

In-Flight Maintenance (IFM) Checklist

**Mission Operations Directorate
Systems Division**

**Generic, Rev E
September 21, 2001**

NOTE
For STS-108 and subsequent flights

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



Verify this is the correct version for the pending operation (training, simulation or flight).
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IN-FLIGHT MAINTENANCE C/L	Generic, Rev E (Sept 21, 2001)
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PCN-1 (Feb 1, 2002) Sheet 1 of 1

List of Implemented Change Requests (482s):

IFM-235A
IFM-236A

NOTE
For STS-109 and subsequent flights

Incorporate the following:

1. Replace iii thru xii
2. Replace 1-11 & 1-12
3. Replace 4-5 & 4-6, 4-9 & 4-10
4. Replace section D (32 pages)

Prepared by: _____
Book Manager

Approved by: _____
Manager,
Mechanical, Booster, & Maintenance Group (USA)

Accepted by: _____
FDF Subsystem Manager (NASA)

Encl: 48 pages

<i>File this PCN immediately behind the front cover as a permanent record</i>
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JSC-48025

MISSION OPERATIONS DIRECTORATE

**IN-FLIGHT MAINTENANCE
(IFM) CHECKLIST**

GENERIC, REVISION E
September 21, 2001

PREPARED BY:

J. R. Shimp
Book Manager

APPROVED BY:

C. D. Paternostro, Manager
Mechanical, Booster, &
Maintenance Group (USA)

S. B. Rainwater, Chief
Mechanical, Booster, &
Maintenance Systems Branch

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IFM/ALL/GEN E

Incorporates the following:

482#: IFM-231
IFM-232
IFM-233
IFM-234

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager

DF/J. Shimp

281-483-2581

IN-FLIGHT MAINTENANCE (IFM) CHECKLIST

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REV E 09/21/01

PCN-1 02/01/02

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IFM/ALL/GEN E

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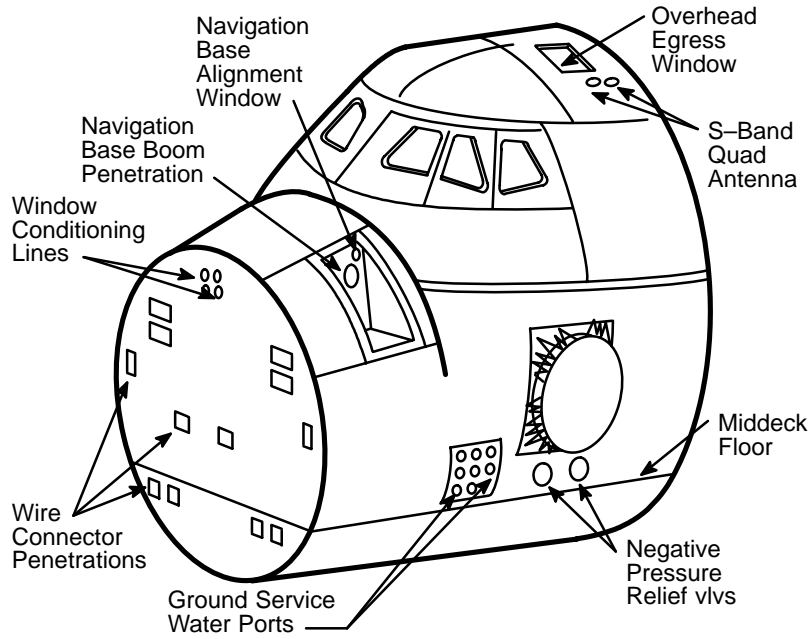
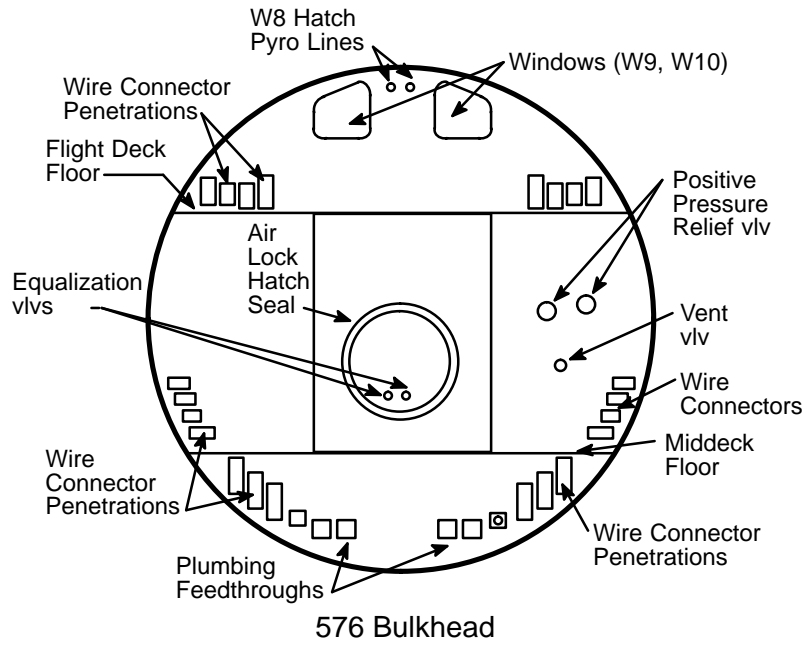
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**GENERAL
INFORMATION**

CREW MODULE PENETRATIONS

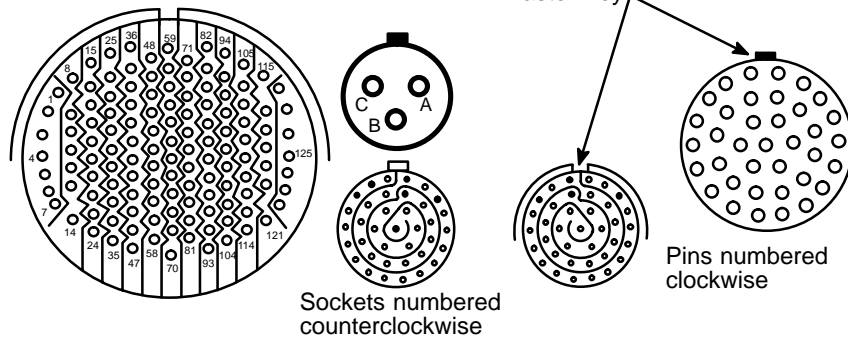


Crew Module Penetrations

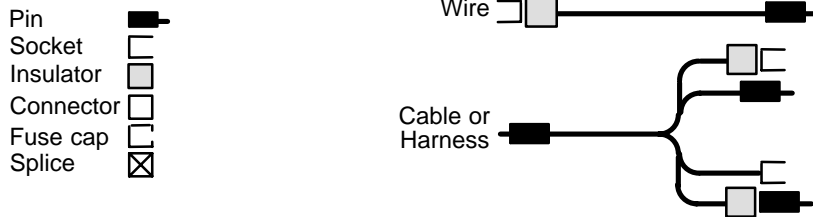
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ELECTRICAL SCHEMATICS (TYPICAL)

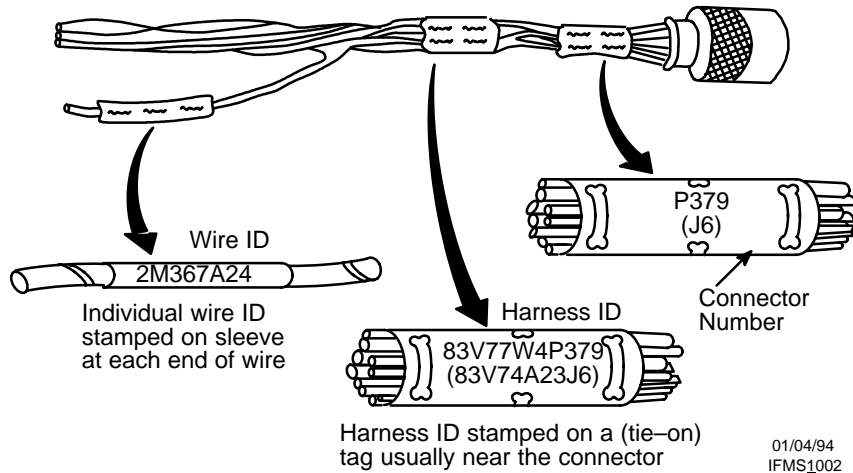
CONNECTOR PIN/SOCKET EXAMPLES



ELECTRICAL SCHEMATICS LEGEND (Typical)



WIRE & HARNESS ID (Typical)



GENERIC STOWAGE VOLUME REMOVAL

OBJECTIVE: Remove stowage volumes to gain access to LRUs (equipment) located behind pnls, closeouts, or in LEB, to allow performance of IFM

VOL A REMOVAL (MF57A) (15 min)

LOCATION: See AV BAYS 1,2 (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL

- Gray Tape
- Ratchet Wrench
- 5/16-in & 7/16-in Sockets
- 1/4-in to 3/8-in Adapter
- 4-in, 6-in, & 10-in Extensions
- #10L Torque Tip
- 5/16-in & 7/16-in Combination Wrenches

NOTE

Refer to components locations AV BAYS 1,2 for schematic, fastener location, and torques

1. Remove Debris Net from around Vol A (MF57A). Temp stow
2. Remove lockers MF43C, MF57C, MF71C
3. Lower audio pnl containing MO42F, MO58F to access suspension bars (two)
4. Remove screws from Vol A (MF57A) lower fwd mount brackets (two/bracket, #10L Torque Tip)
5. Remove bolts, nuts connecting Vol A (MF57A) upper mounting brackets to suspension bars (two bolts, nuts, one/mount, 5/16-in and 7/16-in sockets and wrenches, as reqd)
6. Tape H/W to Vol A (MF57A). Temp stow

VOL B REMOVAL

(5 min)

LOCATION: See AV BAY 3A (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL Locker Tool
3/8-in Driver Handle

NOTE

It may not be acceptable to remove Vol B if experiments installed in adjacent locker row. However, Vol B may be repositioned for access to AV BAY 3A upper closeout fasteners w/o removing any lockers

1. Remove lockers MA9D thru MA9N
2. Pull Pip Pin securing Vol B to mount. Push down to disengage alignment pins (two)

NOTE

When sleep station installed, Vol B cannot be removed

3. Remove Vol B. Temp stow

VOL E ACCESS (MD76C)

(10 min)

LOCATION: See LOWER EQUIPMENT BAY (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL Locker Tool
3/8-in Driver Handle
Ratchet Wrench
1/4-in to 3/8-in Adapter

1. Remove Lockers MF71M, MF71O

NOTE

If sleep station installed, see SLEEP STATION LOWER FIXED PNL REMOVAL (GENERAL INFORMATION), 1-16

2. Open Vol E (MD76C) door

VOL E REMOVAL (MD76C)

(15 min)

LOCATION: See LOWER EQUIPMENT BAY (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL Pwr Screwdriver
5/32-in Allen Head Driver
Locker Tool
3/8-in Driver Handle
Ratchet Wrench

NOTE

It may not be possible to completely remove Vol E (MD76C) w/sleep station installed. However, Vol E (MD76C) may be repositioned enough to allow crewmember to access LEB

1. Remove Lockers MF71K, MF71M, MF71O

NOTE

If sleep station installed, see SLEEP STATION LOWER FIXED PNL REMOVAL (GENERAL INFORMATION), 1-16

2. Loosen Vol E (MD76C) fasteners (eighteen, 5/32-in Allen Head Driver)
3. Reposition (remove) Vol E (MD76C). Temp stow

VOL G ACCESS (MD80R)

(10 min)

LOCATION: See LOWER EQUIPMENT BAY (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL Locker Tool
3/8-in Driver Handle
Ratchet Wrench
1/4-in to 3/8-in Adapter

NOTE

If sleep station installed, see SLEEP STATION LOWER AFT BRACKET REMOVAL (GENERAL INFORMATION), 1-17

1. Remove Lockers MA16N, MA16L
2. Open Vol G (MD80R) door

VOL G REMOVAL (MD80R)

(15 min)

LOCATION: See LOWER EQUIPMENT BAY (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL Pwr Screwdriver
Locker Tool
3/8-in Driver Handle
3/16-in & 5/32-in Allen Head Drivers
1/4-in to 3/8-in Adapter
Ratchet Wrench

NOTE

If sleep station installed, see SLEEP STATION LOWER AFT BRACKET REMOVAL (GENERAL INFORMATION), 1-17

1. Remove Lockers above Vol G (MD80R) (MA16 column) as reqd
2. Loosen Vol G (MD80R) fasteners (twelve, 5/32-in and five, 3/16-in Allen Head Driver)

NOTE

With Sleep Station installed, it may not be possible to remove Vol G (MD80R) completely from in front of AV BAY 3A area, but it will be possible to reposition it enough to allow access to LEB

3. Remove Vol G. Temp stow

VOL H REMOVAL (MD23R)

(10 min)

LOCATION: See LOWER EQUIPMENT BAY (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL Pwr Screwdriver
Locker Tool
3/8-in Driver Handle
3/16-in & 5/32-in Allen Head Drivers
1/4-in to 3/8-in Adapter
Ratchet Wrench

1. Remove Interdeck Access Ladder. See LADDER REMOVAL (GENERAL INFORMATION), 1-8
2. Loosen Vol H (MD23R) fasteners (five, 3/16-in and twelve, 5/32-in Allen Head Driver)
3. Remove Vol H (MD23R). Temp stow

LADDER REMOVAL

(10 min)

OBJECTIVE: Remove interdeck access ladder. Ladder must be removed to allow removal of Vol H (MD23R)

LOCATION: Middeck; port side of Airlock

TOOLS REQD:

TOOL 5/32-in Allen Head Driver
Ratchet Wrench
4-in Extension
1/4-in to 3/8-in Adapter
#6 Torque Driver (for OV102,104)
#8 Torque Driver (for OV103,105)

1. If OV102,104:
Remove Egress Platform clamps (two) attached to ladder. Four screws, washers/clamp (#6 Torque Driver). Temp stow
If OV103,105:
Remove Egress Platform clamps (four) attached to ladder. Two screws/clamp (#8 Torque Driver). Temp stow
- MD25R 2. Loosen fasteners at ladder base (two, 5/32-in Allen Head Driver)
3. Pull ladder out at base and down, toward side hatch, to disengage pins at top of ladder. Temp stow

LiOH STOWAGE VOLUME REMOVAL (MD52M) (20 min)

OBJECTIVE: Access to LEB

LOCATION: See LOWER EQUIPMENT BAY (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL 7/16-in Socket
 Ratchet Wrench
 4-in Extension
 1/4-in to 3/8-in Adapter
 #6 Torque Driver

1. Open Airlock Hatch (reqd for clearance)
2. Open LiOH Stowage Vol (MD52M) door. Remove and discard silver tape securing Teflon closeout strips to edges of LiOH Stowage Box
3. Remove Teflon closeout strips. Temp stow
4. Upper/outboard LiOH stowage racks must be removed to access fasteners. Remove other racks as reqd
5. Remove aft support bolts and then fwd support pin screws securing LiOH Stowage Vol (MD52M). See table

NOTE

For correct installation, note lengths of fasteners. They vary by location

Vehicle	Mounting Hardware	
	Fwd Port/Stbd	Aft Port/Stbd
ALL	1 Inboard – #6 Torque Tip Screws/ Washers (Remove) 1 Outboard – #6 Torque Tip Screws (Loosen/ unscrew until stop) Grasp knurled handles, slide support pins inboard	3 – 7/16-in Bolts/Washers (Remove)

CAUTION

Use care when removing LiOH box. It may impact water lines located in LEB fwd and port of LiOH box

6. Lift LiOH Vol from middeck floor. Temp stow

CAUTION

Two knurled handles of fwd support pins must be at outboard ends of slots, #6 Screws/Washers installed at inboard ends of slots to ensure proper engagement of fwd support pins

7. Reverse steps 1 thru 6 for installation

LOCKER,TURNBUCKLE REMOVAL/ INSTALLATION

(5 min,20 min)

OBJECTIVE: Remove/install lockers,turnbuckles as needed to
access AV BAYS

LOCATION: See (COMPONENT LOCATIONS) AV BAYS
1,2,3A

TOOLS REQD:

TOOL	Locker Tool
	Ratchet Wrench
	1/4-in to 3/8-in Adapter
	Torque Wrench
	Seat Adjustment Tool (for Turnbuckles)
	3/16-in Hex Ball (for Foot Restraint Box)

LOCKER REMOVAL

1. If Locker installed:
 Insert Locker Tool into any corner of locker.
 Ensure tool fully seated (green stripe flush
 w/locker face)
 If Foot Restraint Box installed:
 Use 3/16-in Hex Ball to loosen locker
 fasteners behind Foot Restraint Box
2. Install Ratchet Wrench, 1/4-in to 3/8-in Adapter
3. Loosen all four fasteners until spring releases
4. Remove, temp stow locker

NOTE

Thermal/Debris Traps may be location
specific and marked as such

5. Remove Thermal/Debris Trap, temp stow

LOCKER INSTALLATION

6. Reinstall Thermal/Debris Trap,Locker. Torque
fasteners 30 in-lb (ensure green stripe on
locker tool flush w/locker face after torque)
7. Stow tools

TURNBUCKLE INSTALLATION (if reqd)

1. Install Thermal/Debris Trap
2. Orient turnbuckle to an 'N' shape w/long leg adjuster in lower right corner

NOTE

Ensure all adjusters have two threads exposed on each side of knurled adjuster wheel

3. Install turnbuckle. Hand tighten top left fastener
4. Adjust center leg to allow bottom right fastener to engage smoothly. Hand tighten
5. Adjust, secure remaining two legs
6. Torque all four fasteners 30 in-lb
7. Stow tools

ORBIT STATION ACCESS

(45 min)

OBJECTIVE: Reposition pnl A7L to access connector brackets (wire harnesses) behind aft Orbit Station (OS) for Remote Manipulator System (RMS), Translational Hand Controller (THC), and OS Speaker IFM procedure(s)

LOCATION: Aft Flight Deck Orbit Station

TOOLS REQD:

Tools	10mm Socket
	3/8-in Standard Socket (1/4-in drive)
	Inspection Mirror
	Torque Wrench
BOB	Small-Parts Retainer
MISC	Flashlight

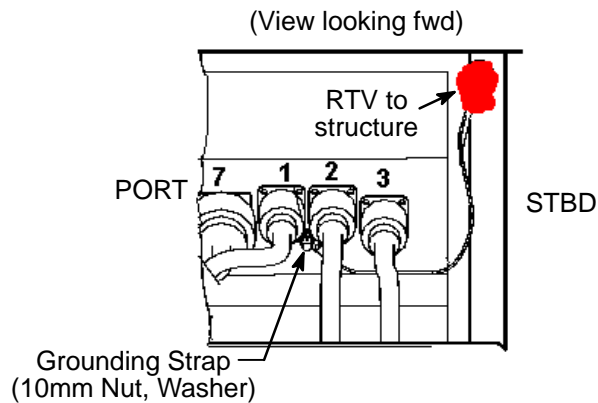
REPOSITION A7L

- A7L
1. Remove mounting bolts (eight, 3/8-in Socket), temp stow

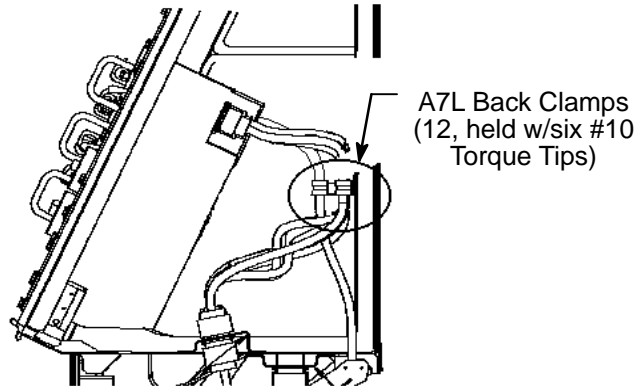
NOTE

Sections of wire harnesses from pnl A7L are wrapped w/Teflon, allowing them to pull thru restraining clamp

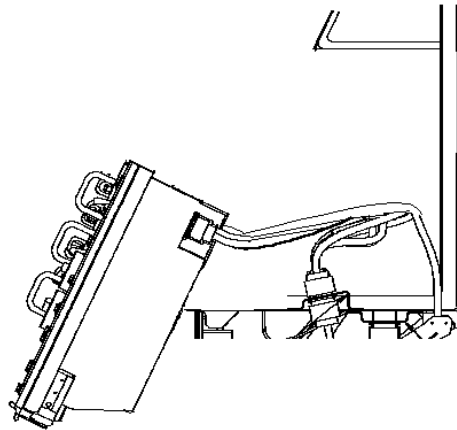
2. Pull pnl out of OS to access cables on back side of pnl until grounding strap on back of pnl taut. See fig below for grounding strap location



3. Starting at port side, carefully pull Teflon cover cables thru restraining clamps. This will allow pnl to be pulled fwd approx an additional 3 in
4. Disconnect grounding strap from pnl (one nut and washer, 10mm Socket). Temp stow H/W
5. Remove 12 cable clamps from aft structure (six screws, #10 Torque Tip Driver). Cut wire ties as reqd to allow more slack in cables. Stow clamps. See fig below



6. Reposition pnl as reqd for access to connectors (wire harnesses). Secure pnl w/Gray Tape



7. Return to appropriate IFM procedure

REINSTALL A7L

- A7L
8. Reinstall grounding strap (10mm nut and washer) (torque nut 40 in-lb)
 9. Install pnl, ensure wire harnesses not crimped (torque mounting bolts 30 in-lb)
 10. To complete, return to appropriate IFM procedure

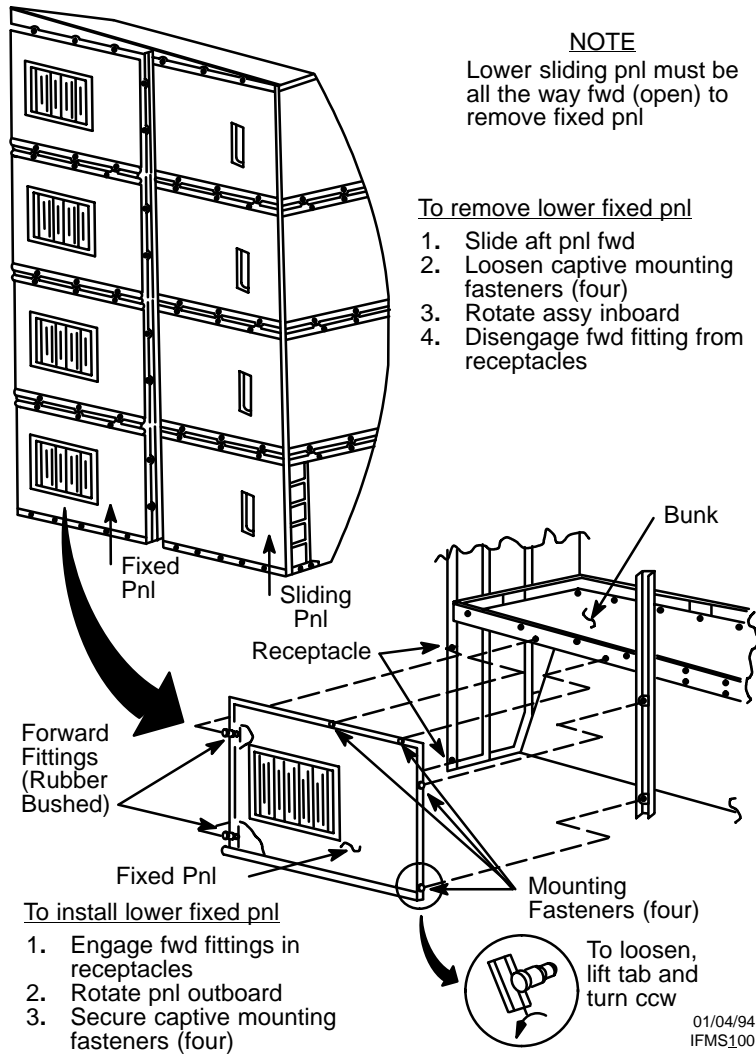
SLEEP STATION LOWER FIXED PNL REMOVAL

(15 min)

OBJECTIVE: Remove fixed pnl in Lower Sleep Station. Pnl must be removed to access Cabin Debris Trap Door for Cabin Fan Filter Cleaning and to access stowage Vol E (MD76C)

LOCATION: Sleep Station (when flown)

TOOLS REQD: None



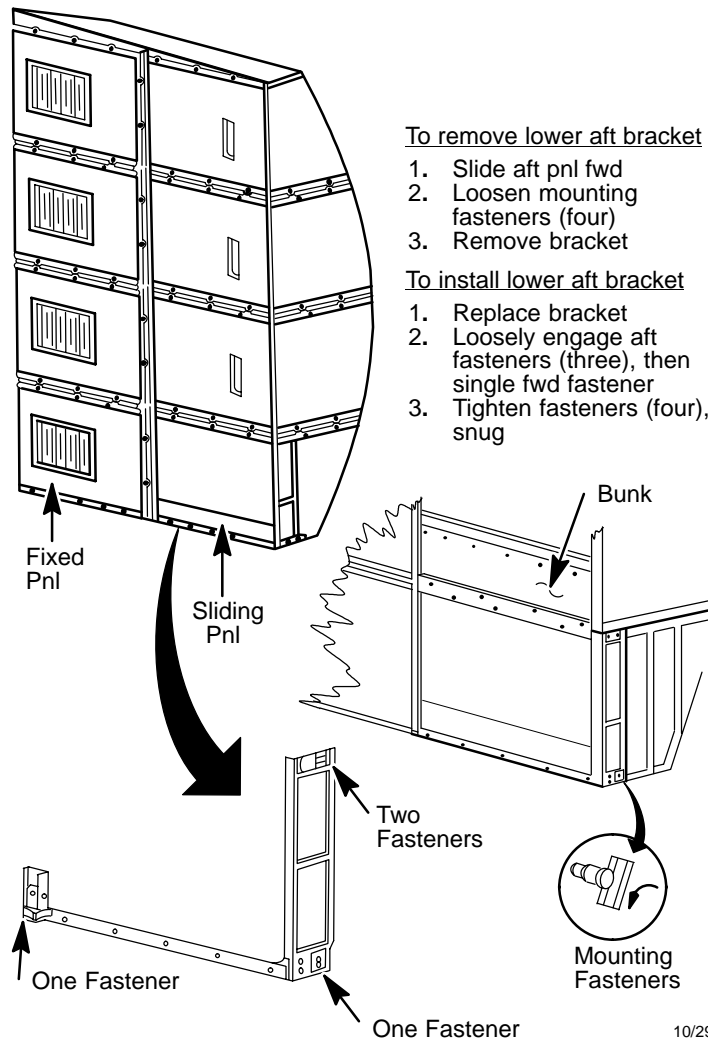
SLEEP STATION LOWER AFT BRACKET REMOVAL

(10 min)

OBJECTIVE: Remove lower aft bracket and guide (one piece).
This bracket must be removed to access Vol F (MD73N) wet trash and to aid access to Vol G (MD80R) when lockers installed in column MA16

LOCATION: Sleep Station (when flown)

TOOLS REQD: None



10/29/96

SOFT STOWAGE SUPPORT REMOVAL

(10 min)

OBJECTIVE: Access to LRUs, equipment in AV BAY 3A

LOCATION: MA9N

TOOLS REQD:

TOOL Locker Tool
 3/8-in Driver Handle
 1/4-in to 3/8-in Adapter
 Ratchet Wrench

1. Remove soft stowage bags from support

IF SLEEP STATION INSTALLED

2. Remove Sleep Station lower aft bracket. See SLEEP STATION LOWER AFT BRACKET REMOVAL (GENERAL INFORMATION), 1-17
3. Remove Locker MA16N
4. Remove lower support aft fasteners (two, Locker Tool)
5. Remove upper fwd fasteners, two thumb screws
6. Slide support right and remove

IF NO SLEEP STATION

7. Do steps 4,5, then remove support

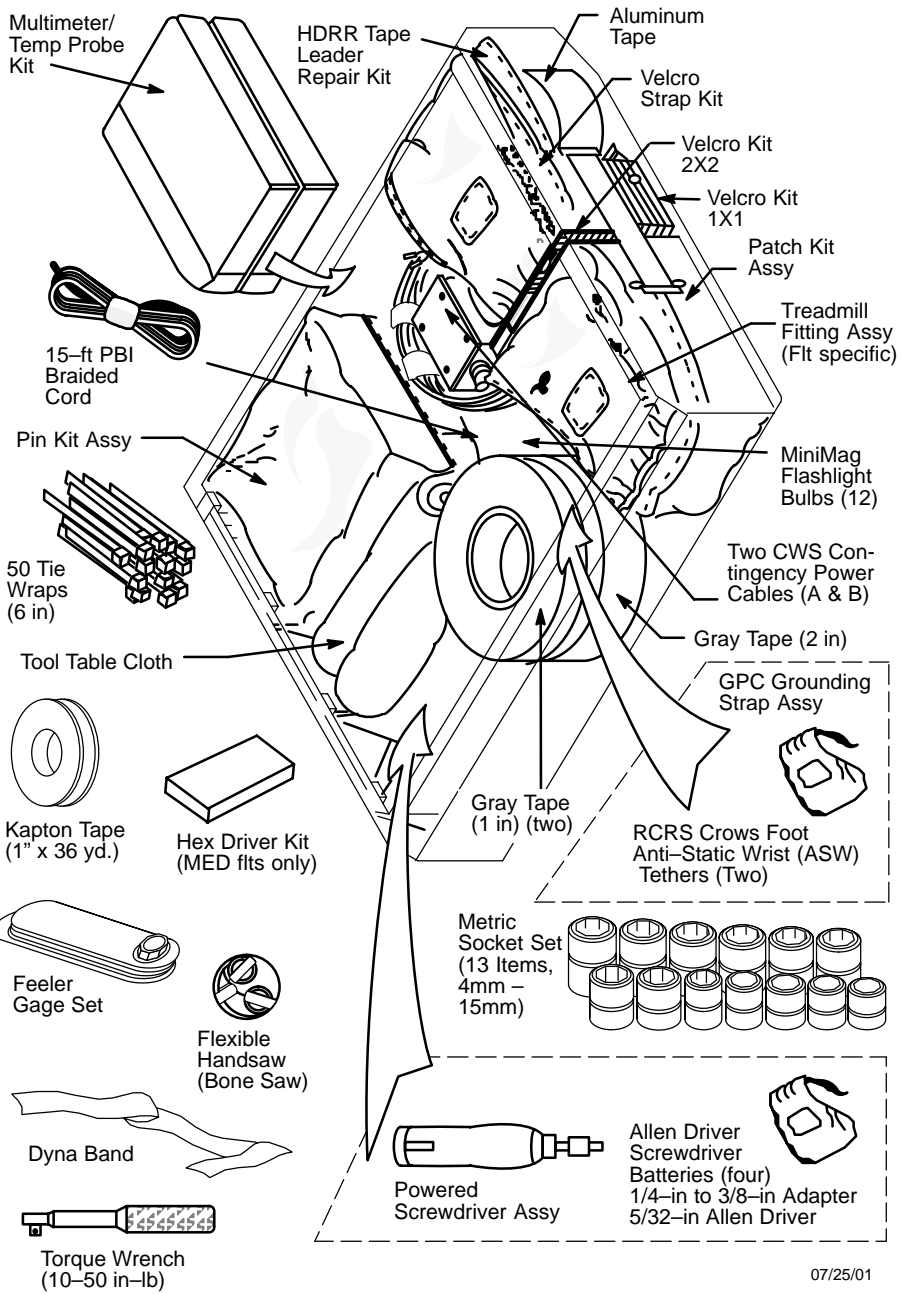
TOOLS

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IFM TOOL LOCKER (TOOL)	
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TOOLS

IFM TOOL LOCKER: TRAY 1 (Typical Packaging)

TOOLS



07/25/01
ifm_s2p2

IFM TOOL LOCKER: TRAY 1 – DIGITAL MULTIMETER

TO OPERATE

1. Insert BLACK probe in COM. RED probe in either $V\Omega \rightarrow | -$ A, or mA μA
2. If DC Volts, select \overline{V} or \overline{mV}
If AC Volts, select \overline{V}
3. If resistance, select Ω
4. If Amps, select A $\overline{---}$
(blue button toggles between DC $\overline{---}$ and AC $\overline{~}$)

NOTE: See Fluke 80 series Quick Reference Guide for additional operating instruction (stowed in pouch)

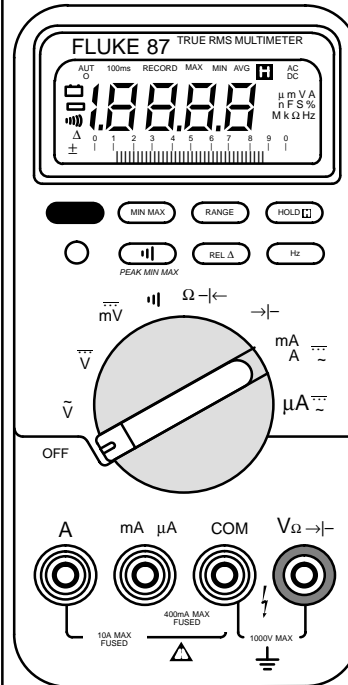
IF TEMPERATURE MEASUREMENT

1. Install temperature probes in COM and $V\Omega \rightarrow | -$
2. Select $^{\circ}F$ or $^{\circ}C$ on temperature probe
3. Select \overline{mV} on multimeter
4. Expose probe tip directly to measured material (noncorrosive liquid, gas, or solid)

IF AMBIENT PRESSURE MEASUREMENT IN PSA (mm HgA)

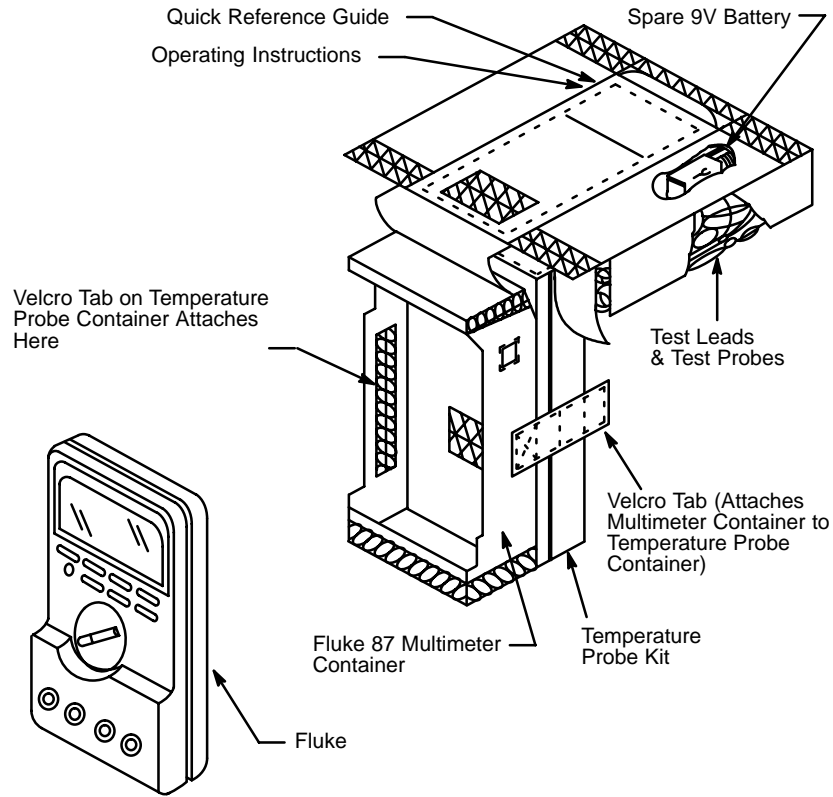
1. \checkmark Filter/coupler connected to QD on pressure module (PM)
2. Plug PM into multimeter (COM to COM and V to $V\Omega \rightarrow | -$)
3. For PSIA output with four digit display:
 \checkmark Multimeter – OFF
Depress yellow button for 2 sec while selecting \overline{mV} on multimeter (if mm HgA) select \overline{V} , select PSIA (mm HgA) on PM
4. Deactivate by turning PM Multimeter – OFF

NOTE: For pressure measurement of vacuum vent SPLY H₂O(WASTE H₂O SYS), contact MCC



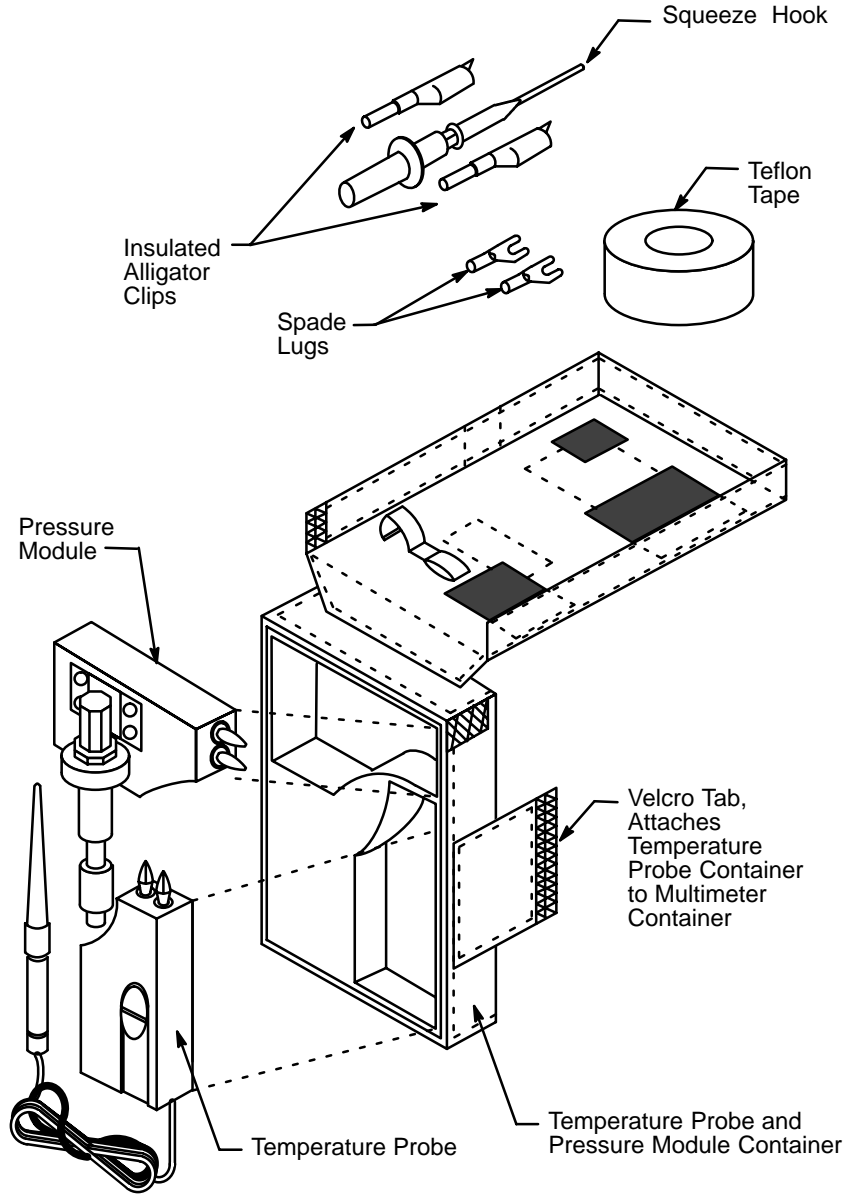
08/02/95
IFMS2P4A

IFM TOOL LOCKER: TRAY 1 – DIGITAL MULTIMETER KIT



08/02/95
IFMS2P5A

IFM TOOL LOCKER: TRAY 1 – TEMPERATURE PROBE AND PRESSURE MODULE KIT



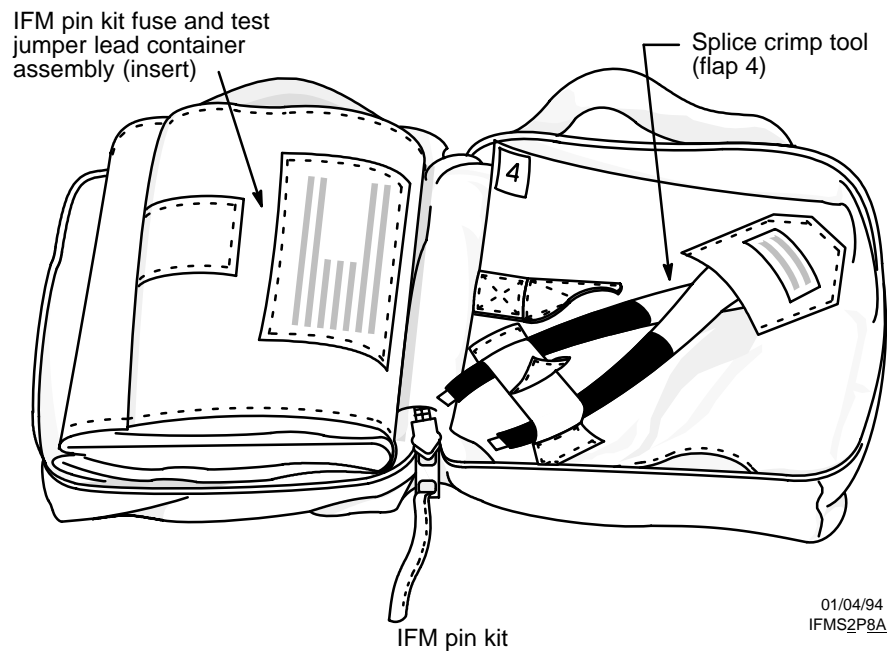
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IFMS2P5

IFM TOOL LOCKER: TRAY 1 – PIN KIT

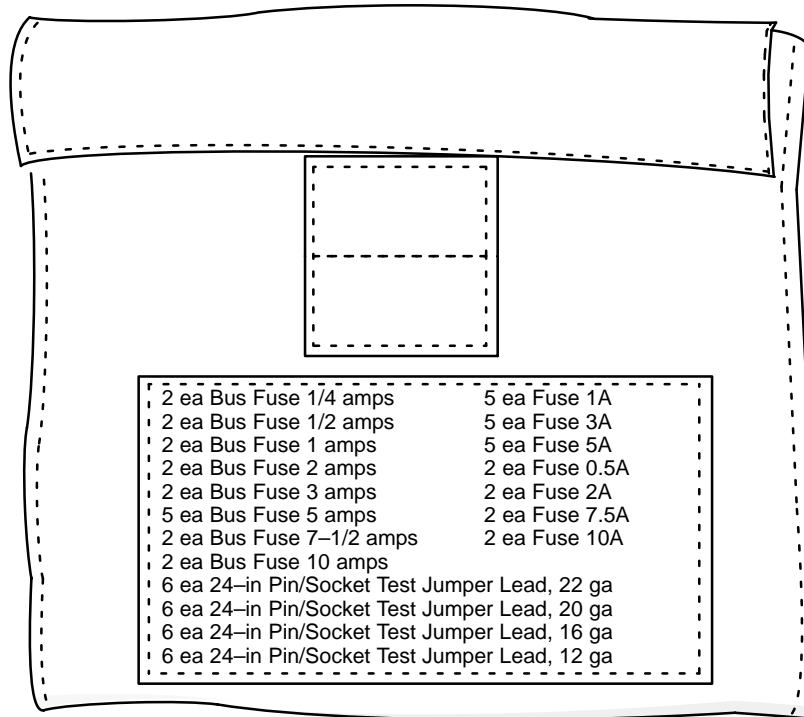


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IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



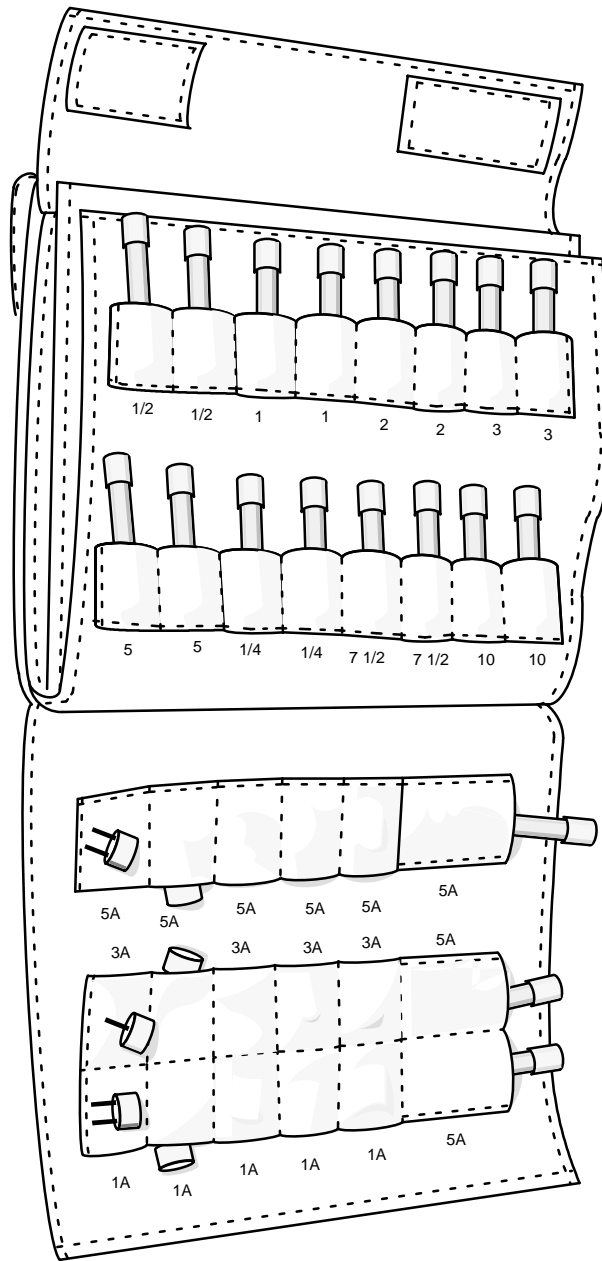
IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



IFM pin kit fuse and test jumper lead container assembly (insert)

01/04/94
IFMS2P10A

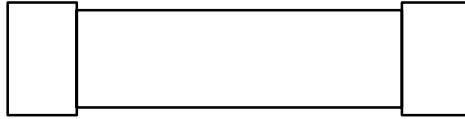
IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



Standard and subminiature (instrument) fuses

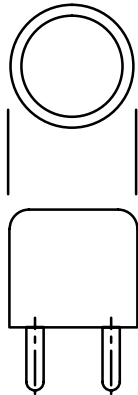
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IFMS2P11A

IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



Fuse–Cartridge (ME451–0009–XXXX)

Ampere rating	Dash #	# Spares Flown in Pin Kit
0.25	–1022	2
0.5	–1023	2
1.0	–1001	2
2.0	–1002	2
3.0	–1003	2
5.0	–1021	5
7.5	–1019	2
10.0	–1005	2

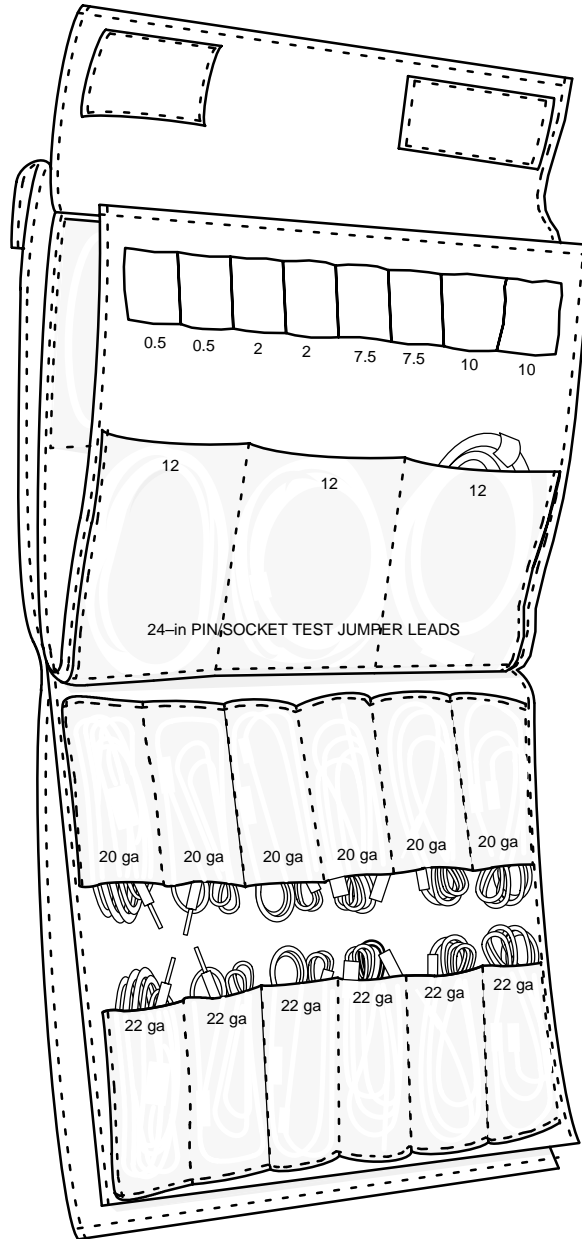


Fuse–subminiature plug in
(ME451–0018–XXXX)

Ampere rating	Dash #	# Spares Flown in Pin Kit
1.00	0100	5
3.00	0300	5
5.00	0500	5
0.50	0050	2
2.00	0200	2
7.50	0750	2
10.00	1000	2

01/04/94
IFMS2P12A

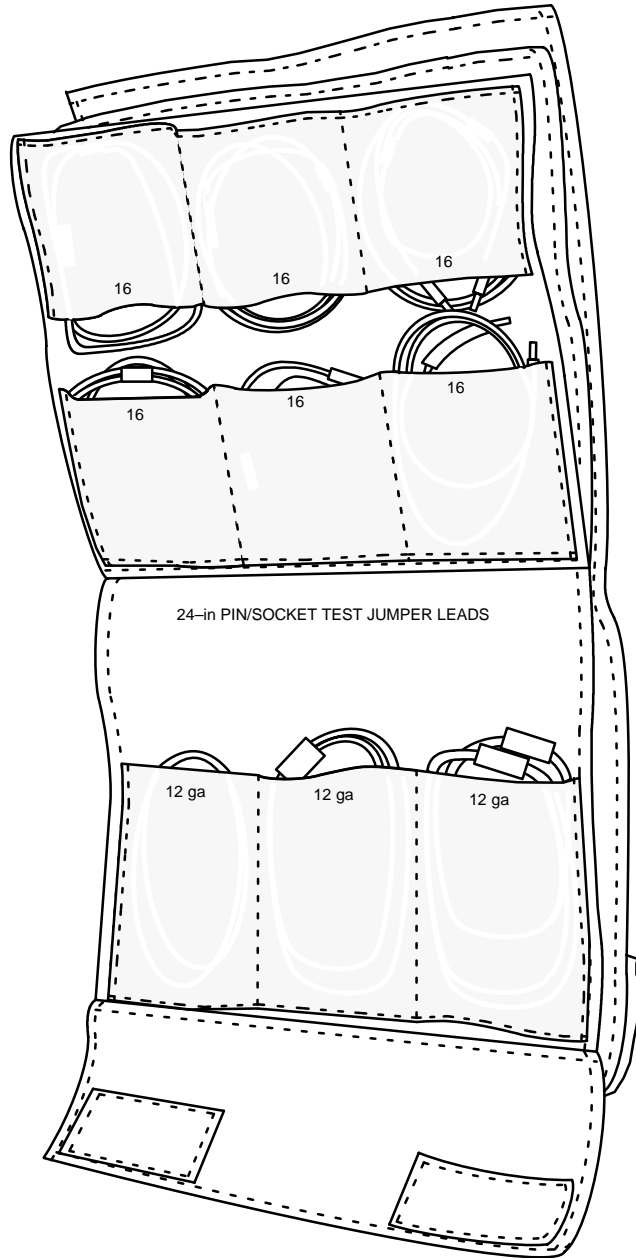
IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



01/04/94
IFMS2P13A

24-in pin/socket test jumper leads (three 12-ga,
six 20-ga, and six 22-ga)

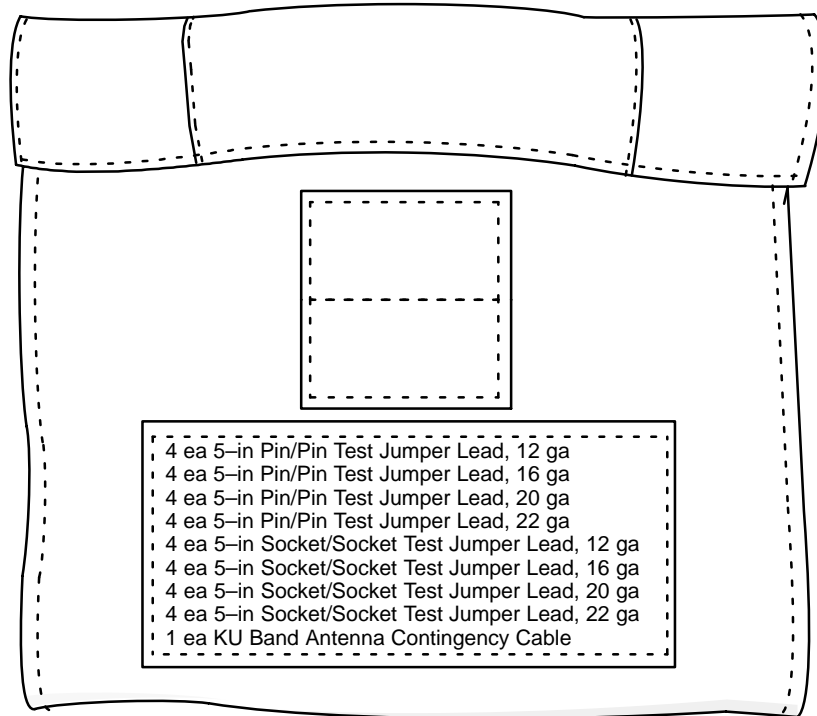
IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



24-in pin/socket test jumper leads
(three 12-ga and six 16-ga)

IFMS2P14A

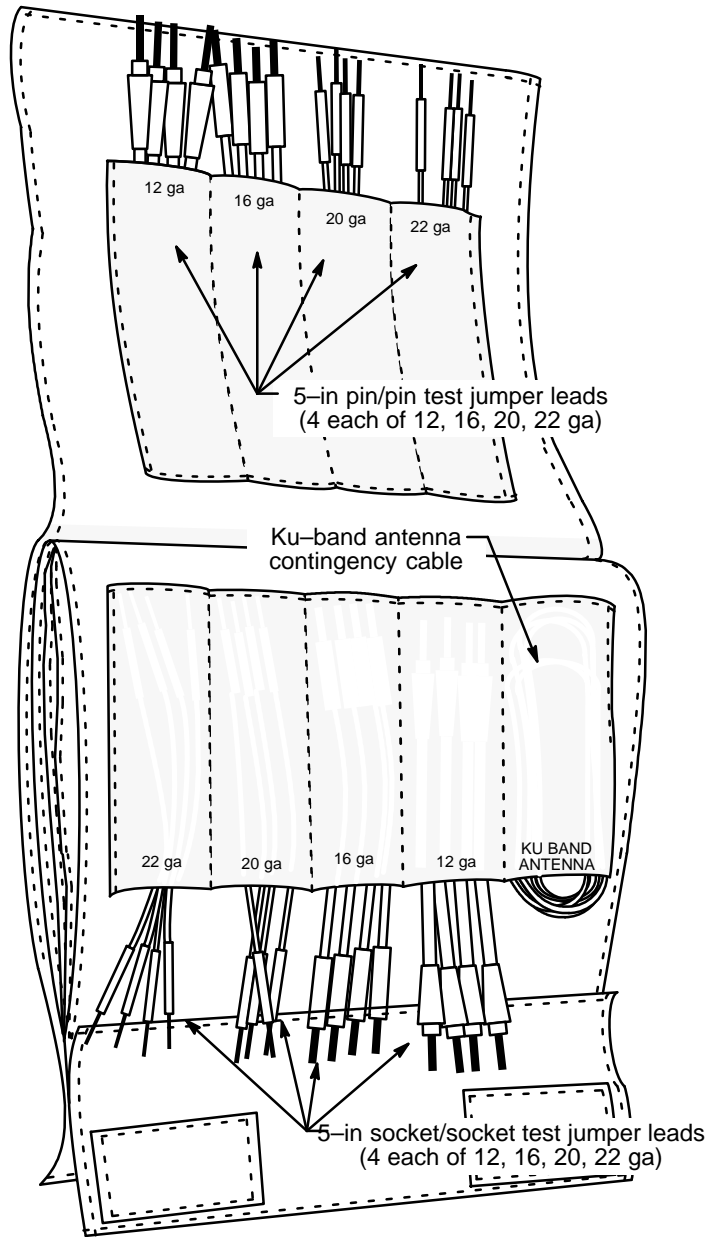
IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



IFM pin kit fuse and test jumper
lead container assembly (insert)

01/04/94
IFMS2P9A

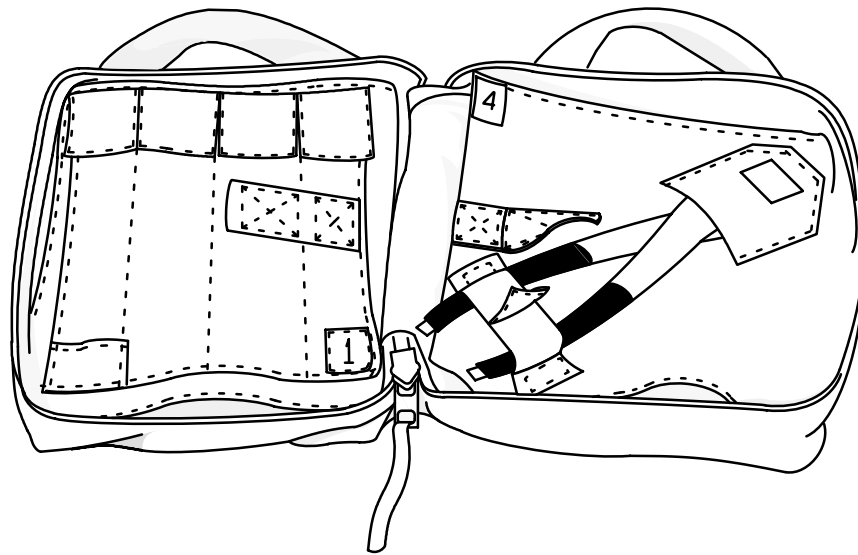
IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



Socket/socket and pin/pin test jumper leads, and
Ku-band antenna contingency cable

01/04/94
IFMS2P15A

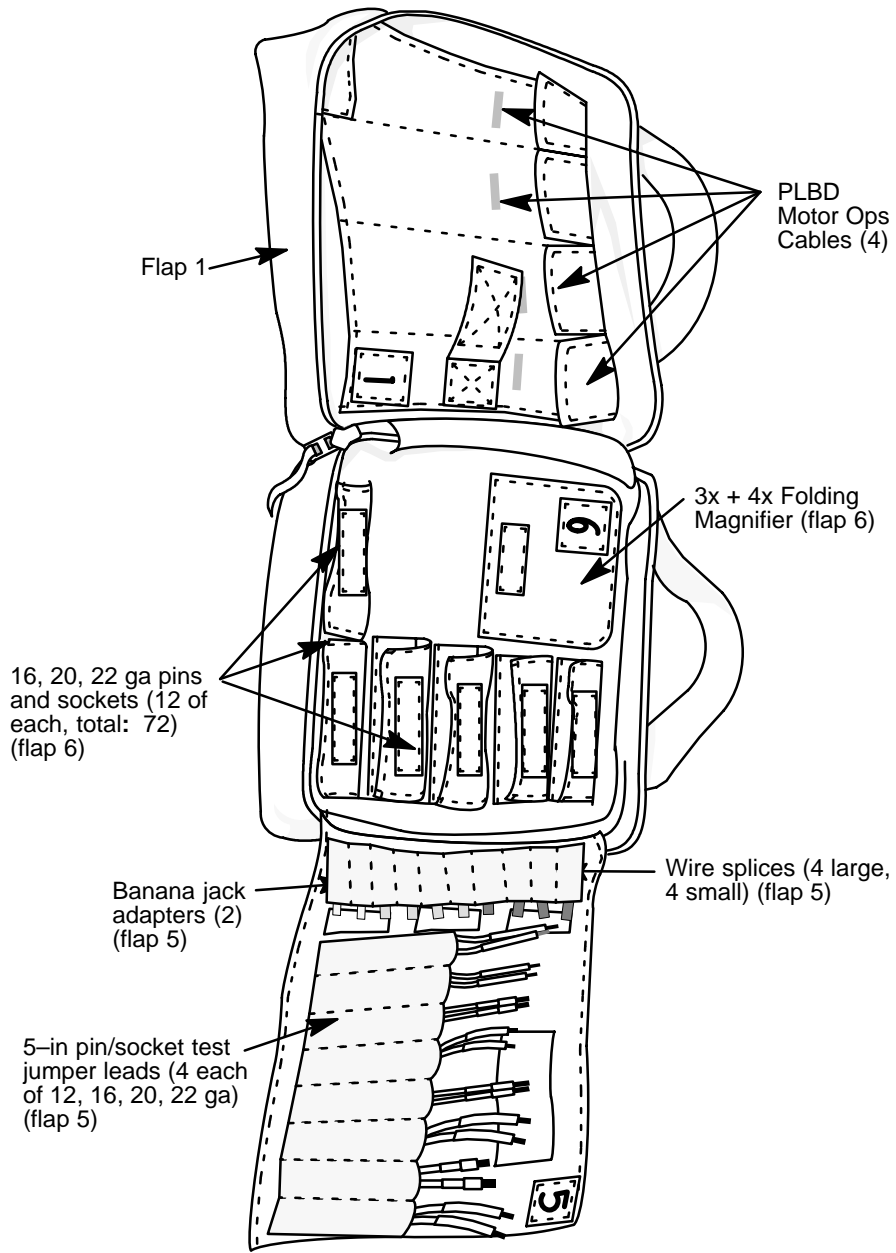
IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



IFM Pin Kit

01/04/94
IFMS2P16A

IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



Flap 1

PLBD Motor Ops Cables (4)

3x + 4x Folding Magnifier (flap 6)

16, 20, 22 ga pins and sockets (12 of each, total: 72) (flap 6)

Banana jack adapters (2) (flap 5)

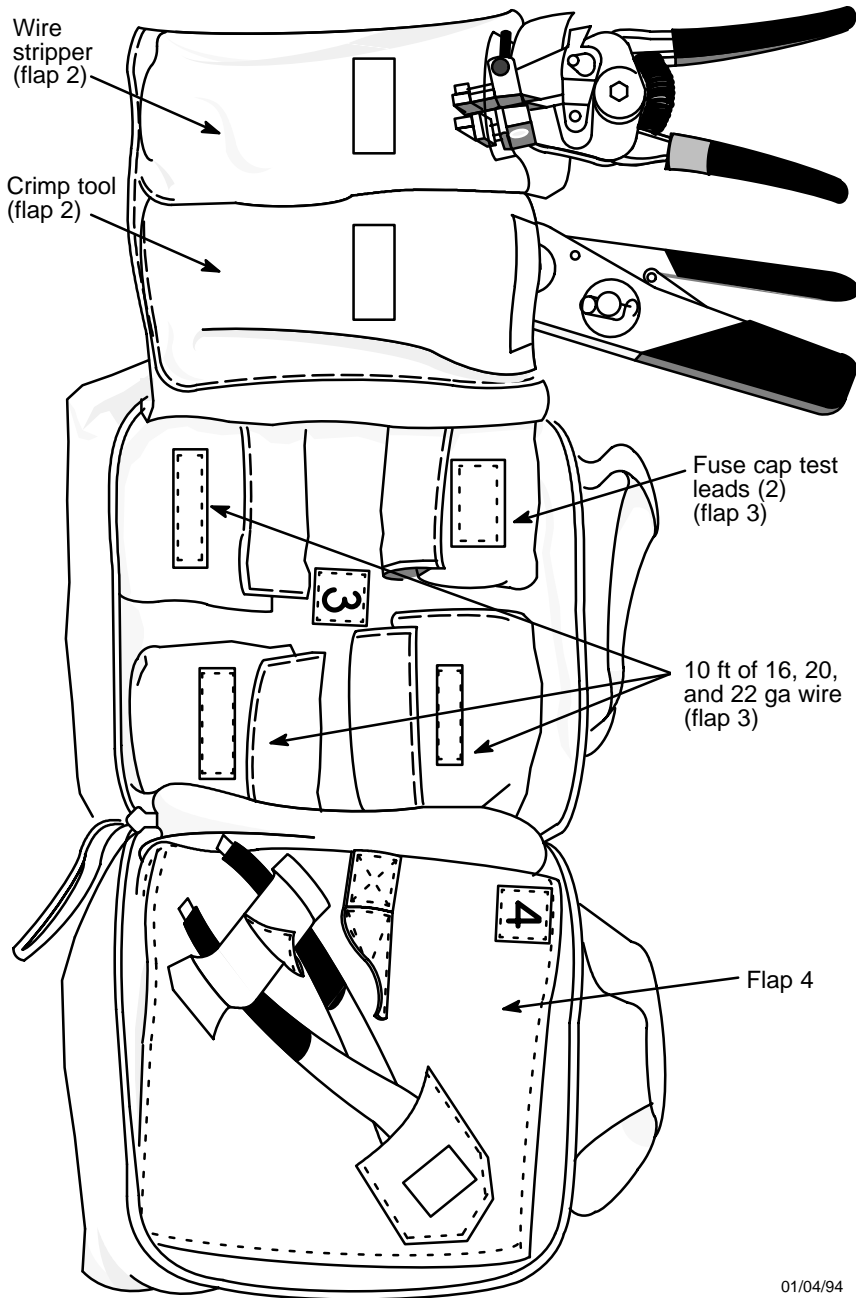
Wire splices (4 large, 4 small) (flap 5)

5-in pin/socket test jumper leads (4 each of 12, 16, 20, 22 ga) (flap 5)

IFM Pin Kit

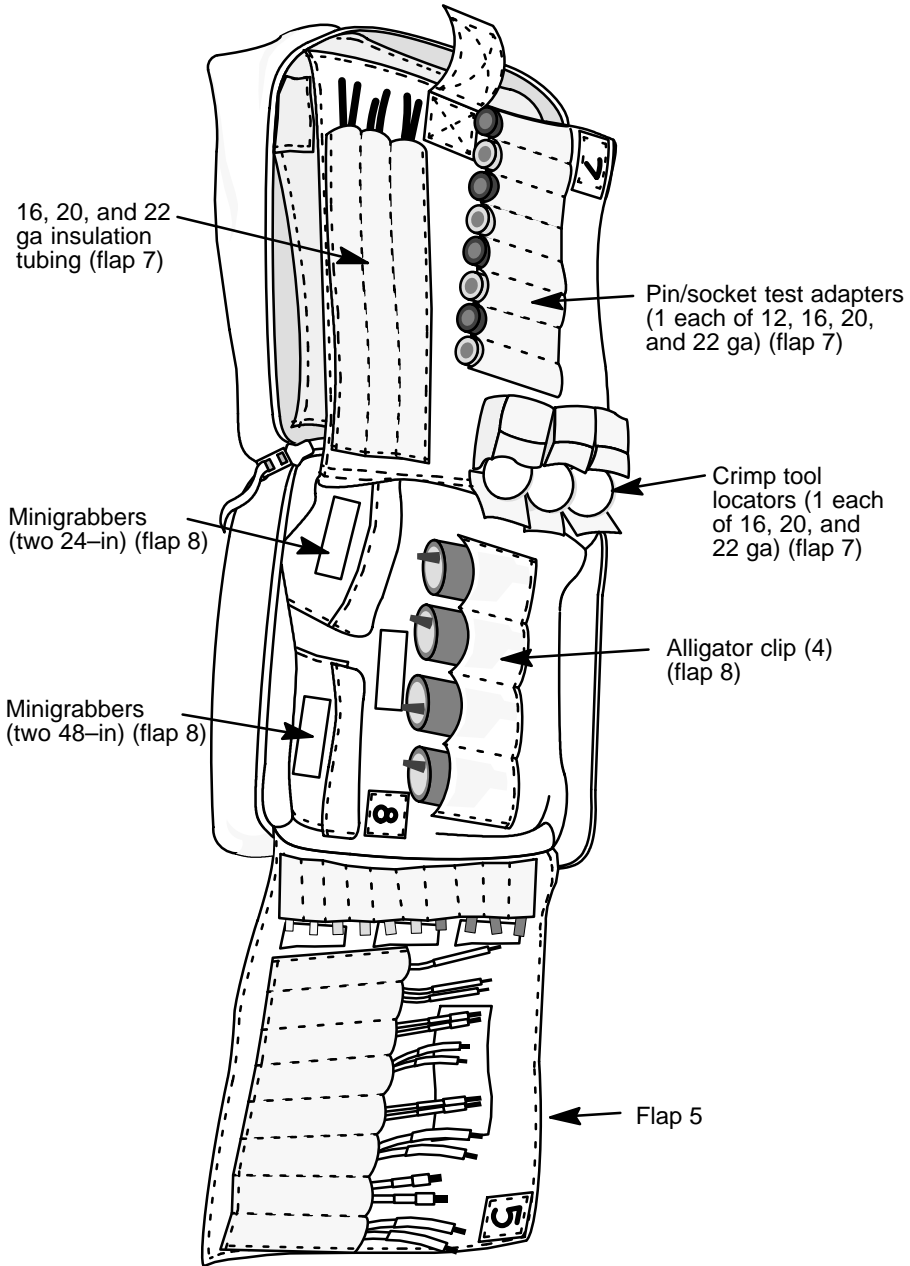
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IFMS2P17A

IFM TOOL LOCKER: TRAY 1 – PIN KIT (Continued)



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IFMS2P18A

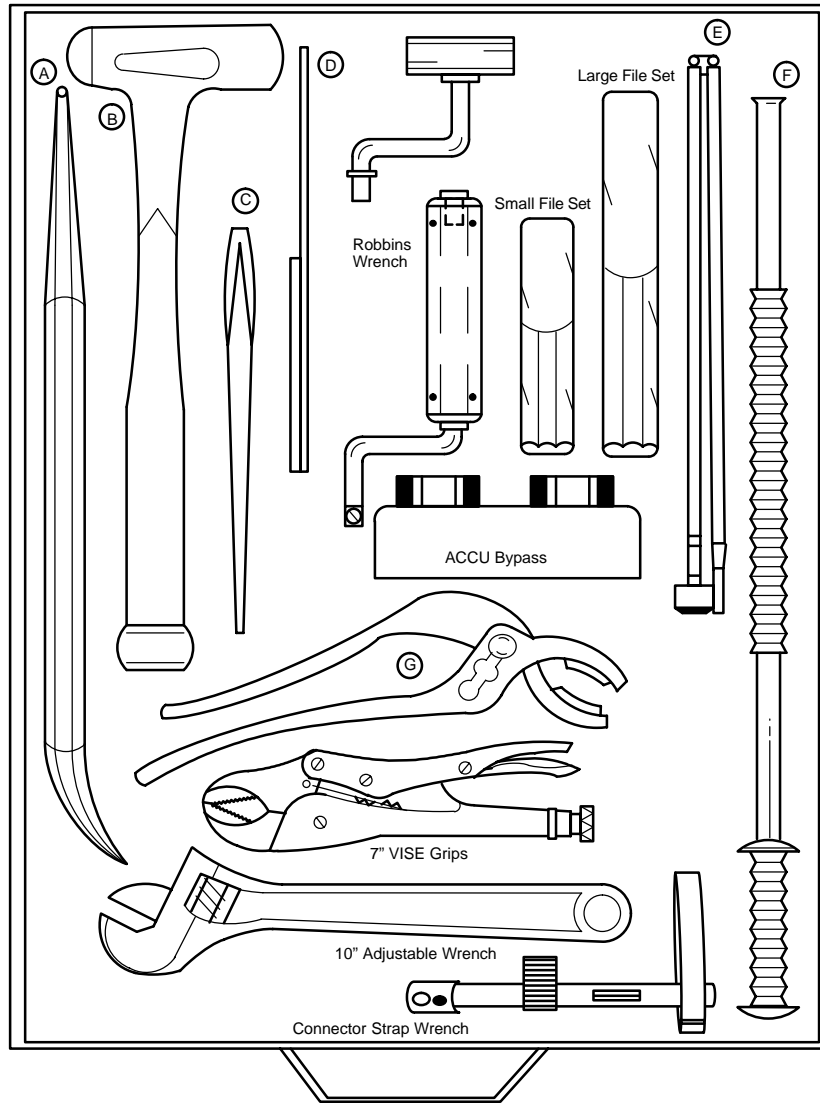
IFM TOOL LOCKER: TRAY 1 – PIN KIT (Concluded)



IFM pin kit

01/04/94
IFMS2P19A

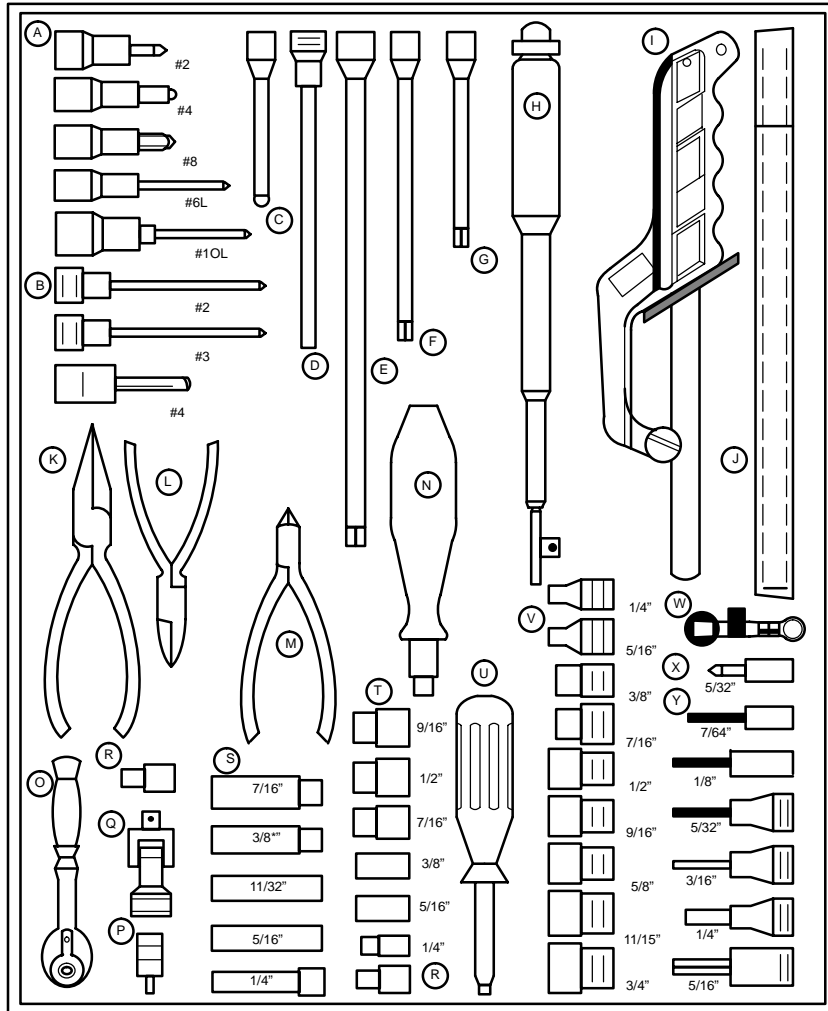
IFM TOOL LOCKER: TRAY 2



- | | |
|-----------------------|---------------------------------------|
| (A) Pinch Bar | (E) Locker Tool 3/16-in Hex Drive (2) |
| (B) Deadblow Hammer | (F) Mechanical Fingers |
| (C) 8-in Punch | (G) Connector Pliers (2) |
| (D) Inspection Mirror | |

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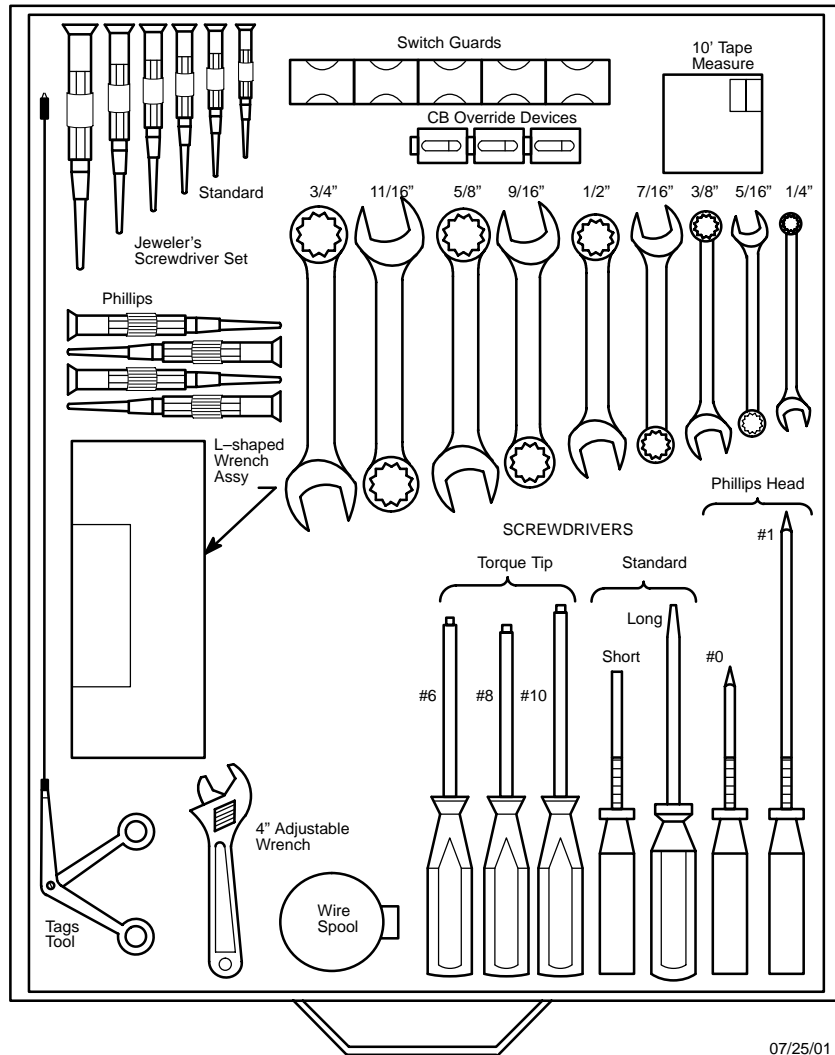
IFM TOOL LOCKER: TRAY 3



- (A) Torque Tips
- (B) Phillips Driver
- (C) 3/16-in Hex Ball
- (D) 3/16-in Seat Adjustment Tool
- (E) 10-in Extension 1/4-in Drive
- (F) 6-in Extension 1/4-in Drive
- (G) 4-in Extension 1/4-in Drive
- (H) 1/4-in Torque Wrench (40-200 in-lb)
- (I) Hacksaw
- (J) Blades
- (K) Large Needlenose
- (L) Small Needlenose 4 1/2-in
- (M) Wire Cutters
- (N) 3/8-in Driver Handle
- (O) 1/4-in Drive Ratchet Wrench 4-in
- (P) Adapter 3/8-in-1/4-in
- (Q) Universal Joint 3/8-in
- (R) Adapter 1/4-in-3/8-in
- (S) Deepwell Sockets 1/4-in Drive
- (T) 1/4-in Standard Sockets
- (U) 1/4-in Driver Handle
- (V) 3/8-in Standard Sockets
- (W) 7/16-in Torque Adapter
- (X) 5/32 in Hex Ball
- (Y) Allen Head Drivers

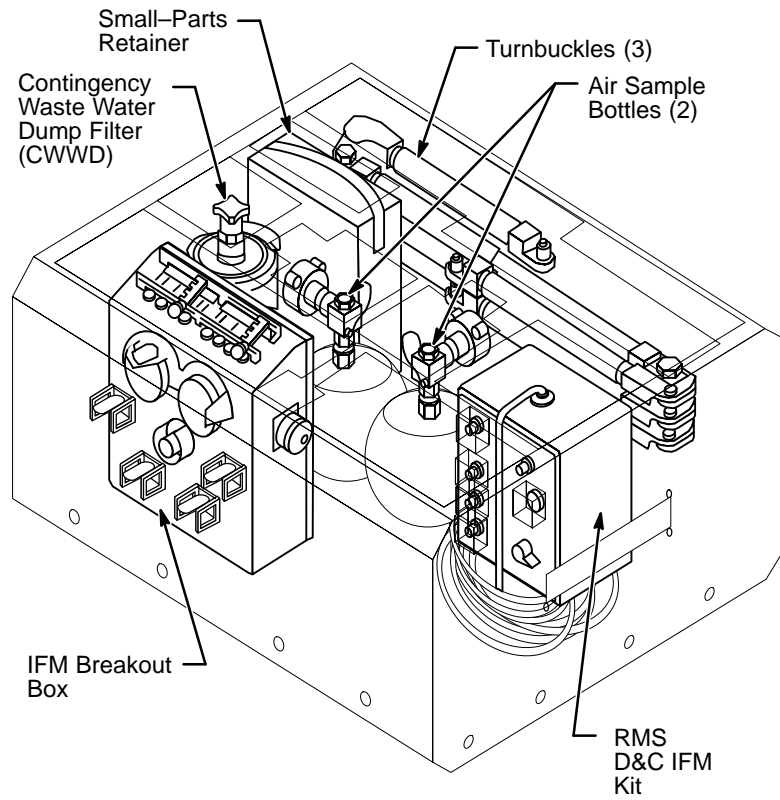
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IFM TOOL LOCKER: TRAY 4



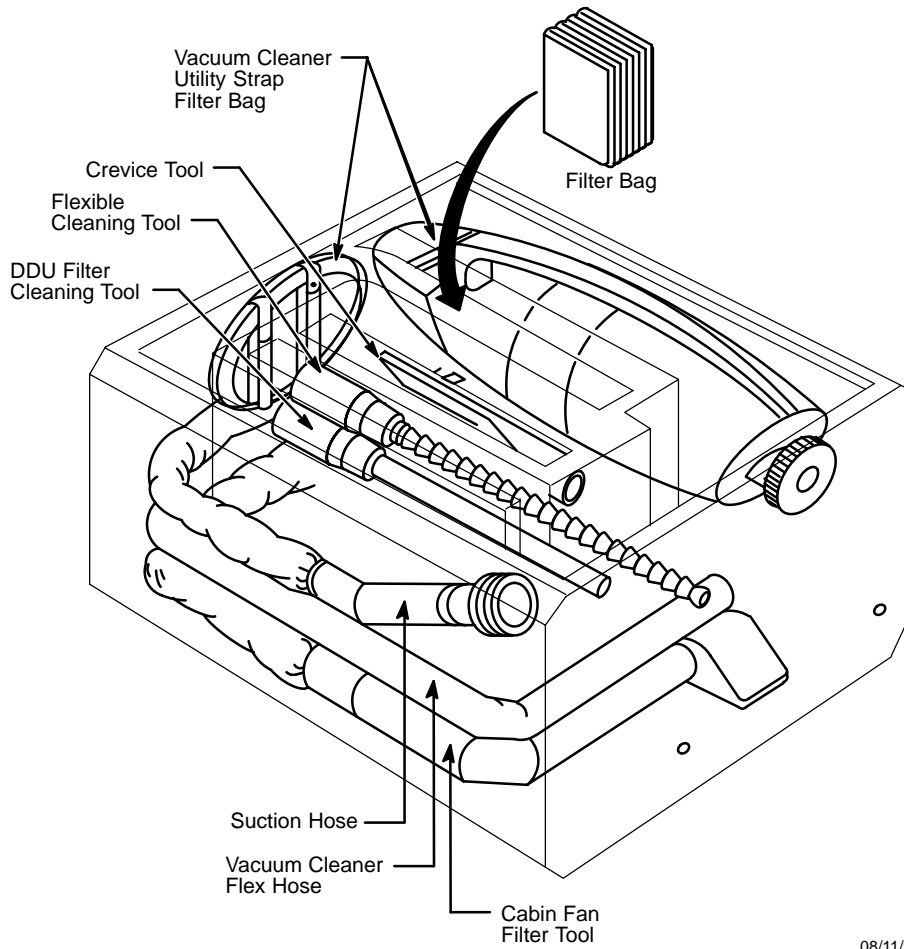
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IFMS2P22A

IFM BREAKOUT BOX (BOB) LOCKER



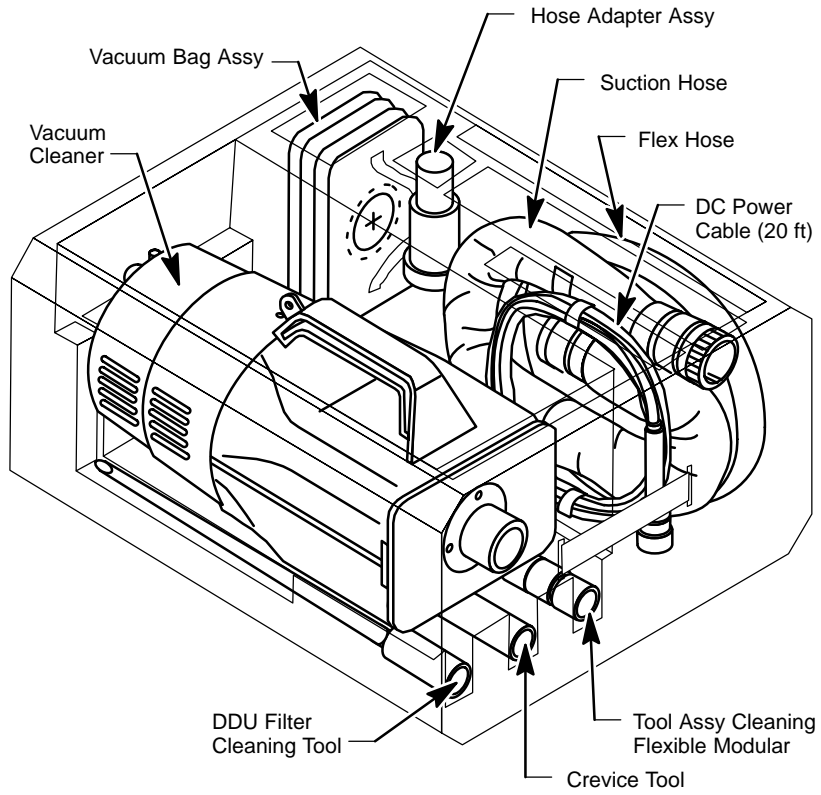
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ifm_s2p22

VACUUM CLEANER LOCKER (VAC) – AC



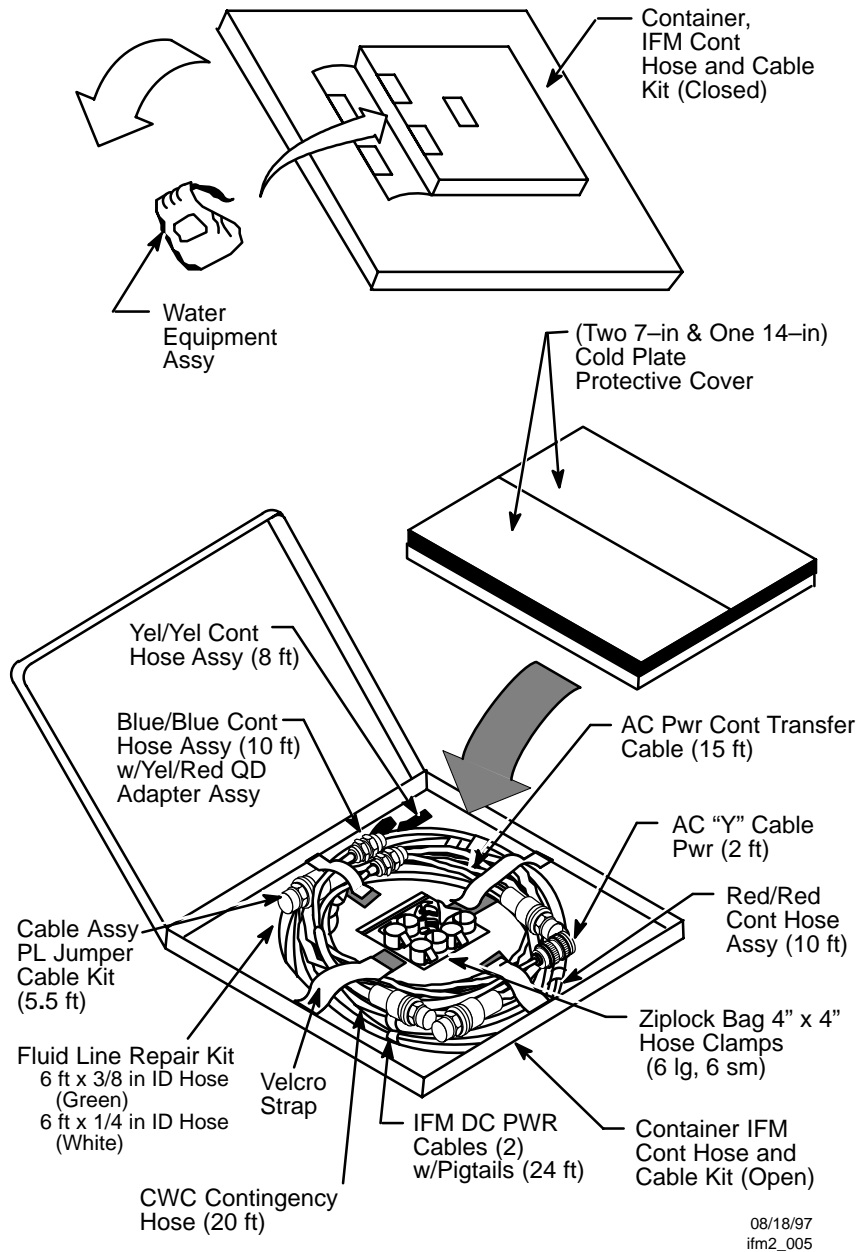
08/11/95
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VACUUM CLEANER LOCKER (VAC) – DC



J48025_s2p24

IFM CONTINGENCY HOSE AND CABLE KIT (CHCK)



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COMPONENT LOCATIONS

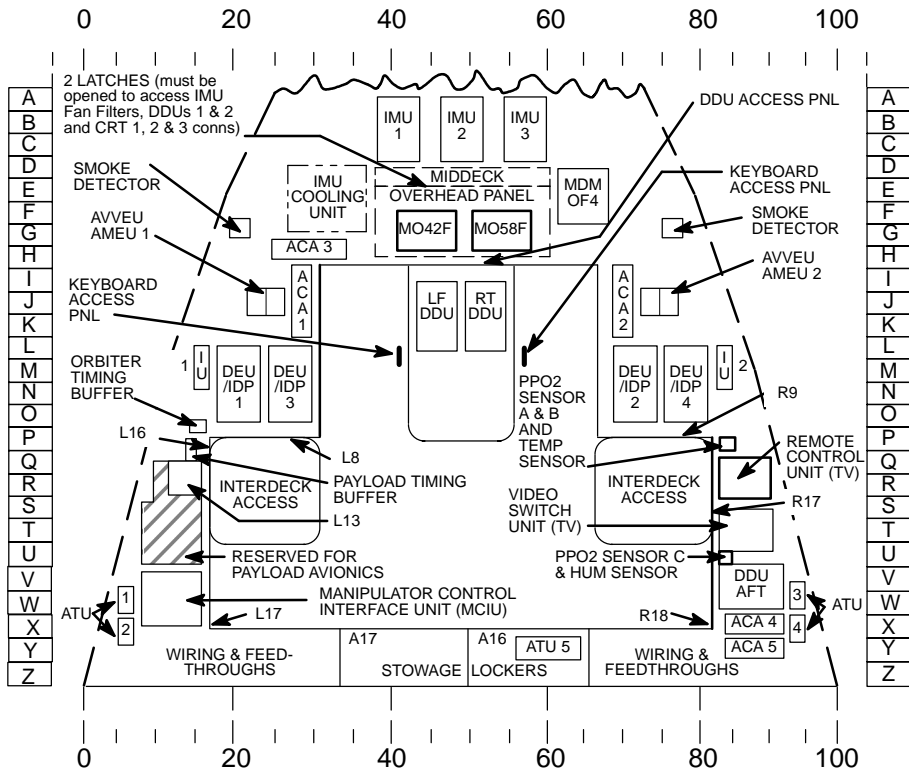
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**COMPONENT
LOCATIONS**

**COMPONENT
LOCATIONS**

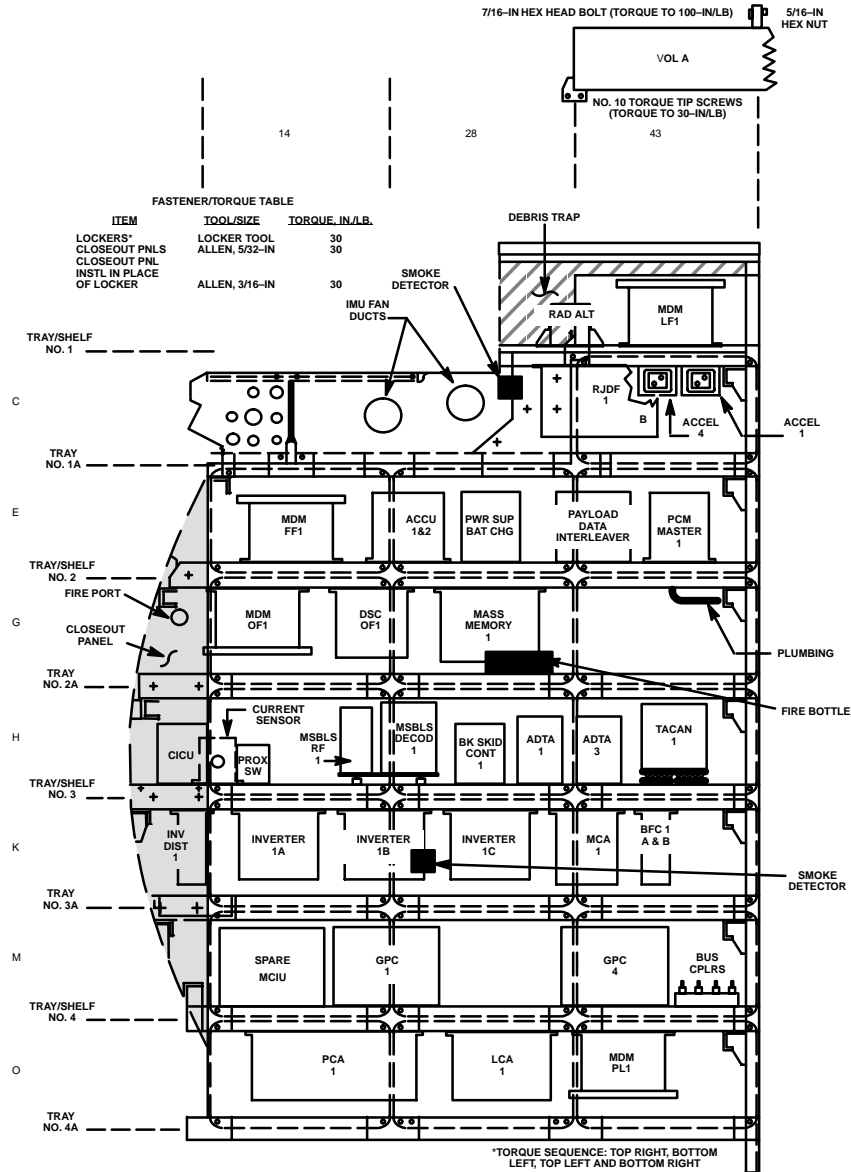
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FLIGHT DECK



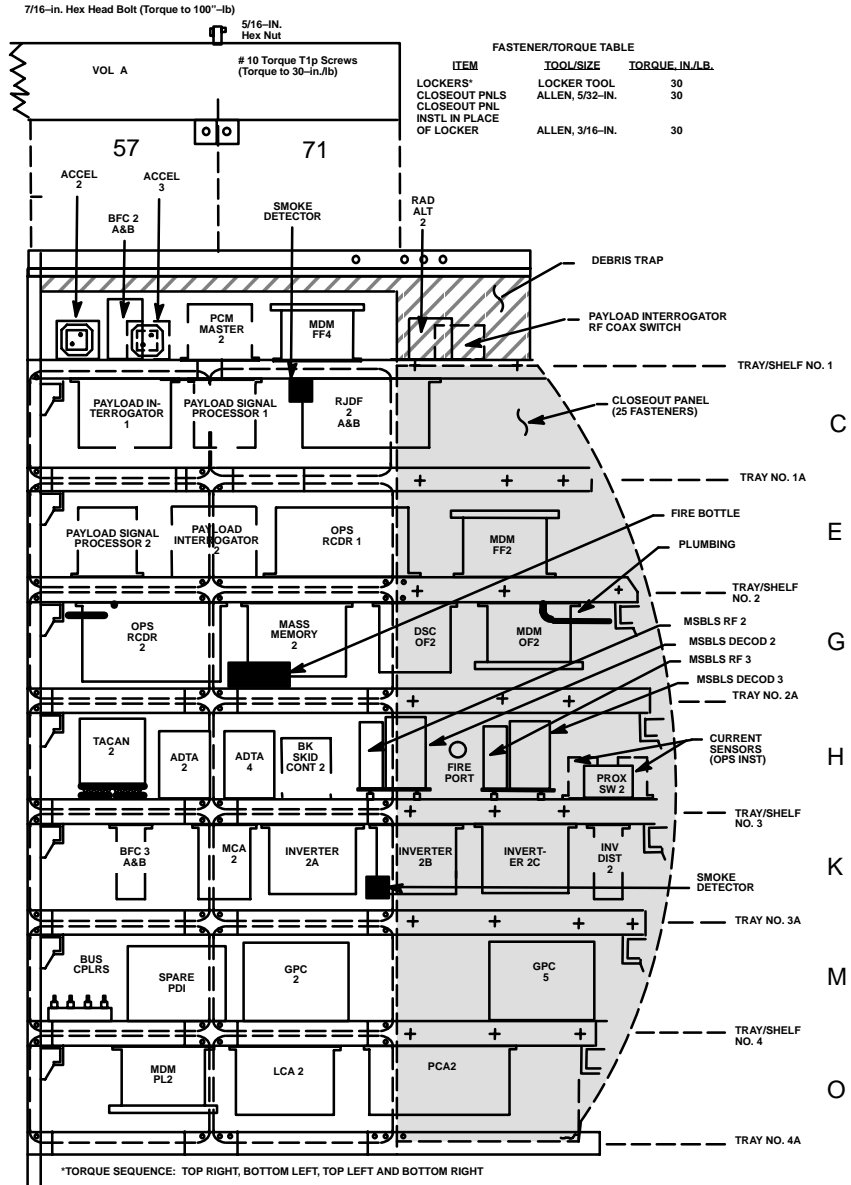
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AV BAY 1



