

27KC БИО — Part 1

**INFLIGHT MAINTENANCE
INTRAVEHICULAR ACTIVITY
INSTALLATION/DEINSTALLATION
FLIGHT 2A.2B**

SM/FGB.1

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INTRODUCTION

This crew procedures book covers 2A.2B Inflight Maintenance Intravehicular Activity Installation/Deinstallation Tasks and contains information for the crew on the inflight maintenance and repair operations.

The book contents and presentation format are intended for fully-trained crew members.

These crew procedures may be updated pending systems modification and procedure validation at simulators and training facilities.

ACRONYMS AND ABBREVIATIONS

бл	-	unit
б/и	-	crew procedures
БКС	-	(onboard) cable network
БЖ	-	liquid unit (Elektron-VM system component)
ВКЛ	-	activate, ON
ВЫКЛ	-	deactivate, OFF
ДнаЗ	-	report to MCC
ДпоУЗ	-	√ MCC
загл	-	plug, cap
ЗАКР	-	close, closed
кбл	-	cable
клав	-	pushbutton
КРЛ	-	command radio link
М	-	torque force
н/с	-	off-nominal situation
ОТКЛ	-	deactivate, OFF
ОТКР	-	to open, open (state)
п	-	a section of crew procedures
П.О.	-	TBD
пан	-	panel
ПоУЗ	-	on MCC Go
ПоУЗ-М	-	on MCC-M Go
ПоУЗ-Х	-	on MCC-H Go
пр	-	instrument, device
ПСС	-	C&W panel

РБС	-	onboard power outlet
рзм	-	connector
рис	-	figure
с/с	-	comm pass
СК	-	Orlan-M suit
СМ	-	Service Module
СНТ	-	voltage and current stabilizer
ТК	-	Soyuz transport vehicle
ТМБ	-	switch, sw
ТОР	-	inflight maintenance and repair operations
ЦУП	-	Mission Control Center, MCC
ЦУП-М	-	MCC-M
ЦУП-Х	-	MCC-H

SYMBOLS

<input type="checkbox"/>	-	illuminated
<input type="checkbox"/>	-	not illuminated
√	-	check (in case of discrepancy, attempt a corrective action one time only)
→	-	set physical device into designated position(state)
↔	-	disconnect
→ ←	-	connect
Ⓢ	-	sw → On (i.e. up relative to label on panel)
Ⓢ	-	sw → Off (i.e. down relative to label on panel)
↖	-	verify
↻	-	adjust by rotating
↻	-	rotate clockwise
↻	-	rotate counterclockwise
↻	-	rotate clockwise to stop
↻	-	rotate counterclockwise to stop
15:46:28	-	15 hours 46 minutes 28 seconds
00:00:28	-	28 sec
00:46:00	-	46 min
15:00:00	-	15 hr
* * * *	-	off-nominal situation
* * * *		

1. GENERAL INSTRUCTIONS

1.1. CREW RESPONSIBILITIES

While performing operations, the crew is responsible for the following actions:

1. Perform operations per these crew procedures and **MCC** instructions (comm passes or radiograms), in accordance with the crew functional responsibilities and current status of the onboard systems.
2. Inspect work area.
3. Provide maximum comfort within work area.
4. Prepare required tools and hardware, and secure them within work area.
All fasteners can be found in bags tethered within installation area.
5. Inspect equipment to be installed (units, cables, etc.) for absence of visible damage.
Report to MCC, if paint coating, housing, connector(s) or cable(s) of the inspected unit appear to be damaged
6. Ensure prior powerdown of the systems, units, devices to be worked on.
7. Carry out required IFM operations.
8. After IFM task is complete, verify the hardware installation was done correctly.
9. Record the time spent to perform procedure or particular activity.
10. **Report** work completion **to MCC** .
Post-IFM powerup of devices, units, as well as activation checks are conducted **on MCC Go**
11. Inspect work area.
12. Verify all used tools are still available and stow them in nominal storage locations.
13. Stow all removed hardware in designated storage locations.
14. When there is a deviation from nominal systems operation, the crew is responsible for the following actions:
 - record the time when the deviation (malfunction) was detected;
 - record the nature of the deviation (malfunction);
 - prepare a report
 - **report to MCC** at the earliest available comm pass.
15. Upon detection of an off-nominal situation, fully documented in these crew procedures, the crew may undertake independent actions in compliance with these crew procedures in order to troubleshoot, eliminate or localize the problem with subsequent **report to MCC** at earliest available comm pass.

1.2. SAFETY PRECAUTIONS

This document contains crew procedures which were developed with a view to ensure crew safety and maintain operability of the onboard systems.

While performing procedures, the crew is responsible for the following actions:

1. All activities are performed **on MCC Go**.
2. During units installation, avoid hitting them against station structures.
3. During IFM activities, all relevant systems, units, devices must be powered down.
4. During IFM activities, use only hardware, tools, and protective devices designated either by these crew procedures or by **MCC**.
5. Avoid kinks of hoses and air ducts.
6. Tighten threaded connections smoothly, without jerking.
7. If connectors are mated by one crew member, the other crew member must check the connection(s) made were correct.
Mate connectors as appears convenient, unless the sequence is specially indicated.
8. Mating of powered connectors must be performed with extreme care in AOS **on MCC Go**
When mating powered connectors:
 - properly align cable and unit connectors, checking if keypin positions are correct;
 - if necessary, align keypins by rotating cable connector shell;
 - move cable connector until its captive nut engages first thread of unit connector;
 - do not skew, tighten captive nut by hand to stop.
9. When working with equipment (control panels, hoses, cables) outfitted with protective caps or covers:
 - remove caps and covers prior to IFM activities;
 - re-install caps and covers after IFM activities completion.
10. When installing cables, avoid sharp bends or kinks of cables or cables harnesses.
11. Tools and hardware, used during IFM activities, must be reliably secured:
12. Upon detection of an off-nominal situation, not documented in these crew procedures, the crew is responsible for the following actions:
 - stop working with the system;
 - record time when the off-nominal situation was detected;
 - record the nature of the off-nominal situation;
 - prepare a report;
 - report to MCC** at earliest available comm pass.

13. When working behind panels FGB:

panels may not be open in more than one compartment at a time.

no more than three panels in any one of the compartments, may be open simultaneously.

All panels must adhere to the following recovery times:

	Time open (minutes)		
	40	60	120
Panel quantity	Time closed (minutes)		
1	10	15	30
2	20	30	60
3	30	45	90

All panels must remain closed during the (temperature conditions) recovery period

2. ELECTRICAL POWER SYSTEM (СЭП)

Charge/Discharge Units (3PY) vs. Battery Units Correspondence Table

3PY #	800A Unit	ПТАБ-1М Unit	БУПТ-1М Unit
3PY 1	A101	A301	A401
3PY 3	A103	A303	A403
3PY 5	A105	A305	A405

2.1. STORAGE BATTERY (800A) INSTALLATION

2.1.1. STORAGE BATTERY (800A) UNIT A101

(01:00:00)

NOTE

Storage battery (800A) unit A101 should be installed prior to the installation of the delivered ПТАБ-1М unit A301.

