION ON MOUNT PLATE](#)

Remove the kapton tape protection from the Ref EC connector (REC SN11: BLBREC03E)

Verify by inspection EC connector – not damaged

Ref EC → insert into Glovebox Working Volume through Glovebox Glove Door

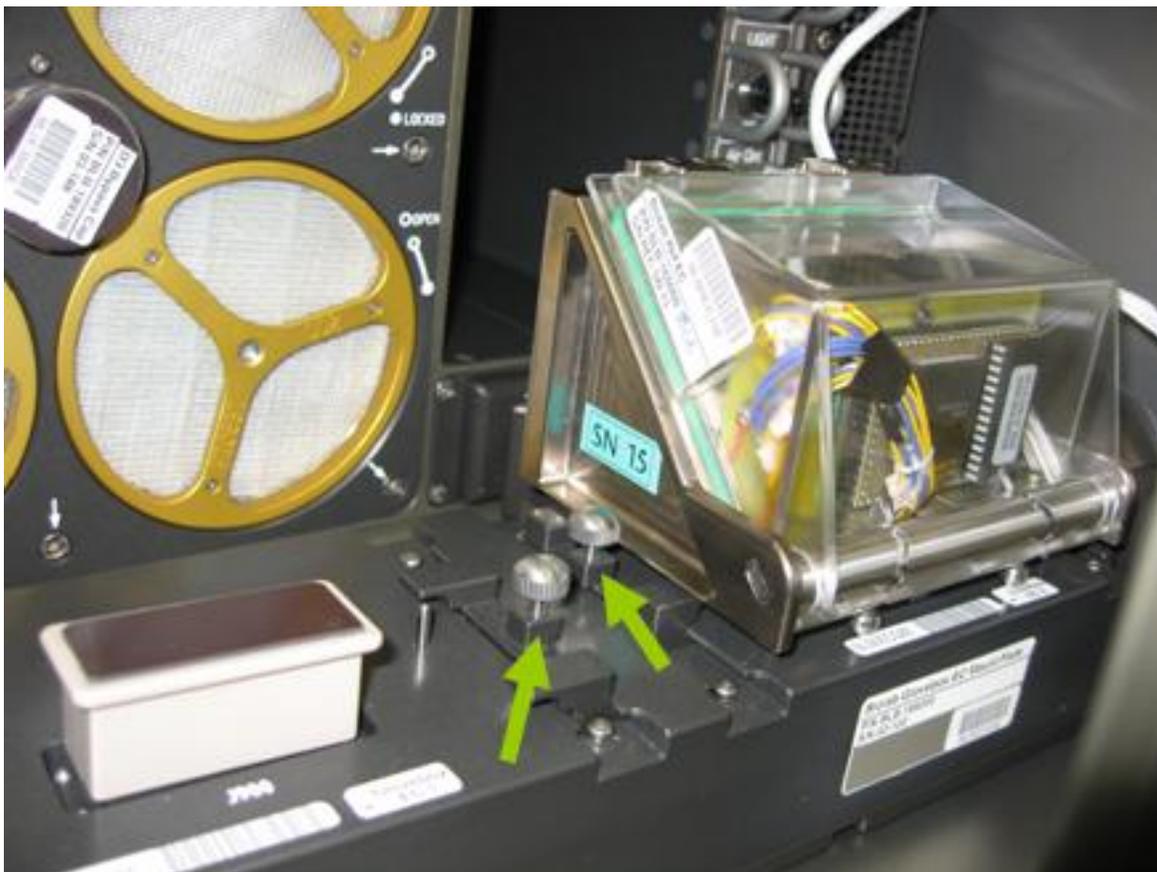


Figure 5. EC Mount Plate locking slides (only two of totally four are shown in this figure: left in open, right in locked position)

Locking slides on both sides of EC (two) → open ↶ and pull to front side (Figure 5)

Remove the protection caps from the EC Mount Plate connectors and stow temporarily inside Working Volume

1.303 BIOLAB GLOVEBOX COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 7 pages

Ref EC REC SN11: BLBREC03E → insert in pins on EC Mount Plate position 2 (right)

Ref EC → connect (by pressing down)

EC Mount Plate locking slides → push to back side to lock EC (Figure 5, right arrow)

5. [REFERENCE EC INSTALLATION ON MOUNT PLATE](#)

Remove the kapton tape protection from the Ref EC connector (REC SN5: BLBREC05E)

Verify by inspection EC connector – not damaged

Ref EC → insert into Glovebox Working Volume through Glovebox Glove Door

Locking slides on both sides of EC (two) → open ↶ and pull to front side

Remove the protection caps from the EC Mount Plate connectors and stow temporarily inside Working Volume

Ref EC REC SN5: BLBREC05E → insert in pins on EC Mount Plate position 1 (left)

Ref EC → connect (by pressing down)

EC Mount Plate locking slide → push to back side to lock EC

6. [GLOVEBOX SPOTLIGHT INSTALLATION](#)



Figure 6. Glovebox Spotlight

1.303 BIOLAB GLOVEBOX COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 7 pages

Glovebox
ICP

- 6.1 [Spotlight ICP Switch De-activation](#)
sw Spotlight → OFF
- 6.2 [Spotlight Installation](#)
Glovebox Spotlight (Figure 6) → Glovebox Working Volume

Remove the protection caps at ICP J305

Stow the protection cap temporarily in Glovebox Working Volume (Cap is magnetic)

Spotlight connector →|← ICP J305 (see Figure 6)

√Spotlight – connected correctly

Spotlight → position in desired location

√Spotlight power line – not disturbing

7. [GLOVEBOX GLOVE DOOR R \(L\) RE-INSTALLATION](#)

Glovebox glove door R (L) → unstow

Verify Glovebox Glove Door R (L) Seal integrity and seat – OK

Bring bottom and top locking pins on Glovebox Glove Door L (R) in most inward position

√Marking "TOP LEFT (TOP RIGHT)" – in upward position

Glovebox Glove Door L (R) → place into Glove Door frame

Glovebox Glove Door L (R) locking pins → lock

√Glovebox Glove Door L (R) locking pins – in locked position

Repeat Step 7 for Glovebox Glove Door R

8. [GLOVEBOX RE-INSERTION INTO MANUAL SECTION](#)

Glovebox → slide-in to inner position, lock (audible click when locked)

Glovebox Nomex Cover → re-install

9. [CLEANUP](#)

Update IMS with stowage location or notify **Col-CC**

ISS ↓ **Col-CC** for task completion

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1.401 BIOLAB HANDLING MECHANISM LAUNCH FIXATIONS DISENGAGEMENT
(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 9 pages

OBJECTIVE:

To prepare and setup Biolab Handling Mechanism during commissioning

Crew:

1 crew member

TOOLS:

Mini Maglite

HM door DZUS screwdriver (P/N BLB-124810)

12-point wrench for LN 29949J06 screws

12 point wrench M6

12 point wrench M8

12 point wrench M4

12 point wrench M5

Hex. socket wrench (size 2.5)

ISS IVA Toolbox:

Drawer 2:

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

Columbus Tool Kit:

Tool Bag 1:

102 mm Extension, 1/4" Drive

Ratchet Wrench, 1/4"

Tool Bag 2:

Driver Handle, 1/4" Drive

2" extension, 1/4" Drive

Tool Bag 3:

1/4" Bit Holder, 1/4" Drive

BIT M6 XZN for Bit Holder 1/4"

M5 (8 mm) Socket, 1/4" Drive

NOTE

This procedure will only be performed during commissioning of Biolab, only.

1. [INSPECTION OF HM WORKING VOLUME](#)

Biolab
(COL1 A2
J1)

Verify sw Rack POWER – OFF

PWS

ISPR A2

ISPR A2

'PDU 1'

1.401 BIOLAB HANDLING MECHANISM LAUNCH FIXATIONS DISENGAGEMENT
(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 9 pages

Verify Main Pwr Bus – OFF

'PDU 2'

Verify Aux Pwr Bus – OFF

COL1 A2
B1

Verify HM Working Volume – no damage, no loose items (visually, through Inspection Window, flashlight)

2. OPENING OF HM DOOR

COL1 A2
(Biolab HM
Drawer)

Quarter turn captive screws on front door (two times five) → push axially and turn 90° ccw (HM Door DZUS Screwdriver), (ref. to fig. 1)



Figure 1. HM Door Locking Screws (blue circles) and Door Closing Mechanism (blue arrow)

Release Door closing mechanism on top of door by turning ↺ to UNLOCK (Driver Handle, 1/4" Drive; M5 (8 mm) Socket, 1/4" Drive), (ref. to fig. 1)

Open HM door by folding downwards

Verify Door seal not damaged, integrity, correct seating, (visually)

3. HM AND AAS LAUNCH/LANDING SCREWS REMOVAL

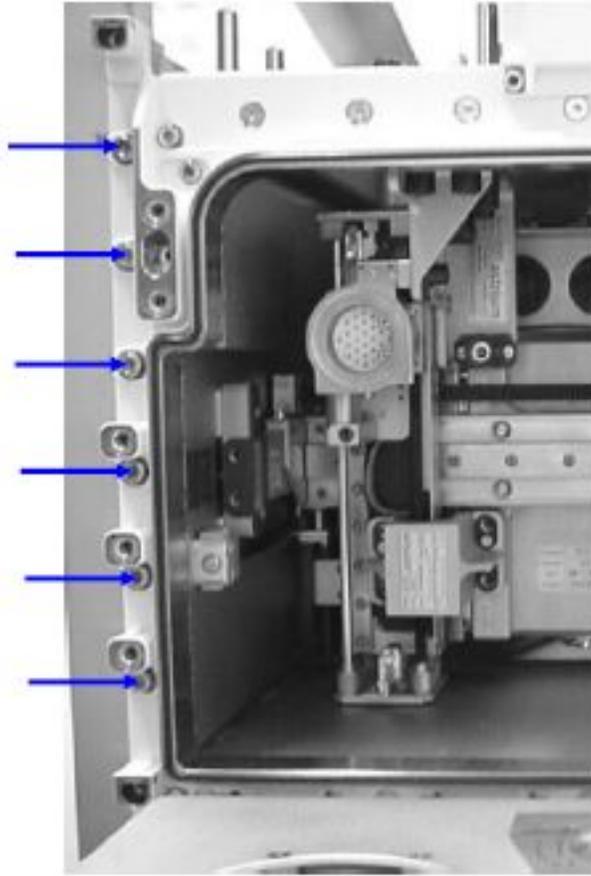


Figure 2. HM Drawer launch front panel screws location (blue arrows), left HM side

Unscrew HM Main Door Launch Screws (twelve), (ref. to fig. 2)

Screw to stowage position at lower left corner of HM door (Ratchet wrench, 1/4"; 102 mm Extension, 1/4" Drive ; 1/4" Bit Holder, 1/4" Drive; BIT M6 XZN for Bit Holder 1/4"), (ref to fig. 3)

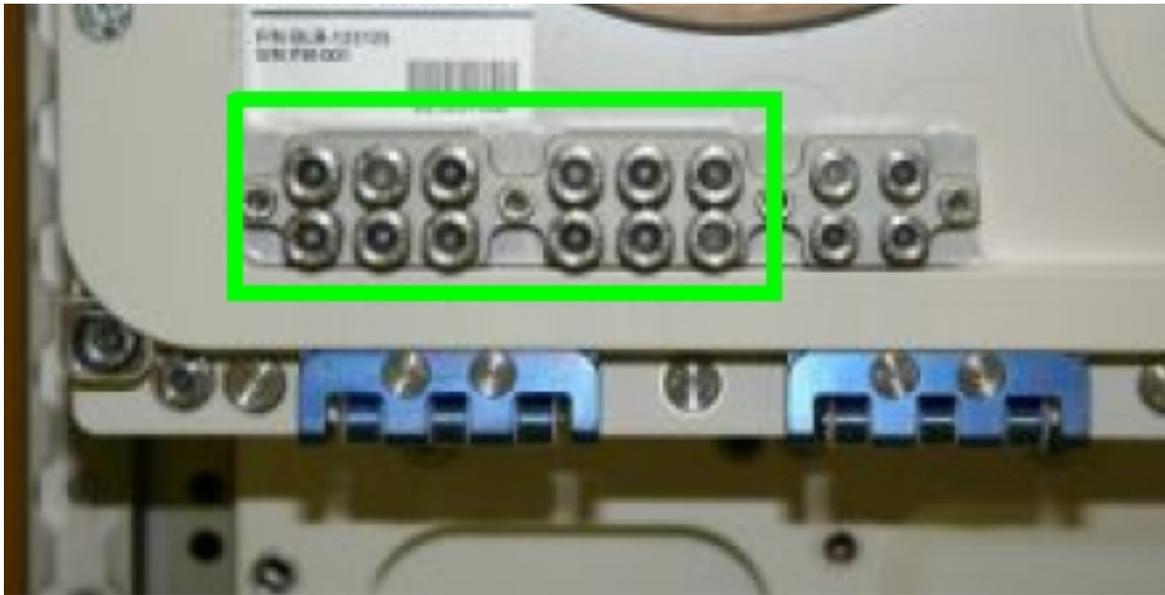


Figure 3. HM Main Door Launch Screws stowage provision for HM front panel screws (green box)

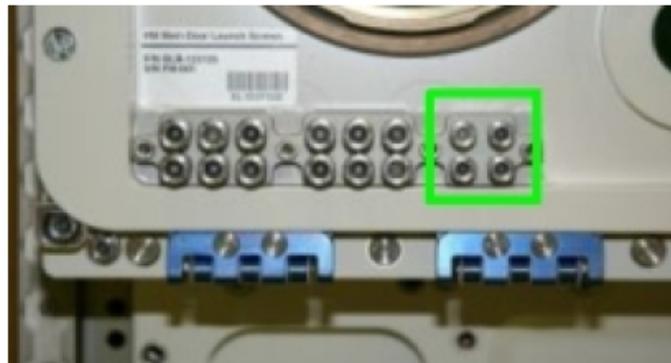
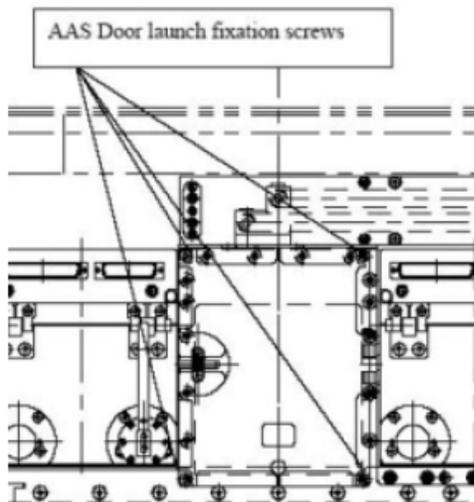


Figure 4. AAS Door Launch Screws location (left) and screws stowage location (right, green box)

Unscrew AAS door launch screws (four), (ref. fig. 4)

Screw AAS door Launch Screws (four) to stowage provision on left bottom corner of HM door (Ratchet wrench, 1/4"; 102 mm Extension, 1/4" Drive; 1/4" Bit Holder, 1/4" Drive; BIT M6 XZN for Bit Holder 1/4"), (ref. fig. 4)

4. REMOVING HM ARM LAUNCH BRACKETS

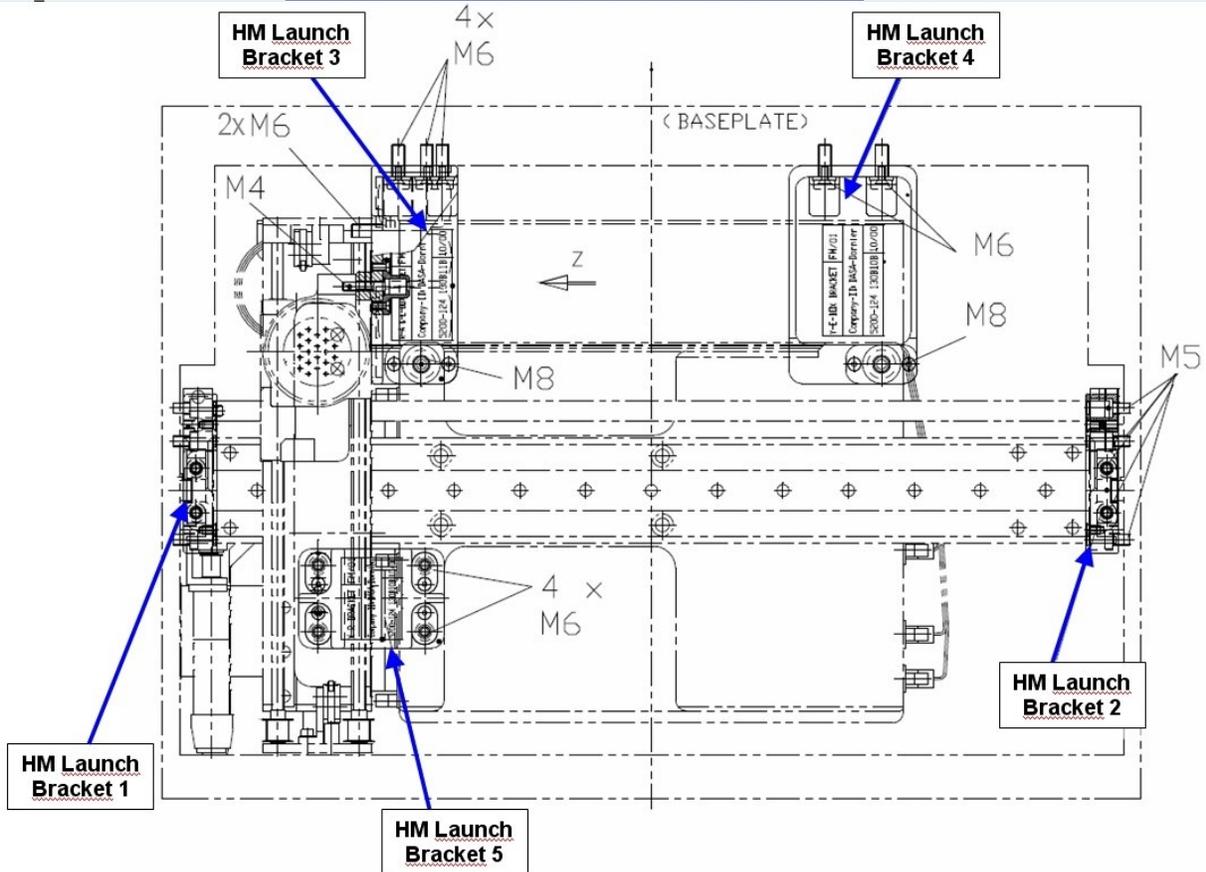


Figure 5. HM Launch Brackets (all, front view)



Figure 6. HM Launch Bracket 5

Remove HM Launch Bracket 5 and tmpry stow (4 captive screws), (12 point wrench for LN 29949J06 screws), (ref. to fig. 5 and 6)



28 AUG 07

Figure 7. HM Launch Bracket 4

Unscrew HM Launch Bracket 4, upper bolts (two) (2 captive screws), (12 point wrench M6), (ref. to fig. 5 and 7)

CAUTION

FOD Hazard. Lower Screw safing splint is non captive.

Remove, tmpy stow Safing pin of lower screw

Unscrew Lower screw (12 point wrench M6)

HM Launch Bracket 4 → remove 1 captive screw, tmpy stow (12 point wrench M8), (ref. to fig. 5)

CAUTION

The HM Belt is very sensitive to damages by contact. Particular care shall be paid when operating in proximity of the HM Belt. Failure to comply may result in hardware damage.

Unscrew HM Launch Bracket 3 (4 captive screws), (12 point wrench M6), (ref. to fig. 5 and 8)

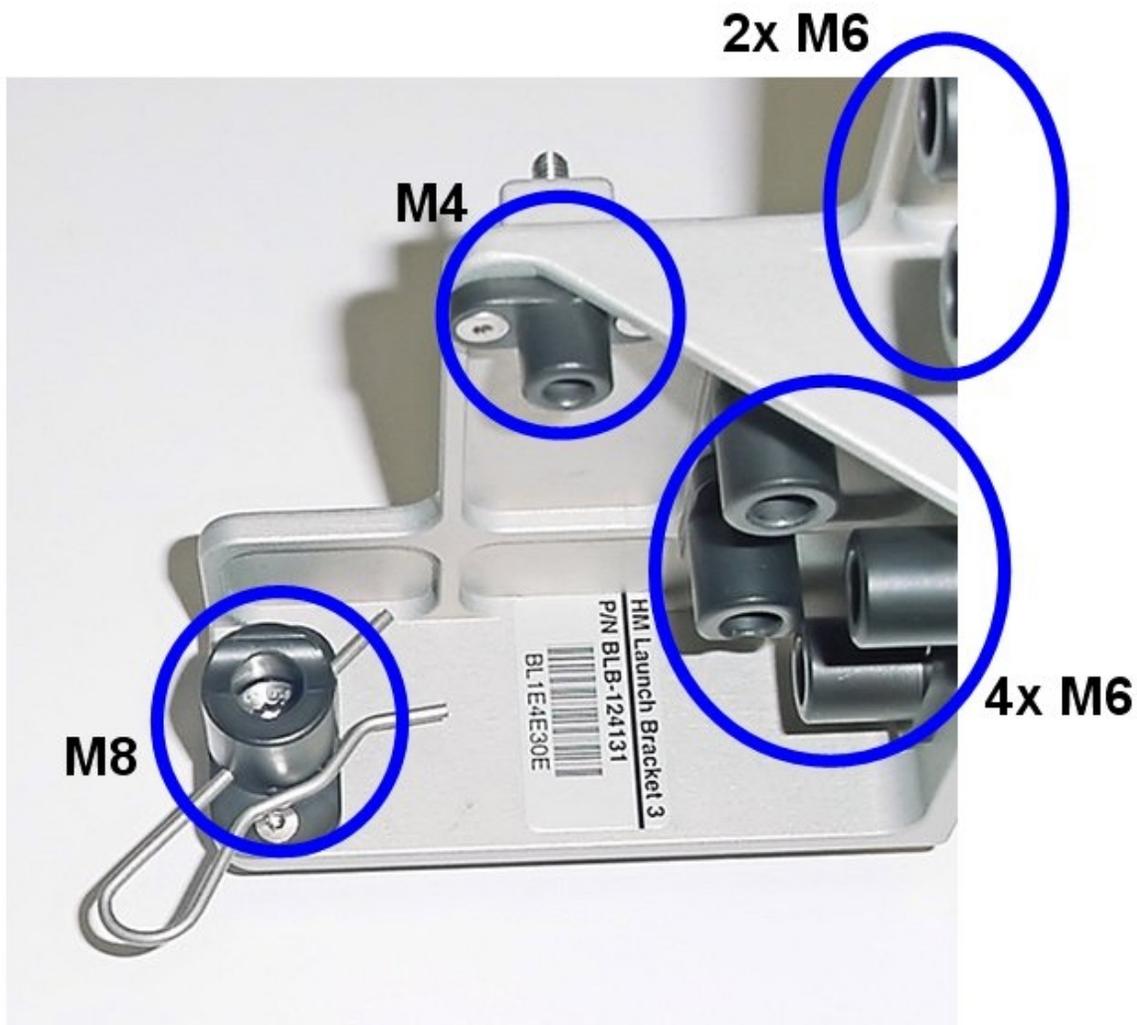


Figure 8. HM Launch Bracket 3

Unscrew HM Launch Bracket 3 (1 captive screw), (12 point wrench M6), (ref. to fig 5 and 9)

Remove from alpha axis HM Launch Bracket 3 (12 point wrench M4)

NOTE

The M8 screw safing splint is tethered to the HM Launch Bracket structure.

Remove Safing splint from M8 screw

Unscrew from Y-E Box HM Launch Bracket 3 (one captive screw), (12 point wrench M8)

Temporarily stow HM Launch Bracket 3



Figure 9. HM Launch Brackets 1 and 2

Remove, tmpy stow HM Launch Bracket 1 (left HM side) (3 captive screws), (12 point wrench M5)

Remove HM Launch Bracket 2 (right HM side) (4 captive screws), (12 point wrench M5), (ref. to fig. 5 and 9)

Stow HM Launch Bracket (all)

5. [HM DOOR CLOSING](#)

Verify HM door seal no damage, correct seating, (visually)

Close HM Door (by folding upwards)

Turn ↻ to LOCK Door closing interface on top of door (ref. to fig. 1)
(Ratchet wrench, 1/4"; 2" Extension 2", 1/4" Drive; M5 (8mm) Socket, 1/4" Drive)

Quarter turn captive screws (twelve), push axially and turn 90° cw to LOCK (HM Door DZUS Screwdriver), (ref. to fig. 1)

6. [CLEANUP](#)

Stow tools and items according to stowage note and update IMS.

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1.402 BIOLAB HANDLING MECHANISM STOWAGE ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 7 pages

OBJECTIVE

To prepare Handling Mechanism for Biolab commissioning check-out and nominal operations

Crew:

1 crew member

DURATION:

15 minutes

TOOLS:

HM door DZUS screwdriver P/N BLB-124810

Biolab HM gripper

ISS IVA Toolbox

Drawer 2:

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

Drawer 3:

4" Common Tip Screwdriver

Columbus Tool Kit:

Tool Bag 3:

M5 (8mm) Socket, 1/4" Drive

M3 (2.5mm) Hex Head Driver, 1/4" Drive

NOTE

This procedure will be only used during commissioning of Biolab, only.

1. [OPENING HM DOOR](#)
Verify sw Rack POWER – OFF

Biolab
(COL1 A2
J1)

COL1 A2
B1

Loosen HM front door 1/4 turn fasteners (ten), (HM Door DZUS
Screwdriver), (ref. fig. 1)



Figure 1. Location of HM door screws and locking mechanism (blue circles)

1.402 BIOLAB HANDLING MECHANISM STOWAGE ITEMS INSTALLATION (ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 7 pages

Release to UNLOCK HM Door Locking mechanism (Driver Handle, 1/4" Drive; M5 (8mm) Socket, 1/4" Drive)

Open HM Door, then visually inspect HM Door seal integrity.

2. HM GRIPPER INSTALLATION

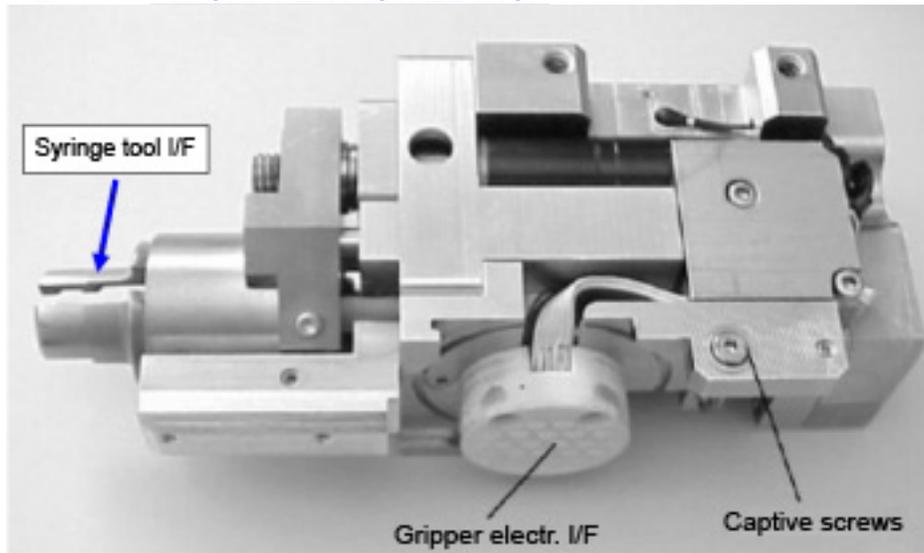


Figure 2. HM Gripper

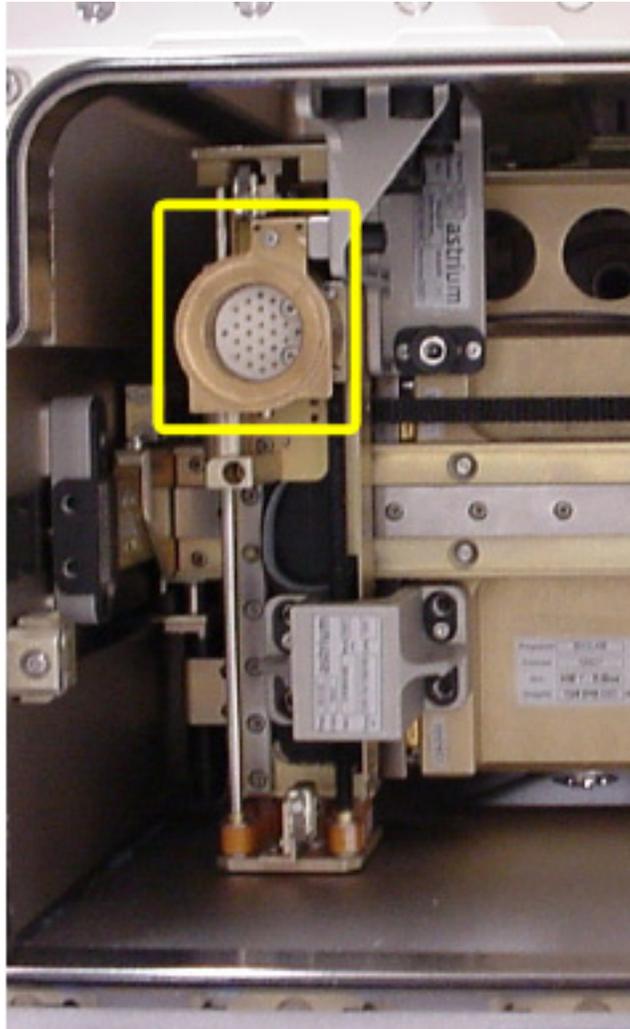


Figure 3. Gripper fixation interface in launch position (shown with HM arm brackets)

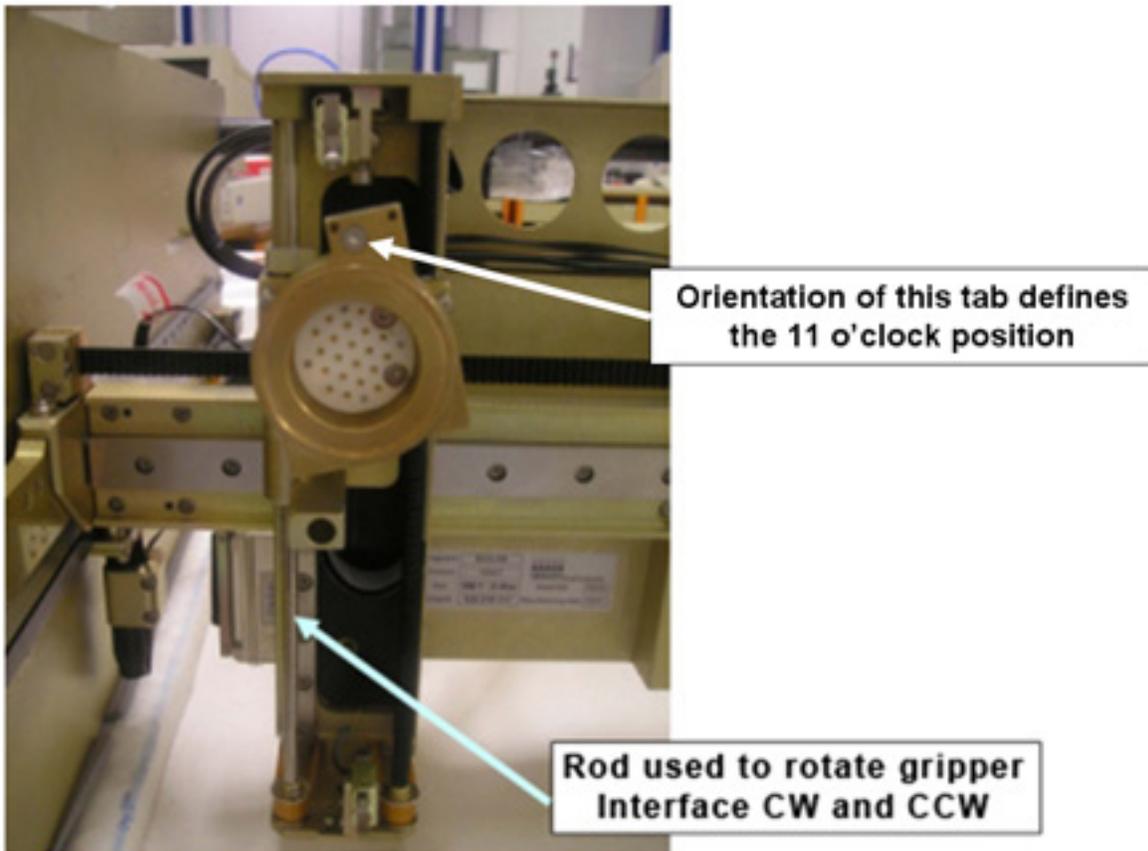


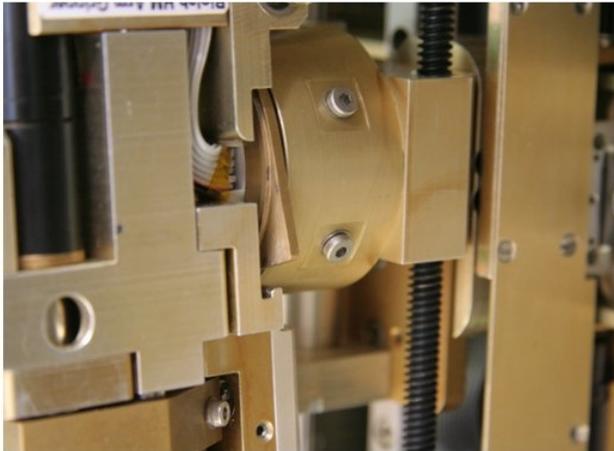
Figure 4. Rod used to rotate Gripper Interface CW and CCW

Using rod shown in Figure 4, rotate Gripper Interface from vertical to 11 o'clock position for Gripper Installation

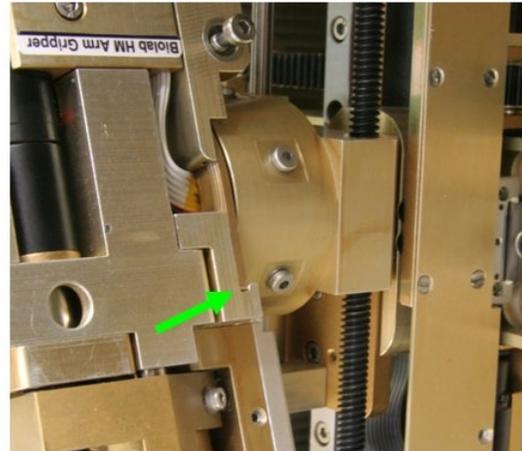
NOTE

Cut-out of gripper must fit into the triangular plate of the gripper fixation.

Install Gripper – Mount Gripper with syringe end pointing down. While holding Interface ring, rotate Gripper CCW approximately 20 deg until Gripper and Interface surfaces are flush.



attached



aligned

Figure 5. Engagement and alignment of Gripper into bayonet fixation

Tighten to 9 in-lbs / 1 Nm Captive fixation screw on right gripper side ((5-32 In-lbs) Trq Driver, 1/4" Drive; M3 (2.5mm) Hex Head Driver 1/4" Drive)

Turn Gripper 10° ↻ into vertical position (gripper downwards by manually turning the left rod (ref. to fig. 6 for final position and orientation of gripper))



Figure 6. HM gripper final position and orientation

CAUTION

Install Gripper - While holding vertical axis arm, push and rotate Gripper CCW approx. 20 deg. until Gripper Interface fits exactly into groove of gripper.

√HM bellows (lever in fig. 7) – rotated forward to closed position (pointing to inside of HM working volume, ref. to label inside HM)

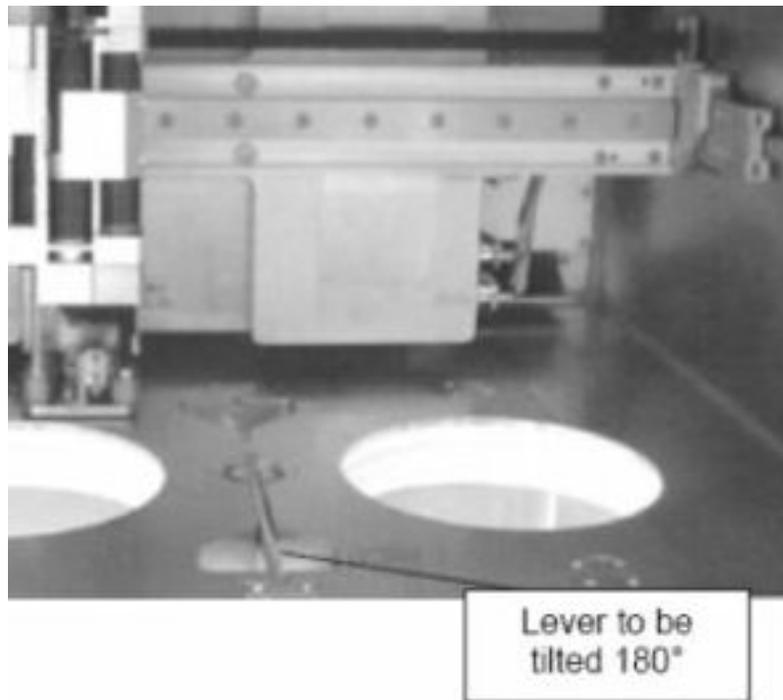


Figure 7. Location of HM bellows (HM/Incubator I/F) lever

3. CLOSING HM DOOR

Close HM door (fold upwards)

Turn HM Door Locking Mechanism to LOCK (Driver Handle, 1/4" Drive;
M5 (8 mm) Socket, 1/4" Drive)

Lock HM front door 1/4 turn fasteners (ten), (HM Door DZUS
Screwdriver), (ref. fig. 1)

Verify HM door seal – seal integrity, correct seating, no damage (visually)

Verify Door closing mechanism and captive screws – LOCK

4. CLEANUP

Stow tools and items according to stowage note and update IMS.

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1.403 BIOLAB HANDLING MECHANISM COMMISSIONING ITEMS INSTALLATION (ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 3 pages

OBJECTIVE:

To prepare AAS for Biolab check-out during commissioning

Crew:

1 crew member

DURATION:

5 min.

ITEMS:

AAS commissioning insert

NOTE

This procedure will be performed during commissioning of Biolab, only.

1. [AAS DOOR OPENING](#)
COL1 A2 J1 Verify sw Rack POWER – OFF
COL1 A2 Open AAS Door
A1
2. [AAS INSERT INSTALLATION](#)
Lever blue knob → press and tilt for about 90° out of the AAS housing



Figure 1. AAS lid, left: brackets in closed position, right: brackets prepared for lid opening

AAS commissioning insert → remove AAS lid (ref. to fig. 1)

Lid of commissioning insert → stow according to stowage note

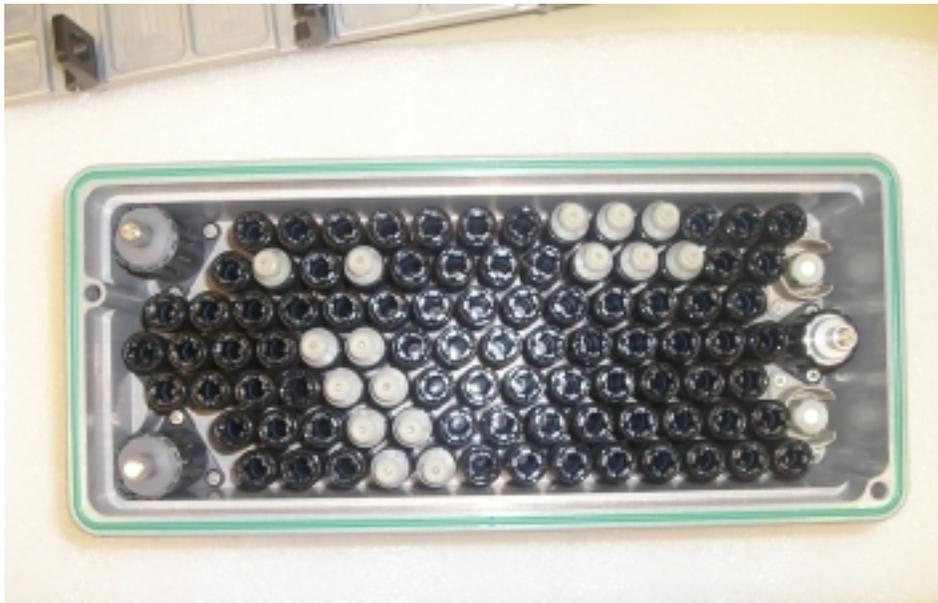


Figure 2. Example view showing correct alignment of syringes and tools in an AAS insert

√AAS commissioning insert – syringes and tools correctly inserted
(visually, ref. to fig. 2)

AAS insert (fig. 3) → insert and slide into AAS housing until mechanical
end-stop



Figure 3. AAS insert insertion into AAS housing

Lever blue knob → press and tilt 90° downwards (inside AAS housing)

Close AAS Door

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1.501 BIOLAB INCUBATOR LAUNCH FIXATIONS DISENGAGEMENT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 14 pages

OBJECTIVE:

To prepare and setup the Incubator during commissioning

Crew:

1 crew member

DURATION:

70 min.

TOOLS:

ISS IVA Toolbox:

Drawer 2:

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

Columbus Tool Kit:

Tool Bag 1:

102 mm Extension, 1/4" Drive

Ratchet Wrench 1/4"

Torque Wrench 4-20 Nm

Tool Bag 3:

1/4" BIT Holder, 1/4" Drive

BIT M6 XZN for Bit Holder 1/4"

M6 (5 mm) Hex Head Driver, 1/4" Drive

M3 (2.5 mm) Hex Head Driver, 1/4" Drive

Torque wrench 4-20 Nm P/N 730/2-50180002

Biolab Specific Tools:

Biolab Incubator Wrench Tool P/N BLB-114450

NOTE

This procedure will only be performed during commissioning of Biolab.

1. REMOVING INC LAUNCH BRACKETS
COL1 A2 J1 Verify sw RACK POWER – OFF

COL1 A2 D1 Inc launch brackets 1, 2, 3, 4 (three, two on left side, bottom one on right side of Inc door) → unscrew (captive screws) (Ratchet Wrench, 1/4"; 1/4" BIT Holder, 1/4" Drive; BIT M6 XZN for Bit Holder 1/4"; for Inc Launch Bracket 4 the Biolab Incubator Wrench Tool is required to remove the top right screw due to interference with TCU door)

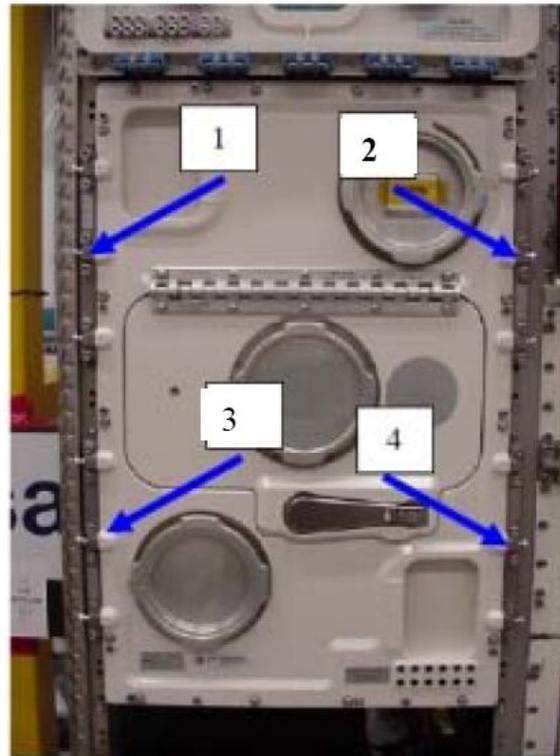


Figure 1. Overview of Inc launch bracket (left all 4 brackets, right: brackets mounted)

Inc launch brackets → stow temporarily



Figure 2. Details of unscrewing bracket 4 (with tool Biolab incubator wrench tool)

Inc launch brackets (four) → stow at ETC Drawer (tbd)

2. INCUBATOR MAIN DOOR LAUNCH & LANDING SCREWS REMOVAL

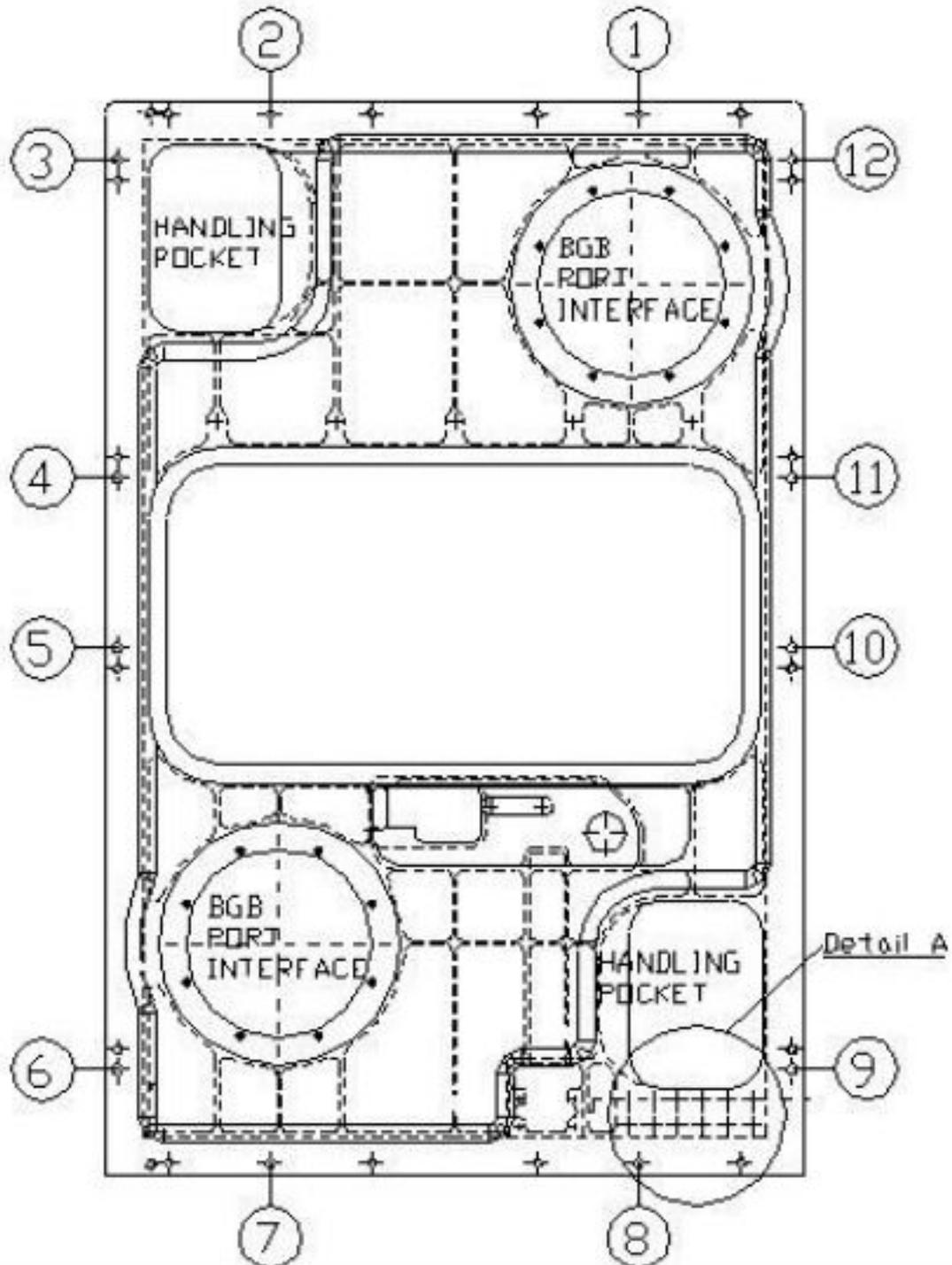


Figure 3. Location of Inc Door launch/landing screws (Detail A refers to fig. 4)



Figure 4. Stowage provision for launch/landing screws on Inc main door

Launch/landing screws (twelve) → completely remove and screw to launch screws storage location (ref. to fig. 3 and 4), (Ratchet Wrench 1/4"; 102 mm Extension, 1/4" Drive; 1/4" BIT Holder, 1/4" Drive; BIT M6 XZN for Bit Holder 1/4") (ref. fig. 3 and 4)

3. DISMOUNTING INC MAIN DOOR

External frame captive screws (sixteen) → unscrew (Ratchet Wrench 1/4"; 102 mm Extension, 1/4" Drive; M6 (5 mm) Hex Head Driver, 1/4" Drive)

CAUTION

Main door needs to be held parallel while moving in the following substep. Don't press. Otherwise guiding pins may be damaged or high friction will require additional power when removing.

Main door → remove (use handling pockets according to fig. 3)

Main door → stow and secure temporarily

Verify Pins of electrical connector (on door bottom) – not bended, not damaged

Visual inspect door seals for damage, correct seating , inetgrity

4. BIOLAB SUPPORT JIGS INSTALLATION

Left and right support jig (ref. to fig. 5 for details) → position on Thermal Housing frame (mind guiding pins "A")

1.501 BIOLAB INCUBATOR LAUNCH FIXATIONS DISENGAGEMENT

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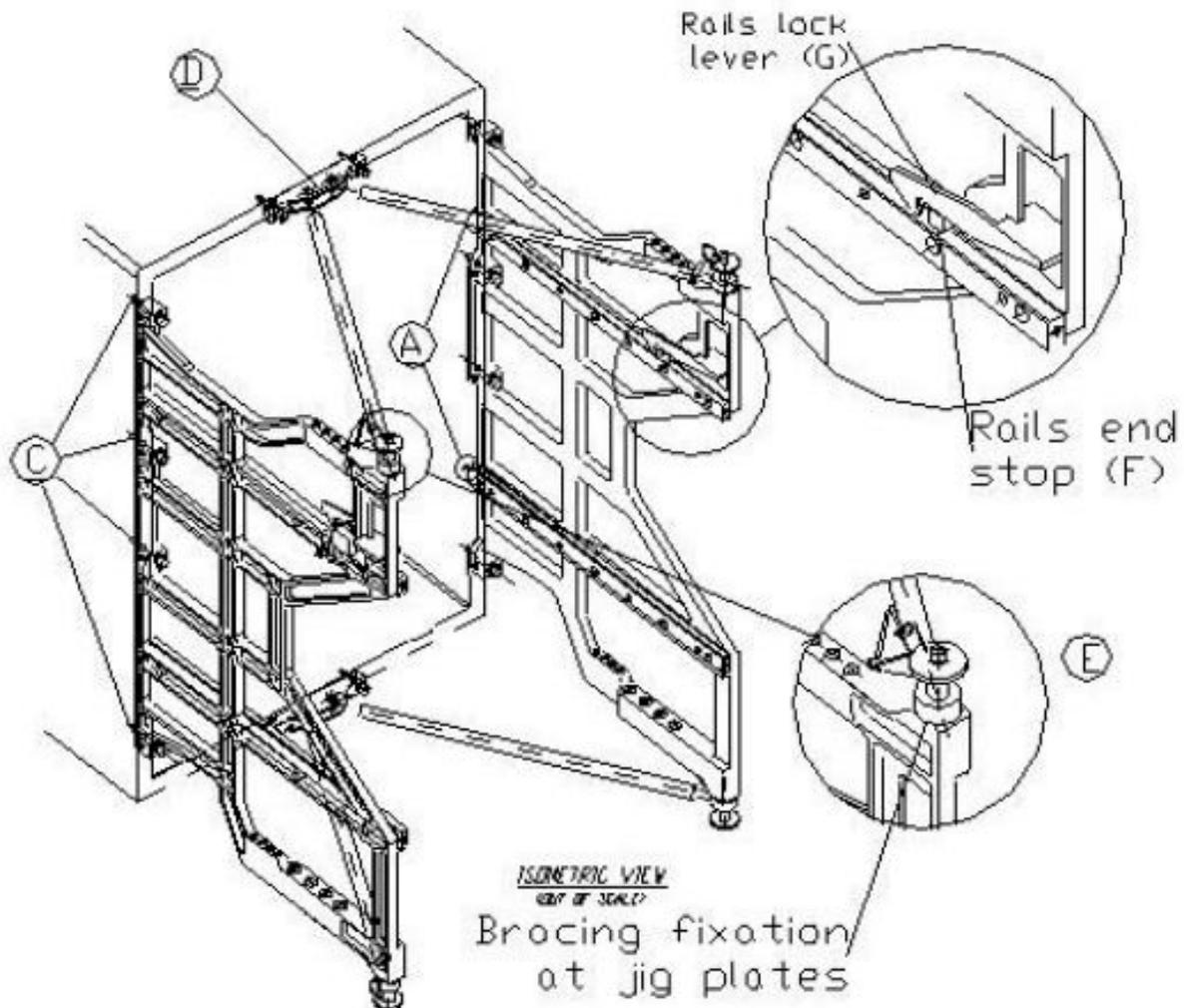


Figure 5. Details of on-orbit support jigs

Left and right support jig captive screws "C" (four per jig) → screw to Thermal Housing frame (torque 5.5 Nm) (Ratchet Wrench 1/4"; Torque Wrench 4-20 Nm; ratchet tool; 1/4" BIT Holder, 1/4" Drive; BIT M6 XZN for Bit Holder 1/4")

Upper and lower jig struts "D" → install and screw (2 screws each) (use self-aligning pin; torque 5.5 Nm) (Ratchet Wrench 1/4"; Torque Wrench 4-20 Nm; ratchet tool; 1/4" BIT Holder, 1/4" Drive; BIT M6 XZN for Bit Holder 1/4") (ref. fig. 5 and 6)

Jig strut flanges → connect to the left and right support jigs (by means of quick-release pins "E")



Figure 6. Detail of Upper Jig Strut (bracing rod) fixation

5. [REMOVING INCUBATOR ROTORS LAUNCH/LANDING SCREWS - STATOR PART](#)

Stator tray fixation screws (eight, four per rotor) → unscrew and stow on Inc bottom parking provisions (Ratchet Wrench 1/4"; 102 mm Extension, 1/4" Drive; 1/4" BIT Holder, 1/4" Drive; BIT M6 XZN for Bit Holder 1/4") (ref. fig. 7 and 8)

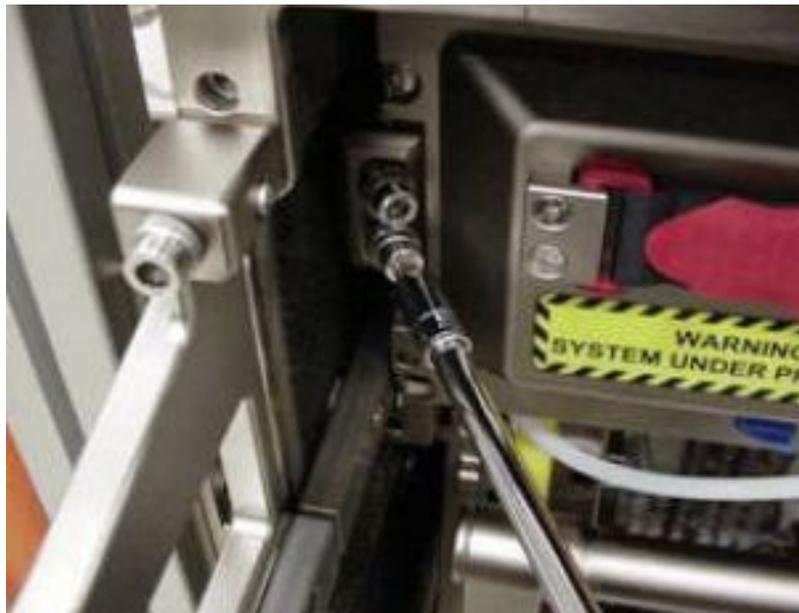


Figure 7. Example of Inc stator fixation screws location

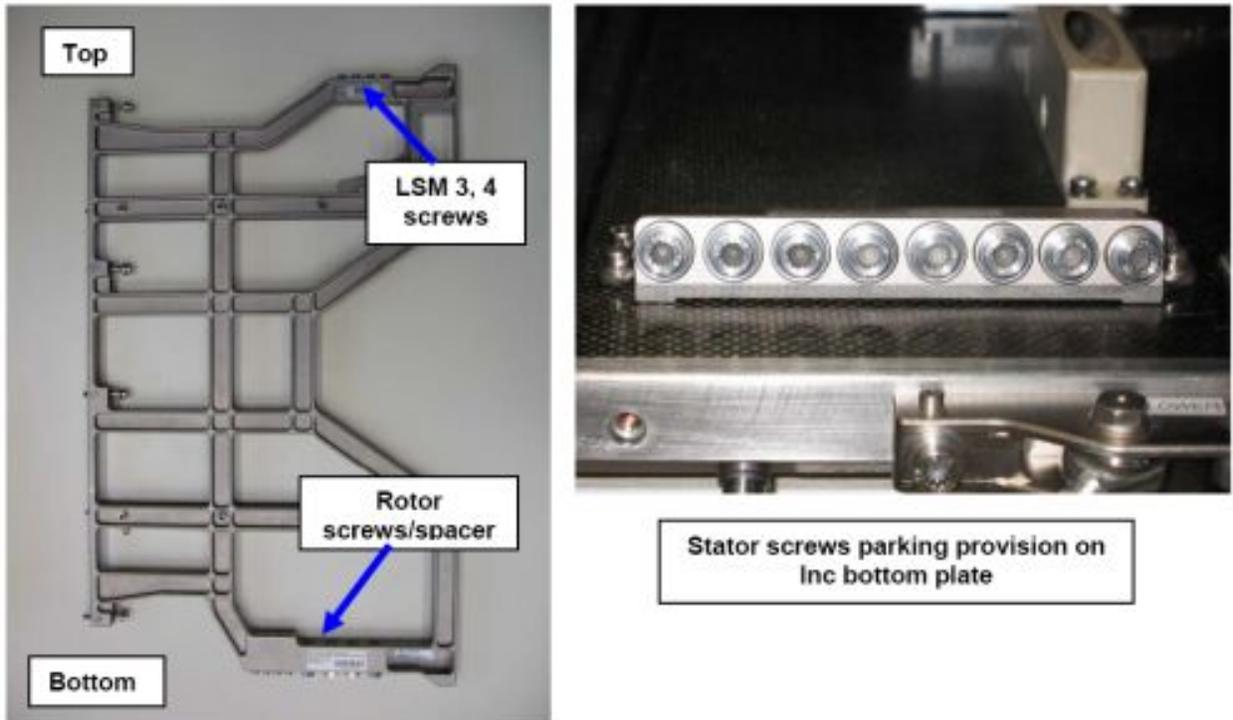


Figure 8. Screws stowage provisions on left support jig and on Inc bottom plate

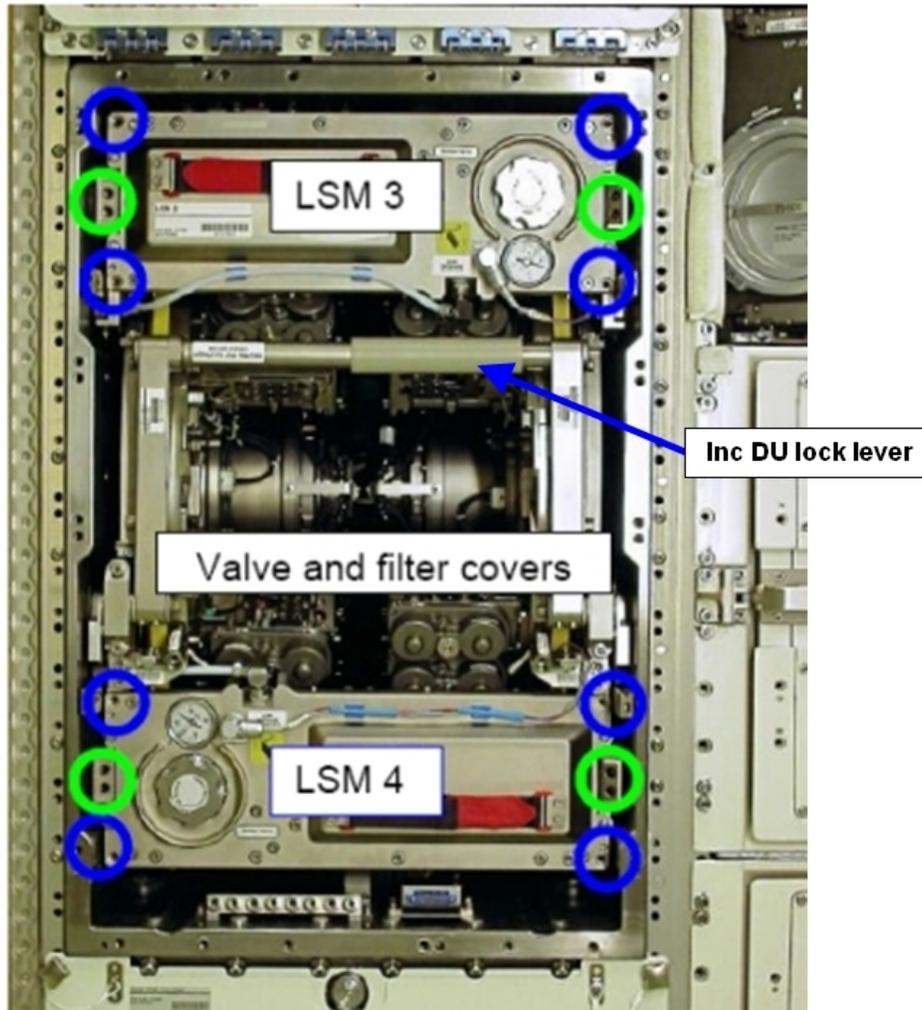


Figure 9. LSM screw locations (blue circles), stator tray locations (green circles) and LSM valve/filter covers

LSM 3, 4 screws (eight, four each LSM) → unscrew and stow at support jig LSM 3, 4 Launch Screws stowage provisions (ref. to fig. 8)

6. EXTRACTING CENTRIFUGES

Before starting to retract centrifuges, ensure proper routing of electrical cables to avoid mechanical interference and pinching with centrifuge rotor.

Inc DU lock lever → pull down

Drive units (both, connected) → extract to end stop (lock lever on support jigs should be engaged)

√Drive units (both, connected) – locked on support jig (by smoothly pushing units backwards, manual lock lever for each side)

Inc DU lock lever → move to upper position

7. REMOVING INCUBATOR ROTORS LAUNCH/LANDING SCREWS - ROTOR PART

NOTE

Rotor launch/landing screw assembly consists of an outer part (= spacer) and an inner screw, ref. to fig. 11.

Rotor launch/landing screws on hollow rotor part (four per rotor) → remove (Ratchet Wrench 1/4"; 102 mm Extension, 1/4" Drive; 1/4" BIT Holder, 1/4" Drive; BIT M6 XZN for Bit Holder 1/4") (ref. fig. 10 and 11)

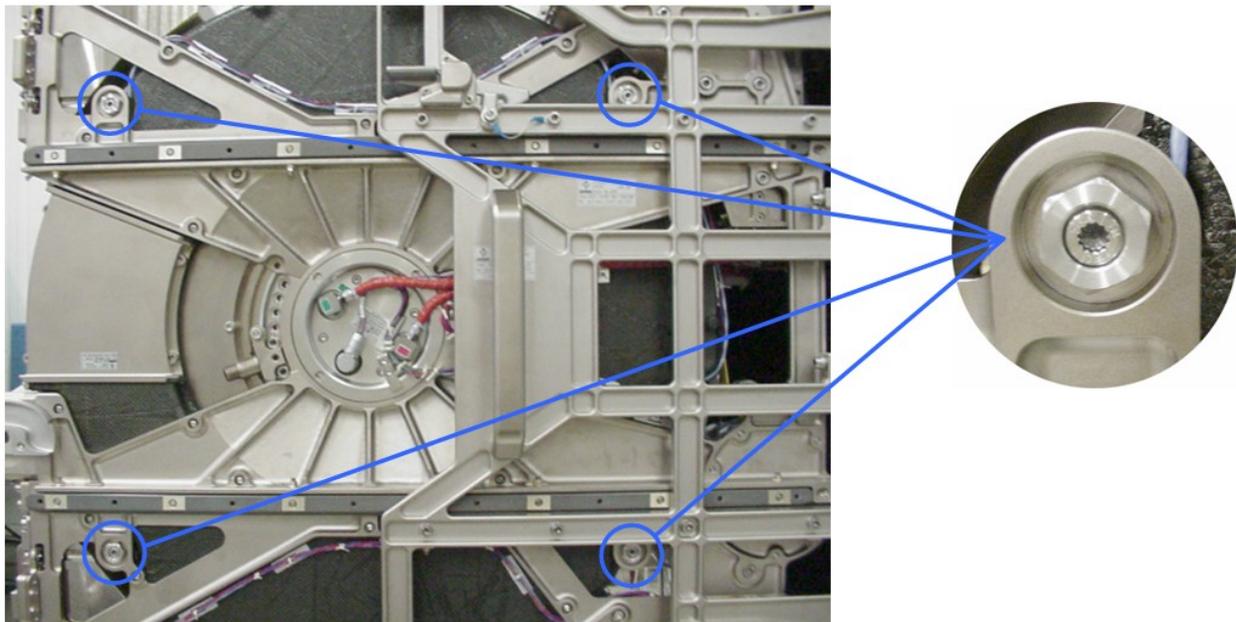


Figure 10. Location of Rotor Launch/Landing Screws

Rotor launch/landing screws (eight, four per rotor) → screw to Inc Launch Rotor Screws stowage provision on support jig (ref. to fig. 8)



Figure 11. Details of complete rotor spacer-screw unit (left), internal fixation screw (middle) and spacer (right)

Spacer (eight, four per rotor) → remove and screw to Inc Launch Rotor Screws stowage provision (ratchet 1/2 inch hex. 16 wrench) (ref. fig. 8)

8. [OPERATING BEARING PRELOAD LEVER](#)

NOTE

Preload lever fixation screw is not captive. Don't remove totally.
Potential FOD hazard.

Right drive Preload lever fixation screw → unscrew (screw, un-secured)

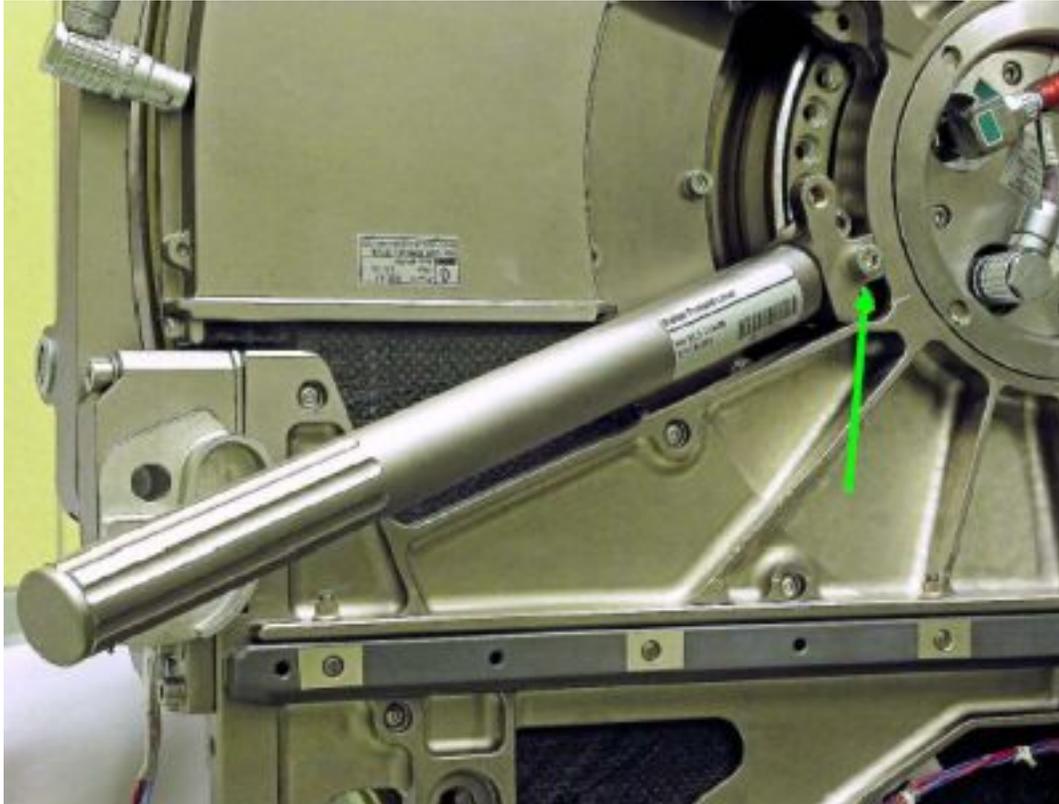


Figure 12. Preload lever mounted to right centrifuge drive (green arrow indicates lever fixation screw)

Preload lever rod → install (ref. to fig. 12)

Preload lever → rotate towards bottom of incubator

Preload lever fixation screw → secure (torque 5.5 Nm)

Preload lever rod → remove

Perform above substeps of step 8 for left drive (Preload lever rod to be moved upwards)

Preload lever rod → store

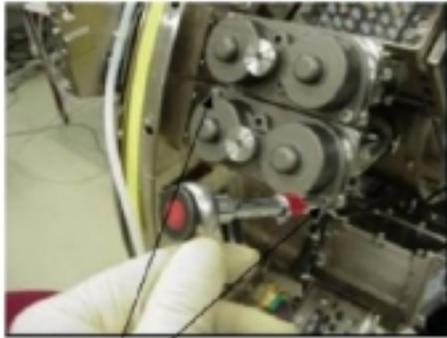
9. [REMOVING VALVE AND FILTER LAUNCH SCREWS](#)

On Col-CC GO

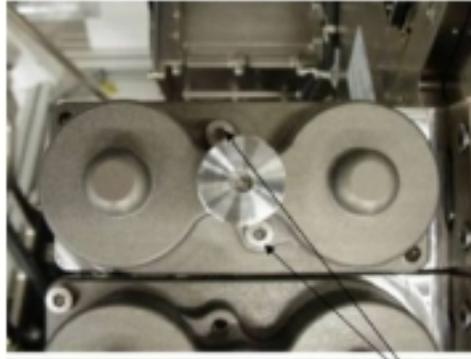
Right centrifuge rotor → rotate until one LSM Filter lid is accessible (ref. to fig. 13)

Right rotor → lock manually (In Rotor Manual Lock)

LSM Filter lid screws (two) → unscrew and stow on LSM Filter lid according to fig. 13 (Ratchet Wrench 1/4"; 102 mm Extension, 1/4" Drive, M3 (2.5 mm) Hex Head Driver, 1/4" Drive)



Launch/landing screws



Storage position

Figure 13. Location of launch/landing screws (left) and their stowage location (right)

Inc Rotor Manual Lock → release

Repeat above substeps for the remaining LSM Filter lids (five) of right rotor

Repeat all above substeps for the left centrifuge rotor LSM Filter lids (six)

10. [REINSERTING THE CENTRIFUGES](#)

√Both drive units – still connected to each other



Figure 14. Detail of jig locking mechanism (blue arrow)

Jig manual locks (one per rotor) → release (ref. to fig. 14, for left: push centrifuge to the left, for right: push centrifuge to the left)

Inc DU lock lever → pull down

Check proper routing of electrical cables to avoid mechanical interference and pinching.

Centrifuges (both, connected) → push inside incubator

Inc DU Lock lever → move upwards (remaining distance until final drives' insertion will be covered by this activity)

√Both centrifuge rotors – free to rotate (manual verification)

11. REMOVING BIOLAB SUPPORT JIGS

Jig struts to the left and right jigs → disconnect (by means of the quick-release pins "E", ref. to [fig. 5](#))

Top and bottom jig strut flanges "D" → unscrew and remove (Ratchet Wrench 1/4"; 1/4" BIT Holder, 1/4" Drive; BIT M6 XZN for Bit Holder 1/4")

Left and right jig support captive screws "C" → unscrew from Thermal Housing frame (tools as above)

Left and right support jig → remove

Stow support jigs and jig struts (four parts)

1.501 BIOLAB INCUBATOR LAUNCH FIXATIONS DISENGAGEMENT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 14 of 14 pages

Update IMS with stowage location of support jigs and jig struts or report to COL-CC

12. MOUNTING INC MAIN DOOR

Verify visually seals of incubator main door – not damaged, integrity, correct seating

Incubator main door → place in position (use guiding pins and respective holes to correctly mate the connector)

External frame captive screws (sixteen) → fasten in staggered row to an intermediate torque of 22 in-lbs / 2.5 Nm (10-50 in-lbs) Trq Wrench, 1/4" Drive; 102 mm Extension, 1/4" Drive; M6 (5 mm) Hex Head Driver, 1/4" Drive)

Frame screws (sixteen) → fasten in staggered row to final torque of 49 in-lbs / 5.5 Nm (same tools as above)

13. CLEANUP

Stow tools and items according to stowage note and update IMS.

1.502 BIOLAB INCUBATOR COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 5 pages

OBJECTIVE:

To install experiment containers to support check-out of incubator

Crew:

1 crew member

DURATION

15 min.

TOOLS:

ISS IVA Toolbox:

Mini-Maglite P/N 528-20084-5

Columbus IVA Tool Kit:

Flat screwdriver

Biolab Specific Tools:

None

ITEMS:

Commissioning Reference Containers (twelve) with the S/Ns:

SN 2, SN 3, SN 6, SN 7, SN 9, SN 10, SN 12, SN 14, SN 16, SN 17, SN 18, SN 21

NOTE

This procedure will only be performed during commissioning of Biolab.

1. INSPECTION OF INCUBATOR WORKING VOLUME
COL1 A2 J1 Verify Biolab Rack POWER sw – OFF



Figure 1. Experiment Container (EC) Exchange Door

COL1 A2
C1

Lid of observation window → open (press latch and turn until removable, ref. to fig. 1)

Observation window lid → stow intermediately

Verify either rotor – no rotation

Verify Incubator Working Volume – no loose parts, no damages (through EC exchange window, use flashlight)

Observation window lid → reinstall

2. [EC EXCHANGE DOOR OPENING - MANUAL OVERRIDE](#)

Door mechanical latch → press to release door lever

1.502 BIOLAB INCUBATOR COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 5 pages



Figure 2. Details of EC Door Manual Override (right picture shows mechanism covered in hole)

Manual override latch → push to the right (flat screwdriver)

Door lever → rotate 90° ↻

EC exchange door → open (fold upwards)

Verify EC exchange door seal – correct seating, integrity, no damage (visually)

3. INSERTING EC'S INTO INCUBATOR

WARNING

Pay attention to rotor(s) while moving. Potential risk of squashing/pinching fingers etc.

Starting with rotor B:

Rotor → turn manually until first free EC location is accessible

Table 1. Reference list for ECs and rotor positions

Rotor	Rotor position	EC number
A	A1	REC SN 9
A	A2	REC SN 18
A	A3	REC SN 10
A	A4	REC SN 3
A	A5	REC SN 2
A	A6	REC SN 12
B	B1	REC SN 17
B	B2	REC SN 16
B	B3	REC SN 7
B	B4	REC SN 6
B	B5	REC SN 21
B	B6	REC SN 14



Figure 3. Details of Rotor Manual Lock (green arrow)

Rotor Manual Lock → lock to stator tray (ref. to fig. 3)

Open EC locking I/F by pressing the small release button/lever (EC I/F lever will be moved out of the rotor circumference allowing the final (about 90°) manual tilting by crew)

Open EC I/F lever

If necessary

| Kapton tape protection of EC connector → remove and trash

NOTE

In the following it is absolutely necessary to insert the correct EC to the respective position on the rotor with reference to table 1. Otherwise Biolab database is not able to identify the EC by checking the EC internal Identity Chip.

Experiment container → slide into rotor's guiding interface (ref. to fig. 4)

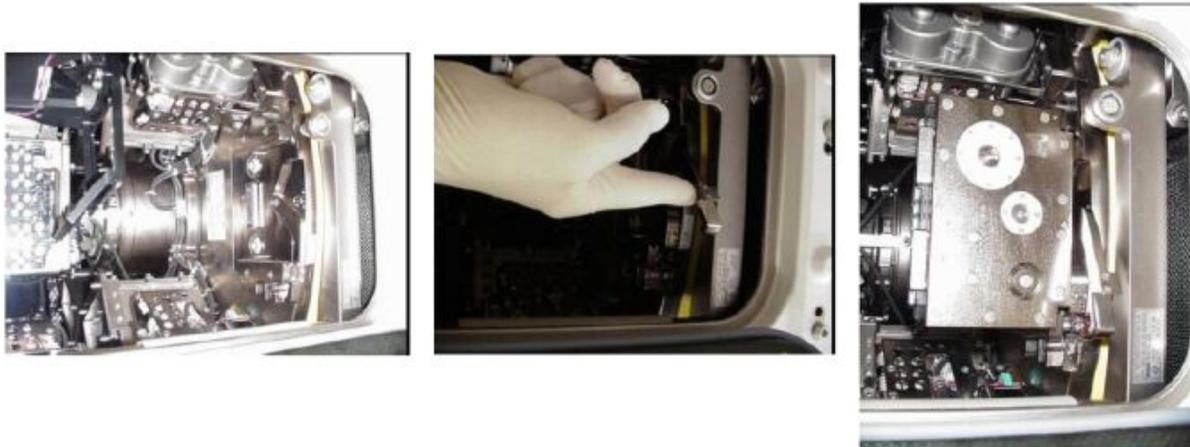


Figure 4. Details of EC insertion into centrifuge drive. Left: empty EC location center, middle: EC interface lever, right: EC inserted

EC I/F lever → push towards rotor to lock the lever to its lock mechanism (indicated by click-stop)

√Locking lever – fixed (by pulling lever without pressing the lever itself)

Rotor Manual Lock → release

Repeat substeps of step 3 for the remaining EC locations on left rotor, then for right rotor

4. EC EXCHANGE DOOR CLOSING

Verify EC door sealing – correct seating, integrity, no damage (visually)

EC exchange door → close (fold downwards)

Door lever → rotate 90° ↶

Door lever → engage at mechanical latch

5. CLEANUP

Stow tools and items according to stowage note and update IMS.

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1.601 BIOLAB ANALYSIS INSTRUMENTS COMMISSIONING ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 16 pages

OBJECTIVE:

Commissioning items have to be installed before check-out of analysis instruments after mechanical setup of Biolab

Crew:

1 crew member

DURATION:

35 min.

TOOLS:

ISS IVA Toolbox

Drawer 2:

4" Ext, 3/8" Drive

9/64" Hex Head, 3/8" Drive

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

Columbus Tool Kit

Tool Bag 1

Ratchet Wrench, 1/4" Drive

102 mm Extension, 1/4" Drive

Torque Wrench 4-20 Nm

Ratchet Tool, 1/4" Drive

Tool Bag 2

10" Extension, 1/4" Drive

6" Extension, 1/4" Drive

Ratchet Wrench, 3/8"

Tool Bag 3:

M5 (8 mm) socket, 1/4" Drive

M6 (10 mm) socket, 1/4" Drive

M3 (2.5mm) Hex Head Driver, 1/4" Drive

M4 (3mm) Hex Head Driver, 1/4" Drive

Adaptor 1/4" Female to 3/8" Male

1/4" Bit Holder, 1/4" Drive

Bit M6 XZN for Bit Holder 1/4"

Biolab Specific Tool:

HM Door Screwdriver P/N BLB-124810

HM QD Installation Tool P/N BLB-124820

ITEMS:

MS Commissioning D&C Cassette

SP Commissioning D&C Cassette

D&C Cassette handle
Spectrophotometer Lamp Assembly

NOTE

The following procedure will be performed during commissioning of Biolab, only.

Caution and warning label on the instruments (with respect to cold/warm surfaces) can be ignored when performing this procedure (Biolab has not been powered)!

1. GLOVEBOX RETRACTION INSIDE MANUAL SECTION
COL1 A2 J1 Verify sw RACK POWER – OFF
PWS ISPR A2
ISPR A2
'PDU 1'
Verify Main Pwr Bus – OFF
'PDU 2'
Verify Aux Pwr Bus – OFF

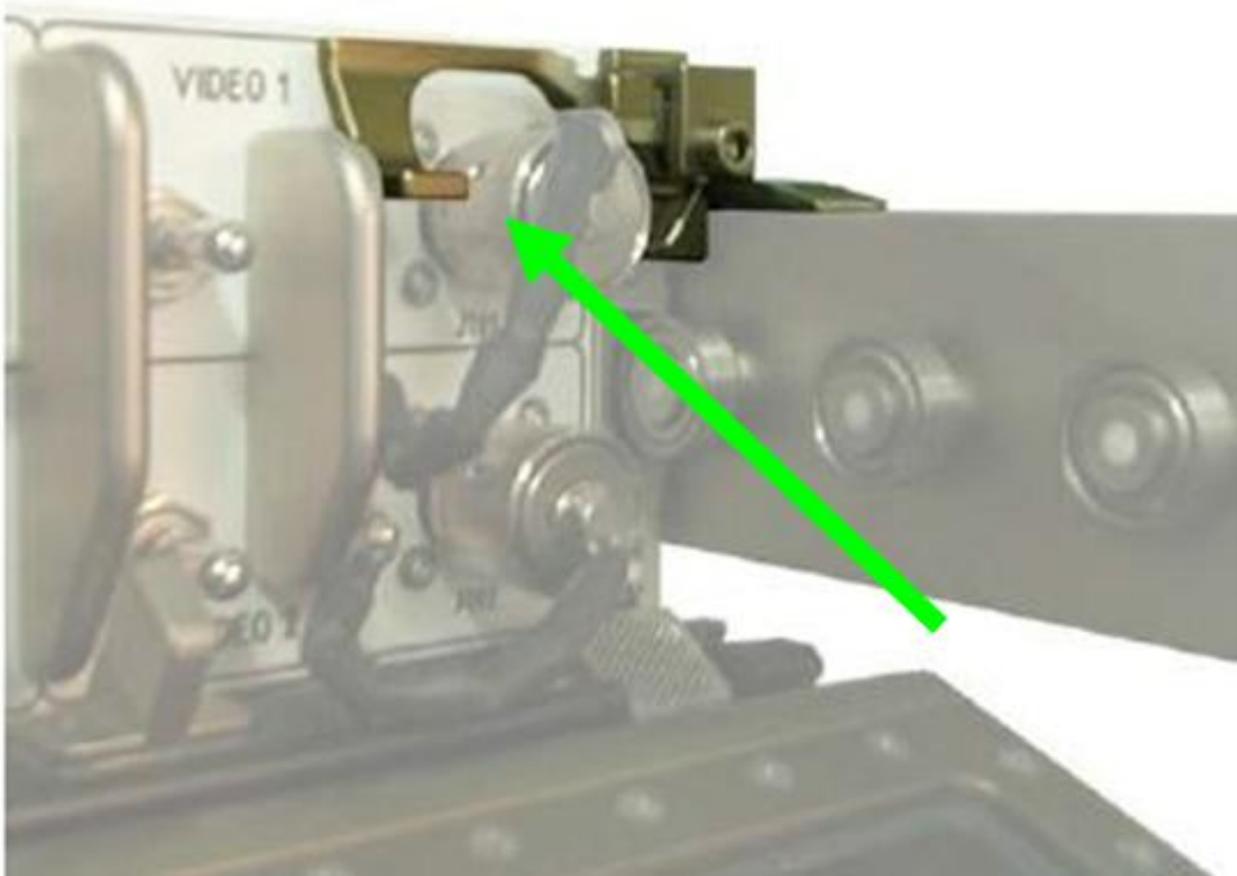


Figure 1. Glovebox Cantilever for Release and Lock

COL1 A2
B2 Glovebox → slide-in to inner position, lock (audible click when locked)

2. EXTRACTING HM DRAWER

COL1 A2
(HM/ATCS
drawer) 2.1 WCL Disconnection
Water tube lever screws M4 (two) → loosen with Allen Wrench
(top of rack left, to allow bending of the water tubes, fig. 2)

NOTE
In the nex substep the Water QD mounting tool can be used if preferred by crew.

Water QDs of the HM drawer (two) → disconnect

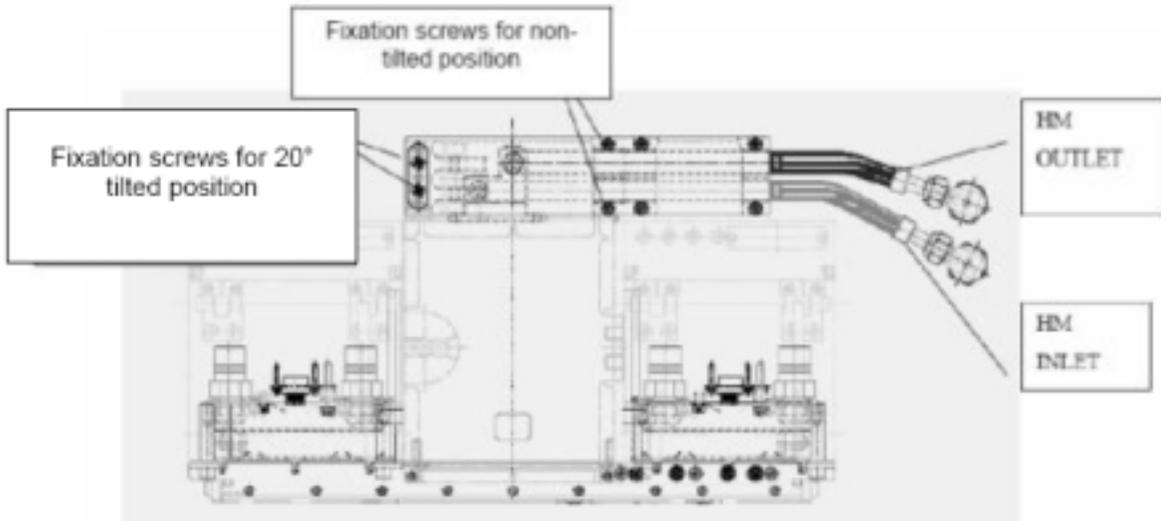


Figure 2. Location of HM WCL tubes and fixation screws

Left screws on the Water QD Front plane above left side of AAS (two, M4, captive)(ref. to fig. 2) → screw to torque 21 in-lbs / 2.4 Nm ((5-35 in-lbs) Trq Driver, 1/4" Drive; M4 (3mm) Hex Head Driver, 1/4" Drive)

√Water QDs (two) – no leakage

Use wipes if leaking and inform Col-CC

2.2 HM Drawer Door Opening



Figure 3. Location of quarter turns and closing mechanism (blue circles/ arrow)

Quarter turn captive screws (2 x 5) → turn 90° to UNLOCK
(push axially and turn) (4" Common Tip Screwdriver) (ref. to fig. 3)

Locking mechanism → release to UNLOCK (M5 (8 mm) Socket, 1/4" Drive)

HM front door → open

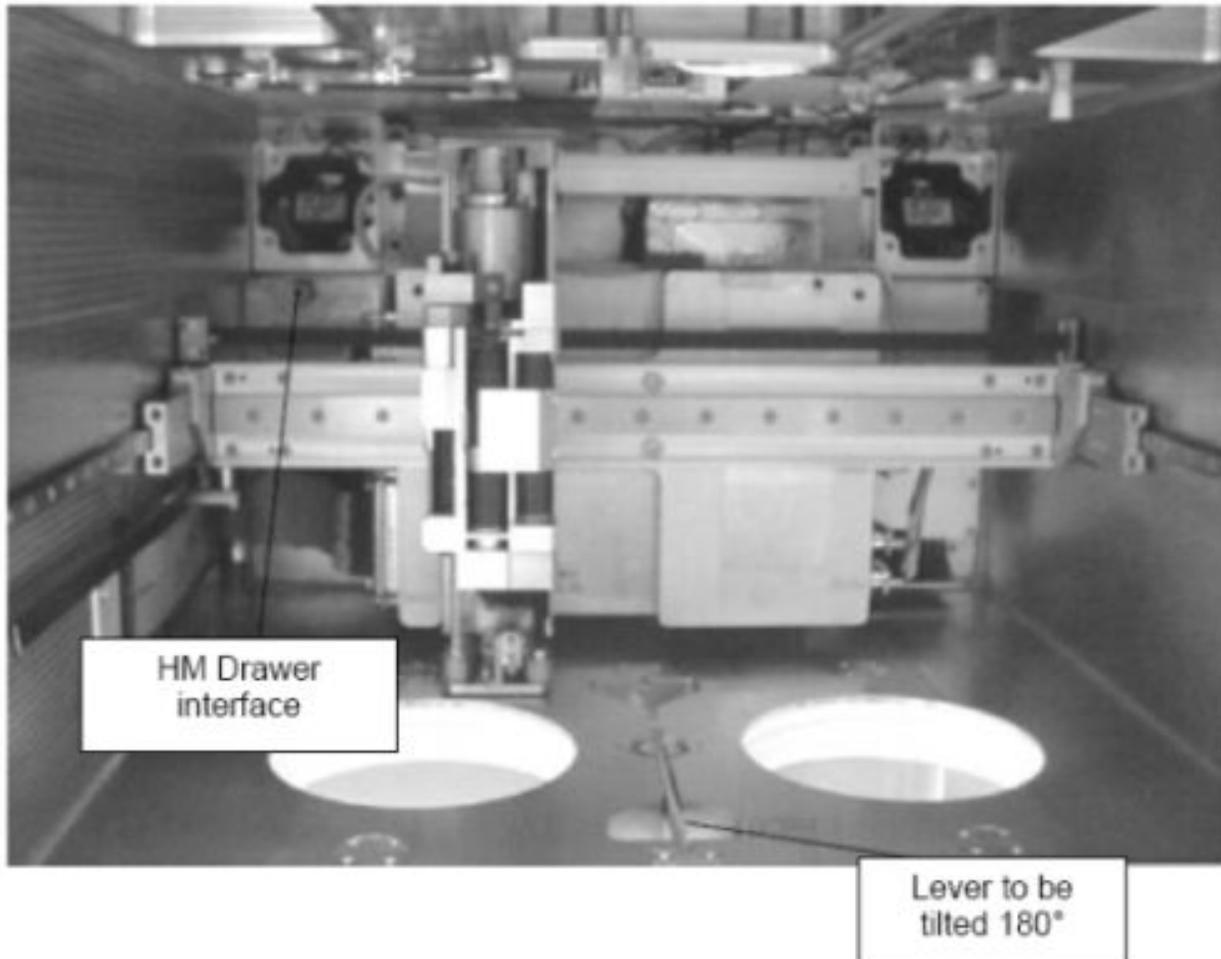


Figure 4. HM seal interface (bellow lever)

NOTE

In the next substep HM arm can be moved backwards manually if required.

HM incubator seal interface lever (fig. 4) → rotate by 180° to open bellows to front position

2.3 [HM Drawer Extraction](#)

Check **CoI-CC** for power status of Handling Mechanism

Corner captive screws (four) → loosen (12 point wrench, to remove front plate fixation from rack post)

Access left side of HM working volume

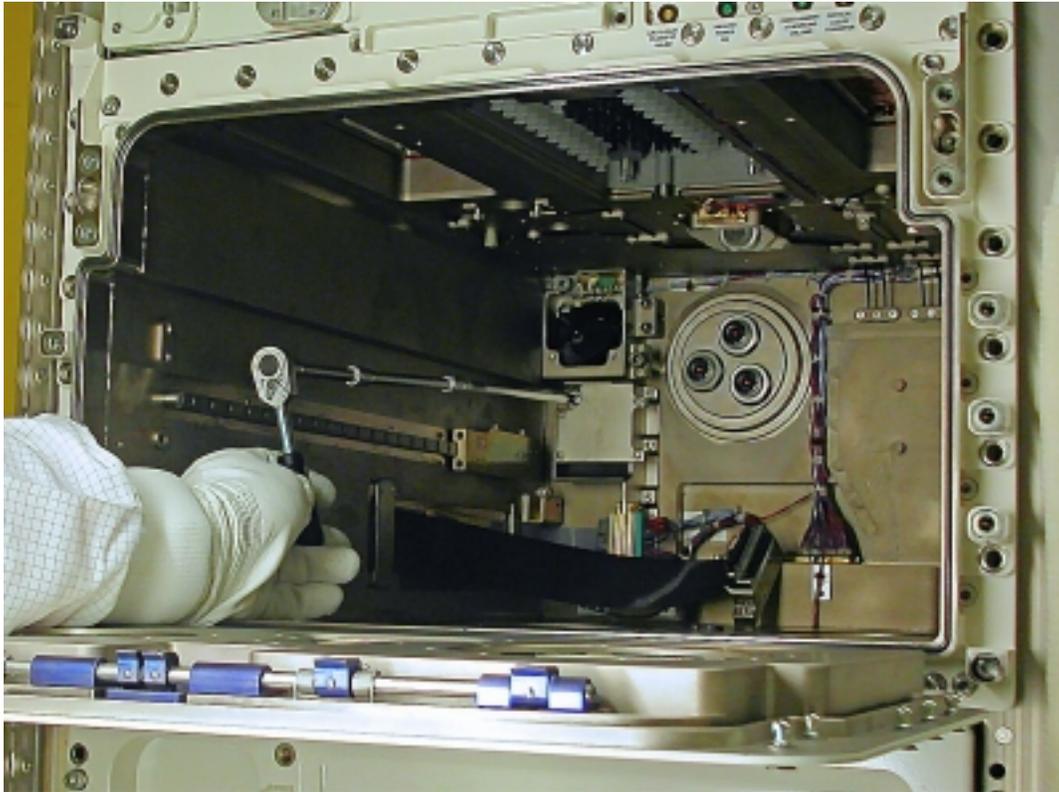


Figure 5. Tool with extension to loosen screw at backwall of HM drawer

√All corner screws of HMD front panel (four) – released completely from the rack front posts

Thread (on back of drawer, left side, fig. 5) → unscrew to disengage HM drawer from rack structure (metric wrench, size 10 mm, and Extension 700 mm)

HM drawer → move forward by about 20 mm

HM drawer front door → close via locking mechanism (M5 (8mm) Socket, 1/4" Drive)

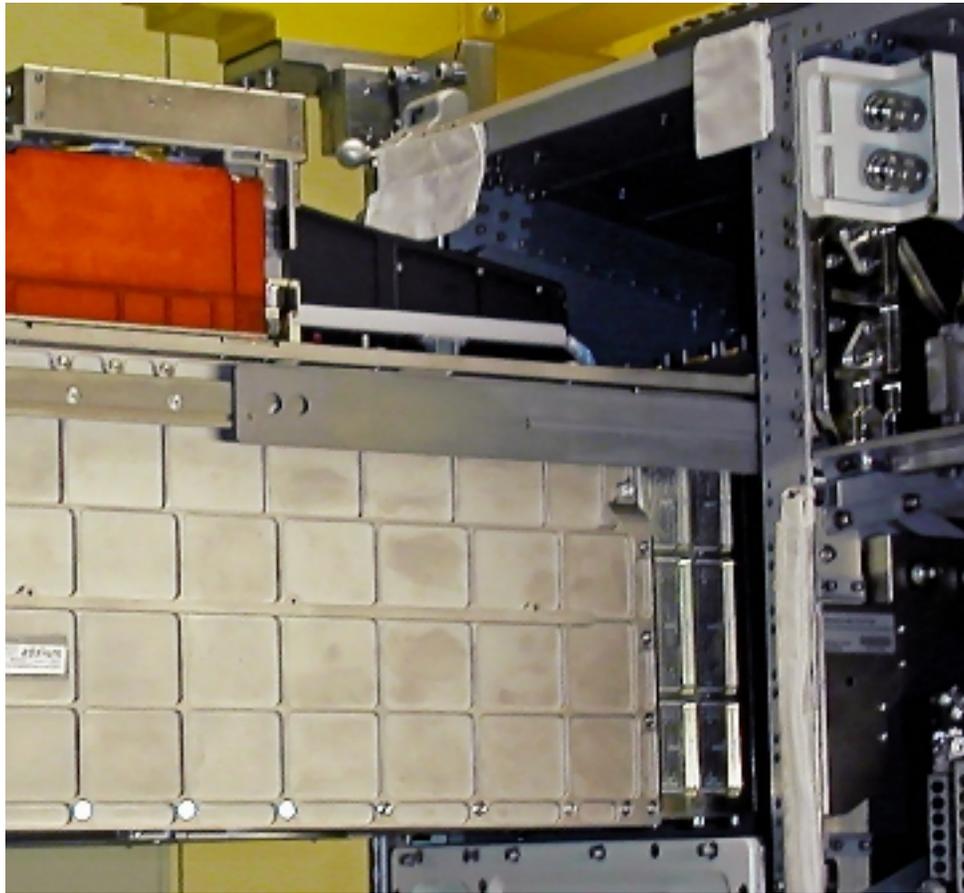


Figure 6. HM drawer with end stop levers (on both sides)

HM drawer → slide out of rack (by pulling at front panel rear side, until telescopic rails limit with mechanical end-stop) (ref. to fig. 6)

3. MICROSCOPE (MS) ACCESS DOOR DISMOUNTING

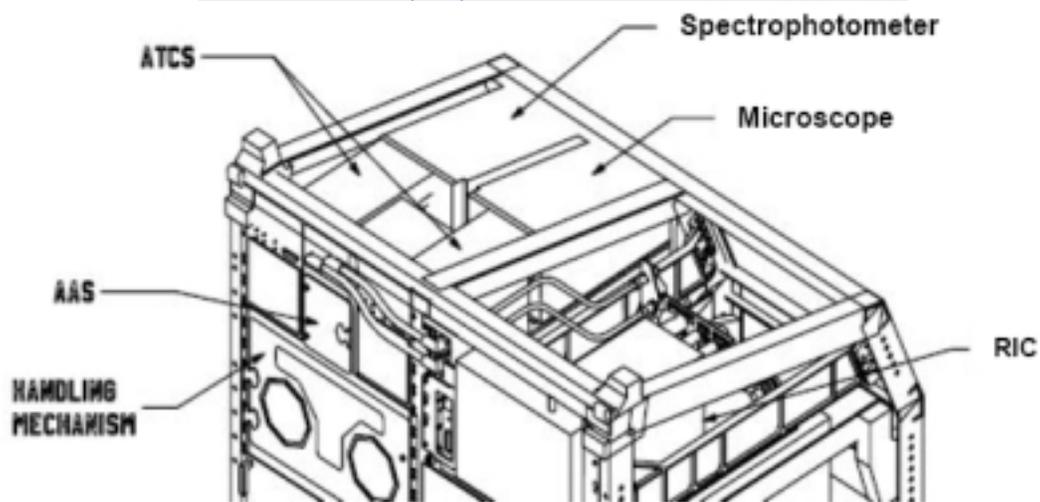


Figure 7. Location of microscope and spectrophotometer on top of HM drawer

Cassette access door bolts (seven, captive) → unscrew (2.5 X 57 mm Folding L-Wrench)

Cassette access door → dismount (ref. to fig. 7)

Cassette access door → store (temporarily)

cassette retainer → unscrew (11 turns ↻ 3 X 62 mm Folding L-Wrench)

4. INSTALLING MS CASSETTE

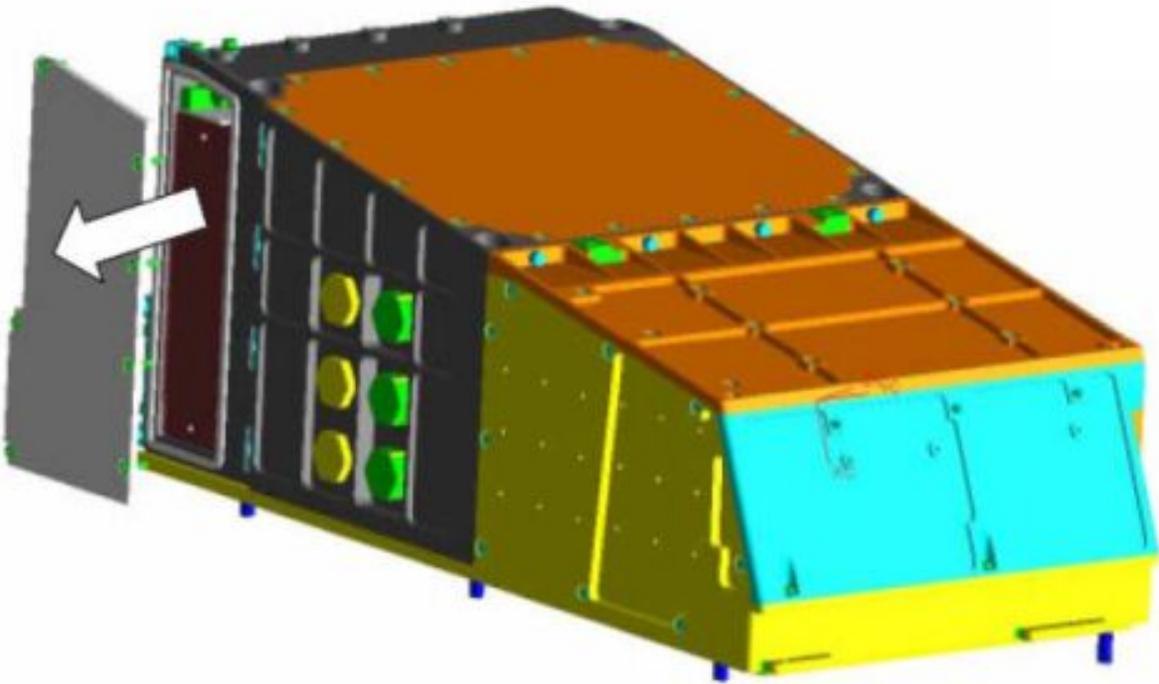


Figure 8. Microscope with location of cassette access door

Cassette (MSAT cassette CI 131399, S/N TBD → remove from transport container

Visually verify MS cassette - integrity, no damage

Cassette handle → install on the rear of the cassette (ref. to fig. 8)

Cassette handle screws (two) → tighten (↻, torque 18 in-lbs / 2 Nm) (3 X 62 mm Folding L-Wrench, (5-35 in-lbs) Trq Driver, 1/4" Drive)

Cassette → insert until end-stop (horizontally)



Figure 9. Cassette handle

Cassette handle screws (two) → unscrew

Cassette handle (fig. 9) → remove and store into transport container

Cassette retainer → tighten to 10 in-lbs / 1.1 Nm (3 X 62 mm Folding L-Wrench; (5-35 in-lbs) Trq Driver, 1/4" Drive)

5. [MS CASSETTE ACCESS DOOR CLOSING](#)

Visually verify cassette access door seal - integrity, damage, seat

Cassette access door → install

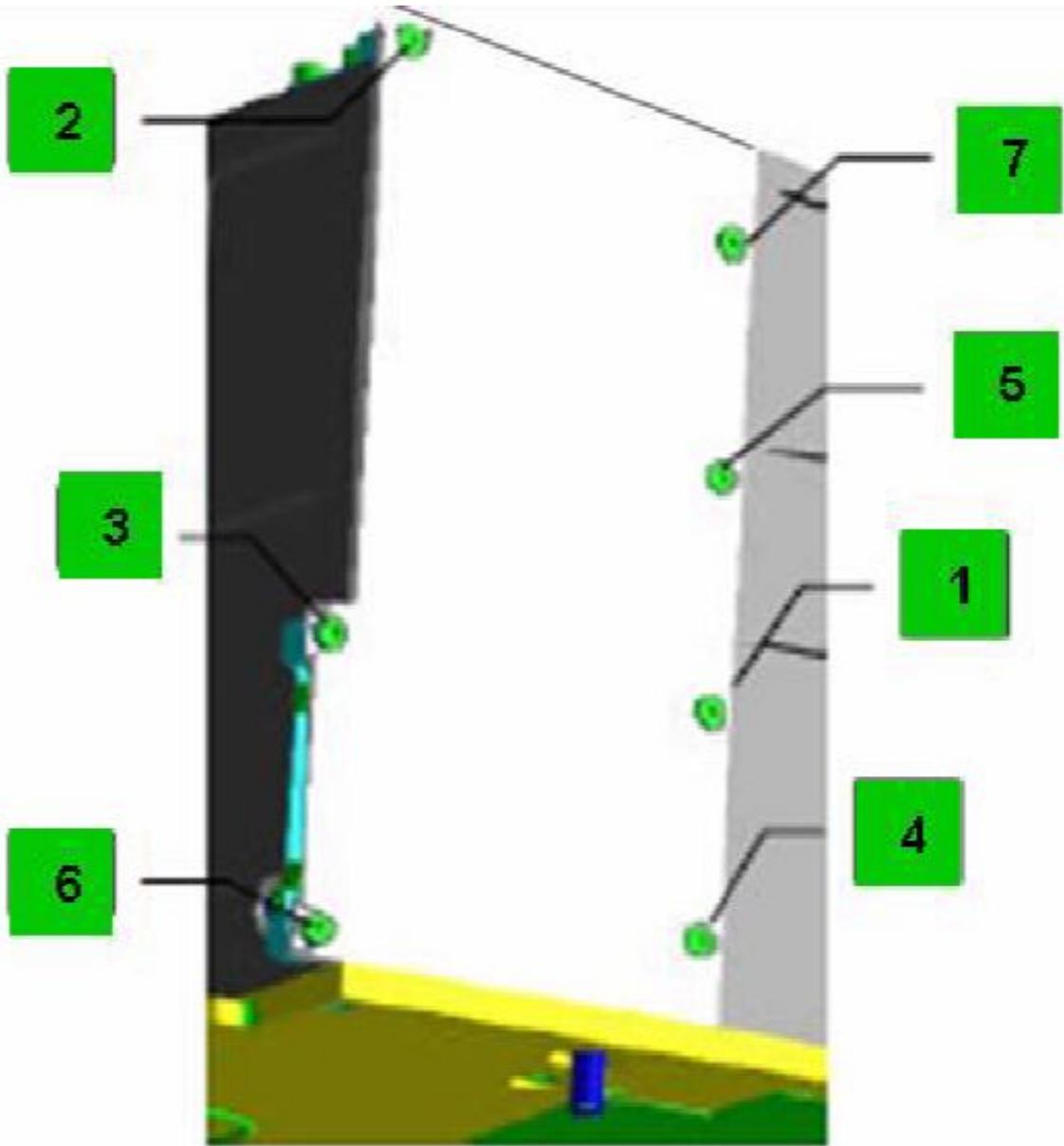


Figure 10. MS cassette door bolts

Cassette access door bolts (seven) → tighten (↻, torque sequentially to 10 in-lbs / 1.1 Nm) (2 X 51 mm Folding L-Wrench; (5-35 in-lbs) Trq Driver, 1/4" Drive)

6. [SPECTROPHOTOMETER CASSETTE ACCESS DOOR OPENING](#)

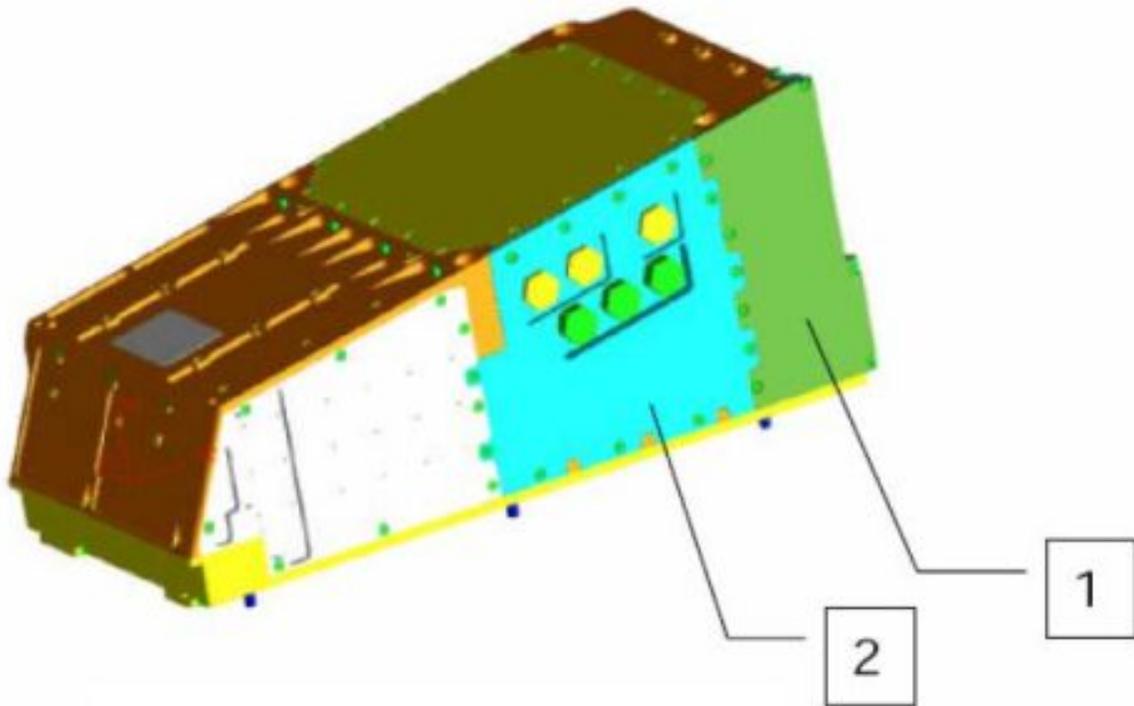


Figure 11. Spectrophotometer with cassette access door (1) and Spectrophotometer Lamp Assembly access door (2)

Cassette access door bolts (seven) → unscrew (2.5 X 57 mm Folding L-Wrench)

Access door (fig. 11) → dismount

Cassette access door → stow temporarily

Cassette retainer → unscrew (11 turns↷) (3 X 62 mm Folding L-Wrench)

7. [SPECTROPHOTOMETER CASSETTE INSTALLATION](#)

Cassette → remove from transport container

FTC protection cap → remove and trash

Visually verify Spectrophotometer - integrity, no damage

Cassette handle → install on the rear of the cassette

Cassette handle screws (two) → tighten (↷, torque 18 in-lbs / 2 Nm) (3 X 62 mm Folding L-Wrench; (5-35 in-lbs) Trq Driver, 1/4" Drive)

Cassette → insert until end-stop (carefully, horizontally)

Cassette handle screws (two) → unscrew

Cassette handle → remove and store into transport container

Cassette retainer → tighten to 10 in-lbs / 1.1 Nm (3 X 62 mm Folding L-Wrench; (5-35 in-lbs) Trq Driver, 1/4" Drive)

8. [SPECTROPHOTOMETER CASSETTE ACCESS DOOR CLOSING](#)
Visually verify Cassette access door seal - integrity, damage, seat

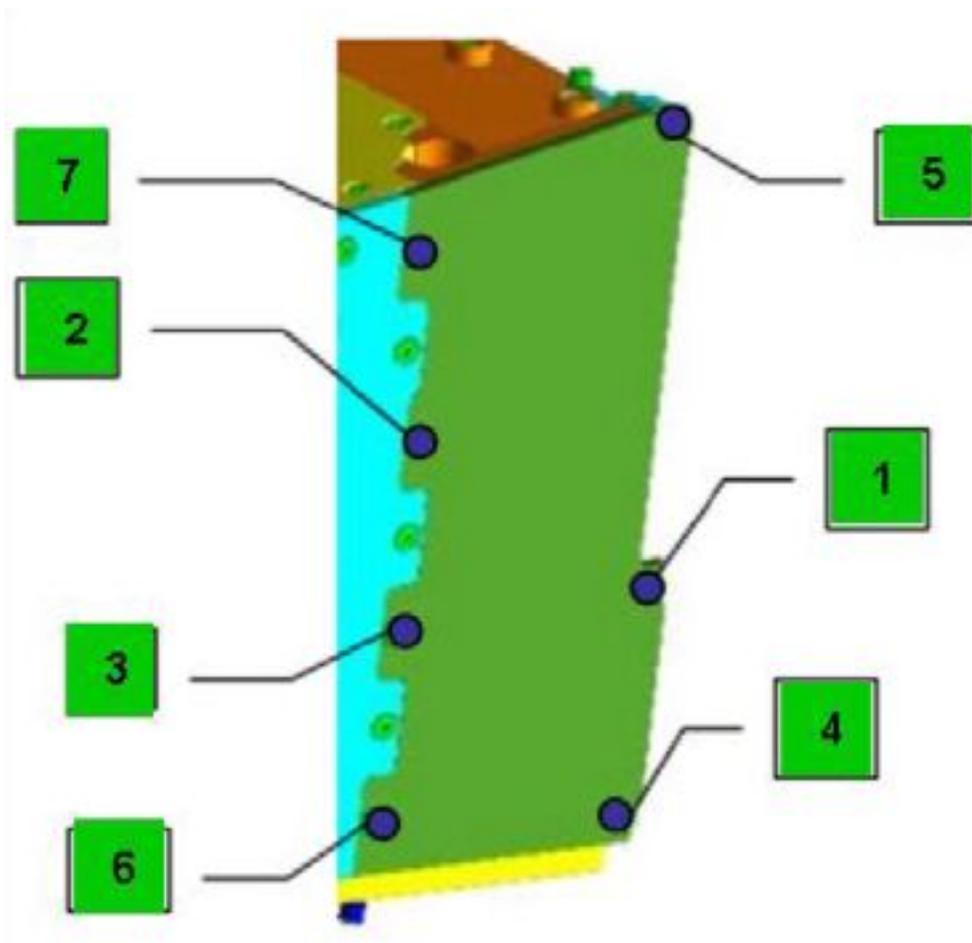


Figure 12. Spectrophotometer cassette door screws

Cassette Access Door → install

Cassette Access Door screws, fig. 12 (seven) → tighten (↻, torque sequentially to 10 in-lb / 1.1 Nm) (2 X 51 mm Folding L-Wrench; (5-35 in-lbs) Trq Driver, 1/4" Drive)

9. [SPECTROPHOTOMETER LAMP ASSEMBLY DOOR REMOVAL](#)
Spectrophotometer Lamp Assembly Door captive bolts (12) → unscrew (↻ (3 X 62 mm Folding L-Wrench) (ref. to fig. 13)

Spectrophotometer Lamp Assembly Door (fig. 15) → remove, stow temporarily

10. SPECTOPHOTOMETER LAMP ASSEMBLY INSTALLATION

Lamp Wedge Lock Retainer Screws (two) → unscrew (15 to 17 turns ↷)
(Allen key 0.14" hex socket head)

Verify visually Spectrophotometer lamp assembly - integrity, no damage

Spectrophotometer lamp assembly → insert

Lamp Wedge Lock Retainer Screws (two) → tighten to 10 in-lbs / 1.1 Nm
(↷) (Allen key 0.14" hex socket head, (5-35 in-lbs) Trq Driver, 1/4" Drive)

11. SPECTOPHOTOMETER LAMP ASSEMBLY DOOR MOUNTING

Verify visually Spectrophotometer Lamp Assembly - integrity, no damage,
seat

Spectrophotometer Lamp Assembly access door → re-install

Spectrophotometer lamp access door captive bolts (12) → tighten and
torque sequentially to 10 in-lb / 1.1 Nm (↷) (Allen key 0.14" hex socket
head; (5-35 in-lbs) Trq Driver, 1/4" Drive)

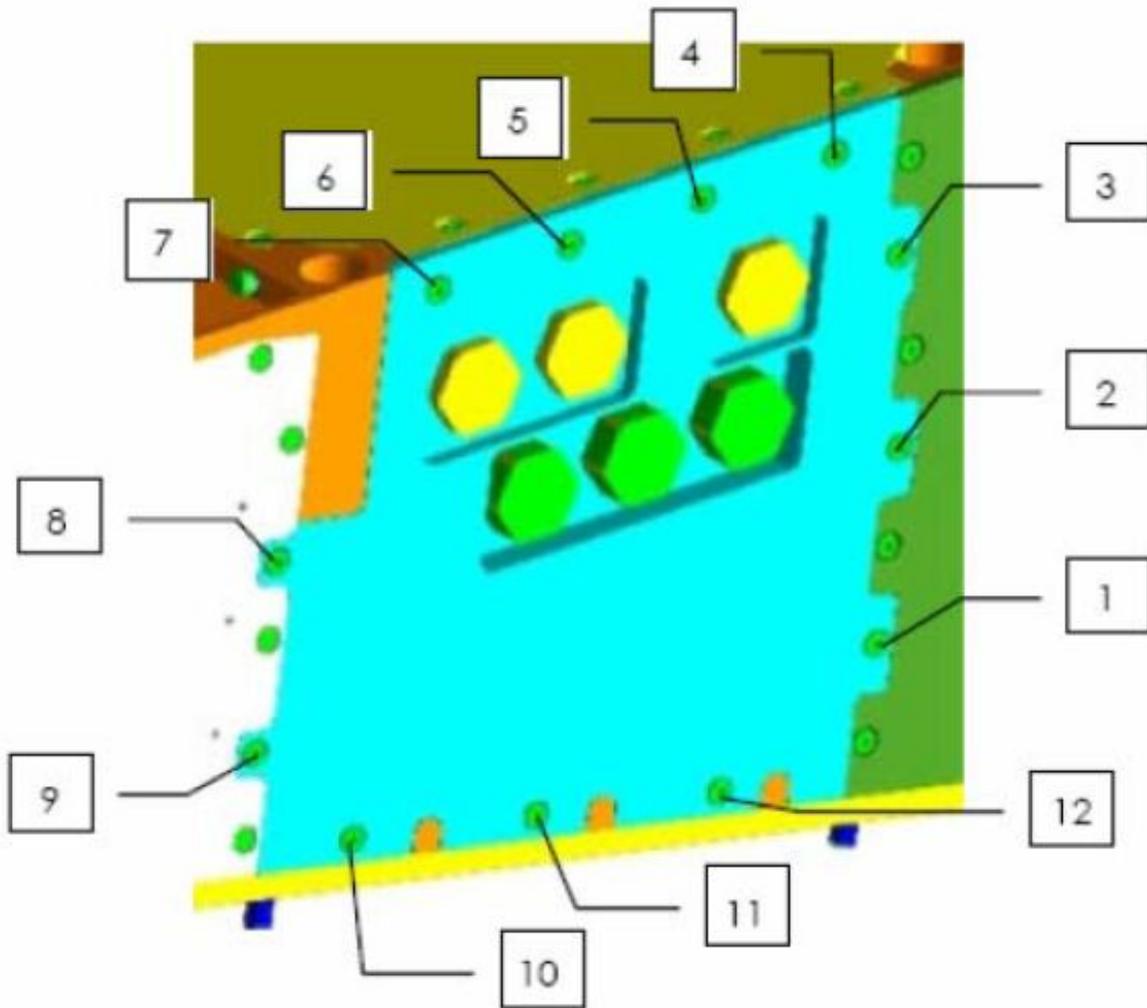


Figure 13. Spectrophotometer Lamp Assembly door screws

12. [HM DRAWER RETRACTION](#)

12.1 [HM Drawer Push-Back](#)

HM drawer → slide into the rack until physical end-stop (HMD will stop approximately 20 mm before rack post at thread of locking mechanism)

Locking mechanism of HM drawer front door → open (M5 (8mm) Socket, 1/4" drive)

12.2 [HM Drawer Fixation](#)

Access left side of drawer working volume

Thread (on back of drawer, left side) → turn until HM front panel is in contact with rack post (metric wrench, size 10; Extension 700 mm)

Thread → torque to 12 in-lbs / 1.3 Nm ((5-35 in-lbs) Trq Driver, 1/4" Drive)

√HM drawer front plate – close to rack post

NOTE

In the next substep HM arm can be moved manually is required.