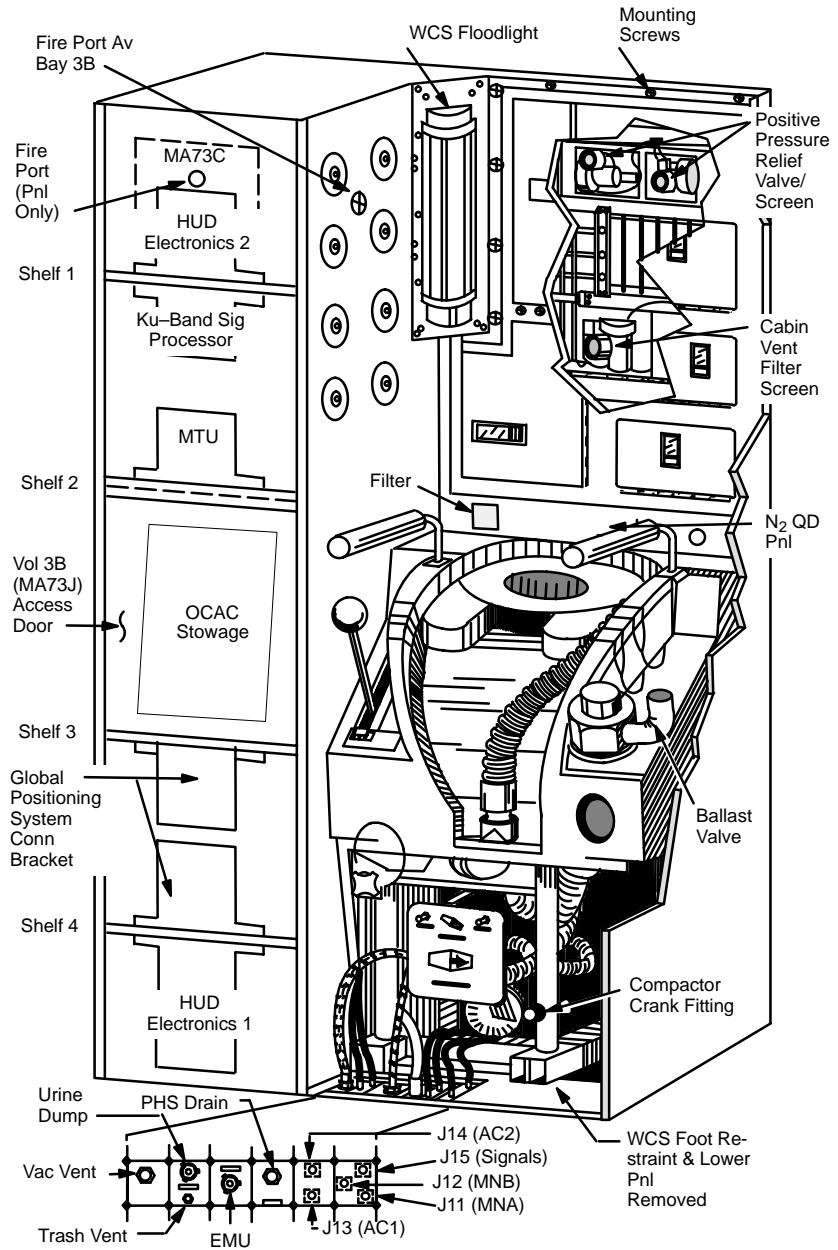
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ifm3_006

AV BAY 2



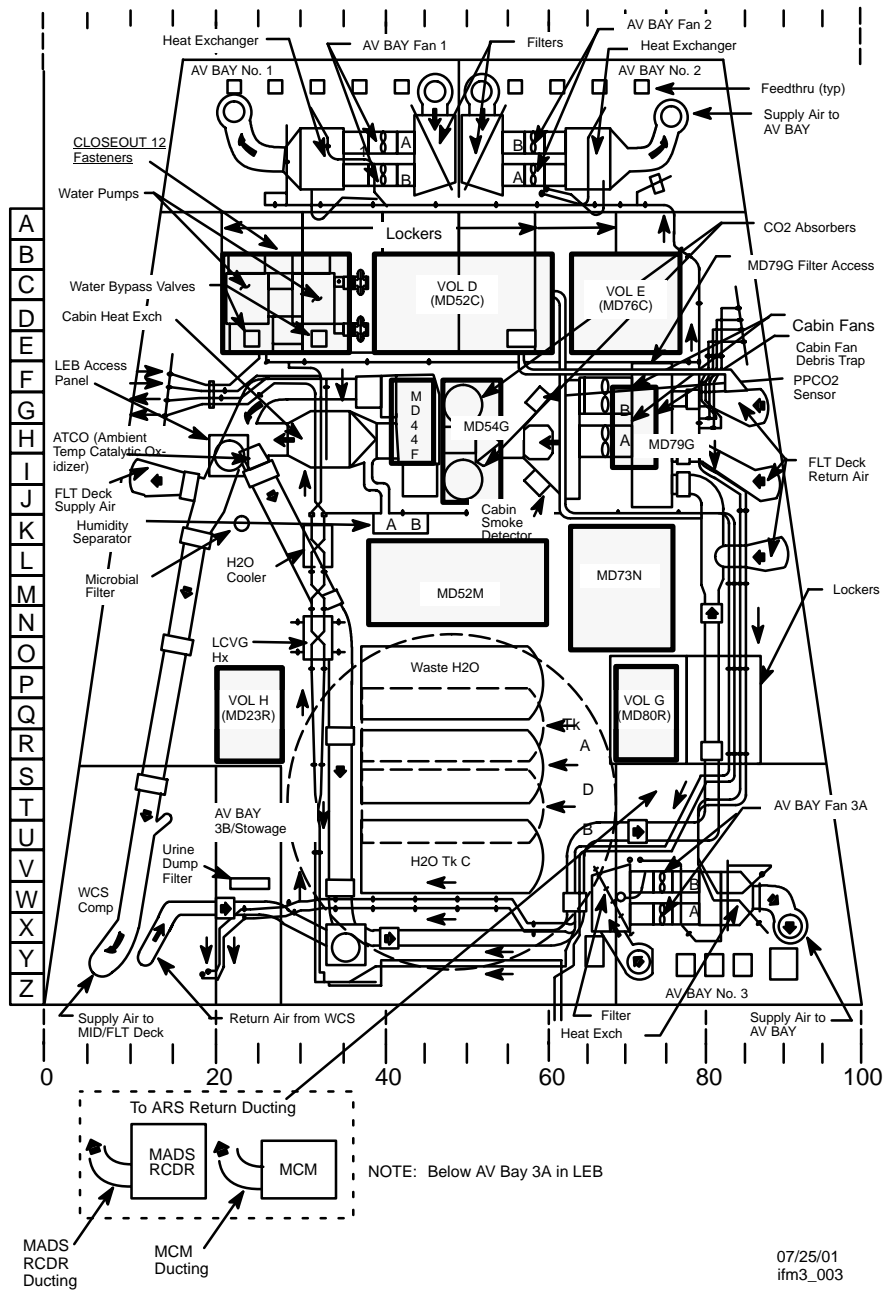
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AV BAY 3B AND WCS COMPARTMENT

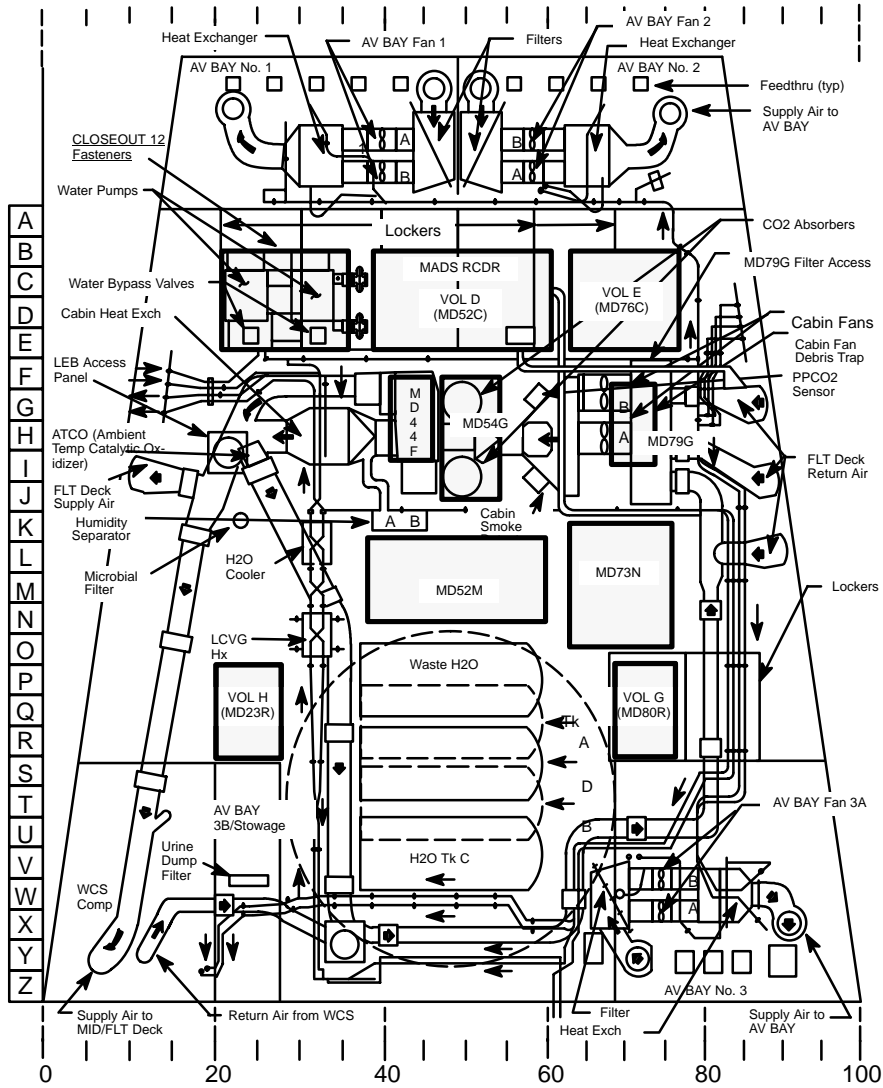


07/25/01
ifm3_004

LOWER EQUIPMENT BAY (OV102,105)



LOWER EQUIPMENT BAY (OV103)



08/18/97
ifm3_003

SCHEDULED MAINTENANCE

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(OVERHEAD)	4-5
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FILTER CLEANING

45 min w/o Av Bay Filter Cleaning
2:10 hr w/Av Bay Filter cleaning

OBJECTIVE: On-orbit filter/screen cleaning accomplished to minimize free air contamination and prevent component/ black box damage which could result from overheating

NOTE

Cabin, AV BAY, and Booster Fans Filter cleaning will not be performed unless directed by MCC

TOOLS REQD:

VAC Vacuum Cleaner and attachments (as reqd)

TOOL AV BAY Fan Only (if reqd)
Robbins Wrench
Locker Tool
1/4-in to 3/8-in Adapter
Extension (as desired)
Ratchet Wrench
5/32-in Allen Head Driver
#6 Torque Driver

VACUUM CLEANER OPERATION (TYP)

FOR AC VACUUM:

CAUTION

Do not run vacuum for more than 5 min continuously w/DDU filter tool attached

NOTE

Vacuum has thermal cutoff sw in line w/motor. If cutoff occurs, allow vacuum to cool 60 min before restart

1. Unstow, assemble vacuum attachments (as reqd)
2. ✓ Vacuum Cleaner Pwr sw – OFF
✓ AC UTIL PWR AC1(3) – OFF
3. Attach Vacuum Cleaner connector to convenient AC UTIL PWR AC1(3) outlet
4. AC UTIL PWR AC1(3) – ON, then:
VAC CLEANER – ON, clean screen/filter
5. VAC CLEANER – OFF, then:
AC UTIL PWR AC1(3) – OFF
6. Stow

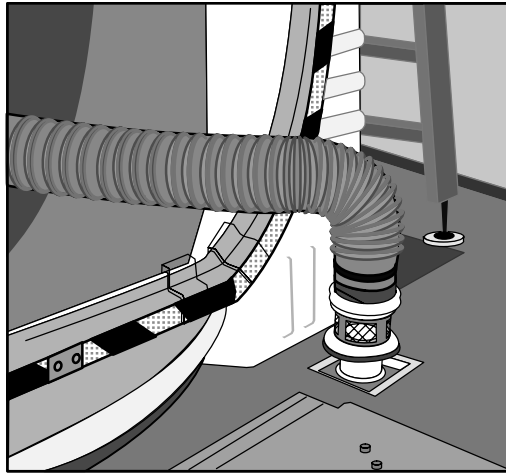
**SCHEDULED
MAINTENANCE**

FOR DC VACUUM:

1. Unstow, assemble vacuum attachments (as reqd)
2. ✓ Vacuum Cleaner Pwr sw – OFF
✓ DC UTIL PWR MNA(B,C) – OFF
3. Attach Vacuum Cleaner connector to convenient DC UTIL PWR MNA(B,C) outlet
4. DC UTIL PWR MNA(B,C) – ON, then:
VAC CLEANER – ON, clean screen/filter
5. VAC CLEANER – OFF, then:
DC UTIL PWR MNA(B,C) – OFF
6. Stow

MIDDECK FLOOR (2 min)

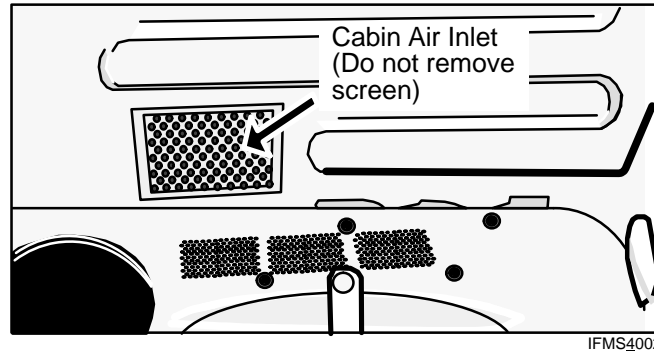
Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
ARS Hose Screen (Spacehab or Docking fits)	Middeck Floor – Left fwd of airlock/None	Not Applicable/Crevice Tool



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MIDDECK (WCS) (5 min)

Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
Cabin inlet	WCS Compartment/Aft Bulkhead	Not Applicable/Crevice Tool

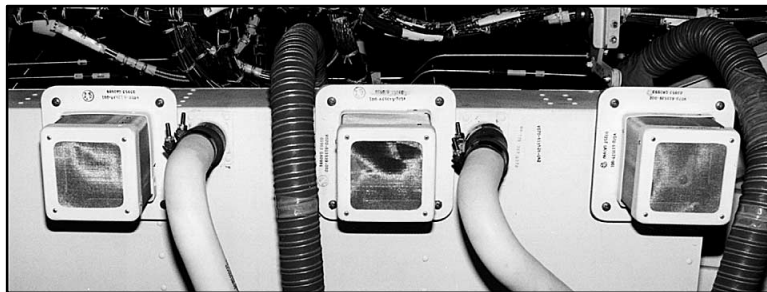


MIDDECK (OVERHEAD) (10 min)

NOTE

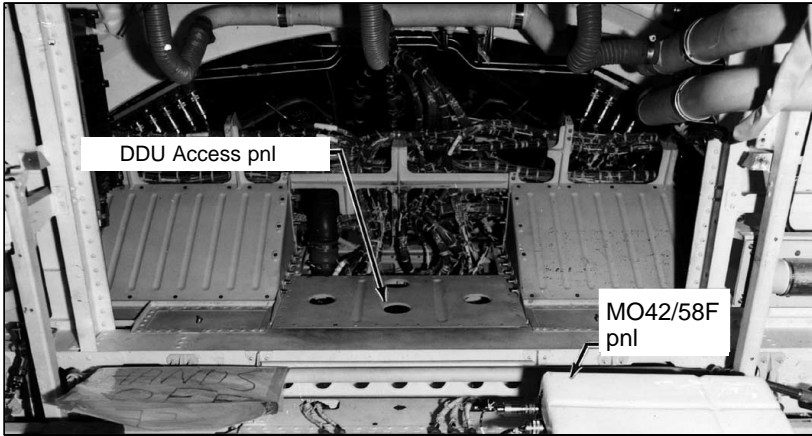
DDU filter cleaning not reqd for OV102,104

Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
IMU #1,2,3	Above/fwd MO42/58F pnl (lower)	Squeeze Latch/Crevice Tool

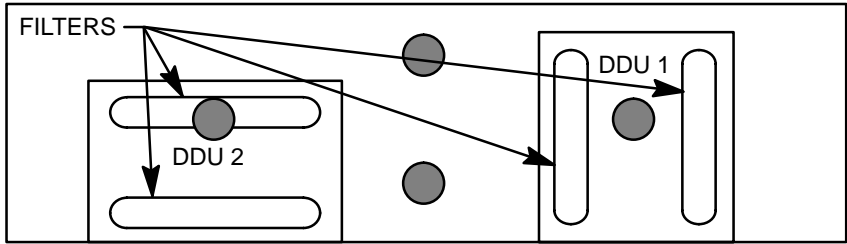


CAUTION
Do not run AC vacuum for more than 5 min continuously w/DDU filter tool attached

Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
DDU 1,2 (not reqd OV102,104)	Above/aft of MO42/58F pnl (lower) NOTE May be necessary to remove closeout in front of DDUs	Squeeze Latch/Crevice Tool(Flex Hose)



A820428-A-66C



NOTE
OCAC may be cleaned w/o pwr off. Recommend setting to
200 CFM. Daily cleaning may be done using Gray Tape

Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
OCAC	Interdeck Access/STBD Side	Not Applicable/Crevice Tool

MIDDECK FLOOR (if reqd) (5 min)

Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
Cabin Fan	Under MD79G (lift/open)	Squeeze latch and knurled knob/Cabin Fan Filter Tool

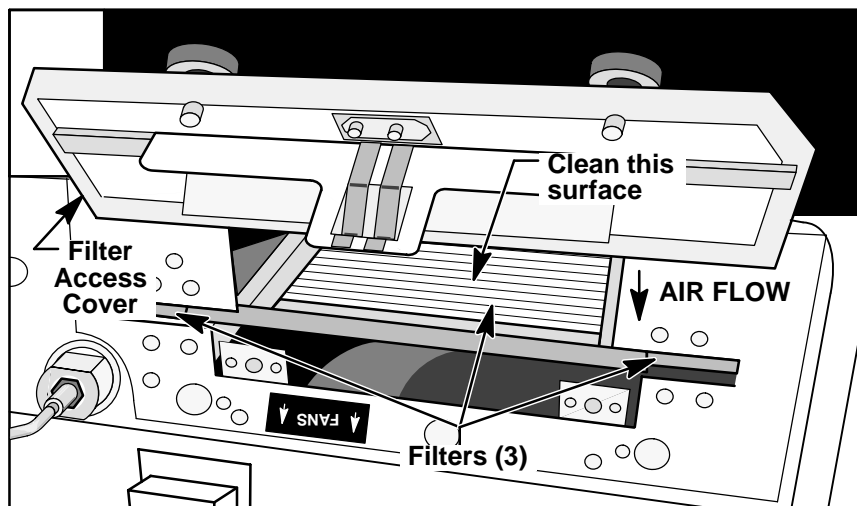
NOTE

When sleep station installed, lower fwd pnl must be removed to access CABIN FAN FILTER door. For instructions on removing pnl, see SLEEP STATION LOWER FIXED PNL REMOVAL (GENERAL INFORMATION)

CAUTION

If Cabin Fan off more than 5 min, avionics overheating could occur

- L1 1. CAB FAN A(B) – OFF (MA, SM ALERT)



S4-P3

- L1 F7 2. Open MD79G and filter access cover, clean filters (using Cabin Fan Filter Tool)
 3. Close access cover, hand-tighten knobs, close MD79G access pnl
 4. CAB FAN A(B) – ON
 5. ✓C/W AV BAY/CAB AIR It – off

BOOSTER FAN (if reqd) (15 min)

Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
Airlock Booster Fan	Internal Airlock Floor/Fan Muffler Plenum Cover	3/8-in Socket/Crevice Tool

TOOLS REQD:

TOOL

3/8-in Socket

BOB

Fastener Retainer Cushion

A7L

1. ARLK/TNL A,B (two) – OFF

ARLK

2. Disconnect A/L flex duct from fan muffler inlet,
temp stow

3. Remove 3/8-in hex bolts (20) from top of fan
inlet plenum, temp stow in fastener retainer
cushion, remove cover

4. Clean filter

5. If filter cleaning expected again:

6. Reinstall 3/8-in hex bolts (only 6 of 20
evenly spaced)

7. ✓No gaps between plenum housing and
cover

8. Reinstall 3/8-in hex bolts (20)

9. ✓No gaps between plenum housing and cover

10. Connect A/L flex duct to fan muffler inlet

A7L

11. ARLK/TNL A(B) – ON

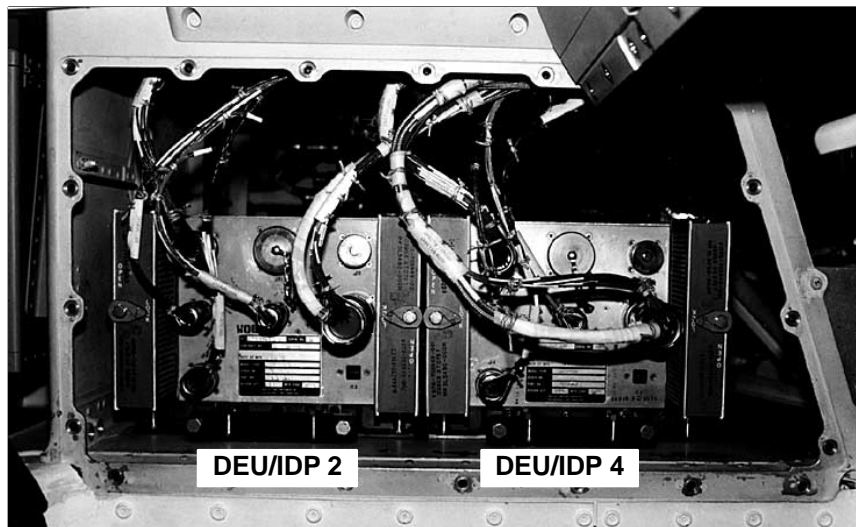
12. ✓For airflow

FLIGHT DECK (STBD SIDE) (10 min)

NOTE

DDU filter cleaning not reqd for OV102,104

Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
DEU/IDP 2,4, PPO2 Sensor* (two), RCU, VSU, DDU3	Behind R9, R17, R18/Open doors	Wing Head Thumbscrew/ Crevice Tool

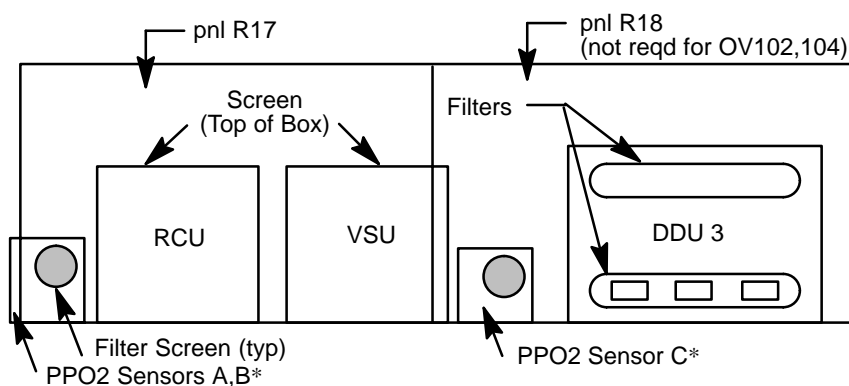


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ifm_s4_p7

NOTE

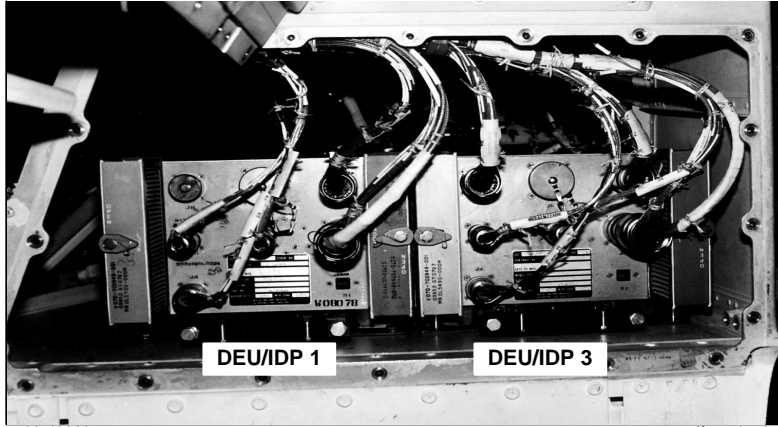
Do not remove pnls R17,R18



*PPO2 Sensors are cleaned from front side of pnls R17,R18

FLIGHT DECK (PORT SIDE) (5 min)

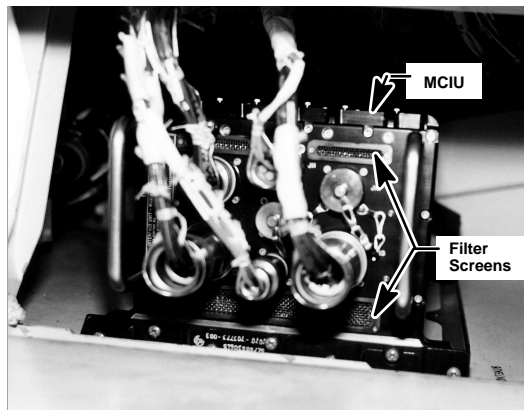
Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
DEU/IDP 1,3	Behind L8 Open door	Wing Head/Thumbscrew Crevice Tool



s92-46863

ifm_s4_p8a

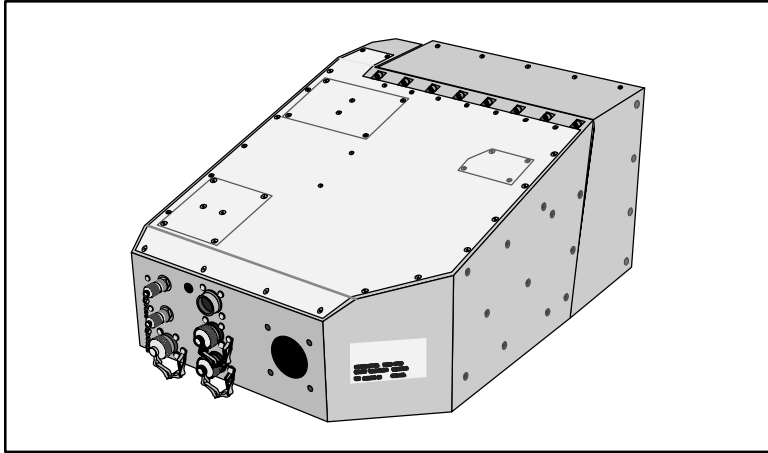
Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
MCIU (if installed)	Behind L17 Open door	Wing Head Thumbscrew/ Crevice Tool



s91-42965

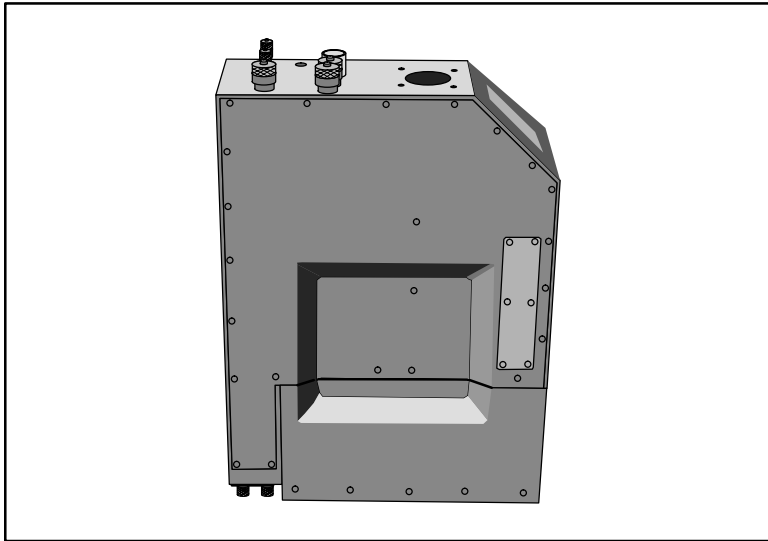
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Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
CCTV MON	Above L12/Top & Bottom of CCTV MON	None/DDU Filter Cleaning Tool (Crevice Tool) (Gray Tape)



S93-48961

J48025D6_TV

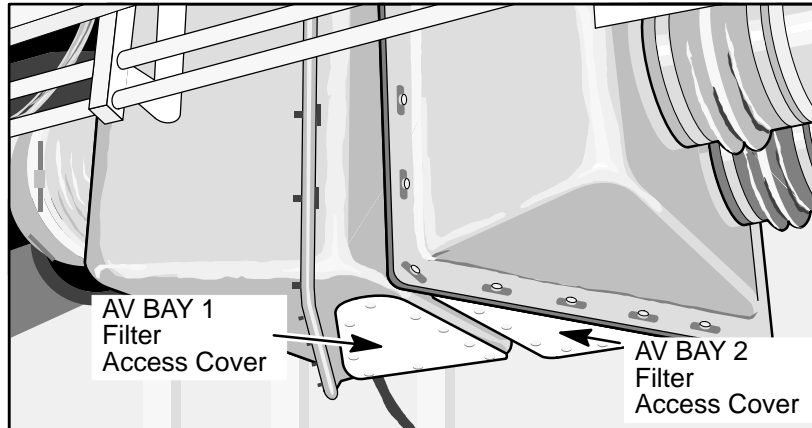


S93-48962

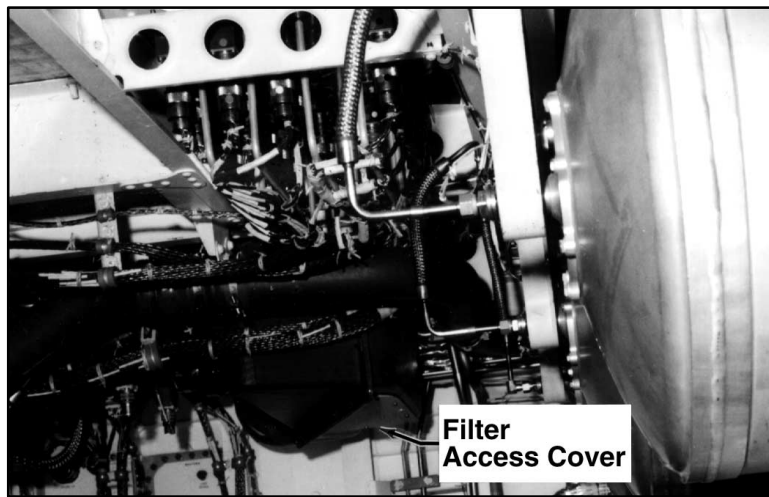
j48025_TV2

LOWER EQUIPMENT BAY (If reqd) (1:30 hr)

Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
AV BAY 1,2 Fan Filters	LEB thru Vol E (MD76C). See GENERAL INFORMATION	Locker tool, 5/32-in Allen, #6 Torque Driver/Crevice Tool



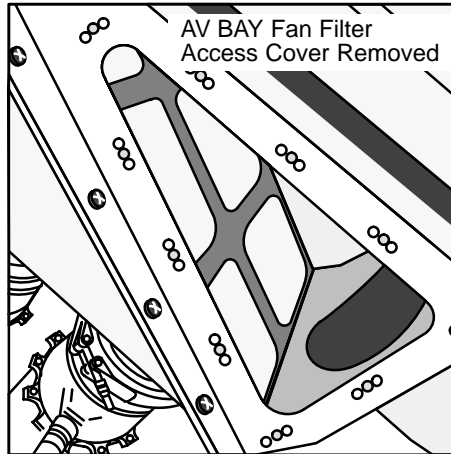
Filter/Screen	Location/Access	Access Fastener/ Cleaning Tools
AV BAY 3A Fan Filters (30 min)	LEB thru Vol G (MD80R) or Vol H (MD23R). See GENERAL INFORMATION	Locker tool, 5/32-in Allen, #6 Torque Driver/Crevice Tool



MD76C 1. For AV BAYS 1,2, remove Vol E (MD76C)
(GENERAL INFORMATION)

MD80R (MD23R) 2. For AV BAY 3A, remove Vol G (MD80R) or Vol H
(MD23R) (GENERAL INFORMATION)

3. Access/remove filter access cover (10 fasteners,
#6 Torque Driver)



IFMS4006

CAUTION
If Avionics Fan off more than 20 min,
avionics overheating could occur

- L1
4. AV BAY 1(2,3) FAN A(B) – OFF (SM ALERT)
 5. Clean filter
 6. Reinstall filter access cover, hand tight
 7. AV BAY 1(2,3) FAN A(B) – ON
 8. Install Vol E (MD76C) or Vol G (MD80R)), torque
(30 in-lb)
 9. Install lockers
 10. Stow tools

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IFM PROCEDURES

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**PROCEDURES
A THRU F**

**PROCEDURES
A THRU F**

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ACCU BYPASS CONNECTOR INSTALLATION (25 min)

OBJECTIVE: Recover air-to-ground (A/G) comm following total failure of one (both) ACCUs

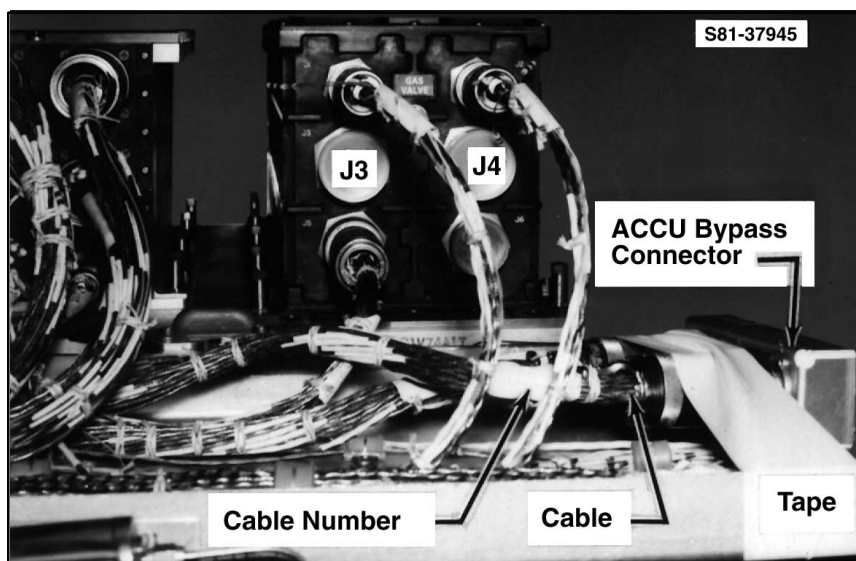
LOCATION: See AV BAY 1, Zone 28E (COMPONENT LOCATIONS), for ACCU location. ACCU 1,2 located in same box

TOOLS REQD:

TOOL Gray Tape
 ACCU Bypass Connector Assy
 Connector Wrench
 Robbins Wrench
 Locker Tool
 Torque Wrench
 1/4-in to 3/8-in Adapter

FOR LOSS OF BOTH ACCUs

- | | |
|-------|---------------------------------------|
| C3 | 1. AUD CTR – OFF |
| O5 | 2. L AUD PWR – OFF |
| O9 | 3. R AUD PWR – OFF |
| MF28E | 4. Remove Locker, Thermal Debris Trap |



S81-37945

5. Disconnect
 Cable 81V77W8P333 from J3 on ACCU
 P334 from J4 on ACCU
- A-1 IFM/ALL/GEN E

6. Install
 - Cable 81V77W8P333 to J3 on ACCU Bypass Connector Assy
 - Cable 81V77W8P334 to J4 on ACCU Bypass Connector Assy
7. Tape ACCU Bypass Connector Assy to wire tray
8. Install Thermal/Debris Trap, Locker
9. Stow tools, tape
- O5 10. L AUD PWR – AUD
- O9 11. R AUD PWR – AUD
- O5 12. If using NSP2 (comm via PLT Aud Pnl):
 - L AUD CNTL – R
 - O9 R AUD CNTL – NORM
 If using NSP1 (comm via CDR Aud Pnl):
 - R AUD CNTL – L
 - O5 L AUD CNTL – NORM
13. Adjust MASTER or HIU volume as reqd
14. CCU pwr may be cycled OFF (to receive), ON (to transmit/receive)

NOTE

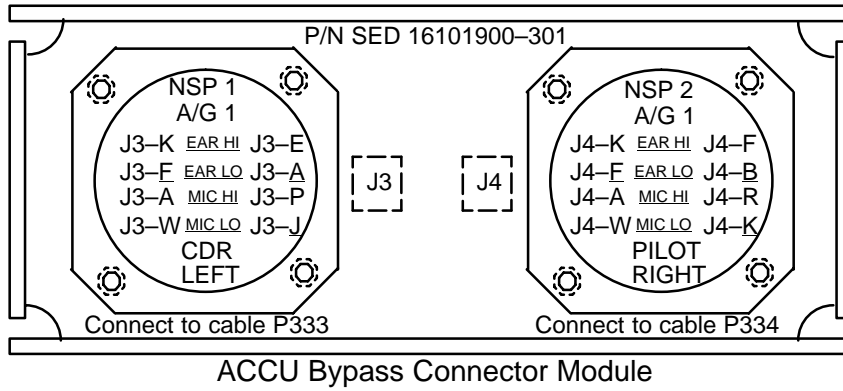
- A. PLT ATU hot mike to A/G 1 of NSP 2;
CDR ATU hot mike to A/G 1 of NSP 1
 - B. Klaxon, Siren tones still avail via Flt Deck and Middeck speakers even when powered down
 - C. C/W, SM tones still available via Middeck speaker in ACCU/BYPASS Mode, if powered, and sleep station tone headset connector
 - D. All other audio functions have been lost
15. Next site AOS, attempt voice w/MCC. If no comm, go to LOSS OF ALL VOICE COMM [2], SSR-1 (MAL, COMM SSR)

FOR LOSS OF ONE ACCU – EITHER ACCU 1(2) (J4 BYPASS)

- MF28E 16. Remove Locker, Thermal/Debris Trap
C3 17. AUD CTR – OFF
O9 18. R AUD PWR – OFF
19. Disconnect:
Cable 81V77W8P334 from J4 on ACCU
20. Install:
Cable 81V77W8P334 to J4 on ACCU Bypass
Connector Assy
21. Tape ACCU Bypass Connector Assy to wire tray
22. Reselect remaining ACCU
C3 AUD CTR – 2(1)
O9 23. R AUD PWR – AUD
24. Perform voice check to MCC using PL ATU (ATU
will be hot mike)
25. R AUD CNTL – L
26. Install Thermal Debris Trap, Locker
27. Stow tools, tape

NOTE

- A. PLT ATU hot mike to A/G 1 of NSP 2.
Use A/G 1 w/NSP 1 (A/G 2 lost). Use
A/G 2 w/NSP 2 (A/G 1 hot mike to PLT
ATU)
- B. Only ICOM A capable of being recorded
by OPS rcdrs (on CH 2 if using NSP 2 or
CH 1 if using NSP 1)
- C. Following functions have been lost:
PS ATU, OS ATU, AL ATU, NSP 1 A/G
2, TACAN 3 TONES, NSP 1 RCD V 2,
NSP 2 RCD V 1, C&W (B) (via ACCU,
MD SMU in ACCU/Bypass OK), ICOM
B – PLB (CCTV), ICOM B – T-O
UMB
- D. Config cntl data still available via both
MS ATU, PLT ATU (J1, J2)



AC POWER TRANSFER CABLE INSTALLATION

25 min (AC1 to AC3)
40 min (AC1(3) to AC2)

OBJECTIVE: Repower AC Bus using AC Pwr Transfer Cable

CAUTION
Perform applicable Bus Loss SSR and
EPS SSR–200 steps prior to entering
this procedure. Repowered AC Bus
limited to 3 Amps per phase

LOCATION: See (COMPONENT LOCATIONS)

For AC1(3) – Flt Deck(Middeck)

For AC2 Only – J37(J36) on Payload(Mission) Station
distribution pnl behind L17(R17)

TOOLS REQD: For AC1 to AC3 interconnect:

TOOL Gray Tape

CHCK AC Pwr Transfer Cable

For AC2 to AC1(AC3)interconnect:

TOOL Gray Tape

Pwr Screwdriver

Torque Wrench

Driver Handle

5/32–in Allen Head Driver

CHCK AC Pwr Transfer Cable

MISC Tongue Depressors

TO CONNECT AC1 TO AC3

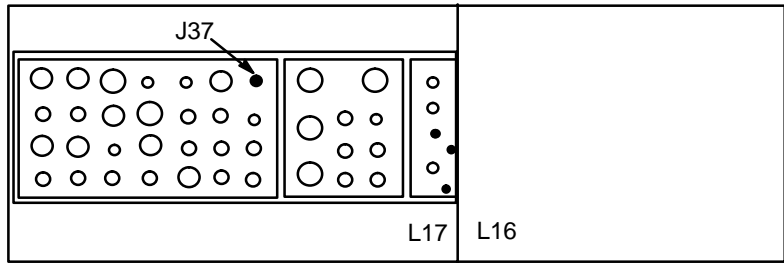
1. ✓AC UTIL PWR AC1 – OFF
(MO52J)
A15 ✓AC3 – OFF
(MO13Q)
2. cb UTIL PWR F1/MO52J AC1 – op
✓A15/MO13Q AC3 – op
3. Connect AC Pwr Transfer Cable between AC1
and AC3 (AC1 on pnl F1 or MO52J, AC3 on pnl
A15 or MO13Q). Route, secure cable w/tape
4. cb UTIL PWR F1/MO52J AC1 – cl
A15/MO13Q AC3 – cl

5. On MCC GO:
 F1 AC UTIL PWR AC1 – ON
 (MO52J)
 A15 AC3 – ON
 (MO13Q)
6. Stow tools

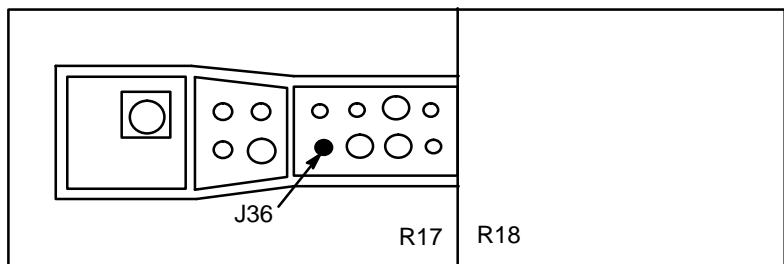
TO CONNECT AC2 TO AC1(AC3)

7. If AC2 to AC1:
 F1 ✓AC UTIL PWR AC1 – OFF
 (MO52J)
 L4:B ✓cb UTIL PWR F1/MO52J AC1 – op
 MA73C:E ✓AC2 PL 3Φ – op
- If AC2 to AC3:
 A15 ✓AC UTIL PWR AC3 – OFF
 (MO13Q)
 L4:B ✓cb UTIL PWR A15/MO13Q AC3 – op
 MA73C:E ✓AC2 PL 3Φ – op

PAYLOAD STATION DISTRIBUTION PNL
 (Looking thru pnl L17 opening)



MISSION STATION DISTRIBUTION PNL
 (Looking thru pnl R17 opening)



- L17(R17)
8. Remove L17(R17) (17 fasteners/pnl, 5/32-in Allen Head Driver)
 9. Remove cap from J37(J36); connect AC Pwr Transfer Cable to J37(J36); route cable thru hinged door in pnl L17(R17); connect other end of cable to AC1(3)
 10. Wrap AC Pwr Transfer Cable w/Gray Tape so pnl will not chafe cable

<p>CAUTION Do not crush cable</p>
--

11. Install closeout pnl L17(R17) (torque fasteners, 30 in-lb). To complete closeout, Gray Tape door closed as reqd
12. Route, secure AC Pwr Transfer Cable w/tape
13. On MCC GO:
 - If AC2 to AC1:
 - cb UTIL PWR F1/MO52J AC1 – cl
 - AC2 PL 3 ϕ – cl
 - AC UTIL PWR AC1 – ON
 - If AC2 to AC3:
 - cb UTIL PWR A15/MO13Q AC3 – cl
 - AC2 PL 3 ϕ – cl
 - AC UTIL PWR AC3 – ON
14. Stow tools

L4:B
MA73C:E
F1
(MO52J)

L4:B
MA73C:E
A15
(MO13Q)

ADI CHANGEOUT

(40 min)

OBJECTIVE: Replace failed fwd ADI w/aft ADI

LOCATION: F6, F8, & Aft Station

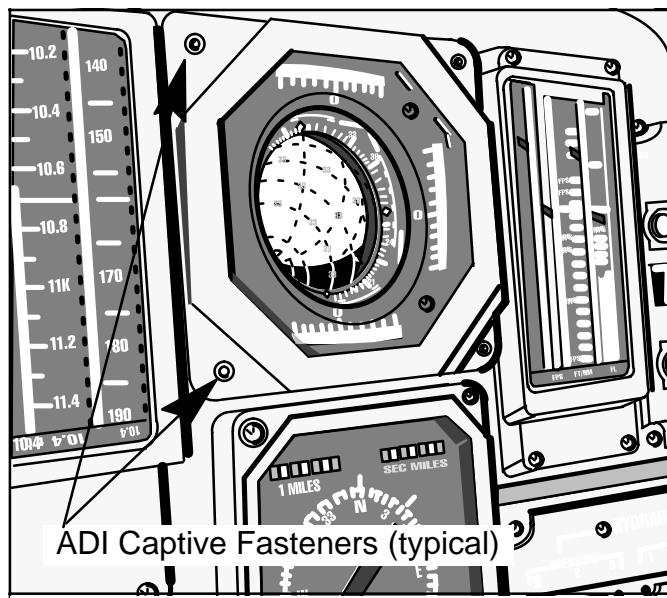
TOOLS REQD:

TOOL Gray Tape
Torque Wrench
1/4-in Driver Handle
5/32-in Allen Head Driver
4-in Extension
1/4-in to 3/8-in Adapter

MISC W9 Window Shade

REMOVE FORWARD ADI

1. For F6 ADI changeout:
O14:E cb MNA DDU L – op
O15:E MNB DDU L – op
For F8 ADI changeout:
O15:E cb MNB DDU R – op
O16:E MNC DDU R – op



2. Loosen ADI fasteners (four, 5/32-in Allen Head Driver)

CAUTION
Do not stretch/strain cable

3. Pull ADI clear of pnl



108-KSC-379C-2280/12

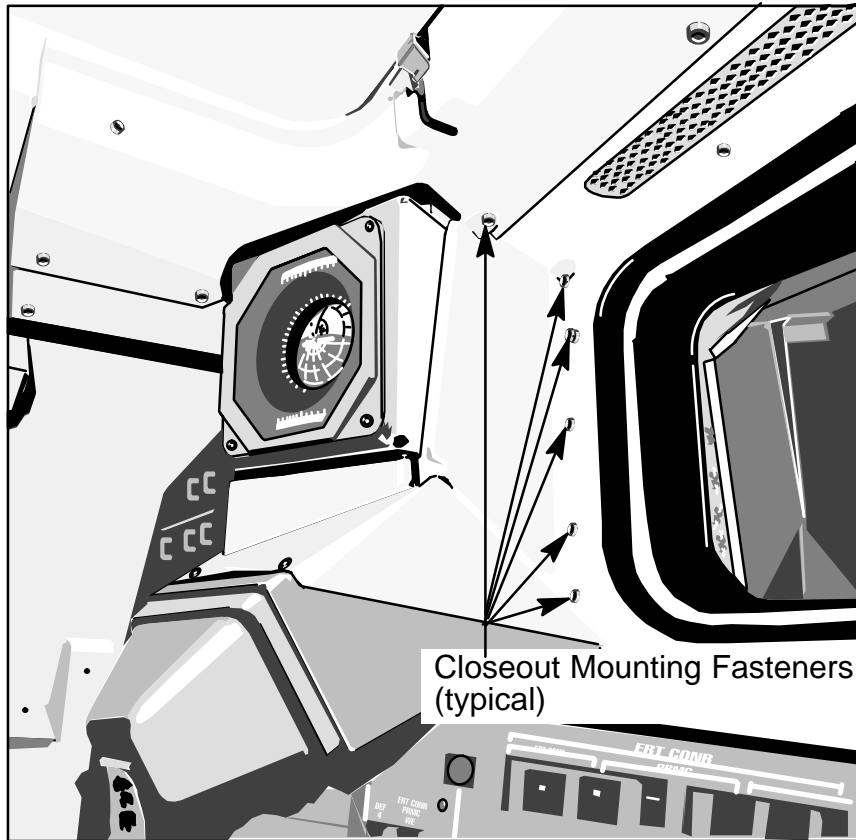
SA-P9

4. For F6(F8) ADI, disconnect cable from J1,J2 on ADI
5. Mark failed unit w/Gray Tape

REMOVE AFT ADI

- | | |
|-------|----------------------------|
| O14:E | 6. cb MNA DDU AFT – op |
| O16:E | 7. MNC DDU AFT – op |
| | 8. Install W9 Window Shade |

9. Remove closeout inboard of aft ADI (six fasteners, 5/32-in Allen Head Driver)



10. Loosen ADI fasteners (four, 5/32-in Allen Head Driver)

CAUTION
Do not stretch/strain cable

11. Disconnect cables from J1,J2 on ADI
12. Pull unit clear of mounting bracket

INSTALL AFT ADI IN FWD LOCATION

- 13. For F6 ADI, connect:
 - Cable 34V73A6W1P4 to J1 on ADI
 - P5 to J2 on ADI
- For F8 ADI, connect:
 - Cable 34V73A8W1P4 to J1 on ADI
 - P5 to J2 on ADI
- 14. Install ADI into mounting bracket (torque fasteners, 30 in-lb)
- 15. For F6 ADI:
 - O14:E cb MNA DDU L – cl
 - O15:E MNB DDU L – cl
- For F8 ADI:
 - O16:E cb MNB DDU R – cl
 - MNC DDU R – cl

STOW FORWARD ADI IN AFT LOCATION

- 16. Tape over connector interface, secure cables out of way w/tape

NOTE

Captive fasteners on fwd ADI longer than those on aft, thus preventing snug fit

- 17. To prevent ADI from vibrating during entry, shim w/Gray Tape
- 18. Tape over connectors J1,J2; install ADI into mounting bracket, snug fasteners
- 19. Install closeout (torque fasteners, 30 in-lb)
- 20. Stow tools

ADI/DDU VOLTAGE TEST

(45 min for ADI;
1:45 hr for ADI,DDU)

OBJECTIVE: Determine if failure in ADI, DDU, or wire harness.
If fault lies in ADI(DDU), changeout will be accomplished

NOTE

Voltage tests will be made at ADI harness connectors and at DDU. Pwr voltages can be tested in OPS 201(801). Signal voltages require OPS 801 to provide known signal voltages via FCS/DED DIS C/O DISPLAY

LOCATION: See (COMPONENT LOCATIONS)

For ADI – FLIGHT DECK, pnl F6(F8)

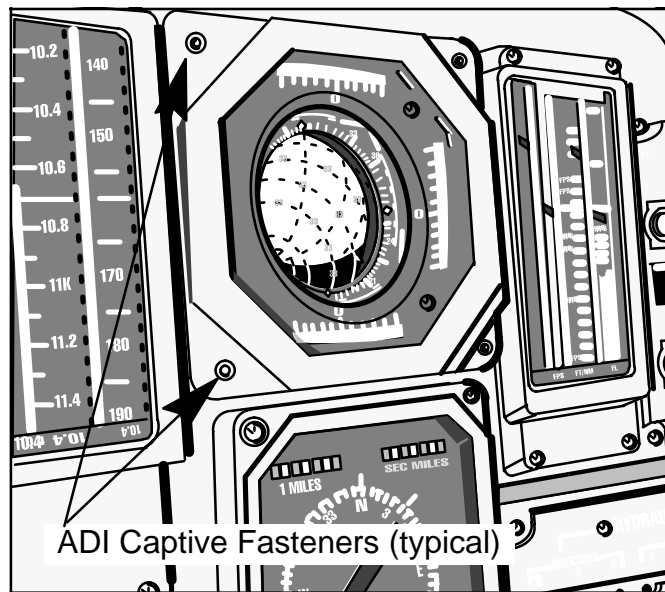
For DDU 1,2 – Zone J50

TOOLS REQD:

TOOL	Gray Tape
	Pin Kit
	Multimeter
	5/32-in Allen Head Driver
	1/4-in Driver Handle
	Torque Wrench
	1/4-in to 3/8-in Adapter

TO PERFORM ADI VOLTAGE TEST

	1. For F6 ADI voltage test:
O14:E	cb MNA DDU L – op
O15:E	MNB DDU L – op
	For F8 ADI voltage test:
	cb MNB DDU R – op
O16:E	MNC DDU R – op



2. Loosen ADI fasteners (four, 5/32-in Allen Head Driver)

CAUTION
Do not stretch/strain cable



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SA-P9

3. Pull ADI clear of pnl
4. For F6(F8) ADI pwr supply voltages,
| disconnect cable from J2 on ADI
For F6(F8) ADI signal voltages,
| disconnect cable from J1 on ADI
5. Tape, secure ADI to structure to ease strain on cable
6. Tape cables (disconnected in step 4) to structure w/face of connector facing into cabin
7. Obtain Multimeter

NOTE

Red & black Multimeter leads have removable test probes installed on one end. Once removed, this end of leads can also be installed into Multimeter so that banana jacks on other end can be used w/Pin Kit accessories

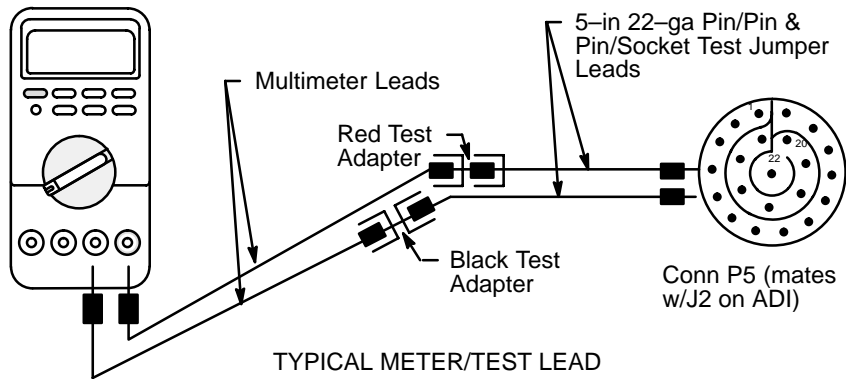
8. Remove test probes from red & black Multimeter leads and insert this end into Multimeter
9. Install 22-ga red & black Test Adapters from Pin Kit (flap 7) onto Multimeter lead banana jacks
10. Obtain one each: 5-in 22-ga Pin/Socket, Pin/Pin, Socket/Socket Test Jumper Lead from Pin Kit (flap 5)
Install onto red,black Test Adapters for tests in tables 1,2 as shown in diagrams

WARNING

When performing ADI voltage tests, ensure pwr removed from harness connectors P4(P5) (see step 1) prior to making connections as instructed in next step

11. Repeat following steps when doing each voltage test from table 1 (test 1–5) or table 2 (test 1–13) as directed by MCC:
 - Set Multimeter per instructions on flap for AC(DC) V (auto range) as reqd for each measurement, except as noted in step 7
 - Insert Test Jumper Leads in(on) pins (sockets) indicated by tests in tables 1,2
 - ✓Connections made above are tight and no bare metal part touching vehicle structure
 - Turn on ADI pwr
 - For F6 ADI:
 - O14:E | cb MNA DDU L – cl
 - For F8 ADI:
 - O15:E | cb MNB DDU R – cl
 - Take voltage reading, record on table
 - Remove pwr from ADI
 - For F6 ADI:
 - O14:E | cb MNA DDU L – op
 - For F8 ADI:
 - O15:E | cb MNB DDU R – op

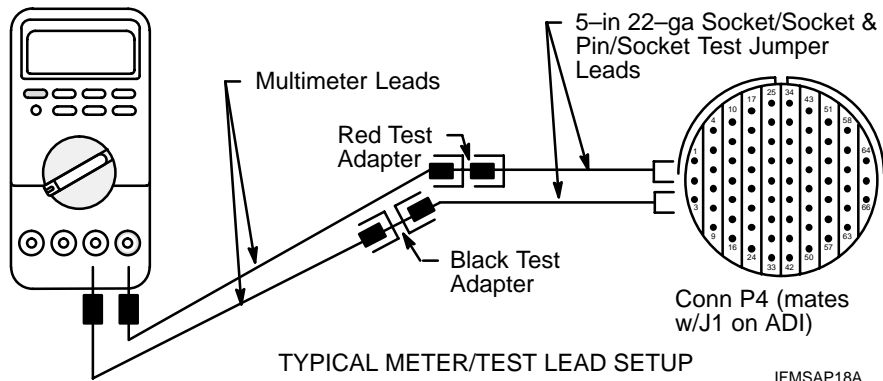
WARNING
 When performing ADI voltage tests,
 ensure pwr removed from P4(P5)
 prior to making connections



NOTE
 Tests in table 1 must be done
 in OPS 201(801)

TABLE 1.— ADI POWER SUPPLY VOLTAGES
 (For F6 ADI, measure at cable connector 34V73A6W1P5 or for F8
 ADI, measure at cable connector 34V73A8W1P5 from J2 on ADI)

Voltage Test #	Meter (auto range)	Conn Socket #		Expected voltage range	Actual voltage read
		Red test lead	Black test lead		
1	VAC	4	5	26 VAC	
2	VAC	16	17	26 VAC	
3	VDC	8	9	+5 VDC	
4	VDC	12	10	+15 VDC	
5	VDC	11	10	-15 VDC	



NOTE

Tests in table 2 must be done in OPS 801

NOTE

On CRT 1:GNC FCS/DED DIS C/O after going to OPS 8: FWD – ITEM 1 EXEC (*). For each test # (1–12): LOW – ITEM 4 EXEC (*) for each low V reading and HIGH – ITEM 3 EXEC (*) for high V reading. For test 13: FLAG – ITEM 5 EXEC (*) for 5V FLG TST then OFF – ITEM 6 EXEC (*)

TABLE 2.– ADI SIGNAL VOLTAGES
(For F6 ADI, measure at cable connector 34V73A6W1P4 or for F8 ADI, measure at cable connector 34V73A8W1P4 from J1 on ADI)

Voltage Test #	Signal	Meter (auto range)	Conn Pin #		Expected voltage range	**OPS 8 DD test voltages		Actual voltage read	
			Red test lead	Black test lead		LO	HI	LO	HI
1	ROLL ERR	VDC	6	7	-8 to +5 VDC	+2	-3		
2	PITCH ERR	VDC	28	29	-8 to +5 VDC	+2	-3		
3	YAW ERR	VDC	19	20	-8 to +5 VDC	+2	-3		
4	ROLL RATE	VDC	8	9	-8 to +5 VDC	-2	+3		
5	PITCH RATE	VDC	23	24	-8 to +5 VDC	-2	+3		
6	YAW RATE	VDC	26	27	-8 to +5 VDC	-2	+3		
7	ROLL SIN	VDC	1	2	-5 to +5 VDC	1.71	-4.33		
8	ROLL COS	VDC	4	5	-5 to +5 VDC	4.70	2.50		
9	PITCH SIN	VDC	14	15	-5 to +5 VDC	1.71	-4.33		
10	PITCH COS	VDC	21	22	-5 to +5 VDC	4.70	2.50		
11	YAW SIN	VDC	10	11	-5 to +5 VDC	1.71	-4.33		
12	YAW COS	VDC	17	18	-5 to +5 VDC	4.70	2.50		
13	ATT FLG	VDC	12	13	0 to +5 VDC	*5V FLG TST			

** 1: GNC, FCS/DED DIS C/O

FWD – ITEM 1 EXEC (*) * FLAG – ITEM 5 EXEC (*)
 LOW – ITEM 4 EXEC (*) OFF – ITEM 6 EXEC (*)
 HIGH – ITEM 3 EXEC (*)

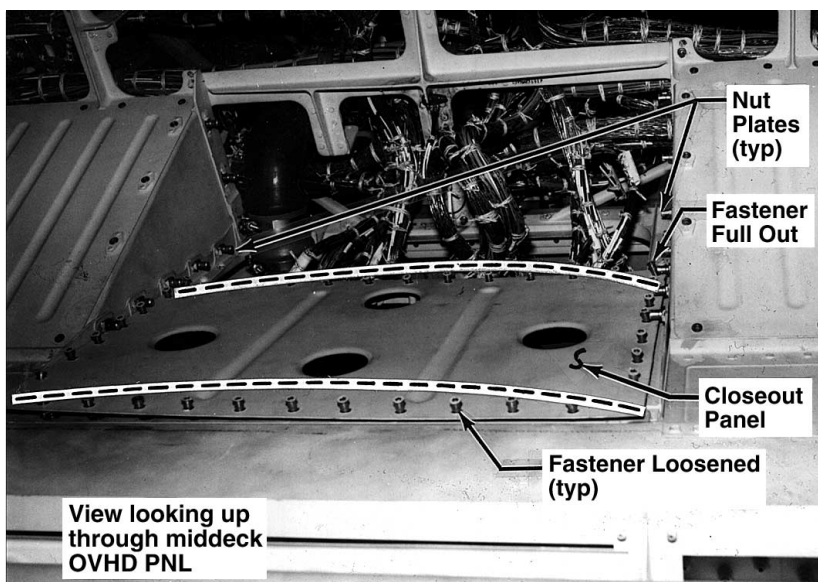
12. Upon completion of voltage tests, turn off Multimeter, report results. Based on results, MCC will direct you to proceed w/ADI changeout, reinstallation, or perform DDU voltage tests
13. If directed to perform ADI changeout, reconfig Probe and stow Multimeter and equipment >> If instructed to perform DDU voltage test, proceed as follows:

TO PERFORM DDU VOLTAGE TEST

ADDITIONAL TOOLS:

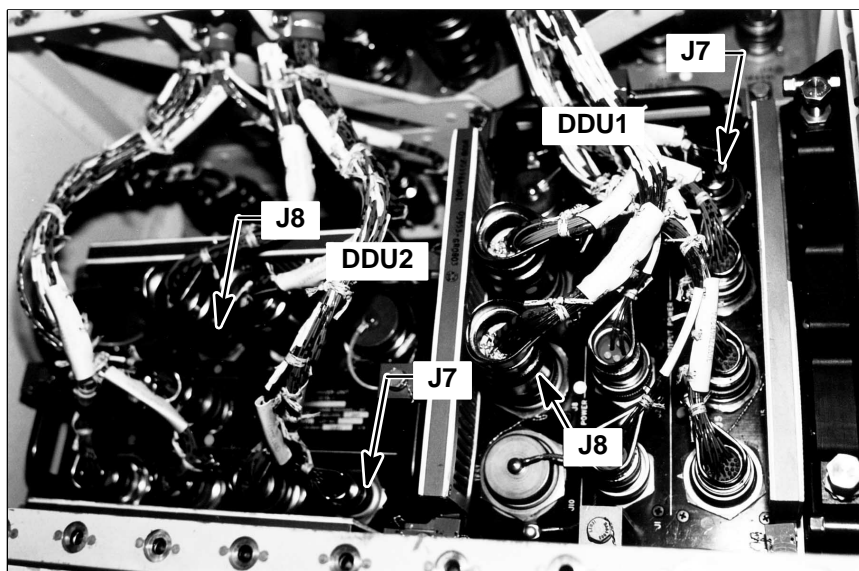
TOOL Pwr Screwdriver

14. For DDU 1:
 - O14:E | cb MNA DDU L – op
 - O15:E | MNB DDU L – op
- For DDU 2:
 - O16:E | cb MNB DDU R – op
 - O16:E | MNC DDU R – op
15. Release debris trap on middeck ceiling and open overhead pnl containing MO42F,MO58F



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16. Loosen closeout pnl fasteners (thirty-six, 5/32-in Allen Head Driver)
17. Pull fasteners out and flex pnl as reqd to ease removal



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**View looking aft at DDUs 1,2
(closeout panel removed)**

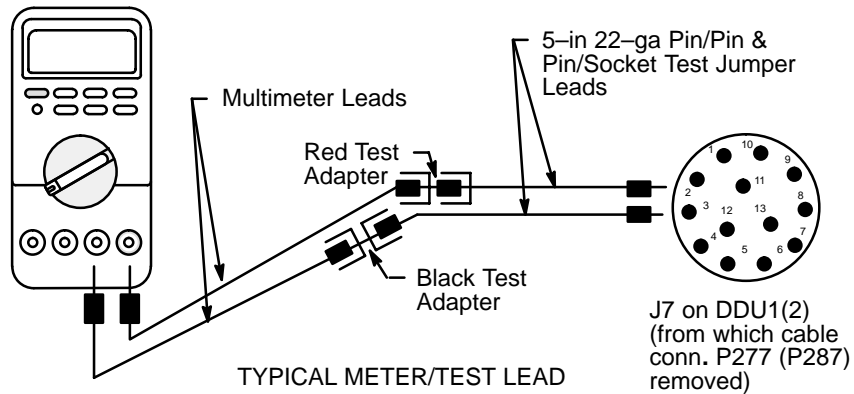
18. a. For F6 ADI pwr supply voltages from DDU, disconnect:
Cable 30V77W4P277 from J7 of DDU 1
For F8 ADI pwr supply voltages from DDU, disconnect:
Cable 30V77W4P287 from J7 of DDU 2
- b. For F6 ADI signal voltages from DDU, disconnect:
Cable 30V77W4P278 from J8 of DDU 1
For F8 ADI signal voltages from DDU, disconnect:
Cable 30V77W4P288 from J8 of DDU 2

19. Obtain one each: 5-in 22-ga Pin/Socket, Pin/Pin, Socket/Socket Test Jumper Lead from Pin Kit (flap 5)
Install onto red & black Test Adapters for tests in tables 1,2 as shown in diagrams

WARNING
When performing DDU voltage tests, ensure pwr has been removed from DDU connectors J7(J8), see step 14, prior to making connections in next step

20. Repeat following steps when doing each voltage test from table 3 (test 1-5) or table 4 (test 1-13) as directed by MCC:
- Set Multimeter per instructions on flap for AC(DC) V (auto range) as reqd for each measurement, except as noted in step 7
 - Insert Test Jumper Leads in/on pins (sockets) indicated by test in tables 3,4
 - ✓Connections made above are tight and no bare metal part is touching vehicle structure
 - Turn on DDU pwr
 - For DDU 1:
 - O14:E | cb MNA DDU L - cl
 - For DDU 2:
 - O15:E cb MNB DDU R - cl
 - Take measurement and record on table
 - Remove pwr from DDU
 - For DDU 1:
 - O14:E | cb MNA DDU L - op
 - For DDU 2:
 - O15:E cb MNB DDU R - op

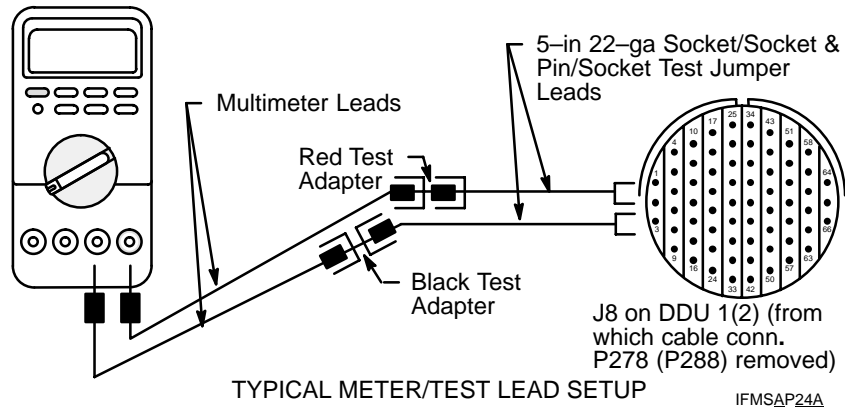
WARNING
 When performing DDU voltage tests,
 ensure pwr removed from DDU J7(J8)
 prior to making connections



NOTE
 Tests in table 3 must be
 done in OPS 201(801)

TABLE 3.- DDU POWER SUPPLY VOLTAGES
 (Measure at DDU 1(2) J7 from which cable 30V77W4P277(287) removed)

Voltage Test #	Meter (auto range)	Conn Socket #		Expected voltage range	Actual voltage read
		Red test lead	Black test lead		
1	VAC	2	3	26 VAC	
2	VAC	4	5	26 VAC	
3	VDC	7	8	-15 VDC	
4	VDC	10	11	+5 VDC	
5	VDC	13	8	+15 VDC	



NOTE

Tests in table 4 must be done in OPS 801

NOTE

On CRT 1:GNC FCS/DED DIS C/O after going to OPS 8: FWD – ITEM 1 EXEC (*). For each test # (1–12): LOW – ITEM 4 EXEC (*) for each low V reading and HIGH – ITEM 3 EXEC (*) for high V reading. For test 13: FLAG – ITEM 5 EXEC (*) for 5V FLG TST then OFF – ITEM 6 EXEC (*)

TABLE 4.– ADI SIGNAL VOLTAGES (OPS 801)
(Measure at DDU 1(2) J8 from which cable 30V77W4P278(288) removed)

Voltage Test #	Signal	Meter (auto range)	Conn Pin #		Expected voltage range	**OPS 8 DD test voltages		Actual voltage read	
			Red test lead	Black test lead		LO	HI	LO	HI
1	ROLL ERR	VDC	49	50	-8 to +5 VDC	+2	-3		
2	PITCH ERR	VDC	47	48	-8 to +5 VDC	+2	-3		
3	YAW ERR	VDC	51	52	-8 to +5 VDC	+2	-3		
4	ROLL RATE	VDC	55	56	-8 to +5 VDC	-2	+3		
5	PITCH RATE	VDC	53	54	-8 to +5 VDC	-2	+3		
6	YAW RATE	VDC	59	60	-8 to +5 VDC	-2	+3		
7	ROLL SIN	VDC	39	40	-5 to +5 VDC	1.71	-4.33		
8	ROLL COS	VDC	41	42	-5 to +5 VDC	4.70	2.50		
9	PITCH SIN	VDC	35	36	-5 to +5 VDC	1.71	-4.33		
10	PITCH COS	VDC	37	38	-5 to +5 VDC	4.70	2.50		
11	YAW SIN	VDC	43	44	-5 to +5 VDC	1.71	-4.33		
12	YAW COS	VDC	45	46	-5 to +5 VDC	4.70	2.50		
13	ATT FLG	VDC	61	62	0 to +5 VDC	*5V FLG TST			

** 1: GNC, FCS/DED DIS C/O

FWD – ITEM 1 EXEC (*) * FLAG – ITEM 5 EXEC (*)
 LOW – ITEM 4 EXEC (*) OFF – ITEM 6 EXEC (*)
 HIGH – ITEM 3 EXEC (*)

21. Upon completion of voltage tests, turn off Multimeter, report results. Based on results, MCC will direct you to proceed w/DDU changeout or reinstall ADI and DDU
22. Reconfig, stow Multimeter and equipment
23. To close out DDU (no DDU changeout reqd):

For DDU 1, connect:

Cable 30V77W4P277 to J7 on DDU or
P278 to J8 on DDU

For DDU 2, connect:

Cable 30V77W4P287 to J7 on DDU or
P288 to J8 on DDU

Install Closeout Pnl (see photo, step 15),
(torque, 30 in-lb)
Close Overhead Pnl

24. To reinstall ADI (no ADI changeout reqd):

For F6 ADI, connect:

Cable 34V73A6W1P4 to J1 on ADI
P5 to J2 on ADI

For F8 ADI, connect:

Cable 34V73A8W1P4 to J1 on ADI
P5 to J2 on ADI

Install ADI (torque, 30 in-lb)

25. MCC will advise on ADI/DDU pwrap
26. Stow tools

APDS DIRECT DRIVE USING BOB

(1:30 hr)

OBJECTIVE: To bypass pallet avionics boxes and directly drive APDS Capture Latch, Ring, Hook, and/or Slip Clutch motors utilizing IFM Breakout Box (BOB)

LOCATION: External Airlock (Port/Stbd Floor I/F Pnl)

TOOLS REQD:

Tool	Gray Tape
	Pin Kit (two 24-in 20-ga Pin/Socket Test Jumper Leads; 3 and/or 5 Amp Fuse)
	Connector Pliers
	Ratchet Wrench
	4-in Extension
	3/8-in Standard Socket, 1/4-in drive
	3/8-in Combination Wrench
	#10 Torque Driver
	1/4-in to 3/8-in Adapter
	Vise Grips
BOB	Breakout Box
CHCK	DC Pwr Cable

APDS POWERDOWN

- | | |
|-------|---|
| A7L | 1. ✓ Status lts (eighteen) – off |
| | ✓ APDS PWR (three) – OFF |
| | ✓ A _{DS} , B _{DS} , C _{DS} lts (three) – off |
| | ✓ HTRS/DCU PWR (three) – OFF |
| | ✓ CNTL PNL PWR (three) – OFF |
| A6L | 2. ✓ PSU PWR MNA,B (two) – OFF |
| MO13Q | 3. ✓ DC UTIL PWR MNB – OFF |
| | 4. Connect one IFM DC pwr cable between DC Util Outlet MO13Q and Breakout Box |

ACCESS CONNECTORS

- | | |
|---------|--|
| EXT A/L | 5. Determine floor I/F pnl to access (see table and diagram for connector(s) location) |
|---------|--|

NOTE

I/F pnl covers have slots for three lower outboard bolts. Loosen, do not remove these bolts

6. Remove floor I/F pnl cover(s):
13 screws/bolts (four, #10 Torque Driver; nine, 3/8-in Combination Wrench or Standard Socket). Temp stow

Function	Connector	Pin # (to BOB + Jack)	Pin # (to BOB – Jack)
Port I/F Pnl			
Capture Latch M1 OPEN	P9453(J9413)	d	F
Capture Latch M2 OPEN	P9453(J9413)	j	D
Capture Latch M3 OPEN	P9449(J9409)	f	B
Capture Latch M1 CLOSE	P9453(J9413)	d	E
Capture Latch M2 CLOSE	P9453(J9413)	j	C
Capture Latch M3 CLOSE	P9449(J9409)	f	A
Stbd I/F Pnl			
Hooks 1 M6 OPEN	P9442(J9402)	b	F
Hooks 1 M7 OPEN	P9454(J9414)	B	d
Hooks 2 M8 OPEN	P9442(J9402)	D	A
Hooks 2 M9 OPEN	P9454(J9414)	H	D
Hooks 1 M6 CLOSE	P9442(J9402)	F	b
Hooks 1 M7 CLOSE	P9454(J9414)	d	B
Hooks 2 M8 CLOSE	P9442(J9402)	A	D
Hooks 2 M9 CLOSE	P9454(J9414)	D	H
Ring Motor M4 IN	P9446(J9406)	x	v
Ring Motor M5 IN	P9454(J9414)	r	t
Ring Motor M4 OUT	P9446(J9406)	v	x
Ring Motor M5 OUT	P9454(J9414)	t	r
Slip Clutch Motor M10 SLIP	P9448(J9408)	71	72
Slip Clutch Motor M11 SLIP	P9452(J9412)	71	72
Slip Clutch Motor M10 LOCK	P9448(J9408)	72	71
Slip Clutch Motor M11 LOCK	P9452(J9412)	72	71

Bubble 7. Demate selected connector(s) (from table above) from airlock floor I/F pnl (Connector Pliers). Gray Tape over I/F pnl connector face

CONFIGURE TOOLS

8. Secure BOB near floor I/F connector pnl on PORT(STBD) floor (Gray Tape)
9. a. Breakout Box:
 - AUX – OFF
 - 28V/VAR V – 28V
 - PWR A,B – OFF
- b. Remove fuse cap, side A
- c. Rotate GA SEL A – 20
- d. Install fuse (3–amp Capture Latch/Hook motors, or 5–amp Ring/Slip Clutch motors), replace fuse cap
10. Install socket end of 24–in, 20–ga Pin/Socket Test Jumper Leads onto designated pins (from table) on cable connector(s). Secure/Gray Tape if necessary
11. Install both Test Jumper Lead pins into (+) and (–) sockets on Breakout Box, side A

TO INITIATE DRIVE FUNCTION

- A7L 12. HTRS/DCU PWR (three) – ON
MO13Q 13. DC UTIL PWR MNB – ON

CAUTION

Capture latch motor drive time is 3 sec and automatically stops. Hook/Ring motors will continue to drive until pwr removed. ✓MCC for drive times

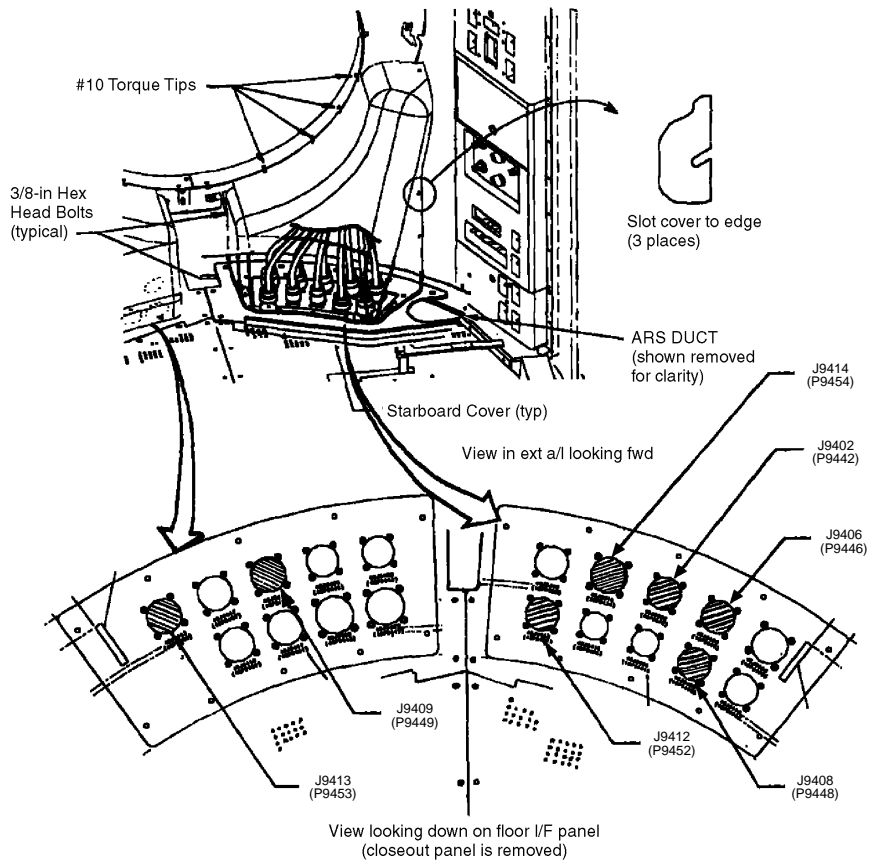
- BOB 14. PWR A – ON

UPON COMPLETION OF DRIVE FUNCTION

- BOB 15. PWR A – OFF
MO13Q 16. DC UTIL PWR MNB – OFF

UPON COMPLETION OF DOCKING/UNDOCKING PROCEDURES

17. Remove Gray Tape and Test Jumper Leads from connector(s) and Breakout Box
18. Replace connector(s) on respective floor I/F pnl(s)
19. Replace floor I/F pnl cover(s) and fasteners (tighten snug)
20. Stow tools



NOTE

Test Jumper Leads connect to cable connector plug(s). Remove from floor jack(s)

AV BAY FAN CHANGEOUT

(2:30 hr)

OBJECTIVE: Replace failed Av Bay Fan Assy (Fan & Check Valve) w/one of two good fans from another Av Bay. This will be done only when both fans in one bay have failed and failure of one fan not pwr related

NOTE

MCC will identify location of spare unit

LOCATION: See LOWER EQUIPMENT BAY (COMPONENT LOCATIONS), two fans below each Av Bay

TOOLS REQD:

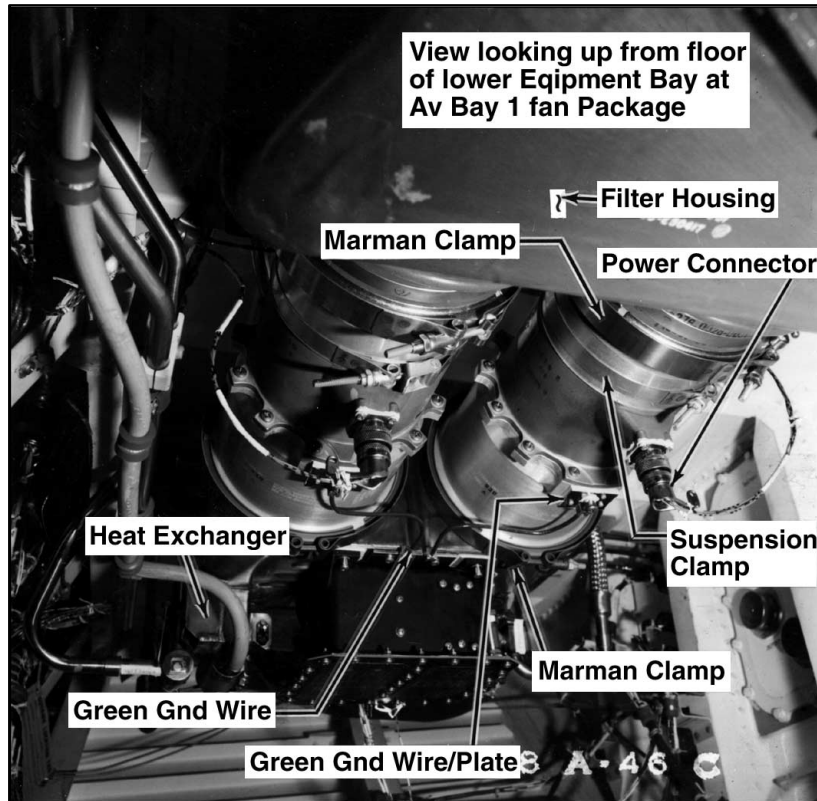
TOOL	Gray Tape
	Multimeter
	Pwr Screwdriver
	5/32-in Allen Head Driver
	Locker Tool
	Robbins Wrench
	Torque Wrench
	Driver Handle
	3/8-in Deepwell Socket
	1/4-in to 3/8-in Adapter
	3/8-in Combination Wrench
	#10 Torque Driver
MISC	Flashlight

TO ACCESS AV BAY FANS

1. See GENERIC STOWAGE LOCKER/VOLUME REMOVAL (GENERAL INFORMATION). (Vol E (MD76) removal for AV BAY 1(2) Fans; Vol G (MD80R) or Vol H (MD23R) removal for AV BAY 3A Fans)

TO CHECK VOLTAGES ON FAN PWR CONNECTORS

- L1 2. ✓AV BAY 1(2,3) FAN A(B) – OFF (SM ALERT)
 (for failed fans)



A820428-A-46C

3. Remove pwr connectors from failed fans
AV BAY 1 Fan A: remove cable 90V77W2P1
 B: remove cable 90V77W3P3
AV BAY 2 Fan A: remove cable 90V77W3P2
 B: remove cable 90V77W11P4
AV BAY 3A Fan A: remove cable 90V77W11P10
 B: remove cable 90V77W2P12

WARNING
115 Volts. Pwr must be off when
installing(removing) test probes
from connector

4. Set up Multimeter per instructions on flap for AC V (auto range), except as noted

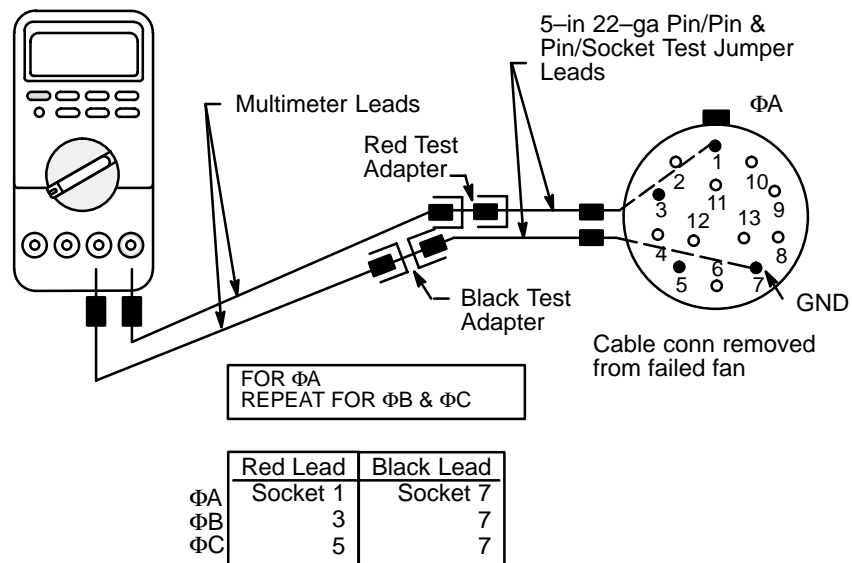
NOTE

Red & black Multimeter leads have removable test probes installed on one end. Once removed, this end of leads can also be installed into Multimeter so that banana jacks on other end can be used w/Pin Kit accessories

5. Remove test probes from red & black Multimeter leads and insert this end into Multimeter
6. Install 22-ga red & black Test Adapters from Pin Kit (flap 5) onto banana jacks of Multimeter leads
7. Install one 5-in 22-ga Pin/Socket Test Jumper Lead from Pin Kit (flap 5) onto red Test Adapter and one 5-in 22-ga Pin/Pin Test Jumper Lead onto black Test Adapter
8. Install Test Jumper Leads onto cable connector removed from failed fan as shown for Φ A
- L1 9. AV BAY 1(2,3) FAN A(B) – ON (rcd reading)
10. – OFF (SM ALERT)
11. Repeat steps 6,7 for Φ B, Φ C

NOTE

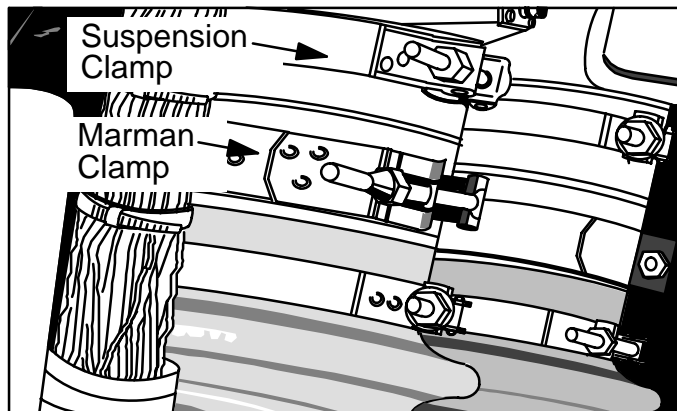
If no pwr at any Φ , inform MCC



IFMSAP30A

TO REMOVE AV BAY FANS

12. For failed fans:
 L1 ✓AV BAY 1(2,3) FAN A(B) – OFF (SM ALERT)



13. Remove green ground wire/plate from fan assy (one fastener, #10 Torque Driver)
14. Remove Suspension Clamp, loosen (“T” bolt) nut and flip latch from bolt head. Clamp will spring open. Spread clamp gently and slide off suspension bracket (one nut, 3/8-in Deepwell Socket)
15. Remove Marman Clamps (two), remove nut (not captive) bolt will slide out of “T” spacer. Clamp will spring open. Spread clamp gently and slide over mounting flanges (one nut/clamp, 3/8-in Deepwell Socket)
16. Remove fan assy and mark w/Gray Tape. Temp stow
17. For spare fan:
L1 AV BAY 1(2,3) FAN A(B) – OFF
(SM ALERT)

NOTE

Have failed fan ready for installation
at this location

18. Repeat steps 13–16
19. Remove fan assy

TO INSTALL AV BAY FANS

AT SPARE FAN LOCATION:

20. Place clamps (three) around fan assy in relative position. Slide fan assy into place, ensure that “V” notch in check valve end of fan assy aligns w/pin in Heat Exchanger Flange, connectors face down
21. Slide suspension clamp over mounting bracket and secure latch over “T” bolt head (hand tighten)
22. Slide Marman Clamps (two) over mounting flanges. Insert bolt into “T” spacer. Tighten nuts (torque, 30 in-lb)
23. Install green ground wire/plate (torque screw, 30 in-lb)

- 24. Install pwr connectors
 - AV BAY 1 Fan A Loc: Cable 90V77W2P1
 - B Loc: Cable 90V77W3P3
 - AV BAY 2 Fan A Loc: Cable 90V77W3P2
 - B Loc: Cable 90V77W11P4
 - AV BAY 3A Fan A Loc: Cable 90V77W11P10
 - B Loc: Cable 90V77W2P12

- L1 25. AV BAY 1(2,3) FAN A(B) – ON (good fan only)

AT FAILED FAN LOCATION:

- 26. Repeat steps 20–24
- 27. Reinstall Vol E (MD76C) and/or Vol H (MD23R)
or Vol G (MD80R) (torque fasteners,
30 in-lb)
- 28. Reinstall lockers. Stow tools

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BRAKE ANTISKID CONTROL COMMAND INHIBIT (1:00 hr)

OBJECTIVE: Inhibit brake coil command current output from Brake Antiskid Control Box associated w/failed Antiskid Control channel by cutting output signal wires from connector P301(P302) on J1(J2) of Control Box 1(2). Antiskid Fail Light annunciation signal will also be inhibited for channel that is cut/failed

LOCATION: See (COMPONENT LOCATIONS)

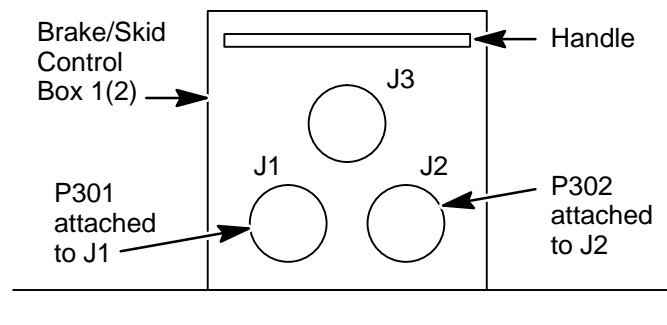
For BK SKID CONT 1 – AV BAY 1, MF28H

For BK SKID CONT 2 – AV BAY 2, MF71H

TOOLS REQD:

TOOL Gray Tape
Locker Tool
Torque Wrench
#10 Torque Tip Driver
Wire Cutters
1/4-in to 3/8-in Adapter
Ratchet Wrench

- O14:A,
O15:A,
O16:A
L2
1. ✓BRAKES MNA,B,C (three) – OFF
 2. ✓ANTISKID – OFF
 3. Remove Locker, Thermal/Debris Trap MF28H(MF71H) to access Brake Skid Control Box 1(2), (four fasteners, Locker Tool)
 4. Remove clamps (temp stow) and cut wire ties as reqd to access wires attached to connector P301(P302) attached to J1(J2) on Brake/Skid Control Box 1(2), see chart, (one screw/clamp, #10 Torque Tip Driver and Wire Cutters)



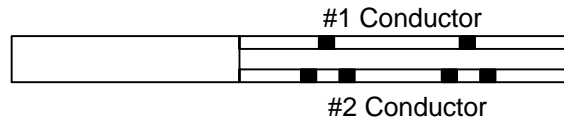
5. Remove ID tags as reqd and separate wires back ~3–5 in from connector P301(P302) back shell to access individual wires as reqd. See table below

Wheel	Signal	Connector	Wire ID*	Conductor
Brake Antiskid Control Box 1				
LOB	LCA, Fail Light	P301/J1	V23A26(24)	
LOB	Brake Coil	P301/J1	1V124A26(22)	One stripe
LIB	LCA, Fail Light	P302/J2	V25A26(24)	
LIB	Brake Coil	P302/J2	1V120A26(22)	One stripe
RIB	LCA, Fail Light	P302/J2	V24A26(24)	
RIB	Brake Coil	P302/J2	1V118A26(22)	One stripe
ROB	LCA, Fail Light	P301/J1	V22A26(24)	
ROB	Brake Coil	P301/J1	1V114A26(22)	One stripe
Brake Antiskid Control Box 2				
LOB	LCA, Fail Light	P301/J1	V67A26(24)	
LOB	Brake Coil	P301/J1	2V124A26(22)	One stripe
LIB	LCA, Fail Light	P302/J2	V69A26(24)	
LIB	Brake Coil	P302/J2	2V120A26(22)	One stripe
RIB	LCA, Fail Light	P302/J2	V68A26(24)	
RIB	Brake Coil	P302/J2	2V118A26(22)	One stripe
ROB	LCA, Fail Light	P301/J1	V66A26(24)	
ROB	Brake Coil	P301/J1	2V114A26(22)	One stripe

*Wire ID # listed refers to orbiters 103,104,105. # in parenthesis refers to orbiter 102

6. Cut wire _____, LCA, Fail Light, from table as directed by MCC
7. Locate wire _____, Brake Coil, twisted pair from table as directed by MCC
8. Strip ~2 in of insulation from twisted shielded pair, ~3–5 in from connector back shell. Use care not to damage inner wires

9. Separate and cut #1 conductor in twisted pair.
#1 conductor has single black band, #2 conductor has double band



10. Tape over wire ends (four) and tape/secure wires to harness (Gray Tape)
11. Inform MCC of status

ON MCC GO

12. Config for brake application
BRAKES MNA,B,C (three) – ON
- O14:A,
O15:A,
O16:A
- L2 ✓ANTISKID – OFF
R2 HYD CIRC PUMP 3 – ON (wait 10 sec)
R4 HYD BRAKE ISOL VLV 3 – OP (Hold 5 sec,
 ✓tb–OP)
13. Depress and hold brake pedals
 14. ✓MCC
 15. Release brake pedals

RECONFIG SYSTEM

- R4 16. HYD BRAKE ISOL VLV 3 – CL (Hold 5 sec,
 ✓tb–CL)
- R2 HYD CIRC PUMP 3 – GPC

INHIBITED FAIL LIGHT VERIFICATION

- L2 17. ANTISKID – ON
F3 ✓Antiskid Fail – Not Illuminated
 Report status to MCC
- L2 ✓ANTISKID – OFF
O14:A,
O15:A,
O16:A BRAKES MNA,B,C (three) – OFF

VERIFICATION COMPLETE

18. On MCC GO, replace ID tags and reinstall clamps (hand-tight) as reqd
19. Reinstall Thermal/Debris Trap and Locker MF28H(MF71H), torque 30 in-lb
20. Stow clamps and tools

CABIN LEAK SEALING

(N/A)

OBJECTIVE: Provides general guidance on locating and sealing leaks. Since no leak detector flown, only exposed or easily accessed areas checked for leaks. Leak detection would be by feeling for airflow. You must be right on leak to feel it

LOCATION: See CREW MODULE PENETRATIONS
(GENERAL INFORMATION)

TOOLS REQD:

TOOL	Patch Kit
MISC	CCK

1. Determine leak location by feeling around accessible hatch(window) seal areas (other areas checked on MCC instructions only)
Specifically, check:
 - Around flt deck window seals
 - Around airlock hatch seals and side hatch window
 - Around Pressure Equalization Valves (under side and on airlock hatches)
2. Don goggles,gloves
3. Stop leak, using Leak Repair Kit/Dux Seal & Tape
4. Stow Patch Kit and equip

DECAL FOR LEAK REPAIR KIT

1. Remove cap, pull pin, open valve, and screw T-handle (CW) into pointy end
 2. Squeeze Syringe to break seal
 3. Mix components – 25 cycles (30 to 60 sec)
 4. Pull T-handle out as far as possible, unscrew, and remove
- Immediately:
5. Close valve
 6. Insert T-handle in opposite end (to act as plunger)
 7. Position for use, open valve, push T-handle, slowly dispense mix onto desired area. As foam appears to set up, quickly dispense remainder onto desired area. (Tacky as soon as mixed, cured in 20 min)
 8. Close valve, place kit in plastic bag, stow

**CAUTION AND WARNING ELECTRONICS UNIT
CONTINGENCY PWR**

(1:30 hr)

OBJECTIVE: Provide pwr source to Caution and Warning (C/W) Electronics Unit (EU) pwr supply A(B) to either (1) bypass failed bus or (2) provide redundant pwr to remaining pwr supply, in event of pwr supply failure

LOCATION: See AV BAY 3A, Zone 9L (COMPONENT LOCATIONS)

NOTE

Procedure written to minimize amount of time during which C/W alarm system powered down. CRT fault messages remain operational

TOOLS REQD:

TOOL

Gray Tape
5–Amp Fuses (for Breakout Box and C/W cable as reqd) (Pin Kit)
CWS Contingency Pwr Cable A(B)
Locker Tool
Connector Strap Wrench (if reqd)

BOB
CHCK

Driver Handle
Breakout Box
DC Pwr Cable

1. Determine failure case by consulting MCC (chart below):

NOTE

Use PN ME451–0009–1021 fuses

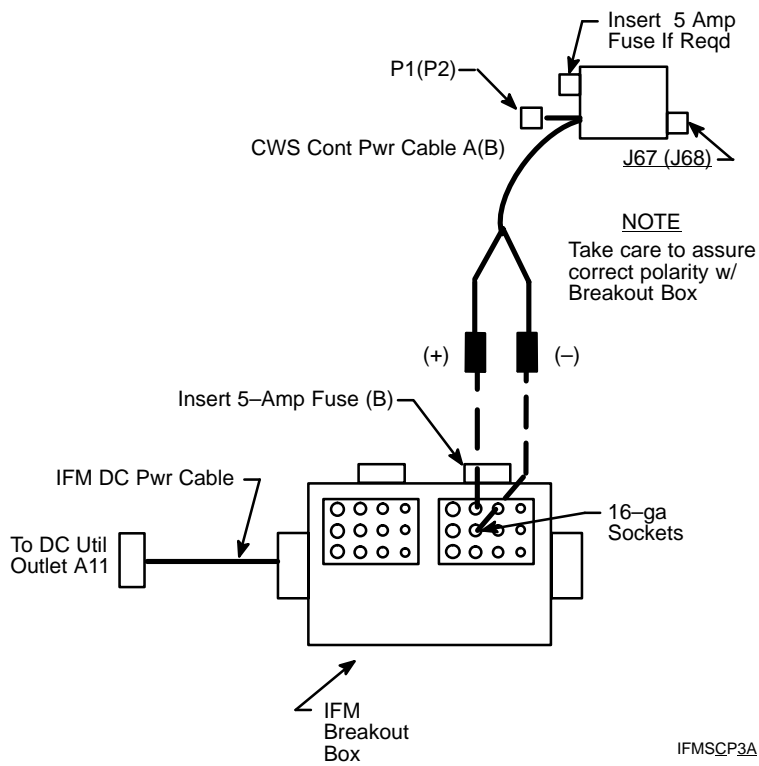
<u>Case</u>	<u>Failure</u>	<u>Cable</u>	<u>Cable Fuse</u>
I	ESS 1BC Failure (DA1 or O13/R14)	A	5–Amp
II	A Supply Failure	B	None
III	ESS 2CA Failure (DA2 or O13/R14)	B	5–Amp
IV	B Supply Failure	A	None

C–2

IFM/ALL/GEN E

A11

2. Insert fuse in fuse holder in CWS Contingency Pwr Cable, if reqd (from chart)
3. ✓ DC UTIL PWR MNC – OFF
4. a. Breakout Box:
AUX – OFF
28V/VAR VOLT – 28V
PWR A,B – OFF
- b. Remove Fuse cap from side B
- c. Rotate GA SEL B – 16
- d. Install 5–Amp Fuse, replace cap
5. Config Breakout Box and CWS CONT PWR Cable A(B) as shown:



6. If MA9N soft stowage installed, see SOFT STOWAGE SUPPORT REMOVAL (GENERAL INFORMATION)
7. Access front of C/W EU in AV BAY 3A removing locker MA9L, Thermal/Debris Traps

INSTALL CABLE

- | | |
|-------|--|
| O13:A | <p>For Case I(IV):</p> <ol style="list-style-type: none"> 8. Locate P67 mated w/J1 on C/W EU 9. cb ESS 1BC C/W A – op 10. Disconnect P67 from J1 and mate P67 w/J67 on CWS CONT PWR Cable A 11. Connect P1 on CWS CONT PWR Cable A to J1 on EU |
| O13:C | <p>For Case II(III):</p> <ol style="list-style-type: none"> 12. Locate P68 mated w/J2 on C/W EU 13. cb ESS 2CA C/W B – op 14. Disconnect P68 from J2 and mate P68 w/J68 on CWS CONT PWR Cable B 15. Connect P2 on CWS CONT PWR Cable B to J2 on EU |