Required Tools and Hardware:

Storage battery **800A** unit **A101**

Flashlight

2A.2B Special Tools:

10 mm Combo Wrench (two)

12 mm Combo Wrench

4" Standard Screwdriver

Wire Cutters

On MCC Go

1. Open panel 226 (Figure 2.1.-1)

INSTALLATION

2. Photograph the area before installation
3. Completely remove restraining bands of БКС connectors, mated to the unit
4. Completely loosen air duct seal retract screw (one) located on the frame (see Figure 2.1.-2.)
5. Remove and discard nuts (three) from hold-down bolts (three) on the upper bracket between battery unit A101 and ПТАБ unit
6. Untighten (not completely) hold-down bolts (three) on the upper bracket
7. Install new battery unit
8. Secure unit in place, using spring fixer (see Figure 2.1.-2.)
9. Mate onboard cable connectors to the unit connectors (in the specified sequence):
 - X1325/42 →← X1325/42
 - X92/100 →← X92/100
 - X90/100 →← X90/100
 - X94/100 →← X94/100
 - X93/100 →← X93/100
10. Completely tighten air duct seal retract screw (one) located on the frame (see Figure 2.1.-2.)
11. Tighten hold-down bolts (three) on the upper bracket
12. Photograph the area after installation
13. Close panel

Report completion to MCC

2.1.2. STORAGE BATTERY (800A) UNIT A103

(00:45:00)

NOTE

Storage battery unit A103 should be installed after the installation of the delivered БУПТ-1М units.

Required Tools and Hardware:Storage battery **800A** unit **A103**

Flashlight

2A.2B Special Tools:

12 mm Combo Wrench

4" Standard Screwdriver

Wire Cutters

On MCC Go

1. Open panel 227 (Figure 2.1.-1)

INSTALLATION

2. Photograph the area before installation
3. Completely remove restraining bands of БКС connectors, mated to the unit
4. Completely loosen air duct seal retract screws (two) on frame (see Figure 2.1.-2.)
5. Install new battery unit
6. Secure unit in place, using spring fixer (see Figure 2.1.-2.)
7. Mate onboard cable connectors to the unit connectors (in the specified sequence):
 - X1325/42 →← X1325/42
 - X92/100 →← X92/100
 - X90/100 →← X90/100
 - X94/100 →← X94/100
 - X93/100 →← X93/100
8. Completely tighten air duct seal retract screws (two) on frame (see Figure 2.1.-2.)
9. Photograph the area after installation
10. Close panel

Report completion to MCC

2.1.3. STORAGE BATTERY (800A) UNIT A105

(01:00:00)

Required Tools and Hardware:Storage battery **800A** unit **A105**

Flashlight

2A.2B Special Tools:

8 mm Combo wrench

12 mm Combo wrench

4" Standard Screwdriver

Wire cutters

On MCC Go

1. Open panel 227 (Figure 2.1.-1)
2. Photograph the area before installation
3. Remove panel located on the vent duct by removing bolts (four) → discard
4. Install screws (four) from bag tethered to frame into bolt hole (four) and tighten until flush

INSTALLATION

5. Completely loosen air duct seal retract screws (two) on frame (see Figure 2.1.-2.)
6. Install new battery unit
7. Secure unit in place, using spring fixer (see Figure 2.1.-2.)
8. Mate onboard cable connectors to the unit connectors (in the specified sequence):
 - X1325/42 →|← X1325/42
 - X92/100 →|← X92/100
 - X90/100 →|← X90/100
 - X94/100 →|← X94/100
 - X93/100 →|← X93/100
9. Completely tighten air duct seal retract screws (two) on frame (see Figure 2.1.-2.)
10. Photograph the area after installation
11. Close panel

Report completion to MCC

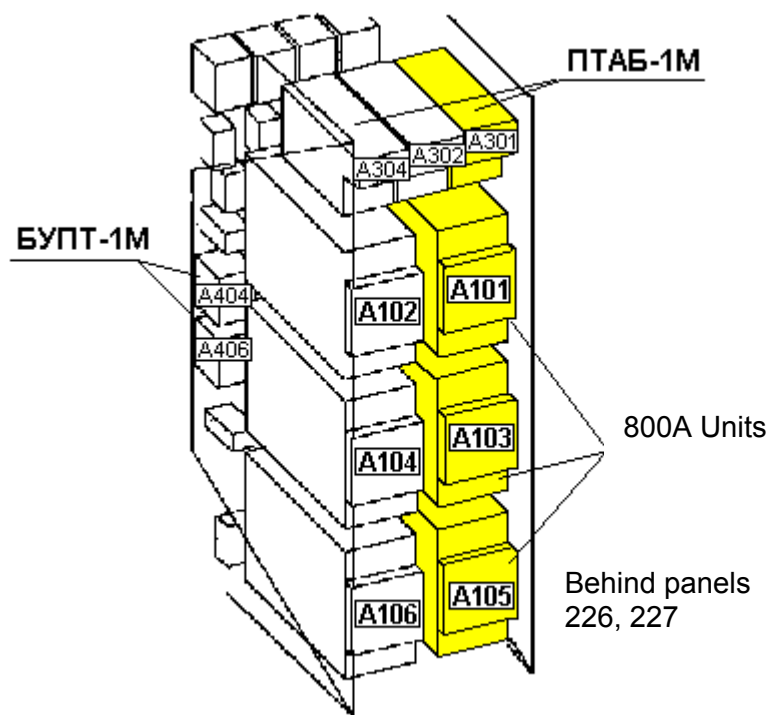
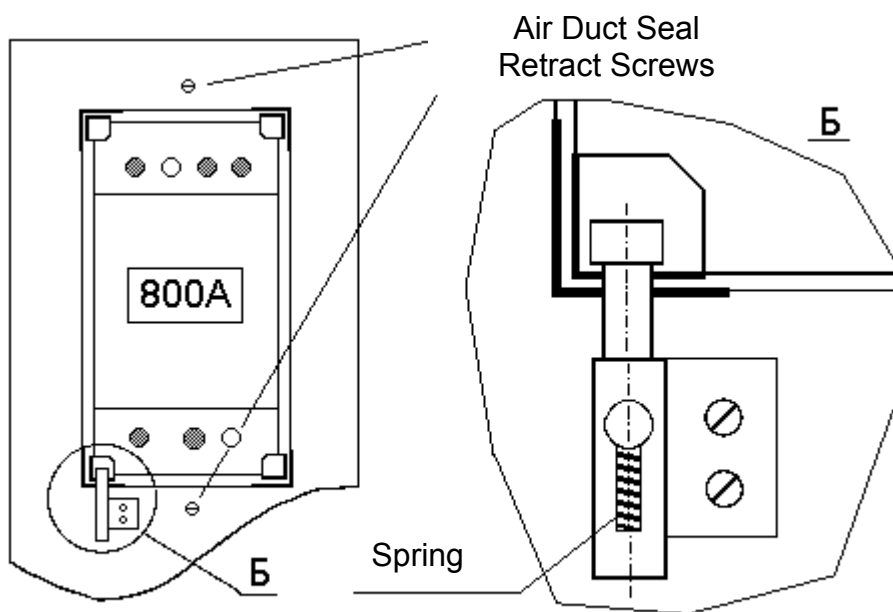


Figure 2.1.-1. 800A Units Location Diagram



800A Units (A101, A103, A105)

Figure 2.1.-2. 800A Unit Installation and Fastening Diagram

2.2. ПТАБ-1M INSTALLATION

2.2.1. ПТАБ-1M UNIT A301 INSTALLATION

(00:45:00)

Required Tools and Hardware:

ПТАБ-1M unit A301

Flashlight

2A.2B Special Tools:

Ratchet 1/4" Drive

10" Extension, 1/4" Drive

10 mm Socket, 1/4" Drive

12 mm Socket, 1/4" Drive

14 mm Socket, 1/4" Drive

10 mm Combo Wrench

Torque Wrench (10-50 in-lbs)

Wire Cutters

Don anti-static wrist tether

Fastening: unit – M8 bolts (four), ground strap – M6 nut, all fasteners are stowed in bag

1. **On MCC Go**, open panel 226 (see Figure 2.1.-1.)