HM incubator seal interface lever (bellows) → tilt by 189° to close (backwards)

12.3 [HM Door Closing](#)

Visually verify HM door seal – integrity, correct seating, no damage

Locking mechanism of HM front door → close

HM corner captive screws (four) → tighten to attach drawer, torque to 8 Nm (12 point wrench; Torque wrench 4-20 Nm)

HM drawer door → close

Quarter turn screws (two times five) → push and turn 90° to LOCK (4" Common Tip Screwdriver) (ref. to fig. 3)

Verify door closing mechanism and captive screws – LOCK position

12.4 [WCL Closing](#)

Left screws on Water Loop CPL front plane (two) → unscrew (ref. to fig. 2)

NOTE

In the next substep the Water QD mounting tool can be used if required or preferred by crew (ref. fig. 16).

Water QDs of HM Drawer (two) → connect (align both parts, push with the counter part and pull)



Figure 14. WCL QD Tool

√Water QDs – no leakage

Water tube lever above HM drawer → tighten (2 captive screws M4) (Allen wrench)

Verify HM door seal – integrity, correct seating, no damage
(visually)

Verify Door closing mechanism and captive screws – LOCK

13. CLEANUP

Stow tools and items according to stowage note and update IMS.

1.701 BIOLAB LAPTOP STOWAGE ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 6 pages

OBJECTIVE:

To install laptop DC/DC converter during Rack Relocation and to install laptop and cables before Biolab checkout activities.

Crew:

1 crewmember

DURATION:

20 Min.

TOOLS:

Columbus Tool Kit:

Tool Bag 1:

Ratchet Wrench 1/4"

Torque wrench 4-20 Nm

Ratchet Tool, 1/4" Drive

Tool Bag 2:

2" Extension, 1/4" Drive

Tool Bag 3:

M5 (4mm) Hex Head Driver, 1/4" Drive

ITEMS:

Biolab DC/DC converter (A3P 120 V DC Power Supply) and power cables (120 V, 16 V)

Biolab facility laptop

Biolab laptop LAN/video cables

Biolab data cable

Biolab facility laptop holder

Multi-function bracket for laptop holder

1. [DC/DC CONVERTER INSTALLATION PREPARATION](#)
Check **Col-CC** for power status of Biolab and of subsystems.

VTR and laptop bracket cover (Nomex) → remove, temporarily stow



Figure 1. Laptop bracket with connectors

Cable 146-01 (120 V) → connect to assigned position of laptop bracket (Laptop Power 146-01J)

Cable harness → direct to rack rear and route it at the left of the laptop bracket

2. INSTALLING DC/DC CONVERTER

Verify Biolab ISPR - relocated to COL A2 position and positioned in the Rotate Down position per [{1.207 COLUMBUS ISPR RACK RELOCATION}](#) (ESA SODF: MSM/NOMINAL/RACK)

Panel R1 screws, captive (sixteen) → unscrew (M5 (4mm) Hex Head Driver, 1/4"; 2" Extension, 1/4" Drive; Ratchet Wrench 1/4")

Panel R1 → remove, temporarily stow



Figure 2. Location of 16 V outlet on DC/DC converter (OUTPUT J2)

Biolab Laptop Pwr Cable (16 V) → Biolab Laptop Pwr Converter (OUTPUT J2)

Harness of Biolab Laptop Pwr Cable (16 V) → direct to the rack front (same side of the laptop bracket as for Biolab Laptop Pwr Converter harness)

NOTE

The following check is absolutely mandatory. If INPUT POWER switch is NOT in ON position, Biolab will need to be re-tilted for correction.

√INPUT POWER – ON

Check **Col-CC**:

Report status of INPUT POWER Switch



Figure 3. Positioning of DC/DC converter on RIC coldplate

DC/DC converter box → position on velcro strips located on RIC coldplate (P2 connector shall face to the right when seen from behind the rack)

DC/DC power supply wire (120V) → connect to 120 VDC INPUT J1

Panel R1 → insert and screw to BLB rack back side (sixteen captive screws) (M5 (4mm) Hex Head Driver 1/4" Drive; 2" Extension, 1/4" Drive; Torque Wrench 4-20 Nm with Ratchet Tool, 1/4" Drive)

Perform [{1.207 COLUMBUS ISPR RACK RELOCATION}](#), remaining steps (ESA SODF: MSM/NOMINAL/RACK).

3. [INSTALLATION OF POWER CABLE](#)
On Col-CC GO

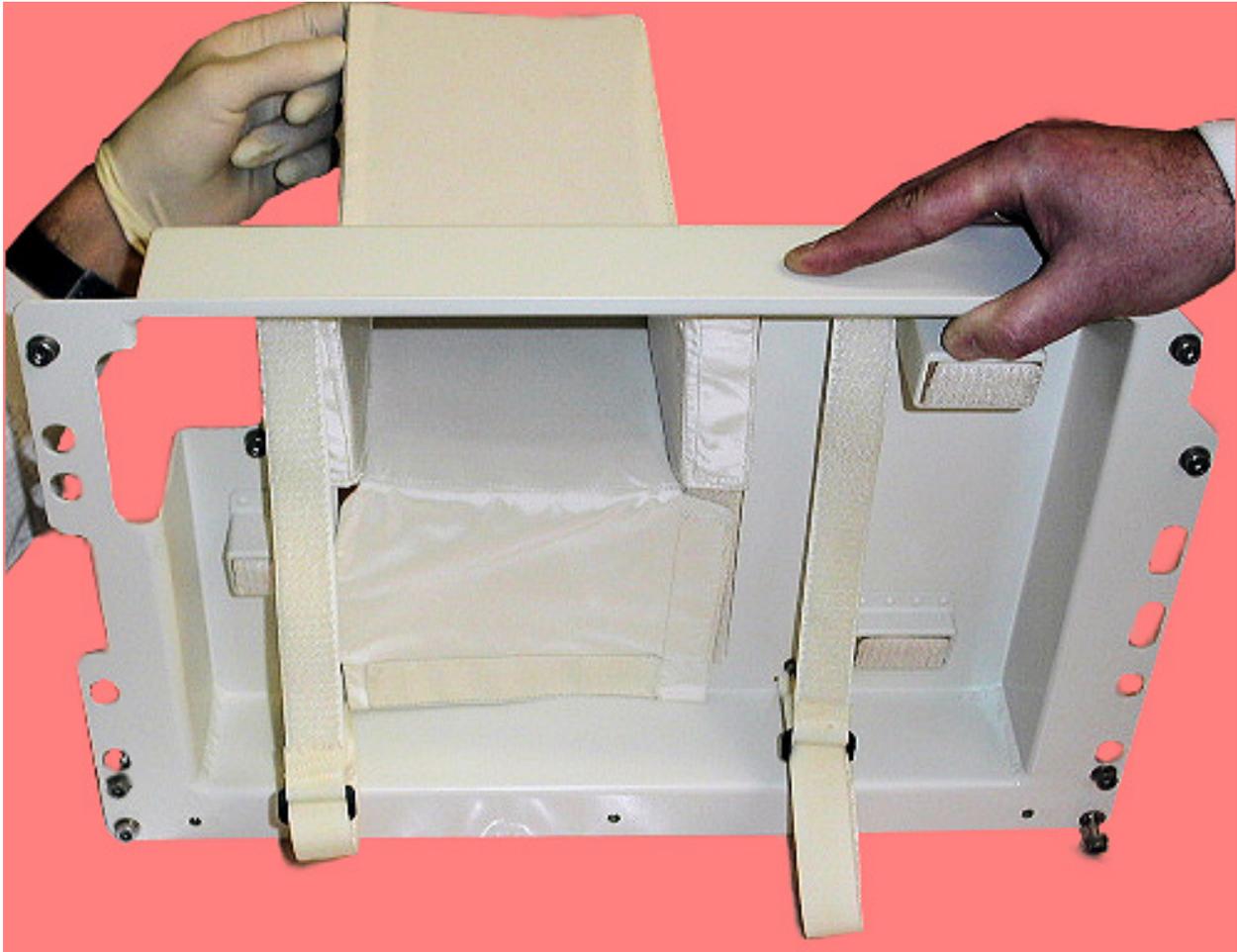


Figure 4. Details of Nomex cover inserted into SPLC front plate (removed from Biolab for illustration of details)

Biolab VTR Harness Nylon Cover → reinstall (route the laptop power harness
Biolab Laptop Pwr Cable (16V) through its window)

4. [INSTALLATION OF DATA/VIDEO CONNECTIONS](#)



Figure 5. Details of LAN/video cables (one connected harness) and data cable and Nomex cover

Cable 146-02 → connect to laptop bracket (cable combined with video cable, Laptop Ethernet, 146-02J)

Cable 146-03 → connect to laptop bracket (cable combined with LAN cable, Laptop Video, 146-03J)

Cable 146-04 → connect to laptop bracket (cable on right side of fig. 5, Laptop Data, 146-04J)

Cables (all) → connect to Biolab Laptop

5. [INSTALLATION OF LAPTOP ON HOLDER](#)

Install Laptop on Holder

6. [CLEANUP](#)

Stow tools and items according to stowage note and update IMS.

1.901 BIOLAB RPDA STORAGE ITEMS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 2 pages

OBJECTIVE:

To check the RPDA switch configuration of the Biolab RPDA and to close the Panel.

Crew:

1 crew member

DURATION:

10 to 15 min.

TOOLS:

None

ITEMS:

Biolab RPDA Front Panel

1. CHECKING RPDA SWITCHES CONFIGURATION



Figure 1. Biolab RPDA ESEM boards

Sw ESEM 1 triple - ON (Verify - On)

Sw ESEM 3-2 (OUT 2) - FIX OFF (Verify - Off)

Sw ESEM 3-4 (OUT 2) - FIX OFF (Verify - Off)

Sw ESEM 4-1 (OUT 1) - ON (Verify - On)

Sw ESEM board triple - OFF (Verify - Off)

2. RPDA PANEL INSTALLATION



Figure 2. RPDA Panel installed



Figure 3. RPDA Panel nut - detail

Biolab RDPA panel → insert (use screws of rack for guidance)
Panel fixation nuts (six, tethered) → hand-tighten

COL EXTERNAL PAYLOADS

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COLUMBUS CONFIGURATION FOR EuTEF AND SOLAR INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 10 pages

OBJECTIVE:

Provide the IVA crew, during EVA3, with the proper information to configure the Columbus EPDS for installation of the external payloads, and activation of the survival heaters. EuTEF (European Technology Exposure Facility) will be installed at the External Payload Facility (EPF) SOX location and SOLAR to the EPF SOZ location.

LOCATION:

Installed: COL1SC (PPSB)

DURATION:

TBD min

CREW:

One

REFERENCE PROCEDURE(S):

- 1.209 SOLAR FEEDER 2 (HEATER) ACTIVATION
- 1.210 SOLAR FEEDER 2 (HEATER) DEACTIVATION
- 1.205 EuTEF FEEDER 2 (HEATER) ACTIVATION

1. [CONFIGURING COLUMBUS FOR SOLAR INSTALLATION](#)

WARNING

Failure to remove power may result in electrical hazard when installing SOLAR on the EPF.

PWS

1.1 [Checking PDU1 Outlets Status](#) COL: EPDS: PDU1 120V Payload

'PDU1 Outlets'

sel Outlet '3'

√SSPC1 Pwr – OFF

√SSPC2 Pwr – OFF

√SSPC3 Pwr – OFF

√SSPC4 Pwr – OFF

Verify Current < 0.1 A

Verify SSPC1 Sys Bus Cntl Stat – DISABLED

Verify SSPC2 Sys Bus Cntl Stat – DISABLED

Verify SSPC3 Sys Bus Cntl Stat – DISABLED

Verify SSPC4 Sys Bus Cntl Stat – DISABLED

COLUMBUS CONFIGURATION FOR EuTEF AND SOLAR INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 10 pages

```
√PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC -  
OFF  
√PDU1_ISPR_A3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC -  
OFF  
√PDU1_ISPR_A3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC -  
OFF  
√PDU1_ISPR_A3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC -  
OFF
```

Verify PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC < 0.1 A

Verify
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
- DISABLED

Verify
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC2_Sys_Cntl_Stat_DMC
- DISABLED

Verify
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC3_Sys_Cntl_Stat_DMC
- DISABLED

Verify
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC4_Sys_Cntl_Stat_DMC
- DISABLED

1.2 [Checking PDU 2 Outlets Status](#)

COL: EPDS: PDU2 120V Payload

PDU 1-2 120V Payload

'PDU2 Outlets'

sel Outlet '3'

PDU2 Outlet 3

√SSPC1 Pwr - OFF

√SSPC2 Pwr - OFF

√SSPC3 Pwr - OFF

√SSPC4 Pwr - OFF

Verify Current < 0.1 A

Verify SSPC1 Sys Bus Cntl Stat - DISABLED

Verify SSPC2 Sys Bus Cntl Stat - DISABLED

Verify SSPC3 Sys Bus Cntl Stat - DISABLED

Verify SSPC4 Sys Bus Cntl Stat - DISABLED

```
√PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC -  
OFF  
√PDU2_ISPR_F3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC -  
OFF
```

COLUMBUS CONFIGURATION FOR EuTEF AND SOLAR INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 10 pages

√PDU2_ISPR_F3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC - OFF
√PDU2_ISPR_F3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC - OFF

Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC < 0.1 A

Verify
PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC - DISABLED

Verify
PDU2_ISPR_F3_Main_Pwr_Bus_SSPC2_Sys_Cntl_Stat_DMC - DISABLED

Verify
PDU2_ISPR_F3_Main_Pwr_Bus_SSPC3_Sys_Cntl_Stat_DMC - DISABLED

Verify
PDU2_ISPR_F3_Main_Pwr_Bus_SSPC4_Sys_Cntl_Stat_DMC - DISABLED

1.3 Checking PPSB Bus #1 Switches Position

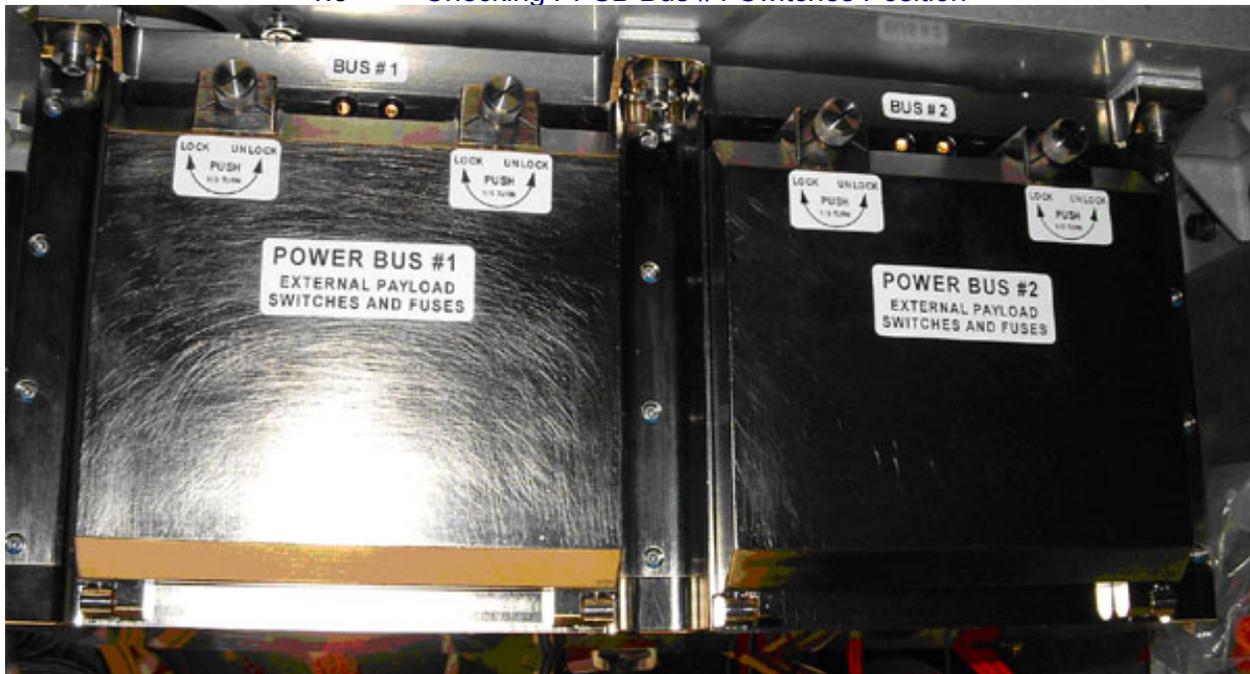


Figure 1. PPSB (Covers Closed)



Figure 2. PPSB Bus #1 Switches (Cover Opened)

COL1SC

Open PPSB Bus #1 protective cover by pushing and turning each of the two locking heads ↻ to UNLOCK position (1/3 turn). Rotate the cover into fully open position (180° turn), until it locks.

Refer to Figure 1.

√all four PPSB switches – DISCHARGE (pull to move lever)

Refer to Figure 2.

Verify the two PPSB LEDs below label "BUS #1" are off.

Close PPSB Bus #1 protective cover by rotating it up into closed position, until it locks.

Push and turn each of the two locking heads ↻ (1/3 turn) to LOCK position.

1.4 Checking PPSB Bus #2 Switches Position

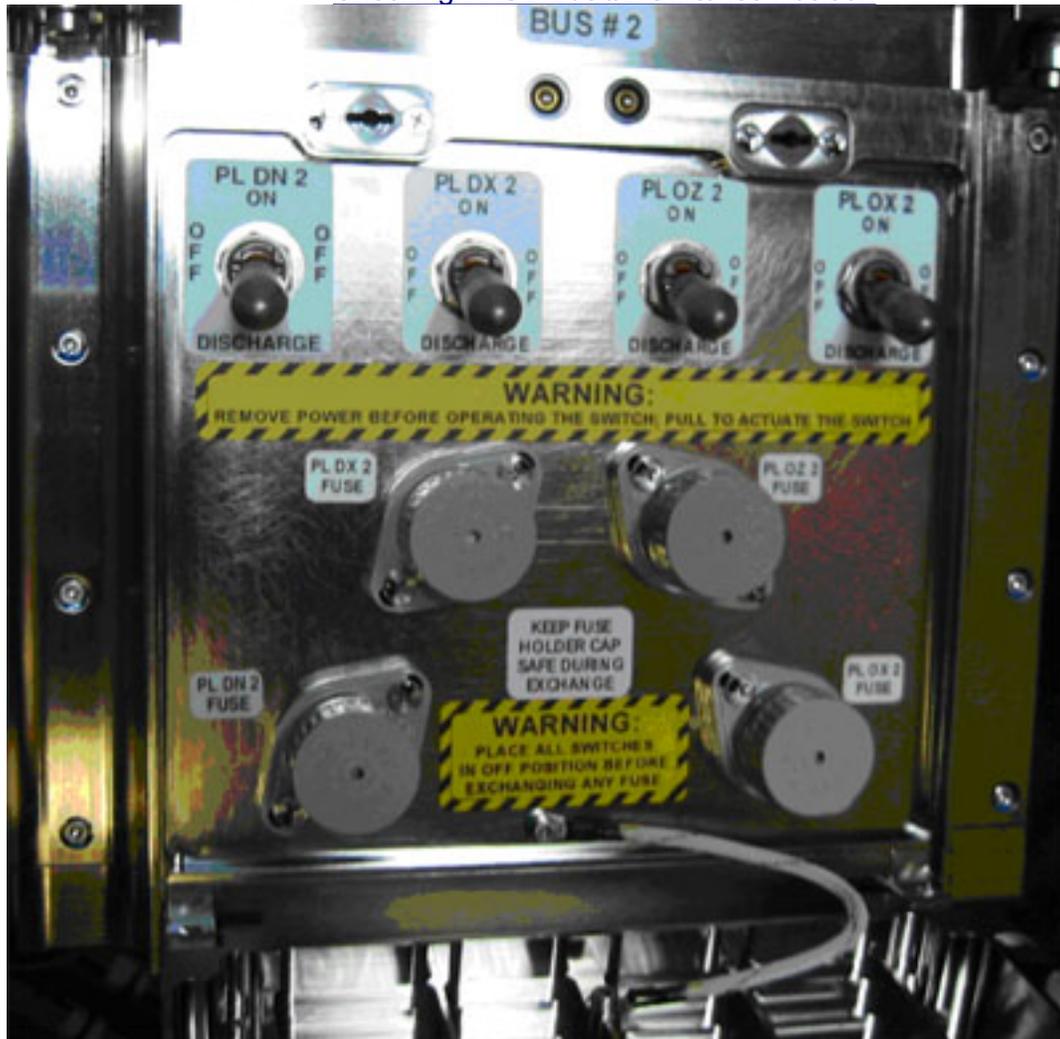


Figure 3. PPSB Bus #2 Switches – Cover Opened

Open PPSB Bus #2 protective cover by pushing and turning each of the two locking heads ↶ to UNLOCK position (1/3 turn). Rotate the cover into fully open position (180° turn), until it locks.

Refer to Figure 1.

√all four PPSB switches – DISCHARGE (pull to move lever)

Refer to Figure 3.

Verify the two PPSB LEDs below label "BUS #2" are off.

Close PPSB Bus #2 protective cover by rotating it up into closed position, until it locks.

Push and turn each of the two locking heads ↷ (1/3 turn) to LOCK position.

1.5 ISS ↓ MCC-H of task completion

2. [ACTIVATING SOLAR SURVIVAL HEATERS](#)

2.1 [Positioning PPSB Bus #2 PL OZ 2 Switch to ON](#)

NOTE

Moving the PPSB switch to ON will not automatically provide power to the external payload since the upstream PDU outlet is switched OFF.

On EVA Crew Call

Open PPSB Bus #2 protective cover by pushing and turning each of the two locking heads ↶ to UNLOCK position (1/3 turn). Rotate the cover into fully open position (180° turn), until it locks.

Refer to Figure 1.

Move sw PPSB PL OZ 2 → ON (pull to move lever)

Refer to Figure 3.

√sw PPSB PL OX 2 – DISCHARGE (pull to move lever)

Refer to Figure 3.

Close PPSB Bus #2 protective cover by rotating it up into closed position, until it locks.

Push and turn each of the two locking heads ↷ (1/3 turn) to LOCK position.

2.2 ISS ↓ **MCC-H** to report PPSB Bus #2 PL OZ 2 switch to ON

2.3 [Activating SOLAR Survival Heaters \(Ground Only\)](#)

COL-CC to perform [{1.209 SOLAR FEEDER 2 \(HEATER\) ACTIVATION}](#), steps 2, 3, 4, and 5.2 (SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL PAYLOADS)

Verify PDU2 ISPR F3 Main Pwr Bus Current DMC < 2.0 A

On COL-CC GO

Open PPSB Bus #2 protective cover by pushing and turning each of the two locking heads ↶ to UNLOCK position (1/3 turn). Rotate the cover into fully open position (180° turn), until it locks.

Refer to Figure 1.

Verify the two PPSB LEDs below label "BUS #2" are lit.

Close PPSB Bus #2 protective cover by rotating it up into closed position, until it locks.

Push and turn each of the two locking heads ↷ (1/3 turn) to LOCK position.

3. [CONFIGURING COLUMBUS FOR EuTEF INSTALLATION](#)

WARNING

Failure to remove power may result in electrical hazard when installing EuTEF on the EPF.

3.1 [Deactivating SOLAR Survival Heaters \(Ground Only\)](#)

COL-CC to perform [{1.210 SOLAR FEEDER 2 \(HEATER\) DEACTIVATION}](#), steps 1 to 4.2 (SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL PAYLOADS)

On COL-CC GO

Open PPSB Bus #2 protective cover by pushing and turning each of the two locking heads ↶ to UNLOCK position (1/3 turn). Rotate the cover into fully open position (180° turn), until it locks.

Refer to Figure 1.

Verify the two PPSB LEDs below label "BUS #2" are off.

Close PPSB Bus #2 protective cover by rotating it up into closed position, until it locks.

Push and turn each of the two locking heads ↷ (1/3 turn) to LOCK position.

3.2 [Checking PDU1 Outlets Status](#)

On MCC-H/COL-CC GO

PWS

COL: EPDS: PDU1 120V Payload

'PDU1 Outlets'

sel Outlet 3

√SSPC1 Pwr – OFF

√SSPC2 Pwr – OFF

√SSPC3 Pwr – OFF

√SSPC4 Pwr – OFF

Verify Current < 0.1 A

Verify SSPC1 Sys Bus Cntl Stat – DISABLED

Verify SSPC2 Sys Bus Cntl Stat – DISABLED

Verify SSPC3 Sys Bus Cntl Stat – DISABLED

Verify SSPC4 Sys Bus Cntl Stat – DISABLED

√PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – OFF

√PDU1_ISPR_A3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC – OFF

√PDU1_ISPR_A3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC – OFF

√PDU1_ISPR_A3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC – OFF

Verify PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC < 0.1 A

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC – DISABLED

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC2_Sys_Cntl_Stat_DMC – DISABLED

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC3_Sys_Cntl_Stat_DMC – DISABLED

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC4_Sys_Cntl_Stat_DMC – DISABLED

COL1SC

3.3 [Checking PPSB Bus #1 Switches Position](#)

Open PPSB Bus #1 protective cover by pushing and turning each of the two locking heads ↶ to UNLOCK position (1/3 turn). Rotate the cover into fully open position (180° turn), until it locks.

Refer to Figure 1.

√sw PPSB PL OX 1 – DISCHARGE (pull to move lever)

Refer to Figure 2.

Verify the two PPSB LEDs below label "BUS #1" are off.

Close PPSB Bus #1 protective cover by rotating it up into closed position, until it locks.

Push and turn each of the two locking heads ↷ (1/3 turn) to LOCK position

3.4 [Checking PPSB Bus #2 Switches Position](#)

Open PPSB Bus #2 protective cover by pushing and turning each of the two locking heads ↶ to UNLOCK position (1/3 turn) Rotate the cover into fully open position (180° turn), until it locks.

Refer to Figure 1.

√sw PPSB PL OX 2 – DISCHARGE (pull to move lever)

Refer to Figure 2.

Verify the two PPSB LEDs below label "BUS #2" are off.

Close PPSB Bus #2 protective cover by rotating it up into closed position, until it locks.

Push and turn each of the two locking heads ↻ (1/3 turn) to LOCK position.

3.5 ISS ↓ **MMC-H** of task completion

4. [ACTIVATING EuTEF AND SOLAR SURVIVAL HEATERS](#)

4.1 [Positioning PPSB Bus #2 PL OX 2 Switch to ON](#)

NOTE

Moving the PPSB switch to ON will not automatically provide power to the external payload since the upstream PDU outlet is switched OFF.

Open PPSB Bus #2 protective cover by pushing and turning each of the two locking heads ↻ to UNLOCK position (1/3 turn). Rotate the cover into fully open position (180° turn), until it locks.

Refer to Figure 1.

Move sw PPSB PL OX 2 → ON (pull to move lever)

Refer to Figure 3.

√sw PPSB PL OZ 2 – ON (pull to move lever)

Refer to Figure 3.

Verify the two PPSB LEDs below label "BUS #2" are off.

Close PPSB Bus #2 protective cover by rotating it up into closed position, until it locks.

Push and turn each of the two locking heads ↻ (1/3 turn) to LOCK position.

4.2 ISS ↓ **MMC-H** to report PPSB Bus 2 PL OX 2 and PL OZ 2 switches to ON

4.3 [Activating EuTEF Survival Heaters \(Ground Only\)](#)

COL-CC to perform [{1.205 EuTEF FEEDER 2 \(HEATER\) ACTIVATION}](#), steps 2, 3, 4, and 5.1 (SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL PAYLOADS)

Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC < 2.2 A

4.4 [Activating SOLAR Survival Heaters \(Ground Only\)](#)

COL-CC to perform [{1.209 SOLAR FEEDER 2 \(HEATER\) ACTIVATION}](#), step 2 and 5.2 (SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL PAYLOADS)

Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC – 1.5 to 4.2 A

On COL-CC GO

Open PPSB Bus #2 protective cover by pushing and turning each of the two locking heads ↶ to UNLOCK position (1/3 turn). Rotate the cover into fully open position (180° turn), until it locks.

Refer to Figure 1.

Verify the two PPSB LEDs below label "BUS #2" are on.

Close PPSB Bus #2 protective cover by rotating it up into closed position, until it locks.

Push and turn each of the two locking heads ↷ (1/3 turn) to LOCK position.

1.203 EuTEF FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 6 pages

OBJECTIVE:

This procedure is used to activate the Power Feeder 1 (Operational Power) of the external payload EuTEF, located on COL EPF SOX position.

NOTE

COL-CC to check and coordinate power status situation for A3 main bus with respect to EPM and external payload feeder 1 for SOLAR.

On COL-CC GO

- PWS
1. [VERIFYING ISPR \(A3\) MAIN POWER BUS STATUS \(PDU1 OUTLET 03\)](#)

EPDS: PDU1 120V Payload

PDU 1-2 120V Payload

'PDU1 Outlets'

sel '3'

PDU 1 Outlet 3

Record SSPC1 Pwr: _____

Record SSPC2 Pwr: _____

Record SSPC3 Pwr: _____

Record SSPC4 Pwr: _____

Record PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC:

Record PDU1_ISPR_A3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC:

Record PDU1_ISPR_A3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC:

Record PDU1_ISPR_A3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC:

2. [VERIFYING PPSB SWITCH FOR EuTEF POWER FEEDER 1](#)

Payload: EPF SOX

EPF SOX

'EPDS'

Verify PPSB Nom Pwr – ON

Verify PPSB_EPFSOX_Nom_Pwr_Stat_DMC – ON

1.203 EuTEF FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 6 pages

3. [CHECKING OF EuTEF \(EPF SOX\) DHPU TEMPERATURE](#)

Payload: EuTEF

EuTEF Health and Status Data

'XCMU'

Verify DHPU-XCMU SENSOR Temp > 5 deg C

Verify EuTEF-XCMU SENSOR Temp > -19 deg C

Verify EPF_SOX_Temp_Meas1_DMC > 5 deg C

Verify EPF_SOX_Temp_Meas2_DMC > -19 deg C

NOTE

In case the DHPU temperature is outside the required range, **COL-CC** to check if EuTEF Feeder 2 (Survival Heater Power) is active.

4. [SETTING EuTEF POWER FEEDER 1 OFF](#)

Payload: EuTEF: XCMU Commands

EuTEF Commands

cmd Feed 1 Off **Execute** (OK)

cmd EPF_SOX_Pulse_Cmd2_DMC

data SW_CMD – DMS_Issue_Discrete_Cmd_SW

data ONBOARD_NODE – SYS_CCSDS_End_Point_PLCU_DMS_SERV

Verify OB Result – 0 (OK) or 1 (OK_SEQ_COUNT_ANOMALY)

5. [ACTIVATING ISPR \(A3\) MAIN POWER BUS \(PDU1 OUTLET 03\)](#)

NOTE

If another payload is already active and powered by the PDU1 outlet 03 (i.e. if step 2 telemetry was showing ON), step 5 can be skipped.

5.1 [Checking ISPR \(A3\) Rack Power Maintenance Switch Position Data](#)

Payload: ISPR A3

ISPR A3

'EPDS'

Verify Maint Switch – ON

Verify ISPR_A3_Maint_Switch_Stat_DMC – ON

1.203 EuTEF FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 6 pages

5.2 [Enabling Power Bus System Control \(Ground only\)](#)

```
If
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
- DISABLED

    cmd
    PDU1 ISPR A3 Main Pwr Bus Svs Cntl Ena VTC
    data SW_CMD - VTC_Disc_Out_Cmd_Cmd_SW
    data Onboard_Node - SYS_CCSDS_End_Point_VTC1

    Verify
    PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC - ENABLED
```

On COL-CC GO

5.3 [Activating ISPR \(A3\) Main Power Bus](#)

COL1SC

Verify both PPSB LEDs below label "Bus #1" are ■ ■

PWS

EPDS: PDU1 120V Payload

'PDU1 Outlets'

sel '3'

Verify 'SSPC1 Sys Bus Cntl Stat' - ENABLED

'Commands'

cmd Pwr On Execute

'Pwr'

Verify SSPC1 Pwr - ON

Verify SSPC2 Pwr - ON

Verify SSPC3 Pwr - ON

Verify SSPC4 Pwr - ON

COL1SC

Verify both PPSB LEDs below label "Bus #1" are □ □

```
cmd PDU1_ISPR_A3_Main_Pwr_Bus_On_AP
data ONBOARD_RECEPTION_NODE -
SYS_CCSDS_End_Point_PLCU_DMS_SERV
data ONBOARD_EXECUTION_NODE -
USM_SW_DMC_USS_Swop_Instance
```

1.203 EuTEF FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 4 of 6 pages

```
Verify
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
ON
Verify
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC –
ON
Verify
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC –
ON
Verify
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC –
ON
```

6. CHECKING EuTEF RELATED PDU 1 OUTLET STATUS

PWS

Payload: EuTEF

EuTEF Health and Status Data

'PDU1 Outlet 03'

Verify A3 Main Pwr Bus – ON

Verify Current Validity – Valid

Wait 2 minutes to allow current value to stabilize.

Record Current: _____ A

```
Verify PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – ON
```

```
Verify PDU1_ISPR_A3_Main_Pwr_Bus_Current_Validity_DMC – Valid
```

Wait 2 minutes to allow current value to stabilize.

Record PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC:
_____ A

7. ACTIVATING EuTEF POWER FEEDER 1 BY XCMU COMMAND

7.1 Activating EuTEF Feeder 1

Payload: EuTEF: XCMU Commands

EuTEF Commands

cmd Feed 1 On **Execute** (OK)

```
cmd EPF_SOX_Pulse_Cmd1_DMC
```

```
data SW_CMD – DMS_Issue_Discrete_Cmd_SW
```

```
data ONBOARD_NODE –
```

```
SYS CCSDS End Point PLCU DMS SERV
```

Verify OB Result – 0 (OK) or 1 (OK_SEQ_COUNT_ANOMALY)

1.203 EuTEF FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 5 of 6 pages

7.2 [Checking PDU1 Outlet 03 Status \(ISPR \(A3\) Main Power Bus\)](#)

Payload: EuTEF

EuTEF Health and Status Data

'PDU1 Outlet 03'

Verify Current Validity – Valid

Wait 2 minutes to allow current to stabilize.

Record Current: _____ A

Subtract current value of step 6 from current value of 7.2.

Record result: _____ A

Verify result – 0.2 to 0.7 A

Verify PDU1_ISPR_A3_Main_Pwr_Bus_Current_Validity_DMC – Valid

Wait 2 minutes to allow current to stabilize.

Record PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC:
A

Subtract current value of step 6 from current value of 7.2.

Record result: _____ A

Verify result – 0.2 to 0.7 A

8. [STARTING EuTEF \(EPF SOX1\) MIL BUS DATA ACQUISITION \(GROUND ONLY\)](#)

cmd DMS_RT_Start_RT_Acquisition_Cmd_SW

prm REMOTE_TERMINAL_ID –

MIL 1553B Bus RT Payload Bus EXPA OX1

data ONBOARD_NODE – SYS_CCSDS_End_Point_PLCU_DMS_SERV

Verify EPF_SOX1_PL_Bus_No_Resp_SW – NO ERROR

Verify EPF_SOX1_PL_Bus_Msg_Error_SW – NO ERROR

Verify EPF_SOX1_PL_Bus_Busy_Flag_SW – NO ERROR

Verify EPF_SOX1_PL_Bus_Erroneous_Msg_SW – NO ERROR

Verify EPF_SOX1_PL_Bus_Terminal_Flag_SW – NO ERROR

Verify EPF_SOX1_PL_Bus_Ena_Stat_SW – ENABLED

Verify EPF_SOX1_PL_Bus_Unit_Error_Flag_SW – NO ERROR

9. [VERIFYING EuTEF \(EPF SOX1\) MIL BUS DATA](#) On COL-CC GO

1.203 EuTEF FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 6 pages

Payload: EuTEF

EuTEF Health and Status Data

'EuTEF H&S Data'

'Update Counter'

Verify SA#09 – incrementing

Verify SA#10 – incrementing

Verify SA#11 – incrementing

'DHPU'

Verify DH Processor Status – READY

Verify ETF_SA9_Counter – incrementing

Verify ETF_SA10_Counter – incrementing

Verify ETF_SA11_Counter – incrementing

Verify ETF_DHPU_Ops_Mode – READY

COL-CC to announce to ERASMUS the completion of EuTEF Feeder 1 Activation.

1.204 EuTEF FEEDER 1 DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 3 pages

OBJECTIVE:

This procedure is used to deactivate the Power Feeder 1 (Operational Power) of the external payload EuTEF, located on Col EPF SOX position.

NOTE

In order to prevent cooling down of EuTEF instruments with Feeder 1 (Operational Power) inactive, **COL-CC** has to check if EuTEF Feeder 2 (Survival Heater Power) is active.

PWS

1. [VERIFYING ISPR \(A3\) MAIN POWER BUS STATUS \(PDU1 OUTLET 03\)](#)

On COL-CC GO

Payload: EuTEF

EuTEF Health and Status Data

'PDU1 Outlet 03'

Verify A3 Main Pwr Bus – ON

Verify Current Validity – Valid

Record Current: _____ A

Verify PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – ON

Verify PDU1_ISPR_A3_Main_Pwr_Bus_Current_Validity_DMC – Valid

Record PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC:
_____ A

2. [STOPPING RT ACQUISITION FOR EuTEF \(EPF SOX1\) \(GROUND ONLY\)](#)

cmd DMS_RT_Stop_RT_Acquisition_Cmd_SW

prm REMOTE_TERMINAL_ID –
MIL 1553B Bus RT Pavload Bus EXPA OX1

data ONBOARD_NODE – SYS_CCSDS_End_Point_PLCU_DMS_SERV

Verify EPF_SOX1_PL_Bus_Ena_Stat_SW – DISABLED

On COL-CC GO

3. [DEACTIVATING EuTEF POWER FEEDER 1 BY XCMU COMMAND](#)

3.1 [Deactivatng EuTEF Power Feeder 1](#)

Payload: EuTEF: XCMU Commands

EuTEF Commands

cmd Feed 1 Off **Execute**

1.204 EuTEF FEEDER 1 DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 3 pages

cmd EPF_SOX_Pulse_Cmd2_DMC

data SW_CMD – DMS_Issue_Discrete_Cmd_SW

data ONBOARD_NODE –
SYS CCSDS End Point PLCU DMS SERV

Verify OB Result – 0 (OK) or 1 (OK_SEQ_COUNT_ANOMALY)

3.2 [Checking PDU1 Outlet 03 Status \(ISPR \(A3\) Main Power Bus\)](#)

Payload: EuTEF

EuTEF Health and Status Data

'PDU1 Outlet 03'

Verify Current Validity – Valid

Record Current: _____ A

Subtract current value of step 3.2 from current value of step 1.

Record result: _____ A

Verify result – 0.2 to 0.35 A

Verify PDU1_ISPR_A3_Main_Pwr_Bus_Current_Validity_DMC –
Valid

Record PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC:
A

Subtract current value of step 3.2 from current value of step 1.

Record result: _____ A

Verify result – 0.2 to 0.35 A

4. [DEACTIVATING ISPR \(A3\) MAIN POWER BUS \(PDU1 OUTLET 03\)](#)

NOTE

The following steps must NOT be performed, if other payloads are currently powered by PDU1 outlet 03.

On COL-CC GO

4.1 [Deactivating ISPR \(A3\) Main Power Bus](#)

COL1SC

Verify both PPSB LEDs below label “Bus #1” are

PWS

EPDS: PDU1 120V Payload

PDU 1-2 120V Payload

'PDU1 Outlets'

1.204 EuTEF FEEDER 1 DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 3 pages

sel '3'

PDU 1 Outlet 3

'Commands'

cmd Pwr Off Execute

'Pwr'

Verify SSPC1 Pwr – OFF

Verify SSPC2 Pwr – OFF

Verify SSPC3 Pwr – OFF

Verify SSPC4 Pwr – OFF

cmd PDU1_ISPR_A3_Main_Pwr_Bus_Off_AP

**data ONBOARD_RECEPTION_NODE –
SYS CCSDS End Point PLCU DMS SERV**

**data ONBOARD_EXECUTION_NODE –
USM SW DMC USS Swop Instance**

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
OFF

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC –
OFF

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC –
OFF

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC –
OFF

COL1SC

Verify both PPSB LEDs below label “Bus #1” are ■ ■

4.2 [Disabling Power Bus System Control Status \(Ground only\)](#)

cmd PDU1_ISPR_A3_Main_Pwr_Bus_Sys_Cntl_Dis_VTC

data SW_CMD – VTC_Disc_Out_Cmd_Cmd_SW

data Onboard_Node – SYS_CCSDS_End_Point_VTC1

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
– DISABLED

COL-CC to announce to ERASMUS the completion of EuTEF
Feeder 1 Deactivation.

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1.205 EuTEF FEEDER 2 (HEATER) ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/SPN) Page 1 of 5 pages

OBJECTIVE:

This procedure is used to activate the Power Feeder 2 (Survival Heater Power) of the external payload EuTEF, located on COL EPF SOX position.

NOTE

COL-CC to check and coordinate power status situation for F3 main power bus with respect to other payloads depending on F3 main power and external payload Feeder 2 for SOLAR.

1. VERIFYING ISPR (F3) MAIN POWER BUS STATUS (PDU2 OUTLET 03)

PWS

On COL-CC GO

EPDS: PDU2 120V Payload

PDU 1-2 120V Payload

'PDU2 Outlets'

sel 3

PDU 2 Outlet 3

Record SSPC1 Pwr: _____

Record SSPC2 Pwr: _____

Record SSPC3 Pwr: _____

Record SSPC4 Pwr: _____

Record Current: _____ A

Record PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC:

Record PDU2_ISPR_F3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC:

Record PDU2_ISPR_F3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC:

Record PDU2_ISPR_F3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC:

Record PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC:

2. VERIFYING PPSB SWITCH FOR EuTEF POWER FEEDER 2

Payload: EPF SOX

EPF SOX

'EPDS'

Verify PPSB Redun Pwr – ON

Verify PPSB_EPF_SOX_Redun_Pwr_Stat_DMC – ON

3. [ACTIVATING ISPR \(F3\) MAIN POWER BUS \(PDU2 OUTLET 03\)](#)

NOTE

If another payload is already active and powered by the PDU2 outlet 03 (i.e. if step 1 telemetry was showing ON), step 3 can be skipped.

3.1 [Verifying ISPR \(F3\) Maintenance Switch Configuration](#)

Payload: ISPR F3

ISPR F3

'EPDS'

Verify Maint Switch – ON

Verify ISPR_F3_Maint_Switch_Stat_DMC – ON

3.2 [Enabling Power Bus System Control \(Ground only\)](#)

If
PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
– DISABLED

cmd PDU2 ISPR F3 Main Pwr Bus Svs Cntl Ena VTC data SW_CMD – VTC_Disc_Out_Cmd_Cmd_SW data Onboard_Node – SYS_CCSDS_End_Point_VTC1

Verify
PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC – ENABLED

3.3 [Activating ISPR \(F3\) Main Power Bus](#)
On COL-CC GO

COL1SC

Verify both PPSB LEDs below label “Bus #2” are ■ ■

PWS

EPDS: PDU2 120V Payload

PDU 1-2 120V Payload

'PDU2 Outlets'

sel 3

PDU 2 Outlet 3

Verify 'SSPC1 Sys Bus Cntl Stat' – ENABLED

'Commands'

1.205 EuTEF FEEDER 2 (HEATER) ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/SPN) Page 3 of 5 pages

cmd Pwr On Execute (OK)

'Pwr'

Verify SSPC1 Pwr – ON

Verify SSPC2 Pwr – ON

Verify SSPC3 Pwr – ON

Verify SSPC4 Pwr – ON

COL1SC

Verify both PPSB LEDs below label “Bus #2” are

cmd PDU2_ISPR_F3_Main_Pwr_Bus_On_AP

data ONBOARD_RECEPTION_NODE –
SYS CCSDS End Point PLCU DMS SERV

data ONBOARD_EXECUTION_NODE –
USM SW DMC USS Swop Instance

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
ON

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC –
ON

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC –
ON

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC –
ON

4. VERIFYING EuTEF RELATED PDU 2 OUTLET STATUS

PWS

Payload: EuTEF

EuTEF Health and Status Data

'PDU2 Outlet 03'

Verify F3 Main Pwr Bus – ON

Verify Current Validity – Valid

Wait 2 minutes to allow current to stabilize.

Record Current: _____ A

Verify PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – ON

Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_Validity_DMC – Valid

Wait 2 minutes to allow current to stabilize.

Record PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC:
_____ A

5. [ACTIVATING EuTEF POWER FEEDER 2 BY XCMU LEVEL COMMAND](#)

5.1 [Activate EuTEF Power Feeder 2](#)

NOTE

The XCMU Feeder 2 button functionality is reversed on PWS (reference SPR 18857/SPN TBD); therefore, the "Feed 2 Off" command will be sent to command Feeder 2 on.

Payload: EuTEF: XCMU Commands

EuTEF Commands

cmd Feed 2 Off **Execute** (OK)

cmd EPF_SOX_Reset_Level_Cmd2_DMC
data SW_CMD – DMS_Issue_Discrete_Cmd_SW
data ONBOARD_NODE –
SYS CCSDS End Point PLCU DMS SERV

Verify OB Result – 0 (OK) or 1 (OK_SEQ_COUNT_ANOMALY)

5.2 [Checking PDU 2 Outlet 3 Status \[ISPR \(F3\) Main Power Bus\]](#)

Payload: EuTEF

EuTEF Health and Status Data

'PDU2 Outlet 03'

Verify Current Validity – Valid

Wait 2 minutes for current to stabilize.

Record Current: _____ A

Subtract current reading of step 4 from current reading of step 5.2.

Record result: _____ A

Verify result < 2.2 A

Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_Validity_DMC – Valid

Wait 2 minutes for current to stabilize.

Record PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC:
A

Subtract current reading of step 4 from current reading of step 5.2.

1.205 EuTEF FEEDER 2 (HEATER) ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/SPN) Page 5 of 5 pages

Record result: _____ A

Verify result < 2.2 A

COL-CC to announce to ERASMUS the completion of EuTEF Feeder 2 Activation.

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1.206 EuTEF FEEDER 2 (HEATER) DEACTIVATION
(ASSY PAYLOAD/1E/FIN/MULTI E/SPN) Page 1 of 4 pages

OBJECTIVE:

This procedure is used to deactivate the Power Feeder 2 (Survival Heater Power) of the external payload EuTEF, located on Col EPF SOX position.

NOTE

Before deactivating Feeder 2, it shall be ensured that Feeder 1 is active and that all instruments are switched on. This is performed by checking that the SA counters and the instrument Heart Beat counters are incrementing.

PWS

1. [VERIFYING EuTEF \(EPF SOX1\) OPERATIONAL POWER \(FEEDER 1\)](#)

On COL-CC GO

Payload: EuTEF

EuTEF Health and Status Data

'EuTEF H&S Data'

'Update Counter'

Verify SA#09 – incrementing

Verify SA#10 – incrementing

Verify SA#11 – incrementing

Verify ETF_SA9_Counter – incrementing

Verify ETF_SA10_Counter – incrementing

Verify ETF_SA11_Counter – incrementing

2. [VERIFYING ISPR \(F3\) MAIN POWER BUS STATUS \(PDU2 OUTLET 03\)](#)

Payload: EuTEF

EuTEF Health and Status Data

'PDU2 Outlet 03'

Verify F3 Main Pwr Bus – ON

Verify Current Validity – Valid

Record Current: _____ A

Verify PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – ON

Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_Validity_DMC – Valid

Record PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC:

_____ A

3. [DEACTIVATING EuTEF POWER FEEDER 2 BY XCMU COMMAND](#)

3.1 [Deactivating EuTEF Power Feeder 2](#)

NOTE

The XCMU Feeder 2 button functionality is reversed on PWS (reference SPR 18857/SPN TBD); therefore, "Feed 2 On" command will be sent to command Feeder 2 off.

Payload: EuTEF: XCMU Commands

EuTEF Commands

cmd Feed 2 On Execute

cmd EPF_SOX_Set_Level_Cmd2_DMC

data SW_CMD – DMS_Issue_Discrete_Cmd_SW

data ONBOARD_NODE –

SYS CCSDS End Point PLCU DMS SERV

Verify OB Result – 0 (OK) or 1 (OK_SEQ_COUNT_ANOMALY)

3.2 [Checking PDU2 Outlet 03 Status \[ISPR \(F3\) Main Power Bus\]](#)

Payload: EuTEF

EuTEF Health and Status Data

'PDU2 Outlet 03'

Verify Current Validity – Valid

Record Current: _____ A

Subtract current value of step 3.2 from current value of step 2.

Record result: _____ A

Verify result < 2.2 A

Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_Validity_DMC – Valid

Record PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC:
A

Subtract current value of step 3.2 from current value of step 2.

Record result: _____ A

Verify result < 2.2 A

4. [DEACTIVATING PDU2 OUTLET 03 \(ISPR COL1F3 MAIN POWER BUS\)](#)

NOTE

The following step must NOT be performed if other payloads are currently powered by PDU2 Outlet 03.

On COL-CC GO

COL1SC

4.1 [Deactivating ISPR \(F3\) Main Power Bus](#)

Verify both PPSB LEDs below label "Bus #2" are

PWS

EPDS: PDU2 120V Payload

PDU 1-2 120V Payload

'PDU2 Outlets'

sel '3'

PDU 2 Outlet 3

Verify 'SSPC1 Sys Bus Cntl Stat' – ENABLED

'Commands'

cmd Pwr Off Execute

Verify SSPC1 Pwr – OFF

Verify SSPC2 Pwr – OFF

Verify SSPC3 Pwr – OFF

Verify SSPC4 Pwr – OFF

cmd PDU2_ISPR_F3_Main_Pwr_Bus_Off_AP

data ONBOARD_RECEPTION_NODE –
SYS CCSDS End Point PLCU DMS SERV

data ONBOARD_EXECUTION_NODE –
USM SW DMC USS Swoop Instance

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
OFF

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC –
OFF

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC –
OFF

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC –
OFF

1.206 EuTEF FEEDER 2 (HEATER) DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/SPN) Page 4 of 4 pages

COL1SC

Verify both PPSB LEDs below label "Bus #2" are ■ ■

4.2 [Disabling Power Bus System Control \(Ground only\)](#)

cmd PDU2_ISPR_F3_Main_Pwr_Bus_Sys_Cntl_Dis_VTC

data SW_CMD – VTC_Disc_Out_Cmd_Cmd_SW

data ONBOARD_NODE – SYS_CCSDS_End_Point_VTC1

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC –
DISABLED

COL-CC to announce to ERASMUS the completion of EuTEF
Feeder 2 Deactivation.

1.207 SOLAR FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 7 pages

OBJECTIVE:

This procedure is used to activate the Power Feeder 1 (Operational Power) of the external payload SOLAR, located on COL EPF SOZ position.

NOTE

1. **COL-CC** to check that SOLAR Power Feeder 2 is not active.
2. **COL-CC** to check and coordinate power status situation for A3 main power bus with respect to EPM power status and external payload Feeder 1 for EuTEF.

1. VERIFYING ISPR (A3) MAIN POWER BUS STATUS (PDU1 OUTLET 03)

PWS

On COL-CC GO

EPDS

EPDS Functional Overview

'PDU1'

sel 120V Payload

PDU 1-2 120V Payload

'PDU1 Outlets'

sel 3

PDU1 Outlet 3

Record SSPC1 Pwr: _____

Record SSPC2 Pwr: _____

Record SSPC3 Pwr: _____

Record SSPC4 Pwr: _____

Record Current: _____ A

Record PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC:

Record PDU1_ISPR_A3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC:

Record PDU1_ISPR_A3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC:

Record PDU1_ISPR_A3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC:

Record PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC:

_____ A

1.207 SOLAR FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 7 pages

2. VERIFYING PPSB SWITCH STATUS FOR SOLAR POWER FEEDER 1

Payload: EPF SOZ

EPF SOZ

'EPDS'

Verify PPSB Nom PWR – ON

Verify PPSB_EPF_SOZ_Nom_Pwr_Stat_DMC – ON

3. VERIFYING SOLAR (EPF SOZ) TEMPERATURE

Payload: SOLAR

SOLAR Health and Status Data

'XCMU'

Verify CMA Temp – _____ > -40 deg C

Verify CU Temp – _____ > -20 deg C

If temperatures violate given limits

Skip remaining steps.

COL-CC to check status of Heater 2.

Verify EPF_SOZ_Temp_Meas1_DMC – _____ > -40 deg C

Verify EPF_SOZ_Temp_Meas2_DMC – _____ > -20 deg C

If temperatures violate given limits

Skip remaining steps.

COL-CC to check status of Heater 2.

4. SETTING SOLAR POWER FEEDER 1 OFF

Payload: SOLAR

SOLAR Health and Status Data

'XCMU'

sel Commands

SOLAR Commands

'Power Feeder Commands'

cmd Feed 1 Off **Execute** (OK)

cmd EPF_SOZ_Pulse_Cmd2_DMC

data SW_CMD – DMS_Issue_Discrete_Cmd_SW

data ONBOARD_NODE – SYS_CCSDS_End_Point_PLCU_DMS_SERV

Verify OB Result – 0 (OK) or 1 (OK_SEQ_COUNT_ANOMALY)

1.207 SOLAR FEEDER 1 ACTIVATION

5. [ACTIVATING ISPR \(A3\) MAIN POWER BUS \(PDU1 OUTLET 03\)](#)

NOTE

If another payload is already active and powered by the PDU1 outlet 03 (i.e. if step 1 telemetry was showing ON), step 5 can be skipped.

5.1 [Checking ISPR \(A3\) Rack Power/Maintenance Switch Position Data](#)

Payload: ISPR A3

ISPR A3

'EPDS'

Verify Maint Switch – ON

Verify ISPR_A3_Maint_Switch_Stat_DMC – ON

5.2 [Enabling Power Bus System Control \(Ground only\)](#)

If
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
- DISABLED

cmd
PDU1 ISPR A3 Main Pwr Bus Svs Cntl Ena VTC
data SW_CMD – VTC_Disc_Out_Cmd_Cmd_SW
data Onboard_Node – SYS_CCSDS_End_Point_VTC1

Verify
PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC – ENABLED

5.3 [Activating ISPR \(A3\) Main Power Bus](#)

On COL-CC GO

COL1SC

Verify both PPSB LEDs below label “Bus #1” are ■ ■

PWS

EPDS

EPDS Functional Overview

'PDU1'

sel 120V Payload

PDU 1-2 120V Payload

'PDU1 Outlets'

sel 3

PDU1 Outlet 3

'Sys Bus Cntl Stat'

1.207 SOLAR FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 4 of 7 pages

Verify SSPC1 – ENABLED

'Commands'

cmd Pwr On Execute

'Pwr'

Verify SSPC1 Pwr – ON

Verify SSPC2 Pwr – ON

Verify SSPC3 Pwr – ON

Verify SSPC4 Pwr – ON

COL1SC

Verify both PPSB LEDs below label “Bus #1” are

cmd PDU1_ISPR_A3_Main_Pwr_Bus_On_AP

data ONBOARD_RECEPTION_NODE –
SYS CCSDS End Point PLCU DMS SERV
data ONBOARD_EXECUTION_NODE –
USM SW DMC USS Swop Instance

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
ON

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC –
ON

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC –
ON

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC –
ON

6. [VERIFYING SOLAR RELATED PDU 1 OUTLET CURRENT STATUS](#)

PWS

Payload: SOLAR

SOLAR Health and Status Data

'PDU1 Outlet 03'

Verify A3 Main Pwr Bus – ON

Verify Current Validity – Valid

Wait 2 minutes to allow current value to stabilize.

Record Current: _____ A

Verify PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – ON

Verify PDU1_ISPR_A3_Main_Pwr_Bus_Current_Validity_DMC – Valid

1.207 SOLAR FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 5 of 7 pages

Wait 2 minutes to allow current value to stabilize.

Record PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC:
_____A

7. [ACTIVATING SOLAR POWER FEEDER 1 BY XCMU COMMAND](#)

7.1 [Checking SOLAR Feeder 2 Status for Deactivation Need](#)

CAUTION

SOLAR Feeders 1 and 2 shall never be simultaneously powered. Feeder 2 must be OFF prior to powering Feeder 1. No telemetry for power status of Feeder 2 is available; therefore COL-CC has to determine SOLAR Feeder 2 power status from console log.

On COL-CC GO

Perform [{1.210 SOLAR FEEDER 2 \(HEATER\) DEACTIVATION}](#), all (SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL PAYLOADS)

Perform [{1.210 SOLAR FEEDER 2 \(HEATER\) DEACTIVATION}](#), all (SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL PAYLOADS)

7.2 [Activating SOLAR Feeder 1](#)

Payload: SOLAR

SOLAR Health and Status Data

'XCMU'

sel Commands

SOLAR Commands

'Power Feeder Commands'

cmd Feed 1 On **Execute** (OK)

cmd EPF_SOZ_Pulse_Cmd1_DMC

data SW_CMD – DMS_Issue_Discrete_Cmd_SW

data ONBOARD_NODE –

SYS CCSDS End Point PLCU DMS SERV

Verify OB Result – 0 (OK) or 1 (OK_SEQ_COUNT_ANOMALY)

7.3 [Checking PDU 1 Outlet 03 Status \[ISPR \(A3\) Main Power Bus\]](#)

Payload: SOLAR

SOLAR Health and Status Data

'PDU1 Outlet 03'

1.207 SOLAR FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 7 pages

Verify Current Validity – Valid

Wait 2 minutes to allow current value to stabilize.

Record Current: _____ A

Subtract current value of step 6 from current value of step 7.3.

Record result: _____ A

Verify result < 1 A

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
ON

Verify PDU1_ISPR_A3_Main_Pwr_Bus_Current_Validity_DMC –
Valid

Wait 2 minutes to allow current value to stabilize.

Record PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC:
A

Subtract current value of step 6 from current value of step 7.3.

Record result: _____ A

Verify result < 1 A

8. [STARTING SOLAR \(EPF SOZ1\) MIL BUS DATA ACQUISITION \(GROUND ONLY\)](#)

cmd DMS_RT_Start_RT_Acquisition_Cmd_SW

prm REMOTE_TERMINAL_ID –

MIL 1553B Bus RT Payload Bus EXPA OZ1

data ONBOARD_NODE – SYS_CCSDS_End_Point_PLCU_DMS_SERV

Verify EPF_SOZ1_PL_Bus_Ena_Stat_SW – ENABLED

Verify EPF_SOZ1_PL_Bus_No_Resp_SW – NO_ERROR

Verify EPF_SOZ1_PL_Bus_Msg_Error_SW – NO_ERROR

Verify EPF_SOZ1_PL_Bus_Busy_Flag_SW – NO_ERROR

Verify EPF_SOZ1_PL_Bus_Erroneous_Msg_SW – NO_ERROR

Verify EPF_SOZ1_PL_Bus_Terminal_Flag_SW – NO_ERROR

Verify EPF_SOZ1_PL_Bus_Unit_Error_Flag_SW – NO_ERROR

9. [VERIFYING SOLAR \(EPF SOZ1\) MIL BUS DATA](#)

On COL-CC GO

Payload: SOLAR

SOLAR Health and Status Data

'H&S Data'

1.207 SOLAR FEEDER 1 ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 7 pages

'Update Counter'

Verify SA#09 – incrementing

Verify SA#10 – incrementing

Verify SA#11 – incrementing

Verify SOL_SA9_Counter – incrementing

Verify SOL_SA10_Counter – incrementing

Verify SOL_SA11_Counter – incrementing

COL-CC to announce to B-USOC the completion of SOLAR Feeder 1 Activation.

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1.208 SOLAR FEEDER 1 DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 4 pages

OBJECTIVE:

This procedure is used to deactivate the Power Feeder 1 (Operational Power) of the external payload SOLAR, located on COL EPF SOZ position.

PWS

1. [VERIFYING ISPR \(A3\) MAIN POWER BUS STATUS \(PDU1 OUTLET 03\)](#)

On COL-CC GO

Payload: SOLAR

SOLAR Health and Status Data

'PDU1 Outlet 03'

Verify A3 Main Pwr Bus – ON

Verify Current Validity – Valid

Record Current: _____ A

Verify PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – ON

Verify PDU1_ISPR_A3_Main_Pwr_Bus_Current_Validity_DMC – Valid

Record PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC:

_____ A

2. [STOPPING RT ACQUISITION FOR SOLAR \(EPF SOZ1\) \(GROUND ONLY\)](#)

cmd DMS_RT_Stop_RT_Acquisition_Cmd_SW

prm REMOTE_TERMINAL_ID –

MIL 1553B Bus RT Pavload Bus EXPA OZ1

data ONBOARD_NODE – SYS_CCSDS_End_Point_PLCU_DMS_SERV

Verify EPF_SOZ1_PL_Bus_Ena_Stat_SW – DISABLED

3. [DEACTIVATING SOLAR POWER FEEDER 1 BY XCMU COMMAND](#)

3.1 [Deactivating SOLAR Power Feeder 1](#)

On COL-CC GO

Payload: SOLAR

SOLAR Health and Status Data

'XCMU'

sel Commands

SOLAR Commands

'Power Feeder Commands'

cmd Feed 1 Off **Execute** (OK)

cmd EPF_SOZ_Pulse_Cmd2_DMC

data SW_CMD – DMS_Issue_Discrete_Cmd_SW

1.208 SOLAR FEEDER 1 DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 4 pages

data ONBOARD_NODE –
SYS CCSDS End Point PLCU DMS SERV

Verify OB Result – 0 (OK) or 1 (OK_SEQ_COUNT_ANOMALY)

3.2 [Checking PDU1 Outlet 03 Status \[ISPR \(A3\) Main Power Bus\]](#)

Payload: SOLAR

SOLAR Health and Status Data

'PDU1 Outlet 03'

Verify Current Validity – Valid

Record Current: _____ A

Subtract current value of step 3.2 from current value of step 1.

Record result: _____ A

Verify result < 1 A

Verify PDU1_ISPR_A3_Main_Pwr_Bus_Current_Validity_DMC –
Valid

Record PDU1_ISPR_A3_Main_Pwr_Bus_Current_DMC:
_____ A

Subtract current value of step 3.2 from current value of step 1.

Record result: _____ A

Verify result < 1 A

4. [DEACTIVATING ISPR \(A3\) MAIN POWER BUS \(PDU1 OUTLET 03\)](#)

NOTE

The following steps must not be performed if other payloads are currently powered by PDU1 outlet 03.

4.1 [Deactivating ISPR \(A3\) Main Power Bus](#)

On COL-CC GO

COL1SC

Verify both PPSB LEDs below label “Bus #1” are

PWS

EPDS

EPDS Functional Overview

'PDU1'

sel 120V Payload

PDU 1-2 120V Payload

'PDU1 Outlets'

1.208 SOLAR FEEDER 1 DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 4 pages

sel 3

PDU1 Outlet 3

'Sys Bus Cntl Stat'

Verify SSPC1 – ENABLED

'Commands'

cmd Pwr Off Execute

'Pwr'

Verify SSPC1 – OFF

Verify SSPC2 – OFF

Verify SSPC3 – OFF

Verify SSPC4 – OFF

COL1SC

Verify both PPSB LEDs below label “Bus #1” are ■■

cmd PDU1_ISPR_A3_Main_Pwr_Bus_Off_AP

data ONBOARD_RECEPTION_NODE -
SYS CCSDS End Point PLCU DMS SERV

data ONBOARD_EXECUTION_NODE -
USM SW DMC USS Swoop Instance

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
OFF

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC –
OFF

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC –
OFF

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC –
OFF

4.2 [Disabling Power Bus System Control \(Ground only\)](#)

cmd PDU1_ISPR_A3_Main_Pwr_Bus_Sys_Cntl_Dis_VTC

data SW_CMD – VTC_Disc_Out_Cmd_Cmd_SW

data Onboard_Node – SYS_CCSDS_End_Point_VTC1

Verify

PDU1_ISPR_A3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
– DISABLED

1.208 SOLAR FEEDER 1 DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 4 of 4 pages

COL-CC to announce to B-USOC the completion of SOLAR Feeder 1 Deactivation.

4.3 [Activating Feeder 2 \(Heater\)](#)

CAUTION

The SOLAR payload has thermal constraints when unpowered; therefore, Feeder 2 (Heater) power shall be applied to prevent hardware damage.

On COL-CC GO

Perform [{1.209 SOLAR FEEDER 2 \(HEATER\) ACTIVATION}](#), all (SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL PAYLOADS).

Perform [{1.209 SOLAR FEEDER 2 \(HEATER\) ACTIVATION}](#), all (SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL PAYLOADS).

1.209 SOLAR FEEDER 2 (HEATER) ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 6 pages

OBJECTIVE:

This procedure is used to activate the Power Feeder 2 (Survival Heater Power) of the external payload SOLAR, located on COL EPF SOZ position.

NOTE

1. **COL-CC** to check that SOLAR Power Feeder 1 is not active.
2. **COL-CC** to check and coordinate power status situation for F3 main power bus with respect to ISPR F3 and external payload Feeder 2 for EuTEF.

1. [VERIFYING ISPR \(A3\) MAIN POWER BUS STATUS \(PDU2 OUTLET 03\)](#)

On COL-CC GO

PWS

EPDS

EPDS Functional Overview

'PDU2'

sel 120V Payload

PDU 1-2 120V Payload

'PDU2 Outlets'

sel 3

PDU2 Outlet 3

Record SSPC1 Pwr: _____

Record SSPC2 Pwr: _____

Record SSPC3 Pwr: _____

Record SSPC4 Pwr: _____

Record Current: _____ A

Record PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC:

Record PDU2_ISPR_F3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC:

Record PDU2_ISPR_F3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC:

Record PDU2_ISPR_F3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC:

Record PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC:

_____ A

2. [VERIFYING PPSB SWITCH FOR SOLAR POWER FEEDER 2](#)

Payload: EPF SOZ

EPF SOZ

'EPDS'

Verify PPSB Redun PWR – ON

Verify PPSB_EPF_SOZ_Redun_Pwr_Stat_DMC – ON

3. [ACTIVATING ISPR \(F3\) MAIN POWER BUS \(PDU2 OUTLET 03\)](#)

NOTE

If another payload is already active and powered by the PDU2 outlet 03 (i.e. if step 1 telemetry was showing ON), step 3 can be skipped.

3.1 [Verifying ISPR \(F3\) Maintenance Switch Configuration Data](#)

Payload: ISPR F3

ISPR F3

'EPDS'

Verify EPDS Maint Switch – ON

Verify ISPR_F3_Maint_Switch_Stat_DMC – ON

3.2 [Enabling Power Bus System Control \(Ground only\)](#)

If
PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
– DISABLED

cmd PDU2 ISPR F3 Main Pwr Bus Svs Cntl Ena VTC data SW_CMD – VTC_Disc_Out_Cmd_Cmd_SW data Onboard_Node – SYS_CCSDS_End_Point_VTC1

Verify
PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC – ENABLED

3.3 [Activating ISPR \(F3\) Main Power Bus](#)

On COL-CC GO

COL1SC

Verify both PPSB LEDs below label “Bus #2” are ■■

PWS

EPDS

EPDS Functional Overview

'PDU2'

sel 120V Payload

PDU 1-2 120V Payload

'PDU2 Outlets'

sel 3

PDU2 Outlet 3

'Sys Bus Cntl Stat'

Verify SSPC1 – ENABLED

'Commands'

cmd Pwr On **Execute** (OK)

'Pwr'

Verify SSPC1 Pwr – ON

Verify SSPC2 Pwr – ON

Verify SSPC3 Pwr – ON

Verify SSPC4 Pwr – ON

COL1SC

Verify both PPSB LEDs below label “Bus #2” are

cmd PDU2_ISPR_F3_Main_Pwr_Bus_On_AP

data ONBOARD_RECEPTION_NODE -
SYS CCSDS End Point PLCU DMS SERV

data ONBOARD_EXECUTION_NODE -
USM SW DMC USS Swop Instance

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
ON

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC –
ON

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC –
ON

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC –
ON

4. VERIFYING SOLAR RELATED PDU 2 OUTLET STATUS

PWS

Payload: SOLAR

SOLAR Health and Status Data

'PDU2 Outlet 03'

Verify F3 Main Pwr Bus – ON

1.209 SOLAR FEEDER 2 (HEATER) ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 4 of 6 pages

Verify Current Validity – Valid

Wait 2 minutes to allow current value to stabilize.

Record Current: _____ A

Verify PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – ON
Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_Validity_DMC – Valid

Wait 2 minutes to allow current value to stabilize.

Record PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC – _____ A

5. [ACTIVATING SOLAR POWER FEEDER 2 BY XCMU LEVEL COMMAND](#)

CAUTION

SOLAR Feeders 1 and 2 shall never be simultaneously powered.
Feeder 1 must be off prior to powering Feeder 2 on.

5.1 [Deactivating SOLAR Power Feeder 1](#) On COL-CC GO

Perform [{1.208 SOLAR FEEDER 1 DEACTIVATION}](#), all
(SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL
PAYLOADS).

Perform [{1.208 SOLAR FEEDER 1 DEACTIVATION}](#), all
(SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL
PAYLOADS).

5.2 [Activating SOLAR Power Feeder 2](#)

Payload: SOLAR

SOLAR Health and Status Data

'XCMU'

sel Commands

SOLAR Commands

'Power Feeder Commands'

cmd Feed 2 On **Execute** (OK)

cmd EPF_SOZ_Reset_Level_Cmd3_DMC
data SW_CMD – DMS_Issue_Discrete_Cmd_SW
data ONBOARD_NODE –
SYS CCSDS End Point PLCU DMS SERV

Verify OB Result – 0 (OK) or 1 (OK_SEQ_COUNT_ANOMALY)

5.3 [Checking PDU 2 Outlet 03 Status \[ISPR \(F3\) Main Power Bus\]](#)

Payload: SOLAR

SOLAR Health and Status Data

'PDU2 Outlet 03'

Verify Current Validity – Valid

Wait 2 minutes to allow current value to stabilize.

Record Current: _____ A

Subtract current value recorded in step 4 from current value recorded in step 5.3.

Record result: _____ A

Verify result < 2 A

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – ON

Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_Validity_DMC – Valid

Wait 2 minutes to allow current value to stabilize.

Record PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC:
A

Subtract current value recorded in step 4 from current value recorded in step 5.3.

Record result: _____ A

Verify result < 2 A

6. [VERIFYING SOLAR \(EPF SOZ\) TEMPERATURE](#)

NOTE

COL-CC to check CMA/CU temperatures from time to time until operational temperature of SOLAR is reached. Operational CMA temperatures should be > -40 deg C. Operational CU temperature should be > -20 deg C.

Payload: SOLAR

SOLAR Health and Status Data

'XCMU'

Record CMA Temp : _____ deg C

Record CU Temp: _____ deg C

1.209 SOLAR FEEDER 2 (HEATER) ACTIVATION
(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 6 pages

Record EPF_SOZ_Temp_Meas1_DMC: _____ deg C
Record EPF_SOZ_Temp_Meas2_DMC: _____ deg C

COL-CC to announce to B-USOC the completion of SOLAR Feeder 2
Activation.

1.210 SOLAR FEEDER 2 (HEATER) DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 4 pages

OBJECTIVE:

This procedure is used to deactivate the Power Feeder 2 (Survival Heater Power) of the external payload SOLAR, located on COL EPF SOZ position.

PWS

1. VERIFYING SOLAR TEMPERATURE

On COL-CC GO

Payload: SOLAR

SOLAR Health and Status Data

'XCMU'

Verify CMA Temp > -40 deg C

Verify CU Temp > -20 deg C

If temperatures violate given limits

| Skip remaining steps.

Verify EPF_SOZ_Temp_Meas1_DMC > -40 deg C

Verify EPF_SOZ_Temp_Meas2_DMC > -20 deg C

If temperatures violate given limits

| Skip remaining steps.

2. VERIFYING ISPR (F3) MAIN POWER BUS STATUS (PDU2 OUTLET 03)

Payload: SOLAR

SOLAR Health and Status Data

'PDU2 Outlet 03'

Verify F3 Main Pwr Bus – ON

Verify Current Validity – Valid

Record Current: _____ A

Verify PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – ON

Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_Validity_DMC – Valid

Record PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC:

_____ A

3. DEACTIVATING SOLAR POWER FEEDER 2 BY XCMU COMMAND

3.1 Deactivating SOLAR Power Feeder 2

Payload: SOLAR

SOLAR Health and Status Data

'XCMU'

sel Commands

SOLAR Commands

'Power Feeder Commands'

cmd Feed 2 Off **Execute** (OK)

cmd EPF_SOZ_Set_Level_Cmd3_DMC

data SW_CMD - DMS_Issue_Discrete_Cmd_SW

data ONBOARD_NODE -

SYS CCSDS End Point PLCU DMS SERV

Verify OB Result - 0 (OK) or 1 (OK_SEQ_COUNT_ANOMALY)

3.2 [Checking PDU2 Outlet 03 Status \[ISPR \(F3\) Main Power Bus\]](#)

Payload: SOLAR

SOLAR Health and Status Data

'PDU2 Outlet 03'

Verify Current Validity - Valid

Record Current: _____ A

Subtract current value recorded in step 3.2 from current value recorded in step 2.

Record result: _____ A

Verify result < 2 A

Verify PDU2_ISPR_F3_Main_Pwr_Bus_Current_Validity_DMC - Valid

Record PDU2_ISPR_F3_Main_Pwr_Bus_Current_DMC:
A

Subtract current value recorded in step 3.2 from current value recorded in step 2.

Record result: _____ A

Verify result < 2 A

4. [DEACTIVATING ISPR \(F3\) MAIN POWER BUS \(PDU2 OUTLET 03\)](#)

NOTE

The following steps must not be performed if other payloads are currently powered by PDU2 Outlet 03.

4.1 [Deactivating ISPR \(F3\) Main Power Bus](#)
On COL-CC GO

1.210 SOLAR FEEDER 2 (HEATER) DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 4 pages

COL1SC

Verify both PPSB LEDs below label "Bus #2" are

PWS

EPDS

EPDS Functional Overview

'PDU2'

sel 120V Payload

PDU 1-2 120V Payload

'PDU2 Outlets'

sel 3

PDU2 Outlet 3

'Sys Bus Cntl Stat'

Verify SSPC1 – ENABLED

'Commands'

cmd Pwr Off Execute

'Pwr'

Verify SSPC1 – OFF

Verify SSPC2 – OFF

Verify SSPC3 – OFF

Verify SSPC4 – OFF

cmd PDU2_ISPR_F3_Main_Pwr_Bus_Off_AP

data ONBOARD_RECEPTION_NODE –

SYS CCSDS End Point PLCU DMS SERV

data ONBOARD_EXECUTION_NODE –

USM SW DMC USS Swoop Instance

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – OFF

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC – OFF

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC – OFF

Verify

PDU2_ISPR_F3_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC – OFF

4.2 [Disabling Power Bus System Control \(Ground only\)](#)

cmd PDU2_ISPR_F3_Main_Pwr_Bus_Sys_Cntl_Dis_VTC
data SW_CMD – VTC_Disc_Out_Cmd_Cmd_SW
data Onboard_Node – SYS_CCSDS_End_Point_VTC1

Verify
PDU2_ISPR_F3_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC –
DISABLED

COL-CC to announce to **B-USOC** the completion of SOLAR Feeder 2 Deactivation.

4.3 [Activating SOLAR Power Feeder 1](#)

CAUTION

The SOLAR payload has thermal constraints when unpowered; therefore, Feeder 1 (operational) power shall be applied to prevent hardware damage.

On COL-CC GO

Perform [{1.207 SOLAR FEEDER 1 ACTIVATION}](#), all (SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL PAYLOADS).

Perform [{1.207 SOLAR FEEDER 1 ACTIVATION}](#), all (SODF: ASSY PAYLOAD: COLUMBUS MODULE EXTERNAL PAYLOADS).

EDR

EDR

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EDR

1.100 PCDF ELECTRONICS UNIT CONNECTIONS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 4 pages

OBJECTIVE:

To install the Protein Crystallization Diagnostics Facility (PCDF) Electronics Unit Front Connections in standalone configuration to allow PCDF Electronics Unit commissioning.

DURATION:

15 minutes crew time

CREW:

One

LOCATION:

COL1F1

TOOLS:

None

PARTS:

EDR STOWAGE BAG #1:

EDR Data Cable

EDR STOWAGE BAG #2:

Eyelet

EDR Water Supply Hose

EDR Water Return Hose 1 & 2 (two hoses connected together)

PCDF Fibre Optics Cable 1, 2 (two)

MATERIALS:

Velcro strip

Gray Tape

- COL1F1 1. [VERIFYING RACK POWER IS OFF](#)
Verify RPDA ESEM1 MAIN ON – ■

√sw Rack Power – OFF
- PCDF
Electronics 2. [INSPECTING FRONT PANEL](#)
Unit
Verify PCDF Electronics Unit front panel for absence of visible damage

√sw POWER – OFF
3. [CONNECTING COOLANT WATER HOSES](#)
Remove caps on Lower Utility Distribution Panel 'COOLANT WATER SUPPLY 2' and 'COOLANT WATER RETURN 2'

Remove dust caps on PCDF Electronics Unit 'COOLANT WATER SUPPLY' and 'COOLANT WATER RETURN'

Retrieve EDR Water Supply Hose and remove any (tethered) dust caps

1.100 PCDF ELECTRONICS UNIT CONNECTIONS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 2 of 4 pages

'To EDR Lower Utility Distribution Panel COOLANT WATER SUPPLY 2'
→|← Lower Utility Distribution Panel 'COOLANT WATER SUPPLY 2'

NOTE

The EDR Water Supply Hose has been labeled in accordance with the PCDF full configuration. Therefore it is nominal that the labels do not match in the current PCDF Electronics Unit standalone configuration.

'To PCDF Process Unit COOLANT WATER SUPPLY' →|← PCDF
Electronics Unit 'COOLANT WATER SUPPLY'

NOTE

The EDR Water Return Hose 1 & 2 consists of two sections of hose connected together.

Retrieve EDR Water Return Hose 1 & 2 and remove any (tethered) dust caps

'To EDR Lower Utility Distribution Panel COOLANT WATER RETURN 2'
→|← Lower Utility Distribution Panel 'COOLANT WATER RETURN 2'

'To PCDF Electronics Unit COOLANT WATER RETURN' →|← PCDF
Electronics Unit 'COOLANT WATER RETURN'

Install Eyelet on EDR seatrack (see Figure 1 below)

Reduce protrusion by securing the water hoses using a Velcro Strip attached to the Eyelet (see Figure 1)

Verify all connections and hoses – no leakage

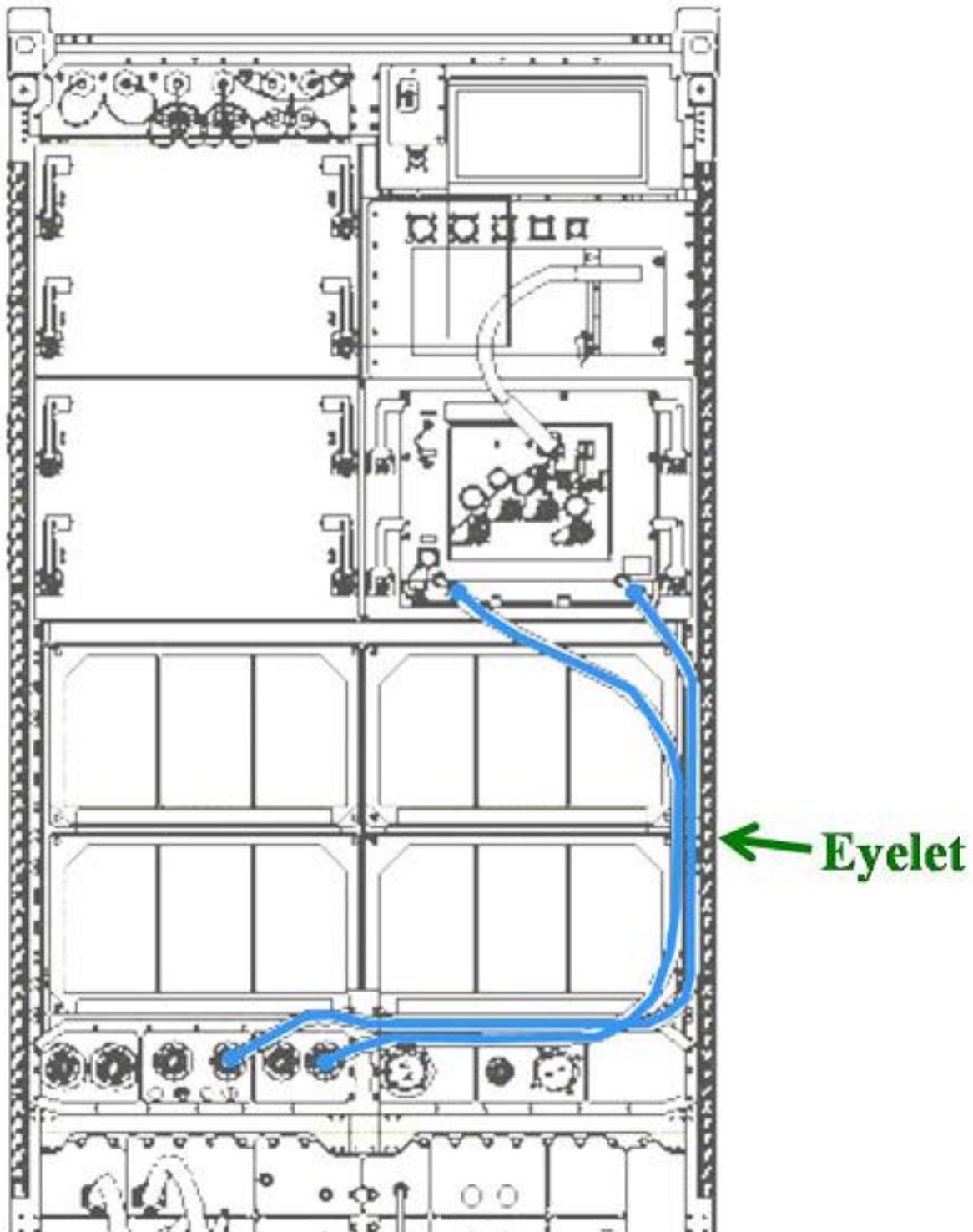


Figure 1. Appearance of EDR - PCDF Electronics Unit Water Loop (with Eyelet)

4. [CONNECTING EDR DATA CABLE](#)
Remove dust cap on PCDF Electronics Unit 'DATA J08'

Remove dust cap on VMU 'HSSL J11'

1.100 PCDF ELECTRONICS UNIT CONNECTIONS INSTALLATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 4 of 4 pages

Retrieve EDR Data Cable

'P08 To PCDF Electronics Unit DATA J08'→|←PCDF Electronics Unit
'DATA J08'

'P11 To VMU HSSL J11'→|←VMU 'HSSL J11'

5. [CONNECTING FIBER OPTICS CABLE 1, 2](#)

Remove dust caps on PCDF Electronics Unit 'CHANNEL 1' and
'CHANNEL 2'

CAUTION

Fiber Optics Cables can be mechanically damaged if bent or not
handled with care.

Retrieve PCDF Fibre Optics Cable 1, 2 (two) and only remove dust caps
at P2 end and at P4 end

'P2 TO PCDF Electronics Unit CHANNEL 1'→|←PCDF Electronics Unit
'CHANNEL 1'

'P4 TO PCDF Electronics Unit CHANNEL 2'→|←PCDF Electronics Unit
'CHANNEL 2'

Secure floating ends with Gray Tape (checkout operations from ground
will measure noise in the floating cables)

6. [CLEANUP](#)

Bags - stow

Update IMS with stowage locations or notify **COL-CC**

1.101 EDR FRONT OPERATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 8 pages

OBJECTIVE:

The objectives are to install post-launch the EDR Video Management Unit (VMU) Hard Disks (HD) 1 and 2, and install the Front Panel Gap Closing Blankets in the correct positions

LOCATION:

COL1F1

DURATION:

15 minutes Crew Time

CREW:

One

TOOLS:

Columbus Tool Kit

Tool Bag 1

Ratchet Wrench, 1/4" Drive

Tool Bag 3:

M4 (3mm) Hex Head Driver, 1/4" Drive

2" Extension, 1/4" Drive

ISS IVA Toolbox

Drawer 2:

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

ITEMS:

VMU Hard Disk 1

VMU Hard Disk 2

DRW1 Gap-Closing Blanket

RPDA Gap-Closing Blanket

Static Wrist Tether

DCS 760 Camera

- COL1F1 1. [SAFING](#)
Check RPDA ESEM1 MAIN ON - ■

Verify sw RACK POWER - OFF
- PWS ISPR F1
 ISPR F1

'PDU 1'
Verify Aux Pwr Bus - OFF

'PDU 2'
Verify Main Pwr Bus - OFF

COL1F1

If NOT

Perform [{1.110 EDR ISPR RACK DE-ACTIVATION}](#), all (ESA SODF: ACTIVATION AND CHECKOUT), then:

sw RACK POWER → OFF

sw RPDA ESEM1 RPDA ON/OFF → OFF

2. REMOVING VMU HARD DISKS ACCESS PANEL

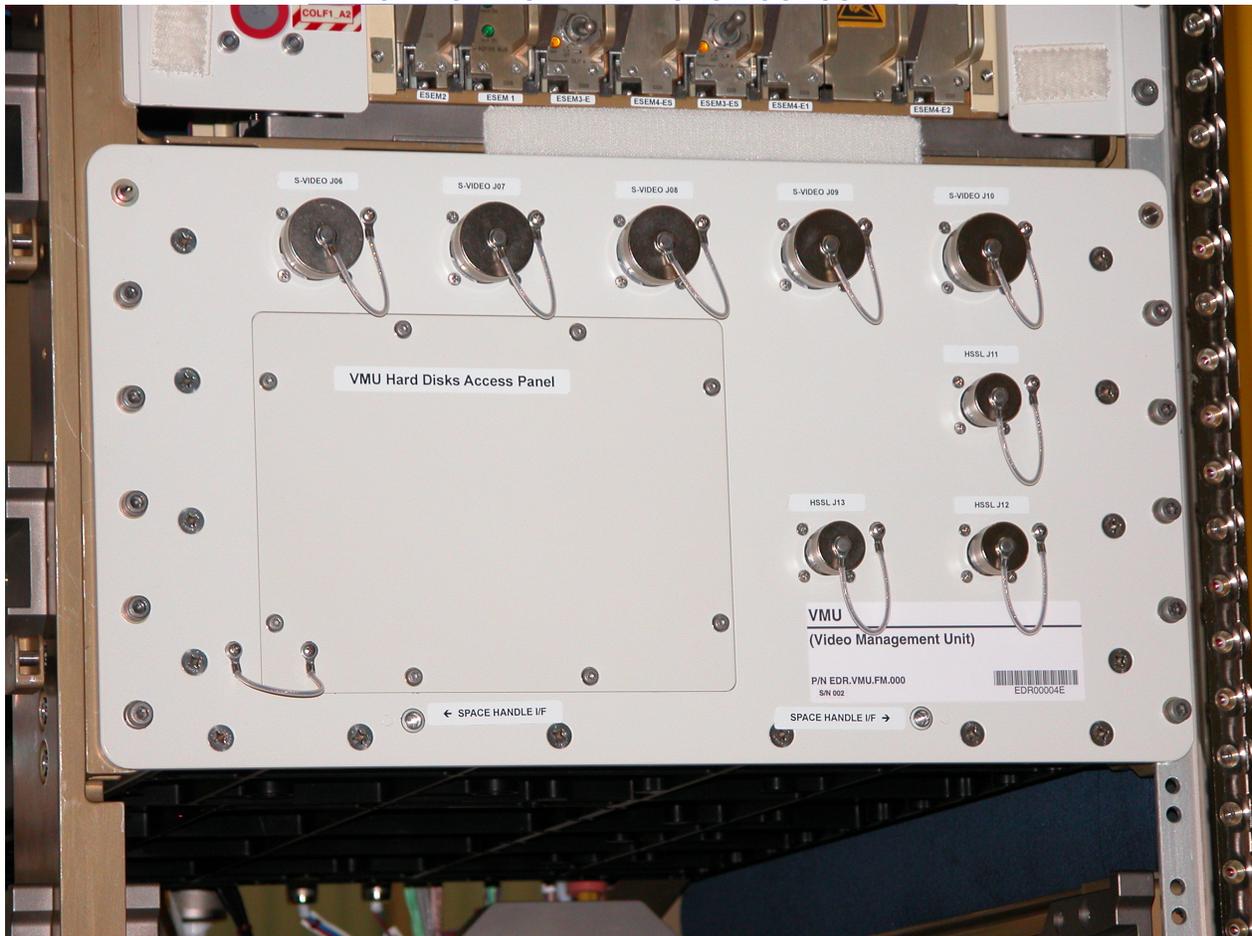


Figure 1. VMU Hard Disks Access panel

- 2.1 Loosed eight (8) Captive screws on the VMU Access Panel. (Ratchet Wrench, 1/4" Drive; M4 (3 mm) Hex Head Driver, 1/4" Drive) (see figure 1)
- 2.2 Open tethered VMU Hard Disks Access Panel

1.101 EDR FRONT OPERATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 3 of 8 pages

3. REMOVING FOAM

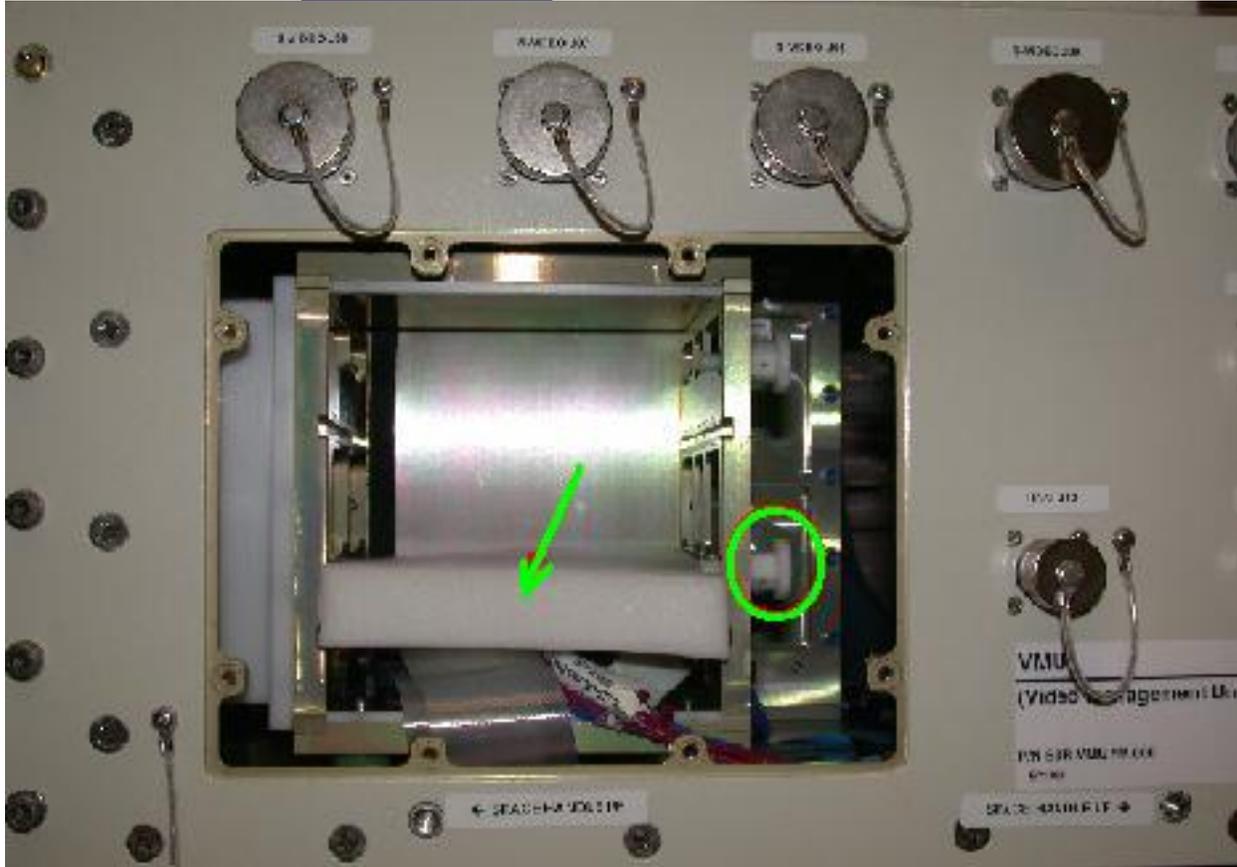


Figure 2. Protective Foam and KNOB - Highlighted

Remove the Protecting Foam from HD Cabinet

VMU Hard Disks 1 and 2 KNOBS on side VMU Cabinet (Fig. 2) – loosen

4. CHECKING VMU HARDDISKS

Verify by visual inspection VMU Hard Disk 1 and VMU Hard Disk 2 are not damaged (no scattered items visible)

Remove packaging from VMU Hard Disk 1 and VMU Hard Disk 2

5. INSTALLING VMU HARD DISKS

NOTE

VMU Hard Disk 1, 2 are to be installed in the correct slots 1, 2 of the VMU Cabinet, because VMU Hard Disk 1 contains EDR start-up files.

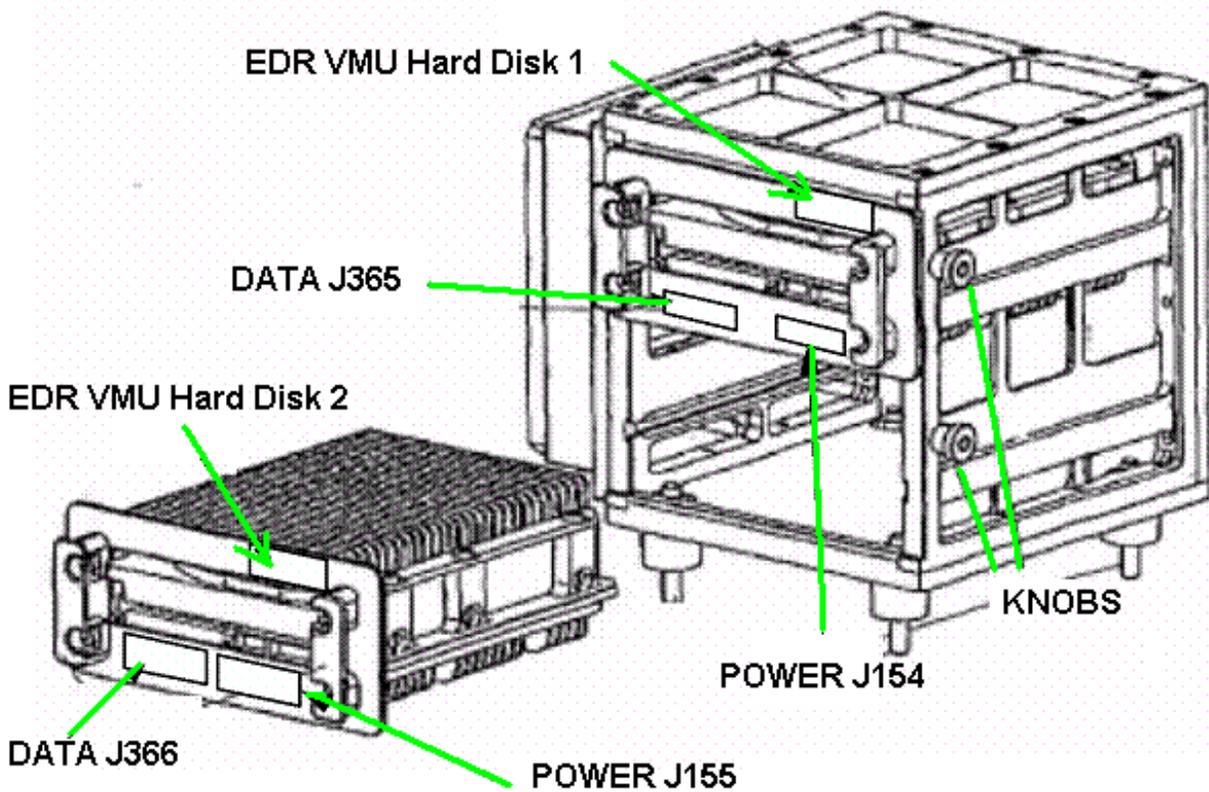


Figure 3. VMU Hard Disks Drawing

- 5.1 VMU Hard Disk 1 (Fig. 3) - insert in slot 1 of VMU Cabinet (pushing the two handles on the front of the HD1)
- 5.2 VMU Hard Disk 2 (Fig. 3) - insert in slot 2 of VMU Cabinet (pushing the two handles on the front of the HD2)
- 5.3 VMU Hard Disks 1 and 2 KNOBS on side VMU Cabinet (Fig. 3) - locked (finger tight)

6. [CONNECTING VMU HARD DISKS](#)

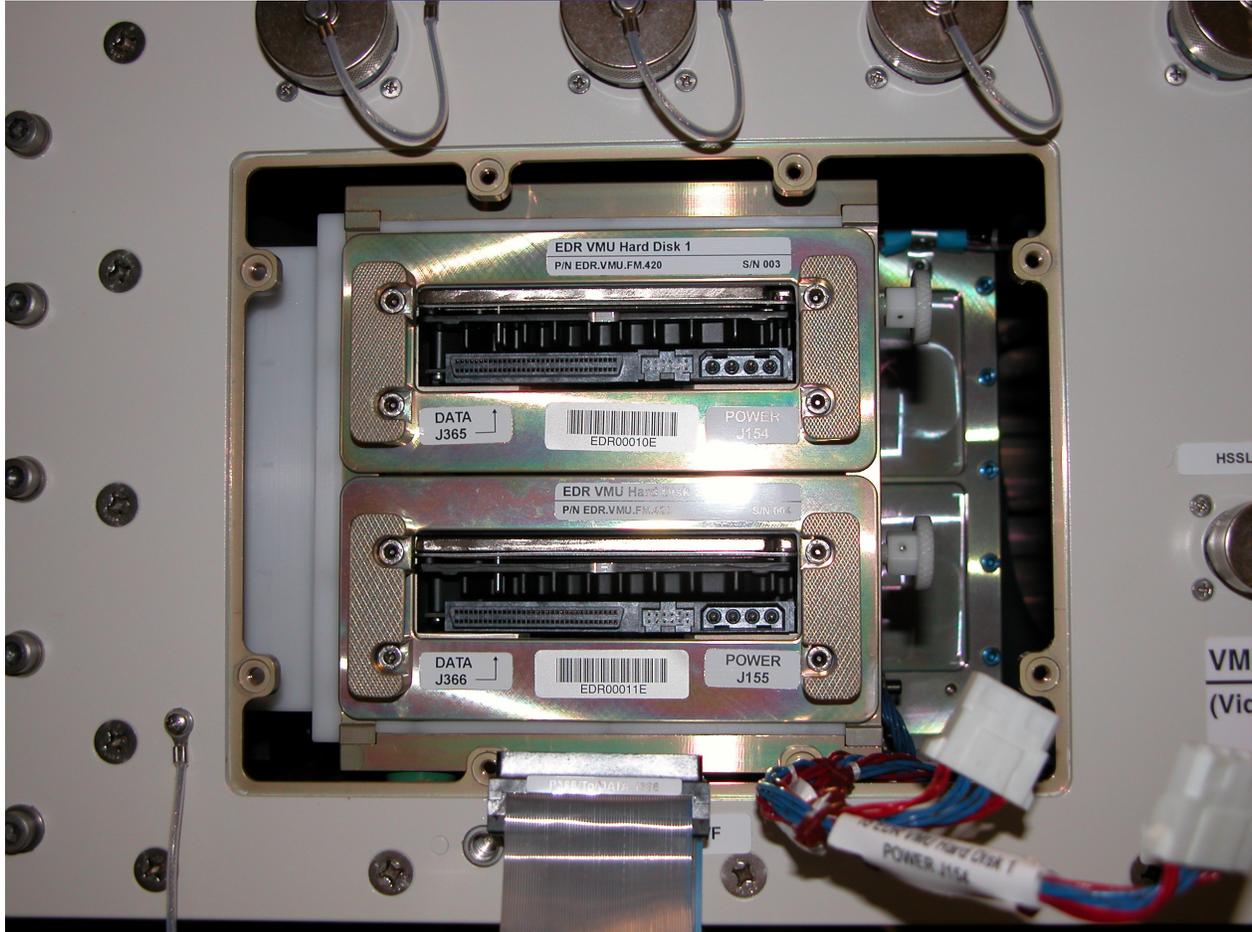


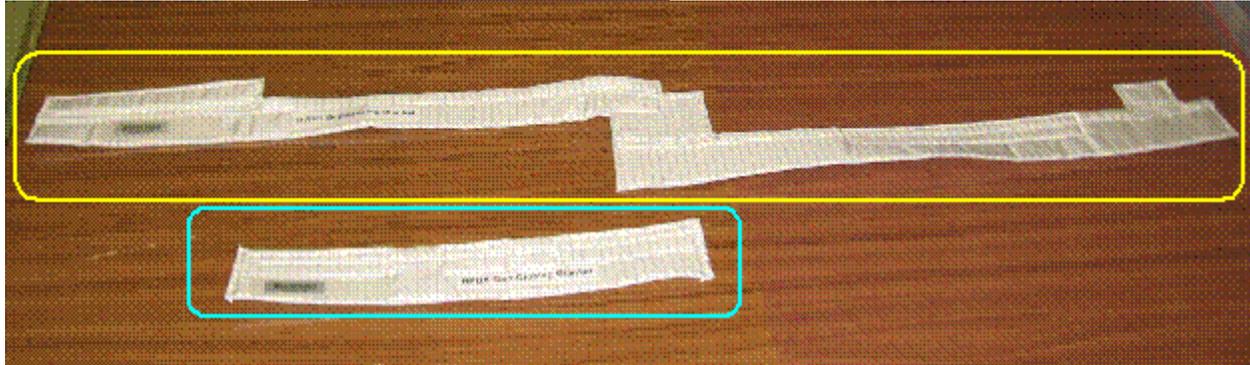
Figure 4. VMU Hard Disks Installation

- 6.1 VMU Hard Disk 2 →|← power connector (HD2 PWR J155) (Fig. 4)
- VMU Hard Disk 2 →|← SCSI Bus connector (HD2 DATA J366)
- VMU Hard Disk 1 →|← power connector (HD1 PWR J154)
- VMU Hard Disk 1 →|← SCSI Bus connector (HD1 DATA J365)
- Photodocument installed Hard Disks (DCS 760 Camera)

7. [REINSTALLING THE VMU HARD DISKS ACCESS PANEL](#)

- 7.1 Reinstall the VMU Hard Disks access panel and torque captive screws (eight) to 24 in-Lb.