REPOWER C/W

- | | |
|-------|---|
| O13:C | <p>For Case II:</p> <ol style="list-style-type: none"> 16. cb ESS 2CA C/W B – cl |
| O13:A | <p>For Case IV:</p> <ol style="list-style-type: none"> 17. cb ESS 1BC C/W A – cl (MA) |
| A11 | <p>For All Cases:</p> <ol style="list-style-type: none"> 18. DC UTIL PWR MNC – ON 19. Breakout Box: <ul style="list-style-type: none"> PWR B – ON (16 lt ON) (MA Case I only) |

PERFORM C/W CHECKOUT

For Case I(IV):

F2(F4,A7)

- 20. MSTR ALARM pb – off
- 21. Re-initialize C/W system A – verify C/W Pwr Supply A:

R13U

- a. Inhibit parameters specified on PRIMARY C/W PARAMETER MATRIX (ORB OPS, Cue Card)
- b. Use C/W and FDA TABLE (REF DATA, C/W) to reset limits for following:

<u>CH</u>	<u>PARAMETER</u>
004	CAB PRESS
007	OMS TK P OX – L
017	OMS TK P FU – L
037	OMS TK P OX – R
047	OMS TK P FU – R
074	CAB FAN delta P
106	Freon Flow 1
116	Freon Flow 2

- c. C/W PARAM SEL tw – >119

- 22. Case I, go to step 27
- 23. Case IV, verify redundant pwr to C/W Pwr Supply A:

O13:C

O13:A

- a. ✓cb ESS 2CA C/W B – op
- b. 1BC C/W A – op (C/W tone)
- c. – cl (MA light)
- d. MSTR ALARM pb – off

F2(F4,A7)

- | | |
|-----------|---|
| F2(F4,A7) | For Case II:
24. MSTR ALARM pb – off
25. Verify redundant pwr to C/W Pwr Supply B: |
| O13:A | a. ✓cb ESS 1BC C/W A – op |
| O13:C | b. 2CA C/W B – op (C/W tone) |
| F2(F4,A7) | c. – cl (MA light) |
| | d. MSTR ALARM pb – off |
| | For Case III: |
| F7 | 26. MSTR ALARM pb – off
27. ✓C/W PRI C/W It – off
B/U C/W It – off |
| | 28. Config assembly for entry by securing wiring and Breakout Box w/Gray Tape, reinstalling Thermal/ Debris Traps (tape in place) taking care not to crimp/damage cable |
| | 29. Stow tools, locker, and Gray Tape |

CONTROL BUS PWRDN

(1:30 hr)

OBJECTIVE: Remove pwr from shorted cntl bus section by removing pwr from appropriate cntl bus RPC(s) on MCC call. If cntl bus short trips off RPC, middle pwr source cb will be opened and this procedure used to pwr down remaining RPC. If cntl bus short does not trip off either RPC, this procedure will be used to pwr down both RPCs

NOTE

No Preflight bus pwr reqd
to perform this procedure

LOCATION: See AV BAY 1, Zone 43A (MDM LF1)

(COMPONENT LOCATIONS)

TOOLS REQD:

TOOL	Gray Tape
	Pin Kit (for Test Jumper Leads and Fuses)
	Connector Wrench (Strap)
BOB	IFM Breakout Box
CHCK	DC Pwr Cable

PROCEDURE:

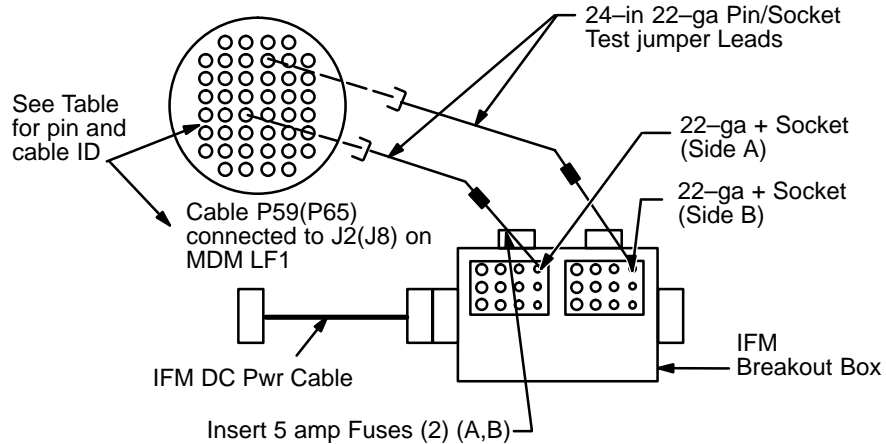
1. Remove Vol A (GENERAL INFORMATION) to access MDM LF1
2. Using CONTROL BUS SOURCE TABLE verify w/MCC appropriate actions

CNTR BUS _____, R14 cb _____, Connector _____, Pins _____

3. Remove connector P59(P65) from J2(J8) as reqd. Place Gray Tape over J2(J8)
4. ✓ DC UTIL PWR – OFF
5. a. Breakout Box:
AUX – OFF
28V/VAR VOLT – 28V
PWR A,B – OFF
- b. Remove Fuse caps from sides A,B
- c. Rotate GA SEL A,B – 22
- d. Install 5–Amp Fuses (two), replace caps

MO13Q/
MO52J

6. Connect Test Jumper Leads and Cables as shown, using table for proper connector and Pin ID



IFMSCP6bA

- | | |
|-----------------|--|
| MO13Q/
MO52J | 7. DC UTIL PWR – ON |
| | 8. Breakout Box:
PWR A,B – ON (22 It ON) |
| R1 | 9. CNTL BUS PWR MNA,MNB,MNC (three) – dn |
| | 10. Verify shorted CNTL BUS still deenergized,
✓MCC |
| | 11. If reqd for entry:
Tape/secure harness/cable and Test
Jumper Leads to nearby structure/harnesses
Tape/secure Breakout Box to Av Bay shelf
Reinstall Vol A
Secure DC UTIL PWR Cable
Stow tools >> |
| | 12. If procedure no longer reqd: |
| | 13. Breakout Box:
PWR A,B – OFF |
| MO13Q/
MO52J | 14. DC UTIL PWR – OFF |
| | 15. Remove Cables and Test Jumper Leads and
reinstall connector P59(P65) to J2(J8) on MDM
LF1 |
| | 16. Reinstall Vol A (MF57A) and stow tools |

CONTROL BUS SOURCE TABLE

CNTL BUS TO BE UNPOWERED	PNL R14 cb	LF1 MDM RPC COMMAND	ALSO LOST IS ONE SOURCE OF
AB1	cb MNC CNTL BUS AB1/2/3	AB1/BC1 – P59 PIN 22 AB1/CA1 – P59 PIN 14	AB2*,AB3*, BC1,CA1
AB2	cb MNC CNTL BUS AB1/2/3	AB2/BC2 – P59 PIN 80 AB2/CA2 – P59 PIN 70	AB1*,AB3*, BC2,CA2
AB3	cb MNC CNTL BUS AB1/2/3	AB3/BC3 – P65 PIN 58 AB3/CA3 – P65 PIN 47	AB1*,AB2*, BC3,CA3
BC1	cb MNA CNTL BUS BC1/2/3	AB1/BC1 – P59 PIN 22 BC1/CA1 – P59 PIN 04	BC2*,BC3*, AB1,CA1
BC2	cb MNA CNTL BUS BC1/2/3	AB2/BC2 – P59 PIN 80 BC2/CA2 – P59 PIN 92	BC1*,BC3*, AB2,CA2
BC3	cb MNA CNTL BUS BC1/2/3	AB3/BC3 – P65 PIN 58 BC3/CA3 – P65 PIN 44	BC1*,BC2*, AB3,CA3
CA1	cb MNB CNTL BUS CA1/2/3	AB1/CA1 – P59 PIN 14 BC1/CA1 – P59 PIN 04	CA2*,CA3*, AB1,BC1
CA2	cb MNB CNTL BUS CA1/2/3	AB2/CA2 – P59 PIN 70 BC2/CA2 – P59 PIN 92	CA1*,CA3*, AB2,BC2
CA3	cb MNB CNTL BUS CA1/2/3	AB3/CA3 – P65 PIN 47 BC3/CA3 – P65 PIN 44	CA1*,CA2*, AB3,BC3

*Only lost if R14 cb tripped due to short or previously opened in step 2

17. If pwr reqd (<3 sec) for crit function

NOTE

Following must be coordinated between crewmembers on flt deck and middeck

18. Hold crit function sw
19. Breakout Box
PWR A,B – OFF (3 sec), then ON

CRT CHANGEOUT

(1:30 hr) (10 min C/O)

OBJECTIVE: Replace failed fwd CRT 1(2,3) w/aft station CRT

LOCATION: Pnl F7 for CRT 1,2,3

Pnl R11U for CRT 4

TOOLS REQD:

TOOL Gray Tape
 Pwr Screwdriver
 Robbins Wrench
 Torque Wrench
 5/32-in Allen Head Driver
 Ratchet Wrench
 1/4-in to 3/8-in Adapter
 3/8-in Deep Socket
 1/4-in Combination Wrench
 #10 Torque Driver

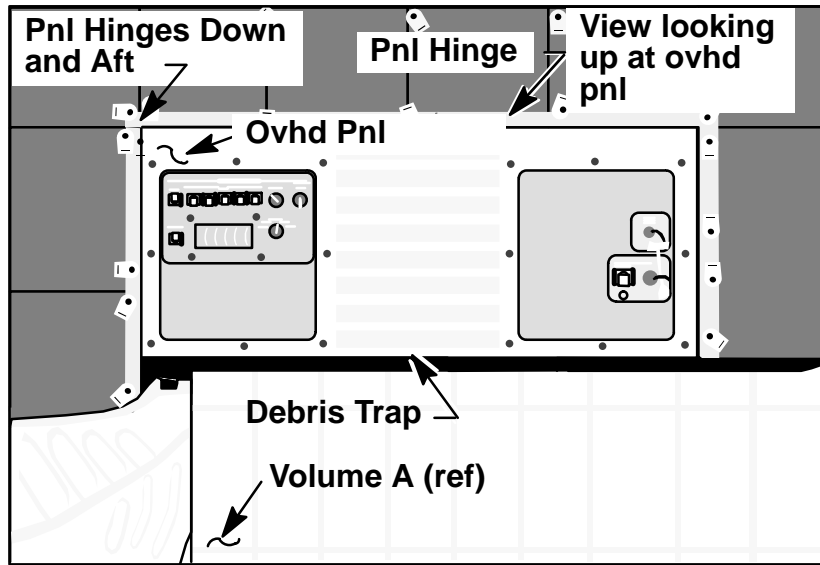
TO REMOVE FWD CRT

- F7 1. On active PASS KYBD, GPC/CRT 01(02,03),
 EXEC:
 ✓Big 'X' and 'POLL FAIL'

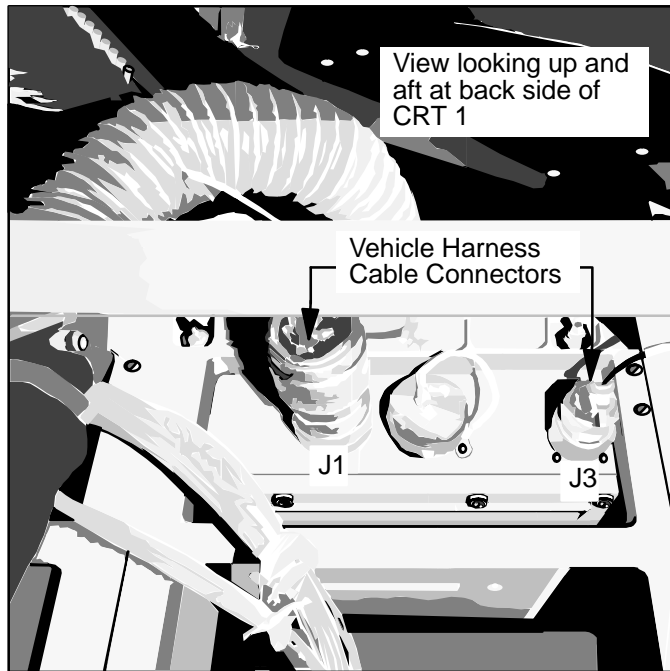
NOTE

Access to CRT 1(2,3) connectors thru
middeck overhead pnl containing
MO42F,MO58F

- C2 2. CRT1(2,3) PWR – OFF



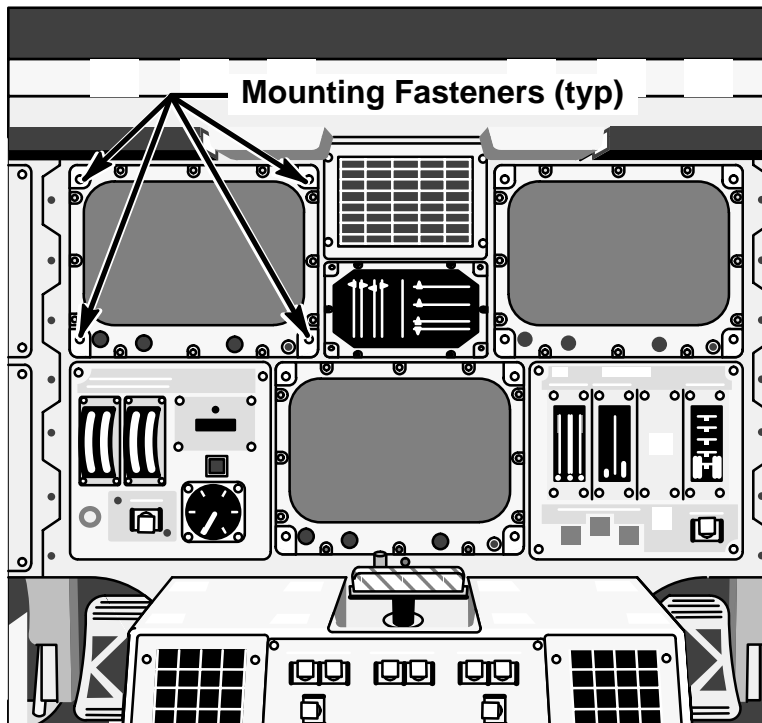
3. Release Debris Trap and open Middeck Ovhd Pnl containing MO42F,MO58F



NOTE

Mate/demate of fwd CRT connectors easier if CRT held out 2–4 in by Flt Deck crewmember

- | | |
|---------|--|
| F7 | 4. Loosen CRT fasteners (four, 5/32-in Allen Head Driver) |
| Middeck | 5. Disconnect vehicle harness cables from CRT
For CRT 1, disconnect
Cable 30V77W20P70 from J1
W14P71 from J3
For CRT 2, disconnect
Cable 30V77W21P72 from J1
W14P73 from J3
For CRT 3, disconnect
Cable 30V77W25P74 from J1
W4P75 from J3 |
| F7 | 6. Remove CRT, mark w/Gray Tape |

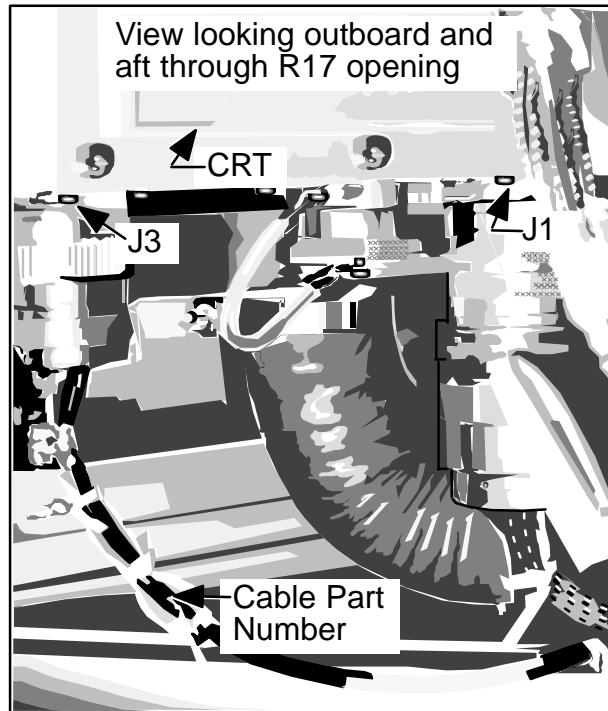


TO REMOVE AFT CRT

- | | |
|-------|---|
| | 7. On active PASS KYBD, GPC/CRT 04 EXEC
✓Big 'X' and 'POLL FAIL' |
| R11L | 8. CRT4 PWR – OFF |
| R17 | 9. Remove R17(R18) as applicable |
| (R18) | (17 fasteners, 5/32-in Allen Head Driver) |

NOTE

CRT connectors may be accessed thru
pnls R12(R17,R18) depending on aft
deck config



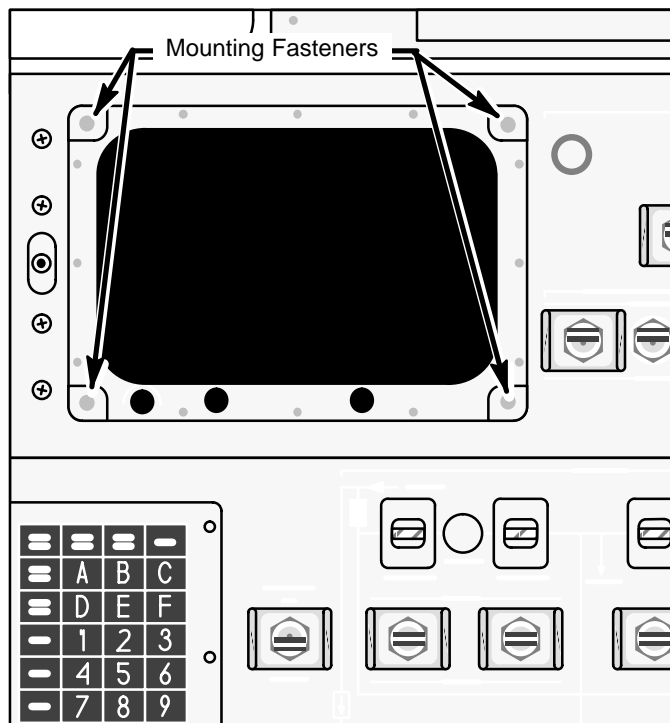
10. Loosen CRT fasteners (four, 5/32-in Allen Head Driver)
11. Disconnect cables from CRT 4
 - Cable 30V77W2P68 from J1
 - P69 from J3

NOTE

If reqd to ease removal of aft CRT,
module containing R11,R14 may
be slid inboard several inches

12. Remove aft CRT

- * If reqd: *
- * Loosen module fasteners (two, 5/32-in *
- * Allen Head Driver) on line between pnls *
- * R14/R17 *
- * Ensure wire harnesses not stretched/ *
- * strained. Pull module inboard *
- * Remove CRT. Temp reinstall module *



TO INSTALL AFT CRT FWD

13. Slide CRT into pnl. Install connectors

For CRT 1, connect

Cable 30V77W20P70 to J1

W14P71 to J3

For CRT 2, connect

Cable 30V77W21P72 to J1

Cable 30V77W14P73 to J3

For CRT 3, connect

Cable 30V77W25P74 to J1

W4P75 to J3

TO INSTALL FWD CRT AFT

14. Tape over connector interfaces on failed CRT
Tape/secure harness to structure
15. Reinstall CRT and pnl R17(R18) (torque fasteners, 30 in-lb)
 - * If reqd: *
 - * Loosen module fasteners (two, 5/32-in Allen *
 - * Head Driver) on line between pnls R14/R17 *
 - * Slide module inboard, ensure wire harness *
 - * not stretched/strained *
 - * Reinstall module (torque fasteners, 30 in-lb) *
16. Stow tools

CRT CHECKOUT

NOTE

Verify affected CRT not assigned to BFS via BFC CRT DISP/SEL sw. If CRT does not show anticipated indications, do not proceed.
✓MCC for further analysis

- C2 17. CRT (changed out) PWR – ON
 - ✓Following appears on CRT within 30 sec (adjust BRT on CRT if reqd):
 - Time Fields (upper RH corner)
 - Big 'X'
 - 'POLL FAIL' (lower RH corner)
18. ITEM B EXEC (OTP BITE status display)
If BITE words other than normal (8200, 8000, 0000), record BITE words
19. ITEM C EXEC (Reset BITE words)
 - ✓Normal BITE words: 8200 8000 0000
20. ITEM E EXEC (deselect OTP)
21. ITEM A EXEC (reinitializes DEU)
22. Assign CRT as reqd:
 - Select desired MAJ FUNC
 - GPC/CRT desired GPC/CRT EXEC
 - (on active PASS KYBD)
- F7 23. Reset DEU/DU BITE flags on CRT (if reqd)

CRYO TANK HEATER FUSE REMOVAL

(30 min)

OBJECTIVE: Access back of pnl R1(A11) and remove pair of fuses in attempt to disable failed-on cryo heater

LOCATION: Pnl R1 Flt Deck (A11 Aft Flt Deck)

TOOLS REQD:

TOOL Pwr Screwdriver
5/32-in Allen Head Driver
Wire Cutters
Torque Wrench

1. Disabling cryo heater reqs removal of pair of fuses. Use matrix to determine appropriate pnl and fuse #s:

<u>Heater</u>	<u>Pnl</u>	<u>Fuses</u>
O2 TK1 HTR A	R1	F1,F2
O2 TK1 HTR B	R1	F3,F4
H2 TK1 HTR A	R1	F5,F6
H2 TK1 HTR B	R1	F7,F8
O2 TK2 HTR A	R1	F9,F10
O2 TK2 HTR B	R1	F11,F12
H2 TK2 HTR A	R1	F13,F14
H2 TK2 HTR B	R1	F15,F16
O2 TK3 HTR A	R1	F17,F18
O2 TK3 HTR B	R1	F19,F20
H2 TK3 HTR A	R1	F21,F22
H2 TK3 HTR B	R1	F23,F24
O2 TK4 HTR A	A11	F1,F2
O2 TK4 HTR B	A11	F3,F4
H2 TK4 HTR A	A11	F5,F6
H2 TK4 HTR B	A11	F7,F8

2. To access fuses on pnl R1:
R1A2 | Loosen seven fasteners (5/32-in Allen Head Driver)
To access fuses on pnl A11:
A11 | Loosen 22 fasteners (5/32-in Allen Head Driver)
3. Open pnl to access fuse caps. Do not stress wire bundles on pnl back
4. Locate fuses (determined in step 1) on pnl back, cut safety wire to fuse caps (Wire Cutters)

NOTE

Fuses powered during removal

5. Remove fuse caps and both fuses (as determined in step 1), replace caps, stow fuses
6. Replace pnl loosened in step 2 (5/32-in Allen Head Driver) (torque fasteners, 30 in-lb)
7. Stow tools

DDU CHANGEOUT (OV102,104 ONLY)

(1:30 hr) |

OBJECTIVE: Replace failed fwd DDU w/DDU from aft station.
If DDU 1 (L) or 2 (R) has partial failure (loss of one pwr supply) and MCC desires failed unit be connected when installed in aft station, cable connection data for aft station installation provided

LOCATION: See FLIGHT DECK (COMPONENT LOCATIONS)

Zone J45 for DDU 1 (L) & 2 (R)

Zone V85 for DDU 3 (Aft)

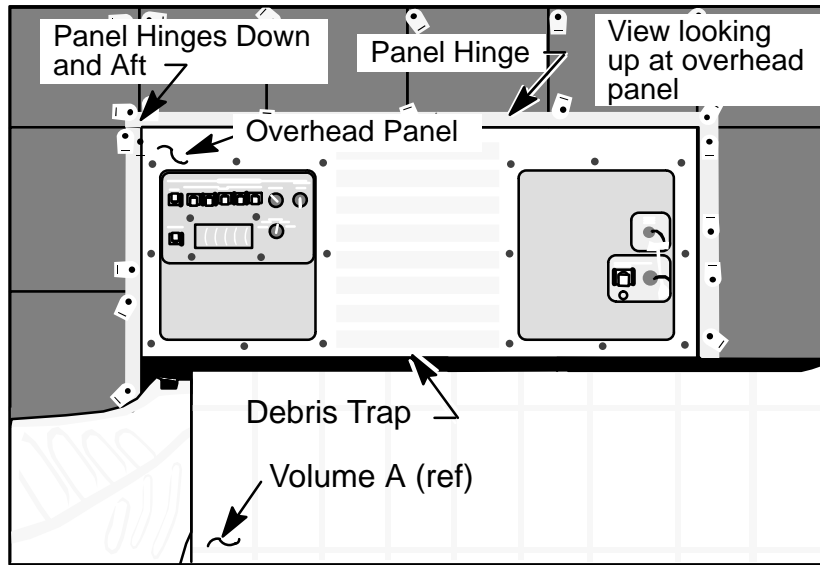
TOOLS REQD:

TOOL Gray Tape
 Pwr Screwdriver
 6-in & 10-in Extensions
 Torque Wrench
 5/32-in Allen Head Driver
 3/8-in Socket
 1/4-in to 3/8-in Adapter
 Driver Handle
 3/8-in Combination Wrench

TO REMOVE FWD DDU

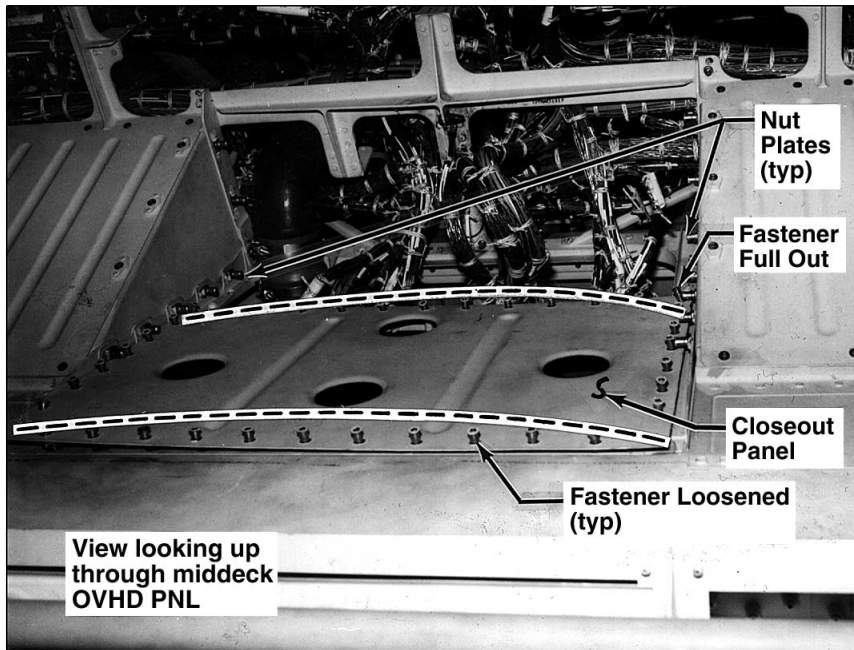
1. For DDU 1 (L)
O14:E | cb MNA DDU L – op
O15:E | MNB DDU L – op
 For DDU 2 (R)
 cb MNB DDU R – op
O16:E MNC DDU R – op

2,4 |



2. Release Debris Trap on middeck ceiling and open overhead pnl containing MO42F,MO58F
3. Loosen closeout pnl fasteners (thirty-six, 5/32-in Allen Head Driver)

2,4 |



108-KSC-382C-2972/8

4. Pull all fasteners full out and flex pnl as reqd to facilitate removal. Pnl must be flexed to clear nut plates

NOTE

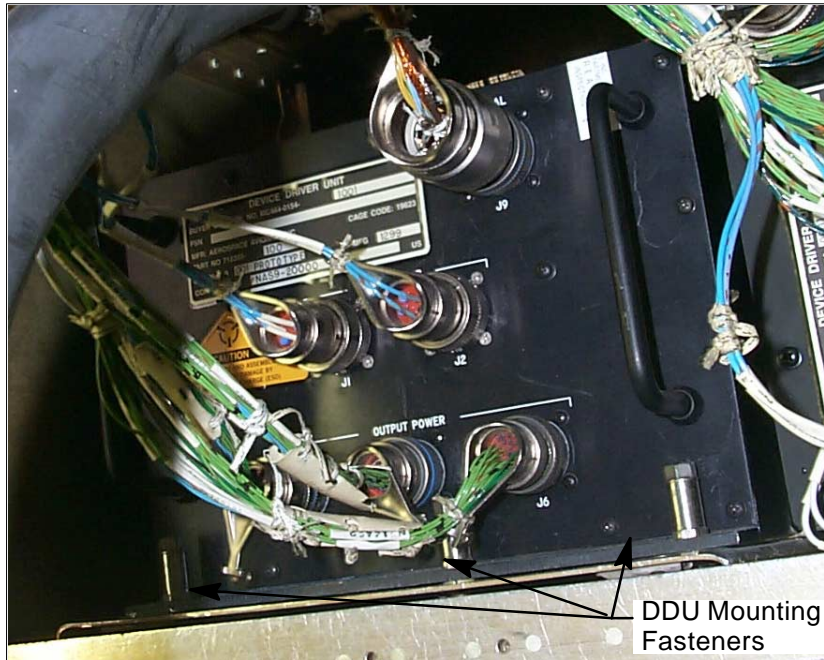
Facing aft, looking at DDU's left and right reversed

5. Remove all harness connectors on failed unit. Order of removal unimportant. Tape harnesses out of way to facilitate DDU removal

CAUTION

Use 3/8-in Combination Wrench to loosen center mounting fastener (to prevent damage to connector above fastener)

2,4 |



6. Loosen DDU mounting fasteners using Socket on outboard two fasteners and Combination Wrench on center one (three, 3/8-in Socket or Combination Wrench)
7. Remove failed unit, mark w/Gray Tape

2,4 |

D-4

IFM/2,4/GEN E,1

TO REMOVE AFT DDU

- O14:E 8. cb MNA DDU AFT – op
- O16:E 9. MNC DDU AFT – op
- 10. Remove pnl R18(17 fasteners, 5/32–in Allen Head Driver)
- 11. Remove all harness connectors on DDU. Order of removal unimportant. Tape harnesses out of way to facilitate DDU removal

<p>CAUTION Use 3/8–in Combination Wrench to loosen center mounting fastener (to prevent damage to connector above fastener)</p>
--

- 12. Loosen DDU mounting fasteners using socket on outboard two fasteners and combination wrench on center one (three, 3/8–in Socket or Combination Wrench)
- 13. Remove DDU

TO INSTALL AFT DDU FWD

- 14. Install DDU, hand–tighten DDU mounting fasteners (three). Due to interference of connectors, only right fastener can be torqued (100 in–lb)
- 15. Install connectors in following sequence (for ease of installation):

<u>DDU 1 (L), connect</u>		<u>DDU 2 (R), connect</u>	
Cable	DDU	Cable	DDU
30V77W4P274	to J4	30V77W4P284	to J4
	P275 to J5		P285 to J5
	P276 to J6		P286 to J6
	P271 to J1		P281 to J1
	P272 to J2		P282 to J2

TO INSTALL FWD DDU AFT

16. Install DDU, hand-tighten DDU mounting fasteners (three). Due to interference of connectors, only right fastener can be torqued (100 in-lb)
17. If DDU 3 (aft) cable connections not reqd, tape over connector interfaces and secure harnesses to structure
If connections reqd, connect:

Cable	DDU
30V77W4P299	to J9
	P291 to J1
	P292 to J2
	P294 to J4
	P295 to J5
	P296 to J6

18. Reinstall flt deck closeout pnl R18 (torque, 30 in-lb)
19. Reinstall middeck DDU closeout pnl, and resecure overhead pnl and Debris Trap (torque, 30 in-lb)

DDU CHANGEOUT (OV103,105 ONLY)

(3:00 hr)

OBJECTIVE: Replace failed fwd DDU w/DDU from aft station.
If DDU 1 (L) or 2 (R) has partial failure (loss of one pwr supply) and MCC desires failed unit be connected when installed in aft station, cable connection data for aft station installation provided

LOCATION: See FLIGHT DECK (COMPONENT LOCATIONS)

Zone J45 for DDU 1 (L) & 2 (R)

Zone V85 for DDU 3 (Aft)

TOOLS REQD:

TOOL

- Gray Tape
- Pwr Screwdriver
- 11/32-in Deepwell Socket
- 1/4-in Deepwell Socket
- 6-in & 10-in Extensions
- Torque Wrench
- 5/32-in Allen Head Driver
- 3/8-in & 1/2-in Sockets
- 1/4-in to 3/8-in Adapter
- Driver Handle
- Wire Cutters
- #8 Torque Driver
- 9/16-in Combination Wrench
- 3/8-in Combination Wrench

TO REMOVE FWD DDU

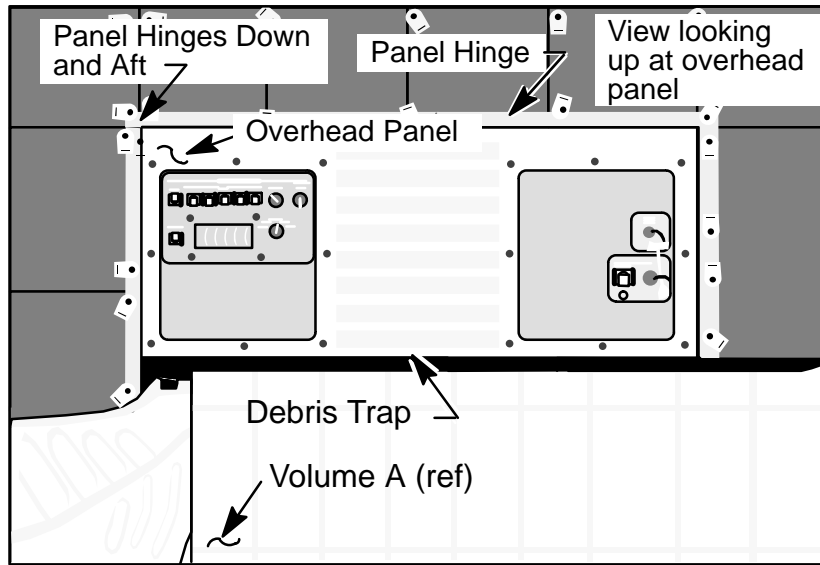
1. For DDU 1 (L)

O14:E		cb MNA DDU L – op
O15:E		MNB DDU L – op

For DDU 2 (R)

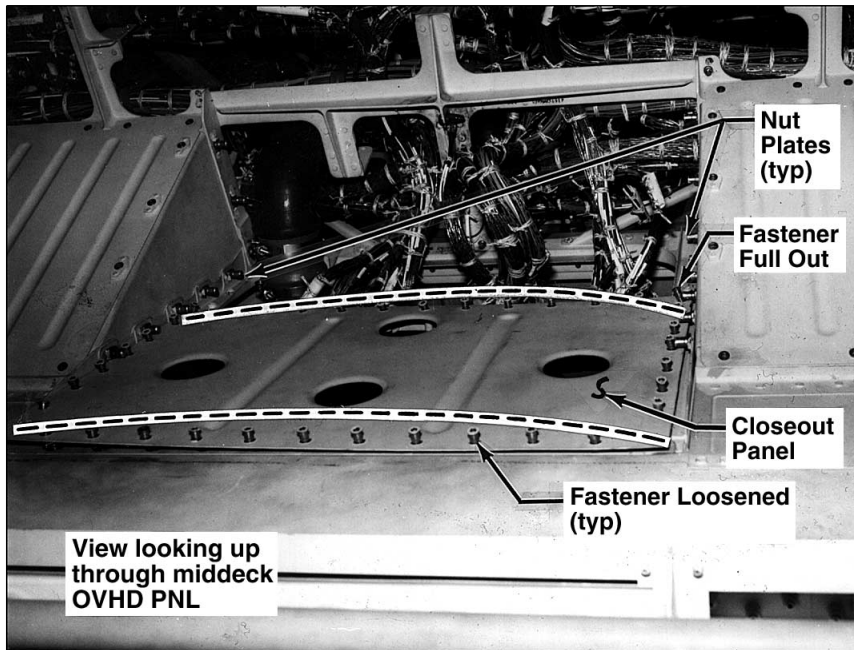
O16:E		cb MNB DDU R – op
		MNC DDU R – op

3,5 |



2. Release Debris Trap on middeck ceiling and open overhead pnl containing MO42F,MO58F
3. Loosen closeout pnl fasteners (thirty-six, 5/32-in Allen Head Driver)

3,5 |



108-KSC-382C-2972/8

4. Pull all fasteners full out and flex pnl as reqd to facilitate removal. Pnl must be flexed to clear nut plates

NOTE

Facing aft, looking at DDU's left and right reversed, step 19 may be done before (during) filter removal as preferred

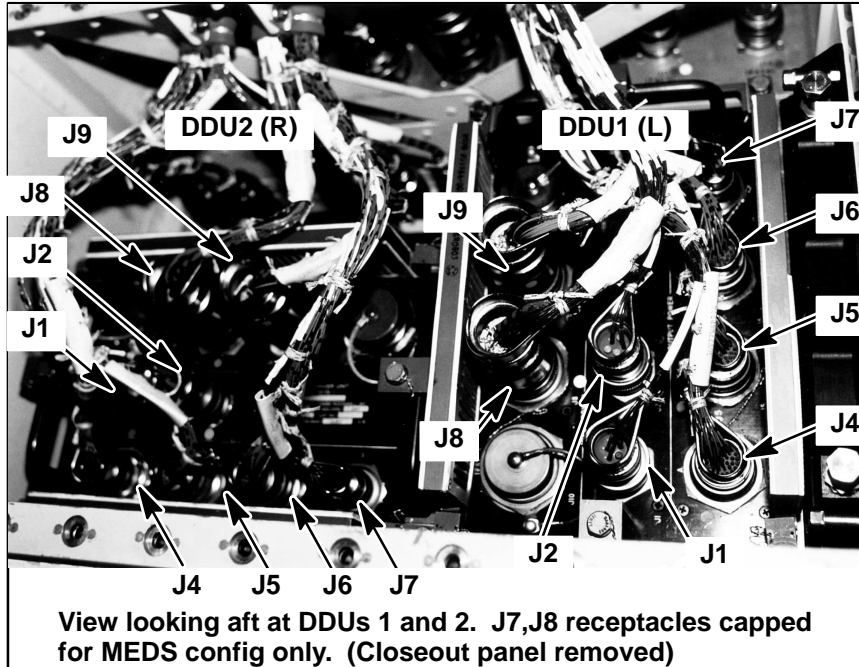
FOR DDU 1 (L)

ON DDU 1 (L)

5. Cut, remove safety wire from six filter and filter-bracket retaining bolts
6. Loosen, do not remove, four upper and lower filter-retaining bolts (two/filter, 3/8-in Socket) far enough to allow filter retainers to be rotated

3,5 |

7. Rotate, release four filter retainers (tabs) (two/bracket), remove filters (two)
8. Loosen, do not remove, two filter-bracket retaining bolts (one/bracket) far enough to allow bracket-retaining tabs, under DDU handles, to be rotated
9. Rotate filter-bracket retaining tabs, remove filter brackets (two)



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ifm_sD_p6

ON DDU 2(R)

10. Cut, remove safety wire on left filter-bracket retaining bolt (one)
11. Loosen, do not remove, filter-bracket retaining bolt far enough to allow bracket retaining tab, under DDU handles, to be rotated
12. Rotate filter-bracket retaining tab, remove filter-bracket. Go to step 19

3,5 |

FOR DDU 2 (R)

ON DDU 1 (L)

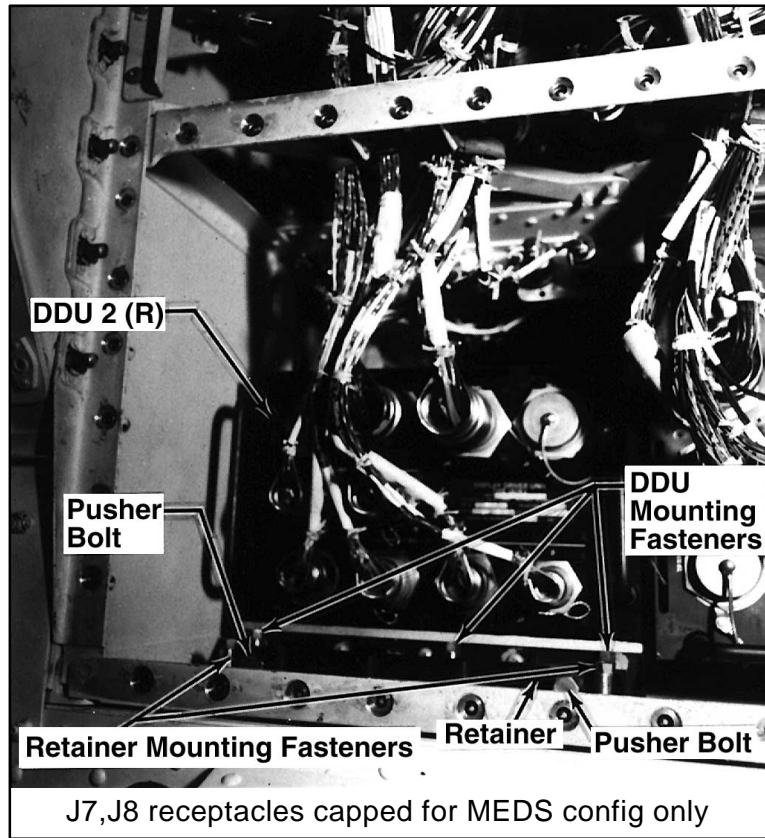
13. Cut, remove safety wire on right filter–retaining bolts (two)
14. Loosen, do not remove, two right filter–retaining bolts (3/8–in Socket) far enough to allow filter retainers to be rotated
15. Rotate, release two filter retainers (tabs) remove filter

ON DDU 2 (R)

16. Cut, remove safety wire from six filter and filter–bracket retaining bolts
17. Loosen, do not remove, four upper and lower filter–retaining bolts (two/filter, 3/8–in Socket) far enough to allow filter retainer to be rotated
18. Rotate, release four filter retainers (tabs) (two/bracket), remove filters (two)

ON FAILED UNIT

19. Remove harness connectors at J1 thru J9 on failed unit. (J7,J8 receptacles capped for MEDS config only.) Order of removal unimportant. Tape harnesses out of way to facilitate DDU removal



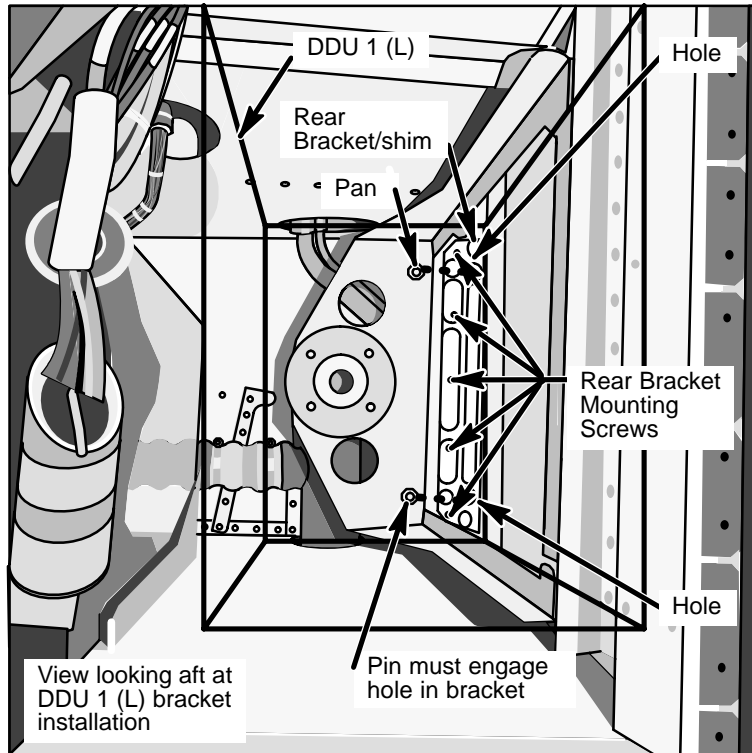
S81-33603

20. Loosen, do not remove four Jam Nuts and two Pusher Bolts (9/16-in Combination Wrench and 1/2-in Socket)
21. Remove Pusher-Bolt retainer (two fasteners, 3/8-in Socket)

CAUTION
Use 3/8-in Combination Wrench to loosen center mounting fastener (to prevent damage to connector above fastener)

22. Loosen DDU mounting fasteners using Socket on outboard two fasteners and Combination Wrench on center one (three, 3/8-in Socket or Combination Wrench)
23. Remove failed unit, mark w/Gray Tape

3,5 |



24. Remove bracket/shim from rear of failed DDU (five screws/washers, #8 Torque Driver). Save bracket/shim for reinstallation

TO REMOVE AFT DDU

- | | | |
|-------|-----|--|
| O14:E | 25. | cb MNA DDU AFT – op |
| O16:E | 26. | MNC DDU AFT – op |
| | 27. | Remove pnl R18 (17 fasteners, 5/32-in Allen Head Driver) |

NOTE

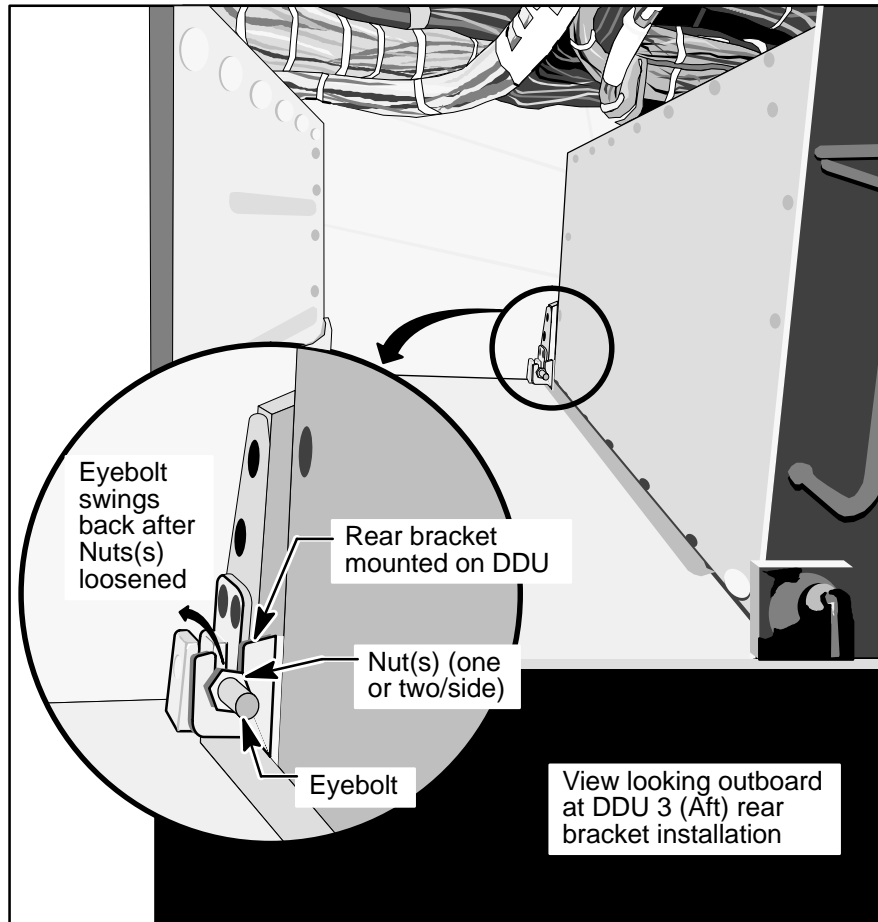
Step 33 may be done before(during) filter removal as preferred

28. Cut, remove safety wire from six filter and filter-bracket retaining bolts

3,5 |

29. Loosen, do not remove, four upper and lower filter-retaining bolts (two/filter, 3/8-in Socket) far enough to allow filter retainers to be rotated
30. Rotate, release four filter retainers (tabs) (two/bracket), remove filters (two)
31. Loosen, do not remove, two filter-bracket retaining bolts (one/bracket) far enough to allow bracket-retaining tabs, under DDU handles, to be rotated
32. Rotate filter-bracket retaining tabs, remove filter brackets (two)
33. Remove harness connectors at J1 thru J9 on DDU. (J7,J8 receptacles capped for MEDS config only.) Order of removal unimportant. Tape harnesses out of way to facilitate DDU removal

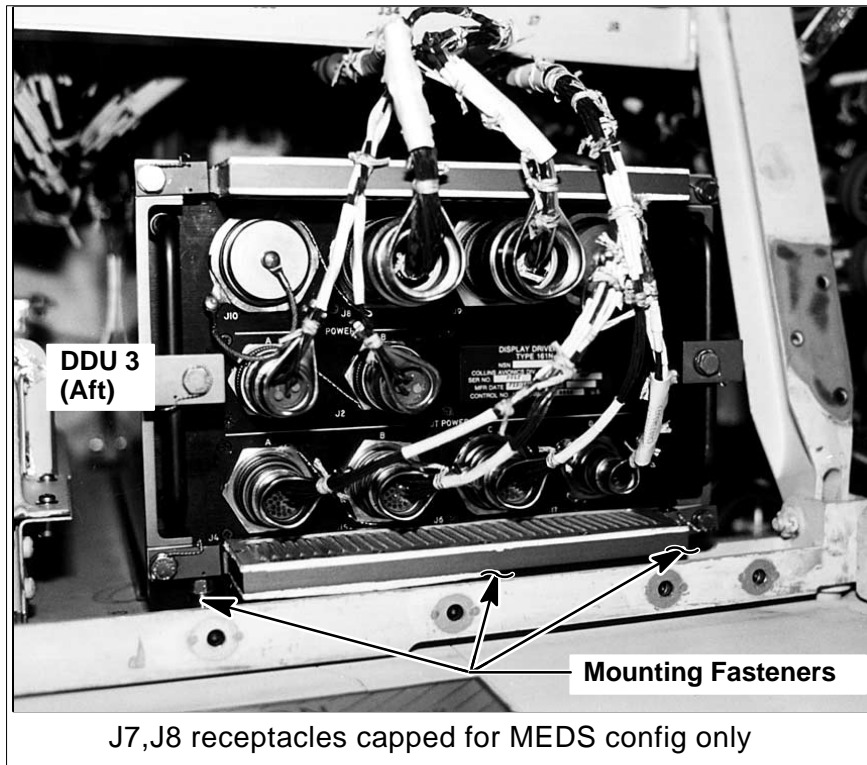
3,5 |



SD-P10

34. Loosen, do not remove, eyebolt nut(s) (two Jam Nuts or one self-locking/side) at rear of DDU, swing eyebolts clear (1/4-in or 11/32-in Deepwell Sockets, 10-in & 6-in Extensions)

3,5 |



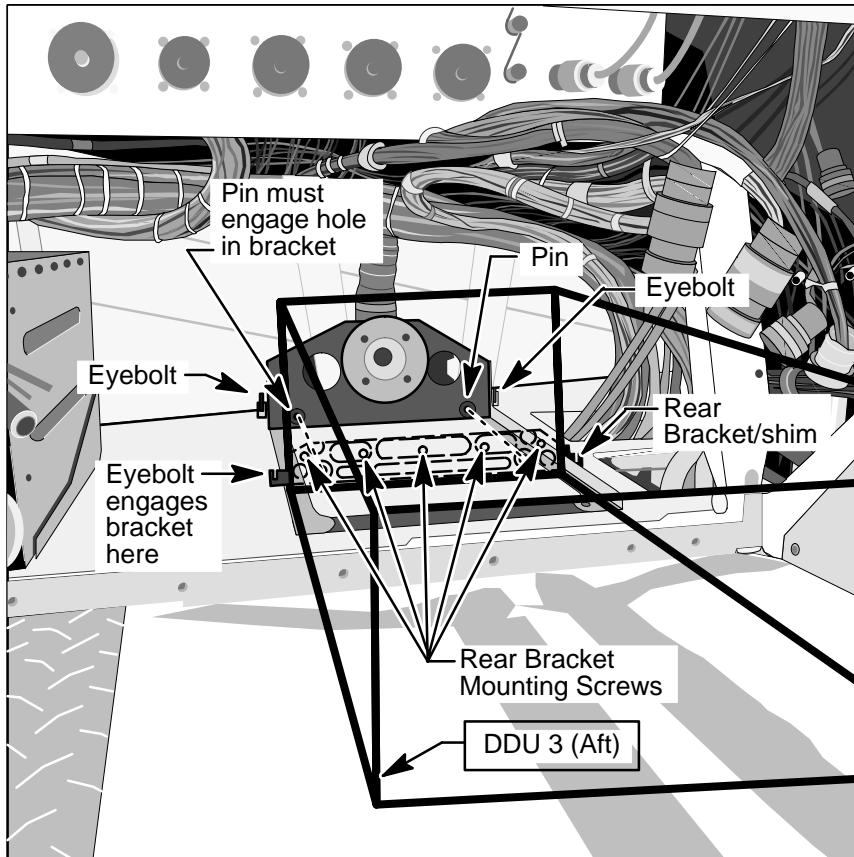
s91-42978

ifm sD_P12

CAUTION
Use 3/8-in Combination Wrench to loosen center mounting fastener (to prevent damage to connector above fastener)

35. Loosen DDU mounting fasteners using socket on outboard two fasteners and combination wrench on center one (three, 3/8-in Socket or Combination Wrench)
36. Remove DDU

3,5 |



108-KSC-380C-153/6

SD-P12

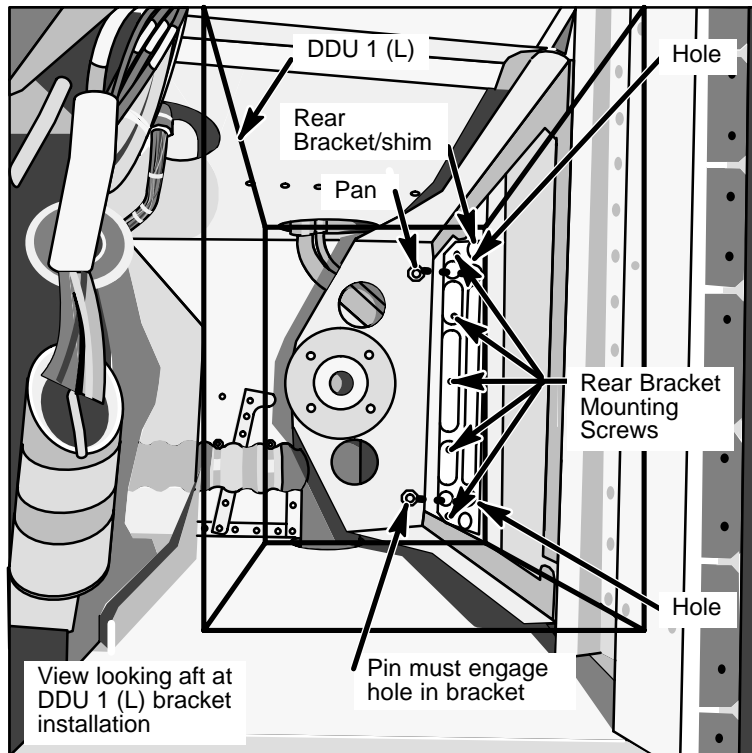
37. Remove bracket/shim from rear of DDU 3 (aft), save for reuse (five screws/washers, #8 Torque Driver)

3,5 |

D-17

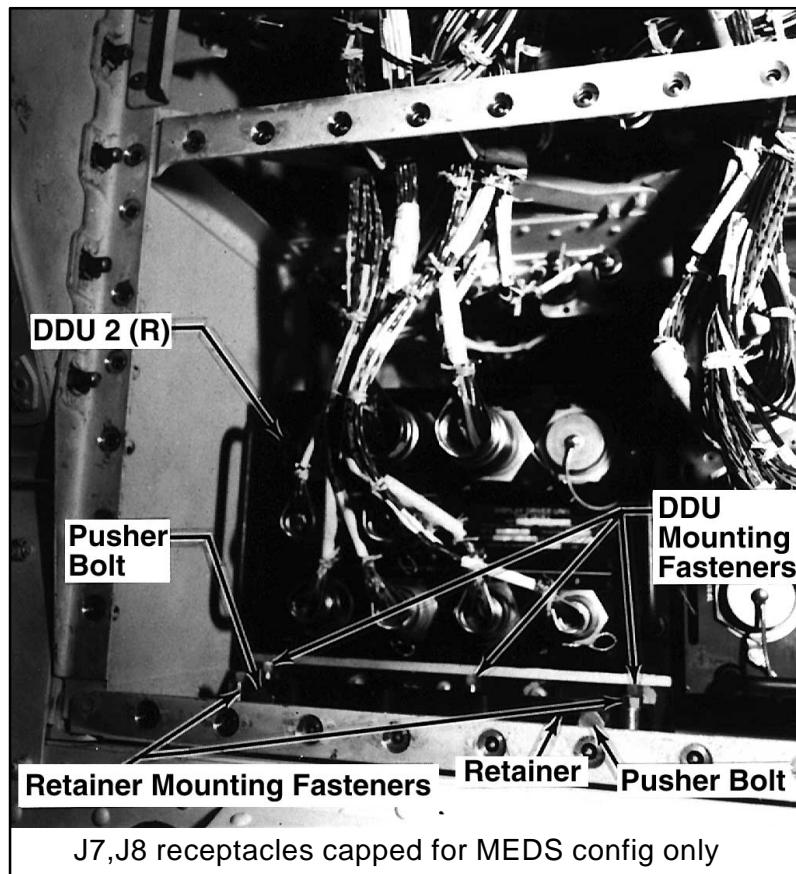
IFM/3,5/GEN E,1

TO INSTALL AFT DDU FWD



38. Install bracket/shim saved from failed fwd DDU onto aft DDU (five screws/washers, #8 Torque Driver). Snug

3,5 |



S81-33603

CAUTION

Use 3/8-in Combination Wrench to install center mounting fastener (to prevent damage to connector above fastener)

39. Install DDU, loosely install mounting fasteners (three)
40. Install retainer (torque fasteners, 100 in-lb)
41. Tighten Pusher Bolts (torque, 40 in-lb). Tighten Jam Nuts (four) snug
42. Hand-tighten DDU mounting fasteners. Due to interference of connectors, only right fastener can be torqued (100 in-lb)

3,5 |

NOTE

Step 43 may be done during(after) filter installation as preferred

43. Install connectors in following sequence (for ease of installation):

NOTE

J7,J8 receptacles capped for MEDS config only

<u>DDU 1 (L), connect</u>		<u>DDU 2 (R), connect</u>	
Cable	DDU	Cable	DDU
30V77W4P274	to J4	30V77W4P284	to J4
	P275 to J5		P285 to J5
	P276 to J6		P286 to J6
	P277 to J7		P287 to J7
	P271 to J1		P281 to J1
	P272 to J2		P282 to J2
	P278 to J8		P288 to J8
	P279 to J9		P289 to J9

FOR DDU 1 (L)

ON DDU 2 (R)

- 44. Reinstall filter-retaining bracket over DDU handle
- 45. Ensure ridges on retainers engage slots on filter ends
- 46. Tighten filter-bracket retaining bolt, snug

ON DDU 1 (L)

- 47. Install filter-retaining brackets (two) over DDU handles. Ensure retaining tabs rotated under handles (one/bracket)
- 48. Tighten filter-bracket retaining bolts snug (one/bracket) (3/8-in Socket)
- 49. Position filters (two). Rotate filter retainers (two/filter) on ends of filter-retaining brackets
- 50. Ensure ridges on retainers engage slots on filter ends. Tighten retaining bolts (two/filter) snug (3/8-in Socket)

3,5 |

FOR DDU 2 (R)

ON DDU 2 (R)

51. Install filter-retaining brackets (two) over DDU handles. Ensure retaining tabs rotate under handles (one/bracket)
52. Tighten filter-bracket retaining bolts snug (one/bracket) (3/8-in Socket)
53. Position filters (two), rotate filter retainers (two/filter) on ends of filter-retaining brackets
54. Ensure ridges on retainers engage slots on filter ends. Tighten retaining bolts (two/filter) snug (3/8-in Socket)

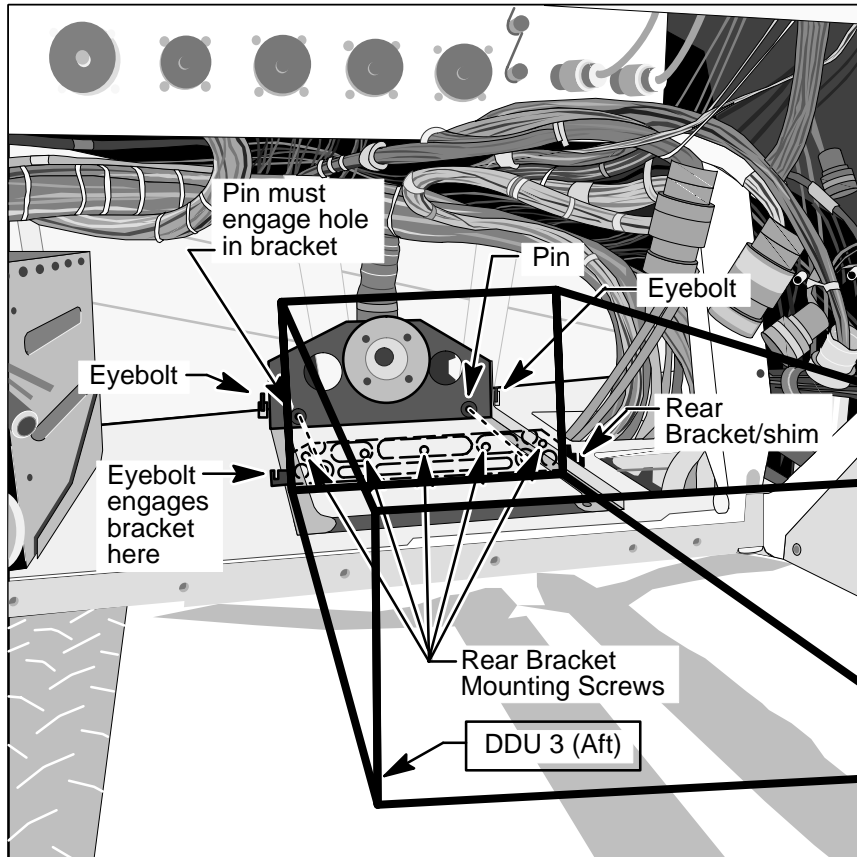
ON DDU 1 (L)

55. Reposition filter onto DDU
56. Rotate filter retainers (tabs) on ends of filter-retaining bracket (two/filter)
57. Ensure ridges on retainers engage slots on filter ends
58. Tighten retaining bolts (two/filter) snug (3/8-in Socket)

3,5 |

TO INSTALL FWD DDU AFT

59. Install bracket/shim saved from good aft DDU onto fwd DDU (five screws/washers, #8 Torque Tip Driver). Snug



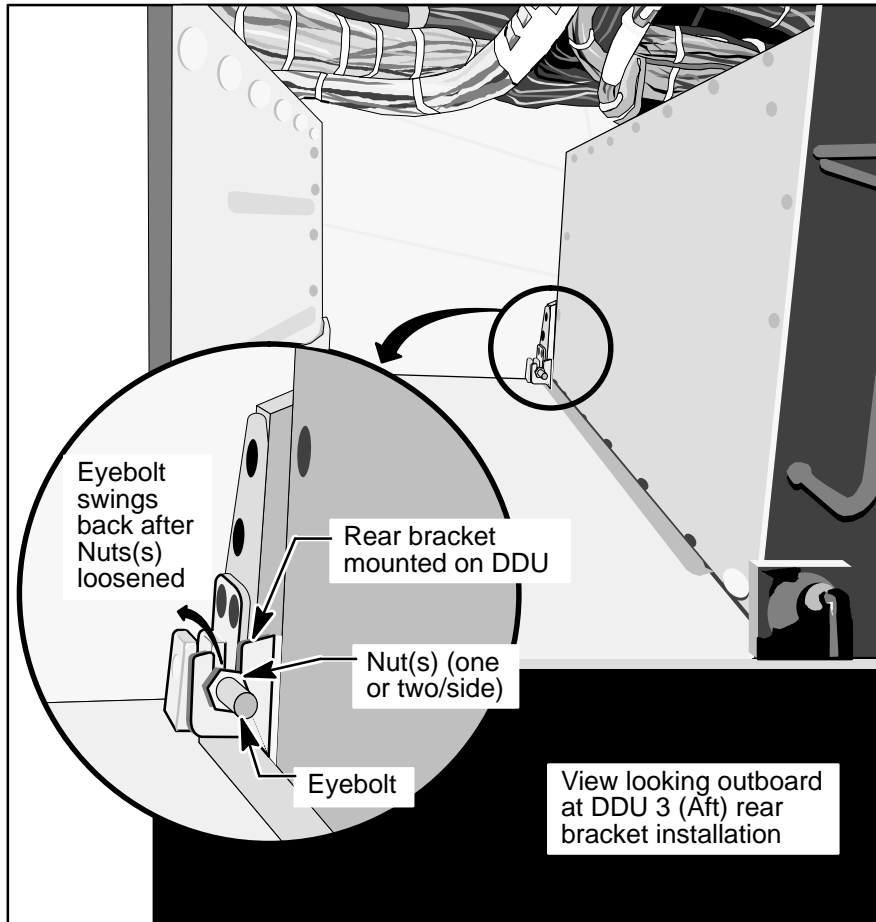
108-KSC-380C-153/6

SD-P12

CAUTION
Use 3/8-in Combination Wrench to install center mounting fastener (to prevent damage to connector above fastener)

60. Install DDU, loosely install mounting fasteners (three)

3,5 |



SD-P10

61. Install eyebolts, tighten nut(s) (torque 30 in-lb)
62. Hand-tighten DDU mounting fasteners. Due to interference of connectors, only right fastener can be torqued (100 in-lb)
63. Install filter-retaining brackets (two) over DDU handles. Ensure retaining tabs rotated under handles (one/bracket)
64. Tighten filter-bracket retaining bolts snug (one/bracket) (3/8-in Socket)

3,5 |

- 65. Position filters (two). Rotate filter retainers (two/filter) on ends of filter-retaining brackets
- 66. Ensure ridges on retainers engage slots on filter ends. Tighten retaining bolts (two/filter) snug (3/8-in Socket)
- 67. If DDU 3 (aft) cable connections not reqd, tape over connector interfaces and secure harnesses to structure. If connections reqd, connect:

NOTE

J7,J8 receptacles capped for
MEDS config only

Cable	DDU
30V77W4P298	to J8
	P299 to J9
	P291 to J1
	P292 to J2
	P294 to J4
	P295 to J5
	P296 to J6
	P297 to J7

- 68. Reinstall flt deck closeout pnl R18 (torque, 30 in-lb)
- 69. Reinstall middeck DDU closeout pnl, and resecure overhead pnl and Debris Trap (torque, 30 in-lb)

**DEU CHANGEOUT AND
CABLE SWAP**

3 hr (DEU 1 or 3,4)
1:30 hr (DEU 2,4)
(15 min C/O)

OBJECTIVE: Replace failed DEU 1,3(2) w/DEU 4. DEU 1(3) will be changed out w/DEU 4, while only cables from DEU 2 will be connected to DEU 4

LOCATION: See FLIGHT DECK (COMPONENT LOCATIONS)

Zone N25 for DEU 1,3

Zone N75 for DEU 2,4

TOOLS REQD:

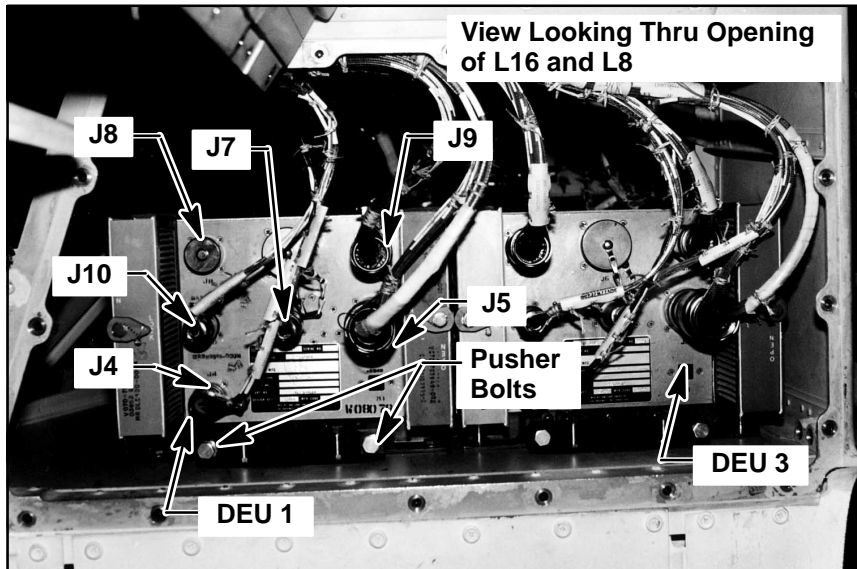
TOOL

Pwr Screwdriver
Gray Tape
Connector Wrench
Ratchet Wrench
Torque Wrench
Driver Handle
3/8-in, 7/16-in, & 1/2-in Sockets
5/32-in Allen Head Driver
1/4-in to 3/8-in Adapter
Wire Cutters
#10 Torque Driver
9/16-in Combination Wrench

TO CHANGE OUT DEU 1(3) W/DEU 4

TO REMOVE DEU 1(3) AND 4

1. On active PASS KYBD, GPC/CRT 01(03) EXEC
✓Big 'X' and 'POLL FAIL'
- C2 2. CRT1(3) PWR – OFF
3. On active PASS KYBD, GPC/CRT 04 EXEC
✓Big 'X' and 'POLL FAIL'
- R11L 4. CRT4 PWR – OFF
5. Remove closeouts L16,R17 (17 fasteners/
closeout, 5/32-in Allen Head Driver), L8,R9
(19 fasteners/closeout, 5/32-in Allen Head
Driver)

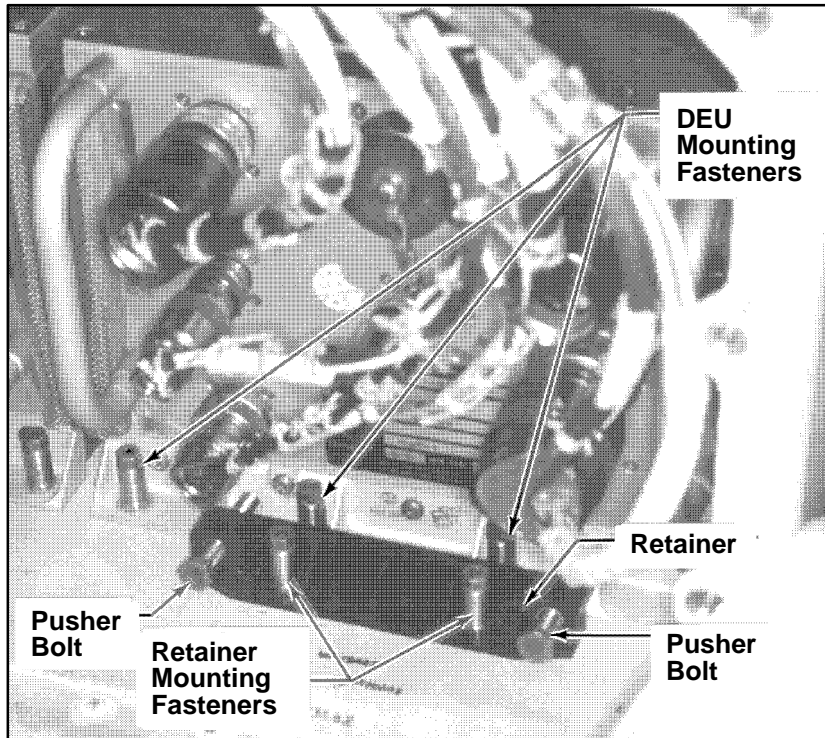


s92-46863

ifm_sD_p22

6. Remove connectors and tape out of way to facilitate DEU removal

For DEU 1 – J4, J5, J7, J9, J10
3 – J4, J5, J7, J8, J9, J10
4 – J4, J5, J7, J8, J10



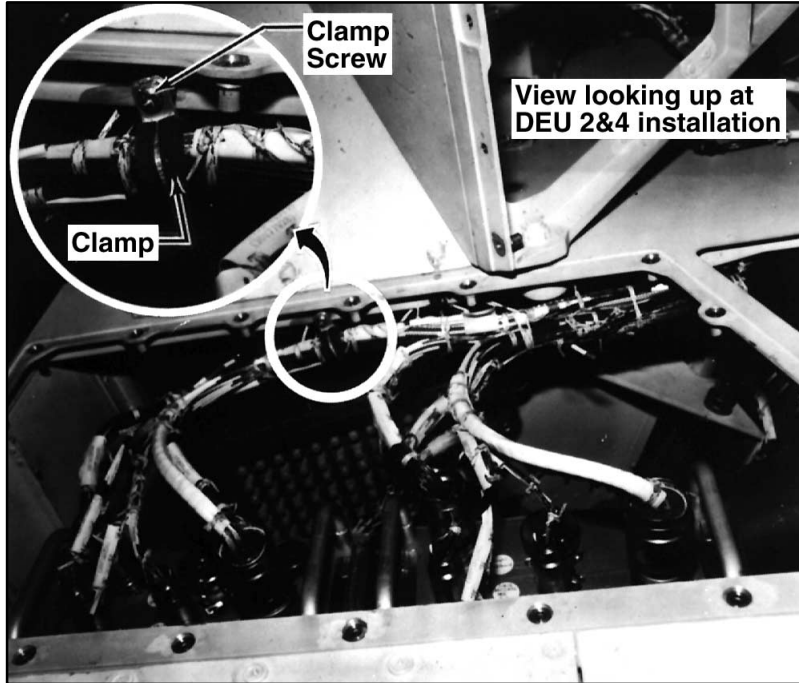
7. Loosen, do not remove four Jam Nuts and two pusher bolts (9/16-in Combination Wrench and 1/2-in Socket)
8. Loosen retainer mounting fasteners (two, 3/8-in Socket), remove retainer
9. Cut, remove filter-retaining bolt safety wire (one/filter)
10. Loosen, do not remove, filter retaining bolts far enough to allow rotation of guide tabs to open position (one/filter)
11. Remove filters (two/DEU)
12. Loosen mounting fasteners(bolts) (four, 3/8-in(7/16-in) Socket); remove DEU 1(3) and mark failed unit w/Gray Tape
13. Repeat steps 6-12 for DEU 4

TO INSTALL DEU 4 AND 1(3)

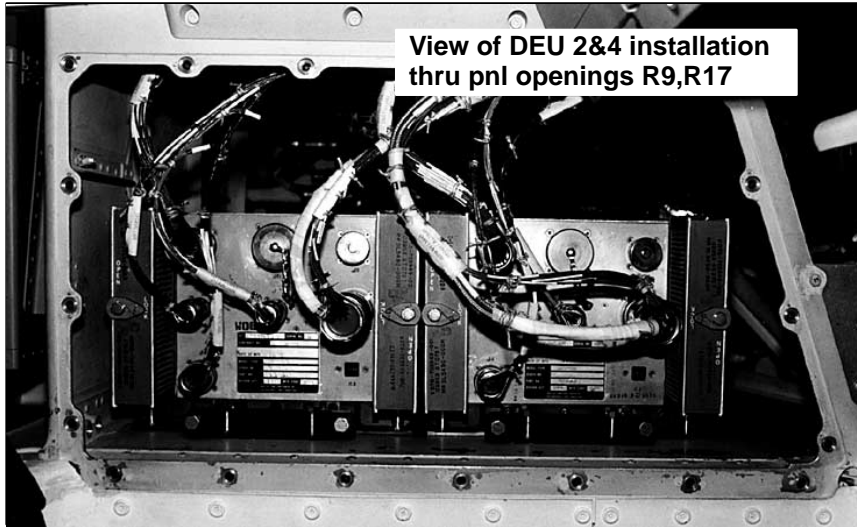
14. Install DEU 4 into DEU 1(3) position and loosely install mounting fasteners(bolts)
15. Install retainer (torque fasteners, 100 in-lb)
16. Tighten Pusher Bolts (torque, 40 in-lb). Tighten Jam Nuts snug
17. Tighten DEU mounting fasteners(bolts) (torque, 100 in-lb)
18. ✓ DEU filter-guide tab in open position
19. Position filter over DEU handle so alignment tabs protrude into DEU air inlet
20. Rotate guide tab to Lock position; ensure retainer engages DEU handle
21. Tighten filter-retaining bolt snug
22. Install connectors:
 - For DEU 1 location, connect
 - Cable 30V77W1P234 to J4
 - W21P235 to J5
 - W5P237 to J7
 - W23P239 to J9
 - W5P230 to J10
 - For DEU 3 location, connect
 - Cable 30V77W1P254 to J4
 - W25P255 to J5
 - W9P257 to J7
 - W26P258 to J8
 - W24P259 to J9
 - W7P250 to J10
23. Repeat steps 14–21 for installation of DEU 1(3) into DEU 4 position
24. Contact MCC if reinstallation of connectors desired; otherwise, tape over connector interfaces and secure harnesses to structure
25. Install closeouts L8,L16, then L9,L17 (torque fasteners, 30 in-lb)
26. Stow tools

FOR DEU 2 TO 4 CABLE SWAP

27. Remove closeouts R17,R9 (seventeen and nineteen fasteners, 5/32-in Allen Head Driver)



28. Remove cable clamp from structure (one screw, #10 Torque Driver); remove clamp from wire bundle. Stow clamp and screw



s92-46876

ifm_sd_p26

29. Remove cables from DEU 4. Tape over face of connectors and tape out of way
30. Remove cables from DEU 2. Cut wire ties as reqd to allow cables to be connected to DEU 4 w/o stretch/strain
31. Connect cables:
 - 30V77W2P244 from DEU 2 to J4 of DEU 4
 - W20P245 from DEU 2 to J5 of DEU 4
 - W7P247 from DEU 2 to J7 of DEU 4
 - W22P248 from DEU 2 to J8 of DEU 4
 - W6P240 from DEU 2 to J10 of DEU 4

DEU CHECKOUT

NOTE

Verify CRT 1(2,3) not assigned to BFS via BFC CRT DISPLAY/SELECT sw. If unit does not check out properly, do not proceed. If discrepancy appears to be interfering w/GPC functions, turn unit OFF. ✓MCC for further analysis

- C2
32. GPC/CRT 0/1(2,3) EXEC (on active PASS KYBD)
 CRT1(2,3) PWR – ON
 ✓Following appears on CRT within 30 sec (adjust
 BRT on CRT if reqd):
 Time Fields (upper RH corner)
 Big 'X'
 'POLL FAIL' (lower RH corner)
 33. Keyboard Interface Test (if DEU 3, test both
 kybds):
 L(R) CRT SEL – 1(2,3)
 ITEM B EXEC (OTP BITE status display)
 If BITE words other than normal
 (8200, 8000, 0000), record BITE words

 Left KYBD: _____
 Right KYBD: _____
 34. ITEM C EXEC (Reset BITE words)
 ✓Normal BITE words:
 8200 8000 0000
 35. ✓Individual keystrokes appear on SPL except as
 noted:

ITEM 1 + <u>2</u> <u>3</u> <u>4</u> <u>5</u> . <u>6</u> <u>7</u> <u>8</u>	OPS
ITEM 9 – <u>A</u> <u>B</u> <u>C</u> <u>D</u> <u>E</u> <u>F</u> EXEC	SPEC 0 PRO
FAULT SUMM	RESUME
SYS SUMM	ACK
	(no SPL interface)
GPC/CRT	MSG RESET
	(no SPL interface)
I/O RESET	CLEAR
	(clears SPL)
 36. ✓Normal BITE words:
 8200 8000 0000
 37. ITEM E EXEC (deselect OTP)
 38. ITEM A EXEC (reinitializes DEU)

39. Assign CRT 1(2,3) to PASS GPC:
 C2 Select desired MAJ FUNC
 GPC/CRT desired GPC/1(2,3) EXEC
 (on active PASS KYBD)
 ✓OPS display appears on CRT
 If any other display appears,
 RESUME (✓OPS display appears on CRT)
 FAULT (✓FAULT display appears)
 RESUME (✓OPS display appears on CRT)
 C2 CRT1(2,3) MAJ FUNC – GNC, SM, PL (✓proper
 response for each sw position)
 L(R) CRT SEL – 3(1,2) (✓proper kybd
 assignment)
 F7 Reset DEU/DU BITE flags on CRT 1(2,3) (if
 reqd)
40. Install closeouts R9,R17 (torque fasteners,
 30 in-lb)
41. Stow tools

Sections E & F Intentionally Omitted
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IFM PROCEDURES

PAGE

Section G Intentionally Omitted

HATCH
INNER JAMMED ACTUATOR/LATCH H-1
HINGE H-2
SIDE JAMMED ACTUATOR H-3

HUD
HEADS UP DISPLAY ELECTRONIC (HUDE) UNIT
CHANGEOUT H-5
PILOT DISPLAY UNIT (PDU) CHANGEOUT H-7

IMU CONTINGENCY COOLING I-1

KEYBOARD CHANGEOUT K-1
KEY CHANGEOUT K-11
KEY PBI CHANGEOUT (Orbital DAP Type) K-14

KU-BAND ANTENNA
CONTINGENCY DEPLOY/STOW – FAILED
DEPLOY/STOW SW K-16
CONTINGENCY STOW – EA1 ALTERNATE PWR K-25
CONTINGENCY STOW – W/EVA ANTENNA GIMBAL
ALIGNMENT K-28

LIGHT BULB CHANGEOUT L-1
LOCKERS – MISALIGNED (MOUNTING SCREWS
WILL NOT START) L-5

PROCEDURES
G THRU L

PROCEDURES
G THRU L

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HATCH: INNER JAMMED ACTUATOR/LATCH (30 min)

OBJECTIVE: Close Airlock Inner Hatch when Actuator(Latch) jammed in open position

NOTE

This procedure would be performed only for 8(10) psi cabin

LOCATION: Middeck; Airlock Inner Hatch

TOOLS REQD:

TOOL PBI Braided Cord

NOTE

Do not repressurize cabin until ready to close hatch

- MA49N
1. Equal vlv (two) – OFF
 2. Position hatch, hold closed while repressurizing cabin
 3. Restrain hatch w/PBI Braided Cord (three) connected and looped thru hatch handholds and Interdeck Access Ladder
 4. Prior to entry:
Equal vlv (one) – NORM
When $\Delta P = 2.5 \pm 0.5$ psid, then
✓Equal vlv (two) – OFF

HATCH: INNER JAMMED HINGE

(15 min)

OBJECTIVE: Close Airlock Inner Hatch when hinge mechanism jammed

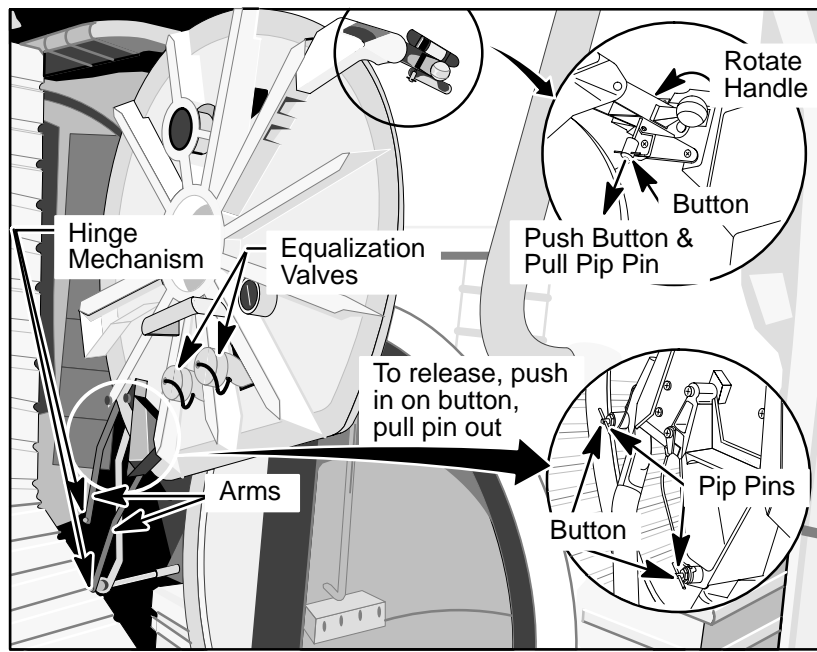
NOTE

When hatch released from arms, it must be manually positioned over airlock opening and latched closed normally

LOCATION: Middeck; Airlock Inner Hatch

TOOLS REQD:

TOOL Gray Tape



1. Release "Hold-Open Latch" pull Pip Pin, then rotate handle
2. Remove Pip Pins (two) from arms of hinge mechanism to release hatch. Reinstall pins into arms
3. Position hatch, hold in place and latch closed normally
4. Push in arms/hinge mechanism. Tape in place
5. Equal vlv (two) – as reqd
6. Stow tools

HATCH: SIDE JAMMED ACTUATOR

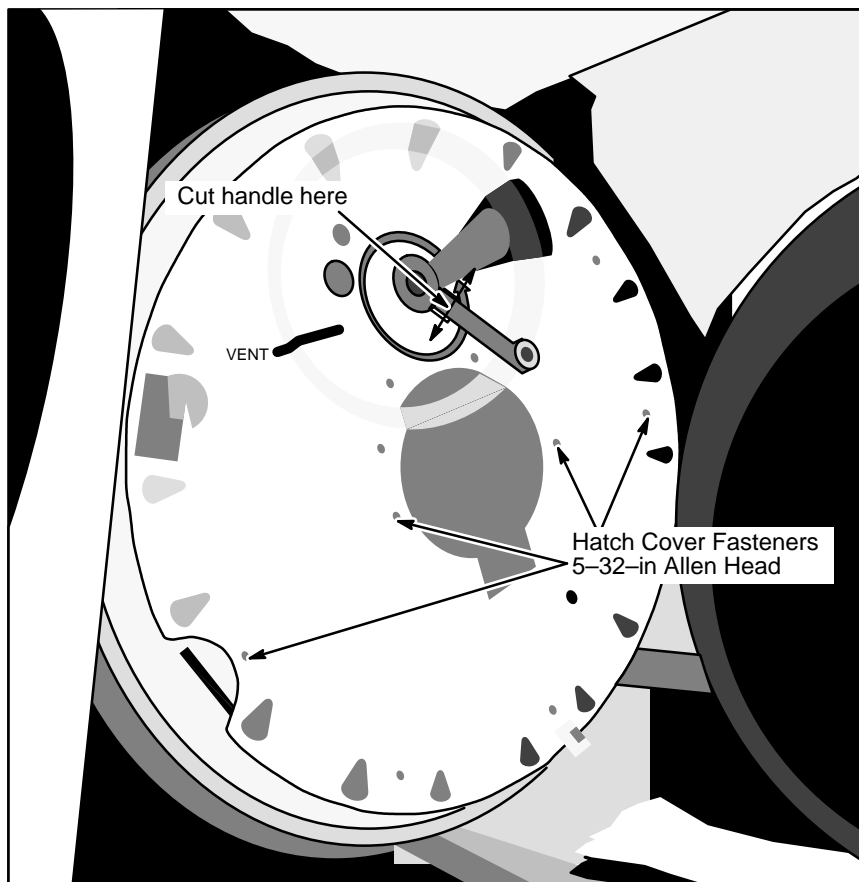
(45 min)

OBJECTIVE: Open cabin Side Hatch if actuator mechanism has jammed (Post Landing)

LOCATION: Middeck; Side Hatch

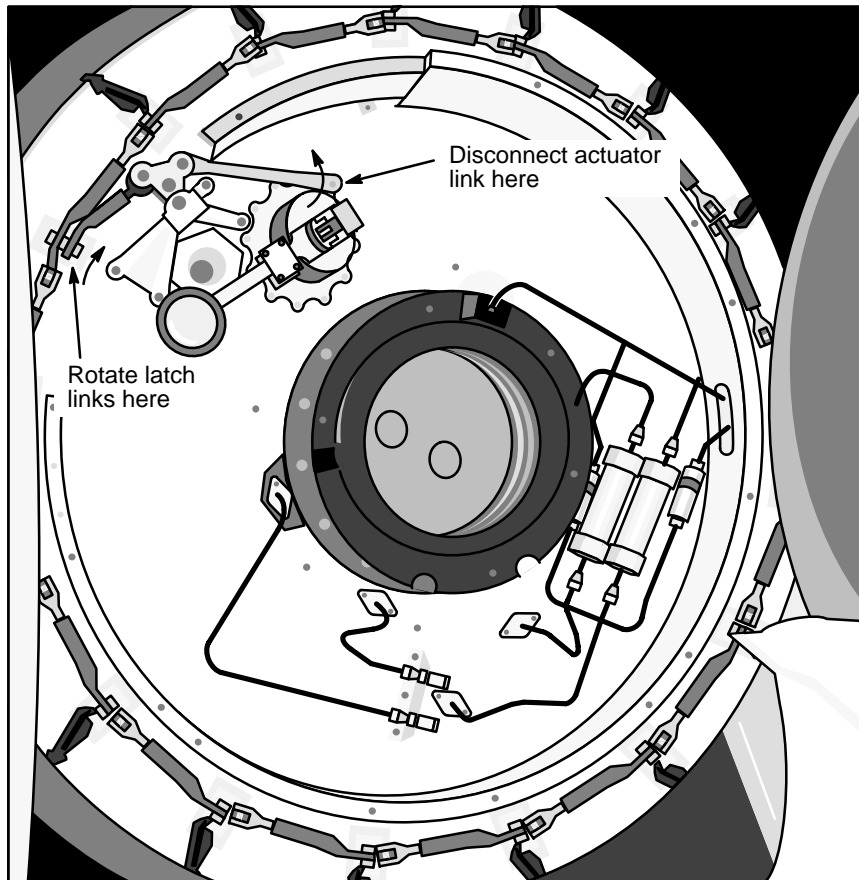
TOOLS REQD:

TOOL 10-in Crescent Wrench
Ratchet Wrench
Driver Handle
5/32-in Allen Head Driver
#10 Torque Driver
5/16-in Combination Wrench
Bone Saw



ifm_sh_p4

1. Cut actuator handle w/Bone Saw where shown (see photo on previous pg)
2. Loosen Hatch Cover fasteners (seventeen, 5/32-in Allen Head Driver)



3. Remove and stow cover
4. Disconnect Actuator Link where shown (see dwg) (#10 Torque Driver and 5/16-in Combination Wrench)
5. Manually (unlock) rotate latch links using Crescent Wrench on exposed nut (see dwg)
6. Open hatch. Stow tools

**HUD: HEADS UP DISPLAY ELECTRONIC
(HUDE) UNIT CHANGEOUT**

(1:30 hr)

OBJECTIVE: Provide instructions for changing out failed HUDE 1(2) w/operational unit, or spare HUDE if flown

LOCATION: See AV BAY 3B: shelf 1 for HUDE 2 and shelf 4 for HUDE 1 (COMPONENT LOCATIONS). "If flown" location of spare HUDE may vary

TOOLS REQD:

TOOL	Gray Tape Connector Wrench Torque Wrench Driver Handle 3/8-in Socket 5/32-in Allen Head Driver
CHCK	Coldplate Protection Cover (small)

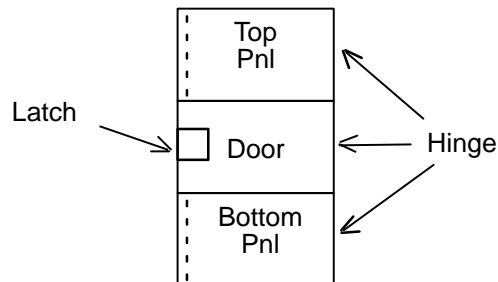
TO REMOVE HUDE

- F3 1. L(R) HUD PWR – OFF

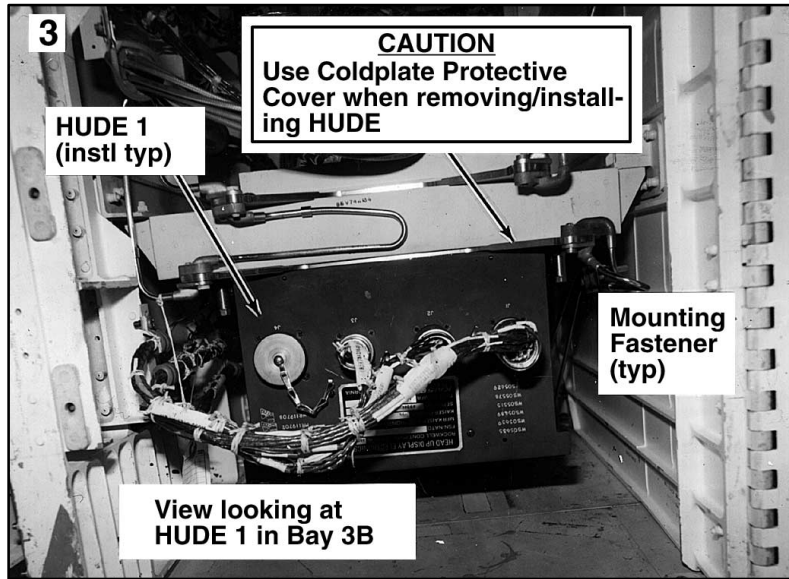
NOTE

Center door must be opened before lower pnl

2. Open AV BAY 3B, hinged access pnls, top and bottom (five fasteners/door, 5/32-in Allen Head Driver)



3. Remove connectors J1,J2,J3 from HUDE(s) as reqd
4. Loosen HUDE mounting fasteners (twelve, 3/8-in Socket)
5. Slide Coldplate Protective Cover between coldplate and HUDE. Remove HUDE w/Coldplate Protective Cover, mark failed unit w/Gray Tape



108-KSC-382C-2974/10

TO INSTALL HUDE

6. Place HUDE 1(2) or spare w/Coldplate Protective Cover into desired location, remove cover, tighten fasteners (torque, 70 in-lb)
7. Install failed HUDE into vacated spot (torque fasteners, 70 in-lb)
8. Install connectors –
 - For HUDE 1 (bottom shelf) connect:
 - Cable 85V77W1P41 to J1
 - P43 to J2
 - P45 to J3
 - For HUDE 2 (top shelf) connect:
 - Cable 85V77W1P40 to J1
 - P42 to J2
 - P44 to J3
9. Close AV BAY 3B access pnls (torque fasteners, 30 in-lb)
10. Stow tools

HUD: PILOT DISPLAY UNIT (PDU) CHANGEOUT (1:30 hr)

OBJECTIVE: Provide instructions for changing out failed CDR(PLT) PDU w/operational unit, or spare if flown

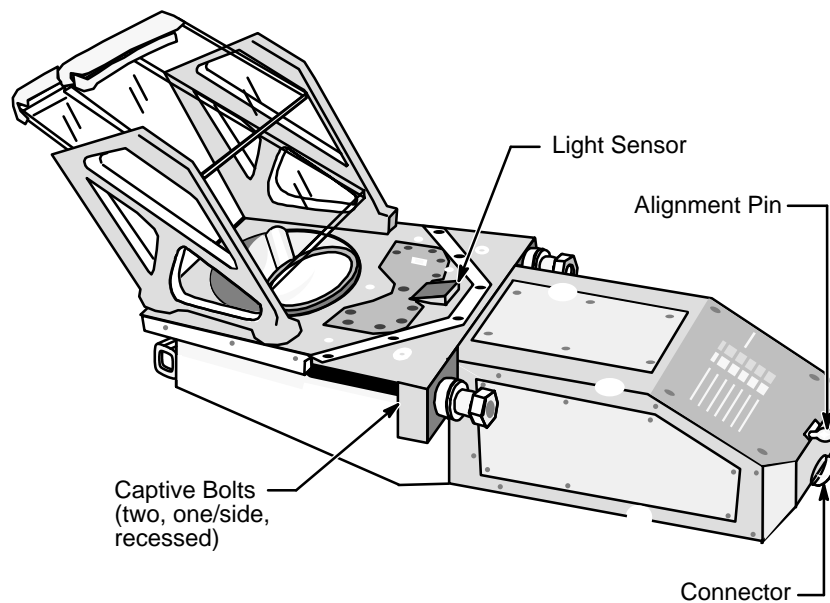
LOCATION: FLIGHT DECK, F6, F8. 'If flown' location of spare PDU will vary

TOOLS REQD:

TOOL

- Gray Tape
- Inspection Mirror
- Torque Wrench
- 7/16-in Socket
- Ratchet Wrench
- 1/4-in to 3/8-in Adapter
- 7/64-in Allen Driver
- 10-in Extension

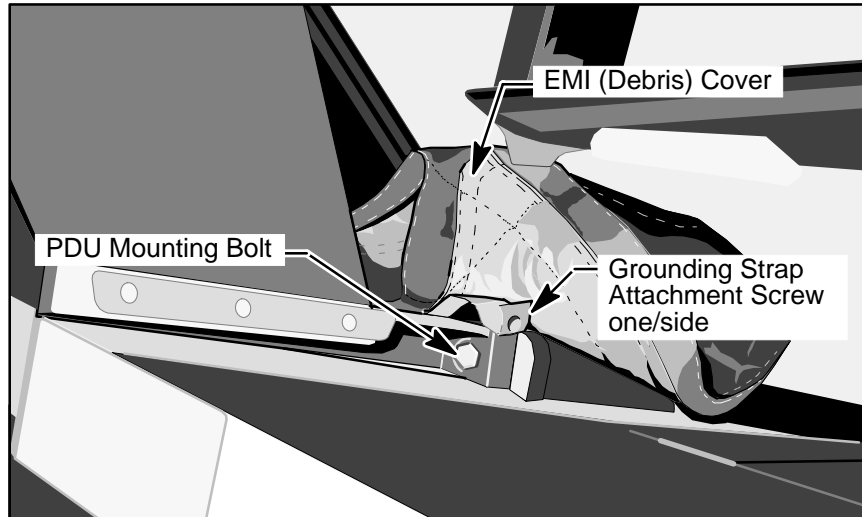
TO REMOVE PDUs



NOTE

Steps 1-8 for both PDUs

- | | |
|-------|--|
| F3 | 1. L(R) HUD PWR – OFF |
| W2,W5 | 2. Fold W2,W5 handholds to stow position |
| W3,W4 | 3. Cover Windows W3,W4 w/shades |
| | 4. Lift EMI cover to access mounting fasteners,
ground strap and connectors |



108-KSC-382C-3855/7

SHP9

NOTE

PDU ground strap acts as spring. Do not allow attachment screw (not captive) to fly loose when removing

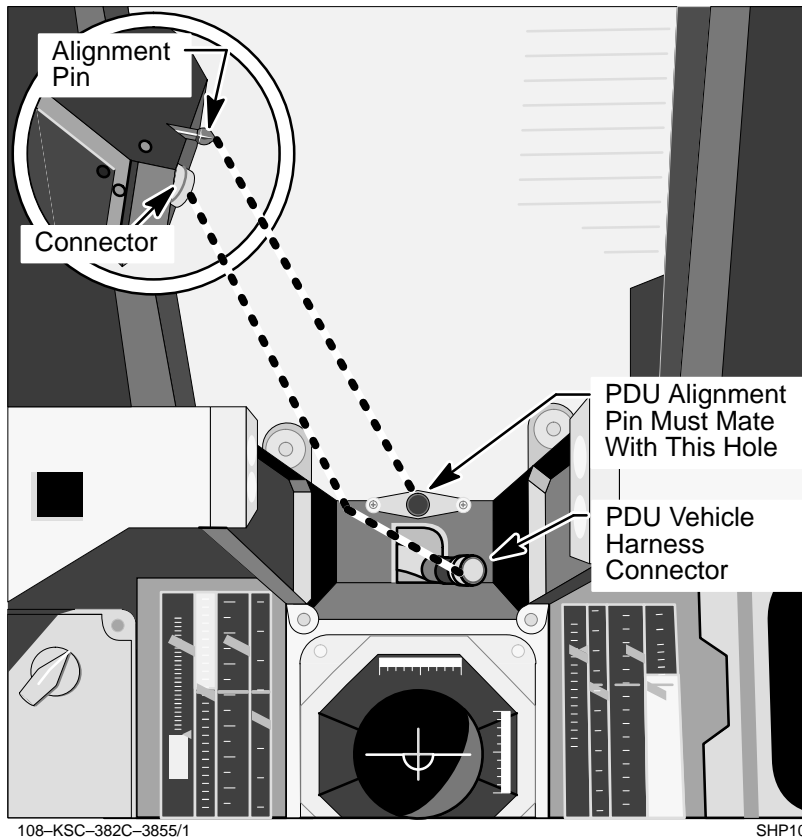
5. Disconnect ground straps (two) from glareshield
For OV102:
| One screw,washer/side, #6 Torque Tip
For OV103, subs:
One screw,washer/side, 7/64-in Allen Head
Driver