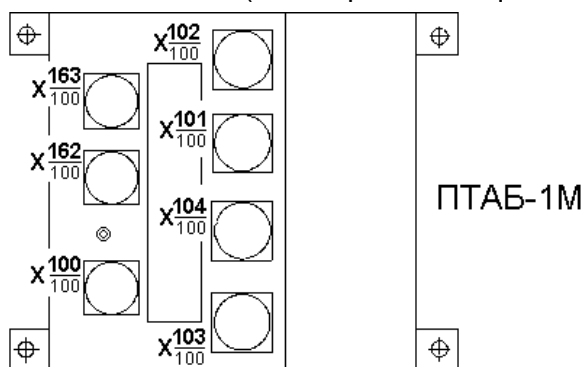
NOTE

Cable connectors X103/100, X104/100, X162/100, X163/100 are powered — 28 V

INSTALLATION

2. Photograph the area before installation
3. Install unit
4. Using 12 mm and 14 mm sockets, tighten M8 bolts (four)
5. Attach ground strap (M6 nut, 10 mm socket, torque wrench, M=15 in-lbs)
6. Disconnect jumper cables from onboard cable connectors: X162/100, X163/100
7. Stow disconnected jumper cables into bag labeled 'ПТАБ-СНТ' on panel 430
8. Mate onboard cable connectors to ПТАБ unit connectors (in the specified sequence):

X162/100 → ← X162/100
 X163/100 → ← X163/100
 X100/100 → ← X100/100
 X102/100 → ← X102/100
 X101/100 → ← X101/100
 X104/100 → ← X104/100
 X103/100 → ← X103/100



9. Photograph the area after installation
10. Close panel

Report completion to MCC

2.2.2. ПТАБ-1М UNITS A303, A305 INSTALLATION

(02:00:00)

Required Tools and Hardware:**ПТАБ-1М units A303, A305**

Flashlight

2A.2B Special Tools:

Ratchet 1/4" Drive

10" Extension, 1/4" Drive

10 mm Socket, 1/4" Drive

12 mm Socket, 1/4" Drive

14 mm Socket, 1/4" Drive

10 mm Combo Wrench (two)

Torque Wrench (10-50 in-lbs)

Wire Cutters

Don anti-static wrist tether

Fastening: unit – M8 bolts (four), ground strap – M6 nut, all fasteners are stowed in bag

On MCC Go

1. Open panel 126 (see Figure 2.2.-1.)

NOTE

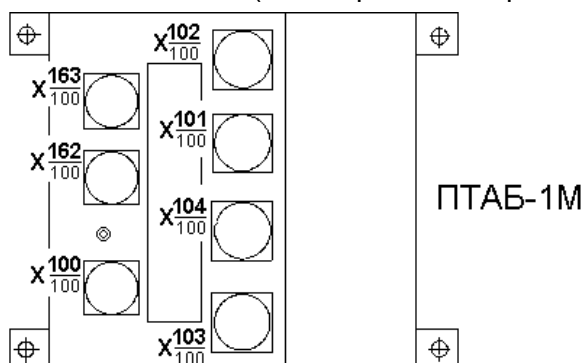
Cable connectors X103/100, X104/100, X162/100, X163/100 are powered — 28 V

2. Panel 338 – ППС24 – ⌀ BCЭП1
3. Photograph the area before installation
4. Remove brackets (two) with attached BCЭП1 fan (M6 bolts (eight), 10 mm Combo wrenches (two))

UNIT A303 INSTALLATION

5. Install unit A303
6. Using 12 mm and 14 mm sockets, tighten M8 bolts (four)
7. Attach ground strap (M6 nut, 10 mm socket, torque wrench, M=15 in-lbs)
8. Disconnect jumper cables from onboard cable connectors: X162/100, X163/100
9. Stow disconnected jumper cables into bag labeled 'ПТАБ-СНТ' on panel 430
10. Mate onboard cable connectors to ПТАБ unit connectors (in the specified sequence):

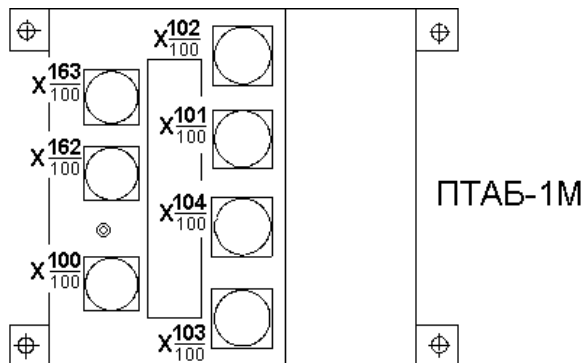
X162/100 → ← X162/100
 X163/100 → ← X163/100
 X100/100 → ← X100/100
 X102/100 → ← X102/100
 X101/100 → ← X101/100
 X104/100 → ← X104/100
 X103/100 → ← X103/100



UNIT A305 INSTALLATION

11. Photograph the area before installation
12. Install unit A305
13. Using 12 mm and 14 mm sockets, tighten M8 bolts (four)
14. Attach ground strap (M6 nut, 10 mm socket, torque wrench, M=15 in-lbs)
15. Disconnect jumper cables from onboard cable connectors: X162/100, X163/100
16. Stow disconnected jumper cables into bag labeled 'ПТАБ-ЧНТ' on panel 430
17. Mate onboard cable connectors to ПТАБ unit connectors (in the specified sequence):

X162/100 → ← X162/100
 X163/100 → ← X163/100
 X100/100 → ← X100/100
 X102/100 → ← X102/100
 X101/100 → ← X101/100
 X104/100 → ← X104/100
 X103/100 → ← X103/100



18. Re-install brackets (two) with attached ВСЭП1 fan (M6 bolts (eight), 10 mm Combo wrenches (two))
19. Panel 338 – ППС24 – ⊕ ВСЭП1

20. Photograph the area after installation
21. Close panel

Report completion to MCC

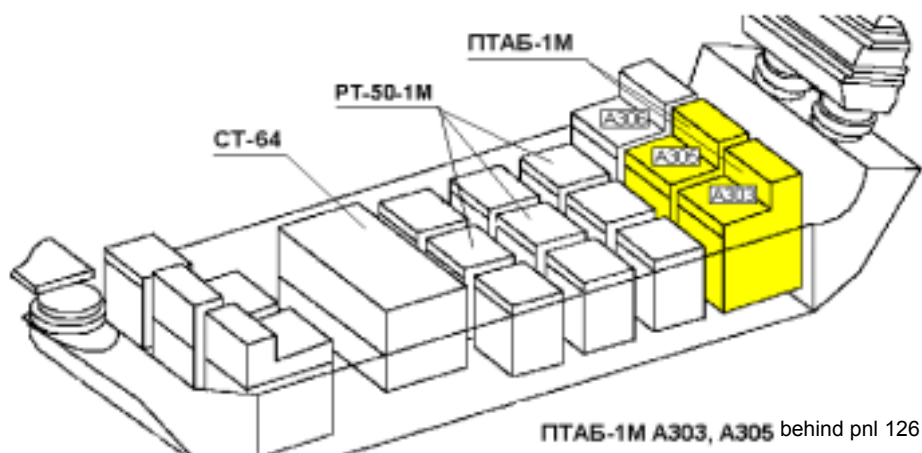


Figure 2.2.-1. ПТАБ-1M Units Location Diagram

2.3. БУПТ-1М UNIT A401, A403, A405 INSTALLATION

(01:00:00 on one unit)

NOTE

БУПТ-1М units A401, A403 and A405 should be installed prior to storage battery A103 installation, first install A405, then install A401 and A403

Required Tools and Hardware:

Corresponding new **БУПТ-1М** unit

Flashlight

2A.2B Special Tools:

Ratchet 1/4" Drive

10" Extension, 1/4" Drive

10 mm Socket, 1/4" Drive

Torque Wrench (10-50 in-lbs)

Wire Cutters

Don anti-static wrist tether

Location: A401, A403, A405 – behind panel 227, A405 – behind storage battery A104
(see Figure 2.3.-1.)