8. GAP CLOSING BLANKETS



LEGENDA:

- DRW1 Gap-Closing Blanket
- RPDA Gap-Closing Blanket

Figure 5. Gap Closing Blankets

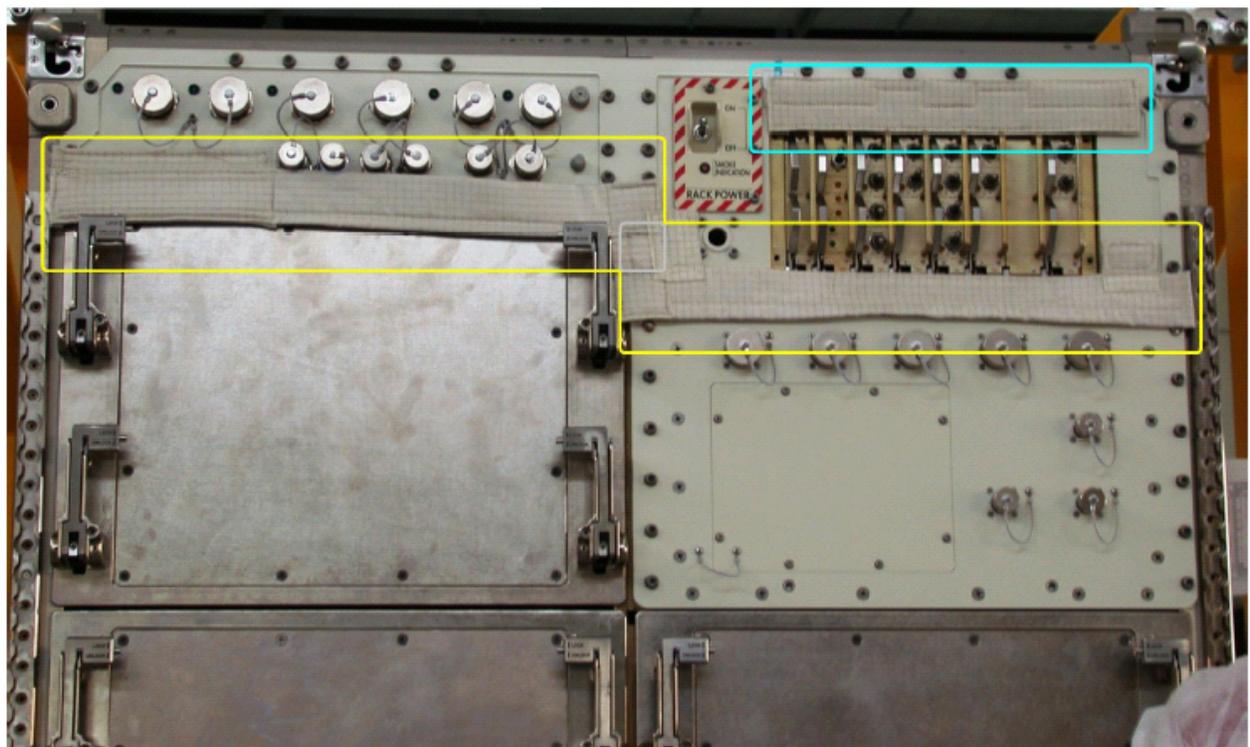


Figure 6. Gap Closing Blankets in position

- 8.1 Unpack the DRW1 Gap-Closing Blanket from protective bag and install in position below Upper Utility Distribution Panel, and between RPDA and VMU (VELCRO strips, refer to Figure 5 for Blanket identification and Figure 6 for Blanket position).
- 8.2 Unstow the RPDA Gap-Closing Blanket from protective bag and install in position above RPDA (VELCRO strips, refer to Figure 5 for Blanket identification and Figure 6 for Blanket position)

1.101 EDR FRONT OPERATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 7 of 8 pages

8.3 Photodocument installed blankets (DCS 760 Camera)

9. VERIFYING MANUAL FLOW CONTROL VALVE

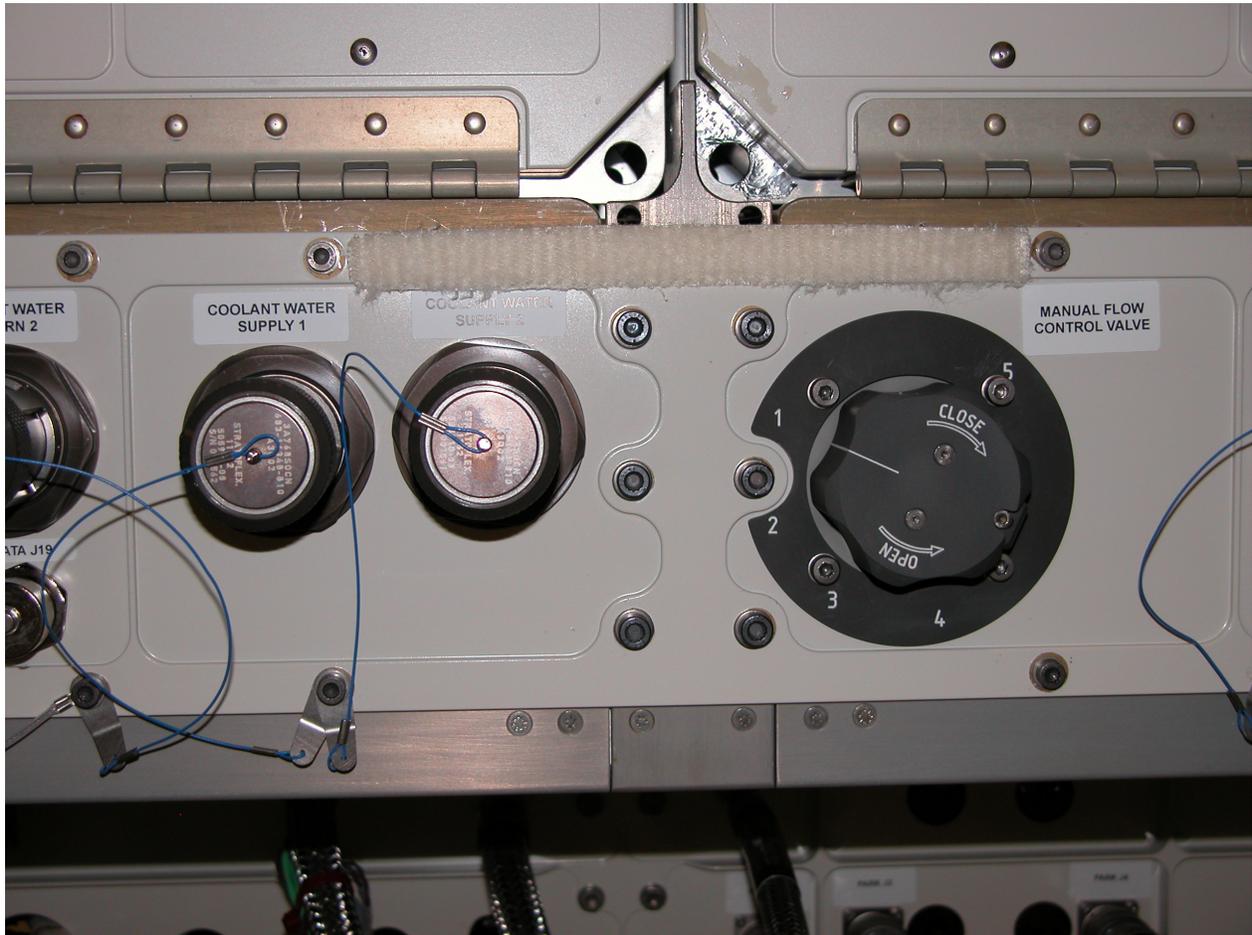


Figure 7. Manual Flow Control Valve

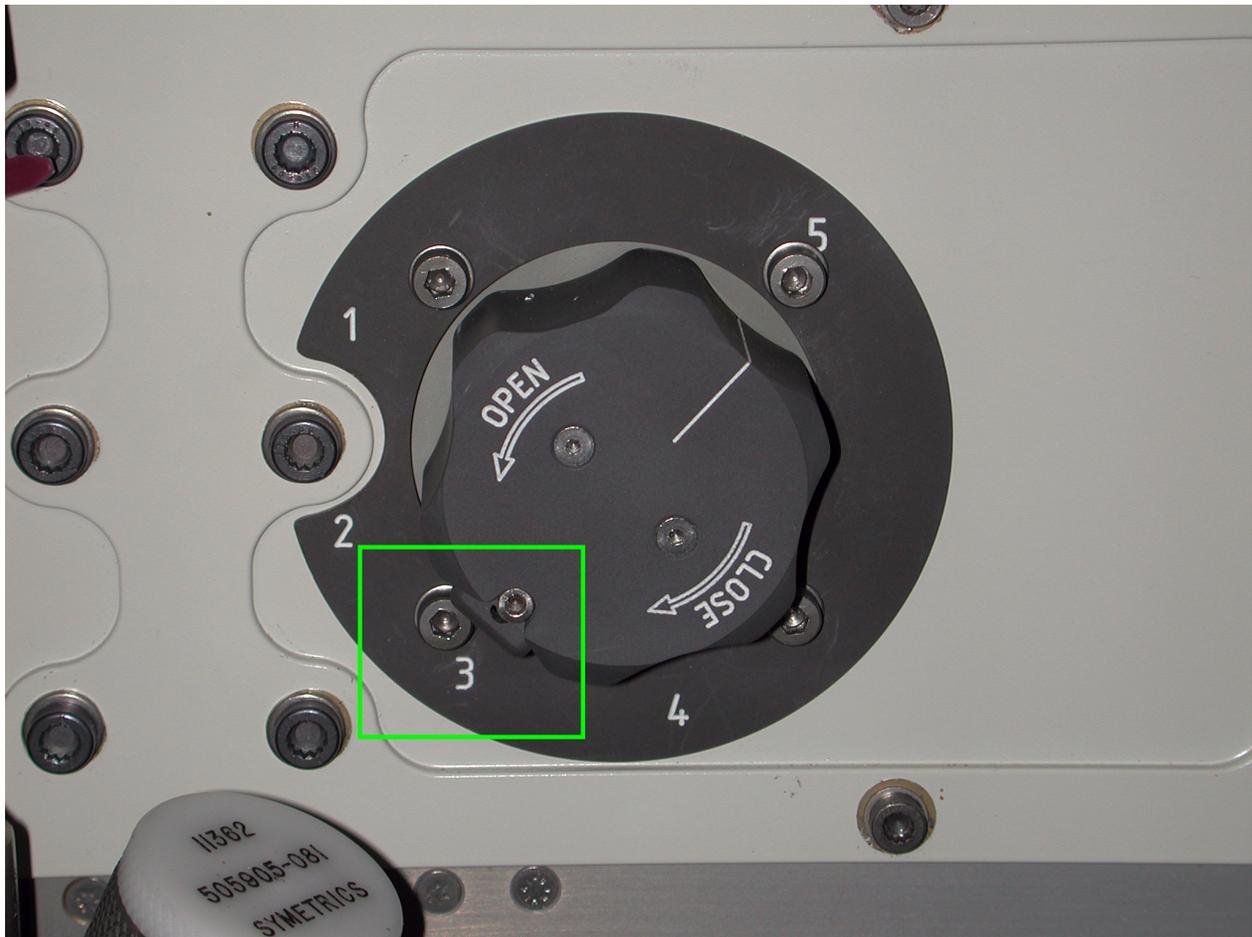


Figure 8. Manual Flow Control Valve - Locking Highlighted

NOTE

MANUAL FLOW CONTROL VALVE Locking (refer to Figure 8) needs to be pressed to rotate the Valve.

√MANUAL FLOW CONTROL VALVE (Position) – 1 (refer to Figure 7)

10. [CLEANUP](#)
Stow tools and materials.

Update IMS with stowage location or notify COL-CC.

1.104 EDR REAR OPERATIONS

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 13 pages

OBJECTIVE:

The objective is to install the EDR Smoke Detector (SD) and Air Duct T-junction, and to place the Audible Noise Reduction Blankets on the AAA Assembly

LOCATION:

COL1F1

DURATION:

50 minutes Crew Time

CREW:

One

TOOLS:

DCS 760 Camera

Eye Protection

Columbus Tool Kit:

Tool Bag 2:

Driver Handle, 1/4" Drive

2" Extension, 1/4" Drive

Tool Bag 3:

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

M4 (7 mm) Socket, 1/4" Drive

ISS IVA Toolbox:

Drawer 2

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

Drawer 5

Static Wrist Tether

8-1/4" Long, 2" Cut Scissors

MATERIALS:

Kapton Tape

Latex Gloves

ITEMS:

Smoke Detector And SD T-Junction Set

Audible Noise Reduction Blankets (Four)

COL1F1 1. [SAFING AND VERIFYING SMOKE DETECTOR](#)

PWS Verify PDU Outlet COL1F1 – OFF

Verify Smoke Detector – undamaged (no shattered items visible)

Verify RPDA ESEM1 MAIN ON – ■

1.104 EDR REAR OPERATIONS

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 2 of 13 pages

Verify sw RACK POWER – OFF

If NOT

Perform [{1.110 EDR ISPR RACK DE-ACTIVATION}](#), all ((ESA SODF: JOINT SYSTEM/PAYLOAD: ACTIVATION AND CHECKOUT)), then:

sw RACK POWER → OFF

sw RPDA ESEM1 RPDA ON/OFF → OFF

2. [REMOVING REAR PANEL R2 AND R3](#)

- 2.1 Perform [{1.202 COL ISPR ROTATION}](#), steps 1,2 (ESA SODF: MSM: NOMINAL), then
- 2.2 Unfasten Rear Panels R2 and R3 respectively 35 and 48 Quick Releases (Driver Handle 1/4" Drive, 5/32" Hex Head Driver, 1/4" Drive)
- 2.3 Remove and temporarily stow Rear Panel R2 and R3

3. REMOVING LAUNCH DUCT

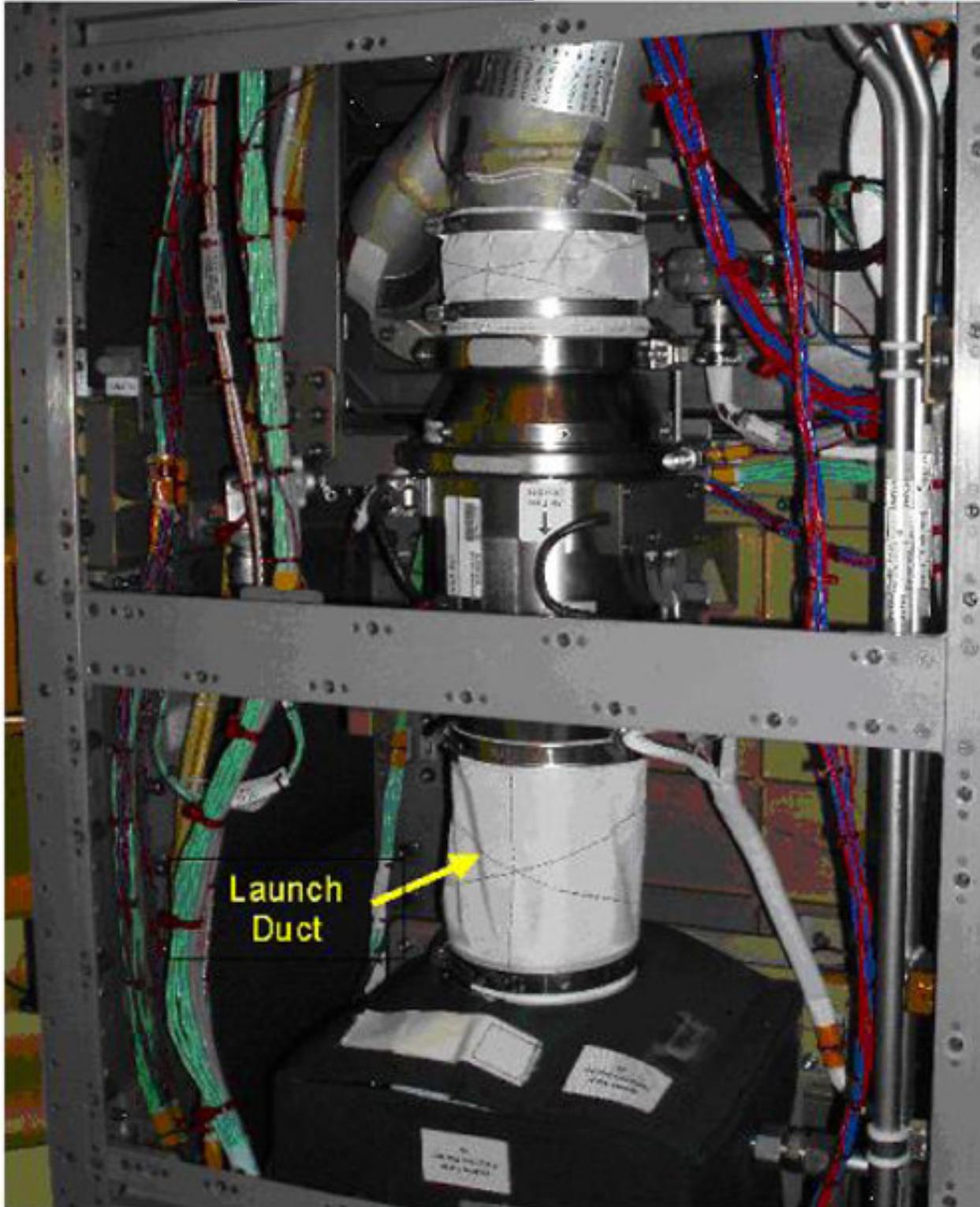


Figure 1. Launch Duct

- 3.1 Loosen Two Launch Duct Clamps (Driver Handle 1/4" Drive, M4 (7mm) Socket, 1/4 " Drive) (Figure 1)

1.104 EDR REAR OPERATIONS

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 4 of 13 pages

- 3.2 Remove and stow the Launch Duct and Clamps
4. VERIFYING SMOKE DETECTOR AND T-JUNCTION
 - 4.1 Verify Smoke Detector and T-junction assembly – undamaged (no shattered items visible)
 - 4.2 Remove Smoke Detector and T-junction Assembly from the protective bags
5. INSTALLING SMOKE DETECTOR AND T-JUNCTION

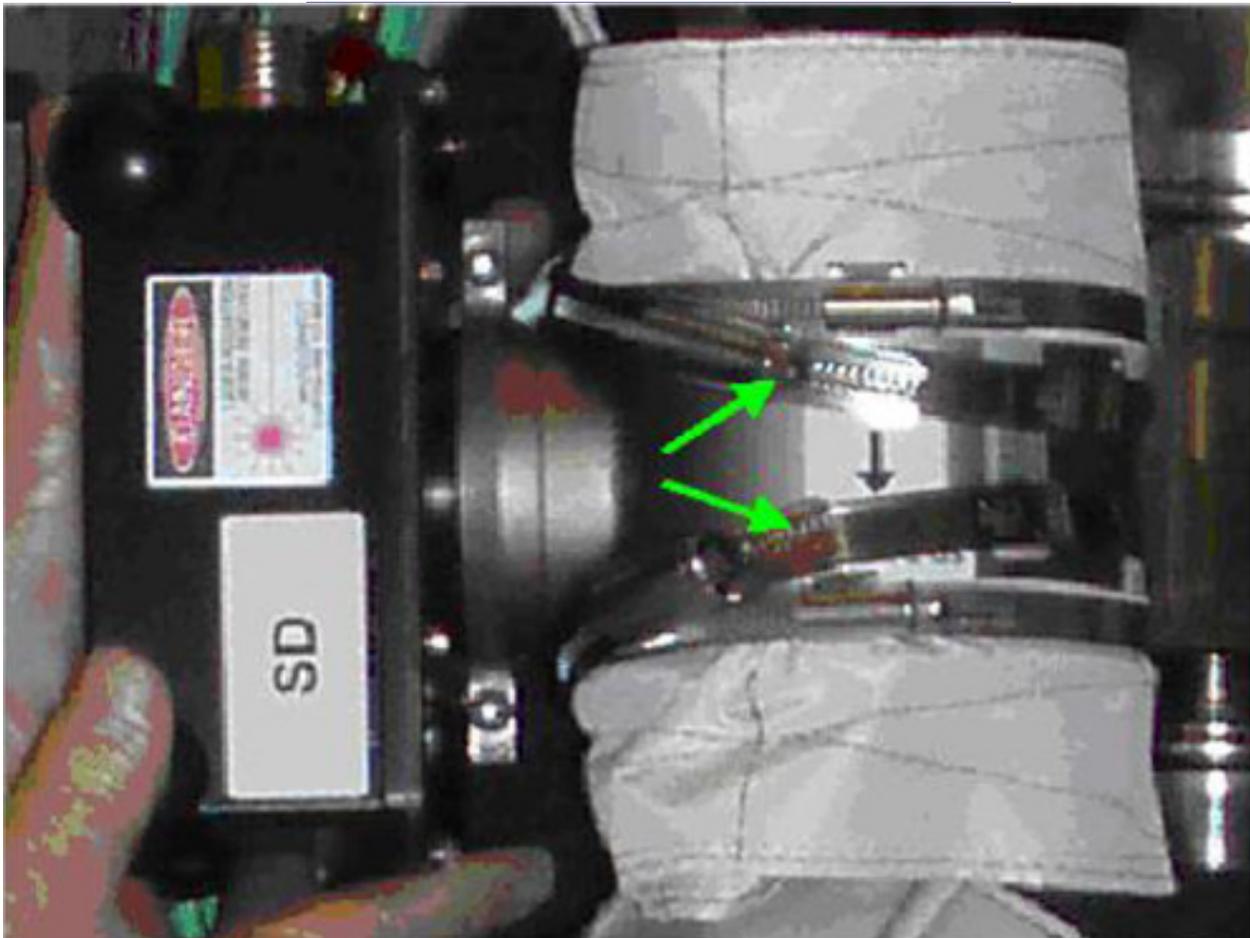


Figure 2. T-junction sleeve clamps launch configuration

NOTE

After installation the orientation of SD and T-junction is correct when the labels "SD" and "Air Flow Direction" are facing the crewmember, refer to Figure 6.



Figure 3. T-junction sleeves folded

- 5.1 On the side opposite to the Smoke Detector fold the Sleeves up, (refer to Figure 3)



Figure 4. SD and T-junction insertion

- 5.2 Insert the SD and T-junction Assembly in the designated area, (refer to Figure 4)
- 5.3 Fold back the T-junction Sleeves at the Heat Exchanger Air Inlet and AAA Fan Air outlet, check that the Sleeves do not remain between the metal T-junction piping.

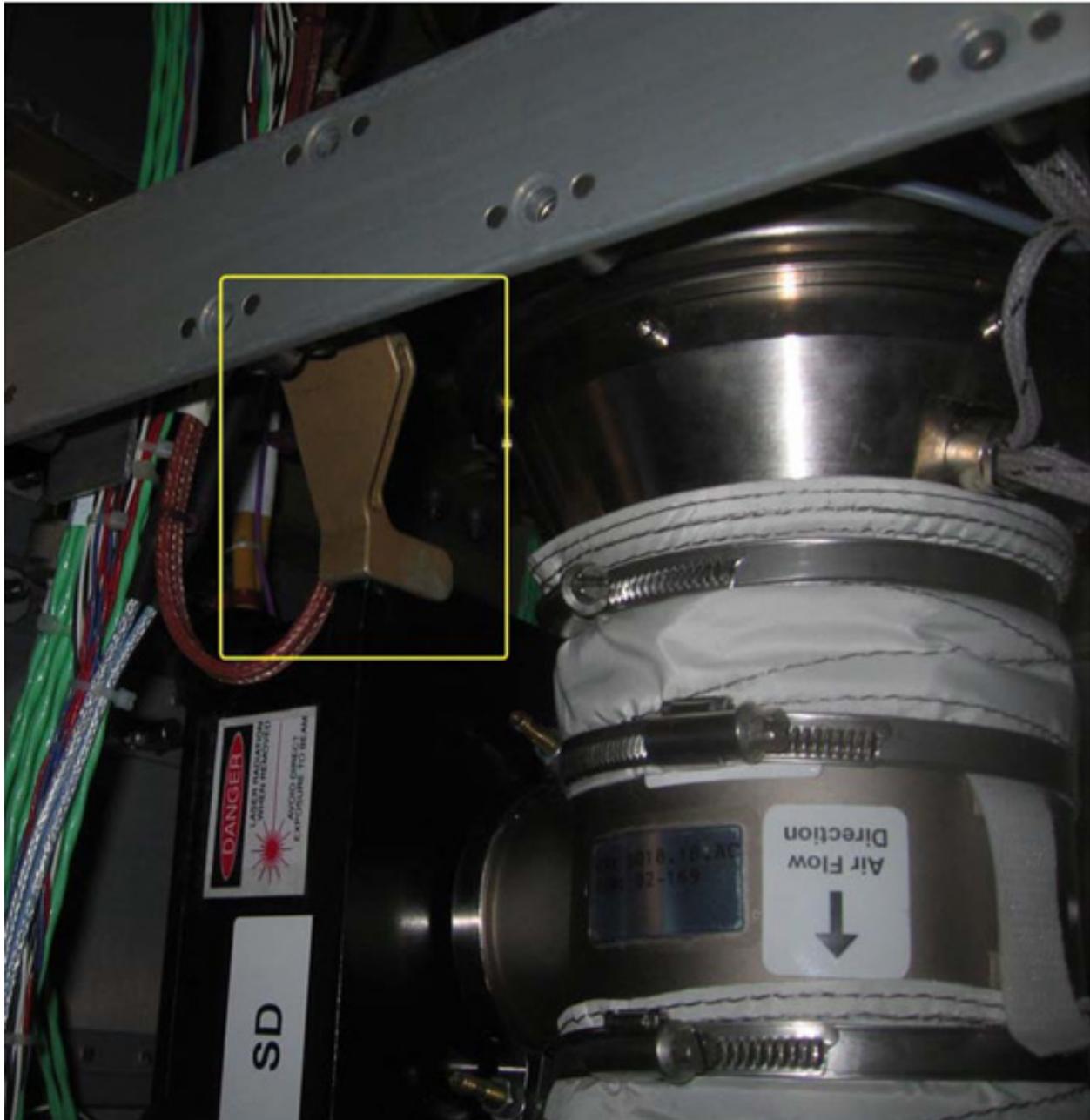


Figure 5. SD mechanical support - High-lighted

- 5.4 Rotate the SD and T-junction assembly in its mechanical support, (refer to Figure 5) (Air Flow Direction label must be visible, and label must point towards the AAA Heat Exchanger)
- 5.5 Loosen clamps (two) that are in temporary configuration (refer to green arrows in Figure 2) (M4 (7mm) Socket, 1/4" drive, Driver Handle 1/4 " Drive)



Figure 6. T-junction final configuration

- 5.6 Adjust the position of the loosened Clamps around the ends of the sleeves that cover the Heat Exchanger Air Inlet and AAA Fan Air outlet, (refer to Figure 6).
- 5.7 ✓Sleeves and the DUCT make good contact (no folding)
- 5.8 Two Sleeve Clamps (at the air duct sleeves ends) - Fasten with Torque 13 In-Lb
- 5.9 Photo document installed hardware (DCS 760 Camera)

6. INSTALLING SMOKE DETECTOR CABLE AND AAA THERMISTOR



Figure 7. SD Electrical Connector P01

- 6.1 Cut SD electrical connector launch tie-raps (two, red), (refer to Figure 7) (Scissors)
- 6.2 Remove and stow the SD electrical connector protective caps. Update IMS with installation locations and stowage locations of electrical connector protective caps or report to COL-CC.

P01 To SD POWER/DATA J1 →|← J01 on Smoke Detector

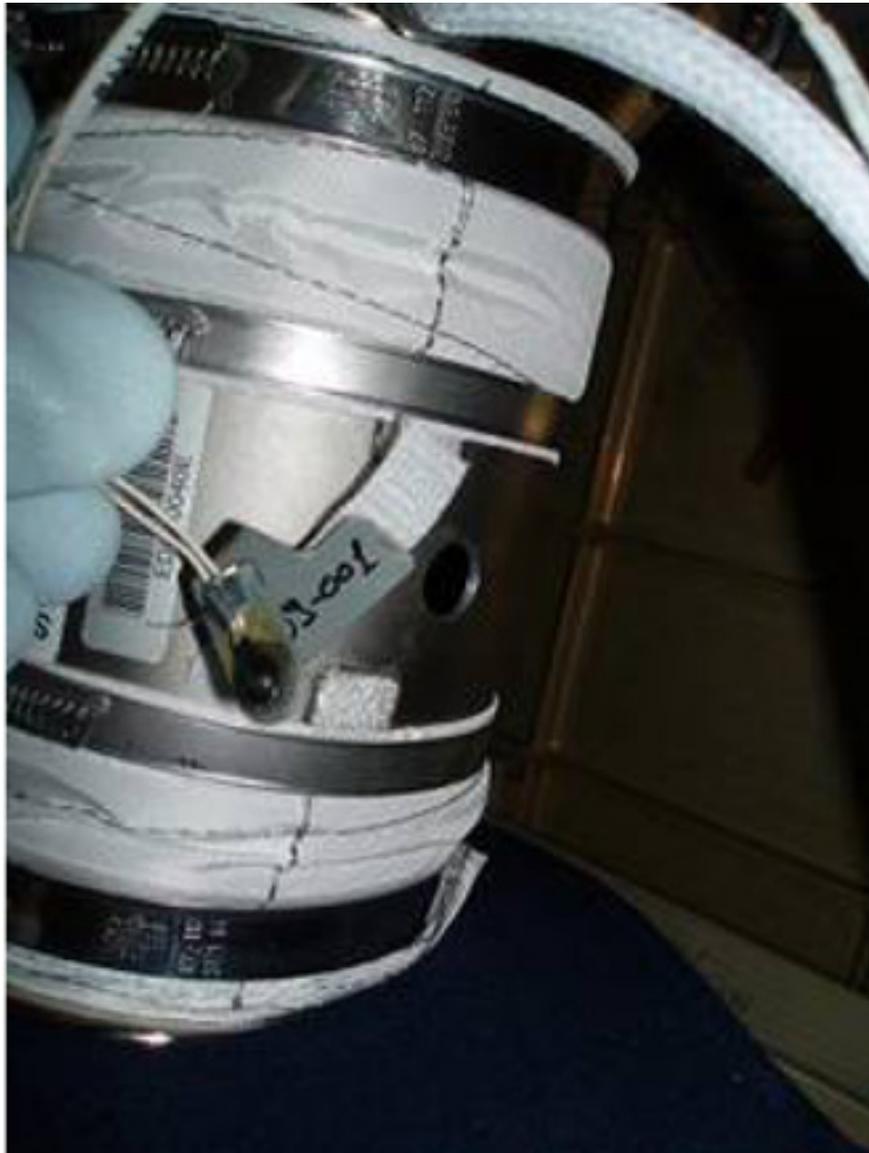


Figure 8. TH18 Thermistor

- 6.3 Remove the launch fastener holding the TH18 Thermistor
- 6.4 Insert the TH18 thermistor to the SD into the T-Junction dedicated hole, (refer to Figure 8) (Velcro and Kapton Tape)
- 6.5 Photo document the installed SD Cable and TH18 Thermistor (DCS 760 Camera)

7. INSTALLING AUDIBLE NOISE REDUCTION BLANKETS

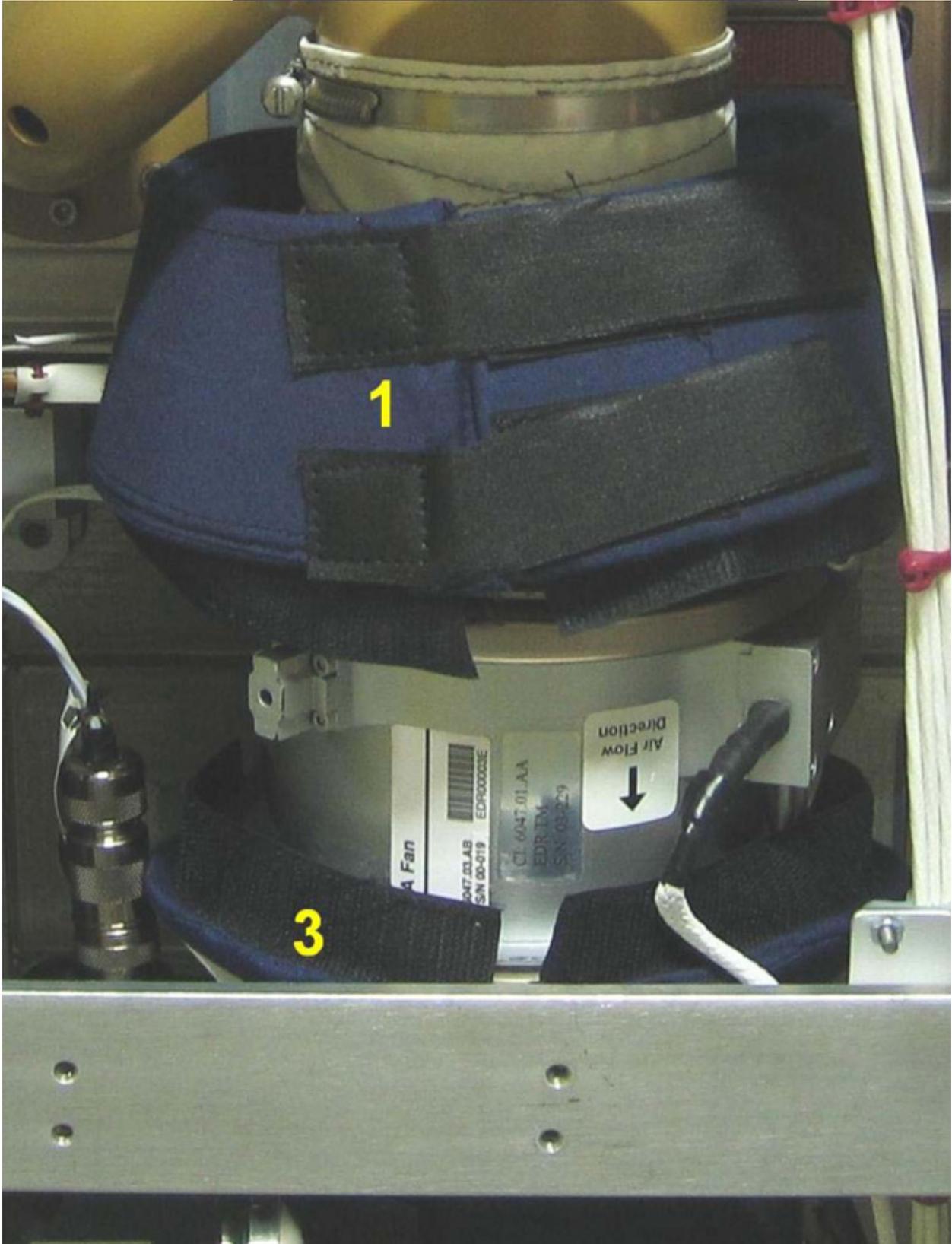
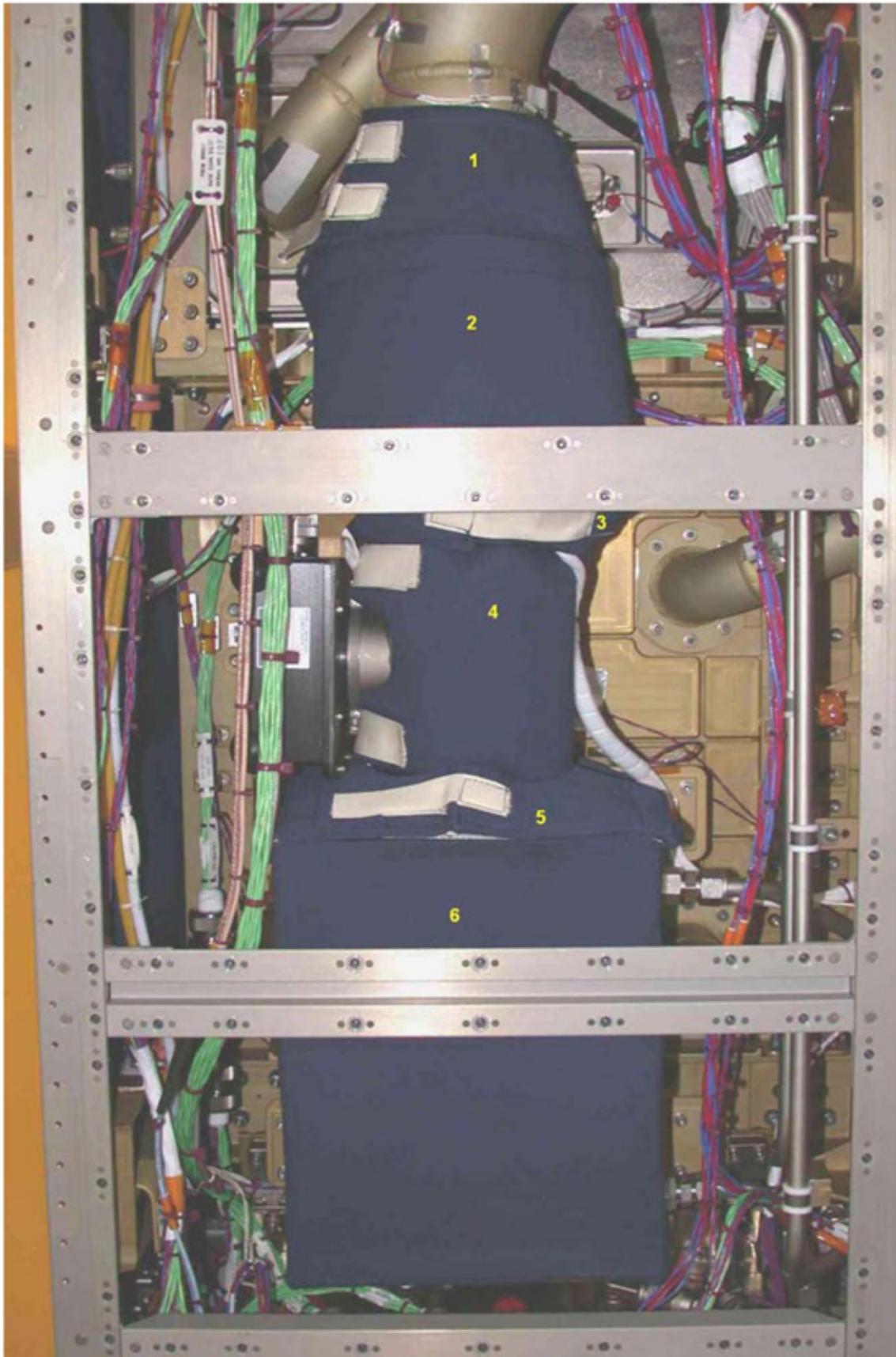


Figure 9. Audible Noise Reduction Blankets 3 and 1 installed



20 AUG 07

Figure 10. All Audible noise Reduction Blankets Installed

1.104 EDR REAR OPERATIONS

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 13 of 13 pages

NOTE

Audible Noise Reduction Blankets 5 and 6 are already installed at launch

Install Audible Noise Reduction Blankets (4 items) on the AAA assembly in the following order 4, 3, 1, 2, refer to Figures 9 and 10 (VELCRO).

Photodocument the installed Blankets (DCS 760 Camera)

8. REINSTALL REAR PANEL R3 AND R2

8.1 Rear Panels R3 and R2 respectively 48 and 35 Quick Releases
– Fasten with Torque 30 In-Lb (Torque Wrench, 3/8" Drive (30-200 In-Lb.), 5/32" Hex Head Driver, 1/4" Drive)

8.2 Perform {1.202 COL ISPR ROTATION}, step 3 (ESA SODF: MSM: NOMINAL)

9. CLEANUP

Update IMS with stowage location or notify **COL-CC**

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1.105 EDR CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 10 pages

OBJECTIVE:

The objective is to perform the EDR checkout during EDR Commissioning from Erasmus USOC with Crew support

LOCATION:

COL1F1

DURATION:

10 minutes Crew Time (starting at step 6)

55 minutes Ground Time

CREW:

One

TOOLS:

None

ITEMS:

None

1. VERIFYING EDR STANDBY AND CONDITIONS (GROUND ONLY)

EDR Main

'EDR Facility Status'

Verify Fac_Mode – Standby

EDR Main

'Data Connection Status'

Verify COF_LAN_Sts – OK

Verify Int_LAN_Sts – OK

Verify Int_BC_MIL_Sts – OK

Verify Intl_PDU_MIL_Sts – OK

Verify HUB_Ready_Sts – OK

Verify HUB ON/OFF Sts – ON

EDR Main

'AAA/FAN (ESEM3-ES out4)'

Verify Power_Sts – ON

Verify Current – < 0.5 A

Verify Inlet_Temp – < 25 deg Celsius

1.105 EDR CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E)

Page 2 of 10 pages

Verify Fan_Speed – 3100 +/- 200 1/min

EDR Main

'ESEM1'

Verify Brd_Sts – OK

EDR Main

'ESEM2'

Verify Brd_Sts – OK

EDR Main

'ESEM3-E'

Verify Brd_Sts – OK

EDR Main

'Drawer1 (ESEM3-E out1)'

Verify Power_Sts – OFF

Verify Current – 0 +/- 0.3 A

EDR Main

'Drawer2 (ESEM3-E out2)'

Verify Power_Sts – OFF

Verify Current – 0 +/- 0.3 A

EDR Main

'ESEM3-E out3 & 4'

Verify Out3_Power_Sts – OFF

Verify Out4_Power_Sts – OFF

EDR Main

'ESEM3-ES'

Verify Brd_Sts – OK

EDR Main

'Drawer3 (ESEM3-ES out1)'

Verify Power_Sts – OFF

1.105 EDR CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 10 pages

Verify Current – 0 +/- 0.3 A

EDR Main

'VMU (ESEM3-ES out2)'

Verify Power_Sts – OFF

Verify Current – 0 +/- 0.3 A

EDR Main

'SDA (ESEM3-ES out3)'

Verify Power_Sts – ON

EDR Main

'ESEM4-E1'

Verify Brd_Sts – OK

EDR Main

'ESEM4-E1 out1 (PCDF-PU)'

Verify Power_Sts – OFF

EDR Main

'ESEM4-E1 out2 (PCDF-EU)'

Verify Power_Sts – OFF

EDR Main

'ESEM4-E2'

Verify Brd_Sts – OK

EDR Main

'ESEM4-E2 out1'

Verify Power_Sts – OFF

EDR Main

'ESEM4-E2 out2'

Verify Power_Sts – OFF

EDR Main

'ESEM4-ES'

1.105 EDR CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 4 of 10 pages

Verify Brd_Sts – OK

EDR Main

'ESEM4-ES out1'

Verify Power_Sts – OFF

EDR Main

'ESEM4-ES out2'

Verify Power_Sts – ON

Verify Current – < 4 A

2. [SETTING EDR TO NOMINAL MODE \(GROUND ONLY\)](#)

MCS Tools

'Manual Command Stack'

sel File, Open, Manual Stack, Stack

sel 'EDR_modeSet_nominal'

cmd EDR_Cmd_PCCU_Set_Mode, Enable – Activate

wait 30 seconds

EDR Main

'EDR Facility Status'

Verify Fac_Mode – NOMINAL

EDR Main

'Data Connection Status'

Verify reject_cmd_cnt – 0

Verify accept_cmd_cnt – 1

3. [VERIFYING EDR-VMU CONDITIONS \(GROUND ONLY\)](#)

EDR VMU

'General Status'

Verify HRD_Sts – NO FAIL

Verify SCSI_Sts – NO FAIL

1.105 EDR CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 5 of 10 pages

Verify PCB_MI_Sts – NO FAIL

Verify PCB_MP_Sts – NO FAIL

Verify HSI_Sts – NO FAIL

Verify ALI_Sts – NO FAIL

Verify OP_MODE – Nominal_Mode

EDR VMU

'JPEG Recorder'

Verify JPEG1_Sts – NO FAIL

Verify JPEG2_Sts – NO FAIL

EDR Main

'Data Connection Status'

Verify APSW_Overrun – OK

Verify SSL_Sts – OK

Verify RS422_Sts – OK

Verify RIC_Driver_Sts – OK

EDR Main

'VMU (ESEM3-ES out2)'

Verify Current – < 1A

Verify Inside_Temp – < 45 deg Celsius

Verify Air_Out_Temp – < 40 deg Celsius

Verify Busy_Sts – Not Busy

Verify Health_Sts – OK

Verify MIL_Sts – OK

4. VERIFYING EDR DRAWER 1 AND PCDF-EU (GROUND ONLY)

EDR Main

'Drawer1 (ESEM3-E out1)'

Verify Outlet_Temp – < 25 deg Celsius

1.105 EDR CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 10 pages

Verify Data_Jmp – OPEN

Verify Power_Jmp – OPEN

EDR Main

'ESEM4-E1 out2 (PCDF-EU)'

Verify Outlet_Temp – < 25 deg Celsius

Verify Data_Jmp – CLOSED

Verify Power_Jmp – CLOSED

5. VERIFYING EDR AAA-FAN (GROUND ONLY)

EDR Main

'AAA/FAN (ESEM3-ES out4)'

Verify ON_OFF_Sts – ON (0)

Verify Prime_PWR_Curr – 0.25+/-0.3A

Verify Fan_Motor_Temp – < 40 deg Celsius

Verify Fan_Speed – 3100 +/- 200 1/min

Verify Filter_Press – < 200 Pa

Verify Elec_Unit_Temp – < 60 deg Celsius

Verify Inlet_Temp – < 25 deg Celsius

Verify Outlet_Temp – < 42 deg Celsius

6. VERIFYING AAA FAN SPEED

MCS Tools

'Manual Command Stack'

sel File, Open, Manual Stack, Stack

cmd tc_AAA_FANSPEED_setp4, Enable – Activate (Set Point 4, 5000 rpm)

EDR Main

'AAA/FAN (ESEM3-ES out4)'

Verify AAA_fanspeed – 5000 +/- 200 (rpm)

1.105 EDR CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 10 pages

EDR Main

'Data Connection Status'

Verify reject_cmd_cnt – 0

Verify accept_cmd_cnt – 2

On Col-CC GO

COL1F1 -
EDR
LAPTOP

European drawer rack - Human Computer Interface (EDR-HCI)

Facility Setup

'EDR'

Verify Current Operational Mode – NOMINAL

Facility Setup

'TCS'

sel TCS

Facility Setup: TCS

sel AAA Fan

Facility Setup: TCS: AAA

'AAA Fan Status'

Verify AAA Fan Speed – 5000 +/- 200 (rpm)

'Set AAA Fanspeed'

pick 3344

cmd SET (3344) – Yes

Wait 30 sec.

'AAA Fan Status'

Verify AAA Fan Speed – 3100 +/- 200 (rpm)

ISS↓ **COL-CC**, step 6 complete

EDR Main

'AAA/FAN (ESEM3-ES out4)'

Verify AAA_fanspeed – 3100 +/- 200 (rpm)

EDR Main

'Data Connection Status'

Verify reject_cmd_cnt – 0

Verify accept_cmd_cnt – 3

7. [LOADING VMU HRDL TEST FILE \(GROUND ONLY\)](#)

MCS Tools

'Manual Command Stack'

sel File, Open, Manual Stack, Stack

sel 'EDR_start_HRDL_test'

cmd CMD_SET_REC_OPR_MODE, Enable – Activate **Execute**

VMU

'JPEG Recorder'

Verify Operation_Mode – PLAYBACK

cmd CMD_OPEN_RECORD, Enable – Activate **Execute**

cmd CMD_ATC_VIDEO_BUS, Enable – Activate **Execute** (parameter 0x61)

VMU

'connection viewgraph'

Verify Line 61 – green

cmd CMD_ATC_VIDEO_BUS, Enable – Activate **Execute** (parameter 0x71)

VMU

'connection viewgraph'

Verify Line 71 – green

cmd CMD_ATC_VIDEO_BUS, Enable – Activate **Execute** (parameter 0x81)

VMU

'connection viewgraph'

Verify Line 81 – green

1.105 EDR CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 9 of 10 pages

cmd CMD_CFG_HRDL_CHAN, Enable – Activate **Execute**

cmd CMD_START_HRDL_TRANS, Enable – Activate **Execute**

VMU

'HRDL'

Verify Operation Sts – TRANSMISSION

cmd CMD_START_RECORDER, Enable – Activate **Execute**

VMU

'JPEG Recorder'

Verify Operation_Sts – RUNNING

8. [VERIFYING DISPLAY OF HRDL TEST](#)

On COL-CC GO

COL1F1 -
EDR
LAPTOP

sel MGI VideoWave (from Windows Start Menu)

sel Capture

Verify HRDL Test – correctly displayed (at laptop)

ISS↓ **COL-CC**, step 8 complete

CDMCS - USS Display

EDR Main

Verify HRDL Test – correctly displayed (at Erasmus USOC)

9. [STOPPING VMU RECORDER \(GROUND ONLY\)](#)

MCS Tools

'Manual Command Stack'

sel File, Open, Manual Stack, Stack

sel 'EDR_stop_HRDL_test'

cmd CMD_STOP_RECORDER, Enable – Activate **Execute**

VMU

'JPEG Recorder'

Verify Operation_Sts – STOP

cmd CMD_REMOVE_VIDEO_BUS, Enable – Activate **Execute**
(parameter 81)

VMU

'connection viewgraph'

Verify Line 81 – black

cmd CMD_STOP_HRDL_TRANS, Enable – Activate **Execute**

VMU

'HRDL'

Verify Operation Sts – STOP

cmd CMD_REMOVE_VIDEO_BUS, Enable – Activate **Execute**
(parameter 71)

VMU

'connection viewgraph'

Verify Line 71 – black

cmd CMD_REMOVE_VIDEO_BUS, Enable – Activate **Execute**
(parameter 61)

VMU

'connection viewgraph'

Verify Line 61 – black

cmd CMD_CLOSE_RECORD, Enable – Activate **Execute**

cmd CMD_SET_REC_OPR_MODE, Enable – Activate **Execute**

VMU

'JPEG Recorder'

Verify Operation_Mode – OFF

10. [SETTING EDR TO STANDBY MODE](#)

On **COL-CC** GO

Perform [{2.120 EDR MODE TRANSITION NOMINAL TO STANDBY}](#),
step 1 (ESA PODF : EDR : COMMISSIONING: NOMINAL)

1.109 EDR ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 10 pages

OBJECTIVE:

This procedure is used to activate the EDR ISPR located in Position COL1F1 to standby mode.

LOCATION:

COL1F1

DURATION:

30 minutes.

CREW:

One

TOOLS

None

REFERENCED PROCEDURES:

9.214 FINE ADJUSTMENT OF WFSV - OPENING

1. CHECKING EDR ISPR (F1) FRONT SWITCHES CONFIGURATION

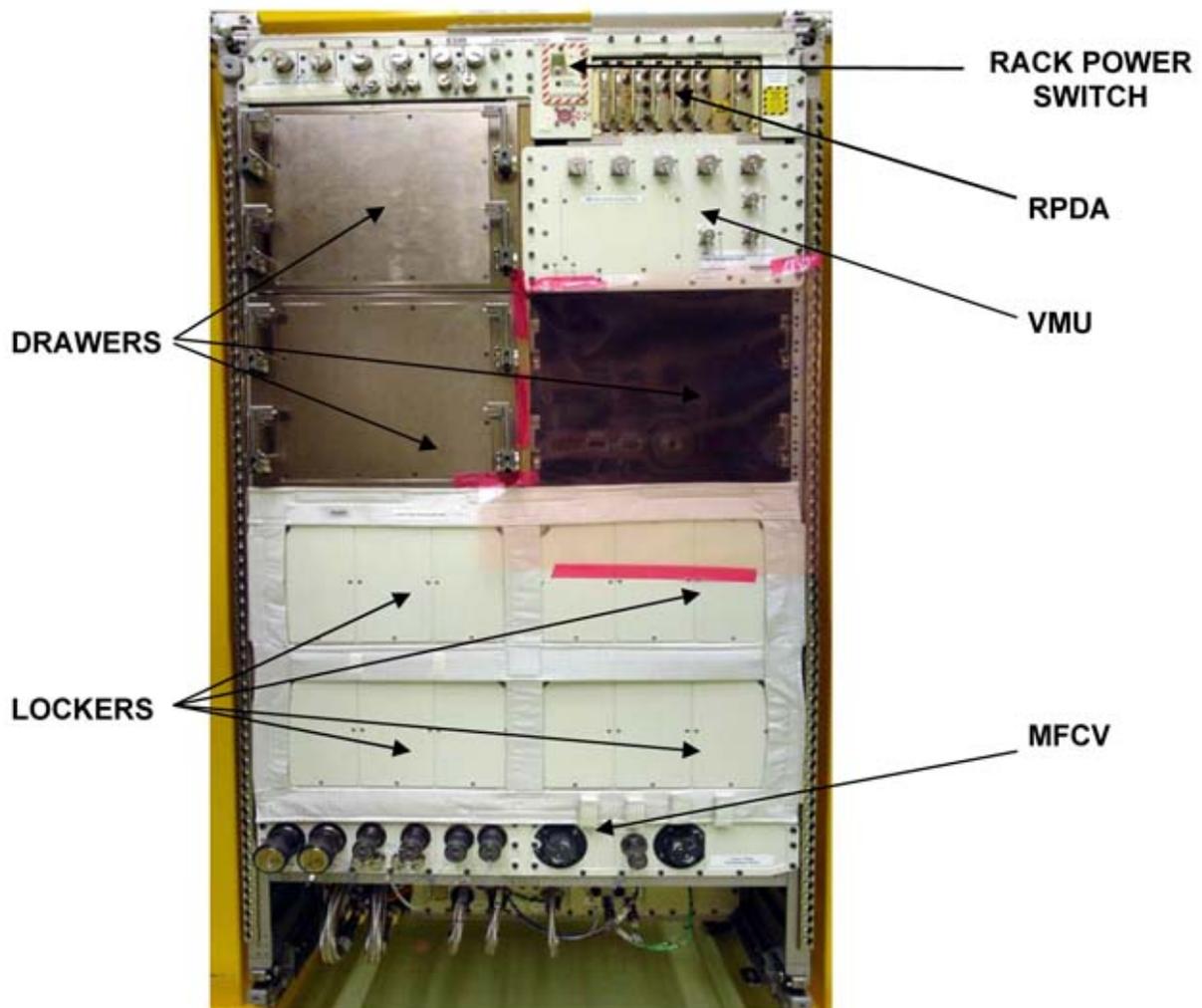


Figure 1. EDR Front Panel View

1.109 EDR ISPR RACK ACTIVATION

(Refer to Figure 2 and Table 1.)

Table 1. RPDA ESEM Switch Positions

Slot (left to right)	ESEM Number	Switch location (top - down)	Switch position
1	ESEM 2	N/A	N/A
2	ESEM 1	1	ON
3	ESEM 3-E	1	OFF
3	ESEM 3-E	2	OFF
3	ESEM 3-E	3	FIX OFF
3	ESEM 3-E	4	FIX OFF
4	ESEM 4-ES	1	OFF
4	ESEM 4-ES	2	ON (essential)
5	ESEM 3-ES	1	OFF
5	ESEM 3-ES	2	OFF
5	ESEM 3-ES	3	ON
5	ESEM 3-ES	4	ON
6	ESEM 4-E1	1	OFF
6	ESEM 4-E1	2	OFF
7	N/A	N/A	N/A
8	ESEM 4-E2	1	OFF
8	ESEM 4-E2	2	OFF

2. VERIFYING TCS STATUS

- EDR 2.1 Checking the EDR MFCV Fluid Cooling Valve Position
Verify MFCV is set in position 1
- PWS 2.2 Verifying the Water Flow Selection Valve (WFSV) ISPR (F1) is in Closed Position
TCS: Plenum: WFSV ISPR F1
WFSV ISPR F1

Verify POSN – Closed
Verify POSN Ind < 7 %

Verify WFSV_ISPR_F1_Close_Stat_DMC – CLOSED (1)
Verify WFSV_ISPR_F1_Posn_Ind_DMC < 7 %
- PWS 2.3 Verifying the Columbus Water Pump Assembly Status
TCS
TCS Functional Overview
'Water Pump Assemblies'

Identify Active WPA

1.109 EDR ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 4 of 10 pages

If Active WPA – WPA1

Record Mass Flow WPA1: _____ kg/h

If Active WPA – WPA2

Record Mass Flow WPA2: _____ kg/h

'Delta Pressure Sensor Blocks'

'DBSB1 Plenum'

Verify Nom dP – 40 to 45 kPa

'DBSB2 Plenum'

Verify Redun dP – 40 to 45 kPa

If WPA_Active_Pump_SW – WPA1

Record WPA1_Massflow_DMC: _____
kg/h

If WPA_Active_Pump_SW – WPA2

Record WPA2_Massflow_DMC: _____
kg/h

(For calculation later on in section 3.3)

Verify DPSB1_Nom_Plenum_DP_MVD – 40 to 45 kPa

Verify DPSB2_Redun_Plenum_DP_MVD – 40 to 45 kPa

3. ACTIVATING EDR ISPR (F1) COOLING

3.1 Configuring WFSV ISPR (F1) to Open Position (GROUND ONLY)

To open the WFSV of ISPR (F1), perform [{9.214 FINE ADJUSTMENT OF WFSV - OPENING}](#) (ESA SODF: GND: TCS: NOMINAL).

Wait 1 minute for valve to fully open

Verify WFSV_ISPR_F1_Open_Stat_DMC – OPEN (1)

Verify WFSV_ISPR_F1_Posn_Ind_DMC – > 97 %

Verify WFSV_ISPR_F1_Act_Stat_DMC – INACTIVE (0)

Verify WFSV_ISPR_F1_Current_Ovld_Stat_DMC – OK (0)

3.2 Verifying the ISPR (F1) Flow Rate

On COL-CC GO:

1.109 EDR ISPR RACK ACTIVATION

PWS

TCS

TCS Functional Overview

'Water Pump Assemblies'

Identify active WPA

If Active WPA - WPA1

Record Mass Flow WPA1: _____ kg/h

If Active WPA - WPA2

Record Mass Flow WPA2: _____ kg/h

Crew

Subtract Mass flow obtained in step 2.3 from Mass flow obtained in step 3.3.

Record Result of Subtraction: _____ kg/h

Verify Result of Subtraction – 79 to 97 kg/h

PWS

TCS Functional Overview

'Delta Pressure Sensor Blocks'

'DBSB1 Plenum'

Verify Nom dP – 40 to 45 kPa

'DBSB 2 Plenum'

Verify Redun dP – 40 to 45 kPa

If WPA_Active_Pump_SW - WPA1

Record WPA1_Massflow_DMC: _____ kg/h

If WPA_Active_Pump_SW - WPA2

Record WPA2_Massflow_DMC: _____ kg/h

Subtract Mass flow obtained in step 2.3 from WPA Mass flow obtained in step 3.3

Record Result of Subtraction: _____ kg/h

Verify Result of Subtraction – 79 to 97 kg/h

Verify DPSB1_Nom_Plenum_DP_MVD – 40 to 45 kPa

Verify DPSB2_Redun_Plenum_DP_MVD – 40 to 45 kPa

1.109 EDR ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 10 pages

4. [ACTIVATING EDR ISPR \(F1\) POWER SUPPLY](#)

4.1 [Enabling ISPR \(F1\) Main Power Bus System Control \(ground only\)](#)

```
If
PDU2_ISPR_F1_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
- DISABLED (0)
|
| cmd
| PDU2 ISPR F1 Main Pwr Bus Svs Cntl Ena VTC
| data SW_CMD - VTC_Disc_Out_Cmd_Cmd_SW
| data Onboard_Node -
| SYS_CCSDS_End_Point_VTC1
```

```
Verify
PDU2_ISPR_F1_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC -
ENABLED (1)
```

4.2 [Activating the ISPR \(F1\) Main Power Bus](#)

NOTE ISPR RIC boots automatically when power is supplied.

On COL-CC GO

PWS

EPDS

[EPDS Functional Overview](#)

'PDU2'

sel PDU2 120V Payload

[PDU 1-2 120V Payload](#)

'PDU2 Outlets'

sel 1

[PDU2 Outlet 1](#)

Verify 'SSPC1 Sys Bus Cntl Stat' – ENABLED

'Commands'

cmd Pwr On **Execute** [OK]

'Pwr'

Verify SSPC1 Pwr – ON

Verify SSPC2 Pwr – ON

Verify SSPC3 Pwr – ON

1.109 EDR ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 10 pages

Verify SSPC4 Pwr – ON

Wait 2 minutes to allow current value to stabilize

Verify Current – 1.5 A to 1.9 A

```
cmd PDU2_ISPR_F1_Main_Pwr_Bus_On_AP
data ONBOARD_RECEPTION_NODE -
SYS CCSDS End Point PLCU DMS SERV
data ONBOARD_EXECUTION_NODE -
USM SW DMC USS Swop Instance
```

Verify

PDU2_ISPR_F1_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC – ON

Verify

PDU2_ISPR_F1_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC – ON

Verify

PDU2_ISPR_F1_Main_Pwr_Bus_SSPC3_On_Off_Stat_DMC – ON

Verify

PDU2_ISPR_F1_Main_Pwr_Bus_SSPC4_On_Off_Stat_DMC – ON

Wait 2 minutes to allow current value to stabilize

Verify PDU2_ISPR_F1_Main_Pwr_Bus_Current_DMC – 1.5 A to 1.9 A

5. [ACQUIRING EDR ISPR \(F1\) MIL BUS DATA \(GROUND ONLY\)](#)

```
cmd DMS_RT_Start_RT_Acquisition_Cmd_SW
prm REMOTE_TERMINAL_ID -
MIL 1553B Bus RT Payload Bus ISPR F1
data ONBOARD_NODE - SYS_CCSDS_End_Point_PLCU_DMS_SERV
```

Verify ISPR_F1_PL_BUS_Ena_Stat_SW – ENABLED (1)

Verify ISPR_F1_PL_Bus_No_Resp_SW – NO_ERROR

Verify ISPR_F1_PL_Bus_Msg_Error_SW – NO_ERROR

Verify ISPR_F1_PL_Bus_Busy_Flag_SW – NO_ERROR

Verify ISPR_F1_PL_Bus_Erroneous_Msg_SW – NO_ERROR

Verify ISPR_F1_PL_Bus_Terminal_Flag_SW – NO_ERROR

Verify ISPR_F1_PL_Bus_Unit_Error_Flag_SW – NO_ERROR

6. [VERIFYING EDR ISPR \(F1\) MIL BUS DATA](#)

On COL-CC GO

PWS

PAYLOAD: EDR

EDR Health and Status Data

1.109 EDR ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 8 of 10 pages

'Status'

Verify Caution – NO_ALARM

Verify Warning – NO_ALARM

Verify Mode – STANDBY

'Update Counter'

Verify SA#09 – incrementing

Verify SA#10 – incrementing

Verify SA#11 – incrementing

Verify EDR_Caution_Stat – NO_ALARM

Verify EDR_Warning_Stat – NO_ALARM

Verify EDR_Facility_Mode – STANDBY

Verify EDR_SA9_Counter – incrementing

Verify EDR_SA10_Counter – incrementing

Verify EDR_SA11_Counter – incrementing

NOTE

The Ops names for the following EDR RPDA ESEM 3ES Outlets 2, 3 and 4 have been erroneously defined in the MDB (see SPR 18531/SPN TBD)

Additional ground verification:

Verify EDR_RPDA_ESEM3_ES_VMU_Stat – ON (1) for SDA

Verify EDR_RPDA_ESEM3_ES_SDA_Stat – ON (1) for AAA

Verify EDR_RPDA_ESEM3_ES_AAA_Stat – OFF (0) for VMU

7. [ACTIVATING THE ISPR \(F1\) CAUTION & WARNING MONITORING](#)

7.1 [Verifying ISPR \(F1\) Smoke Detector Signals](#)

PWS

DMS: DMS Payload Status

DMS Payload Status

Verify ISPR F1 CIFA Stat – > 4.5 V

PCS

COL: ECLSS: F1 (ISPR)

COL ISPR F1 Smoke Detector VTC2

Verify Obscuration < 25 % Contamination

Verify Scatter < 1 % Obscuration per Meter

Verify ISPR_F1_CIFA_Stat_MVD – > 4.5 V

Verify ISPR_F1_SD_Obscuration_VTC_PP < 25 %

Verify ISPR_F1_SD_Scatter_VTC_PP < 1 %

1.109 EDR ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 9 of 10 pages

PCS 7.2 [Enabling the Smoke Detector ISPR \(F1\) Monitoring](#)
COL: ECLSS: F1 (ISPR)
COL ISPR F1 Smoke Detector VTC2
'Monitoring'

cmd - Enable (Verify Status - Ena)

```
cmd VTC_Monitoring_Ena_Cmd_SW
prm MONITORED_ITEM_ID - ISPR_F1_SD
prm ACTION - 1(ENABLE)
data ONBOARD_NODE - SYS_CCSDS_End_Point_VTC2
```

Verify ISPR_F1_SD_Monitoring_Ena_PP - ENABLED
Verify VTC2_ISPR_F1_SD_Stat_MVD - OK

7.3 [Activating EDR ISPR \(F1\) Caution and Warning BITs monitoring \(ground only\)](#)

```
cmd DMS_MONIT_Ena_Monitoring_Cmd_SW
prm MT_ID - PL_PLCU_MON_PL_Health_Stat1
prm EI_ID - EDR_Caution_Stat
prm LIMIT_SET_ID - 0
data ONBOARD_NODE -
SYS CCSDS End Point PLCU DMS SERV
```

Verify EDR_Caution_Stat_MS - NORMAL_1

```
cmd DMS_MONIT_Ena_Monitoring_Cmd_SW
prm MT_ID - PL_PLCU_MON_PL_Health_Stat1
prm EI_ID - EDR_Warning_Stat
prm LIMIT_SET_ID - 0
data ONBOARD_NODE -
SYS CCSDS End Point PLCU DMS SERV
```

Verify EDR_Warning_Stat_MS - NORMAL_1

7.4 [Verifying EDR ISPR \(F1\) Caution & Warning Status](#)
On COL-CC GO

PWS

PAYLOAD: EDR

EDR Health and Status Data

'Status'

Verify Caution - NO_ALARM

Verify Warning - NO_ALARM

Verify EDR_Caution_Stat - NO_ALARM

1.109 EDR ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 10 of 10 pages

Verify EDR_Warning_Stat – NO_ALARM

Col-CC to announce completion of EDR ISPR Activation to ERASMUS

1.120 PCDF ELECTRONICS UNIT ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 2 pages

OBJECTIVE:

To activate the Protein Crystallization Diagnostics Facility (PCDF) Electronics Unit in standalone configuration.

DURATION:

10 minutes

5 minutes Crew Time

10 minutes Ground Time

CREW:

One

LOCATION:

COL1F1

TOOLS:

None

PARTS:

None

MATERIALS:

None

PCDF Electronics Unit 1.

SWITCHING ON PCDF ELECTRONICS UNIT



Figure 1. PCDF Electronics Unit Front Panel (OFF)

On COL-CC GO

Verify PCDF Electronics Unit LEDs (four) – ■ (POWER ON, LSU POWER ON, PRCSR FAILURE, EDR POWER ON)

NOTE

1. A transient PRCSR FAILURE led status will have to be verified just after PCDF Electronics Unit switch activation.
2. Please read the following 2 instructions before executing the next instruction.

sw POWER → ON

1.120 PCDF ELECTRONICS UNIT ACTIVATION (ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 2 pages

Verify status of the following LEDs:

PRCSR FAILURE-■(□for less than about 1 second)

POWER ON-□

LSU POWER ON-■

EDR POWER ON-□

NOTE

The PCDF Electronics Unit is then kept powered while further operations are performed from ground.

2. VERIFYING PCDF ELECTRONICS UNIT (GROUND ONLY)

NOTE

Telemetry is expected to arrive about 3 minutes after PCDF Electronics Unit activation by the crew. The complete booting of the PCDF Electronics Unit can however take up to 6 minutes.

POT

EDR Monitor

'ESEM for PCDF ESEM4 E1 Out2 PCDF EU'

Verify Outlet Status – ON

Verify Current > 1 (A)

Verify Outlet Trip – OK

PCDF Monitoring & Control

'PCDF Status'

Wait about 3 minutes for the start of telemetry

Verify H&S Cycle – incrementing

Verify HK Local Time, HK Onboard Time ~ synchronized

LSU Monitoring & Control

'LSU Status'

Verify Power Status – OFF (grey)

1.122 EDR LAPTOP CONNECTION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 2 pages

OBJECTIVE:

The objective is to connect the EDR Laptop to the EDR and the SUP.

LOCATION:

COL1F1

DURATION:

5 minutes Crew Time

CREW:

One

TOOLS:

None

ITEMS:

EDR Laptop

EDR Laptop Data Cable

EDR Laptop Power Cable

- COL1 F1 1. [VERIFYING LAPTOP AND CABLES](#)
Verify EDR Laptop – not damaged (no shattered items visible)
- EDR Laptop – remove packaging
- EDR Laptop Data Cable – remove packaging
- EDR Laptop Cables Connector Caps – remove and temporary stow
2. [CONNECTING EDR LAPTOP POWER CABLE TO COLUMBUS SUP](#)

NOTE

Reference procedure ESA SODF 1.500 shall be used to connect the EDR Laptop Power Cable to the Columbus SUP3(J03).

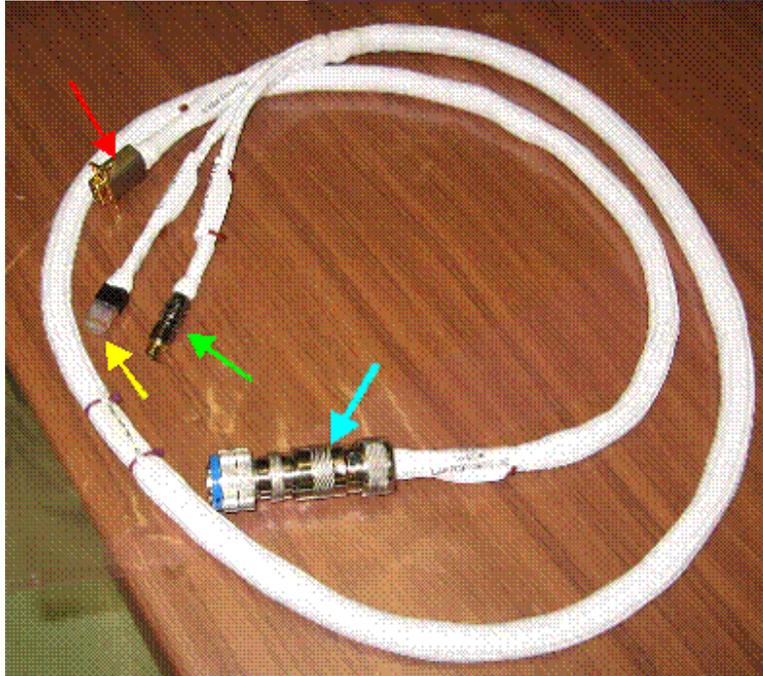
All callouts for COL PWS are to be substituted with EDR Laptop (both are A31P-type Laptops)

Perform [{1.500 COL PWS INSTALLATION SETUP}](#), steps 1, 2.2, 2.3, 2.4, 2.6, 3 (ESA SODF: ASSY OPS: ACTIVATION AND CHECKOUT)

1.122 EDR LAPTOP CONNECTION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 2 pages

3. CONNECTING EDR LAPTOP DATA



LEGENDA:

- Green: To Laptop S-VIDEO IN
- Yellow: To Laptop LAN
- Red: To Laptop RS422
- Blue: P12 To EDR Laptop Data J12

Figure 1. EDR Laptop Data Cable

EDR Laptop Data CBL → | ← EDR Upper Utility Distribution Panel 'LAPTOP DATA J12'

EDR Laptop Data CBL 'Laptop LAN' → | ← EDR Laptop LAN port 'LTU-LAN'

EDR Laptop Data CBL 'serial line' → | ← EDR Laptop serial port 'RS-422/232'

EDR Laptop Data CBL 'S-Video' → | ← EDR Laptop S-Video port 'LTU-SVHS'

4. ACTIVATING EDR LAPTOP

pb EDR Laptop power → ON

Wait 2 min. -EDR Laptop boot completion

If EDR-HCI not automatically started, then

sel 'EDR-HCI' (Double mouseclick on icon)

5. CLEANUP

Update IMS with stowage loaction or notify **COL-CC**

1.125 PCDF ELECTRONICS UNIT DEACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 2 pages

OBJECTIVE:

To deactivate the PCDF (Protein Crystallization Diagnostics Facility) Electronics Unit.

DURATION:

5 minutes

5 minutes Crew Time

5 minutes Ground Time

CREW:

One

LOCATION:

COL1F1

TOOLS:

None

PARTS:

EDR STOWAGE BAG #2

MATERIALS:

None

PCDF
Electronics Unit

1. [SWITCHING OFF PCDF ELECTRONICS UNIT](#)

sw POWER → OFF

Verify PCDF Electronics Unit LEDs (four) – ■ (POWER ON, LSU POWER ON, PRCSR FAILURE, EDR POWER ON)

2. [DISCONNECTING FIBRE OPTICS CABLE 1, 2](#)

CAUTION

Fiber Optics Cables can be mechanically damaged if bent or not handled with care.

'P2 TO PCDF Electronics Unit CHANNEL 1'←|→PCDF Electronics Unit 'CHANNEL 1'

Reinstall dust cap on PCDF Fibre Optics Cable 1 and stow temporarily

'P4 TO PCDF Electronics Unit CHANNEL 2'←|→PCDF Electronics Unit 'CHANNEL 2'

Reinstall dust cap on PCDF Fibre Optics Cable 2

Stow PCDF Fibre Optics Cable 1, 2 (two) in EDR STOWAGE BAG #2 and update IMS with stowage location or notify **COL-CC**

Reinstall dust caps on PCDF Electronics Unit 'CHANNEL 1' and 'CHANNEL 2'

3. VERIFYING PCDF ELECTRONICS UNIT (GROUND ONLY)

POT

EDR Monitor

'ESEM for PCDF'

'ESEM4 E1 Out2 PCDF EU'

Verify Current ~ 0 (A)

POT

PCDF Monitoring & Control

'PCDF Status'

Verify H&S Cycle – not incrementing

1.215 EDR UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 1 of 9 pages

OBJECTIVE:

Mate all EDR ISPR-to-COL Utility Interface Panel (UIP) umbilicals, with the EDR readily installed at its assigned location COL1F1 and all required Columbus systems operating nominally.

LOCATION:

COL1F1

DURATION:

30 minutes

CREW:

One

PARTS:

Pressure Cap P/N 683-16348-810

MATERIALS:

Gray Tape

Trash Bag

Dry Wipe

Cleaning Cloth

TOOLS:

DCS 760 Camera

ISS IVA Toolbox:

Drawer 5:

Static Wrist Tether

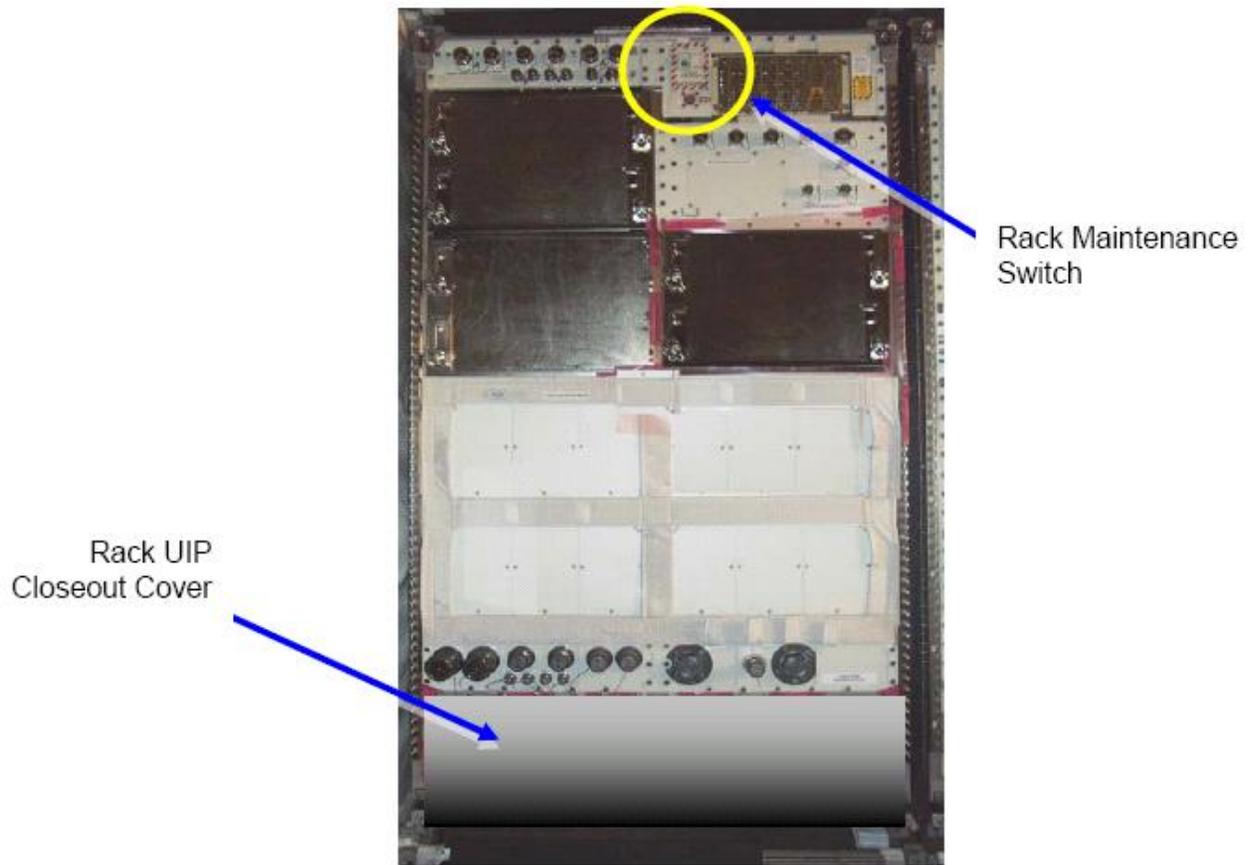


Figure 0-1 European Drawer Rack (EDR)
(Launch Configuration, Installed at COL1F1)

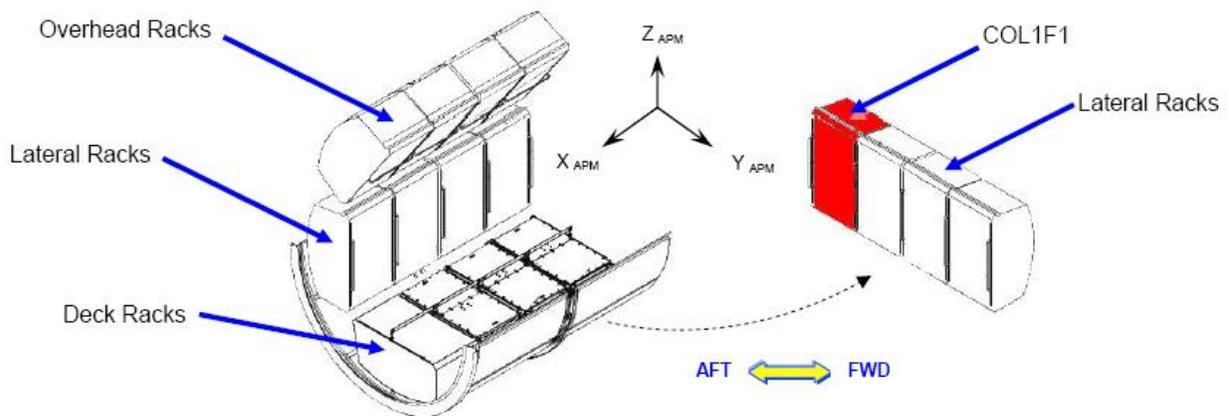


Figure 0-2 EDR On-Orbit Installation Location (COL1F1)

1. SAFING

1.1 Verify COL1F1 UIP Main Power – OFF

1.215 EDR UMBILICAL MATE

PWS

EPDS: EPDS Functional Overview: PDU1-2: 120V Payload

120V Payload

'PDU2 Outlets'

sel '1'

EPDS PDU2 Outlet 1 - ISPR F1 Main Pwr Bus

Verify SSPC (all) – OFF

Verify Current (all) – < 0.1 A

Verify Sys Bus Cntl (all) – OFF

1.2 √WFSV F1 – CLOSED

COL SYNOPTICS HOME PAGE: ISPR F1

ISPR F1 System Status Information

'TCS'

Verify WFSV Posn – CLOSED

Verify WFSV Posn Ind – < 8%

1.3 Verify Rack Power Switch – OFF.

Refer to Figure 0-1.

1.4 [Check Combined Output of String 2 Parallel DDCUs](#)

NOTE

If total output current is not reduced to less than 52A. there is a risk that when 1 DDCU is turned off, the other DDCU will trip due to an overcurrent condition.

PCS

Node2: EPS: DDCU N22A3A Dist

DDCU N22A3A Dist

Power Sharing, %

Record DDCU N2P2A: _____

Record DDCU N2P3A: _____

Total Output Current, A (sum of two DDCUs): _____

Record DDCU N2P2A Output Current, A: _____

Record DDCU N2P3A Output Current, A: _____

If Total Output Current > 52 A

√**MCC-H**. Loads must be powered down until total output current < 52 A

1.5 [Powering Off String 2 Parallel DDCU](#)**NOTE**

1. One of the parallel DDCUs must be turned off to limit potential circuit currents to less than 65A per power connection inhibit requirements.
2. The decision regarding which DDCU to turn off will be made real time based on power channel loading.

DDCU N22A3A Dist

If powering off DDCU N2P2A

sel DDCU N2P2A

DDCU N2P2A

'DDCU N2P2A'

sel Converter

DDCU N2P2A Converter

'Converter Off'

cmd Off (command is 1-step, arm not required)

If powering off DDCU N2P3A

sel DDCU N2P3A

DDCU N2P3A

'DDCU N2P3A'

sel Converter

DDCU N2P3A Converter

'Converter Off'

cmd Off (command is 1-step, arm not required)

DDCU N22A3A Dist

'Power Sharing, %'

Verify that the DDCU which was turned off is 0% and the operating DDCU is 100%.

2. [ACCESSING](#)

- 2.1 Remove rack UIP closeout cover, temporary stow.
Cover is attached by Velcro only.
Refer to Figure 0-1.

1.215 EDR UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

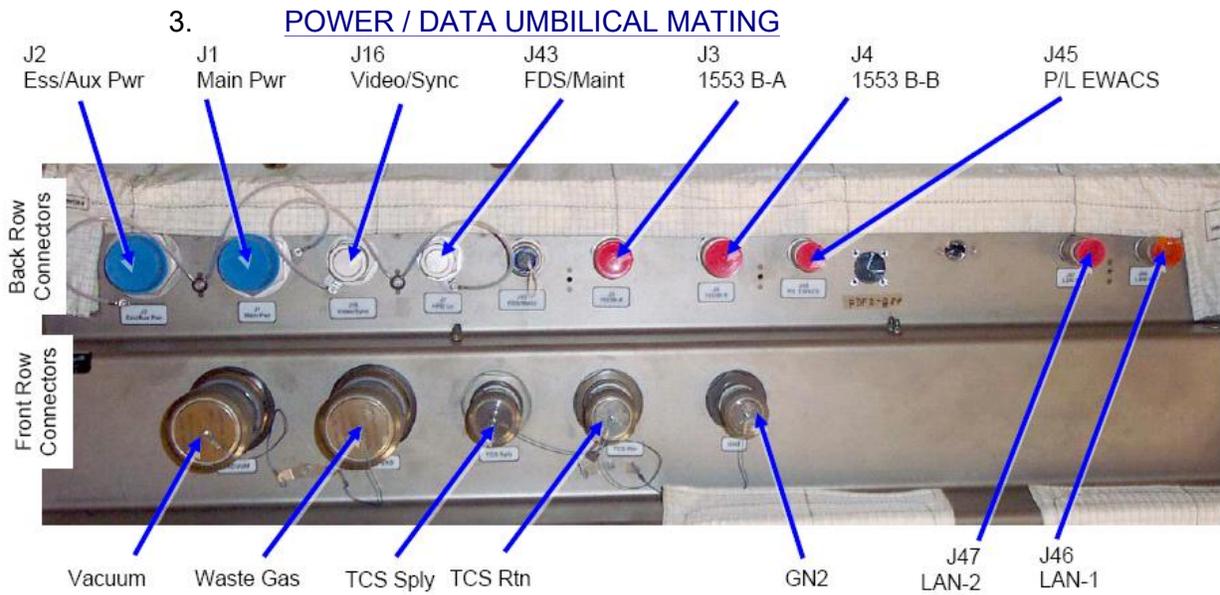


Figure 3-1 COL UIP at COL1F1 Location

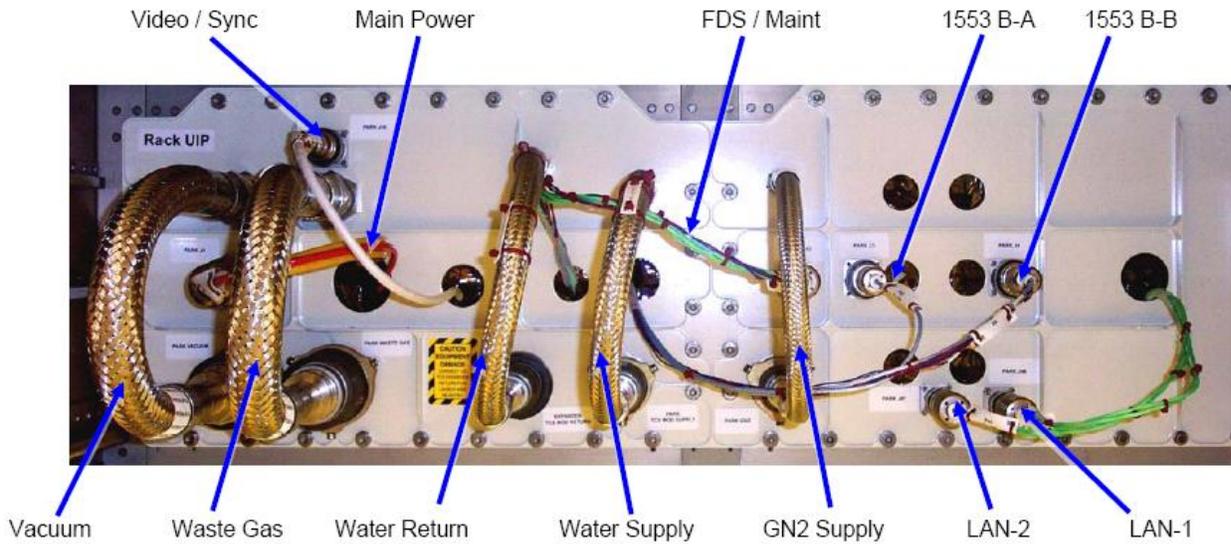


Figure 3-2 EDR Umbilicals Launch Configuration.

CAUTION

1. To prevent damage to EMI rings, hold connector back shell with one hand while using other hand to rotate connector collar.
2. Handle fiber optic cables by connector only. Do not bend, or apply pressure to cable during mating.

NOTE

Do not cut plastic cable ties bundling umbilicals.

1.215 EDR UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 6 of 9 pages

Place unthethered protection caps removed from COL UIP jacks on empty launch restraint (park) connectors on rack UIP. Caps can be additionally fixed using gray tape.

Always fix tethered caps to the corresponding umbilical using gray tape.

Table 1. Power / Data Umbilicals (recommended installation order)

Order Number [X]	EDR Umbilical Function	Rack Umbilical Label	Rack UIP Label	COL UIP Label
1	MAIN POWER	P01 To UIP J01	PARK J1	J1 MAIN PWR
2	VIDEO / SYNC	P16 To UIP J16	PARK J16	J16 VIDEO/SYN C
3	FDS / MAINT	P43 To UIP J43	PARK J43	J43 FDS/MAINT
4	MIL-BUS-A (1553B-A)	P03 To UIP J03	PARK J3	JJ3 1553 B-A
5	MIL-BUS-B (1553B-B)	P04 To UIP J04	PARK J4	J4 1553 B-B
6	ETHERNET (LAN-2)	P47 To UIP J47	PARK J47	J47 LAN-2
7	ETHERNET (LAN-1)	P46 To UIP J46	PARK J46	J46 LAN-1

3.1 Don Static Wrist Tether

Attach clip to unpainted, unanodized metal structure.

3.2 Mate umbilical [X] to COL UIP where [X] = [1][2][3][4][5][6][7]

Refer to Table 1.

Remove protective cap from COL UIP jack, temporary stow if untethered.
Refer to Figure 3-1.

Disconnect umbilical from launch restraint (park) connector on rack UIP.
Refer to Figure 3-2.

Mate umbilical to COL UIP jack, restrain tethered protection cap to umbilical (Gray Tape) where possible.

√Red Indicator Ring – not visible.

Repeat

If EDR connects to Columbus Ess/Aux Power

NOTE

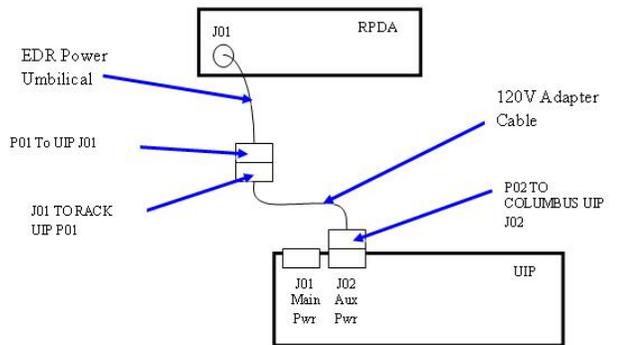
EDR connection to UIP Ess/Aux Power requires use 120V Adaptor Cable. EDR Power jumper can not be connected to UIP ESS/AUX PWR J02 due to different connector keying. Contact **COL-CC** for power adapter cable stowage.

J01 to RACK UIP P01 →|← P01 To UIP J01.

P02 to COLUMBUS UIP J02 →|← J2 Ess/Aux Pwr.

√Red Indicator Ring – not visible.

Restrain protection caps (all) power umbilical (gray tape).



4. **FLUIDS UMBILICAL MATING**

Table 2. Fluid Umbilicals (recommended installation order)

Order Number [X]	EDR Umbilical Function	Fluid Umbilical Label	Rack UIP Label	COL UIP Label
1	Vacuum	TO UIP WASTE GAS	PARK VACUUM	VACUUM
2	Waste Gas	TO UIP VACUUM	PARK WASTE GAS	WASTE GAS
3	TCS Return	TO UIP TCS MOD RETURN	EXPANDER TCS MOD RETURN	TCS Rtn
4	TCS Supply	TO UIP TCS MOD SUPPLY	PARK TCS MOD SUPPLY	TCS Sply
5	GN2 Supply	TO UIP GN2	PARK GN2	GN2

- 4.1 Mate umbilical [X] to COL UIP where [X] = [1][2][3][4][5]
 - Refer to Table 2.
 - Remove protective cap from COL UIP jack, temporary stow if untethered. Refer to Figure 3-2.
 - Disconnect umbilical from launch restraint (park) connector on rack UIP.
 - Mate umbilical to COL UIP jack, restrain tethered protection cap to to umbilical (Gray Tape) where possible.
 - √No leakage from QD, remove droplets (Dry Wipe) as necessary.
 - Repeat

- 4.2 Pressure Cap →|← EXPANDER TCS MOD RETURN QD (on rack UIP).

5. CLOSEOUT

- 5.1 ISS ↓ **COL-CC** of completing umbilical mating, wait for **GO** to closeout worksite.
- 5.2 ISS ↓ **MCC-H**, 'Go for DDCU Powerup'. **MCC-H** will perform step 7.
- 5.3 Doff Static Wrist Tether.
- 5.4 Photo-document all installed umbilicals (DCS 760 Camera).
- 5.5 Check for FOD around work area.
- 5.6 Attach rack UIP closeout cover. Cover is attached by Velcro only.

6. POST INSTALL

- 6.1 ISS ↓ **COL-CC** of task completion.
- 6.2 Stow tools and equipment.

7. MCC-H ONLY - DDCU POWERUP

- 7.1 Powering on String 2 Parallel DDCU
Node2: EPS: DDCU N22A3A Dist
DDCU N22A3A Dist

If powering on DDCU N2P2A
|
~

1.215 EDR UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

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sel DDCU N2P2A

DDCU N2P2A

'DDCU N2P2A'

sel Converter

DDCU N2P2A Converter

'Converter On'

cmd Arm

cmd On

If powering on DDCU N2P3A

sel DDCU N2P3A

DDCU N2P3A

'DDCU N2P3A'

sel Converter

DDCU N2P3A Converter

'Converter On'

cmd Arm

cmd On

NOTE

After the DDCU is repowered, the power sharing ratio will default back to its previously commanded values.

DDCU N22A3A Dist

'Power Sharing, %'

Verify DDCU N2P2A = _____ (value recorded in Step 1.4)

Verify DDCU N2P3A = _____ (value recorded in Step 1.4)

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EPM

EPM

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EPM

1.111 EPM ISPR RACK ACTIVATION ON AUX POWER BUS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 12 pages

OBJECTIVE:

This procedure is used to activate the EPM ISPR located in position COL1A3 connected to the AUX POWER BUS (PDU2).

LOCATION:

COL1A3

DURATION:

30 minutes

CREW:

One

TOOLS:

None

REFERENCED PROCEDURES:

9.214 FINE ADJUSTMENT OF WFSV - OPENING

1. CHECKING EPM ISPR (A3) FRONT SWITCHES CONFIGURATION

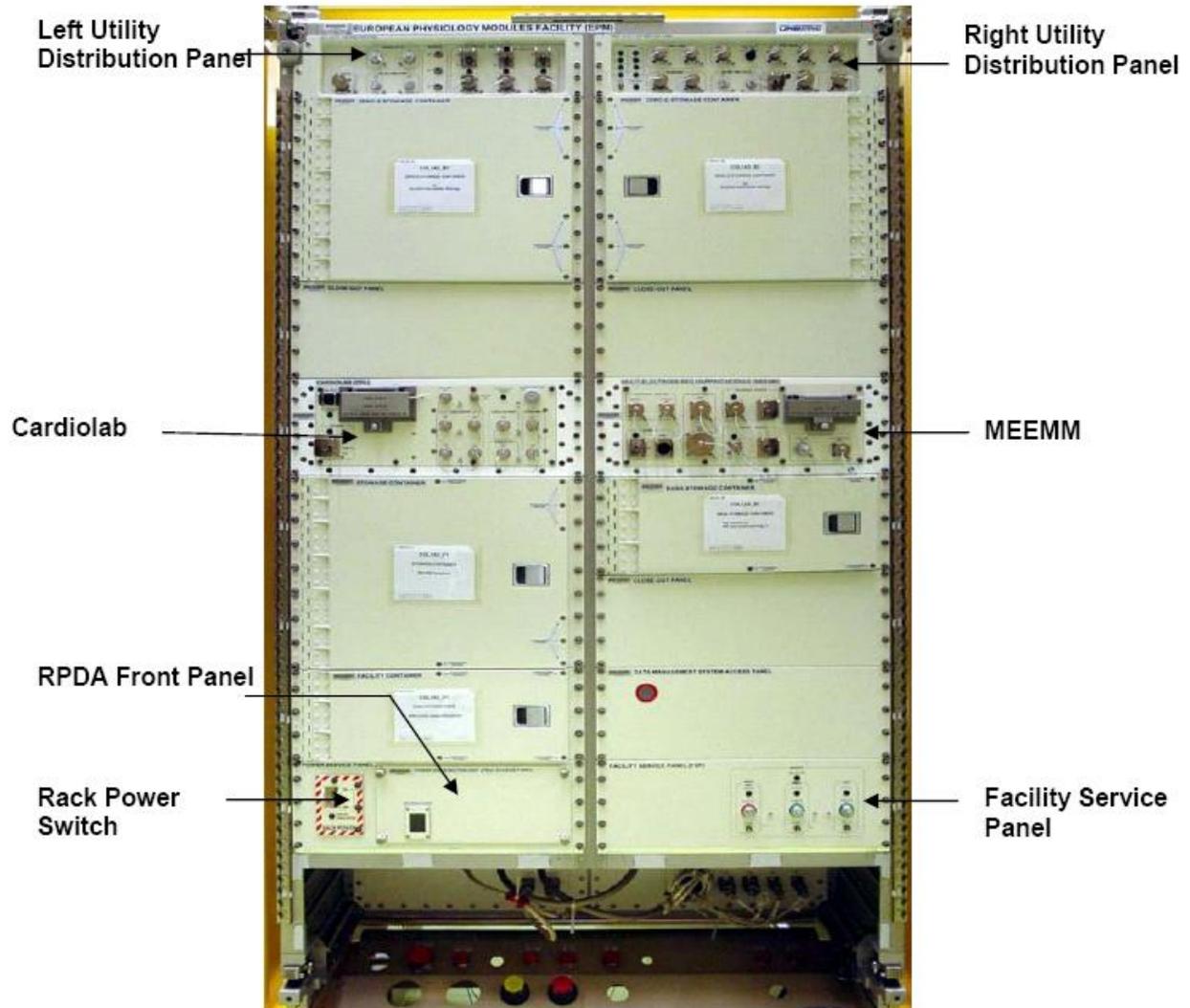


Figure 1. EPM Front Panel View

1.1 [Verifying RACK POWER Switch Position](#)

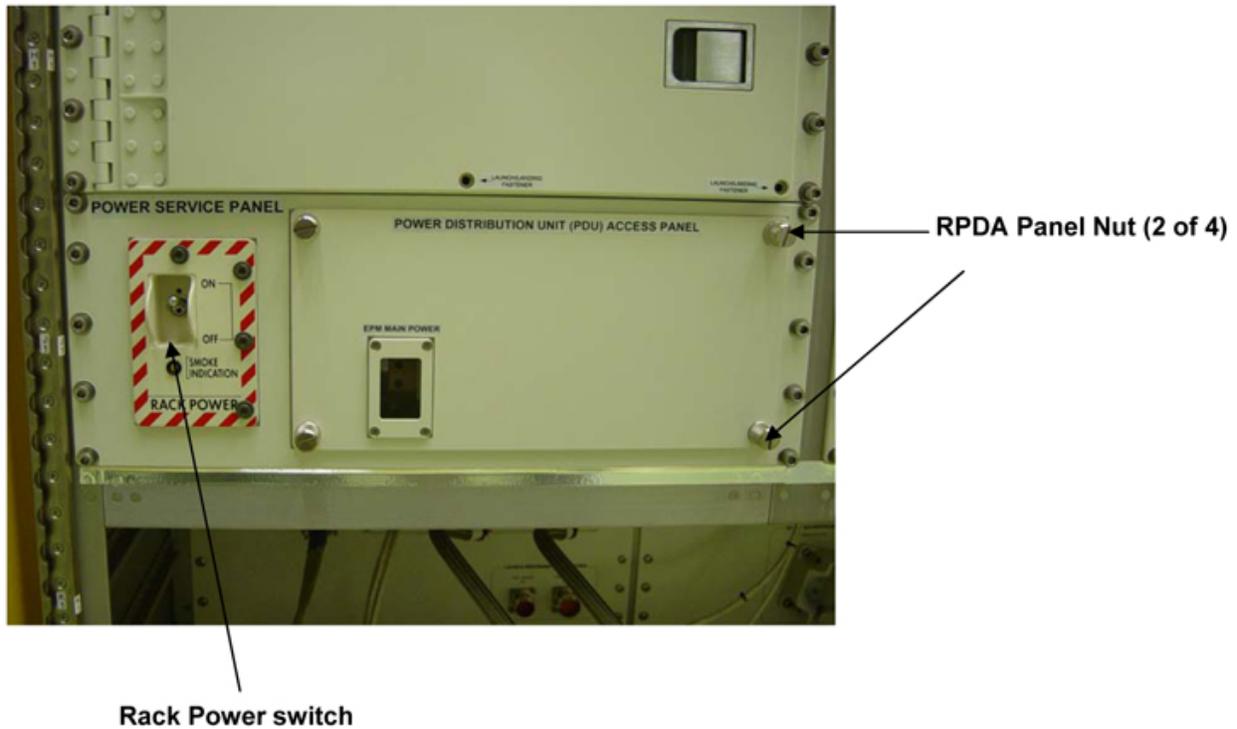


Figure 2. RPDA Front Panel View

√sw RACK POWER – ON

PWS

1.2 [Verifying RACK POWER Switch Position Data](#)

Payload: ISPR A3

ISPR A3

'EPDS'

Verify Maint Switch – ON

Verify ISPR_A3_Maint_Switch_Stat_DMC – ON (1)

EPM

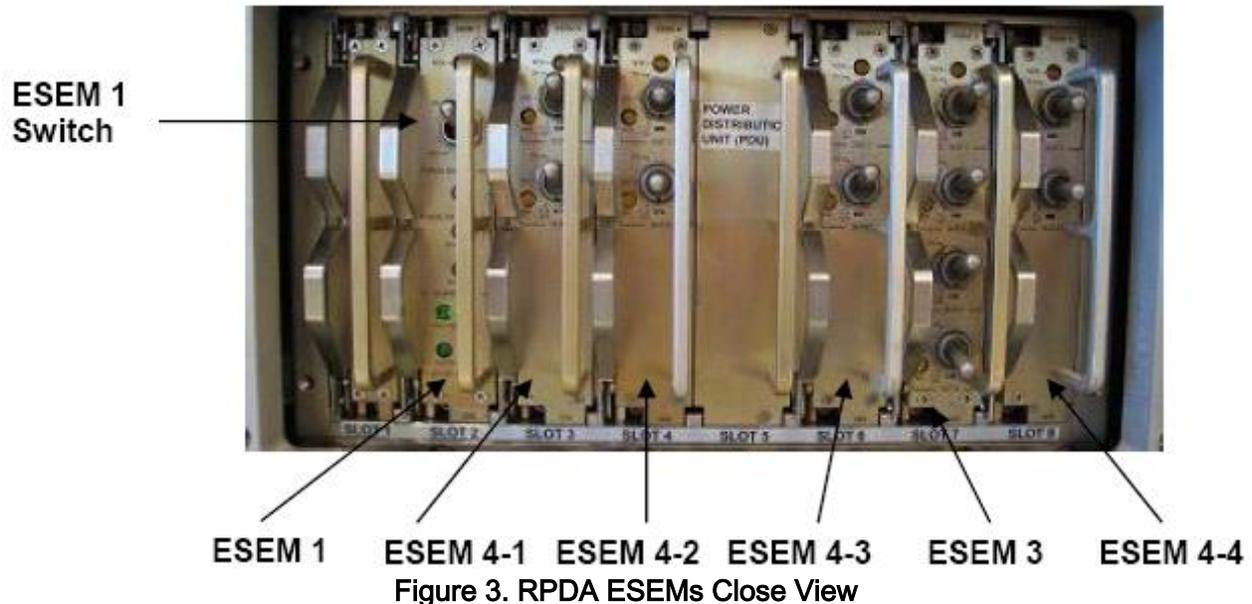
1.3 [Removing RPDA Front Panel](#)

manual operated nuts → unscrew from RPDA Front Panel
 (4nuts, secured by safing string, refer to Figure 2)

RPDA Front Panel → remove

Tm pry stow RPDA Front Panel

1.4 [Verifying EPM ISPR RPDA Switch Positions](#)



NOTE

1. The EPM ISPR RPDA switch positions need to be verified by the crew and manually reconfigured only if directed by COL-CC.
2. All ESEM switch positions except for FIX OFF can and will be overwritten by the RIC during P/L internal initialization sequence.
3. The ESEM 4-1 (slot 3), Switch 1 controls the RIC power. Setting to OFF or FIX OFF will result in loss of P/L communication.