NOTE

Due to limited space, it will be necessary to alternate sides while removing 7/16-in Fasteners (two turns Port, two turns Stbd, etc)

6. Remove mounting fasteners (one/side, 7/16-in Socket)
7. Slide unit out ~5-in and remove connector
8. Remove PDU, mark failed unit w/Gray Tape

TO INSTALL PDUs



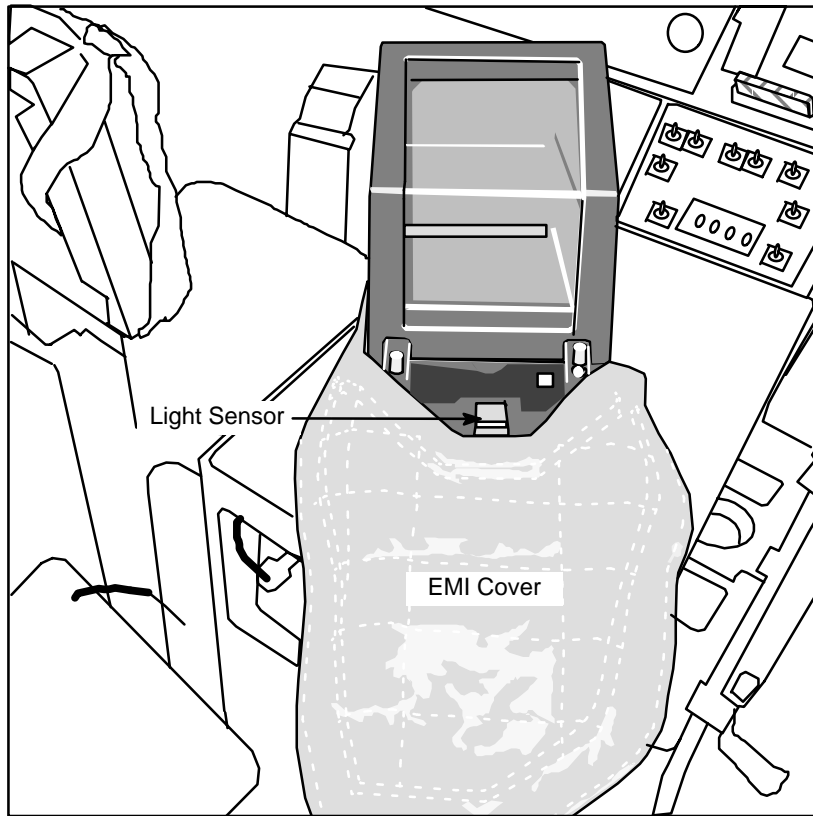
WARNING

When installing PDU, ensure that alignment pin at fwd end of unit mates w/hole in structure

NOTE

Steps 9–12 for both PDUs

9. Place unit in approx position, install connector then slide fwd making certain that alignment pin at fwd end mates w/alignment hole in mounting structure (Inspection Mirror)
10. Install mounting fasteners (torque, 45 in-lb)



IFMSHP11A

11. Install ground straps (one screw, washer/side), tighten screws snug

CAUTION

Ensure EMI Cover does not obstruct light sensor. PDU will not work properly if light sensor blocked

12. Reinstall EMI Cover, ensure Velcro secure around light sensor
13. Install failed PDU into vacated position
14. Stow tools

IMU CONTINGENCY COOLING

(1:00 hr)

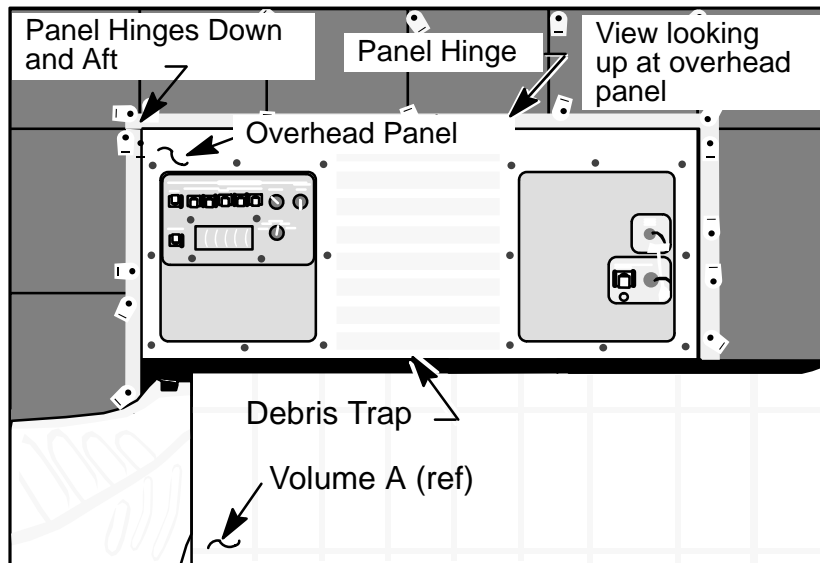
OBJECTIVE: Provide ambient air cooling to IMUs using Vacuum Cleaner in place of IMU fan. This procedure will only be accomplished if all three IMU fans have failed

LOCATION: IMU hoses are above and fwd of middeck overhead pnl containing MO42F,MO58F

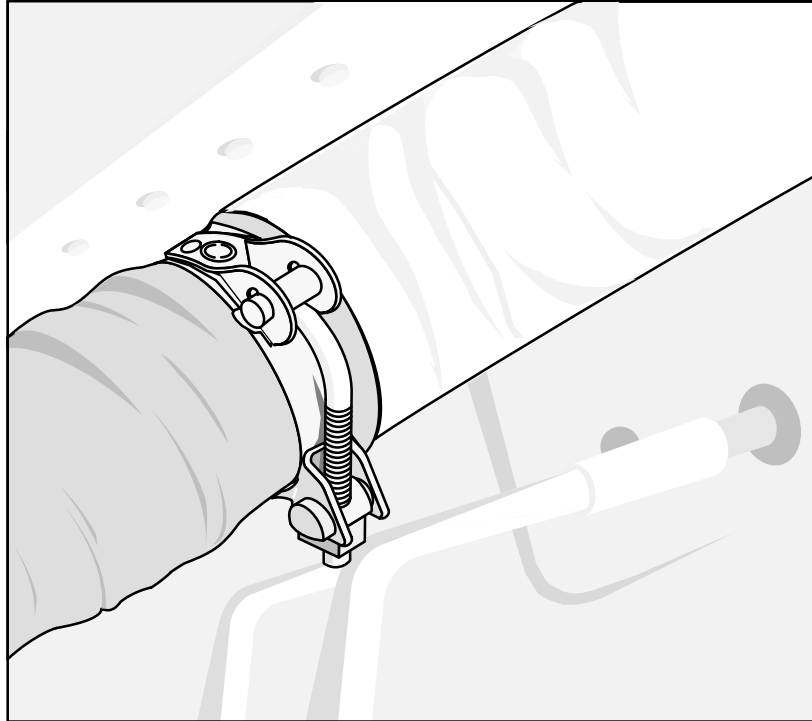
TOOLS REQD:

TOOL	Gray Tape
	3/8-in Deepwell Socket
	Ratchet Wrench
	1/4-in to 3/8-in Adapter
	3/8-in Combination Wrench
VAC	Vacuum Cleaner and Hose
MISC	Flight Data File

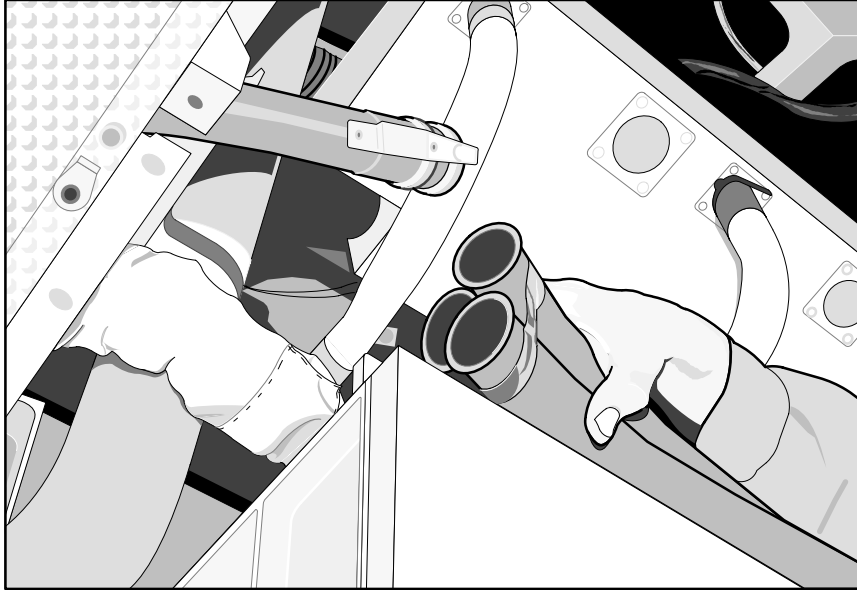
1. Release Debris Trap and open overhead panel containing MO42F,MO58F



2. Loosen IMU outlet hose clamps (two above, one left of IMU Muffler) at outlet manifold (3/8-in Deepwell Socket). Remove clamps (not captive)



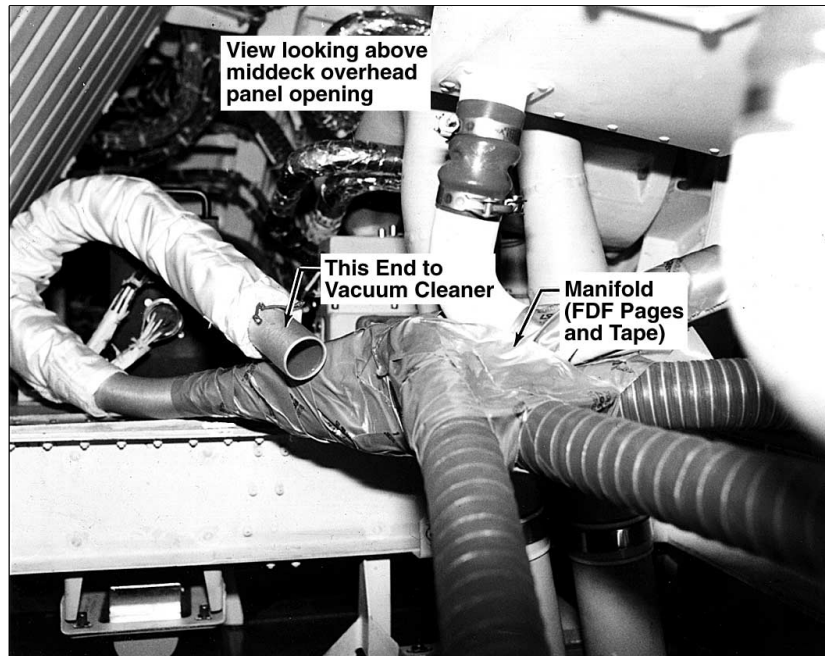
3. Pull IMU outlet hoses (three) from IMU manifold (two above, one left of IMU Muffler), bring hose ends together near Vol A (MF57A) and in close relationship to Vacuum Cleaner Hose end



SIP3

CAUTION
Do not crush flexible hose ends
restricting air flow to IMUs

4. Build manifold using Flight Data File and Gray Tape as shown



5. Secure Vacuum Cleaner to top of Vol A (MF57A) w/Gray Tape. Connect Vacuum Cleaner Hose to Vacuum
- MO52J 6. ✓ AC UTIL PWR AC1 – OFF
7. Connect Vacuum Cleaner cable to AC1 outlet
8. AC UTIL PWR AC1 – ON
9. VAC CLEANER – ON
10. Install middeck overhead pnl and Debris Trap w/Gray Tape
11. Stow tools and clamps

Section J
Intentionally
Omitted

KEYBOARD CHANGEOUT

(2:00 hr)(15 min C/O)

OBJECTIVE: Replace failed fwd CRT Keyboard w/aft Keyboard

NOTE

This procedure will not be performed for failure of individual key

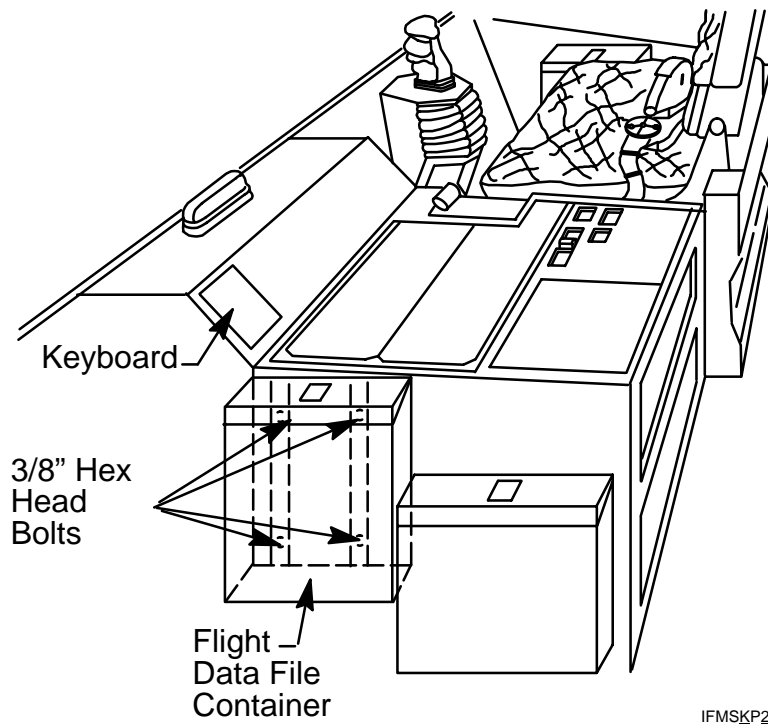
LOCATION: Fwd Keyboards – pnl C2
Aft Keyboards – pnl R11L

TOOLS REQD:

TOOL Gray Tape
3/8-in Deepwell Socket
Ratchet Wrench
1/4-in to 3/8-in Adapter
Torque Wrench
Driver Handle
5/32-in Allen Head Driver
#6 Torque Driver
#10 Torque Driver

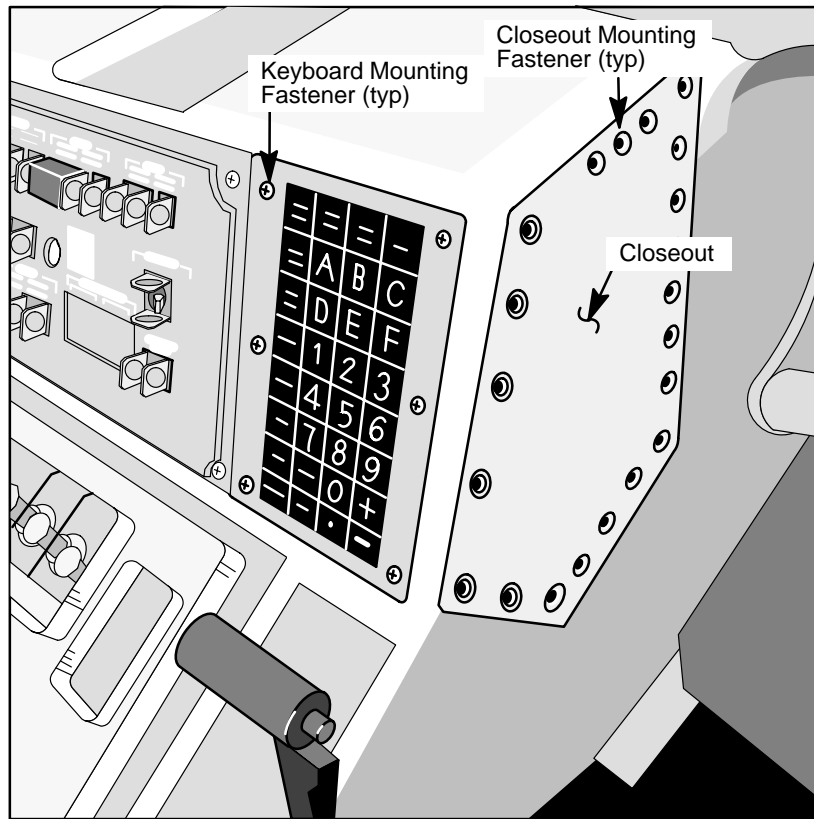
TO REMOVE FWD KEYBOARD

1. On active PASS KYBD, GPC/CRT 03/01,02 EXEC as reqd
 2. ✓ Big 'X' and 'POLL FAIL'
For left Keyboard
 - 3. cb AC3 Φ B INST L/CTR – op
 - 4. CRT1,3 PWR (two) – OFFFor right Keyboard
 - 5. cb AC1 Φ A INST R – op
 - 6. CRT2,3 PWR (two) – OFF
- L4:R
C2
- L4:R
C2



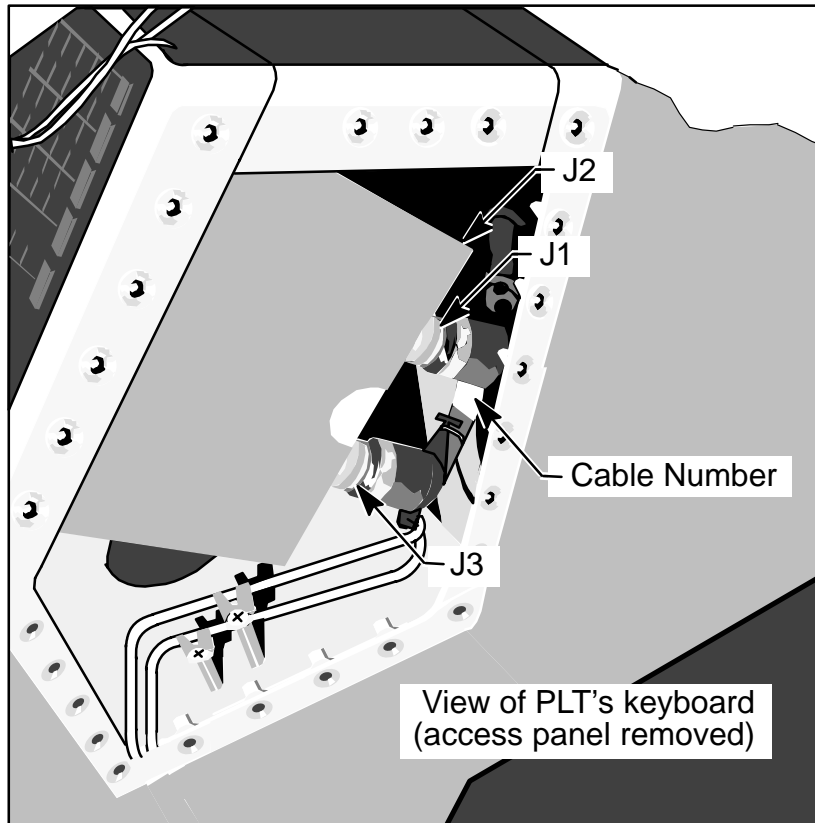
IFMSKP2

7. FDF Container blocks access to CDR's station access pnl, remove using 3/8-in Deepwell Socket



ifm_sK_p3

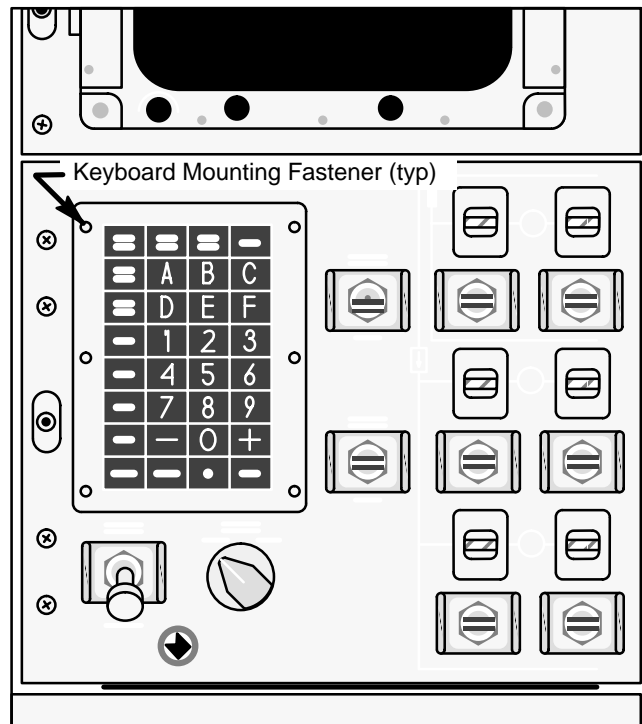
8. Remove closeout (PLT's shown) (twenty-six, 5/32-in Allen Head Driver)
9. Loosen Keyboard mounting fasteners (six, #6 Torque Driver)



ifm_s4_p8

10. Disconnect cables
 - For PLT Keyboard, disconnect:
 - Cable 35V77W4P4 from J1
 - W1P5 from J2
 - W2P6 from J3
 - For CDR Keyboard, disconnect:
 - Cable 35V77W3P1 from J1
 - W1P2 from J2
 - W5P3 from J3

11. Remove failed Keyboard and mark w/tape



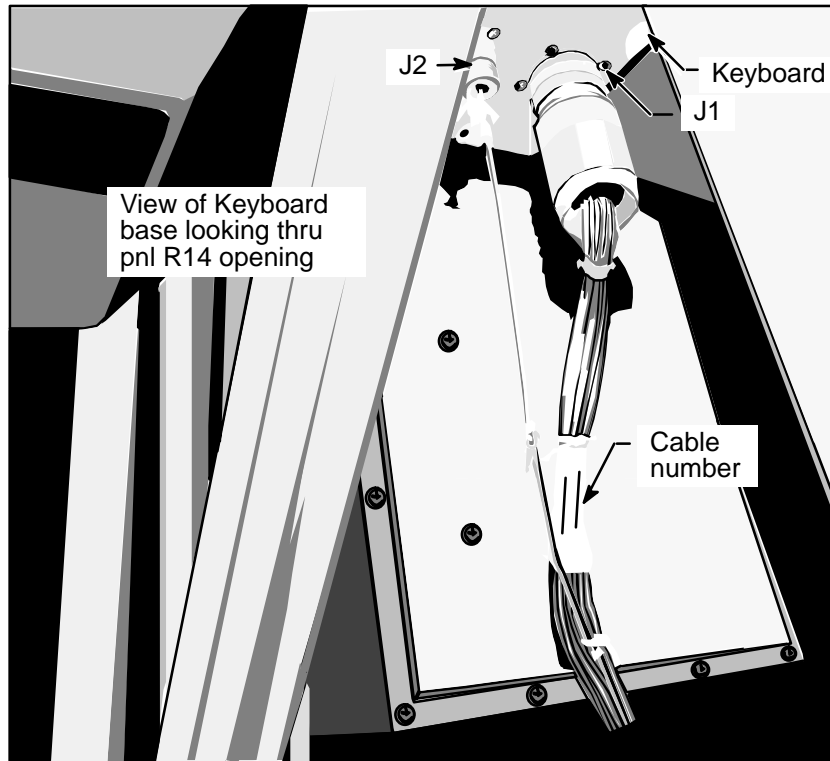
TO REMOVE AFT KEYBOARD

- L4:Q
R11L
12. On active PASS KYBD, GPC/CRT 04 EXEC
 13. ✓ Big 'X' and 'POLL FAIL'
 14. cb AC3 ϕ B LTG PNL MS – op
 15. CRT4 PWR – OFF

NOTE

Aft Keyboard connectors may be accessed thru pnls R12(R17,R18) depending on aft deck config

16. Remove fasteners from R17(R18) (5/32-in Allen Head Driver) or screws from R12 (#10 Torque Driver) (screws not captive, secure w/tape)
17. Loosen Keyboard mounting fasteners (six, #6 Torque Driver)



18. Disconnect cables
Cable 30V77W28P66 from J1
W2P67 from J2
19. Remove Keyboard

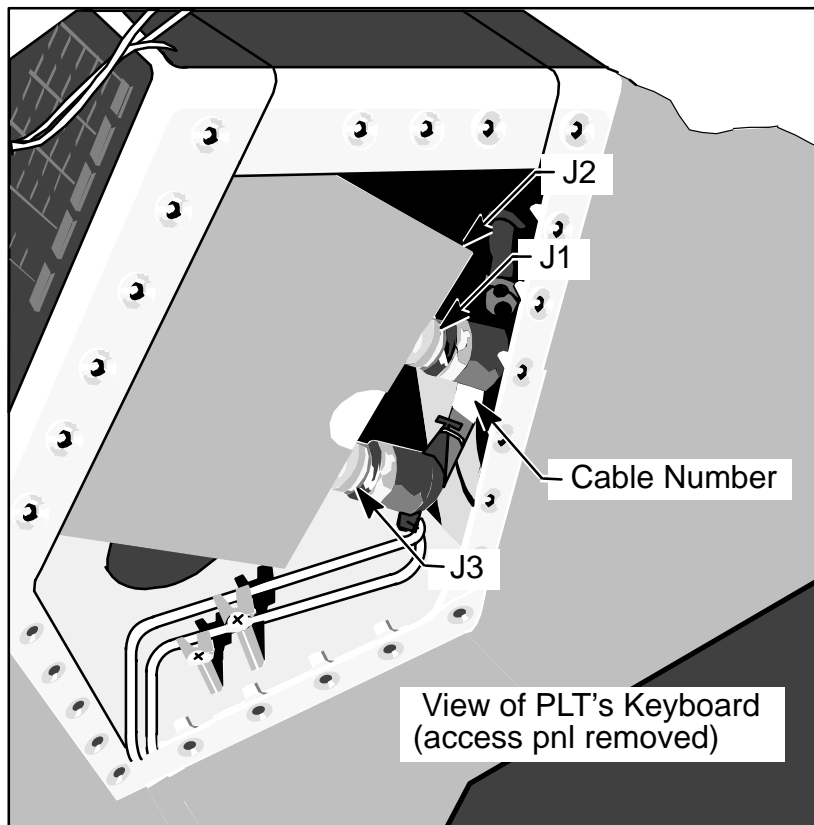
TO INSTALL AFT KEYBOARD FWD

20. Remove protective cap from J3 of aft Keyboard and install it on J3 of fwd Keyboard

NOTE

Fasteners on aft Keyboard longer than those on fwd, thus preventing snug fit

21. To prevent aft Keyboard from vibrating during entry, shim w/Gray Tape as reqd



ifm_s4_p8

22. Slide Keyboard into pnl and install connectors

For PLT Keyboard location, connect:

Cable 30V77W4P4 to J1

W1P5 to J2

W2P6 to J3

For CDR Keyboard location, connect:

Cable 30V77W3P1 to J1

W1P2 to J2

W5P3 to J3

23. Tighten Keyboard fasteners (six) snug
24. Install closeout (torque, 30 in-lb)

TO INSTALL FWD KEYBOARD AFT

25. Tape over connector interfaces. Tape harnesses to structure
26. Slide Keyboard into pnl, snug fasteners
27. Install R12(R17,R18) (torque, 30 in-lb)
28. Stow tools, tape

KEYBOARD CHECKOUT

NOTE

Verify affected CRTs not assigned to BFS via BFC CRT DISP/SEL sw. If CRTs do not show anticipated indications, do not proceed. ✓MCC for further analysis

29. IF LEFT KEYBOARD CHANGED OUT:
 - a. cb AC3 ϕ B INST L/CTR – cl
 - b. GPC/CRT 03 EXEC (on active PASS KYBD)
 - c. CRT3 PWR – ON
 - ✓Following appears on CRT within 30 sec (adjust BRT on CRT if reqd):
 - Time Fields (upper RH corner)
 - Big 'X'
 - 'POLL FAIL' (lower RH corner)
 - d. L CRT SEL – 3
 - e. Perform KEYSTROKE CHECKOUT (step 31)

- C2
 - f. Assign CRT as reqd:
Select desired MAJ FUNC
GPC/CRT desired GPC/3 EXEC (on active PASS KYBD)
 - g. GPC/CRT 01 EXEC (on active PASS KYBD)
 - h. CRT1 PWR – ON
 - ✓Following appears on CRT within 30 sec (adjust BRT on CRT if reqd):
Time Fields (upper RH corner)
Big 'X'
'POLL FAIL' (lower RH corner)
 - i. L CRT SEL – 1
 - j. Perform KEYSTROKE CHECKOUT (step 31)
 - k. Assign CRT as reqd:
Select desired MAJ FUNC
GPC/CRT desired GPC/1 EXEC (on active PASS KYBD)
- F7
 - l. Reset DEU/DU BITE flags on CRTs 1,3 (if reqd)

30. IF RIGHT KEYBOARD CHANGED OUT:

- L4:R
 - a. cb AC1 ϕ A INST R – cl
- C2
 - b. GPC/CRT 03 EXEC (on active PASS KYBD)
 - c. CRT3 PWR – ON
 - ✓Following appears on CRT within 30 sec (adjust BRT on CRT if reqd):
Time Fields (upper RH corner)
Big 'X'
'POLL FAIL' (lower RH corner)
 - d. R CRT SEL – 3
 - e. Perform KEYSTROKE CHECKOUT (step 31)
 - f. Assign CRT as reqd:
Select desired MAJ FUNC
GPC/CRT desired GPC/3 EXEC (on active PASS KYBD)
 - g. GPC/CRT 02 EXEC (on active PASS KYBD)
 - h. CRT2 PWR – ON
 - ✓Following appears on CRT within 30 sec (adjust BRT on CRT if reqd):
Time Fields (upper RH corner)
Big 'X'
'POLL FAIL' (lower RH corner)
 - i. R CRT SEL – 2

- j. Perform KEYSTROKE CHECKOUT (step 31)
- k. Assign CRT as reqd:
 - C2 Select desired MAJ FUNC
 - GPC/CRT desired GPC/2 EXEC (on active PASS KYBD)
- F7 l. Reset DEU/DU BITE flags on CRTs 2,3 (if reqd)

31. KEYSTROKE CHECKOUT:

- a. ITEM B EXEC (OTP BITE status display)
If BITE words other than normal (8200, 8000, 0000), record BITE words

CRT 3: _____

CRT 1/2: _____

- b. ITEM C EXEC (Reset BITE words)
 - ✓ Normal BITE words:
8200 8000 0000
- c. ✓ Individual keystrokes appear on SPL except as noted:

ITEM 1 +2 3 4 5 . 6 7 8	OPS
ITEM 9 -A B C D E F EXEC	SPEC 0 PRO
FAULT SUMM	RESUME
SYS SUMM	ACK
	(no SPL interface)
GPC/CRT	MSG RESET
	(no SPL interface)
I/O RESET	CLEAR
	(clears SPL)

- d. ✓ Normal BITE words:
8200 8000 0000
- e. ITEM E EXEC (deselect OTP)
- f. ITEM A EXEC (reinitializes DEU)

KEYBOARD KEY CHANGEOUT

(10 min)

OBJECTIVE: Replace failed Key in fwd Keyboard using ACK
Key from aft Keyboard as spare

LOCATION: Fwd Keyboards pnl C2, aft Keyboard pnl R11

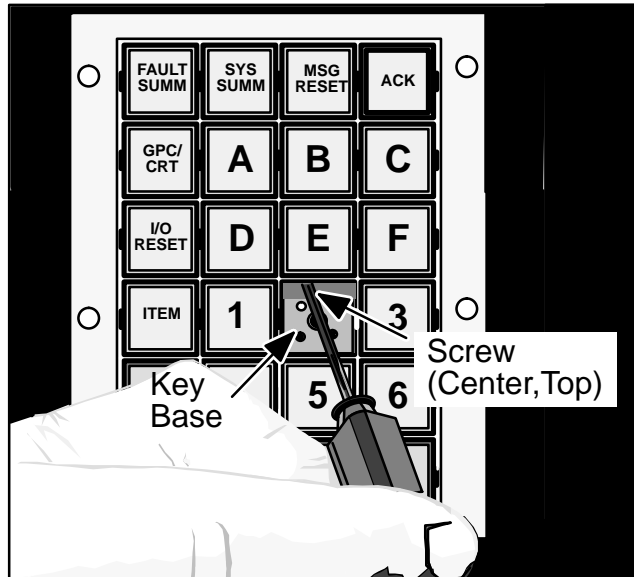
TOOLS REQD:

TOOL Gray Tape
 Small Screwdriver
 Jeweler's Screwdriver

TO REMOVE KEYBOARD KEY

- Left Keyboard
- L4:R 1. cb AC3 Φ B INST L/CTR – op
 - C2 2. CRT1,3 PWR (two) – OFF
- Right Keyboard
- L4:R 3. cb AC1 Φ A INST R – op
 - C2 4. CRT2,3 PWR (two) – OFF
- Aft Keyboard
- L4:Q 5. cb AC3 Φ B LTG PNL MS – op
 - R11L 6. CRT4 PWR – OFF
7. Carefully pry Key Cap up/out and remove





S81-35057

IFMSKP10

8. Remove Key base by turning screw (see dwg) ccw approx 13-1/2 turns until base can be pulled free of pnl

TO INSTALL KEYBOARD KEY

9. ✓Label (TOP) up, in relationship to Keyboard nomenclature. Install base, tighten screw
10. Install Key Cap
 - ✓Orientation nomenclature on cap
11. Place Gray Tape over exposed hole in aft Keyboard
12. Stow tools, failed Key

13. Pwr up Keyboard and check Key for affected CRT(s):

- Left Keyboard
 - L4:R 14. cb AC3 ϕ B INST L/CTR - cl
 - C2 15. CRT1,3 PWR (two) - ON
- Right Keyboard
 - L4:R 16. cb AC1 ϕ A INST R - cl
 - C2 17. CRT2,3 PWR (two) - ON
- Aft Keyboard
 - L4:Q 18. cb AC3 B LTG PNL MS - cl
 - R11L 19. CRT4 PWR - ON

KEY PBI CHANGEOUT (Orbital DAP Type)

(10 min)

OBJECTIVE: Replace failed Key w/Key from another pnl

NOTE

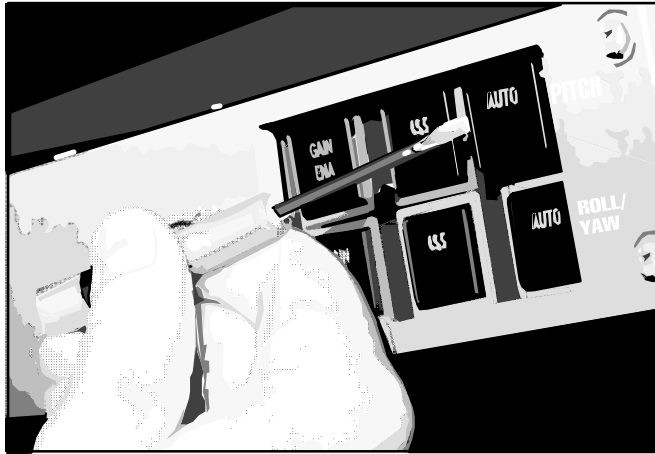
Contact MCC for location/name of spare Key

LOCATION: (Following PBIs interchangeable)

PBI	PNL
AUTO	F2,F4
CSS (GAIN ENA) (OV102)	
AUTO/MAN	
ABORT	F6
RANGE SAFE ARM	
ATT REF	F6,F8
ARM	
DN	
SM ALERT	F7
LFT/LFT	
CNT/CNT	
RT/RT	
LFT	C3
CNT	
RT	
ORBITAL DAP (ALL)	
SEP	
AGENT DISCH	L1
ATT REF	A6
ORBITAL DAP (ALL)	
VIDEO IN/OUT (ALL)	A7

TOOLS REQD:

TOOL Gray Tape
 Small Screwdriver



IFMSKP13a



1. To remove, pry Key (up/loose) w/screwdriver
2. To install, align Key by label (TOP) or nomenclature on face and gently push in
3. Tape over hole at spare Key location
4. Stow replaced Key and tools

CAUTION
Contact MCC for functional test

**KU-BAND ANTENNA: CONTINGENCY
DEPLOY/STOW – FAILED DEPLOY/STOW SW (1:00 hr)**

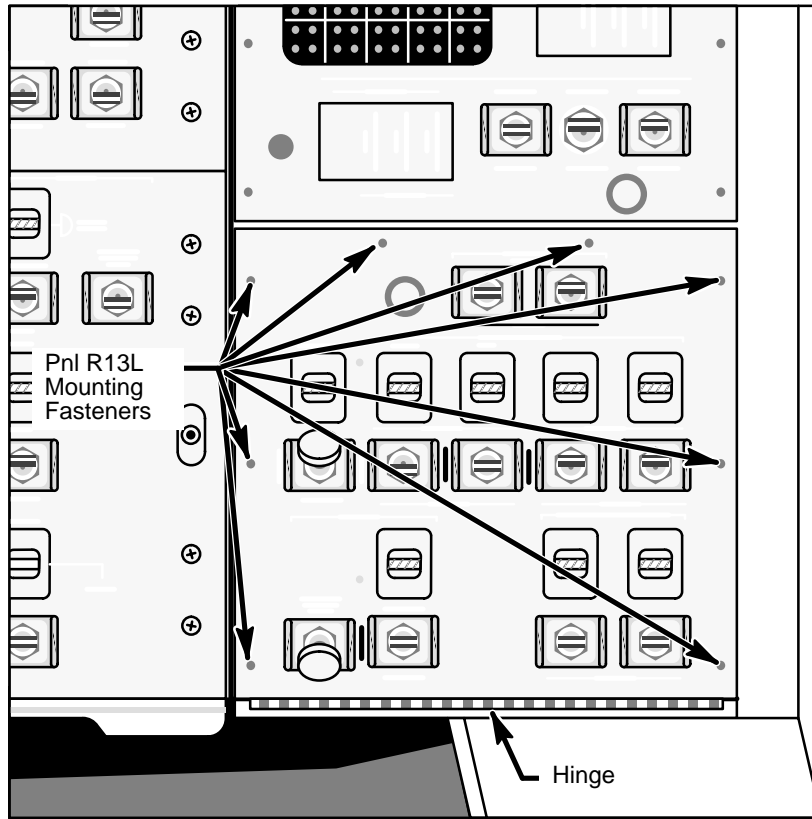
OBJECTIVE: Deploy(stow) Ku-Band Antenna should
Deploy/Stow sw fail. Procedure uses auxiliary source of DC
voltage to bypass sw. This will be performed using single motor
operation

LOCATION: Backside of pnl R13L

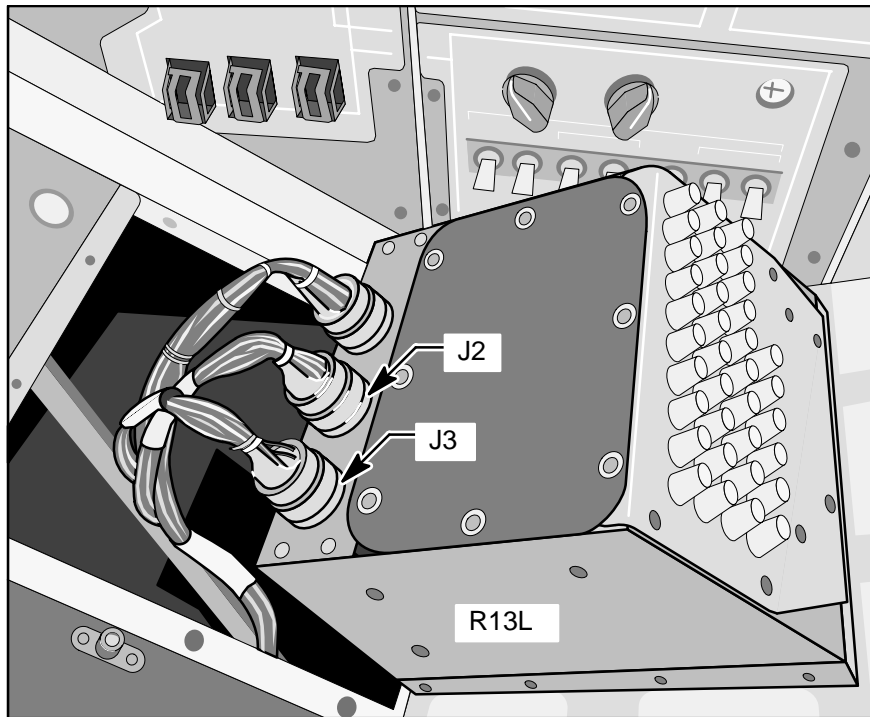
TOOLS REQD:

TOOL	Gray Tape Pin Kit (for Test Jumper Leads and Ku-Band Antenna Cable) Torque Wrench Driver Handle 5/32-in Allen Head Driver
BOB	IFM Breakout Box
CHCK	DC Pwr Cables

- R13L
1. Pwr down
PL BAY MECH PWR SYS 1,2 (two) – OFF
KU ANT DIRECT STO – OFF
– GND
 2. a. Breakout Box:
AUX – OFF
28V VAR VOLT – 28V
PWR A,B – OFF
 - b. Remove Fuse Cap from side B
 - c. Rotate GA SEL B – 22
 - d. Install 1-Amp Fuse, replace cap



- R13L 3. Open pnl R13L (hinged at bottom, eight fasteners, 5/32-in Allen Head Driver)



S83-32560

SKP16

R13L

For Motor 1 operation:

4. Disconnect Cable 30V77W2P9438 from J3

For Motor 2 operation:

5. Disconnect Cable 30V77W2P9437 from J2

O19

6. ✓ DC UTIL PWR MNA – OFF

Ku-Band Antenna deployment:

7. For Motor 1, go to step 11

8. For Motor 2, go to step 12

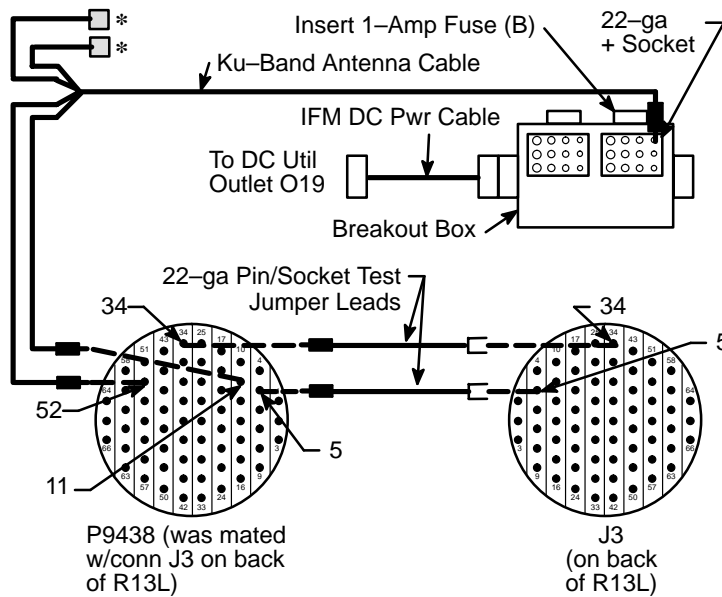
Ku-Band Antenna stowage:

9. For Motor 1, go to step 13

10. For Motor 2, go to step 14

11. To deploy Ku-Band Antenna using Motor 1
 - a. Connect Ku-Band Antenna Cable and two 22-ga Pin/Socket Test Jumper Leads as shown:
 - b. Go to step 15

PIN ASSIGNMENT		
Pin/Socket No.	Connects To	Purpose
S11(P9438)	DC UTIL PWR	Aux source of 28 VDC to close DPLY CMD RLY K72
S52(P9438)	DC UTIL PWR	Aux source of 28 VDC to close DPLY CMD RLY K70
S5(P9438)	P5(J3)	Provide CNTL CA1 pwr thru PL MECH PWR SYS 1 sw
S34(P9438)	P34(J3)	Provide CNTL CA2 pwr thru PL MECH PWR SYS 1 sw



P9438 (was mated w/conn J3 on back of R13L)

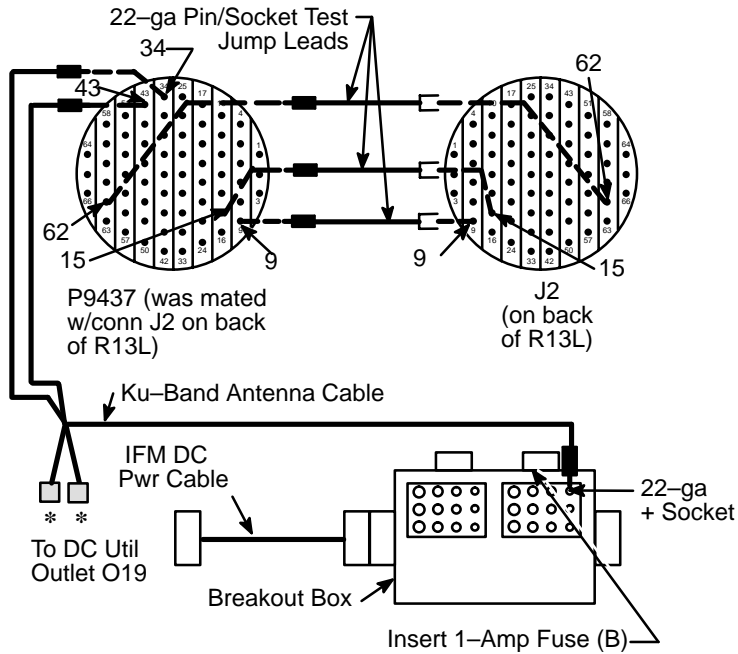
J3 (on back of R13L)

* Install insulation (Pin Kit, Flap 7); insulation must fully cover unused sockets and pins

ifm_sk_p18

12. To deploy Ku-Band Antenna using Motor 2

- a. Connect Ku-Band Antenna Cable and three 22-ga Pin/Socket Test Jumper Leads as shown:
- b. Go to step 15



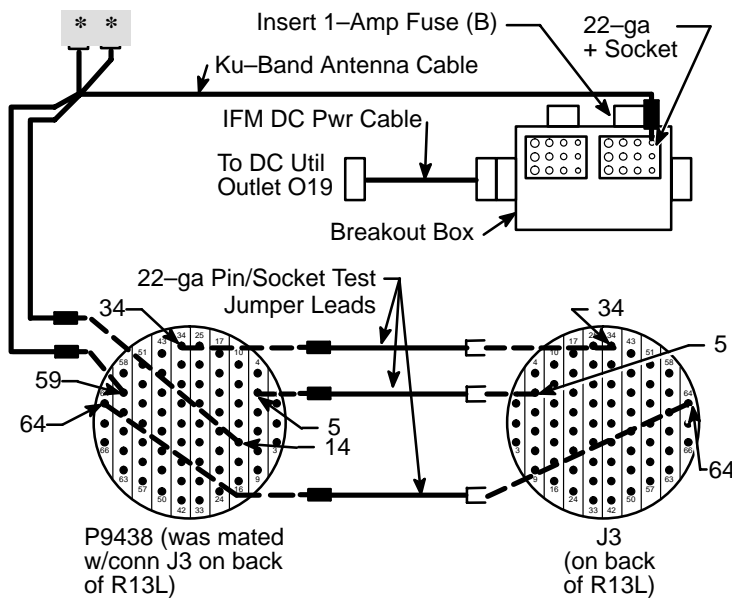
* Install insulation (Pin Kit, Flap 7); insulation must fully cover unused sockets and pins

PIN ASSIGNMENT		
Pin/Socket No.	Connects To	Purpose
S34(P9437)	DC UTIL PWR	Aux source of 28 VDC to close DPLY CMD RLY K37
S43(P9437)	DC UTIL PWR	Aux source of 28 VDC to close DPLY CMD RLY K27
S62(P9437)	P62(J2)	Provide CNTL BC1 pwr thru PL MECH PWR SYS 2 sw
S15(P9437)	P15(J2)	Provide CNTL BC2 pwr thru PL MECH PWR SYS 2 sw
S9(P9437)	P9(J2)	Regain Deploy/Stow tb

13. To stow Ku-Band Antenna using Motor 1

- a. Connect Ku-Band Antenna Cable and three 22-ga Pin/Socket Test Jumper Leads as shown:
- b. Go to step 25

PIN ASSIGNMENT		
Pin/Socket No.	Connects To	Purpose
S59(P9438)	DC UTIL PWR	Any source of 28; VDC to close STO CMD RLY K68
S14(P9438)	DC UTIL PWR	Any source of 28 VDC to close STO CMD RLY K14
S5(P9438)	P5(J3)	Provide CNTL CA1 pwr thru PL MECH PWR SYS 1 sw
S34(P9438)	P34(J3)	Provide CNTL CA2 pwr thru PL MECH PWR SYS 1 sw
S64(P9438)	P64(J3)	Regain Deploy/Stow tb

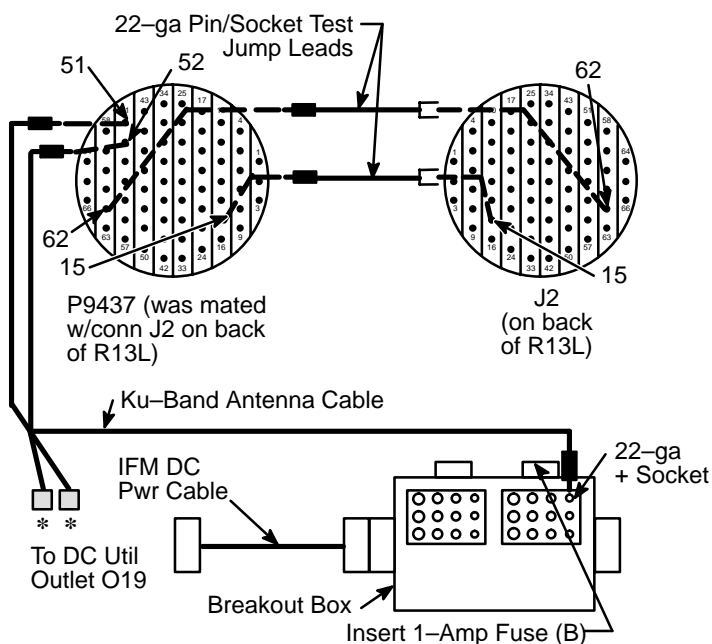


* Install insulation (Pin Kit, Flap 7); insulation must fully cover unused sockets and pins

ifm_sk_p20

14. To stow Ku-Band Antenna using Motor 2

- a. Connect Ku-Band Antenna Cable and two 22-ga Pin/Socket Test Jumper Leads as shown:
- b. Go to step 25



* Install insulation (Pin Kit, Flap 7); insulation must fully cover unused sockets and pins

PIN ASSIGNMENT		
Pin/Socket No.	Connects To	Purpose
S51(P9437)	DC UTIL PWR	Any source of 28 VDC to close DPLY CMD RLY K25
S52(P9437)	DC UTIL PWR	Any source of 28 VDC to close DPLY CMD RLY K2
S62(P9437)	P62(J2)	Provide CNTL BC1 pwr thru PL STO PWR SYS 2 sw
S15(P9437)	P15(J2)	Provide CNTL BC2 pwr thru PL STO PWR SYS 2 sw

15. Perform steps 16–24 to deploy:

NOTE

Activate TV, select best Camr to view antenna deploy and rcd video on VTR

- A1U 16. ✓KU PWR – OFF
- 17. CNTL – PNL
- R13L 18. ✓ANT – GND
- 19. ✓DIRECT STO – OFF
- 20. PL BAY MECH PWR SYS 1,2 (two) – ON
- O19 21. DC UTIL PWR MNA – ON
- 22. Breakout Box:
PWR B – ON (22 lt ON)
- R13L 23. ✓KU ANT tb – DPY (~46 sec)
- 24. Go to step 49

25. Perform steps 26–51 to stow:

NOTE

Activate TV, select best Camr to view antenna stow and rcd video on VTR

- R13L 26. ✓PL BAY MECH PWR SYS 1,2 (two) – OFF
- A1U 27. KU MODE – RDR PASSIVE
- 28. CNTL – PNL
- 29. ✓PWR – ON
- If KU PWR was OFF in step 29:
 - 30. SM ANTENNA
 - 31. I/O RESET KU – ITEM 8 EXEC (*)
 - 32. Wait 1 min for antenna to initialize before proceeding to step 33
- A2 33. ✓DIGI-DIS SEL – EL/AZ
- A1U 34. ✓KU sel – MAN SLEW
- 35. SLEW RATE – as reqd
ELEV – as reqd
- A2 36. R/ELE ind: $-27.0 (\pm 1^\circ)$
- A1U 37. SLEW AZM – as reqd
- A2 38. R dot/AZM ind: $-123.0 (\pm 1^\circ)$

LOCK GIMBALS

NOTE

Breakout Box must remain powered until KU PWR deactivated to prevent antenna reinitialization

- O19 39. DAP: VERN(FREE)
- O19 40. DC UTIL PWR MNA – ON
- O19 41. Breakout Box:
 - PWR B – ON (22 lt ON)
- O19 42. Monitor KU ANT gimbal angles for 50 sec (gimbal lock test), then:
- A2 43. ✓R/EL ind: $-29.0 (\pm 1^\circ)$
- A2 43. ✓R dot/AZM ind: $-125.0 (\pm 1^\circ)$
- A2 44. DAP: as reqd

STOW DEPLOYED ASSEMBLY

- R13L 45. PL BAY MECH PWR SYS 1,2 (two) – ON
- R13L 46. ✓KU ANT tb – STO (~46 sec)
- A1U 47. PWR – OFF (Expect 'BCE KU BYP')
- A1U 48. cb MNB KU ELEC – op
 - MNC KU SIG PROC – op
- R13L 49. PL BAY MECH PWR SYS 1,2 (two) – OFF
- R13L 50. Breakout Box:
 - PWR B – OFF
- O19 51. DC UTIL PWR MNA – OFF

CLOSE OUT PNL AND STOW TOOLS

- O19 52. Disconnect Pin/Socket Test Jumper Leads
- O19 53. Disconnect Ku-Band Antenna Cable
- O19 54. Disconnect IFM Pwr Cable from O19 and Breakout Box
- R13L For Motor 1:
 - 55. Reconnect cable 30V77W2P9438 to J3
- R13L For Motor 2:
 - 56. Reconnect cable 30V77W2P9437 to J2
- R13L 57. Close R13L (torque fasteners, 30 in-lb)
- R13L 58. Stow Ku-Band Antenna Cable and Pin/Socket Test Jumper Leads in Pin Kit
- R13L 59. Stow Pin Kit, Breakout Box, tools, tape, IFM Pwr Cable

**KU-BAND ANTENNA: CONTINGENCY
STOW – EA1 ALTERNATE PWR**

(2:00 hr)

OBJECTIVE: Stow Ku-Band Antenna when pwr to EA1 lost due to shorted Cross Pointer, Digital Display Meter, EA2, or other failures causing loss of RPC #53. RPC #53 cntls MNC pwr to EA1

NOTE

These failures also cause loss of Radar Mode, due to loss of pwr signals for Radar Mode

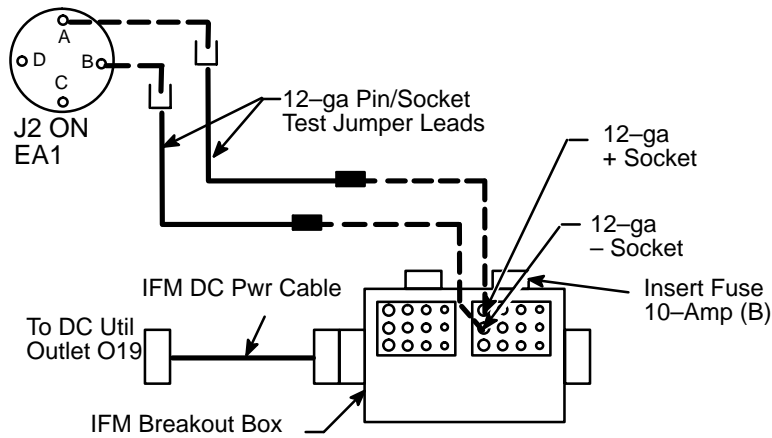
LOCATION: See AV BAY 3A, Zone 9A (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL	Gray Tape
	Pwr Screwdriver
	Connector Pliers
	3/16-in & 5/32-in Allen Head Driver
	Pin Kit (12-ga Test Jumper Leads)
	Ratchet Wrench
BOB	IFM Breakout Box
CHCK	DC Pwr Cable

- | | |
|-------|--|
| A1U | 1. KU BAND PWR – OFF
CNTL – PNL |
| R14:C | 2. cb MNB KU ELEC – op
MNC KU SIG PROC – op |
| | 3. a. Breakout Box:
AUX – OFF
28V VAR VOLT – 28V
PWR A,B – OFF |
| | b. Remove Fuse Cap from side B |
| | c. Rotate GA SEL B – 12 |
| | d. Install 10-Amp Fuse, replace cap |
| | 4. Remove Window Shade Bag from mounting brkt
(loosen straps) |
| | 5. Remove mounting brkt from AV BAY 3A
(4 of 7 fasteners, 3/16-in Allen Head Driver) |
| | 6. If reqd, reposition Vol B (one pip pin) and/or
remove AV BAY 3A upper closeout pnl(s)
(5/32-in Allen Head Driver) |
| | 7. Remove P358 from J2 on EA1, tape over
interface and temp secure cable to structure |

8. Remove P375 from J2 of EA2, tape over interface
- O19 9. ✓ DC UTIL PWR MNA – OFF
10. Install Breakout Box and Cables as illustrated:



- R14:C 11. cb MNB KU ELEC – cl
MNC KU SIG PROC – cl
- O19 12. DC UTIL PWR MNA – ON
13. Breakout Box:
PWR B – ON (12 lt ON)
- A1U 14. KU BAND PWR – ON
MODE – COMM

NOTE

Allow 2 min for system to initialize

15. SM ANTENNA
16. I/O RESET KU – ITEM 8 EXEC (*)
17. ✓ EL ACT – 00.0
18. ✓ AZ ACT – 00.0

NOTE

Stow antenna in Comm Mode not Radar Mode

O19

19. Stow Antenna in Comm Mode per KU-BD ANT STOW (ORB OPS, COMM/INST)
20. DC UTIL PWR – OFF
21. Remove Test Jumper Leads and Cables.
Remove tape from connector and reinstall P358 to J2 on EA1 and P375 on J2 of EA2
22. Reinstall AV BAY 3A upper closeout pnl(s), (torque fasteners, 30 in-lb). Reinstall Vol B if reqd
23. Reinstall Window Shade Bag mounting brkt (torque fasteners, 30 in-lb)
24. Reinstall Window Shade Bag
25. Stow tools, tape

**KU-BAND ANTENNA: CONTINGENCY STOW –
W/EVA ANTENNA GIMBAL ALIGNMENT** (2:30 hr)

OBJECTIVE: Stow Ku-Band Antenna when gimbals can not be slewed due to EA1 Command Path failure(gimbal motor) failure. This procedure reqs Antenna gimbal alignment by EVA crewmember to allow gimbal lock

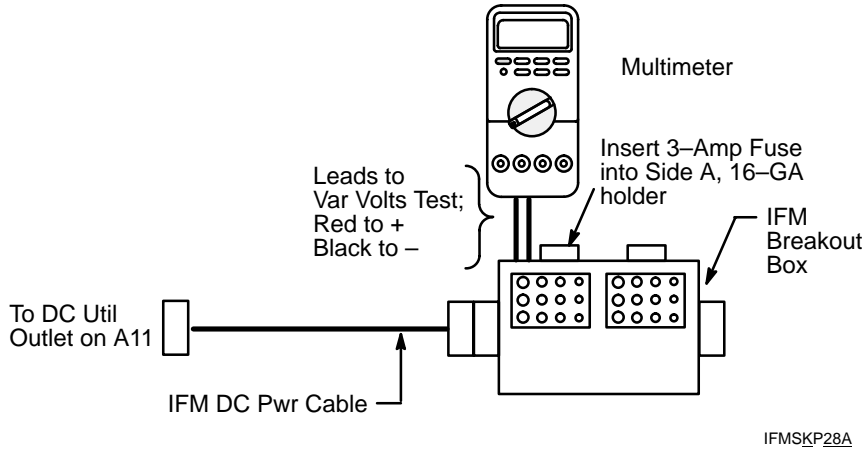
LOCATION: See AV BAY 3A, Zone 9 (top shelf); for Electronic Assembly 1 (EA1) location (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL	Gray Tape
	Pin Kit (16-ga Test Jumper Leads)
	Multimeter
	Pwr Screwdriver
	Robbins Wrench
	1/4-in to 3/8-in Adapter
	Locker Tool
	Driver Handle
	Torque Wrench
	3/16-in & 5/32-in Allen Head Driver
	Ratchet Wrench
BOB	IFM Breakout Box
CHCK	DC Pwr Cable

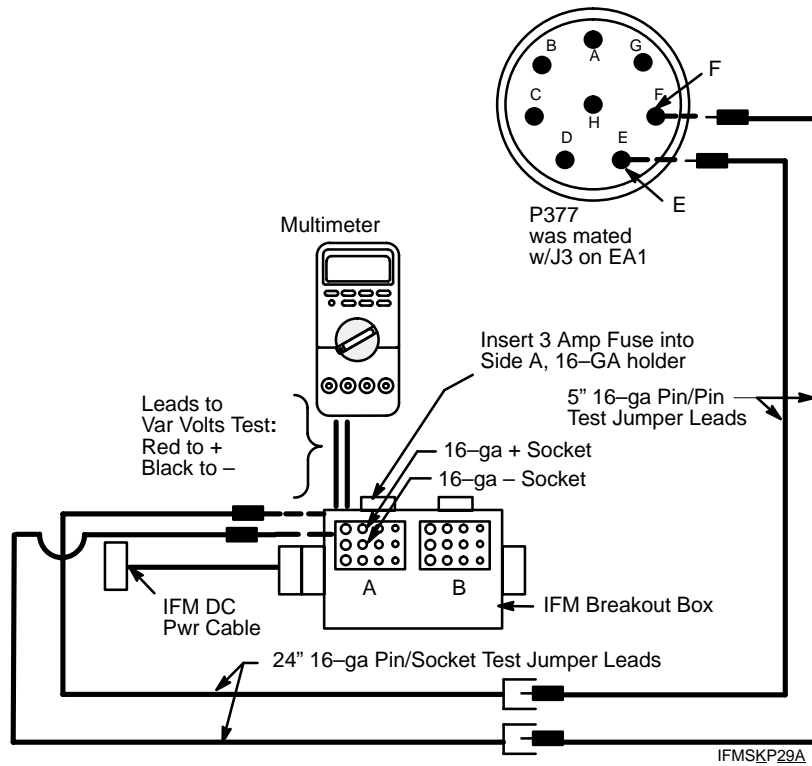
1. Remove window shade bag from mounting brkt (loosen straps)
 2. Remove mounting brkt from AV BAY 3A (4 of 7 fasteners, 3/16-in Allen Head Driver)
 3. If reqd, reposition Vol B and/or remove AV BAY 3A upper closeout pnl(s) to gain access to Ku-Band EA1 (5/32-in Allen Head Driver)
 4. Remove two, 5-in 16-ga Pin/Pin and two, 24-in 16-ga Pin/Socket Test Jumper Leads from Pin Kit
 5. a. Breakout Box:
 - AUX – OFF
 - 28V VAR VOLT – VAR VOLT
 - PWR A,B – OFFb. Remove Fuse Cap from side A
 - c. Rotate GA SEL A – 16
 - d. Install 3-Amp Fuse, replace cap
- A1U
6. KU PWR – OFF
 - CNTL – PNL

- R13L 7. PL BAY MECH PWR SYS 1,2 – OFF
 KU ANT – GND
- R14:C 8. cb MNB KU ELEC – op
- 9. Disconnect cable 83V77W4P377 from J3 on EA1
- A11 10. DC UTIL PWR MNC – OFF
- 11. Config Breakout Box and Multimeter as shown:



- 12. Config Multimeter for DC volts (auto range)
- 13. DC UTIL PWR MNC – ON
- 14. Breakout Box:
 - ✓VAR VOLTS It – ON
 - (Set VAR VOLTS output by rotating VAR rotary sw until Multimeter reads 14 VDC)
- When VAR VOLTS output reads 14 VDC:
- 15. DC UTIL PWR MNC – OFF

16. Connect Pin/Socket and Pin/Pin Test Jumper Leads as shown:



Pin/Socket No.	Connects To	Purpose
P377, Soc E	DC Util Pwr	Provides +14V aux source to drive locking pins closed
P377, Soc F	DC Util Pwr	Provides -(return) aux source to drive locking pins closed

NOTE

Select best Camr to view antenna
and record antenna stowage (VTR)

17. Perform steps 18–21 to stow Ku–Band Antenna
Deployed Assembly w/gimbals unlocked

NOTE

Coordinate EV manipulation of Ku–Band
Antenna gimbal assembly during IV stow
of Ku–Band Antenna Deployed
Assembly

CAUTION

Ku–Band Antenna sw must be in GND
position prior to use of Direct Stow sw to
preclude phase–to–phase bus short

- A1U 18. ✓KU PWR – OFF
✓CNTL – PNL
R13L ✓PL BAY MECH PWR SYS 1,2 – OFF
✓KU ANT – GND
19. ✓DAP: VERN(FREE)

CAUTION

- EV,IV 1. Ensure Ku Antenna dish clears
sill and slidewire while IV
stows Antenna Deployed
Assembly
EV 2. Avoid contact between safety
tether and Antenna dish

20. PL BAY MECH PWR SYS 1 – ON
KU ANT DIRECT STO – ON
✓tb – bp, STO ~46 sec
21. KU ANT DIRECT STO – OFF
PL BAY MECH PWR SYS 1 – OFF
22. Perform steps 23–26 to drive Ku–Band Antenna
gimbal lock pins

CAUTION

1. Avoid contact w/black (Antenna dish) or gold (thermal blankets). Ku Antenna very fragile
2. Contact w/white (gimbal structure) or silver (DEA structure) only, when aligning lock pins w/lock pin wedges

NOTE

Coordinate EV manipulation of Ku Antenna gimbal assembly w/IV gimbal, lock pin, motor drive

- EV
A11
23. Align Antenna gimbal assembly
 24. When Ku Antenna gimbals positioned so that lock pins aligned w/lock pin wedges:
DC UTIL PWR MNC – ON

NOTE

Lock pins drive sequentially. Top lock pin (adjacent to gold covering) engages fully before bottom lock pin (adjacent to silver gyro box) begins to drive

25. On EVA GO:
Breakout Box:
PWR A – ON (after lock pins fully engage wedges, ~30 sec)
– OFF
26. ✓MCC to verify BSE II High (indicates 2nd pin fully engaged)
27. ✓Ku–Band Antenna within STO envelope using Ku Antenna Overlay
28. DC UTIL PWR MNC – OFF
29. DAP: as reqd
30. Disconnect Test Jumper Leads, stow in Pin Kit
31. Reconnect Cable 83V77W4P377 to J3 of EA1
32. Reinstall AV BAY 3A upper closeout pnl(s)
(torque fasteners, 30 in–lb)
33. If reqd, reinstall Vol B
34. Reinstall Window Shade Bag mounting brkt
(torque fasteners, 30 in–lb)
35. Reinstall Window Shade Bag
36. Stow tools

LIGHT BULB CHANGEOUT

(20 min)

OBJECTIVE: Replace failed C&W and/or Annunciator light bulb w/light bulb from unused position

LOCATION: F2,F4,F6,F7,L1,A8U

TOOLS REQD:

TOOL Gray Tape
 Small Screwdriver
 Jeweler's Screwdriver

1. Contact MCC for pwrn of pertinent lights
2. Three examples follow

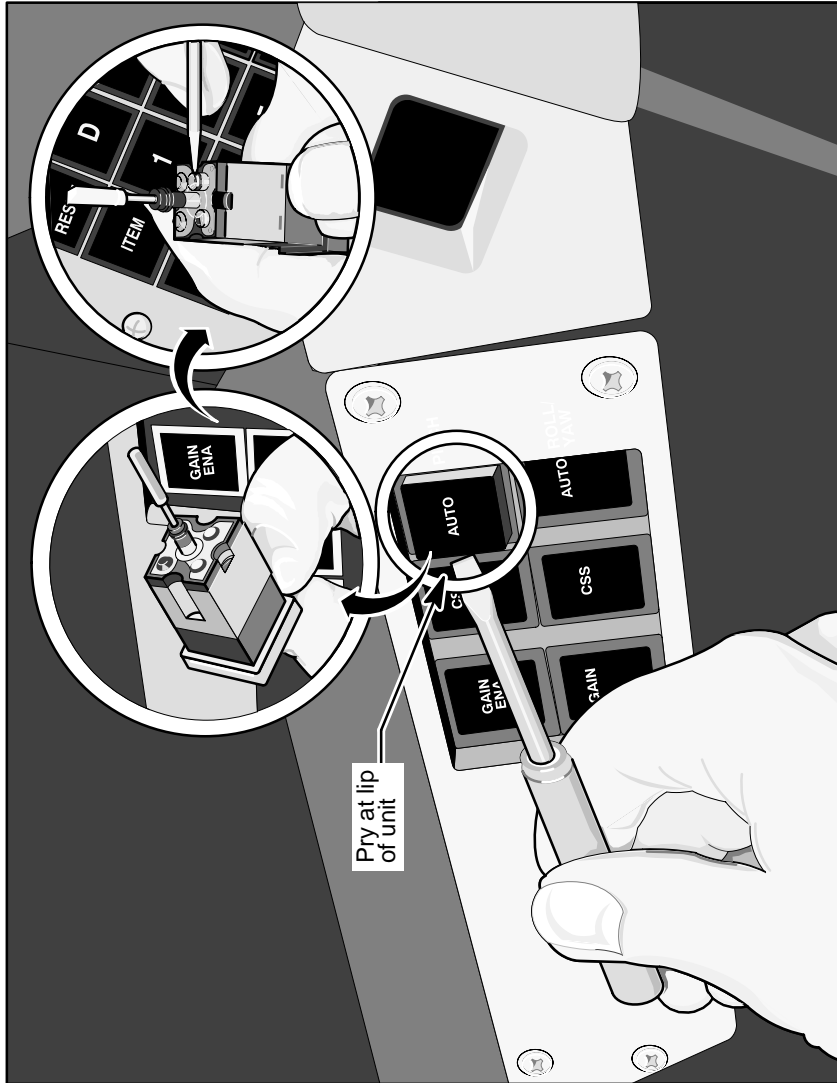
CAUTION

Some lights have grounding strap that prevents unit from pulling free of pnl. Use care when removing unit and bulb from unit

- Carefully pry unit from pnl. Carefully pry light from unit at lip as shown

NOTE

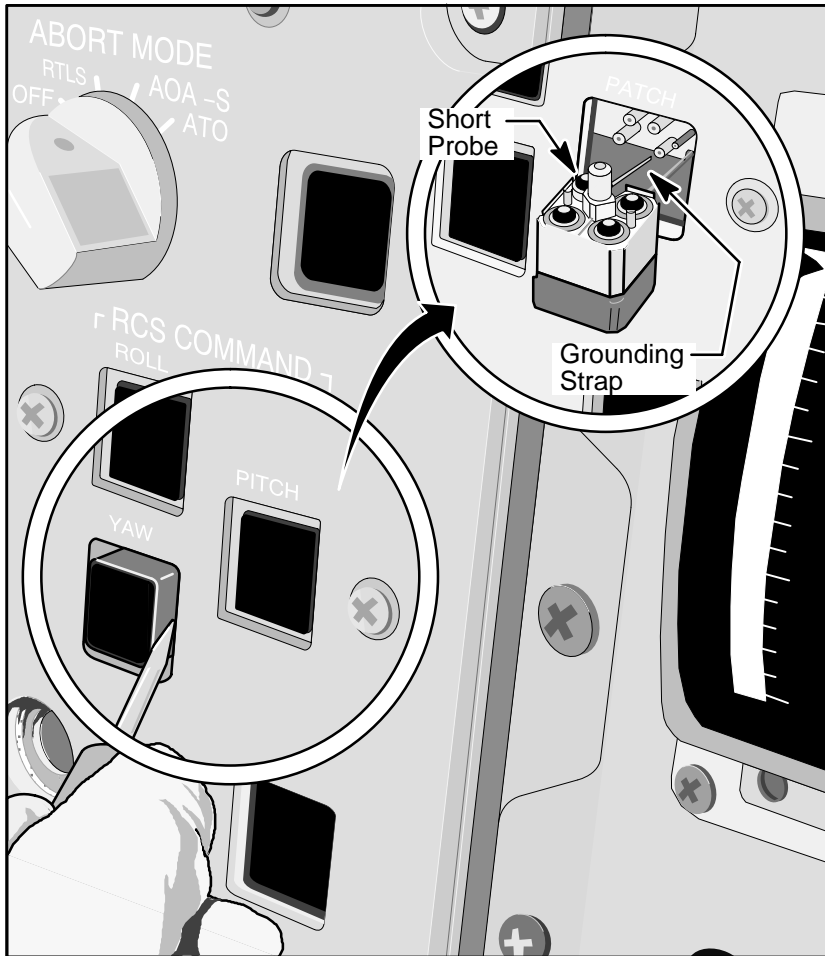
Removal sequence typical of square units



S81-38848

SHLP2

4. Removal same as step 3, except for ground strap



S81-38854

slp3

5. Push in, unit will pop out. Carefully pry light from unit at lip as shown in step 3

NOTE

This removal sequence is typical of rectangular units



s81-38855

SLP4

**LOCKERS – MISALIGNED (MOUNTING SCREWS
WILL NOT START)** (25 min)

OBJECTIVE: Propose means by which locker fasteners may be realigned to effect nut plate engagement. ΔP across orbiter structure can result in deformation of locker mounting surface preventing normal installation

LOCATION: Any stowage locker on AV BAYS 1(2,3A)

TOOLS REQD:

TOOL	Pinch Bar
	Locker Tool
	8-in Punch
	Ratchet/Torque Wrench
	Large Screwdriver

CAUTION

Minimum of three out of four locker mounting fasteners must be secured for entry

NOTE

If fasteners cannot be secured, remove locker, stow, and install turnbuckles

1. Position locker, secure two mounting fasteners if possible
2. Align third fastener using Pinch Bar/Screwdriver to position locker to ease installation
3. Repeat step 2 for fourth fastener
4. Torque fasteners (30 in-lb)
5. Stow tools



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IFM PROCEDURES

MA73C WIRE CUT	M-1
MDM CHANGEOUT	M-4
MEDS IDP CHANGEOUT AND CABLE SWAP	M-10
KEYBOARD CHANGEOUT	M-18
MDU CHANGEOUT	M-28
MMU CONTINGENCY PWRUP	M-34
CHANGEOUT	M-36
ODS CENTERLINE CAMR ANGULAR ALIGNMENT	O-1
OIU CABLE SWAP	O-5
OS SPEAKER DISCONNECT	O-7
O2 SYS 1(2), FAILED XOVR VLV BYPASS	O-9
OSVU CONTINGENCY PWRUP	O-11
REPLACEMENT	O-13
PARACHUTE REPACK	P-1
PAYLOAD BAY DOOR MOTOR OPERATION	P-10
SYS ENABLE RECOVERY	P-36
PDI REPLACEMENT	P-43
PGSC CARD CHANGEOUT	P-46
EXPANSION CARD CHANGEOUT	P-49
PREFLIGHT TEST BUS SETUP	P-51
PSP CHANGEOUT	P-56
RECORDER CHANGEOUT	R-1
RECORDER JUMPER CABLE INSTALLATION (PL,OPS)	R-4
RHC CHANGEOUT	R-7
RMS	
CONTINGENCY OPERATION (Installation and Removal of RMS IFM D&C Kit)	R-16
CONTINGENCY POWERUP	R-21
JETT REDUNDANCY	R-25
MANIPULATOR POSITIONING MECHANISM (MPM) CONTINGENCY DEPLOY/STOW	R-29
MANIPULATOR RETENTION LATCHES (MRL) CONTINGENCY RELEASE/LATCH	R-35
MCIU CHANGEOUT	R-40

**PROCEDURES
M THRU R**

**PROCEDURES
M THRU R**

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MA73C WIRE CUT

(45 min)

OBJECTIVE: Isolate single phase AC bus short between inverter and Pnl MA73C from three phase motors so other two phases can be used

LOCATION: MA73C

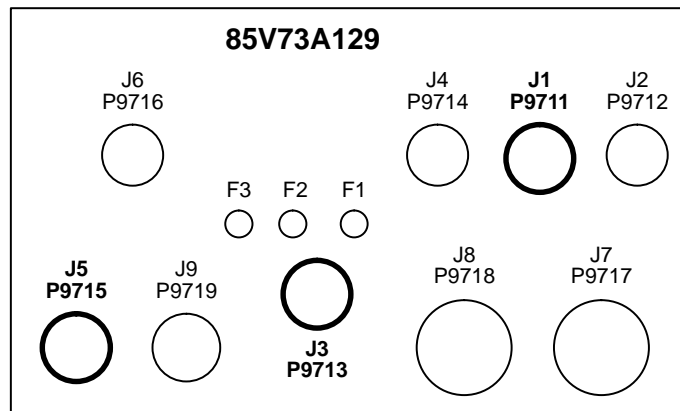
TOOLS REQD:

TOOL Gray Tape
Wire Cutters
Wire Stripper
Multimeter
Pwr Screwdriver
5/32-in Allen Head Driver
Torque Wrench

NOTE

Procedure assumes all cbs for affected phase and all applicable 3 Φ ganged cbs on MA73C open. This is to ensure continuity check is only for MA73C and avoid any erroneous measurements due to impedance of downstream equipment

- R1 1. ✓ Affected AC bus phase unpowered
INV/AC BUS tb – OFF
INV PWR tb – OFF
- MA73C 2. Open AV BAY 3B upper access pnl (five fasteners, 5/32-in Allen Head Driver)



Rear View of AV BAY 3B Upper Access Pnl (MA73C)

3. Locate appropriate connector and wire bundle for affected bus (see table below)

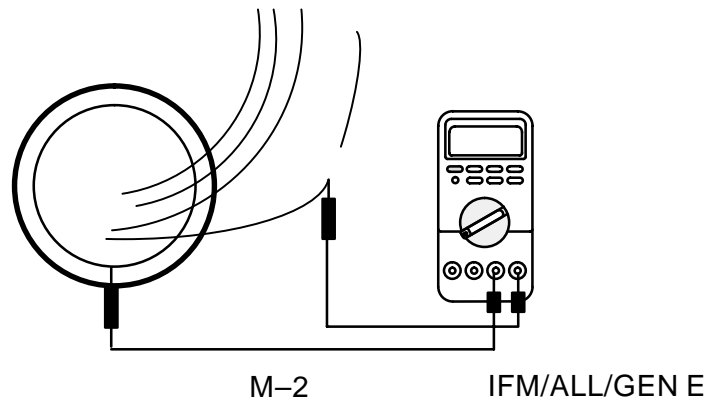
	Connector	Wire ID	Φ A	Φ B	Φ C	Neutral
AC1	P9711 (J1)	1A7B12	1 Stripe	2 Stripes	3 Stripes	4 Stripes
AC2	P9713 (J3)	2A7B12	1 Stripe	2 Stripes	3 Stripes	4 Stripes
AC3	P9715 (J5)	3A7B12	1 Stripe	2 Stripes	3 Stripes	4 Stripes

4. Remove bundle ID tag and wire wraps from appropriate bundle as reqd to separate wires back ~6 inches from connector backshell
5. Locate and cut applicable wire ~5 inches from connector backshell
6. Remove ~0.5 inch of insulation from connector side of wire cut in previous step
7. Obtain Multimeter

NOTE

Red & black Multimeter leads have removable test probes installed on one end. Once removed, this end of leads can also be installed into Multimeter so that banana jacks on other end can be used w/Pin Kit accessories

8. Remove test probes from red & black Multimeter leads and insert this end into Multimeter
9. Install alligator clips from Pin Kit (flap 8) onto Multimeter lead banana jacks
10. Attach red Multimeter lead alligator clip to area of wire stripped in step 6
11. Config Multimeter for continuity check
12. Attach black Multimeter lead alligator clip to connector backshell (chassis gnd)



13. If Multimeter indicates continuity between backshell and wire, a pnl short exists in MA73C:
 ✓MCC for further actions >>
 If Multimeter indicates no continuity between backshell and wire, proceed
14. Tape over exposed ends of wire cut in step 5
15. Close AV BAY 3B upper access pnl (torque fasteners, 30 in-lb), stow tools
16. Close all three Φ ganged cbs on MA73C for affected ac bus

AC1 (5 cbs)	
MA73C:C	cb MCA PWR AC1 3 Φ FWD 1 – cl MID 1 – cl
MA73C:C	cb MCA PWR AC1 3 Φ AFT 1 – cl MID 3 – cl
MA73C:F	cb AC1 MAR 3 Φ – cl

AC2 (9 cbs)	
MA73C:C	cb MCA PWR AC2 3 Φ FWD 2 – cl MID 1 – cl MID 2 – cl
MA73C:D	cb MCA PWR AC2 3 Φ AFT 2 – cl MID 3 – cl MID 4 – cl
MA73C:E	cb AC2 PL 3 Φ – cl
MA73C:F	cb AC2 L SEAT 3 Φ – cl
MA73C:G	R SEAT 3 Φ – cl

AC3 (7 cbs)	
MA73C:C	cb MCA PWR AC3 3 Φ FWD 3 – cl MID 2 – cl
MA73C:D	cb MCA PWR AC3 3 Φ AFT 3 – cl MID 4 – cl
MA73C:E	cb AC3 PL 3 Φ – cl
MA73C:F	cb AC3 L SEAT 3 Φ – cl
MA73C:G	R SEAT 3 Φ – cl

MDM CHANGEOUT

(3:00 hr) (15 min C/O)

OBJECTIVE: Replace MDM FF1(2,3) w/FF4 or swap PL MDMs. Flight fwd MDM will be replaced only after pwr cycling and port moding fails to clear non-GPC caused 'I/O ERROR FF1(2,3)' or total output card failure and loss of MDM results in loss of second IMU or second AA (AA4 must be failed). PL MDM will be swapped only after pwr cycling and port moding fails to clear non-GPC caused 'I/O ERROR PL' and there has been failure of any PLBD MCA, except MCA2, controlled by good MDM

LOCATION: See (COMPONENT LOCATIONS)
AV BAY 1 (Zone 14E) for MDM FF1 and (Zone 43O) for MDM PL1
AV BAY 2 (Zone 71B) for MDM FF4 (Zone 85E) for MDM FF2, and (Zone 57O) for MDM PL2
AV BAY 3A (Zone 2D) for MDM FF3

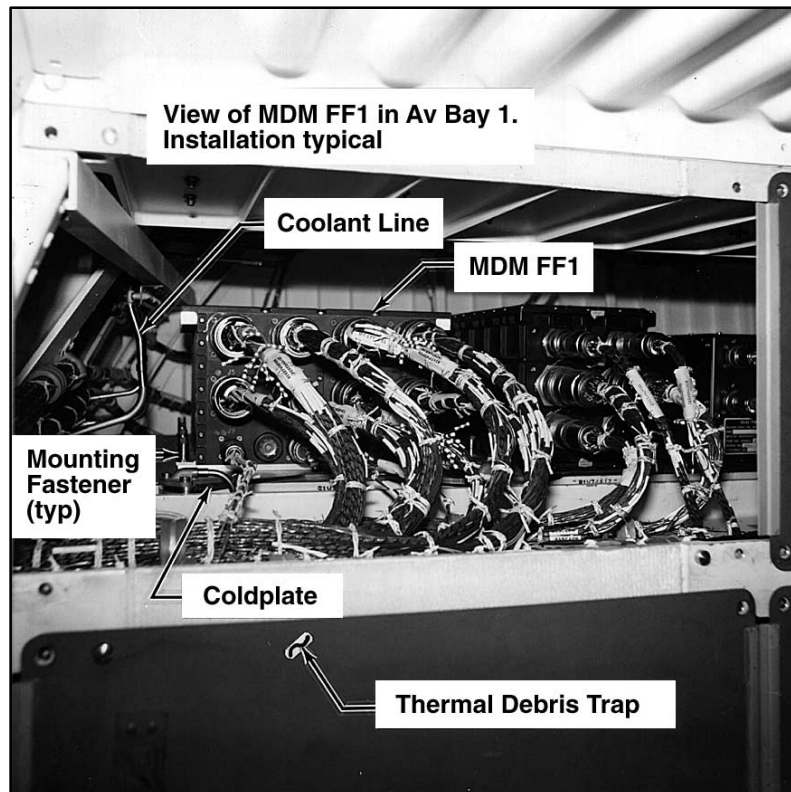
TOOLS REQD:

TOOL Gray Tape
 Pwr Screwdriver
 Locker Tool
 3/8-in Deepwell Socket
 Torque Wrench
 Driver Handle
 4-in Extension
 1/4-in to 3/8-in Adapter
CHCK Coldplate Protective Cover
 Configure prior to removal of failed MDM F1,2,3

		<u>FF1</u>	<u>FF2</u>	<u>FF3</u>
C3	1. ✓DAP RCS JETS – NORM			X
O14:F	2. ✓RJDF 1B F1 DRIVER – OFF	X		
O15:F	3. ✓1A F2 DRIVER – OFF		X	
O16:F	4. 2A F3 DRIVER – OFF	X	X	X
	2B F4/F5 DRIVER – OFF			X

TO REMOVE MDM

O6 5. MDM FF4,1(2,3) – OFF
 or
 MDM PL1,2 – OFF



108-KSC-379C-2272/1

6. Remove Debris Trap, Vol A (MF57A) (see GENERAL INFORMATION) lockers, closeouts, and Thermal/Debris Traps to access MDMs as reqd
7. Remove connectors J1 thru J12 from MDMs as reqd. Tape harnesses and connectors out of way to facilitate MDM removal
8. Loosen MDM mounting fasteners (eight, 3/8-in Socket). Vehicle structure does not permit use of extension on outboard side of MDM FF1(2)
9. Slide Coldplate Protective Cover between coldplate and MDM. Remove MDM w/Coldplate Protective Cover, mark failed unit w/Gray Tape

TO INSTALL MDM

10. Slide MDM w/Coldplate Protective Cover into place, remove cover, tighten fasteners (torque, 70 in-lb)
11. Install connectors:

<u>In FF1 Location, connect</u>		<u>In FF2 Location, connect</u>	
Cable	MDM	Cable	DDU
81V77W8P36	to J1	82V77W9P36	to J1
	P37 to J2		P37 to J2
	P38 to J3		P38 to J3
	P39 to J4		P39 to J4
	P40 to J5		P40 to J5
	P41 to J6		P41 to J6
	P42 to J7		P42 to J7
	P43 to J8		P43 to J8
	P44 to J9		P44 to J9
	P45 to J10		P45 to J10
	P46 to J11		P46 to J11
	P47 to J12		P47 to J12

<u>In FF3 Location, connect</u>		<u>In FF4 Location, connect</u>	
Cable	MDM	Cable	MDM
83V77W4P23	to J1	82V77W9P48	to J1
	P24 to J2		P49 to J2
	P25 to J3		P50 to J3
	P26 to J4		P51 to J4
	P27 to J5		P52 to J5
	P28 to J6		P53 to J6
	P29 to J7		P54 to J7
	P30 to J8		P55 to J8
	P31 to J9		P56 to J9
	P32 to J10		P57 to J10
	P33 to J11		P58 to J11
	P34 to J12		P59 to J12

In PL1 Location, connect		In PL2 Location, connect	
Cable	MDM	Cable	MDM
81V77W8P108 to	J1	82V77W9P60 to	J1
P109 to	J2	P61 to	J2
P110 to	J3	P62 to	J3
P111 to	J4	P63 to	J4
P112 to	J5	P64 to	J5
P113 to	J6	P65 to	J6
P114 to	J7	P66 to	J7
P115 to	J8	P67 to	J8
P116 to	J9	P68 to	J9
P117 to	J10	P69 to	J10
P118 to	J11	P70 to	J11
P119 to	J12	P71 to	J12

12. Contact MCC if reinstallation of connectors on failed unit desired. Normally, tape over connector interfaces and secure out of way
13. Install Thermal/Debris Traps
14. If FF MDM

GNC 21 IMU ALIGN

- a. ✓ Affected IMU deselected:
 - If FF 1 – ✓DES: ITEM 7 (*)
 - 2 – ✓DES: ITEM 8 (*)
 - 3 – ✓DES: ITEM 9 (*)
- b. ✓ Affected RJDF pwrd OFF:
 - If FF 1 – ✓RJDF 1B F1 DRIVER – OFF
 - 2 – ✓RJDF 1A F2 DRIVER – OFF
 - 3 – ✓RJDF 2B F4 DRIVER – OFF

O14:F
O15:F
O16:F

NOTE

If unexpected fault msgs occur for affected MDM, record fault msg and continue to RJDF powerup, then STOP and ✓MCC. If RCS 'JET FAIL' msgs occur associated w/powered-off RJDF Manfs, ignore and continue

- O6 c. MDM FF1(FF2, FF3) – ON
 - FAULT**
 - GNC CRT – I/O RESET
 - Observe fault msgs for affected MDM:
 - ✓No 'I/O ERROR FF1(2,3)'
 - ✓No 'MDM OUTPUT FF1(2,3)'
 - ✓No unexpected 'BCE STRG 1(2,3)' msg

SM 1 DPS UTILITY

- d. Select SEC ports on affected MDM:
PORT ASSIGN SEC – ITEM 16(18,20)
EXEC (*)

FAULT

- e. Observe fault msgs for affected MDM:
 - ✓No 'I/O ERROR FF1(2,3)'
 - ✓No 'MDM OUTPUT FF1(2,3)'
 - ✓No unexpected 'BCE STRG 1(2,3)' msg

SM 1 DPS UTILITY

- f. Reselect PRI ports on affected MDM:
PORT ASSIGN SEC ITEM 15(17,19)
EXEC (*)

- g. Pwr ON affected RJDF:
 - If FF 1: RJDF 1B F1 (two) – ON
 - 2: RJDF 1A F2 (two) – ON
 - 3: RJDF 2B F4/F5 LOGIC – ON
 - F4 DRIVER – ON

O14:F
O15:F
O16:F

GNC 23 RCS

- h. For all jets which have failed during MDM C/O:
 - RCS FWD – ITEM 1 EXEC
 - JET RESET – ITEM 45 EXEC
 - Reselect deselected jets
 - JET RESET – ITEM 45 EXEC
 - ✓No 'JET FAIL' fault msgs occur
- i. After completion of MDM c/o, ✓MCC for IMU recovery, additional MDM/LRU c/o, and potential MDM FF 4 utilization/checkout

15. If PL MDM

NOTE

One or more of following fault msgs may be annunciated at I/O RESET or port moding steps:

- 'I/O ERROR FLEX'
- 'BCE BYP FLEX'
- 'BCE BYP SCA'
- 'BCE BYP KU'
- 'S62 BCE BYP PSP1(2)'
- 'S62 BCE BYP PL'
- 'S62 BCE BYP PDI'

If unexpected fault msg occurs for aff MDM, record fault msg and continue

O6

a. MDM PL1,PL2 – ON

FAULT

SM CRT – I/O RESET

Observe fault msgs for aff MDMs:

- ✓No 'I/O ERROR PL1(2)'
- ✓No 'MDM OUTPUT PL1(2)'

SM 1 DPS UTILITY

b. Select SEC ports on aff MDMs:

PORT ASSIGN SEC – ITEM 24 EXEC
(*)

FAULT

c. Observe fault msgs for aff MDMs:

- ✓No 'I/O ERROR PL1(2)'
- ✓No 'MDM OUTPUT PL1(2)'

SM1 DPS UTILITY

d. Reselect PRI ports on aff MDMs:

PORT ASSIGN SEC – ITEM 23 EXEC
(*)

e. ✓MCC for additional MDM/LRU checkout

f. Go to SSR-4 PLBD CHECKOUT AFTER
MDM CHANGEOUT (MAL, MECH)

16. Install closeouts, lockers (torque, 30 in-lb), Vol A (MF57A), and Debris Trap

17. Stow tools

**MEDS IDP CHANGEOUT AND
CABLE SWAP**

3 hr (IDP 1 or 3,4)
1:30 hr (IDP 2,4)
(15 min C/O)

OBJECTIVE: Replace failed IDP 1,3(2) w/IDP 4. IDP 1(3) will be changed out w/IDP 4, while only cables from IDP 2 will be connected to IDP 4

LOCATION: See FLIGHT DECK (COMPONENT LOCATIONS)

Zone N25 for IDP 1,3

Zone N75 for IDP 2,4

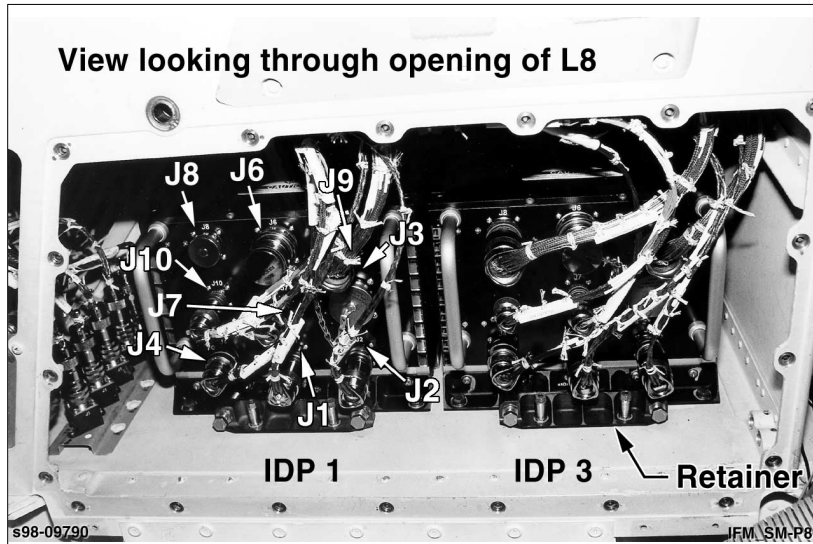
TOOLS REQD:

TOOL Pwr Screwdriver
Gray Tape
Connector Wrench
Ratchet Wrench
Torque Wrench
Driver Handle
3/8-in, 7/16-in, & 1/2-in Sockets
5/32-in Allen Head Driver
1/4-in to 3/8-in Adapter
Wire Cutters
#10 Torque Driver
9/16-in Combination Wrench
Anti-Static Wrist Tether

TO CHANGE OUT IDP 1(3) W/IDP 4

TO REMOVE IDP 1(3) AND 4

1. On active PASS KYBD, GPC/CRT 01(03) EXEC
✓Big 'X' and 'POLL FAIL'
2. For IDP 1
MDU CRT1 PWR – OFF
C2 IDP/CRT1 PWR sw – OFF
For IDP 3
MDU CRT3 PWR – OFF
C2 IDP/CRT3 PWR sw – OFF
3. On active PASS KYBD, GPC/CRT 04 EXEC
✓Big 'X' and 'POLL FAIL'
4. For IDP 4
MDU CRT4 PWR – OFF
R11 IDP/CRT4 PWR sw – OFF
5. Remove closeouts L16,R17 (17 fasteners/
closeout, 5/32–in Allen Head Driver), L8,R9 (19
fasteners/closeout, 5/32–in Allen Head Driver)

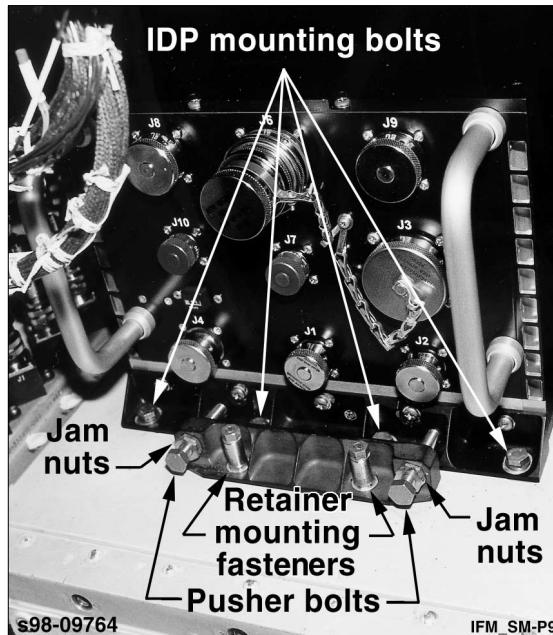


6. Don Anti-Static Wrist Tethers, clip to unpainted ground as reqd
7. Remove all connectors and tape out of way to facilitate IDP removal

For IDP 1 – J4, J7, J9, J10, J1, J2

3 – J4, J7, J8, J9, J10, J1, J2

4 – J4, J7, J8, J10, J1, J2



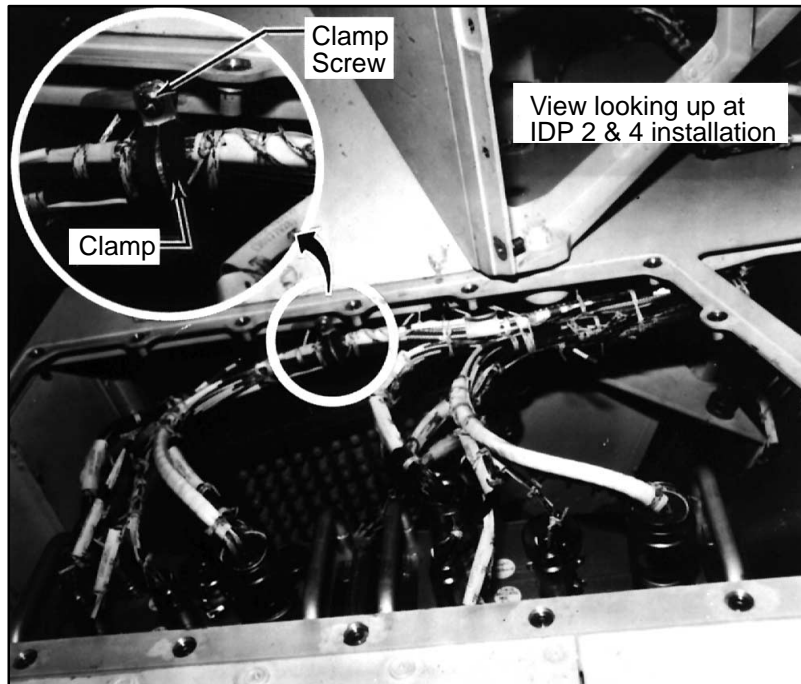
8. Loosen, do not remove four Jam Nuts and two pusher bolts (9/16-in Combination Wrench and 1/2-in Socket)
9. Loosen retainer mounting fasteners (two, 3/8-in Socket), remove retainer
10. Cut, remove filter-retaining bolt safety wire (one/filter)
11. Loosen, do not remove, filter retaining bolts far enough to allow rotation of guide tabs to open position (one/filter)
12. Remove filters (two/IDP)
13. Loosen mounting bolts (four, 7/16-in Socket); remove IDP 1(3) and mark failed unit w/Gray Tape
14. Repeat steps 7-13 for IDP 4

TO INSTALL IDP 4 AND 1(3)