Fastening: unit – four M6 bolts, ground strap – one M6 nut, all fasteners can be found in bag

On MCC Go

1. Open panel 227

NOTE

Cable connector X80/100 is powered — 28 V.

INSTALLATION

2. Photograph the area before installation
3. Install new unit
4. Tighten four M6 bolts (10 mm socket)
5. Attach grounding strap (M6 nut, 10 mm socket, torque wrench, M=15 in-lbs)
6. Mate onboard cable connectors to БУПТ unit connectors (in the specified sequence):

X1328/42 →← X1328/42

X100/42 →← X100/42

X77/100 →← X77/100

X72/100 →← X72/100

X82/100 →← X82/100

X71/100 →← X71/100

X79/100 →← X79/100

X70/100 →← X70/100

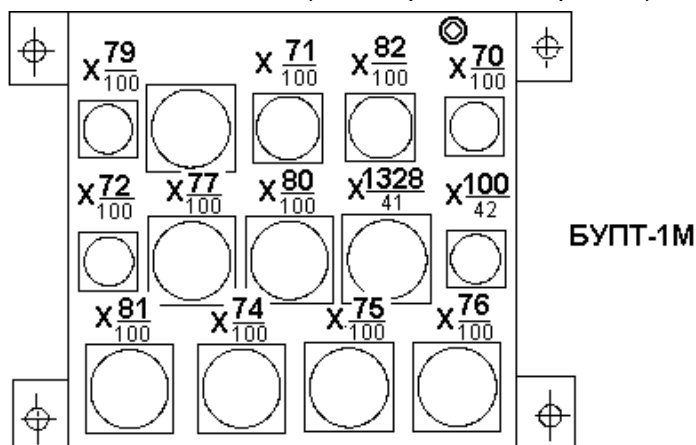
X80/100 →← X80/100

X75/100 →← X75/100

X76/100 →← X76/100

X74/100 →← X74/100

X81/100 →← X81/100



7. Photograph the area after installation
8. Close panel

Report completion to MCC

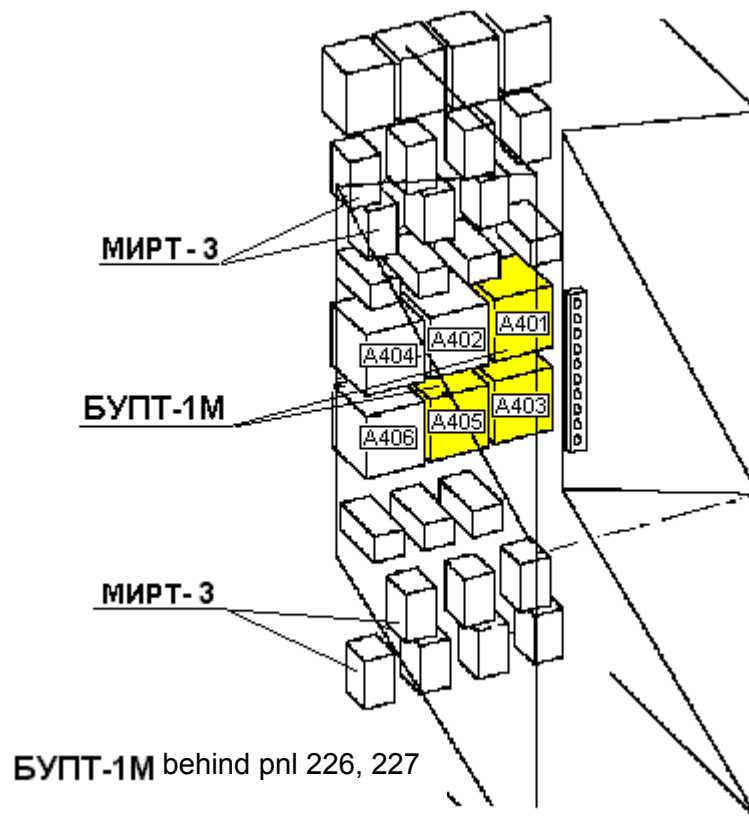


Figure 2.3.-1. БУПТ-1М Units Location Diagram

2.4. STORAGE BATTERY 800A (A104) REMOVAL AND RE-INSTALLATION

(01:30:00)

Required Tools and Hardware:

2A.2B Special Tools:

- 12 mm Combo wrench
- Connector pliers
- 4" Standard screwdriver

Location: Storage battery 800A (A104) is located behind panel 227 (see Figure 2.1.-1.)

Fastening: Two angle brackets having two custom bolts on each (see Figure 2.4.-1.)

STORAGE BATTERY 800A (A104) REMOVAL

1. **On MCC Go**, (after charge/discharge unit 3PY4 has been powered down)
2. Open panels 226, 227
3. Completely loosen air duct seal retract screws (two) on frame (see Figure 2.4.-1.)
4. Demate onboard cable connectors from storage battery 800A (A104) connectors
(in the specified sequence):
 - X93/100 ↔ X93/100
 - X94/100 ↔ X94/100
 - X90/100 ↔ X90/100
 - X92/100 ↔ X92/100
 - X1325/42 ↔ X1325/42
5. Unscrew nuts (two) on each of two angle brackets (12 mm socket)
6. Remove storage battery 800A A104

STORAGE BATTERY 800A A104 RE-INSTALLATION

7. Install storage battery 800A A104
8. Secure storage battery by tightening nuts (two) on each of two angle brackets
(12 mm socket)
9. Mate onboard cable connectors to storage battery connectors (in the specified sequence):
 - X1325/42 →← X1325/42
 - X92/100 →← X92/100
 - X90/100 →← X90/100
 - X94/100 →← X94/100
 - X93/100 →← X93/100
10. Completely tighten air duct seal retract screws (two) located on the frame (see Figure 2.4.-1.)
11. Close panels

Report completion to MCC

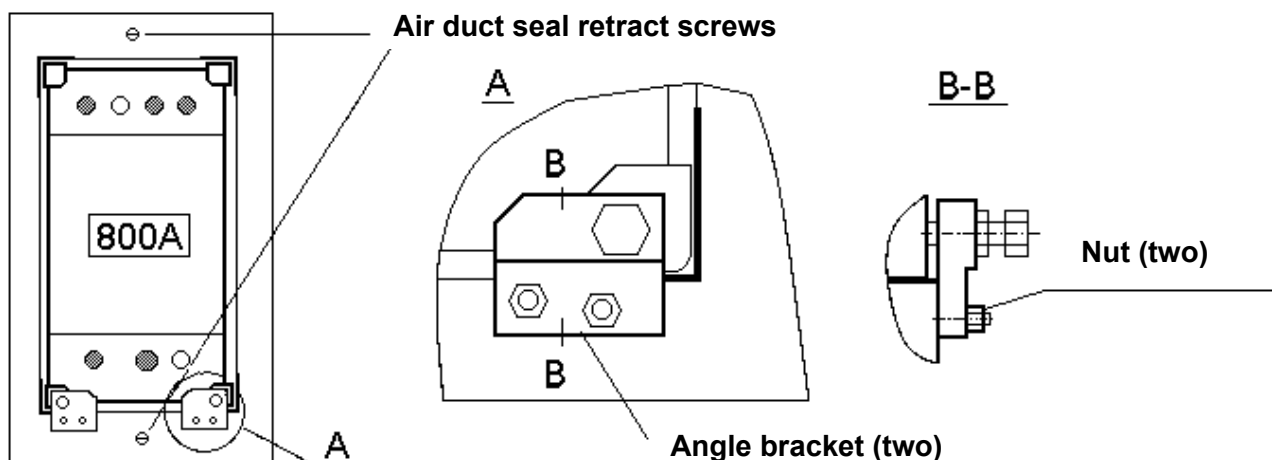


Figure 2.4.-1. Storage Battery 800A Installation and Fastening

2.5. VOLTAGE AND CURRENT STABILIZER UNIT (CHT-50MΠ) A21, A22, A23, A24 INSTALLATION

(01:20:00 on one unit)