Verify RPDA Switch Positions

Refer to Figure 3 and Table 1

Report COL-CC any anomalies

1.111 EPM ISPR RACK ACTIVATION ON AUX POWER BUS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 5 of 12 pages

Table 1. RPDA ESEM Default Switch Positions

Slot (left to right)	ESEM Number	Switch location (top-down)	Switch position
1	ESEM 2	N/A	N/A
2	ESEM 1	1	ON
3	ESEM 4-1	1	ON
3	ESEM 4-1	2	ON
4	ESEM 4-2	1	OFF
4	ESEM 4-2	2	OFF
5	FREE	N/A	N/A
6	ESEM 4-3	1	OFF
6	ESEM 4-3	2	ON
7	ESEM 3	1	ON
7	ESEM 3	2	ON
7	ESEM 3	3	ON
7	ESEM 3	4	FIX OFF
8	ESEM 4-4	1	OFF
8	ESEM 4-4	2	OFF

1.5 [Installing RPDA Front Panel](#)

RPDA Front Panel → unstow from Tmptry stow (refer to Figure 1)

RPDA Front Panel → insert (match with screws of rack side)

manual operated nuts (4, secured by safing string) → screw onto their respective screw (hand tight)

1.6 [Checking EPM ISPR \(A3\) CARDIOLAB Switch Configuration](#)

'Cardiolab (CDL) DMS Control Unit (DMCU)' (refer to figure 1)
'Power'

Verify Switch in position – OFF

1.7 [Checking EPM ISPR \(A3\) MEEMM Switches configuration](#)

'Multi-Electrode EEG Mapping Module (MEEMM) (ME)'
(refer to figure 1)

'Power'

Verify Switch in position – OFF

'Headbox Power'

Verify Switch in position – OFF

'Camera Power'

Verify Switch in position – OFF

1.8 [Checking EPM ISPR \(A3\) LUDP Switches configuration](#)

Left Utility Distribution Panel (LUDP)

1.111 EPM ISPR RACK ACTIVATION ON AUX POWER BUS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 12 pages

(refer to Figure 1)
'28 VDC PWR OUT Max 10A'
'Power OUT 1'
Verify Switch in position – OFF
'Power OUT 2'
Verify Switch in position – OFF
'Power OUT 3'
Verify Switch in position – OFF

- 1.9 [Checking EPM ISPR \(A3\) RUDP Switches configuration](#)
'Right Utility Distribution Panel (RUDP)' (refer to figure 1)
'NTSC Video'
'Video Select'
Verify Switch in position – OFF
'Laptop'
'Power'
Verify Switch in position – OFF

2. [VERIFYING TCS STATUS](#)

PWS

2.1 [Checking the WFSV ISPR \(A3\) is in Closed Position](#)

TCS: Plenum: WFSV ISPR A3

Verify POSN – Closed
Verify POSN Ind < 7 pct

Verify WFSV_ISPR_A3_Close_Stat_DMC – CLOSED (1)
Verify WFSV_ISPR_A3_Posn_Ind_DMC – < 7 %

2.2 [Verifying Water Pump Status](#)

TCS

'Water Pump Assemblies'

Identify active WPA

If active WPA – WPA1

| Record Mass Flow WPA 1: _____ kg/h

If active WPA – WPA2

| Record Mass Flow WPA2: _____ kg/h

1.111 EPM ISPR RACK ACTIVATION ON AUX POWER BUS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 12 pages

'Delta Pressure Sensor Blocks'

'DPSB1 Plenum'

Verify Nom dP – 40 to 45 kPa

'DPSB2 Plenum'

Verify Redun dP – 40 to 45 kPa

If WPA_Active_Pump_SW - WPA1

Record WPA1_Massflow_DMC: _____
kg/h

If WPA_Active_Pump_SW -WPA2

Record WPA2_Massflow_DMC: _____
kg/h

(For calculation later on in section 3.3)

Verify DPSB1_Nom_Plenum_DP_MVD – 40 to 45 kPa

Verify DPSB2_Redun_Plenum_DP_MVD – 40 to 45 kPa

3. [ACTIVATING EPM ISPR \(A3\) COOLING](#)

3.1 [Configuring WFSV ISPR \(A3\) to Open Position \(GROUND ONLY\)](#)

Perform [{9.214 FINE ADJUSTMENT OF WFSV - OPENING}](#) (ESA SODF:GND:TCS:NOMINAL) to open the WFSV of ISPR (A3).

Wait 1 minute for valve to fully open

Verify WFSV_ISPR_A3_Open_Stat_DMC – OPEN (1)

Verify WFSV_ISPR_A3_Posn_Ind_DMC – > 97 %

Verify WFSV_ISPR_A3_Act_Stat_DMC – INACTIVE (0)

Verify WFSV_ISPR_A3_Current_Ovld_Stat_DMC – OK (0)

3.2 [Verifying the ISPR \(A3\) Flow Rate](#)

TCS

[TCS Functional Overview](#)

'Water Pump Assemblies'

Identify active WPA

If active WPA – WPA1

Record Mass Flow WPA 1: _____ kg/h

If active WPA – WPA2

~

1.111 EPM ISPR RACK ACTIVATION ON AUX POWER BUS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 8 of 12 pages

Record Mass Flow WPA2: _____ kg/h

Crew Subtract WPA Mass flow obtained in step 2.2 from WPA Mass flow obtained in step 3.3.

Record result of subtraction: _____ kg/h

Verify result of subtraction – 75 to 101 kg/h

PWS

TCS Functional Overview

'Delta Pressure Sensor Blocks'

'DPSB1 Plenum'

Verify Nom dP – 40 to 45 kPa

'DPSB2 Plenum'

Verify Redun dP – 40 to 45 kPa

If WPA_Active_Pump_SW – WPA1

Record WPA1_Massflow_DMC: _____ kg/h

If WPA WPA_Active_Pump_SW – WPA2

Record WPA2_Massflow_DMC: _____ kg/h

Subtract WPA Mass flow obtained in step 2.2 from WPA Mass flow obtained in step 3.3

Record result of subtraction: _____ kg/h

Verify result of subtraction – 75 to 101 kg/h

Verify DPSB1_Nom_Plenum_DP_MVD – 40 to 45 kPa

Verify DPSB2_Redun_Plenum_DP_MVD – 40 to 45 kPa

4. ACTIVATING EPM ISPR (A3) AUX POWER SUPPLY

4.1 Enabling ISPR (A3) Aux Power Bus System Control (ground only)

If PDU2_ISPR_A3_Aux_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC – DISABLED (0)

cmd PDU2_ISPR_A3_Aux_Pwr_Bus_Sys_Cntl_Ena_VTC

data SW_CMD – VTC_Disc_Out_Cmd_Cmd_SW

data Onboard_Node – SYS_CCSDS_End_Point_VTC1

Verify

PDU2_ISPR_A3_Aux_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC – ENABLED (1)

4.2 [Activating ISPR \(A3\) Aux Power Bus](#)

NOTE

1. ISPR RIC boots automatically if power supplied!

On COL-CC GO

EPDS:

[EPDS Functionl Overview](#)

'PDU2'

sel 120 V Payload

[PDU 1-2 120V Payload](#)

'PDU2 Outlets'

sel 8

[PDU2 Outlet 8](#)

'Sys Bus Cntl Stat'

Verify SSPC1 – ENABLED

'Commands'

cmd Pwr On Execute [OK]

'Pwr'

Verify SSPC1 Pwr – ON

Verify SSPC2 Pwr – ON

Wait 2 minutes to allow current value to stabilize

'Current'

Verify – 2.5 A to 3.1 A

```
cmd PDU2_ISPR_A3_Aux_Pwr_Bus_On_AP
data ONBOARD_RECEPTION_NODE –
SYS CCSDS End Point PLCU DMS SERV
data ONBOARD_EXECUTION_NODE –
USM SW DMC USS Swop Instance
```

Verify

PDU2_ISPR_A3_Aux_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
ON

Verify

PDU2_ISPR_A3_Aux_Pwr_Bus_SSPC2_On_Off_Stat_DMC –
ON

Wait 2 minutes to allow current value to stabilize

1.111 EPM ISPR RACK ACTIVATION ON AUX POWER BUS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 10 of 12 pages

Verify PDU2_ISPR_A3_Aux_Pwr_Bus_Current_DMC – 2.5 A to 3.1 A

5. [ACQUIRING EPM ISPR \(A3\) MIL BUS DATA \(GROUND ONLY\)](#)

cmd DMS_RT_Start_RT_Acquisition_Cmd_SW
prm REMOTE_TERMINAL_ID
MIL 1553B Bus RT Pavload Bus ISPR A3
data ONBOARD_NODE – SYS_CCSDS_End_Point_PLCU_DMS_SERV

Verify ISPR_A3_PL_Bus_Ena_Stat_SW – ENABLED
Verify ISPR_A3_PL_Bus_No_Resp_SW – NO_ERROR
Verify ISPR_A3_PL_Bus_Msg_Error_SW – NO_ERROR
Verify ISPR_A3_PL_Bus_Busy_Flag_SW – NO_ERROR
Verify ISPR_A3_PL_Bus_Erroneous_Msg_SW – NO_ERROR
Verify ISPR_A3_PL_Bus_Terminal_Flag_SW – NO_ERROR
Verify ISPR_A3_PL_Bus_Unit_Error_Flag_SW – NO_ERROR

6. [VERIFYING EPM ISPR \(A3\) MIL BUS DATA](#)

On Col-CC GO

PAYLOAD: EPM

EPM Health and Status Data

'EPM H&S Data'

'Status'

Verify Overall – OK

Verify Ground Ops Active – NO

Verify Anomaly – NOMINAL

Verify Ready for Shutdown – NO

'Update Counter'

Verify SA#09 – incrementing

Verify SA#10 – incrementing

Verify EPM_Overall_Stat – OK

Verify EPM_Ground_Ops_Active_Stat – NO

Verify EPM_Anomaly_Flag_Stat – NOMINAL

Verify EPM_Ready_For_Shutdown_Stat – NO

Verify EPM_SA9_Counter – incrementing

Verify EPM_SA10_Counter – incrementing

Additional ground verification:

Verify EPM_FCC_Mode – NOMINAL

Verify EPM_SMSC_Mode – NOMINAL

7. [ACTIVATING EPM ISPR \(A3\) SMOKE DETECTOR MONITORING](#)

1.111 EPM ISPR RACK ACTIVATION ON AUX POWER BUS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 11 of 12 pages

7.1 [Verify ISPR \(A3\) Smoke Detector Signals](#)

DMS: DMS Payload Status

DMS Payload Status

'ISPR A3'

Verify CIFA Stat - > 4.5 V

PCS

COL: ECLSS: A3 (ISPR)

COL ISPR A3 Smoke Detector VTC1

Verify Obscuration < 25 % Contamination

Verify Scatter < 1 % Obscuration per Meter

Verify ISPR_A3_CIFA_Stat_MVD - > 4.5 V

Verify ISPR_A3_SD_Obscuration_VTC < 25 %

Verify ISPR_A3_SD_Scatter_VTC < 1 %

7.2 [Enabling the Smoke Detector ISPR \(A3\) Monitoring](#)

COL: ECLSS: A3 (ISPR)

COL ISPR A3 Smoke Detector VTC1

'Monitoring'

cmd - Enable (Verify Status - Ena)

cmd VTC_Monitoring_Ena_Cmd_SW

prm MONITORED_ITEM_ID - ISPR_A3_SD

prm ACTION - 1(ENABLE)

data ONBOARD_NODE - SYS_CCSDS_End_Point_VTC1

Verify ISPR_A3_SD_Monitoring_Ena_PP - ENABLED

Verify VTC1_ISPR_A3_SD_Stat_MVD - OK

8. [VERIFYING EPM ISPR \(A3\) STATUS](#)

8.1 [Verify ISPR \(A3\) LEDs ON](#)

ON COL-CC GO

EPM

'Power Service Panel'

'Power Distribution Unit (PDU) Access Panel'

'EPM Main power'

Verify green LED Main - ON

'Facility Service Panel (FSP)'

'Service'

Verify green LED DMS Status - ON

'Video Unit'

Verify green LED Status – ON

'SMSC'

Verify green LED Status – ON

'FCC'

Verify green LED Status – ON

'Right Utility Distribution Panel (RUDP)'

Verify green LED EPM MAIN PWR – ON

8.2 [Perform ISPR \(A3\) Lamptest](#)

'Right Utility Distribution Panel (RUDP)'

Push LAMP TEST button and hold

On 'Right Utility Distribution Panel (RUDP):

Verify all LED – ON

On 'Left Utility Distribution Panel (LUDP)'

Verify all LED – ON

Release button

COL-CC to announce completion of Activation of EPM ISPR to
CADMOS

1.120 EPM REMOVAL AND STOWAGE OF LAUNCH AND LANDING FASTENERS (ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 5 pages

OBJECTIVE:

Removal of the EPM Launch and Landing Fasteners and stowage into their dedicated EPM Fastener Stowage Bar

DURATION:

15 minutes

CREW:

One

LOCATION:

COL1A3

TOOLS:

Columbus Toolkit:

Tool Bag 1:

Ratchet Wrench, 1/4"

Tool Bag 2:

2" Extension, 1/4" Drive

Tool Bag 3:

1/4" Bit Holder, 1/4" drive

Bit M5 XZN for Bit Holder 1/4"

ITEMS TO UNSTOW WITHIN PROCEDURE:

EPM Fastener Stowage Bar P/N STOW-004 (unstow step 1.2)

NOTE

All EPM Launch And Landing Fasteners (EPM Facility Container, 8-PU Stowage Container, Right and Left 0-G Stowage Containers) are non-captive

1. REMOVING FACILITY CONTAINER LAUNCH AND LANDING FASTENERS



Figure 1. EPM Facility Container Launch And Landing Fasteners

1.120 EPM REMOVAL AND STOWAGE OF LAUNCH AND LANDING FASTENERS
(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 5 pages

- H1 1.1 Unscrew and remove the EPM Facility Container Launch And Landing Fasteners (four M5 screws) (Refer to Figure 1) and temporarily stow them

NOTE

Take care when opening trays of EPM Facility Container, trays have no End Stop



Figure 2. EPM Fastener Stowage Bar

- 1.2 Retrieve the EPM Fastener Stowage Bar (Refer to figure 2)
- 1.3 Screw (by hand) the four Fasteners on the Stowage Bar at the location "Facility Container" (Refer to figure 2)

2. REMOVING 8-PU STOWAGE CONTAINERS AND ZERO G STOWAGE CONTAINERS LAUNCH FASTENERS



Figure 3. EPM 8-PU Stowage Container Launch and Landing Fasteners

F1, G1

- 2.1 Unscrew and remove the 8-PU Stowage Container Launch And Landing Fasteners (eight M5 screws) (Refer to Figure 3)
- 2.2 Screw (by hand) the eight Fasteners on the Stowage Bar at the location "8 PU SC" (Refer to figure 2)



Figure 4. Left 0-G Stowage Container Launch and Landing Fasteners

- | | | |
|--------|-----|--|
| B1, C1 | 2.3 | Unscrew and remove the EPM Left 0-G Stowage Container Launch And Landing Fasteners (six M5 screws) (Refer to Figure 4) |
| | 2.4 | Screw (by hand) the six Fasteners on the Stowage Bar at the location "0G SC" (Refer to figure 2) |

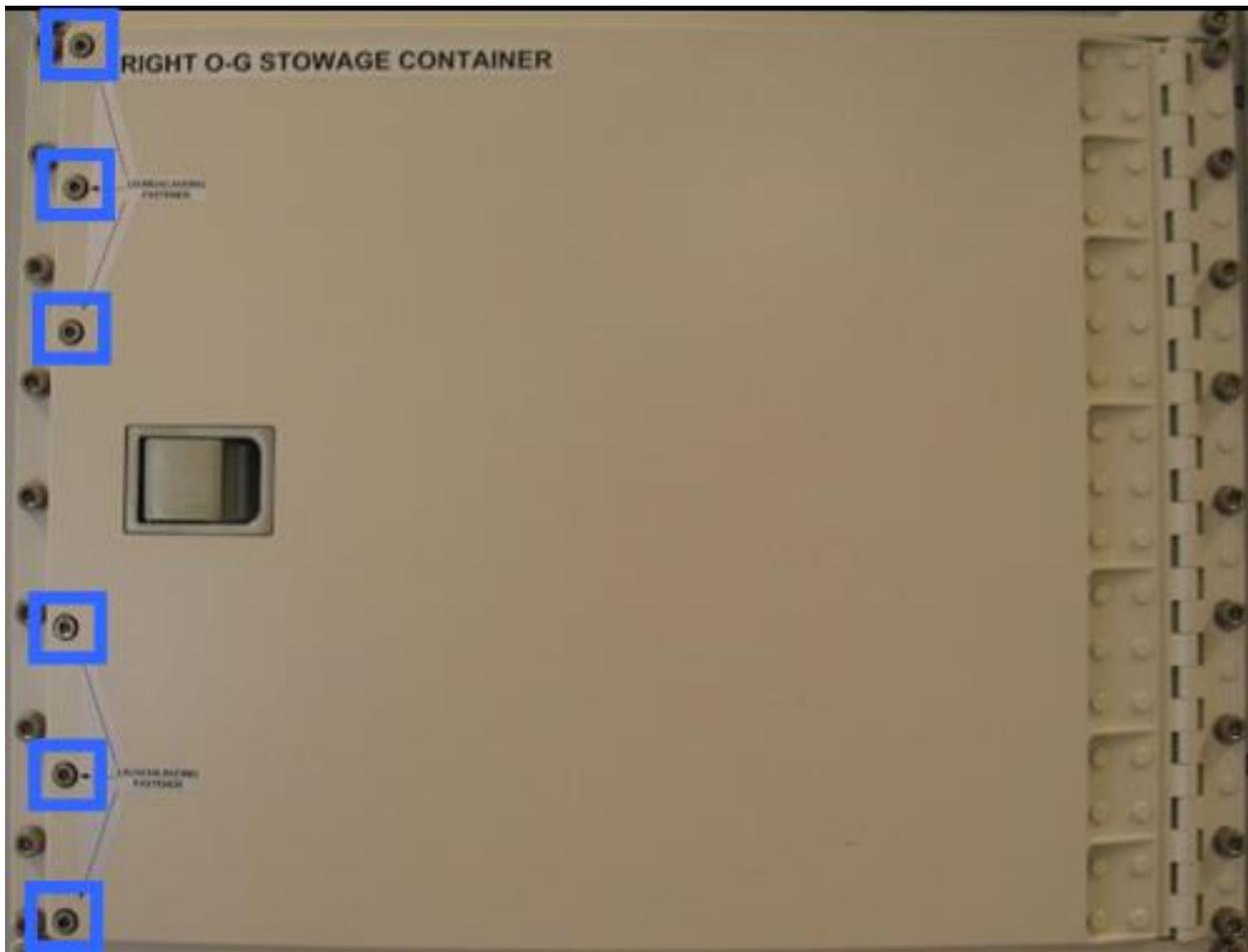


Figure 5. Right 0-G Stowage Container Launch and Landing Fasteners

- | | | |
|--------|-----|---|
| B2, C2 | 2.5 | Unscrew and remove the EPM Right 0-G Stowage Container Launch Fasteners (six M5 screws) (Refer to Figure 5) |
| | 2.6 | Screw (by hand) the six Fasteners on the Stowage Bar at the location "0G SC" (Refer to figure 2) |
| H1 | 3. | <u>CLEANUP</u> |
| | 3.1 | Stow the EPM Fastener Stowage Bar with all fasteners screwed on it |
| | 3.2 | Update IMS with stowage location or notify COL-CC |

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1.213 EPM UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 11 pages

OBJECTIVE:

Mate all EPM ISPR-to-COL Utility Interface Panel (UIP) umbilicals, with the EPM readily installed at its assigned location COL1A3 and all required Columbus systems operating nominally.

LOCATION:

COL1A3

DURATION:

30 minutes

CREW:

One

PARTS:

EPM Aux Power Cable P/N HMU E08

EPM QD Dust Cap P/N STOW014

MATERIALS:

Gray Tape

Trash Bag

Dry Wipe

Ziplock Bag

Sharpie

TOOLS:

DCS 760 Camera

Columbus Tool Kit:

Tool Bag 1:

Ratchet Wrench, 1/4"

Ratchet Tool, 1/4" Drive

Tool Bag 2:

6" Extension, 1/4" Drive

Tool Bag 3:

1/4" Bit Holder, 1/4" Drive

BIT M6 XZN for Bit Holder 1/4"

Tool Bag 5:

Torque Wrench 4-20 Nm

ISS IVA TOOLBOX:

Drawer 5:

Static Wrist Tether

1.213 EPM UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

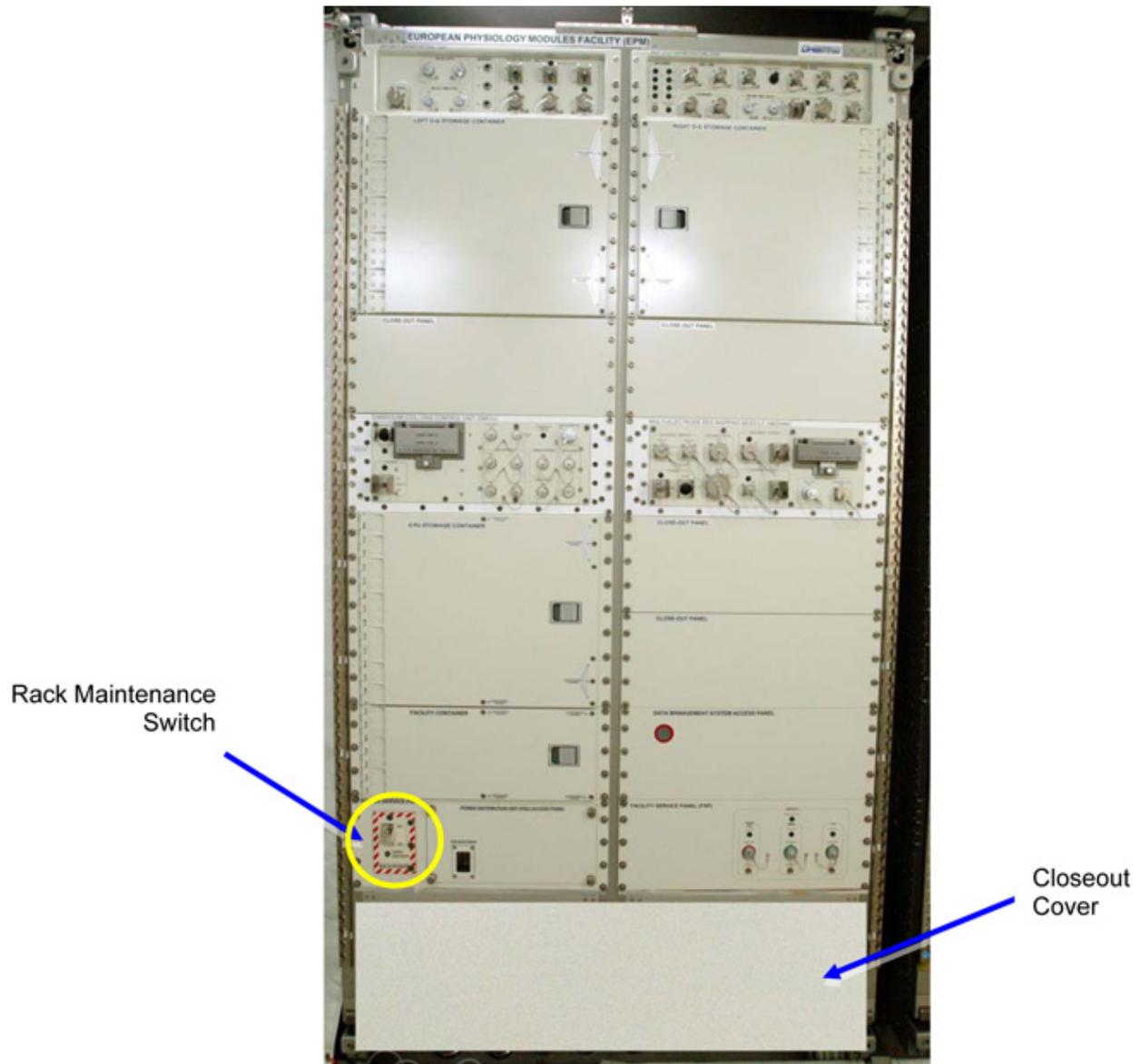


Figure 0-1 European Physiological Module – EPM
(Installed, UIP Closeout Cover in Place)

1.213 EPM UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 3 of 11 pages

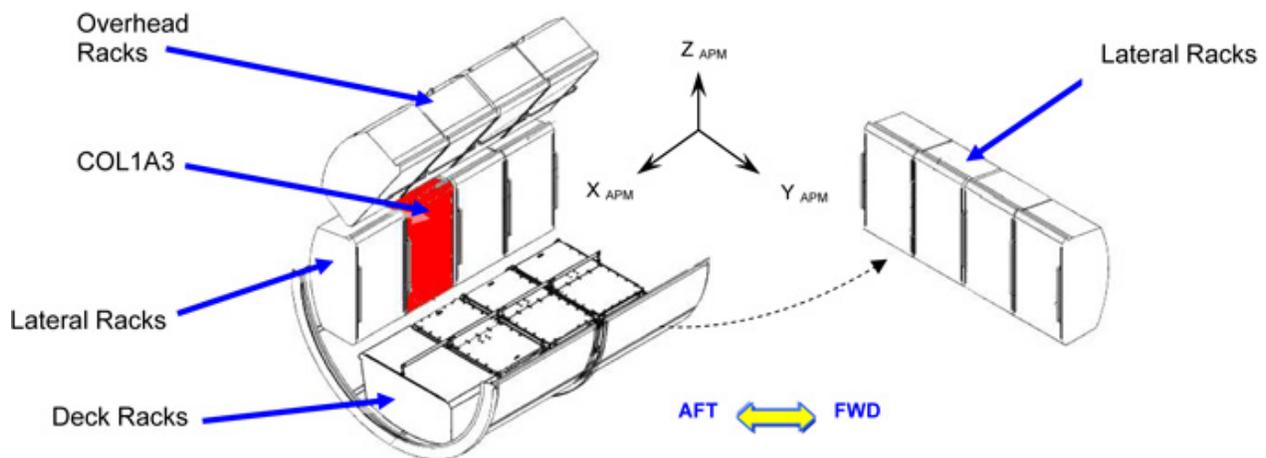


Figure 0-2 EPM On-Orbit Installation Location (COL1A3)

1. INITIAL SAFING

- 1.1 Verify COL1A3 UIP Main / Aux Power – OFF

PWS

EPDS: EPDS Functional Overview -PDU1-2: 120V Payload

120V Payload

'PDU1 Outlets'

sel PDU1 Outlet 3

Verify SSPC (all) – OFF

Verify Current (all) – < 0.1 A

Verify Sys Bus Cntl (all) – OFF

EPDS: EPDS Functional Overview - PDU1-2: 120V Payload

120V Payload

'PDU2 Outlets'

sel PDU2 Outlet 8

Verify SSPC (all) – OFF

Verify Current (all) – < 0.1 A

Verify Sys Bus Cntl (all) – OFF

1.213 EPM UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 5 of 11 pages

WARNING

Rack Power Switch Replacement Connector installed at UIP J43 FDS/MAINT. Connector must be removed prior mating MAIN or AUX power umbilical. Failure to remove connector can result in electrical shock hazard.

If EPM is not installed at COL1A3 or COL1F3, then skip step 3.

- 3.1 Verify Rack Maintenance Switch Replacement Connector not installed at UIP J43 FDS/MAINT

If installed, then

√J43 – Connector Installed.

Refer to Figure 3-1.

- 3.2 Remove J43 connector, ↻ rotate to unlock, place in Ziplock bag

- 3.3 Label Ziplog bag, temporary stow (Sharpie)

4. TCS UMBILICAL MATE

- 4.1 Don Static Wrist Tether.
Attach clip to unpainted, unanodized metal structure.

NOTE

Do not open / remove **red cable ties** bundling umbilicals.

- 4.2 Remove (without cutting) white cable ties (5) from rack umbilicals, temporary stow.
(Refer to Figure 4-1).

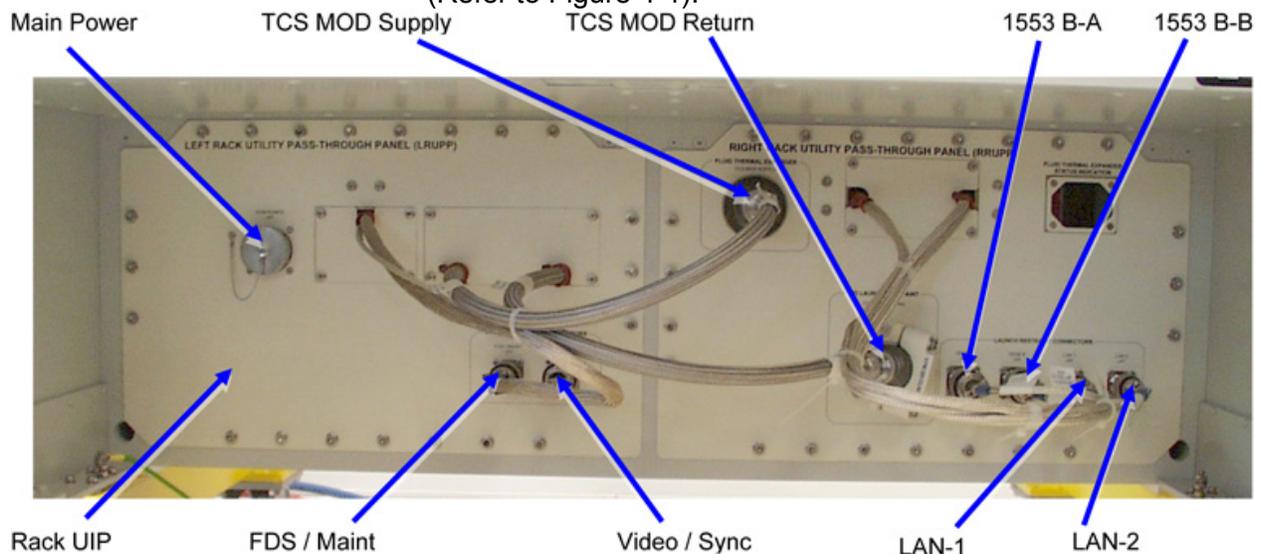


Figure 4-1 EPM Umbilicals in Launch Configuration at Rack UIP.

1.213 EPM UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 6 of 11 pages

Table 1. TCS Umbilicals.

EPM Rack Umbilical Function	Fluid Umbilical Label	COL UIP QD Label
TCS Return Line	To COL UIP TCS MOD RETURN	TCS Rtn
TCS Supply Line	To COL UIP TCS MOD SUPPLY	TCS Sply

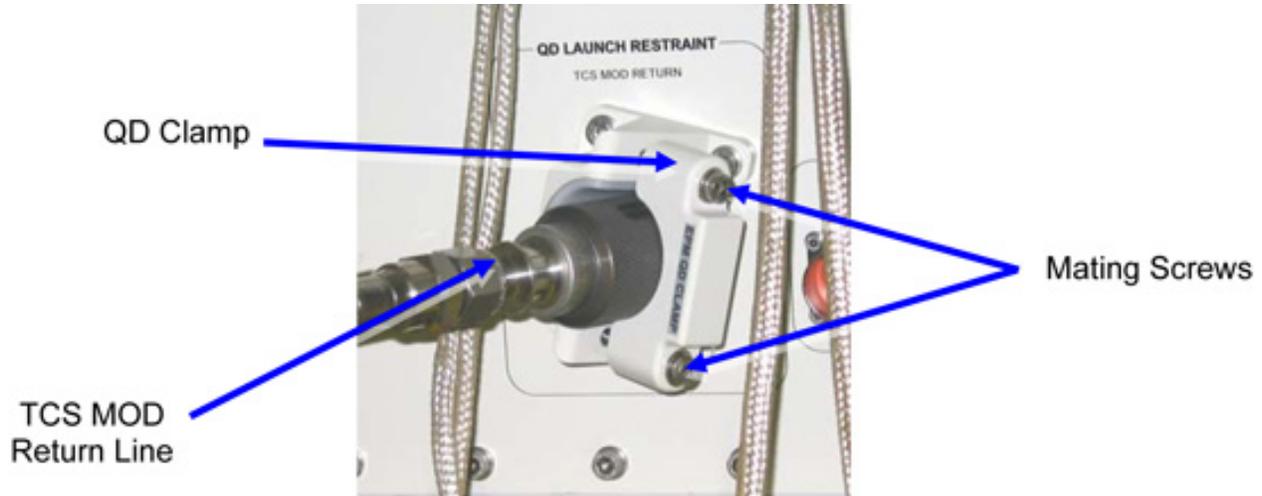


Figure 4-2 TCS MOD Return Line Launch Stowage

NOTE

1. Do not completely remove QD clamp from its seat.
2. TCS MOD Return Line QD Pressure Plug shall be stored on QD clamp.

- 4.3 Release QD clamp mating (captive) screws (2) and remove TCS MOD Return Line from QD clamp (Ratchet Wrench, 1/4" Drive; 6" Extension, 1/4" Drive; M6 XZN Head, 1/4" Drive). (Refer to Figure 4-1 / Figure 4-2).
- 4.4 Remove Pressure Plug from TCS MOD Return Line QD, temporary stow.
- 4.5 ✓No leakage from QD, remove droplets (Dry Wipe) as necessary.
- 4.6 TCS MOD Return →|← TCS Rtn.
Restrain COL UIP protection cap to umbilical (gray tape). (Refer to Figure 3-1 / Table 1).
- 4.7 ✓No leakage from QD, remove droplets (Dry Wipe) as necessary.
- 4.8 ✓Red Indicator Ring – not visible.

1.213 EPM UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 7 of 11 pages

- 4.9 Place Pressure Plug on QD clamp, fasten mating screws (2) (Ratchet Wrench, 1/4" Drive; 6" Extension, 1/4" Drive; M6 XZN Head, 1/4" Drive).

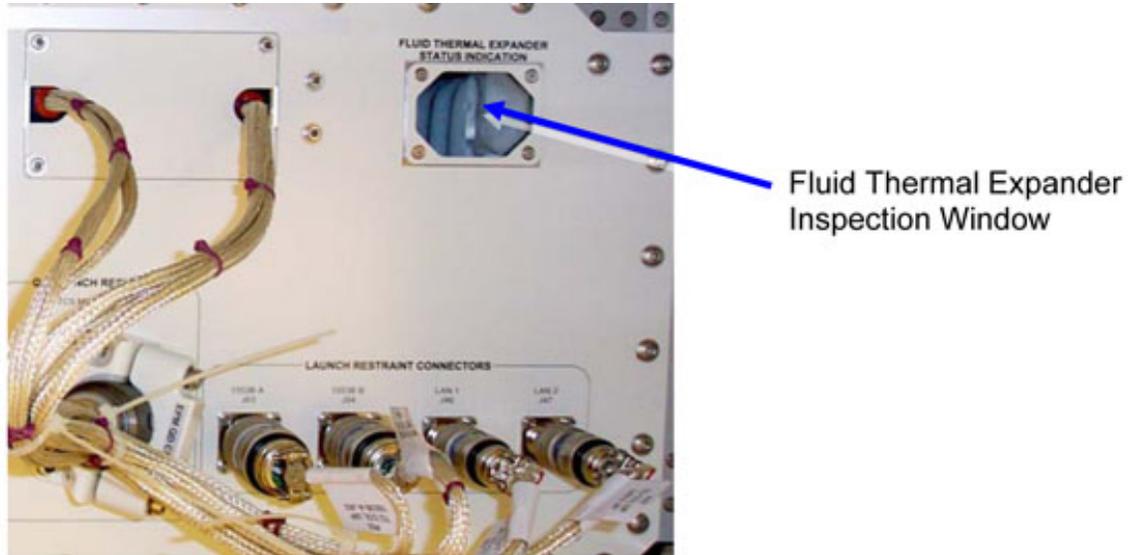


Figure 4-3 Fluid Thermal Expander Inspection Window

- 4.10 √Fluid Thermal Expander Status, Indicator Pin shall not be visible. Use flashlight for better visibility. (Refer to Figure 4-3).

```
*****
*           If Indicator Pin visible, then
*           |           Wait for 60 sec.
*           |           Verify Indicator Pin – not visible
*           |
*****
```

- 4.11 TCS MOD Supply ←|→ Fluid Thermal Expander QD. (Refer to Figure 4-1).
- 4.12 √No leakage from QD, remove droplets (Dry Wipe) as necessary.
- 4.13 TCS MOD SUPPLY →|← TCS Sply.
Restrain COL UIP protection cap to umbilical (gray tape). (Refer to Figure 3-1 / Table 1).
- 4.14 √No leakage from QD, remove droplets (Dry Wipe) as necessary.
- 4.15 √Red Indicator ring – not visible.
- 4.16 EPM QD Dust Cap →|← Fluid Thermal Expander QD.

5. DATA UMBILICAL MATING

CAUTION
1. To prevent damage to EMI rings, hold connector backshell with one hand while using other hand to rotate connector collar.
2. Handle fiber optic cables by connector only. Do not bend, or apply pressure to cable during mating.
3. Connectors J43, J46 and J47 are equipped with some exposed, unbundled thin wires (refer to Figure 5-1), pay attention when mating.

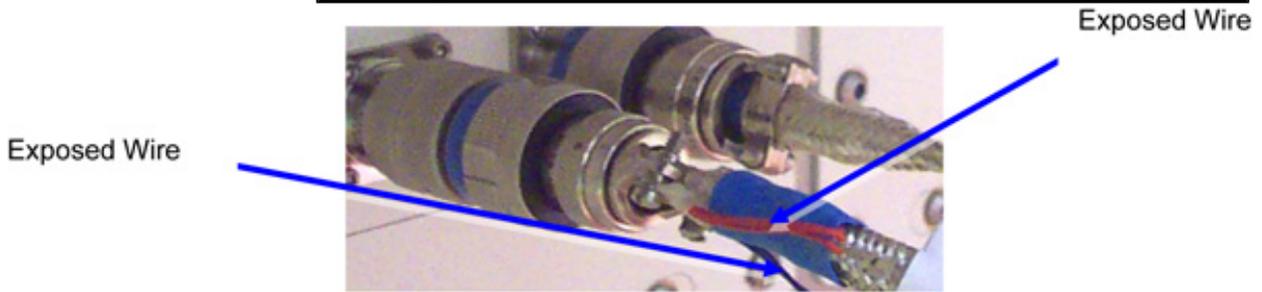


Figure 5-1 Exposed Thin Wires

NOTE
1. Untethered protection caps removed from COL UIP jacks shall be placed on empty launch restraint connectors on rack UIP. Caps can be additionally fixed using gray tape.
2. Tethered caps shall always be fixed to the umbilical using gray tape.

Table 2. Data Umbilicals (recommended installation order).

Order Number [X]	EPM Rack Umbilical Function	Rack Umbilical Label	COL UIP Label
1	FDS / MAINT	P43 TO COL UIP FDS/MAINT J43	J43 FDS/MAINT
2	VIDEO / SYNC	P16 TO COL UIP VIDEO/SYNC J16	J16 VIDEO/SYNC
3	MIL-BUS-A (1553B-A)	P03 TO COL UIP 1553 B-A J03	J3 1553 B-A
4	MIL-BUS-B (1553B-B)	P04 TO COL UIP 1553 B-B J04	J4 1553 B-B
5	ETHERNET (LAN) 1	P46 TO COL UIP LAN-1 J46	J46 LAN-1
6	ETHERNET (LAN) 2	P47 TO COL UIP LAN-1 J47	J47 LAN-2

1.213 EPM UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 9 of 11 pages

- 5.1 Mate data umbilical [X] to COL UIP jacks where [X] = [1] [2] [3] [4] [5]
Refer to Table 2.

Remove, tmpy stow protective cap from COL UIP jack
(Refer to Figure 3-1).

Disconnect umbilical from launch restraint connector
on rack UIP.
Refer to Figure 4-1.

Mate umbilical to COL UIP jack, restraint, stow
protection cap.

√Red Indicator Ring – not visible.

Repeat

6. POWER UMBILICAL MATING

CAUTION

To prevent damage to EMI rings, hold connector backshell with one hand while using other hand to rotate connector collar.

NOTE

AUX and MAIN power umbilical provide different clocking at umbilical to COL UIP connector, umbilicals are not interchangeable.

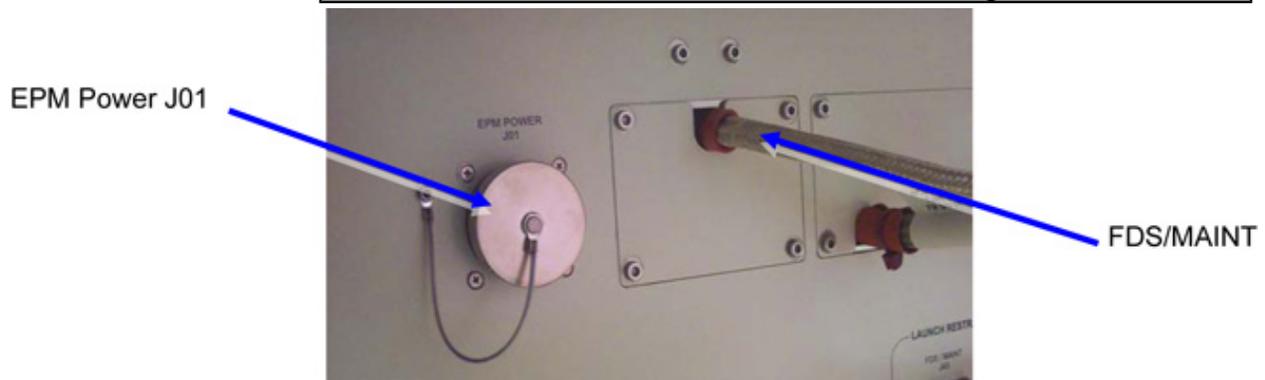


Figure 6-1 EPM Main Power Connector
(Connector w/ Protection Cap Installed)

1.213 EPM UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 10 of 11 pages



Figure 6-2 EPM Power Umbilical (Main or Aux)
(Plugs w/ Protection Caps installed)

Table 3. Power Umbilical.

EPM Rack Umbilical Function	Umbilical Label	COL UIP Connector Label	EPM Connector Label
MAIN POWER	P01 TO COL UIP MAIN PWR J01	J1 Main Pwr	N/A
	P01 TO LRUPP EPM POWER J01	N/A	EPM POWER J01
AUX POWER	P01 TO RACK UIP EPM POWER J01	N/A	EPM POWER J01
	P02 TO COL UIP AUX POWER J02	J2 Ess/Aux Pwr	N/A

NOTE

1. EPM is powered by Columbus AUX power unless otherwise required by **COL-CC**.
2. EPM power umbilical (MAIN or AUX) is not attached to the rack UIP but is stored separately.

- 6.1 Remove protective cap from rack UIP power jack J01
Restrain protection cap to rack UIP (Gray tape).
(Refer to Figure 6-1).
- 6.2 Remove protective caps (2) from EPM power umbilical.
Caps are tethered.
(Refer to Figure 6-2).
- 6.3 P01 TO RACK UIP EPM POWER J01 →|← EPM POWER J01.

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1.310 EPM LEVEL CHECKOUT OF EPM LAPTOP
(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 2 pages

OBJECTIVE:

Verification of the EPM Laptop Connection at EPM Facility level

DURATION:

5 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

None

TOOLS:

None

REFERENCED PROCEDURE

2.210 EPM LAPTOP SETUP AND ACTIVATION

EPM
Laptop

1. [CHECKING EPM LAPTOP AND EPM SOFTWARE ARE ACTIVATED](#)

√ EPM Laptop and Software – activated

```
*****
*
*   If EPM Laptop is not powered or EPM Laptop Control Panel
*   Home Display is not loaded, then
*
*   |
*   |   Perform {2.210 EPM LAPTOP SETUP AND
*   |   ACTIVATION}, all (SODF: ASSY PAYLOAD), then:
*
*****
```

2. [CHECKING EPM LAPTOP CONNECTIONS](#)

2.1 European Physiology Module (EPM)

sel General Services

General Services

'Tools'

sel Connections...

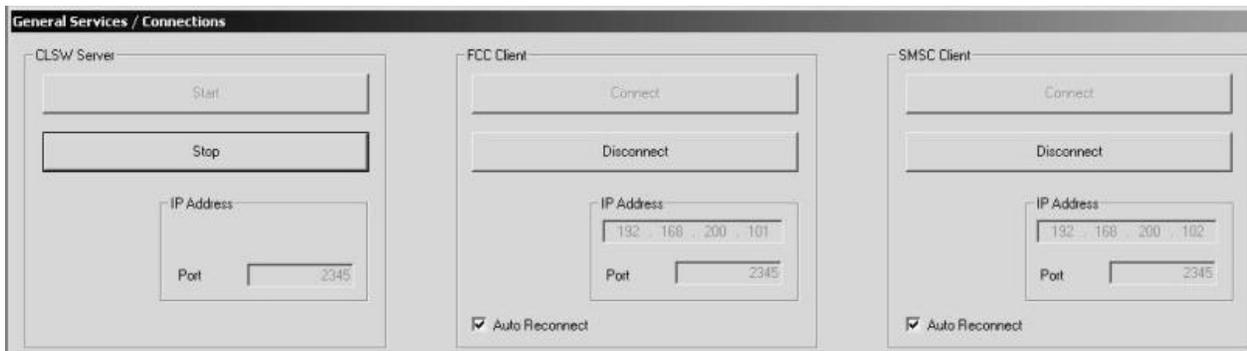


Figure 1. CLSW Server, FCC and SMSC Clients

2.1.1 'CLSW server'

√CLSW server – started (Stop button enabled) (Refer to Figure 1)

2.1.2 'FCC Client'

√FCC Client – connected (Disconnect button enabled) (Refer to Figure 1)

√Auto Reconnect – √

2.1.3 'SMSC Client'

√SMSC Client – connected (Disconnect button enabled) (Refer to Figure 1)

√Auto Reconnect – √

1.320 EPM SELF TEST REPORT ANALYSIS
(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 5 pages

OBJECTIVE:

EPM FCC, SMSC & VU Status Report Analysis

DURATION:

10 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

None

TOOLS:

None

REFERENCED PROCEDURE

2.210 EPM LAPTOP SETUP AND ACTIVATION

EPM
Laptop

1. [CHECKING EPM LAPTOP AND EPM SOFTWARE ARE ACTIVATED](#)

√ EPM Laptop and Software – activated

```
*****
*
*   If EPM Laptop is not powered or EPM Laptop Control Panel
*   Home Display is not loaded, then
*
*   |
*   |   Perform {2.210 EPM LAPTOP SETUP AND
*   |   ACTIVATION}, all (SODF: ASSY PAYLOAD), then:
*
*****
```

2. ANALYZING FCC, SMSC, VU SELF TEST REPORTS

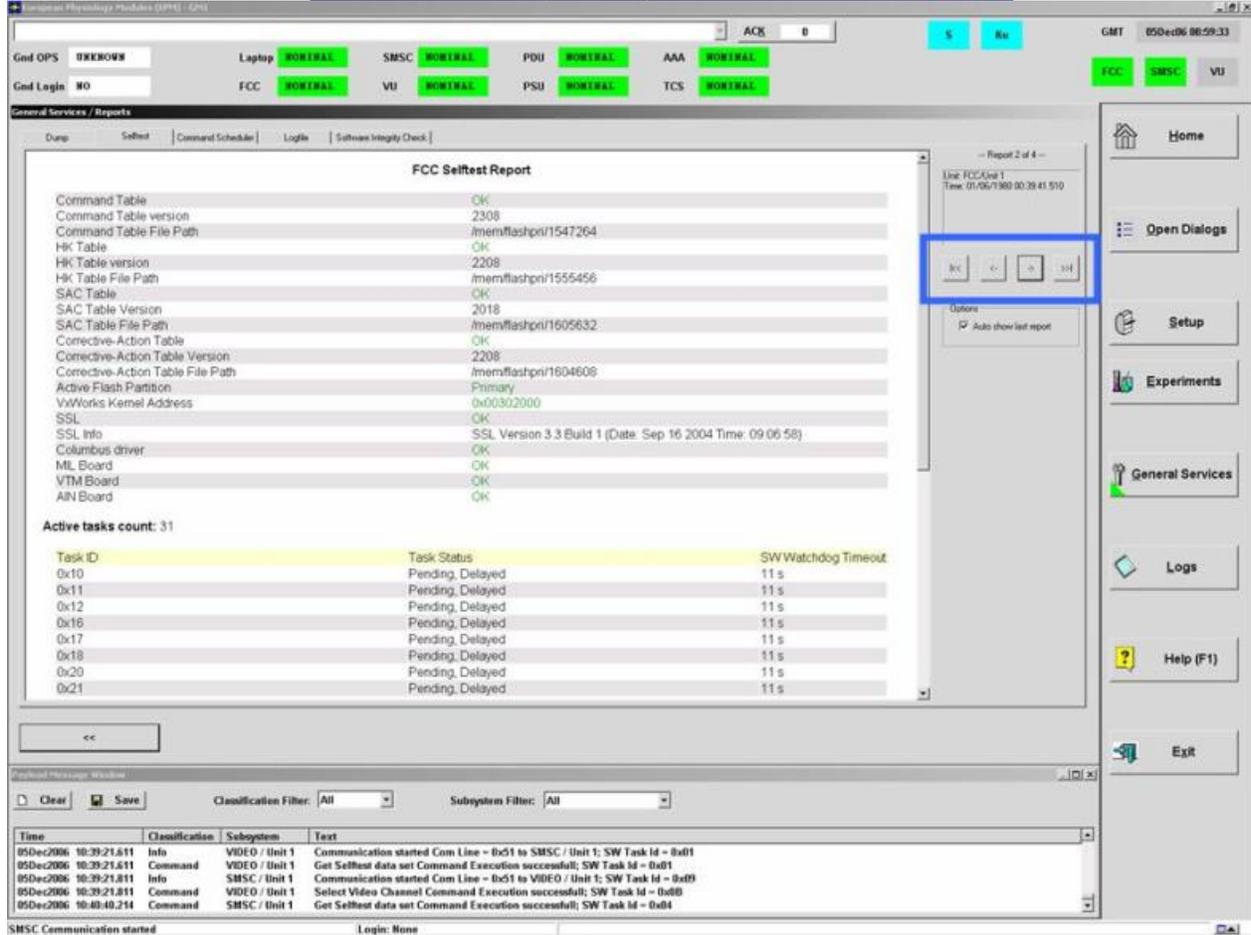


Figure 1. Example (for FCC) of Selftest report with blue-highlighted navigation arrows

2.1 European Physiology Modules (EPM)

sel Home

Home

sel General Services

General Services

'Tools'

sel Reports...

General Services/Reports

sel Selftest

Verify that the three selftest report pages (FCC, SMSC and Video Unit) appear on the screen (by clicking on the navigation arrows blue-highlighted on Figure 1)

```
*****
*
*
*   If the FCC or SMSC or Video Unit Selftest Report
*   page does not appear on the window while clicking on
*   the navigation arrows, then
*
*   European Physiology Modules (EPM)
*   
*
*   sel General Services
*
*   
*   'Tools'
*
*   sel Manual Commanding...
*
*   
*   'Addressed Component'
*
*   pick Subsystem - FCC or SMSC or VIDEO
*   (according to the report page which is
*   missing)
*
*   pick Unit - Unit 1
*
*   'Command'
*
*   pick Group - Selftest and Monitoring
*
*   pick Id - Get Selftest report data
*
*   sel Execute
*
*   cmd Yes (to confirm choice)
*
*   European Physiology Modules (EPM):
*   Payload Message Window
*   
*
*   Verify 'Get Selftest data set Command
*   Execution successful' - appears
*
*   Go back to step 2.1.
*
*****
```

FCC Selftest Report	
Command Table	OK
Command Table version	2308
Command Table File Path	/mem/flashpri/1547264
HK Table	OK
HK Table version	2208
HK Table File Path	/mem/flashpri/1555456
SAC Table	OK
SAC Table Version	2018
SAC Table File Path	/mem/flashpri/1605632
Corrective-Action Table	OK
Corrective-Action Table Version	2208
Corrective-Action Table File Path	/mem/flashpri/1604608
Active Flash Partition	Primary
VxWorks Kernel Address	0x00302000
SSL	OK
SSL Info	SSL Version 3.3 Build 1 (Date: Sep 16 2004 Time: 09:06:58)
Columbus driver	OK
MIL Board	OK
VTM Board	OK
AIN Board	OK

Figure 2. Nominal FCC Selftest Report

- 2.2 Verify that FCC page contains only green and black values (no red values) (Refer to Figure 2)

SMSC Selftest Report	
Last Reset	Power ON
HRD Board	present
HRD RAM	OK
Carrier 1	present
Carrier 2	present
IPM 12	present
IP 206.1	present
IP 206.2	present
IP 206.3	present
IP 660	present
IP Therm. 1	present
IP Therm. 2	present
AD 45	present
UnitConf Table	OK
SMSC TC Table	OK
SMSC HK Table	OK
AFS Config	OK
SAC Config	OK
RS422 Config	OK
RS 485 Config	OK

Figure 3. Nominal SMSC Selftest Report

- 2.3 Verify that SMSC page contains only green and black values (no red values) (Refer to Figure 3)

Video Unit Selftest Report	
HRD Board Present	present
HRD RAM	OK
MPEG 0	present
MPEG 1	present
VU_Conf Table	OK
UnitConf Table	OK
Video TC Table	OK
Video HK Table	OK
Sac Config	OK

Figure 4. Nominal Video Unit Selftest Report

- 2.4 Verify that Video Unit Selftest Report page contains only green and black values (no red values) (Refer to Figure 4)

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1.330 EPM CARRIER HEALTH AND STATUS CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 3 pages

OBJECTIVE:

Checkout of the EPM Carrier Health and Status Values

DURATION:

10 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

None

TOOLS:

None

REFERENCED PROCEDURE

2.210 EPM LAPTOP SETUP AND ACTIVATION

EPM Laptop

1. CHECKING EPM LAPTOP AND EPM SOFTWARE ARE ACTIVATED

√ EPM Laptop and Software – activated

```
*****
*
*   If EPM Laptop is not powered or EPM Laptop Control Panel
*   Home Display is not loaded, then
*
*   |
*   |   Perform {2.210 EPM LAPTOP SETUP AND
*   |   ACTIVATION}, all (SODF: ASSY PAYLOAD), then:
*
*****
```

2. RECORDING THE EPM WATER COOLING LOOP

European Physiology Modules (EPM)

sel Home

Home



sel TCS (

Home/EPM TCS

'COL Supply (°C)'
(Left down corner)

1.330 EPM CARRIER HEALTH AND STATUS CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 3 pages

Record Temperature: _____ °C

'COL Return (°C)
(Left down corner)

Record Temperature: _____ °C

3. VERIFYING THE COLUMBUS HEALTH AND STATUS UPDATE FIELD

3.1 European Physiology Modules (EPM)

European Physiology Modules (EPM)

sel General Services

General Services

'Tools'

sel COL MAIN Display

pick COL MAIN Display / COL H&S Main Display

sel Open Display...

√COL H&S Main Display – pops up

3.2 COL Main Display / COL H&S Main Display

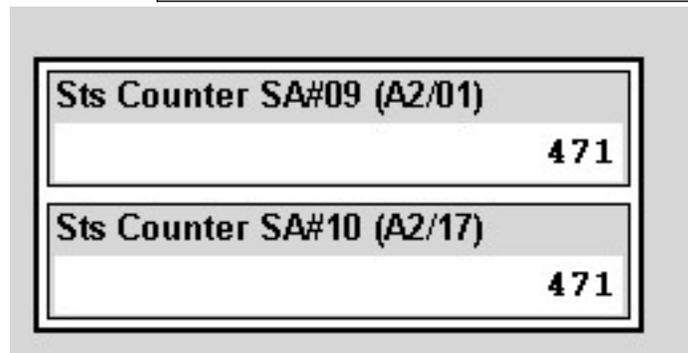


Figure 1. STS Counters SA#09, SA#10 (Values are not indicative ones)

Verify Sts Counter SA#09, SA#10 – counting (Refer to Figure 1)

4. VERIFYING COLUMBUS-EPM STATUS DATA DISPLAY

4.1 European Physiology Modules (EPM)

European Physiology Modules (EPM)

sel General Services

General Services

'Tools'

1.330 EPM CARRIER HEALTH AND STATUS CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 3 pages

pick COL MAIN Display / COL Status Data

sel Open Display...

√COL Status Data Display – pops up

EPM Status Data	FCC	SMSC
PDU Status (A7/07) OK (1)	FCC Status (A7/10) OK (1)	SMSC Status (A7/11) OK (1)
PSU RS422 COM Status (A7/15) COM OK (1)	LTU LAN COM Status (A7/17) COM OK (1)	HRD COM Status (A7/26) NO DATA (0)
PSU Status (A7/08) OK (1)	FCC / SMSC int. RS422 COM (A7/13) COM OK (1)	LTU LAN COM Stat. (A7/28) COM OK (1)
AAA Status (A7/09) OK (1)	MIL Bus Status (A7/14) COM OK (1)	VU
AFS COM Status (A7/23) COM OK (1)	LAN Status (A7/16) COM OK (1)	VU Status (A7/29) OK (1)
LTU Status (A7/12) OK (1)		VU RS485 COM Stat. Main (A7/24) COM OK (1)
SM RS485 Main COM Stat. (A7/21) NO DATA (0)		VU RS485 COM Stat. Red. (A7/25) NO DATA (0)
SM RS485 Red. COM Stat. (A7/22) NO DATA (0)		HRD COM Status (A7/27) NO DATA (0)

Figure 2. Nominal EPM STATUS DATA values

- 4.2 Verify that EPM Status Data, FCC, SMSC and VU values are the same as the values reported in the Figure 2 here above

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1.410 EPM CHECKOUT OF EPM FACILITY / COLUMBUS LAN INTERFACE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 11 pages

OBJECTIVE:

Checkout of the LAN Interface by downloading an EPM File to ground

DURATION:

15 minutes

CREW:

None

LOCATION:

COL1A3

PARTS:

None

TOOLS:

None

REFERENCED PROCEDURE:

2.210 EPM LAPTOP SETUP AND ACTIVATION

EPM Laptop

1. [CHECKING EPM LAPTOP AND EPM SOFTWARE ARE ACTIVATED](#)

√ EPM Laptop and Software – activated

```
*****  
*  
* If EPM Laptop is not powered or EPM Laptop Control Panel  
* Home Display is not loaded, then  
*  
* |  
* |  
* | Perform {2.210 EPM LAPTOP SETUP AND  
* | ACTIVATION}, all (SODF: ASSY PAYLOAD), then:  
*  
*****
```

2. [VERIFYING S/Ku BAND AVAILABILITY](#)

European Physiology Modules (EPM)



Figure 1. S and Ku band status indicators

Verify S Band status indicator – Green (Refer to Figure 1)

Verify Ku Band status indicator – Green (Refer to Figure 1)

EPM-TMTC
-OPS

European Physiology Modules (EPM)



Figure 1. S and Ku band status indicators

Verify S Band status indicator – Green (Refer to Figure 1)

Verify Ku Band status indicator – Green (Refer to Figure 1)

3. SELECTING DOWNLINK PATH

European Physiology Modules (EPM)

sel General Services

General Services

'Tools'

sel Diagnostics...

General Services / Diagnostics

'Diagnostic Scripts'

sel SMSC_SetDownlinkPath_FCC

sel Execute

cmd Yes (to confirm choice)

European Physiology Modules (EPM)

Payload Message Window

Verify 'Set Downlink Path FCC succeed' message – appears

European Physiology Modules (EPM)

sel General Services

General Services

'Tools'

sel Diagnostics...

General Services / Diagnostics

'Diagnostic Scripts'

sel SMSC_SetDownlinkPath_FCC

sel Execute

cmd Yes (to confirm choice)

European Physiology Modules (EPM)

Verify 'Set Downlink Path FCC succeed' message – appears

4. VERIFYING DOWNLINK PATH SELECTION

European Physiology Modules (EPM)

sel General Services

'Tools'

sel Health & State...

pick Subsystems – SMSC

pick Unit – Unit 1

pick Value Group – System & Resources

pick Value – Downlink Path

Verify 'Downlink Path:' Value = 0x0001

European Physiology Modules (EPM)

sel General Services

'Tools'

sel Health & State...

pick Subsystems – SMSC

pick Unit – Unit 1

pick Value Group – System & Resources
pick Value – Downlink Path
Verify 'Downlink Path:' Value = 0x0001

5. [PERFORMING FILE TRANSFER](#)

5.1 SMSC mode switching to Setup mode

EPM Physiology Modules (EPM)

sel General Services

'File Transfer'

sel File Transfer...

(left sub-window)

pick Subsystem – SMSC

sel Set to Setup Mode

cmd Yes (to confirm choice)

Wait few seconds until 'File...' button gets enabled again

European Physiology Modules (EPM)

Verify 'SMSC Mode changed from NOMINAL to SETUP'
message – appears

EPM Physiology Modules (EPM)

sel General Services

'File Transfer'

sel File Transfer...

General Services / File Transfer

(left sub-window)

pick Subsystem - SMSC

General Services / File Transfer

sel Set to Setup Mode

cmd Yes (to confirm choice)

Wait few seconds until 'File...' button gets enabled again

European Physiology Modules (EPM)

Payload Message Window

Verify 'SMSC Mode changed from NOMINAL to SETUP'
message – appears

5.2 Selecting File Transfer Path

General Services / File Transfer

'Subsystem SMSC'

(left sub-window)

sel File...

cmd File – List Directory

Wait ten seconds (in order to allow the directory's content to appear)

1.410 EPM CHECKOUT OF EPM FACILITY / COLUMBUS LAN INTERFACE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 11 pages

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist' appears,
*      then
*      |
*      |      Go back to step 5.2
*
*****
```

sel COL_TEST

sel File...

cmd File – List Directory

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist' appears,
*      then
*      |
*      |      Go back to step 5.2
*
*****
```

sel VXWORKRM.PDF

General Services / File Transfer

'Subsystem SMSC'
(left sub-window)

sel File...

cmd File – List Directory

Wait ten seconds (in order to allow the directory's content to appear)

1.410 EPM CHECKOUT OF EPM FACILITY / COLUMBUS LAN INTERFACE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 11 pages

```
*
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*
*      If 'file does not exist' or 'item does not exist' appears,
*      then
*      |
*      |      Go back to step 5.2
*
*****
```

```
sel COL_TEST

sel File...

cmd File – List Directory

.....
*
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*
*      If 'file does not exist' or 'item does not exist' appears,
*      then
*      |
*      |      Go back to step 5.2
*
*****
```

```
sel VXWORKRM.PDF
```

5.3 Proceeding to File Transfer

General Services / File Transfer

sel Downlink...

pick Downlink... – FRC...

Files: Downlink

NOTE

When renaming the file, don't put more than 8 characters in the filename

Rename file indicating the date of the day (yyyymmdd.PDF)

cmd OK

European Physiology Modules (EPM)

Payload Message Window

Verify 'File Transfer started' message – appears

Wait about 1 minute

Verify 'File Transfer terminated nominally' message – appears

```
*****  
*  
*      European Physiology Modules (EPM)  
*      Payload Message Window  
*  
*  
*      If 'file does not exist' or 'item does not exist' appears,  
*      then  
*      |  
*      |          Go back to step 5.3  
*  
*****
```

General Services / File Transfer

sel Downlink...

pick Downlink... – FRC...

Files: Downlink

NOTE

When renaming the file, don't put more than 8 characters in the filename

Rename file indicating the date of the day (yyyymmdd.PDF)

cmd OK

European Physiology Modules (EPM)

Payload Message Window

Verify 'File Transfer started' message – appears

Wait about 1 minute

Verify 'File Transfer terminated nominally' message – appears

1.410 EPM CHECKOUT OF EPM FACILITY / COLUMBUS LAN INTERFACE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 9 of 11 pages

```
.....
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*
*      If 'file does not exist' or 'item does not exist' appears,
*      then
*      |
*      |      Go back to step 5.3
*
*****
```

5.4 SMSC mode switching back to Nominal mode

European Physiology Modules (EPM)
European Physiology Modules (EPM)

sel Home

Home



sel COMMS ()

Home / COMMS

'SMSC'

sel Nominal

cmd Yes (to confirm choice)

European Physiology Modules (EPM)
Payload Message Window

Verify 'SMSC Mode changed from SETUP to NOMINAL' – appears (wait about twenty seconds)

Home / COMMS

'SMSC'

Verify SMSC Mode – Nominal

1.410 EPM CHECKOUT OF EPM FACILITY / COLUMBUS LAN INTERFACE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 10 of 11 pages

```
*****
*
*      If SMSC does not switch to Nominal Mode, then
*      |
*      |      Go back to step 5.4
*
*****
```

European Physiology Modules (EPM)

European Physiology Modules (EPM)

sel Home

Home



sel COMMS ()

Home / COMMS

'SMSC'

sel Nominal

cmd Yes (to confirm choice)

European Physiology Modules (EPM)

Payload Message Window

Verify 'SMSC Mode changed from SETUP to NOMINAL' – appears (wait about twenty seconds)

Home / COMMS

'SMSC'

Verify SMSC Mode – Nominal

1.410 EPM CHECKOUT OF EPM FACILITY / COLUMBUS LAN INTERFACE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 11 of 11 pages

```
.....
*
*
*   If SMSC does not switch to Nominal Mode, then
*   |
*   |   Go back to step 5.4
*
*****
```

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1.420 EPM CHECKOUT OF UTILITY DISTRIBUTION PANEL INTERFACES

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 4 pages

OBJECTIVE:

Checkout of the EPM Right and Left Utility Distribution Panel (RUDP and LUDP) Interfaces

DURATION:

10 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

None

TOOLS

None

REFERENCED PROCEDURE

2.210 EPM LAPTOP SETUP AND ACTIVATION

EPM Laptop

1. [CHECKING EPM LAPTOP AND EPM SOFTWARE ARE ACTIVATED](#)

√ EPM Laptop and Software – activated

```
*****  
*  
* If EPM Laptop is not powered or EPM Laptop Control Panel  
* Home Display is not loaded, then  
*  
* |  
* |  
* | Perform {2.210 EPM LAPTOP SETUP AND  
* | ACTIVATION}, all (SODF: ASSY PAYLOAD), then:  
* |  
*****
```

2. [VERIFYING THE LEFT UTILITY DISTRIBUTION PANEL \(LUDP\) POWER OUTLETS](#)

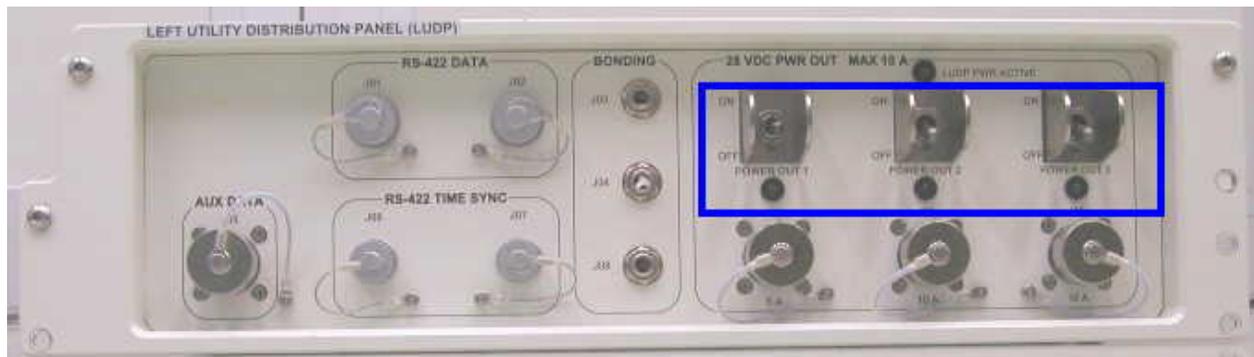


Figure 1. Left Utility Distribution Panel (LUDP) POWER outlets and LEDs

A1 2.1 sw 28 VDC PWR OUT MAX 10 A POWER OUT 1,2,3 (three) → ON

1.420 EPM CHECKOUT OF UTILITY DISTRIBUTION PANEL INTERFACES
(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 2 of 4 pages

2.2 Verify 28 VDC PWR OUT MAX 10 A POWER OUT LEDs 1,2,3
– □

```
*****  
*  
*  
* If one of the 28 VDC PWR OUT MAX 10 A POWER  
* OUT LEDs 1,2,3 is not lit, then  
*  
* European Physiology Modules (EPM)  
*   
*  
* sel Home  
*  
*   
*  
* sel POWER SYSTEM ()  
*  
*   
* 'ESEM4'  
*  
* 'ESEM 4 CN 6'  
*  
* sel More...  
*  
*   
* 'LUDP Power (Outlet 1)'  
*  
* sel Power On  
*  
* cmd Yes (to confirm choice)  
*  
* Verify POWER OUT LEDs 1,2,3 – □  
*****
```

2.3 sw 28 VDC PWR OUT MAX 10 A POWER OUT 1,2,3 → OFF

2.4 Verify 28 VDC PWR OUT MAX 10 A POWER OUT LEDs 1,2,3
– ■

3. VERIFYING THE RIGHT UTILITY DISTRIBUTION PANEL (RUDP) LAN CONNECTIONS

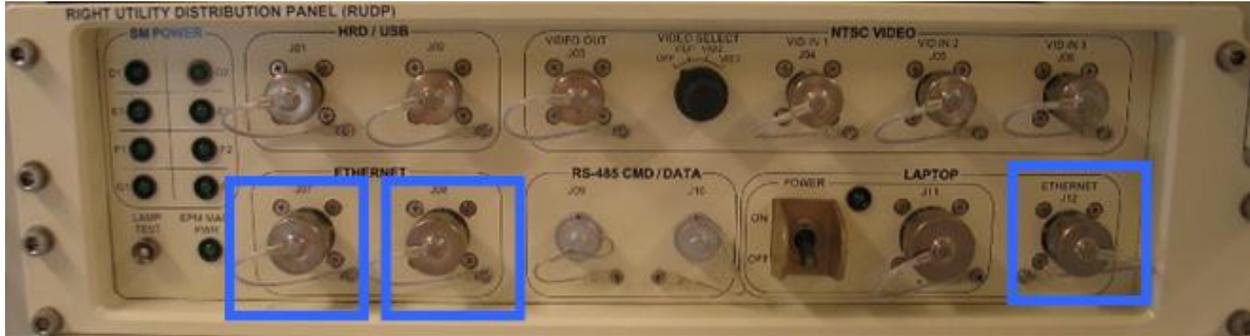


Figure 2. Right Utility Distribution Panel (RUDP) LAPTOP and ETHERNET LAN Connections J07, J08 and J12

- A2 3.1 Testing LAN Connection with LAPTOP J12
 - 3.1.1 √EPM Laptop LAN Cable →|← LAPTOP ETHERNET J12
 - EPM 3.1.2 European Physiology Modules (EPM)
 - Laptop European Physiology Modules (EPM)
 - sel Home
 - Home
 - sel DMS ()
 - Home / EPM DMS
 - 'Laptop'
 - 'LAN RX Traffic'
 - √Data traffic – present (positive values)
 - 3.2 Testing LAN Connection with RUDP ETHERNET J08
 - A2 3.2.1 EPM Laptop LAN Cable←|→LAPTOP ETHERNET J12
 - 3.2.2 EPM Laptop LAN Cable→|←ETHERNET J08
 - EPM 3.2.3 Home/EPM DMS
 - Laptop 'LAN RX Traffic'
 - √Data traffic – present (positive values appearing after about twenty seconds)
 - 3.3 Testing LAN Connection with RUDP ETHERNET J07
 - A2 3.3.1 EPM Laptop LAN Cable←|→ETHERNET J08

- 3.3.2 EPM Laptop LAN Cable→|←ETHERNET J07
- EPM Laptop
 - 3.3.3 Home / EPM DMS
'LAN RX Traffic'
√Data traffic – present (positive values appearing after about twenty seconds)
- 3.4 Reconnecting EPM Laptop LAN Cable to RUDP LAPTOP ETHERNET J12
- A2
 - 3.4.1 EPM Laptop LAN Cable←|→ETHERNET J07
 - 3.4.2 Tighten EPM Laptop LAN Cable→|←LAPTOP ETHERNET J12

1.510 EPM MEEMM SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 3 pages

OBJECTIVE:

Setup of the EPM Multi Electrode Electroencephalogram Mapping Module (MEEMM)

DURATION

5 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

MEEMM Hard Disk P/N 1240.10.0, S/N 10

TOOLS:

None

E2 1. VERIFYING MEEMM REM MODE



Figure 1. MEEMM POWER switch and POWER LED

sw MEEMM POWER → REM (Refer to Figure 1)

Verify MEEMM POWER LED – ■ (Refer to Figure 1)

2. INSERTING MEEMM HARD DISK



Push and loosen

Figure 2. Opening MEEMM Hard Disk door

E2

- 2.1 MEEMM Hard Disk Door → Open by pushing screw and turning counter-clockwise (Refer to Figure 2)



Figure 3. MEEMM Hard Disk insertion

- 2.2 Insert MEEMM Hard Disk and push it until it gets locked (Refer to Figure 3)



Push and tighten

Figure 4. Closing MEEMM Hard Disk door

- 2.3 MEEMM Hard Disk Door → Close by pushing screw and turning clockwise (Refer to Figure 4)
3. CLEANUP
 - 3.1 Update IMS with stowage location or notify **COL-CC**
 - 3.2 Notify **COL-CC** about completion of procedure

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1.520 EPM MEEMM MAIN UNIT CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 14 pages

OBJECTIVE:

Checkout of the EPM Multi-electrode ElectroEncephalogram Mapping Module (MEEMM) Main Unit

DURATION:

15 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

None

TOOLS:

None

REFERENCED PROCEDURE:

2.210 EPM LAPTOP SETUP AND ACTIVATION

EPM Laptop

1. [CHECKING EPM LAPTOP AND EPM SOFTWARE ARE ACTIVATED](#)

√ EPM Laptop and Software – activated

```

*****
*
*       If EPM Laptop is not powered or EPM Laptop Control Panel
*       Home Display is not loaded, then
*
*       |
*       |       Perform {2.210 EPM LAPTOP SETUP AND
*       |       ACTIVATION}, all (SODF: ASSY PAYLOAD), then:
*
*****

```

NOTE

Only one Science Module must be started-up at one time

2. [ACTIVATING MEEMM](#)

2.1 Verifying FCC and SMSC correct Status

EPM laptop

2.1.1 European Physiology Modules (EPM)

sel Home

'FCC'

1.520 EPM MEEMM MAIN UNIT CHECKOUT

Verify Timer Status – Sync by SNTP

```
.....
*
*   If Timer Status is not Sync by SNTP twenty
*   seconds after the FCC nominal mode
*   activation, then
*
*   European Physiology Modules
*   (EPM)
*
*   sel General Services
*
*   
*   'Tools'
*
*   sel Manual Commanding...
*
*   
*   'Addressed Component'
*
*   pick Subsystem – FCC
*
*   pick Unit – Unit 1
*
*   'Command'
*
*   pick Group – Time Handling
*
*   pick Id – Distribute COL Time
*
*   sel Execute
*
*   cmd Yes (to confirm choice)
*
*   European Physiology Modules
*   (EPM)
*   
*
*   Verify 'Time sync with SMSC
*   succesfull' message – appears
*
*****
```

2.1.2

'SMSC'

Verify SMSC Mode – Nominal

1.520 EPM MEEMM MAIN UNIT CHECKOUT

```
*
*
* If Timer Status is not Synchronised twenty
* seconds after the SMSC nominal mode
* activation, then
*
*
* European Physiology Modules
* (EPM)
*
* sel General Services
*
* 
* 'Tools'
*
* sel Manual Commanding...
*
* 
* 'Addressed Component'
*
* pick Subsystem - FCC
*
* pick Unit - Unit 1
*
* 'Command'
*
* pick Group - Time Handling
*
* pick Id - Distribute COL Time
*
* sel Execute
*
* cmd Yes (to confirm choice)
*
* European Physiology Modules
* (EPM)
* 
*
* Verify 'Time sync with SMSC
* succesfull' message - appears
*
*****
```

2.2 Activating MEEMM Science Module

NOTE

Prior to starting-up the Science Module, a MEEMM Hard Disk must have already been installed in the MEEMM Hard Disk slot

1.520 EPM MEEMM MAIN UNIT CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 8 of 14 pages

2.2.1 European Physiology Modules (EPM)

sel Home

'E2 MEEMM'

sel More...

sel Startup SM

cmd Yes (to confirm choice)

NOTE

Prior to starting-up the Science Module, a MEEMM Hard Disk must have already been installed

European Physiology Modules (EPM)

sel Home

'E2 MEEMM'

sel More...

sel Startup SM

cmd Yes (to confirm choice)

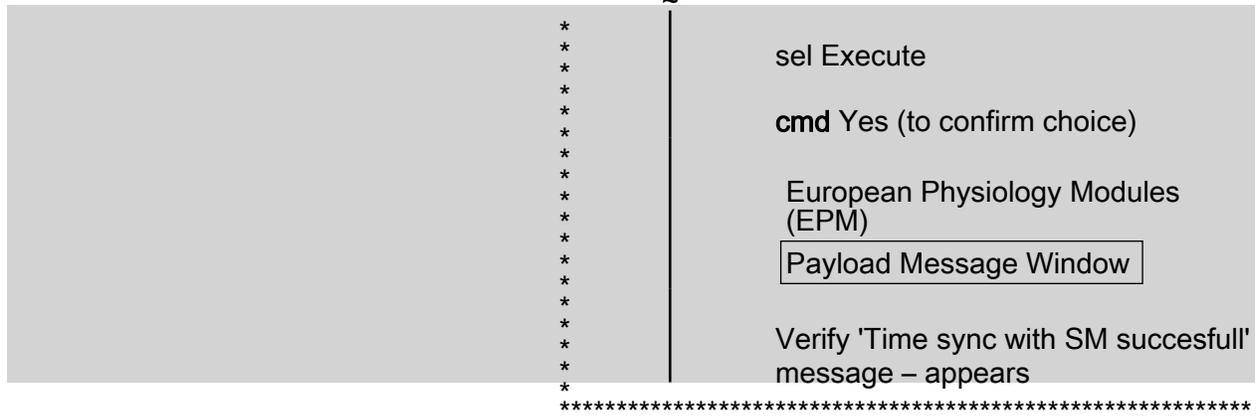
2.2.2 European Physiology Modules (EPM)

Verify 'Power On/Off SM's Command Execution successfull' – appears

European Physiology Modules (EPM)

Verify 'Power On/Off SM's Command Execution successfull' – appears

1.520 EPM MEEMM MAIN UNIT CHECKOUT



3. CHECKING MEEMM TEMPERATURE & HOUSE KEEPING VALUES

3.1 European Physiology Modules (EPM)

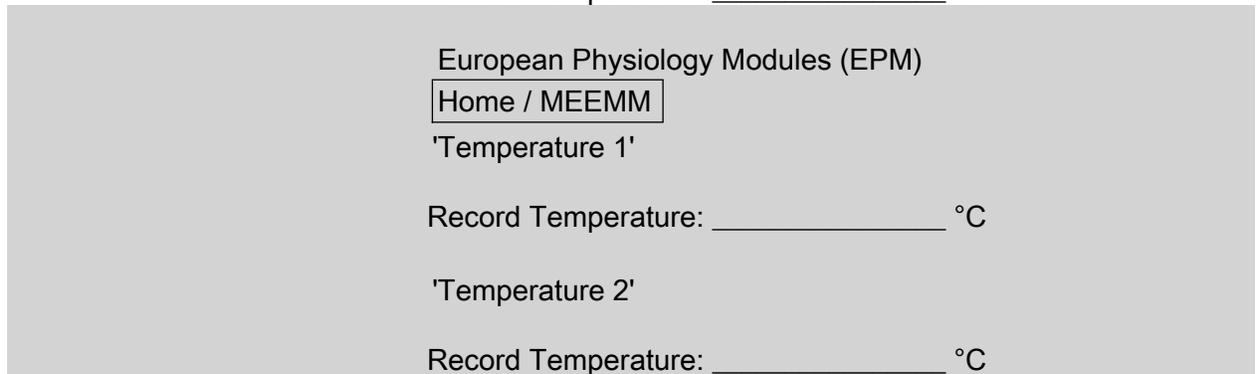
Home / MEEMM

'Temperature 1'

Record Temperature: _____ °C

'Temperature 2'

Record Temperature: _____ °C



3.2 Checkout of MEEMM Supervisor HK values

European Physiology Modules (EPM)

sel General Services

General Services

'Tools'

sel Health & State...

General Services / Health & State

1.520 EPM MEEMM MAIN UNIT CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 12 of 14 pages

pick Subsystem – MEEMM

pick Unit – SPVR

pick Value Group – All Values

Verify that the values table is present on the display (no need to verify values themselves but just verify that the table is not blank)

European Physiology Modules (EPM)

sel General Services

General Services

'Tools'

sel Health & State...

General Services / Health & State

pick Subsystem – MEEMM

pick Unit – SPVR

pick Value Group – All Values

Verify that the values table is present on the display (no need to verify values themselves but just verify that the table is not blank)

3.3 Checkout of the MEEMM CTRL HK values

General Services / Health & State

pick Subsystem – MEEMM

pick Unit – CTRL

pick Value Group – All Values

Verify that the values table is present on the display (no need to verify values themselves but just verify that the table is not blank)

General Services / Health & State

pick Subsystem – MEEMM

pick Unit – CTRL

1.520 EPM MEEMM MAIN UNIT CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 13 of 14 pages

pick Value Group – All Values

Verify that the values table is present on the display (no need to verify values themselves but just verify that the table is not blank)

4. [MEEMM SCIENCE MODULE SHUTDOWN](#)

4.1 European Physiology Modules (EPM)

sel Home

Home

'E2 MEEMM'

sel More...

Home / MEEMM

sel Shutdown SM

cmd Yes (to confirm choice)

European Physiology Modules (EPM)

sel Home

Home

'E2 MEEMM'

sel More

Home / MEEMM

sel Shutdown SM

cmd Yes (to confirm choice)

4.2 European Physiology Modules (EPM)

Payload Message Window

Verify 'Shutdown MEEMM succeeded' message – appears

European Physiology Modules (EPM)

Payload Message Window

Verify 'Shutdown MEEMM succeeded' message – appears

1.520 EPM MEEMM MAIN UNIT CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 14 of 14 pages

4.3

Home / MEEMM

'Mode'

Verify MEEMM Mode – OFF (after having switched temporarily to CHECKOUT mode) (wait about three minutes)

Home / MEEMM

'Mode'

Verify MEEMM Mode – OFF (after having switched temporarily to CHECKOUT mode) (wait about three minutes)

1.610 EPM CARDIOLAB SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 3 pages

OBJECTIVE:

Setup of the EPM Cardiolab (CDL) Data Management Computer Unit (DMCU) Science Module

DURATION:

5 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

CARDIOLAB Hard Disk 1 P/N CDL101610REFR S/N 001

CARDIOLAB Hard Disk 2 P/N CDL101610REFR S/N 002

TOOLS:

None

E1 1. VERIFYING CARDIOLAB REMOTE MODE



Figure 1. CARDIOLAB POWER switch and POWER LED

sw CARDIOLAB POWER → REMOTE

Verify CARDIOLAB POWER LED – ■

2. [INSERTING CDL HARD DISKS 1 & 2](#)



Push and loosen

Figure 2. Opening CDL Hard Disks Door

E1

- 2.1 CDL Hards Disk Door → Open by pushing screw and turning counter-clockwise (Refer to Figure 2)

NOTE

If only one Hard Disk is available, it should be inserted in the lower slot as it is the slot on which the system is booting



Figure 3. CDL Hard Disk 1

- 2.2 Insert CDL Hard Disk 1 into the lower slot and push until it gets locked (Refer to Figure 3)

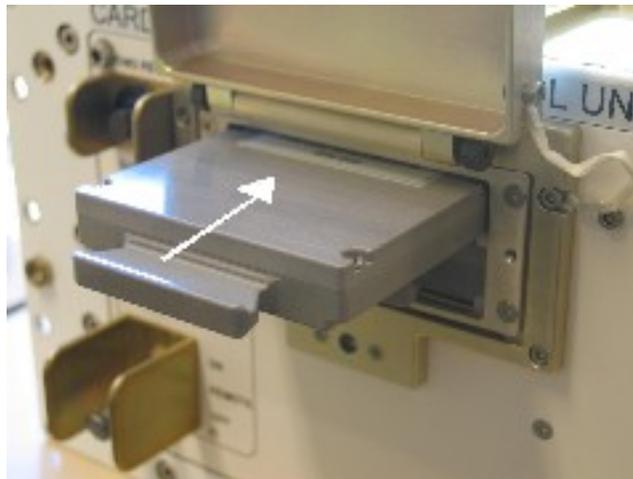


Figure 4. CDL Hard Disk 2

- 2.3 Insert CDL Hard Disk 2 into the upper slot and push until it gets locked (Refer to Figure 4)



Push and tighten

Figure 5. Closing CDL Hard Disks Door

- 2.4 CDL Hard Disks Door → Close by pushing screw and turning clockwise (Refer to Figure 5)
3. CLEANUP
- 3.1 Update IMS with stowage location or notify **COL-CC**
- 3.2 Notify **COL-CC** about completion of procedure

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1.620 EPM CARDIOLAB MAIN UNIT CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 14 pages

OBJECTIVE:

Checkout of the EPM Cardiolab (CDL) Data Management Computer Unit (DMCU) Science Module

DURATION

15 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

None

TOOLS:

None

REFERENCED PROCEDURES:

2.210 EPM LAPTOP SETUP AND ACTIVATION

EPM Laptop

1. [CHECKING EPM LAPTOP AND EPM SOFTWARE ARE ACTIVATED](#)

√ EPM Laptop and Software – activated

```
*****  
*  
* If EPM Laptop is not powered or EPM Laptop Control Panel  
* Home Display is not loaded, then  
* |  
* | Perform {2.210 EPM LAPTOP SETUP AND  
* | ACTIVATION}, all (SODF: ASSY PAYLOAD), then:  
* |  
*****
```

NOTE

Only one Science Module must be started-up at one time

2. [ACTIVATING CDL](#)

2.1 Verifying FCC and SMSC correct Status

EPM laptop

2.1.1 European Physiology Modules (EPM)

sel Home

'FCC'

Verify Timer Status – Sync by SNTP

```
.....
*
* If Timer Status is not Sync by SNTP twenty
* seconds after the FCC nominal mode
* activation, then
*
* European Physiology Modules
* (EPM)
*
* sel General Services
*
* 
* 'Tools'
*
* sel Manual Commanding...
*
* 
* 'Addressed Component'
*
* pick Subsystem – FCC
*
* pick Unit – Unit 1
*
* 'Command'
*
* pick Group – Time Handling
*
* pick Id – Distribute COL Time
*
* sel Execute
*
* cmd Yes (to confirm choice)
*
* European Physiology Modules
* (EPM)
*
* 
*
* Verify 'Time sync with SMSC
* succesfull' message – appears
*
*****
```

2.1.2

'SMSC'

Verify SMSC Mode – Nominal

1.620 EPM CARDIOLAB MAIN UNIT CHECKOUT

```
*
*
* If Timer Status is not Synchronised twenty
* seconds after the SMSC nominal mode
* activation, then
*
*
* European Physiology Modules
* (EPM)
*
* sel General Services
*
* 
* 'Tools'
*
* sel Manual Commanding...
*
* 
* 'Addressed Component'
*
* pick Subsystem - FCC
*
* pick Unit - Unit 1
*
* 'Command'
*
* pick Group - Time Handling
*
* pick Id - Distribute COL Time
*
* sel Execute
*
* cmd Yes (to confirm choice)
*
* European Physiology Modules
* (EPM)
* 
*
* Verify 'Time sync with SMSC
* succesfull' message - appears
*
*****
```

2.2 Activating CDL Science Module

NOTE

Prior to starting-up the Science Module, the CARDIOLAB Lower Slot Hard Disk must at least be installed, as it is the system slot booting

1.620 EPM CARDIOLAB MAIN UNIT CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 8 of 14 pages

2.2.1 European Physiology Modules (EPM)

sel Home

Home

'E1 CDL'

sel More...

Home / CDL

sel Startup SM

cmd Yes (to confirm choice)

NOTE

Prior to starting-up the Science Module, the CARDIOLAB Lower Slot Hard Disk must at least be installed, as it is the system slot booting

European Physiology Modules (EPM)

sel Home

Home

'E1 CDL'

sel More...

Home / CDL

sel Startup SM

cmd Yes (to confirm choice)

2.2.2 European Physiology Modules (EPM)

Payload Message Window

Verify 'Power On/Off SM's Command Execution successfull' message – appears

European Physiology Modules (EPM)

'Payload Message Window'

Verify 'Power On/Off SM's Command Execution successfull' message – appears

1.620 EPM CARDIOLAB MAIN UNIT CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 9 of 14 pages

2.2.3 European Physiology Modules (EPM)

Home / CDL

'Mode'

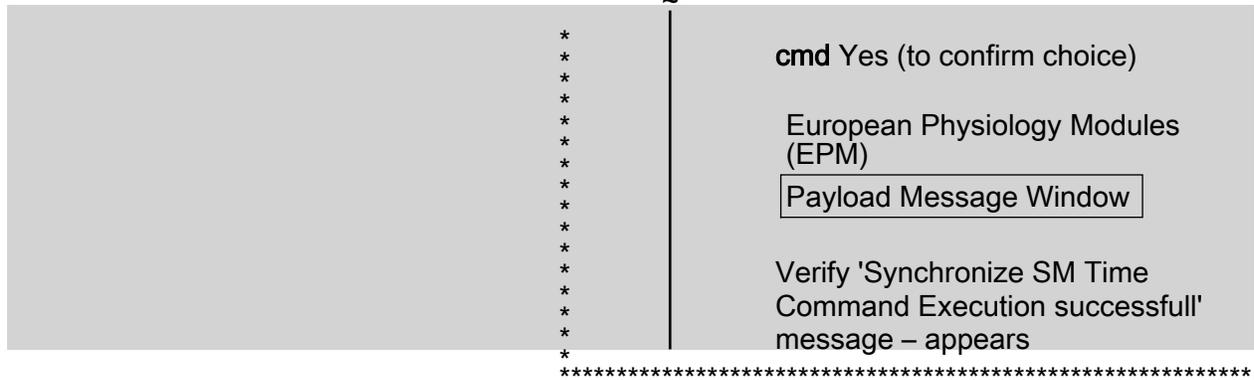
Verify CARDIOLAB Mode – NOMINAL (after having switched temporarily to STARTUP mode) (wait about three minutes)

'Timer Status'

Verify CADIOLAB Timer Status – SYNCHRONIZED (wait about twenty seconds)

```
*****
*
* If CARDIOLAB Timer Status is not
* SYNCHRONIZED twenty seconds after the
* CARDIOLAB nominal mode activation, then
*
*
* European Physiology Modules
* (EPM)
*
* sel General Services
*
* General Services
*
* 'Tools'
*
* sel Manual Commanding...
*
* General Services/Manual
* Commanding
*
* 'Addressed Component'
*
* pick Subsystem – SMSC
*
* pick Unit – Unit 1
*
* 'Command'
*
* pick Group – Time Handling
*
* pick Id – Synchronise to SM time
*
* sel Execute
*
* cmd Yes (to confirm choice)
*
* European Physiology Modules
* (EPM)
* Payload Message Window
*
```


1.620 EPM CARDIOLAB MAIN UNIT CHECKOUT



3. CHECKING CDL TEMPERATURE & HOUSE KEEPING VALUES

3.1 European Physiology Modules (EPM)

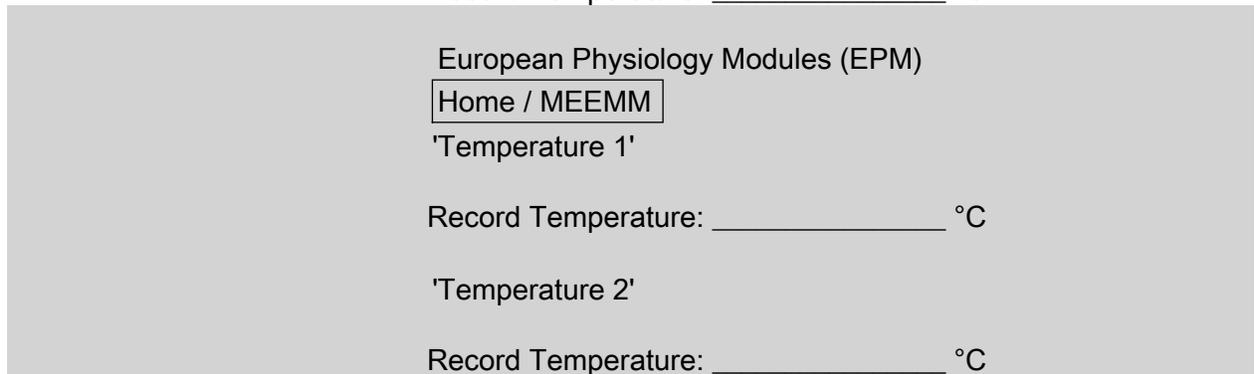
Home / CDL

'Temperature 1'

Record Temperature: _____ °C

'Temperature 2'

Record Temperature: _____ °C



3.2 Checkout of the CDL Supervisor HK values

European Physiology Modules (EPM)

sel General Services

General Services

'Tools'

sel Health & State...

General Services / Health & State

pick Subsystem – CDL

1.620 EPM CARDIOLAB MAIN UNIT CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 12 of 14 pages

pick Unit – SPVR

pick Value Group – All Values

Verify that the values table is present on the display (no need to verify values themselves but just verify that the table is not blank)

European Physiology Modules (EPM)

sel General Services

General Services

'Tools'

sel Health & State...

General Services / Health & State

pick Subsystem – CDL

pick Unit – SPVR

pick Value Group – All Values

Verify that the values table is present on the display (no need to verify values themselves but just verify that the table is not blank)

3.3 Checkout of the CDL CPU HK values

General Services / Health & State

pick Subsystem – CDL

pick Unit – CPU

pick Value Group – All Values

Verify that the values table is present on the display (no need to verify values themselves but just verify that the table is not blank)

General Services / Health & State

pick Subsystem – CDL

pick Unit – CPU

pick Value Group – All Values

Verify that the values table is present on the display (no need to verify each value individually but just verify that the table is not blank)

4. [CDL SCIENCE MODULE SHUTDOWN](#)

4.1 European Physiology Modules (EPM)

sel Home

Home

'E1 CDL'

sel More

Home / CDL

sel Shutdown SM

cmd Yes (to confirm choice)

European Physiology Modules (EPM)

sel Home

Home

'E1 CDL'

sel More

Home / CDL

sel Shutdown SM

cmd Yes (to confirm choice)

4.2 European Physiology Modules (EPM)

Payload Message Window

Verify 'Shutdown CDL succeeded' message – appears

European Physiology Modules (EPM)

Payload Message Window

Verify 'Shutdown CDL succeeded' message – appears

1.620 EPM CARDIOLAB MAIN UNIT CHECKOUT

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 14 of 14 pages

4.3

'Mode'

Verify CDL Mode – OFF (after having switched temporarily to CHECKOUT mode) (wait about three minutes)

'mode'

Verify CDL Mode – OFF (after having switched temporarily to CHECKOUT mode) (wait about three minutes)

2.210 EPM LAPTOP SETUP AND ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 4 pages

OBJECTIVE:

Installation and activation of the EPM Facility Laptop

DURATION:

15 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

EPM Laptop

EPM Laptop LAN Cable P/N HMU-E02

DC Power 28VDC Cable Assy Adapter P/N HMU-E10

Power Cable Assembly DC Power 28VDC PCS/PGSC P/N SEG39129264-305

Power Supply Assembly 28VDC P/N SEG33116428

Cable Assembly A31P 16VDC Power P/N SDG33115374

EPM Laptop Holder

TOOLS:

None

A2 1. VERIFYING EPM LAPTOP CONNECTION



Figure 1. RUDP LAPTOP POWER switch, POWER LED, J11 and ETHERNET J12

√ LAPTOP POWER switch – OFF

Verify LAPTOP POWER LED – ■

2. INSTALLING EPM LAPTOP AND LAPTOP HOLDER ON THE EPM FACILITY

2.1 Install the Laptop Holder on the EPM Seat-Track

2.2 Secure the EPM Laptop on the EPM Laptop Holder

3. CONNECTING EPM LAPTOP TO EPM RIGHT UTILITY DISTRIBUTION PANEL (RUDP)

3.1 Mating the laptop cables

2.210 EPM LAPTOP SETUP AND ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 2 of 4 pages



Figure 2. RIGHT UTILITY DISTRIBUTION PANEL (RUDP) LAPTOP ETHERNET J12

A2

3.1.1 EPM Laptop LAN Cable HMU-E02 → ← LAPTOP ETHERNET J12 (to be hand-tightened until fixed) (Refer to Figure 2)



Figure 3. EPM Laptop Ethernet socket

EPM Laptop

3.1.2 EPM Laptop LAN Cable HMU-E02 → ← EPM Laptop Ethernet socket (Refer to Figure 3)

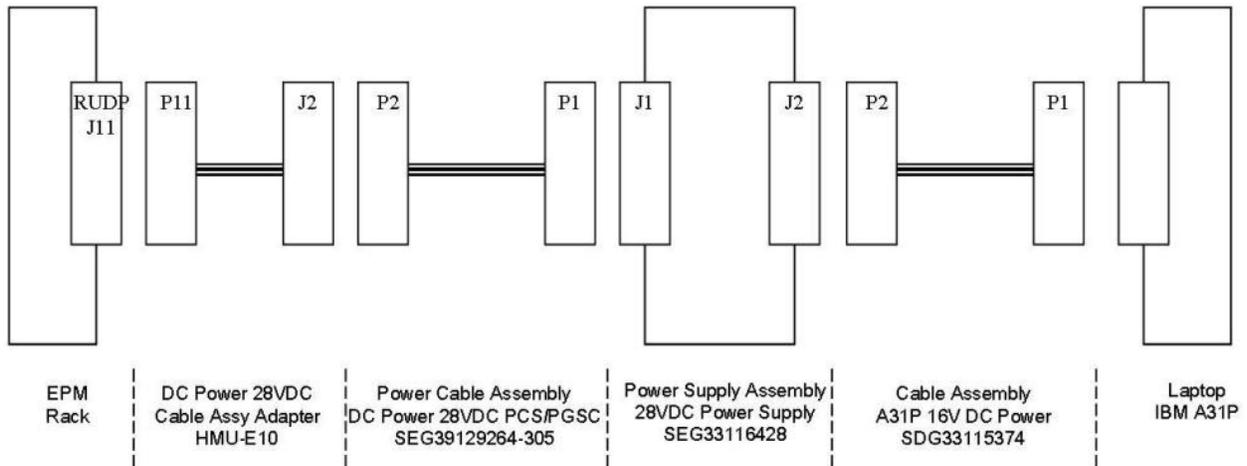


Figure 4. EPM Laptop Power Supply Assembly



Figure 5. RIGHT UTILITY DISTRIBUTION PANEL (RUDP) LAPTOP POWER J11

2.210 EPM LAPTOP SETUP AND ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 3 of 4 pages

- | | | |
|----|-------|--|
| A2 | 3.1.3 | DC Power 28VDC Cable Assy Adapter HMU-E10 P11→ ← LAPTOP POWER J11 (to be tightened until fixed) (Refer to Figures 4 and 5) |
| | 3.1.4 | DC Power 28VDC Cable Assy Adapter HMU-E10 J2→ ←Power Cable Assembly DC Power 28VDC PCS/PGSC P2 (Refer to Figure 4) |
| | 3.1.5 | Power Cable Assembly DC Power 28VDC PCS/PGSC P1→ ←Power Supply Assembly 28VDC J1 (Refer to Figure 4) |
| | 3.1.6 | Power Supply Assembly 28VDC J2→ ←Cable Assembly A31P 16VDC Power P2 (Refer to Figure 4) |



Figure 6. EPM Laptop Power socket

- | | | |
|------------|-------|---|
| EPM Laptop | 3.1.7 | Cable Assembly A31P 16VDC Power P1→ ←EPM Laptop Power socket (Refer to Figures 4 and 6) |
| A2 | 3.2 | Activation of EPM Facility Laptop Power line

sw LAPTOP POWER → ON |
| EPM Laptop | 4. | ACTIVATING THE EPM LAPTOP
↓Laptop Power Button |

2.210 EPM LAPTOP SETUP AND ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 4 of 4 pages

If EPM Laptop system asks for Id and Password, then

Unlock Computer

'User name:'

input Id - e p m - t e a m

'Password'

input Password - e p m

sel Enter

Verify EPM Laptop Control Panel Home Display-loaded (wait about one minute)

5. CLEANUP

- 5.1 Update IMS with stowage location or notify **COL-CC**
- 5.2 Notify **COL-CC** about completion of procedure

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 27 pages

OBJECTIVE:

Downloading EPM Log Files to ground for EPM Commissioning off-line analysis

DURATION:

15 minutes

CREW:

None

LOCATION:

COL1A3

PARTS:

None

TOOLS:

None

REFERENCED PROCEDURE:

2.210 EPM LAPTOP SETUP AND ACTIVATION

EPM Laptop

1. [CHECKING EPM LAPTOP AND EPM SOFTWARE ARE ACTIVATED](#)

√ EPM Laptop and Software – activated

```
*****
*
*       If EPM Laptop is not powered or EPM Laptop Control Panel
*       Home Display is not loaded, then
*
*       |
*       |       Perform {2.210 EPM LAPTOP SETUP AND
*       |       ACTIVATION}, all (SODF: ASSY PAYLOAD), then:
*
*****
```

2. [VERIFYING S/Ku BAND AVAILABILITY](#)

European Physiology Modules (EPM)



Figure 1. S and Ku band status indicators

Verify S Band status indicator – Green (Refer to Figure 1)

Verify Ku Band status indicator – Green (Refer to Figure 1)

EPM-TMTC
-OPS

European Physiology Modules (EPM)

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 27 pages



Figure 1. S and Ku band status indicators

Verify S Band status indicator – Green (Refer to Figure 1)

Verify Ku Band status indicator – Green (Refer to Figure 1)

3. VERIFYING DOWNLINK PATH SELECTION

European Physiology Modules (EPM)

European Physiology Modules (EPM)

sel General Services

General Services

'Tools'

sel Health & State...

General Services/Health & State...

pick Subsystems – SMSC

pick Unit – Unit 1

pick Value Group – System & Resources

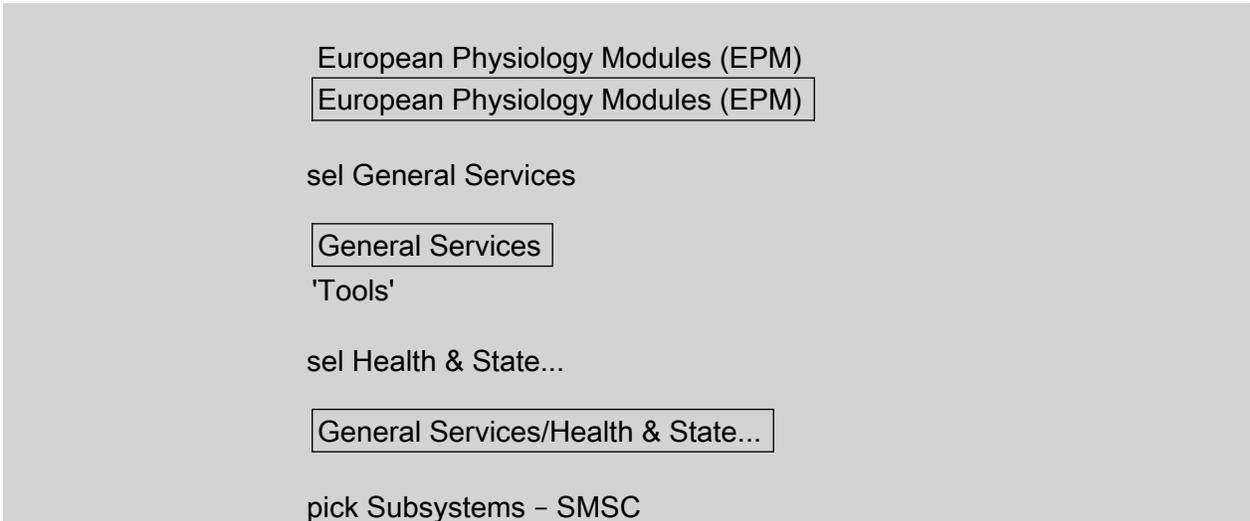
pick Value – Downlink Path

Verify 'Downlink Path:' Value = 0x0001

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 27 pages

```
*****
*
*   If 'Downlink Path:' Value is not 0x0001, then
*
*
*   European Physiology Modules (EPM)
*   
*
*
*   sel General Services
*
*   
*   'Tools'
*
*
*   sel Diagnostics...
*
*   
*   'Diagnostic Scripts'
*
*
*   sel SMSC_SetDownlinkPath_FCC
*
*   sel Execute
*
*   cmd Yes (to confirm choice)
*
*   European Physiology Modules (EPM)
*   
*
*
*   Verify 'Set Downlink Path FCC succeeded' message –
*   appears
*
*   Go back to step 3.
*
*****
```



2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 5 of 27 pages

sel General Services

General Services

'File Transfer'

sel File Transfer...

General Services/File Transfer

(left sub-window)

pick Subsystem - CLSW

General Services/File Transfer

(left sub-window)

sel Set to Setup

cmd Yes (to confirm choice)

Wait 3 seconds until 'File...' button gets enabled again

European Physiology Modules (EPM)

Payload Message Window

Verify 'CLSW Mode changed from NOMINAL to SETUP'
message – appears

EPM Physiology Modules (EPM)

EPM Physiology Modules (EPM)

sel General Services

General Services

'File Transfer'

sel File Transfer...