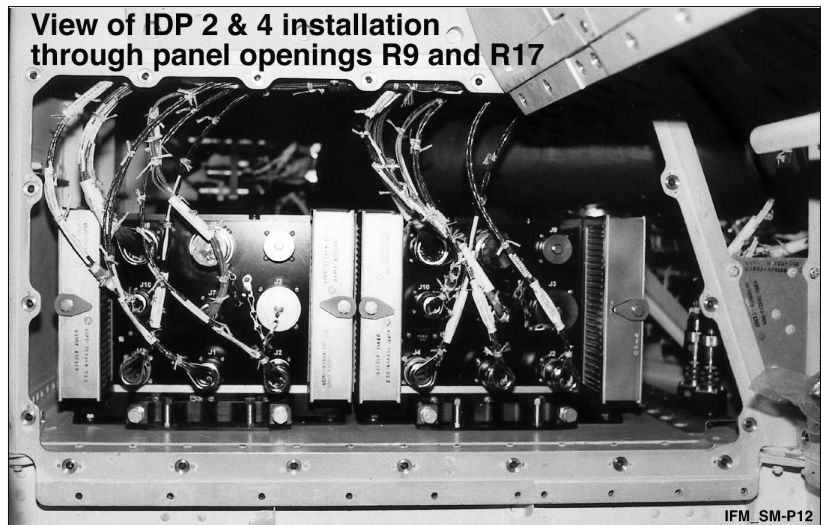
15. Install IDP 4 into IDP 1(3) position and loosely install mounting bolts
16. Install retainer (torque fasteners, 100 in-lb)
17. Tighten Pusher Bolts (torque, 40 in-lb). Tighten Jam Nuts snug
18. Tighten IDP mounting bolts (torque, 100 in-lb)
19. ✓ IDP filter-guide tab in open position
20. Position filter over IDP handle so alignment tabs protrude into IDP air inlet
21. Rotate guide tab to Lock position; ensure retainer engages IDP handle
22. Tighten filter-retaining bolt snug
23. Install connectors:
 - For IDP 1 location, swap protective caps between J8 and J9 on each IDP; connect
 - Cable 30V77W1P234 to J4
 - W6P232 to J2
 - W5P237 to J7
 - W23P239 to J9
 - W5P230 to J10
 - W9P231 to J1
 - For IDP 3 location, move protective cap from IDP 4 J9 to IDP 3 J9; connect
 - Cable 30V77W1P254 to J4
 - W6P252 to J2
 - W9P257 to J7
 - W26P258 to J8
 - W24P259 to J9
 - W7P250 to J10
 - W9P251 to J1
24. Repeat steps 15–22 for installation of IDP 1(3) into IDP 4 position
25. Contact MCC if reinstallation of connectors desired; otherwise, tape over connector interfaces and secure harnesses to structure
26. Install closeouts L8,L16, then L9,L17 (torque fasteners, 30 in-lb)
27. Stow tools

FOR IDP 2 TO 4 CABLE SWAP

28. On active PASS KYBD, GPC/CRT 02 EXEC
✓Big 'X' and 'POLL FAIL'
29. For IDP 2
MDU C2 CRT2 PWR – OFF
IDP/CRT2 PWR sw – OFF
30. On active PASS KYBD, GPC/CRT 04 EXEC
✓Big 'X' and 'POLL FAIL'
31. For IDP 4
MDU R11 CRT4 PWR – OFF
IDP/CRT4 PWR sw – OFF
32. Remove closeouts R17,R9 (17 and 19 fasteners,
5/32-in Allen Head Driver)



33. Remove cable clamp from structure (one screw, #10 Torque Driver); remove clamp from wire bundle. Stow clamp and screw



34. Don Anti-Static Wrist Tethers, clip to unpainted ground as reqd
35. Remove cables from IDP 4. Tape over face of connectors and tape out of way
36. Remove cables from IDP 2. Cut wire ties as reqd to allow cables to be connected to IDP 4 w/o stretch/strain
37. Connect cables:
 - 30V77W2P244 from IDP 2 to J4 of IDP 4
 - W7P247 from IDP 2 to J7 of IDP 4
 - W22P248 from IDP 2 to J8 of IDP 4
 - W5P240 from IDP 2 to J10 of IDP 4
 - W9P241 from IDP 2 to J1 of IDP 4
 - W6P242 from IDP 2 to J2 of IDP 4

IDP CHECKOUT

NOTE

If problems/errors detected at any time during self-test stop procedure, ✓MCC and report results. Use CRT MDU connected to replaced IDP for following checkout

IDP POWERUP

- C2 MDU 38. IDP/CRT1(2,3) PWR sw – ON
39. CRT1(2,3) PWR – ON
40. MAIN MENU:DPS
✓Following appears on CRT MDU (adjust brightness if reqd):
Time Fields (upper RH corner)
Big 'X'
'POLL FAIL' (lower RH corner)
- C3 41. ✓BFC/CRT SEL – OFF
- C2 42. GPC/CRT desired GPC/(IFM'ed IDP) EXEC (on active PASS KYBD)
43. ✓OPS display appears on MDU
If any other display appears,
RESUME (✓OPS display appears on MDU)
FAULT (✓FAULT display appears)
RESUME (✓OPS display appears)
44. IDP/CRT1(2,3) MAJ FUNC – GNC, SM, PL
(✓proper response for each sw position)

PERFORM IDP SELF-TEST

- MDU 45. MAIN MENU:MEDS MAINT:CST:START IDP
✓MEDS MAINT DISPLAY appears on MDU
✓"IDP 1 (2,3) INTERACTIVE CST" appears on bottom of screen
- C2 MDU 46. L(R) IDP/CRT SEL sw – 1(2,3) (IFM'ed IDP)
47. ✓All KYBD entries echoed next to "KEYSTROKE:" on lower RH corner of display by pressing each key on KYBD
- C2 48. If IDP 3 C/O:
R(L) IDP/CRT SEL sw – 3 (alt KYBD)
Repeat step 47 w/alt KYBD

49. L(R) IDP/CRT SEL sw (both) – (non IFM'ed IDP)
✓“ACTIVE KYBD:” blank on bottom middle of display
- O6 50. IDP 1(2,3) LOAD – LOAD
✓“IDP LOAD: LOAD” on bottom left of display
- MDU 51. MAIN MENU:MEDS MAINT: CST:START
IDP:HW CST
Expect 'I/O ERROR CRT 1(2,3)' msg
Wait up to 60 sec
✓IDP 1(2,3) box, rows 2,3 show all zeroes

VERIFY PROPER FC BUS INTERFACE

- MDU 52. MAIN MENU:FLT INST:ORBIT:ADI:DATA BUS
✓ADI DISPLAY appears and no “OFF” flags observed when selecting each FC bus
If “OFF” flags observed, ✓MCC >>
53. Pwr ON(OFF) MDUs, IDPs, and config displays as desired

MEDS KEYBOARD CHANGEOUT (2:00 hr)(15 min C/O)

OBJECTIVE: Replace failed fwd MEDS Keyboard w/aft Keyboard

NOTE

This procedure will not be performed for failure of individual key

LOCATION: Fwd Keyboards – pnl C2
Aft Keyboards – pnl R11L

TOOLS REQD:

TOOL Gray Tape
3/8-in Deepwell Socket
Ratchet Wrench
1/4-in to 3/8-in Adapter
Torque Wrench
Driver Handle
5/32-in Allen Head Driver
#6 Torque Driver
#10 Torque Driver
Anti-Static Wrist Tethers

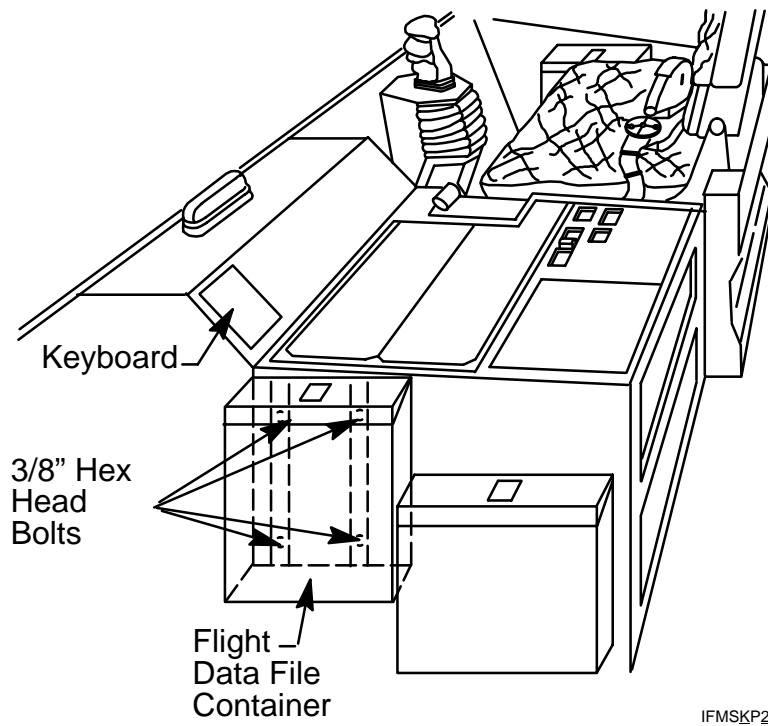
TO REMOVE FWD KEYBOARD

1. On active PASS KYBD, GPC/CRT 03/01,02 EXEC as reqd
2. ✓Big 'X' and 'POLL FAIL'

NOTE

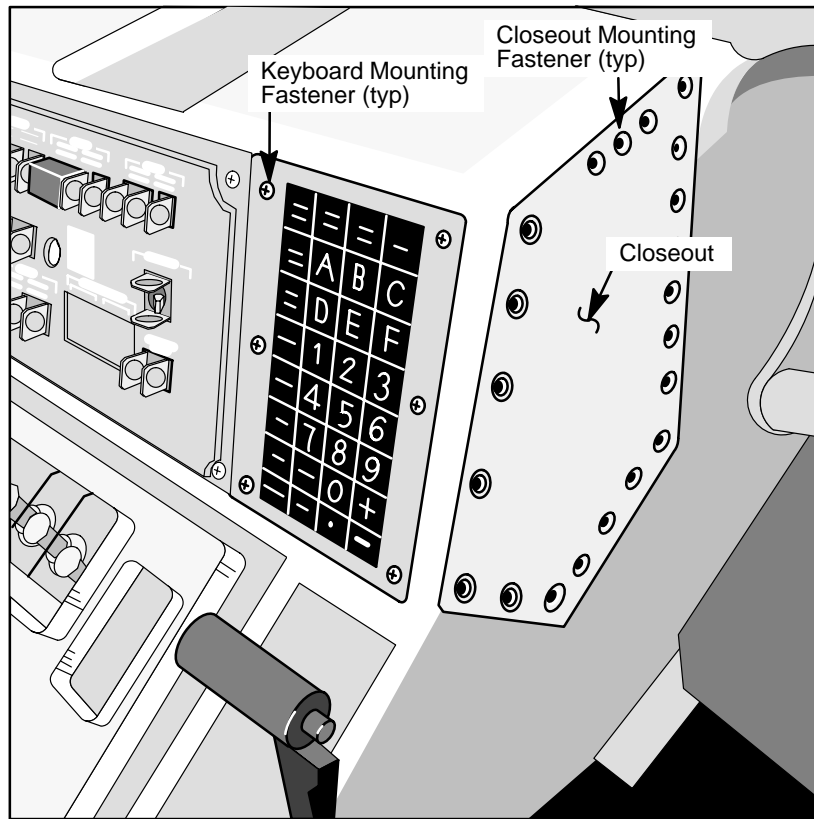
Expect 'PORT CHANGE' and 'MDU is autonomous' msgs when performing steps below

3. For left Keyboard
L4:R | cb AC3 Φ B INST L/CTR – op
C2 | IDP/CRT1,3 PWR sw (two) – OFF
For right Keyboard
L4:R | cb AC1 Φ A INST R – op
C2 | IDP/CRT2,3 PWR sw (two) – OFF



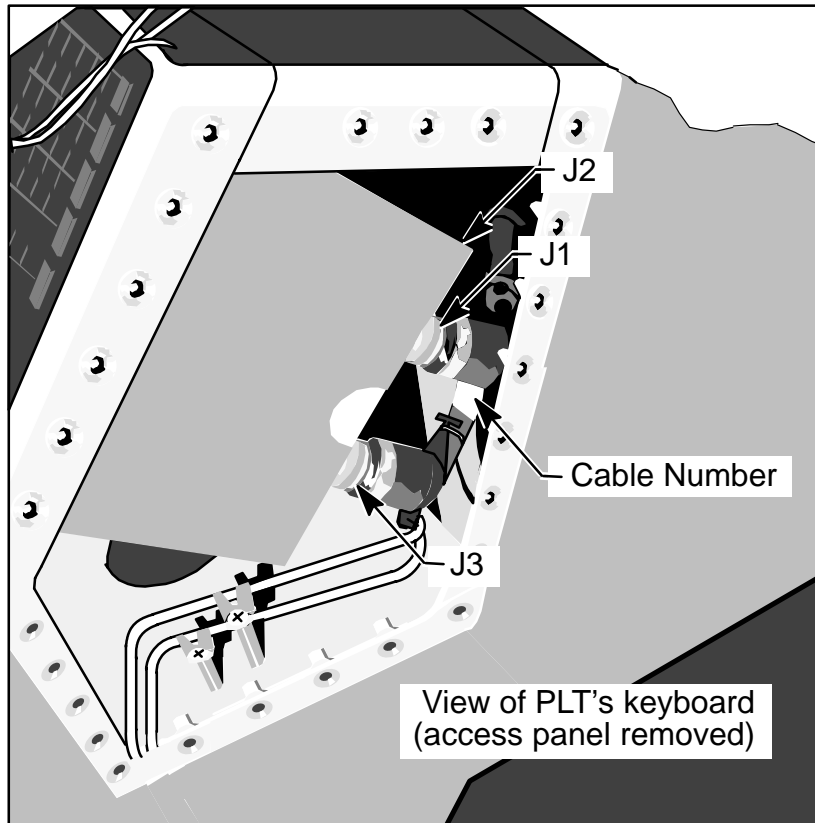
IFMSKP2

4. FDF Container blocks access to CDR's station access pnl, remove using 3/8-in Deepwell Socket



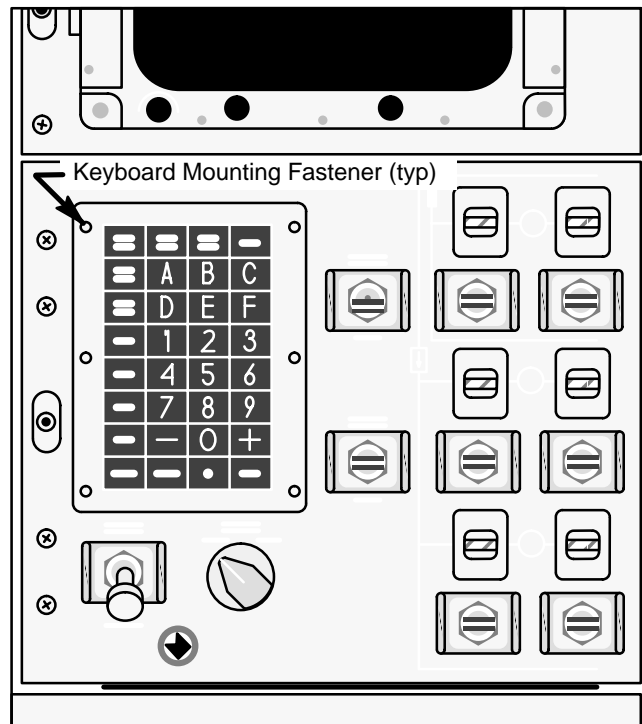
ifm_sK_p3

5. Remove closeout (PLT's shown) (twenty-six, 5/32-in Allen Head Driver)
6. Loosen Keyboard mounting fasteners (six, #6 Torque Driver)



ifm_s4_p8

7. Don Anti-Static Wrist Tethers, clip to unpainted ground as reqd
8. Disconnect cables:
 - For PLT Keyboard, disconnect:
 - Cable 35V77W4P4 from J1
 - W1P5 from J2
 - W2P6 from J3
 - For CDR Keyboard, disconnect:
 - Cable 35V77W3P1 from J1
 - W1P2 from J2
 - W5P3 from J3
9. Remove failed Keyboard and mark w/tape



TO REMOVE AFT KEYBOARD

10. On active PASS KYBD, GPC/CRT 04 EXEC
11. ✓Big 'X' and 'POLL FAIL'

NOTE

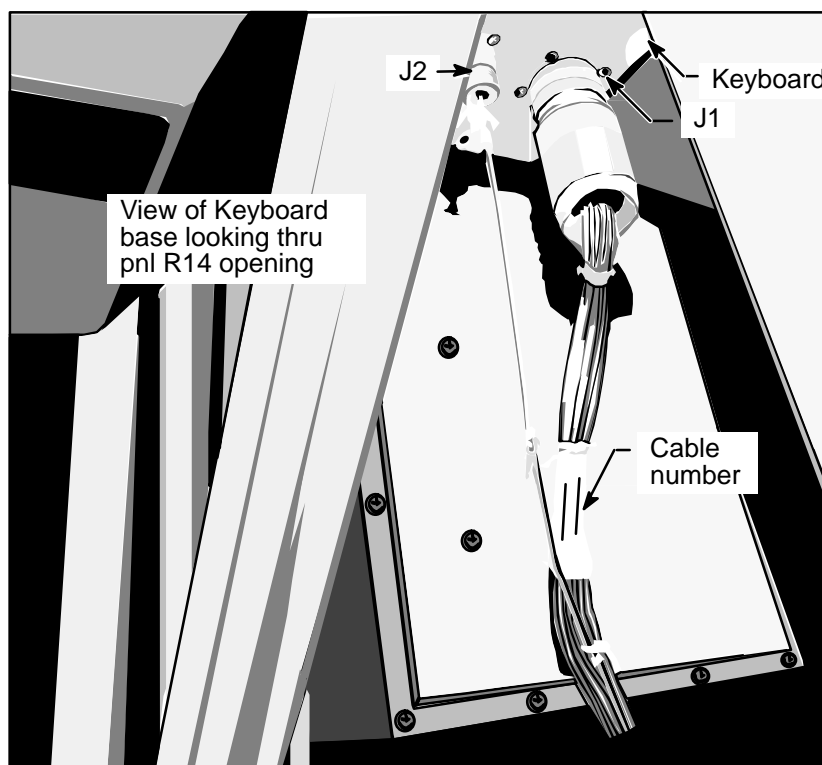
Expect 'PORT CHANGE' and 'MDU is autonomous' msgs when performing steps below

- | | |
|------|-------------------------------------|
| L4:Q | 12. cb AC3 ϕ B LTG PNL MS – op |
| R11 | 13. IDP/CRT4 PWR sw – OFF |

NOTE

Aft Keyboard connectors may be accessed thru pnls R12(R17,R18) depending on aft deck config

14. Remove fasteners from R17(R18) (5/32-in Allen Head Driver) or screws from R12 (#10 Torque Driver) (screws not captive, secure w/tape)
15. Loosen Keyboard mounting fasteners (six, #6 Torque Driver)



16. Don Anti-Static Wrist Tethers, clip to unpainted ground as reqd
17. Disconnect Cables
Cable 30V77W28P66 from J1
W2P67 from J2
18. Remove Keyboard

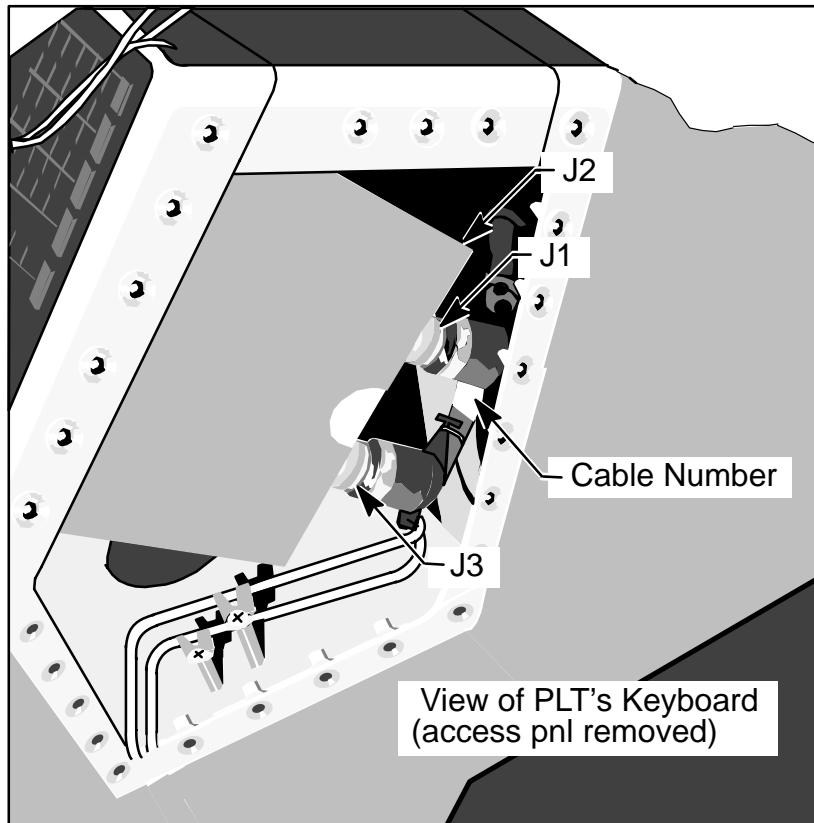
TO INSTALL AFT KEYBOARD FWD

19. Remove protective cap from J3 of aft Keyboard and install it on J3 of fwd Keyboard

NOTE

Fasteners on aft Keyboard longer than those on fwd, thus preventing snug fit

20. To prevent aft Keyboard from vibrating during entry, shim w/Gray Tape as reqd



ifm_s4_p8

21. Slide Keyboard into pnl and install connectors

22. For PLT Keyboard location, connect:

Cable 35V77W4P4 to J1

W1P5 to J2

W2P6 to J3

For CDR Keyboard location, connect:

Cable 35V77W3P1 to J1

W1P2 to J2

W5P3 to J3

23. Tighten Keyboard fasteners (six) snug

24. Install closeout (torque, 30 in-lb)

TO INSTALL FWD KEYBOARD AFT

25. Tape over connector interfaces. Tape harnesses to structure

26. Slide Keyboard into pnl, snug fasteners

R12, R17,R18 27. Install R12(R17,R18) (torque, 30 in-lb)

28. Stow tools, tape

KEYBOARD CHECKOUT

NOTE

If problems encountered during checkout, stop procedure immediately and DO NOT proceed. ✓MCC for further analysis

SYSTEM POWERUP

29. For left Keyboard

C2 IDP/CRT1,3 PWR sw (two) – ON

MDU CRT 1,3 PWR (two) – ON

L4:R cb AC3 Φ B INST L/CTR – cl (✓Keyboard lighting by adjusting O6 LTG INST L/CTR as reqd)

For right Keyboard

C2 IDP/CRT2,3 PWR sw (two) – ON

MDU CRT 2,3 PWR (two) – ON

L4:R cb AC1 Φ A INST R – cl (✓Keyboard lighting by adjusting O8 LTG INST R as reqd)

30. ✓BFC/CRT SEL – OFF

IF LEFT KEYBOARD CHANGED OUT:

- C2 31. Assign IDP 3:
Select desired MAJ FUNC
GPC/CRT desired GPC/3 EXEC (on active
PASS KYBD)
- MDU 32. L IDP/CRT SEL – 3
- MDU 33. Perform KEYSTROKE CHECKOUT on CRT 3
(steps 45,46)
- C2 34. Assign IDP 1:
Select desired MAJ FUNC
GPC/CRT desired GPC/1 EXEC (on active
PASS KYBD)
- MDU 35. L IDP/CRT SEL – 1
- MDU 36. Perform KEYSTROKE CHECKOUT on CRT 1
(steps 45,46)
- 37. Pwr ON(OFF) MDUs, IDPs, and config displays
as desired >>

IF RIGHT KEYBOARD CHANGED OUT:

- C2 38. Assign IDP 3:
Select desired MAJ FUNC
GPC/CRT desired GPC/3 EXEC (on active
PASS KYBD)
- MDU 39. R IDP/CRT SEL – 3
- MDU 40. Perform KEYSTROKE CHECKOUT on CRT 3
(steps 45,46)
- C2 41. Assign IDP 2:
Select desired MAJ FUNC
GPC/CRT desired GPC/2 EXEC (on active
PASS KYBD)
- MDU 42. R IDP/CRT SEL – 2
- MDU 43. Perform KEYSTROKE CHECKOUT on CRT 2
(steps 45,46)
- 44. Pwr ON(OFF) MDUs, IDPs, and config displays
as desired >>

KEYSTROKE CHECKOUT

- MDU 45. MAIN MENU:MEDS MAINT:CST:START IDP
✓MEDS MAINT DISPLAY appears on MDU
✓“IDP 1 (2,3) INTERACTIVE CST” appears on
bottom of screen

NOTE

Expect “IDP CST INITIATED” on other
MDUs currently commanded by IDP

- C2 46. ✓All KYBD entries are echoed next to
“KEYSTROKE:” on bottom RH corner of display
by pressing each key on KYBD

MEDS MDU CHANGEOUT

(45 min)
(15 min C/O)

OBJECTIVE: Replace failed MDU w/operational MDU

LOCATION: Pnl F6 for CDR1, CDR2
Pnl F7 for CRT1, CRT2, CRT3, MFD1, MFD2
Pnl F8 for PLT1, PLT2
Pnl R11 for CRT4
Pnl AFT for AFD1

TOOLS REQD:

TOOL Gray Tape
 Connector Pliers
 Ratchet Wrench
 3/32-in Allen Head Driver
 Anti-Static Wrist Tethers

CAUTION

No tools are to be used to aid
in inserting(dislodging) MDU
during its installation(removal)

NOTE

✓MCC for MDUs to be swapped

MDU PWRDN

1. For CDR1(2)
MDU CDR1(2) PWR – OFF
L4:R cb AC3 Φ B INST L/CTR – op
R14:A cb MNC(B) MDU/CDR1(2) – op
For CRT1(2,3)
MDU CRT1(2,3) PWR – OFF
L4:R cb AC3 Φ B INST L/CTR – op
C2 IDP/CRT1(2,3) PWR sw – OFF
For CRT4
MDU CRT4 PWR – OFF
L4:Q cb AC3 Φ B LTG PNL MS – op
R11 IDP/CRT4 PWR sw – OFF

	For MFD1(2)
MDU	MFD1(2) PWR – OFF
L4:R	cb AC3 Φ B INST L/CTR – op
R14:A	cb MNB(A) MDU/MFD1(2) – op
	For PLT1(2)
MDU	PLT1(2) PWR – OFF
L4:R	cb AC1 Φ A INST R – op
R14:A	cb MNA(C) MDU/PLT1(2) – op
	For AFD1
MDU	AFD1 PWR – OFF
L4:Q	cb AC1 Φ C LTG INST OS – op
R14:A	cb MNC MDU/AFD1 – op

MDU REMOVAL

2. Don Anti-Static Wrist Tethers, clip to unpainted ground as reqd
3. Loosen four front pnl fasteners (3/32-in Allen Head Driver)
4. Slide MDU out
5. Disconnect vehicle harness cables from MDU
6. Pull until clear of mounting bracket, mark failed MDU w/Gray Tape

TO INSTALL MDU

NOTE

CRT1(2,3,4) has shorting plug installed on receptacle J2

7. Mate connector as reqd

FWD MDUs

<u>For CDR1, connect</u>			<u>For CDR2, connect</u>			<u>For CRT1, connect</u>		
Cable	to	MDU	Cable	to	MDU	Cable	to	MDU
34P27	to	J1	34P24	to	J1	34P4	to	J1
34P22	to	J2	34P25	to	J2	34P6	to	J3
34P23	to	J3	34P26	to	J3	Short- ing Plug	to	J2

<u>For CRT2, connect</u>			<u>For CRT3, connect</u>			<u>For MFD1, connect</u>		
Cable	to	MDU	Cable	to	MDU	Cable	to	MDU
34P7	to	J1	34P11	to	J1	34P15	to	J1
34P9	to	J3	34P13	to	J3	34P16	to	J2
Short- ing Plug	to	J2	Short- ing Plug	to	J2	34P17	to	J3

<u>For MFD2, connect</u>			<u>For PLT1, connect</u>			<u>For PLT2, connect</u>		
Cable	to	MDU	Cable	to	MDU	Cable	to	MDU
34P19	to	J1	34P21	to	J1	34P24	to	J1
34P20	to	J2	34P22	to	J2	34P25	to	J2
34P21	to	J3	34P23	to	J3	34P26	to	J3

AFT MDUs

<u>For CRT4, connect</u>			<u>For AFD1, connect</u>		
Cable	to	MDU	Cable	to	MDU
30P68	to	J1	30P857	to	J1
30P69	to	J3	30P845	to	J2
Short- ing Plug	to	J2	30P849	to	J3

- Slide MDU into pnl

NOTE

Start all fasteners before tightening them

- Tighten four front fasteners snug (3/32–in Allen Head Driver)

MDU CHECKOUT

NOTE

If problems encountered during checkout, stop procedure immediately. ✓MCC for further actions

IDP POWERUP

- C2/R11 10. Pwr up all IDPs interfacing w/affected MDU
11. Aff IDP/CRT1(2,3,4) PWR – ON

MDU POWERUP

12. For CDR1(2)
R14:A cb MNC(B) MDU/CDR1(2) – cl
MDU CDR1(2) PWR – ON
 ✓MDU not AUTONOMOUS
L4:R cb AC3 ΦB INST L/CTR – cl (✓Edgekey
 lighting by adjusting O6 LTG INST L/CTR
 as reqd)
- For CRT1(2,3)
MDU CRT1(2,3) PWR – ON
 ✓MDU not AUTONOMOUS
L4:R cb AC3 ΦB INST L/CTR – cl (✓Edgekey
 lighting by adjusting O6 LTG INST L/CTR
 as reqd)
- For CRT4
MDU CRT4 PWR – ON
 ✓MDU not AUTONOMOUS
L4:Q cb AC3 ΦB LTG PNL MS – cl (✓Edgekey
 lighting by adjusting R10 MS LTG as reqd)
- For MFD1(2)
R14:A cbMNB(A) MDU/MFD1(2) – cl
MDU MFD1(2) PWR – ON
 ✓MDU not AUTONOMOUS
L4:R cb AC3 ΦB INST L/CTR – cl (✓Edgekey
 lighting by adjusting O6 LTG INST L/CTR
 as reqd)

R14:A MDU	For PLT1(2) cb MNA(C) MDU/PLT1(2) – cl PLT1(2) PWR – ON
L4:R	✓MDU not AUTONOMOUS cb AC1 Φ A INST R – cl (✓Edgekey lighting by adjusting O8 LTG INST R as reqd)
R14:A MDU	For AFD1 cb MNC MDU/AFD1 – cl AFD1 PWR – ON
L4:Q	✓MDU not AUTONOMOUS cb AC1 Φ C LTG INST OS – cl (✓Edgekey lighting by adjusting A6A1 OS LTG as reqd)

VERIFY PRIMARY,SECONDARY PORT (Non-CRT MDU)

MDU	13. Record current MDU Port (*):
	14. MAIN MENU:MEDS MAINT:CONFIG STATUS:PORT SELECT ✓Alt Port Selected (*) and MDU not AUTONOMOUS

PERFORM MDU SELF-TEST

MDU	15. MAIN MENU:MEDS MAINT:CST:START MDU
-----	--

NOTE

Expect "MEDS I/O ERROR" msg
annunciated for affected MDU.
Do not perform MEDS MSG
RST(ACK) until CST complete

16. ✓Following displays appeared for ~10 sec each:

- a. Blank
- b. All red
- c. All Green
- d. All Blue
- e. All White
- f. Graphics Test Pattern

NOTE

During next step, pressing an edgekey twice will cause CST to fail

17. ✓White dots appear above each edgekey
Press,release each edgekey, ✓white dot above it disappears
18. Wait until system status display appears
✓Affected MDU line 6 of SYSTEM STATUS = 0000FF
19. Reconfig MEDS as desired
 - ✓NEG viewing angle
 - ✓FC Bus assignment
 - ✓MDU Port assignment

MMU CONTINGENCY PWRUP

(1:30 hr)

OBJECTIVE: Recover one MMU if failure due to loss of orbiter pwr

LOCATION: See (COMPONENT LOCATIONS)

AV BAY 1, Zone 28G for MMU 1

AV BAY 2, Zone 71G for MMU 2

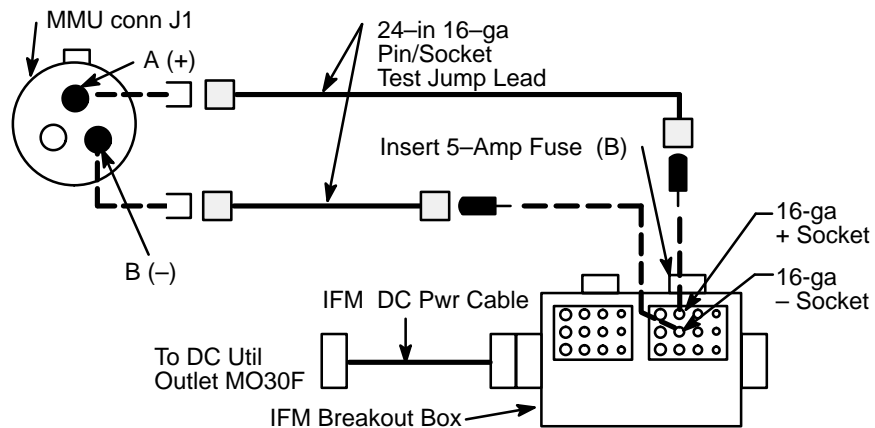
TOOLS REQD:

TOOL Gray Tape
Pin Kit (16-ga Pin/Socket Test Jumper Leads)
Locker Tool
Torque Wrench
Driver Handle
1/4-in to 3/8-in Adapter

BOB IFM Breakout Box

CHCK DC PWR cable

- O14:F 1. MMU 1(2) – OFF
(O15:F)
- MO30F 2. ✓DC UTIL PWR MNC – OFF
3. a. Breakout Box:
AUX – OFF
28V VAR VOLT – 28V
PWR A,B – OFF
- b. Remove Fuse Cap, from side B
- c. Rotate GA SEL B – 16
- d. Install 5–Amp Fuse, replace cap
4. Remove locker, Thermal/Debris Traps to access MMU 1(2)
5. Remove connector from J1 on MMU 1(2) and install Breakout Box and cables as shown:



M-34

IFM/ALL/GEN E

- MO30F
6. Perform pwrup and checkout
DC UTIL PWR MNC – ON
Breakout Box:
PWR B – ON (16 lt ON)
 7. X: SM 1 DPS UTILITY
MMU STATUS 1(2) RDY (within 34 sec)
If busy, consult MCC
MMU 1(2) ASSIGN – ITEM 3(4)(*)
 8. Perform SM CHECKPOINT INITIATE (Cue Card)
to MMU 1(2) only and report results
 9. Install Thermal/Debris Trap using care not to
pinch wires. Secure Breakout Box, cables as
reqd
 10. Stow locker
 11. Stow tools, tape

MMU CHANGEOUT

(2:00 hr)

OBJECTIVE: Swap failed MMU w/operational MMU. This will be done only when one MMU hard failed internally and other MMU failed externally (has bad data path)

LOCATION: See (COMPONENT LOCATIONS)

AV BAY 1, Zone 28G for MMU 1

AV BAY 2, Zone 71G for MMU 2

TOOLS REQD:

TOOL	Gray Tape
	Locker Tool
	3/8-in Deepwell Socket
	Torque Wrench
	Driver Handle
	1/4-in to 3/8-in Adapter
CHCK	Coldplate Protective Cover

TO REMOVE MMU

- O14:F
(O15:F)
1. MMU 1,2 – OFF
 2. Remove lockers and Thermal/Debris Traps to access MMUs 1,2
 3. Remove connector cables J1,J2,J3 on MMU 1,2
 4. Loosen mounting fasteners (ten, 3/8-in Deepwell Socket)
 5. Slide Coldplate Protective Cover between coldplate and MMU
 6. Remove unit w/protective cover
 7. Mark hard-failed unit w/Gray Tape

TO INSTALL MMU

8. Place MMU w/Coldplate Protective Cover into position. Remove cover, tighten fasteners (torque, 70 in-lb)
9. Install connectors:

In MMU 1 Location, connect		In MMU 2 Location, connect	
Cable	MMU	Cable	MMU
81V77W8P21	to J1	82V77W8P21	to J1
	P22 to J2		P22 to J2
	P23 to J3		P23 to J3

10. Install Thermal/Debris Traps
 11. Perform MMU pwrup and checkout
MMU 1(2) – ON
- O14:F
(O15:F)
12. X: SM 1 DPS UTILITY
 - ✓MMU STATUS 1(2) – RDY (within 34 sec)
If busy, consult MCC
 - ✓MMU 1(2) ASSIGN – ITEM 3(4)(*)
 13. Perform SM CHECKPOINT INITIATE (ORB OPS, DPS) to MMU 1(2) only, advise MCC of results
 14. Install lockers (torque, 30 in-lb)
 15. Stow tools, tape

Section N
Intentionally
Omitted

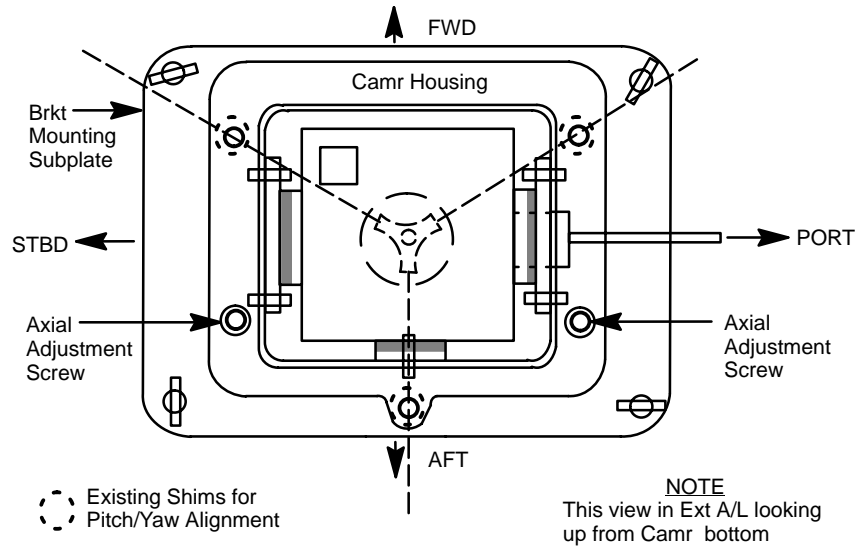
ODS CENTERLINE CAMR ANGULAR ALIGNMENT (2:00 hr)

OBJECTIVE: Verify, adjust ODS Centerline Camr alignment

LOCATIONS: External Airlock, AFD

TOOLS REQD:

TOOL 3/16-in Allen Driver
 1/4-in Allen Driver
 1/4-in Ratchet Wrench
 Torque Wrench
 Tape Measure
MISC Feeler Gage (shims)



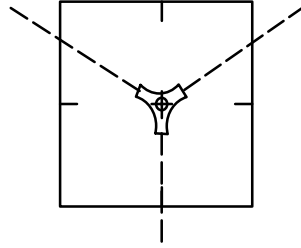
VERIFY CAMERA POSITION

- ✓ Camr position relative to ODS structure by measuring from A,B,C decals on brkt mounting subplate to corresponding A,B,C decals on ODS wall and compare to following preflight values (Tape Measure)

Camr	Fwd Decal B	Aft No Decal	Port Decal C	Stbd Decal A
Primary	25 1/4-in	26 1/16-in	24-in	24 1/16-in
Backup	25 5/16-in	26-in	24 1/16-in	24 1/16-in

VERIFY ANGULAR ALIGNMENT

- AFD
2. Set up CCTV monitor for C/L Camr view
 3. Adjust Camr zoom setting to $22.0^\circ \pm 0.5^\circ$
 - ✓ Monitor lower vert tick mark and monitor center vert crosshair coincide w/target vert support wire, and are parallel w/same. If wire, crosshair, tick mark overlay each other, no yaw(axial) alignment needed



4. ✓ Intersection of monitor vert, horiz crosshair falls within target circular opening from $\sim 10^\circ$ – 39° zoom range of Camr
5. Report results of both translational, angular verifications to MCC

ADJUST ANGULAR ALIGNMENT

FOR AXIAL MISALIGNMENT

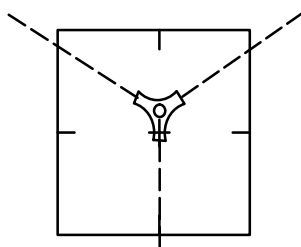
- Ext A/L
6. Loosen, but do not remove three (3) screws at shim locations and two (2) axial adjustment screws, as indicated in diagram on O-1 (1/4-in Allen Driver, Ratchet Wrench)
 7. Twist Camr housing to align monitor lower vert tick mark w/target vert support wire
 8. Tighten two (2) axial alignment screws (45 in-lb) (1/4-in Allen Driver, Torque Wrench)

NOTE

Following sections are written for pure vert(horiz) misalignment. For both, sections may be executed in parallel

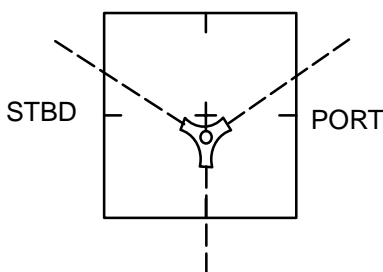
FOR VERTICAL MISALIGNMENT

9. Loosen, but do not remove three (3) screws at shim locations, as indicated in diagram on O-1 (1/4-in Allen Driver, Ratchet Wrench)
10. If crosshairs below target circle:



Place appropriately thick Feeler Gage (shims) between Camr housing and brkt mounting subplate at both loosened screws on fwd side. Tighten screws (45 in-lb) (1/4-in Allen Driver, Torque Wrench)

11. If crosshairs above target circle:



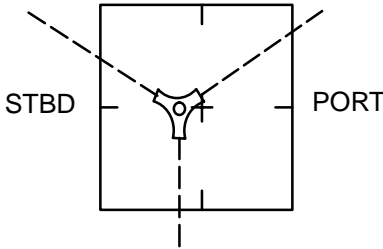
Place appropriately thick Feeler Gage (shims) between Camr housing and brkt mounting subplate at loosened fastener on aft side. Tighten screws (45 in-lb) (1/4-in Allen Driver, Torque Wrench)

12. ✓ Alignment by repeating steps 2 thru 5; repeat steps 9,10(9,11) as necessary to achieve proper alignment

FOR HORIZONTAL MISALIGNMENT

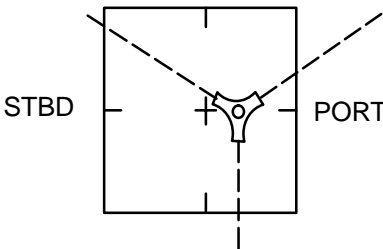
- Ext A/L 13. Loosen, but do not remove three (3) screws at shim locations as indicated in diagram on O-1 (1/4-in Allen Driver, Ratchet Wrench)

14. If crosshairs to right of target circle:



Place appropriately thick Feeler Gage (shims) between Camr housing and brkt mounting subplate on stbd side at each corner, taking care to avoid changing pitch orientation (unless desired). Tighten screws (45 in-lb) (1/4-in Allen Driver, Torque Wrench)

15. If crosshairs to left of target circle:



Place appropriately thick Feeler Gage (shims) between Camr housing and brkt mounting subplate on port side at each corner, taking care to avoid changing pitch orientation (unless desired). Tighten screws (45 in-lb) (1/4-in Allen Driver, Torque Wrench)

- AFD 16. ✓ Alignment by repeating steps 2 thru 5; repeat steps 13,14(13,15) as necessary to achieve proper alignment

17. Stow tools

OIU CABLE SWAP

(45 min)

OBJECTIVE: Recover commands/data lost due to PSP/OIU failure by swapping J3 connectors at OIU 1,2

LOCATION: Flt Deck, normally Pnl L11 for OIUs and Pnl L14 for OIU cable access at rear of LRU

NOTE

Nominal orbiter config has commands routed PSP1 to OIU 1 and PSP 2 to OIU 2. Cable swap reroutes PSP 1 to OIU 2 and PSP 2 to OIU 1, and changes OIU 1 to PDI Input 2 and OIU 2 to PDI Input 1

TOOLS REQD:

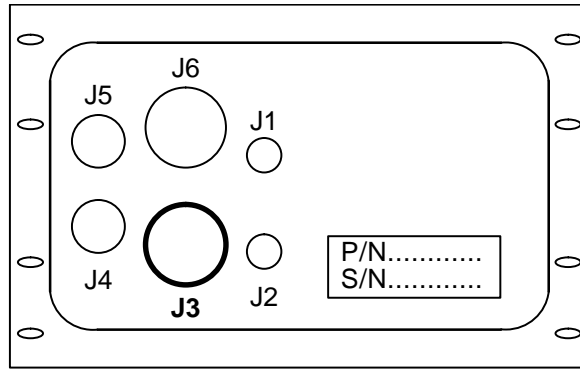
TOOL Gray Tape
 Pwr Screwdriver
 #10L Torque Tip
 1/4-in to 3/8-in Adapter
 5/32-in Allen Head Driver
 Torque Wrench
 Inspection Mirror
 Wire Cutters
MISC Flashlight

- A1L 1. ✓S-BD PL CNTL – CMD
 ✓PSP CMD OUTPUT – PL UMB
 ✓SEL – PSP
 PWR SYS – OFF
 CNTL – PNL
- L11 2. OIU PWR – OFF (tb-bp)

NOTE

PL Timing Buffer low level timing signals will remain active on following connector demate, remate

3. Remove Panel L14 (six screws, #10L Torque Tip; 12 fasteners, 5/32-in Allen Head Driver)
4. Demate cable P13 (J3) from OIU 1 and P23 (J3) from OIU 2. Remove wire ties if necessary (Wire Cutters)



REAR VIEW OF OIU

5. Remate cable P13 (J3) to OIU 2 and P23 (J3) to OIU 1

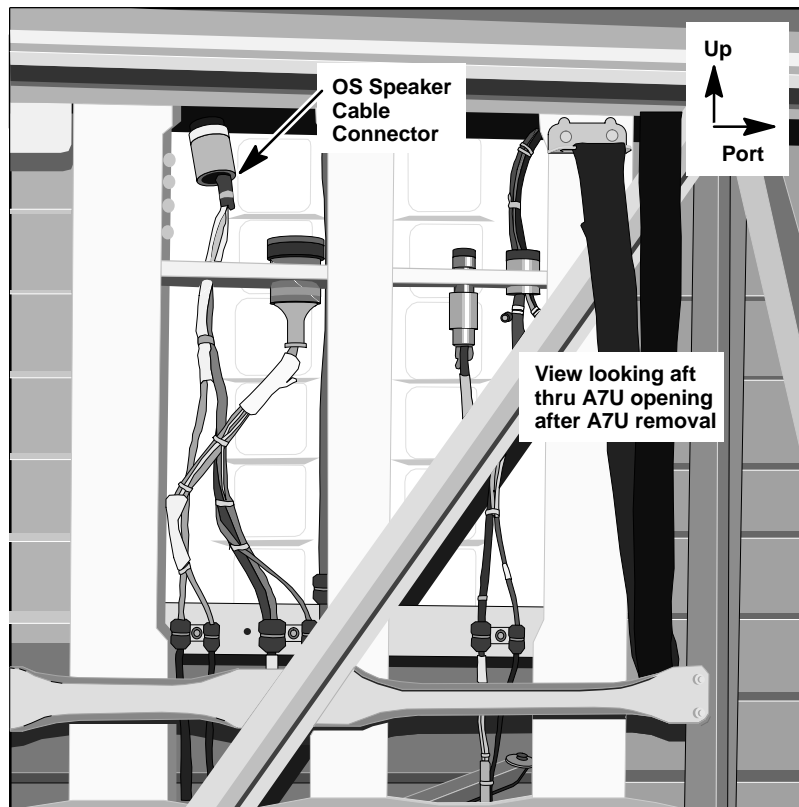
OIU ACTIVATION

6. S-BD PL CNTL – CMD
PWR SYS – 2(1)
CNTL – PNL,CMD

NOTE

OIU 1 now connected to PSP 2
and OIU 2 connected to PSP 1

7. Perform I/O RESET on PSP 2(1):
SPEC 62 – ITEM 7(6) EXEC
- L11 8. OIU PWR – OIU 1(2) ON (tb-UP/DN)
Advise MCC of OIU activation for PDI,OIU reconfig
9. Reinstall Panel L14, (six screws/12 fasteners, torque 30 in-lb); stow tools



108-KSC-379C-2236/8

sOp2

5. Remove connector plug from Speaker Box
6. Tape over plug interface and tape/secure harness to structure
- A7U 7. Reinstall A7U, eight bolts/washers (torque, 30 in-lb)
 - * If reqd: *
 - * Reinstall RHC wire harness *
 - * clamp behind A7C from aft *
 - * station structure (torque, *
 - * 30 in-lb) *
8. For A7C blank pnl:
 - Install pnls A7C,A8L (torque, 30 in-lb)
 - For APDS pnl:
 - Perform ORBIT STATION ACCESS,
 - step 9 (GENERAL INFORMATION)
9. Stow tools, tape

O2 SYS 1(2), FAILED XOVR VLV BYPASS

(45 min)

OBJECTIVE: Provide dual O2 sys supply, bypass failed closed O2 sys crossover valve using IFM hose between MO10W,C7

LOCATION: LEH panel connections, WCS ovhd

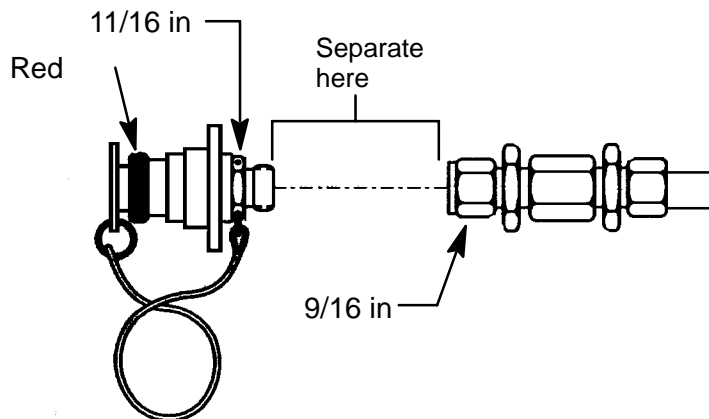
TOOLS REQD:

TOOL Gray Tape
 9/16-in Combination Wrench
 11/16-in Combination Wrench

CHCK R/R Hose

CONFIG R/R HOSE

- R/R Hose 1. Remove Red QD from each end of R/R Hose at dynatube connection (11/16-in and 9/16-in Combination Wrenches), temp stow



CONFIG PANELS

- C7 2. LEH O2 SPLY 1,2 vlv – CL
MO69M 3. LEH O2 8 vlv – CL
MO10W 4. O2 REG INLET SYS 1(2) vlv – CL
 5. Loosen Test Port (TP), TP4(3) cap two turns,
 (9/16-in Combination Wrench)
 6. Depress TP4(3) cap insert to relieve pressure
 7. Remove cap from TP4(3), temp stow

- | | | |
|-------|-----|--|
| | 8. | Install one end of R/R Hose onto TP4(3) (9/16–in Combination Wrench), snug |
| C7 | 9. | Loosen TP1 cap two turns (9/16–in Combination Wrench) |
| | 10. | Depress TP1 cap insert to relieve pressure |
| | 11. | Remove cap from TP1, temp stow |
| | 12. | Install other end of R/R Hose onto TP1 (9/16–in Combination Wrench), snug |
| | 13. | Secure R/R Hose to prevent sudden movement during pressurization (Gray Tape) |
| MO10W | 14. | O2 REG INLET SYS 1(2) vlv – OP |
| MO32M | 15. | LEH O2 5 vlv – OP |
| | 16. | ✓ Mask flow out of LEH 5; give MCC mark when test performed |
| | 17. | Following flow test: |
| MO69M | | LEH O2 8 vlv – OP |
| MO32M | | 5 vlv – CL |
| C7 | | SPLY 1,2 (two) – OP |
| | 18. | Stow tools |

OSVU CONTINGENCY PWRUP

(1:00 hr)

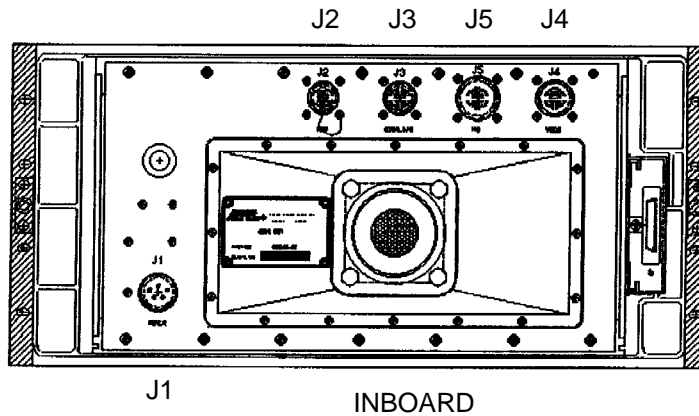
OBJECTIVE: Repower failed OSVU, due to failed switch(circuit breaker), using Breakout Box

LOCATION: Pnls R12,R15

TOOLS REQD:

TOOL	1/4-in to 3/8-in Adapter 5/32-in Allen Head Driver #10 Torque Tip Torque Wrench Ratchet Wrench Pin Kit (for Test Jumper leads,fuses) Connector Pliers Inspection Mirror Gray Tape
BOB	Breakout Box
CHCK	DC Pwr Cable
MISC	Flashlight

- | | |
|------|---|
| LCDM | 1. PWR – OFF |
| R12 | 2. ✓OSVS PWR – OFF
✓It – OFF |
| | 3. ✓cb OSVS Pwr – op |
| R15 | 4. Remove Pnl R15 (six #10 Torque Tip,
12 fasteners, 5/32-in Allen Head Driver) |
| | 5. Demate connectors P1(J1/Pwr), put Gray Tape
over face of connector and tape it aside. (Wire
bundle connector not used) |

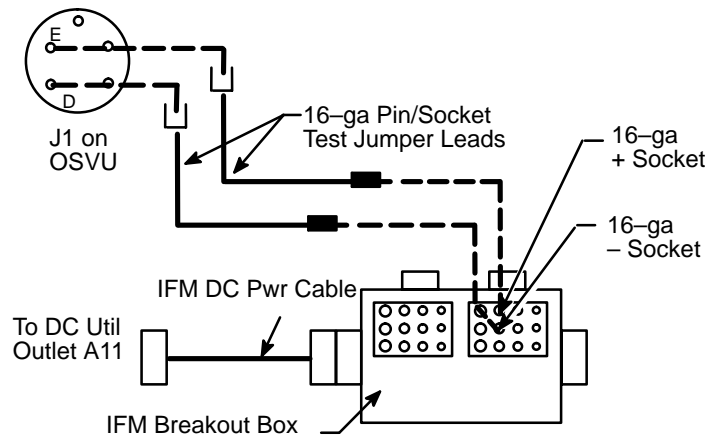


- | | |
|-----|---------------------------|
| A11 | 6. ✓DC UTIL PWR MNC – OFF |
|-----|---------------------------|

O-11

IFM/ALL/GEN E

7. a. Breakout Box:
 AUX – OFF
 28V/VAR V – 28V
 PWR A,B – OFF
- b. Remove fuse cap, side B
- c. Rotate GA SEL B – 16
- d. Install 10-Amp fuse, replace cap
- e. Connect two 24-in, 16-ga Pin/Socket Test Jumper Leads and 24 ft DC UTIL Cable as shown. Use Gray Tape to secure DC Pwr Cable and Breakout Box as reqd



- A11
8. DC UTIL PWR MNC – ON
 9. Breakout Box:
 PWR B – ON (16-ga It ON)

OSVU OPS COMPLETE

10. Breakout Box:
 PWR B – OFF
- A11 11. DC UTIL PWR MNC – OFF
12. Stow Breakout Box and cables
- R15 13. DO NOT reconnect P1(J1), leave secured to bulkhead
14. Place Gray Tape over J1 to protect pins
15. Replace Panel R15 (torque Fasteners, 30 in-lb)
16. Stow tools

OSVU REPLACEMENT

(1:00 hr)

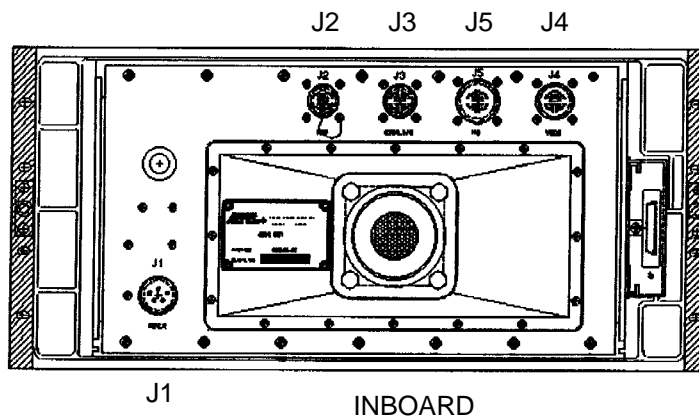
OBJECTIVE: Replace failed OSVU w/spare

LOCATION: Aft Flight Deck, Pnl R12L

TOOLS REQD:

TOOL #10 Torque Tip
1/4-in to 3/8-in Adapter
5/32-in Allen Head Driver
3/8-in Deepwell Socket
Torque Wrench
Ratchet Wrench
Anti-static Wrist Tether

- EXT 1. Unstow spare OSVU
A/L Bag
LCDM 2. PWR – OFF
R12 3. OSVS PWR – OFF
✓It – OFF
4. cb OSVS Pwr – op
R15 5. Remove Pnl R15 (six #10 Torque Tip,
12 fasteners, 5/32-in Allen Head Driver)



6. Don Anti-static Wrist Tether
7. Demate connectors P1(J1/Pwr), P4(J4/Video), P5(J5/HMI), and P3(J3/Serial I/O)
8. Loosen clamp on orbiter air cooling hose (3/8-in Deepwell Socket)
9. Demate orbiter air cooling hose from OSVU, temp stow clamp

- | | | |
|---------|-----|--|
| R12L | 10. | Remove OSVU mounting screws/washers (eight, #10 Torque Tip), temp stow |
| | 11. | Remove OSVU from panel, mark failed w/Gray Tape, temp stow |
| | 12. | Remove OSVU Hard Drive (HDD1) from failed unit |
| | 13. | Remove Dummy Hard Drive from spare OSVU |
| | 14. | Install spare OSVU Dummy Hard Drive into failed unit, tighten thumbscrews |
| | 15. | Install original OSVU Hard Drive into spare OSVU, tighten thumbscrews |
| | 16. | Slide spare unit into panel, hand tight mounting screws (eight, #10 Torque Tip) |
| R15 | 17. | Mate orbiter air cooling hose to OSVU |
| | 18. | Tighten clamp on orbiter air cooling hose, snug (3/8-in Deepwell Socket) |
| | 19. | Install connectors P3(J3/Serial I/O), P5(J5/HMI), P4(J4/Video), and P1(J1/Pwr) |
| R12L | 20. | Torque OSVU mounting screws, 30 in-lb |
| R15 | 21. | Install pnl R15 (six #10 Torque Tip, 12 fasteners, 5/32-in Allen Head Driver, torque 30 in-lb) |
| | 22. | Perform OSVS PWRUP (PDRS OPS, <u>OSVS OPS</u>) |
| EXT | 23. | Stow failed OSVU |
| A/L Bag | 24. | Stow tools |

PARACHUTE REPACK

(30 min)

OBJECTIVE: Repack upper parachute compartment to regain parachute deploy capability. Procedure does not completely repack parachute. However, it does secure drogue chute compartment to prevent early drogue chute deploy and possible entanglement at bailout

LOCATION: See MIDDECK (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL Gray Tape
 PPA Repack Kit
 Nylon Cord
 Curved Pin
 Large Ziploc Bag
 Scissors

CAUTION

Do not pull on the deployed pilot chute and riser. Pulling the pilot chute and riser may deploy the drogue chute and further complicate the repack procedure

1. Pull ripcord handle on left riser free from parachute pack. Place handle in Return-to-Houston bag

NOTE

Red pyros under pyro flap unfired. Accidentally pulling yellow cords attached to red pyros will fire pyros but is not hazardous. These pyros are no longer useful for parachute operation

2. Using scissors, cut two white pyro flap stitches securing pyro flap to top flap. These two flaps cover pilot/drogue chute compartment (photo 1) Separate pyro flap and top flap that are velcroed together (photo 2)
3. Carefully Gray Tape red pyros (two) toward base of pyro flap (photos 2,3)

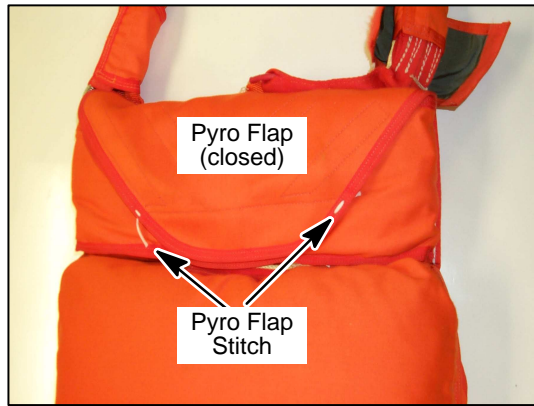


Photo 1

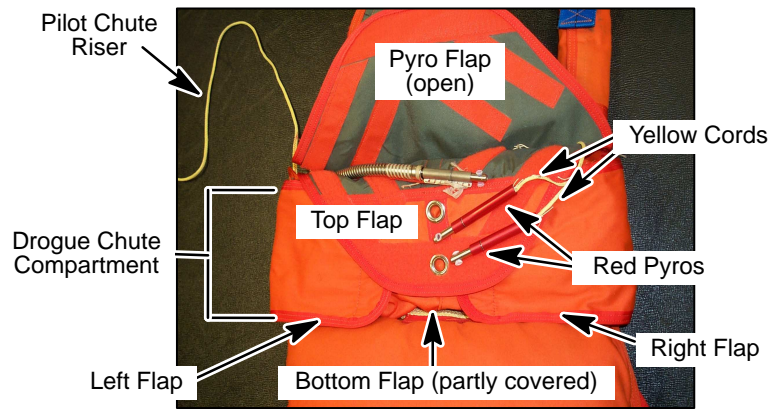


Photo 2

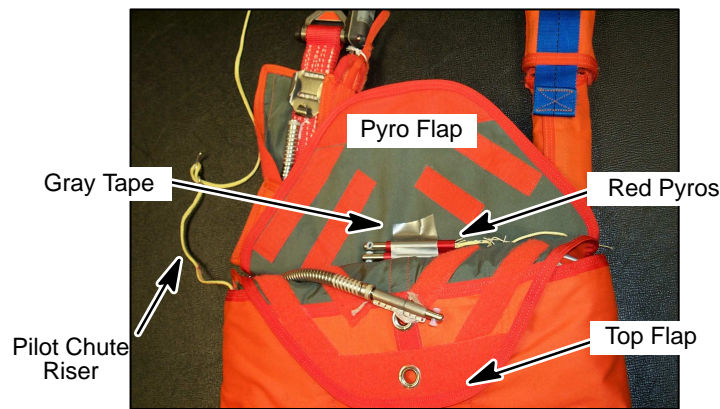


Photo 3

4. Install curved pin on pilot chute riser using Larks Head knot (photo 4)
Locate curved pin ~6 in from stitching on pilot chute riser at drogue chute sleeve (photo 5)
Draw Larks Head knot tight around curved pin

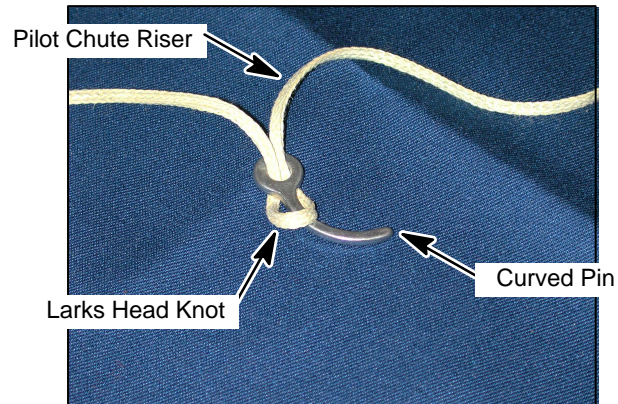


Photo 4

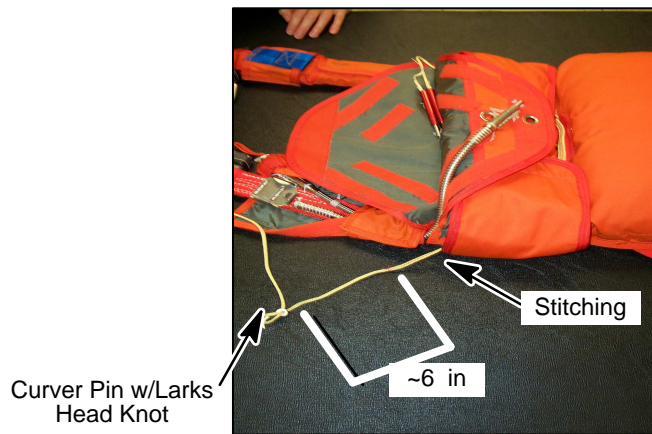


Photo 5

WARNING

When opening flaps covering drogue chute sleeve, drogue chute sleeve and risers will not be secure. Make sure sleeve stays close to parachute pack to prevent firing main canopy Automatic Opening Device (AOD). There is no immediate hazard if AOD fires, but main canopy will deploy immediately on bailout instead of at 14k ft

5. Open four flaps (top, left, right, bottom) covering drogue chute sleeve and locate main locking loop under drogue chute sleeve (photo 6, w/o nylon cord)
Slide cord remnant to base of main locking loop (photos 6a,6b)

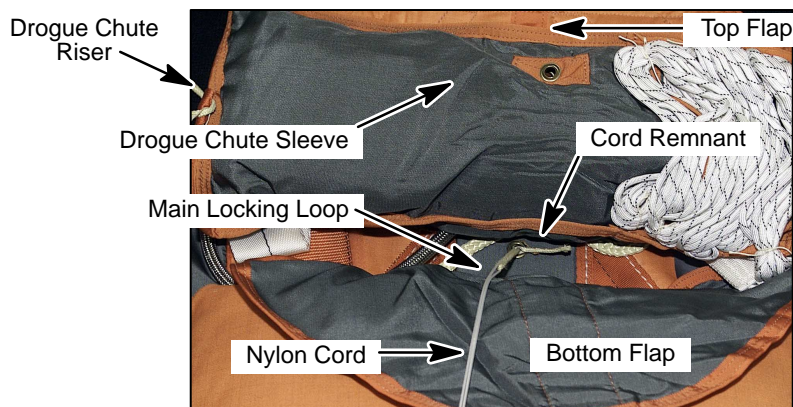


Photo 6

6. Pass nylon cord from PPA repack kit thru main locking; center cord (photo 6)

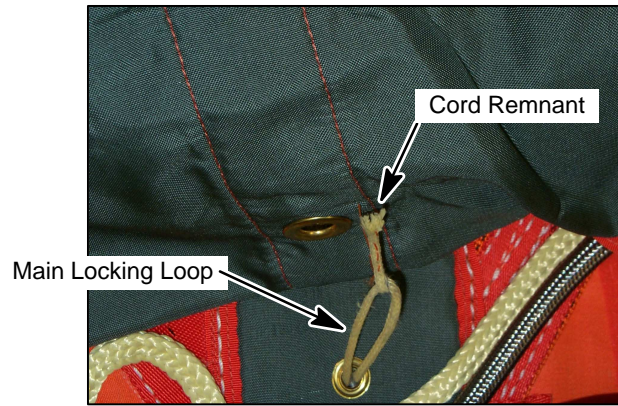


Photo 6a

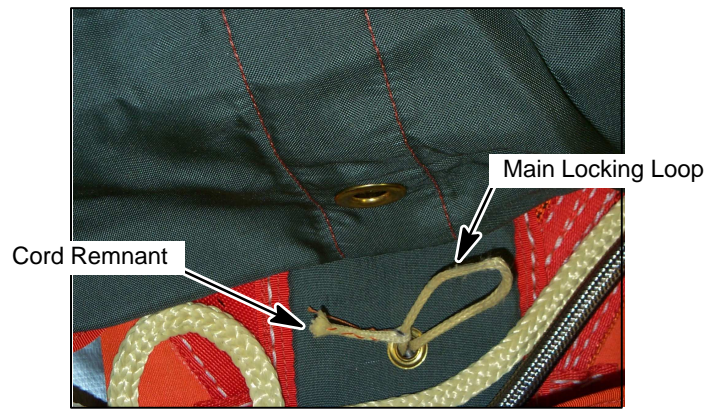


Photo 6b

7. Reposition drogue chute sleeve over main locking loop

8. Pass nylon cord ends thru bottom flap eyelet, then thru each side flap (either order), and finally thru top flap eyelet (photos 7,8)

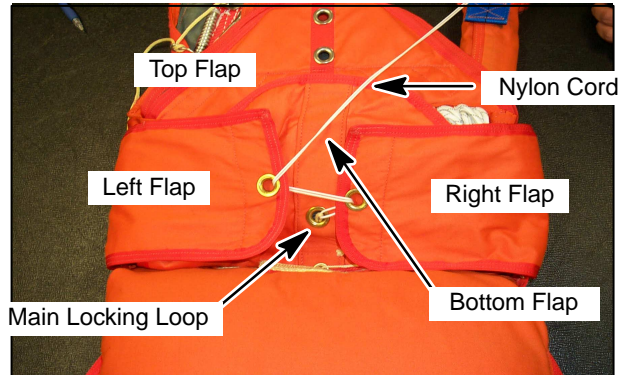


Photo 7

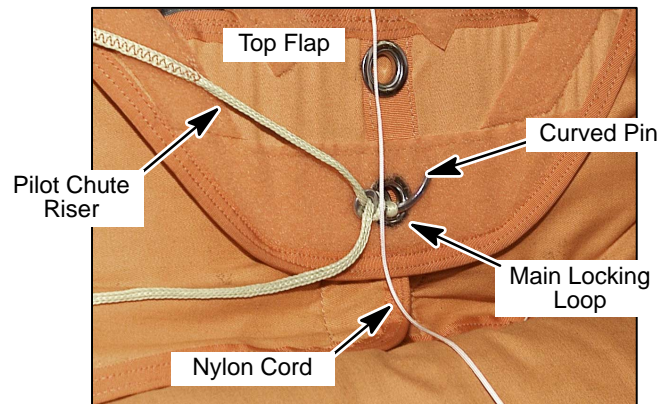


Photo 8

9. Pull on nylon cord and compress drogue chute/flaps to expose main locking loop. (Use as much force as necessary to expose main locking loop)
10. Pass curved pin left to right thru main locking loop to secure drogue chute compartment (curved pin may curve up/down) but must lie flat (photo 8) Remove nylon cord from main loop; do not discard
11. Remove slack in pilot chute riser at Larks Head knot

12. Thread nylon cord thru curved pin eye, around main locking loop, and under end of pin (photo 9)
Pull cord tight against curved pin; secure nylon cord using square knot

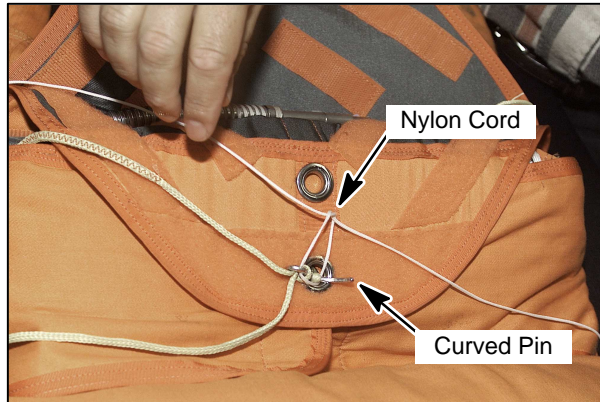


Photo 9

13. Cut nylon cord ends 1 in from square knot (photo 10)

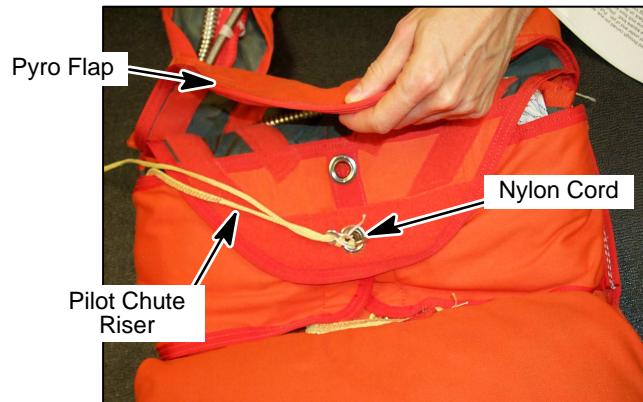


Photo 10

14. Route pilot chute riser toward top left corner of parachute pack. Close pyro flap over pilot chute riser by mating Velcro (make sure pilot chute riser is routed as depicted) (photos 10,11)

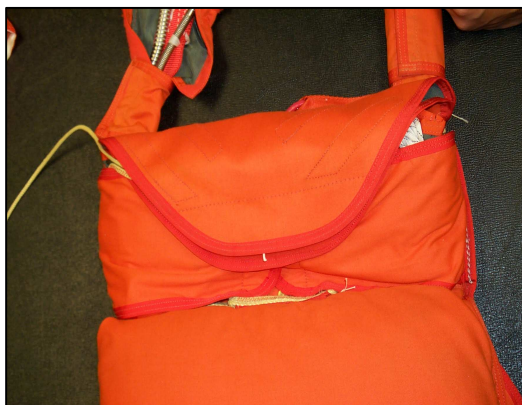


Photo 11

WARNING
Do not wrap pilot chute riser around pilot chute. Doing so may prevent proper parachute opening

15. Twist loose fabric around pilot chute (photo 12)



Photo 12

16. Place pilot chute, riser end first, into large Ziploc bag. Wrap bag closely around pilot chute
17. Using long piece of Gray Tape (>3 ft), tape Ziploc bag/pilot chute to pack. Place tape vertically across bag. Fashion pull handle at top end of tape by folding tape back on itself (photo 13)



Photo 13

NOTE

Bailout procedures modified as follows:

EARLY DEPLOYMENT OF PILOT CHUTE WILL AFFECT WING CLEARANCE MARGIN AND POSSIBLY DAMAGE PARACHUTES

1. Prior to attaching d-ring on right riser to pole lanyard, have next crewmember in bailout sequence remove Gray Tape, and carefully remove pilot chute from Ziploc bag
2. Attach d-ring on right riser to pole lanyard and enter hatch tunnel
3. Next crewmember in sequence will carefully hand pilot chute over left shoulder to egressing crewmember
4. Grasp pilot chute to upper-left chest and hold tightly
5. Bail out
6. Upon clearing pole, deploy pilot chute over left shoulder
7. Standard parachute ops apply at this point

PAYLOAD BAY DOOR MOTOR OPERATION

(3:00 hr)

OBJECTIVE: Close door(s) and/or latch centerline/bulkhead latch gang(s) by bypassing PL MDM(s) and directly providing AC pwr enable and door/latch cmd signals

LOCATION: See MIDDECK (COMPONENT LOCATIONS)

AV BAY 1, Zone 043 for MDM PL1

AV BAY 2, Zone 057 for MDM PL2

TOOLS REQD:

TOOL	Gray Tape
	Pin Kit (PLBD Motor Ops Cables, two 2-Amp Fuses)
	Locker Tool
	Connector Pliers
	Torque Wrench
	Ratchet Wrench
	Driver Handle
BOB	IFM Breakout Box
CHCK	DC PWR Cable

- | | |
|---------|--|
| O6 | 1. MDM PL1(2) – OFF (expect I/O error PL1(2)) |
| MO30F | 2. ✓DC UTIL PWR MNC – OFF |
| | 3. a. Breakout Box: |
| | AUX – OFF |
| | 28V VAR VOLT – 28V |
| | PWR A,B – OFF |
| | b. Remove Fuse Caps from sides A,B |
| | c. Rotate GA SEL A,B – 22 |
| | d. Install 2-Amp Fuses (2), replace caps |
| MA73C:C | 4. cb MCA PWR AC1 3Φ MID 1 – op |
| :D | 3 – op |
| :C | AC2 3Φ MID 2 – op |
| :D | 4 – op |
| :C | AC3 3Φ MID 2 – op |
| :D | 4 – op |
| | 5. Remove lockers, Thermal/Debris Traps to
access applicable MDM (PL1 or PL2) |

CRTX 6. SM, OPS 202 PRO or BFS, SM 63 PL BAY DOORS

X: SM PL BAY DOORS

R13L 7. ✓ PL BAY DR – STOP
✓ SYS 1,2 (two) – DSBL

CRTX ✓ PBD SW – STOP
✓ MAN SEL (ten) – (no*)
✓ PBD SW BYPASS – (no*)
✓ AC POWER OFF – ITEM 2 (*)
8. Remove appropriate connector cables from J2,J6,J8 on MDM PL1(2) as reqd
9. Remove appropriate PLBD Motor Ops Cable from Pin Kit, Flap 1 (see individual step for cable rqmts)

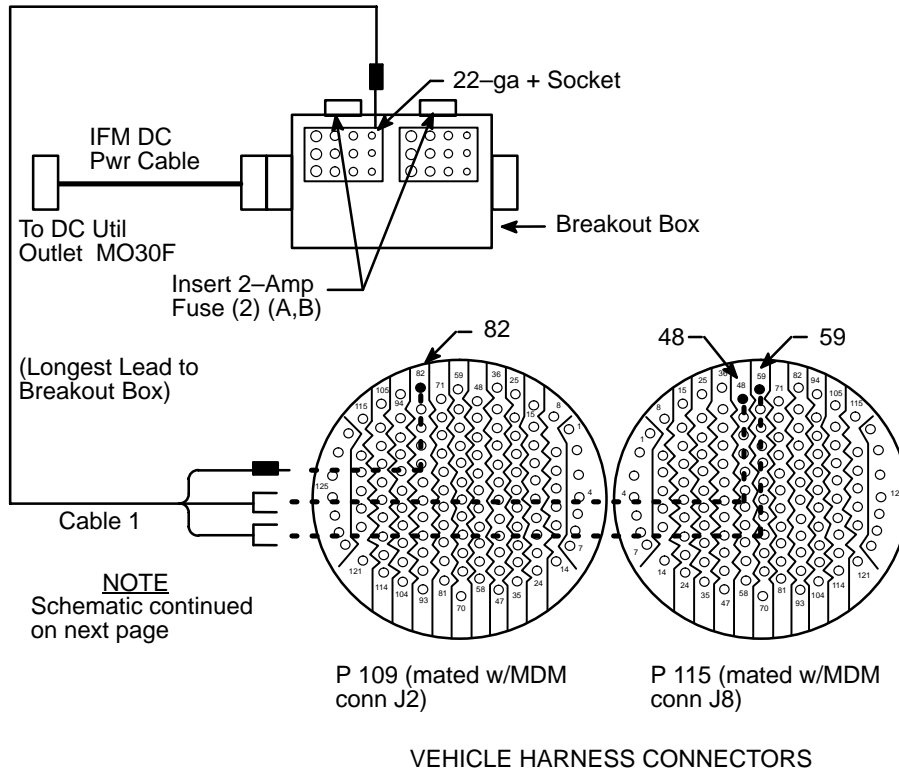
NOTE

Steps 10–17 are for MDM PL1 bypass.

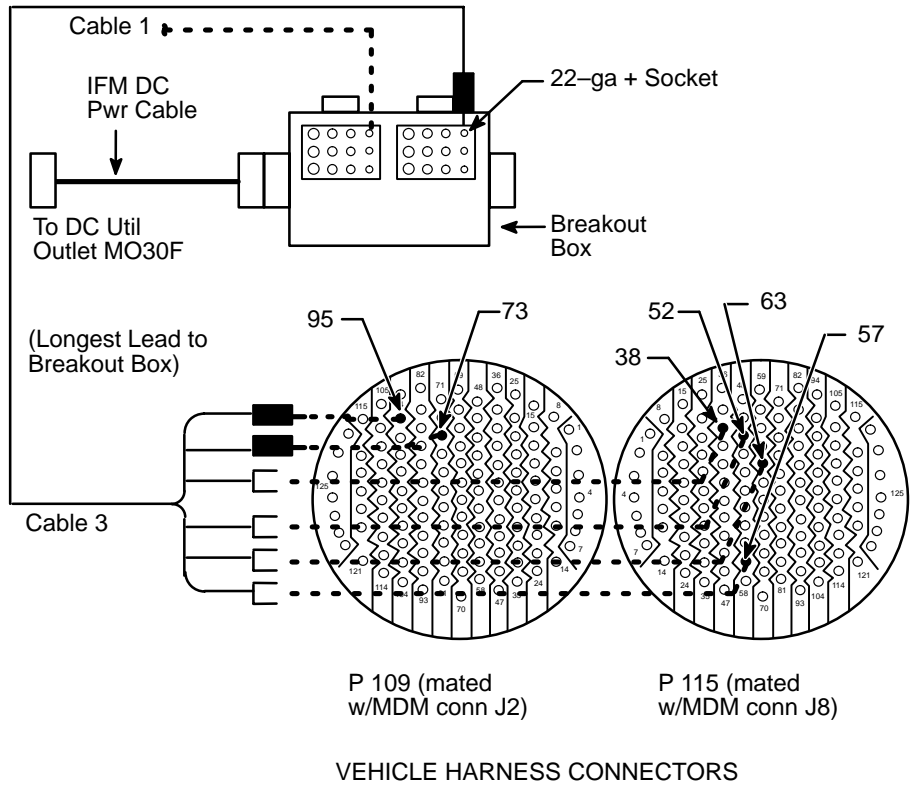
Steps 18–25 are for MDM PL2 bypass

10. To close and latch Port Door (MDM PL1 bypassed)

a. Connect Cables 1,3 as illustrated

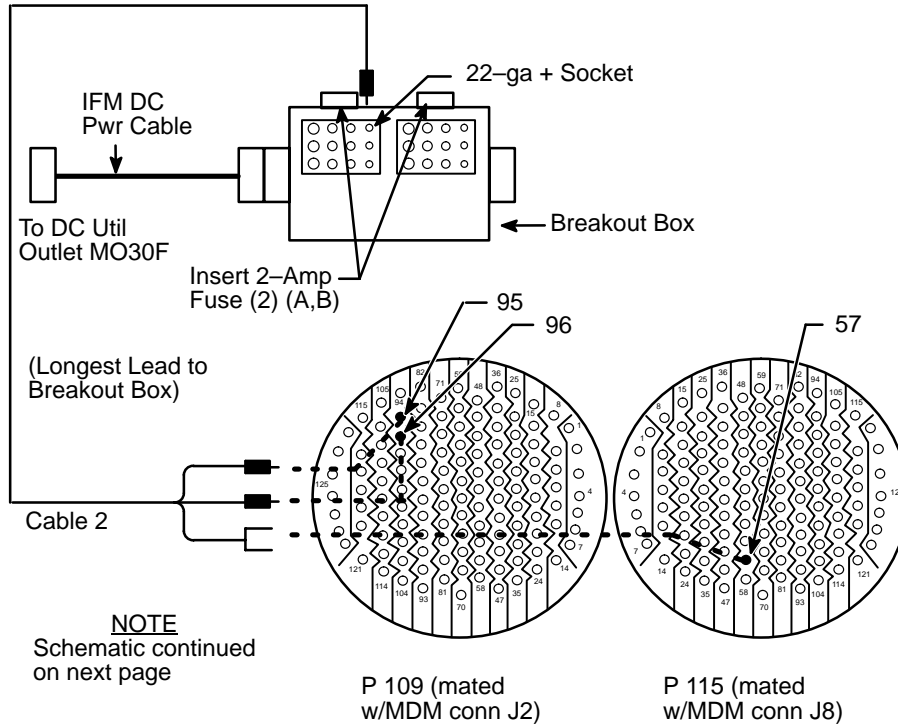


- b. Perform step 26, DOOR/BULKHEAD LATCH DRIVE, P-32, then return to this step
- c. Continue w/step 11 to close,latch stbd door, or go to step 28 to exit procedure



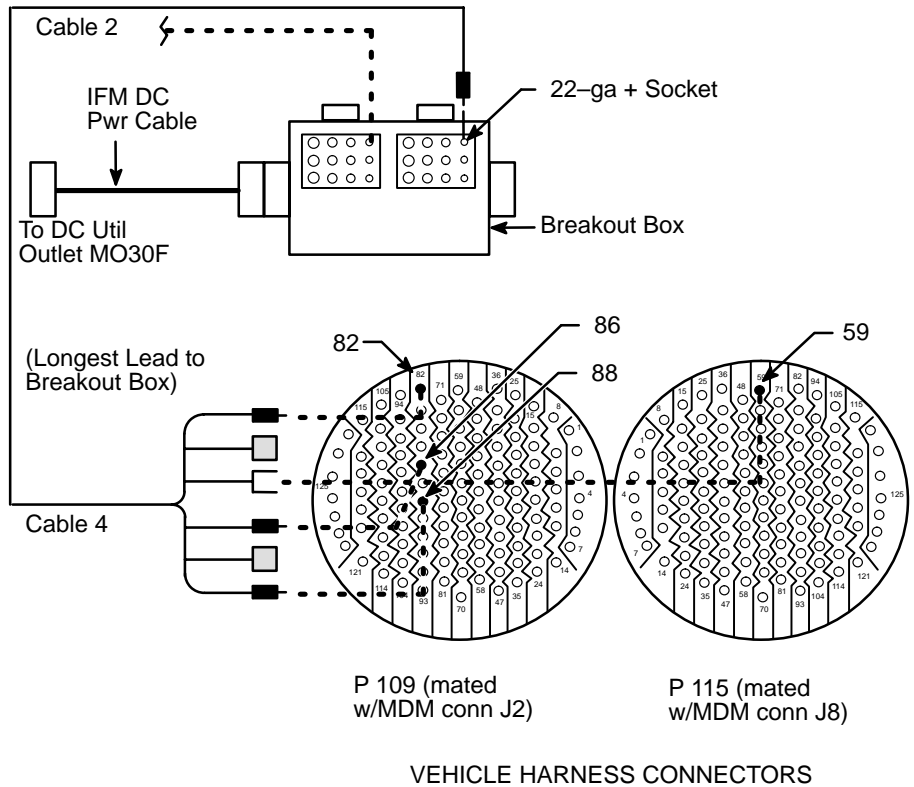
11. To close and latch Stbd Door (MDM PL1 bypassed)

a. Connect Cables 2,4 as illustrated



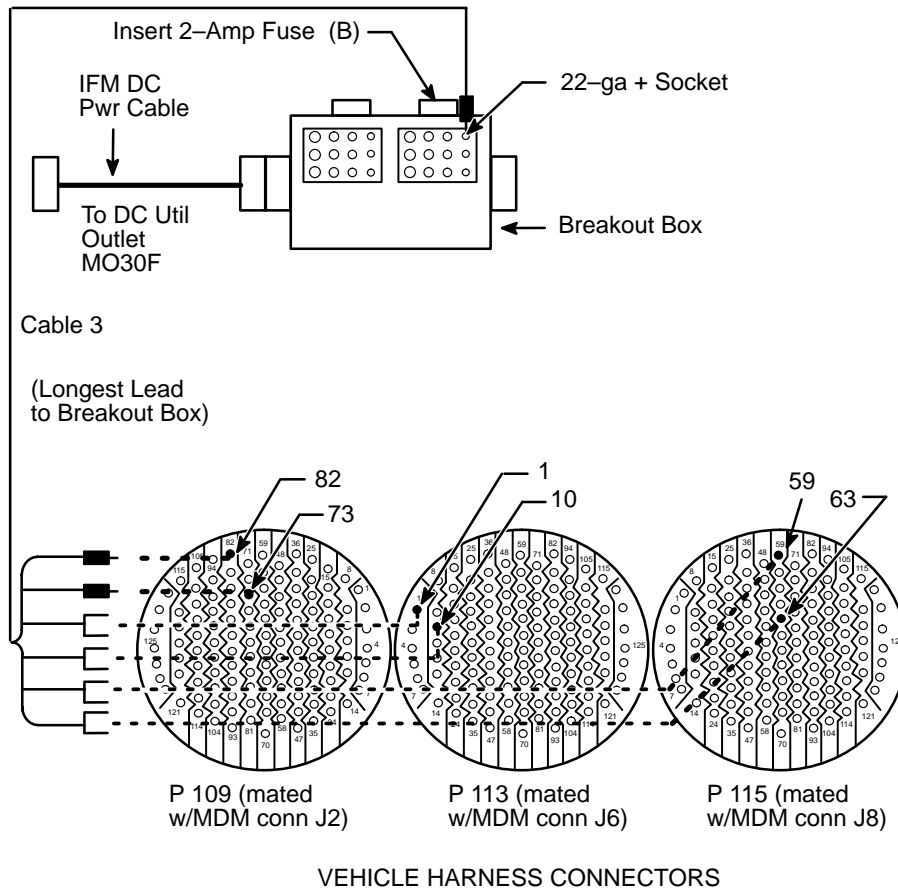
VEHICLE HARNESS CONNECTORS

- b. Perform step 26, DOOR/BULKHEAD LATCH DRIVE, P-32, then return to this step
- c. Continue w/step 12 to close,latch stbd door, or go to step 28 to exit procedure



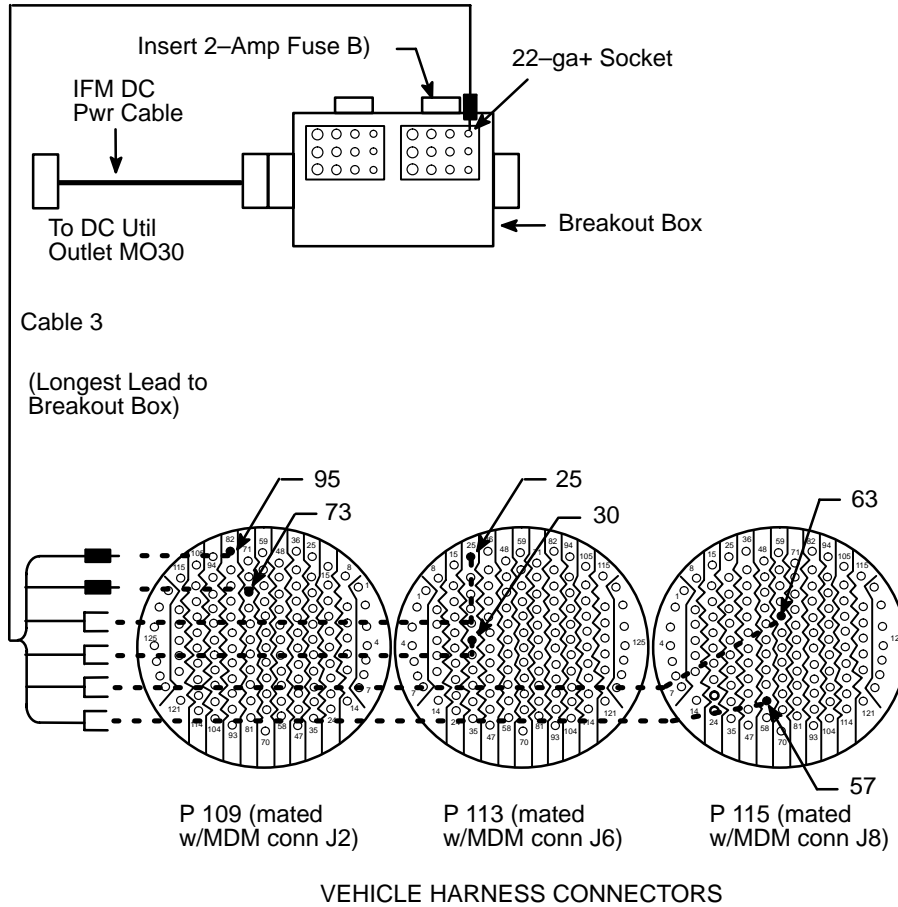
12. To close Latch Groups 1–4 and 13–16 (MDM PL1 bypassed)

- a. Connect Cable 3 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. Continue w/step 13 to latch remaining centerline latches, or go to step 28 to exit procedure



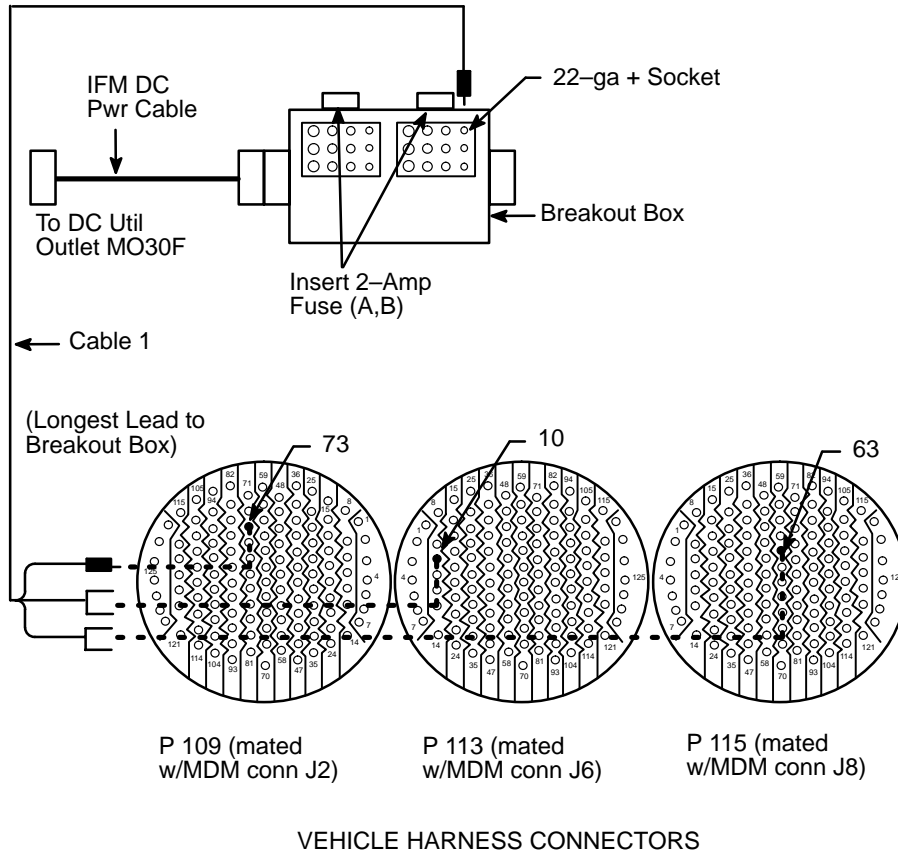
13. To close Latch Groups 5-8 and 9-12 (MDM PL1 bypassed)

- a. Connect Cable 3 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. ✓MCC for next step, or go to step 28 to exit procedure



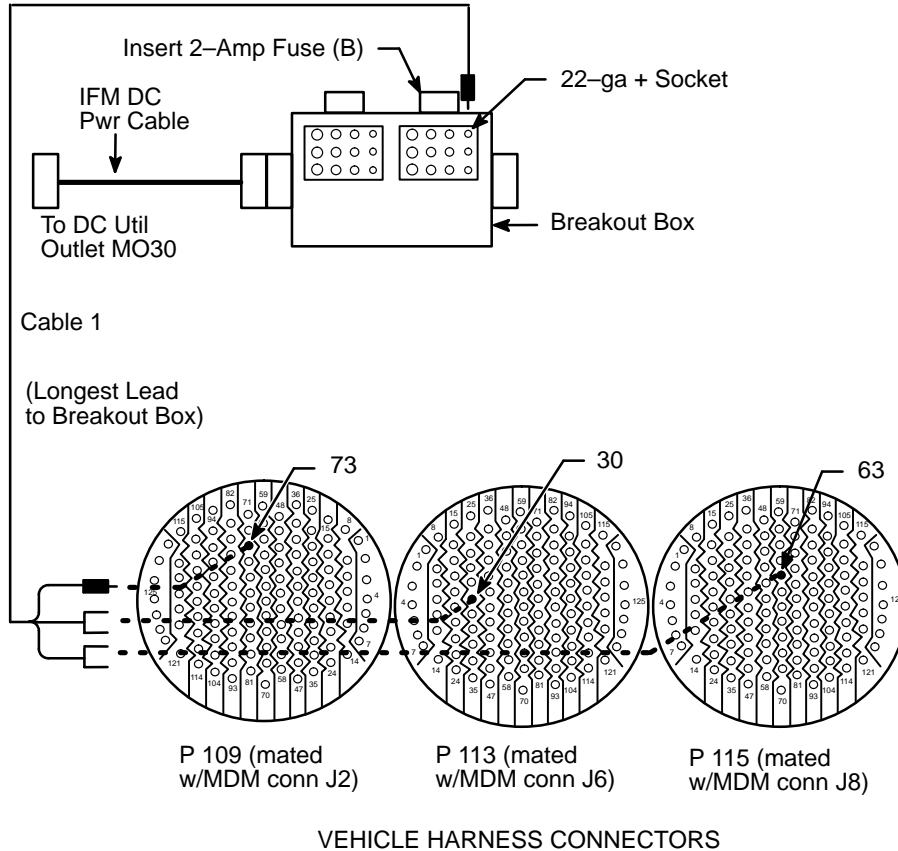
14. To close Latch Group 1-4 (MDM PL1 bypassed)

- a. Connect Cable 1 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. ✓MCC for next step, or go to step 28 to exit procedure



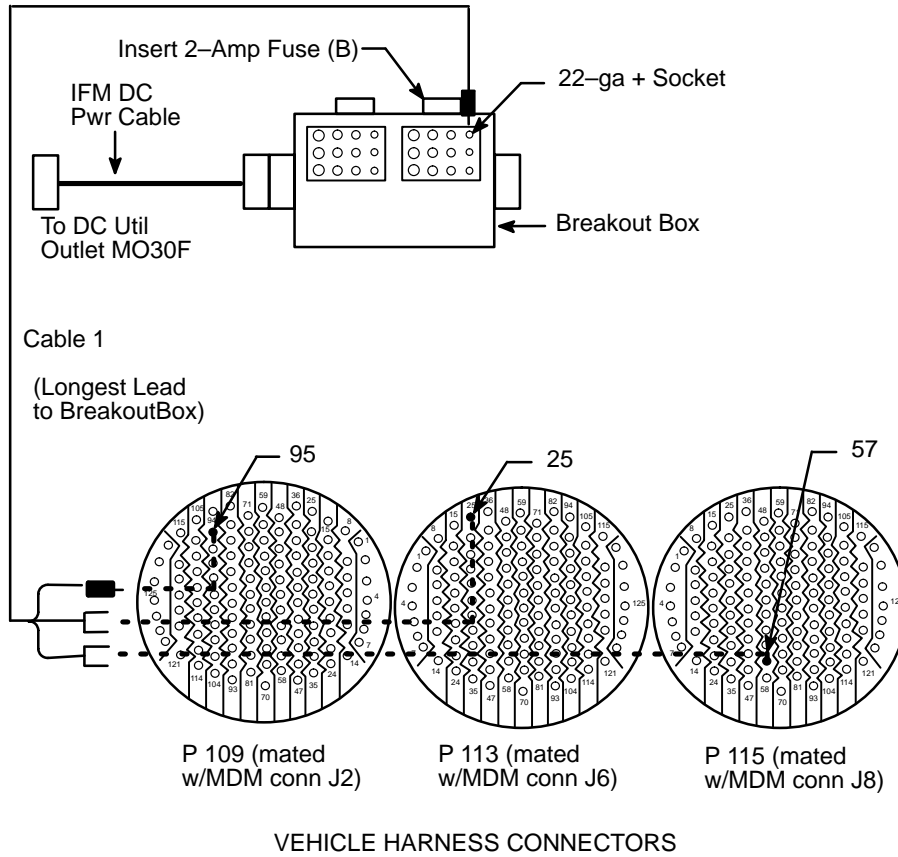
15. To close Latch Group 5-8 (MDM PL1 bypassed)

- a. Connect Cable 1 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. ✓MCC for next step, or go to step 28 to exit procedure