Required Tools and Hardware:

Corresponding unit **CHT-50MΠ**,
Thermal conductive patch container #3:
Thermal conductive patch for CHT-50MΠ

Flashlight

2A.2B Special Tools:

Ratchet 1/4" Drive
Torque Wrench (10-50 in-lbs)
Torque Wrench (40-200 in-lbs)
10" Extension, 1/4" Drive
10 mm Socket, 1/4" Drive
Wire Cutters
Gray Tape

Don anti-static wrist tether

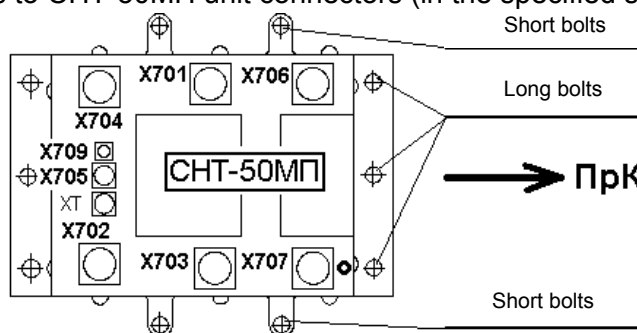
Location: A21, A22, A23, A24 under treadmill (see Figure 2.5.-1.)

Fastening: unit – ten M6 bolts, ground strap – one M6 nut, all fasteners can be found in bag
Verify removal of Orlan-M racks and the panels (two) between panels 134 and 135

On MCC Go INSTALLATION

1. Install thermal conductive patch on CHT-50MΠ unit (secure with gray tape)
2. Photograph the area before installation
3. Install new CHT-50MΠ unit
4. Screw long bolts (six) into the mounting holes and short bolts (four) into the eyelets (10 mm socket, torque wrench, M=80 in-lbs)
5. Attach ground strap (M6 nut, 10 mm socket, torque wrench, M=15 in-lbs)
6. Demate jumper cables from onboard cable connectors X706, X707
7. Stow disconnected jumper cable into bag labeled 'ПТАБ-CHT' behind panel 430
8. Mate onboard cable connectors to CHT-50MΠ unit connectors (in the specified sequence):

X705 →← X705
X706 →← X706
X707 →← X707
X702 →← X702
X701 →← X701
X703 →← X703
X704 →← X704
X709 →← X709



9. Photograph the area after installation
Report completion to MCC

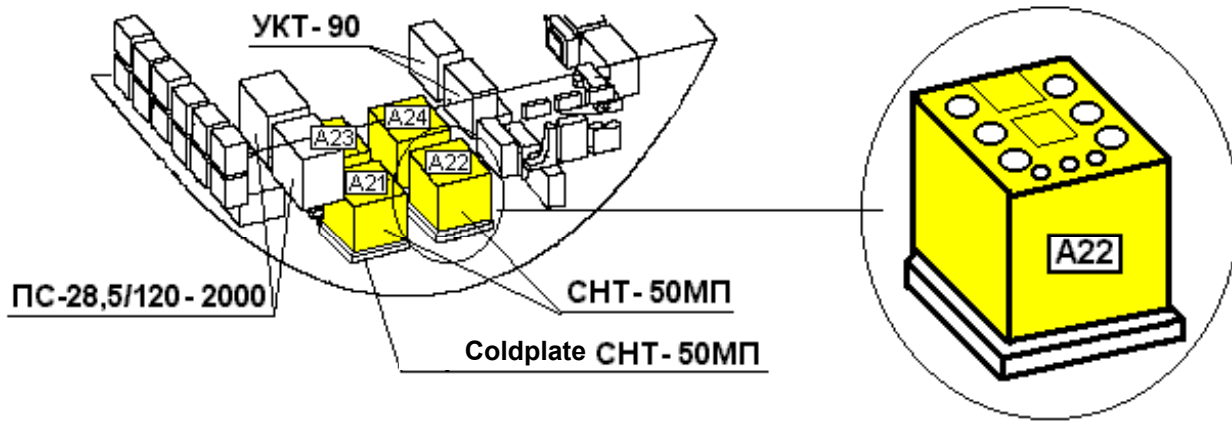


Figure 2.5.-1. CHT-50MΠ Units Location Diagram

2.6. CURRENT STABILIZER UNIT (CT-25) A7 INSTALLATION

(00:30:00)

Required Tools and Hardware:

Current stabilizer unit **CT-25 A7**

Flashlight

2A.2B Special Tools:

Ratchet 1/4" Drive

4" Extension, 1/4" Drive

10" Extension, 1/4" Drive

10 mm Socket, 1/4" Drive

12 mm Socket, 1/4" Drive

14 mm Socket, 1/4" Drive

Torque Wrench (10-50 in-lbs)

Wire cutters

Don anti-static wrist tether

Location: A7 – panel 130

Fastening: unit – four M8 bolts, ground strap – one M6 nut, all fasteners can be found in bag

On MCC Go

1. Open panel 130

INSTALLATION

2. Photograph the area before installation
3. Install new CT-25 unit
4. Tighten M8 bolts (four) (12 mm socket)
5. Attach ground strap (M6 nut, 10 mm socket, torque wrench, M=15 in-lbs)
6. Mate onboard cable connectors to CT-25 unit connectors (in the specified sequence) (see Figure 2.6.-1):
 - X620/210 →← X620/210
 - X621/210 →← X621/210
 - X622/210 →← X622/210
 - X628/210 →← X628/210

7. Photograph the area after installation
8. Close panel

Report completion to MCC

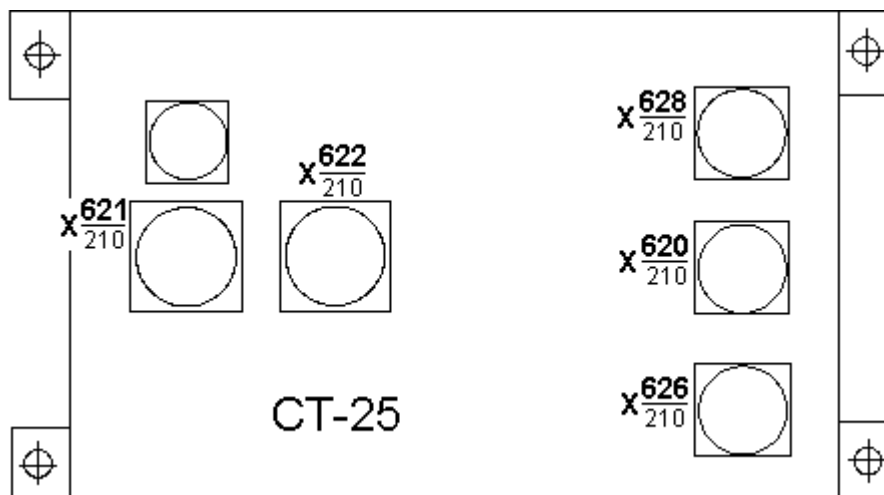


Figure 2.6.-1. CT-25 Unit Connector Location Diagram

3. ELEKTRON-VM SYSTEM (COFC)

3.1. LIQUID UNIT INSTALLATION

(00:30:00)

Required Tools and Hardware:

Liquid Unit (**БЖ**) with attached combustion unit

Flashlight

2A.2B Special Tools:

Ratchet 1/4" Drive

10" Extension, 1/4" Drive

10 mm Socket, 1/4" Drive

14 mm Socket, 1/4" Drive

4" Standard Screwdriver

Wire Cutters

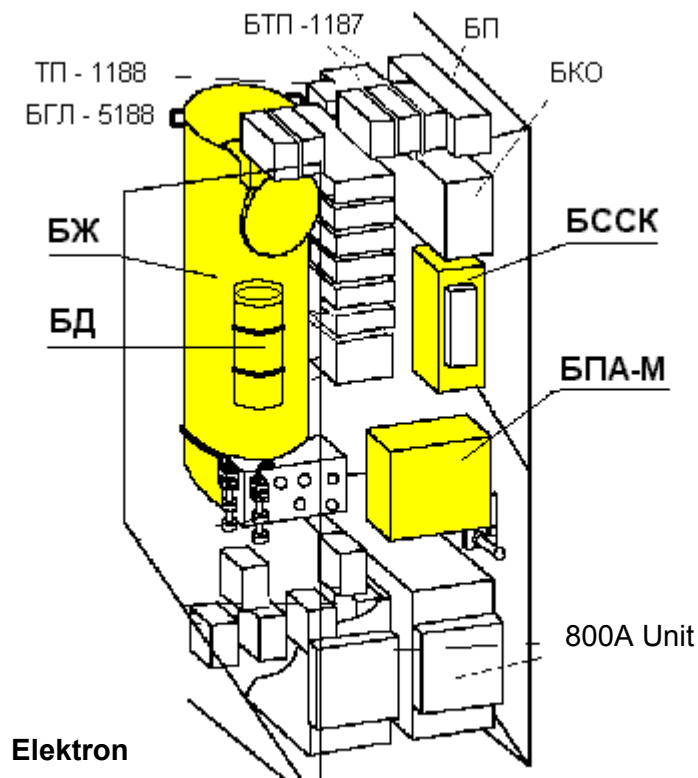
Fasteners are pre-installed

Location: see Figure 3.1.-1.

1. Open panels 429, 430
2. Photograph the area before installation
3. If necessary, detach removable БПА-M support brackets (three):
 - 17 KCM.7810-231 by removing M6 bolts (two) (10 mm socket)
 - 17 KCM.7810-231-01 by removing M6 bolts (two) (10 mm socket)
 - 17 KCM.7810-232 by removing M6 bolts (four) (screwdriver)
4. Remove clamp for Liquid Unit by removing M10 bolts (two) (14 mm socket)

LIQUID UNIT INSTALLATION

5. Install Liquid Unit
 6. Tighten two M10 nuts (14 mm socket)
 7. Install and secure clamp for Liquid Unit by tightening M10 bolts (two) (14 mm socket)
 8. Install three removable БПА-M mounting brackets:
 - 17 KCM.7810-231 by tightening M6 bolts (two) (10 mm socket),
 - 17 KCM.7810-231-01 by tightening M6 bolts (two) (10 mm socket),
 - 17 KCM.7810-232 by tightening M6 screws (four) (screwdriver)
 9. Photograph the area after installation
 10. Close panels 429, 430
- Report completion to MCC**



Units **БЖ, БД, БССК, БПА-М** behind pnl 429, 430

Figure 3.1.-1. Elektron System Units Location Diagram

3.2. SIGNAL AND COMMAND MATCHING UNIT (БССК) INSTALLATION

(00:20:00)

Required Tools and Hardware:

Signal and Command Matching Unit (**БССК**),
Flashlight

2A.2B Special Tools:

Ratchet 1/4" Drive
4" Extension, 1/4" Drive
10 mm Socket, 1/4" Drive

Fasteners are pre-installed

1. Open panel 429

INSTALLATION

2. Install БССК unit into nominal location (on four dampers)
3. Tighten M6 nuts (eight, i.e. two nuts for each of four bolts) (10 mm socket)
4. Close panel 429
Report completion to MCC

3.3. CURRENT STABILIZER UNIT (CT-64) INSTALLATION

(00:40:00)

Required Tools and Hardware:

Current stabilizer **CT-64**

Thermal conductive patches for CT-64 (thermal conductive patch container #3)

Flashlight

2A.2B Special Tools:

Ratchet 1/4" Drive

Torque wrench (40-200 in-lbs)

10" Extension, 1/4" Drive

10 mm Socket, 1/4" Drive

4" Standard Screwdriver

1/4 to 3/8 "Adapter

Phillips-Head Screwdriver #2

Large Flat-Tip Head Driver, 3/8" Drive

All fasteners can be found in bag within installation area

1. Open panel 127

INSTALLATION

2. Install thermal conductive strips (two) on CT-64 (secure with adhesive tape)
 3. Install CT-64 into nominal location (see Figure 3.3.-1)
 4. Tighten M8 bolts (eight) (12 mm torque wrench, M=90 in-lbs)
 5. Attach ground strap M6 nuts (two) (10 mm socket)
 6. Close panel 127
- Report completion to MCC**

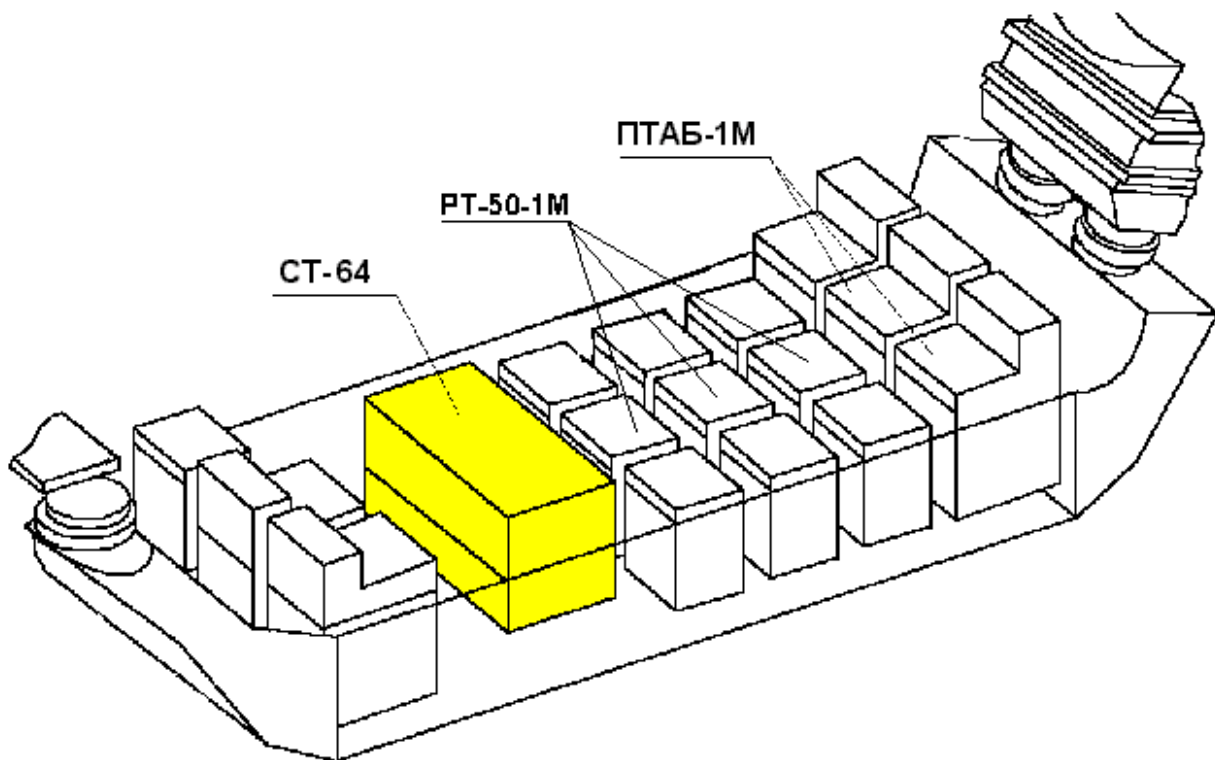


Figure 3.3.-1. CT-64 Unit Location Diagram

3.4. NITROGEN PURGING UNIT (БПА-М) INSTALLATION

(00:10:00)