General Services/File Transfer

(left sub-window)

pick Subsystem - CLSW

General Services/File Transfer

(left sub-window)

sel Set to Setup

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 27 pages

cmd Yes (to confirm choice)

Wait 3 seconds until 'File...' button gets enabled again

European Physiology Modules (EPM)

Payload Message Window

Verify 'CLSW Mode changed from NOMINAL to SETUP' message – appears

4.2 SMSC Setup Mode commanding

General Services/File Transfer

(right sub-window)

pick Subsystem – SMSC

sel Set to Setup

cmd Yes (to confirm choice)

Wait until 'File...' button gets enabled again

European Physiology Modules (EPM)

Payload Message Window

Verify 'SMSC Mode changed from NOMINAL to SETUP' message – appears

General Services/File Transfer

(right sub-window)

pick Subsystem – SMSC

sel Set to Setup

cmd Yes (to confirm choice)

Wait until 'File...' button gets enabled again

European Physiology Modules (EPM)

Payload Message Window

Verify 'SMSC Mode changed from NOMINAL to SETUP' message – appears

4.3 Selecting source for the file transfer

4.3.1 Navigating into 'C:\' directory

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 27 pages

General Services / File Transfer

'Subsystem CLSW'
(left sub-window)

sel File...

cmd File – List Directory

sel C:\

sel File...

cmd File – List Directory (to enter into folder)

Double-click on the C:\ folder

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

General Services / File Transfer

'Subsystem CLSW'
(left sub-window)

sel File...

cmd File – List Directory

sel C:\

sel File...

cmd File – List Directory (to enter into folder)

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 8 of 27 pages

Double-click on the C:\ folder

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

4.3.2 Navigating into 'Program Files' directory

sel Program Files

sel File...

cmd File – List Directory (to enter into folder)

Double-click on the Program Files folder

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

sel Program Files

sel File...

cmd File – List Directory (to enter into folder)

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 9 of 27 pages

Double-click on the Program Files folder

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

4.3.3 Navigating into 'OHB System' directory

sel OHB System

sel File...

cmd File – List Directory (to enter into folder)

Double-click on the OHB System folder

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

sel OHB System

sel File...

cmd File – List Directory (to enter into folder)

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 10 of 27 pages

Double-click on the OHB System folder

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

4.3.4 Navigating into 'EPM' directory

sel EPM

sel File...

cmd File – List Directory (to enter into folder)

Double-click on the EPM folder

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

sel EPM

sel File...

cmd File – List Directory (to enter into folder)

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 11 of 27 pages

Double-click on the EPM folder

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

4.3.5 Navigating into 'EPMControlPanel' directory

```
sel EPMControlPanel
```

```
sel File...
```

```
cmd File – List Directory (to enter into folder)
```

Double-click on the EPMControlPanel folder

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

```
sel EPMControlPanel
```

```
sel File...
```

```
cmd File – List Directory (to enter into folder)
```

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 12 of 27 pages

Double-click on the EPMControlPanel folder

```
.....
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

4.3.6 Navigating into 'Logs' directory

sel Logs

sel File...

cmd File – List Directory (to enter into folder)

Double-click on the Logs folder

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
```

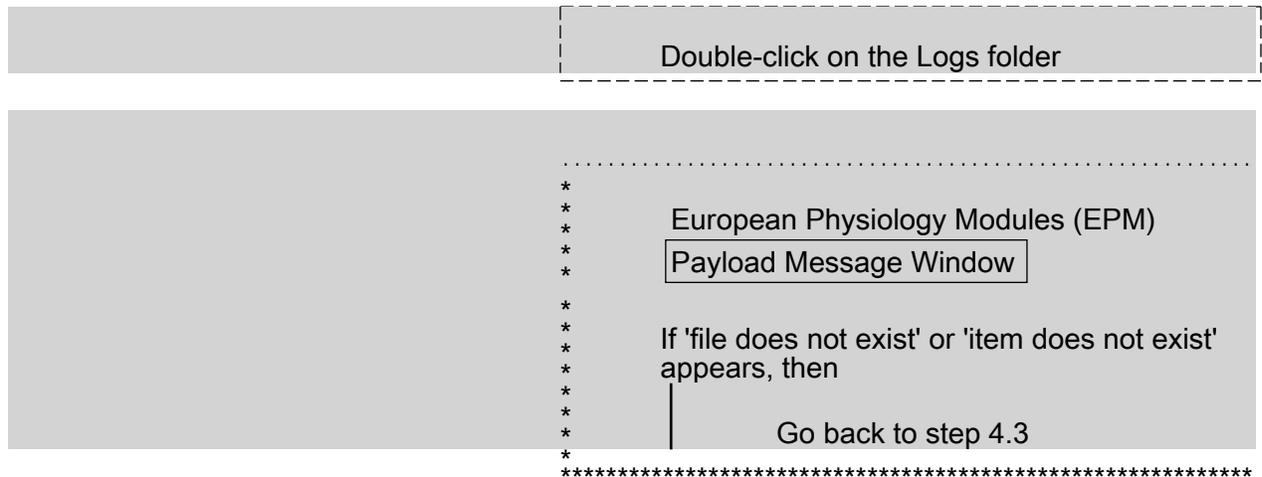
sel Logs

sel File...

cmd File – List Directory (to enter into folder)

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 13 of 27 pages



5. COPYING FILES TO THE SMSC FOLDER

5.1 Copying the log files (from CLSW to SMSC)

General Services / File Transfer

'Subsystem CLSW'
(left sub-window)

Where [X] = [tm001.log] [tm002.log] [tm003.log] [tc001.log]
[msg001.LOG] [hk001.LOG]

sel [X]

General Services / File Transfer

sel Copy

Verify 'Files: Copy' window – appears

Files: Copy

cmd OK (do not rename the file)

European Physiology Modules (EPM)

Payload Message Window

Verify 'File Transfer terminated nominally' message –
appears (wait few seconds depending on the file size)

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 14 of 27 pages

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |           Go back to step 4.3
*
*****
```

Repeat

General Services / File Transfer

'Subsystem CLSW'
(left sub-window)

Where [X] = [tm001.log] [tm002.log] [tm003.log] [tc001.log]
[msg001.LOG] [hk001.LOG]

sel [X]

General Services / File Transfer

sel Copy

Verify 'Files: Copy' window – appears

Files: Copy

cmd OK (do not rename the file)

European Physiology Modules (EPM)

Payload Message Window

Verify 'File Transfer terminated nominally' message –
appears (wait few seconds depending on the file size)

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 15 of 27 pages

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 4.3
*
*****
Repeat
```

5.2 Copying the Message.xml File (from CLSW to SMSC)

5.2.1 General Services / File Transfer

'Subsystem CLSW'

(left sub-window)

sel File – Messageyyyymmdd hmmmss.xml (file with
the date of the day)

```
*****
*
*      If there are several Messageyyyymmdd
*      hmmmss.xml files with the date of the day,
*      then
*      |
*      |      Perform Step 5.2 for each file
*
*****
```

General Services / File Transfer

sel Copy

Verify 'Files: Copy' window – appears

```
sel File – Messageyyyymmdd hmmmss.xml (file with  
the date of the day)
```

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 16 of 27 pages

```
*
*   If there are several Messageyyyymmdd
*   hmmmss.xml files with the date of the day,
*   then
```

```
Perform Step 5.2 for each file
```

```
*****
```

General Services / File Transfer

sel Copy

Verify 'Files: Copy' window – appears

5.2.2 Renaming and copying the file

Files: Copy

NOTE

When renaming the file, do not put more than 8 characters in the filename

Rename the file indicating the date of the day with month and day (mmdd.xml)

```
*****
```

```
*
*   If there are several Messageyyyymmdd
*   hmmmss.xml files with the date of the day,
*   then
```

```
Add a letter (a,b,c,...) at the end of
the filename (before the extension
.xml) when renaming it
(mmdda.xml, mmddb.xml,...)
```

```
*****
```

cmd OK

European Physiology Modules (EPM)

Payload Message Window

Verify 'File Transfer terminated nominally' message – appears

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 17 of 27 pages

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |           Go back to step 5.2
*
*****
```

Files: Copy

NOTE

When renaming the file, do not put more than 8 characters in the filename

Rename the file indicating the date of the day with month and day (mmdd.xml)

```
.....
*
*      If there are several Messageyyyyymmdd
*      hhhmss.xml files with the date of the day,
*      then
*      |
*      |           Add a letter (a,b,c,...) at the end of
*      |           the filename (before the extension
*      |           '.xml') when renaming it
*      |           (mmdda.xml, mmddb.xml,...)
*
*****
```

cmd OK

European Physiology Modules (EPM)

Payload Message Window

Verify 'File Transfer terminated nominally' message – appears

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 18 of 27 pages

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |      Go back to step 5.2
*
*****
```

5.3 Copying the Panel.log File (from CLSW to SMSC)

5.3.1 General Services / File Transfer

'Subsystem CLSW'

(left sub-window)

sel File - Panelyyyymmdd_hhmmss.log (file with the date of the day)

```
*****
*
*      If there are several
*      Panelyyyymmdd_hhmmss.log files with the
*      date of the day, then
*      |
*      |      Perform Step 5.3 for each file
*
*****
```

General Services / File Transfer

sel Copy

Verify 'Files: Copy' window – appears

```
sel File - Panelyyyymmdd_hhmmss.log (file with the date of the dav)
```

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 19 of 27 pages

```
*
*   If there are several
*   Panelyyyymmdd_hhmmss.log files with the
*   date of the day, then
```

```
*
*   |
*   | Perform Step 5.3 for each file
*
*****
```

General Services / File Transfer

sel Copy

Verify 'Files: Copy' window – appears

5.3.2 Renaming and copying the file

Files: Copy

NOTE

When renaming the file, do not put more than 8 characters in the filename

Rename the file indicating the date of the day with month and day (mmdd.log)

```
*****
*
*   If there are several
*   Panelyyyymmdd_hhmmss.log files with the
*   date of the day, then
*
*   |
*   | Add a letter (a,b,c,...) at the end of
*   | the filename (before the extension
*   | '.log') when renaming it (mmdda.log,
*   | mmddb.log,...)
*
*****
```

cmd OK

European Physiology Modules (EPM)

Payload Message Window

Verify 'File Transfer terminated nominally' message – appears

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 20 of 27 pages

```
*****
*
*      European Physiology Modules (EPM)
*      Payload Message Window
*
*      If 'file does not exist' or 'item does not exist'
*      appears, then
*      |
*      |           Go back to step 5.3
*
*****
```

Files: Copy

NOTE

When renaming the file, do not put more than 8 characters in the filename

Rename the file indicating the date of the day with month and day (mmdd.log)

```
.....
*
*      If there are several
*      Panelyyyymmdd_hhmmss.log files with the
*      date of the day, then
*      |
*      |           Add a letter (a,b,c,...) at the end of
*      |           the filename (before the extension
*      |           '.log') when renaming it (mmdda.log,
*      |           mmddb.log,...)
*
*****
```

cmd OK

European Physiology Modules (EPM)

Payload Message Window

Verify 'File Transfer terminated nominally' message – appears

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 22 of 27 pages

```
*
*      If TM001.LOG, TM002.LOG, TM003.LOG,
*      TC001.LOG, MSG001.LOG or HK001.LOG file is
*      missing, then
```

```
*      |
*      |      Go back to step 5.1.
```

```
*
*      If the MMDD.XML file is missing, then
```

```
*      |
*      |      Go back to step 5.2.
```

```
*
*      If the MMDD.LOG file is missing, then
```

```
*      |
*      |      Go back to step 5.3.
```

```
*****
```

6. [DOWNLINKING COPIED FILES TO GROUND](#)

6.1 Select folder of files to downlink

```
General Services / File Transfer
```

(left sub-window)

pick Subsystem – SMSC (instead of CLSW)

sel File...

cmd File – List Directory

```
General Services / File Transfer
```

(left sub-window)

pick Subsystem – SMSC (instead of CLSW)

sel File...

cmd File – List Directory

6.2 Proceed to file transfer

```
Where [X] = [TM001.LOG] [TM002.LOG] [TM003.LOG]
[TC001.LOG] [MSG001.LOG] [HK001.LOG] [MMDD.XML]
[MMDD.LOG]
```

```
sel [X]
```

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 23 of 27 pages

```
*****
*
*       If there are MMDDA.XML, MMDDB.XML,... or
*       MMDDA.LOG, MMDDB.LOG,...
*
*       |
*       |       Proceed also to their transfer
*
*****
```

General Services / File Transfer

sel Downlink...

pick Downlink... - FRC...

Files: Downlink

cmd OK (do not rename the file)

European Physiology Modules

Payload Message Window

Verify 'File Transfer started' message – appears

Verify 'File Transfer terminated nominally' message – appears (wait about 1 minute, also depending on the file size)

```
*****
*
*       European Physiology Modules (EPM)
*       Payload Message Window
*
*
*       If 'file does not exist' or 'item does not exist'
*       appears, then
*
*       |
*       |       Go back to step 6.1
*
*****
```

Repeat

Where [X] = [TM001.LOG] [TM002.LOG] [TM003.LOG]
[TC001.LOG] [MSG001.LOG] [HK001.LOG] [MMDD.XML]
[MMDD.LOG]

sel [X]

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 24 of 27 pages

```
.....
*
*   If there are MMDDA.XML, MMDDDB.XML,... or
*   MMDDA.LOG, MMDDDB.LOG,...
*
*   Proceed also to their transfer
*
*****
```

General Services / File Transfer

sel Downlink...

pick Downlink... - FRC...

Files: Downlink

cmd OK (do not rename the file)

European Physiology Modules

Payload Message Window

Verify 'File Transfer started' message – appears

Verify 'File Transfer terminated nominally' message – appears (wait about 1 minute, also depending on the file size)

```
.....
*
*   European Physiology Modules (EPM)
*   Payload Message Window
*
*   If 'file does not exist' or 'item does not exist'
*   appears, then
*
*   Go back to step 6.1
*
*****
```

Repeat

7. SMSC NOMINAL MODE COMMANDING

European Physiology Modules (EPM)

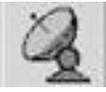
European Physiology Modules (EPM)

sel Home

Home

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 25 of 27 pages

sel COMMS ()

'SMSC'

sel Nominal

cmd Yes (to confirm choice)

European Physiology Modules (EPM)

Verify 'SMSC Mode changed from SETUP to NOMINAL' – appears (wait about twenty seconds)

'SMSC'

Verify SMSC Mode – Nominal

```
*****
*
*       If SMCS does not switch to Nominal Mode, then
*       |
*       |       Go back to step 7.
*
*****
```

European Physiology Modules (EPM)

sel Home

sel COMMS ()

'SMSC'

sel Nominal

cmd Yes (to confirm choice)

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 26 of 27 pages

```
European Physiology Modules (EPM)
Payload Message Window

Verify 'SMSC Mode changed from SETUP to NOMINAL' – appears (wait
about twenty seconds)

Home / COMMS
'SMSC'

Verify SMSC Mode – Nominal

.....
*
*
*   If SMCS does not switch to Nominal Mode, then
*
*   |
*   |
*   |   Go back to step 7.
*
*
*****
```

8. CLSW NOMINAL MODE COMMANDING

```
Home/COMMS
```

```
'CLSW'
```

```
sel Nominal
```

```
cmd Yes (to confirm choice)
```

```
European Physiology Modules (EPM)
```

```
Payload Message Window
```

```
Verify 'SMSC Mode changed from SETUP to NOMINAL' – appears (wait
about twenty seconds)
```

```
Verify CLSW Mode – Nominal
```

2.710 EPM POST-TEST LOG FILES ANALYSIS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 27 of 27 pages

```
*****
*
*      If CLSW does not switch to Nominal Mode, then
*      |
*      |      Go back to step 8.
*
*****
```

Home/COMMS

'CLSW'

sel Nominal

cmd Yes (to confirm choice)

European Physiology Modules (EPM)

Payload Message Window

Verify 'SMSC Mode changed from SETUP to NOMINAL' – appears (wait about twenty seconds)

Verify CLSW Mode – Nominal

```
.....
*
*      If CLSW does not switch to Nominal Mode, then
*      |
*      |      Go back to step 8.
*
*****
```

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2.810 EPM SHUTDOWN PREPARATION AT EPM FACILITY LEVEL

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 3 pages

OBJECTIVE:

Preparation of the EPM Facility to shutdown

DURATION:

5 minutes

CREW:

One

LOCATION:

COL1A3

PARTS

None

TOOLS:

None

REFERENCED PROCEDURE:

2.210 EPM LAPTOP SETUP AND ACTIVATION

EPM
Laptop

1. CHECKING EPM LAPTOP AND EPM SOFTWARE ARE ACTIVATED

√ EPM Laptop and Software – activated

```
*****
*
*   If EPM Laptop is not powered or EPM Laptop Control Panel
*   Home Display is not loaded, then
*
*   |
*   |   Perform {2.210 EPM LAPTOP SETUP AND
*   |   ACTIVATION}, all (SODF: ASSY PAYLOAD), then:
*
*****
```

2. PREPARING EPM FOR SHUTDOWN

2.1 European Physiology Modules (EPM)

sel Home

sel Prepare EPM for Shutdown

cmd Yes

EPM-TMTC
-OPS

European Physiology Modules (EPM)

sel Home

2.810 EPM SHUTDOWN PREPARATION AT EPM FACILITY LEVEL

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 3 pages

sel Prepare EPM for Shutdown

cmd Yes

2.2

Home

'FCC'

'SMSC'

'VU'

Wait until 'CHECK-OUT' appears in the FCC, SMSC and VU Mode fields (about 1 minute)

```
*****
*
*
*   If CHECK-OUT does not appear in FCC or/and SMSC
*   or/and VU Mode fields, then
*
*   European Physiology Modules (EPM)
*   Home
*
*   
*   sel COMMS ( )
*
*   Home/COMMS
*   'FCC or SMSC or VU'
*   (depending on the system which is not on
*   CHECK-OUT Mode)
*
*   sel Check-Out
*
*   cmd Yes (to confirm choice)
*****
```

HOME

'FCC'

'SMSC'

'VU'

Wait until 'CHECK-OUT' appears in the FCC, SMSC and VU Mode fields (about 1 minute)

2.810 EPM SHUTDOWN PREPARATION AT EPM FACILITY LEVEL

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 3 pages

```
*
*
* If CHECK-OUT does not appear in FCC or/and SMSC
* or/and VU Mode fields, then
*
*
* European Physiology Modules (EPM)
* Home
*
*
*
* sel COMMS (  )
*
* Home/COMMS
* 'FCC or SMSC or VU'
* (depending on the system which is not in
* CHECKOUT Mode)
*
* sel Check-Out
*
* cmd Yes (to confirm choice)
*
*****
```

2.3 European Physiology Modules (EPM)

Home

'Ready for Shut down'

Verify YES – appears

European Physiology Modules (EPM)

Home

'Ready for Shut down'

Verify YES – appears

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2.820 EPM LAPTOP DEACTIVATION AND STOWAGE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 4 pages

OBJECTIVE:

Deactivation and stowage of the EPM Laptop

DURATION:

15 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

EPM Laptop

EPM Laptop LAN Cable P/N HMU-E02

DC Power 28VDC Cable Assy Adapter P/N HMU-E10

Power Cable Assembly DC Power 28VDC PCS/PGSC P/N SEG39129264-305

Power Supply Assembly 28VDC P/N SEG33116428

Cable Assembly A31P 16VDC Power P/N SEG33115374

EPM Laptop Holder

TOOLS:

None

EPM
Laptop

1. [EPM LAPTOP DEACTIVATION](#)

1.1 European Physiology Modules (EPM)

sel Exit

sel Yes

√EPM Control Panel applications – shutdown (wait about twenty seconds)

1.2 EPM Laptop

sel Start

pick Shut Down...

1.3

pick Shut down

sel OK

1.4 Wait until Laptop has shut down totally

1.5 EPM Laptop cover → closed

A2 2. LAPTOP POWER OUTLET DEACTIVATION

2.1 sw LAPTOP POWER → OFF

2.2 Verify LAPTOP POWER LED – ■

3. DEMATING AND STOWING EPM LAPTOP

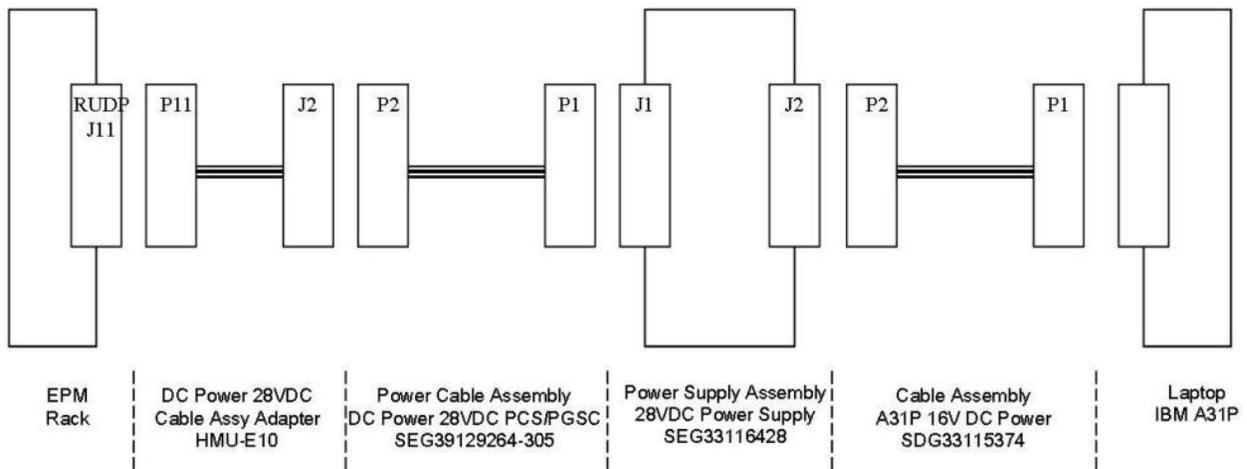


Figure 1. Power Supply Assembly



Figure 2. RIGHT UTILITY DISTRIBUTION PANEL (RUDP) LAPTOP POWER J11

- A2
- 3.1 DC Power 28VDC Cable Assy Adapter HMU-E10
P11←|→LAPTOP POWER J11 (to be loosened to disconnect)
(Refer to Figures 1 and 2)
 - 3.2 DC Power 28VDC Cable Assy Adapter HMU-E10 J2←|→Power
Cable Assembly DC Power 28VDC PCS/PGSC P2 (Refer to
Figure 1)
 - 3.3 Power Cable Assembly DC Power 28VDC PCS/PGSC
P1←|→Power Supply Assembly 28VDC J1 (Refer to Figure 1)
 - 3.4 Power Supply Assembly 28VDC J2←|→Cable Assembly A31P
16VDC Power P2 (Refer to Figure 1)

2.820 EPM LAPTOP DEACTIVATION AND STOWAGE
 (ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 3 of 4 pages



Figure 3. EPM Laptop Power socket

EPM Laptop 3.5 Cable Assembly A31P 16VDC Power P1←|→EPM Laptop Power socket (Refer to Figures 1 and 3)



Figure 4. RIGHT UTILITY DISTRIBUTION PANEL (RUDP) LAPTOP ETHERNET J12

A2 3.6 EPM Laptop LAN Cable HMU-E02←|→LAPTOP ETHERNET J12 (to be loosened to disconnect) (Refer to Figure 4)



Figure 5. EPM Laptop Ethernet socket

EPM Laptop 3.7 EPM Laptop LAN Cable HMU-E02←|→EPM Laptop Ethernet socket (Refer to Figure 5)

4. **STOW ALL MATERIALS**

- 4.1 Stow
- Laptop LAN Cable HMU-E02
- DC Power 28VDC Cable Assy Adapter
- Power Cable Assembly DC Power 28VDC PCS/PGSC
- Power Supply Assembly 28VDC
- Cable Assembly A31P 16VDC Power

4.2 Stowing EPM Laptop and EPM Laptop Holder

4.2.1 Remove the EPM Laptop from the EPM Laptop holder

4.2.2 Stow the EPM Laptop

4.2.3 Deinstall the EPM Laptop Holder from the EPM Seat-Track

4.2.4 Stow the EPM Laptop Holder

5. CLEANUP

5.1 Update IMS with stowage location or notify **COL-CC**

5.2 Notify **COL-CC** about procedure completion

3.710 EPM LOG AND XML FILES RENAMING

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 3 pages

OBJECTIVE:

Renaming EPM log and xml files to allow the files transfer to ground

DURATION:

5 minutes

CREW:

One

LOCATION:

COL1A3

PARTS:

None

TOOLS:

None

REFERENCED PROCEDURE:

2.210 EPM LAPTOP SETUP AND ACTIVATION

EPM Laptop

1. [CHECKING EPM LAPTOP AND EPM SOFTWARE ARE ACTIVATED](#)

√ EPM Laptop and Software – activated

```
*****  
*  
* If EPM Laptop is not powered or EPM Laptop Control Panel  
* Home Display is not loaded, then  
*  
* | Perform {2.210 EPM LAPTOP SETUP AND  
* | ACTIVATION}, all (SODF: ASSY PAYLOAD), then:  
*  
*****
```

2. [OPENING FILES FOLDER](#)

Minimize EPM Laptop software window

Laptop Desk



Double-click on 'My Computer' icon (

My Computer

Double-click on 'C:\' folder

C:\

Double-click on 'Program Files' folder

C:\ Program Files

Double-click on 'OHB System' folder

C:\ Program Files\OHB System

Double-click on 'EPM' folder

C:\ Program Files\OHB System\EPM

Double-click on 'EPMControlPanel' folder

C:\ Program Files\OHB System\EPM\EPMControlPanel

Double-click on 'Logs' folder

3. [RENAMING FILES](#)

3.1 Renaming xml file

C:\ Program Files\OHB System\EPM\EPMControlPanel\Logs

Right click on the PayloadMessageyyyymmdd hhmmss.xml file with the date of the day

pick Rename

Rename the file into Messageyyyymmdd hhmmss.xml (Removing the 'Payload' word from the original file name)

If there are several PayloadMessageyyyymmdd_hhmmss.xml files with the date of the same day, then

Perform Step 3.1 for each file

3.2 Renaming log file

C:\ Program Files\OHB System\EPM\EPMControlPanel\Logs

Right click on the EPMControlPanelyyyyymmdd hhmmss.log file with the date of the day

pick Rename

Rename the file into Panelyyyyymmdd hhmmss.log (Removing the 'EPMControl' word from the original file name)

If there are several EPMControlPanelyyyyymmdd_hhmmss.log files with the date of the same day, then

3.710 EPM LOG AND XML FILES RENAMING

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 3 pages



Perform Step 3.2 for each file

4. [RESTORING EPM LAPTOP SOFTWARE](#)
Close 'C:\ Program Files\OHB System\EPM\EPMControlPanel\Logs'
window

Restore EPM Laptop software window
5. Notify **COL-CC** about procedure completion

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FSL

FSL

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1.103 FSL ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 10 pages

OBJECTIVE:

This procedure is used to activate the FSL Rack in the standby mode.

LOCATION:

COL101

DURATION:

15 minutes.

CREW:

One

TOOLS:

None

REFERENCED PROCEDURE(S):

2.106 WFSV OPENING

1. CHECKING FSL ISPR (O1) FRONT SWITCHES CONFIGURATION

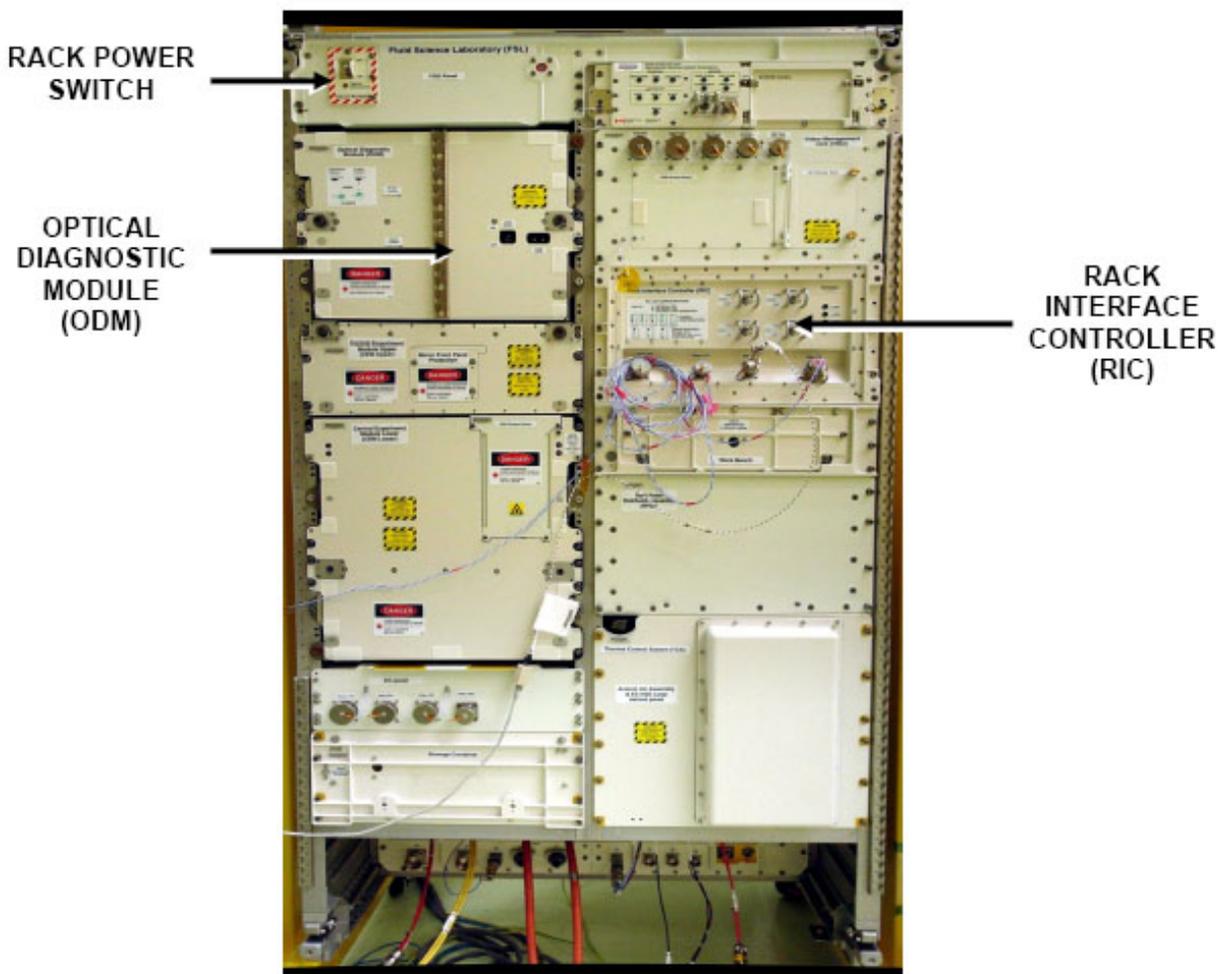


Figure 1. FSL Rack

1.1 [Checking RACK POWER Switch Position](#)

1.103 FSL ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 10 pages

COL101 √sw RACK POWER – ON

PWS 1.2 [Verifying RACK POWER Switch Data](#)
 Payload: ISPR O1

ISPR O1

'EPDS'

Verify Maint Switch – ON

Verify ISPR_O1_Maint_Switch_Stat_DMC – ON (1)

1.3 [Verifying RIC and ODM Switches](#)
 Refer to Figure 2 and Figure 3.

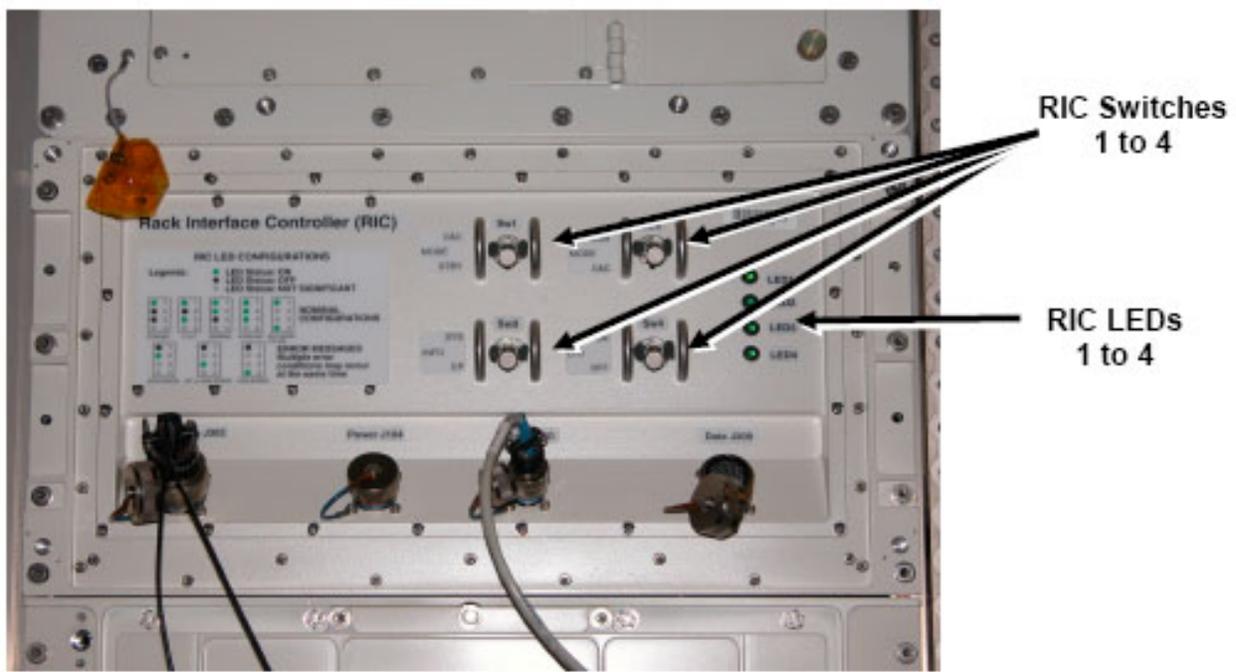


Figure 2. Rack Interface Controller (RIC) Panel

COL101 Verify RIC Switch 1 – Down / STBY
 Verify RIC Switch 2 – Down / C&C
 Verify RIC Switch 3 – Down / EP
 Verify RIC Switch 4 – Down / OFF

1.103 FSL ISPR RACK ACTIVATION

'Delta Pressure Sensor Blocks'

'DPSB1 Plenum'

Verify Nom dP – 40 to 45 kPa

'DPSB2 Plenum'

Verify Redun dP – 40 to 45 kPa

If WPA_Active_Pump_SW – WPA1

Record WPA1_Massflow_DMC : _____
kg/h

If WPA_Active_Pump_SW – WPA2

Record WPA2_Massflow_DMC : _____
kg/h

(For calculation later on in section 3.3)

Verify DPSB1_Nom_Plenum_DP_MVD – 40 to 45 kPa

Verify DPSB2_Redun_Plenum_DP_MVD – 40 to 45 kPa

3. [ACTIVATING FSL ISPR \(O1\) COOLING](#)

3.1 [Configuring WFSV ISPR \(O1\) to Open Position \(Ground only\)](#)

To open the WFSV of ISPR (O1), perform [{2.106 WFSV OPENING}](#) (ESA SODF: TCS: NOMINAL).

Wait 1 minute for valve to fully open.

Verify WFSV_ISPR_O1_Open_Stat_DMC – OPEN (1)

Verify WFSV_ISPR_O1_Posn_Ind_DMC > 97 %

Verify WFSV_ISPR_O1_Act_Stat_DMC – INACTIVE (0)

Verify WFSV_ISPR_O1_Current_Ovld_Stat_DMC – OK (0)

3.2 [Verifying Water Pump Assembly Flow Rate to FSL On COL-CC GO](#)

TCS

[TCS Functional Overview](#)

'Water Pump Assemblies'

Identify Active WPA

If Active WPA – WPA1

Record Mass Flow WPA1: _____ kg/h

If Active WPA – WPA2

Record Mass Flow WPA2: _____ kg/h

1.103 FSL ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 5 of 10 pages

Crew Subtract Mass flow obtained in step 2.2 from WPA Mass flow obtained in step 3.2.

Record Result of Subtraction: _____ kg/h

Verify Result of Subtraction – 150 to 185 kg/h

PWS

TCS Functional Overview

'Delta Pressure Sensor Blocks'

'DPSB1 Plenum'

Verify Nom dP – 40 to 45 kPa

'DPSB2 Plenum'

Verify Redun dP – 40 to 45 kPa

If WPA_Active_Pump_SW – WPA1

Record WPA1_Massflow_DMC : _____
kg/h

If WPA_Active_Pump_SW – WPA2

Record WPA2_Massflow_DMC: _____
kg/h

Subtract Mass flow obtained in step 2.2 from WPA Mass flow obtained in step 3.2.

Record Result of Subtraction: _____ kg/h

Verify Result of Subtraction – 150 to 185 kg/h

Verify DPSB1_Nom_Plenum_DP_MVD – 40 to 45 kPa

Verify DPSB2_Redun_Plenum_DP_MVD – 40 to 45 kPa

4. ACTIVATING FSL ISPR (O1) POWER SUPPLY

4.1 Enabling ISPR (O1) Main Power Bus System Control (Ground only)

If
PDU1_ISPR_O1_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
– DISABLED (0)

cmd

PDU1 ISPR O1 Main Pwr Bus Svs Cntl Ena VTC

data SW_CMD – VTC_Disc_Out_Cmd_Cmd_SW

data Onboard_Node – SYS_CCSDS_End_Point_VTC1

1.103 FSL ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 10 pages

Verify
PDU1_ISPR_O1_Main_Pwr_Bus_SSPC1_Sys_Cntl_Stat_DMC
– ENABLED (1)

4.2 [Activating the ISPR \(O1\) Main Power Bus](#)

NOTE

ISPR RIC boots automatically when power is supplied.

On COL-CC GO

EPDS

[EPDS Functional Overview](#)

'PDU1'

sel PDU1 120V Payload

[PDU 1-2 120V Payload](#)

'PDU1 Outlets'

sel 5

[PDU1 Outlet 5](#)

Verify 'SSPC1 Sys Bus Cntl Stat' – ENABLED

'Commands'

cmd Pwr On Execute [OK]

'Pwr'

Verify SSPC1 Pwr – ON

Verify SSPC2 Pwr – ON

Wait 2 minutes to allow current value to stabilize.

Verify Current – 1.5 A to 2.2 A

cmd PDU1_ISPR_O1_Main_Pwr_Bus_On_AP
data ONBOARD_RECEPTION_NODE –
SYS CCSDS End Point PLCU DMS SERV
data ONBOARD_EXECUTION_NODE –
USM SW DMC USS Swoop Instance

Verify
PDU1_ISPR_O1_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC –
ON (1)

1.103 FSL ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 10 pages

Verify
PDU1_ISPR_O1_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC –
ON (1)

Wait 2 minutes to allow current value to stabilize.

Verify PDU1_ISPR_O1_Main_Pwr_Bus_Current_DMC – 1.5 A
to 2.2 A

4.3 [Enabling ISPR \(O1\) Aux Power Bus System Control \(Ground only\)](#)

If PDU2_ISPR_O1_Aux_Pwr_Bus_Sys_Cntl_Stat_DMC –
DISABLED (0)

cmd

PDU2 ISPR O1 Aux Pwr Bus Svs Cntl Ena VTC

data SW_CMD - VTC_Disc_Out_Cmd_Cmd_SW

data Onboard_Node - SYS_CCSDS_End_Point_VTC1

Verify PDU2_ISPR_O1_Aux_Pwr_Bus_Sys_Cntl_Stat_DMC –
ENABLED (1)

4.4 [Activating FSL ISPR \(O1\) Aux Power Bus On COL-CC GO](#)

EPDS

[EPDS Functional Overview](#)

'PDU2'

sel PDU2 120V Payload

[PDU 1-2 120V Payload](#)

'PDU2 Outlets'

sel 10

[PDU2 Outlet 10](#)

Verify 'SSPC1 Sys Bus Cntl Stat' – ENABLED

'Commands'

cmd Pwr On **Execute** (OK)

'Pwr'

Verify Pwr – ON

Verify Current – 0.0 A to 0.5 A

1.103 FSL ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 8 of 10 pages

```
cmd PDU2_ISPR_O1_Aux_Pwr_Bus_On_AP
data ONBOARD_RECEPTION_NODE –
SYS CCSDS End Point PLCU DMS SERV
data ONBOARD_EXECUTION_NODE –
USM SW DMC USS Swop Instance
```

Verify PDU2_ISPR_O1_Aux_Pwr_Bus_On_Off_Stat_DMC – ON
Verify PDU2_ISPR_O1_Aux_Pwr_Bus_Current_DMC – 0.0 A to 0.5 A

4.5 [Verifying FSL ISPR \(O1\) is in Standby Mode](#)

Refer to Figure 2.

RIC

Verify RIC LED 1 – ON
Verify RIC LED 2 – OFF
Verify RIC LED 3 – OFF
Verify RIC LED 4 – not significant

5. [ACQUIRING FSL ISPR \(O1\) MIL BUS DATA \(GROUND ONLY\)](#)

```
cmd DMS_RT_Start_RT_Acquisition_Cmd_SW
prm REMOTE_TERMINAL_ID –
MIL 1553B Bus RT Pavload Bus ISPR O1
data ONBOARD_NODE – SYS_CCSDS_End_Point_PLCU_DMS_SERV
```

Verify ISPR_O1_PL_Bus_Ena_Stat_SW – ENABLED (1)
Verify ISPR_O1_PL_Bus_No_Resp_SW – NO_ERROR
Verify ISPR_O1_PL_Bus_Msg_Error_SW – NO_ERROR
Verify ISPR_O1_PL_Bus_Busy_Flag_SW – NO_ERROR
Verify ISPR_O1_PL_Bus_Erroneous_Msg_SW – NO_ERROR
Verify ISPR_O1_PL_Bus_Terminal_Flag_SW – NO_ERROR
Verify ISPR_O1_PL_Bus_Unit_Error_Flag_SW – NO_ERROR

6. [VERIFYING FSL ISPR \(O1\) MIL BUS DATA](#)

On COL-CC GO

PWS

PAYLOAD: FSL

FSL Health and Status Data

'Status'

Verify Caution – NO_ALARM
Verify Warning – NO_ALARM

'Update Counter'

Verify SA#09 – incrementing
Verify SA#10 – incrementing
Verify SA#11 – incrementing

1.103 FSL ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 9 of 10 pages

Verify FSL_Caution_Stat – NO_ALARM

Verify FSL_Warning_Stat – NO_ALARM

Verify FSL_SA9_Counter – incrementing

Verify FSL_SA10_Counter – incrementing

Verify FSL_SA11_Counter – incrementing

Additional ground verification:

Verify FSL_Op_Mode_PP – STANDBY

Verify FSL_AAA_Fan_Stat – ON (1)

7. [ACTVATING THE ISPR \(O1\) CAUTION & WARNING MONITORING](#)

7.1 [Verifying ISPR \(O1\) Smoke Detector Signals](#)

DMS: DMS Payload Status

Verify ISPR O1 CIFA Stat > 4.5 V

PCS

COL: ECLSS: O1 (ISPR)

Verify Obscuration < 25 % Contamination

Verify Scatter < 1 % Obscuration per Meter

Verify ISPR_O1_CIFA_Stat_MVD > 4.5 V

Verify ISPR_O1_SD_Obscuration_VTC_PP < 25 %

Verify ISPR_O1_SD_Scatter_VTC_PP < 1 %

7.2 [Enabling the Smoke Detector ISPR \(O1\) Monitoring](#)

COL: ECLSS: O1 (ISPR)

'Monitoring'

cmd Enable (Verify Status – Ena)

cmd VTC_Monitoring_Ena_Cmd_SW

prm MONITORED_ITEM_ID – ISPR_O1_SD

prm ACTION – 1(ENABLE)

data ONBOARD_NODE – SYS_CCSDS_End_Point_VTC1

Verify ISPR_O1_SD_Monitoring_Ena_PP – ENABLED

Verify VTC1_ISPR_O1_SD_Stat_MVD – OK

1.103 FSL ISPR RACK ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 10 of 10 pages

7.3 [Activating FSL ISPR \(O1\) Caution and Warning BITs monitoring \(Ground only\)](#)

```
cmd DMS_MONIT_Ena_Monitoring_Cmd_SW
prm MT_ID – PL_PLCU_MON_PL_Health_Stat1
prm EI_ID – FSL_Caution_Stat
prm LIMIT_SET_ID – 0
data ONBOARD_NODE –
SYS CCSDS End Point PLCU DMS SERV
```

Verify FSL_Caution_Stat_MS – NORMAL_1

```
cmd DMS_MONIT_Ena_Monitoring_Cmd_SW
prm MT_ID – PL_PLCU_MON_PL_Health_Stat1
prm EI_ID – FSL_Warning_Stat
prm LIMIT_SET_ID – 0
data ONBOARD_NODE –
SYS CCSDS End Point PLCU DMS SERV
```

Verify FSL_Warning_Stat_MS – NORMAL_1

7.4 [Verifying FSL ISPR \(O1\) Caution & Warning Status On COL-CC GO](#)

PWS

PAYLOAD: FSL

FSL Health and Status Data

'Status'

Verify Caution – NO_ALARM

Verify Warning – NO_ALARM

Verify FSL_Caution_Stat – NO_ALARM

Verify FSL_Warning_Stat – NO_ALARM

COL-CC to announce completion of FSL ISPR Activation to MARS.

1.214 FSL UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 1 of 6 pages

OBJECTIVE:

Mate all FSL ISPR-to-COL Utility Interface Panel (UIP) umbilicals, and verify all required Columbus systems operating nominally.

LOCATION:

COL101

DURATION:

30 minutes

CREW:

One

PARTS:

None

MATERIALS:

Gray Tape

Dry Wipes

TOOLS:

DCS 760 Camera

ISS IVA Toolbox:

Drawer 5:

Static Wrist Tether

1.214 FSL UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 2 of 6 pages

1. VERIFYING COL101 UIP MAIN POWER/AUX POWER IS OFF

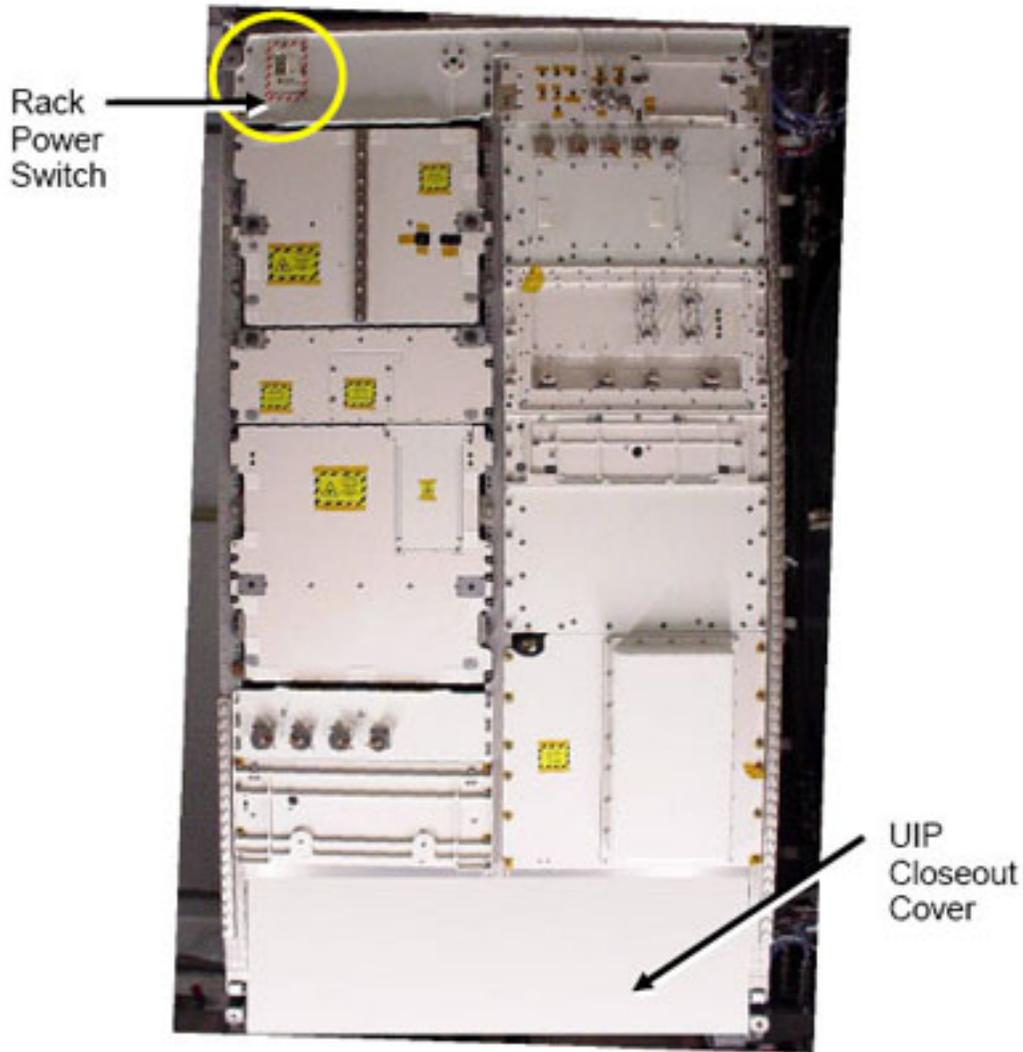


Figure 1. Fluid Science Lab - FSL

PWS

EPDS: EPDS Functional Overview: PDU1-2: 120V Payload

120V Payload

'PDU1 Outlets'

sel '5'

EPDS PDU1 Outlet 5 - ISPR O1 Main Pwr Bus

Verify SSPC (all) – OFF

Verify Current (all) < 0.01 A

Verify Sys Bus Cntl (all) – DISABLED

1.214 FSL UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 3 of 6 pages

EPDS: EPDS Functional Overview: PDU1-2: 120V Payload

120V Payload

'PDU2 Outlets'

sel '10'

EPDS PDU2 Outlet 10 - ISPR O1 Aux Pwr Bus

Verify Pwr – OFF

Verify Current < 0.01 A

Verify Sys Bus Cntl – DISABLED

1.1 [Verifying WFSV O1 is Closed](#)

COL SYNOPTICS HOME PAGE: ISPR O1

ISPR O1 System Status Information

'TCS'

Verify WFSV Posn – CLOSED

Verify WFSV Posn Ind < 8 %

1.2 Verify Rack Power Switch – OFF

Refer to Figure 1.

2. [ACCESSING](#)

2.1 Remove UIP closeout cover, temporary stow.

Refer to Figure 1.

3. [TCS UMBILICAL MATING](#)

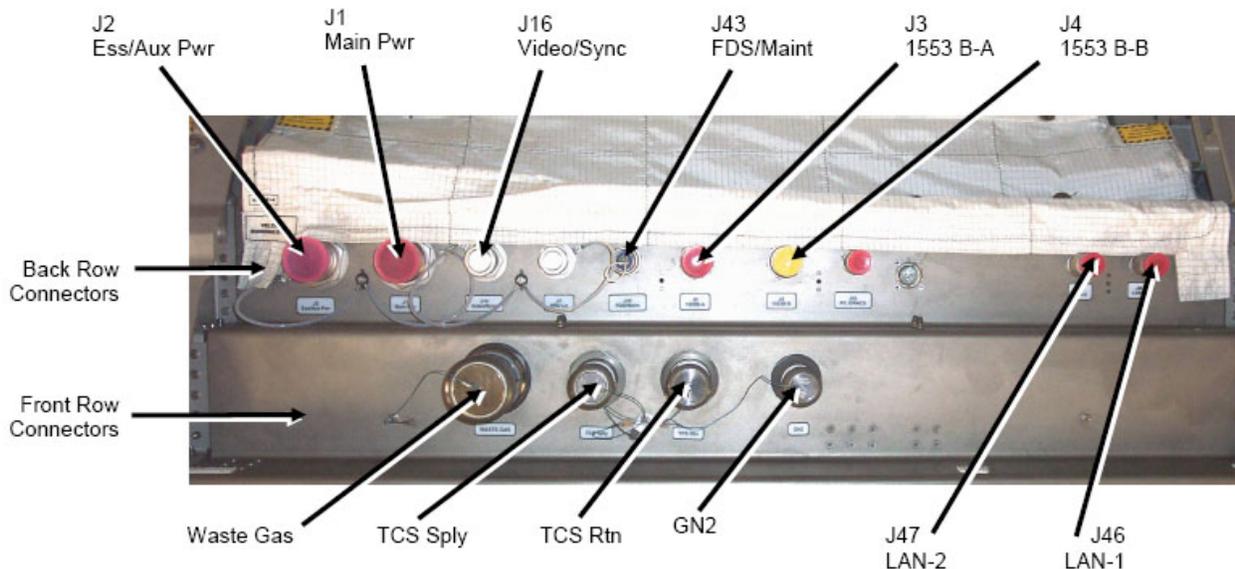


Figure 2. COL UIP at COL101 Location

1.214 FSL UMBILICAL MATE

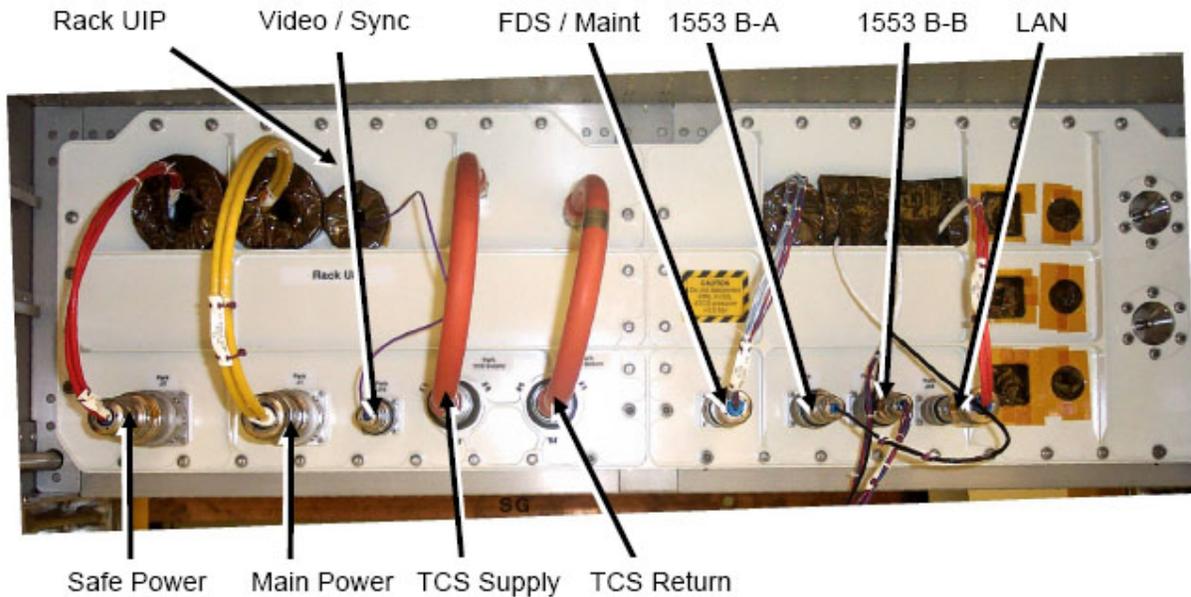


Figure 3. FSL Umbilicals in Launch Configuration

Table 1. TCS Umbilicals (recommended installation order)

Order Number [X]	FSL Rack Umbilical Function	Fluid Umbilical Label	COL UIP QC Label
1	TCS Supply Line	No Label is provided on this umbilical	TCS Sply
2	TCS Return Line	No Label is provided on this umbilical	TCS Rtn

- 3.1 Don Static Wrist Tether.
 Attach clip to unpainted, unanodized metal structure.

NOTE

1. TCS jumpers do not provide any identification label but color-coding only by colored ribbons located at loose end of jumper:
 - TCS MOD Supply jumper: blue ribbon
 - TCS MOD Return jumper: green ribbon
2. Remove and mate only one umbilical at a time to avoid having an umbilical hang loose.

- 3.2 Mate TCS umbilical [X] to COL UIP jacks where [X] = [1] [2]
 Refer to Table 1.
- Remove protective cap from COL UIP jack, temporary stow if untethered.

1.214 FSL UMBILICAL MATE

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 5 of 6 pages

Refer to Figure 2.

Disconnect umbilical from launch restraint (park) connector.

Refer to Figure 3.

Mate umbilical to COL UIP jack, restrain tethered protection cap to umbilical (Gray Tape) where possible.

√No leakage from QD, remove droplets (Dry Wipe) as necessary.

√Red Indicator Ring – not visible.

Repeat

4. POWER / DATA UMBILICAL MATING

CAUTION

1. To prevent damage to EMI rings, hold connector back shell with one hand while using other hand to rotate connector collar.
2. Handle fiber optic cables by connector only. Do not bend, or apply pressure to cable during mating.

NOTE

1. Untethered protection caps removed from COL UIP jacks shall be placed on empty launch restraint connectors on rack UIP.
2. Tethered caps shall always be fixed to the corresponding umbilical using Gray Tape.

Table 2. Power / Data Umbilicals (recommended installation order)

Order Number [X]	FSL Rack Umbilical Function	Rack Umbilical Label	COL UIP Label
1	VIDEO / SYNC	No label is provided on this umbilical	J16 VIDEO/SYNC
2	MAIN POWER	P1 TO UIP MAIN POWER J1	J1 MAIN PWR
3	SAFE POWER	P2 TO UIP AUX J2	J2 ESS/AUX PWR
4	FDS / MAINT	P43 TO UIP FDS LINES J43	J43 FDS/MAINT
5	MIL-BUS-A (1553B-A)	P3 TO UIP MILBUS A J3	J3 1553 B-A
6	MIL-BUS-B (1553B-B)	P4 TO UIP MILBUS B J4	J4 1553 B-B
7	ETHERNET (LAN) 1&2	P46 TO UIP COF LAN J46	J46 LAN-1

- 4.1 Mate power / data umbilical [X] to COL UIP jacks where [X] = [1] [2] [3] [4] [5] [6] [7]
Refer to Table 2.
- Remove protective cap from COL UIP jack, temporary stow if untethered.
Refer to Figure 2.
- Disconnect umbilical from launch restraint (park) connector on rack UIP.
Refer to Figure 3.
- Mate umbilical to COL UIP jack, restrain tethered protection cap to umbilical (Gray Tape) where possible.
- √Red Indicator Ring – not visible.
- Repeat

5. CLOSEOUT

- 5.1 ISS ↓ **COL-CC** of completing umbilical mating, wait for **GO** to closeout worksite.
- 5.2 Doff Static Wrist Tether.
- 5.3 Photo-document all installed umbilicals (DCS 760 Camera).
- 5.4 Check for FOD around work area.
- 5.5 Attach UIP closeout cover to rack.
Cover is attached by Velcro only.
- 5.6 Stow tools and equipment.
- Update IMS or report to **COL-CC**.

2.103 FSL START UP

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 8 pages

OBJECTIVE:

Change the operational mode of FSL after the ISPR activation to perform the experiment.

DURATION:

40 minutes (elapsed time), 10 minutes (crew time).

CREW:

One

TOOLS:

None

ITEMS:

None

REFERENCED PROCEDURE(S):

2.240 FSL LAPTOP SETUP AND ACTIVATION

1. PRELIMINARY VERIFICATIONS AT FRC (GROUND ONLY)

FSL MAIN: DaSS PROCESSED

DaSS PROCESSED

1.1 [Verification of Columbus Water Loop Data \(ISPR Flow Rate\)](#) (Ground only)

Verify WFSV_ISPR_O1_Open_Stat_DMC_PP – OPEN

Verify Verify WFSV_ISPR_O1_Posn_Ind_DMC_PP > 97

Verify DPSB1_Nom_Plenum_DP_MVD_PP – in the range 40 to 45 kPa

Verify DPSB2_Redun_Plenum_DP_MVD_PP – in the range 40 to 45 kPa

Verify WPA1_Massflow_DMC_PP – in the range 280 - 1050 ka/h

Verify WPA2_Massflow_DMC_PP – in the range 280 - 1050 kg/h

1.2 [Verification of Columbus Water Loop Temperature Parameters](#) (Ground only)

Verify WTSB1_Nom_Plenum_Temp3_MVD_PP – in the range 15.5 to 18.5 °C

Verify WTSB2_Redun_Plenum_Temp3_MVD_PP – in the range 15.5 to 18.5 °C

Verify WPA1_Water_Temp_DMC_PP – in the range 17 to 40 °C

Verify WPA2_Water_Temp_DMC_PP – in the range 17 to 40 °C

1.3 [Verification of FSL ISPR \(O1\) Main Power Bus Activation \(Ground only\)](#)

Verify
PDU1_ISPR_O1_Main_Pwr_Bus_SSPC1_On_Off_Stat_DMC_PP – ON (1)

Verify
PDU1_ISPR_O1_Main_Pwr_Bus_SSPC2_On_Off_Stat_DMC_PP – ON (1)

Verify PDU1_ISPR_O1_Main_Pwr_Bus_Current_DMC_PP – in the range 1.5 to 2.2 A

1.4 [Verification of ISPR Monitoring Activation \(Ground only\)](#)

Verify ISPR_O1_CIFA_Stat_MVD_PP > 4.5 V
Verify ISPR_O1_SD_Scatter_VTC_PP – in the range -0.49 to 0.66 %
Verify ISPR_O1_SD_Obscuration_VTC_PP – in the range -4.1 to 46.7 %

1.5 [Verification of Warning and Caution System Activation \(Ground only\)](#)

Verify FSL_Caution_Stat_PP – NO_ALARM
Verify FSL_Warning_Stat_PP – NO_ALARM

COL101 2. [FSL LAPTOP INSTALLATION](#)

If the Laptop is not installed

Perform [{2.240 FSL LAPTOP SETUP AND ACTIVATION}](#), all (SODF: ASSY PAYLOAD: FSL), then:

FSL Laptop 3. [STANDBY MODE STATUS VERIFICATION](#)

NOTE

In Standby Mode the following FSL subsystems are active:
Rack Interface Controller - RIC (MCU in the FSL HCI)
Remote Power Distribution Assembly - RPDA (EPS in the FSL HCI)
Avionic Air Assembly - AAA

Home

'Set FSL Operative Mode'

Verify Current Mode – Standby

'Master Control Unit (MCU)'

Verify 120V Power LED – □ (Green)

2.103 FSL START UP

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 8 pages

Verify Status – On

'Thermal Control System (TCS)'

Verify 120V (AAA) Power LED – (Green)

Verify Status – On

FSL MAIN

FSL MAIN

'Operative Mode'

Verify Current Mode – Standby

Menu bar: RPDA

RPDA

'ESEM5-1'

Verify Out1 (120V) --> RIC – ON

'ESEM5-2'

Verify Out2 (120V) --> AAA – ON

4. [CHANGING THE STATUS FROM STANDBY TO CONFIGURATION AND CHECKOUT](#)

NOTE

In Configuration and Checkout Mode, in addition to the subsystems already activated in Standby Mode, the following subsystems are powered:

Video Management Unit - VMU

Optical Diagnostic Module - ODM

Central Experiment Module - CEM

4.1 [Changing the AAA Fan Speed](#)

Home: Facility Setup: Thermal Control System (TCS): AAA

Home/TCS/ Air Avionic Assembly - AAA

Verify Fan Speed – 5000 (\pm 100) rpm

pick Set AAA speed 7500 rpm

cmd Set

Wait 30 seconds.

2.103 FSL START UP

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 4 of 8 pages

Verify Fan Speed – 7500 ± (250) rpm

Menu bar: TCS: AAA

AAA - Air Avionic Assembly

'AAA Command'

pick Command 7500

cmd set AAA speed

Wait 30 seconds.

Verify Fan Speed – 7500 ± (250) rpm

4.2 [Mode Transition](#)

Home

Home

'Set FSL Operative Mode'

pick Mode Selection = Configuration and Checkout

cmd Set Operative Mode

Wait four minutes.

Verify Current Mode – Configuration and Checkout

'Facility Core Equipment (FCE)'

'Optical Diagnostic Module (ODM)'

Verify Power LEDs (four) – (5V, 12V,15V,28V LEDs are green)

Verify Status – On

'Facility Core Equipment (FCE)'

'Central Experiment Module (CEM)'

Verify Power LEDs (four) – (5V, 12V, 15V, 28V LEDs are green)

Verify Status – On

'Video Management Unit (VMU)'

Verify 120V Power LED – (Green)

Verify Status – On

FSL MAIN
FSL MAIN
'Operative Mode'

cmd C&C

Wait four minutes.

Verify Current Mode – C & C

Menu bar: RPDA
RPDA
'ESEM3'

Verify Out1 (120V) --> VMU – ON

'ESEM4-1'

Verify Out1 (28V) --> ODM – ON
Verify Out2 (28V) --> CEM – ON

'ESEM6-2'

Verify Out1 (5V) --> ODM – ON
Verify Out2 (12V) --> ODM – ON
Verify Out3 (15V) --> ODM – ON

'ESEM6-3'

Verify Out1 (5V) --> CEM – ON
Verify Out2 (12V) --> CEM – ON
Verify Out3 (15V) --> CEM – ON

5. [CHANGING THE STATUS FROM CONFIGURATION AND CHECKOUT TO NOMINAL](#)

NOTE

In Nominal Mode, in addition to the subsystems already activated in the previous modes (Stand-by and Configuration and Checkout) the following subsystems are powered:

- Experiment Container - EC
- EC H2O loop (SWLA in the displays)

Thermal
Control
System

Verify EC H2O Loop flex hoses →|← Experiment container

2.103 FSL START UP

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 8 pages

FSL HCI

Home

Home

'Set FSL Operative Mode'

pick Mode Selection = Nominal

cmd Set Operative Mode

NOTE

The transition from the C & C mode to the Nominal mode may take a minimum of 15 minutes to a maximum of 25 minutes.

Verify Current Mode – Nominal

'Facility Core Equipment (FCE)'

'Experiment Container (EC)'

Verify Power LEDs (4) – □ (5V, 12V,15V,28V LEDs are green)

Verify Status – On

'Thermal Control System (TCS)'

Verify 28 Power LED – □ (Green)

Verify Status – On

FSL MAIN

FSL MAIN

'Operative Mode'

cmd Nominal

Wait from a minimum of 15 minutes to a maximum of 25 minutes.

Verify Current Mode – Nominal

Main menu bar: RPDA

RPDA

'ESEM4-2'

Verify Out1 (28V) --> EC – ON

Verify Out2 (28V) --> EC H2O LOOP – ON

'ESEM6-1'

2.103 FSL START UP

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 7 of 8 pages

Verify Out1 (5V) --> EC – ON

Verify Out2 (12V) --> EC – ON

Verify Out3 (15V) --> EC – ON

Menu bar: TCS

TCS

NOTE

FSL requires a minimum of 1 hour to reach thermal stationary conditions.

Verify RPDA_Air_Outlet_Temp – not exceeding 42.5° C

Verify RICL_Air_Outlet_Temp – not exceeding 35° C

Verify RICU_Air_Outlet_Temp – not exceeding 35° C

Verify VMU_Air_Outlet_Temp – not exceeding 41° C

Verify CEML_Air_Outlet_Temp – not exceeding 35° C

Verify CEMU_Air_Outlet_Temp – not exceeding 33° C

Verify ODML_Air_Outlet_Temp – not exceeding 33° C

Verify ODMU_Air_Outlet_Temp – not exceeding 31° C

Verify AAA_Air_Inlet_Temp – not exceeding 37° C

Verify AAA_Air_Outlet_Temp – not exceeding 25° C

Verify EC_H2OLoop_Wat_In_Temp – not exceeding 25° C

Verify EC_H2OLoop_Wat_Out_Temp – not exceeding 36° C

6. EC H2O LOOP CHECKOUT

Home: FSL DMS

Home \ Data Management System - DMS

'SWLA Serial Line Commands'

pick SWLA Serial Line Commands Enabled HK Periodic

cmd Set Serial Line

√Serial Line Status – Enabled HK Periodic

√Secondary Water Loop Assembly TM – is present (box checked)

Home: Facility Setup: Thermal Control System (TCS): SWLA

Home \ TCS \ Secondary Water Loop Assembly - SWLA

2.103 FSL START UP

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 8 of 8 pages

Verify Delta pressure – 0.5 bar (± 0.03)

'Pump Control'

Verify Pump Speed – 5600 rpm (± 100)

Menu Bar: FSL DMS

FSL DMS (Data Management System)

'ECH2O Serial Line Commands'

pick ECH2O Serial Line Commands Enabled HK Periodic

cmd Set Serial Line

√Serial Line Status – Enabled HK Periodic

√Secondary Water Loop Assembly TM LED – (green)

Menu Bar: TCS: EC H2O

TCS-EC H2O Cooling System

Verify Delta pressure – 0.5 bar (± 0.03)

'Pump Control'

Verify Pump Speed – 5600 rpm (± 100)

2.210 FSL REAR LAUNCH FIXATIONS REMOVAL

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 9 pages

OBJECTIVE:

Preparation of FSL for nominal operations by means of removal of the Facility Core Element rear pins and release of

ODM (Optical Diagnostic Module), CEM Upper (Central Experiment Module Upper) and CEM Lower (Central Experiment Module Lower) rear launch fixations.

DURATION:

90 minutes

CREW:

One

TOOLS:

ISS IVA Toolbox:

Drawer 2:

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

Columbus Toolkit:

Tool Bag 1:

Ratchet Wrench 1/4"

Tool Bag 2:

Ratchet Wrench 3/8"

2" Extension 1/4" Drive

6" Extension 1/4" Drive

Driver Handle 1/4" Drive

Tool Bag 3:

Universal Joint 1/4"

M5 (4 mm) Driver 1/4" Drive

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

Adaptor 3/8" Female to 1/4" Male

ITEMS:

None

REFERENCED PROCEDURE(S):

1.202 COL ISPR ROTATION

COL101 1. [TILTING THE RACK](#)

To rotate FSL down, perform [{1.202 COL ISPR ROTATION}](#), step 1 (SODF: ASSY OPS: ACTIVATION & CHECKOUT: COLUMBUS MODULE OUTFITTING), then:

2. REMOVING FSL REAR PANELS

R1	L1
R2	L2
R3	L3
R4	L4

Figure 1. FSL Rear Panels Scheme

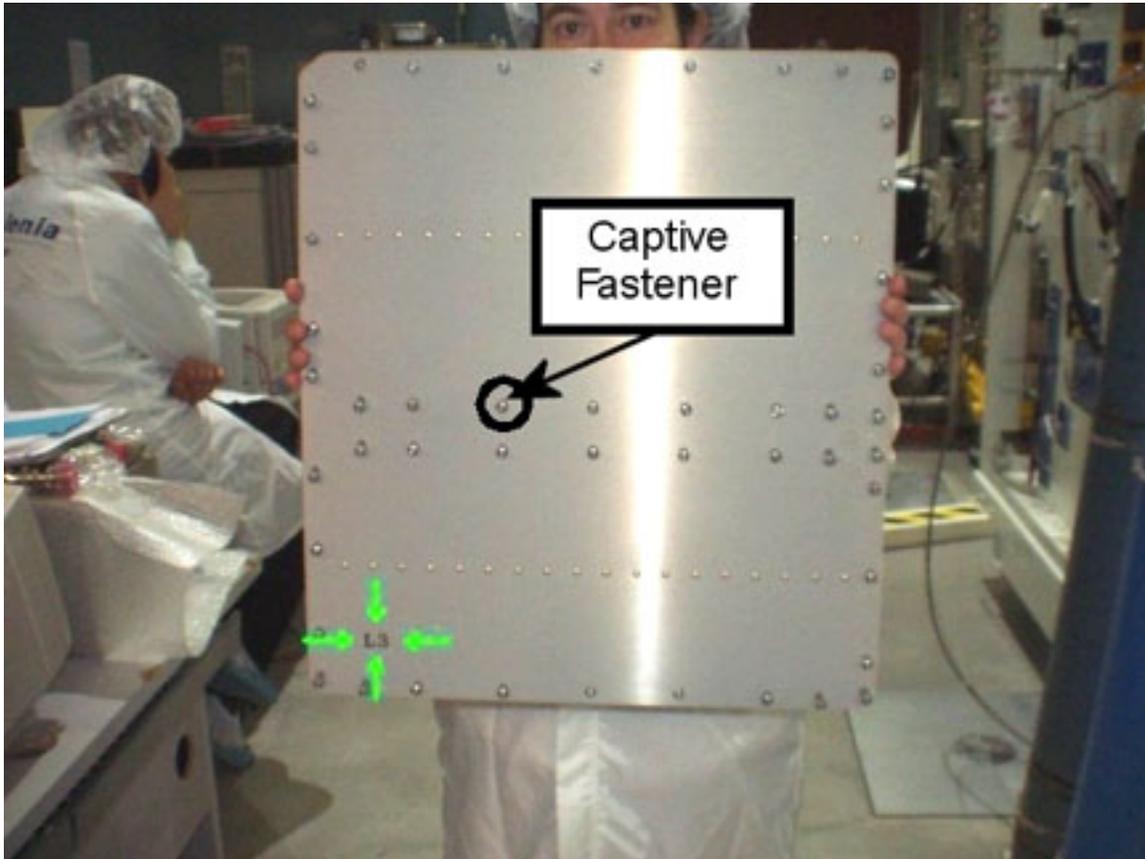


Figure 2. Panel L3 (label identification)

- 2.1 Remove, tmpy stow FSL rear panel L1 captive fasteners (sixteen) (5/32" Hex Head Driver 1/4" Drive and Driver Handle 1/4" Drive). Refer to Figures 1 and 2.
- 2.2 Remove, tmpy stow FSL rear panel L2 captive fasteners (thirty-five) (5/32" Hex Head Driver 1/4" Drive and Driver Handle 1/4" Drive). Refer to Figures 1 and 2.
- 2.3 Remove, tmpy stow FSL rear panel L3 captive fasteners (forty-eight) (5/32" Hex Head Driver 1/4" Drive and Driver Handle 1/4" Drive). Refer to Figures 1 and 2.

3. REMOVING FACILITY CORE ELEMENT MECHANICAL LAUNCH
FIXATION

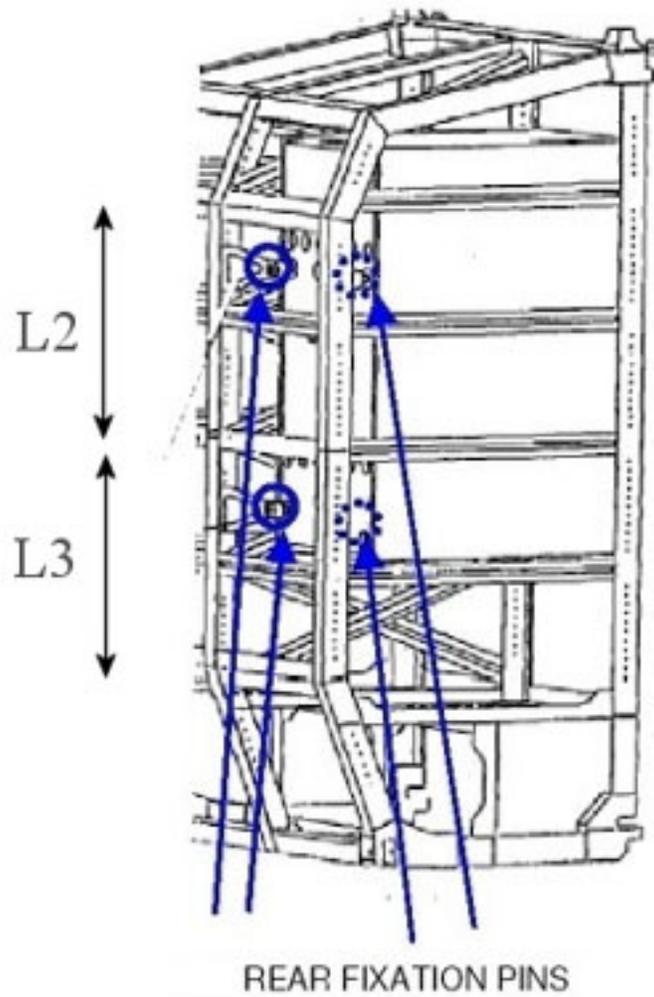


Figure 3. FSL Rear Pins Positions



Figure 4. Facility Core Element Rear Pins (indicated by the green arrows, frame corresponding to the L2 panel)

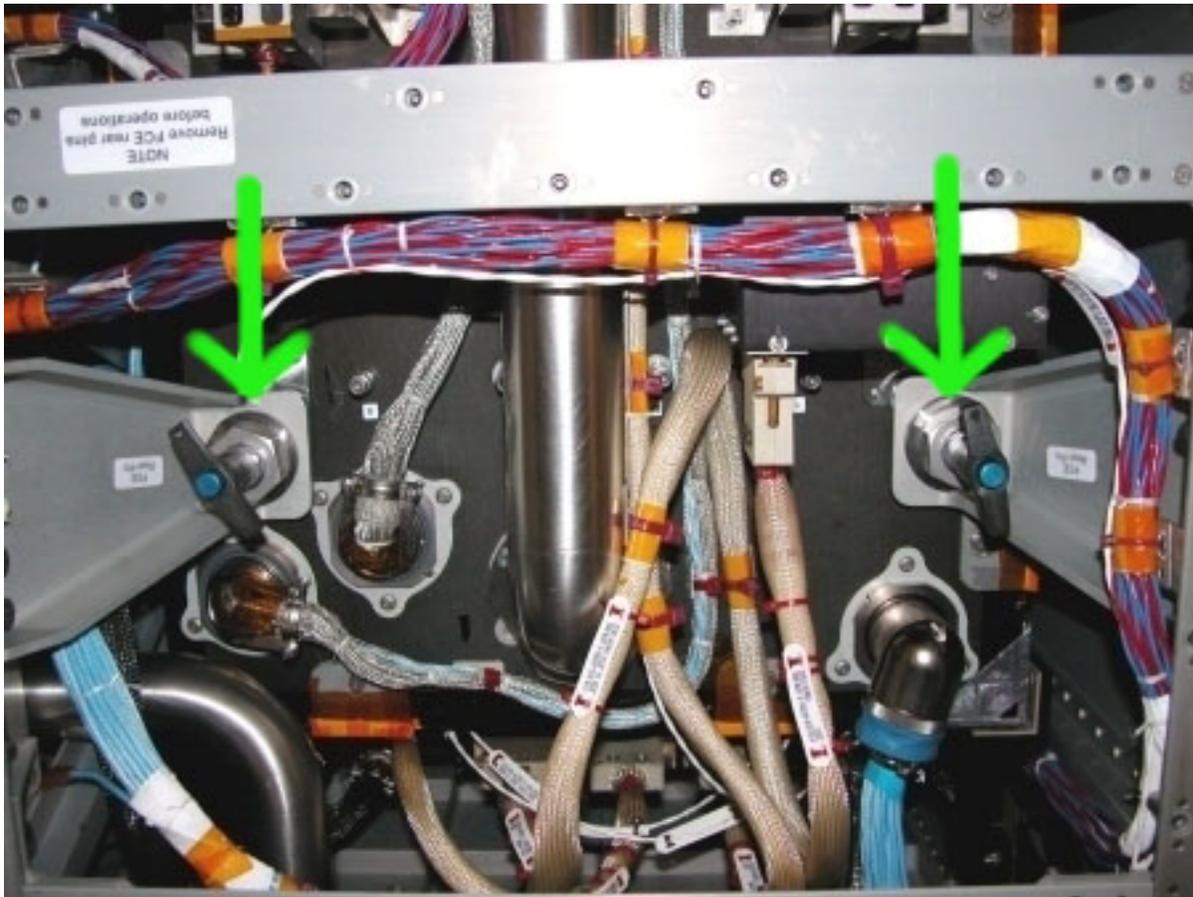


Figure 5. Facility Core Element Rear Pins (indicated by the green arrows, frame corresponding to the L3 panel)

NOTE

The Facility Core Element rear pins are removed by pushing the blue button and pulling the pin.

- 3.1 Remove, tmpry stow Facility Core Element (four) rear pins. Refer to Figures 3, 4 and 5.

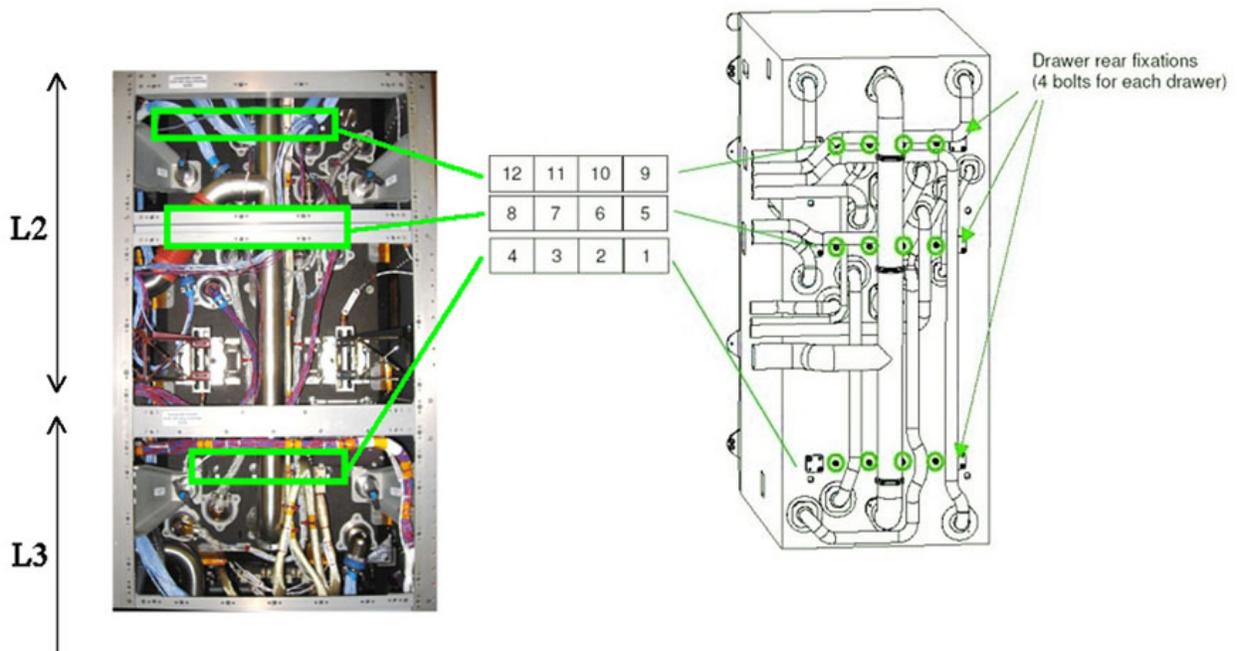


Figure 6. Facility Core Element Fixation Points

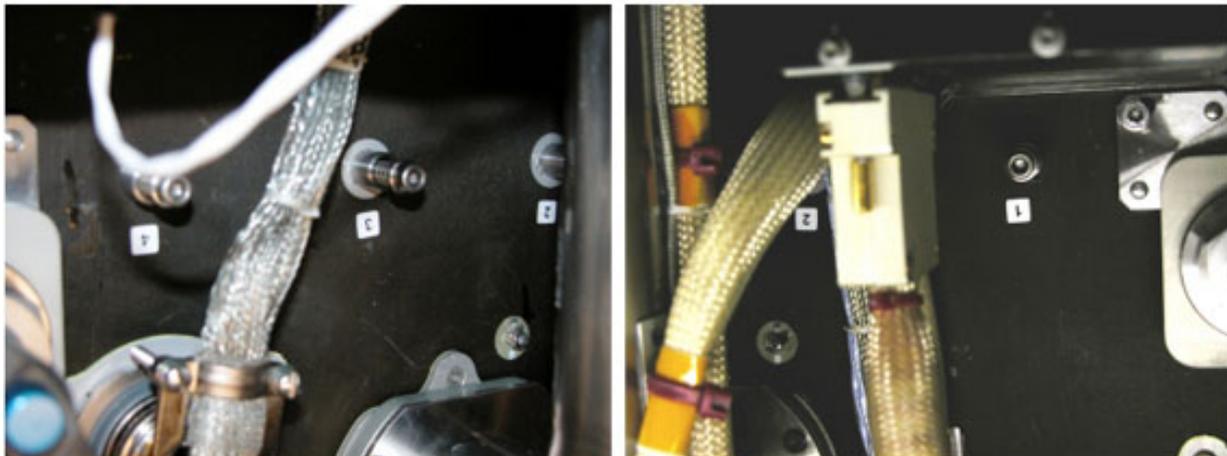


Figure 7. Bolts 1 to 4

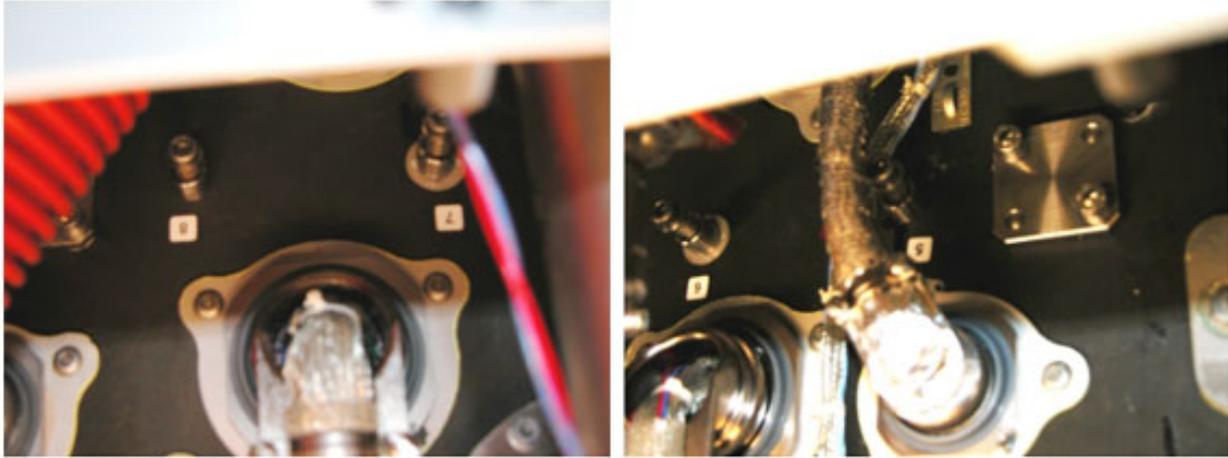


Figure 8. Bolts 5 to 8

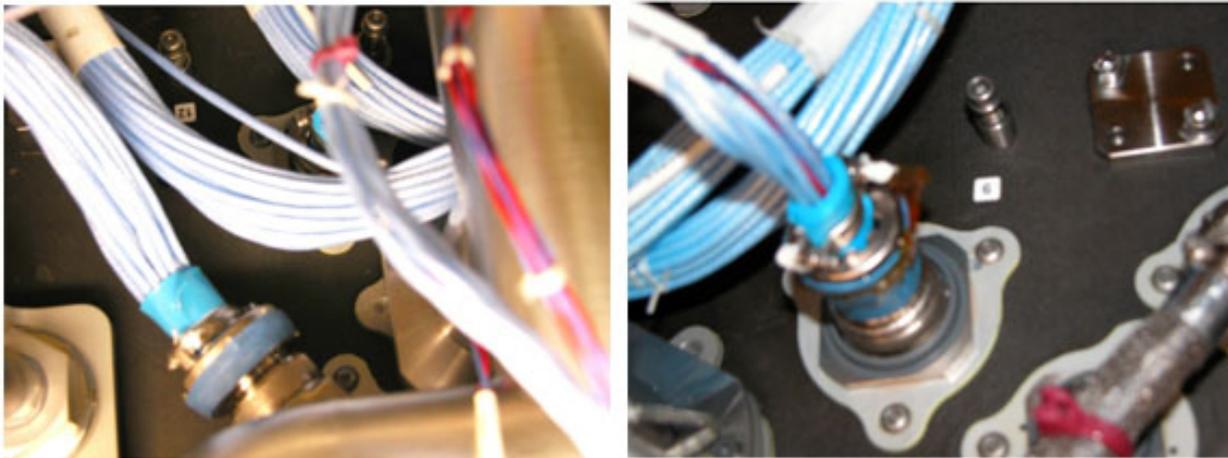


Figure 9. Bolts 9 to 12

- 3.3 Completely loosen captive rear fixation fasteners 1 to 12 except 6 and 8 as shown in Figures 6, 7, 8, 9 [Ratchet Wrench 3/8"; 6" Extension 1/4" Drive; Adaptor 3/8" Female to 1/4" Male and M5 (4 mm) Driver 1/4" Drive].
- 3.4 Completely loosen captive rear fixation fasteners 6 and 8 shown in Figure 6 and Figure 8 [Ratchet Wrench 3/8"; 6" Extension 1/4" Drive; Adaptor 3/8" Female to 1/4" Male; Universal Joint 1/4" and M5 (4 mm) Driver 1/4" Drive].
4. [INSTALLING REAR PANELS](#)

NOTE

For the following steps refer to Figures 1 and 2.

2.210 FSL REAR LAUNCH FIXATIONS REMOVAL

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 9 of 9 pages

Retrieve and replace L1, L2 and L3 panels (5/32" Hex Head Driver 1/4" Drive; Ratchet Wrench 1/4"). Torque all panel fasteners to 30 in-lb (5/32" Hex Head Driver 1/4" Drive; 2" Extension 1/4" Drive and 5-35 in-lbs Trq Driver, 1/4" Drive).

5. [TILTING THE RACK](#)

To rotate FSL up, perform [{1.202 COL ISPR ROTATION}](#), step 2 (SODF: ASSY OPS: ACTIVATION & CHECKOUT: COLUMBUS MODULE OUTFITTING), then:

6. [CLEANUP](#)

Stow tools and rear pins.

Update IMS with stowage location of rear pins or notify **COL-CC**.

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2.211 FSL FRONT LAUNCH FIXATIONS REMOVAL

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 6 pages

OBJECTIVE:

Preparation of FSL for nominal operations after the FSL on board installation.

DURATION:

30 minutes

CREW:

One

TOOLS:

ISS IVA Toolbox:

Drawer 2:

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

Columbus Toolkit:

Tool Bag 1:

Ratchet Wrench 1/4"

Tool Bag 2:

2" Extension 1/4" Drive

Tool Bag 3:

M5 (4 mm) Driver 1/4" Drive

M6 (5 mm) Driver 1/4" Drive

ITEMS

FSL Upper Latch - P/N FSL00049E

FSL Lower Latch - P/N FSL00050E

Kapton tape

Teflon tape

COL101 1. [FACILITY CORE ELEMENT LATCHES INSTALLATION](#)

NOTE

1. The Facility Core Element is composed of a main structure that contains the three optical modules (ODM, CEM Upper, CEM Lower)
2. The FSL Latches are needed to fix the Facility Core Element to the FSL Rack once in orbit. They must be removed before the experiment starts.



Figure 1. FSL Facility Core Element Latches

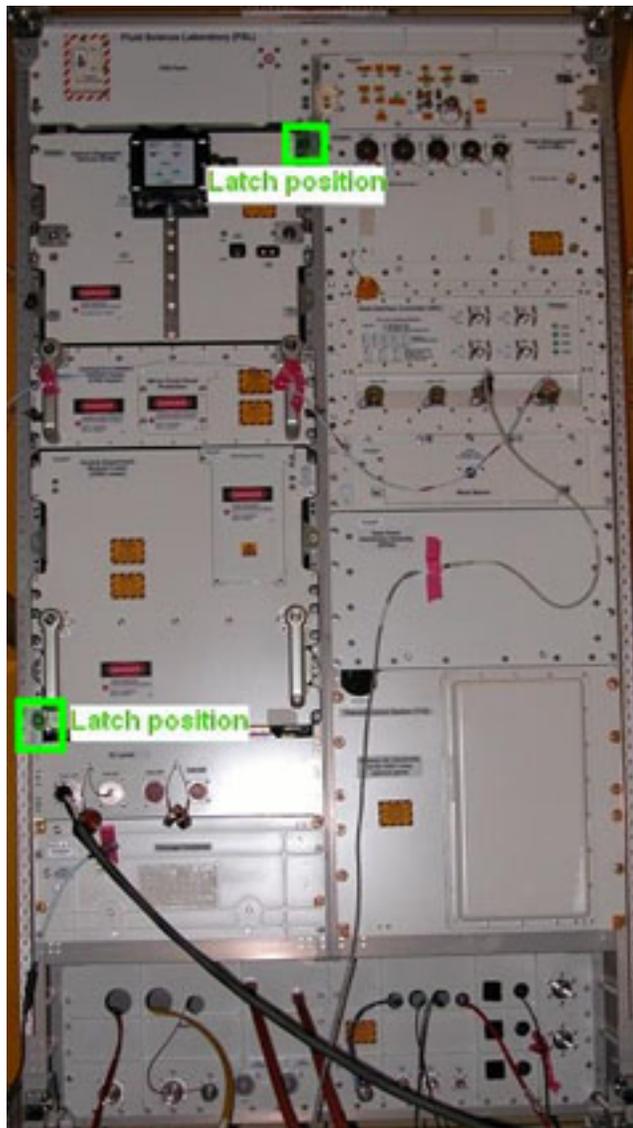


Figure 2. Latches Positions

Install the Facility Core Element latches per Figures 1 and 2 by screwing the top and bottom captive bolts and not exceeding the torque of 13 in-lbs (M5 (4 mm) Driver 1/4" Drive; 5-35 in-lbs Trq Driver, 1/4" Drive; 2" Extension 1/4" Drive).

Facility
 Core
 Element

2. DISENGAGEMENT OF THE CEM UPPER AND THE ODM

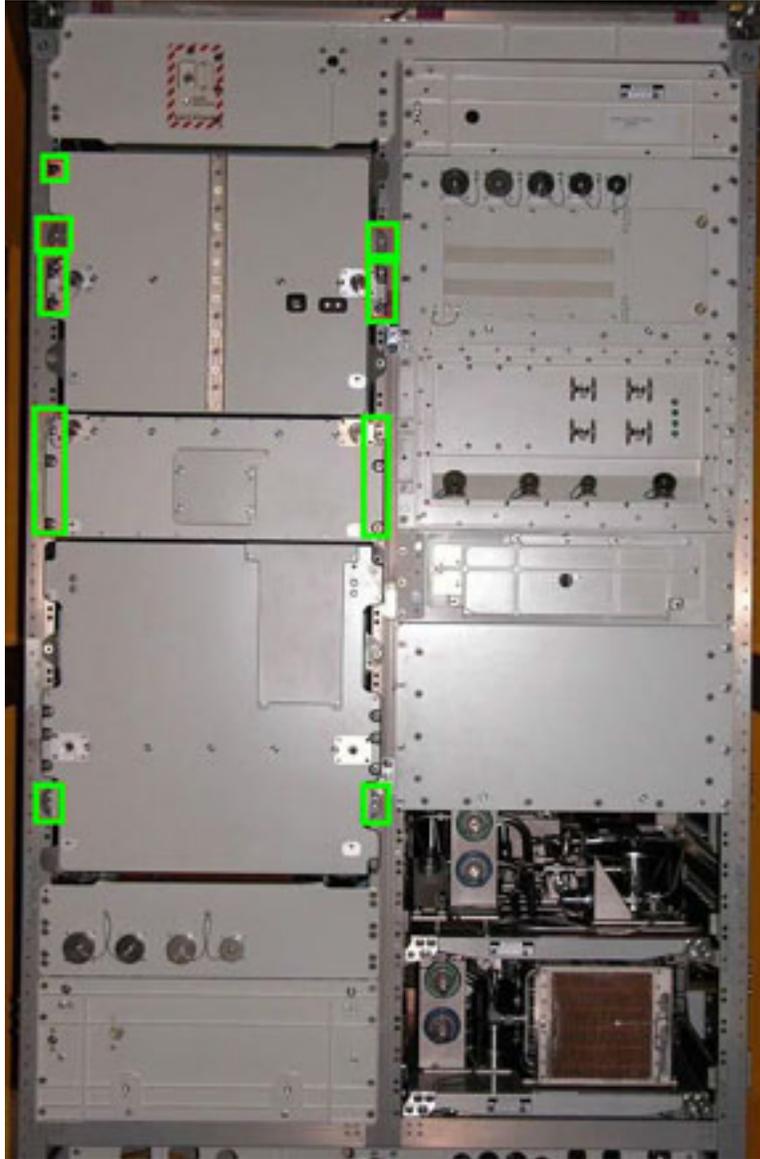


Figure 3. Facility Core Element Launch Fixations Bolts

Table 1. Facility Core Element Launch Fixations Bolts

Item	Number of Bolts
Facility Core Element	8
ODM	7
CEM Upper	8

NOTE

The bolts related to the CEM Lower remain tightened in this phase. This is required to maintain the CEM Lower Drawer fixed to the Facility Core Element structure. These bolts will be removed as soon as the handles are mounted on the CEM Lower Drawer.

Disengage the launch captive bolts (twenty-three) per Figure 3 (bolts enclosed in the green boxes) and Table 1 [M6 (5 mm) Driver 1/4" Drive and Ratchet Wrench 1/4"].

3. FACILITY CORE ELEMENT BOLT PROTECTION



Figure 4. Loose Bolt with Kapton Tape

Wrap the thread of the (seven) ODM front panel loose launch bolts with Teflon Tape.

Wrap the thread of the (eight) CEM Upper front panel loose launch bolts with Teflon Tape.

Wrap the thread of the (eight) Facility Core Element front panel loose launch bolts with Teflon Tape.

Wrap Kapton Tape around Teflon Tape and the head of the (seven) ODM front panel loose launch bolts.

Wrap Kapton Tape around Teflon Tape and the head of the (eight) CEM Upper front panel loose launch bolts.

Wrap Kapton Tape around Teflon Tape and the head of the (eight) Facility Core Element front panel loose launch bolts.

Stowage
Container

4.

STOWAGE CONTAINER DISENGAGEMENT

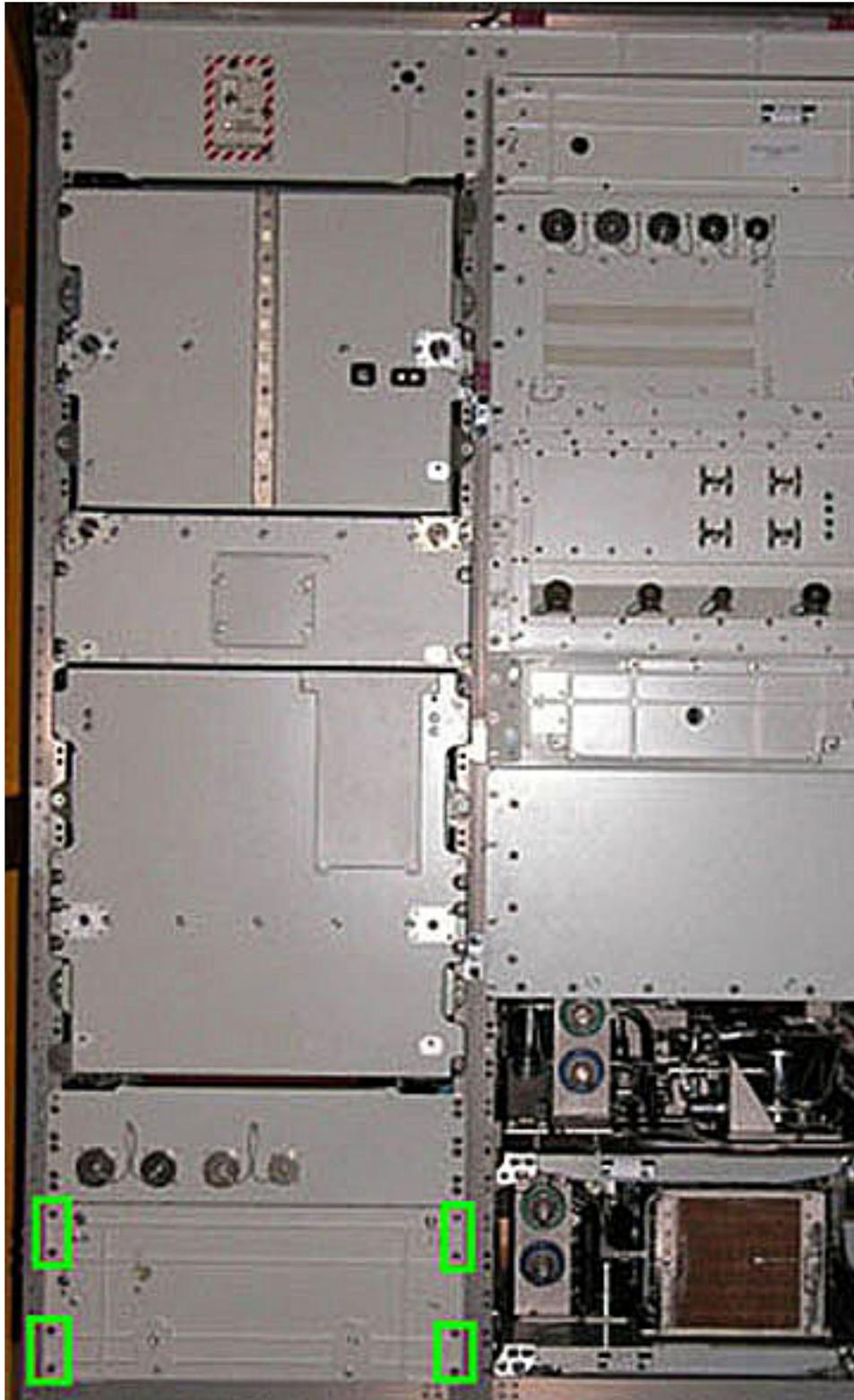


Figure 5. Stowage Container Launch Fixations Bolts

2.211 FSL FRONT LAUNCH FIXATIONS REMOVAL (ASSY PAYLOAD/1E/FIN/MULTI E) Page 6 of 6 pages

Unlock the (eight) MJ6 captive launch fixations bolts (enclosed in the green boxes in Figure 5) between the front panel of the stowage container and the rack front [M6 (5 mm) Driver 1/4" Drive and Ratchet Wrench 1/4"].

Wrap the thread of the (eight) released bolts with Teflon Tape.

Wrap Kapton Tape around Teflon Tape and the head of the (eight) released bolts.

Work Bench 5. [WORK BENCH DISENGAGEMENT](#)

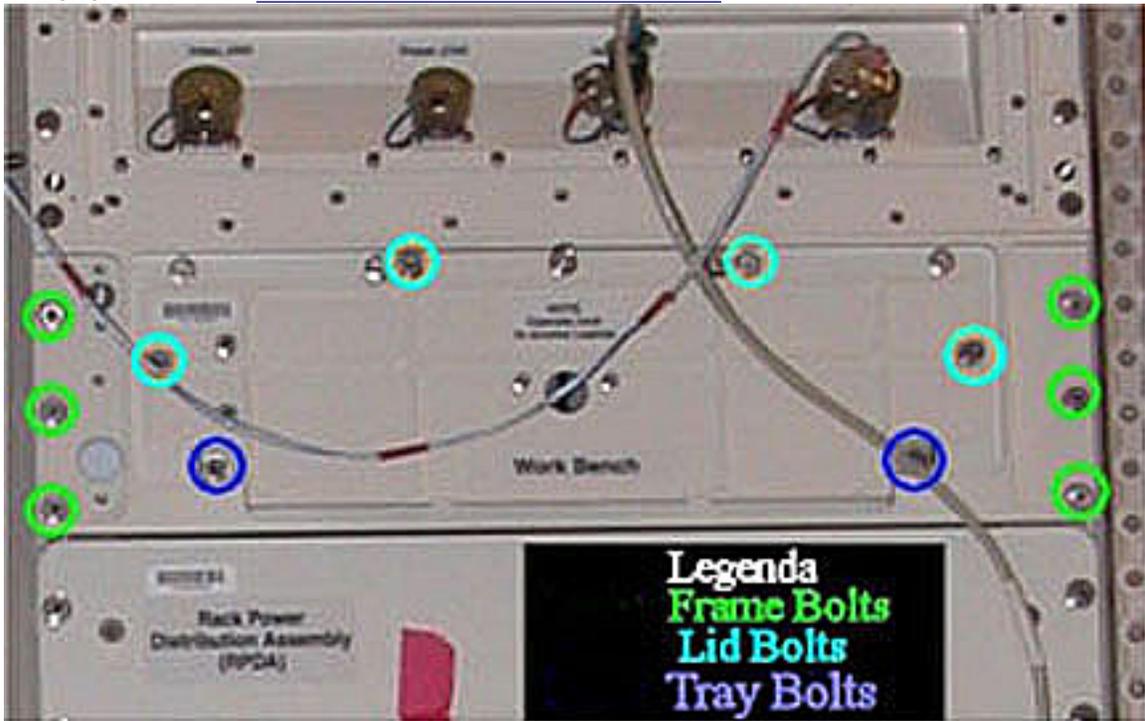


Figure 6. Work Bench Launch Fixations Bolts

Front launch captive bolts (twelve) enclosed in circles in Figure 6 → release (M6 (5 mm) Driver 1/4" Drive and Ratchet Wrench 1/4").

Wrap the thread of the (twelve) released bolts with Teflon Tape.

Wrap Kapton Tape around Teflon Tape and the head of the (twelve) released bolts.

6. [POST SETUP INSPECTION](#)

√ Facility Core Element and its Modules (ODM and CEM Upper) captive bolts – released and locked with tape

√ Stowage Container captive bolts (eight) – released and locked with tape

√ Work Bench captive bolts (twelve) – released and locked with tape

7. [CLEANUP](#)

Stow tools.

2.215 FSL FACILITY CORE ELEMENT UMBILICAL MODIFICATIONS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 20 pages

OBJECTIVE:

The aim of the present procedure is the reconfiguration of the umbilicals at the rear of the Facility Core Element to allow optimal operation of the MVIS subsystem (by decreasing the umbilical stiffness).

DURATION:

130 minutes

CREW:

Two (TBC)

TOOLS:

ISS IVA Toolbox

Drawer 2:

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

Drawer 4:

Wire Cutters

Drawer 5:

8-1/4" Long, 2" Cut Scissors

Columbus Toolkit

Tool Bag 1:

Ratchet Wrench 1/4" Drive

Tool Bag 2:

Driver Handle 1/4" Drive

2" Extension 1/4" Drive

Tool Bag 3:

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

ITEMS:

Nikon D1 Camera with a F=17-35 mm lens (TBC)

NIKON SB 28DX Flash (TBC)

Vacuum Cleaner

COL101 1. REMOVING FSL REAR PANELS

R1	L1
R2	L2
R3	L3
R4	L4

Figure 1. FSL Rear Panels Scheme

Remove the FSL rear panel L4 by unfastening all (thirty-six) captive bolts (5/32" Hex Head Driver 1/4" Drive and Driver Handle 1/4" Drive). Refer to Figure 1.

L4 panel→ Temporarily stow.

Remove the FSL rear panel L1 by unfastening all (sixteen) captive bolts (5/32" Hex Head Driver 1/4" Drive and Driver Handle 1/4" Drive). Refer to Figure 1.

L1 panel→ Temporarily stow.

Remove the FSL rear panel L2 by unfastening all (thirty-five) captive bolts (5/32" Hex Head Driver 1/4" Drive and Driver Handle 1/4" Drive). Refer to Figure 1.

L2 panel→ Temporarily stow.

Remove the FSL rear panel L3 by unfastening all (forty-eight) captive bolts (5/32" Hex Head Driver 1/4" Drive and Driver Handle 1/4" Drive). Refer to Figure 1.

L3 panel→ Temporarily stow.

2. HMU306 AND HMU307 MODIFICATIONS

NOTE

The HMU306 mentioned in this step is related to VMU-P306 to ODM-P301 umbilicals.

The HMU307 mentioned in this step is related to VMU-P307 to ODM-P302 umbilicals.