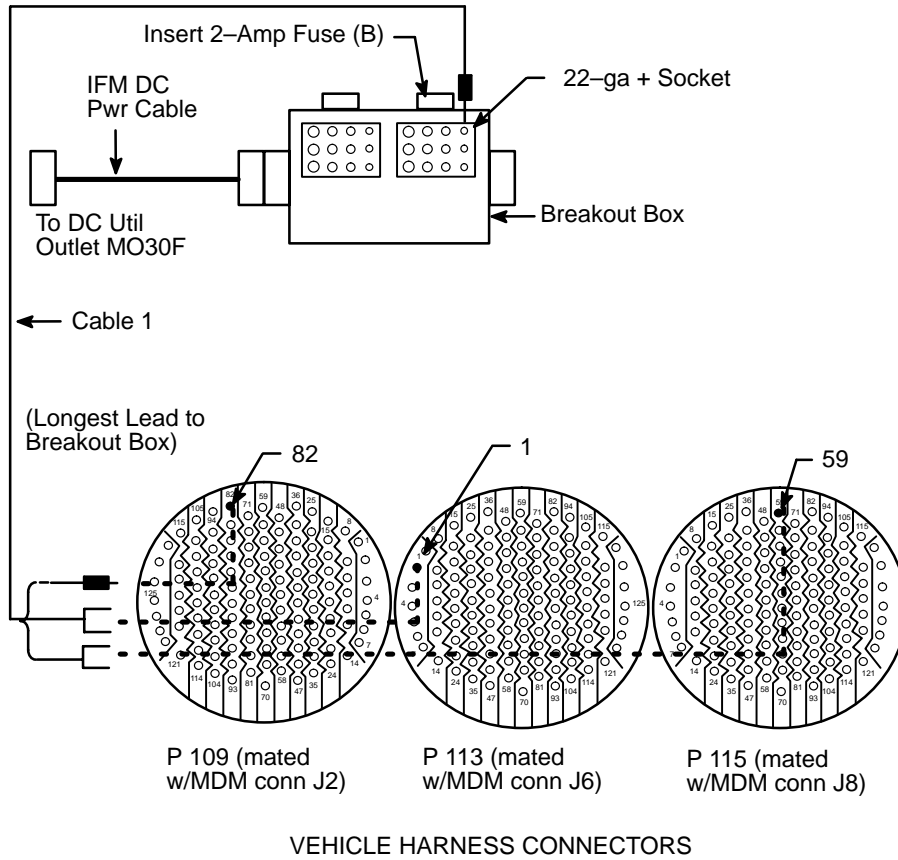
16. To close Latch Group 9-12 (MDM PL1 bypassed)

- a. Connect Cable 1 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. ✓MCC for next step, or go to step 28 to exit procedure



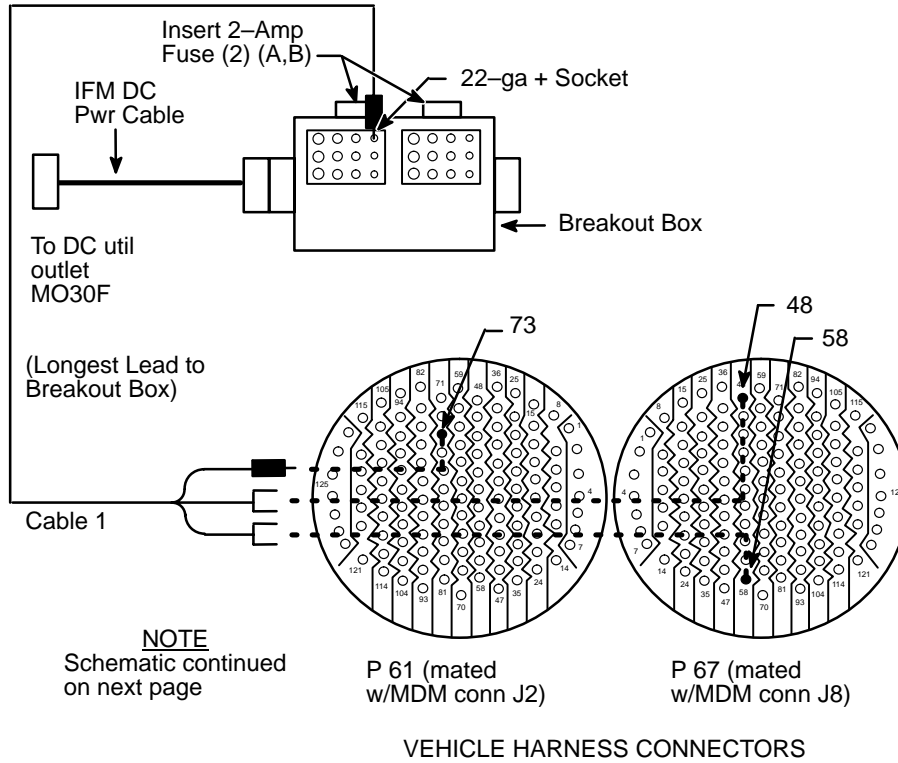
17. To close Latch Group 13-16 (MDM PL1 bypassed)

- a. Connect Cable 1 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. ✓MCC for next step, or go to step 28 to exit procedure

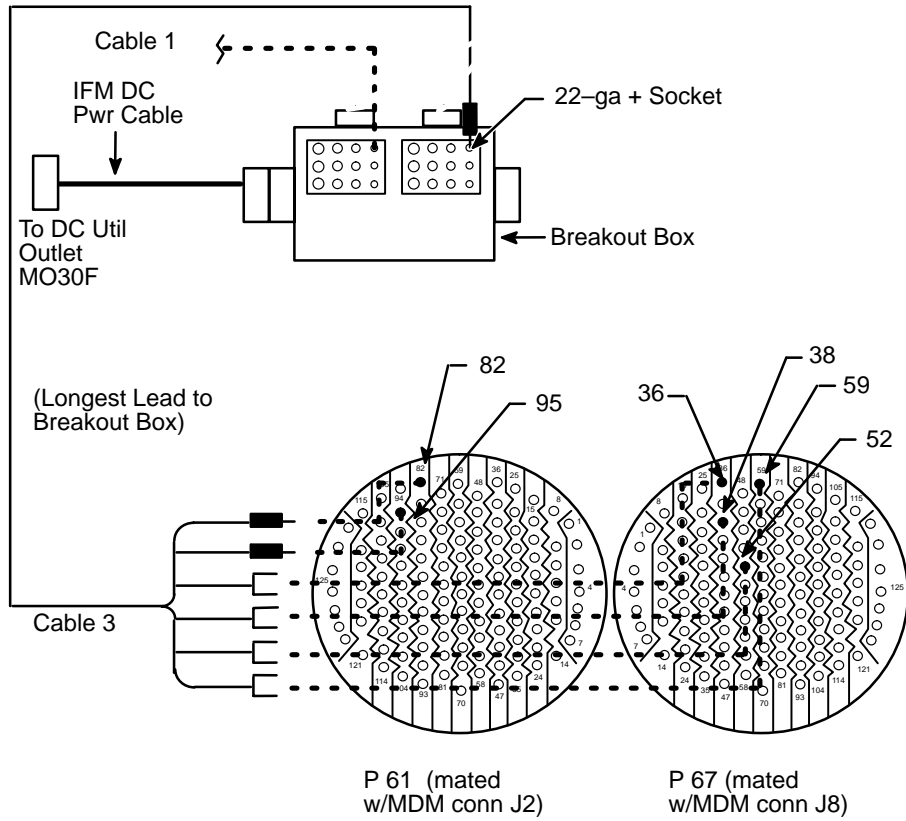


18. To close and latch Port Door (MDM PL2 bypassed)

a. Connect Cables 1,3 as illustrated



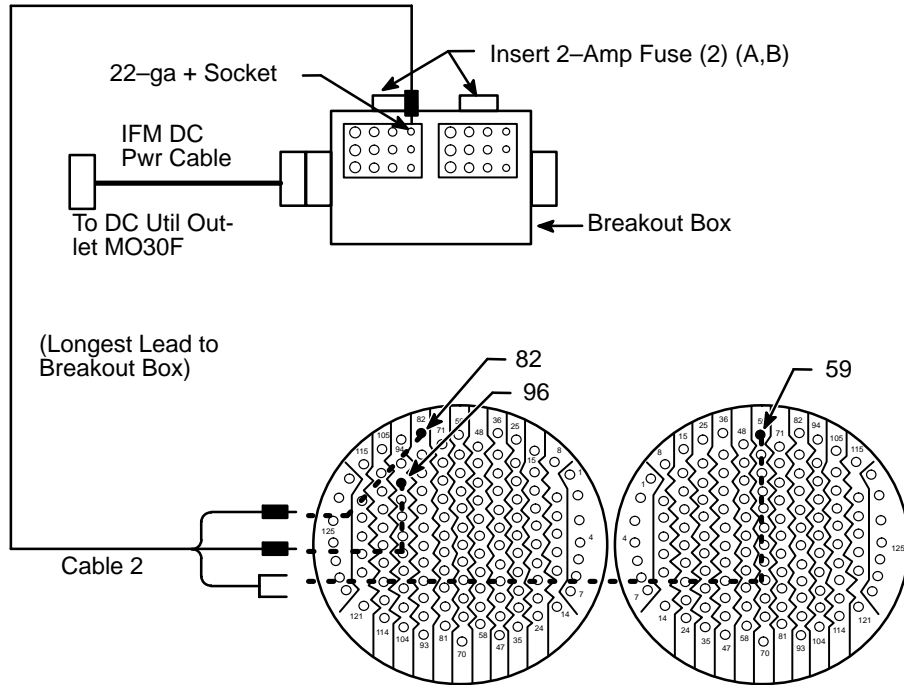
- b. Perform step 26, DOOR/BULKHEAD LATCH DRIVE, P-32, then return to this step
- c. Continue w/step 19. To close, latch stbd door, or go to step 28 to exit procedure



VEHICLE HARNESS CONNECTORS

19. To close and latch Stbd Door (MDM PL2 bypassed)

a. Connect Cables 2,4 as illustrated



NOTE
Schematic continued
on next page

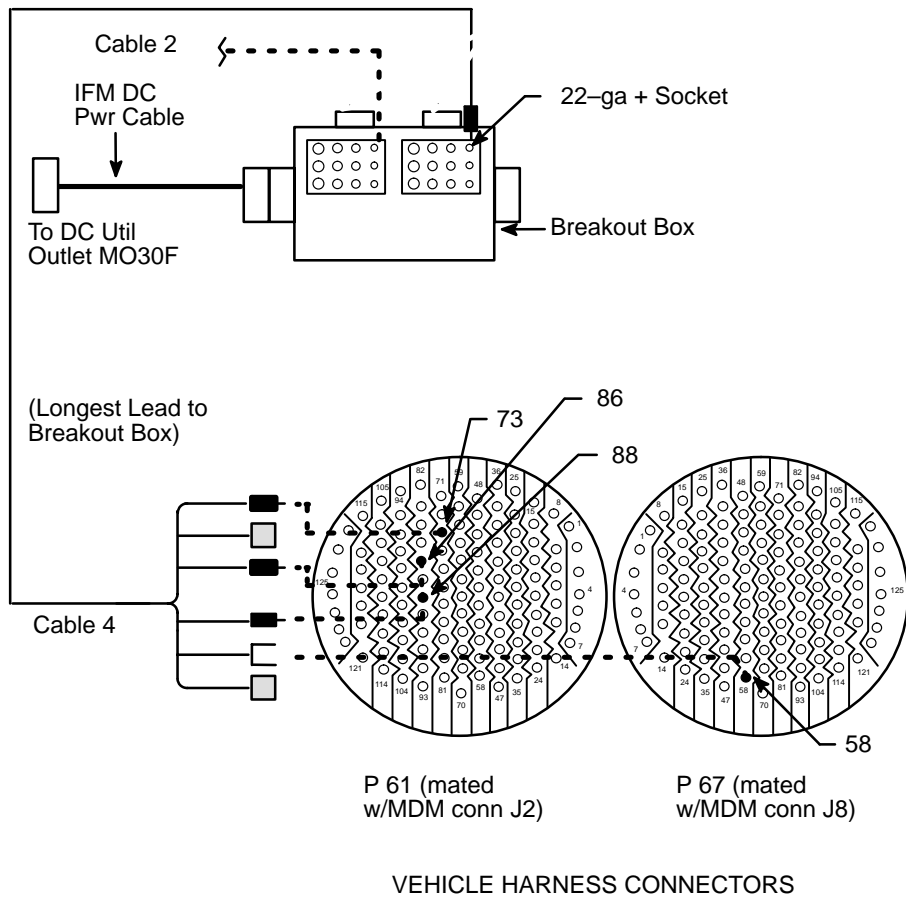
P 61 (mated
w/MDM conn J2)

P 67 (mated
w/MDM conn J8)

ifm_sP_p15

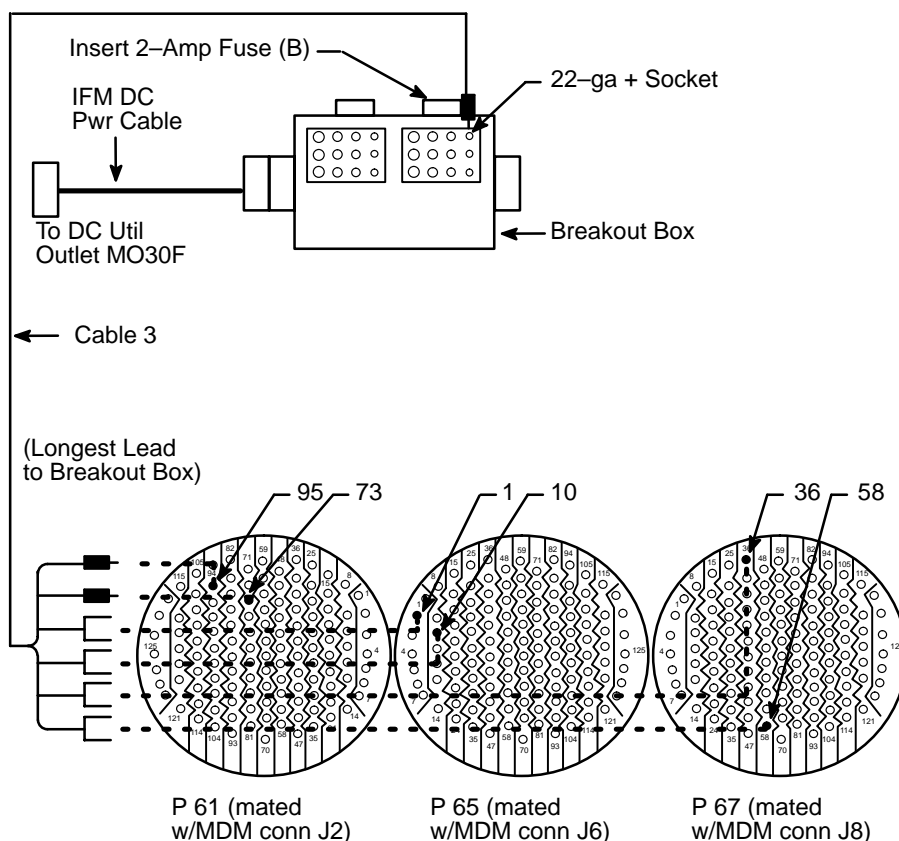
VEHICLE HARNESS CONNECTORS

- b. Perform step 26, DOOR/BULKHEAD LATCH DRIVE, P-32, then return to this step
- c. Continue w/step 20 to latch centerline latches, or go to step 28 to exit procedure



20. To close Latch Groups 1–4 and 13–16 (MDM PL2 bypassed)

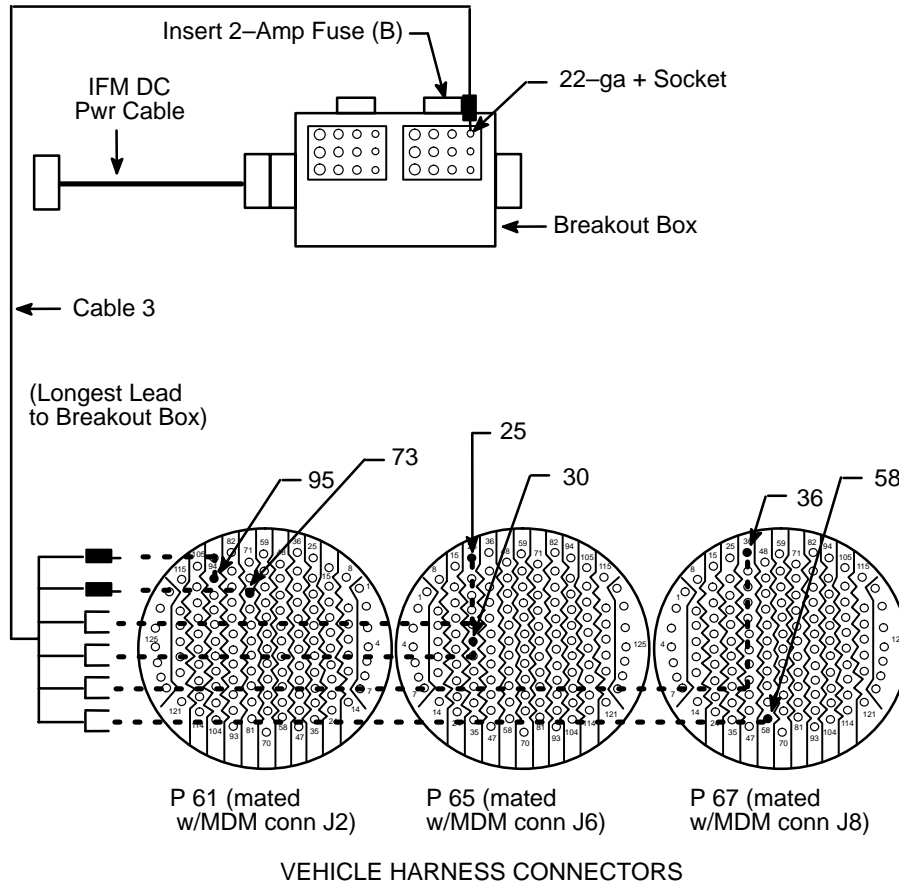
- a. Connect Cable 3 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P–33, then return to this step
- c. Continue w/step 21 to latch centerline latches, or go to step 28 to exit procedure



VEHICLE HARNESS CONNECTORS

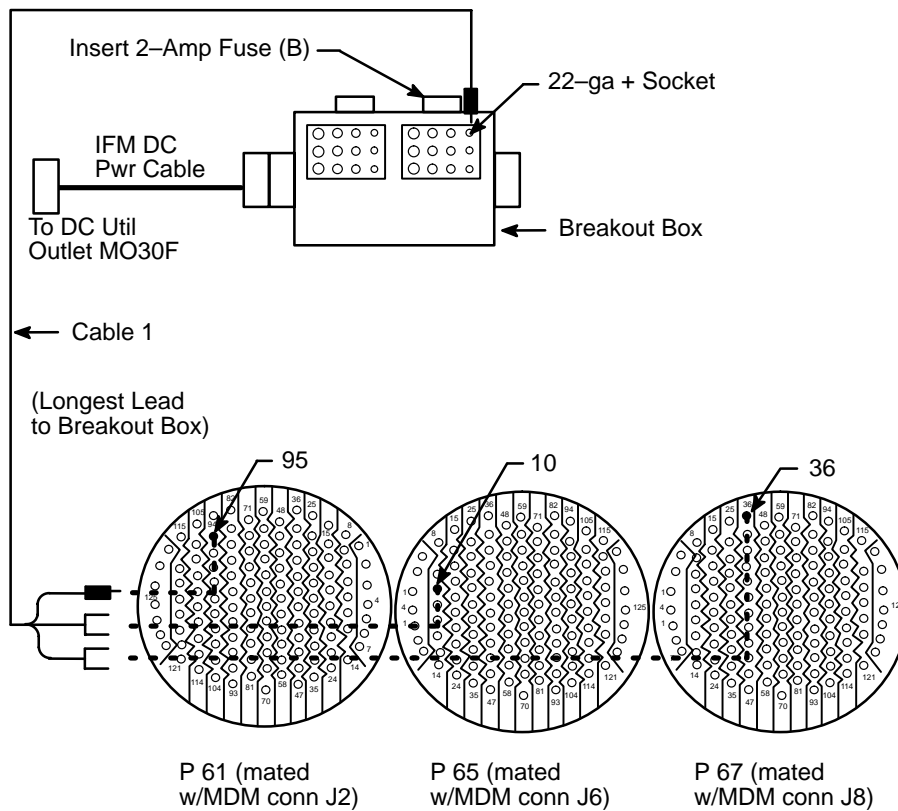
21. To close Latch Groups 5-8 and 9-12 (MDM PL2 bypassed)

- a. Connect Cable 3 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. ✓MCC for next step, or go to step 28 to exit procedure



22. To close Latch Group 1-4 (MDM PL2 bypassed)

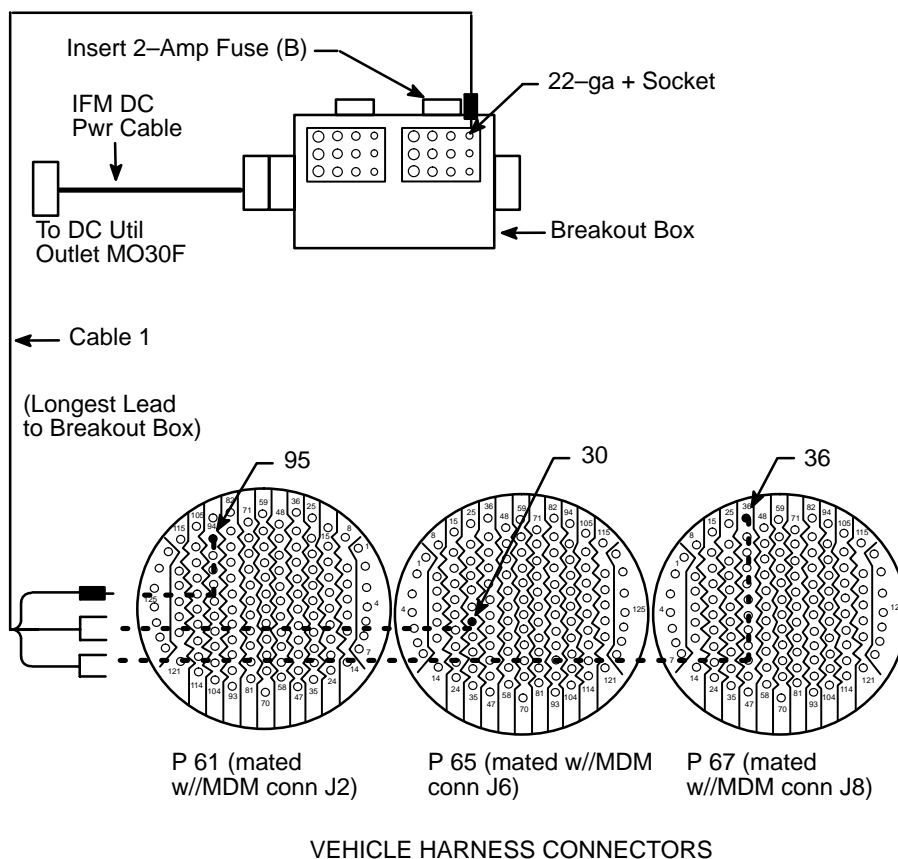
- a. Connect Cable 1 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. ✓MCC for next step, or go to step 28 to exit procedure



VEHICLE HARNESS CONNECTORS

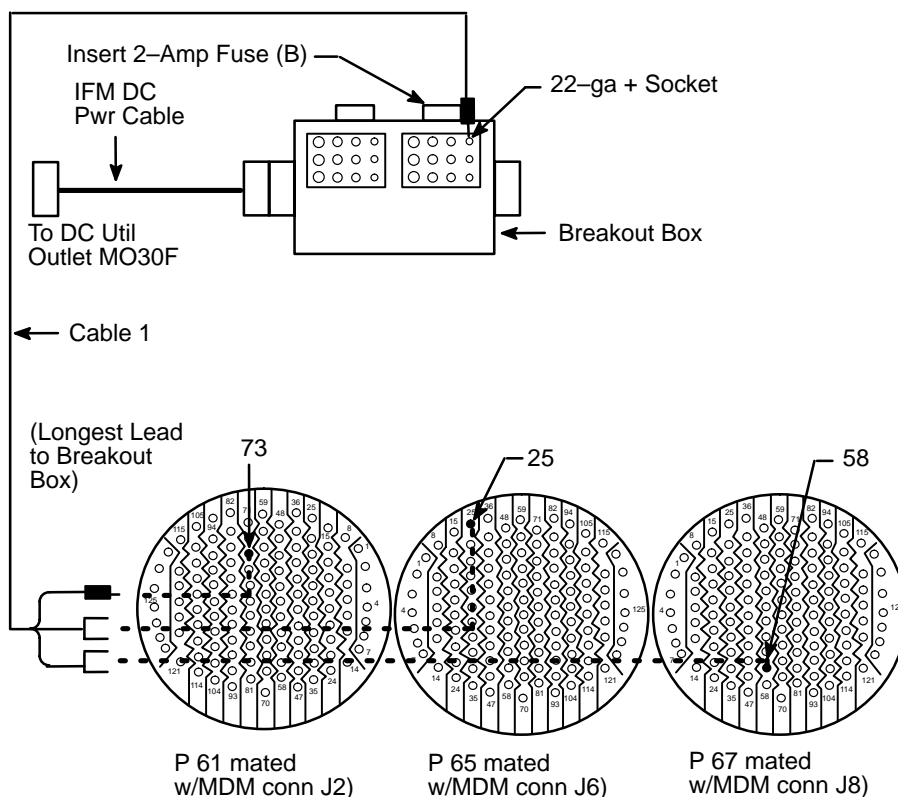
23. To close Latch Group 5-8 (MDM PL2 bypassed)

- a. Connect Cable 1 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. ✓ MCC for next step, or go to step 28 to exit procedure



24. To close Latch Group 9-12 (MDM PL2 bypassed)

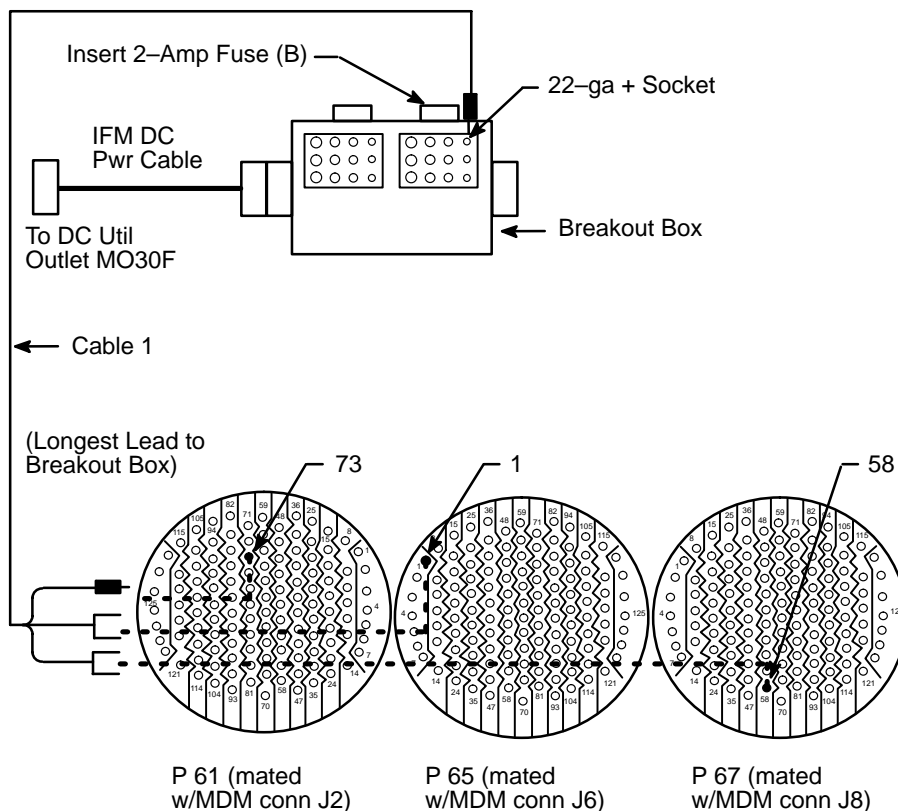
- a. Connect Cable 1 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. ✓MCC for next step, or go to step 28 to exit procedure



VEHICLE HARNESS CONNECTORS

25. To close Latch Group 13-16 (MDM PL2 bypassed)

- a. Connect Cable 1 as illustrated
- b. Perform step 27, CENTERLINE LATCH DRIVE, P-33, then return to this step
- c. ✓MCC for next step, or go to step 28 to exit procedure



VEHICLE HARNESS CONNECTORS

26. DOOR/BULKHEAD LATCH DRIVE

- a. Enable proper system sw(s) (see CIRCUIT BREAKER (cb) AND SYSTEM ENABLE SWITCH (sw) TABLE, P-34):
R13L PL BAY DR SYS X – ENA
- b. DC UTIL PWR MNC – ON
MO30F Breakout Box:
PWR A,B (two) – ON (22 lts on)
- c. Wait for MCC verification of door,latch pwr,drive cmd discrettes
- d. PWR A,B (two) – OFF
- e. Close proper door MCA cb (see CIRCUIT BREAKER (cb) AND SYSTEM ENABLE SWITCH (sw) TABLE, P-34):
MA73C:X cb MCA PWR ACX 3Φ MID X – cl
- f. Breakout Box:
PWR A – ON (22 lts on)
- g. ✓Door operation (~120 sec; ✓MCC). When door closed (door scallop on or below target stripe):
PWR A – OFF (22 lts off)
- h. Close proper door MCA cb (see CIRCUIT BREAKER (cb) AND SYSTEM ENABLE SWITCH (sw) TABLE, P-34):
MA73C:X cb MCA PWR ACX 3Φ MID X – cl
- i. Breakout Box:
PWR A,B (two) – ON (22 lts on)
- j. ✓Door operation (~60 sec; ✓MCC)
- k. When door closed,latched:
MO30F PWR A,B (two) – OFF (22 lts off)
DC UTIL PWR MNC – OFF

l. Disable system sw(s) and open MCA cb
(see CIRCUIT BREAKER (cb) AND
SYSTEM ENABLE SWITCH (sw) TABLE,
P-34):
R13L PL BAY DR SYS X – DSBL
MA73C:X cb MCA PWR ACX 3Φ MID X – op

m. Return to original step

27. CENTERLINE LATCH DRIVE

a. Enable proper system sw(s) (see CIRCUIT
BREAKER (cb) AND SYSTEM ENABLE
SWITCH (sw) TABLE, P-34):
R13L PL BAY DR SYS X – ENA

b. DC UTIL PWR MNC – ON
Breakout Box:
MO30F PWR B – ON (22 lts on)

c. Wait for MCC verification of latch pwr,drive
cmd discretes

d. PWR B – OFF (22 lts off)

e. Close proper door MCA cb (see CIRCUIT
BREAKER (cb) AND SYSTEM ENABLE
SWITCH (sw) TABLE, P-34):
MA73C:X cb MCA PWR ACX 3Φ MID X – cl

f. Breakout Box:
PWR B – ON (22 lts on)

g. ✓Latch operation (~40 sec; ✓MCC)

h. When latching complete:
MO30F PWR B – OFF (22 lts off)
DC UTIL PWR MNC – OFF

- i. Disable system sw(s) and open MCA cb (see CIRCUIT BREAKER (cb) AND SYSTEM ENABLE SWITCH (sw) TABLE, P-34):

R13L
MA73C:X

PL BAY DR SYS X – DSBL
cb MCA PWR ACX 3Φ MID X – op

- j. Return to original step

CIRCUIT BREAKER (cb) AND SYSTEM ENABLE SWITCH (sw) TABLE

Actuator(s) to close:		If PL1 Bypassed:		If PL2 Bypassed:	
		cb	Sys ENA	cb	Sys ENA
a	Port Door	MA73C:C AC2 3Φ MID 2	1	AC3 3Φ MID 4 (MA73C:D)	2
b	Port BKHD Latches	MA73C:D AC1 3Φ MID 3 MA73C:C AC1 3Φ MID 1	1,2 (two)	AC3 3Φ MID 2 (MA73C:C) AC2 3Φ MID 4 (MA73C:D)	1,2 (two)
c	Stbd Door	MA73C:C AC1 3Φ MID 1	1	AC2 3Φ MID 4 (MA73C:D)	2
d	Stbd BKHD Latches	MA73C:C AC1 3Φ MID 1 MA73C:C AC2 3Φ MID 2	1	AC2 3Φ MID 4 (MA73C:D) AC3 3Φ MID 4 (MA73C:D)	2
e	C/L Latch 1-4	MA73C:D AC1 3Φ MID 3	2	AC3 3Φ MID 2 (MA73C:C)	1
f	C/L Latch 13-16	MA73C:C AC2 3Φ MID 2	1	AC3 3Φ MID 4 (MA73C:D)	2
g	C/L Latches 1-4 and 13-16	MA73C:D AC1 3Φ MID 3 MA73C:C AC2 3Φ MID 2	1,2 (two)	AC3 3Φ MID 2 (MA73C:C) AC3 3Φ MID 4 (MA73C:D)	1,2 (two)
h	C/L Latch 5-8	MA73C:D AC1 3Φ MID 3	2	AC3 3Φ MID 2 (MA73C:C)	1
i	C/L Latch 9-12	MA73C:C AC1 3Φ MID 1	1	AC3 3Φ MID 4 (MA73C:D)	2
j	C/L Latches 5-8 and 9-12	MA73C:D AC1 3Φ MID 3 MA73C:C AC1 3Φ MID 1	1,2 (two)	AC3 3Φ MID 2 (MA73C:C) AC3 3Φ MID 4 (MA73C:D)	1,2 (two)

CLEANUP

NOTE

Ensure all steps reqd completed before continuing

- MO52J 28. Disconnect IFM DC Pwr Cable from MO30F,Breakout Box and PLBD Motor Ops Cable from vehicle harness connectors, Breakout Box; reinstall vehicle harness connectors

PL1 connect			PL2 connect		
Cable		MDM	Cable		MDM
81V77W8P109	to	J2	82V77W9P61	to	J2
P113	to	J6	P65	to	J6
P115	to	J8	P67	to	J8

29. Install Thermal/Debris Traps and lockers (torque, 30 in-lb)
30. Stow IFM Tools
- O6 31. MDM PL1(PL2) – ON
- CRTX SM, I/O RESET
32. Close MCA cbs:
- MA73C:C cb MCA PWR AC1 3Φ MID 1 – cl
- :D 3 – cl
- :C AC2 3Φ MID 2 – cl
- :D 4 – cl
- :C AC3 3Φ MID 2 – cl
- :D 4 – cl
- CRT 33. Continue PLBD closing as reqd

PAYLOAD BAY DOOR SYS ENABLE RECOVERY (1:00 hr)

OBJECTIVE: Bypass PL BAY DOOR SYS 1(2) sw to regain AB1(AB2), BC1(BC2), and/or CA1(CA2) capability

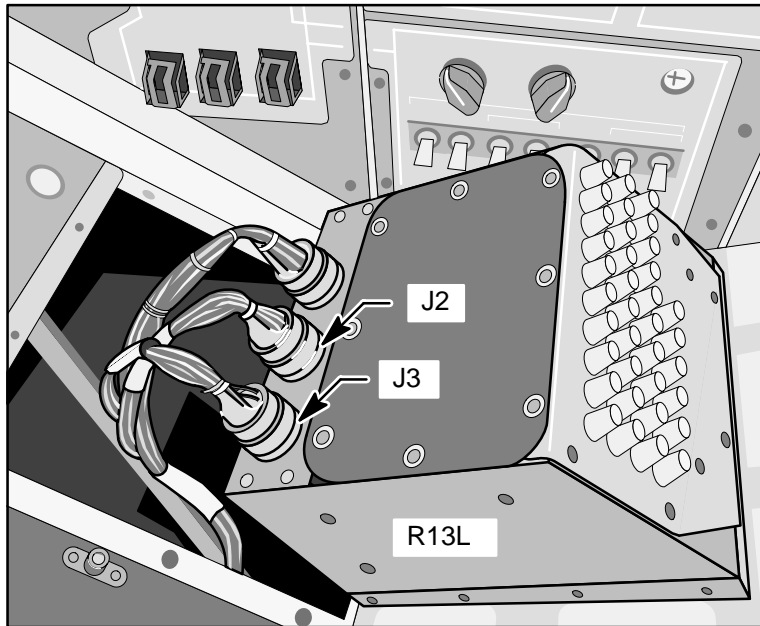
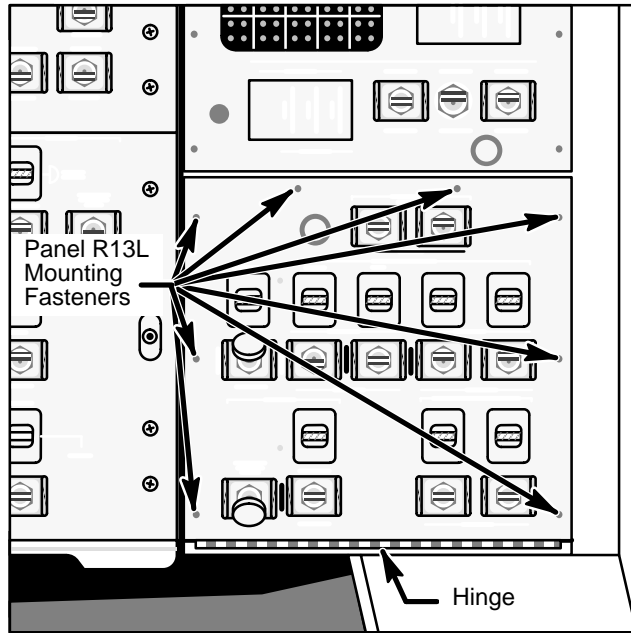
LOCATION: R13L

TOOLS REQD:

TOOL	Gray Tape
	Pin Kit
	Torque Wrench
	3/8-in Driver Handle
	5/32-in Allen Head Driver
	1/4-in to 3/8-in Adapter
BOB	IFM Breakout Box
CHCK	DC PWR Cable
MED	Tongue Depressors

- | | |
|------|--|
| R13L | 1. ✓PL BAY DR SYS 1,2 (two) – DSBL |
| | 2. ✓PL BAY MECH PWR SYS 1,2 (two) – OFF |
| | 3. ✓RAD LAT CNTL SYS A,B (two) – OFF |
| | 4. ✓RAD CNTL SYS A,B (two) – OFF |
| | 5. ✓KU ANT DIRECT STO – OFF |
| | 6. ✓KU ANT – GND |
| | 7. ✓MMU GN2 SPLY ISOL VLV A,B (two) – CL |
| | 8. ✓PL BAY DR – STOP |
| O19 | 9. ✓DC UTIL PWR MNA – OFF |
| BOB | 10. If using Breakout Box: |
| | a. Breakout Box: |
| | AUX – OFF |
| | 28V VAR VOLT – 28V |
| | PWR A,B – OFF |
| | b. Remove Fuse Caps from sides A,B |
| | c. Rotate GA SEL A,B – 22 |
| | d. Install 2-Amp Fuses (two), replace caps |
| | If not using Breakout Box: |
| | Proceed to next step |

- R13L 11. Open pnl R13L (hinged at bottom, eight fasteners, 5/32-in Allen Head Driver)



S83-32560

SKP16

12. Select appropriate connector from table below based on CNTL bus failure

CNTL Bus	Connector	Pins	MCA Pwr	Affected Functions
AB1(2)	P9436 (J1)	65	AC1 Mid 1	C/L 9–12 M1 STBD FWD BKHD M1 STBD Door M1 PORT FWD BKHD M1
		63	AC1 Mid 3	C/L 5–8 M1 C/L 1–4 M1 PORT AFT BKHD M2
BC 1(2)	P9437 (J2)	65	AC2 Mid 2	C/L 13–16 M2 STBD AFT BKHD M2 PORT Door M2
		63	AC2 Mid 4	STBD FWD BKHD M2 STBD Door M2 PORT FWD BKHD M2
CA1(2)	P9438 (J3)	65	AC3 Mid 2	C/L 9–12 M2 C/L 1–4 M2 PORT AFT BKHD M2
		63	AC3 Mid 4	C/L 9–12 M2 C/L 13–16 M1 STBD AFT BKHD M1 PORT Door M1

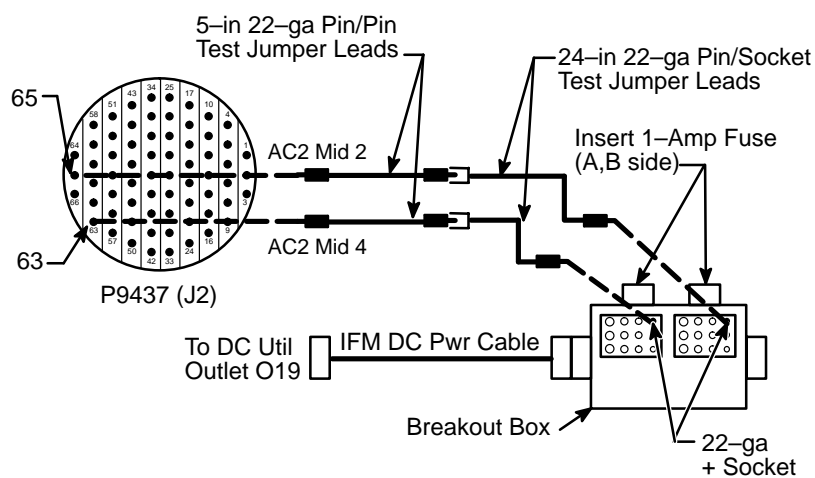
WARNING
28VDC present on some pins of receptacle

13. Demate connector selected from table

14. To configure using Breakout Box:
 - a. Use following setup to config Breakout Box, DC Cable, and Test Jumper Leads to provide 28V to both affected PLBD System Enables thru demated connector. Use Gray Tape to secure connections, and place a piece of tape over face on pin receptacle (28VDC in some of pins)

NOTE

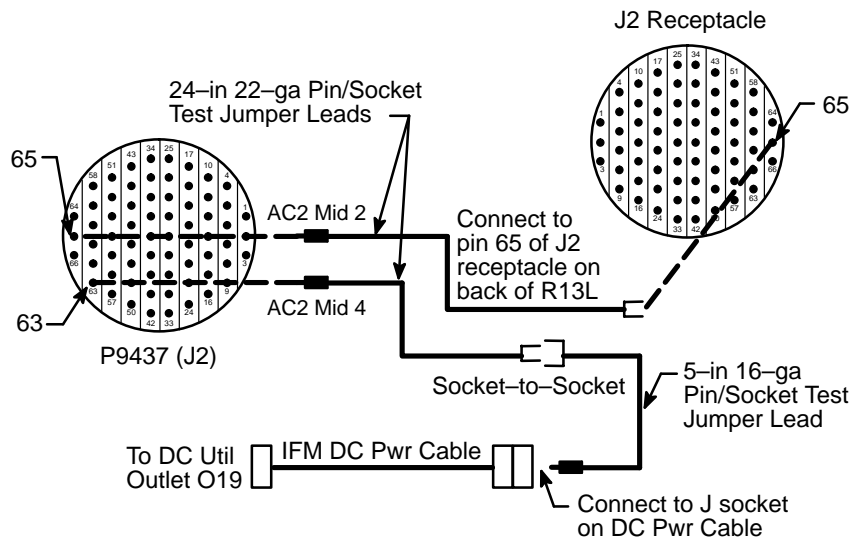
Following assumes CNTLBC2 failure. This config provides enables from Breakout Box to CNTLBC2 and CNTLBC1, enable lost when J2 demated. To config for other failures, check table for correct connector/pin number(s)



15. To configure w/o Breakout Box
 - a. Obtain two 24-in 22-ga Pin/Socket and one 5-in 16-ga Pin/Socket Test Jumper Leads from Pin Kit
 - b. Use following setup to config DC Cable and Test Jumper Leads to provide 28V to both affected PLBD System Enables thru demated connector. Use Gray Tape to secure connections

NOTE

Following assumes CNTLBC2 failure. This config provides enables from pwr outlet to BC2 MCAs and regains BC1 MCAs by reconnecting BC1 pwr signal as shown below. To config for other failures, check previous table for correct connector/pin number(s)



CAUTION
Do not pinch Test Jumper Leads when closing pnl. Use Tongue Depressor, if necessary

- O19
BOB
16. Rotate pnl R13L to closed posn. Secure pnl closed w/Gray Tape
 17. Secure either config to pnl(s) w/Gray Tape
 18. DC UTIL PWR MNA – ON
 19. If using Breakout Box:
 - | PWR A,B – ON (22 lt on)If not using Breakout Box:
Proceed to next step

VERIFY FUNCTIONS REGAINED

- R13L
20. **SM OPS 202 PRO**
 - ✓PBD SW – STOP
 - ✓MAN SEL (ten) – (no *)
 - ✓PBD SW BYPASS – (no *)
 - AC POWER ON – ITEM 1 EXEC (*)
 - PL BAY DR SYS 1,2 (two) – ENA
 - ✓MCC for PLBD POWER ENA indications

PERFORM PLBD OPS

NOTE

Use sw bypass instead of R13L PL BAY DOOR sw for subsequent PLBD ops. Use MANUAL PLBD procedure

- a. Post Insertion:
 - Perform MANUAL PLBD OPENING PROCEDURES (POST INSERT, POST-INSERTION)
 - b. Deorbit Prep:
 - Perform MANUAL PLBD CLOSING (D/O PREP, NOMINAL DEORBIT PREP) or MANUAL PLBD OPENING (D/O PREP, DEORBIT PREP BACKOUT) as reqd
- CRT 21. PBD SW BYPASS – ITEM 14 (*)

WHEN PLBD OPS COMPLETE

- | | | |
|------|-----|---|
| BOB | 22. | If using Breakout Box:
PWR A,B – OFF
If not using Breakout Box:
Proceed to next step |
| O19 | 23. | DC UTIL PWR MNA – OFF |
| | 24. | Remove DC Pwr Cable, Test Jumper Leads, and
Gray Tape from receptacle |
| | 25. | Reconnect appropriate connector to receptacle |
| R13L | 26. | Close pnl and tighten fasteners (torque, 30 in-lb) |
| | 27. | Stow tools |

PDI REPLACEMENT

(2:30 hr) (15 min C/O)

OBJECTIVE: Replace failed PDI with spare

LOCATION: See AV BAY 1, Zones 28 and 43E for PDI location, AV BAY 2, Zone 57M for spare (COMPONENT LOCATION)

TOOLS REQD:

TOOL	Gray Tape
	Locker tool
	Inspection Mirror
	3/8-in Deepwell Socket
	Torque Wrench
	Driver Handle
	1/4-in to 3/8-in Adapter
	6-in Extension (1/4-in drive)
	Ratchet Wrench
	7/16-in Socket
CHCK	Coldplate Protective Covers (2)
MISC	Flashlight

TO OBTAIN SPARE PDI

1. Remove Locker(s) MF57M(MF71M), Thermal/Debris Trap to access spare PDI
2. Tape one Coldplate Protective Cover to wireway in front and above spare PDI to protect wire harnesses

NOTE

PDI and MCIU mounted to trays which attach to original GPC mount points (two pins at back, four bolts in front), plus leveling shim under front edge

3. Remove bolts securing PDI/MCIU mount tray to Av Bay Shelf (four 7/16-in Socket)
4. Remove mount tray and shim w/PDI attached. Use caution to prevent damage to adjacent wiring. Temp stow shim
5. Remove PDI from mount tray (fourteen fasteners, 3/8-in Deepwell Socket). Temp stow tray

TO REMOVE FAILED PDI

NOTE

Following step may cause S62 BCE BYP
PDI and/or S62 PDI decom FAIL and/or S62
BCE BYP PL message

6. Pwr down failed PDI
A1L PL DATA INTLVR PWR – OFF
S–BD PL CNTL – PNL
- MF28E 7. Remove lockers and Thermal/Debris Traps to
(MF43E) access failed PDI
8. Remove connectors
Cable 81V77W8P386 from J3 on PDI
P389 from J6 on PDI
P384 from J1 on PDI
P385 from J2 on PDI
P388 from J5 on PDI
9. Loosen mounting fasteners (fourteen, 3/8–in
Socket), slide Coldplate Protective Covers
between Coldplate and PDI
10. Remove failed unit w/Coldplate Protective
Cover. Use caution to prevent damage to
adjacent wiring
11. Mark failed PDI w/Gray Tape

TO INSTALL SPARE PDI

12. Position replacement PDI w/Coldplate Protective
Cover, then remove cover (torque fasteners,
60 in–lb)
13. Install connectors
Cable 81V77W8P388 onto J5 of PDI
P385 onto J2 of PDI
P384 onto J1 of PDI
P389 onto J6 of PDI
P386 onto J3 of PDI

NOTE

If J4 on replacement PDI not capped,
remove cap from failed PDI, install on
replacement PDI

14. Install Thermal/Debris Traps and contact MCC for pwrap/checkout
15. Reinstall lockers (torque, 30 in-lb), stow failed PDI, tools

TO STOW FAILED PDI

16. Position failed PDI on mount tray start fasteners then tighten (torque, 60 in-lb)
- MF57M 17. ✓Coldplate Protective Cover in place in front and above spare PDI location
18. Slide tray w/PDI attached into position. Ensure pins in GPC bracket engage tray receptacles
19. Position shim under front of tray and start bolts (four). ✓Proper pin engagement w/Inspection Mirror, Flashlight
20. Tighten bolts (torque, 100 in-lb)
21. Install Thermal/Debris Traps and Lockers (torque, 30 in-lb). Stow tools

PGSC CARD CHANGEOUT

(45 min)

OBJECTIVE: Swap malfunctioning PGSC card w/stowed spare

NOTE

Procedure originally written for OCA card. Deltas may be reqd for other PGSC cards

LOCATION: PGSC Expansion Chassis

TOOLS REQD:

TOOL #2 Phillips Driver
Driver Handle
Anti-static Wrist Tether

BOB Fastener Retainer Cushion

- PGSC**
1. Pwr off PGSC, Expansion Chassis
 2. Demate Expansion Chassis Pwr Cable
 3. Demate PGSC Card I/F Cable
 4. Don anti-static Wrist Tether(s)
 5. Loosen, do not remove (1.5 turns), two (2) countersunk Phillips Screws between connectors on aft face of chassis



6. Remove five (5) non-captive screws from bottom of PGSC expansion chassis (four corners, center aft; #2 Phillips Driver, Fastener Retainer)

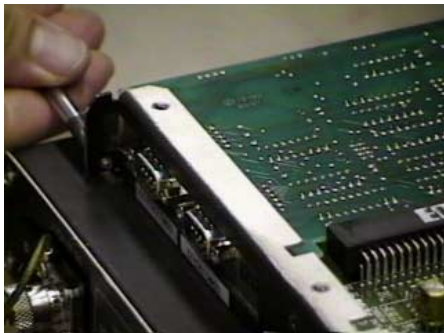
7. Remove chassis cover, temp stow

NOTE

PGSC card has label on card end plate

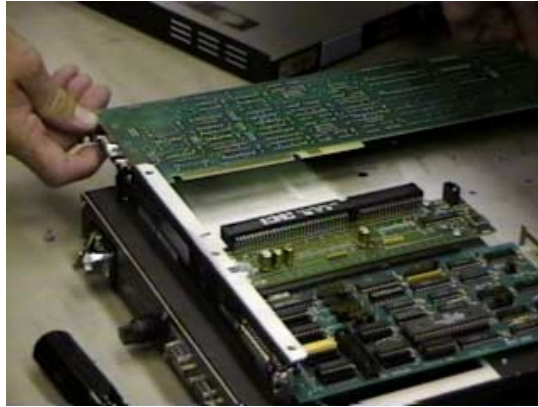


8. Remove one screw securing PGSC card to chassis (#2 Phillips Driver, Fastener Retainer)
9. If reqd to ease card removal, loose, do not remove, two screws securing card end guide positioning brkt to chassis (#1 Phillips Screwdriver)



10. Grasping card by edges only, remove card from edge connector. Gentle rocking may be reqd to release from connector

11. Mark failed card w/Gray Tape on end plate only, temp stow



12. Unstow new card
13. Grasping new card by edges only, slide card into place ensuring end guide and edge connector engaged
14. Secure card w/one screw thru tab on outboard side (#2 Phillips Driver)
15. If step 9 performed, ✓proper engagement of end guide brkt; tighten two screws securing brkt to chassis, hand tight
16. Tighten two (2) screws loosened in step 5
17. Replace chassis cover, install,tighten five (5) screws
18. Stow tools

PGSC EXPANSION CARD CHANGEOUT

(30 min)

OBJECTIVE: Swap malfunctioning PGSC expansion card
w/stowed spare

LOCATION: PGSC Selectadock Expansion Unit

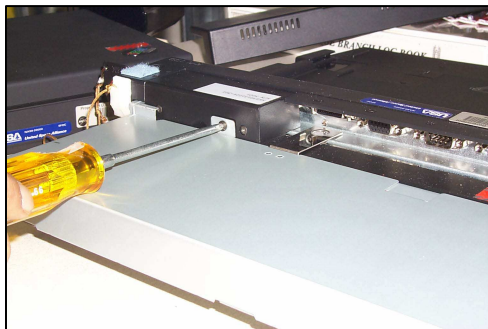
TOOLS REQD:

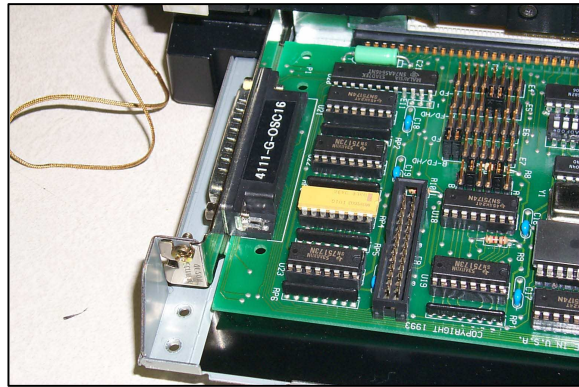
TOOL #2 Phillips Driver
Anti-static Wrist Tether
Gray Tape

- PGSC
1. AC Util Pwr – off
 2. PGSC Pwr – off
 3. Demate Expansion Unit Pwr Cable
 4. Demate PGSC Expansion Card Data Cable, if reqd
 5. Don anti-static Wrist Tether(s)
 6. Insert security key, rotate to unlock position, remove PGSC from expansion unit



7. Disengage captive screw (#2 Phillips Driver) attaching metal chassis cover, remove cover, temp stow





8. Remove single screw (#2 Phillips Driver) securing PGSC expansion card, temp stow
9. Grasping card by edges only, remove card from edge connector. Gentle rocking may be reqd to release from connector
10. Mark failed card w/Gray Tape on end plate only, temp stow
11. Unstow new card
12. Grasping new card by edges only, slide card into place ensuring edge connector engaged
13. Reinstall PGSC expansion card, one screw
14. Replace chassis cover, ensure guide clips on top right seat properly, tighten screws
15. Reinstall PGSC to expansion unit, rotate security key to lock position
16. Stow tools

PREFLIGHT TEST BUS SETUP

(FC1 – 1:30 hr)
(FC2,3 – 2:00 hr)

OBJECTIVE: Recover system(function) by using preflight test bus

LOCATION: See (COMPONENT LOCATIONS)
AV BAY 1, Zone 14O (PCA 1) and 43 (MDM LF1)
AV BAY 3A, Zone 9N (PCA 3)

TOOLS REQD:

TOOL	Gray Tape Pin Kit (for 16-ga & 22-ga Test Jumper Leads) Locker Tool Torque Wrench Ratchet Wrench
BOB	IFM Breakout Box
CHCK	DC Pwr Cables (two, as reqd)

1. Remove Vol A (see GENERAL INFORMATION, VOL A REMOVAL) to access MDM LF1
For FC 1 recovery, access PCA 1
Remove MF14O Locker Thermal/Debris Trap
For FC 2(3) recovery, access PCA 3
See SOFT STOWAGE SUPPORT REMOVAL (GENERAL INFORMATION)
Remove MA9N closeout
For other recover, check MCC
2. Remove Plugs P67,P68 from MDM LF1 connectors J10,J11, respectively. (This disconnects MDM LF1 from preflight test buses)
- MO30F 3. DC UTIL PWR MNC – OFF
MO52J MNA – OFF
4. a. Config Breakout Box
AUX – OFF
28V VAR VOLT – 28V
PWR A,B – OFF
b. Remove fuse cap and fuse from F10 of PCA 1(3). Stow fuse cap
c. Install fuse into Fuse Cap Test Lead and install assembly into F10 of PCA 1(3)

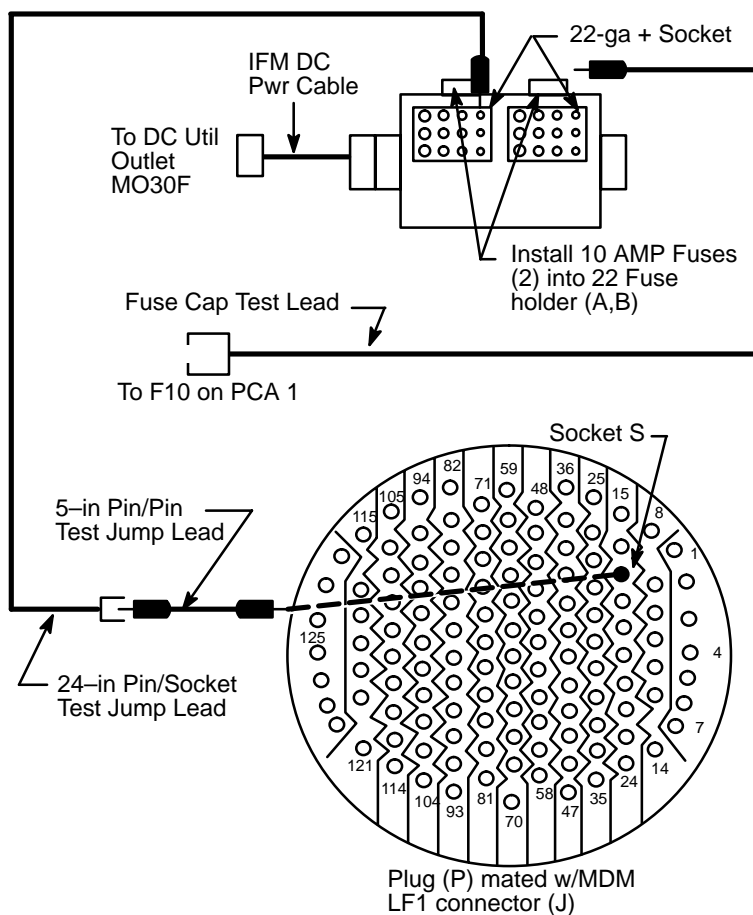
5. If FC 1 recovery desired, go to step 6
If FC 2(3) recovery desired, go to step 7
If function(system) recovery other than FC
desired, then:
For Preflight test bus 1(2), use setup shown
in step 6(7)
✓MCC for exact plug, connector, and pin
socket reqd for system/function recovery

6. FC 1 Recovery/Preflight Test Bus 1 Use:

- a. See table below for exact plug, connector, and socket location reqd

	Plug	Connector	Socket
FC1 Recovery	P59	J2	17
Other (✓MCC)			

- b. Install fuses and connect cables as shown below
 c. Then, go to step 8

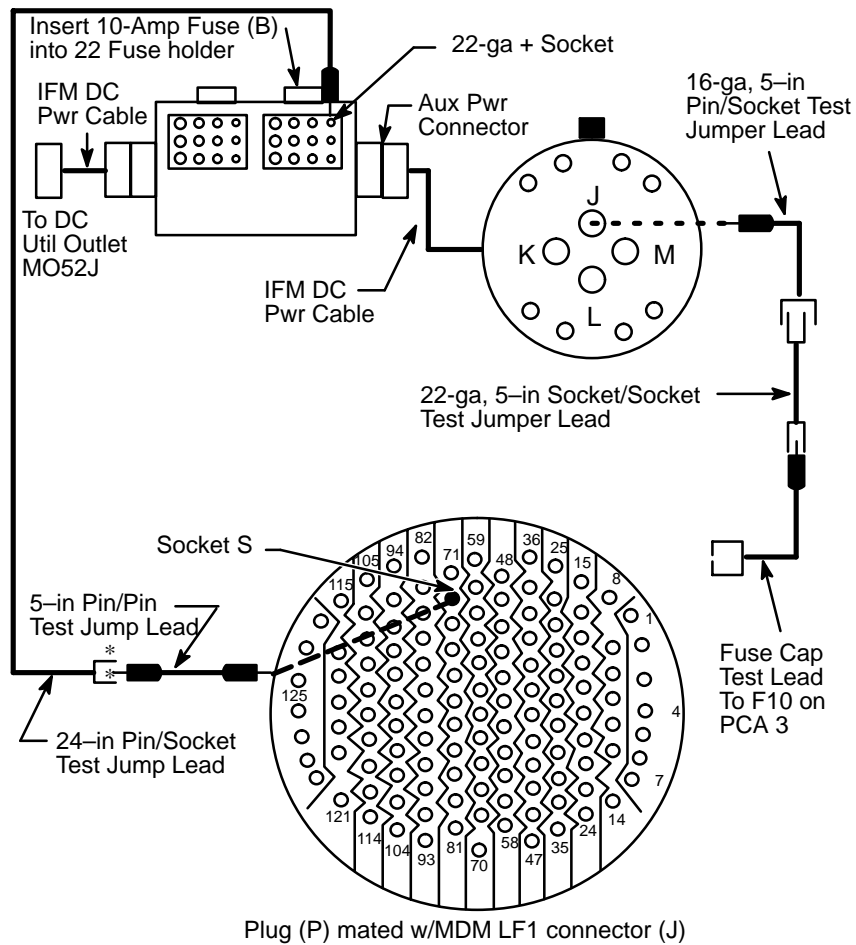


7. FC 2(FC 3) Recovery/Preflight Test Bus 2 Use:

- a. See table below for exact plug, connector, and socket location reqd

	Plug	Connector	Socket
FC 2 Recovery	P59	J2	72
FC 3 Recovery	P63	J6	72
Other (✓MCC)			

- b. Install fuses and connect cables as shown below
 c. Then, go to step 8



8. Return to MAL, EPS SSR-202 to complete recovery procedure
If preflight test bus task completed and installation no longer reqd for this flight:
 9. Disconnect and stow cables
 10. Reinstall all Thermal/Debris Traps, Vol A, lockers, and stow tools >>If preflight bus reqd to be installed for remainder of flight:
 11. Reinstall all Thermal/Debris Traps, Vol A, and lockers (see next step), taking care not to crimp (cut) wires going to PCA(MDM)
 12. Restrain lockers that cannot be installed (installation of locker could cut/crimp wires)
 13. Locate Breakout Box(es) where it can be powered ON/OFF during entry by crewmember strapped in seat, and secure box(es) and cables
 14. Stow tools

PSP CHANGEOUT

(2:00 hr)

OBJECTIVE: Replace failed PSP 1 w/PSP 2

LOCATION: See AV BAY 2, Zones 71C and 57E, for PSP locations (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL	Gray Tape
	Locker Tool
	3/8-in Deepwell Socket
	Torque Wrench
	Driver Handle
	1/4-in to 3/8-in Adapter
	Ratchet Wrench
	6-in Extension (1/4-in drive)
CHCK	Coldplate Protective Cover

TO REMOVE PSP

NOTE

Following step may cause
S62 BCE BYP PSP message

- | | |
|-----|--|
| A1L | 1. Pwr dn PSP |
| | S-BD PL PWR SYS – OFF |
| | SEL – BOTH |
| | CNTL – PNL |
| | 2. Remove Lockers, Thermal/Debris Traps to access PSP 1,2 |
| | 3. Remove connector cables J1,J2,J3 on PSP 1,2 |
| | 4. Loosen mounting fasteners (eight, 3/8-in socket), slide Coldplate Protective Cover between Coldplate, PSP |
| | 5. Remove PSP w/Coldplate Protective Cover w/caution to prevent damage to adjacent wiring |
| | 6. Mark failed unit w/Gray Tape |

TO INSTALL PSP

7. Place PSP, w/Coldplate Protective Cover, into position being careful not to damage coldplate(cabling)
8. Remove Coldplate Protective Cover (torque fasteners, 60 in-lb)
9. Install connectors

In PSP 1 location:

In PSP 2 location:

Connect Cable	PSP	Connect Cable	PSP
81V77W8P291 to	J1	82V77W9P294 to	J1
P292 to	J2	P295 to	J2
P293 to	J3	P296 to	J3

10. Install Thermal/Debris Traps and contact MCC for pwrap/checkout
11. Reinstall lockers (torque, 30 in-lb), stow tools

Section Q
Intentionally
Omitted

RECORDER CHANGEOUT

(3:00 hr)

OBJECTIVE: Swap failed OPS 1(2) or PL RCDR as reqd. This will normally be done only if both OPS RCDRs have failed and one failure not pwr related

LOCATION: See (COMPONENT LOCATIONS)

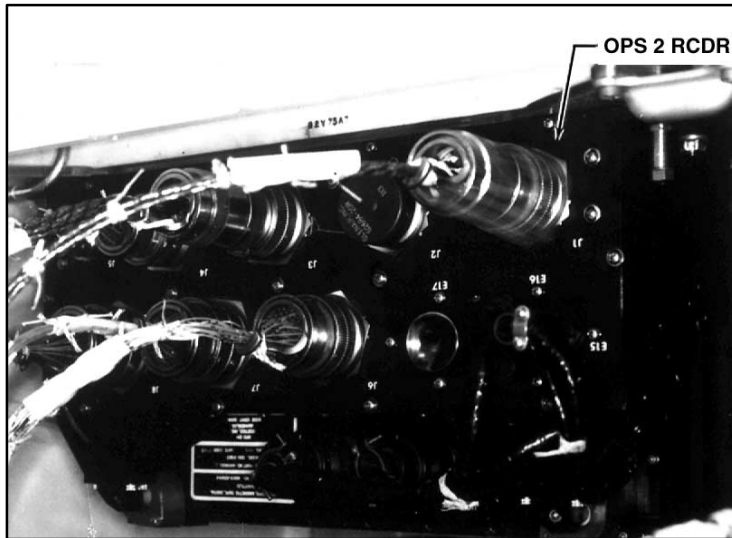
- AV BAY 1 – Zone 43G for PL RCDR
- AV BAY 2 – Zone 71E for OPS RCDR 1
- Zone 57G for OPS RCDR 2

TOOLS REQD:

TOOL	Gray Tape
	Locker Tool
	3/8-in Deepwell Socket
	Torque Wrench
	Driver Handle
	1/4-in to 3/8-in Adapter
	4-in Extension
	Ratchet Wrench
CHCK	Coldplate Protective Covers (2)

TO REMOVE RECORDER

- | | |
|-----|---|
| A1R | 1. ✓MCC, Recorders configured for IFM |
| | 2. If OPS 1(2)/Payload Recorder Changeout |
| | PL RCDR PWR – OFF |
| | OPS RCDRS PWR 1(2) – OFF |
| | If OPS 1,2 Recorder Changeout |
| | OPS RCDRS PWR 1,2 – OFF |
| | 3. Remove Lockers and Thermal/Debris Traps as reqd to access OPS RCDR 1(2) or PL RCDR |
| | Inform MCC before continuing |
| | 4. Remove connectors J1 thru J8 from recorders as reqd |
| | 5. Loosen mounting fasteners (twelve, 3/8-in Deepwell Socket) |



6. Install two Coldplate Protective Covers taped together between coldplate and recorder
7. Remove recorder w/protective covers
Mark failed unit w/Gray Tape
8. Repeat steps 3–7 for removal of other recorder

TO INSTALL RECORDER

9. Place recorder w/Coldplate Protective Cover into position
10. Remove Coldplate Protective Covers and tighten fasteners (torque, 70 in-lb)
11. Install connectors onto RCDRs as reqd

For PL RCDR location, connect –	
Cable	Recorder
81V77W8P85	to J1
	P86 to J2
	P87 to J3
	P88 to J4
	P89 to J5
	P90 to J6
	P91 to J7
	P92 to J8

For OPS 1 RCDR location, connect –	
Cable	Recorder
82V77W9P88	to J1
	P89 to J2
	P90 to J3
	P91 to J4
	P92 to J5
	P93 to J6
	P94 to J7
	P95 to J8

For OPS 2 RCDR location, connect –	
Cable	Recorder
82V77W9P96	to J1
	P97 to J2
	P98 to J3
	P99 to J4
	P100 to J5
	P101 to J6
	P102 to J7
	P103 to J8

- A1R
12. Install Thermal/Debris Traps
 13. Repeat steps 9–12 for failed RCDR
 14. Perform RCDR Powerup
 - If replacement RCDR in PL RCDR location
 - PL RCDR PWR – ON
 - If replacement RCDR in OPS 1(2) RCDR location
 - OPS RCDRS PWR 1(2) – ON
 15. ✓MCC, RCDR changeout complete
 16. If recorder GO based on MCC checkout, install lockers (torque, 30 in-lb), stow tools

RECORDER JUMPER CABLE INSTALLATION (PL,OPS) (1:00 hr)

OBJECTIVE: Install jumper cables to have Operational Recorder 2 (OPS RCDR 2) function as Payload Recorder (PL RCDR) following PL RCDR failure. This procedure can be performed only if both OPS RCDRS 1,2 operational

LOCATION: See COMPONENT LOCATIONS:

AV BAY 1, Zone 43G for PL RCDR
AV BAY 2, Zone 57G for OPS RCDR 2

TOOLS REQD:

TOOL	Gray Tape Locker Tool Connector Wrench Driver Handle Wire Cutters (small)
CHCK	Recorder Jumper Cable 1
MISC	Flashlight

- A1R
1. ✓MCC, PL RCDR,OPS RCDR 2 configured for IFM
PL RCDR PWR – OFF
OPS RCDRS PWR 2 – OFF
 2. Remove Lockers/Thermal Debris Traps as reqd to access OPS RCDR 2,PL RCDR
Inform MCC before continuing

PL RCDR

3. Demate P85 from J1 on PL RCDR
Connect P85 to J85 on Recorder Jumper Cable 1, tape over J1
4. Demate P91,P92 wire harness jumper from J7,J8 on PL RCDR, tape over J7,J8
Remove P91,P92 wire harness jumper from AV BAY 1 (remove cable clamps, cut wire ties as necessary), temp stow

OPS RCDR 2

5. Route Recorder Jumper Cable 1 to OPS RCDR 2
6. Demate P96 from J1 on OPS RCDR 2, tape over P96
Connect J1 to P1 on Recorder Jumper Cable 1

7. Demate P102,P103 wire harness jumper from J7,J8 on OPS RCDR 2 (P102 from J7 and P103 from J8)
Tape over P102,P103; tape P102,P103 jumper to orbiter structure
8. Connect P91,P92 wire harness jumper (removed from PL RCDR in step 4) to J7,J8 of OPS RCDR 2 (P91 to J7 and P92 to J8)

CHECKOUT

9. Reinstall Thermal/Debris Traps w/tape, as necessary (tape Recorder Jumper Cable 1 to prevent damage by Thermal/Debris Traps)
- A1R 10. Perform OPS RCDR 2 pwrup
OPS RCDRS PWR 2 – ON
11. ✓MCC, Jumper Cable installation complete

NOTE

INCO will have to change its commands to run OPS RCDR 2 as PL RCDR

PRIOR TO DEORBIT PREP

12. Repeat steps 1–2

OPS RCDR 2

13. Demate P91,P92 wire harness jumper from J7,J8 on OPS RCDR 2, temp stow
Remove tape, reconnect P102,P103 wire harness jumper to J7,J8 at OPS RCDR 2 (P102 to J7 and P103 to J8)
14. Remove Recorder Jumper Cable 1 from J1 on OPS RCDR 2
Remove tape and reconnect following cable to OPS RCDR 2:
Cable P96 to J1

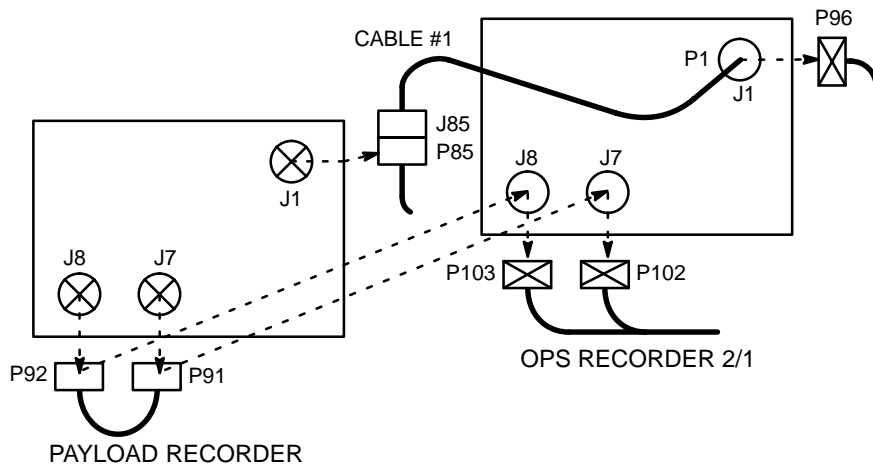
PL RCDR



15. Remove tape, install P91,P92 wire harness cable (removed from OPS RCDR 2 in step 13) on J7,J8 of PL RCDR (P91 to J7 and P92 to J8)

16. Remove Recorder Jumper Cable 1 from cable P85 at PL RCDR
Remove tape and reconnect following cable to PL RCDR:
Cable P85 to J1

CHECKOUT

- A1R
17. Install Thermal/Debris Traps
 18. Perform OPS RCDR 2 pwrup
OPS RCDRS PWR 2 – ON
 19. ✓MCC, Jumper Cable deorbit prep complete
 20. Install lockers, closeout pnls (torque 30 in-lb)
 21. Stow Recorder Jumper Cable 1, tools, Gray Tape



  = Gray Tape will be placed over these connectors

- Cable Summary**
1. Install Recorder Jumper Cable 1 between P85 (PL RCDR) & J1 (OPS RCDR 2)
 2. Demate Cables P102 from J7 and P103 from J8 on OPS RCDR 2
 3. Demate Cables P91 from J7 and P92 from J8 on PL RCDR
 4. Install cable (removed from PL RCDR) on J7 and J8 of OPS RCDR 2 (cable P91 to J7 and cable P92 to J8)

RHC CHANGEOUT

(3:00 hr)

OBJECTIVE: Replace failed fwd RHC w/aft RHC (RHC considered failed if two channels lost)

LOCATION: FLT DECK

TOOLS REQD:

TOOL Gray Tape
 Silicon Lubricant (Patch Kit)
 7/64-in Allen Head Wrench
 3/8-in & 1/4-in Combination Wrenches
 Torque Wrench
 Ratchet Wrench
 3/8-in Socket
 4-in Extension
 5/32-in Allen Head Driver
 1/4-in to 3/8-in Adapter
 #6 Torque Driver
 #10 Torque Driver

TO REMOVE FWD RHC

GNC 25 RM ORBIT

1. Deselect non-failed L(R) RHC XDCRS RHC
L(R) DES ITEMS 7,8,9(10,11,12)EXEC (*)

2. For left RHC

O14:E | cb MNA DDU L - op

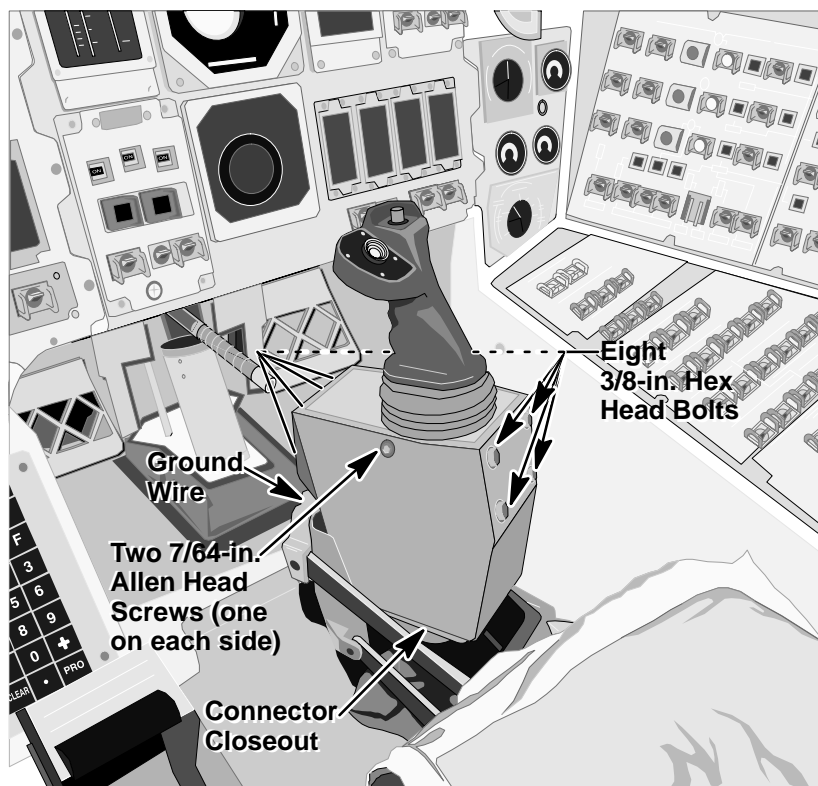
O15:E | MNB DDU L - op

For right RHC

 cb MNB DDU R - op

O16:E MNC DDU R - op

FWD RHC OVERVIEW

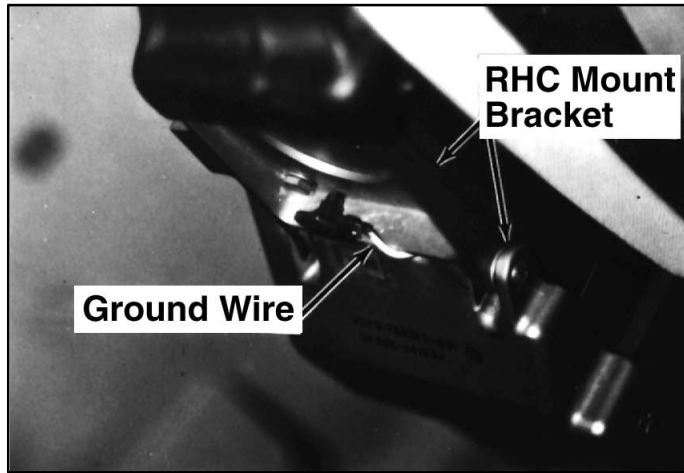


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SRP6

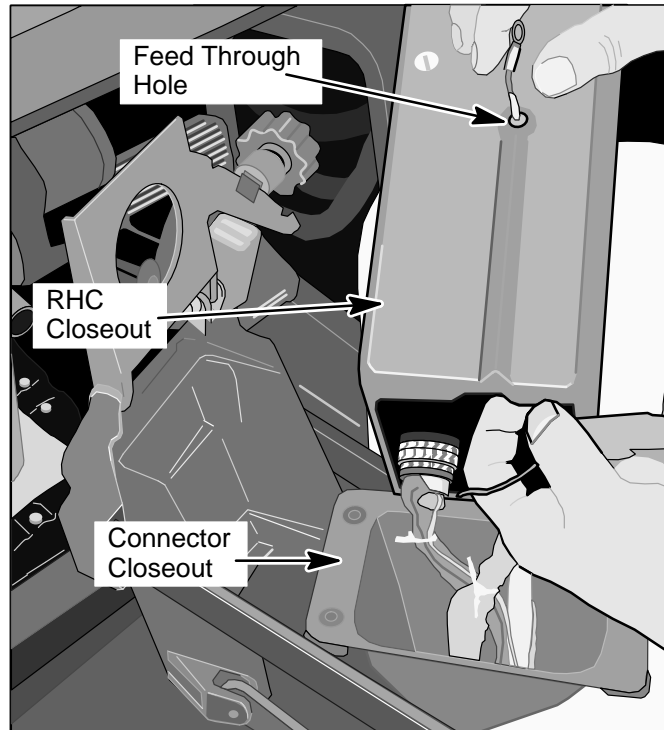
NOTE

RHC closeout pnl and RHC mounting bolts, screws not captive. Secure temporarily to structure w/tape



S85-32939

3. Remove ground wire from fwd side of RHC mount. One screw and nut covered w/red RTV (#10 Torque Driver and 1/4-in Combination Wrench)



S885-43887

4. Remove RHC assembly from mount using care that ground wire does not hang up in mount slot (four bolts/washers, 3/8-in Socket)
5. Remove connector closeout from base of RHC closeout (four fasteners, #10 Torque Driver)

NOTE

There are eight additional washers, four fwd & four aft, used as spacers under RHC closeout

6. Remove closeout from around RHC. Ground wire feeds through hole in fwd side of closeout (four bolts/washers, 3/8-in Socket and two screws/washers, 7/64-in Allen Head Driver)
7. Remove connectors:
For PLT's(CDR's) RHC, remove cables from J1,J2,J3
8. Remove RHC, mark failed unit w/Gray Tape

TO REMOVE AFT RHC

- O14:E 9. cb MNA DDU AFT – op
O16:E MNC DDU AFT – op

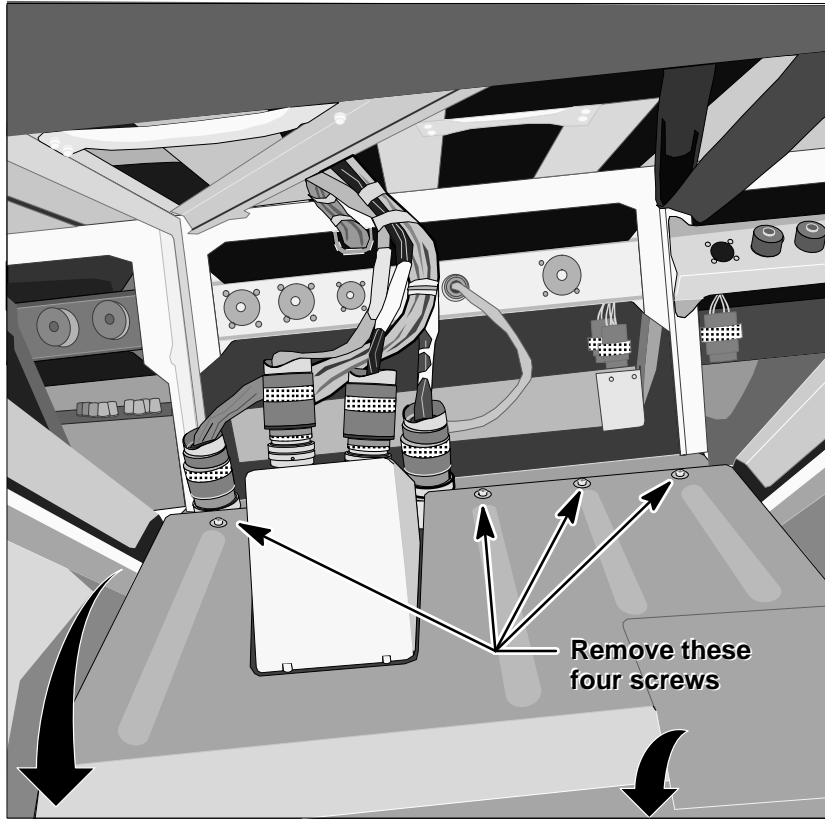
NOTE

Panel bolts/washers, closeout screws/washers and RHC mounting bolts (removed in steps 10–14) not captive. Secure to pnl using tape

WARNING

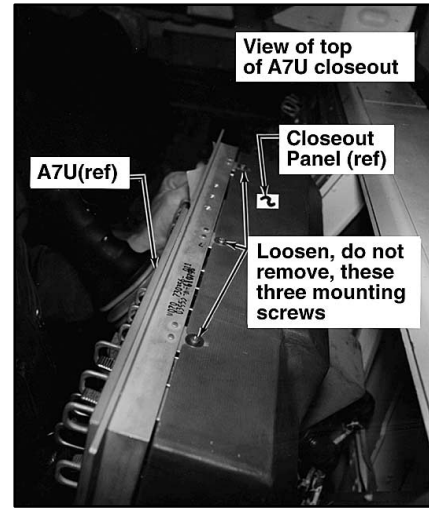
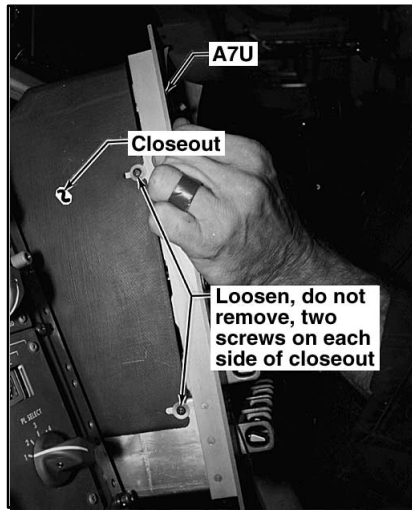
DO NOT demate connectors in back of pnl A7U(A7C)

10. If A7C blank pnl installed:
Remove A7C blank pnl (eight bolts, 3/8–in Socket) to access RHC cable clamps behind A7. Remove cable clamp(s) as reqd to allow greater movement of A7U in following steps (#10, Torque Driver)
If APDS pnl installed:
Perform ORBIT STATION ACCESS
(GENERAL INFORMATION)
- A7U 11. Remove A7U (eight bolts/washers, 3/8–in Socket)
12. Remove A7U rear closeout. Remove four lower rear screws; loosen, do not remove, three top and four side screws (eleven screws/washers, 7/64–in Allen Head Driver)

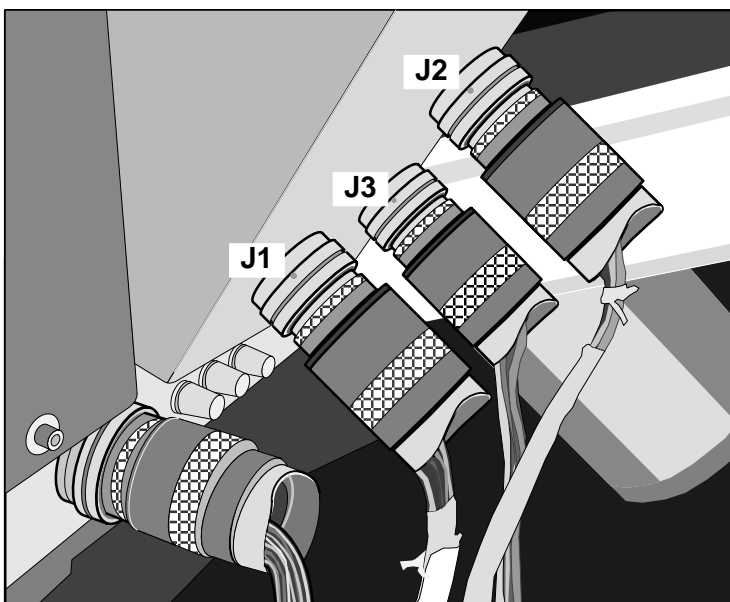


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SRP10



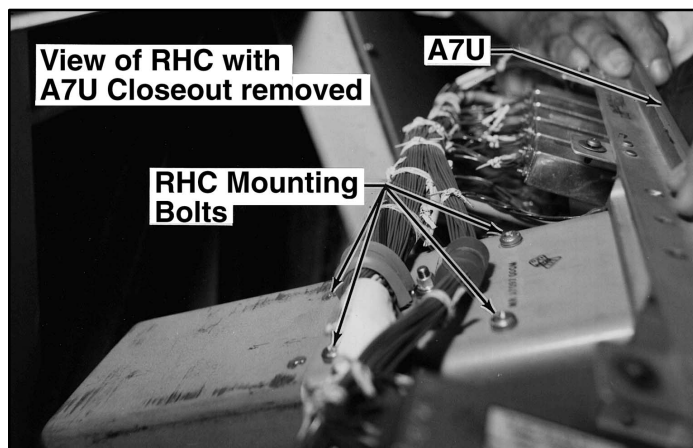
13. Remove RHC connectors as follows (for ease of removal): J2,J3,J1 on RHC



S85-43880

SRP17A

14. Remove RHC (four bolts, 3/8-in Socket)



108-KSC-380C-1473/12

TO INSTALL AFT RHC FWD

15. Install connectors:
 - For left RHC
 - 30V77W1P201 to J1
 - P203 to J2
 - P205 to J3
 - For right RHC
 - 30V77W2P200 to J1
 - P202 to J2
 - P204 to J3
16. Place eight washers, four fwd & four aft, as spacers under closeout and over nut plates. Use small dab of Silicon lubricant, stowed in patch kit, to stick washers in place, if reqd
17. Install closeout around RHC. Ensure ground wire fed thru hole in fwd side of closeout. Start four bolts/washers and two screws/washers, do not tighten
18. Install connector closeout to base of RHC closeout (four fasteners, #10 Torque Driver), snug
19. Install RHC to mount. Ensure that ground wire fed thru slot in mount before tightening fasteners. Flex closeout as reqd to align holes for mounting bolts. Tighten mount, closeout fasteners (eight bolts/washers, torque, 30 in-lb); (two screws/ washers), gently tighten snug
20. Reconnect ground wire to RHC mount. Do not allow wire to rotate/twist when tightening nut (tighten snug)

TO INSTALL FWD RHC AFT

21. Tape over connector interfaces, tape connector harnesses out of way to structure
22. Install RHC into pnl A7U (four bolts/washers, torque, 30 in-lb)
23. Install A7U rear closeout (11 screws), gently tighten snug
24. Install cable clamps if removed

25. For A7C blank pnl:
 Install pnl A7U,A7C (eight bolts/washers each,
 torque, 30 in-lb)
 For APDS pnl:
 Perform ORBIT STATION ACCESS,
 step 9 (GENERAL INFORMATION)
- O14:E 26. cb MNA DDU AFT – cl
 O16:E MNC DDU AFT – cl

L(R) RHC TEST

- O14:E 27. For left RHC
 O15:E cb MNA DDU L – cl
 MNB DDU L – cl
 For right RHC
 O16:E cb MNB DDU R – cl
 MNC DDU R – cl
- GNC 25 RM ORBIT
- F7(F8) 28. SW RM INH – ITEM 16 (*)
 L(R) FLT CNTLR PWR – ON
 SW RM INH – ITEM 16 (no *)
29. ✓L(R) RHC deflect to hardstop in each axis:
 ✓RHC L(R): R,P > 92%
 Y > 88%
30. ✓Correct polarity of output, RM tracking test limit
 not exceeded:
 22% P, 29% R, 20% Y
31. Reselect all good RHC XDCRS:
 RHC L(R) DES – ITEMS 7,8,9(10,11,12)
 EXEC (no *)
32. If time permits,
 Perform G2 to G8 TRANSITION, perform L(R)
 RHC TRIM SWITCH TEST
- GNC 43 CONTROLLERS
- F7(F8) 33. L(R) RHC TRIM – deflect sw in each axis
 ✓RHC TRIM L(R): R – R/L, P – U/D
34. L(R) FLT CNTLR PWR – OFF
 34. Stow tools, tape

**RMS: CONTINGENCY OPERATION (Installation
and Removal of RMS IFM D&C Kit)** (1:00 hr)
(Add 45 min for Orbit station Access)

OBJECTIVE: Provide contingency ops of Remote Manipulator System using RMS IFM D&C Kit which is designed to work around following failures:

Shoulder Brace Release sw
End Effector Capture/Release sw
End Effector Mode sw
K1,K2,K6 relays
Zener diodes
Mode Select sw
Single (Direct) sw
Joint Select sw
28V Brake sw contact
EE Man Contr sw

LOCATION: FLIGHT DECK (COMPONENT LOCATIONS);
Connector Bracket (CB) behind pnl A8L

TOOLS REQD:

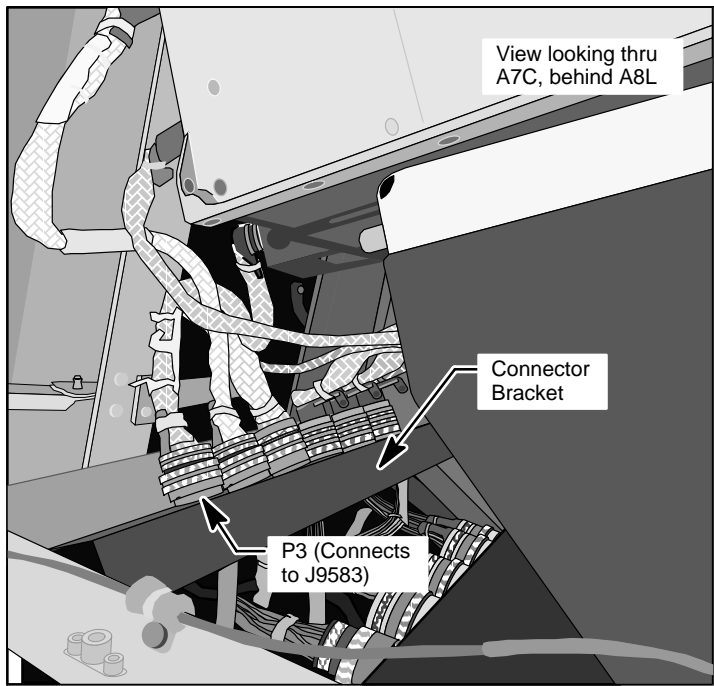
TOOL	Gray Tape Inspection Mirror Connector Wrench Ratchet Wrench Driver Handle 4-in Extension 3/8-in Socket Torque Wrench
BOB	RMS IFM D&C Kit

TO INSTALL RMS IFM D&C KIT

- | | |
|-----|---|
| | 1. SM 94 PDRS CONTROL
Record WRR _____ |
| A8L | 2. RMS SEL – OFF
PWR – OFF |
| A8U | 3. ✓EE MODE – OFF |
| | 4. If Shoulder Brace Release reqd:
✓COAS PWR – OFF |
| O19 | 5. ✓DC UTIL PWR MNA – OFF |

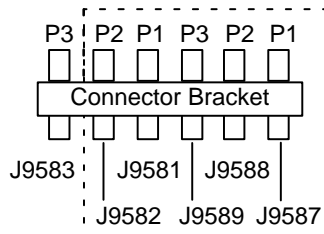
WARNING
DO NOT demate connectors behind pnl A7C

6. If A7C blank pnl installed:
 Remove A7C blank pnl (eight bolts, 3/8-in Socket)
- If APDS pnl installed:
 Perform ORBIT STATION ACCESS
 (GENERAL INFORMATION)

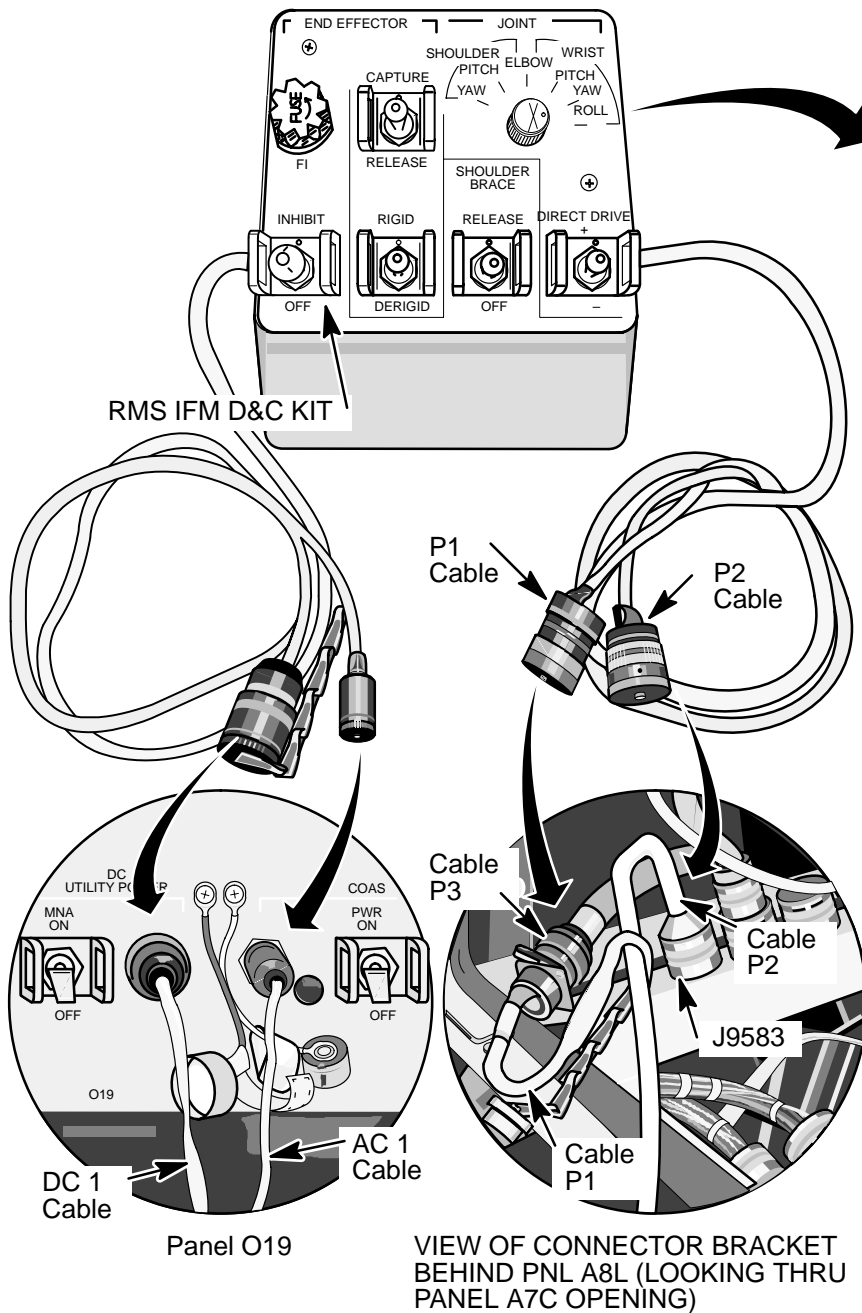


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NOTE

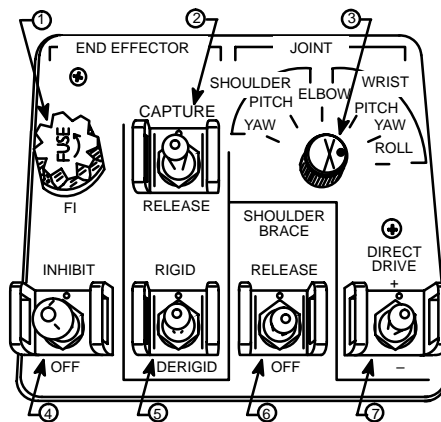


DO NOT DEMATE



SR_P16

RMS IFM D&C KIT SWITCH FUNCTIONS



- ① FUSE – 1/4 AMP. All VDC protected by this fuse
- ② CAPTURE/RELEASE – Captures/releases PL when Box installed.
End Effector sw on D&C pnl and RHC disabled when Box installed
- ③ JOINT SELECT – Selects joint which Direct Drive will drive. Joint
Select on D&C pnl will still work single mode and joint angle
readout
- ④ INHIBIT/OFF – Function no longer available due to SPA design
change
- ⑤ RIGID/DERIGID – Rigidizes/derigidizes end effector when attached
to PL. End Effector sw on D&C pnl and RHC disabled when Box
installed
- ⑥ SHOULDER BRACE – Release posn applies 115 VAC (Φ A) directly
to drive motor. Center,down posn – OFF posn
- ⑦ DIRECT DRIVE – Drives select joint regardless of Brake sw posn

7. Disconnect P3 from J9583 (J9583 located on Connector Bracket behind A8L)
8. Connect RMS IFM D&C Kit connector P1 to P3 on vehicle harness
9. Connect RMS IFM D&C Kit connector P2 to J9583 on Connector Bracket
- O19 10. If DIRECT DRIVE(END EFFECTOR) functions reqd, connect RMS IFM D&C Kit DC 1 Pwr Cable connector to DC Util Outlet
11. If SHOULDER BRACE RELEASE reqd, connect RMS IFM D&C Kit AC 1 Pwr Cable connector to COAS Outlet
12. Perform RMS IFM D&C Kit, SSR-4 (MAL, PDRS SSR)