Required Tools and Hardware:

Nitrogen purging unit (БПА-М),

1. Open panels 429, 430

INSTALLATION

2. Install БПА-М unit into nominal location (Figure 3.1-1.)
3. Secure БПА-М using bungee cords
4. Close panels 429, 430

Report completion to MCC

4. ONBOARD COMPLEX CONTROL SYSTEM (СУБА)

4.1. CONTROL PANEL PROTECTIVE COVERS INSTALLATION

(00:30:00)

Required Tools and Hardware:

Protective covers to be installed onto control panels:

17KC.10Ю 2483-0-20	on ППС-21	(panel 306)
17KC.10Ю 2483-0-21	on ППС-22	(panel 308)
17KC.10Ю 2483-0-22	on ППС-23	(panel 338)
17KC.10Ю 2483-0-23	on ППС-24	(panel 338)
17KC.10Ю 2488-0	on ПУРВ-К	(panel 432)
17KC.10Ю 2489-0	on ПУС	(panel 330)

1. Put cover on control panel face so that two guide pins on cover would enter two corresponding holes on control panel
2. Manually tighten captive screws (two) until there is no visible clearance between cover and panel

Report completion to MCC

4.2. "WIENER POWER" LAPTOP CONNECTION

(00:40:00)

Required Tools and Hardware:

"Wiener Power" laptop — **WP** (A5),
 Power Supply 17КС.10Ю 2506-0 (A852) (with pre-installed plug X3 «20,5»),
 adapter cable "Питание Wiener Power",
 cable 17КС.10Ю 8210А-4100,
 cable 17КС.10Ю 8210А-260 (stowed in bag "И", SM panels 114, 120)

Don antistatic wrist strap

1. Secure WP laptop on the sliding desk of the medical locker (on Velcro pads)
2. Secure power supply unit (БП) on the side wall of the medical locker (on Velcro pads)
3. cnctr ≠10Ю=A5-J01 of adapter cable "Питание Wiener Power" →|← cnctr ≠10Ю=A5-J01 of cable 17КС.10Ю 8210А-4100
4. cnctr ≠10Ю=A852-X2 of cable 17КС.10Ю 8210А-4100 →|← cnctr jack X2 of БП
5. cnctr jack X1 of БП →|← cnctr X1/БП of cable 17КС.10Ю 8210А-260
6. pnl 230 Ⓢ РБС10/3 (A335)
7. cnctr XT4 of cable 17КС.10Ю 8210А-260 (ground) →|← grounding terminal on РБС10/3 (A335)
8. cnctr X2/РБС3А of cable 17КС.10Ю 8210А-260 →|← cnctr 3А of РБС10/3 (A335)
9. cnctr of adapter cable "Питание Wiener Power" →|← cnctr jack on computer rear panel
10. cnctr ≠10Ю=A808-J06 of cable 17КС.10Ю 8210А-1020 →|← cnctr J06 of WP laptop (route cable 17КС.10Ю 8210А-1020 outside through the opening in panel 436)

Report to MCC

On MCC Go

11. pnl 230 Ⓢ РБС10/3 (A335)
12. <| □ LEDs are lit on БП

Report to MCC

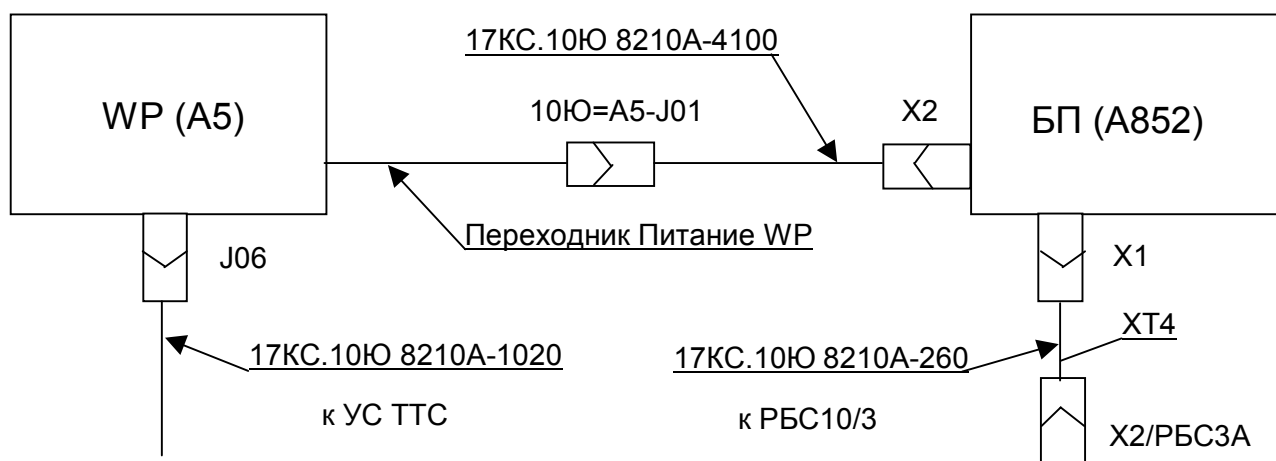


Figure 4.2. WP (A5) Installation Diagram

5. MEDICAL SUPPORT SYSTEM (CMO)

5.1. CYCLE ERGOMETER INSTALLATION

(00:20:00)

Required Tools and Hardware:

Cycle ergometer **BБ-3**

Flashlight

2A.2B Special Tools:

Ratchet 1/4" Drive

4" Extension, 1/4" Drive

12 mm Socket, 1/4" Drive

Fasteners can be found in bag tethered within installation area

Location: panel 121 (on the interior side)

1. Open panel 121 and secure in the open position
2. Install cycle ergometer into nominal location on panel 121
3. Fasten cycle ergometer by tightening M8 bolts (four) (12 mm socket)
4. Photograph the area after installation
5. Close panel 121

Report completion to MCC

5.2. MEDICAL LOCKER ENCLOSURES INSTALLATION

(01:00:00)

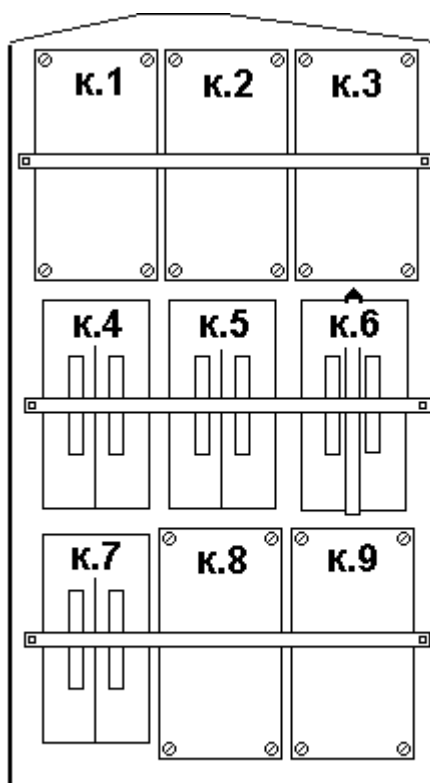
Required Tools and Hardware: enclosures 5A4.056.033 (five),
2A.2B Special Tools:
8 mm Combo Wrench
4" Standard Screwdriver

NOTE

Enclosures ## 1, 2, 3, 8 are temporarily installed in medical locker cells ## 4, 5, 6, 7.