2.215 FSL FACILITY CORE ELEMENT UMBILICAL MODIFICATIONS
(ASSY PAYLOAD/1E/FIN/MULTI E) Page 3 of 20 pages



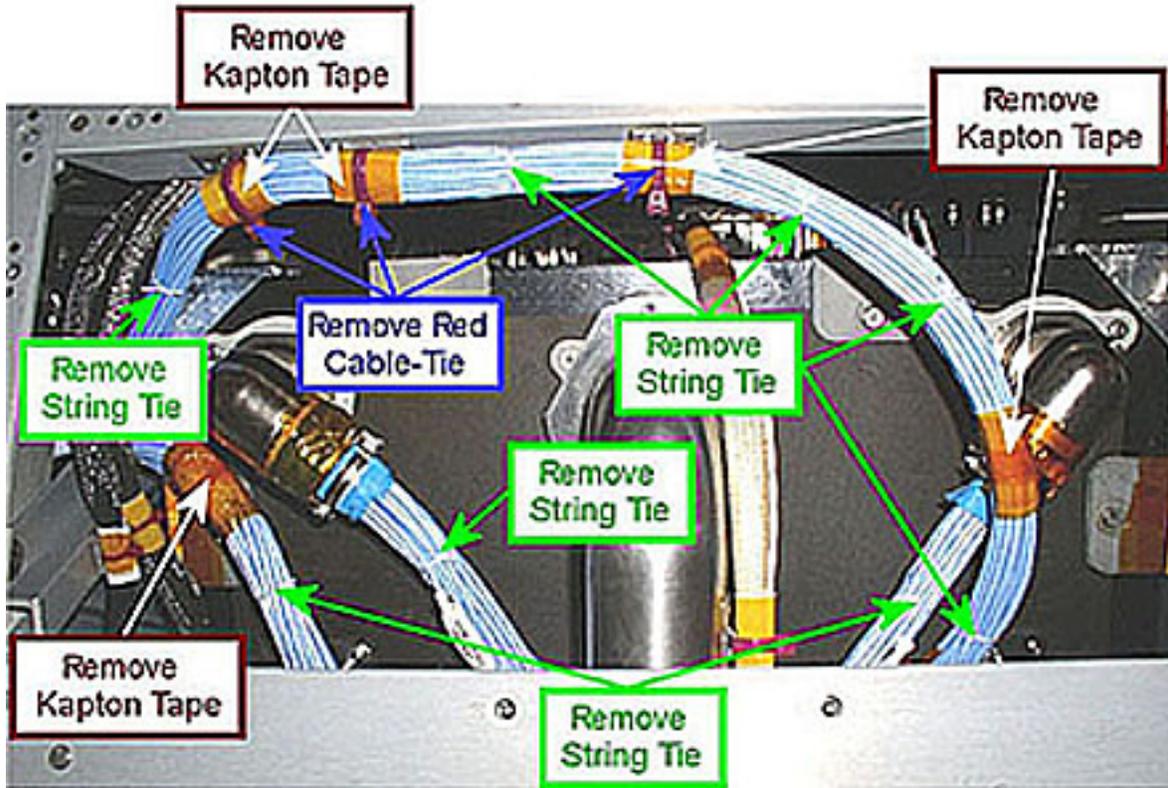


Figure 2. HMU306 and HMU307 Bundles

2.215 FSL FACILITY CORE ELEMENT UMBILICAL MODIFICATIONS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 5 of 20 pages

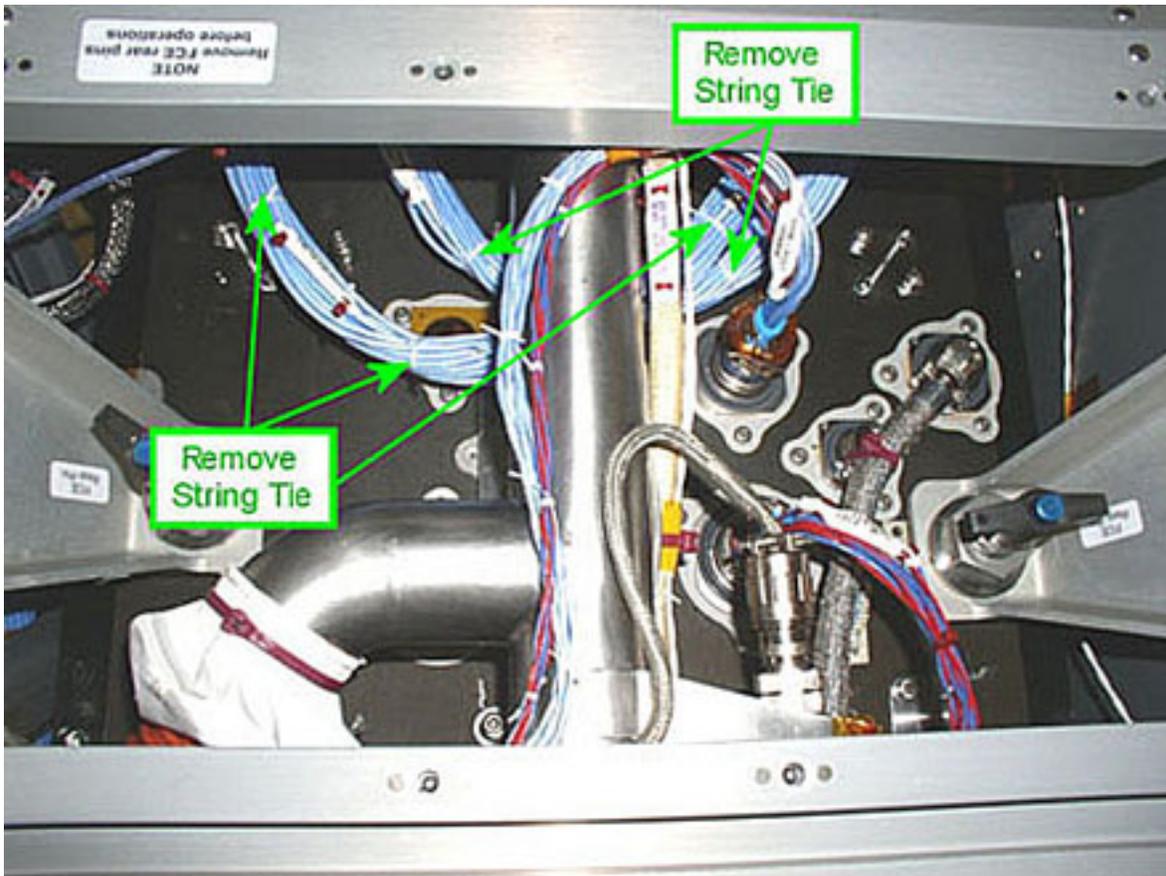


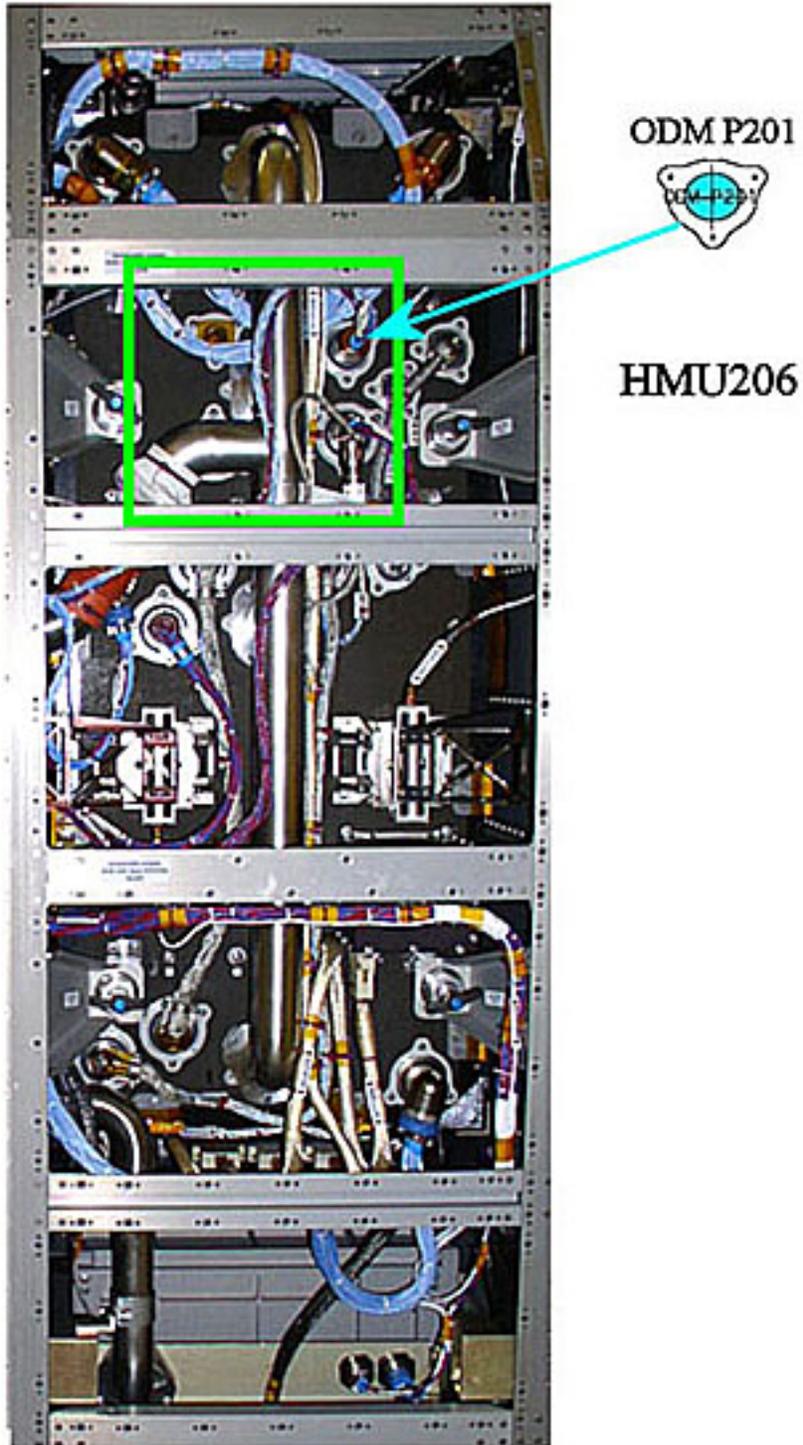
Figure 3. HMU306 and HMU307 Bundles Viewed From Below

- CM1
- Red Cable-Ties (three) on HMU307, as shown in Figure 2 → Remove (Wire Cutter)
 - String Ties on HMU307 as shown in Figure 2 → Remove (Wire Cutter)
 - Kapton Tapes (five) as shown in Figure 2 → Peel off (by hand)
 - String Ties on HMU306, as shown in Figure 2 → Remove (Wire Cutter)
 - String Ties on HMU306 and HMU307 as shown in Figure 3 → Remove (Wire Cutter)
 - Verify by inspection both the affected cables and the nearby ones – not damaged
- CM2
- If debris is visible
 - Remove debris (Vacuum Cleaner)
 - Take a picture of FSL rear zones shown in Figures 2 and 3 after completion of Umbilicals reconfiguration.

3. HMU206 MODIFICATIONS

NOTE

The HMU206 mentioned in this step is related to RIC-P206 to ODM-P201 Umbilicals.



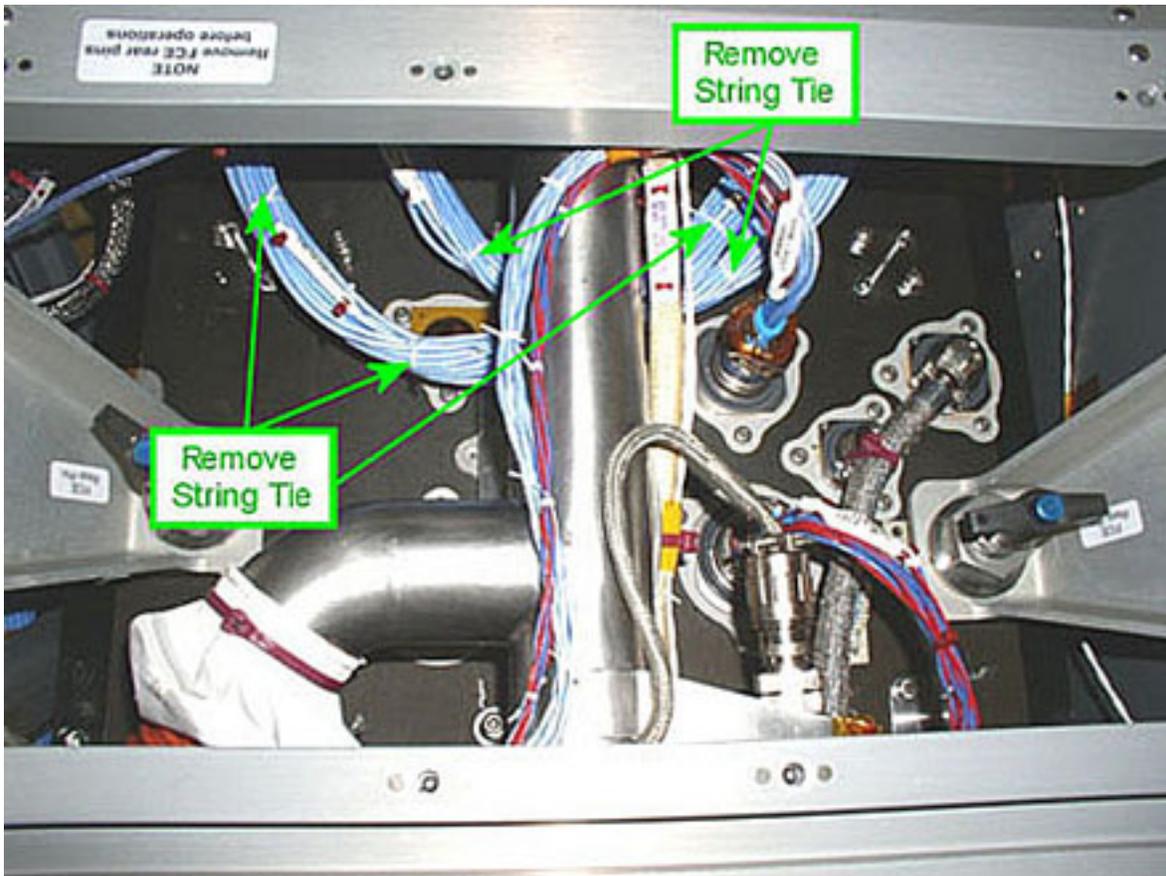


Figure 4. HMU206 Bundle

CM1

String Ties as shown in Figure 4 → Remove (Wire Cutter)

Kapton Tape, as shown in Figure 4 → Peel off (by hand)

Red Cable-Ties (two) shown in Figure 4 → Remove (Wire Cutter)

Verify by inspection both the affected cables and the nearby ones – not damaged

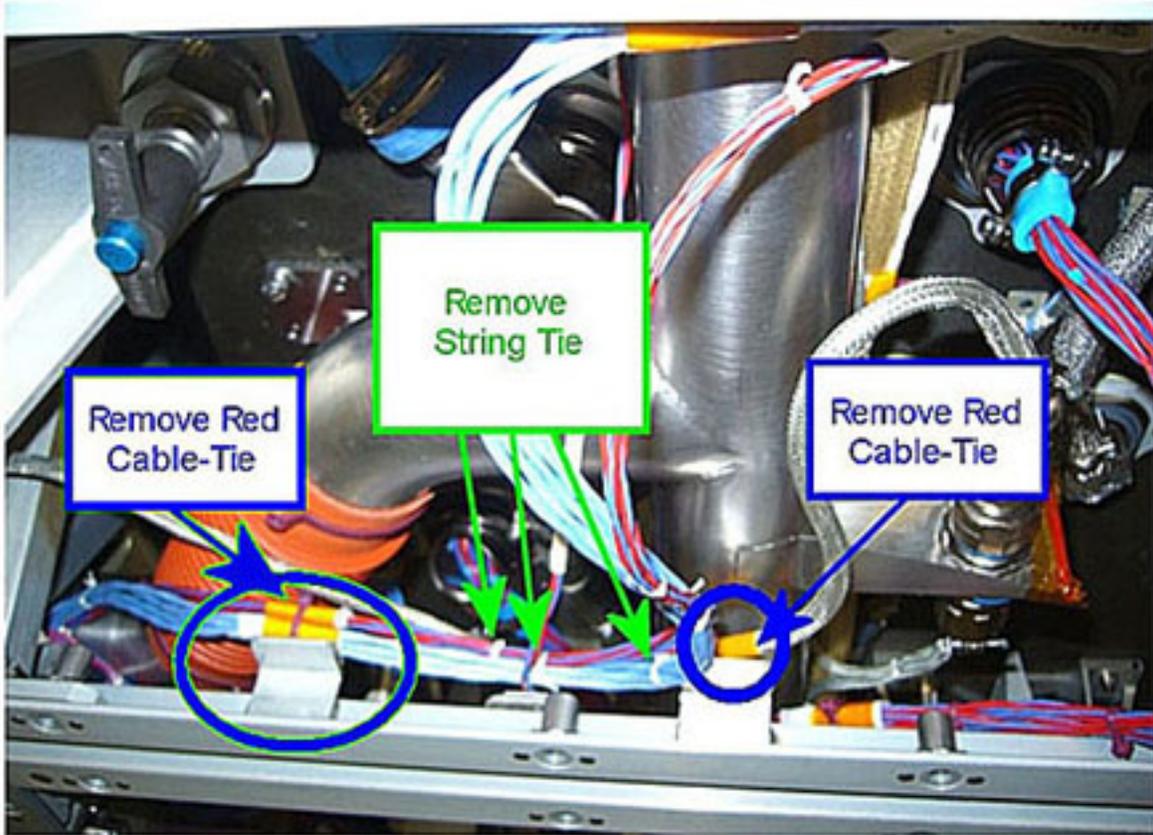


Figure 5. HMU206 Red Cable-Tie to the Structure

Red Cable-Tie to the structure shown in Figure 5 (left blue circle) → Remove (Wire Cutter)

Kapton Tape under the Red Cable-Tie shown in Figure 5 (left blue circle) → Peel off (by hand)

String Ties (three) as shown in Figure 5 → Remove (Wire Cutter)

Red Cable-Tie holding the AAA outlet temperature sensor umbilical (right blue circle in Figure 5) → Remove (Wire Cutter)

Kapton Tape under the Red Cable-Tie shown in Figure 5 (blue circle) → Peel off (by hand)

Verify by inspection both the affected cables and the nearby ones – not damaged

CM2

If debris is visible

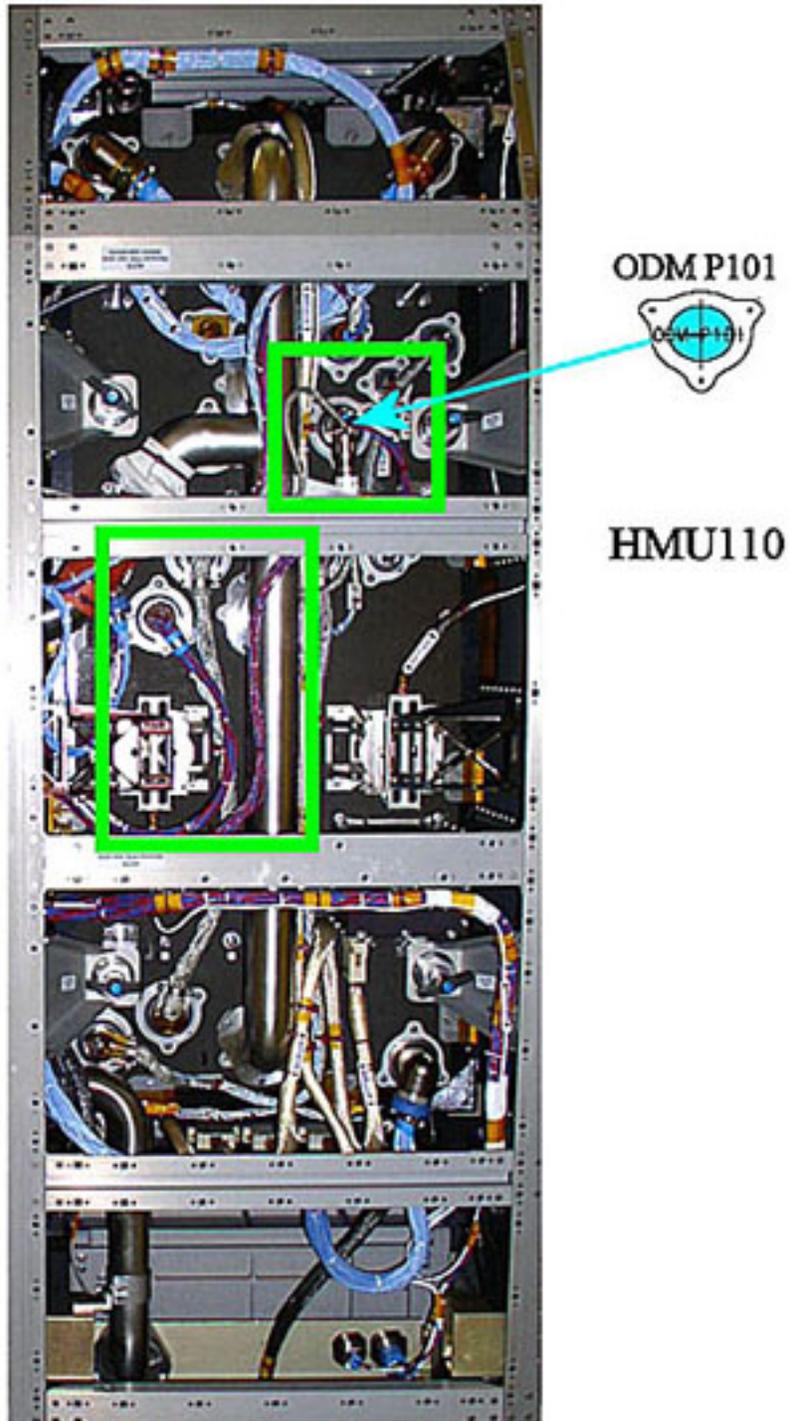
Remove debris (Vacuum Cleaner)

Take a picture of FSL rear zones shown in Figures 4 and 5 after completion of Umbilicals reconfiguration.

4. [HMU110 MODIFICATIONS](#)

NOTE

The HMU110 mentioned in this step is related to RPDA-P110 to ODM-P101 Umbilicals.



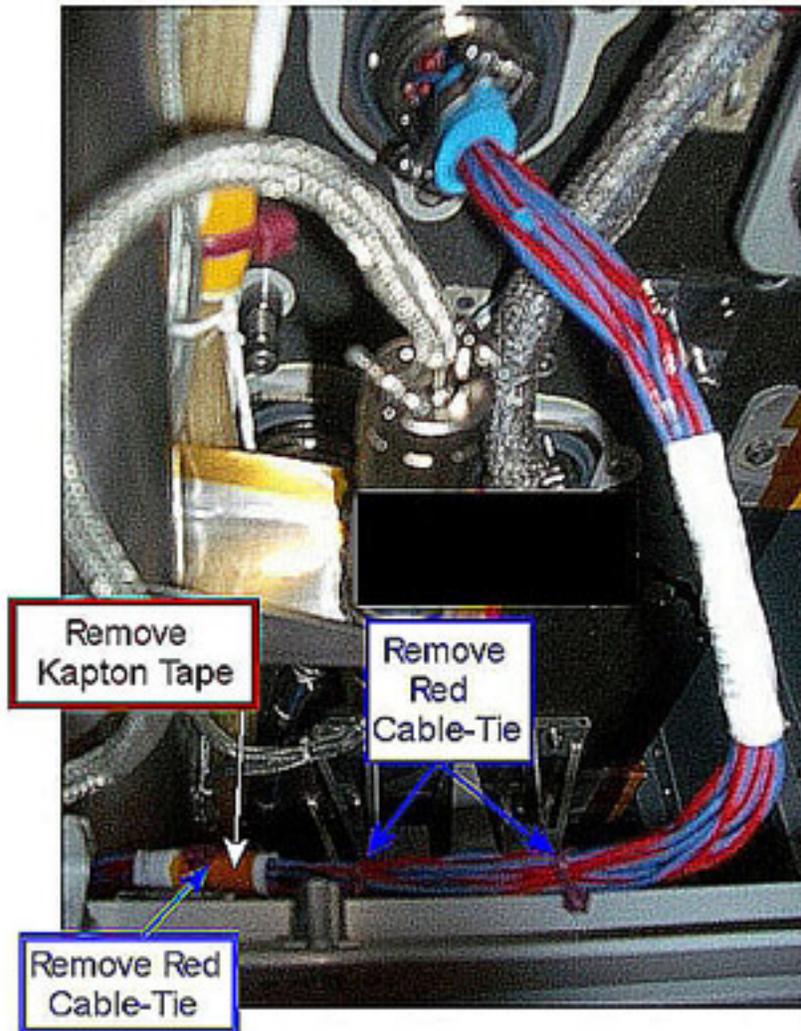


Figure 6. HMU110 Bundle

CM1 Red Cable-Ties (three) as shown in Figure 6 → Remove (Wire Cutter)

Kapton Tape shown in Figure 6 → Peel off (by hand).

Verify by inspection both the affected cables and the nearby ones – not damaged

CM2 If debris is visible

Remove debris (Vacuum Cleaner)

Take a picture of FSL rear zones shown in Figure 6 after completion of Umbilicals reconfiguration.

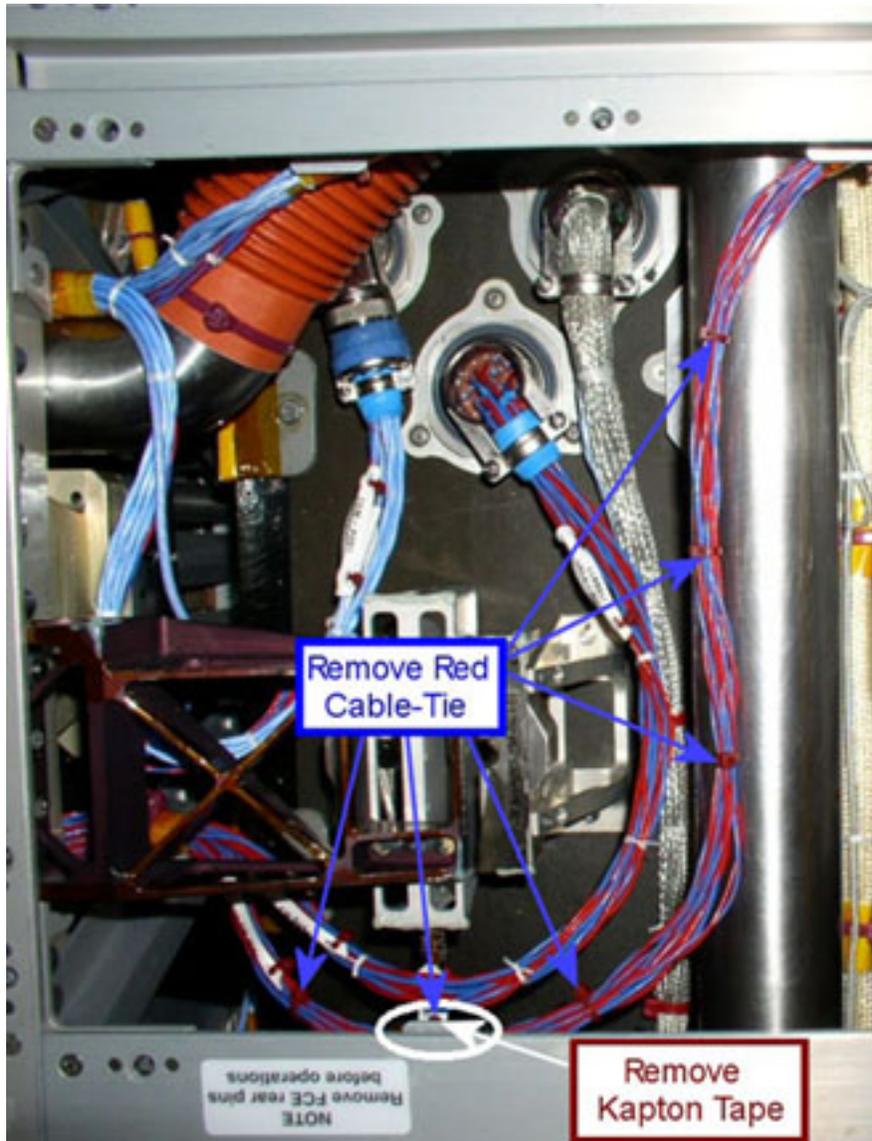


Figure 7. HMU110

CM1 Red Cable-Ties on the bundle and one Red Cable-Tie to the structure (see the white ellipse in Figure 7) → Remove (Wire Cutter)

Kapton Tape under the Red Cable-Tie shown in Figure 7 (see the white ellipse) → Peel off (by hand).

Verify by inspection both the affected cables and the nearby ones – not damaged

CM2

If debris is visible

Remove debris (Vacuum Cleaner)

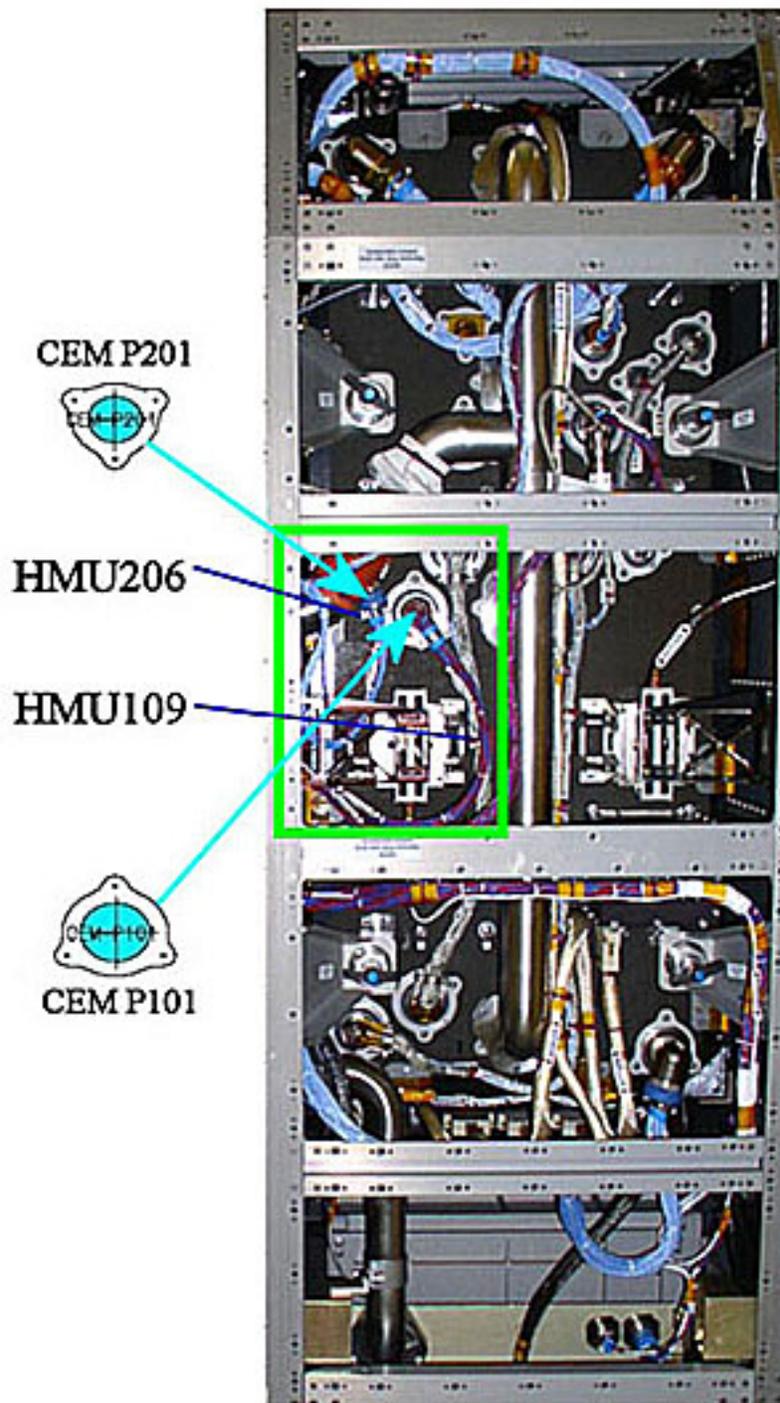
Take a picture of FSL rear zones shown in Figure 7 after completion of Umbilicals reconfiguration.

5. [HMU109 AND HMU206 MODIFICATIONS](#)

NOTE

The HMU109 mentioned in this step is related to RPDA-P109 to CEM-P101 Umbilicals.

The HMU206 mentioned in this step is related to RIC-P206 to CEM-P201 Umbilicals.



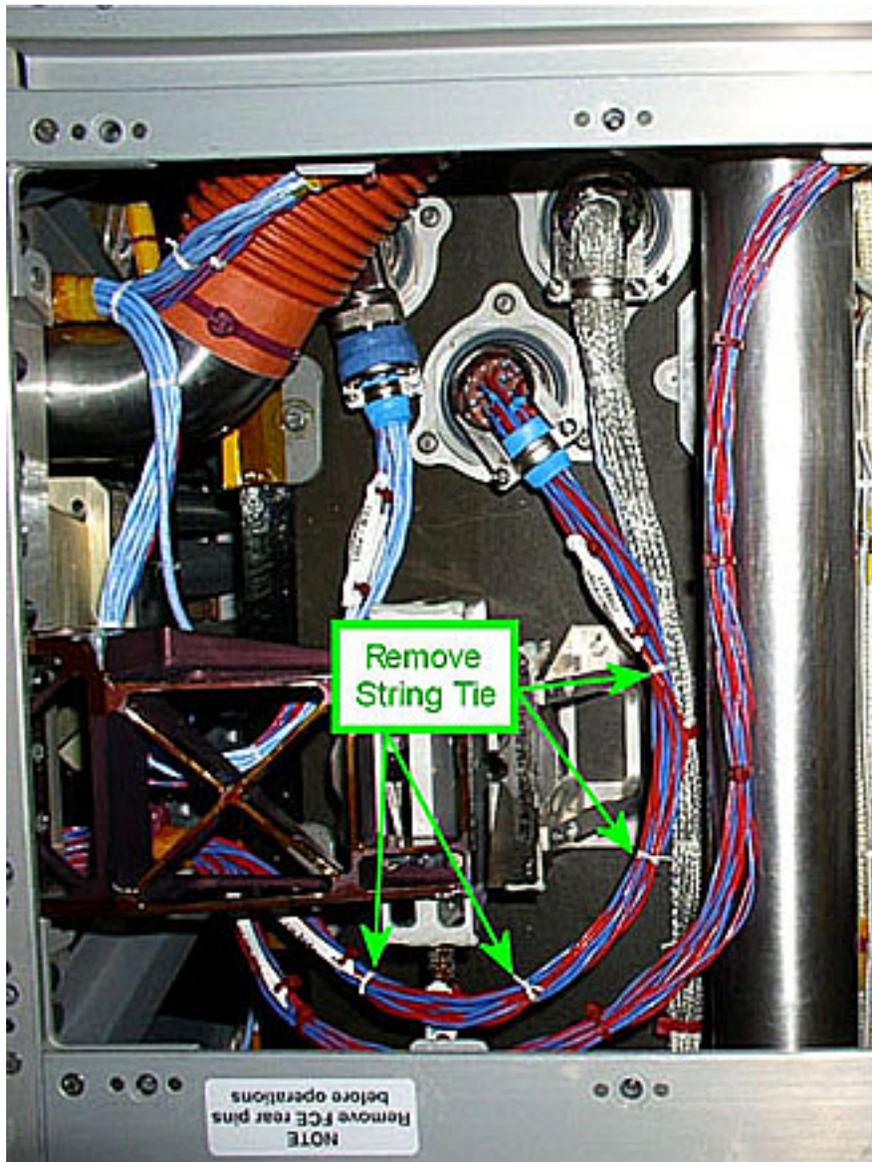


Figure 8. HMU109 Bundle

CM1

String Ties, as shown in Figure 8 → Remove (Wire Cutter)

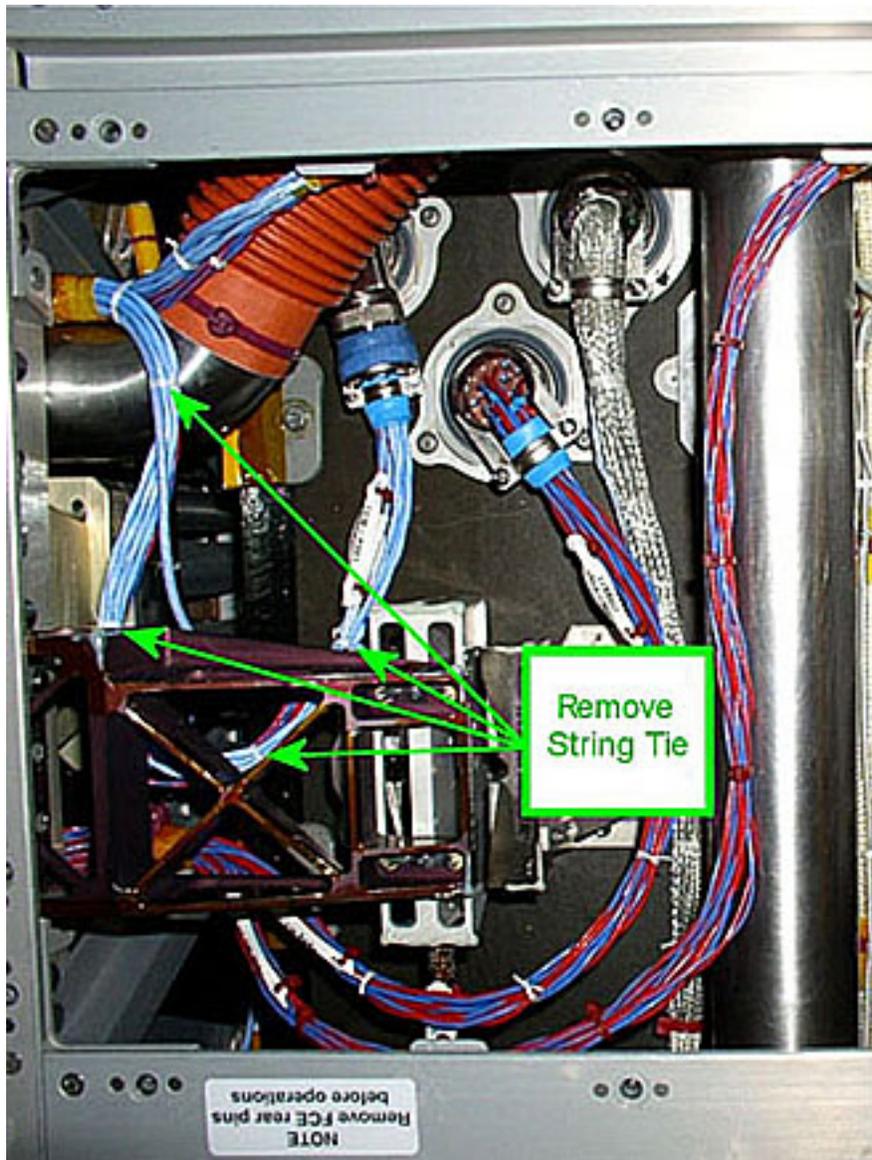


Figure 9. HMU206 Bundle

String Ties as shown in Figure 9 → Remove (Wire Cutter)

Verify by inspection both the affected cables and the nearby ones – not damaged

CM2

If debris is visible

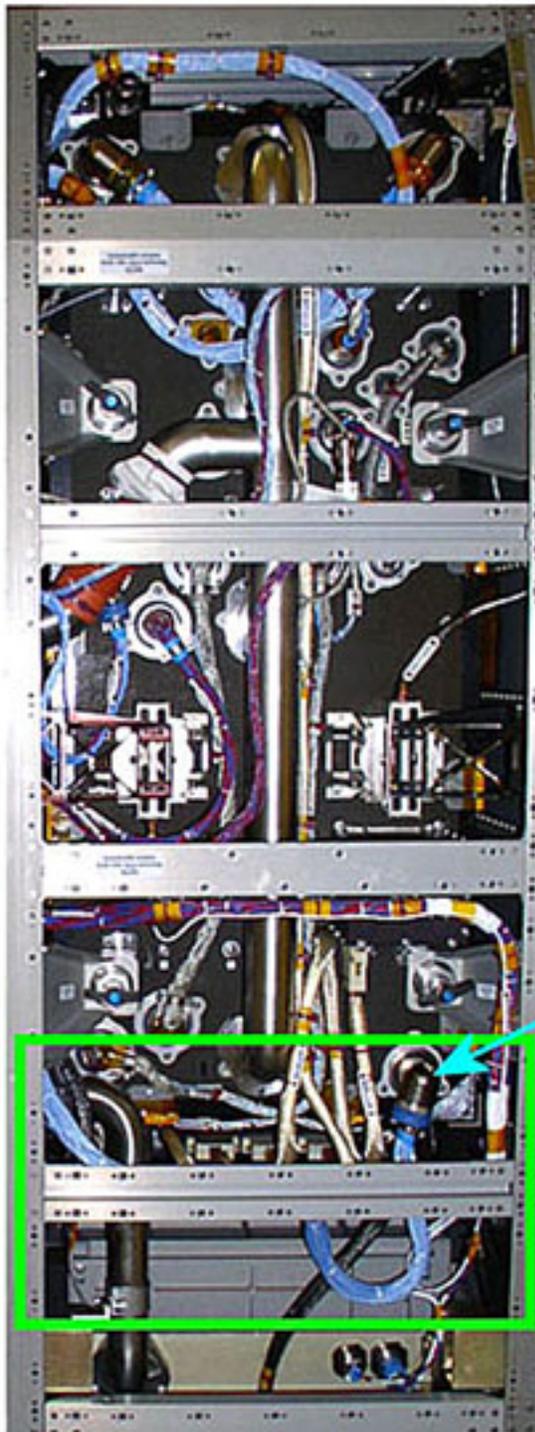
Remove debris (Vacuum Cleaner)

Take a picture of FSL rear zones shown in Figure 8 after completion of Umbilicals reconfiguration.

6. HMU305 MODIFICATIONS

NOTE

The HMU305 mentioned in this step is related to VMU-P305 to CEM-P301 Umbilicals.



CEM P301



HMU305

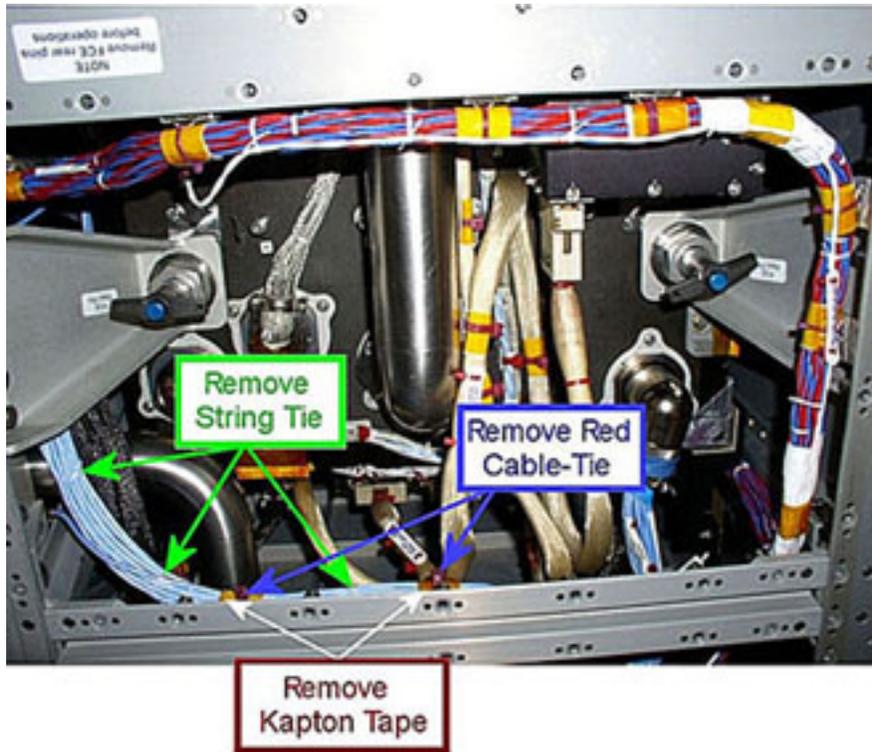


Figure 10. HMU305 Bundle - View 1

CM1 Red Cable-Ties (two) shown in Figure 10 → Remove (Wire Cutter)

Kapton tapes (two) shown in Figure 10 → Peel off (by hand).

String Ties (three) shown in Figure 10 → Remove (Wire Cutter)

Verify by inspection both the affected cables and the nearby ones – not damaged

CM2 If debris is visible

Remove debris (Vacuum Cleaner)

Take a picture of FSL rear zones shown in Figure 10 after completion of Umbilicals reconfiguration.

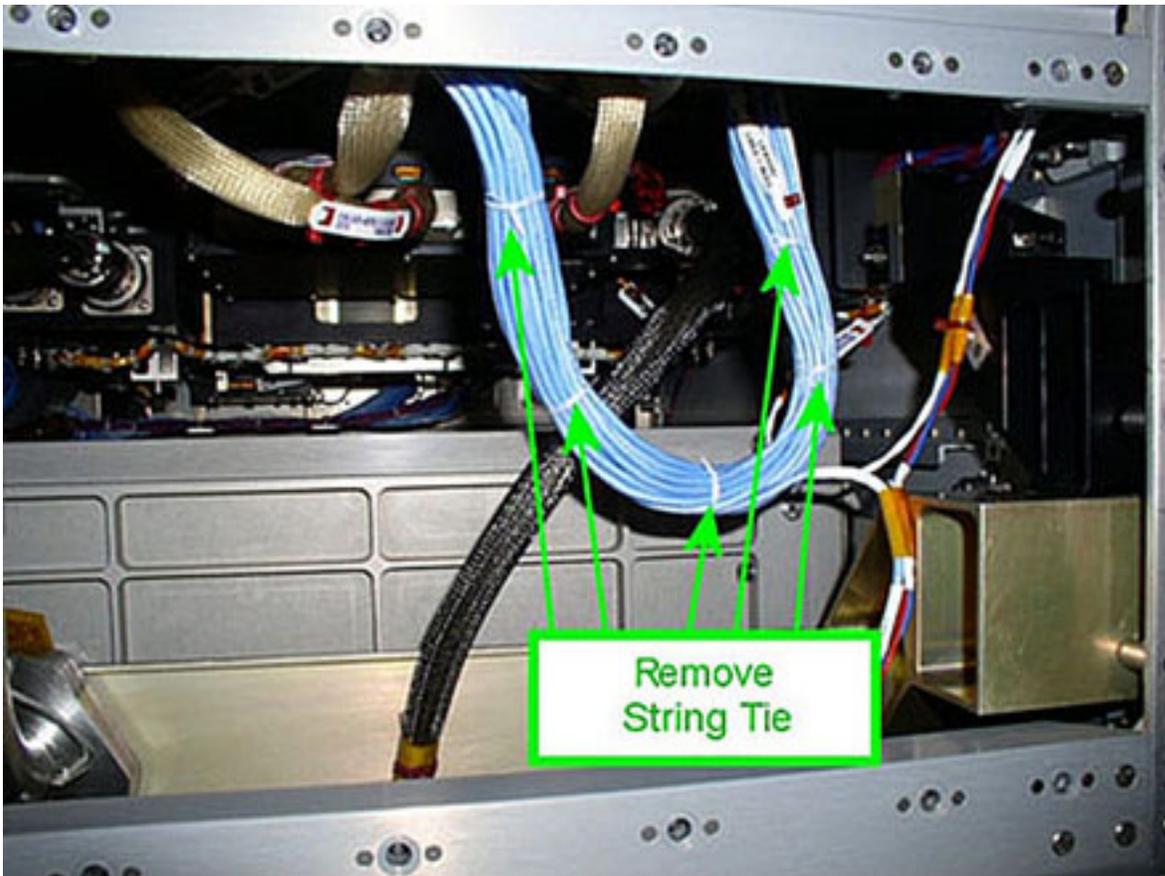


Figure 11. HMU305 Bundle - View 2

CM1

String Ties as shown in Figure 11 → Remove (Wire Cutter)

Inspect HMU305 bundle for the presence of additional String Ties.

Additional String Ties → Remove (Wire Cutter)

Verify by inspection both the affected cables and the nearby ones – not damaged

CM2

If debris is visible

Remove debris (Vacuum Cleaner)

Take a picture of FSL rear zones shown in Figure 11 after completion of Umbilicals reconfiguration.

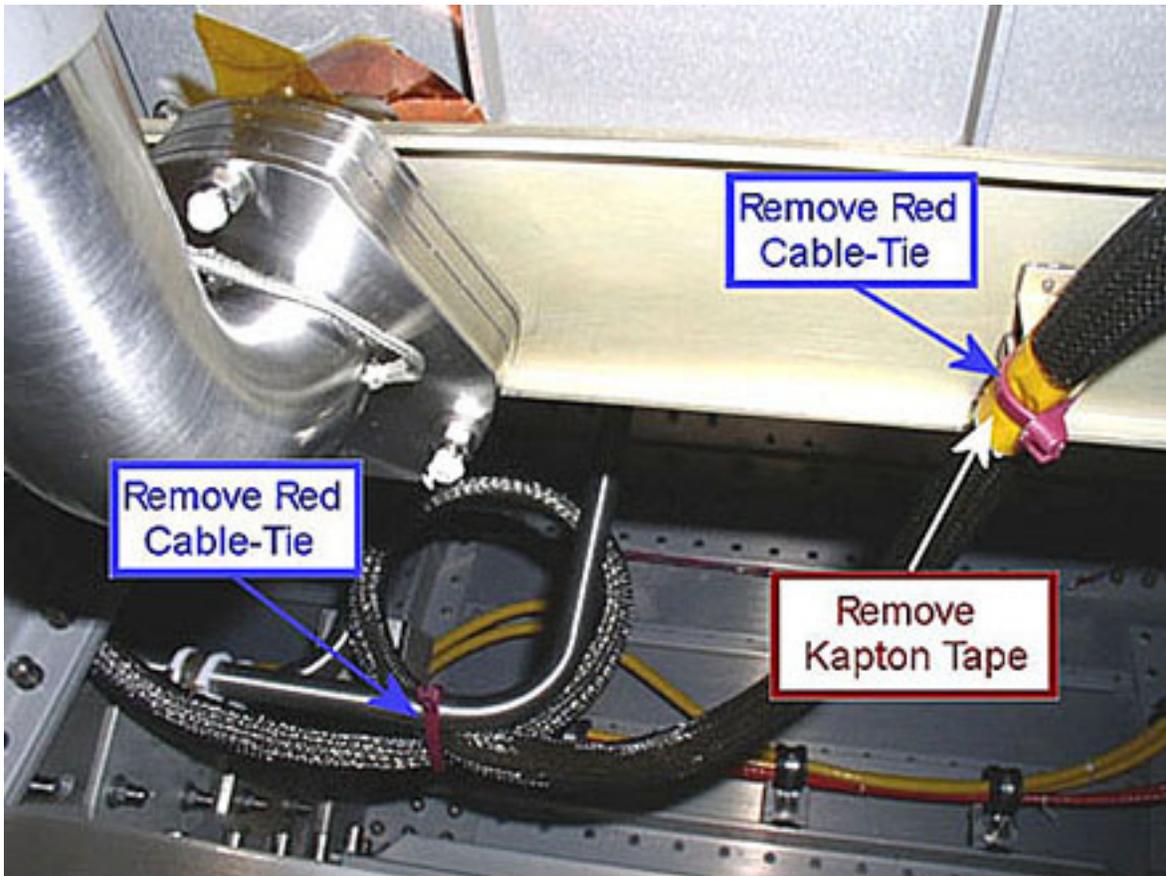


Figure 12. MVIS Umbilical

- CM1 Red Cable-Ties shown in Figure 12 → Remove (Wire Cutter)
- Kapton Tape shown in Figure 12 → Peel off (by hand).
- CM2 If debris is visible
| Remove debris (Vacuum Cleaner)
- Take a picture of FSL rear zones shown in Figure 12 after completion of Umbilicals reconfiguration.
7. FANNING OUT THE UMBILICALS
- CM1 Fan out the umbilicals to further reduce their stiffness.
- √by inspection Umbilicals – not rubbing onto the FSL structure, other cables or assemblies
- √by inspection Umbilicals – not reducing the Facility Core Element rattle space

2.215 FSL FACILITY CORE ELEMENT UMBILICAL MODIFICATIONS

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 20 of 20 pages

8. INSTALLING REAR PANEL

CAUTION

Once the Red Cable-Ties removed, in 0-g the bundle cables will tend to fan out and the overall envelope of each bundle will "swell". Due to the limited volume available and to the number and position of the affected cables, the rear will be severely reduced by the distribution of loose cables in the area, which may increase the risk to damage the cables in the rear panels closeout. Cable damage may seriously affect FSL subsystems proper functioning.

√ by inspection cables – not protruding out

Replace L4 panel (5/32" Hex Head Driver 1/4" Drive; Ratchet Wrench 1/4" Drive). Torque all panel fasteners to 30 in-lb (5/32" Hex Head Driver 1/4" Drive; 2" Extension 1/4" Drive and 5-35 in-lbs Trq Driver, 1/4" Drive).

Replace L1 panel (5/32" Hex Head Driver 1/4" Drive; Ratchet Wrench 1/4" Drive). Torque all panel fasteners to 30 in-lb (5/32" Hex Head Driver 1/4" Drive; 2" Extension 1/4" Drive and 5-35 in-lbs Trq Driver, 1/4" Drive).

Replace L2 panel (5/32" Hex Head Driver 1/4" Drive; Ratchet Wrench 1/4" Drive). Torque all panel fasteners to 30 in-lb (5/32" Hex Head Driver 1/4" Drive; 2" Extension 1/4" Drive and 5-35 in-lbs Trq Driver, 1/4" Drive).

Replace L3 panel (5/32" Hex Head Driver 1/4" Drive; Ratchet Wrench 1/4" Drive). Torque all panel fasteners to 30 in-lb (5/32" Hex Head Driver 1/4" Drive; 2" Extension 1/4" Drive and 5-35 in-lbs Trq Driver, 1/4" Drive).

9. CLEANUP

Tools→ stow.

2.240 FSL LAPTOP SETUP AND ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 7 pages

OBJECTIVE:

This procedure illustrates the steps to deploy the Work Bench tray, install the FSL Laptop on tray, connect the Laptop to FSL and to activate the FSL software.

DURATION:

Laptop setup and activation: 5 minutes.

CREW:

One

TOOLS:

None

ITEMS

FSL Laptop

LAN CABLE

SVIDEO CABLE

Enhanced A31p 16 VDC Power Cable

DC Power 28 VDC Cable

Power Converter

COL101 1. WORK BENCH TRAY DEPLOYMENT

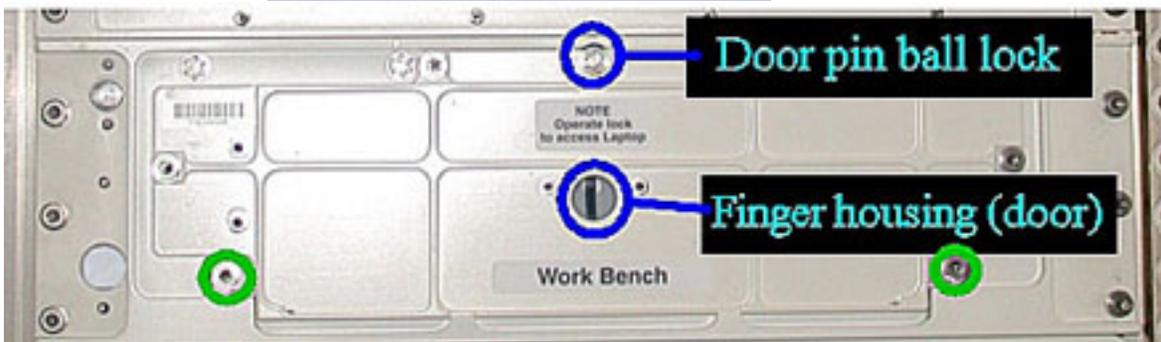


Figure 1. Door Opening and Tray Deployment

2.240 FSL LAPTOP SETUP AND ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 2 of 7 pages

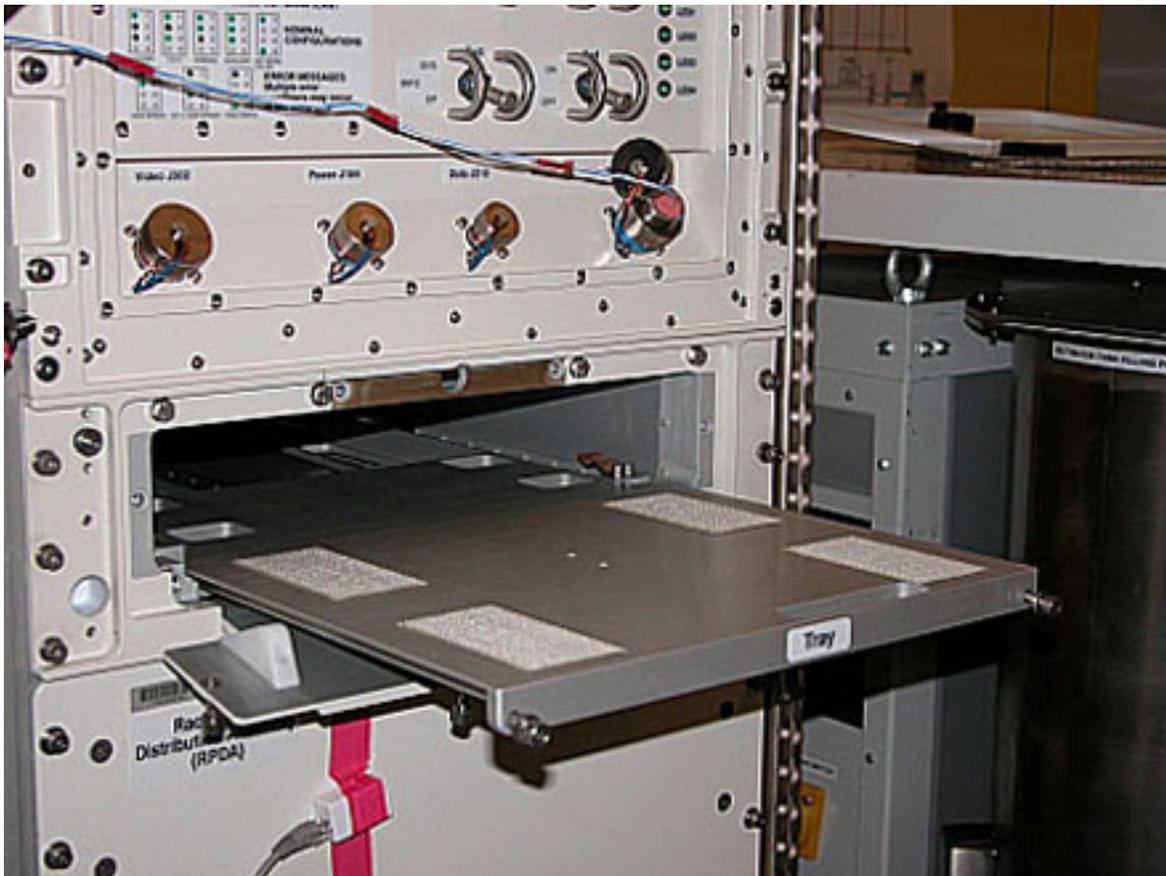


Figure 2. Tray Deployed

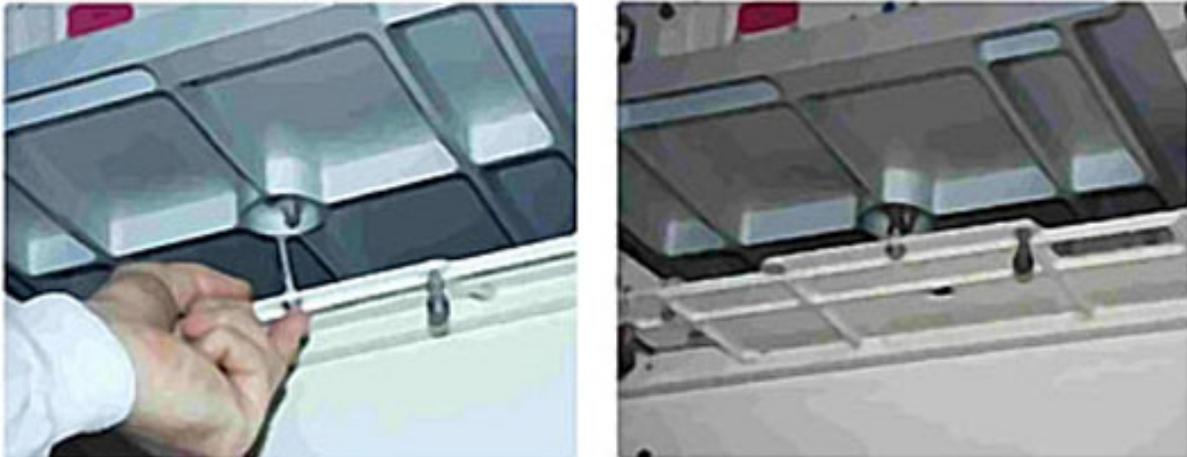


Figure 3. Work Bench Door Pin Ball Lock Fixation

√Work Bench Tray launch fixation captive bolts (two) – loose (green circles in Figure 1).

Activate the Work Bench Door Pinball Lock with help of fingertip housing (Figure 1).

2.240 FSL LAPTOP SETUP AND ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 3 of 7 pages

Fold Work Bench Door up to reach the mechanical stop.

Extract fully the Work Bench tray until hard stop (Figure 1 and Figure 2).

Secure the Work Bench Tray and the Work Bench Door activating the Door Pinball Lock (with help of the fingertip housing) and introducing it in the dedicated hole located on the Work Bench Tray lower side, as shown in Figure 3.

2. [FSL LAPTOP SETUP](#)

2.1 [Verifying Power Line to Laptop is Disabled](#)

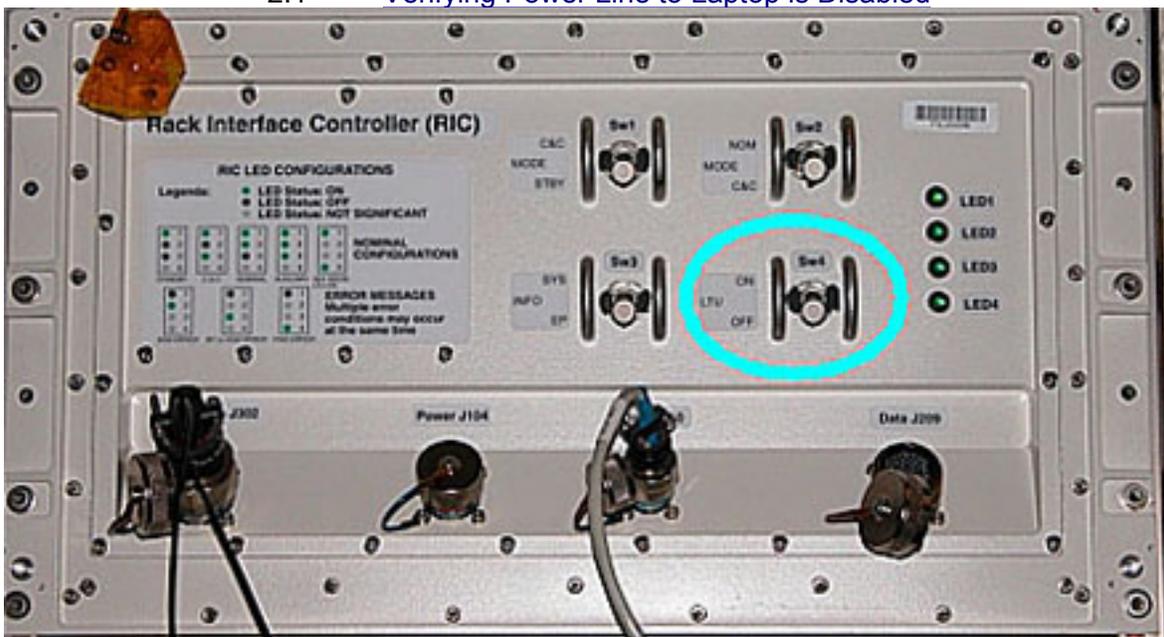


Figure 4. RIC

RIC √Sw4 – OFF (Refer to the blue circle in Figure 4)

Verify LED4 – ■

2.240 FSL LAPTOP SETUP AND ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 4 of 7 pages

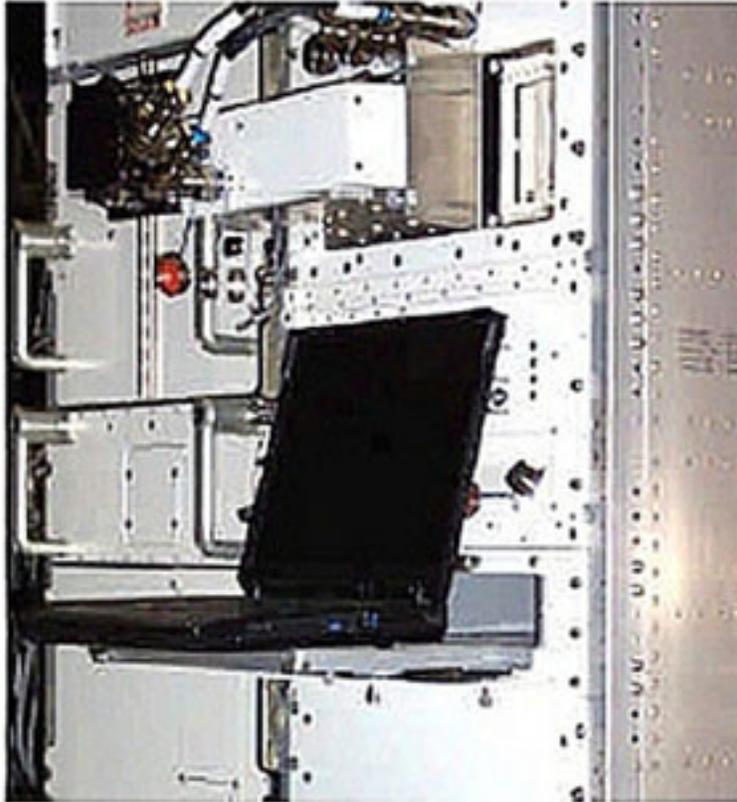


Figure 5. FSL Laptop in Operational Configuration

NOTE

The FSL Laptop is stowed in an initial location at launch. After the FSL Initial Setup it will be stowed in the Work Bench housing on the Work Bench tray.

2.2 [FSL Laptop installation on the Work Bench Tray](#)

Verify FSL Laptop – not damaged (by visual inspection)

Remove the FSL Laptop and the utilities from packaging.

Position the FSL Laptop on the Work Bench tray in operational position (Figure 5 but do not open the laptop cover) .

√Velcro strips adhere properly

2.240 FSL LAPTOP SETUP AND ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 5 of 7 pages

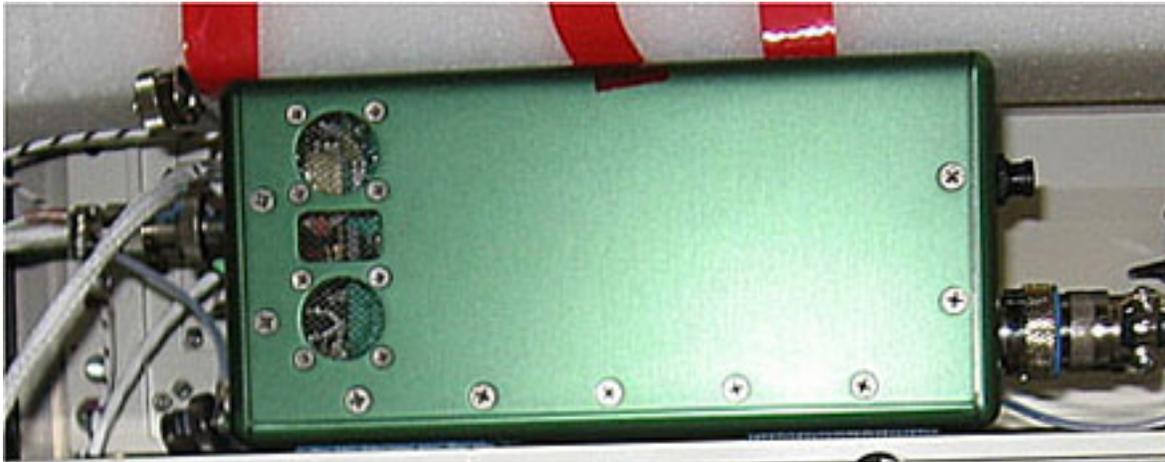


Figure 6. FSL Laptop Power Converter

NOTE

Velcro strips must be attached to the Power Converter and the RPDA front panel only the first time this procedure is executed.

If it is the first time this procedure is executed

Attach Velcro to the Power Converter.

Attach Velcro to the RPDA front panel.

Attach the Power Converter to the Velcro on the RPDA front panel.

√Velcro strips adhere properly

2.3 Connecting the FSL Laptop to the RIC



Figure 7. FSL Laptop Rear

2.240 FSL LAPTOP SETUP AND ACTIVATION

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 6 of 7 pages

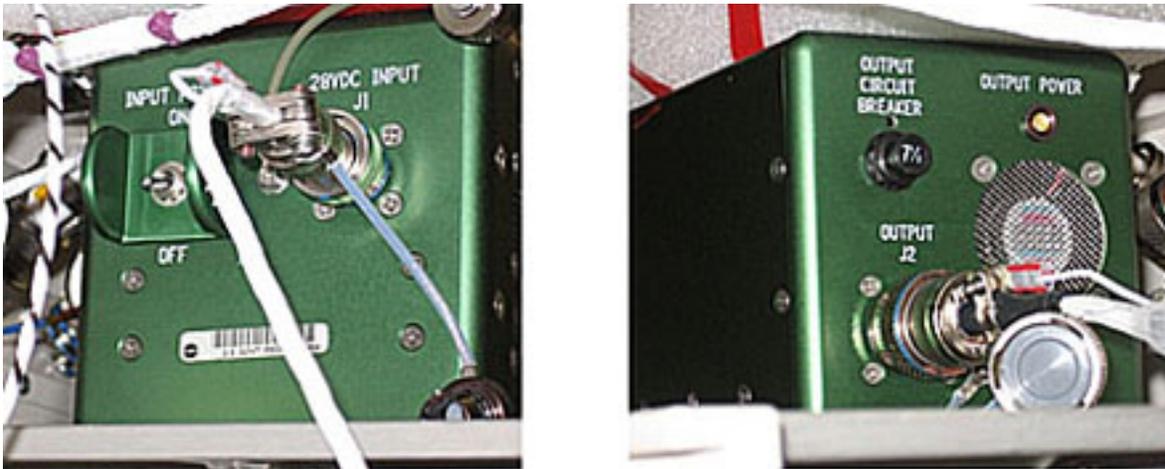


Figure 8. FSL Laptop Power Converter - Details

FSL Laptop LAN CABLE → | ← Data J210 (Figure 4) and laptop Ethernet outlet (Figure 7).

FSL Laptop SVIDEO CABLE → | ← Data J302 (Figure 4) and laptop S-Video outlet (Figure 7).

FSL Laptop Enhanced A31p 16 VDC Power Cable → | ← Power Converter OUTPUT J2 (Figure 8, right frame) and laptop (Figure 7).

FSL Laptop DC Power 28 VDC Cable → | ← Pwr J104 (Figure 4) and Power Converter 28VDC INPUT J1 (Figure 8, left frame).

3. FSL LAPTOP ACTIVATION
- RIC Sw4 → ON
- Verify LED4 – (green)
- POWER CONVERTER sw INPUT POWER (Figure 8, left frame) → ON
- Verify OUTPUT POWER LED (Figure 8, right frame) –
- FSL Laptop FSL Laptop → On
- Wait 2 minutes for the Laptop to complete bootstrap.
- Double-click on the FSL HCI icon.
- Verify the Home window – displayed (Refer to Figure 9)

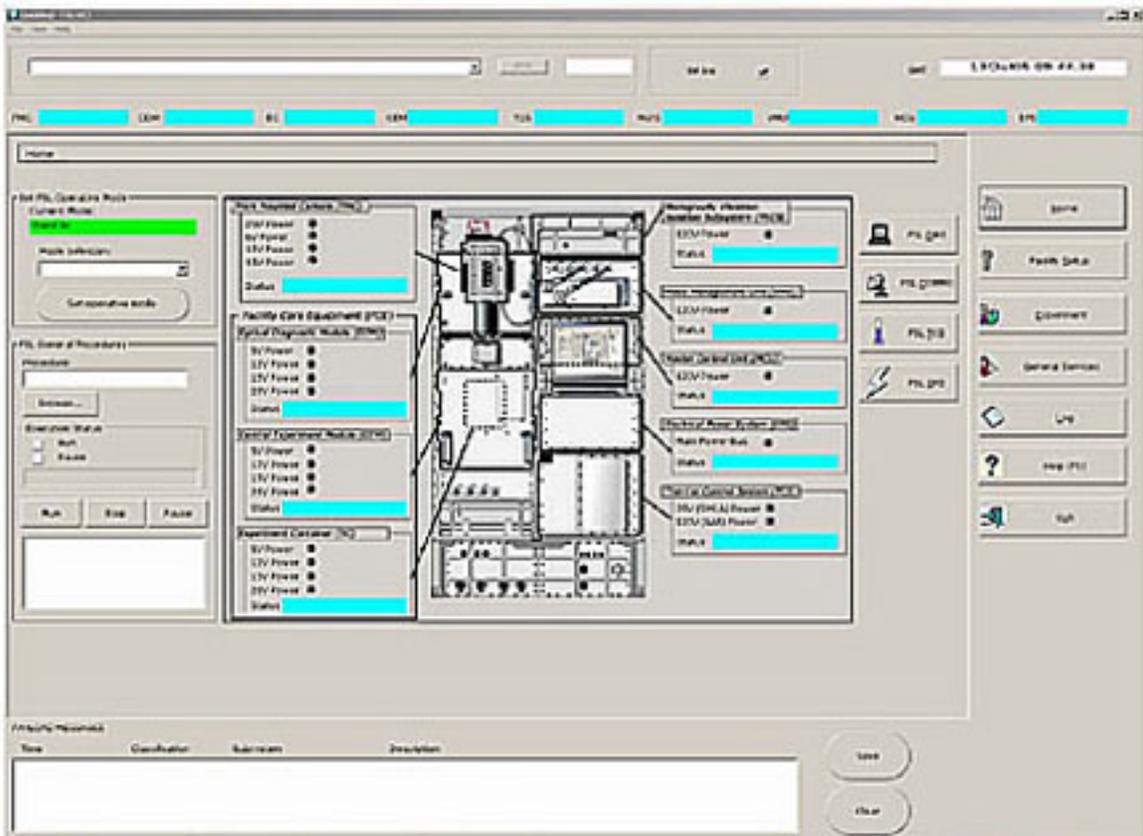


Figure 9. FSL Home Display

4. [POST MAINTENANCE OPERATIONS](#)
Update IMS with stowage location of connectors protective caps.

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2.250 FSL STOWAGE CONTAINER LID LAUNCH FIXATIONS REMOVAL

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 4 pages

OBJECTIVE:

Preparation of the Stowage Container for nominal operations after the FSL on board installation by means of removal of the lid launch fixation bolts and installation of the dedicated handle.

DURATION

25 minutes.

CREW

one

TOOLS

ISS IVA Toolbox

none

Columbus Toolkit

Tool Bag 2:

Driver Handle, 1/4" Drive

Tool Bag 3:

5 mm Hex Head Driver, 1/4" Drive

ITEMS

Eyelet (two)

Adjustable Bungee Assembly P/N SEG33107626-306

Space Handle, P/N 57429)

COL101 1. STOWAGE CONTAINER EXTRACTION



Figure 1. Stowage Container

NOTE

The front launch fixation bolts are released during the execution of the Procedure 2.211 FSL FRONT LAUNCH FIXATIONS REMOVAL that is executed prior to the present procedure as a part of the commissioning activities.

2.250 FSL STOWAGE CONTAINER LID LAUNCH FIXATIONS REMOVAL (ASSY PAYLOAD/1E/FIN/MULTI E) Page 2 of 4 pages

√Launch fixations bolts (front panel) – released.

Stowage Container pinball lock (the pip pin located at the left side of the front panel, see the blue box in Figure 1)→ release.

2. RESTRAINING THE FSL STOWAGE CONTAINER

2.1 Mounting the Eyelets

Install Eyelets (two) in the seat tracks of the Deck Rack.

2.2 Remove the Stowage Container by the front panel finger housing shown in the green box in Figure 1.

2.3 Stowage Container Locking

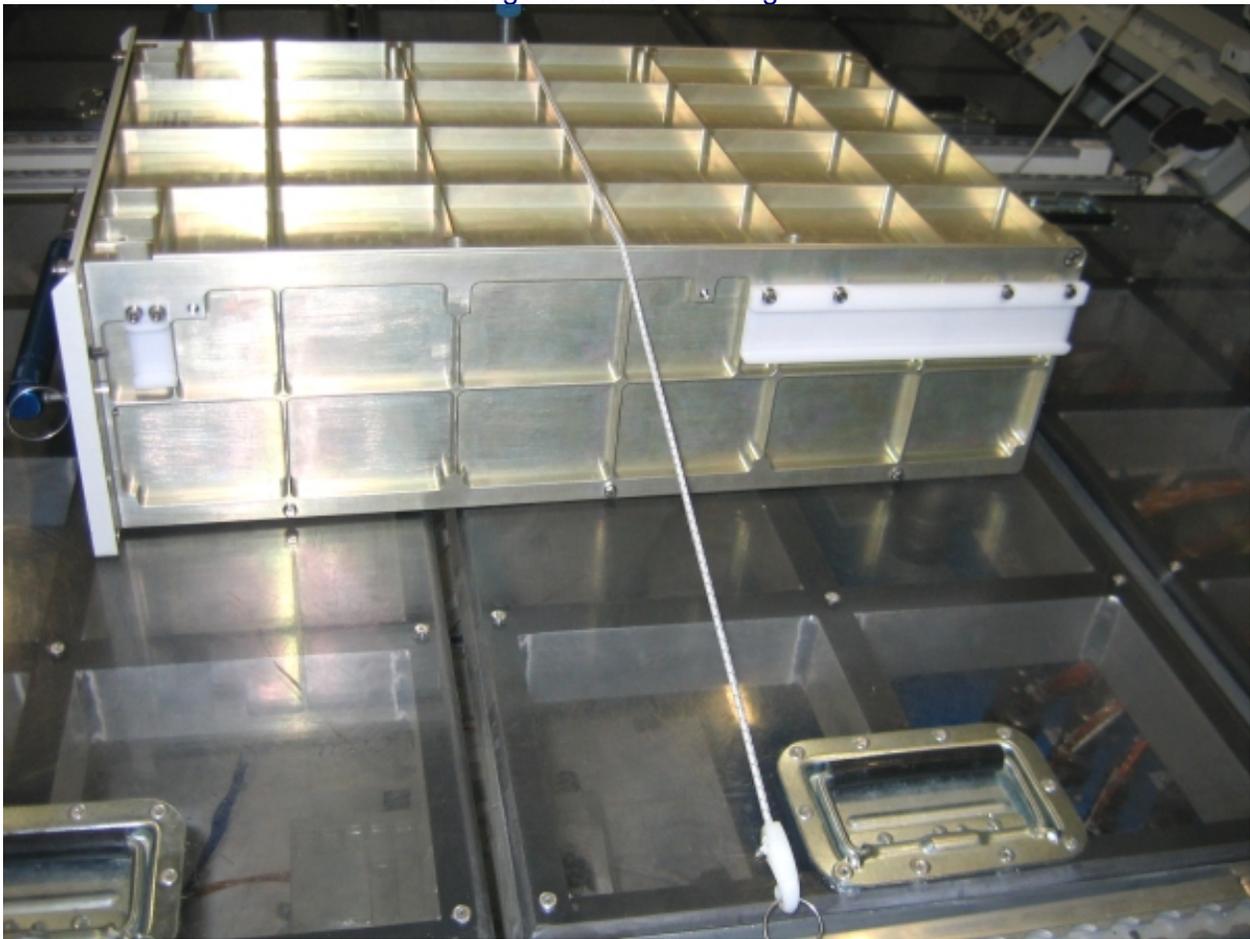


Figure 2. Stowage Container restrained on the Columbus floor panel

Restrain the Stowage Container on the Columbus Floor panel (Adjustable Bungee Assembly). Refer to Figure 2

3. [STOWAGE CONTAINER LID LAUNCH FIXATION BOLTS UNLOCKING](#)



Figure 3. Captive launch fixation bolts on the Stowage Container Lid

Unlock the captive launch fixation bolts (eight, see the blue circles in Figure 3) from the Stowage Container Lid (5 mm Hex Head Driver, 1/4" Drive and Driver Handle 1/4" Drive).

4. [STOWAGE CONTAINER REPLACEMENT IN RACK](#)

Disengage the Stowage Container from the Columbus floor.

Position the closed Stowage Container in front of the rack and gently push it in.

Activate the Stowage Container Pinball Lock (located near the left side as shown in Figure 1) to secure the Stowage Container to the Rack.

√Stowage Container – safely locked in place (pulling the Stowage Container by the finger housing, it remains locked)

5. MOUNTING THE HANDLE ON THE STOWAGE CONTAINER



Figure 4. Space handle



Figure 5. Stowage Container - Handle position

Mount the Handle on the Stowage Container (Refer to Figures 4 and 5).

√Handle – firmly mounted (pulling the handle, it remains locked)

6. CLEANUP
Tools→stow

2.260 FSL VMU SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 6 pages

OBJECTIVE:

Preparation of the FSL VMU (Video Management Unit) for nominal operations by means of Installation of the following items: VMU Hard Disk 1, VMU Hard Disk 2 and VMU DLT (Digital Line Tape).

DURATION:

10 minutes

CREW:

One

TOOLS:

ISS IVA Toolbox

Drawer 2:

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

Columbus Toolkit:

Tool Bag 1:

Ratchet Wrench 1/4" Drive

Tool Bag 2:

2" Extension 1/4" Drive

Tool Bag 3:

M4 (3 mm) Hex Head Driver 1/4" Drive

ITEMS

FSL VMU HDD 1

FSL VMU HDD 2

FSL VMU DLT

COL101 1.

PREPARATION OF THE FSL VMU FOR THE INSTALLATION OF THE RELATED ITEMS

Verify sw RACK POWER – OFF

WARNING

Fragments of damaged items may float out.

Verify by inspection FSL VMU HDD 1 and 2 – not damaged (no scattered parts visible through the transparent envelope)

Verify by inspection FSL VMU DLT – not damaged (no scattered parts visible through the transparent envelope)

If no anomalies found

Remove packaging.

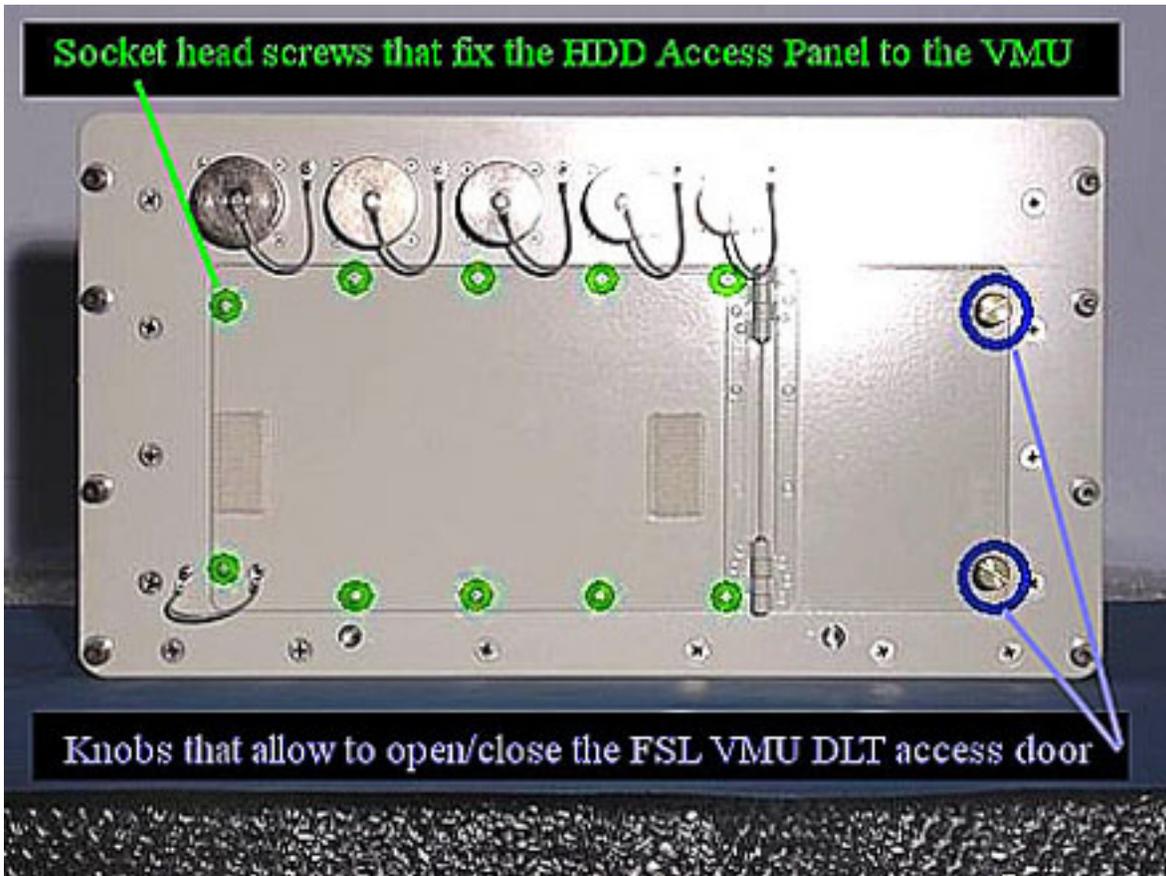


Figure 1. VMU Front Panel

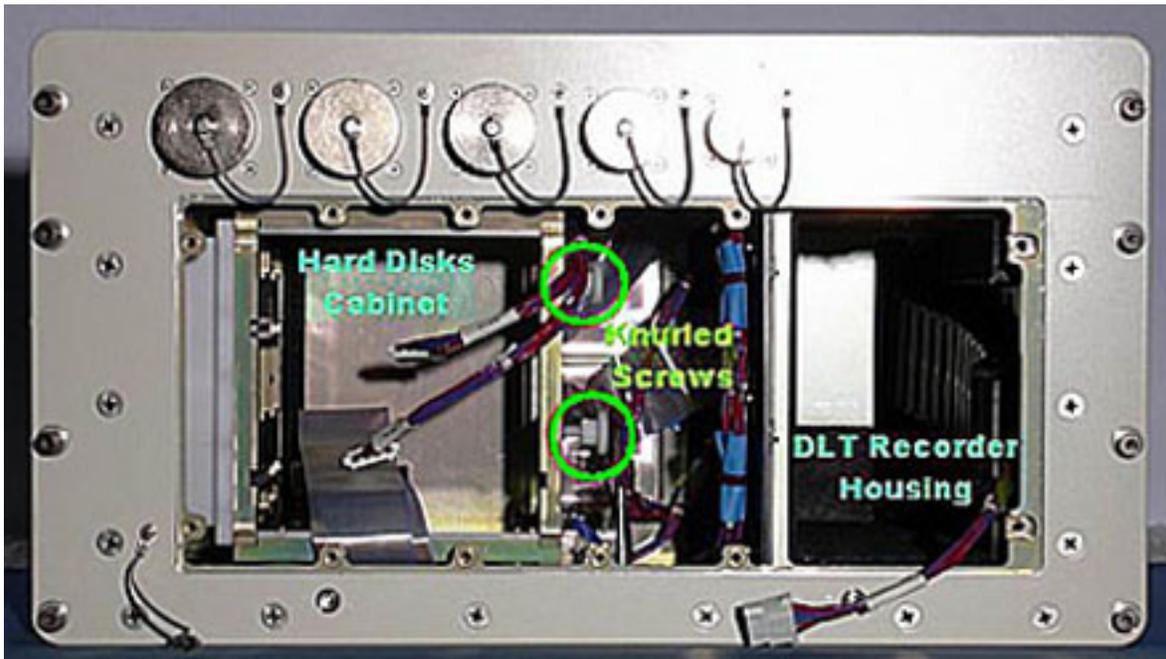


Figure 2. VMU Inner View

- 1.1 [VMU DLT Access Door Opening](#)
Open FSL VMU DLT Access Door.

2.260 FSL VMU SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 3 of 6 pages

1.2 [HDD Access Panel Removal](#)

Loosen captive socket head screws (ten) [M4 (3 mm) Hex Head Driver 1/4" Drive and Ratchet Wrench 1/4" Drive].

Remove HDD Access Panel (tethered).

HDD
Cabinet

2. [VMU ITEMS INSTALLATION](#)

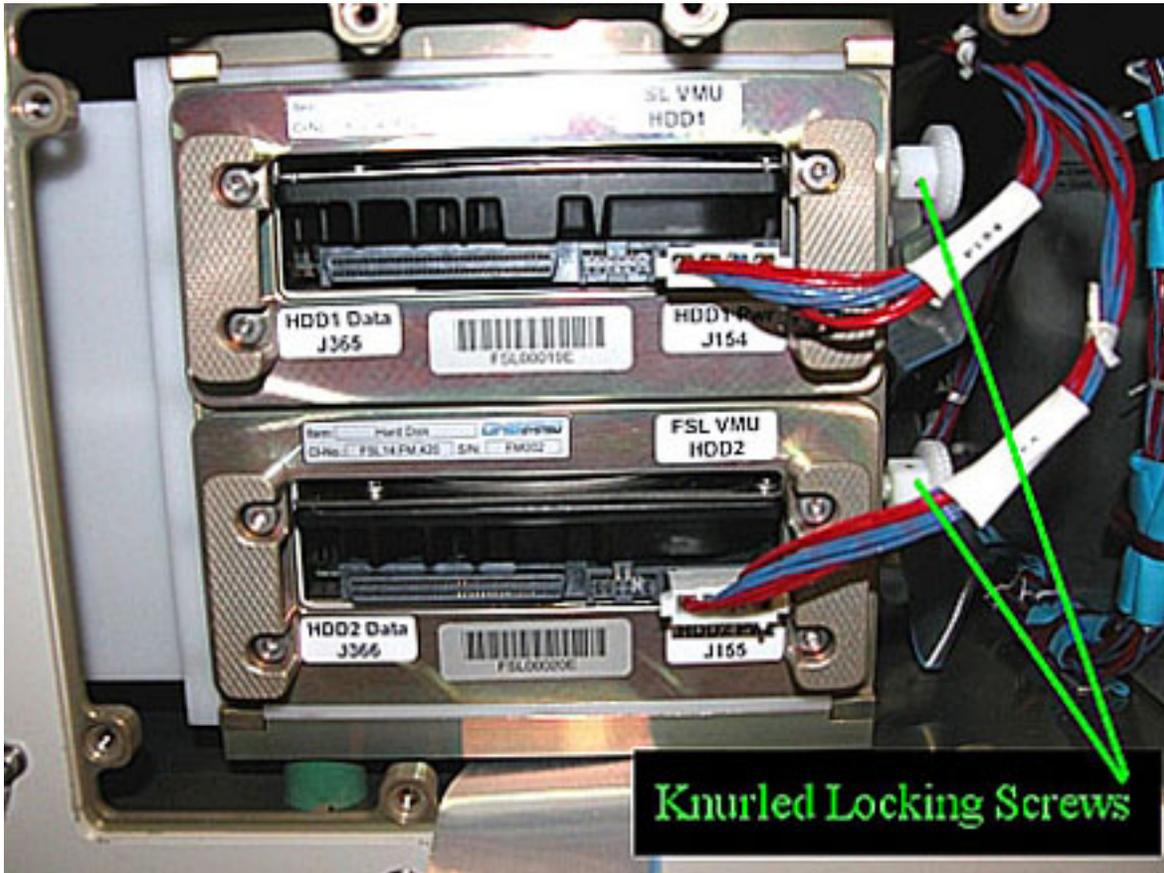


Figure 3. Hard Disks and Related Connectors

Loosen the two knurled screws at the right side of the HDD Cabinet (shown in Figure 2) until their extremities no longer protrude into the Cabinet.

NOTE

The FSL VMU HDD 1 and 2 must be installed in the correct slot (HDD1 in the upper position, HDD2 in the lower position).

2.1 [Installing HDD2](#)

Insert FSL VMU HDD 2 into the guide of HDD Cabinet and lock using the white knurled screw (finger tight).

P155 (power cable) →|← HDD 2 Pwr J155 (Figure 3)

P366 (data cable) →|← HDD 2 Data J366 (Figure 3).

2.260 FSL VMU SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 4 of 6 pages

2.2 [Installing HDD1](#)

Insert FSL VMU HDD 1 into the guide of HDD Cabinet and lock using the white knurled screw (finger tight).

P154 (power cable) →|← HDD 1 Pwr J154 (Figures 3 and 4).

P365 (data cable) →|← HDD 1 Data J365 (Figures 3 and 4).

DLT
Recorder
Housing

3. [FSL VMU DLT RECORDER INSTALLATION](#)



Figure 4. FSL VMU DLT Recorder (front and rear view)

2.260 FSL VMU SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 5 of 6 pages

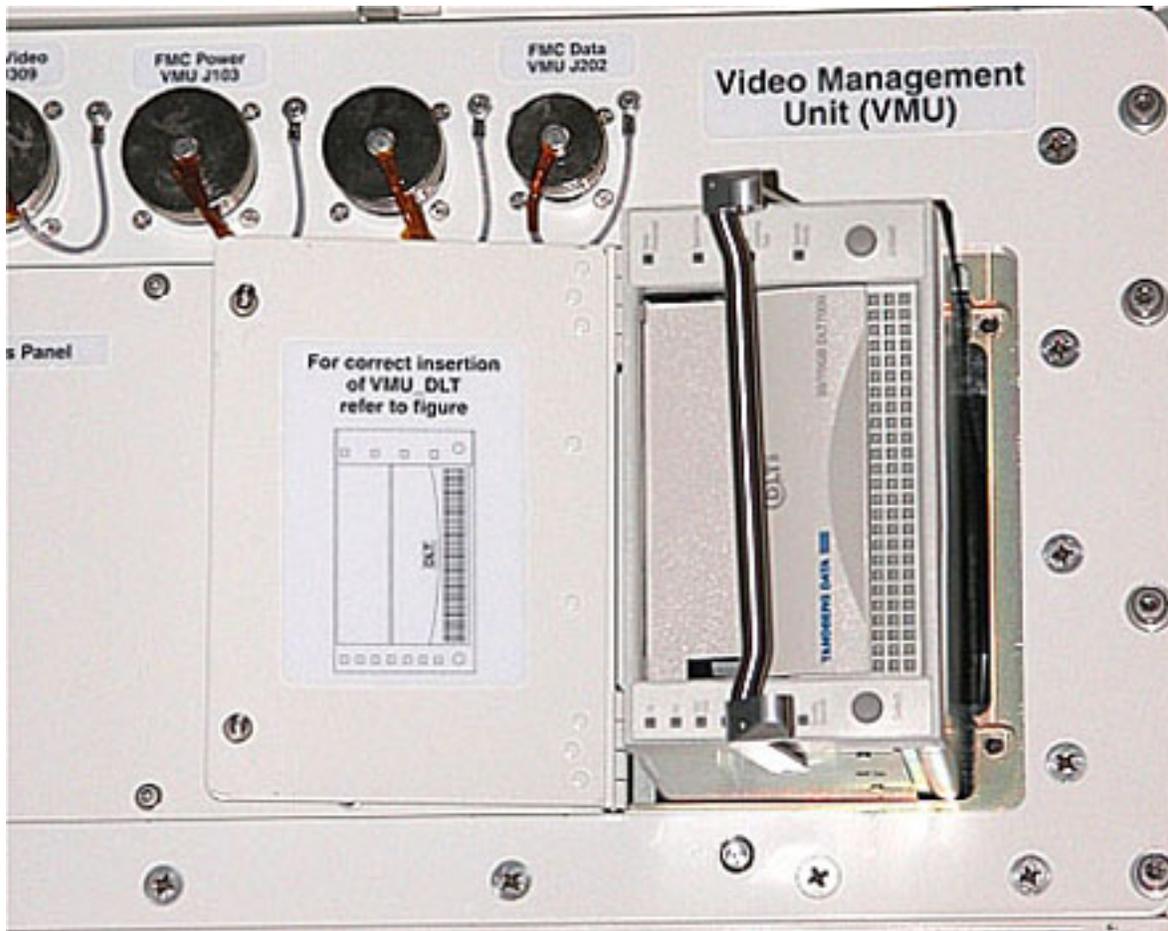


Figure 5. FSL VMU DLT Recorder Installation

- 3.1 Power connector →|← FSL VMU DLT Recorder Power Connector (Figure 5, right frame) .
- 3.2 Data Connector→|←FSL VMU DLT Recorder Data Connector (Figure 5, right frame).
- 3.3 Insert the FSL VMU DLT Recorder into the foam guided VMU Housing (front air grid oriented to the right) per Figure 6.
4. [CLOSING THE FSL VMU DLT DOOR](#)
 - 4.1 FSL VMU DLT access door → close, lock
5. [CLOSING THE HDD ACCESS PANEL](#)

CAUTION

Due to limited volume available, the Hard Disk cables may protrude out, which may lead to the risk to damage the cables in the panel closeout.

√Hard Disk Cables – not protruding out (visual inspection)

2.260 FSL VMU SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 6 of 6 pages

- 5.1 HDD Access Panel → position in its location on the VMU
 - 5.2 Screw the socket head screws (ten) and apply a screw torque of 28.3 in-lb [M4 (3 mm) Hex Head Driver 1/4" Drive; 5-35 in-lbs Trq Driver, 1/4" Drive and 2" Extension 1/4" Drive].
6. [POST MAINTENANCE OPERATIONS](#)
Stow tools.

2.310 FSL ODM SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 22 pages

OBJECTIVE:

Preparation of the FSL ODM (Optical Diagnostic Module) for nominal operations after the FSL on board installation, by means of removal of the launch fixations from the OU12 (ODM Optical Unit 12), OU31 (ODM Optical Unit 31) and OU32 (ODM Optical Unit 32), and the installation of the Laser.

DURATION:

85 minutes

CREW:

One

TOOLS:

ISS IVA Toolbox:

Drawer 2:

- 5-35 in-lbs Trq Driver, 1/4" Drive
- 8 mm Hex Head, 3/8" Drive
- 3/32" Hex Head, 1/4" Drive
- Hex Shank, 1/4" Drive
- 40-200 in-lbs Trq Wrench, 3/8" Drive

Columbus Toolkit:

Tool Bag 1:

- Torque Wrench 4-20 Nm

Tool Bag 2:

- Ratchet Wrench 3/8"
- 2" Extension 1/4" Drive
- 6" Extension 1/4" Drive
- Driver Handle 1/4" Drive
- L-Wrench from Metric Folding Hex Key Set (2.5,3,4,5,6,8,10 mm ball tip)

Tool Bag 3:

- M3 (2.5 mm) Hex Head Driver 1/4" Drive
- M4 (3 mm) Hex Head Driver 1/4" Drive
- Adaptor 3/8" Female to 1/4" Male
- Universal Joint 1/4"
- 1/4" Bit Holder 1/4" Drive
- Ratchet Tool 3/8" Drive

ITEMS:

- FSL ODM Laser
- FSL Drawer Handles (two)
- Kapton Tape
- Silk Gloves

2.310 FSL ODM SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 2 of 22 pages

Banister (two) P/N 9120C A 101-401
Adjustable Bungee Assembly P/N SEG33107626-306
2mm Extra Long Hex Head Driver
4 mm Extra Long Hex Drive, 1/4" Drive, Straight Top
Torque Driver Tohnichi LTD120CN (20-120cNm)
Soft Shields (S/N:001, 002, 003, 005, 007, 008, 010)

REFERENCED PROCEDURE(S):

2.340 FSL DRAWER HANDLE INSTALLATION

- COL101 1. [ODM EXTRACTION AND FIXATION ON COLUMBUS FLOOR](#)
Verify sw RACK POWER – OFF
Verify sw LASER SWITCH – OFF
- 1.1 [Mounting the Facility Core Element Handles on the ODM](#)
Perform {[2.340 FSL DRAWER HANDLE INSTALLATION](#)}, step 2 (ESA PODF: FSL RACK: NOMINAL), then:
- 1.2 [Mounting the Banisters](#)

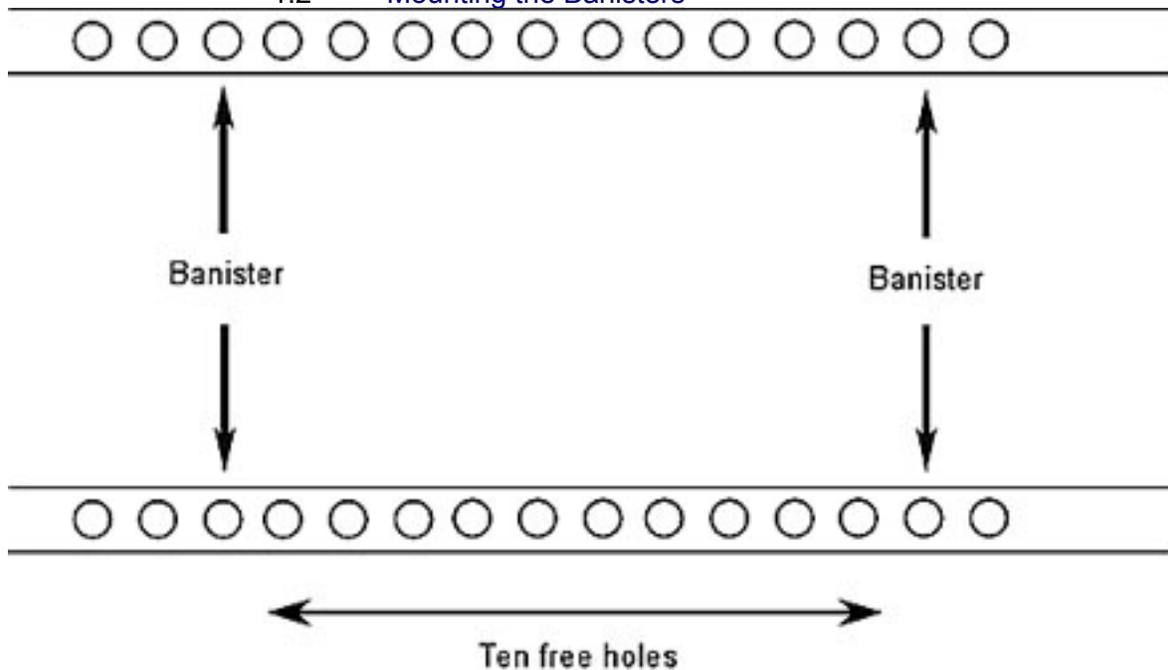


Figure 1. Seat Track and Distance Between the Banisters



Figure 2. Banisters Mounted on Columbus Mockup Seat Tracks

Install Banisters (two), spaced out by ten free holes on Columbus Deck Rack (D2 or D3 racks) as shown in Figures 1 and 2.

- 1.3 [ODM Drawer Extraction](#)
Don Silk Gloves.

2.310 FSL ODM SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

Page 4 of 22 pages

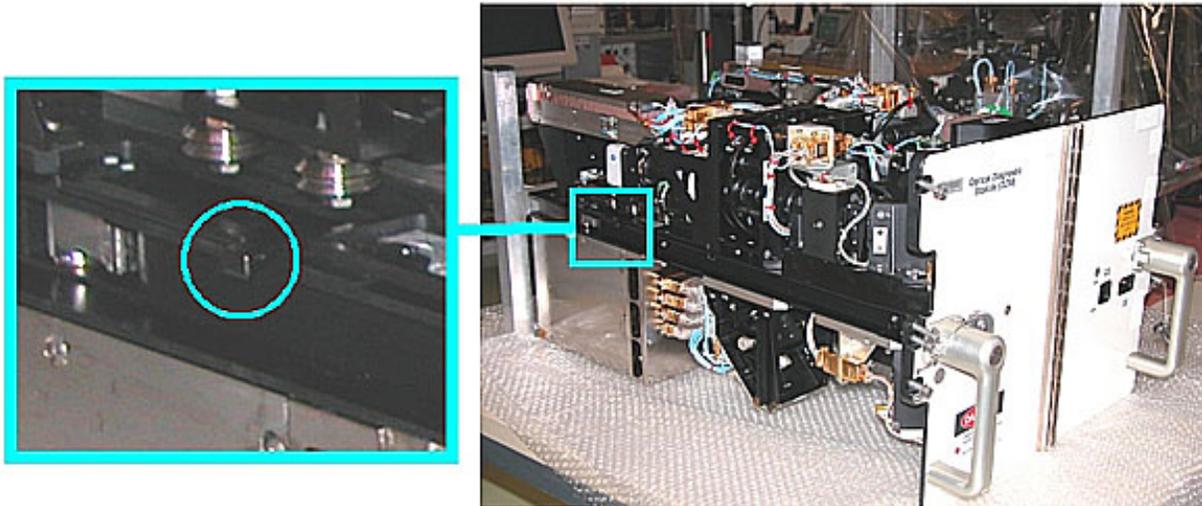
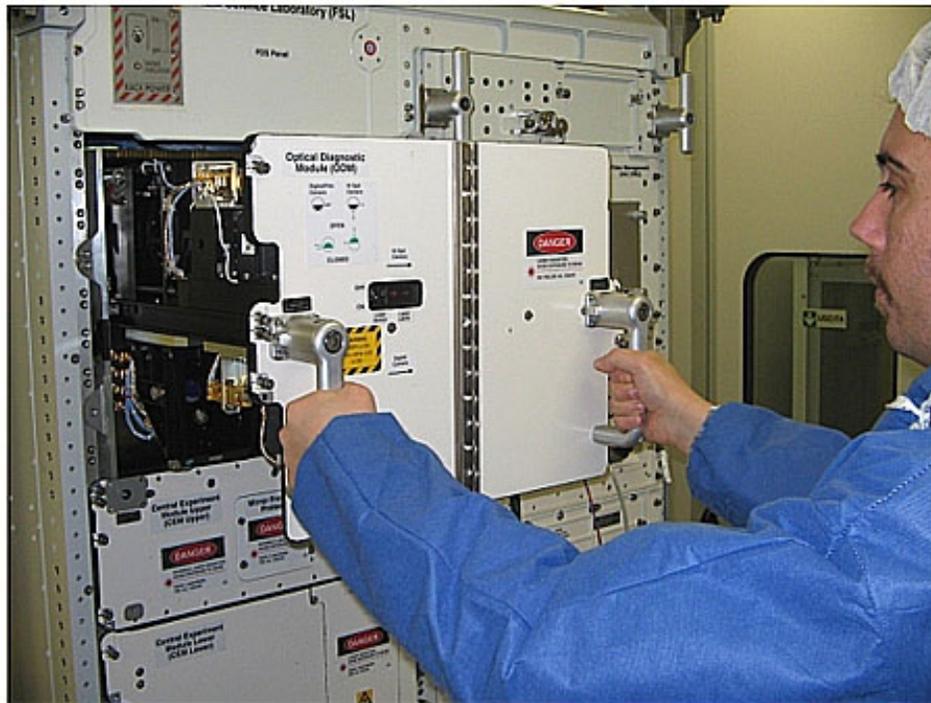


Figure 3. Drawer Extraction (the lower frame shows the location of the ODM mechanical end stops)

NOTE

1. When the screws are loose there is a gap of 8 mm between the drawer front panel and the Facility Core Element structure.

Right Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench 3/8"; 8 mm Hex Head, 3/8" Drive).

Left Facility Core Element Handle lock/unlock screw →
 ↻ (two turns) (Ratchet Wrench 3/8"; 8 mm Hex Head,
 3/8" Drive).

Repeat until both the screws are completely loose.

Open the drawer by pulling the handles, until the end stops are reached as shown in the upper part of Figure 3.

Remove the drawer completely by pressing the end mechanical stops as shown in the lower part of Figure 3.

1.4 Drawer Fixation on the Columbus Floor Drawer front panel

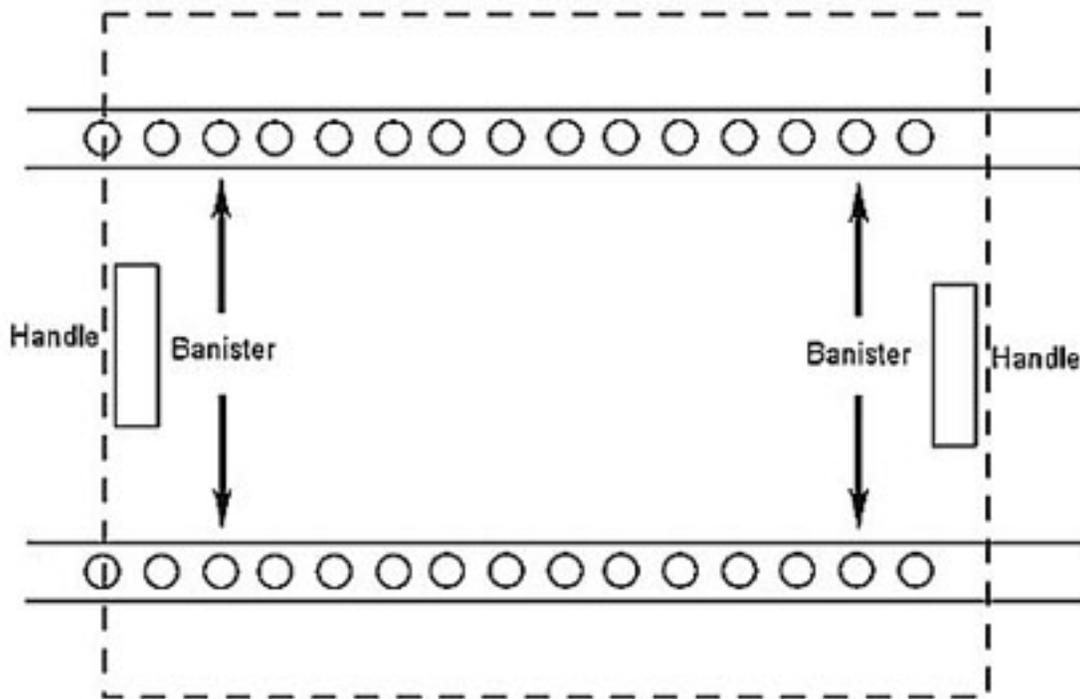


Figure 4. Relative Position of Banisters and Drawer Handles

NOTE

The following figure represents training model hardware. For this reason, the details appearing on the drawer sides may exhibit some significant differences with respect to the flight hardware.

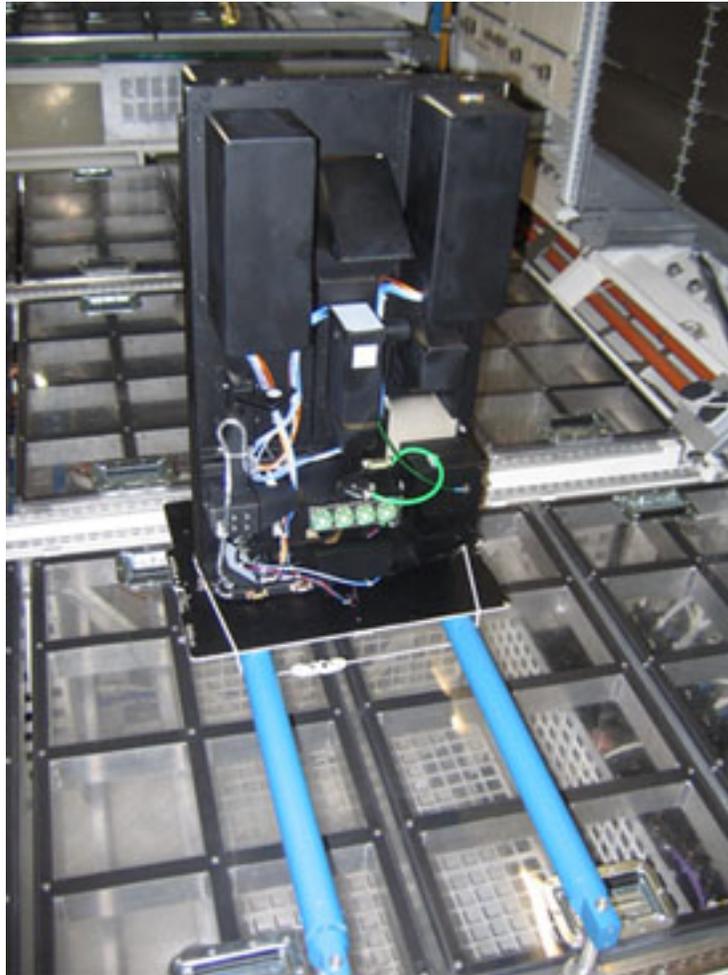


Figure 5. ODM

Install the drawer on the Banisters with its front panel parallel to the Columbus floor and its handles protruding into the space under the Banisters as shown in Figure 4.

NOTE

To have both hands free, engage one hook on the Bungee Cord while operating on the other.

Restrain the drawer to the Banisters with its front panel facing rack panels (Adjustable Bungee Assembly) as shown in Figure 5.