TO REMOVE RMS IFM D&C KIT

- A8L 13. RMS SEL – OFF
PWR – OFF
- A8U 14. ✓EE MODE – OFF
- O19 15. ✓COAS PWR – OFF
16. ✓DC UTIL PWR MNA – OFF
17. Disconnect RMS IFM D&C Kit AC 1 Pwr Cable connector from COAS Outlet, if connected
18. Disconnect RMS IFM D&C Kit DC 1 Pwr Cable connector from DC Utility Outlet, if connected
19. Disconnect RMS IFM D&C Kit connector P1 from connector P3 on vehicle harness
20. Disconnect RMS IFM D&C Kit connector P2 from connector J9583 on Connector Bracket
21. Reconnect Vehicle Harness connector P3 to connector J9583 on Connector Bracket behind A8L
22. For A7C blank pnl:
Reinstall A7C blank pnl (torque, 30 in-lb)
For APDS pnl:
Perform ORBIT STATION ACCESS,
step 9 (GENERAL INFORMATION)
23. Stow tools, RMS IFM D&C Kit

RMS: CONTINGENCY POWERUP (3:00 hr)
(Add 45 min for Orbit station Access)

OBJECTIVE: Regain all primary modes of operation of arm due to RMS PWR(RMS SEL) sw failure

NOTE

Backup will not be regained in event of total RMS PWR(RMS SEL) sw failure

LOCATION: FLIGHT DECK (COMPONENT LOCATIONS);
Connector Bracket behind pnl A8L

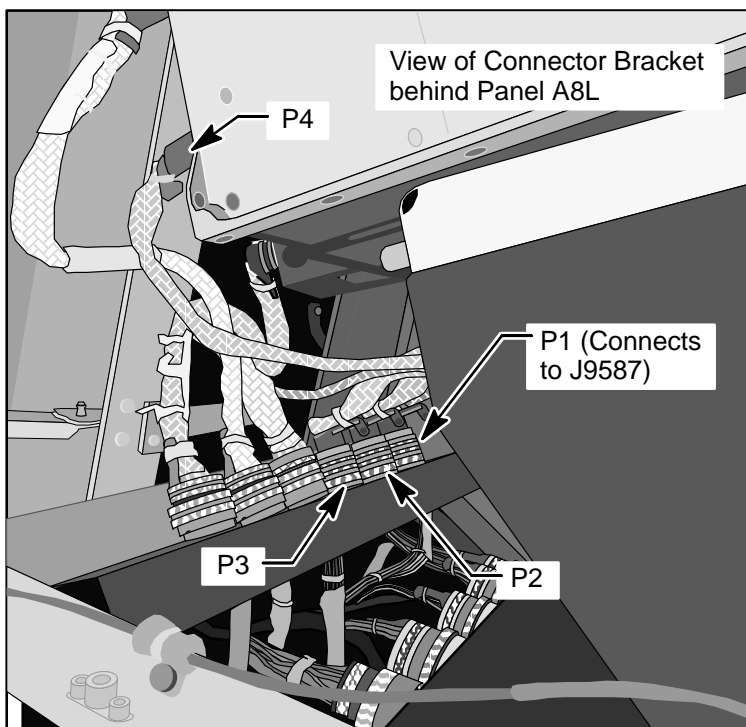
TOOLS REQD:

TOOL	Gray Tape
	Pin Kit
	Pwr Screwdriver
	Inspection Mirror
	Torque Wrench
	Driver Handle
	4-in Extension
	3/8-in Socket
BOB	IFM Breakout Box
CHCK	DC Pwr Cable

TO INSTALL IFM

- | | |
|---------|---|
| A8L | 1. RMS SEL – OFF
PWR – OFF
PORT RMS HTR A,B (two) – OFF |
| L4:Q | 2. cb AC3 ϕ C LTG PNL OS – op |
| MA73C:F | 3. AC1 RMS PRI ϕ A – op
AC2 RMS B/U ϕ A – op |
| | 4. a. Breakout Box:
AUX – OFF
28V/VAR VOLT – 28V
PWR A,B – OFF
b. Remove Fuse Cap from side B
c. Rotate GA SEL B – 22
d. Install 2-Amp Fuse, replace cap |
| | 5. If A7C blank pnl installed:
Remove A7C blank pnl (eight bolts, 3/8-in Socket)
If APDS pnl installed:
Perform ORBIT STATION ACCESS
(<u>GENERAL INFORMATION</u>) |

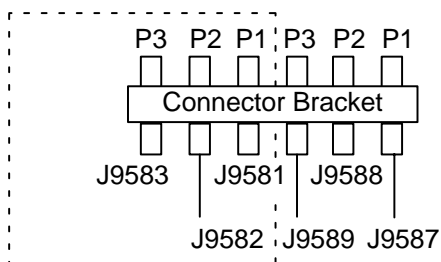
6. Remove bolts from pnl A8L (eight, 3/8-in Socket)



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CAUTION
 28V Cntl Bus voltage present in some connectors. Backup will not be available while P2 disconnected

NOTE



DO NOT DEMATE

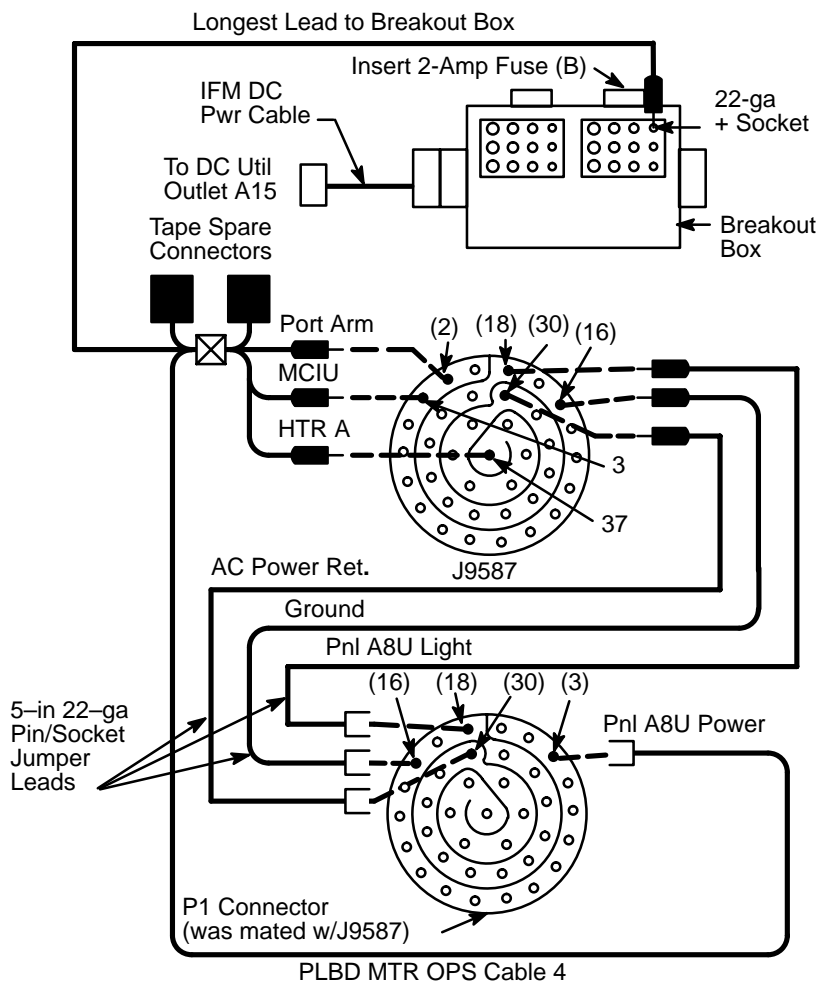
7. Remove connectors P1,P2,P3,P4 then reposition pnl A8L to provide access to P1,J9587 (outboard connector on bracket)
8. Remove PLBD MTR OPS Cable 4 and three 22-ga Pin/Socket Test Jumper Lead from Pin Kit
9. ✓ DC UTIL PWR MNC – OFF

A15

NOTE

If pnl A8U lighting available prior to IFM, connect pins 18,30

10. Install cables as follows:



- A15 11. Move pnl A8L back into position and reconnect P2,P3,P4
- L4:Q 12. cb AC3 ϕ C LTG PNL OS – cl
If pnl A8U lgt available prior to IFM:
- MA73C:F 13. cb AC1 RMS PRI ϕ A – cl
AC2 RMS B/U ϕ A – cl
- A8L RMS PWR – PRI

NOTE

Expect single motor times for MPMs, MRLs while IFM installed. Port RMS tb and RETEN LAT tb will remain bp. AFT,MID,FWD ready for latch tb available

- A15 14. DC UTIL PWR MNC – ON
Breakout Box:
PWR B – ON (22 lt ON) (MA)
SM 94 PDRS CONTROL
- CRT 15. I/O ON – ITEM 5 EXEC (*)
- A8U 16. SAFING – CANCEL (tb-gray)
If pnl A8U lighting not available:
SPEC 169 PDRS STATUS
- 17. ✓ Joint Angles

TO REMOVE IFM

- 18. Breakout Box:
PWR B – OFF
- A15 19. DC UTIL PWR MNC – OFF
- MA73C:F 20. cb AC1 RMS PRI ϕ A – op
- 21. Disconnect cable installed in step 10, stow
- 22. Reconnect P1 to J9587
- 23. For A7C blank pnl:
Install pnls A7C,A8L (torque, 30 in-lb)
For APDS pnl:
Perform ORBIT STATION ACCESS,
step 9 (GENERAL INFORMATION)
- MA73C:F 24. cb AC1 RMS PRI ϕ A – cl
- 25. Stow tools

RMS: JETT REDUNDANCY

(2:30 hr)

OBJECTIVE: Restore redundancy for jettison to RMS Jettison System. Due to loss of either sub-bus MNB(MNC) from pnl ML86B

LOCATION: See Middeck (pnl ML86B) and FLIGHT DECK (pnl A14) (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL	Gray Tape
	Pin Kit
	Pwr Screwdriver
	5/32-in Allen Head Driver
	Driver Handle
	Torque Wrench
BOB	IFM Breakout Box
CHCL	DC Pwr Cable

TO REGAIN RMS JETT SYS A (LOSS OF MNB SUB-BUS)

NOTE

Regains jettison deadface capability

- ML86B:D A14
1. ✓cb MNB PYRO JETT SYS A PORT RMS – op
 2. RCS/OMS HTR FWD RCS JET 2,3 – OFF
 3. Loosen fasteners (sixteen, 5/32-in Allen Head Driver). Reposition pnl A14 to access connectors on back

WARNING

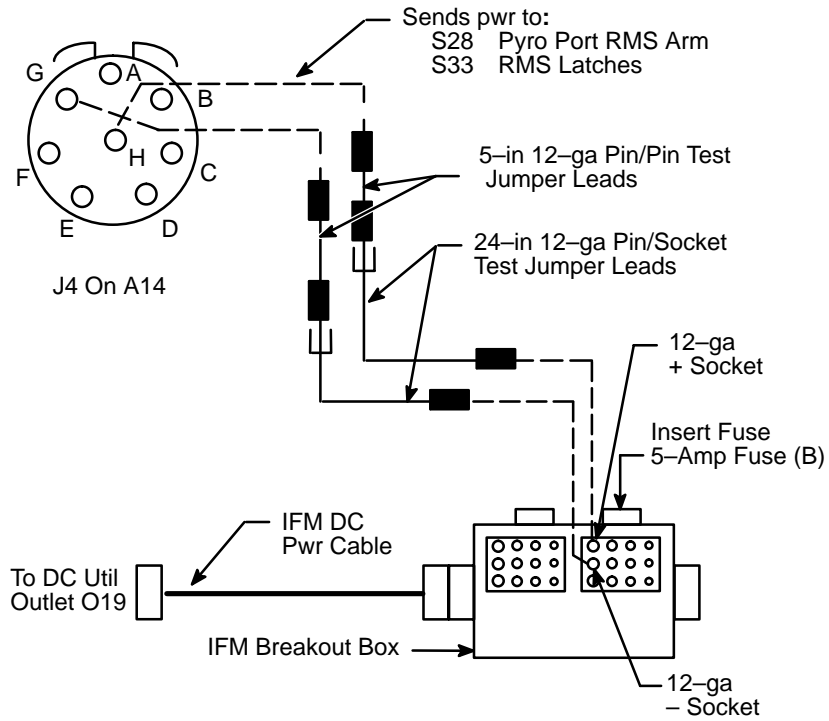
Socket A on P9644 hot (MNB) 24V DC pwr for RCS JET HTR)

- O19
4. Remove connector P9644 from J4 on back of pnl A14
 5. Tape over face of P9644, tape secure harness to nearby harness/structure
 6. ✓DC UTIL PWR MNA – OFF
 7. a. Breakout Box:
 - AUX – OFF
 - 28V/VAR VOLT – 28V
 - PWR A,B – OFF
 - b. Removes Fuse Cap from side B
 - c. Rotate GA SEL B – 12
 - d. Install 5-Amp Fuse, replace cap

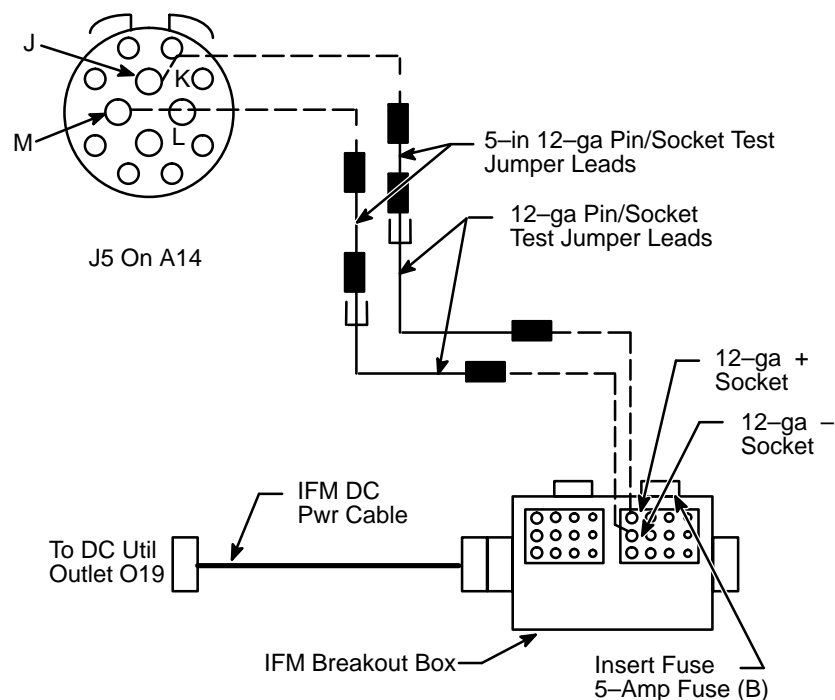
R-25

IFM/ALL/GEN E

8. Install Breakout Box, Cables, and Test Jumper Leads as shown:
9. Go to step 18



17. Install Breakout Box, Cables, and Test Jumper Leads as shown:



IFMSRP22dA

- | | |
|-----|--|
| O19 | 18. DC UTIL PWR MNA – ON |
| | 19. Breakout Box:
PWR B – ON (12 ga It ON) |
| | 20. Perform jettison: <u>RMS JETT</u> (PDRS OPS) |
| | 21. Breakout Box:
PWR B – OFF |
| | 22. DC UTIL PWR MNA – OFF |
| A14 | 23. Remove Test Jumper Leads, Cables |
| | 24. Reconnect P9644(P9645) to J4(J5) on back of
pnl A14 |
| | 25. Reposition pnl A14 and tighten fasteners
(torque, 30 in-lb) |
| | 26. Stow tools |

**RMS: MANIPULATOR POSITIONING MECHANISM (MPM)
CONTINGENCY DEPLOY/STOW** (2:30 hr)

(Add 45 min for Orbit station Access)

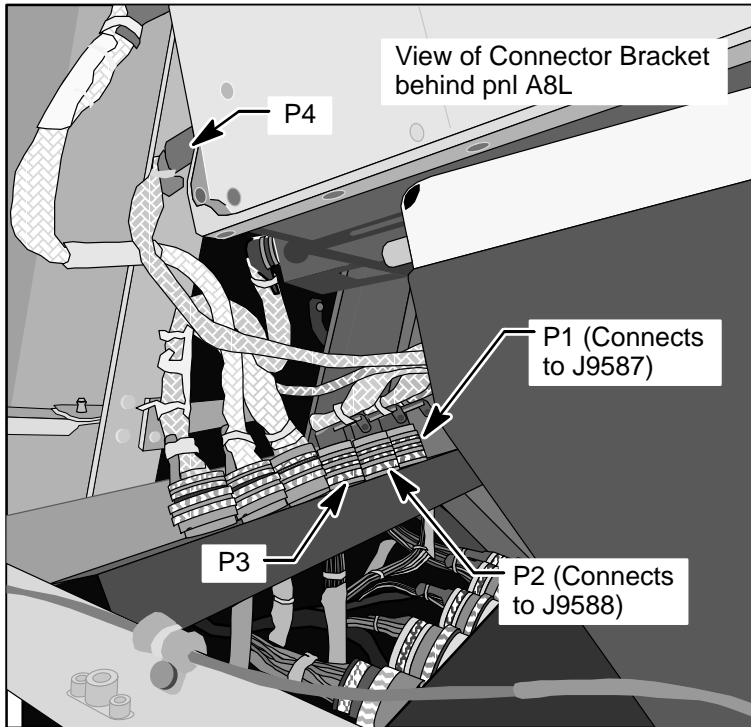
OBJECTIVE: Provide alternate method to deploy/stow MPM due to deploy/stow sw failure by applying 28 VDC UTIL Pwr for appropriate deploy/stow MPM motor 1(2) command signal (assumes Port RMS)

LOCATION: Flight Deck; CB behind pnl A8L

TOOLS REQD:

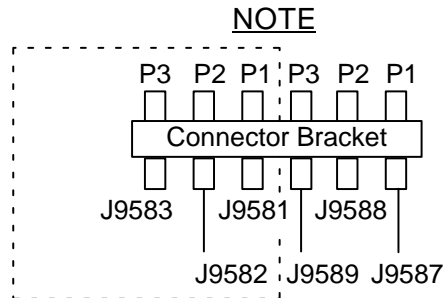
TOOL Gray Tape
Pin Kit (for Test Jumper Leads)
Pwr Screwdriver
Robbins Wrench
Driver Handle
1/4-in to 3/8-in Adapter
Torque Wrench
4-in Extension
3/8-in Socket
BOB IFM Breakout Box
CHCK DC Pwr Cable

- O19 1. DC UTIL PWR MNA – OFF
A8L 2. PORT RMS – OFF
RMS SEL – OFF
PWR – OFF
- L4:Q 3. cb AC3 ϕ C LTG PNL OS – op
MA73C:F 4. AC1 RMS PRI ϕ A – op
AC2 RMS B/U ϕ A – op
5. a. Breakout Box:
AUX – OFF
28V/VAR VOLT – 28V
PWR A,B – OFF
b. Remove Fuse Cap from side B
c. Rotate GA SEL B-22
d. Install 1-Amp Fuse, replace cap
6. If A7C blank pnl installed:
Remove A7C blank pnl (eight bolts, 3/8-in Socket)
If APDS pnl installed:
Perform ORBIT STATION ACCESS
(GENERAL INFORMATION)
7. Remove bolts from pnl A8L (eight bolts, 3/8-in Socket)



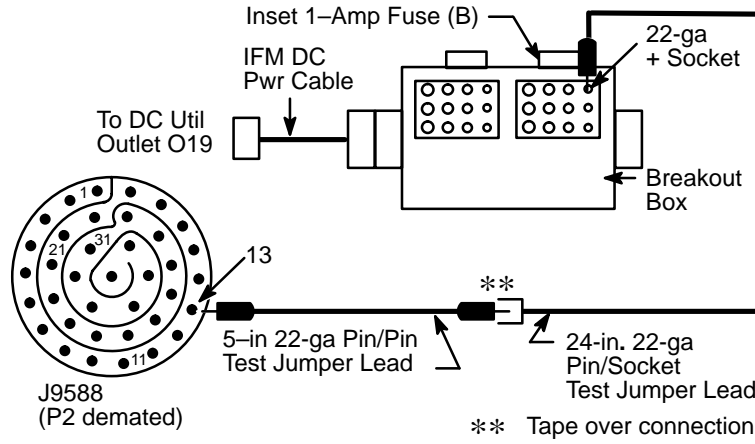
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CAUTION
 28V bus voltage present in some connectors. BACKUP will not be available while P2 disconnected. PRIMARY pwr will not be available while P1 disconnected



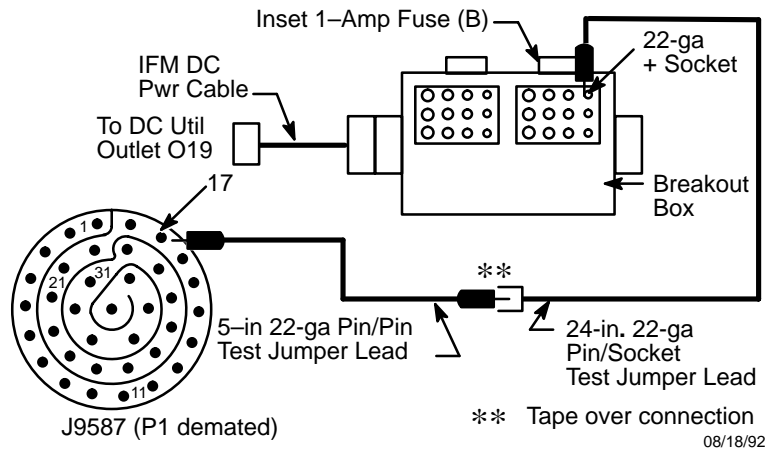
DO NOT DEMATE

8. Remove connectors P1,P2,P3,P4. Reposition A8L to access J9588(J9587)
9. To deploy MPM, go to step 10
To stow MPM, go to step 12
10. Deploy MPM:
 - To deploy MPM using motor 1
 - a. Install 22-ga Test Jumper Lead as shown in diagram below:
 - b. Go to step 11



To deploy MPM using motor 2

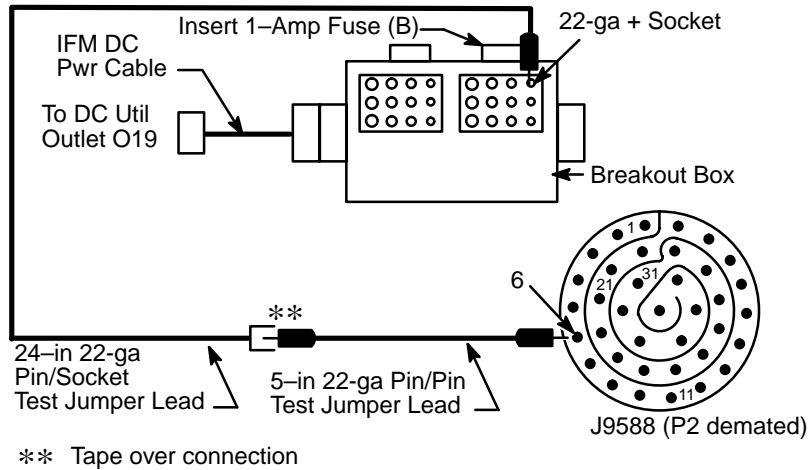
- a. Install 22-ga Test Jumper Lead as shown in diagram below:
- b. Go to step 11



12. Stow MPM:

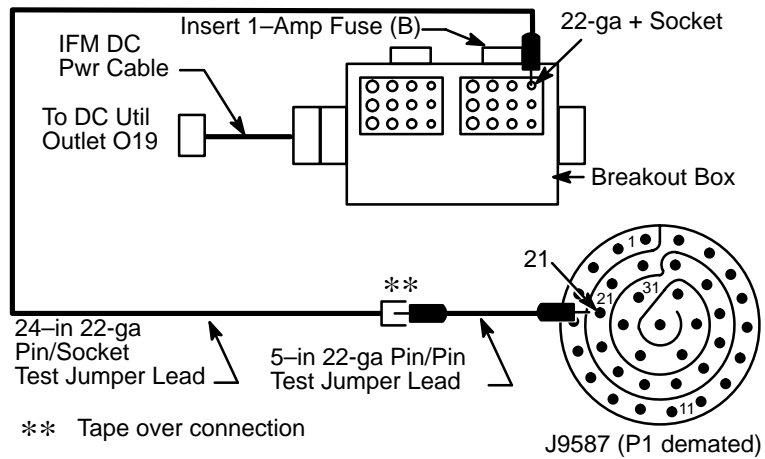
To stow MPM using motor 1

- a. Install 22-ga Test Jumper Lead as shown in diagram below:
- b. Go to step 13



To stow MPM using motor 2

- a. Install 22-ga Test Jumper Lead as shown in diagram below:
- b. Go to step 13



13. Move pnl A8L back into position and reconnect P1(P2),P3,P4
- MA73C:C a. cb MCA PWR AC2 3Φ MID 2 = cl
MA73C:D AC3 3Φ MID 4 = cl

NOTE

Expect single motor times

- R13L b. PL BAY MECH PWR SYS 1,2 – ON
O19 c. DC UTIL PWR MNA – ON

NOTE

If P1 disconnected, PORT RMS
tb not avail. ✓SPEC 94 for
STO/DPLY indications

- A8L d. Breakout Box:
PWR B – ON (22 lt ON)(68 sec max)
- e. ✓PORT RMS tb – STO
- f. Breakout Box: PWR B – OFF
- g. DC UTIL PWR MNA – OFF
- R13L h. PL BAY MECH PWR SYS 1,2 – OFF
- MA73C:C i. cb MCA PWR AC2 3Φ MID 2 = op
MA73C:D AC3 3Φ MID 4 = op
- j. Disconnect Pin/Pin Test Jumper Lead from
J9588 (J9587), stow in Pin Kit
- k. Disconnect IFM Pwr Cable from utility
outlet, stow
- l. Reconnect P2 to J9588 (P1 to J9587)
- m. For A7C blank pnl:
| Install pnls A7C,A8L (torque, 30 in-lb)
For APDS pnl:
Perform ORBIT STATION ACCESS,
step 9 (GENERAL INFORMATION)
- L4:Q n. cb AC3 ΦC LTG PNL OS – cl
MA73C:F o. AC1 RMS PRI ΦA – cl
AC2 RMS B/U ΦA – cl

14. RMS TEMP MON

- A8L a. RMS PWR – PRI (MA)
- CRT b. SM 94 PDRS CONTROL
I/O ON – ITEM 5 EXEC (*)
- A8U c. SAFING – CANCEL (tb-bp)
✓GPC DATA lt – off
PARAM sel – PORT TEMP
JOINT sel – CRIT TEMP

**RMS: MANIPULATOR RETENTION LATCHES (MRL)
CONTINGENCY RELEASE/LATCH** (2:30 hr)
(Add 45 min for Orbit station Access)

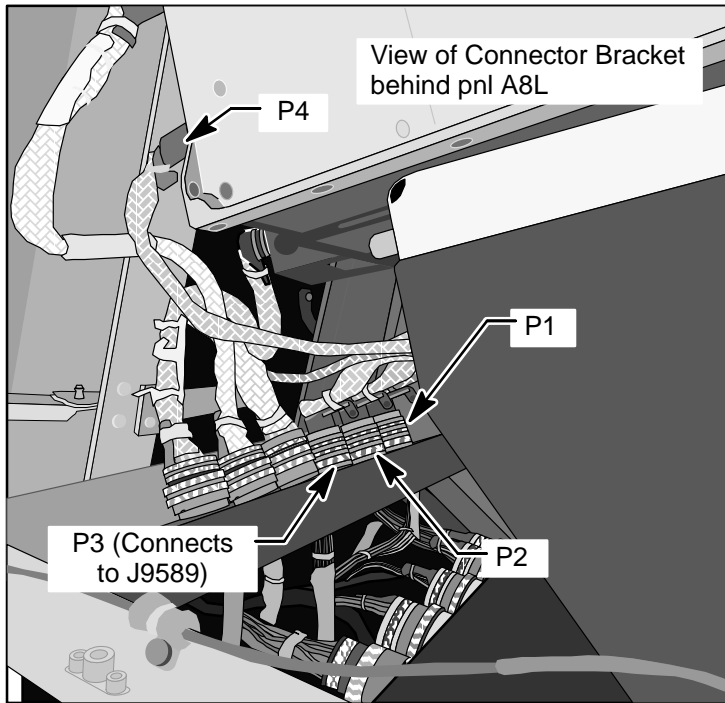
OBJECTIVE: Provide alternate method of releasing(latching) MRLs (due to Retention Latch sw failure) by applying 28 VDC Util Pwr to FWD MRL motor 1, MID MRL motor 1, and AFT MRL motor 2

LOCATION: Flt Deck; CB behind pnl A8L

TOOLS REQD:

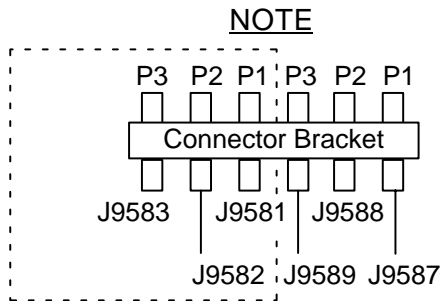
TOOL	Gray Tape
	Pin Kit
	Pwr Screwdriver
	Robbins Wrench
	Driver Handle
	1/4-in to 3/8-in Adapter
	Torque Wrench
	4-in Extension
	3/8-in Socket
BOB	IFM Breakout Box
CHCK	DC Pwr Cable

- | | | |
|---------|----|--|
| O19 | 1. | DC UTIL PWR MNA – OFF |
| A8L | 2. | PORT RMS RETEN LAT – OFF
RMS SEL – OFF
PWR – OFF |
| L4:Q | 3. | cb AC3 ϕ C LTG PNL OS – op |
| MA73C:F | 4. | cb AC1 RMS PRI ϕ A – op
AC2 RMS B/U ϕ A – op |
| | 5. | a. Breakout Box:
AUX – OFF
28V/VAR VOLT – 28V
PWR A,B – OFF |
| | | b. Remove Fuse Cap from side B |
| | | c. Rotate GA SEL B – 22 |
| | | d. Install 1-Amp Fuse, replace cap |
| | 6. | If A7C blank pnl installed:
Remove A7C blank pnl (eight bolts, 3/8-in Socket) |
| | | If APDS pnl installed:
Perform ORBIT STATION ACCESS
(<u>GENERAL INFORMATION</u>) |
| | 7. | Remove bolts from pnl A8L (eight bolts, 3/8-in Socket) |



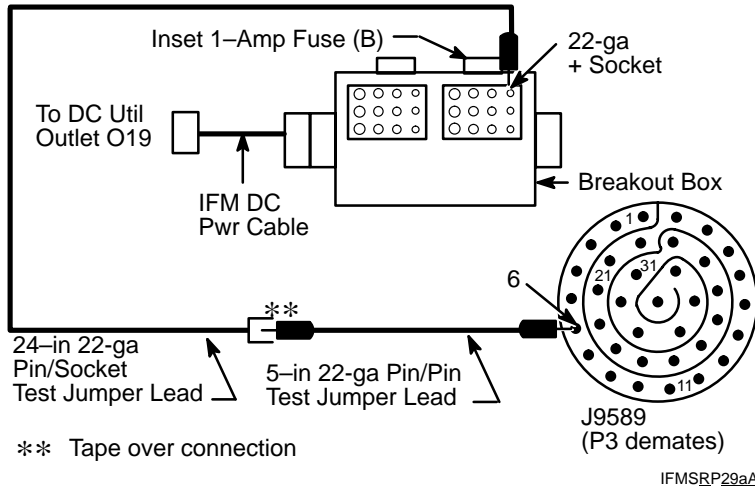
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CAUTION
 28V bus voltage present in some connections. BACKUP will not be available while P2 disconnected. PRIMARY pwr will not be available while P1 disconnected

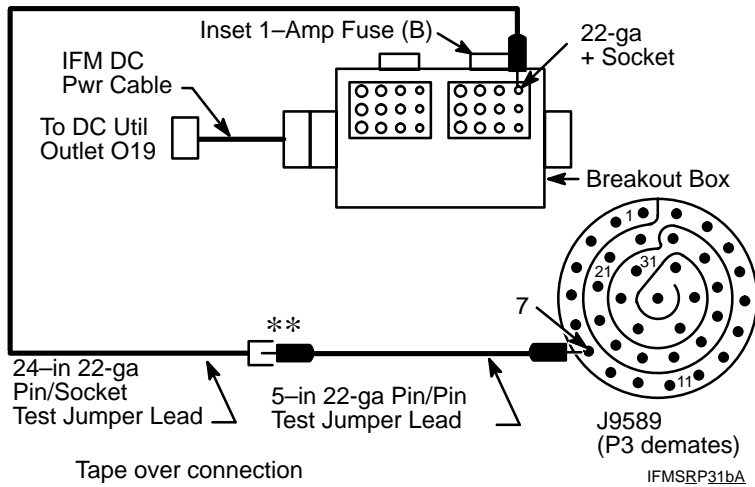


DO NOT DEMATE

8. Remove connectors P1,P2,P3,P4 then reposition A8L to access J9589
9. To release MRLs, go to step 10
To latch MRLs, go to step 11
10. To release MRLs
 - a. Install 22-ga Test Jumper Lead as shown in diagram below:
 - b. Go to step 12



11. To latch MRLs
 - a. Install 22-ga Test Jumper Lead as shown in diagram below:
 - b. Go to step 13



12. Move pnl A8L back into position and reconnect P1,P2,P4
- MA73C:C a. ✓cb MCA PWR AC1 3Φ MID1 = cl
AC2 3Φ MID2 = cl
:D ✓AC1 3Φ MID3 = cl

NOTE

Expect single motor times

- R13L b. DAP: VRCS(FREE)
O19 c. PL BAY MECH PWR SYS 1,2 – ON
d. DC UTIL PWR MNA – ON
e. Breakout Box:
PWR B – ON (22 lt ON) (18 sec max)
- A8L f. ✓PORT RMS RETEN LAT tb – REL
g. Breakout Box:
PWR B – OFF
- O19 h. DC UTIL PWR MNA – OFF
R13L i. PL BAY MECH PWR SYS 1,2 – OFF
MA73C:C j. cb MCA PWR AC1 3Φ MID1 = op
AC2 3Φ MID2 = op
:D AC1 3Φ MID3 = op
- k. Disconnect Pin/Pin Test Jumper Lead from J9589. Reconnect P3. Temp stow Lead and tools (they will be reqd to latch MRLs)
- l. For A7C blank pnl:
| Install pnls A7C,A8L (torque, 30 in-lb)
For APDS pnl:
Perform ORBIT STATION ACCESS, step 9 (GENERAL INFORMATION)
- L4:Q m. cb AC3 ΦC LTG PNL OS – cl
MA73C:F n. AC1 RMS PRI ΦA – cl
AC2 RMS B/U ΦA – cl
- o. Stow tools
p. Go to step 14

13. Move pnl A8L back into position and reconnect P1,P2,P4
- MA73C:C a. ✓cb MCA PWR AC1 3Φ MID1 = cl
AC2 3Φ MID2 = cl
:D ✓AC1 3Φ MID3 = cl

NOTE

Expect single motor times

- R13L b. DAP: VRCS(FREE)
O19 c. PL BAY MECH PWR SYS 1,2 – ON
d. DC UTIL PWR MNA – ON
e. Breakout Box:
PWR B – ON (22 lt ON) (18 sec max)
- A8L f. ✓PORT RMS RETEN LAT tb – LAT
g. Breakout Box:
PWR B – OFF
- O19 h. DC UTIL PWR MNA – OFF
R13L i. PL BAY MECH PWR SYS 1,2 – OFF
MA73C:C j. cb MCA PWR AC1 3Φ MID 1 = op
AC2 3Φ MID 2 = op
AC1 3Φ MID 3 = op
:D k. Disconnect Pin/Pin Test Jumper Lead from J9589, stow in Pin Kit
l. Disconnect IFM DC Pwr Cable from util outlet, stow
m. Reconnect P3 to J9589
n. For A7C blank pnl:
| Install pnls A7C,A8L (torque, 30 in-lb)
For APDS pnl:
Perform ORBIT STATION ACCESS, step 9 (GENERAL INFORMATION)
- L4:Q o. Install pnls A7C,A8L (torque, 30 in-lb)
MA73C:F p. cb AC3 ΦC LTG PNL OS – cl
q. AC1 RMS PRI ΦA – cl
AC2 RMS B/U ΦA – cl
r. Stow tools

14. RMS TEMP MON

- A8L a. RMS PWR – PRI (MA)
CRT b. SM 94 PDRS CONTROL
I/O ON – ITEM 5 EXEC (*)
A8U c. SAFING – CANCEL (tb-bp)
✓GPC DATA lt – off
PARAM sel – PORT TEMP
JOINT sel – CRIT TEMP

RMS: MCIU CHANGEOUT

(2:30 hr)

OBJECTIVE: Replace hard failed MCIU w/spare. Provides full recovery of RMS computer supported modes and data display capabilities via CRT and D&C pnl

LOCATION: See FLIGHT DECK, Zone W15 for MCIU, AV BAY 1, Zone 14M for spare (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL	Gray Tape Pwr Screwdriver Inspection Mirror Driver Handle or Ratchet Wrench 1/4-in to 3/8-in Adapter Torque Wrench 5/32-in Allen Head Driver 7/16-in Socket 11/32-in Deepwell Socket 6-in and 10-in Extension 1/4-in Deepwell Socket
MISC	Flashlight

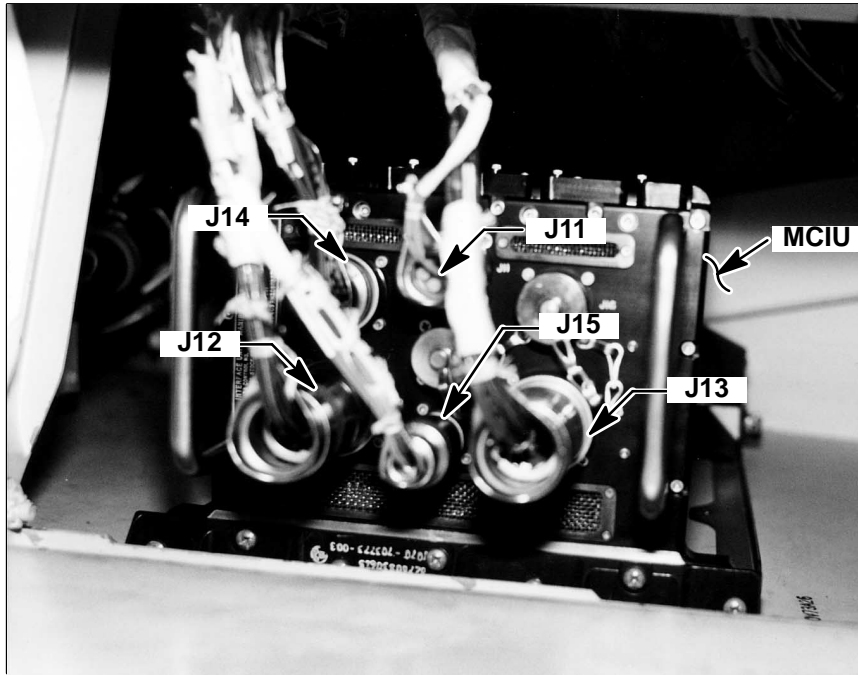
TO OBTAIN SPARE MCIU

- | | |
|-------|---|
| MF14M | <ol style="list-style-type: none">1. Remove Locker, Thermal/Debris Trap to access spare MCIU2. Tape Coldplate Protective Cover to wireway in front and above spare MCIU to protect wire harnesses3. Loosen MCIU mounting bolts (three, 7/16-in Sockets)4. Remove spare MCIU using caution to prevent damage to adjacent wiring |
|-------|---|

TO REMOVE MCIU

- | | |
|-----|--|
| A8L | <ol style="list-style-type: none">5. ✓RMS SEL – OFF
✓PWR – OFF (If ON, SM ALERT, BCE BYP MCIU) |
| L17 | <ol style="list-style-type: none">6. Remove pnl L17 (17 fasteners, 5/32-in Allen Head Driver) |

View looking thru L17 opening



s91-42965

ifm_sr_p45

7. Remove connectors from MCIU:
 - Cable 30V77W3P451 from J11
 - W1P452 from J12
 - W1P453 from J13
 - W1P454 from J14
 - W5P455 from J15

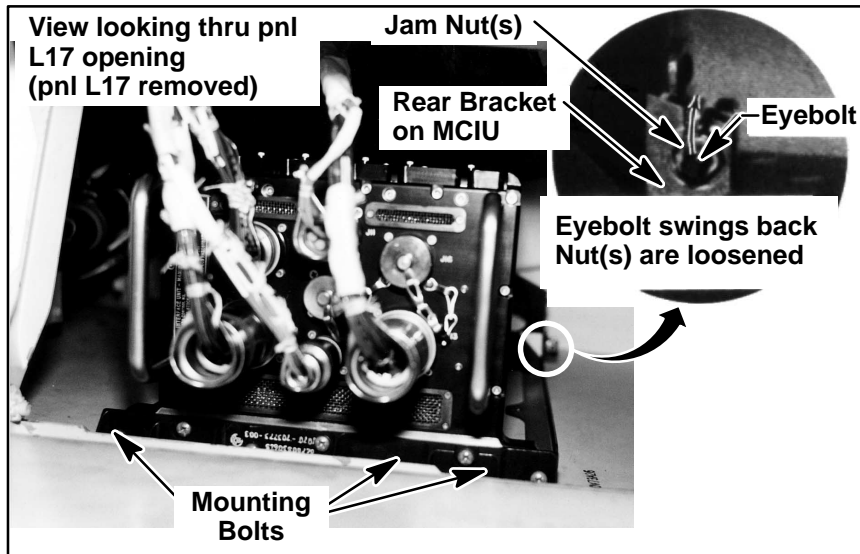
NOTE

When removing jam nuts, ensure socket engages both 11/32-in nuts

8. Loosen, do not remove, eyebolt nut(s) (one or two/side, 1/4-in or 11/32-in Deepwell socket), swing eyebolt out of way
9. Loosen MCIU mounting bolts (three, 7/16-in Socket)
10. Remove MCIU. Mark failed unit w/Gray Tape

TO INSTALL MCIU

11. Place spare MCIU into position, start mounting fasteners
12. Install eyebolts, tighten nuts (torque, 30 in-lb)
13. Tighten mounting bolts (torque, 100 in-lb)



s91-42965

ifm_sr_p47

14. Install connectors onto MCIU:
 - Cable 30V77W3P451 onto J11
 - W1P452 onto J12
 - W1P453 onto J13
 - W1P454 onto J14
 - W5P455 onto J15
15. Perform ON-ORBIT INIT, PDRS OPS, steps 2 & 5, then record any out-of-limit temps
- L17 16. Install pnl L17 (torque, 30 in-lb)

TO STOW FAILED MCIU

- MF14M 17. ✓ Coldplate Protective Cover in place in front and above spare MCIU location
18. Position failed MCIU into spare location. Ensure pins on shelf bracket engage receptacles in rear of MCIU
19. Start mounting fasteners. ✓ Proper pin engagement w/Inspection Mirror, Flashlight (torque fasteners, 100 in-lb)
20. Install Thermal/Debris Trap and Locker (torque, 30 in-lb). Stow tools

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IFM PROCEDURES

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PROCEDURES
S THRU Z

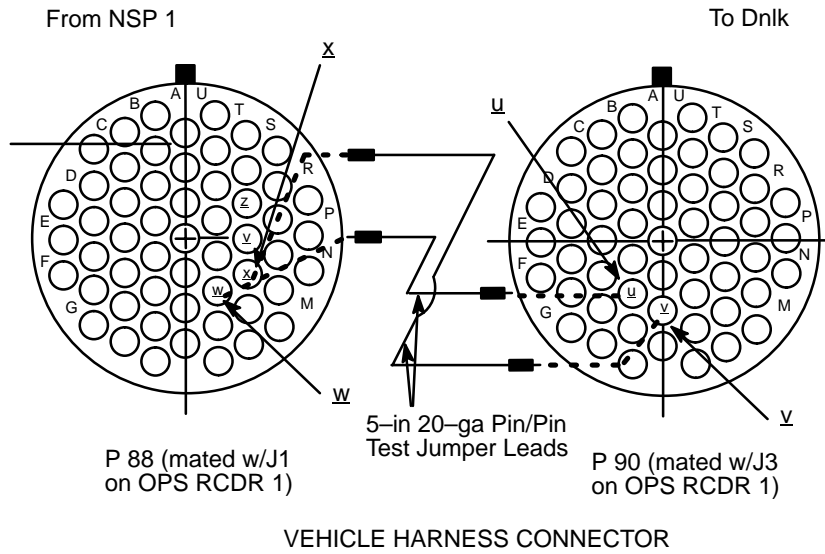
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**PROCEDURES
S THRU Z**

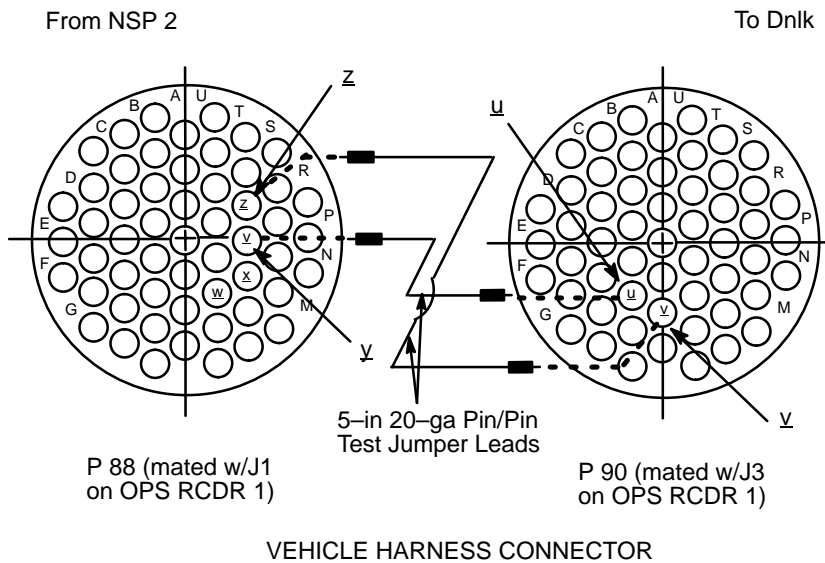
S-ii

IFM/ALL/GEN E

6. For NSP 1 to Dnlk
 - a. Connect Test Jumper Leads as illustrated
 - b. Then do steps 8 to 13



7. For NSP 2 to Dnlk
 - a. Connect Test Jumper Leads as illustrated
 - b. Then do steps 8 to 13



A1L
C3

8. Tape/secure jumper cables to connectors and tape connectors to wire trays
9. NSP PWR – 1(2)
S-BD PM CNTL – CMD
10. Reinstall Thermal/Debris Traps
11. Wait for MCC checkout
12. Reinstall Locker (torque, 30 in-lb)
13. Stow tools

**STANDARD SWITCH PANEL (SSP)
CABLE CHANGEOUT**

(2:00 hr)

OBJECTIVE: Regain SSP capabilities (due to failure of sw or sw tb) by exchanging cables on back of pnls. This will shift sw functions from failed side to redundant side of pnl or other pnl as reqd

NOTE

Nominal orbiter config is two SSPs in positions L12. Each pnl has redundant halves. In many cases only one pnl or part of pnl used(wired) for PL, allowing several sw(tb) recovery options

LOCATION: Flt Deck; normally Pnl(s) L12 for SSPs and pnl L14(L17) for cable access as reqd

TOOLS REQD:

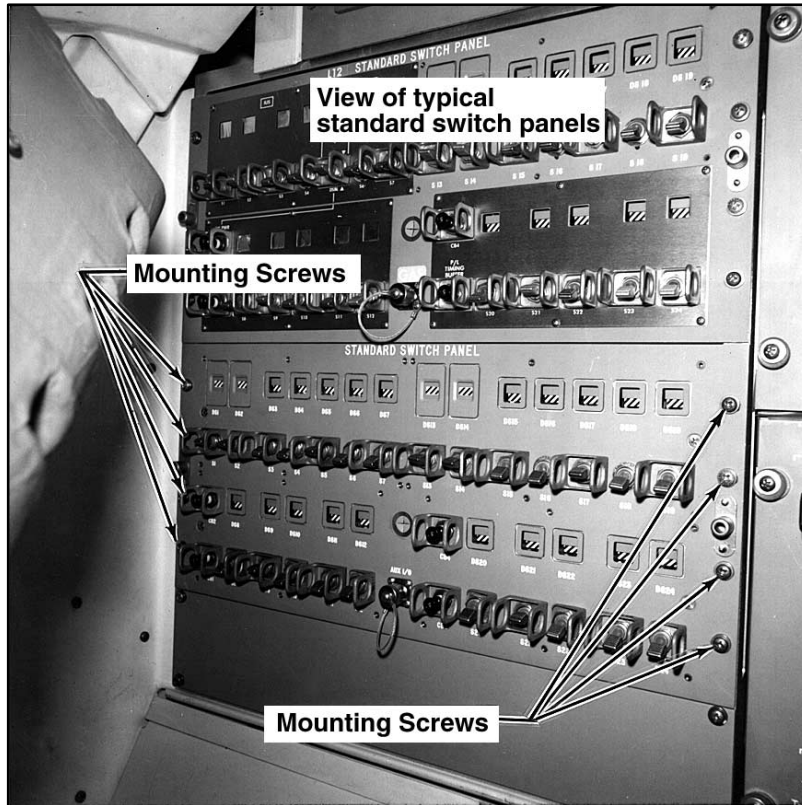
TOOL	Gray Tape
	Pwr Screwdriver
	Robbins Wrench or Driver Handle
	1/4-in Combination Wrench
	Torque Wrench
	1/4-in to 3/8-in Adapter
	5/32-in Allen Head Driver
	Wire Cutters (small)
	#10 Torque Driver

L11
(L12)

1. cb 2 SW PWR – op (PWR for sw 1–12)
4 SW PWR – op (PWR for sw 13–24)
1,3 PWR – op (as reqd, see table, step 6)

NOTE

Sw,cb nomenclature on pnl cue cards
vary according to PL, see example below

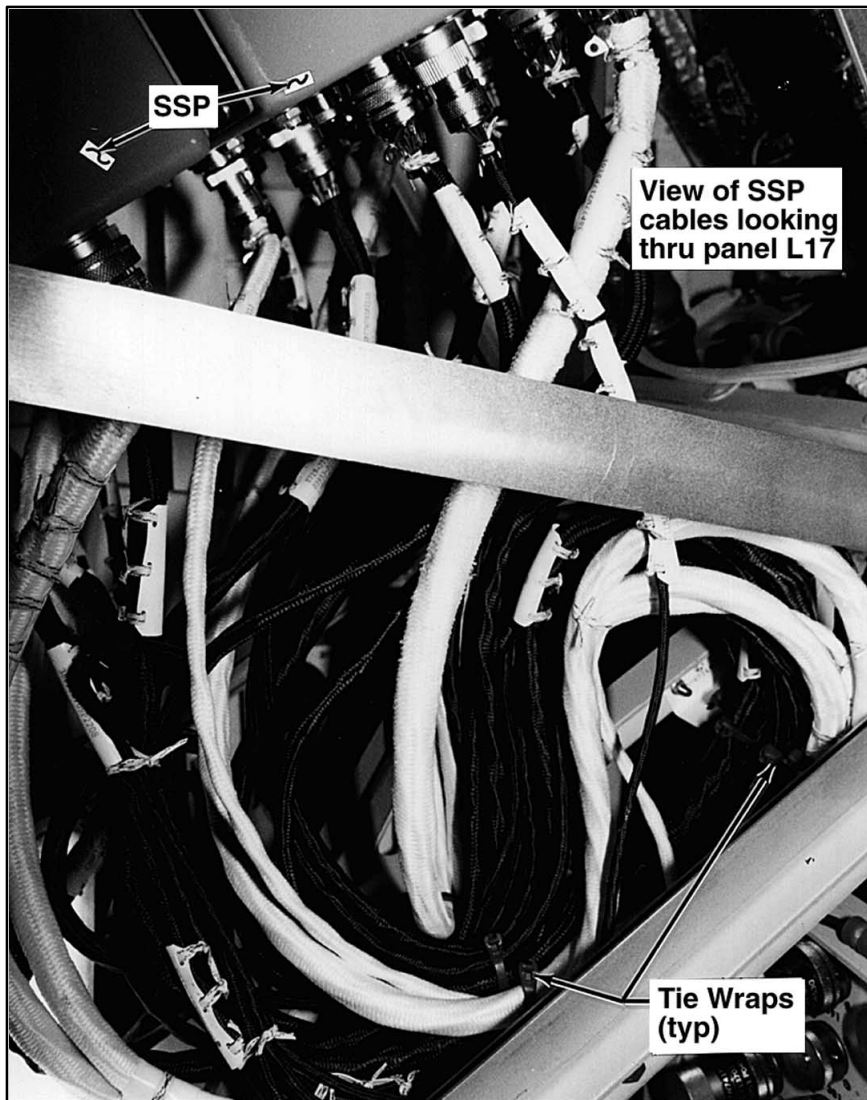


108-KSC-383C-308/10

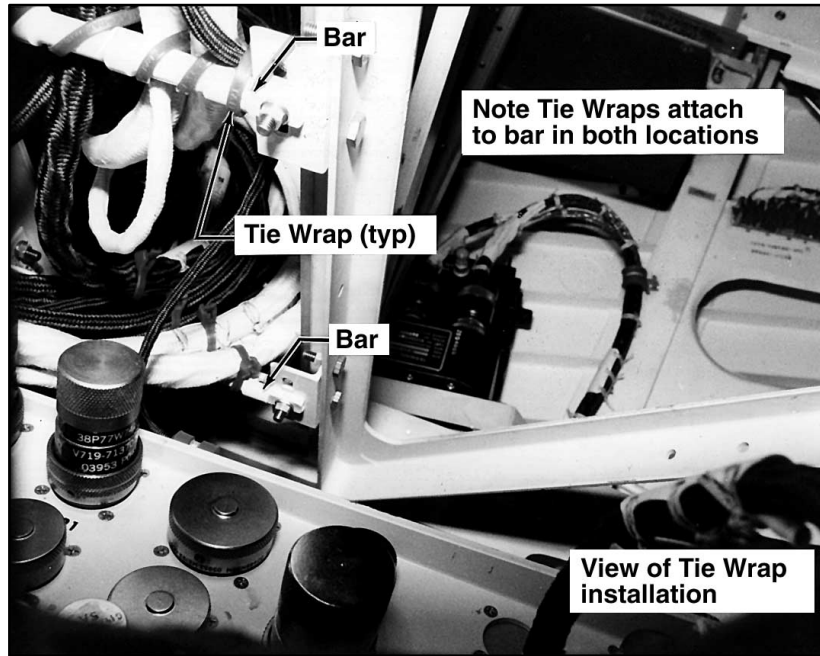
2. Remove SSP mounting screws (eight, #10 Torque Tip Screwdriver)

L17

3. Remove pnl L14(L17) to access cables
(17 fasteners, 5/32-in Allen Head Driver)

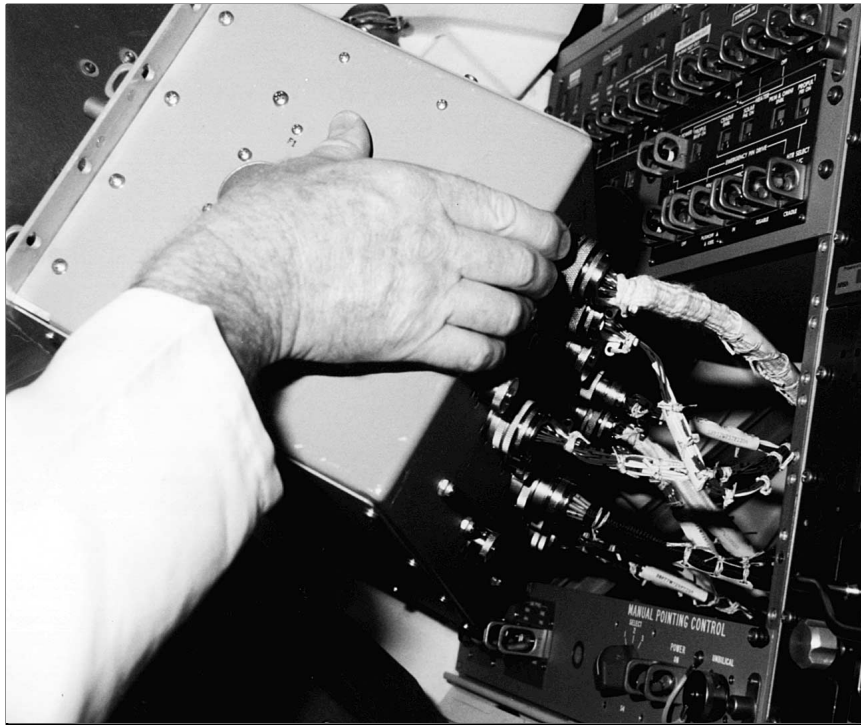


S83-32551



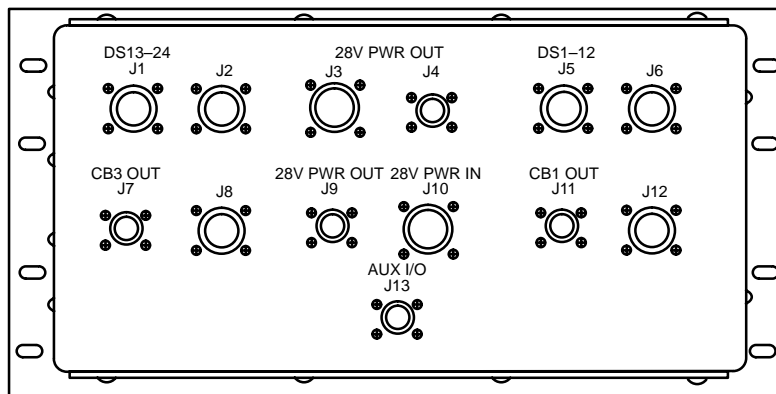
S83-32557

4. Cut wire ties as reqd to ease removal of SSP pnl.
Do not remove cables at this time



S84-31153

5. Pull SSP pnl out to access cables on back side of pnl



REAR VIEW

6. Remove and exchange cables as reqd. Use table or ✓MCC

ITEM	NUMBER							CONNECTOR	
	Functional Pairs							wired thru	
SW PAIR	1	2	8	11	12		9	J6	} swap cables
	13	14	20	23	24		21	J2	
SW PAIR	3	4	5	6	7	10	9	J12	} swap cables
	15	16	17	18	19	22	21	J8	
tbs	1	2	3	etc thru			12	J5	} swap cables
	13	14	15	etc thru			24	J1	
cbs	1							J11	} swap cables
	3	(on SSP-1 PWRs P/L timing buffer)						J7	

NOTE: cb 2 PWR sw 1-12
4 PWR sw 13-24

NOTE: To regain function for sw 9(21) four cables must be swapped (J6,J2) and (J12,J8)

Example: Sw 8 failed. Swap cable from J6 w/cable from J2. Sw 20 now functions as sw 8. tb for this function remains above sw 8 unless cables J5,J1 swapped

- L11
(L12)
7. Reinstall SSP pnl (torque screws, 30 in-lb)
 8. cb 2,4 sw PWR - cl
1,3 PWR - cl (as reqd)
 9. Contact MCC for SSP pnl checkout
 10. If checkout successful, tape cables to vehicle structure, reinstall pnl L14(L17) (torque fasteners, 30 in-lb)
 11. Stow tools

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THC CHANGEOUT

(2:00 hr)

OBJECTIVE: Replace failed fwd THC w/aft THC. THC considered failed when two channels lost

LOCATION: Flt Deck; pnl F5, Aft Station

TOOLS REQD:

TOOL Gray Tape
 Torque Wrench
 Driver Handle
 Ratchet Wrench
 5/32-in Allen Head Driver
 4-in Extension
MISC Window Shade (W9)

TO REMOVE FWD THC

1. Deselect THC contacts

GNC 25 RM ORBIT

THC L – ITEMS 1,2,3 EXEC (*)

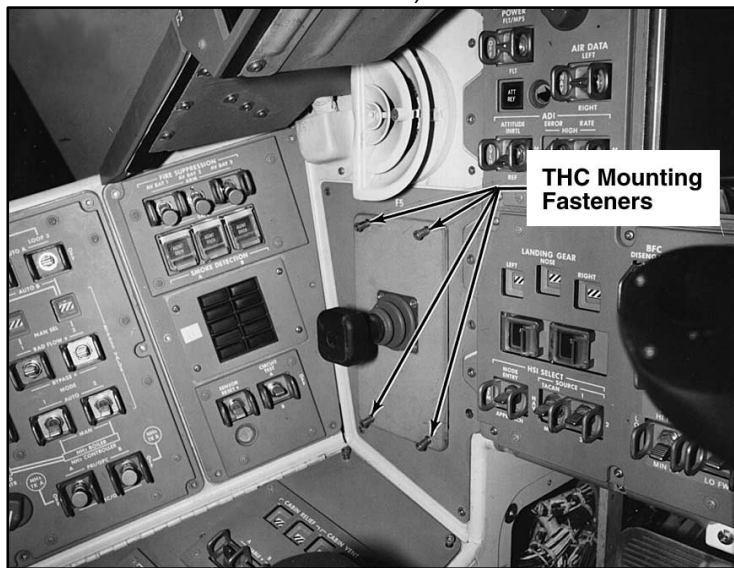
AFT – ITEMS 4,5,6 EXEC (*)

O14:E 2. cb MNA DDU L,AFT – op

O15:E MNB DDU L – op

O16:E MNC DDU AFT – op

3. Loosen THC mounting fasteners (four, 5/32-in Allen Head Driver)



108-KSC-379C-2283/2

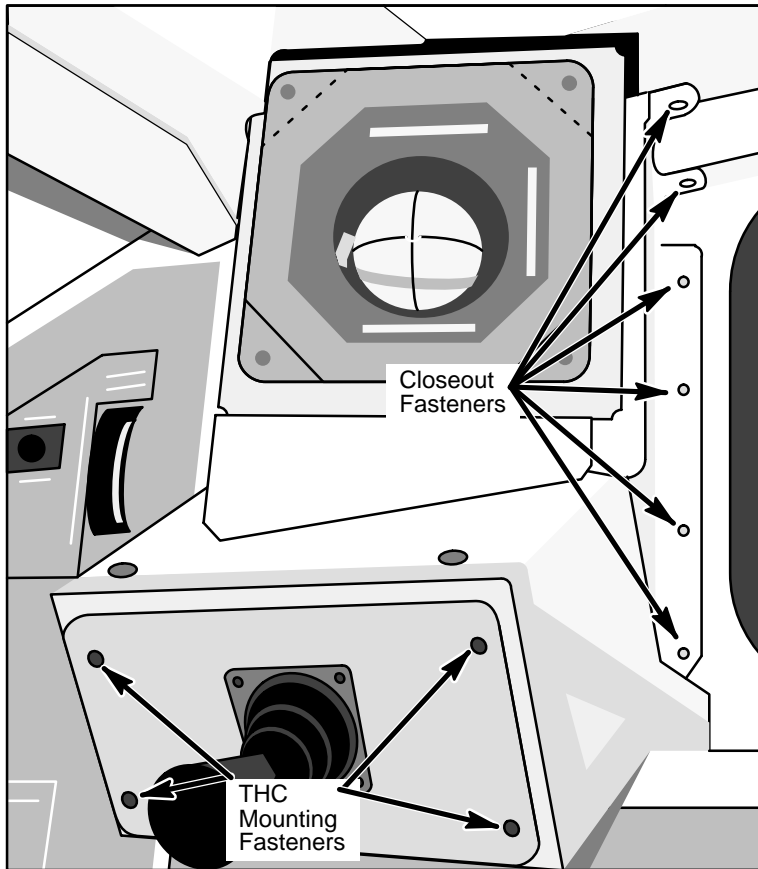


108-KSC-379C-2283/5

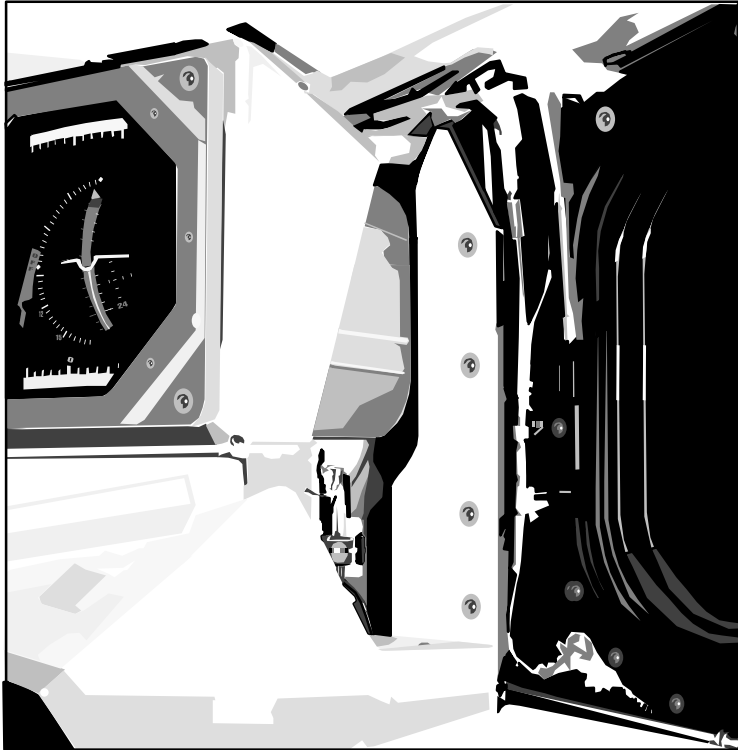
4. Pull unit clear of pnl using care not to stretch/strain cables, note arrow points down
5. Remove connectors from J1,J2,J3 on THC.
Mark failed unit w/Gray Tape

TO REMOVE AFT THC

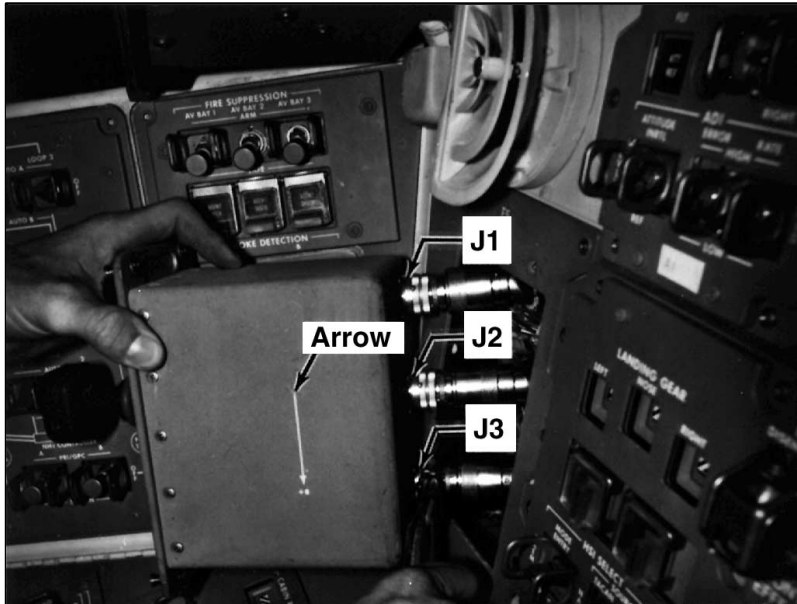
6. Install Window Shade (W9)
7. Remove closeout inboard of ADI to access connectors when THC partially removed (six fasteners, 5/32-in Allen Head Driver)



8. Loosen THC mounting fasteners (four, 5/32-in Allen Head Driver)
9. Remove connectors from J1,J2,J3 on THC
10. Remove THC from pnl



TO INSTALL AFT THC FWD



108-KSC-379C-2283/5

WARNING

To assure proper THC response, ARROW on side of THC must point down when installed

11. Install connectors
 - Cable 30V77W1P219 to J1 on THC
 - P221 to J2 on THC
 - P223 to J3 on THC
12. Install THC into pnl, ARROW down (torque fasteners, 30 in-lb)
- O14:E 13. cb MNA DDU L - cl
- O15:E MNB DDU L - cl
- F7 L FLT CNTLR PWR - ON
14. L THC - deflect in each axis
 - √THC - '+' and '-'
 - L FLT CNTLR PWR - OFF
15. Reselect THC contacts
 - GNC 25 RM ORBIT**
 - THC L - ITEMS 1,2,3 EXEC

T-5

IFM/ALL/GEN E

TO STOW FWD THC IN AFT LOCATION

16. Tape over connector interfaces and tape harnesses to structure (out of way)
17. Install THC (torque fasteners, 30 in-lb)
18. Install closeout (tighten snug)
19. Stow tools

UTIL CABLE/OUTLET PWR CHECK (AC)

(30 min)

OBJECTIVE: Determine if loss of pwr is in middeck experiment or in AC UTIL PWR Cable/Outlet

LOCATION: Middeck Lockers and/or Middeck Overhead AC UTIL PWR outlets

TOOLS REQD:

TOOL	Pin Kit
	Multimeter

NOTE

Check for recessed pins after connector demate

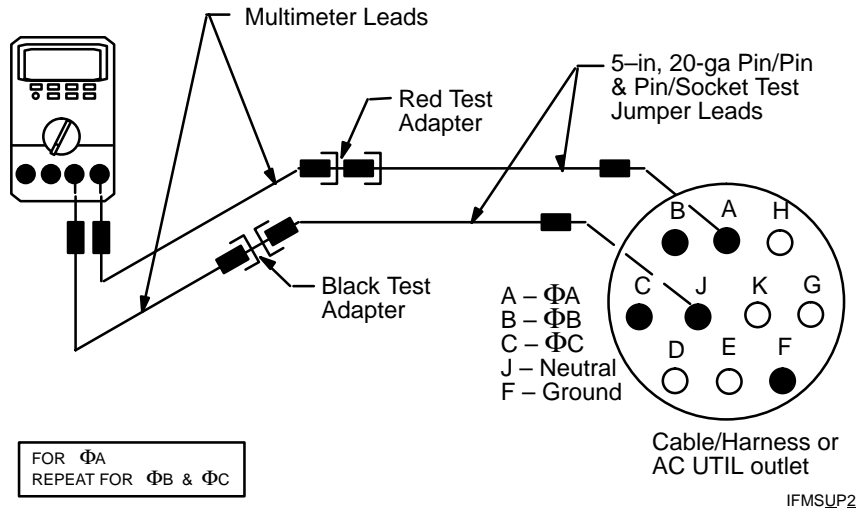
1. AC UTIL PWR – OFF (as reqd)
2. Disconnect AC UTIL PWR Cable at middeck experiment or AC UTIL PWR Outlet (as reqd)
3. Set up Multimeter per instructions on flap for AC V (auto range), except as noted

NOTE

Red & black Multimeter leads have removable test probes installed on one end. Once removed, this end of leads can also be installed into Multimeter so that banana jacks on other end can be used w/Pin Kit accessories

4. Remove test probes from red & black Multimeter leads and insert this end into Multimeter
5. Install, 20-ga, red & black test adapters from Pin Kit (flap 5), onto banana jacks of Multimeter leads
6. Install one 5-in, 20-ga pin/socket test jumper lead from Pin Kit (flap 5), onto red test adapter and one 5-in, 20-ga pin/pin test jumper lead onto black test adapter

7. Install test jumper leads into AC UTIL PWR Cable or Outlet as shown for ΦA



NOTE

Normally ~115V

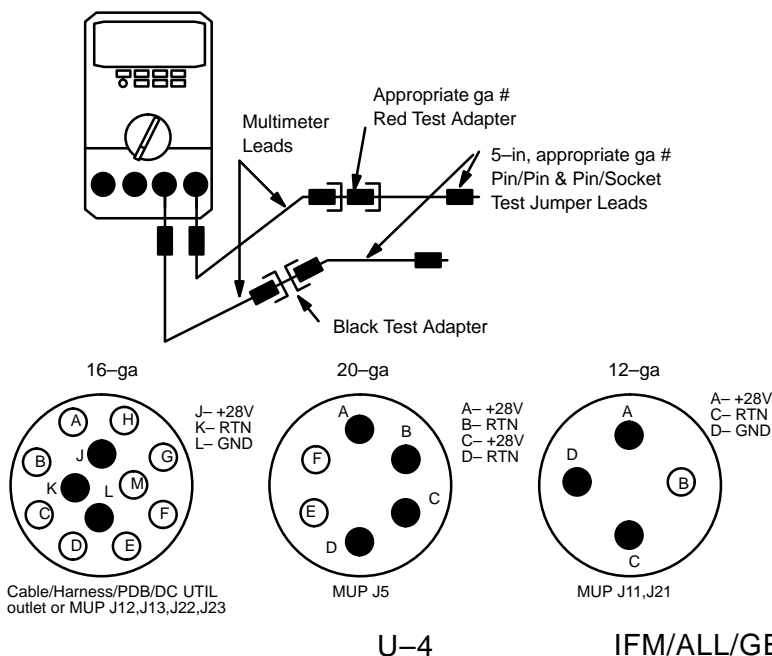
8. AC UTIL PWR – ON (as reqd)(record voltages)
9. – OFF (as reqd)
10. Repeat steps 7,8 for $\Phi B, \Phi C$
11. Contact MCC w/results
12. Repeat steps 7–10 as reqd
13. When complete, stow Pin Kit and Multimeter

- Disconnect DC UTIL PWR Cable at middeck experiment, MUP, PDB, or DC UTIL PWR Outlet (as reqd)

NOTE

Red & black Multimeter leads have removable test probes installed on one end. Once removed, this end of leads can also be installed into Multimeter so that banana jacks on other end can be used w/Pin Kit accessories

- Remove test probes from red & black Multimeter leads and insert this end into Multimeter
- Set up Multimeter per instructions on flap for DC V (auto range), except as noted
- Install following items; (refer to diagram below for appropriate ga numbers)
 - Red & black Test Adapters (Pin Kit, flap 7) onto banana jacks of Multimeter leads
 - 5-in pin/socket test jumper lead (Pin Kit, flap 5) onto red test adapter
 - 5-in pin/pin test jumper lead (Pin Kit, insert) onto black test adapter
- Install test jumper leads into DC UTIL PWR Cable, MUP, PDB, or DC UTIL PWR Outlet as shown



Section V
Intentionally
Omitted

U-6

IFM/ALL/GEN E

WATER PROCEDURES

GENERAL INFORMATION

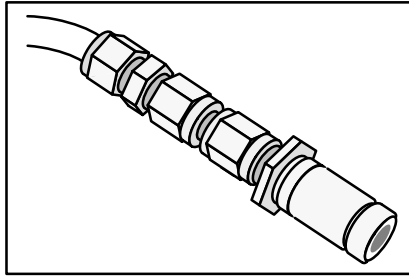
EQUIPMENT

Following listing identifies all water equipment carried to support IFM procedures

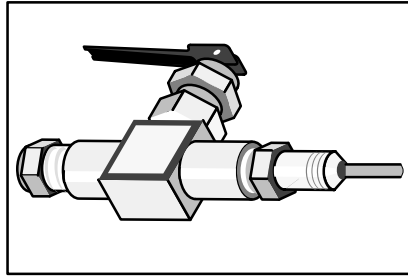
COMPONENT	COLOR BAND	LENGTH	CONNECTOR
B/B Hose	Blue – Blue	10 ft	Male ^{4,1}
R/R Hose	Red – Red	10 ft	Female ¹
Y/Y Hose	Yellow – Yellow	8 ft	Female ³
Y/R QD Adapter	Yellow – Red	5 in	Female ⁴
Free Fluid Nozzle	None	8 in	Male ⁸
Personal Hygiene Hose	None	12 ft	Female ²
CWC Hose (1)	Yellow – Yellow	20 ft	Female ³
CWC (2)	None		Male ^{3,5}
Contingency Water Dispenser	None	6 in	Male ⁶
Waste Water Dump Filter	None	8 in	Male, Female ⁷

NOTES

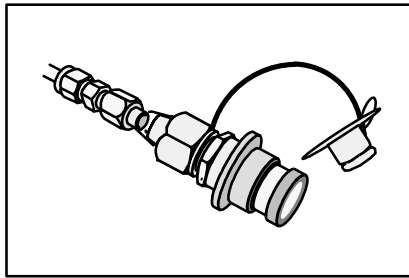
1. Red hose mates to blue hose
2. Personal hygiene hose mates w/auxiliary ports and deck QDs. Connector same size as R/R Hose connectors
3. Yellow hose mates w/potable and waste CONTINGENCY X-TIE QDs in WCS, Free Fluid Nozzle, and CWC and payload QDs
4. Y/R QD Adapter allows blue hose to mate w/potable and waste CONTINGENCY X-TIE QDs in WCS
5. CWC – contingency water container (max allowable capacity 95 lb)
6. Contingency water dispenser attaches to R/R Hose
7. Connects to CONTINGENCY X-TIE QDs in WCS; used for Free Fluid Disposal and CWC dumps
8. Free Fluid Nozzle attaches to Y/Y and CWC hoses



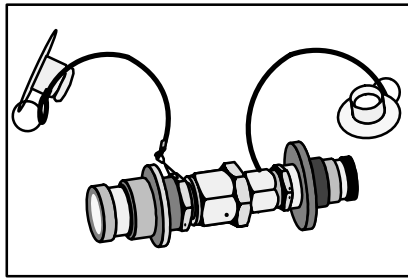
B/B Hose (male QD)



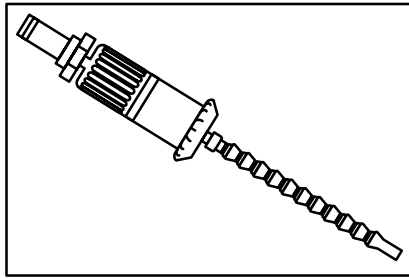
Contingency Water Dispenser
(male QD)



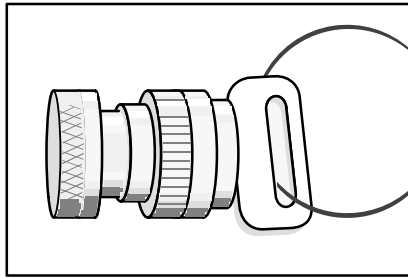
R/R Hose (female QD)



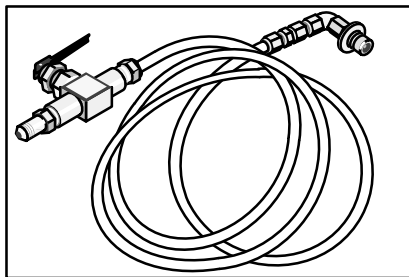
Y/R QD Adapter
(female/female QDs)



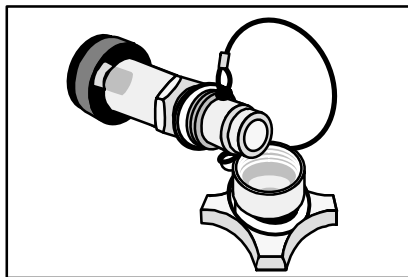
Free Fluid Nozzle (male QD)



5/8-in to 7/8-in Adapter

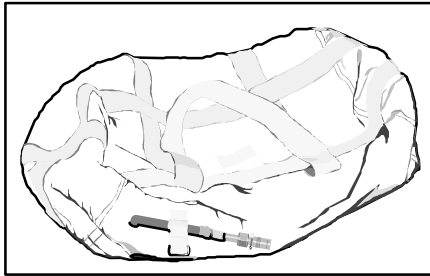


Personal Hygiene Hose
(female QD)

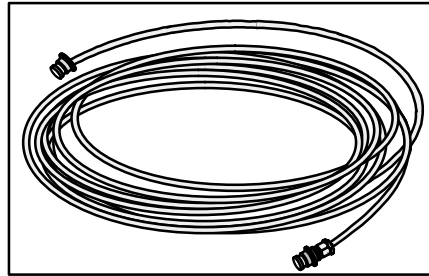


Urine QD Adapter
(male QD)

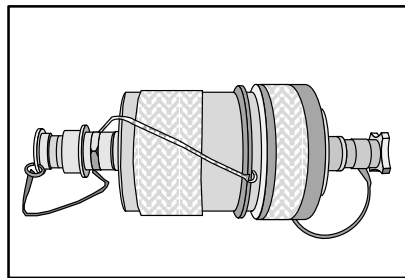
ifm_sw_p3



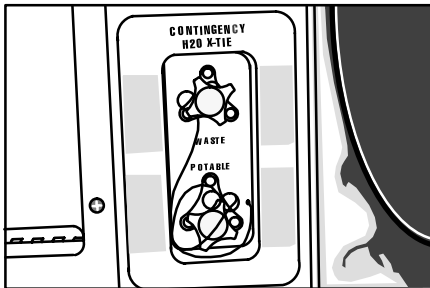
Contingency Water Container (CWC) (male)



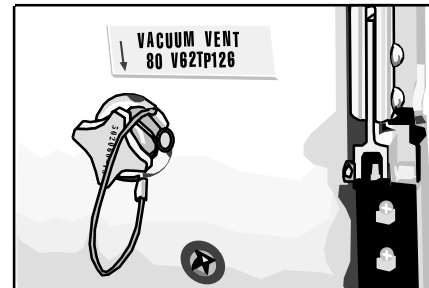
CWC Hose (20 ft)



Waste Water Dump Filter (male, female QDs)



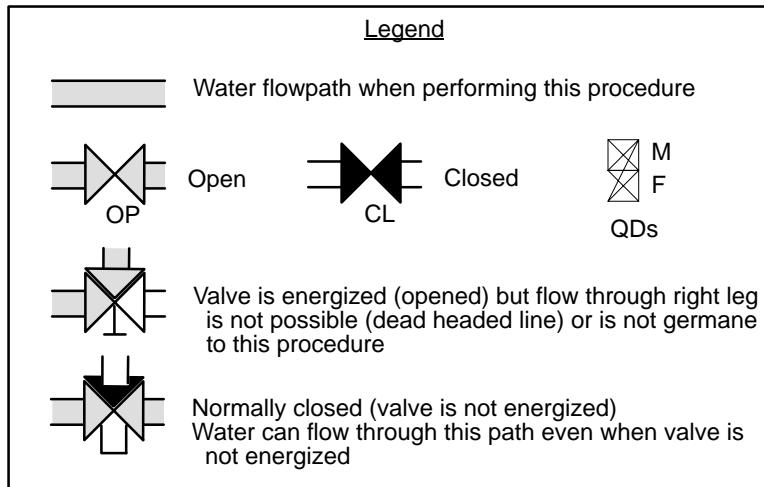
Contingency H2O X-TIE (male QDs)



WCS Vacuum Vent (male QDs)

LEGEND

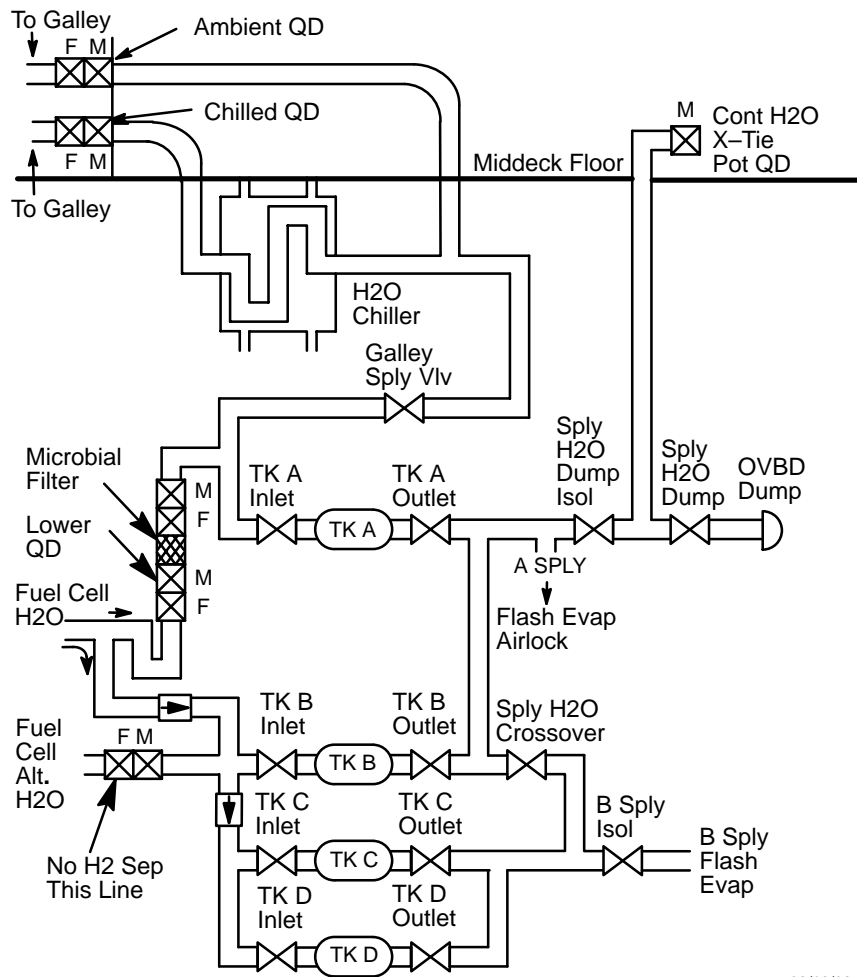
Following legend may be used in conjunction with schematics/drawings provided as part of individual water procedures



SCHEMATICS

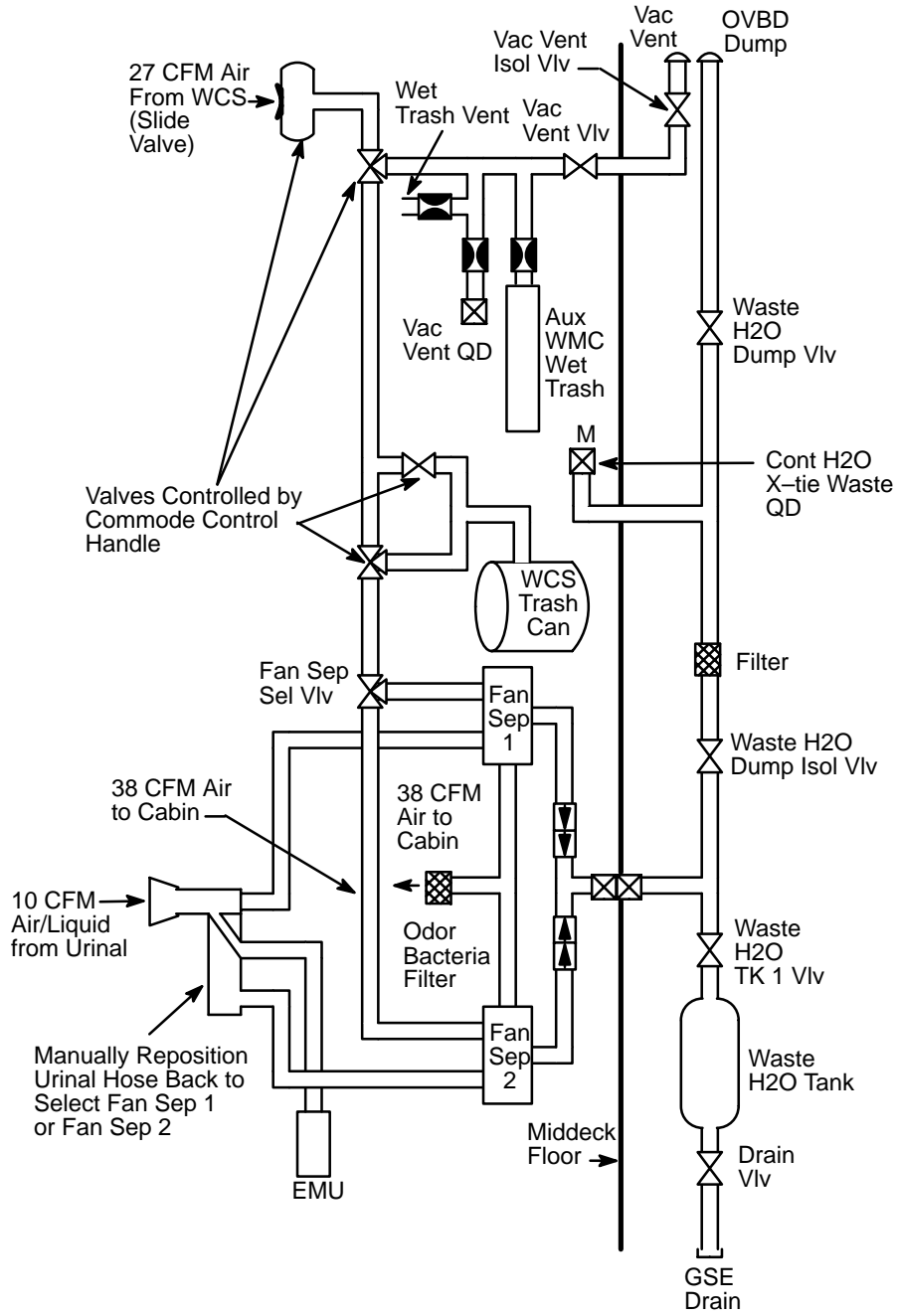
Following schematics cover galley, supply, and waste water systems. Middeck floor reference line shown to distinguish between water lines in cabin and water lines in lower equipment bay

SUPPLY WATER SYSTEM (SWS)

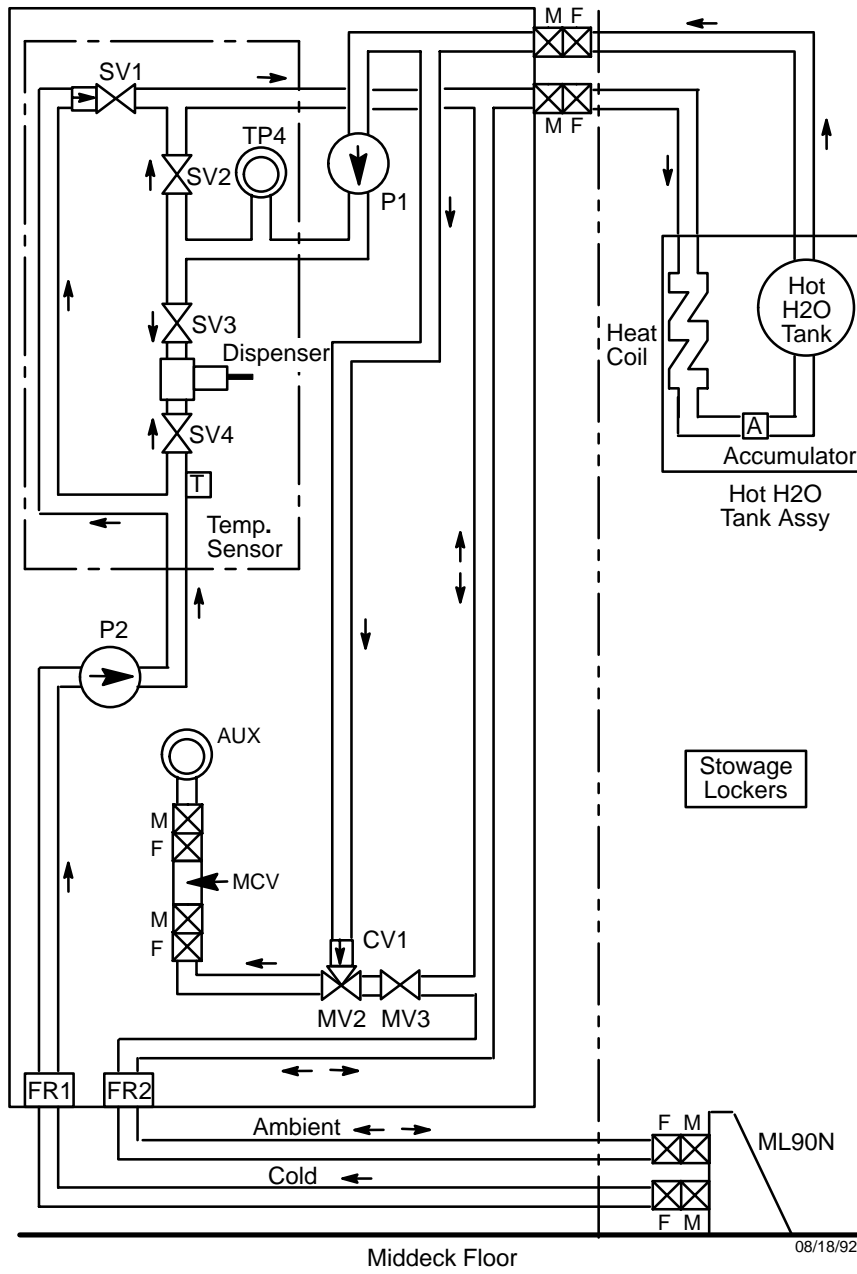


08/18/92

WASTE WATER SYSTEM (WWS)



GALLEY WATER SYSTEM (GWS)



W-7

IFM/ALL/GEN E

**CONTINGENCY WATER CONTAINER
(CWC) OPS, WASTE**

(1:00 hr Setup)

OBJECTIVE: CWC used to store waste water in event waste tank full and cannot be dumped

NOTE

Requires Ops 2 config and two crewmembers

LOCATION: CONT H2O X-TIE WASTE QD located on outboard WCS wall, inside WCS compartment

TOOLS REQD:

TOOL Gray Tape
CHCK CWC Contingency Hose
MISC Contingency Water Container (CWC) in Vol G (MD80R)

1. To access Vol G (MD80R), see VOL G ACCESS (GENERAL INFORMATION)
2. Remove contents of Vol H (MD23R) or Vol G (MD80R) and stow as directed by MCC

NOTE

LiOH Vol (MO52M) may be used on RCRS-configured flts

3. Pack soft material (clothing or towels) in bottom of Vol H (MD23R) or Vol G (MD80R)
4. ✓ No trapped gas in CWC
If gas present, connect Hose to CWC QD and WCS Vacuum Vent QD, and vent CWC.
Disconnect hose from vacuum vent
If no gas present, connect Hose to CWC
5. Install CWC in Vol H (MD23R) or Vol G (MD80R)
6. ML31C WASTE H2O DUMP ISOL VLV – CL (tb-CL)
7. ✓ TK1 VLV – OP (tb-OP)
8. WCS Connect CWC Contingency Hose to CONT H2O X-TIE WASTE QD
Secure CWC Contingency Hose w/Gray Tape

NOTE

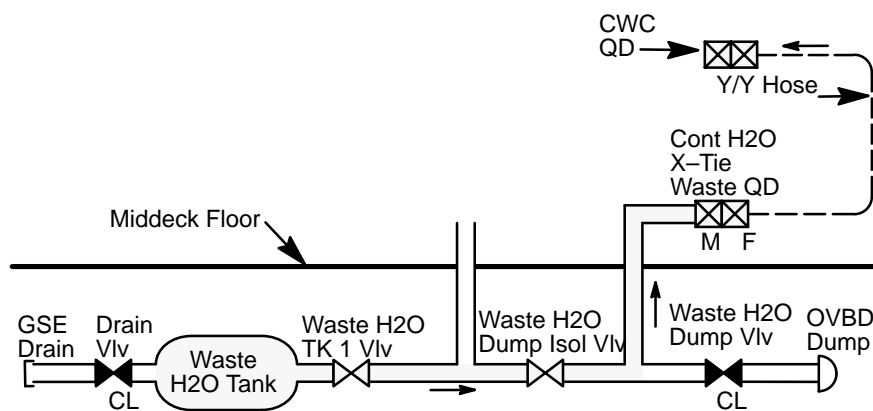
MCC will TMBU limits if desired

- 9. Log present Waste H2O TK qty _____%
- 10. Subtract 56% (95 Lbm) -56 %
- 11. FDA limit for Waste TK to CWC transfer _____%

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O QTY 1	0620540	5	-

- ML31C 12. WASTE H2O DUMP ISOL VLV – OP (tb–OP)
- 13. Monitor CWC fill rate continuously
- CRT 14. When 'S66 H2O' for Waste TK qty, continue
- ML31C 15. WASTE H2O DUMP ISOL VLV – CL (tb–CL)
- WCS 16. Disconnect CWC Contingency Hose from CONT H2O X–TIE WASTE QD
- 17. Disconnect CWC Contingency Hose from CWC
- 18. Cover CWC w/towels(clothing) and close Vol H (MD23R) or Vol G (MD80R)
- 19. Stow tools
- ML31C 20. WASTE H2O DUMP ISOL VLV – OP (tb–OP)



**CONTINGENCY WATER CONTAINER
(CWC) OPS, SUPPLY**

(1:00 hr Setup)

OBJECTIVE: Create ullage for supply water system if water cannot be dumped due to payload constraints or system failure. Procedure dumps water from TKB. Reconfig may be reqd if dump reqd from other supply water tanks

NOTE

Requires Ops 2 config and two crewmembers

LOCATION: CONT H2O X-TIE POT QD located on outboard WCS wall, inside WCS compartment

TOOLS REQD:

TOOL	Gray Tape Locker Tool 3/8-in Driver Handle
CHCK	CWC Contingency Hose
MISC	Contingency Water Container (CWC) in Vol G (MD80R)

1. To access Vol G (MD80R), see VOL G ACCESS (GENERAL INFORMATION)
2. Remove contents of Vol H (MD23R) or Vol G (MD80R) and temp stow as directed by MCC

NOTE

LiOH Vol (MO52M) may be used on RCRS-config flts

3. Pack soft material (clothing or towels) in bottom of Vol H (MD23R) or Vol G (MD80R)
4. ✓ No trapped gas in CWC
If gas present, connect hose to CWC QD and WCS Vacuum Vent QD, and vent CWC. Disconnect hose from vacuum vent
If no gas present, connect hose to CWC
5. Install CWC in Vol H (MD23R) or Vol G (MD80R)
6. R11L SPLY H2O DUMP ISOL VLV – CL (tb-CL)
✓TKB OUTLET – OP (tb-OP)
7. WCS Connect CWC Contingency Hose to CONT H2O X-TIE POT QD
Secure CWC Contingency Hose w/Gray Tape

- | | | | |
|------|-----|---|-------------|
| | 8. | Log present Supply H2O TKB qty | _____% |
| | 9. | Subtract 56% (95 Lbm) | <u>-56%</u> |
| | 10. | FDA limit for Supply TKB to CWC transfer | _____% |
| | | SM 60 TABLE MAINT | |
| | 11. | ITEM 1 +0 6 2 0 4 2 0 EXEC
ITEM 2 + TKB limit from above EXEC | |
| R11L | 12. | SPLY H2O DUMP ISOL VLV – OP (tb–OP) | |
| | 13. | Monitor CWC fill rate continuously | |
| CRT | 14. | When 'S66 H2O' for Supply TK qty, continue | |
| R11L | 15. | SPLY H2O DUMP ISOL VLV – CL (tb–CL) | |
| | 16. | ✓ Total qty dumped from TKB = 56% (95 Lbm) | |
| | 17. | If total dump < 56%:
SPLY H2O DUMP ISOL VLV – OP (tb–OP) | |
| | | When total dump = 56%:
SPLY H2O DUMP ISOL VLV – CL (tb–CL) | |
| WCS | 18. | Disconnect CWC Contingency Hose from CONT H2O X–TIE POT QD | |
| | 19. | Disconnect CWC Contingency Hose from CWC QD | |
| | 20. | Cover CWC w/towels(clothing) and close Vol H (MD23R) or Vol G (MD80R) | |
| | 21. | Stow tools | |
| R11L | 22. | SPLY H2O DUMP ISOL VLV – OP (tb–OP) | |

NOTE

MCC will TMBU lower limits
post procedure as reqd

FC H2O pH TEST

(20 min)