√Drawer – safely locked

If not

Regulate bungee length up to safely lock the drawer.

2. ODM POST LAUNCH INSPECTION

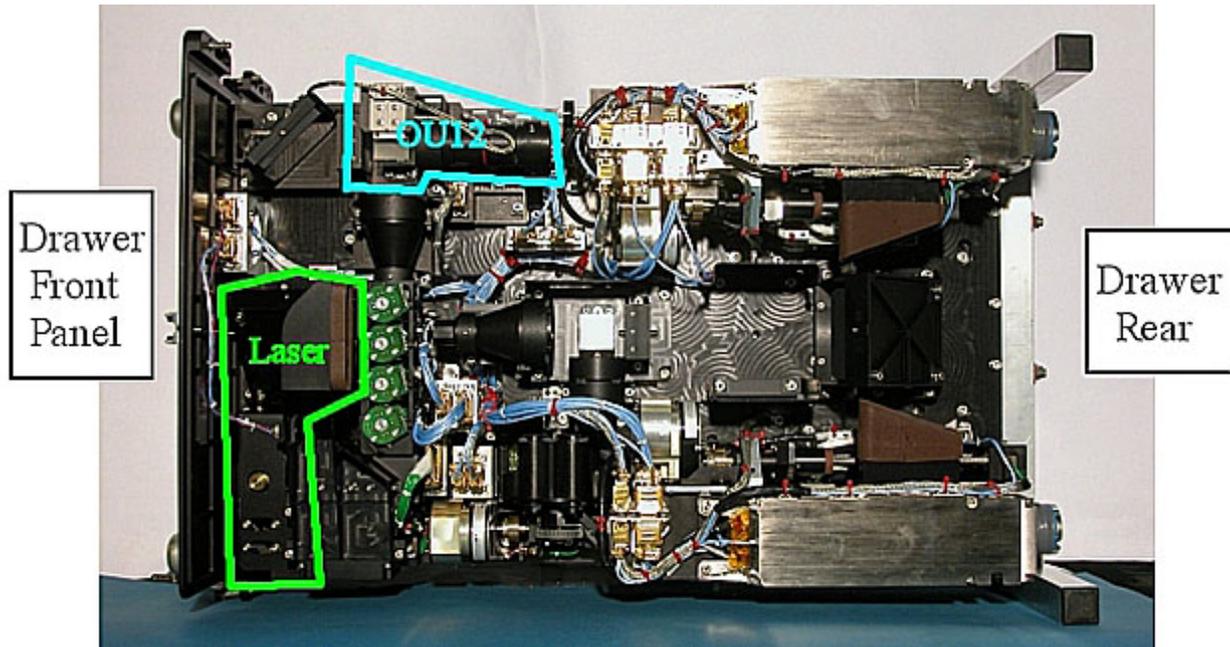


Figure 6. ODM - Top View Showing the Positions of the OU12 and Laser

Verify by inspection ODM items on upper side (shown in Figure 6) – not damaged (no scattered parts or debris visible)

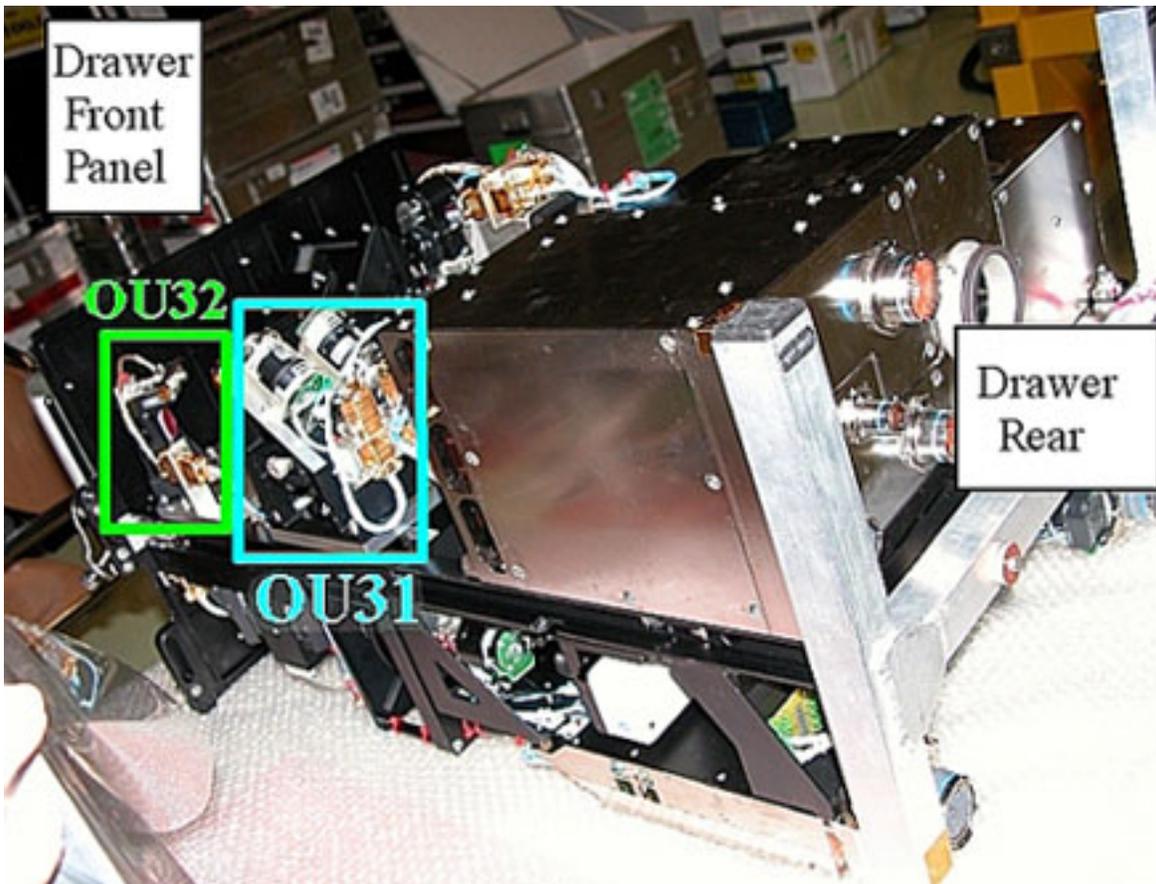


Figure 7. ODM - Bottom View Showing the Positions of the OU32 and OU31

Verify by inspection ODM Items on lower side (shown in Figure 7) – not damaged (no scattered parts or debris visible)

3. SOFT SHIELDS INSTALLATION

NOTE

Soft shields are installed on the optical elements by means of Kapton Tape.

Pay attention not to put tape on lenses, mirrors and other optical surfaces. Dirty optics may not work correctly.

2.310 FSL ODM SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

3.1 Upper Side Soft Shields Installation

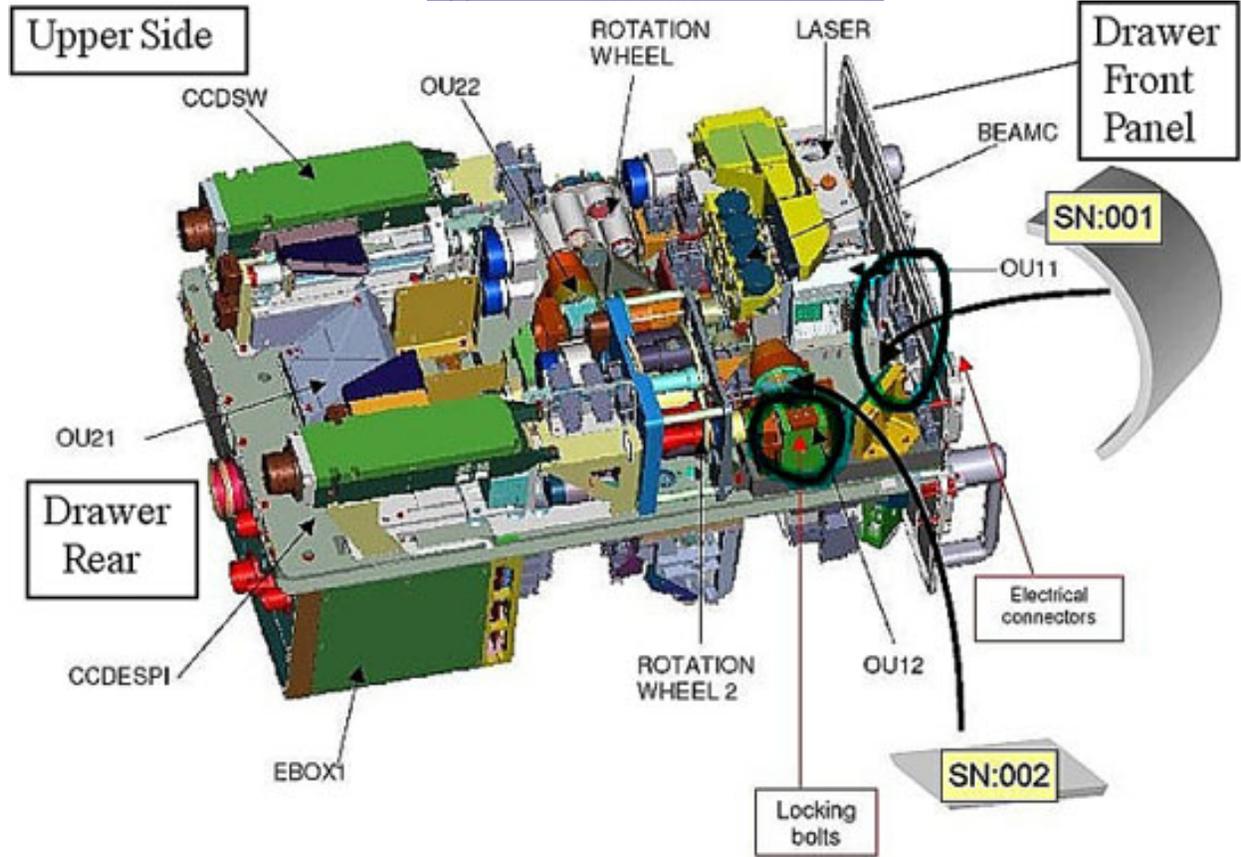


Figure 8. ODM Soft Shields Installation Concept (Upper side)

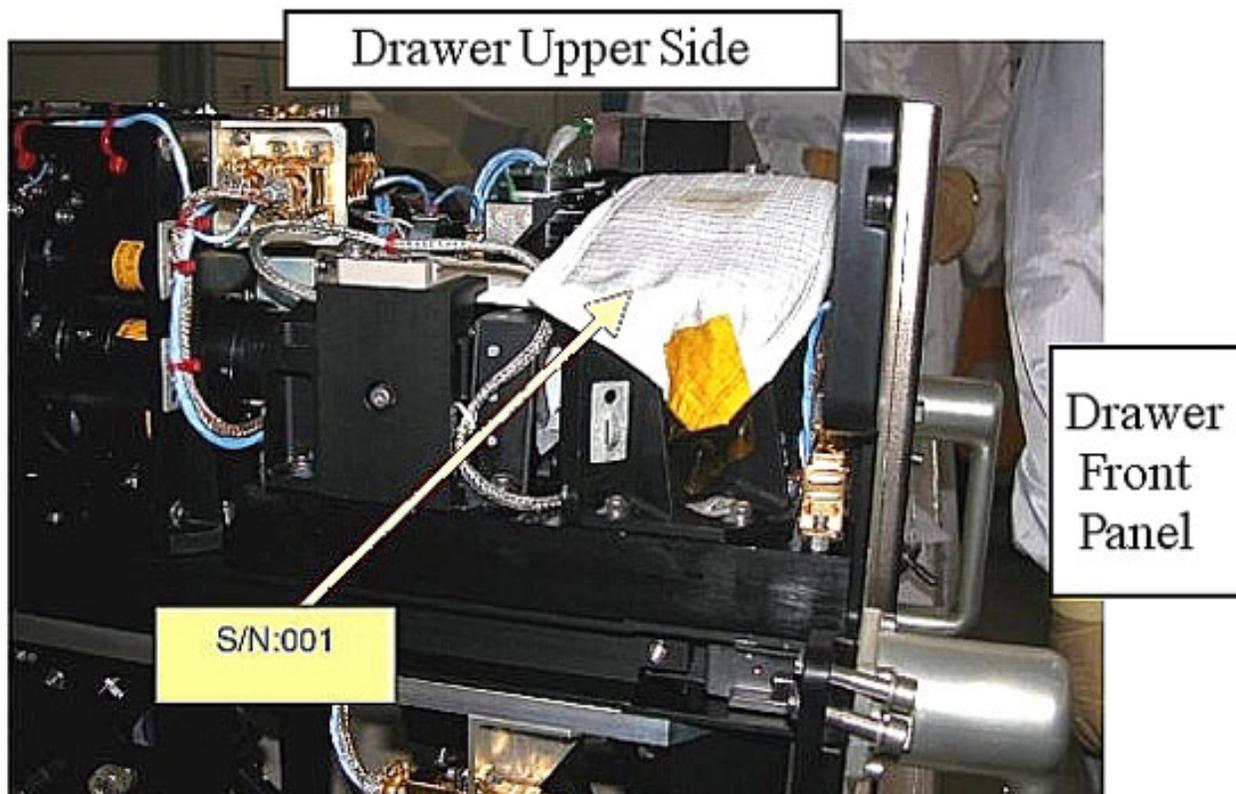


Figure 9. ODM Upper Side, Installation of Shield S/N 001

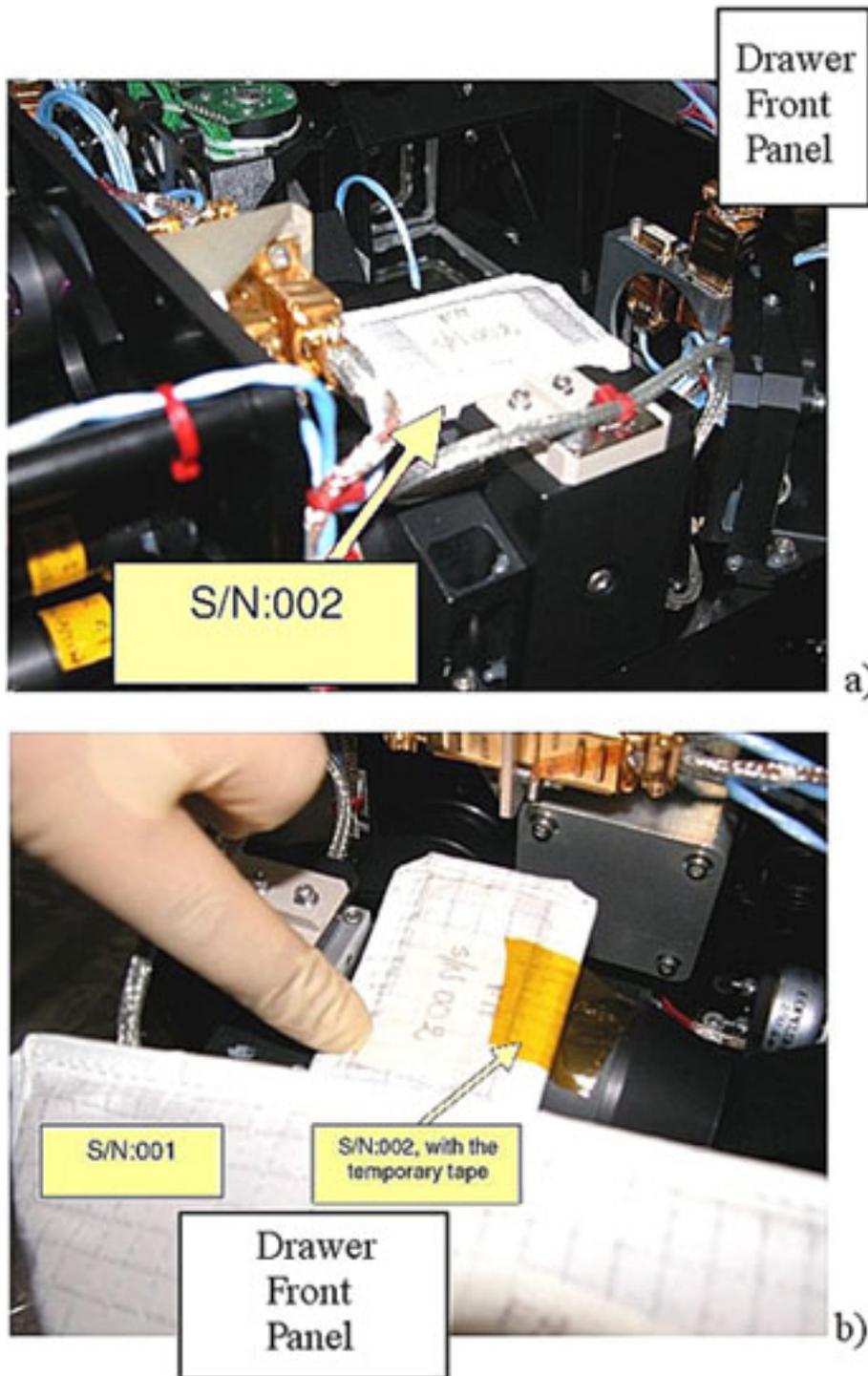


Figure 10. ODM Upper Side, Installation of Shield S/N 002 (two different views)

Protect mirrors and lenses with soft shields installing the elements S/N 001 and S/N 002 on ODM upper side, as shown in Figures 8, 9 and 10.

3.2 Lower Side Soft Shields Installation

Drawer Lower Side

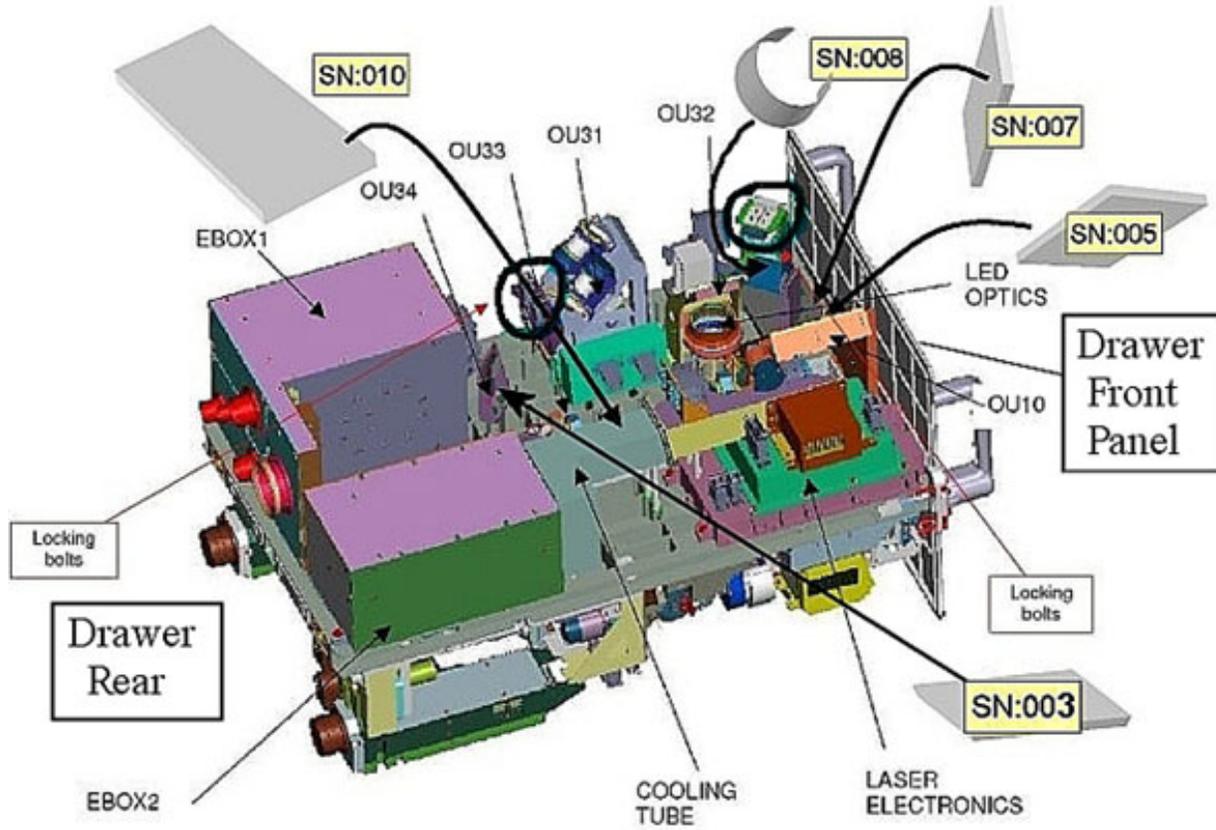


Figure 11. ODM Soft Shields Installation Concept (Lower side)

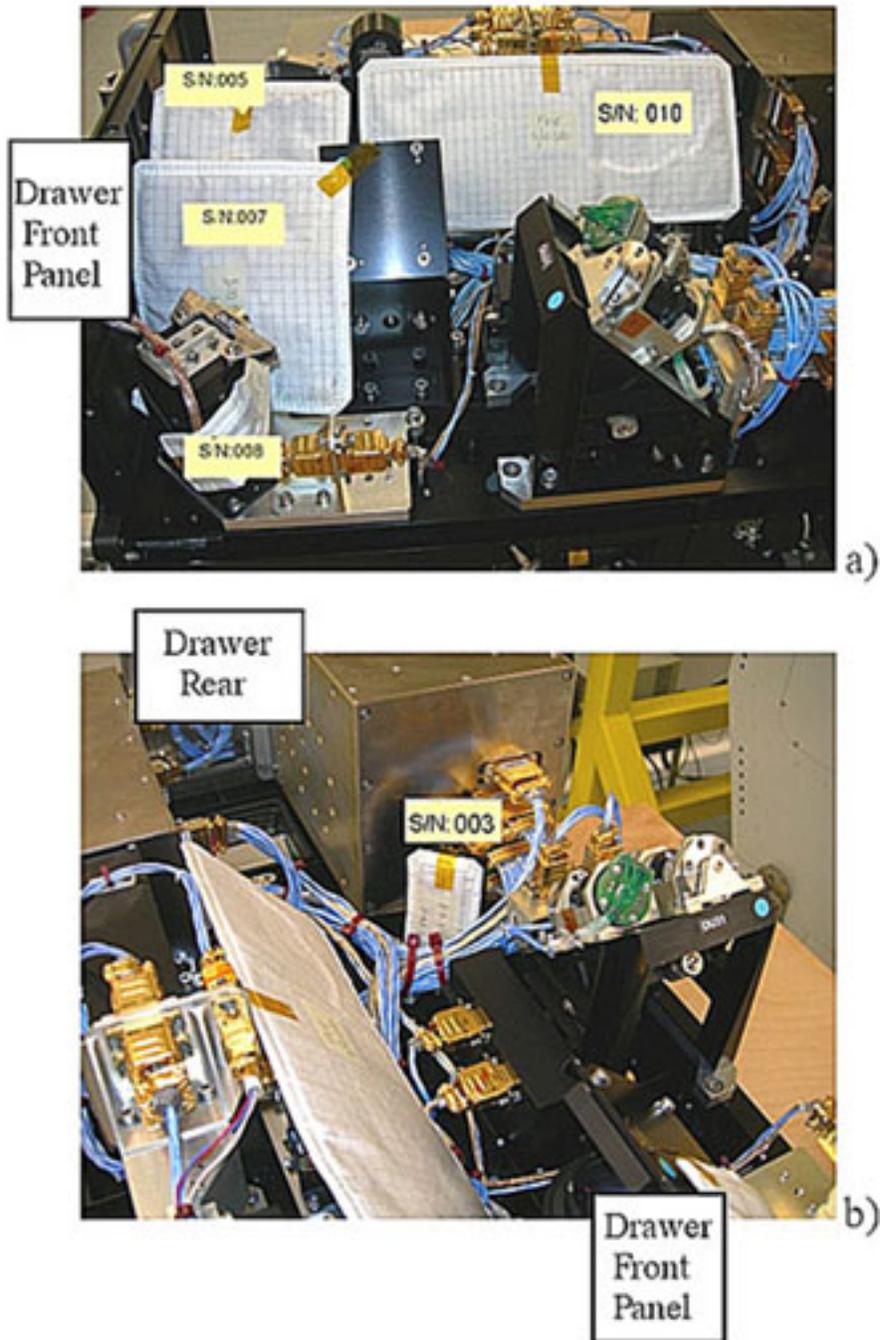
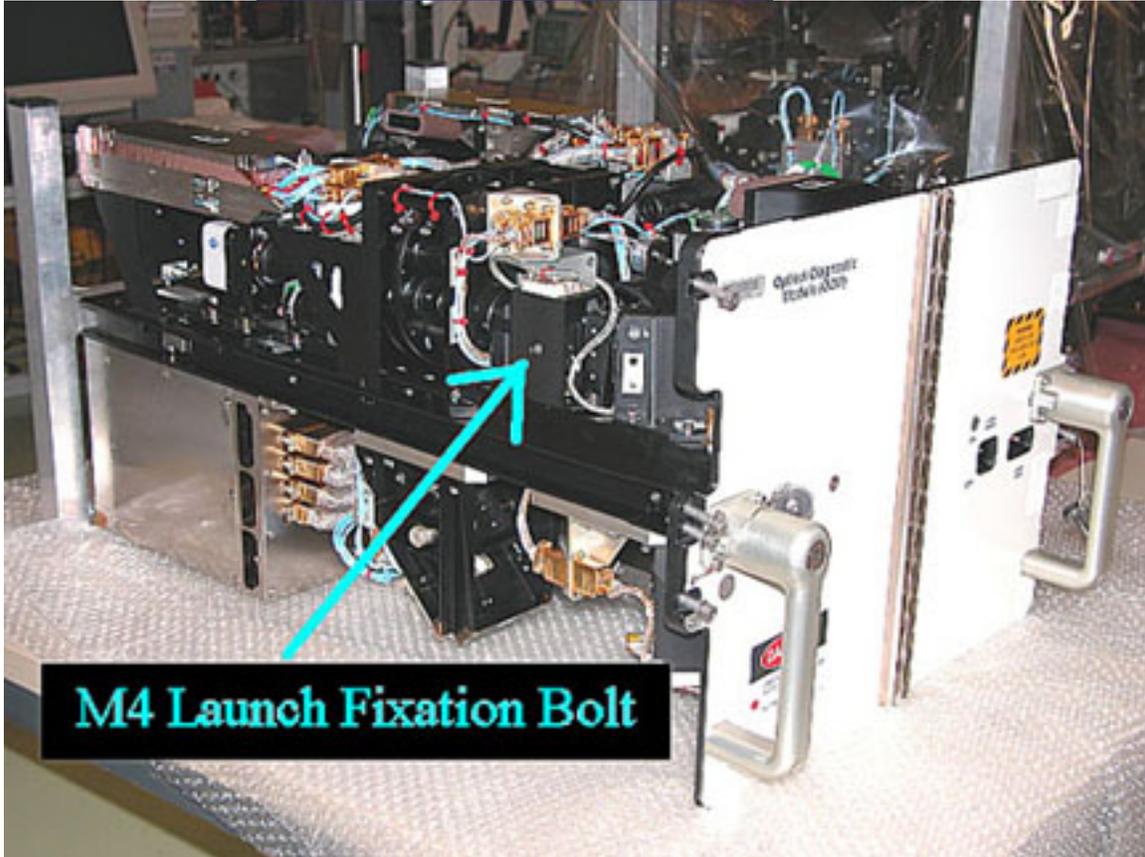


Figure 12. ODM Lower Side, Installation of Shields S/N 005, S/N 007, S/N 008, S/N 010 (Frame a) and S/N 003 (Frame b)

Protect mirrors and lenses with soft shields installing the elements S/N 003, S/N 005, S/N 007, S/N 008 and S/N 010 on ODM upper side, as shown in Figures 11 and 12.

4. [OU12 LAUNCH FIXATIONS REMOVAL](#)



M4 Launch Fixation Bolt

Figure 13. OU12 - Side View With Indication of the M4 Launch Fixation Bolt Access Hole

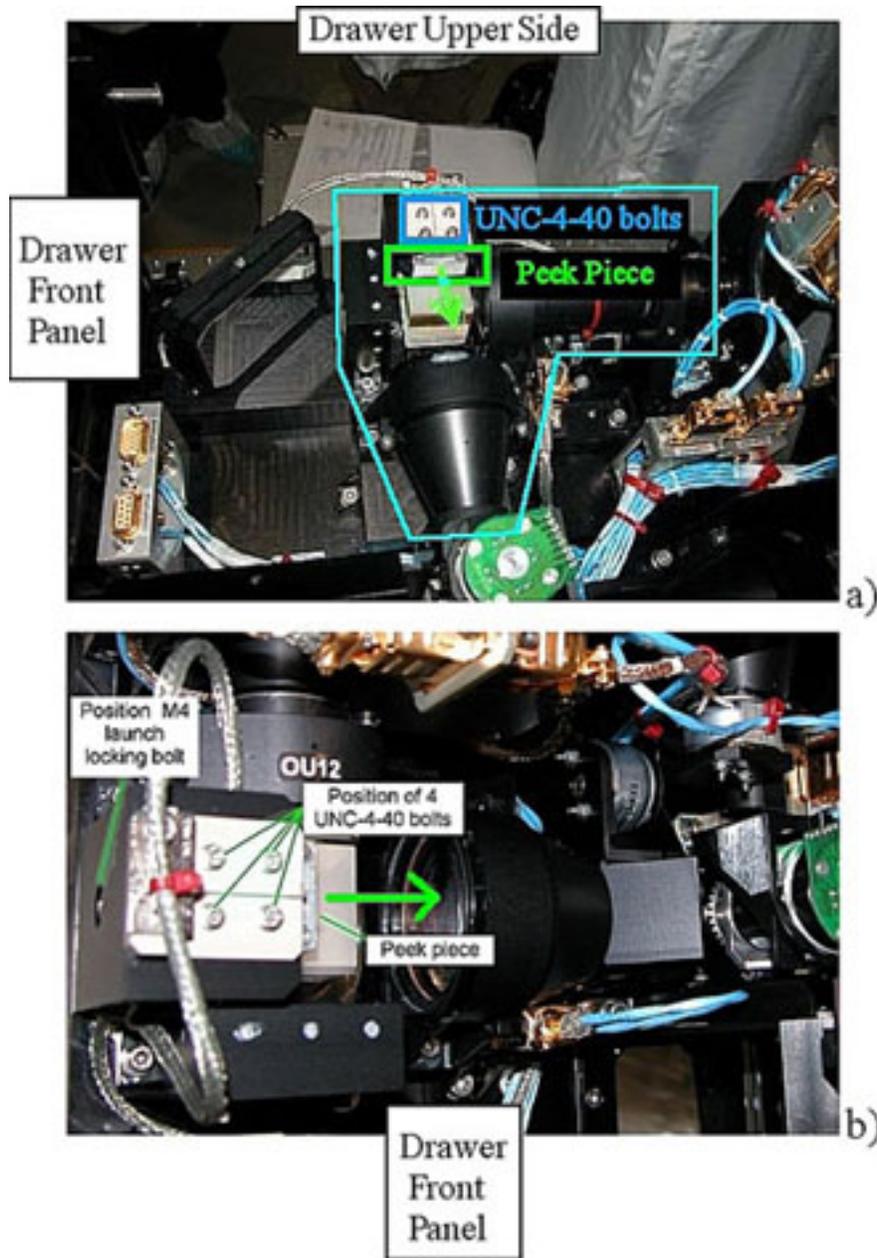


Figure 14. Drawer Upper Side, Two Different Views Showing OU12 Details

Loosen the M4 launch fixation bolt (Driver Handle 1/4" Drive; M4 (3 mm) Hex Head Driver 1/4" Drive). Refer to Figure 13 or Figure 14 lower frame.

Unscrew (two turns, the UNC bolts are captive thus not removable) UNC4-40 bolts (four) (Driver Handle 1/4" Drive; 3/32" Hex Head, 1/4" Drive). Refer to Figure 14.

Pull the PEEK piece under the UNC bolts in the direction of the green arrow in Figure 14.

2.310 FSL ODM SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 16 of 22 pages

NOTE

The PEEK part locked position can be found by checking when one of the UNC-4-40 bolts engages its thread

Lock the 4 UNC4-40 bolts (Figure 14) and put to torque 45 cNm (Torque Driver Tohnichi LTD120CN 20-120cNm; Hex Shank 1/4" Drive; 3/32" Hex Head, 1/4" Drive).

5. ODM LASER INSTALLATION

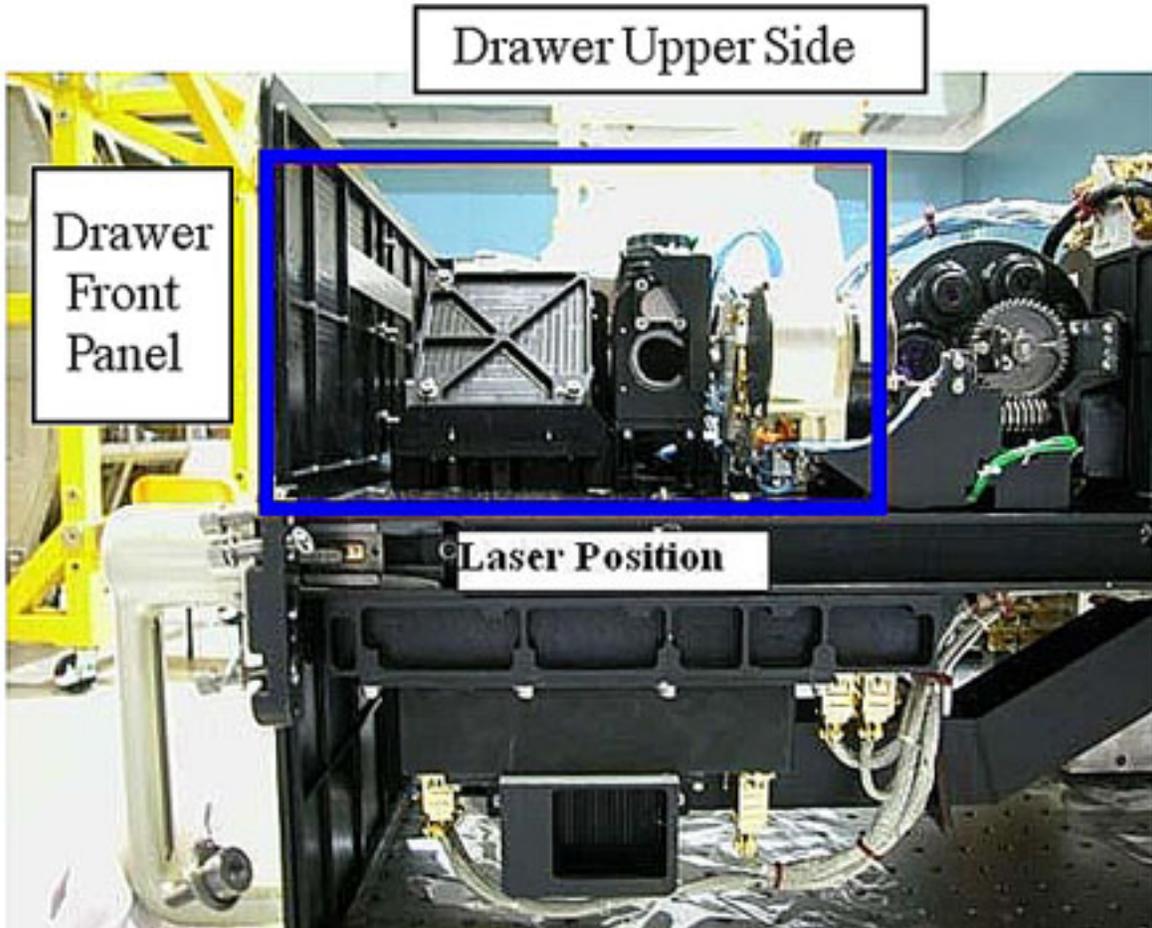


Figure 15. ODM Laser Position

Verify by inspection ODM Laser – not damaged (no scattered parts visible through the transparent envelope)

If no anomalies found

Remove packaging.

Position the Laser gently in its final position. Refer to Figure 15.

√ODM Laser – fits on the alignment pins

√Bonding Strap – not under the Laser

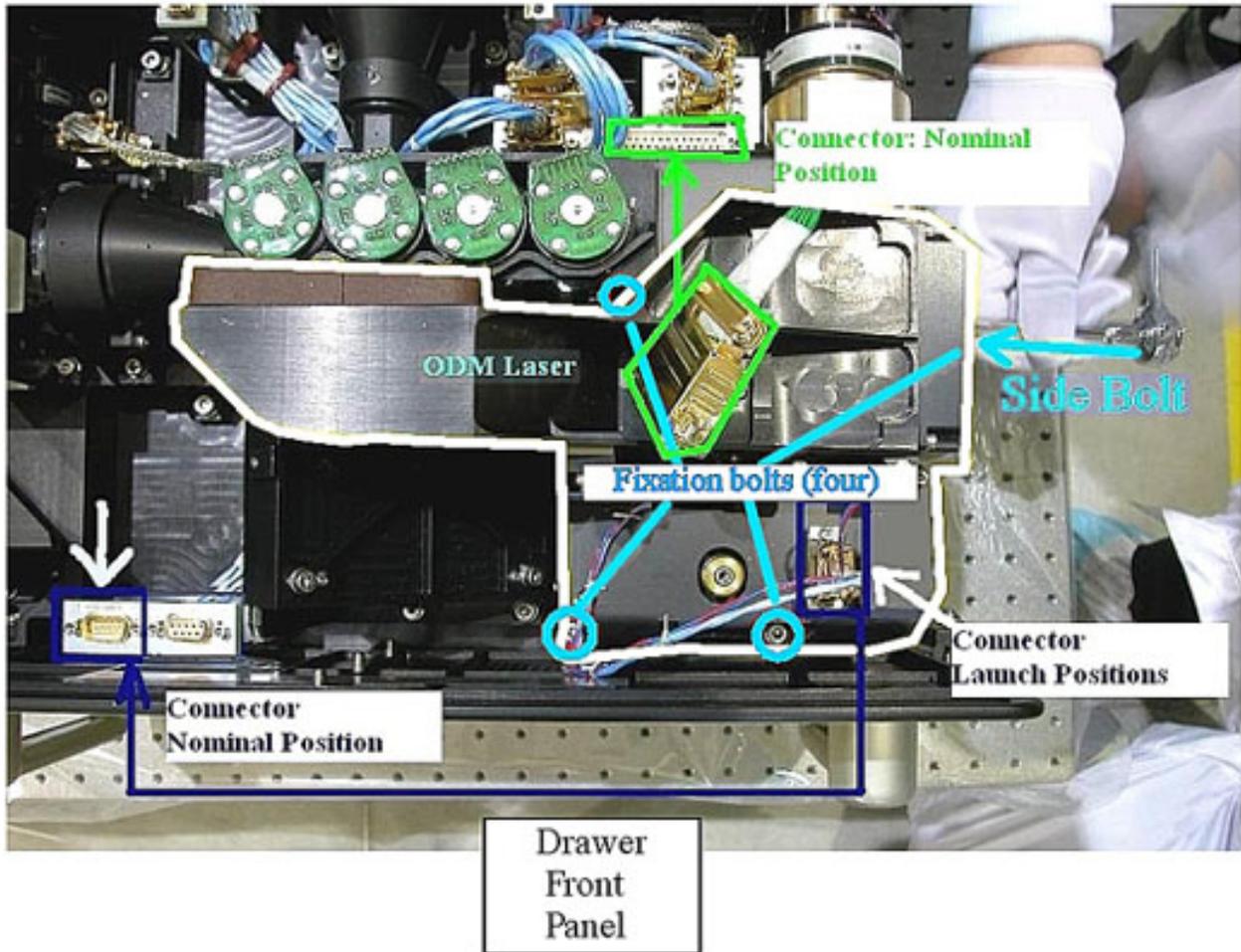


Figure 16. ODM Laser Setup (Drawer Upper Side) - Positions of Fixation Bolts and Initial and Final Positions of the Connectors

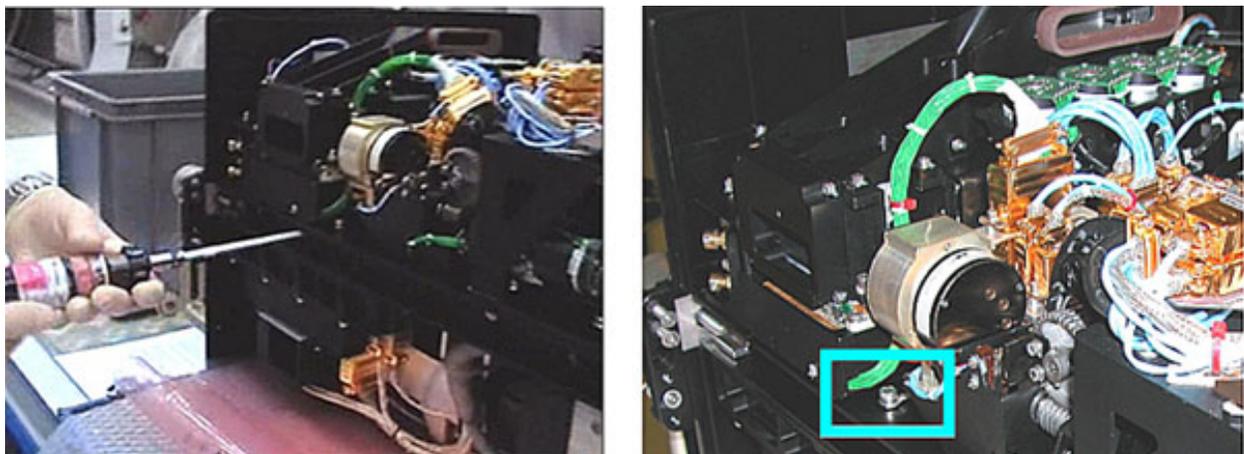


Figure 17. Laser Setup - Lateral View

5.1 ODM Laser Fixation**NOTE**

In order to guarantee the laser alignment, follow the sequence described below exactly.

Torque the side bolt with a torque of 30 cNm (Torque Driver Tohnichi LTD120CN 20-120cNm; 4 mm Extra Long Hex Head Drive, 1/4" Drive, Straight Top; Hex Shank, 1/4" Drive; 1/4" Bit Holder 1/4" Drive). Refer to Figures 16 and 17.

Repeat for the top bolts (three). Refer to the small blue circles in Figure 16.

Apply a torque of 16 in-lb to each of the top bolts (5-35 in-lbs Trq Driver, 1/4" Drive; 6" Extension, 1/4" Drive; 4 mm Extra Long Hex Head Drive, 1/4" Drive, Straight Top; 1/4" Bit Holder 1/4" Drive).

Repeat for the side bolt.

Apply a torque of 57 in-lb to the side bolt (40-200 in-lbs Trq Wrench, 3/8" Drive; Adaptor 3/8" Female to 1/4" Male; 4 mm Extra Long Hex Head Drive, 1/4" Drive, Straight Top; 1/4" Bit Holder 1/4" Drive).

Repeat for the top bolts.

5.2 Connectors Mating

Unscrew Connector Bolts (four) (2 mm Extra long Hex Head Driver).

ODM Laser Connectors (two) → | ← Drawer Sockets (Initial and final positions of the connectors are shown in Figure 16.)

Torque the Connectors Screws (four) at torque 45 cNm (Torque Driver Tohnichi LTD120CN 20-120cNm; Hex Shank 1/4" Drive; 2mm Extra Long Hex Head Driver).

Push the Bonding Strap under the bold head of the Bonding Strap Interface Bolt.

Refer to the blue box in Figure 17.

Put on torque to 32 in-lb (5-35 in-lbs Trq Driver, 1/4" Drive; 4 mm Extra Long Hex Drive, 1/4" Drive, Straight Top; 2" Extension 1/4" Drive and the 1/4" Bit Holder 1/4" Drive).

6. OU32 LAUNCH FIXATIONS REMOVAL**NOTE**

OU32 is located on the drawer lower side. Refer to Figure 7 for its position.

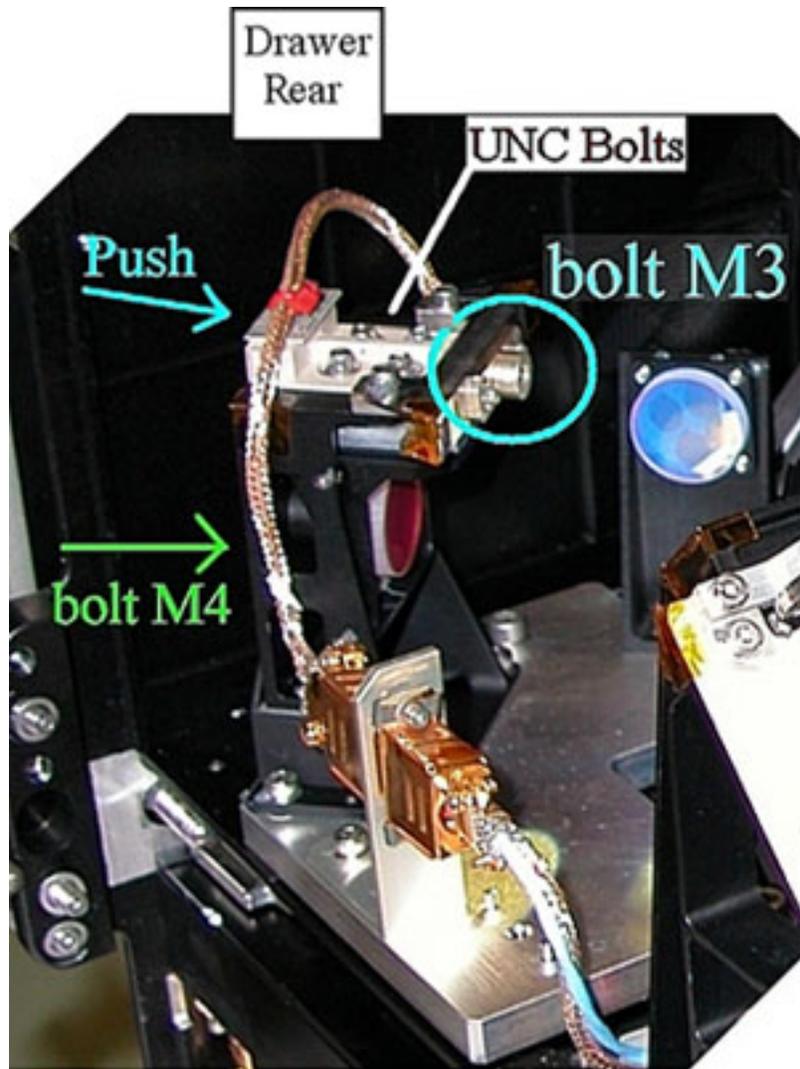


Figure 18. OU32 Launch Fixations

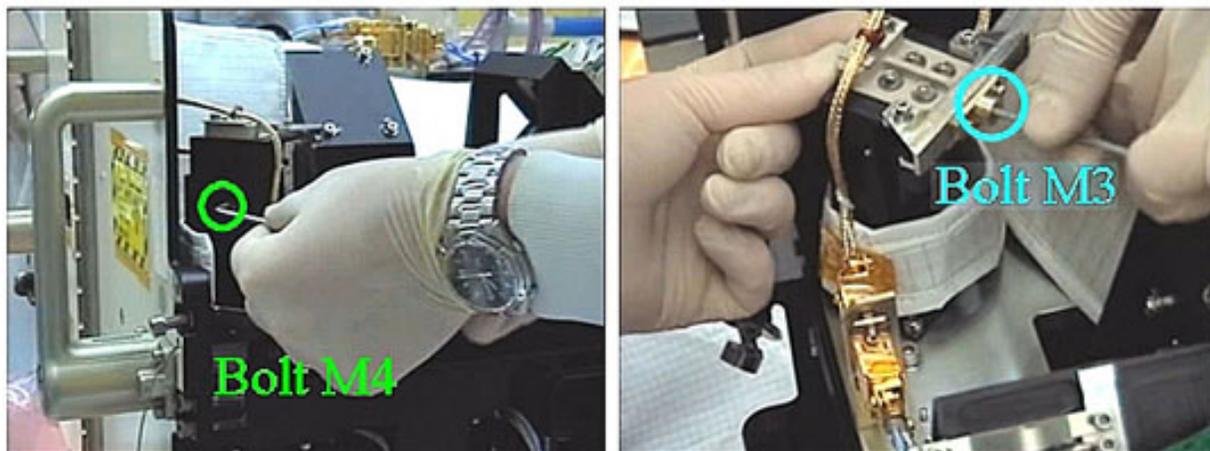


Figure 19. OU32 Bolts

2.310 FSL ODM SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 20 of 22 pages

NOTE

Locking of the "piezo in operation" M3 bolt is very important as this defines the reference position of the mirror in the optical path.

Loosen the M4 launch fixation bolt carefully (Driver Handle 1/4" Drive and M4 (3 mm) Hex Head Driver 1/4" Drive) as shown in Figures 18 and 19.

Push the PEEK piece under the UNC bolts in the direction of the arrow on the drawing. Refer to Figure 18. The piezo mirror is now free to move.

Lock the piezo in operation M3 bolt and put to torque to 50 cNm (Torque Driver Tohnichi LTD120CN 20-120cNm; Hex Shank 1/4" Drive; M3 (2.5 mm) Hex Head Driver 1/4" Drive; Universal Joint 1/4").

7. OU31 LAUNCH FIXATIONS REMOVAL

NOTE

OU31 is located on the drawer lower side. Refer to Figure 7 for its position.

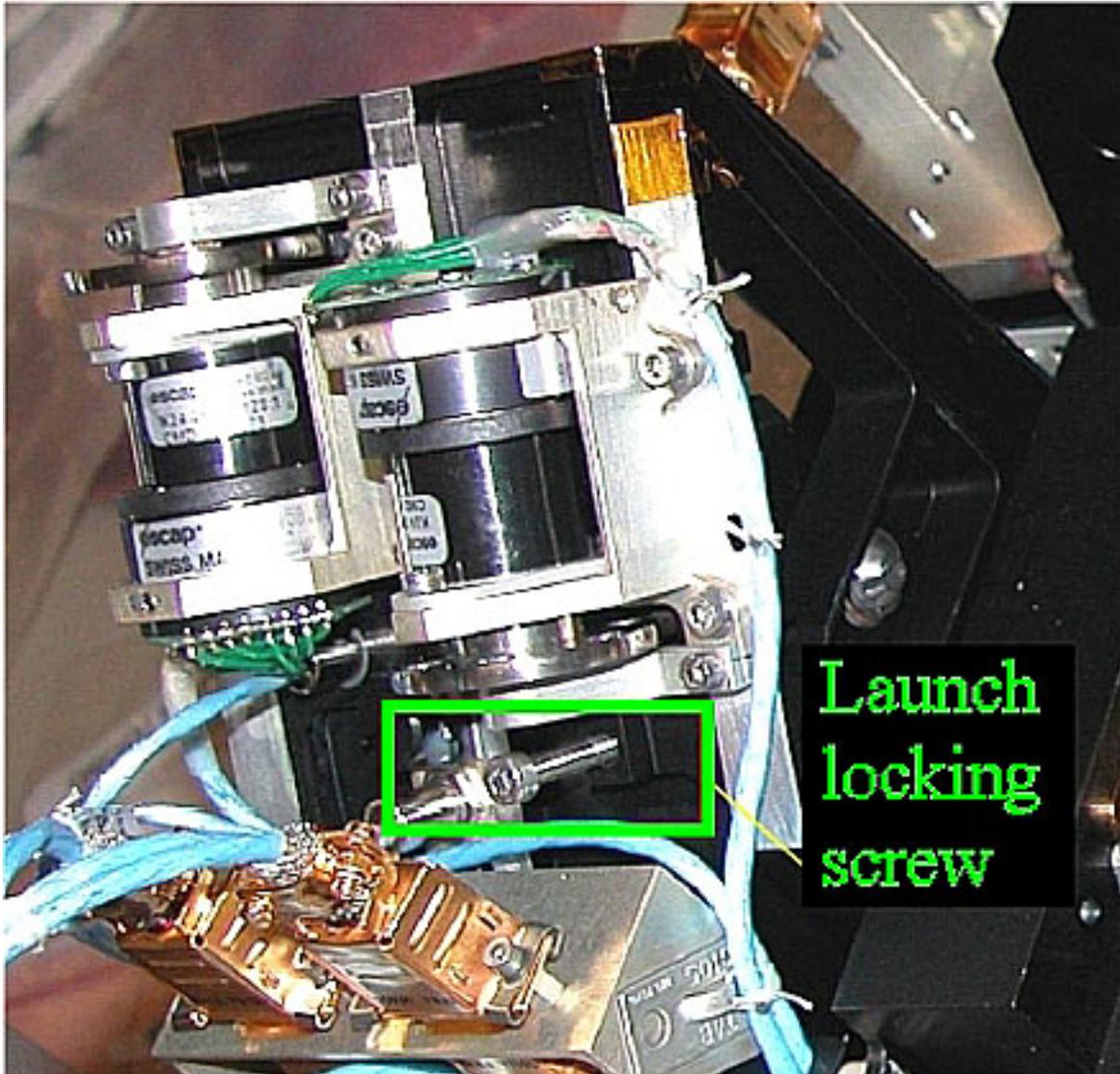


Figure 20. OU31 Launch Fixation

Loosen the launch fixation bolt of the mirror (self locking screw) until mirror holders are free to move (3mm ball tip L-Wrench). Refer to Figure 20.

8. [SOFT SHIELDS REMOVAL](#)

Soft shields: S/N: 001(002,003,005,007,008,010) → remove and stow in own Ziplock Bags.

√all soft shields S/N: 001(002,003,005,007,008,010) – removed and stowed

9. [ODM LAUNCH FIXATION REMOVAL INSPECTION](#)

√Laser ORU – installed and two connectors in place (Connectors and their final location are shown in Figure 16.)

OU12

√M4 launch fixation bolt – loose

√UNC4-40 bolts (four) – tight (locked to torque 45 cNm)

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(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 22 of 22 pages

OU31 √Mirror launch bolt – loose

OU32 √M4 launch fixation bolt – loose

√Peek piece – in operation position (per explanation given in step 6)

√M3 "Piezo in operation" bolt – locked to torque 50 cNm

10. ODM INTEGRATION IN RACK

NOTE

Drawer is closed when there is no gap between the front panel and the Facility Core Element structure.

Remove Columbus restraints from the drawer.

Insert ODM in its location in the FSL Rack.

Close the drawer by pushing the two Facility Core Element Handles. (At the end of this step the gap between the drawer and the Facility Core Element structure is 8 mm.)

Right Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench 3/8"; 8 mm Hex Head, 3/8" Drive) until the lock/unlock screw of the other handle comes +/- 3mm out of the handle, then go to the left handle.

Left Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench 3/8"; 8 mm Hex Head, 3/8" Drive) until the lock/unlock screw of the other handle comes +/- 3mm out of the handle, then go to the right handle.

Repeat until the drawer is completely closed.

Torque the handle lock/unlock screw to 4 Nm (40-200 in-lbs Trq Wrench, 3/8" Drive; 8 mm Hex Head, 3/8" Drive).

11. CLEANUP

Doff Silk Gloves

Remove Banisters (two) from the Columbus floor.

Tools and soft shields → stow

2.320 FSL CEM UPPER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 19 pages

OBJECTIVE:

Preparation of FSL for nominal operations after the FSL on board installation, by means of removal of the launch fixations from the ORUs related to the CEM Upper (Central Experiment Module Upper). The ORUs involved are the LSXZ (Light Sheet C11XZ), the MFMC (Mirror Front Mounted Camera) and Lamp 1. This procedure also foresees the installation of the E-box 3 (Electronic Box 3) Halogen Lamp.

DURATION:

75 minutes

CREW:

One

TOOLS:

ISS IVA Toolbox:

Drawer 2:

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

8 mm Hex Head, 3/8" Drive

Hex Shank, 1/4" Drive

Drawer 5:

8-1/4" Long, 2" Cut Scissors

Columbus Toolkit:

Tool Bag 1:

Torque Wrench 4-20 Nm

Tool Bag 2:

Ratchet Wrench 3/8" Drive

2" Extension 1/4" Drive

Ratchet Tool 3/8" Drive

Driver Handle 1/4" Drive

Tool Bag 3:

M3 (2.5 mm) Hex Head Driver 1/4" Drive

M4 (3 mm) Hex Head Driver 1/4" Drive

M5 (4 mm) Hex Head Driver 1/4" Drive

ITEMS:

E-Box 3 Lamp

Banister (two) P/N 9120C A 101-401

Adjustable Bungee Assembly P/N SEG33107626-306

Kapton Tape

Silk Gloves

1.5 mm L-Wrench

Torque Driver Tohnichi LTD120CN (20-120cNm)

2.320 FSL CEM UPPER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 2 of 19 pages

4 mm long L-Wrench

Soft Shields (S/N:001, 005, 007, 009, 010, 011, 014)

REFERENCED PROCEDURES:

2.340 FSL DRAWER HANDLE INSTALLATION

COL101 1. [CEM UPPER EXTRACTION AND FIXATION ON COLUMBUS FLOOR](#)

Verify sw RACK POWER – OFF

1.1 [Mounting the Facility Core Element Handles on the CEM Upper](#)

Perform [{2.340 FSL DRAWER HANDLE INSTALLATION}](#), all (ESA PODF: FSL RACK: NOMINAL), then:

1.2 [Mounting the Banisters](#)

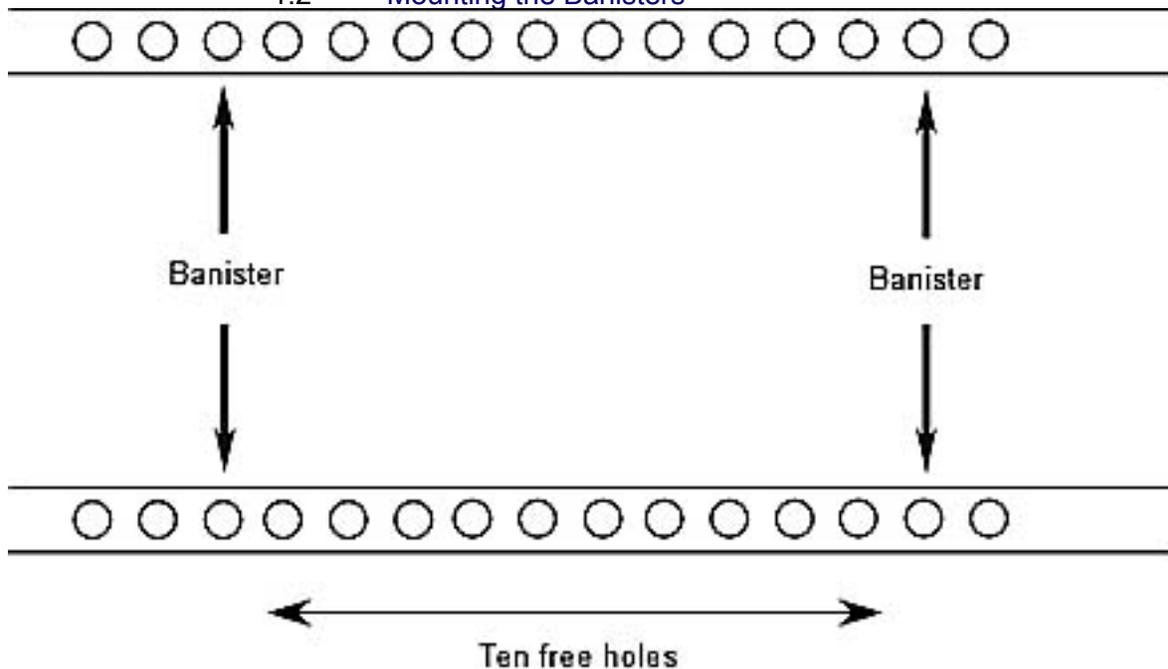


Figure 1. Seat Track and Distance Between Banisters



Figure 2. Banisters Mounted on Columbus Mockup Seat Tracks

Install Banisters (two), spaced out by ten free holes on Columbus Deck Rack (D2 or D3 racks) as shown in Figures 1 and 2.

1.3 [CEM Upper Drawer Extraction](#)

CAUTION

Silk Gloves must be worn to protect the optics from degradation due to inadvertent contact.

Don Silk Gloves.

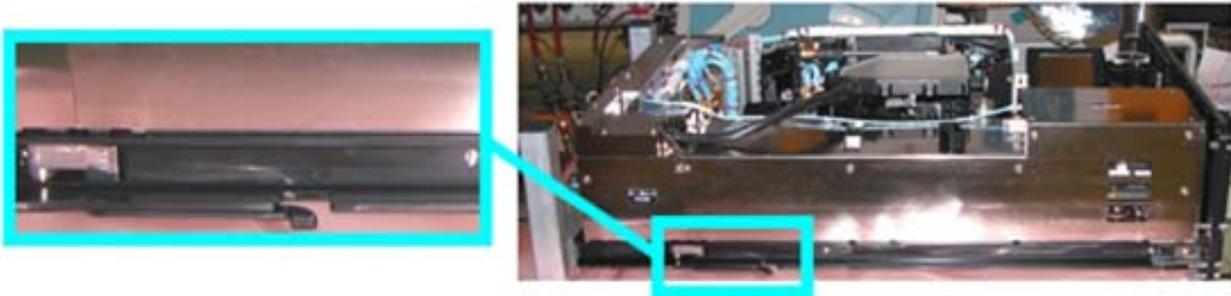


Figure 3. Drawer Extraction (the lower frame shows the location of the CEM Upper mechanical end stops)

NOTE

1. When the screws are loose, there is a gap of 8 mm between the drawer front panel and the Facility Core Element structure.

Right Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench, 3/8" Drive; 8 mm Hex Head Driver, 3/8" Drive).

Left Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench, 3/8" Drive; 8 mm Hex Head Driver, 3/8" Drive).

Repeat until both of the screws are completely loose.

2.320 FSL CEM UPPER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 5 of 19 pages

Open the drawer by pulling the handles, until the end stops are reached as shown in the upper part of Figure 3.

Remove the drawer completely by pressing the end mechanical stops (Refer to the lower part of Figure 3).

1.4 Drawer Fixation on the Columbus Floor Drawer front panel

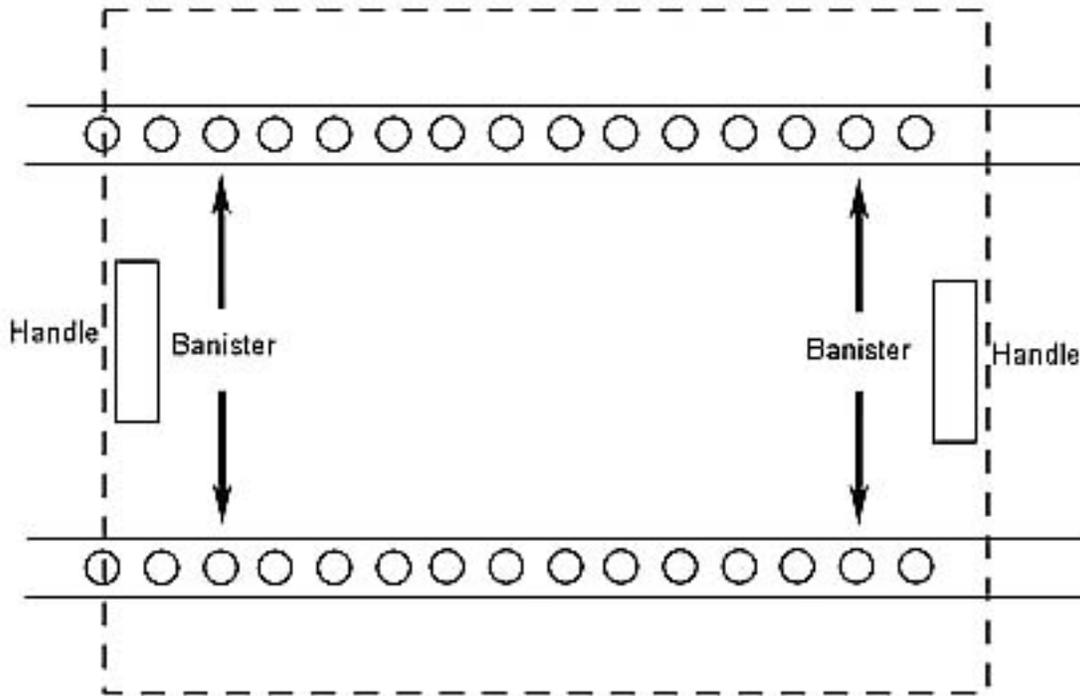


Figure 4. Relative Position of Banisters and Drawer Handles

NOTE

The following figure represents training model hardware. For this reason the details appearing on the drawer sides may exhibit some significant differences with respect to the flight hardware.



Figure 5. CEM Upper

Install the drawer on the banisters with its front panel parallel to the Columbus floor and its handles protruding into the space under the banisters as shown in Figure 4.

NOTE

To have both hands free, engage one hook on the Bungee cord while operating on the other.

Restrain the drawer to the banisters with its front panel facing rack panels (Adjustable Bungee Assembly) as shown in Figure 5.

√Drawer – safely locked

If not

Regulate Bungee length up to safely lock the drawer.

2.320 FSL CEM UPPER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 7 of 19 pages

2. CEM UPPER POST LAUNCH INSPECTION

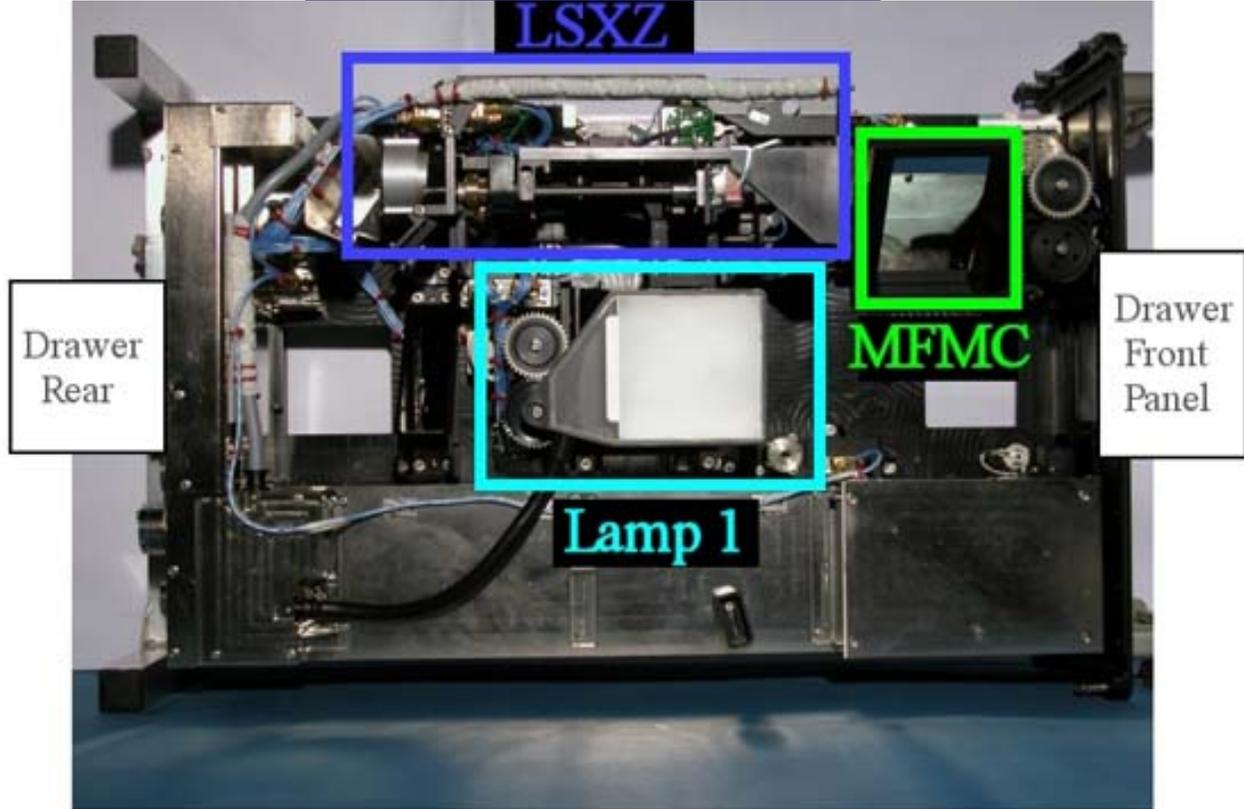


Figure 6. CEM Upper - Positions of LSXZ, MFMC and Lamp 1

Verify by inspection CEM Upper Items (mirrors, optical surfaces) – not damaged (no scattered parts or debris visible)

3. SOFT SHIELDS INSTALLATION

NOTE

Soft shields are installed on the optical elements by means of tape.
Pay attention not to put tape on lenses, mirrors and other optical surfaces. Dirty optics may not work correctly.

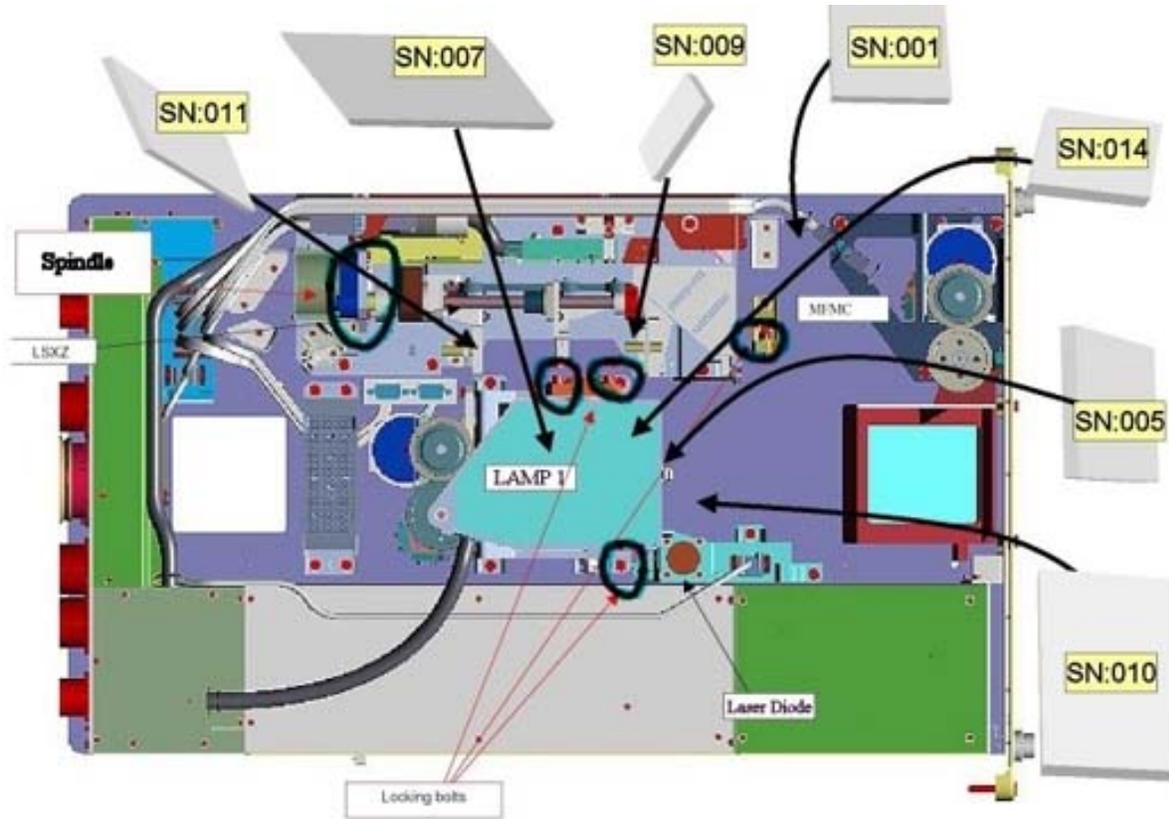


Figure 7. Soft Shields Installation Concept

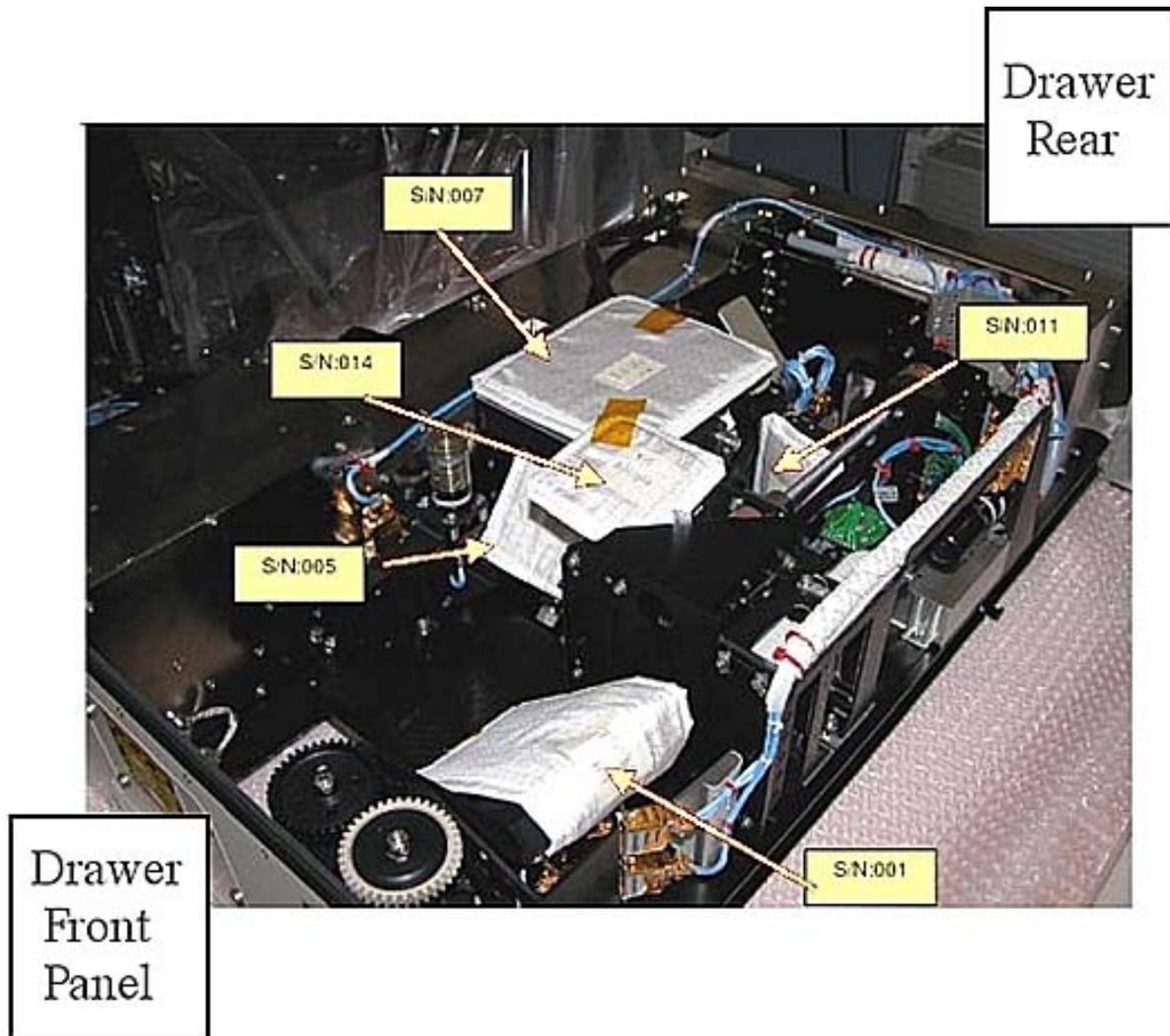


Figure 8. CEM Upper Soft Shields Positioning

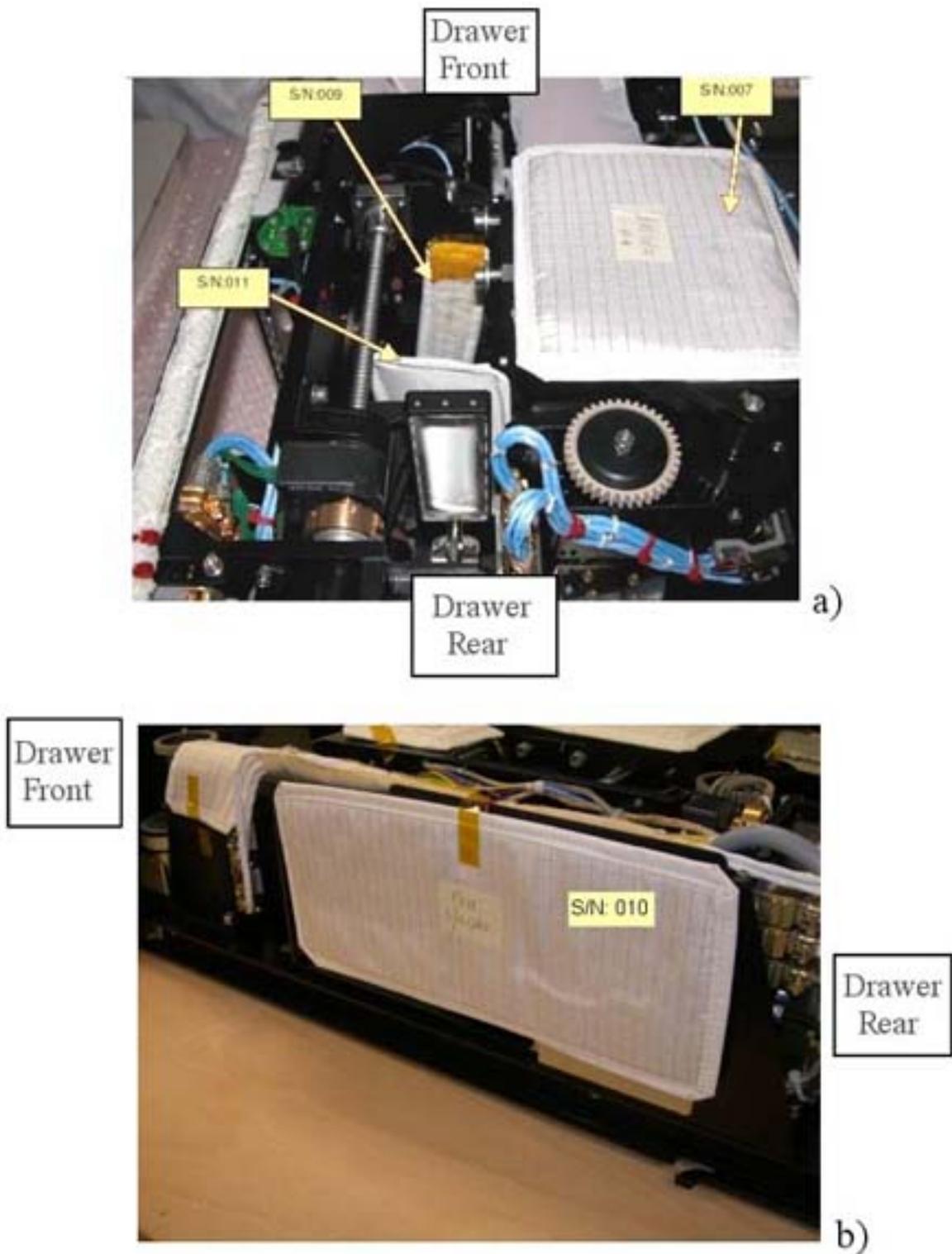


Figure 9. CEM Upper Soft Shields Positioning (Two Different Views)

Protect mirrors and lenses with soft shields by installing the elements S/N:001, 005, 007, 009, 010, 011, 014, as shown in Figures 7, 8 and 9.

4. LAMP 1 LAUNCH FIXATIONS REMOVAL

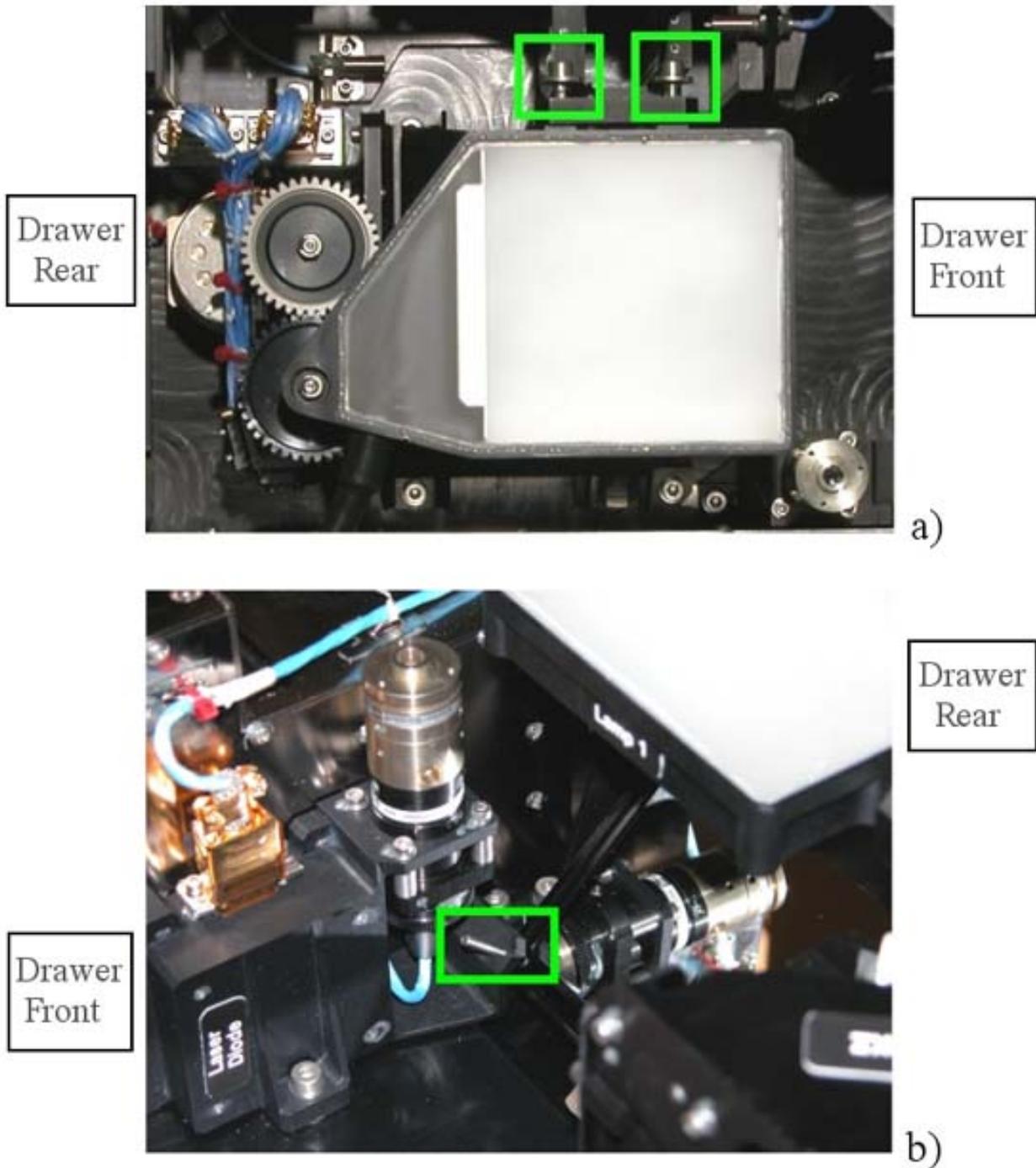


Figure 10. Lamp 1 Launch Fixations Bolts

Loosen completely the launch fixations captive bolts (two), (Figure 10, the green boxes in the upper part of the figure) of the background illumination (4 mm long L-Wrench).

NOTE

Active alignment launch fixation setscrew not captive.

Loosen the active alignment launch fixation setscrew (1.5 mm L-Wrench), shown by the green rectangle in the lower frame of Figure 10 until the mirror moves freely (by pushing).

5. **LSXZ LAUNCH FIXATIONS REMOVAL**

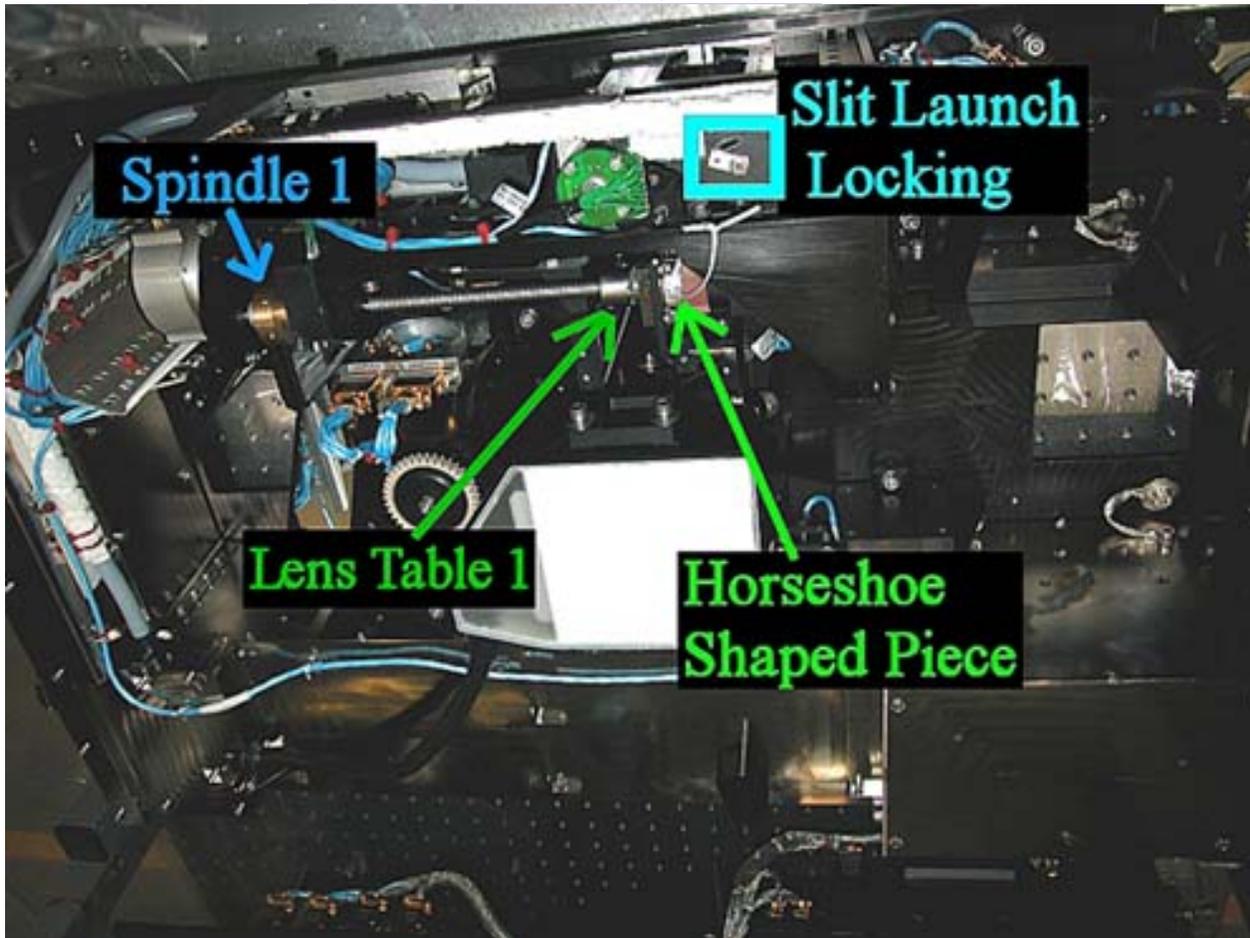


Figure 11. LSXZ With Launch Fixations

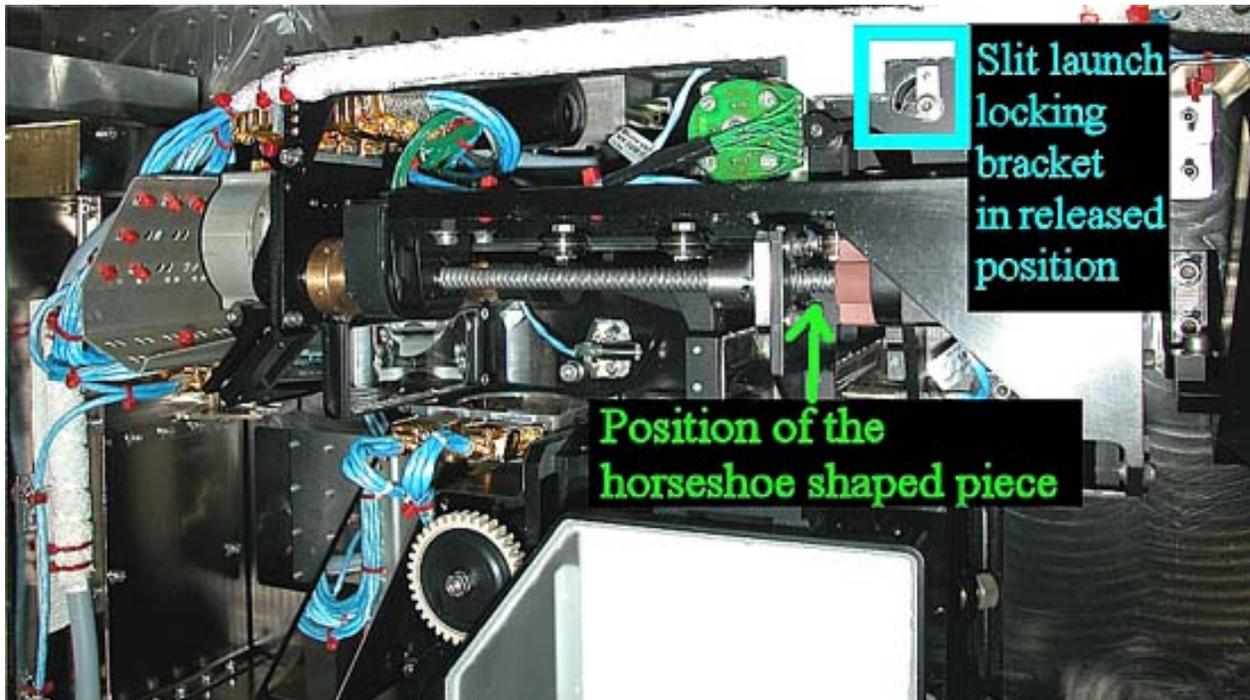


Figure 12. LSXZ - Operational Configuration With Launch Fixations Released or Removed

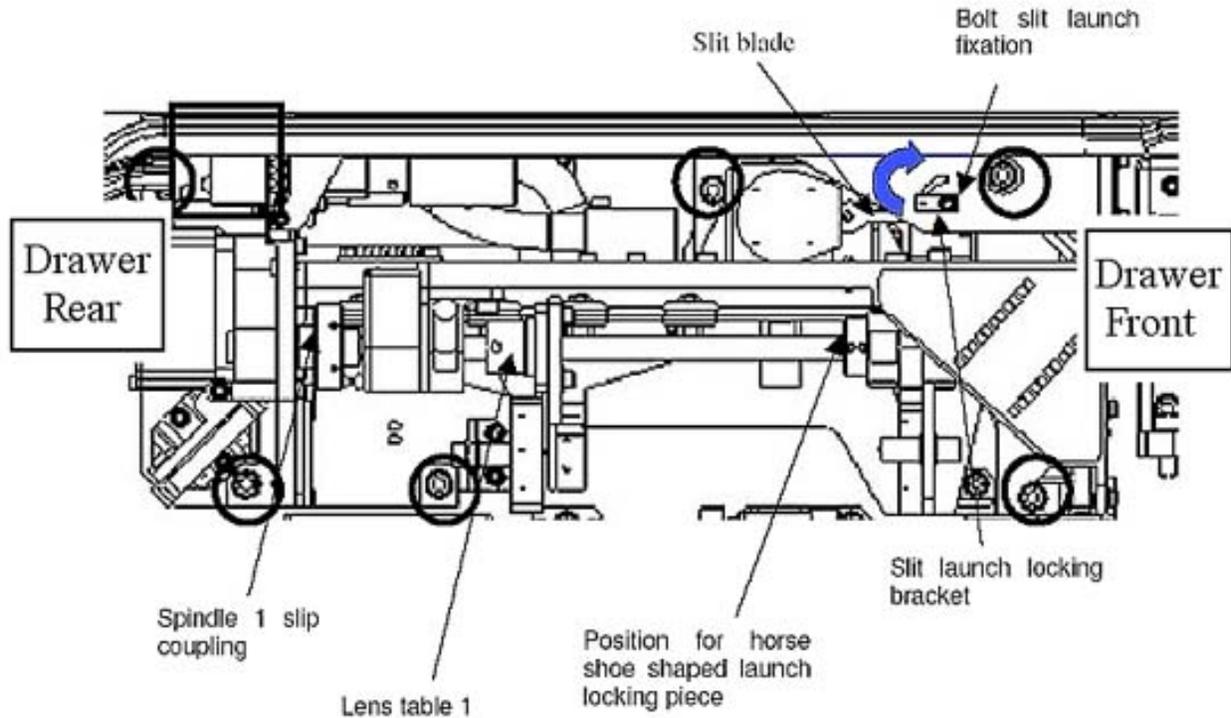


Figure 13. Launch Locking Positions Overview

5.1 Removing the Horseshoe Shaped Piece on Spindle 1

Turn (by hand) Spindle 1 until there is sufficient space between the spindle hardstop (at the switch side) and the Lens Table 1 (indicated in Figure 11) so that the horseshoe shaped piece can be removed (Refer to Figures 11 and 12).

Cut the leasing tape (scissors).

Remove horseshoe-shaped piece which should have become loose (Figures 11 and 12).

Horseshoe-shaped piece → temporarily stow.

5.2 Slit Launch Fixation Unlocking

Unscrew (two turns) the slit launch fixation bolt (Driver Handle, 1/4" drive; 2.5 mm Hex Head Driver). Refer to Figures 11, 12 and 13.

Push the slit launch-locking bracket in the direction as indicated in Figure 13 with the blue arrow (the released position is shown in Figure 12).

Lock the slit launch fixation bolt and torque to 7 in-lb (2.5 mm Hex Head Driver; 5-35 in-lb Torque Driver, 1/4" Drive; 2" Extension, 1/4" Drive).

6. MFMC LAUNCH FIXATIONS REMOVAL

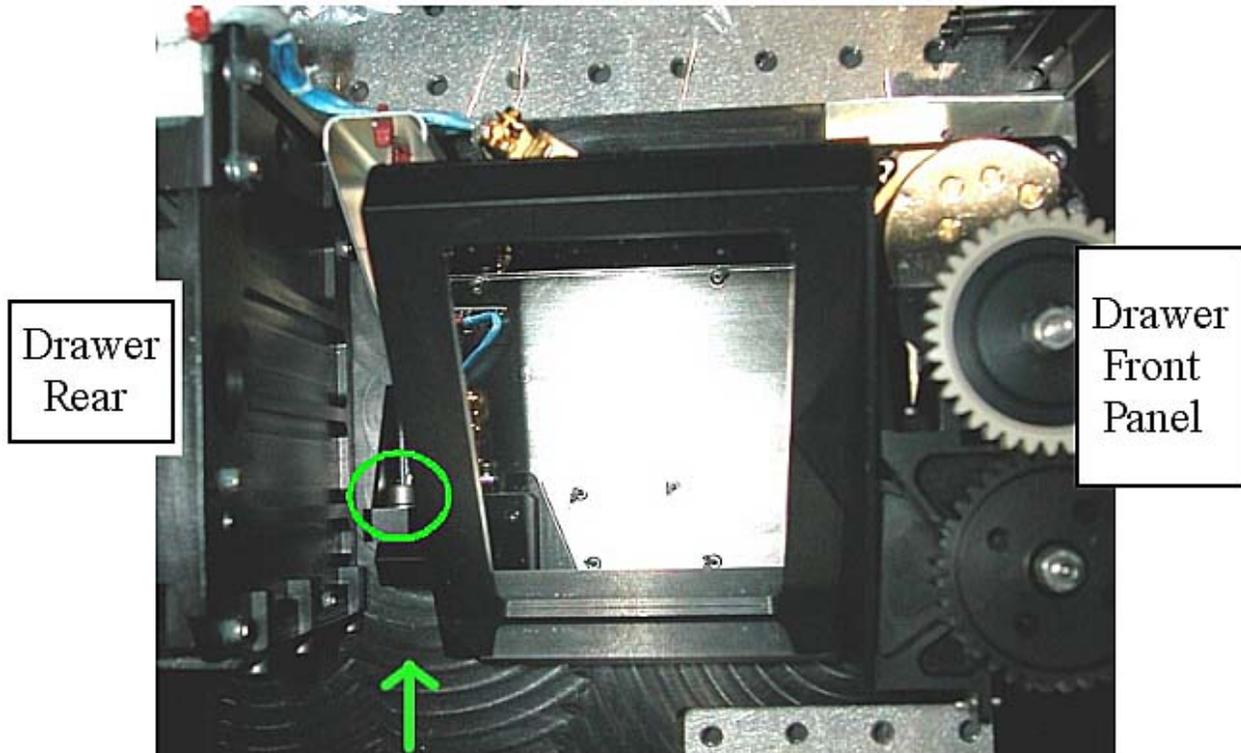


Figure 14. MFMC Launch Fixation Bolt Position

2.320 FSL CEM UPPER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 15 of 19 pages

Loosen the launch fixation bolt (captive) completely (4 mm long L-Wrench). Refer to Figure 14 within the green circle.

7. E-BOX 3 LAMP INSTALLATION

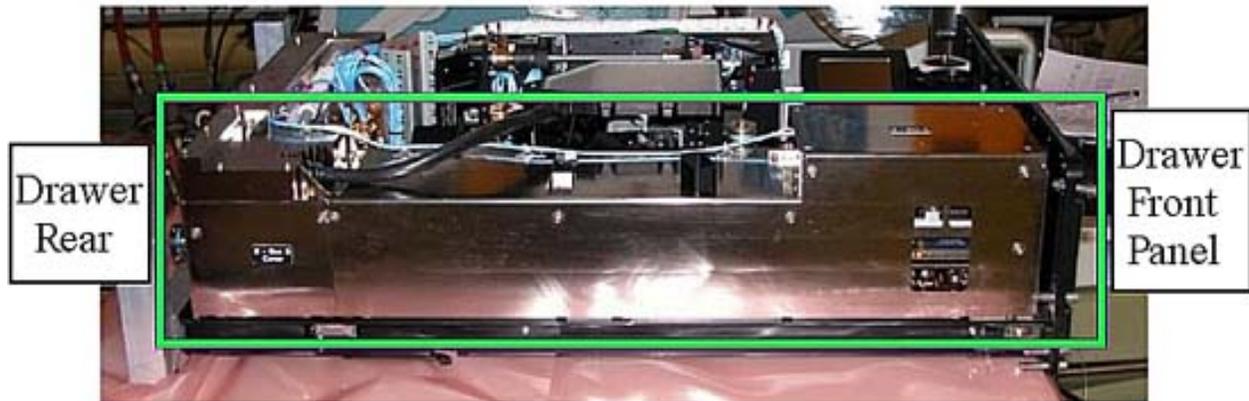


Figure 15. E-Box Identification in CEM Upper

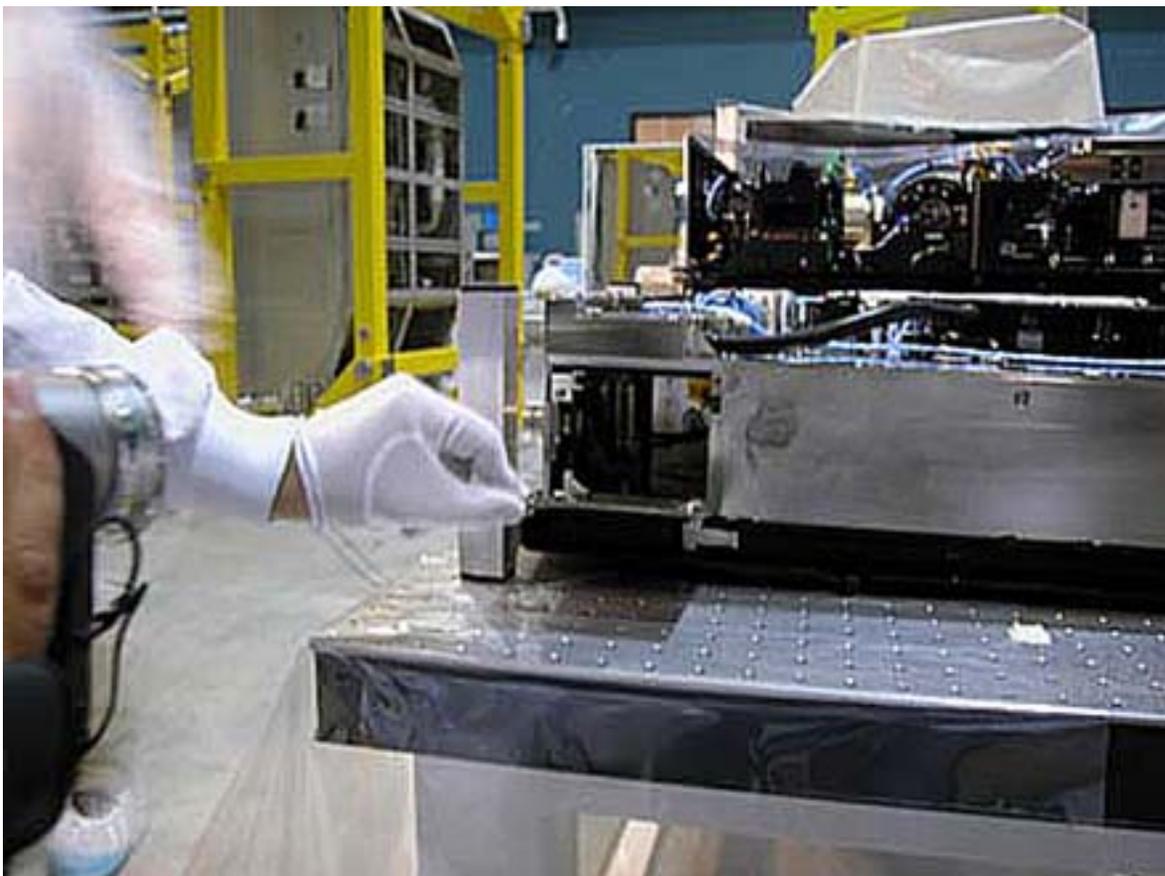


Figure 16. FSL E-Box 3 Lamp Holder



Figure 17. Lamp Insertion



Figure 18. Lamp Fixation

Open the cover of E-Box 3 (Figure 16) by loosening the (two) M4 bolts (Driver Handle ¼" Drive; 3 mm Hex Head Driver, ¼" Drive).

WARNING

Fragments of damaged items may float out.

Verify by inspection the E-Box 3 Lamp – not damaged (no scattered parts visible through the transparent envelope)

If no anomalies are found

Remove packaging.

On the lamp unit, unscrew the (two) bolts of the sliding mechanism (Driver Handle ¼" Drive; 2.5 mm Hex Head Driver, 1/4" Drive).

Slide the lamp housing back in its place (Figure 17).

Tighten the (two) bolts of the sliding mechanism (Torque Driver Tohnichi LTD120CN (20-120cNm); Hex shank, ¼" Drive; 2.5 mm Hex Head Driver, 1/4" Drive). Put on torque to 40 cNm. Refer to Figure 18.

2.320 FSL CEM UPPER SETUP

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Close the cover of E-Box 3 and fasten (5-35 in-lb Torque Driver, 1/4" Drive; 2" Extension, 1/4" Drive; 3 mm Hex Head Driver) the two bolts of the cover to 7 in-lb.

8. SOFT SHIELDS REMOVAL

Soft shields: S/N: 001, 005, 007, 009, 010, 011, 014 → remove and stow in own ziplock bags.

9. CEM UPPER LAUNCH FIXATIONS REMOVAL INSPECTION

CAUTION

Incomplete or incorrect CEM Upper setup will result in serious damage to the facility.

- | | | |
|--------|-----|--|
| Lamp 1 | 9.1 | √Launch fixation captive bolts (two) – completely loosen |
| | 9.2 | √Active alignment launch fixation setscrew – loose |
| LSXZ | 9.3 | √Horse-shoe shaped piece on Spindle 1 – removed |
| | 9.4 | √Slit launch locking – released |
| MFMC | 9.5 | √Launch fixation captive bolt – completely loose |
| Ebox-3 | 9.6 | √Halogen Lamp – Installed |
| | 9.7 | √E-Box 3 cover – replaced and bolts (two) fastened |

10. CEM UPPER INTEGRATION IN RACK

NOTE

The drawer is closed when there is no gap between the front panel and the Facility Core Element structure.

Remove Columbus restraints from the drawer.

Insert CEM Upper in its location in the FSL Rack.

Close the drawer by pushing the two Facility Core Element Handles (at the end of this step the gap between the drawer and the Facility Core Element structure is 8 mm).

Right Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench, 3/8" drive; 8 mm Hex Head Driver, 3/8" drive) until the lock/unlock screw of the other handle comes +/- 3mm out of the handle, then go to the left handle.

Left Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench, 3/8" drive; 8 mm Hex Head Driver, 3/8" drive) until the lock/unlock screw of the other handle comes +/- 3mm out of the handle, then go to the right handle.

2.320 FSL CEM UPPER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

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||
└─ Repeat until the drawer is completely closed.

Torque the handle lock/unlock screw to 4 Nm (4-20 Nm Trq Wrench, Ratchet Tool 3/8"; 8 mm Hex Head drivers, 3/8" Drive).

11.

CLEANUP

Doff Silk Gloves.

Remove banisters (two) from the Columbus floor.

Tools, soft shields and Horseshoe-shaped piece →stow

Update IMS with stowage location of Horseshoe-shaped piece or notify COL-CC.

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2.330 FSL CEM LOWER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 1 of 33 pages

OBJECTIVE:

Preparation of FSL for nominal operations after the FSL on board installation, by means of removal of the launch fixations from the ORUs related to the CEM Lower (Central Experiment Module Lower). The following ORUs are involved: Fresnel Diffuser, M1, Prism XZ, Prism XY, FMU (Front Mounted Unit), M5, LSXY (Light Sheet XY) and M4. This procedure also foresees the installation of the E-box 4 (Electronic Box 4) Halogen Lamp and the preparation of the EC (Experiment Container) volume.

DURATION

120 minutes

CREW

one

TOOLS

ISS IVA Toolbox

Drawer 1:

13 mm Crowfoot Wrench, 3/8" Drive

10 mm Combination Wrench

Drawer 2:

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

8 mm Hex Head Driver, 3/8" Drive

Drawer 5:

Scissors, 2" Cut Length, 8-1/4" Long

Columbus Toolkit

Tool Bag 1:

Ratchet Wrench, 1/4" Drive

4-20 Nm Torque Wrench

Tool Bag 2:

Ratchet Wrench, 3/8" Drive

2" Extension, 1/4" Drive

10" Extension, 1/4" Drive

Driver Handle 1/4" Dr.

L-Wrench from Metric Folding Hex Key Set (2.5,3,4,5,6,8,10 mm ball tip)

Tool Bag 3:

Ratchet Tool 3/8"

Adaptor 1/4" Female to 3/8" Male

2.5 mm Hex Head Driver, 1/4" Drive

3 mm Hex Head Driver, 1/4" Drive

4 mm Hex Head Driver, 1/4" Drive

5 mm Hex Head Driver, 1/4" Drive

ITEMS

2.330 FSL CEM LOWER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

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E-Box 4 Lamp

Banister (two) P/N 9120C A 101-401

Adjustable Bungee Assembly P/N SEG33107626-306

Kapton Tape

Teflon tape

Silk Gloves

2mm Extra Long Hex Head Driver

Soft Shields (S/N:001, 005, 006, 007, 009, 010, 012, 013 and 014)

REFERENCED PROCEDURES:

2.340 FSL DRAWER HANDLE INSTALLATION

COL101 1. [FRONT LAUNCH FIXATIONS REMOVAL](#)

Verify sw RACK POWER – OFF

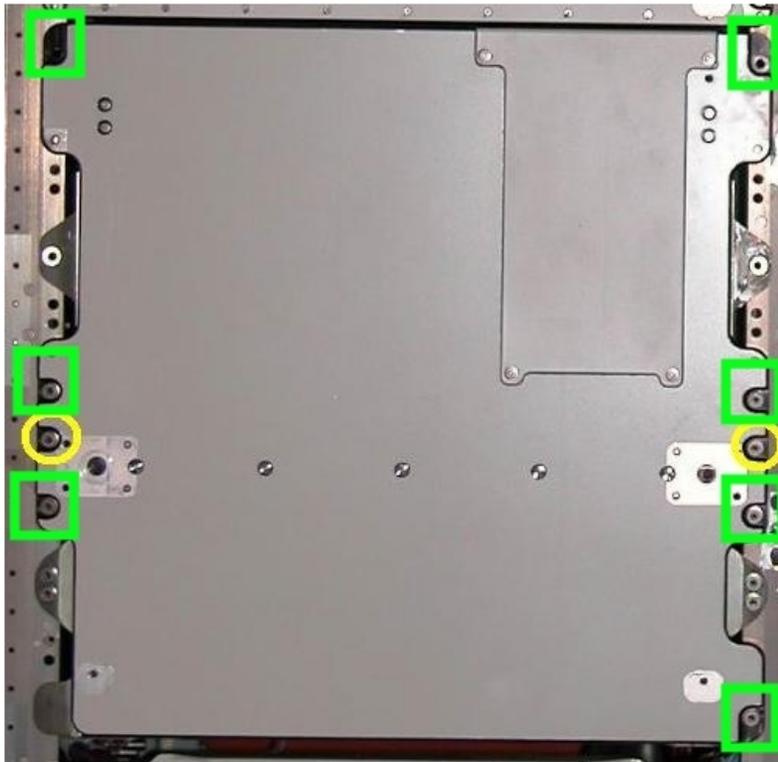


Figure 1. CEM Lower Front Launch Fixations (left) and example of loose bolt protected with tape (right)

1.1 [Bolts Disengagement](#)

NOTE

The two bolts enclosed in the yellow circles in Figure 1 remain unscrewed in this phase

2.330 FSL CEM LOWER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC) Page 3 of 33 pages

Disengage the (seven) launch captive bolts (5 mm Hex Head Drivers, 1/4" drive and Driver Handle, 1/4" Drive), see Figure 1 (bolts enclosed in the green boxes).