OBJECTIVE: Test Fuel Cell water to confirm pH indication.
Accomplished by flowing Fuel Cell water into urinal and checking pH concentration using pH Strips (high pH caused by high KOH concentration in water)

LOCATION: WCS, ML90N below Galley

TOOLS REQD:

TOOL	Pin Kit
	Gray Tape
	9/16-in & 11/16-in Combination Wrenches
CHCK	R/R Hose
MISC	Wet Washes (WCS)
	Spare (Clean) Urinal Funnel
	Goggles & Gloves (CCK)
	pH Strips (CCK)

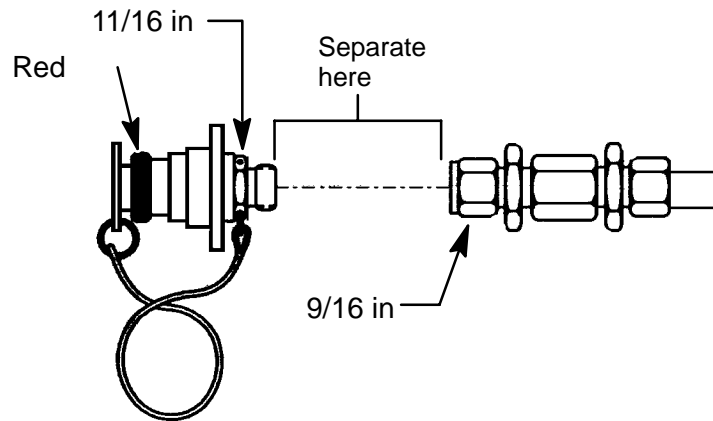
NOTE

For detailed schematic, see SUPPLY WATER SYSTEM, W-5

CAUTION

KOH caustic. Avoid contact w/skin and eyes

CCK	1. Don Goggles & Gloves
R11L	2. ✓ SPLY H2O TKA INLET – CL (tb-CL)
	3. GALLEY SPLY VLV – OP (tb-OP)
GALLEY	4. Disconnect ambient and chilled line QDs from ML90N, below Galley
	5. Remove QD from one end of R/R hose (9/16-in & 11/16-in Combination Wrenches)



- WCS
6. ✓ FAN SEP same as HOSE BLOCK
 - ✓ MODE – AUTO
 - ✓ CRADLE – AUTO
 Unstow hose and install spare urinal funnel
 7. Tape free end of R/R hose into urinal funnel; allow for adequate airflow

NOTE

Ensure adequate airflow before connecting R/R hose to ML90N QDs

8. ✓ Airflow
 - ✓ WCS ON Lt – ON

NOTE

Sample water immediately as it begins flowing into WCS using 22-ga Insulation Tubing from Pin Kit (flap 7) to obtain single drop of water

9. Connect R/R hose to ML90N ambient QD below Galley

10. Immediately obtain drop of water from urinal to blot pH Strip
If pH 9:
 11. Disconnect R/R hose from ambient QD
 12. Return to MAL, EPS, 7.3aIf pH 9:
 13. Flow water into urinal for 10 min. (This ensures fuel cell water to the ambient QD)
 14. After 10 min, check pH of water flowing into urinalIf pH 9:
 15. Disconnect R/R hose from ambient QD
 16. Return to MAL, EPS, 7.3aIf pH 9:
 17. Disconnect R/R hose from ML90N and remove remaining QD from end of R/R Hose (9/16-in & 11/16-in Combination Wrenches) to evacuate residual water
18. Reconnect Galley ambient line to its ML90N QD

NOTE

FAN SEP will run for ~30
sec after hose stowage

19. Stow hose in cradle
✓WCS ON Lt – OFF
20. Reattach QDs removed in steps 5,17
21. Stow equipment
22. Return to MAL, EPS, 7.3a

FC H2O SPLY LINE FLUSH

(45 min)

OBJECTIVE: Purge Fuel Cell water lines of high pH water.
Accomplished by dumping Fuel Cell water into urinal (high pH caused by high KOH concentration in water)

LOCATION: WCS, ML90N below Galley

TOOLS REQD:

TOOL	Pin Kit
	Gray Tape
	9/16-in & 11/16-in Combination Wrench
CHCK	R/R Hose
MISC	Spare (Clean) Urinal Funnel
	Goggles & Gloves (CCK)
	pH Strips (CCK)
	Wet Washes (WCS)

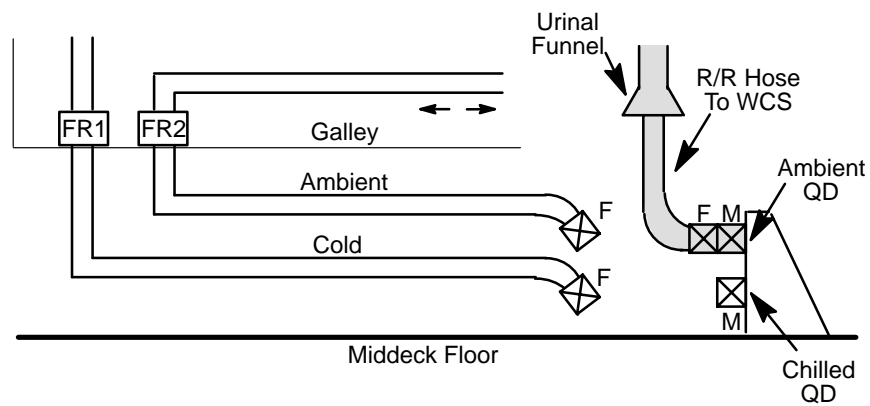
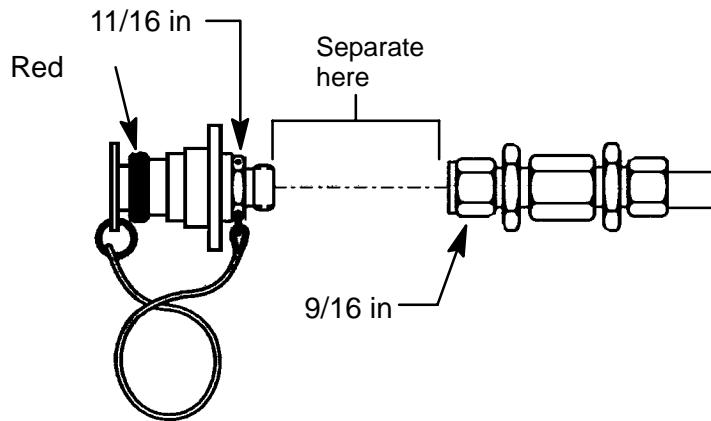
NOTE

For detailed schematic, see SUPPLY WATER SYSTEM, W-5

CAUTION

KOH caustic. Avoid contact w/skin and eyes

1. If FC H2O pH TEST already performed, go to step 10
2. Don Goggles & Gloves
3. ✓ SPLY H2O TKA INLET – CL (tb-CL)
4. ✓ GALLEY SPLY VLV – OP (tb-OP)
5. Disconnect ambient and chilled line QDs from ML90N, below Galley
6. Remove QD from one end of R/R hose (9/16-in & 11/16-in Combination Wrenches)



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- WCS
7. ✓FAN SEP same as HOSE BLOCK
 - ✓MODE – AUTO
 - ✓CRADLE – AUTO
 Unstow hose and install spare urinal funnel
 8. Tape free end of R/R hose into urinal funnel; allow for adequate airflow

NOTE

Ensure adequate airflow before connecting R/R hose to ML90N QDs

9. ✓Airflow
 - ✓WCS ON Lt – ON

NOTE

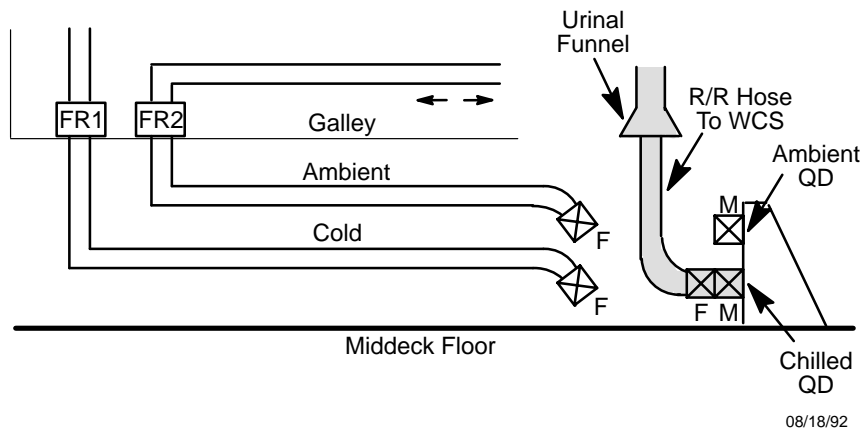
Sample water immediately as it begins flowing into WCS using 22-ga Insulation Tubing from Pin Kit (flap 7) to obtain single drop of water. If pH \leq 9, this procedure will be followed by galley line flush (see step 23)

- R11L
10. Connect R/R hose to ML90N ambient QD below Galley. Immediately obtain drop of water from urinal to blot pH Strip
 11. Flow water into urinal for 10 min. (This clears high pH from Fuel Cell to ambient QD)
 12. Check pH of water flowing into urinal. If pH $>$ 9, continue to flow water until pH $<$ 9
 13. SPLY H2O TK A inlet – OP (tb–OP)
 14. After 10 min, check pH of H2O TK A water flowing into urinal
 15. If pH \leq 9, SPLY H2O TK A unusable (contaminated)
SPLY H2O TK A INLET – CL (tb–CL)
Continue to flow water until pH \leq 9
If pH $>$ 9, SPLY H2O TK A usable (not contaminated)
 16. Disconnect R/R hose from ML90N and remove remaining QD from end of R/R Hose (9/16-in & 11/16-in Combination Wrenches) to evacuate residual water before performing next step

NOTE

Sample water immediately as it begins flowing into WCS using 22-ga Insulation Tubing from Pin Kit (flap 7) to obtain single drop of water. If pH \leq 9, this procedure must be followed by galley line flush

17. Reattach QD removed in step 16 and connect R/R hose to ML90N chilled QD below Galley. Immediately obtain drop of water from urinal to blot pH Strip



18. Flow water into urinal for 10 min. (This clears high pH from Fuel Cell to chilled QD)
19. Check pH of water flowing into urinal. If pH > 9, continue to flow water until pH < 9
20. Disconnect R/R hose from ML90N and remove remaining QD from end of R/R Hose (9/16-in & 11/16-in Combination Wrenches) to evacuate residual water
21. Reconnect ambient and chilled lines to their respective QDs (chilled line is insulated line)

NOTE

FAN SEP will run for ~30
sec after hose stowage

22. Stow hose in cradle
✓WCS ON Lt – OFF
23. If pH in steps 10 and 14 or step 10 in
FC H2O pH TEST 9, as water started to
flow, go to GALLEY H2O LINE FLUSH, W-30
24. If galley line flush not reqd, remove R/R from
urinal and clean w/wet wash
25. Reattach QDs removed in steps 6 and 20
26. Stow equipment

FES SUPPLY, WASTE H2O

(15 min)

OBJECTIVE: Supply Flash Evaporator System (FES)
w/supplemental waste water by interconnecting Supply and
Waste Water Systems

LOCATION: CONT H2O X-TIE POT and WASTE QDs are on
outboard WCS wall

TOOLS REQD:

CHCK Y/Y Hose

NOTE

WCS should not be used for urine collection
until after step 15(21) completed

- R11L 1. ✓SPLY H2O DUMP ISOL VLV – CL (tb–CL)
2. ✓VLV – CL (tb–CL)
3. ✓TKA OUTLET – CL (tb–CL)
4. ✓XOVR VLV – OP (tb–OP)
5. ✓TKB OUTLET – CL (tb–CL)
- ML31C 6. ✓WASTE H2O DUMP ISOL VLV – CL (tb–CL)
7. ✓VLV – CL (tb–bp)
8. ✓TK1 VLV – OP (tb–OP)

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O QTY 1	0620540	5	99

SM 66 ENVIRONMENT

- WCS 9. Connect one end of Y/Y Hose to CONT H2O
X-TIE POT QD and other end to CONT H2O
X-TIE WASTE QD
- R11L 10. SPLY H2O DUMP ISOL VLV – OP (tb–OP)
- ML31C 11. WASTE H2O DUMP ISOL VLV – OP (tb–OP)

* If FES shuts down, cycle affected FES *
* controller OFF, then ON (pnl L1) *

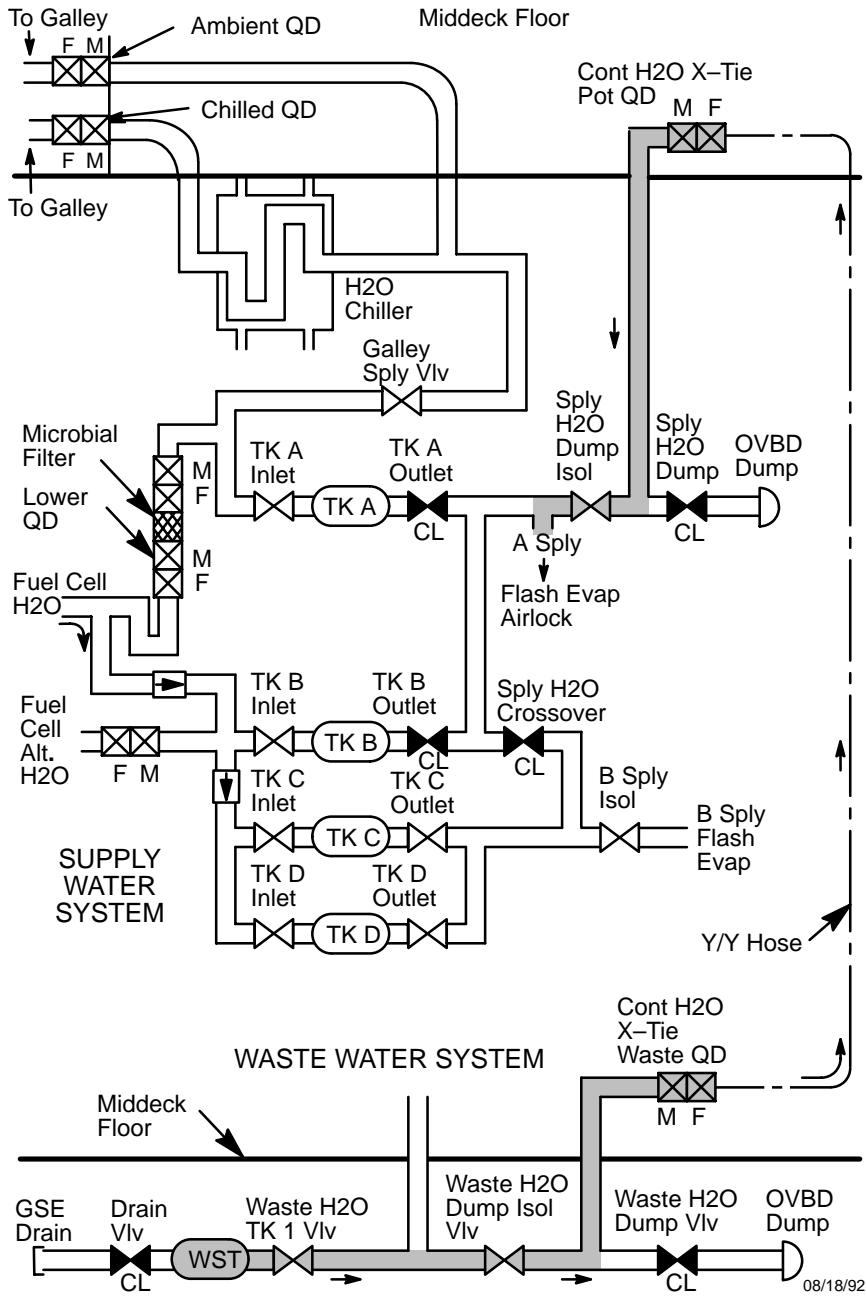
For FES A SPLY (schematic, W-21)

- R11L 12. SPLY H2O XOVR VLV – CL (tb-CL)
- CRT 13. When WASTE H2O QTY 1 = 5%,
- R11L 14. SPLY H2O XOVR VLV – OP (tb-OP)
- ML31C 15. WASTE H2O DUMP ISOL VLV – CL
(tb-CL)
- R11L 16. SPLY H2O TKB OUTLET – OP (tb-OP)

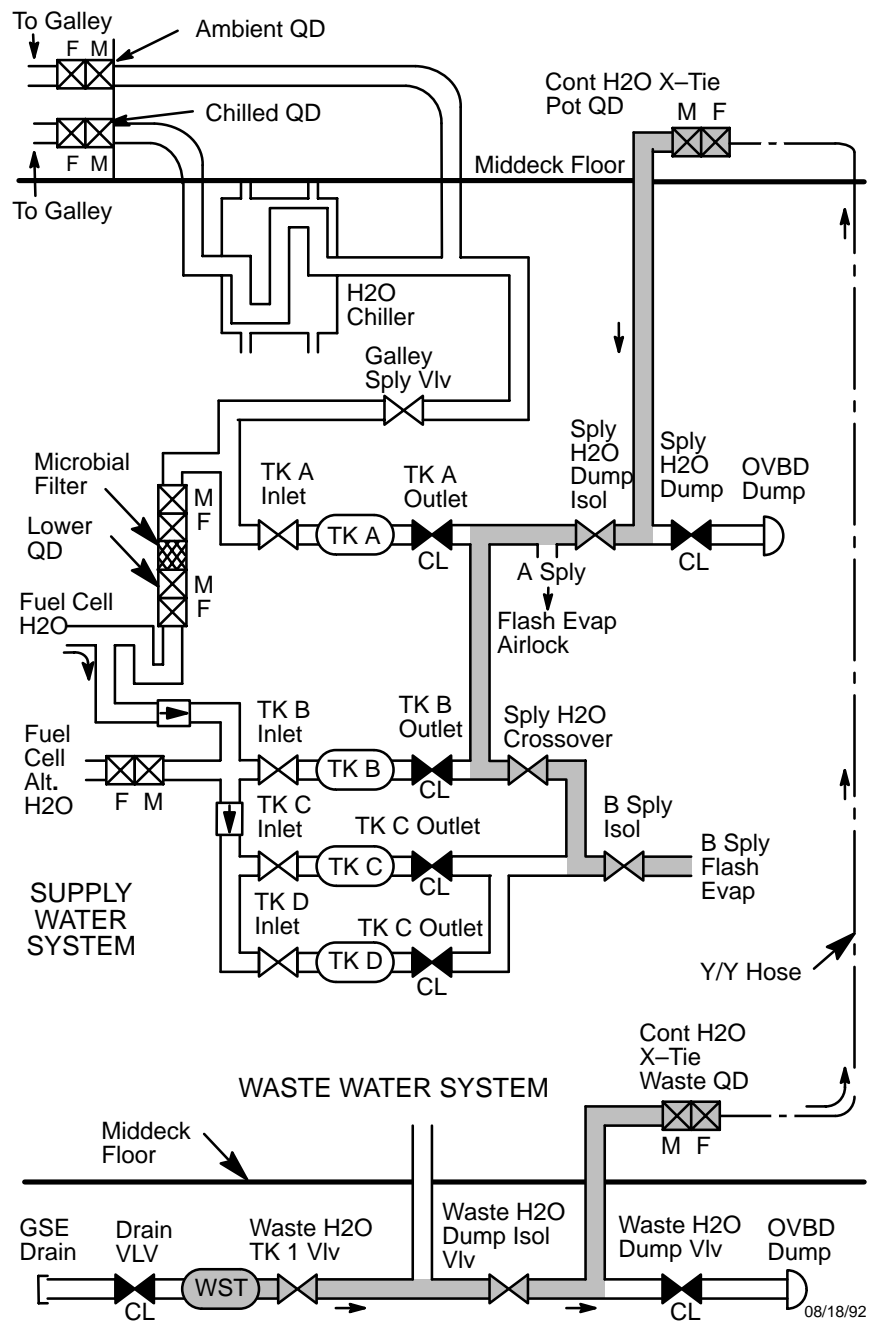
For FES B SPLY (schematic, W-22)

- ML31C 17. SPLY H2O TKD OUTLET – CL (tb-CL)
- R11L 18. TKC OUTLET – CL (tb-CL)
- CRT 19. When WASTE H2O QTY 1 = 5%,
- ML31C 20. SPLY H2O TKD OUTLET – OP (tb-OP)
- 21. WASTE H2O DUMP ISOL VLV – CL
(tb-CL)
- R11L 22. SPLY H2O TKB,TKC OUTLET (two) – OP
(tb-OP)

FES A SUPPLY



FES B SUPPLY



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FREE FLUID DISPOSAL

(30 min)

OBJECTIVE: Remove free fluid from cabin by dumping overboard via Waste Water Dump Line

LOCATION: CONT H2O X-TIE WASTE QD located on WCS compartment outboard wall

TOOLS REQD:

BOB Waste Water Dump Filter
CHCK Free Fluid Nozzle
Y/Y Hose
MISC 12x12 Zip Lock Bag

1. SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O NOZ A	0620520	60	250
B	0620519	60	250

SM 66 ENVIRONMENT

CAUTION
WASTE H2O NOZ T should not exceed 350

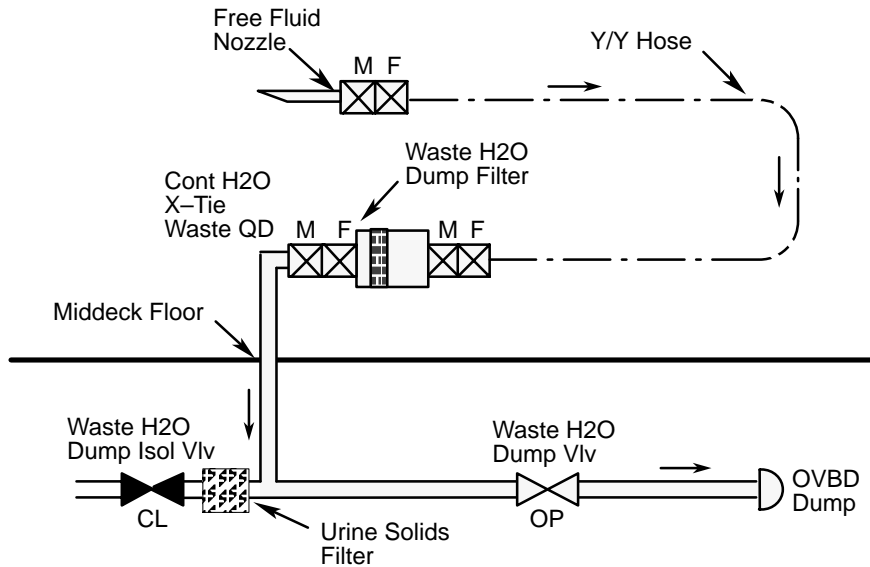
2. ✓WASTE DMP LN T 50

* If T 50, enable 2nd heater: *
* ML86B:A *
* cb MNA(MNB) H2O LINE HTR *
* A(B) – cl *

ML31C 3. WASTE H2O DUMP ISOL VLV – CL (tb-CL)

NOTE

Schematic shows water flowpath for this procedure when system properly configured. See W-6 for complete schematic



- | | | |
|-------|-----|---|
| ML31C | 4. | WASTE H2O DUMP VLV ENA/NOZ HTR – ON
(✓DUMP VLV tb-CL) |
| WCS | 5. | Connect Free Fluid Nozzle to one end of Y/Y Hose
Connect free end of Y/Y Hose to WASTE H2O DUMP FILTER. Do not connect to CONT H2O X-TIE WASTE QD at this time |
| CRT | 6. | When WASTE H2O NOZ T A,B (two) 250, continue |
| | 7. | Connect WASTE H2O DUMP FILTER to CONT H2O X-TIE WASTE QD |
| ML31C | 8. | WASTE H2O DUMP VLV – OP (tb-OP) |
| | 9. | Insert Nozzle into free fluid; when fluid collection complete, continue |
| | 10. | Wait 30 sec to empty any remaining water from hoses; then disconnect WASTE H2O DUMP FILTER from CONT H2O X-TIE WASTE QD |
| | 11. | WASTE H2O DUMP VLV – CL (tb-CL)
ISOL VLV – OP (tb-OP) |

- CRT 12. When WASTE H2O NOZ T A,B (two) 250, continue
- ML31C 13. WASTE H2O DUMP VLV ENA/NOZ HTR – OFF (✓DUMP VLV tb–bp)
14. If no further use expected, disconnect Y/Y Hose from Nozzle and Waste H2O Dump Filter
15. Place WASTE H2O DUMP FILTER in plastic (Ziploc) bag, seal and stow
16. Stow Y/Y Hose and Nozzle
- CRT 17. ✓WASTE H2O NOZ T A,B (two) – not increasing

- * If NOZ T increasing *
- * ML86B:A *
- * cb MNA WASTE H2O DUMP *
- * VLV/NOZ HTR – op *

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O NOZ A	0620520	-82	250
B	0620519	-82	250

GALLEY, FAILED SUPPLY LINE, BYPASS

(45 min)

OBJECTIVE: Bypass failed Galley Supply line/valve.
Procedure draws water from TKA by backflowing through
Microbial Filter

LOCATION:

Microbial Filter located under middeck floor. See LOWER
EQUIPMENT BAY, Zone K25 (COMPONENT LOCATIONS)

Primary access to Microbial Filter thru LEB access pnl.

See LOWER EQUIPMENT BAY, Zone I25 (COMPONENT
LOCATIONS)

Secondary access to Microbial Filter thru (Vol H) MD23R.

See LOWER EQUIPMENT BAY, Zone R25 (COMPONENT
LOCATIONS)

TOOLS REQD:

TOOL	Gray Tape
	Torque Wrench
	Driver Handle
	5/32-in Allen Head Driver
	Ratchet Wrench
	1/4-in to 3/8-in Adapter
CHCK	R/R Hose
	B/B Hose

NOTE

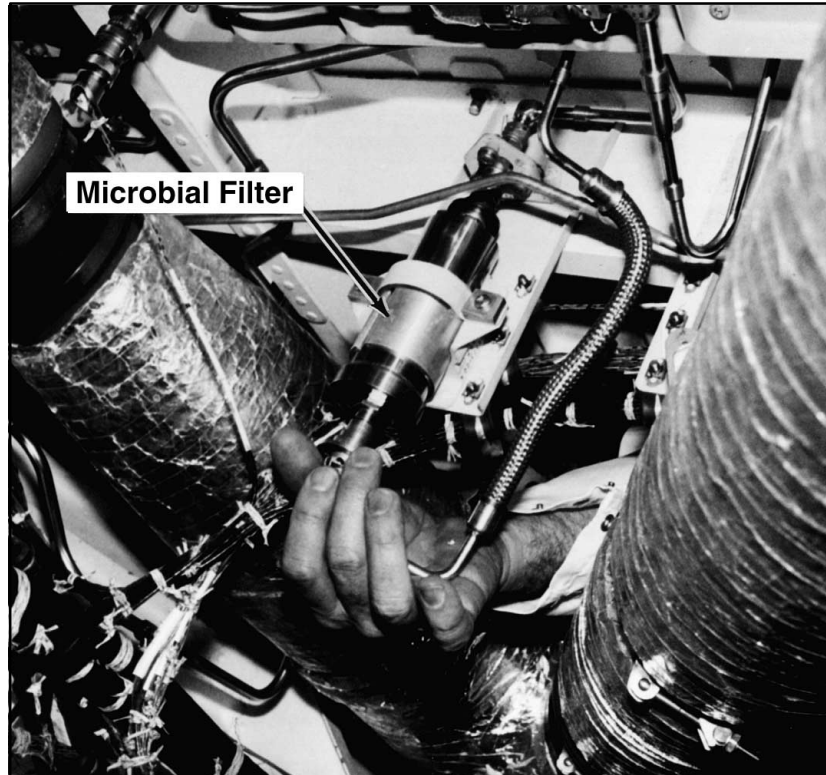
Upon completion of this procedure,
Galley will function normally

1. Open LEB access pnl on middeck floor and
disconnect Fuel Cell Hose (lower QD) from
Microbial Filter (See photo, W-27)

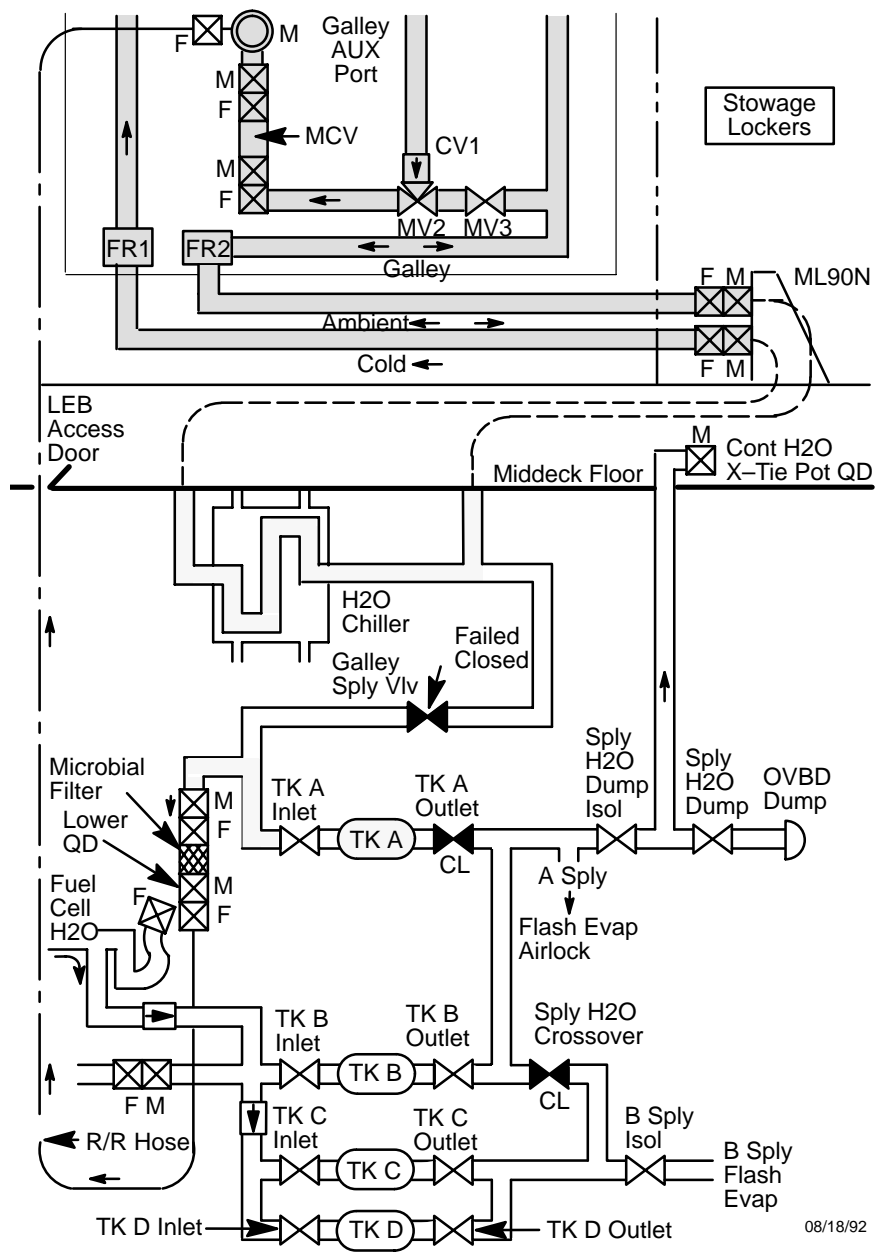
* If reqd, remove Vol H (MD23R) *
* (see GENERAL INFORMATION) *
* to access Microbial Filter *
2. Connect one end of R/R hose to bottom of
Microbial Filter QD and route hose thru LEB
access pnl opening on middeck floor
3. Disconnect PHS hose from Galley AUX PORT
and connect R/R hose to AUX PORT
4. Connect one end of B/B Hose to PHS Hose QD

5. Tape B/B hose to Galley so free end near AUX PORT

- * To use PHS hose: Remove R/R hose *
- * from Galley AUX PORT and connect to *
- * free end of B/B hose *
- * When finished: Remove R/R hose from *
- * B/B hose and reconnect to AUX PORT *



SUPPLY WATER SYSTEM



08/18/92

R11L

6. ✓ SPLY H2O TKA INLET – OP (tb–OP)

7. Secure hoses to middeck structure w/Gray Tape

- * Reinstall Vol H, if necessary *
- * (torque, 30 in–lb). Reinstall *
- * ladder (torque, 30 in–lb) *

8. Stow tools, Gray Tape

9. When procedure no longer reqd:

Disconnect R/R, B/B Hoses

Reconnect Fuel Cell Hose to Microbial Filter

GALLEY H2O LINE FLUSH

(20 min)

OBJECTIVE: Purge Galley water lines of high pH water by dumping water into urinal

LOCATION: Galley

TOOLS REQD:

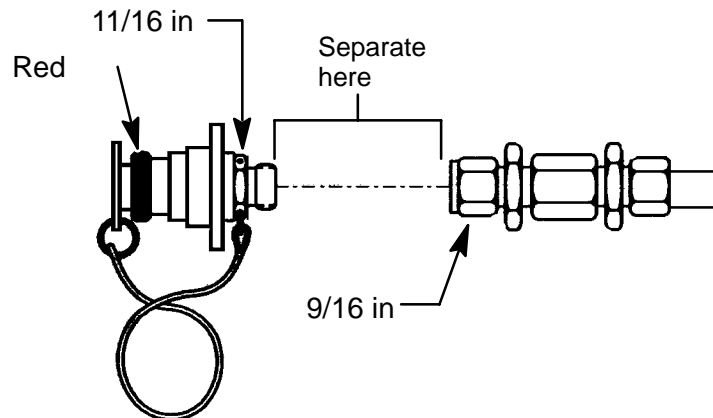
TOOL Pin Kit
Gray Tape
9/16-in & 11/16-in Combination Wrench

CHCK R/R Hose

MISC Goggles & Gloves (CCK)
ph Strips (CCK)
Spare (Clean) Urinal Funnel
Wet Washes (WCS)

CAUTION
KOH caustic. Avoid contact
w/skin and eyes

- CCK** 1. Don Goggles & Gloves
- R11L** 2. ✓SPLY H2O TKA INLET – CL (tb-CL)
3. ✓GALLEY SPLY VLV – OP (tb-OP)
4. Disconnect QD from one end of R/R Hose
(9/16-in & 11/16-in Combination Wrenches)



- WCS** 5. ✓FAN SEP same as HOSE BLOCK
✓MODE – AUTO
✓CRADLE – AUTO
Unstow hose and install spare urinal funnel

W-30

IFM/ALL/GEN E

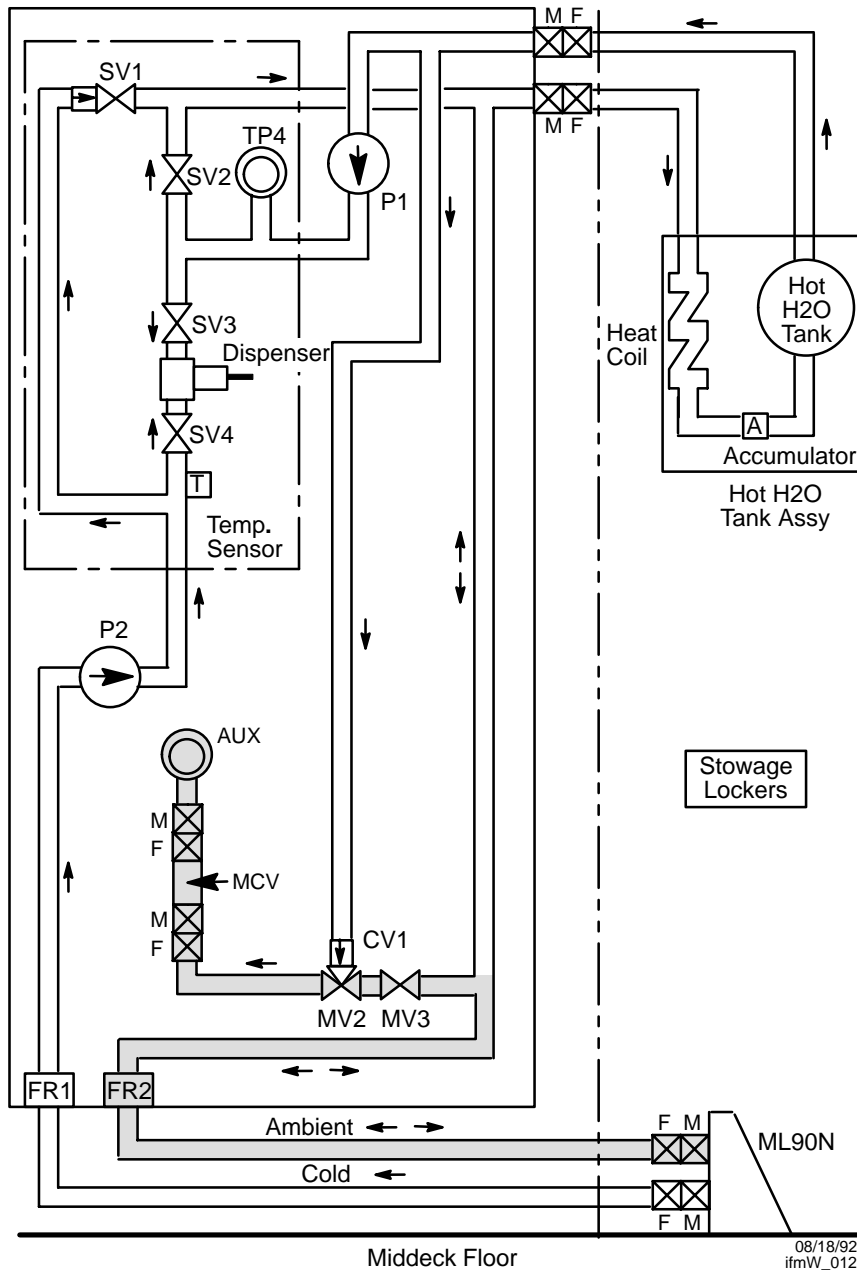
6. Tape hose end into urinal funnel; allow for adequate airflow
7. ✓Airflow
✓WCS ON Lt – ON

NOTE

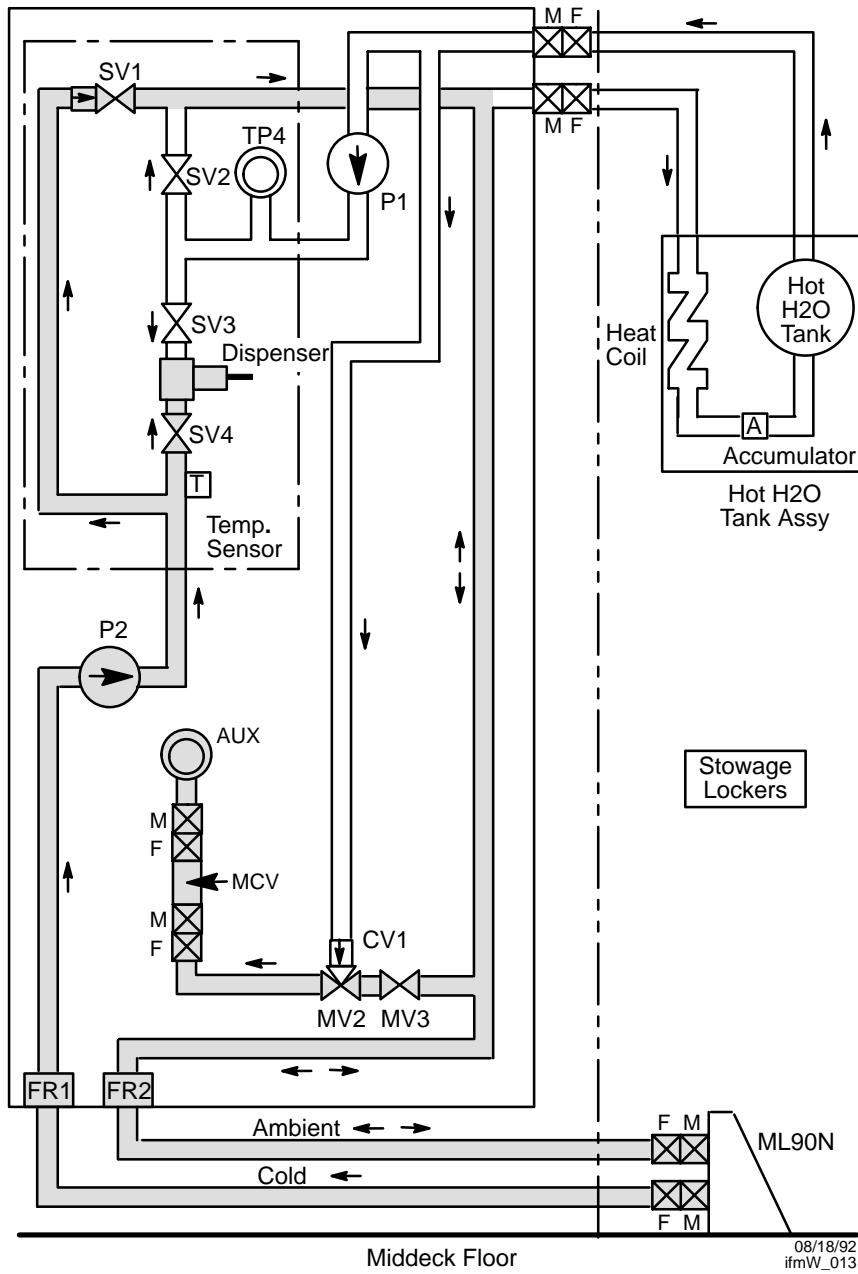
Ensure adequate airflow before connecting R/R hose to Galley

- Galley
8. MV2 vlv – Full AMB
 9. Remove PHS Hose and install R/R Hose to Galley AUX PORT
 10. Flow water for 10 min or until pH 9 (using pH Strip from CCK and 22-ga Insulation Tubing from Pin Kit (flap 7) obtain single drop of water to determine pH). This clears Ambient Water Line from Fuel Cell thru Galley of high pH water. (See flow diagram, W-32)

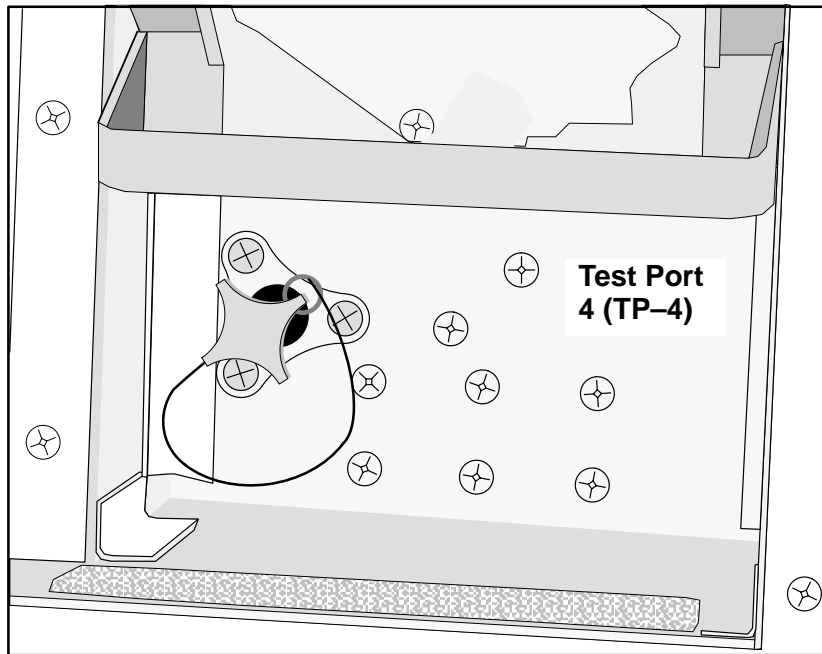
GWS - AMBIENT H2O LINE FLUSH



GWS - CHILLED H2O LINES FLUSH



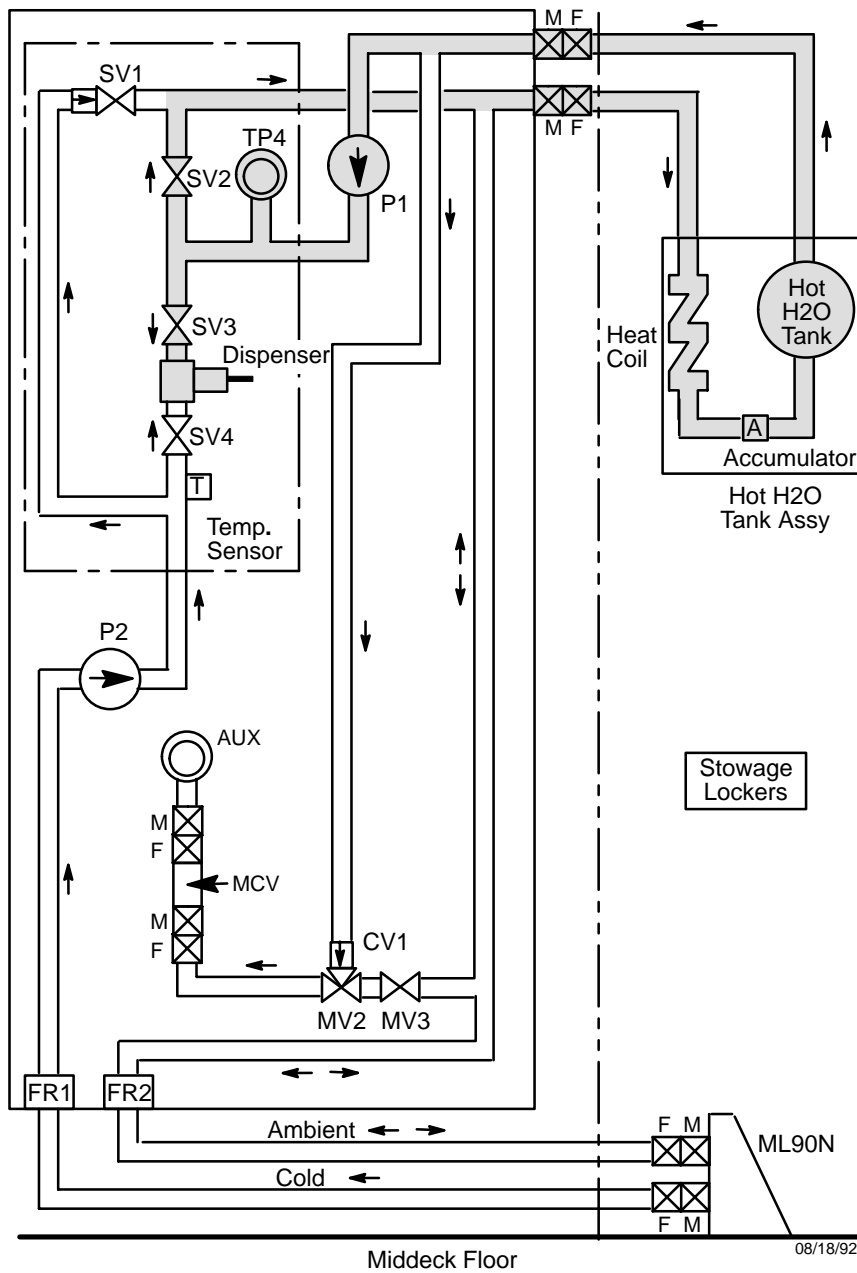
11. When pH = 9, disconnect R/R Hose from AUX PORT. Fill 8-oz drink container w/cold water (at Rehydration Station). This clears Chilled Water Lines internal to Galley of high pH water. (See flow diagram, W-33)
12. Remove cap from TP-4 (front of galley) and connect R/R Hose to TP-4



ifm_sw_p26

13. Flow water for 10 min or until pH = 9 (using pH strip from CCK and 22-ga Insulation Tubing from Pin Kit (flap 7) obtain single drop of water to determine pH). This clears Hot Water lines and tank of high pH. (See flow diagram, W-35)

GWS - HOT H2O LINES FLUSH



14. When pH = 9, fill 8-oz drink container w/hot water (at Rehydration Station). This clears Hot Water Line thru Hot Water Solenoid Valve (SV-3) of high pH water. (See flow diagram, W-35)
15. Disconnect R/R Hose from TP-4 and replace cap on TP-4
16. Remove remaining QD from end of R/R Hose (1/2 in & 9/16 in Combination Wrenches) to evacuate residual water
17. Remove R/R Hose from urinal and clean w/Wet Wash stowed in WCS
18. Reconnect PHS Hose to AUX PORT and flush line into urinal funnel

NOTE

FAN SEP will run for ~30
sec after hose stowage

19. Stow hose in cradle
✓WCS ON Lt – OFF
20. Reattach QDs, removed in steps 5 & 15, to R/R Hose
21. Stow tools and tape

HUM SEP AIR OUTLET H2O ABSORPTION

(1:30 hr)

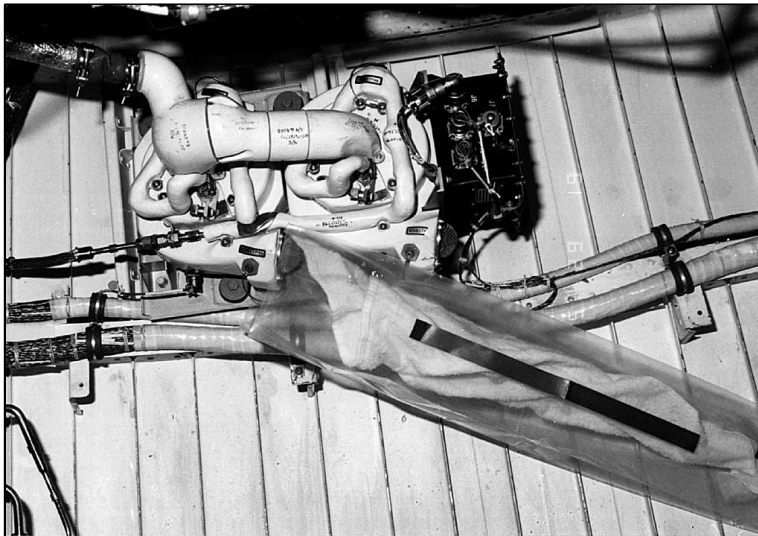
OBJECTIVE: To prevent free fluid from clogged Hum Sep leaking into LEB

LOCATION: See LOWER EQUIPMENT BAY, fwd of Vol. MD52M (COMPONENT LOCATIONS)

TOOLS REQD:

TOOL Gray Tape
MISC Trash Bag Liner (Food Trash Bag)
1-2 Towels

1. Remove LiOH stowage volume: See LiOH STOWAGE VOLUME REMOVAL (GENERAL INFORMATION)
2. Obtain trash bag liner and reinforce bottom and sides w/strips of Gray Tape
3. Use pocket knife to punch holes thru Gray Tape and liner, for airflow
4. Loosely pack 1-2 towels in trash bag liner
- LEB 5. Securely attach opening of trash bag liner to air outlet port of leaking Hum Sep (Gray Tape). Allow room for reinstallation of LiOH Stowage Box
6. Stow tape



S32-29-010

7. Periodically, ✓towel for accumulated water
8. When saturated, replace w/dry towel. Stow wet towel in wet trash

SUPPLY H2O SYS BACKUP DUMP – TK A,B (30 min Setup)

OBJECTIVE: Provide ullage for fuel cell water by dumping supply system water thru waste water dump line. Procedure assumes Supply Sys Dump Valve failure

LOCATION: CONT H2O X-TIE POT and WASTE QDs are located on outboard WCS wall

TOOLS REQD:

TOOL Gray Tape
CHCK Y/Y Hose

- R11L 1. ✓ SPLY H2O XOVR VLV – CL (tb-CL)
 - ✓TKA OUTLET – CL (tb-CL)
 - ✓TKB OUTLET – OP (tb-OP)
- ML31C 2. WASTE H2O DUMP ISOL VLV – CL (tb-CL)
- R11L 3. SPLY H2O DUMP ISOL VLV – CL (tb-CL)

NOTE

Disregard ✓s requiring temperatures (quantities) if PASS SM not available

- WCS 4. Connect one end of Y/Y Hose to CONT H2O X-TIE POT QD and other end to CONT H2O X-TIE WASTE QD
- 5. SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O NOZ A B	0620520	60	250
	0620519	60	250

CAUTION
WASTE H2O NOZ T should not
exceed 350

6. SM 66 ENVIRONMENT

7. ✓ WASTE DMP LN T 50

* If $T \leq 50$, enable 2nd heater: *
* ML86B:A *
* cb MNB(MNA) H2O LINE HTR *
* B(A) – cl *

ML31C 8. WASTE H2O DUMP VLV ENA/NOZ HTR – ON
(✓DUMP VLV tb–CL)

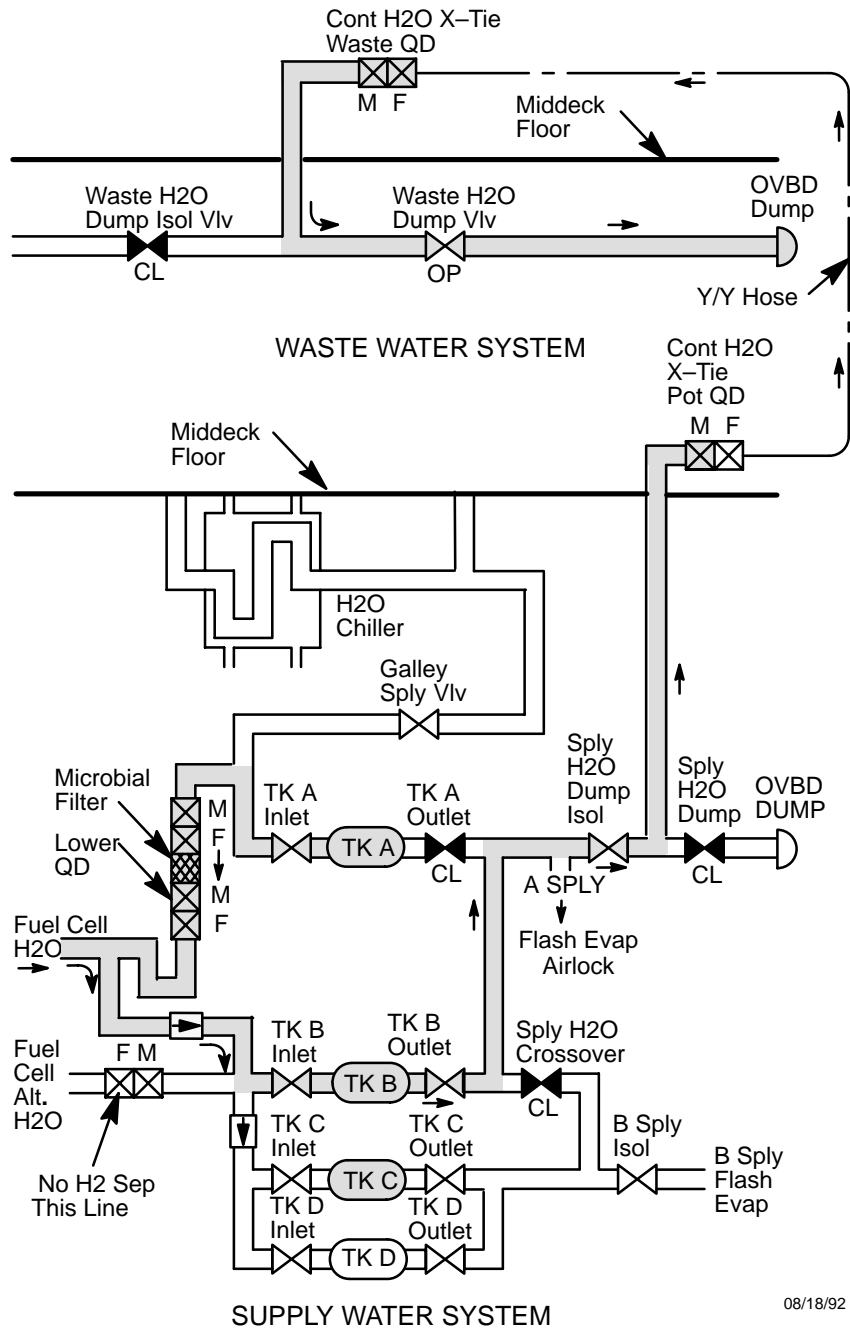
CRT 9. When WASTE H2O NOZ T A,B (two) 250,
continue

NOTE

If PASS SM not available, dump
tank(s) using time supplied by MCC

R11L 10. SPLY H2O DUMP ISOL VLV – OP (tb–OP)

ML31C 11. WASTE H2O DUMP VLV – OP (tb–OP)



- CRT 12. ✓ SUPPLY H2O QTY B decr (~1%/min) followed by SUPPLY H2O QTY A decr
13. When SUPPLY H2O QTY B(A) at specified level or time has elapsed
- ML31C WASTE H2O DUMP VLV – CL (tb–CL)
- R11L SPLY H2O DUMP ISOL VLV – CL (tb–CL)
- ML31C WASTE H2O DUMP VLV ENA/NOZ HTR – OFF (✓DUMP VLV tb–bp)
- CRT 14. ✓ SUPPLY H2O QTY B(A) – not decr
15. ✓ WASTE H2O NOZ T A,B (two) – not incr

* If T increasing: *

* ML86B:A *

* cb MNA WASTE H2O DUMP *

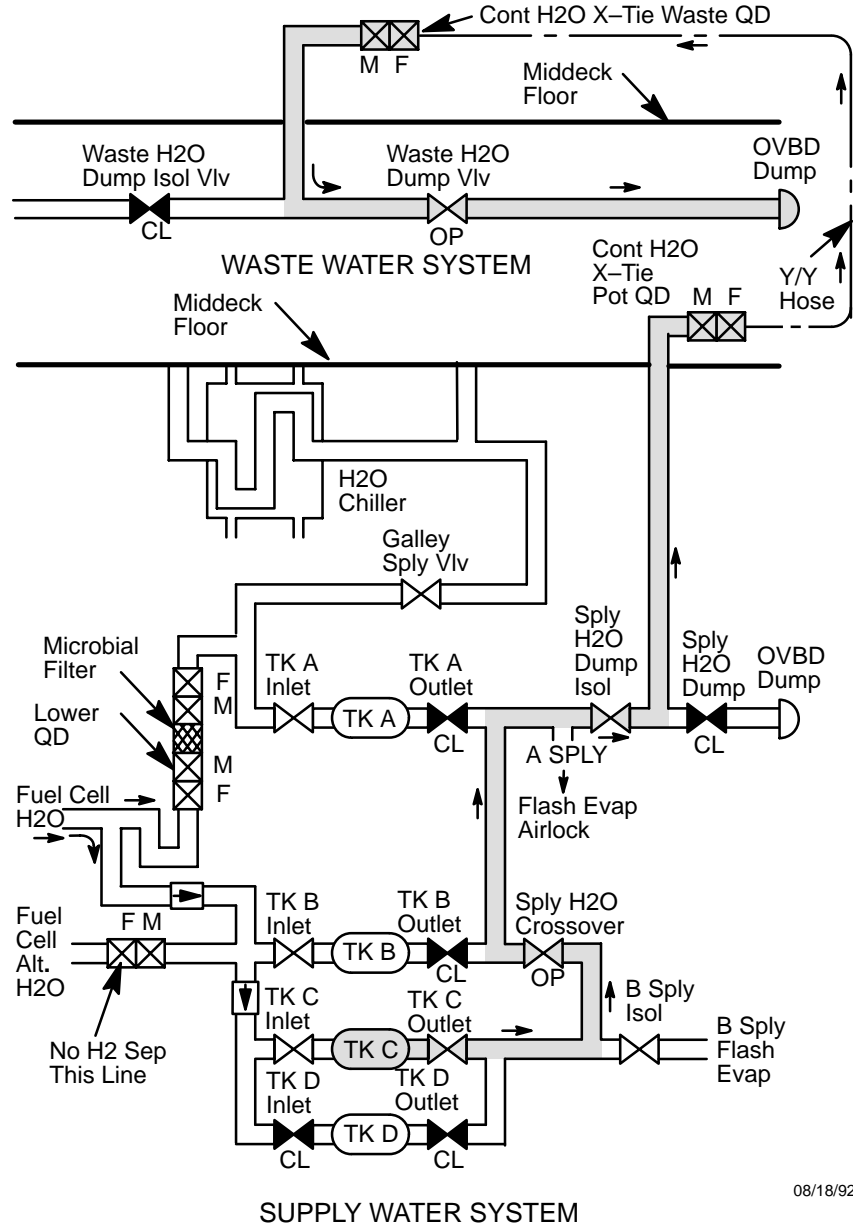
* VLV/NOZ HTR – op *

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O NOZ T A	0620520	-82	250
B	0620519	-82	250

- WCS 16. Disconnect Y/Y Hose from CONT H2O X–TIE POT and WASTE QDs
- ML31C 17. WASTE H2O DUMP ISOL VLV – OP (tb–OP)
18. SPLY H2O DUMP ISOL VLV – OP (tb–OP)
19. Stow hose, Gray Tape

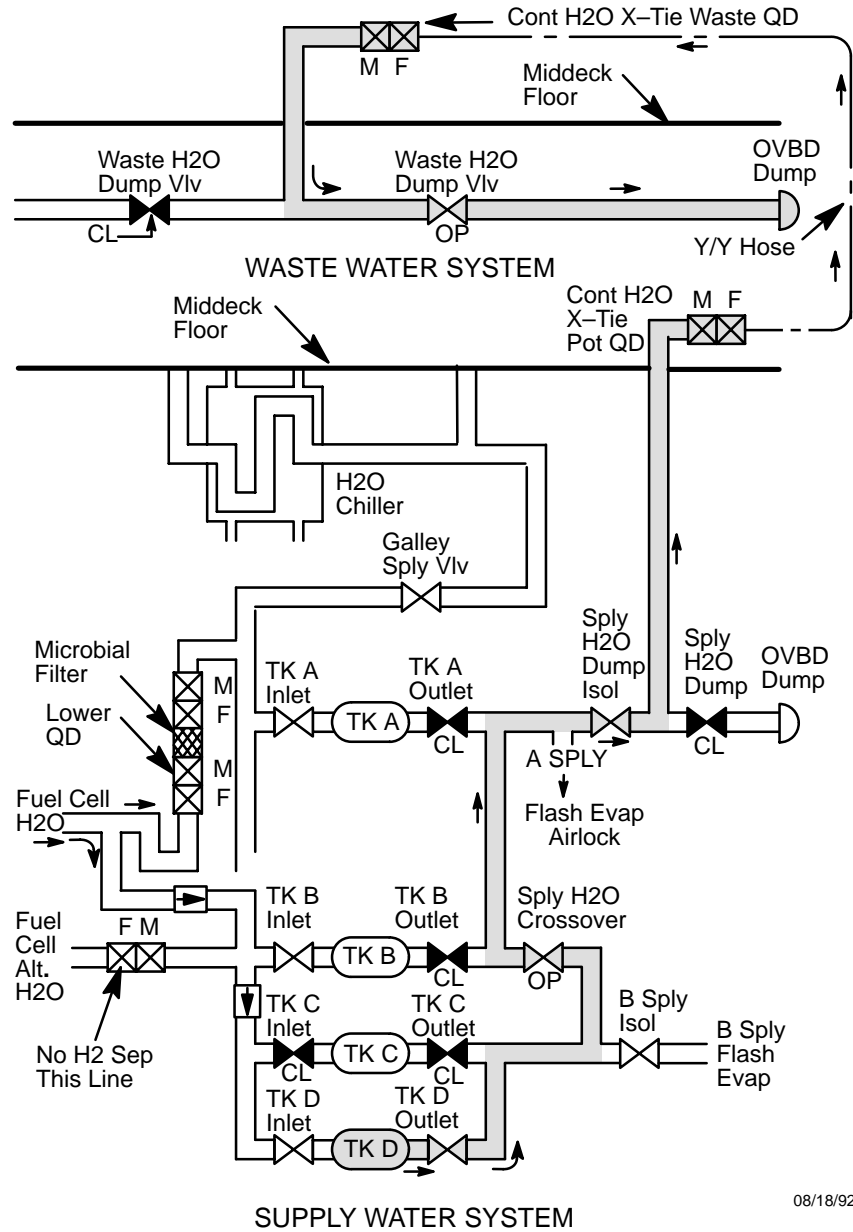
6. If TKC only dump desired:
 ML31C SPLY H2O TKD INLET - CL (tb-CL)
 OUTLET - CL (tb-CL)



08/18/92

SUPPLY WATER SYSTEM
TANK C DUMP SCHEMATIC

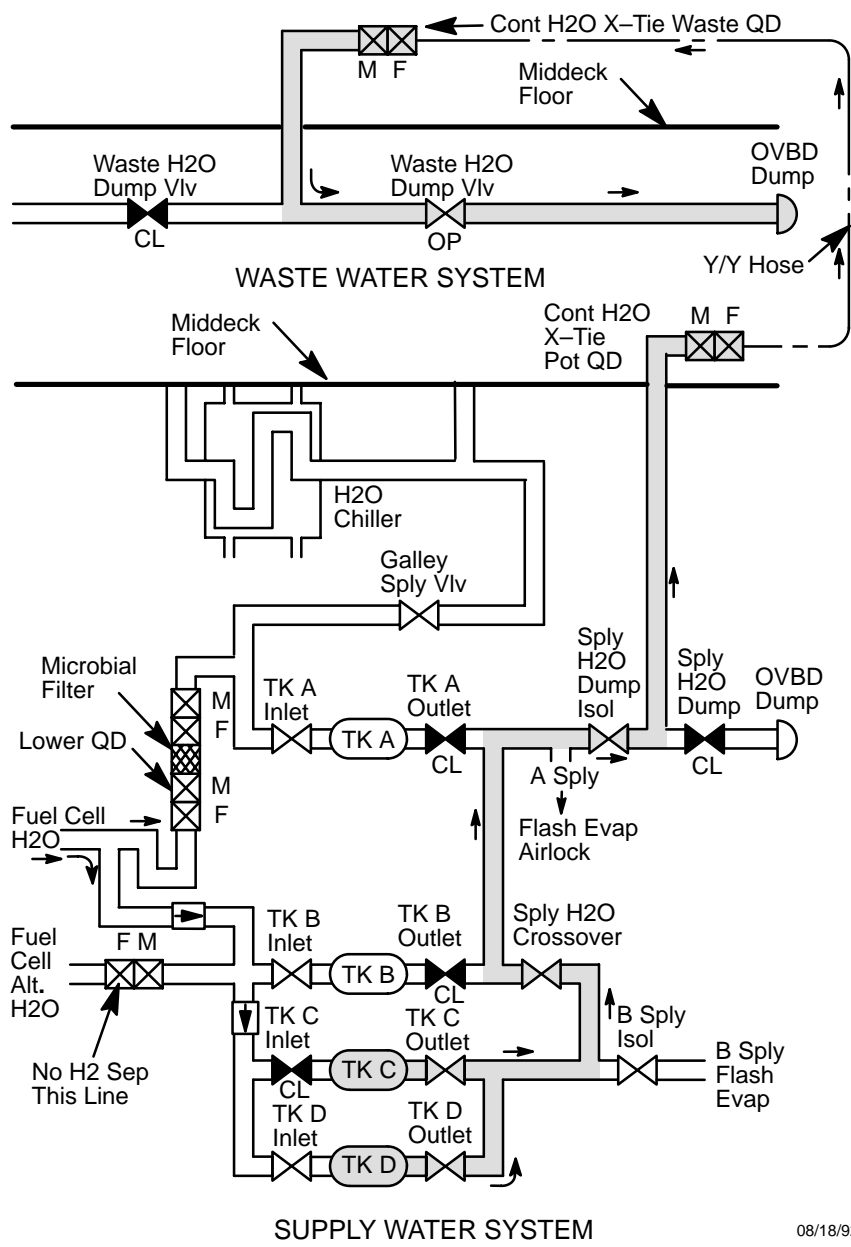
7. If TKD only dump desired:
 R11L SPLY H2O TKC INLET – CL (tb-CL)
 OUTLET – CL (tb-CL)



08/18/92

SUPPLY WATER SYSTEM
TANK D DUMP SCHEMATIC

8. If TKC,D dump desired, continue



TANK C,D DUMP SCHEMATIC

9. **SM 60 TABLE MAINT**

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O NOZ T A	0620520	60	250
B	0620519	60	250

CAUTION
WASTE H2O NOZ T A/B should not exceed 350

10. **SM 66 ENVIRONMENT**

11. WASTE DMP LN T 50

- * If T 50, enable 2nd Heater: *
- * ML86B:A *
- * cb MNB(MNA) H2O LINE HTR *
- * B(A) – cl *

- ML31C 12. WASTE H2O DUMP VLV ENA/NOZ HTR – ON
(DUMP VLV tb–CL)
CRT When WASTE H2O NOZ T A,B (two) 250,
continue

NOTE

If PASS SM not available, dump tank(s) using time supplied by MCC

- R11L 13. SPLY H2O DUMP ISOL VLV – OP (tb–OP)
ML31C 14. WASTE H2O DUMP VLV – OP (tb–OP)
CRT 15. SPLY H2O QTY C(D) decreasing
16. When SUPPLY H2O QTY C(D) at specified level
or specified time has elapsed:
ML31C WASTE H2O DUMP VLV – CL (tb–CL)
R11L SPLY H2O DUMP ISOL VLV – CL (tb–CL)
ML31C WASTE H2O DUMP VLV ENA/NOZ HTR –
OFF (DUMP VLV tb–bp)

- CRT 17. ✓ SPLY H2O QTY C(D) – not decr
 18. ✓ WASTE H2O NOZ T (A/B) – not incr

* If NOZ T incr: *
 * ML86B:A *
 * cb MNA WASTE H2O DUMP *
 * VLV/NOZ HTR – op *

19. SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O NOZ T A	0620520	-82	250
B	0620519	-82	250

- WCS 20. Disconnect Y/Y Hose from CONT H2O X-TIE
 POT and WASTE QDs
21. Stow hose, tape
- ML31C 22. WASTE H2O DUMP ISOL VLV – OP (tb-OP)
- R11L 23. SPLY H2O DUMP ISOL VLV – OP (tb-OP)
 XOVR VLV – CL (tb-CL)
 TKB OUTLET – OP (tb-OP)
24. Reconfigure TKs C & D as follows:
- If TKC dumped:
- SPLY H2O TKD INLET – OP (tb-OP)
 OUTLET – OP (tb-OP)
- If TKD dumped:
- SPLY H2O TKC INLET – OP (tb-OP)
 OUTLET – OP (tb-OP)
- If TKs C,D dumped:
 No reconfiguration reqd

**SUPPLY(WASTE) H2O PURGE
FROM DUMP LINE(S)**

(30 min)

OBJECTIVE: Purge water from supply(waste) dump line(s) to avoid freezing water in line(s) for heater failure(s), dump valve(s) failure, or loss of line/nozzle temperature insight

LOCATION: CONTINGENCY H2O X-TIE POT (WASTE) QD located on WCS outboard wall

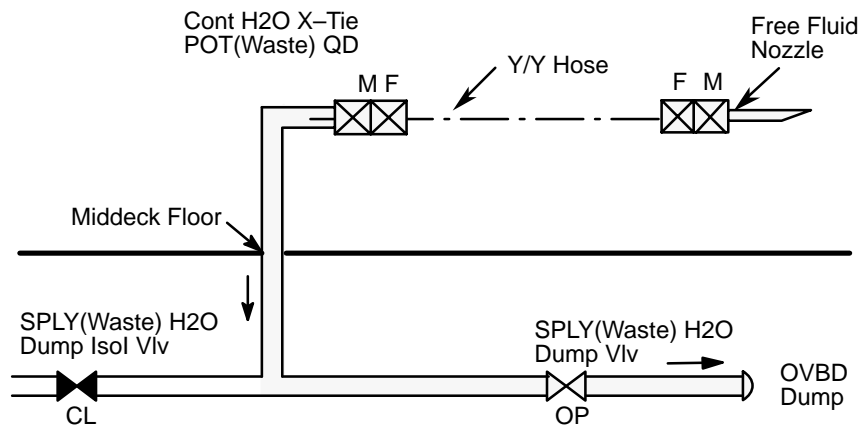
TOOLS REQD:

CHCK Free Fluid Nozzle
Y/Y Hose
MISC Towel

- R11L (ML31C) 1. SPLY(WASTE) H2O DUMP ISO VLV – CL (tb-CL)
2. SPLY(WASTE) DUMP VLV ENA/NOZ HTR – ON

CAUTION
SPLY(WASTE) H2O DUMP NOZ T should not exceed 350

- CRT 3. SM 66 ENVIRONMENT
When SPLY(WASTE) NOZ T (A/B) > 100(250), continue
- WCS 4. Connect one end of Y/Y Hose to Free Fluid Nozzle QD
5. Hold towel around Free Fluid Nozzle top to soak up water and connect free end of Y/Y Hose to CONT H2O X-TIE POT(WASTE) QD



- R11L
(ML31C)
WCS
6. SPLY(WASTE) H2O DUMP VLV – OP (tb–OP)
 7. ✓Free Fluid Nozzle tip for airflow and purge for 5 min or until MCC call
 8. ✓MCC to continue
- R11L
(ML31C)
9. SPLY(WASTE) H2O DUMP VLV – CL (tb–CL)
 10. SPLY(WASTE) H2O DUMP VLV ENA/NOZ
HTR – OFF
 11. ✓SPLY(WASTE) H2O DUMP VLV tb – bp

NOTE

Supply(Waste) H2O Dump Isolation Valve will remain close thru EOM unless notified by MCC

- WCS
12. Disconnect Y/Y Hose from CONT H2O X–TIE POT(WASTE) QD and Free Fluid Nozzle. Stow tools
 13. Report results to MCC

VACUUM VENT CONTINGENCY OPERATION (30 min)

OBJECTIVE: In event of failed close Vacuum Vent Isolation Valve and clogged valve orifice. Procedure allows H2 gas from hydrogen separator and odors from wet trash to be vented overboard. Interconnects Vacuum Vent System to Waste Water Dump System

NOTE

No crew insight into clogged orifice. Procedure done on MCC call.

Vacuum Vent Isolation Valve has orifice in valve plate that allows 3-lb/hr flow when valve closed. Orifice may freeze w/moisture from Wet Trash/WCS

LOCATION: CONT H2O X-TIE WASTE QD on outboard WCS compartment wall and WCS Vacuum Vent QD (TP126) on WCS compartment lower pnl

TOOLS REQD:

TOOL	Gray Tape
CHCK	Free Fluid Nozzle
	Y/Y Hose

WARNING

Terminate all WCS Commode Ops until 5 min after IFM complete. WCS Commode Ops will decrease Vacuum Vent System volume and increase H2 concentration

PURGE WATER FROM LINE

NOTE

Terminate WCS Urinal Ops during
purge to prevent additional liquid
in Waste Water lines

- ML31C 1. WASTE H2O DUMP VLV ENA/NOZ HTR – ON
(tb–CL)
✓WASTE H2O DUMP ISOL VLV – OP (tb–OP)

CAUTION

WASTE H2O DUMP NOZ T should
not exceed 350

- WCS 2. ✓FAN SEP same as HOSE BLOCK
✓MODE – AUTO
✓CRADLE – AUTO
Unstow hose
✓Airflow
✓WCS ON Lt – ON

3. SM 66 ENVIRONMENT

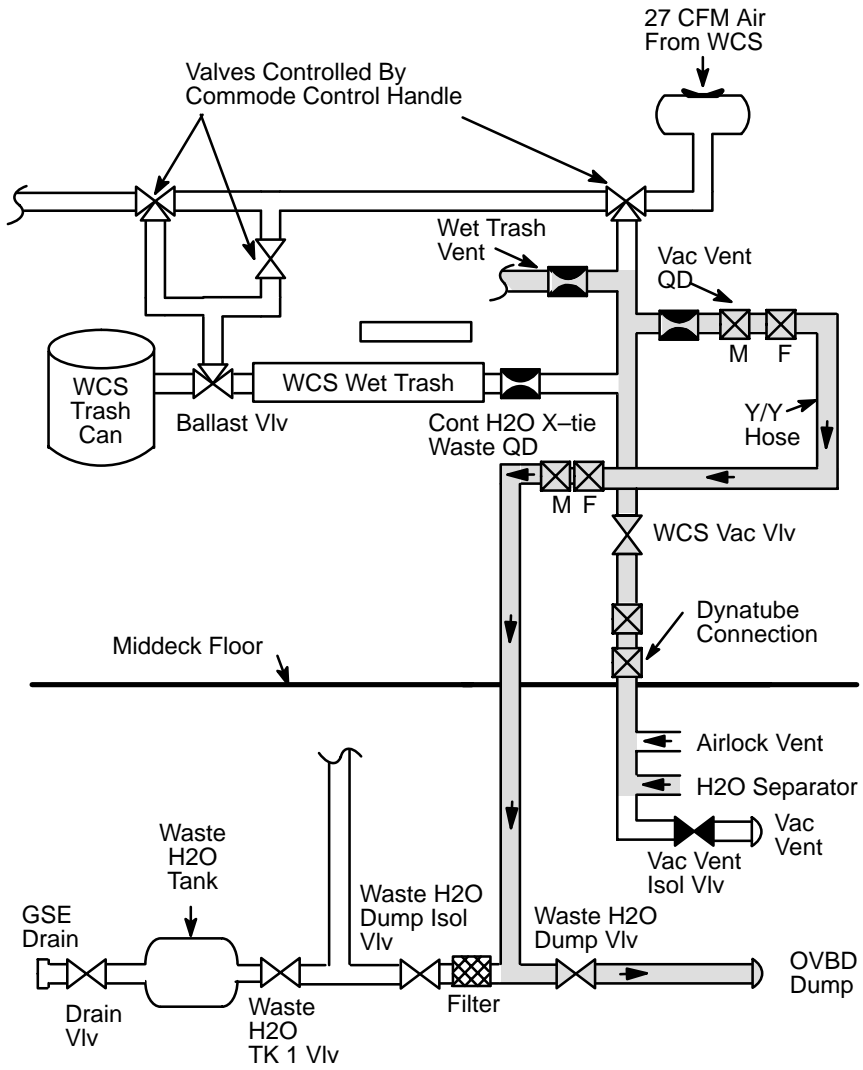
- ML31C 4. When WASTE NOZ T A,B (two) 250 continue
WASTE H2O TK1 VLV – CL (tb–CL)
DUMP VLV – OP (tb–OP)
5. Wait 5 min
6. Connect one end of Y/Y Hose to Free Fluid
Nozzle
WCS 7. Connect free end of Y/Y Hose to CONT H2O
X–TIE WASTE QD

NOTE

FAN SEP will run for ~30
sec after hose stowage

- ML31C 8. Stow hose in cradle
✓WCS ON Lt – OFF
9. WASTE H2O DUMP VLV – CL (tb–CL)
TK1 VLV – OP (tb–OP)
10. Wait 5 min
11. Disconnect Y/Y Hose from Free Fluid Nozzle

VACUUM VENT SYSTEM



INTERCONNECT VACUUM VENT AND WASTE WATER DUMP SYSTEMS

- WCS 12. Connect free end of Y/Y Hose to Vacuum Vent QD (TP126)
- ML31C 13. ✓WASTE H2O DUMP VLV – OP (tb–OP)
WASTE H2O DUMP VLV ENA/NOZ HTR – OFF (✓tb–bp)
- 14. ✓MCC for Waste Collector Pressure

NOTE

WCS Commode Ops can resume when Waste Collector Pressure 1 psia for 5 min. If necessary, apply light downward pressure to WCS slide gate to assist it in sealing due to reduced flowrate

- WCS 15. Route Y/Y Hose to avoid interference w/egress path and emergency egress slide. Secure hose w/Gray Tape
- 16. Stow tools, towel

CONFIGURE FOR WASTE WATER DUMP

- WCS 17. Disconnect Y/Y Hose QD from CONT H2O X–TIE WASTE QD
- ML31C 18. WASTE H2O DUMP VLV ENA/NOZ HTR – ON – CL (tb–CL)
ISOL VLV – OP (tb–OP)
WASTE H2O DUMP VLV ENA/NOZ HTR – OFF (✓tb–bp)
- 19. Go to SUPPLY/WASTE WATER DUMP (ORB OPS, ECLS)

RECONFIGURE FOR CONTINGENCY VACUUM VENT OPERATION

- 20. Repeat steps 1–11
- 21. Reconnect Y/Y hose QD to CONT H2O X–TIE WASTE QD. Perform steps 13,14
- 22. Stow tools

WASTE H2O SYS BACKUP DUMP

(45 min Setup)

OBJECTIVE: Dump waste water thru supply water dump line.

Procedure assumes failure of waste water system dump vlv

LOCATION: CONT H2O X-TIE POT and WASTE QDs are located on outboard WCS wall

TOOLS REQD:

TOOL Gray Tape

CHCK Y/Y Hose

CAUTION

SPLY H2O DUMP ISOL VLV will remain closed until end of mission. Supply water will be dumped via Flash Evaporator System (FES)

- R11L 1. SPLY H2O DUMP ISOL VLV – CL (tb–CL)
ML31C 2. ✓WASTE H2O TK1 VLV – OP (tb–OP)
3. Connect one end of Y/Y Hose to CONT H2O X-TIE POT QD and other end to CONT H2O X-TIE WASTE QD
ML31C 4. ✓WASTE H2O DUMP ISOL VLV – OP (tb–OP)
5. SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
SUPPLY H2O NOZ T A B	0620440	90	250
	0620434	90	250

CAUTION
SUPPLY H2O NOZ T A/B should
not exceed 350

6. SM 66 ENVIRONMENT

7. ✓ SUPPLY H2O DMP LN T ≥ 65,

- * If T 65, enable 2nd Heater: *
- * ML86B:A *
- * cb MNB(MNA) H2O LINE HTR *
- * B(A) – cl *

R11L 8. SPLY H2O DUMP VLV ENA/NOZ HTR – ON
(✓DUMP VLV tb–CL)

CRT 9. When SUPPLY H2O NOZ T A,B (two) 250,
continue

NOTE

If PASS SM not available, dump
tank on MCC call

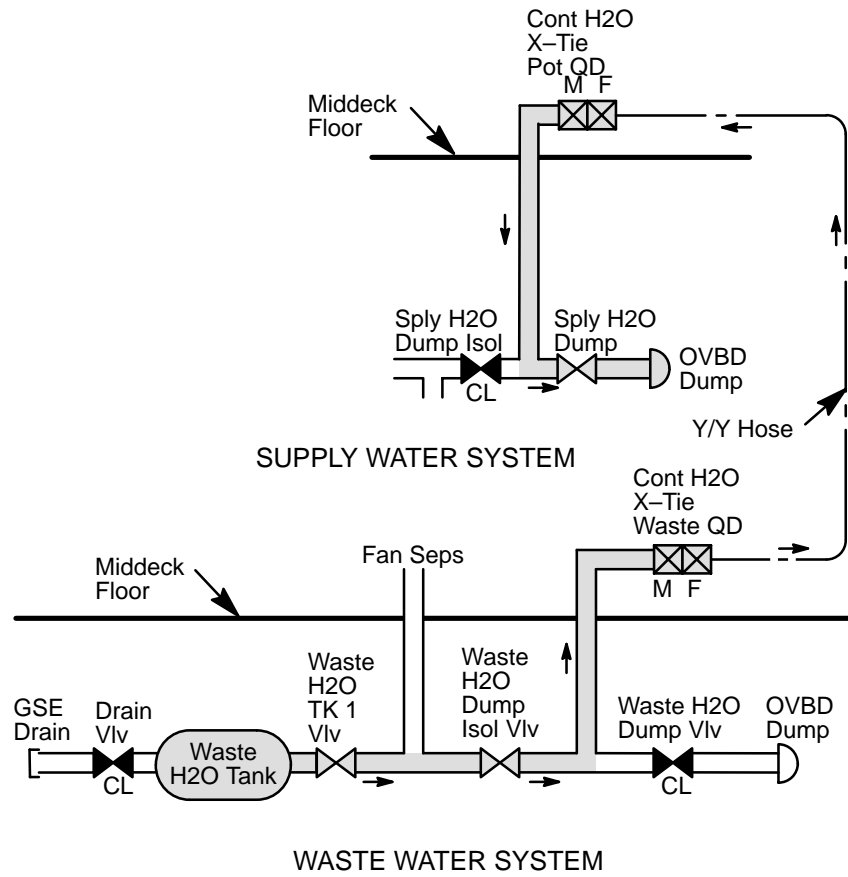
R11L 10. SPLY H2O DUMP VLV – OP (tb–OP)

CRT 11. ✓ WASTE H2O QTY 1 decreasing (~1%/min)

12. If 'S66 H2O', H2O SPLY NOZ T A(B) '↓' then,
SPLY H2O DUMP VLV – cl (tb–CL)

CRT 13. When H2O SPLY NOZ T A,B (two) > 250,
continue

R11L 14. SPLY H2O DUMP VLV – OP (tb–OP)



- 15. When WASTE H2O QTY 1 at level specified by MCC, or specified time has elapsed, continue
 R11L SPLY H2O DUMP VLV – CL (tb–CL)
 ML31C WASTE H2O DUMP ISOL VLV – CL (tb–CL)
- 16. When SPLY H2O NOZ T A,B (two) > 250, continue
 R11L SPLY H2O DUMP VLV ENA/NOZ HTR – OFF
 (✓DUMP VLV tb–bp)
- 17. ✓WASTE H2O QTY 1 not decr
 CRT
- 18. ✓SUPPLY H2O NOZ T A,B (two) not incr

* If SPLY H2O NOZ T incr: *

* ML86B:A *

* cb MNC SPLY H2O DUMP *

* VLV/NOZ HTR – op *

SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
H2O SUPPLY NOZ T A	0620440	-82	250
B	0620439	-82	250

- 19. Disconnect Y/Y Hose from CONT H2O X–TIE POT and WASTE QDs
 WCS
- 20. WASTE H2O DUMP ISOL VLV – OP (tb–OP)
 ML31C
- 21. Stow hose, Gray Tape
- 22. After last waste water dump, perform SUPPLY (WASTE) H2O PURGE FROM DUMP LINE(s), W–48

WCS FAILED COMMODE CNTL VLV

(1:30 hr)

OBJECTIVE: Access WCS Commode cntl vlv linkage, test, and manually operate if reqd

LOCATION: WCS

TOOLS REQD:

TOOL	Gray Tape
	Inspection Mirror
	Large Screwdriver
MISC	WCS Linkage Tool
	Pen Light

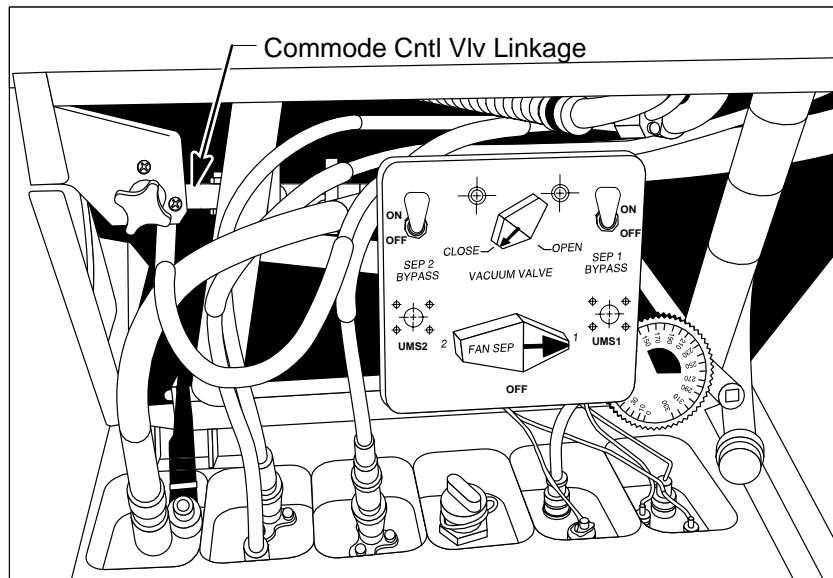
NOTE

No WCS ops until procedure complete

- | | | |
|---------|----|--|
| ML86B:B | 1. | cb MNA,B WCS CNTLR (two) – op |
| MA73C:E | 2. | cb AC1,2 WCS FAN SEP 1,2 (six) – op |
| WCS | 3. | VAC VLV – CL |
| | 4. | Remove WCS kickplate (nine fasteners, large Screwdriver), stow |
| | 5. | Locate WCS Commode Cntl vlv linkage: |
| | a. | Start from WCS Vacuum vlv sw |
| | b. | Locate vlv housing immediately aft of this sw |
| | c. | WCS Commode Cntl vlv linkage extends horizontally inboard from vlv assembly |
| | d. | Commode Cntl vlv linkage is fwd–most, larger, of two double–U–joint linkages |

CAUTION

Ignore second (aft–most) linkage which also extends from WCS Commode Cntl vlv



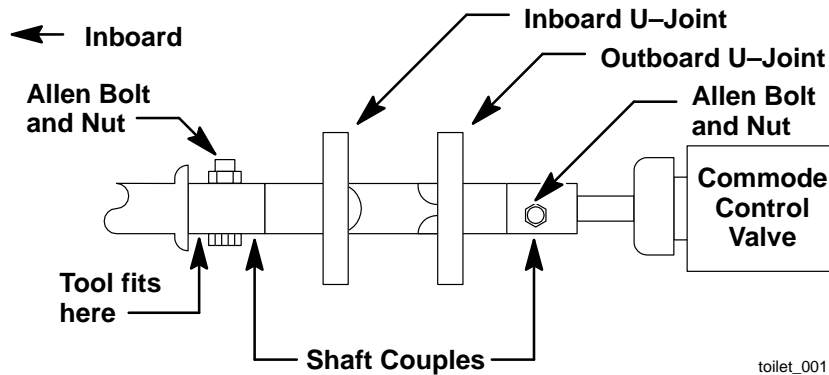
toilet_002

WCS 6. MODE – COMMODE/MANUAL/EMU

NOTE

In following steps, cw is oriented looking outboard along axis of Commode Cntl vlv linkage

7. Observe Commode Cntl vlv linkage, would normally rotate cw during this step:
WCS COMMODE CNTL – UP
8. Report observation to MCC
9. If Commode Cntl vlv linkage does not rotate, on MCC call, continue
10. Locate Allen bolt and nut fastening inboard U-joint to Command Cntl vlv (~3-1/2 in inboard of vlv and 4 in aft of SEP 2 Bypass sw)



toilet_001

11. Slide WCS Linkage Tool upwards onto shaft to immediate left of Allen Bolt
12. Rotate Commode Cntl vlv linkage cw 1/4 turn (90 deg) against stop; do not overtorque
13. VAC VLV – OP (wait 20 sec)
14. COMMODE CNTL – FORWARD
15. If cabin dP/dT Alarm:
 - a. WCS VAC VLV – CL
 - b. COMMODE CNTL – BACK
 - c. ✓MCC
16. If no cabin dP/dT Alarm, continue
17. COMMODE CNTL – BACK
18. Rotate Commode Cntl vlv linkage ccw 1/4 turn (90 deg) against stop, do not overtorque

CAUTION

If Mode Cntl vlv will not rotate in next step, ensure Commode Cntl vlv linkage fully ccw against stop

19. MODE – AUTO
- ML86B:B 20. cb MNA,B WCS CNTLR (two) – cl

- MA73C:E
WCS
21. cb AC1,2 WCS FAN SEP 1,2 (six) – cl
 22. MODE – COMMODE/MANUAL/EMU
 23. Rotate Commode Cntl vlv linkage cw 1/4 turn (90 deg) against stop; do not overtorque (wait 20 sec)
 24. COMMODE CNTL – FORWARD
 25. ✓WCS airflow at both commode and urinal. Report to MCC
 26. COMMODE CNTL – BACK
 27. – DOWN
 28. Rotate Commode Cntl vlv linkage ccw against stop
 29. MODE – AUTO
 30. Stow tools, except WCS Linkage Tool

REVISED WCS OPERATING PROCEDURES

CAUTION

This procedure bypasses normal interlocks which prevent opening a cabin leak path thru WCS. Before moving COMMODE CNTL – FORWARD, be sure Commode Cntl vlv linkage has been rotated 90 deg cw against stop

TO USE WCS:

1. MODE – COMMODE/MANUAL/EMU
2. Rotate Commode Cntl vlv linkage cw 1/4 turn (90 deg) against stop; do not over torque (wait 20 sec)
3. COMMODE CNTL – UP
4. – FORWARD

TO SECURE WCS:

1. COMMODE CNTL – BACK
2. – DOWN
3. Rotate Commode Cntl vlv linkage ccw 1/4 turn (90 deg) against stop; do not overtorque
4. MODE – AUTO

WCS FAN SEP FAILURE (FAILED URINAL)

(45 min)

OBJECTIVE: Recover use of urinal in event of fan separator failure

LOCATION: WCS

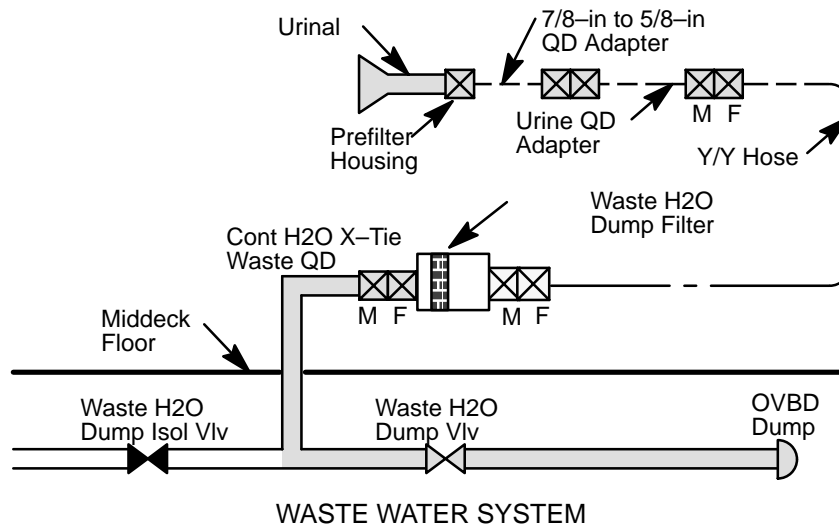
TOOLS REQD:

BOB Waste H2O Dump Filter (WWD)
CHCK Y/Y Hose
MISC Urine QD Adapter
7/8-in to 5/8-in QD Adapter
Individual Urinal Funnel
Prefilter Housing Block
Towel (WCS)

NOTE

First use, perform steps 1–17;
thereafter, perform steps 6–17

ML31C 1. WASTE H2O DUMP ISOL VLV – CL (tb-CL)



- WCS
2. Connect one end of Y/Y Hose to WASTE H2O DUMP FILTER
 3. Connect WASTE H2O DUMP FILTER to CONT H2O X-TIE WASTE QD
 4. Disconnect urinal, if installed, and prefilter housing from WCS line at QD

NOTE

Adapters in steps 5,6 stowed together and may not require assembly

5. Connect 7/8-in to 5/8-in QD Adapter to Urinal Prefilter housing
6. Connect Urinal QD Adapter to 7/8-in to 5/8-in QD Adapter
7. Attach Individual Urinal Funnel to Prefilter housing
8. SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O NOZ T A B	0620520	60	250
	0620519	60	250

CAUTION
WASTE H2O NOZ T should not exceed 350

9. SM 66 ENVIRONMENT

10. ✓WASTE DMP LN T 50

- * If T 50, enable 2nd Heater: *
- * ML86B:A *
- * cb MNB(MNA) H2O LINE HTR *
- * B(A) – cl *

11. WASTE H2O DUMP VLV ENA/NOZ HTR – ON
(✓DUMP VLV tb-CL)
- CRT 12. When WASTE H2O NOZ T A,B (two) 250, continue
13. Connect free end of Y/Y Hose to Urine QD Adapter
- ML31C 14. WASTE H2O DUMP VLV – OP (tb-OP)

WCS FAN SEP 1(2) CLEARING

(30 min Setup)

OBJECTIVE: Clear flooded Fan Sep 1(2) by reducing Fan Sep outlet pressure by opening outlets to vacuum using Waste Water Dump System

NOTE

Procedure should be performed only if both Fan Seps fail due to flooding

LOCATION: WCS

TOOLS REQD:

MISC Towels (as reqd)
Trash Bag Liner
Goggles, Gloves, & Mask (CCK)

1. Consult MCC for possible Waste H2O dump if:
WASTE QTY 1 58%
2. SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O NOZ T A	0620520	60	250
B	0620519	60	250

3. SM 66 ENVIRONMENT

✓H2O WASTE DMP LN T 50

* If H2O WASTE DMP LN T < 50, *
* enable 2nd heater: *
* ML86B:A *
* cb MNB(MNA) H2O LINE HTR *
* B(A) – CL *

- ML31C
4. WASTE H2O DUMP VLV ENA/NOZ HTR – ON
✓VLV – CL (tb-CL)
 5. When H2O WASTE NOZ T A,B (two) exceed 250 (~10 min), continue
 6. WASTE H2O TK1 VLV – CL (tb-CL)
✓DUMP ISOL VLV – OP (tb-OP)
✓VLV – OP (tb-OP)

W-65

IFM/ALL/GEN E

- CCK 7. Don Goggles, Gloves, Mask
- WCS 8. Remove odor/bacteria filter and install towel(s) loosely in filter cavity (absorbs backflowing liquid)
- WCS 9. ✓FAN SEP same as HOSE BLOCK
 - ✓MODE – AUTO
 - ✓CRADLE – AUTO
 - Unstow hose
 - ✓Airflow
 - ✓WCS ON Lt – ON
- 10. Allow fan to run until it clears (runs faster, more noise, more airflow)

NOTE

FAN SEP will run for ~30
sec after hose stowage

- 11. Stow hose in cradle
 - ✓WCS ON Lt – OFF
- 12. Repeat steps 9 to 11 for alternate Fan Sep if necessary. See WCS (Cue Card) (ORB OPS, FAN SEP SWITCHING)
- 13. WASTE H2O DUMP VLV – CL (tb-CL)
ENA/NOZ HTR – OFF
(tb-bp)
- CRT 14. ✓WASTE H2O NOZ T A,B (two) – not incr

- * If NOZ T incr: *
- * ML86B:A *
- * cb MNA WASTE H2O DUMP *
- * VLV/NOZ HTR – op *

15. SM 60 TABLE MAINT

PARAMETER NAME	PARA ID	SM ALERT	
		LOW	HIGH
WASTE H2O NOZ T A	0620520	-82	250
B	0620519	-82	250

WCS 16. WASTE H2O TK1 VLV – OP (tb–OP)
 17. ✓FAN SEP same as HOSE BLOCK

- ✓MODE – AUTO
- ✓CRADLE – AUTO
- Unstow hose
- ✓Airflow
- ✓WCS ON Lt – ON
- Run fan for 2 min, then:

NOTE

FAN SEP will run for ~30
 sec after hose stowage

- Stow hose in cradle
 - ✓WCS ON Lt – OFF
18. Remove towels from odor/bacteria filter cavity,
 place towels in trash bag liner and stow in wet
 trash
19. Replace odor/bacteria filter
20. Resume normal WCS ops

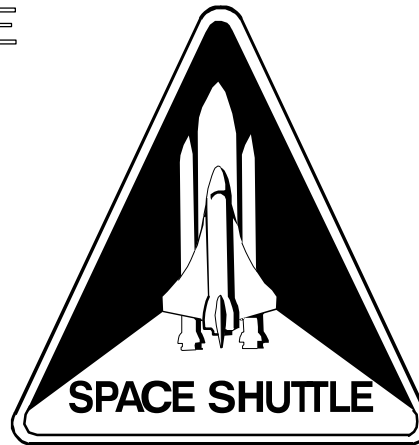
Sections X, Y, & Z
Intentionally
Omitted

W-68

IFM/ALL/GEN E

Space Shuttle Program
FLIGHT DATA FILE

GENERIC, REV E



IFM
CHECKLIST

STS
ALL

Flight Cover (trim bottom to expose tabs)