1.2 [Bolt Protection](#)

Wrap the thread of the (seven) loose launch bolts with Teflon Tape.

Wrap Kapton Tape around Teflon tape and the head of the (seven) loose launch bolts.

2. [CEM LOWER EXTRACTION AND FIXATION ON COLUMBUS FLOOR](#)

2.1 [Mounting the Facility Core Element Handles on the CEM Lower](#)

Perform [{2.340 FSL DRAWER HANDLE INSTALLATION}](#), all (FSL Rack:Nominal), then

2.2 [Mounting the banisters](#)

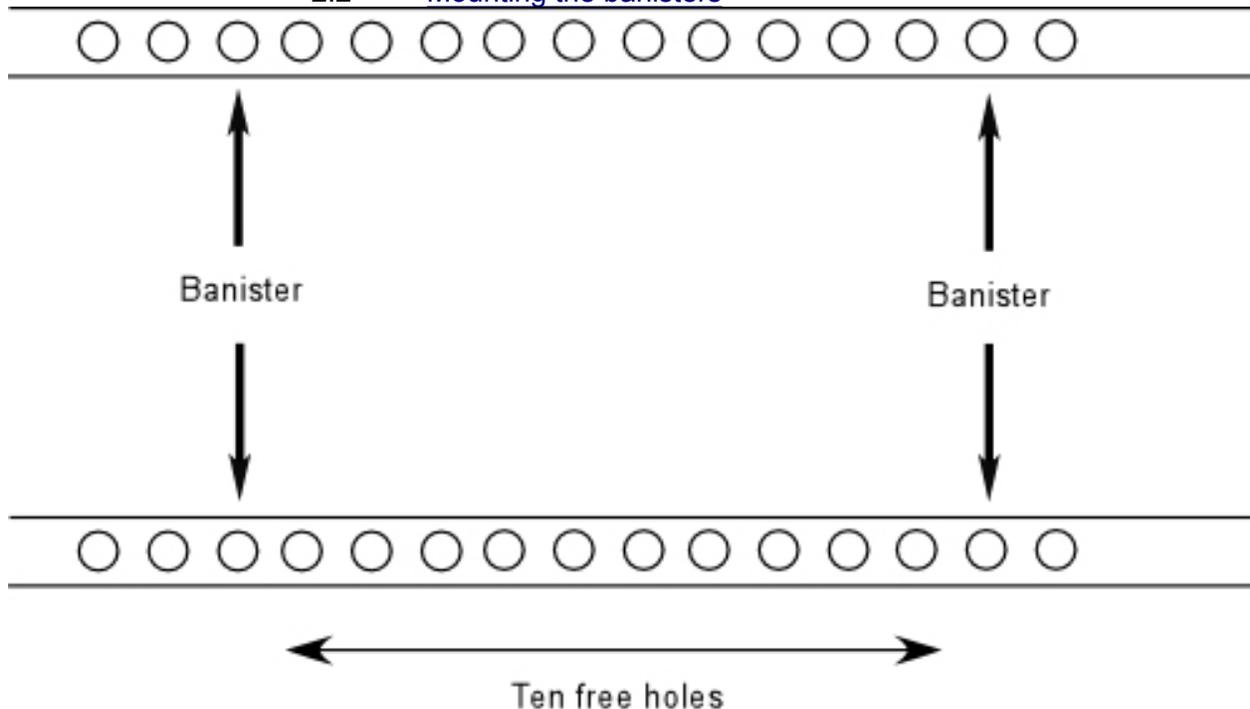


Figure 2. seat track and distance between the banisters

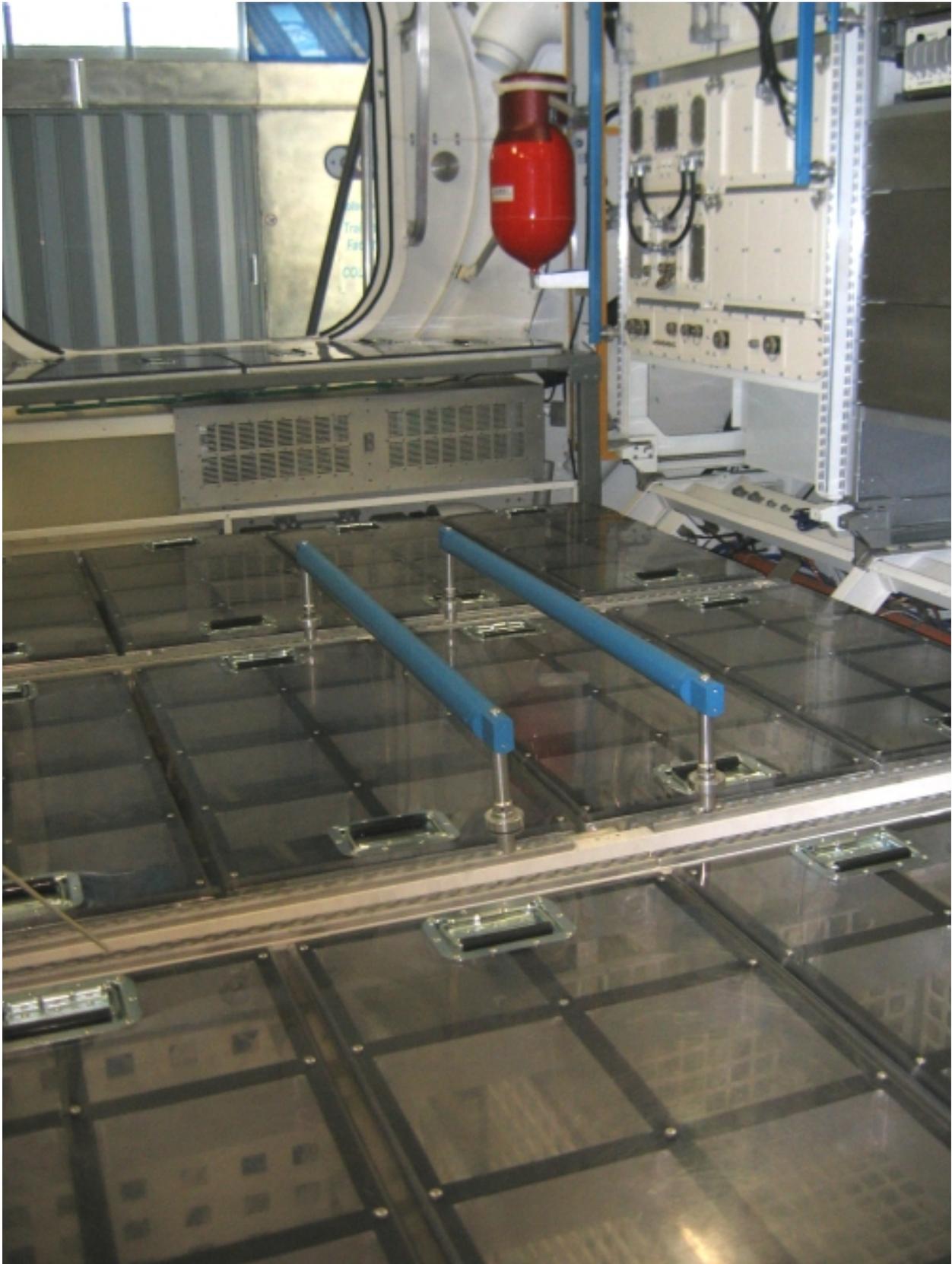


Figure 3. Banisters mounted on Columbus Mock Up seat tracks

Install banisters (two), spaced out by ten free holes on Columbus Deck Rack (D2 or D3 racks) as shown in Figures 2 and 3.

2.3 [CEM Lower Drawer Extraction](#)

CAUTION

Silk Gloves must be worn to protect the optics from degradation due to inadvertent contact.

Don Silk Gloves.

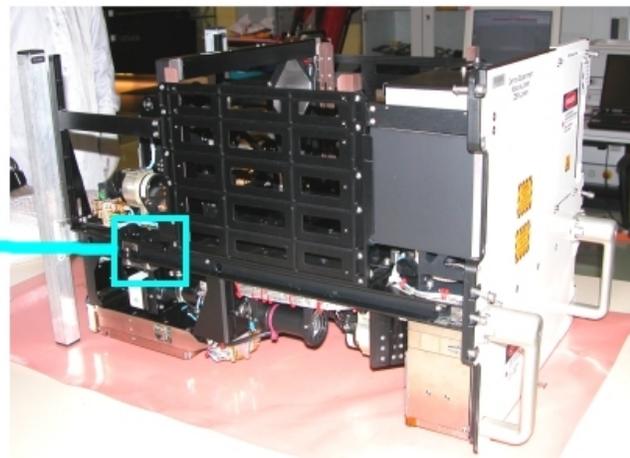
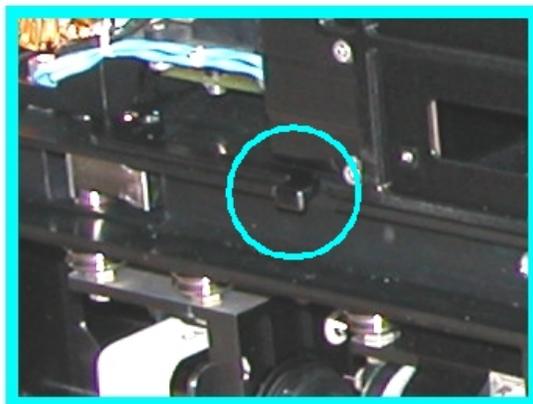


Figure 4. Drawer Extraction (the lower frame shows the location of the mechanical end stops)

2.330 FSL CEM LOWER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

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NOTE

1. When the screws are loose there is a gap of 8 mm between the drawer front panel and the Facility Core Element structure

Right Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench, 3/8" drive; 8 mm Hex Head Driver, 3/8" drive).

Left Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench, 3/8" drive; 8 mm Hex Head Driver, 3/8" drive).

Repeat until both the screws are completely loose.

Open the drawer by pulling the handles, until the end stops are reached as shown in the upper part of Figure 4.

Remove the drawer completely by pressing the end mechanical stops (see the lower part of Figure 4).

2.4 [Drawer Fixation on the Columbus Floor](#)

Drawer front panel

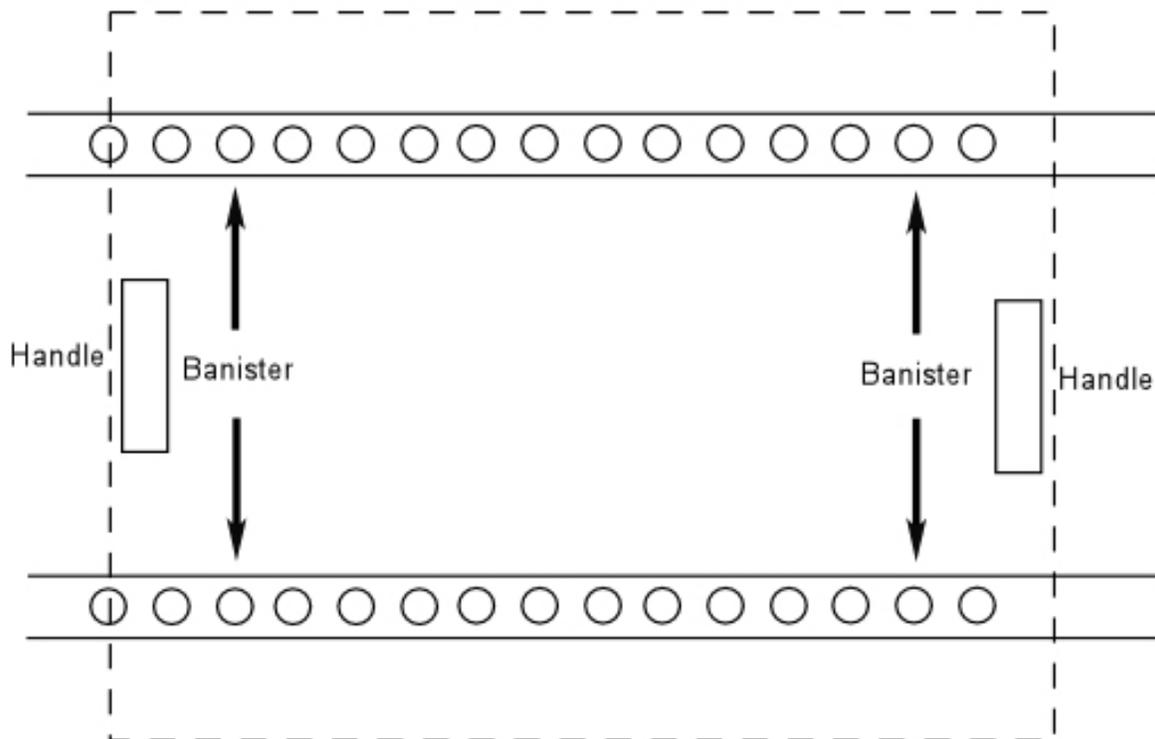


Figure 5. Relative position of banisters and Drawer handles

2.330 FSL CEM LOWER SETUP

(ASSY PAYLOAD/1E/FIN/MULTI E/HC)

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NOTE

The following Figure represents Training Model hardware. For this reason the details appearing on the Drawer sides may exhibit some significant differences with respect to the Flight hardware.

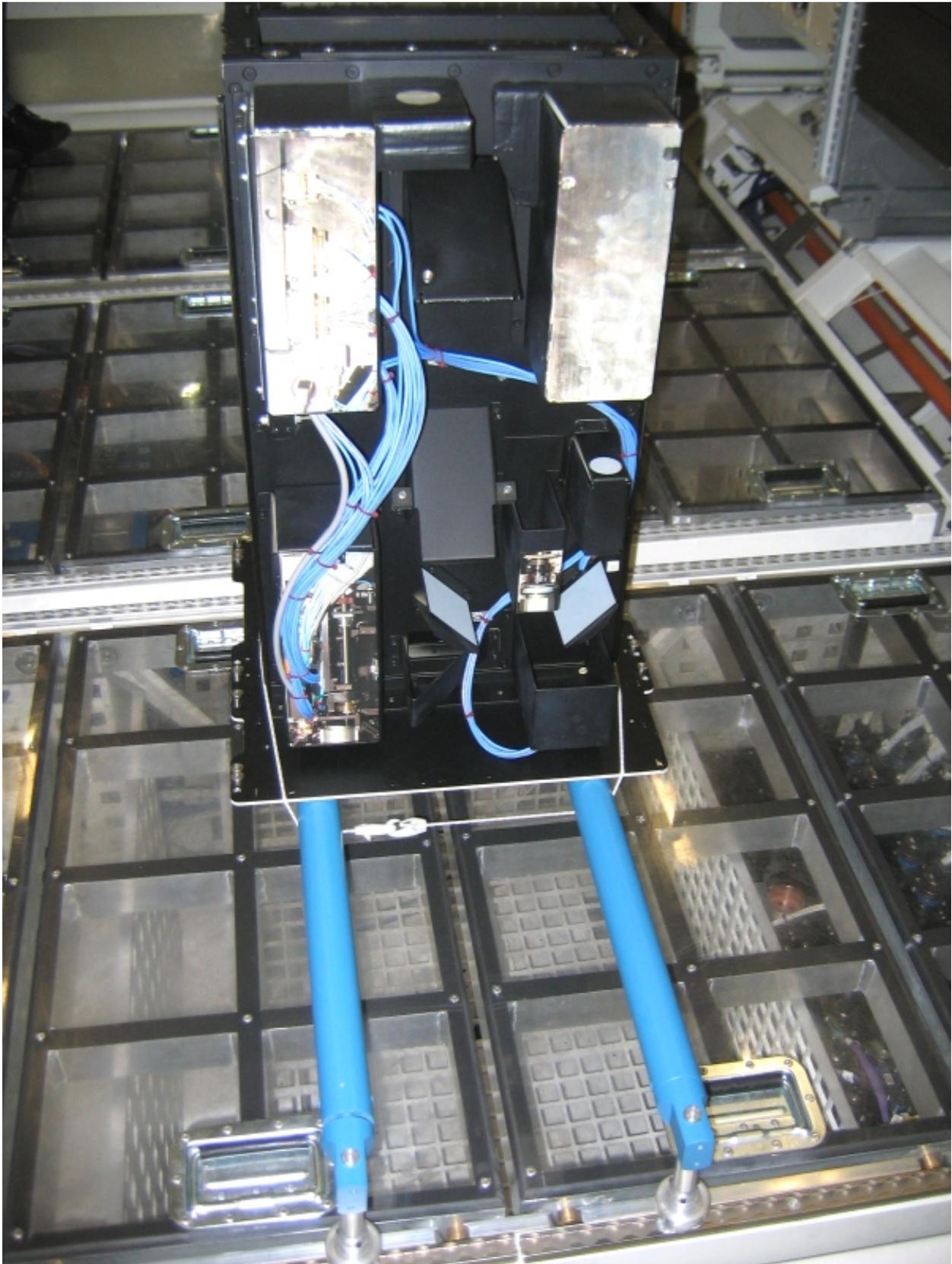


Figure 6. CEM Lower

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Install the Drawer on the banisters with its front panel parallel to the Columbus floor and its handles protruding into the space under the banisters as shown in Figure 5.

NOTE

To have both hands free, engage one hook on the bungee cord while operating on the other.

Restrain the Drawer to the banisters with its front panel facing rack panels (Adjustable Bungee Assembly) as shown in Figure 6.

√Drawer – safely locked

If not

Regulate bungee length up to safely lock the drawer

3. CEM LOWER POST LAUNCH INSPECTION

Verify by inspection CEM Lower Items (mirrors, optical surfaces) – not damaged (no scattered parts visible)

4. SOFT SHIELDS INSTALLATION ON CEM LOWER TOP SIDE

NOTE

Pay attention not to put tape on lenses, mirrors and other optical surfaces. Dirty optics may not work correctly.

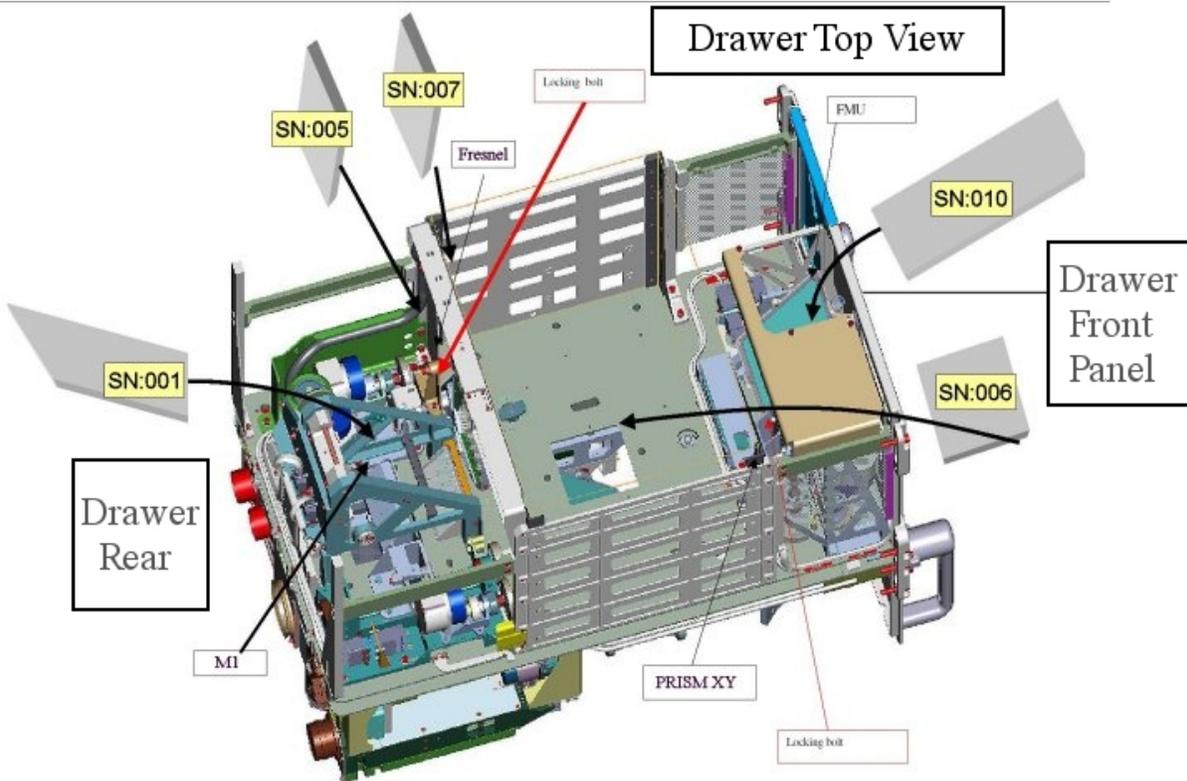


Figure 7. CEM Lower soft shields installation concept (top side)

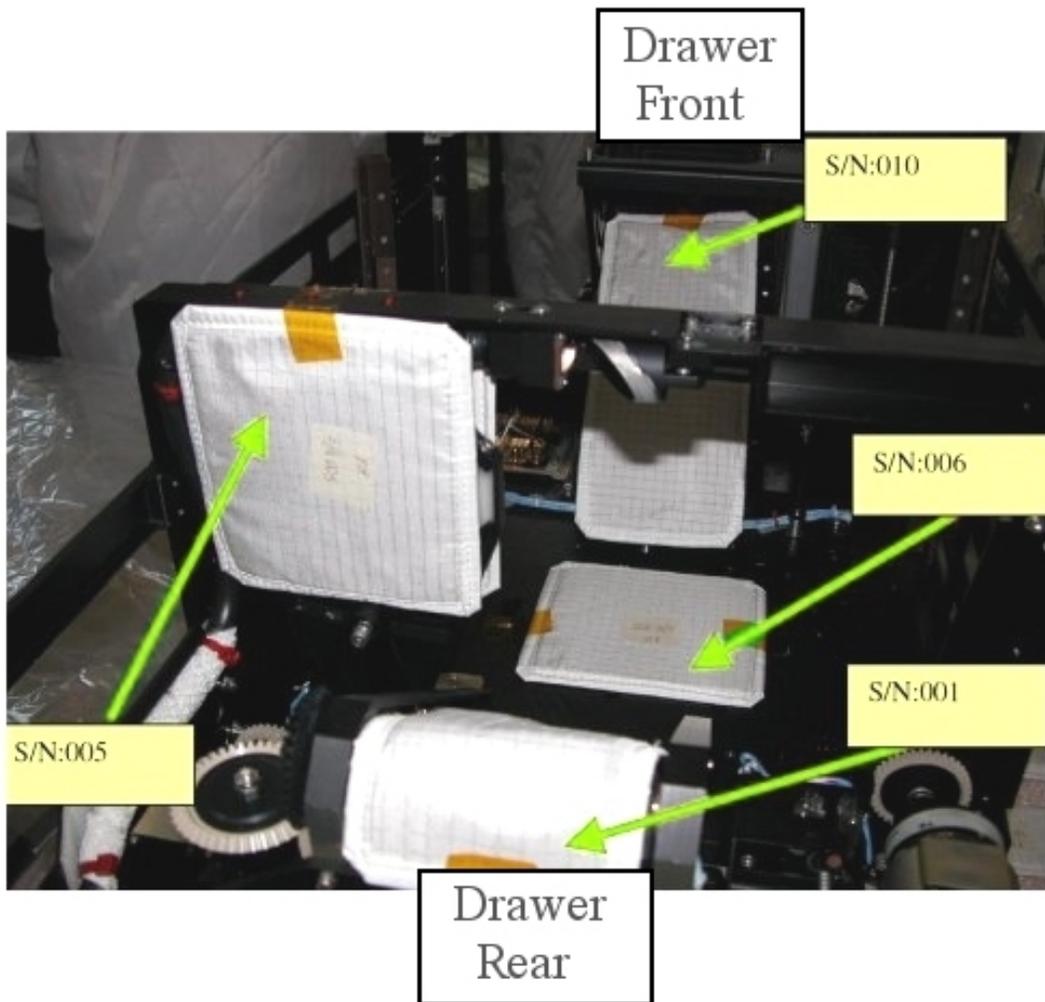


Figure 8. CEM Lower soft shields installation

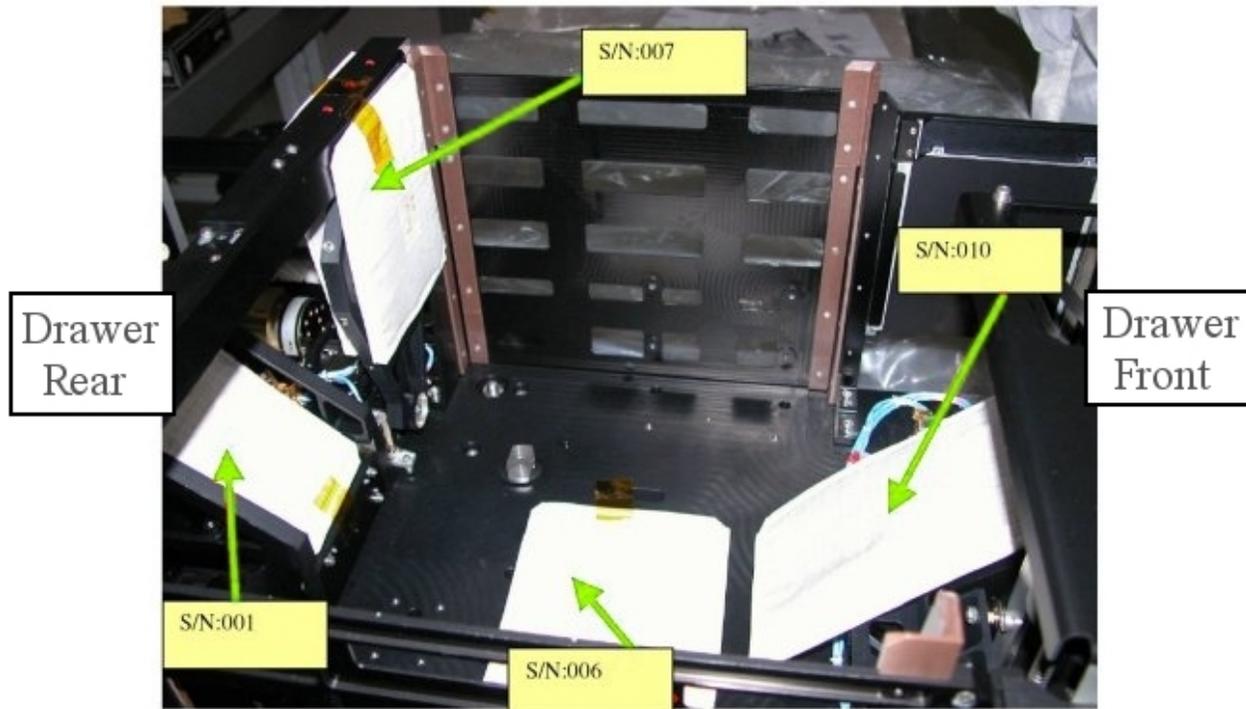


Figure 9. CEM Lower soft shields installation, a different view

Protect mirrors and lenses with soft shields installing the elements S/N: 001, 005, 006, 007, 010, as shown in Figures 7, 8 and 9.

5. CEM LOWER TOP SETUP

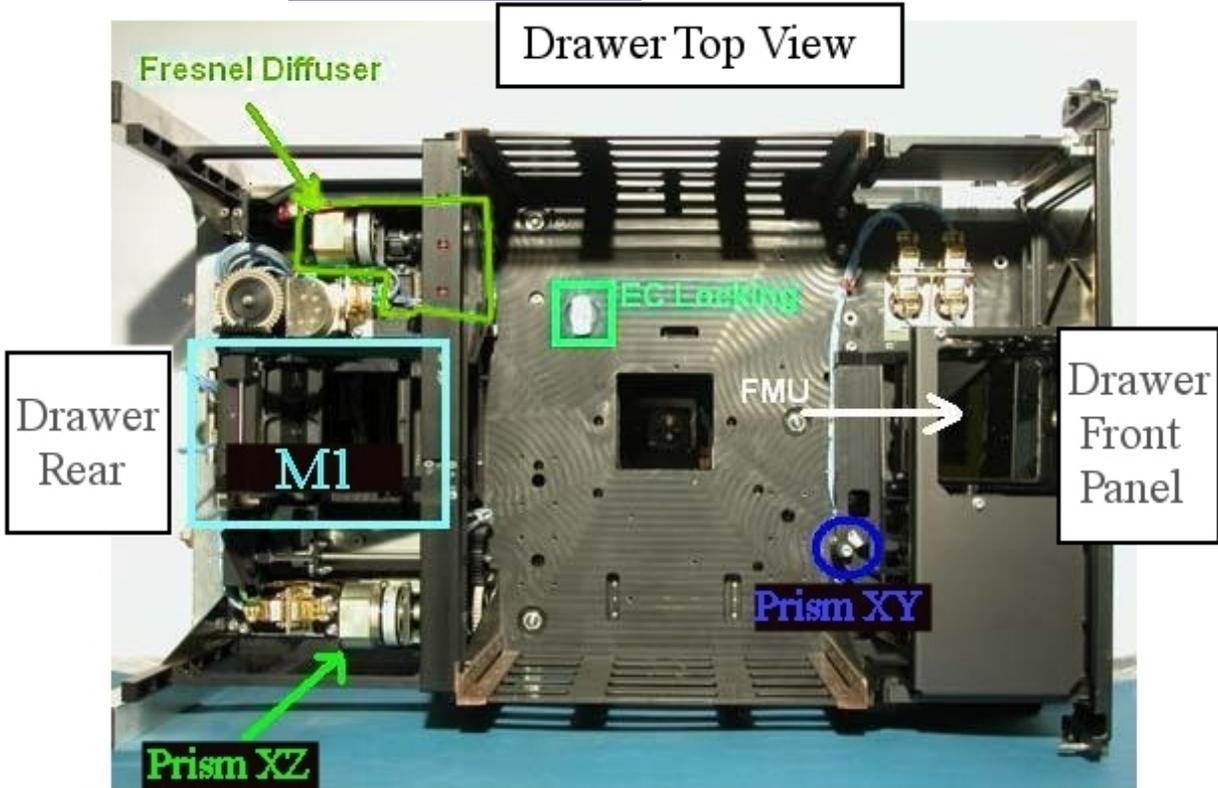


Figure 10. CEM Lower - Top view showing the positions of Fresnel Diffuser, M1, Prism XZ, Prism XY and FMU.

5.1 [Fresnel Diffuser Launch Fixation Removal](#)

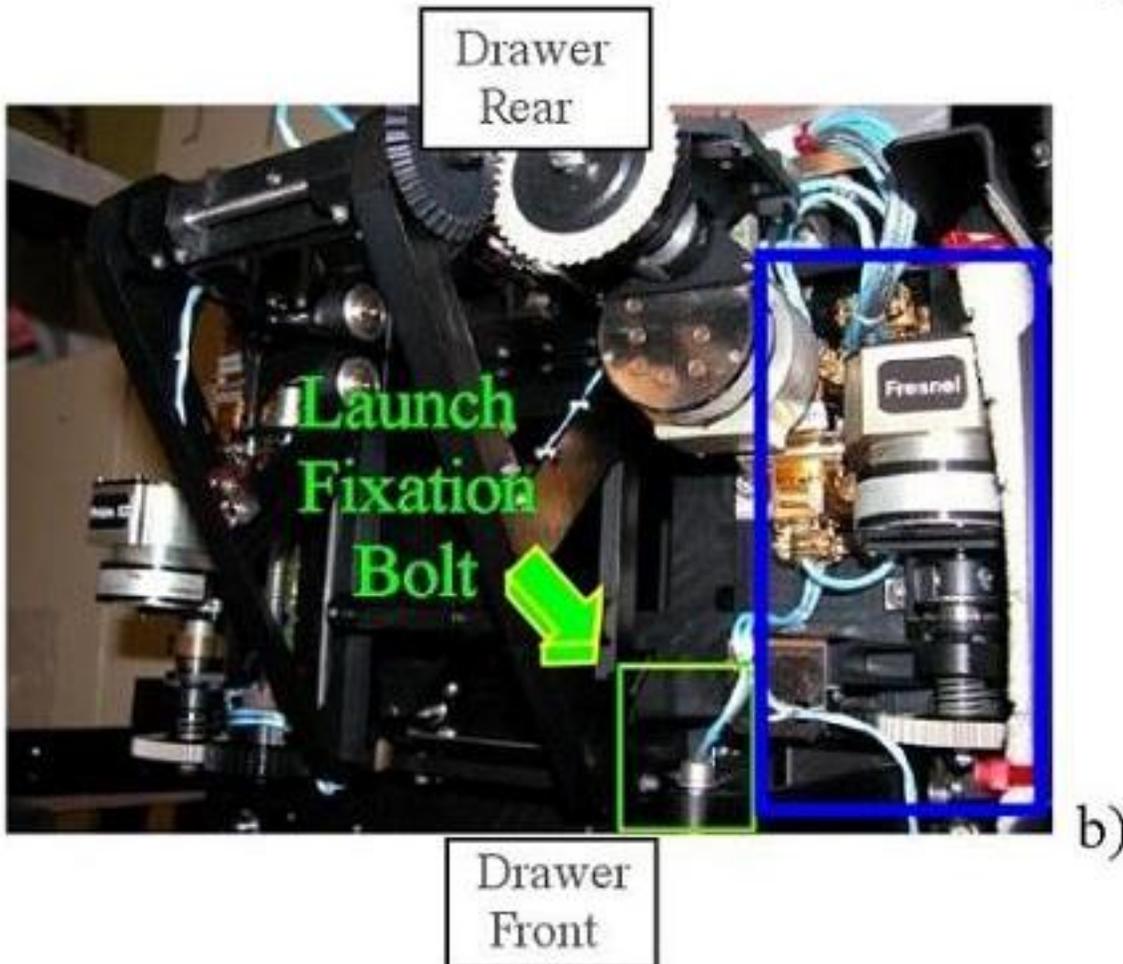


Figure 11. Fresnel Diffuser (two views)- frame (b) shows the launch fixation bolt

Loosen the launch fixation bolt of the diffuser completely (captive) (Driver handle, 1/4" Drive and 4 mm Hex Head Driver, 1/4" Drive), see Figure 11.

5.2 M1 Launch Fixation Removal

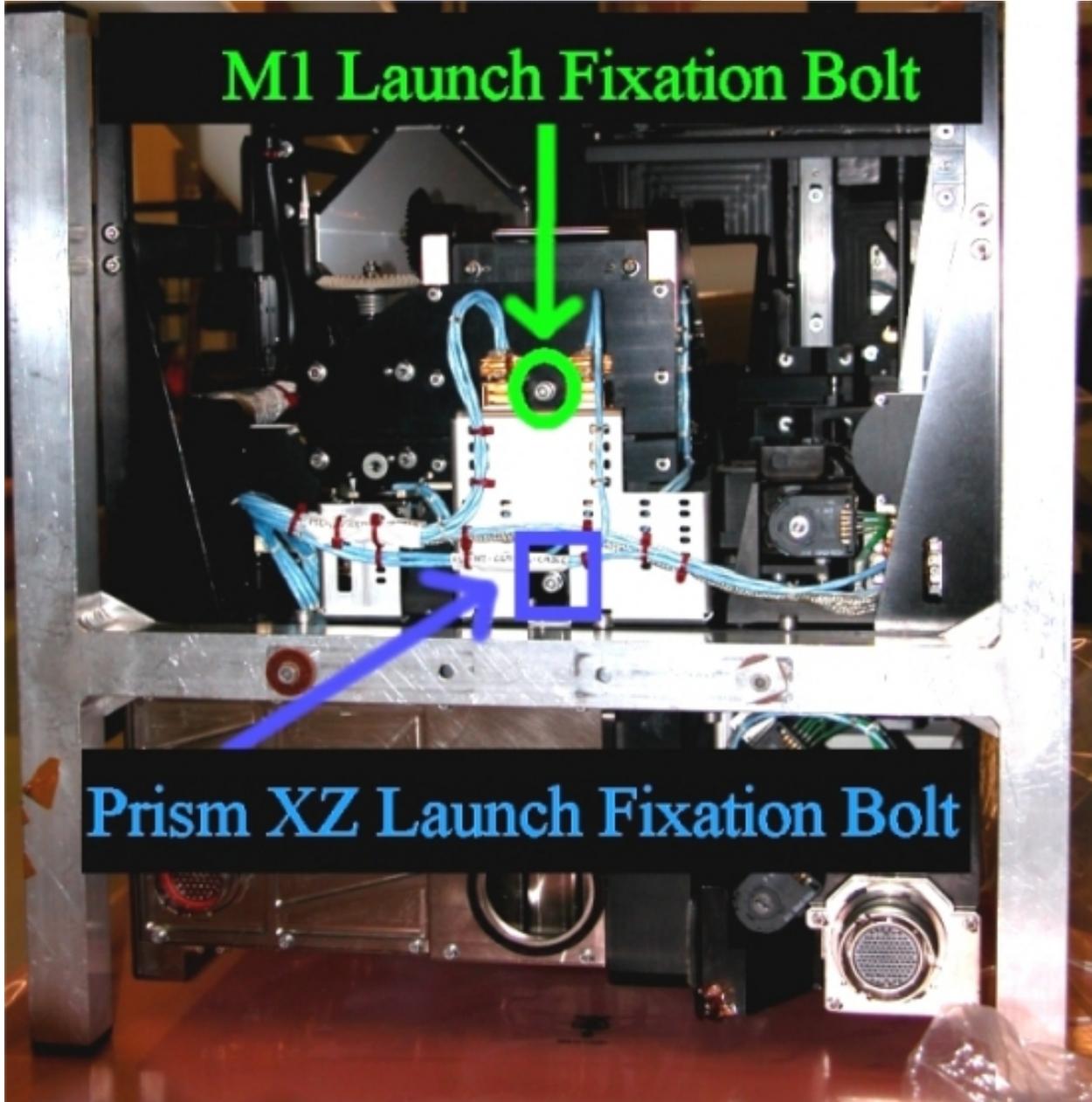


Figure 12. M1 - Launch Fixation Bolt (Drawer Rear)

Loosen the M1 launch fixation bolt completely (captive) (Driver handle, 1/4" Drive and 4 mm Hex Head Driver, 1/4" Drive), see the green circle in Figure 12.

2.330 FSL CEM LOWER SETUP

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5.3 [Prism XZ Launch Fixation Removal](#)

Loosen the Prism XZ launch fixation bolt completely (captive) (Driver handle, 1/4" Drive and 4 mm Hex Head Driver, 1/4" Drive), see the blue box in Figure 12.

5.4 [FMU Launch Fixations Removal](#)

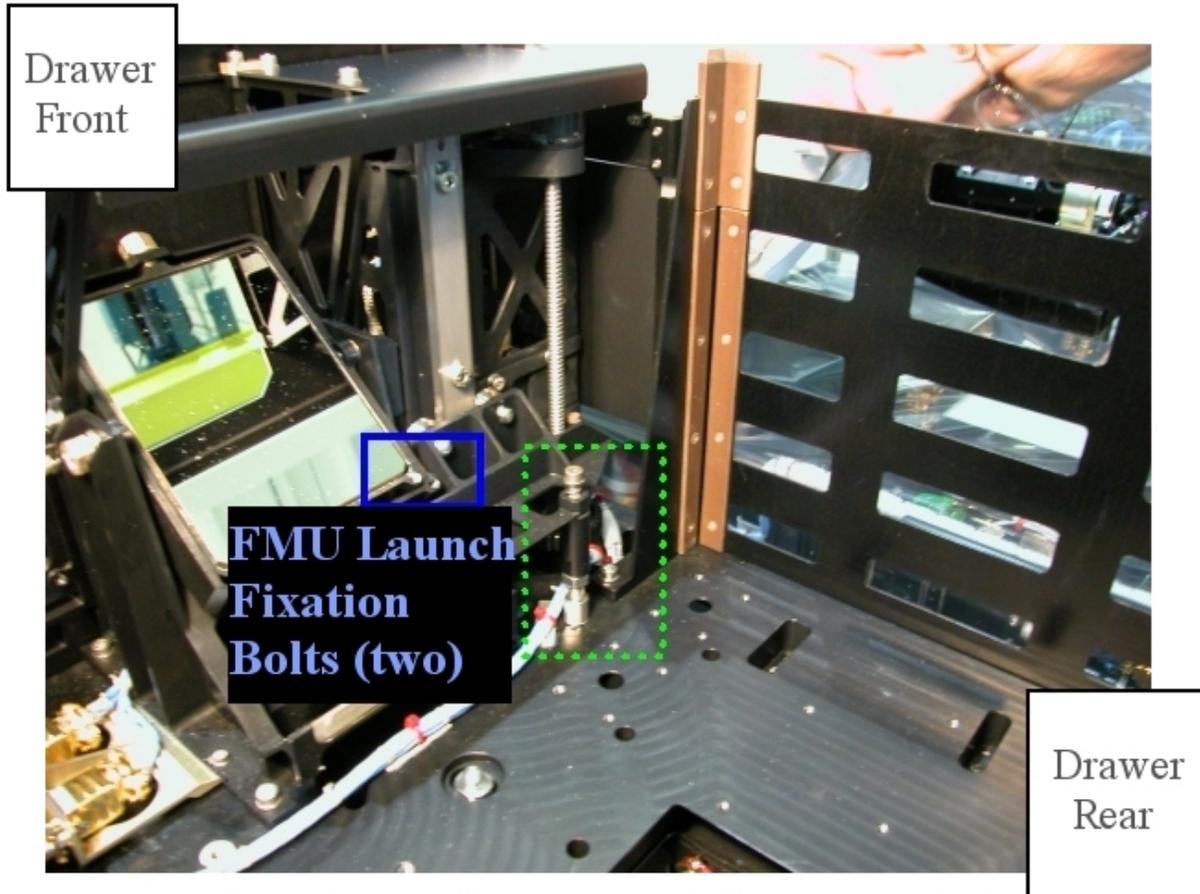


Figure 13. FMU Launch fixations (blue box), the green box shows the position of Prism XY Launch fixations

Loosen both FMU launch fixation setscrews completely (captive) (2 mm Extra Long Hex Head, 1/4" Drive and Ratchet Wrench 1/4") so that mirror-holders are free to move as shown in Figure13 (see the two bolts enclosed in the blue box).

5.5 Prism XY Launch Fixations Removal

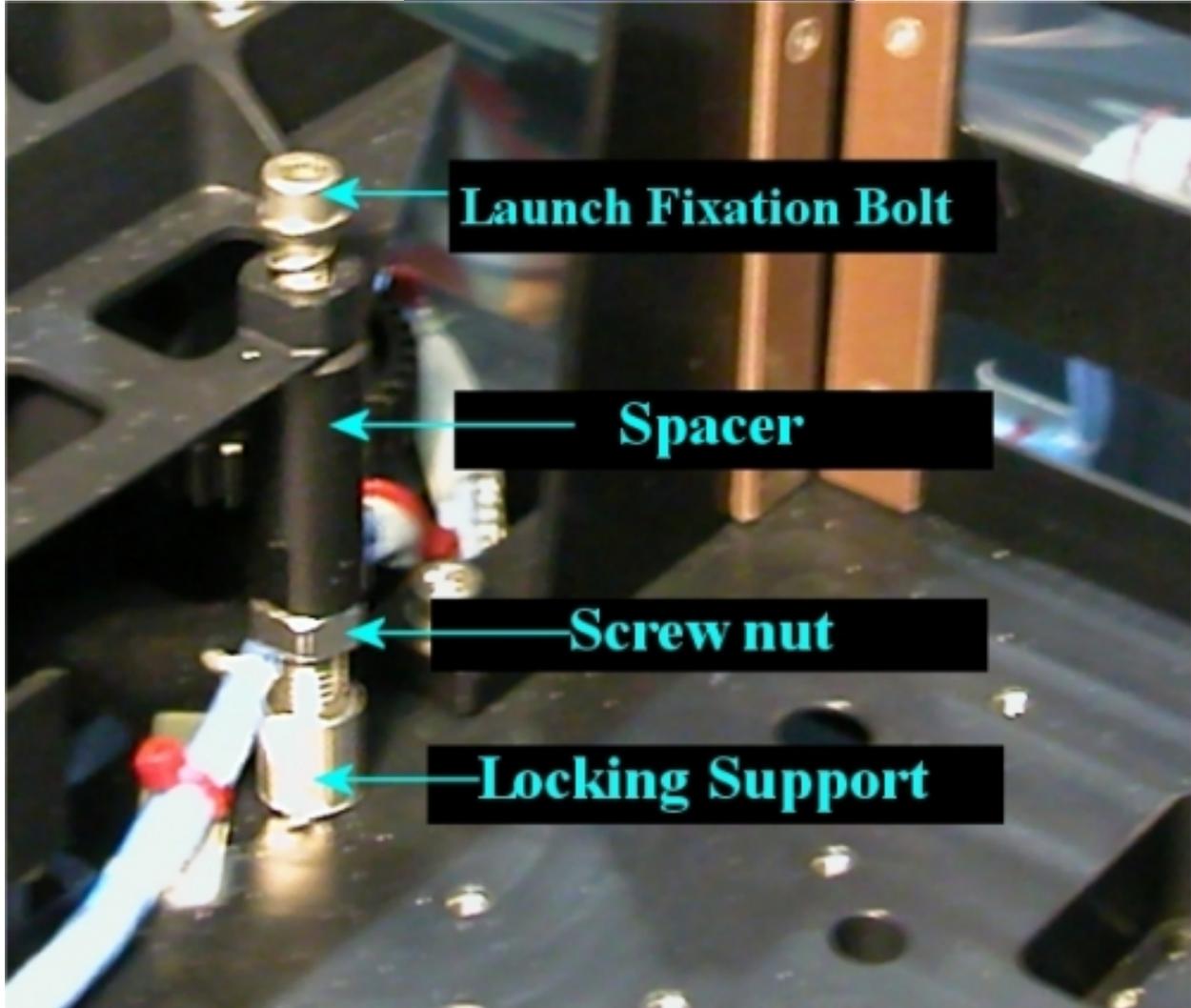


Figure 14. Prism XY with launch fixations

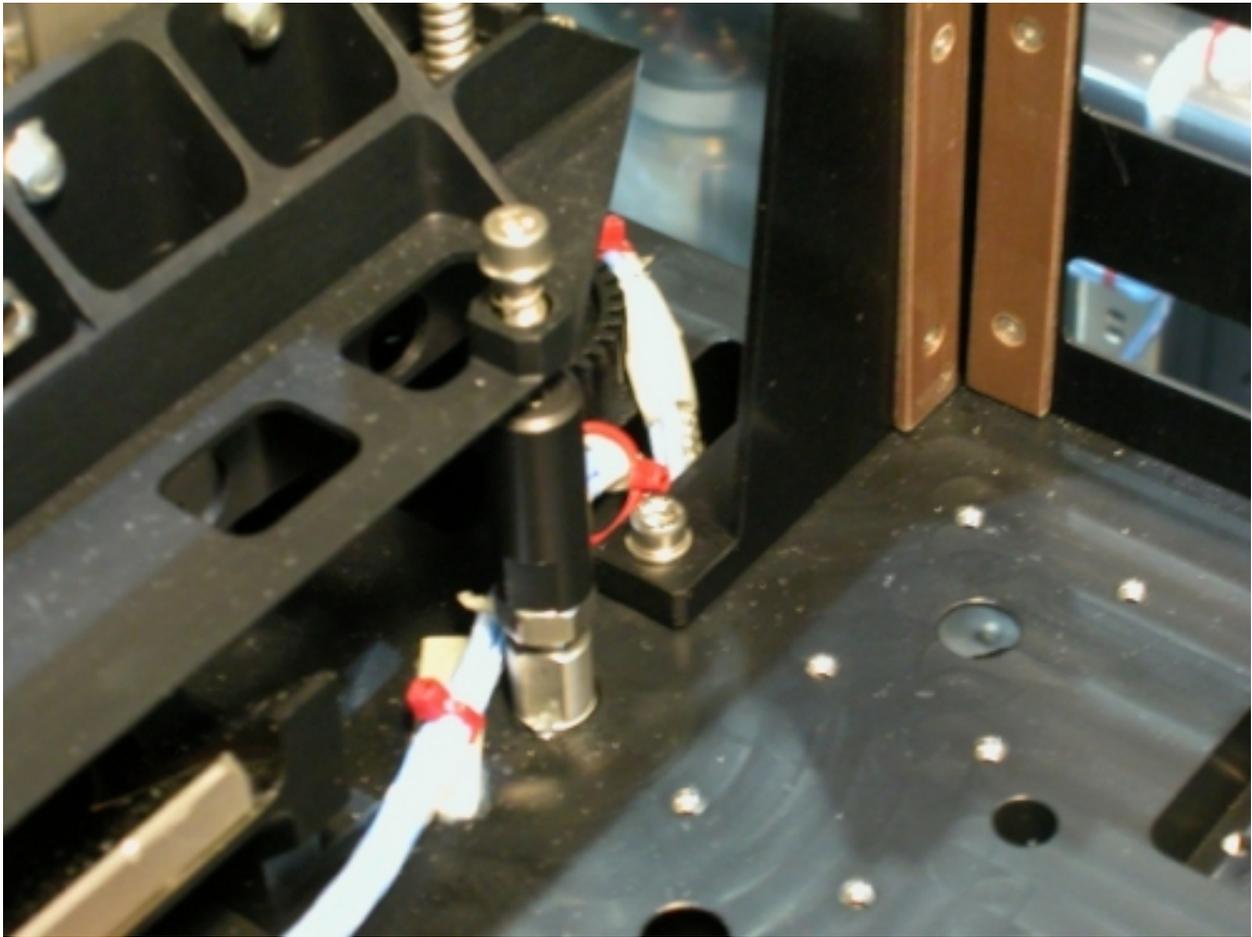


Figure 15. Prism XY with released launch fixations

Loosen the Prism XY launch fixation bolt completely (captive) (Driver handle, 1/4" drive and 4mm Hex Head Driver), see Figure 14.

Loosen the height locking screw nut (shown in Figure 14) up to the locking support (13 mm Crowfoot wrench, 3/8" drive, the Driver Handle, 1/4" Drive, and the Adaptor 1/4" Female to 3/8" Male) while holding the launch locking support with the 10 mm combination wrench.

Screw the Spacer down (13 mm Crowfoot wrench, 3/8" drive, the Driver Handle, 1/4" Drive, and the Adaptor 1/4" Female to 3/8" Male), until the spacer reaches the screw nut (see Figure 15 for the final configuration).

5.6 [EC Volume Preparation](#)

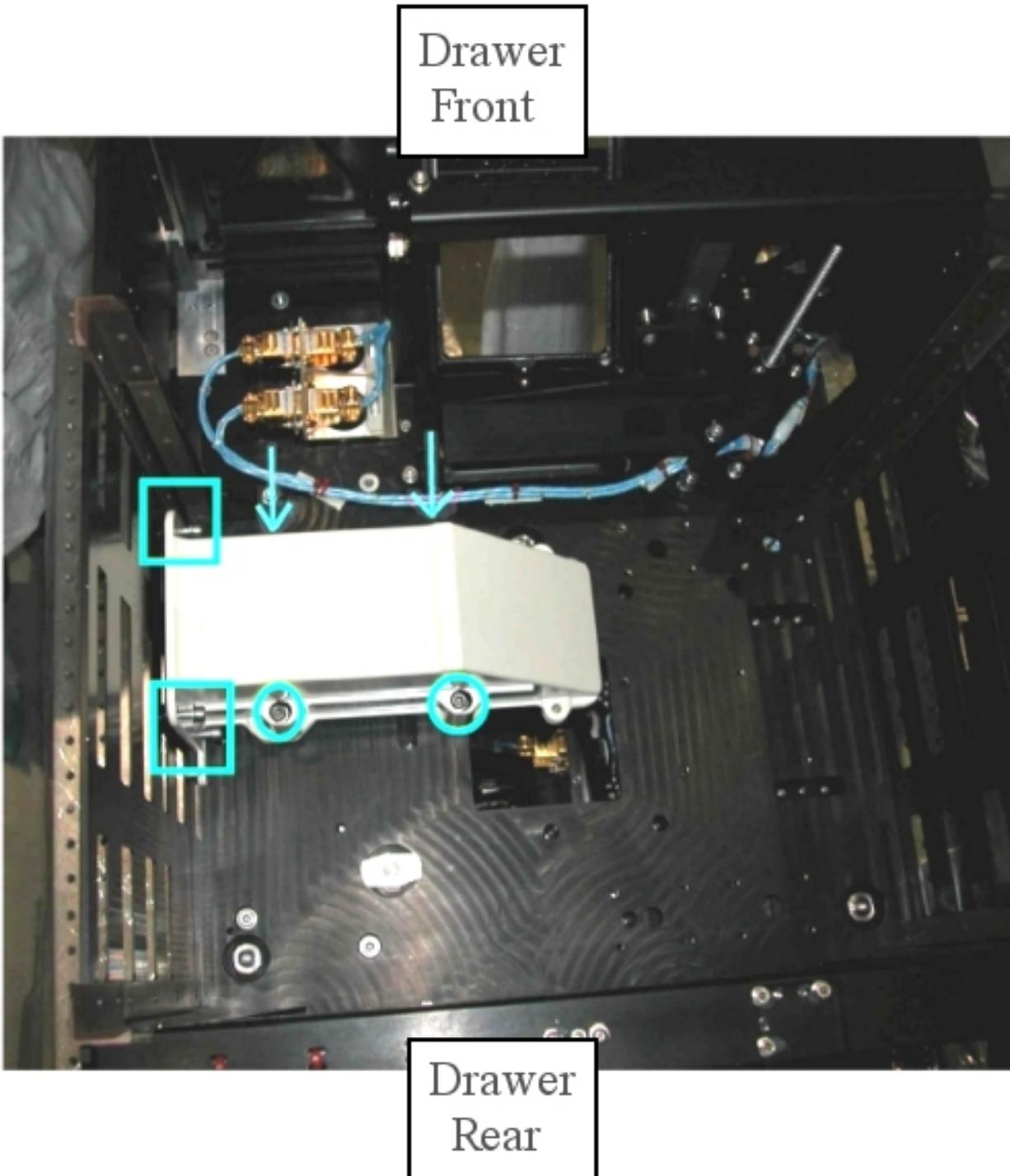


Figure 16. Mirror Front Panel Launch configuration

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NOTE

The Mirror Front Panel is hold in place in the CEM Lower EC-Volume by eight bolts (four against the bottom, four against the wall, see figure 16).

Unfasten (four) launch fixations bolts and (two) lower mounting screws (4 mm Hex Head Driver, 1/4" drive; Ratchet Wrench, 1/4" drive; 10" extension, 1/4" drive).

Unfasten (two) upper M5 Mirror Front Panel mounting screws (ball-tip L-wrench, 4 mm Hex Head) .



Figure 17. Mirror Front Panel

Remove Mirror Front Panel from the CEM Lower EC Volume (see Figure 17).

Pack Mirror Front Panel in own ziplock bag.

Mirror Front Panel → temporarily stow.

6. [SOFT SHIELDS REMOVAL FROM TOP SIDE](#)

Soft shields: S/N: 001, 005, 006, 007, 010 → remove and stow in own ziplock bags.

7. SOFT SHIELDS INSTALLATION ON CEM LOWER BOTTOM SIDE

NOTE

Soft shields are installed on the optical elements by means of tape. Pay attention not to put tape on lenses, mirrors and other optical surfaces. Dirty optics may not work correctly.

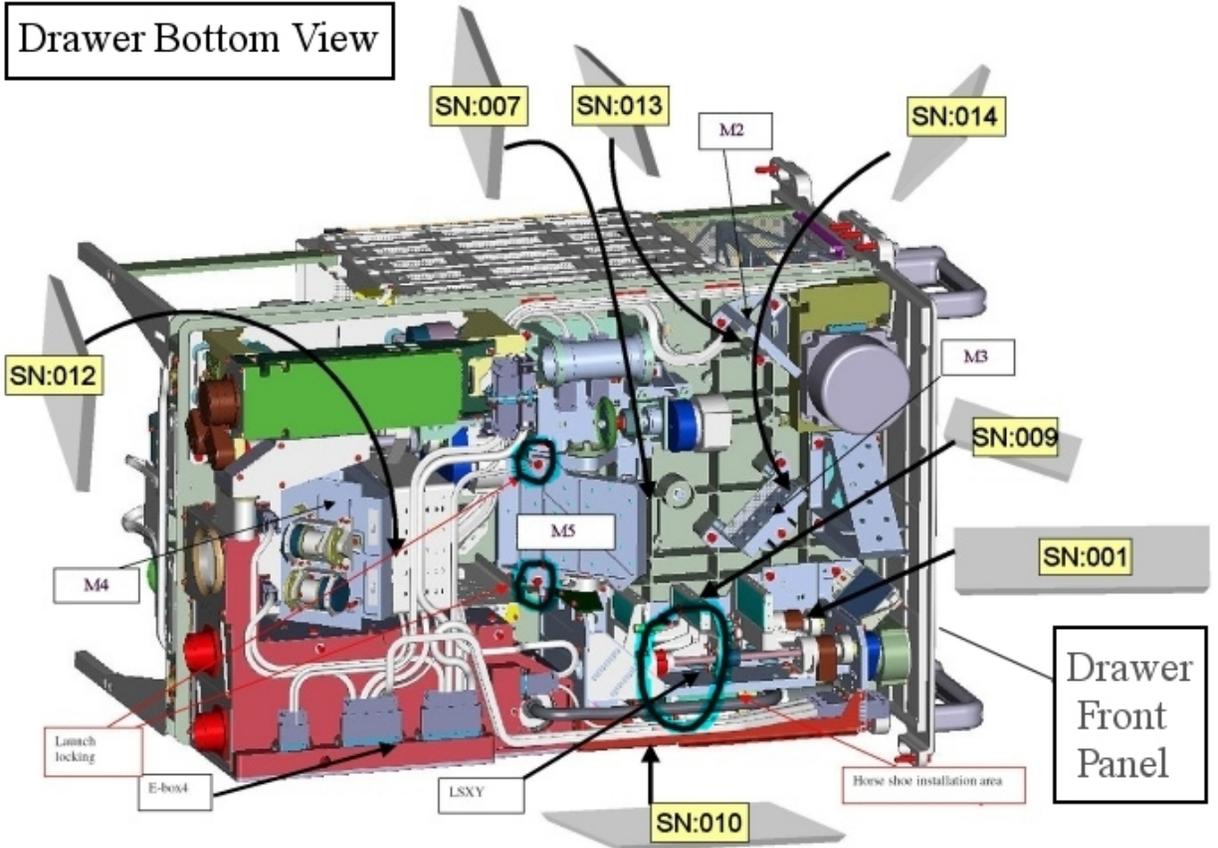


Figure 18. CEM Lower soft shields installation concept (bottom side)

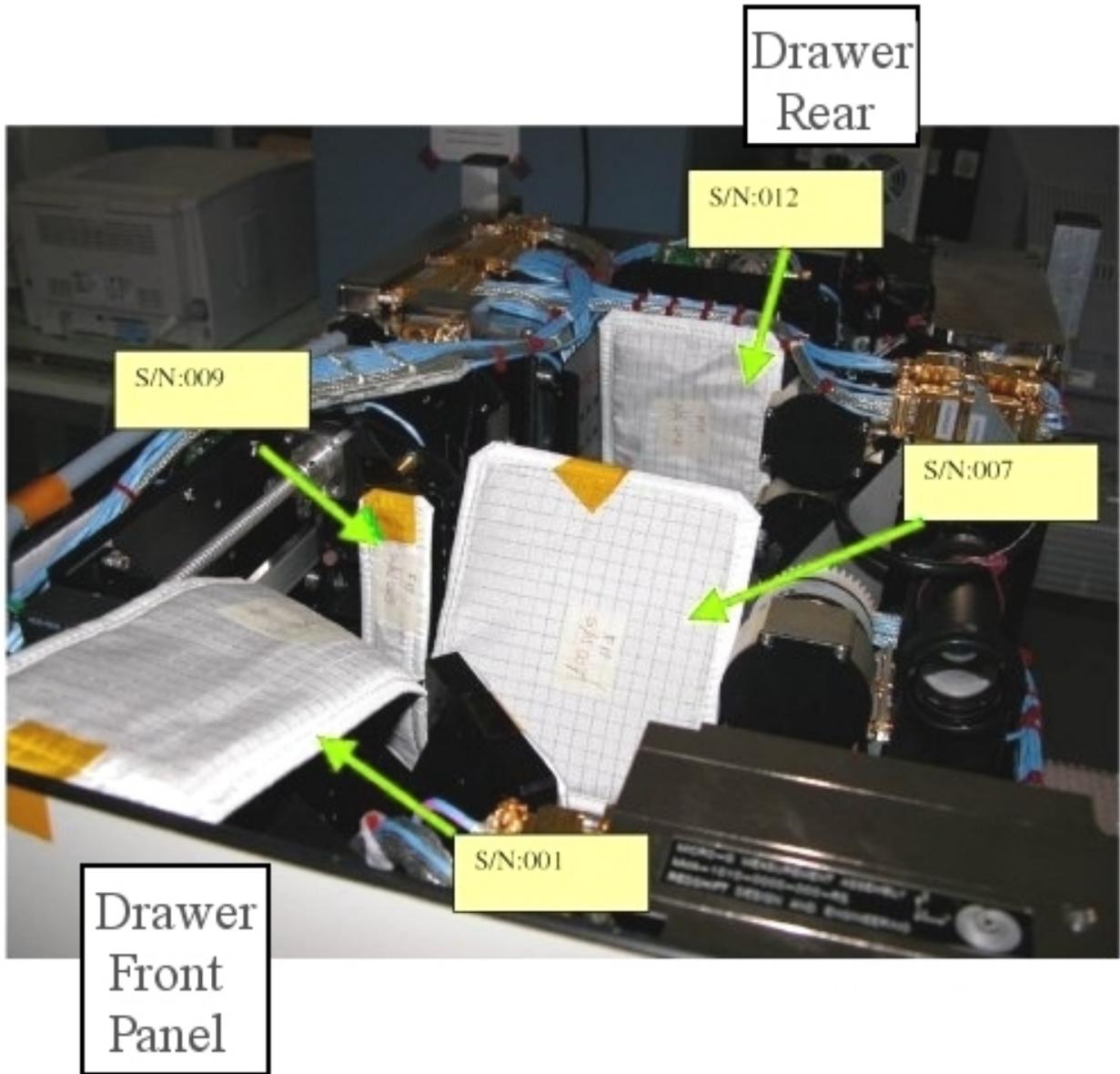


Figure 19. CEM Lower soft shields installation (bottom side)

Protect mirrors and lenses with soft shields installing the elements S/N: 001, 007, 009, 010, 012, 013 and 014, as shown in Figures 18 and 19.

8. [CEM LOWER BOTTOM SETUP](#)

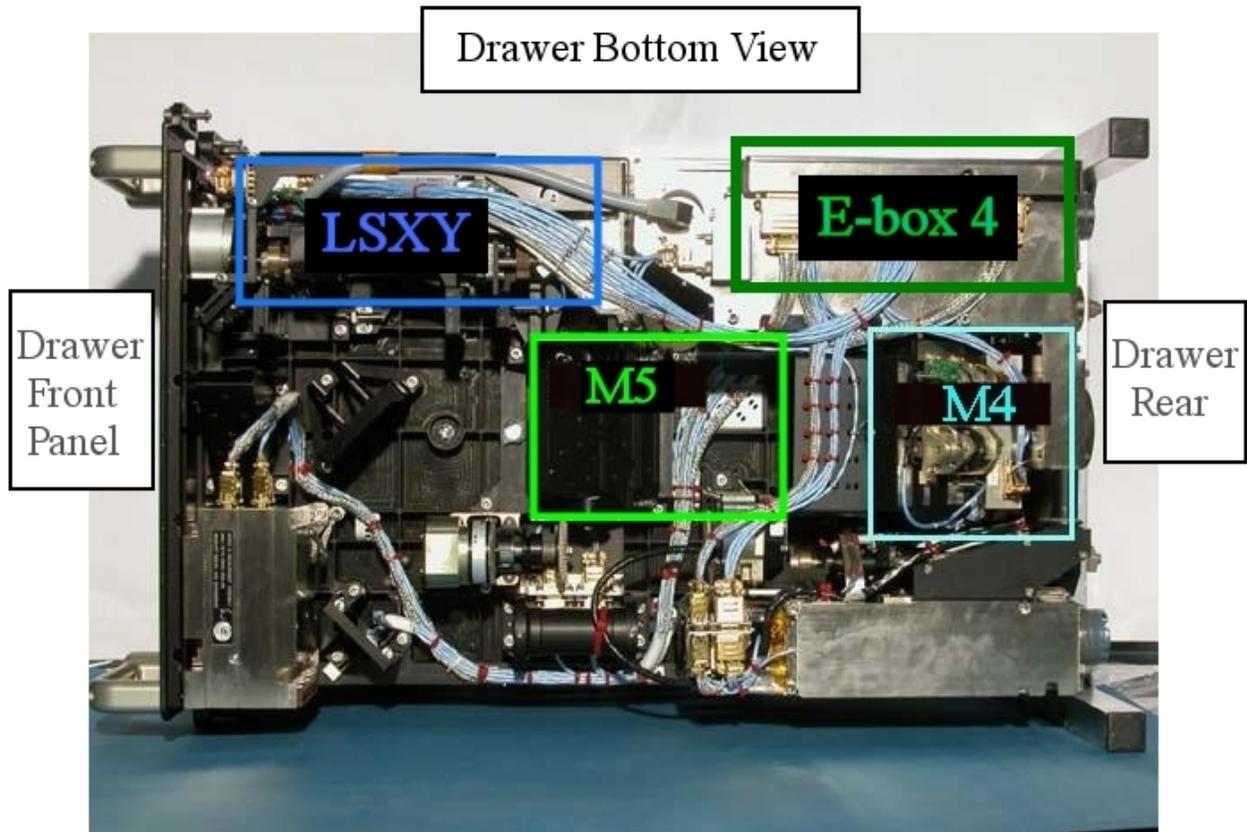


Figure 20. CEM Lower Bottom View showing the positions of M5, LSXY, M4 and E-box 4.

8.1 M5 Launch Fixations Removal

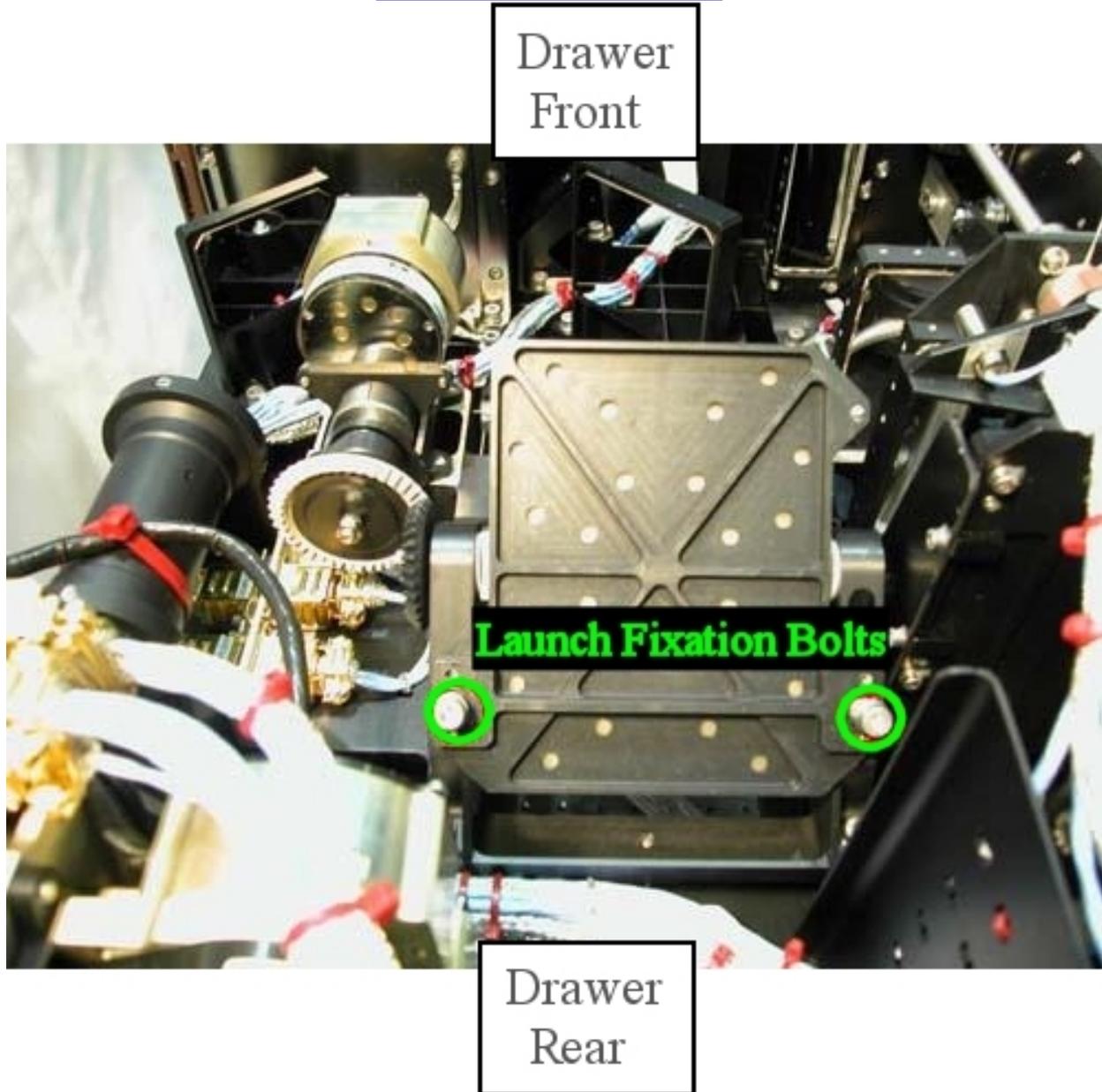


Figure 21. M5: Front view

Loosen the launch fixation bolts of the mirror completely (captive) (Driver handle, 1/4" drive and 4 mm Hex Head Driver, 1/4" Drive), see Figure 21.

8.2 LSXY Launch Fixations Removal

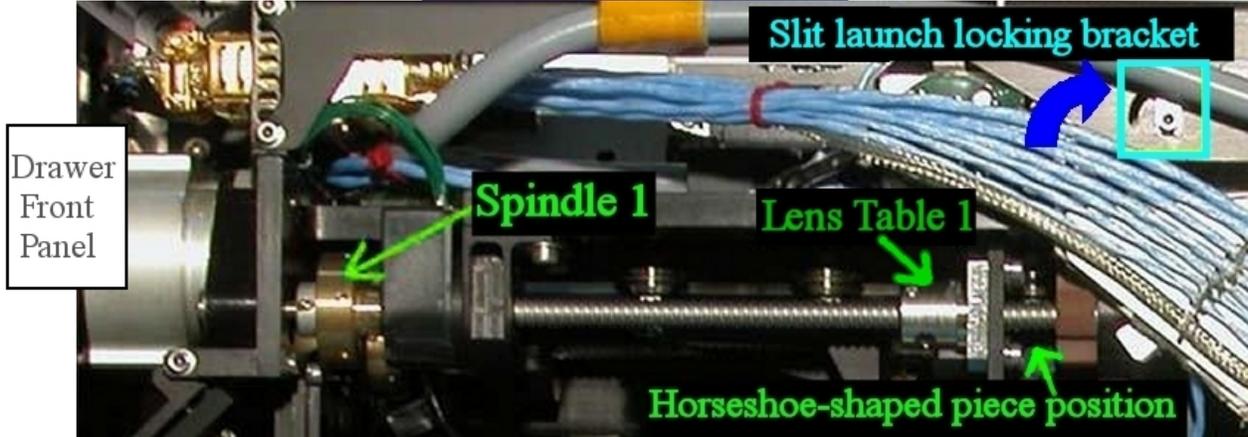


Figure 22. LSXY Detail (the figure shows the operational configuration with launch fixations already released or removed)

8.2.1 Removing the Horseshoe shaped piece on spindle1

Turn (by hand) the Spindle 1 until there is sufficient space between the spindle hardstop (at the switch side) and the Lens table 1 (indicated in Figure 22) so that the horseshoe shaped piece can be removed.

Cut the leasing tape (scissors).

Remove horseshoe-shaped piece which should have become loose.

Horseshoe-shaped piece → temporarily stow.

8.2.2 Slit Launch Unlocking

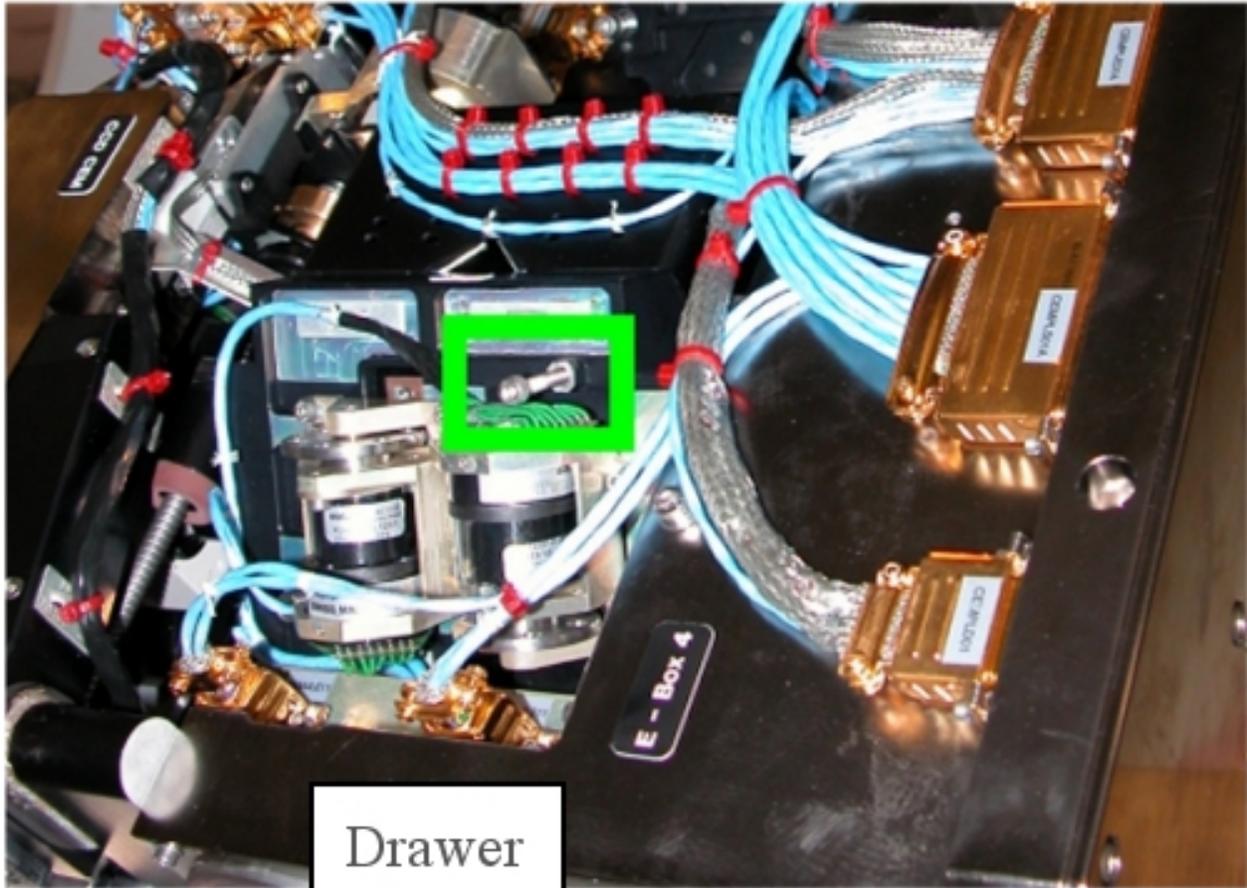
Unscrew the slit launch fixation bolt (2 turns), (Driver handle, 1/4" drive and 2.5 mm Hex Head Driver, 1/4" drive), see Figure 22 (blue box).

Push the slit launch-locking bracket in the direction as indicated in Figure 22 with the blue arrow (this Figure shows the bracket released position).

Lock the slit launch fixation bolt and put on torque 0,78 Nm (6.9 in-lb), (5-35 in-lb Torque Driver, 1/4" Drive; 2" Extension, 1/4" Drive; and 2.5 mm Hex Head Drivers, 1/4" Drive).

8.3 M4 Launch Fixations Removal

Drawer
Front



Drawer
Rear

Figure 23. M4 Launch fixation bolt (see the green box)

Loosen the launch fixation bolt of the mirror (see Figure 23)
(Driver Handle, 1/4" Drive and 3 mm Hex Head Driver, 1/4"
Drive) until the end stop.

9. E-BOX 4 LAMP INSTALLATION

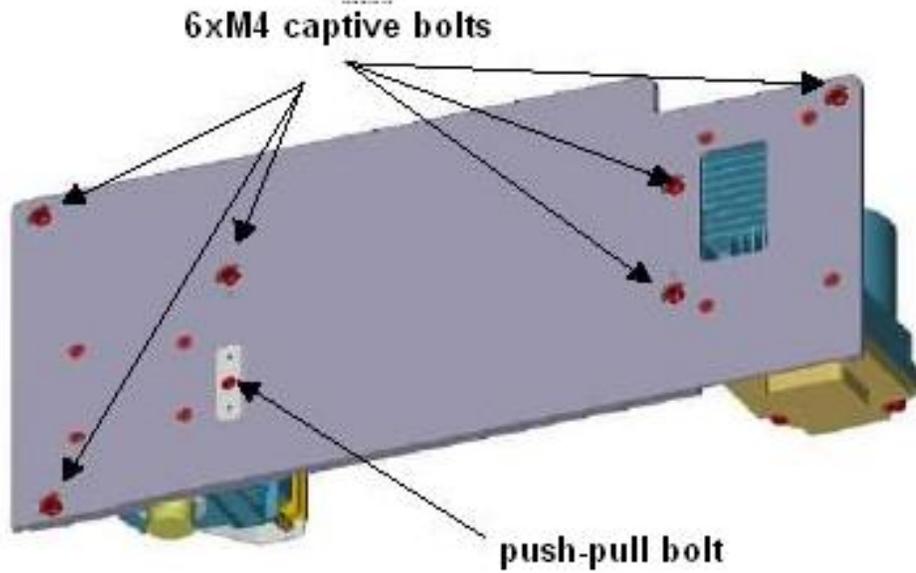


Figure 24. E-Box 4 sketch showing the position of the push-pull bolt

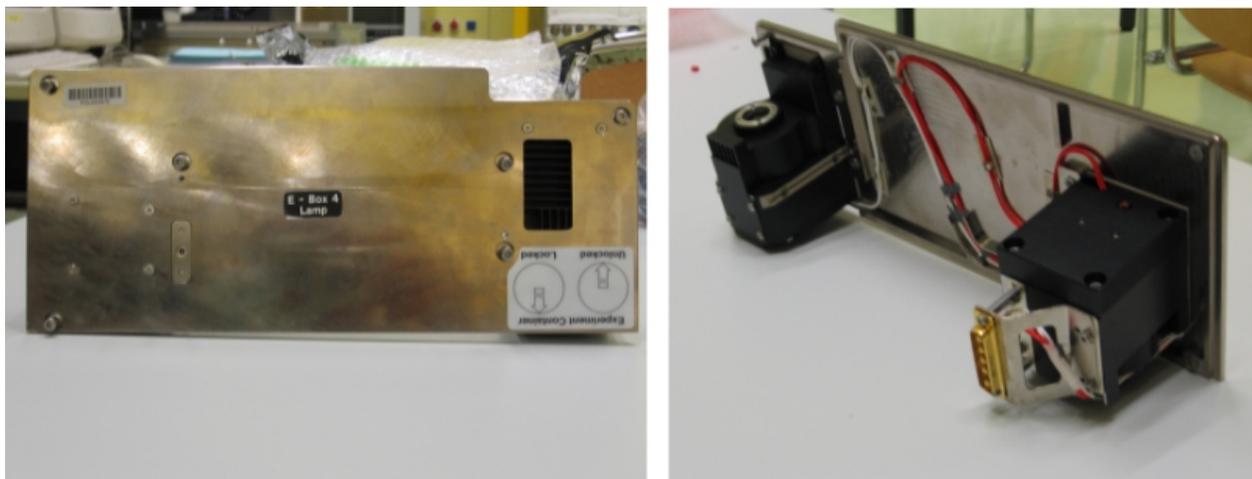


Figure 25. E-Box 4 Lamp - front and rear views

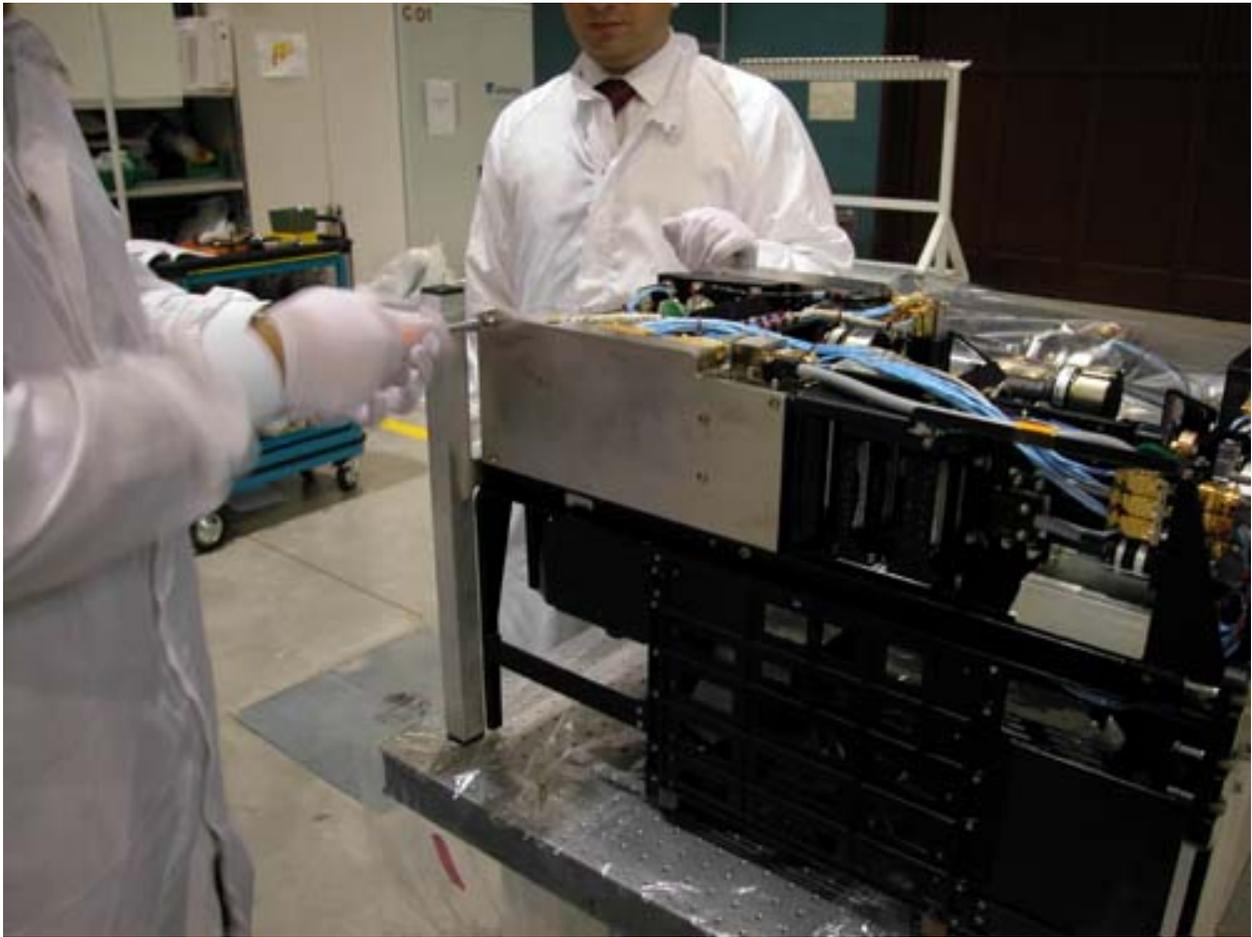


Figure 26. E-Box 4: Opening (removal of the empty cover)

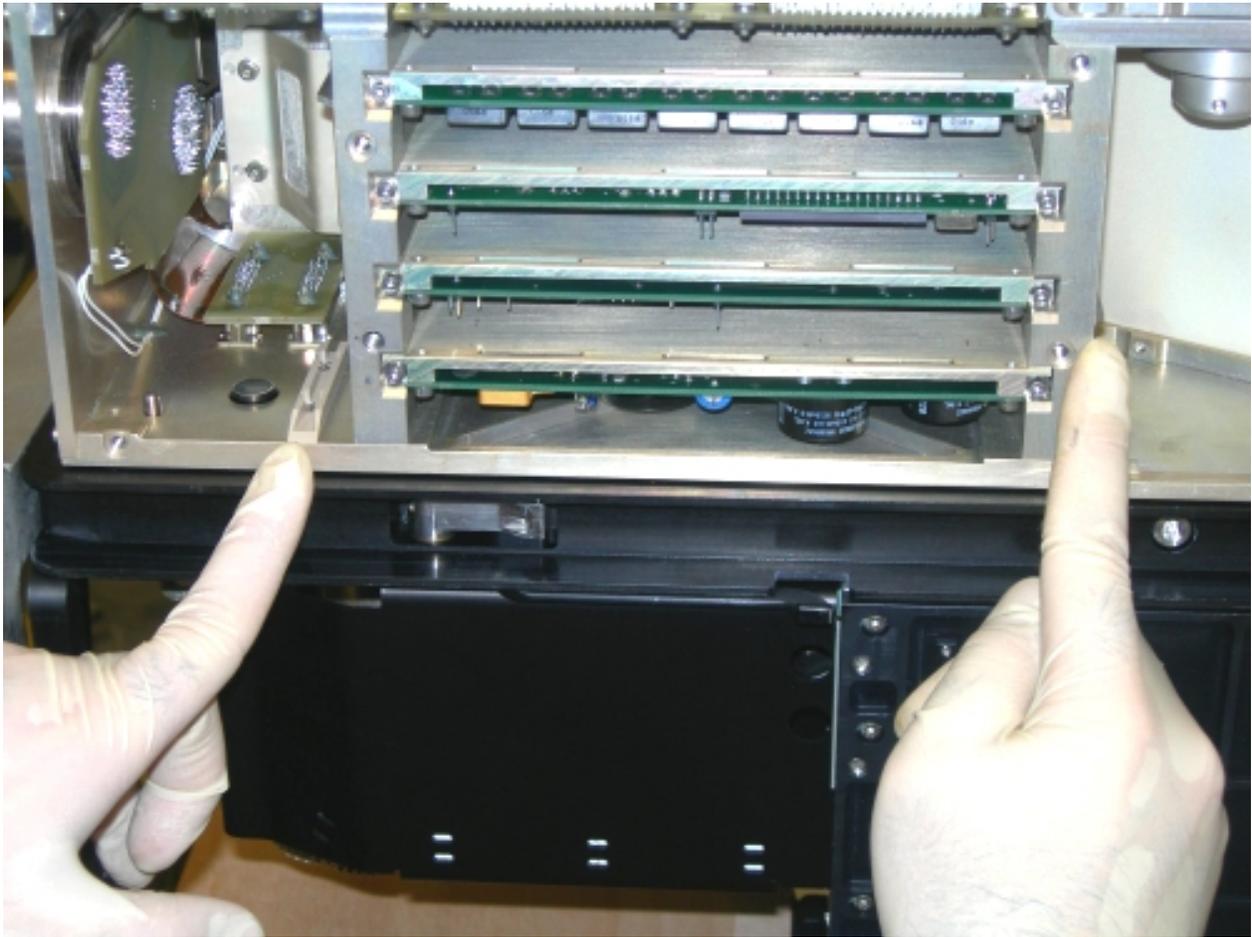


Figure 27. E-Box 4 after removal of the lamp unit empty cover

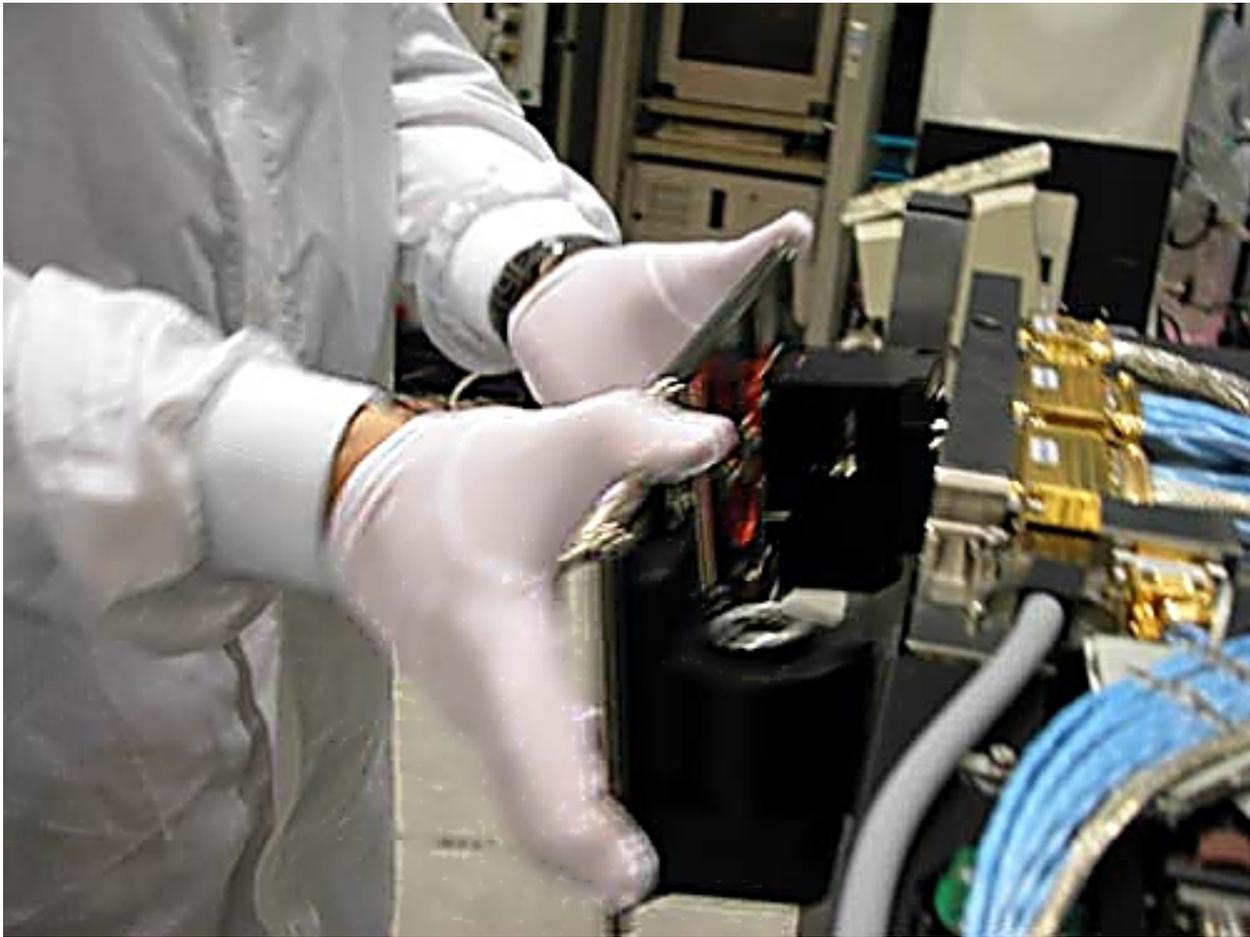


Figure 28. E-Box 4: Mounting the Lamp

Verify by inspection the E-Box 4 Lamp – not damaged (no scattered parts visible through the transparent envelop)

If no anomalies are found

remove packaging

Remove the lamp unit empty cover by loosening the (six) M4 bolts (Driver Handle, 1/4" Drive and 3 mm Hex Head Driver, 1/4" Drive), see Figures 24, 25, 26 and 27.

Lamp unit empty cover → temporarily stow

Mount the E-Box 4 lamp (see Figure 27 and 28, Figure 27 shows the location of the rail and guide driving the lamp insertion).

Screw the push-pull bolt (Driver Handle, 1/4" Drive and 3 mm Hex Head Driver, 1/4" Drive) ↻

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Screw the (six) bolts of the cover (Driver Handle, 1/4" Drive and 3 mm Hex Head Driver, 1/4" Drive). Put on torque 12 in-lb (5-35 in-lb Torque Driver, 1/4" Drive; 2" Extension, 1/4" Drive and 3 mm Hex Head Driver, 1/4" Drive).

10. SOFT SHIELDS REMOVAL FROM BOTTOM SIDE

Soft shields: S/N: 001, 007, 009, 010, 012, 013 and 014→ remove and stow in own ziplock bags.

CEM Lower Top

11. CEM LOWER TOP LAUNCH FIXATION REMOVAL INSPECTION

Fresnel Diffuser

11.1 √Fresnel Diffuser launch fixation captive bolt (one) – completely loose

M1

11.2 √ M1launch fixation captive bolt (one) – completely loose

Prism XZ

11.3 √ Prism XZ launch fixation captive bolt (one) – completely loose

Prism XY

11.4 √Prism XY launch fixation captive bolt (one) – completely loose

11.5 √screw nut – in contact with locking support

11.6 √spacer – in contact with screw nut

FMU

11.7 √FMU launch fixation captive setscrews (two) – completely loose

CEM Lower Bottom

12. CEM LOWER BOTTOM LAUNCH REMOVAL INSPECTION

CAUTION

Incomplete or incorrect CEM Lower setup will result in serious damage to the facility.

M5

12.1 √ M5 mirror launch fixation captive bolts (two) – completely loose

LSXY

12.2 √LSXY-ORU-horse-shoe-shaped-piece on spindle 1 – removed

12.3 √slit launch locking – removed

M4

12.4 √M4 self-locking screw (one) – loose

13. E BOX 4 INSPECTION

CAUTION

Incomplete or incorrect CEM Lower setup will result in serious damage to the facility.

Ebox-4

13.1 √Halogen Lamp Unit – Installed

13.2 ✓Cover – replaced

13.3 ✓bolts (six) – fastened

14. CEM LOWER INTEGRATION IN RACK

NOTE

The drawer is closed when there is no gap between the front panel and the Facility Core Element structure

Remove Columbus restraints from the Drawer.

Insert CEM Lower in its location in the FSL rack.

Close the drawer by pushing the two Facility Core Element Handles (at the end of this step the gap between the drawer and the Facility Core Element structure is 8 mm).

Right Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench, 3/8" Drive; 8 mm Hex Head Driver, 3/8" drive) until the lock/unlock screw of the other handle comes +/- 3mm out of the handle, then go to the left handle.

Left Facility Core Element Handle lock/unlock screw → ↻ (two turns) (Ratchet Wrench, 3/8" Drive; 8 mm Hex Head Driver, 3/8" drive) until the lock/unlock screw of the other handle comes +/- 3mm out of the handle, then go to the right handle.

Repeat until the drawer is completely closed.

Torque to 4 Nm the handle lock/unlock screw (4-20 Nm Trq Wrench, Ratchet Tool 3/8"; 8 mm Hex Head Driver, 3/8" Drive).

15. CLEANUP

Doff Silk Gloves.

Remove banisters (two) from the Columbus floor.

Tools, soft shields →stow

Horseshoe-shaped piece →stow

Lamp unit empty cover →stow

Mirror Front Panel → stow (increment specific temporary stowage)

Update IMS with stowage location of Horseshoe-shaped piece or notify COL-CC.

Update IMS with stowage location of lamp unit empty cover or notify COL-CC.

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Update IMS with stowage location of Mirror Front Panel or notify COL-CC.

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2.390 FSL FACILITY CORE ELEMENT RELEASE

(ASSY PAYLOAD/1E/FIN/MULTI E) Page 1 of 5 pages

OBJECTIVE:

To release the FSL Facility Core Element and install the antivibration system required by the selected experiment.

DURATION:

10 min

CREW:

One

TOOLS:

ISS IVA Toolbox:

(5-35 in-lbs) Trq Driver, 1/4" Drive
Drawer 2:

8mm 6 Pt Deep Socket, 1/4" Drive

Columbus Toolkit:

Driver Handle, 1/4" Drive
Tool Bag 2:

M5 (4mm) Hex Head Driver, 1/4" Drive
Tool Bag 3:

M6 (5mm) Hex Head Driver, 1/4" Drive

ITEMS (as required by experiment):

FSL AVM Brackets (four)

MVIS Lower Stop

MVIS Upper Stop

FSL Latches Ziplock Bag

1. [RELEASING THE FACILITY CORE ELEMENT](#)

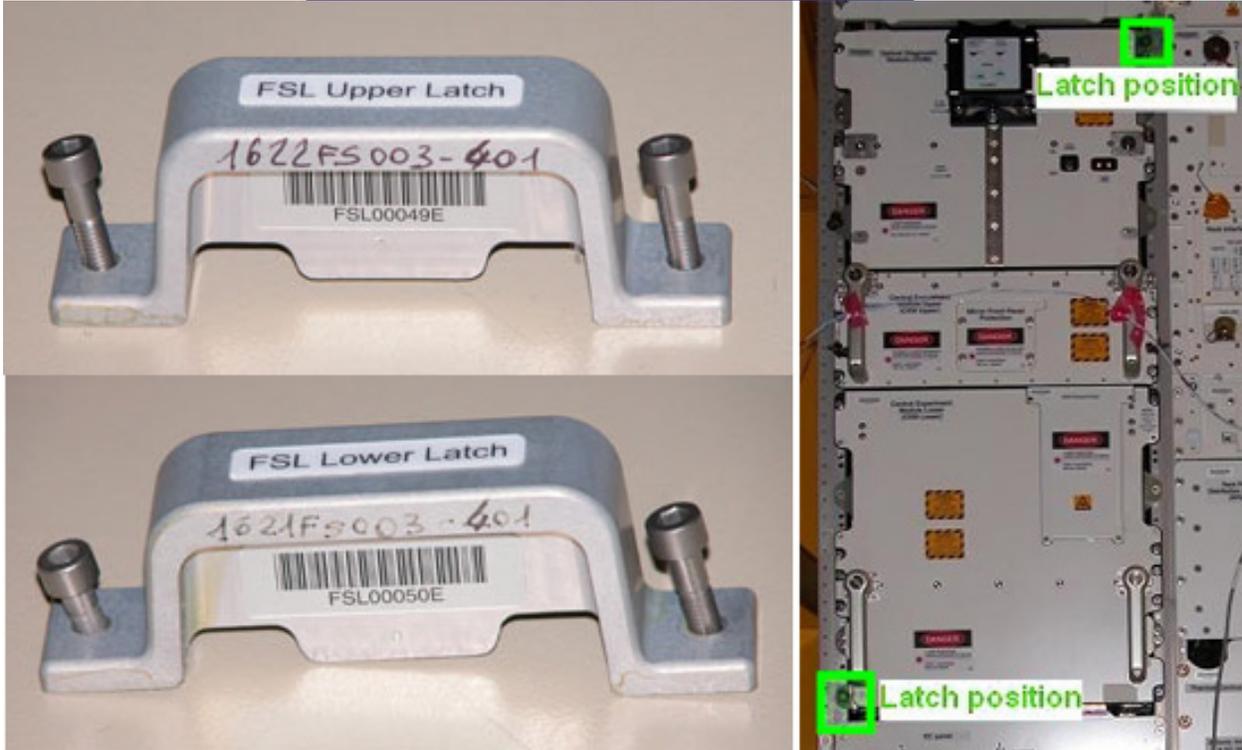


Figure 1. FSL Latches

COL101

Remove FSL Lower Latch and FSL Upper Latch from the structure.
Refer to Figure 1.

Pack both latches in FSL Latched Ziplock Bag and stow.

2. [INSTALLING THE ANTIVIBRATION SYSTEM REQUIRED BY THE
SELECTED EXPERIMENT](#)

If the Microgravity Vibration Isolation System (MVIS) is NOT to be used

2.1 Anti Vibration Mount Brackets (FSL AVM Brackets)
Installation



Figure 2. FSL AVM Bracket

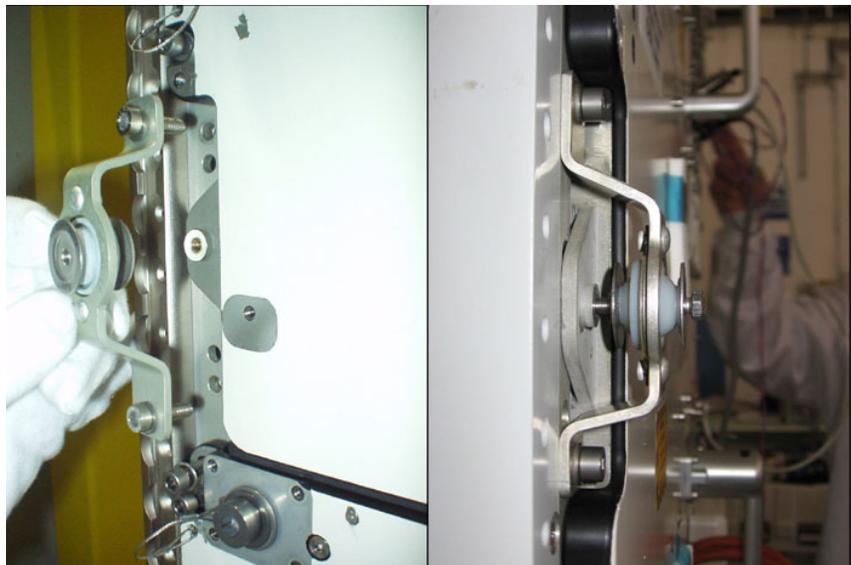


Figure 3. FSL AVM Brackets installation

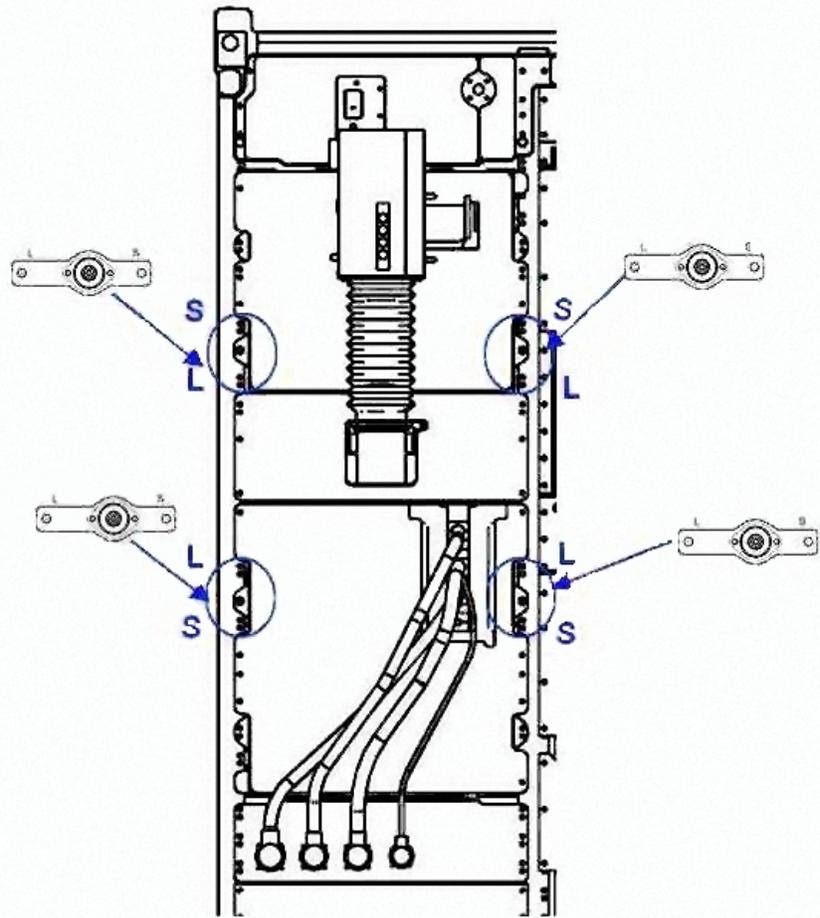


Figure 4. FSL AVM Brackets mounting location (L: Long side of bracket; S: Short side of bracket)

Install each bracket on the structure: lock the top and bottom captive bolts. Do not exceed a torque of 13.0 in-lbs. Refer to Figures 3 and 4 for correct positioning.

Hand-tighten (8 mm 6 Pt Deep Socket, 1/4" Drive; Driver Handle, 1/4" Drive).

If the Microgravity Vibration Isolation System (MVIS) is to be used

2.2 MVIS Stops Installation



Figure 5. MVIS Stops

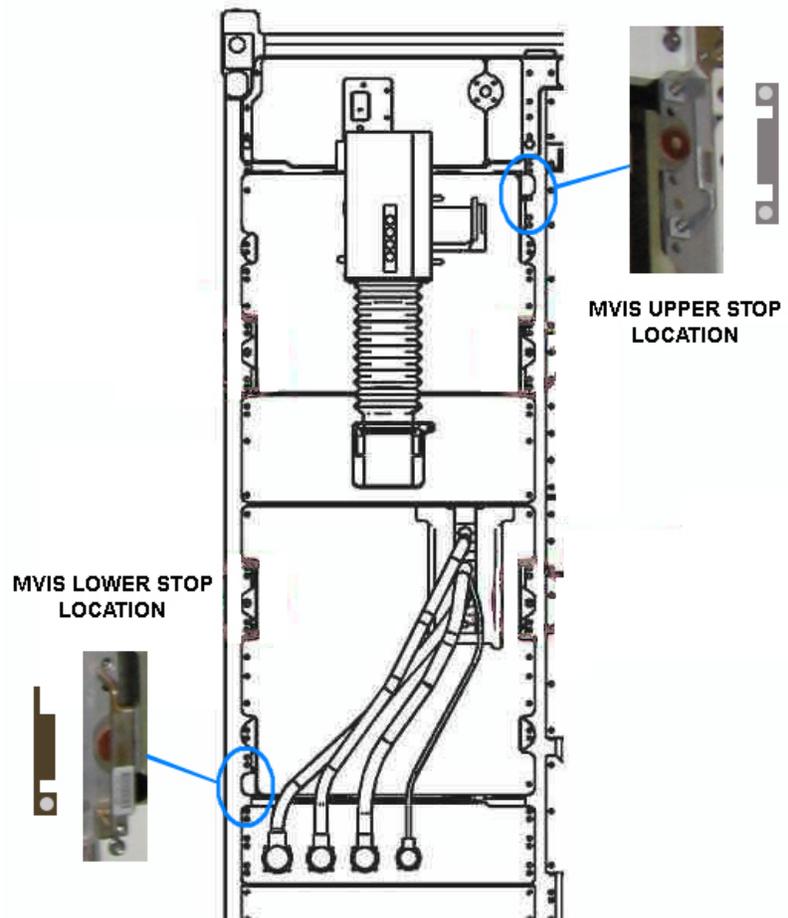


Figure 6. MVIS Stops mounting location

Install MVIS Stops (Upper and Lower) on the structure: screw. Torque to 13.0 in-lbs. Refer to Figures 5 and 6 for correct positioning.

3. CLEANUP
Stow tools.

Update IMS with stowage location of FSL Latches (Upper and Lower) or notify COL-CC.

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