1. Open medical locker
2. Remove launch restraint hold-downs (three) (two M6 bolts on each)
3. Remove factory closeout panels (five) (four screws on each)
4. Discard removed factory closeout panels and screws
5. Re-install enclosures ## 1, 2, 3, 8 into corresponding medical locker cells (Figure 5.2).
6. Install enclosures ## 4, 5, 6, 7, 9 into corresponding medical locker cells (Figure 5.2).
7. Secure installed enclosures with bungee cords

Report to MCC



Medical Locker Enclosures

Figure 5.2

6. VENTILATION SYSTEM (CB)

6.1. TREADMILL FAN INSTALLATION

(00:30:00)

Required Tools and Hardware: fan **ВПО12** MO-2-5008,
2A.2B Special Tools:
6 mm Combo Wrench
12 mm Combo Wrench
4" Standard Screwdriver
Combo Pliers

1. Panel 338 – ППС-24 Ⓢ ВПО12
2. Remove panel 130

3. Photograph the area before installation
4. Remove flange 17KCM.7664-301 from bracket 17KCM.7664-370 (keep three M8 bolts)
5. Install fan into flange 17KCM.7664-301, with fan outlet directed towards treadmill
6. Install flange with fan into bracket 17KCM.7664-370 (three M8 bolts)

7. Attach ground strap M3 bolt (one)
8. cnctr #59Ю=ВПО12-X1 of onboard cable →← cnctr X1 of fan

9. Panel 338 – ППС-24 Ⓢ ВПО12
10. Verify fan blades are rotating
11. Panel 338 – ППС-24 Ⓢ ВПО12
12. Photograph the area after installation
13. Install panel back into place

Report to MCC

7. TOILET SYSTEM (СГО-АКУ)

7.1. PRETREAT TANK (E-K) AND E-K HOSE INSTALLATION

(01:00:00)

Required Tools and Hardware: pretreat tank (E-K), E-K hose,
dry wipes from kit labeled 'Dry Wipes'
2A.2B Special Tools:
10 mm Combo wrench (two)
4" Standard Screwdriver

NOTE

Bracket 1 is the one that has an opening and is located closer to pretreat and water dispenser (ДКиВ).

Bracket 2 is the one located farther from ДКиВ.

On MCC Go

1. Remove panels 453, 454
2. Photograph the area before installation
3. Loosen bolts (two), remove bracket 1
4. Remove bolts (two) from bracket 1
5. Install bracket 1 onto E-K (pass E-K hose through the bracket opening, E-K tabs should be on top of bracket 1). Tighten bolts (two).
6. Remove bolts (two) from bracket 2
7. Secure E-K on bracket 2 (bottom guide pin of bracket 2 must enter the hole in the deck, E-K tabs should be on top of bracket 2) by tightening bolts (two).
8. Secure brackets 1 with attached E-K (E-K hose should be directed at ДКиВ) by tightening bolts (two)

WARNING

1. Extreme care (E-K and ДКиВ containing sulfuric acid)
2. Minimum connector demating time
3. Do not touch internal surfaces of connectors
4. Do not rotate and pull away handwheels of demated connectors without caps

9. Remove plugs from connector PY4 of ДКиВ and connector PY4 of hose E-K (two captive screws on each)
10. Align connector PY4 of E-K hose with corresponding connector of ДКиВ (guide pins (two) of connector PY4 of E-K hose must enter grooves (two) of connector PY4 of ДКиВ)
connector PY4 of E-K hose → ← connector PY4 of ДКиВ
Tighten captive screws (two) in the openings of manual valve PY4 (screwdriver)
(perform sequentially and without skewing)
11. Control knobs of connectors PY4 and PY5 → O (open)
12. Photograph the area after installation
13. Install panels back into place

Report to MCC

8. ORLAN-M SPACESUIT

8.1. ORLAN RACKS REMOVAL

(03:00:00)

Required Tools and Hardware:

Flashlight

2A.2B Special Tools:

Power Driver

Hex Shank 1/4" Drive

Ratchet 1/4" Drive

4" Extension, 1/4" Drive

10" Extension, 1/4" Drive

8 mm Socket, 1/4" Drive

10 mm Socket, 1/4" Drive

8 mm Combo wrench

10 mm Combo wrench

4" Standard Screwdriver

ORLAN 1 (RED) REMOVAL FROM RACK LOCATED BETWEEN WINDOWS # 7 AND #8

1. Remove clamp (central node), by removing M6 bolts (two) (10 mm Combo wrench)
2. Unscrew side brackets (two) (8 mm Combo wrench)
3. Remove Orlan rack pulldown strap, by removing M5 bolts (two) on each end of the strap (8 mm Combo wrench)
4. Remove Orlan 1 from the rack
5. Install Orlan 1 in the area between windows #7 and #8
6. Secure Orlan 1 using bungee cords
7. Remove the rack by removing M6 bolts (twenty-two) (10 mm Combo wrench)
8. Discard removed fasteners and Orlan 1 rack into Progress

If required:

Remove brace struts (six) (twenty bolts, 10 mm wrench)

Remove transverse brackets (two) (seven bolts, 10 mm wrench)

ORLAN 2 (BLUE) REMOVAL

9. Remove clamp (central node) by removing M6 bolts (two) (10 mm Combo wrench)
10. Remove side brackets (two) (8 mm Combo wrench)
11. Remove Orlan rack pulldown strap, by removing M5 bolts (two) on each end of strap (8 mm Combo wrench)
12. Remove Orlan 2 from rack
13. Install Orlan 2 in nominal location on ПxO Deck
14. Restrain Orlan 2 using bungee cords
15. Remove the rack by removing M6 bolts (six) (10 mm Combo wrench)
16. Discard removed fasteners and Orlan 2 rack into Progress

If required:

Remove side bracket (two) (sixteen bolts, 10 mm wrench)

Remove brace strut (six) (eighteen bolts, 10 mm wrench)

Remove cross bracket (two) (seven bolts, 10 mm wrench)

Report to MCC

On MCC Go

17. Remove panels 17 KCM-3121-400-08 (two) on plane I, remove panels (two) and fasteners
→ discard
18. Remove kits (three) with tools and secure them with bungee cord next to panel 226

Report to MCC

8.2. ORLAN HARDWARE COMPONENTS DEINSTALLATION

(04:00:00)

Required Tools and Hardware:

Flashlight
2A.2B Special Tools:
Power Driver
Hex Shank 1/4" Drive
Ratchet 1/4" Drive
4" Extension, 1/4" Drive
10" Extension, 1/4" Drive
8 mm Socket, 1/4" Drive
10 mm Socket, 1/4" Drive
12 mm Socket, 1/4" Drive
8 mm Combo wrench
10 mm Combo wrench
12 mm Combo wrench
4" Standard Screwdriver

Location: Orlan components – on racks in [PO] crew cabins (see Figure 8.2)

1. Remove oxygen tanks БК-3 (three) by unclasp the band clamps, securing them to racks
2. Remove БК-3 racks (three) by removing nuts (four) (10 mm socket or Combo wrench)
3. Remove oxygen tanks БК-3 (four) by unclasp the band clamps, securing them to racks
4. Remove ЗИП-1, ЗИП-2М, ЗИП-3, ЗИП-5, ЗИП-6 accessories by removing bolts (four) on each (8 mm socket or Combo wrench)
5. Remove kits with replaceables ('Укладка сменных элементов') by removing bolts (four)
6. Remove LiOH canisters ЛП-9 (four) by unclasp the band clamps, securing them to racks
7. Remove tanks 5ПТ (two), by removing bolts (three) (10 mm socket or Combo wrench)
8. Remove water purification and separation unit (БОС-2), by removing bolts (four) (12 mm socket or Combo wrench)
9. Remove kits with 2.5 m umbilicals and Orlan testing unit (ПКО-М) by undoing the belts
10. Remove brackets with БРТА-1М units (two) by removing bolts (four) (12 mm socket or Combo wrench)
11. Remove БРТА-1М units (two) from brackets by removing screws (four)
12. Stow Orlan components in bags for storage in [PO] (discard all removed fasteners)
13. Remove kit with underwear and stow in [PO]

Report to MCC

On MCC Go

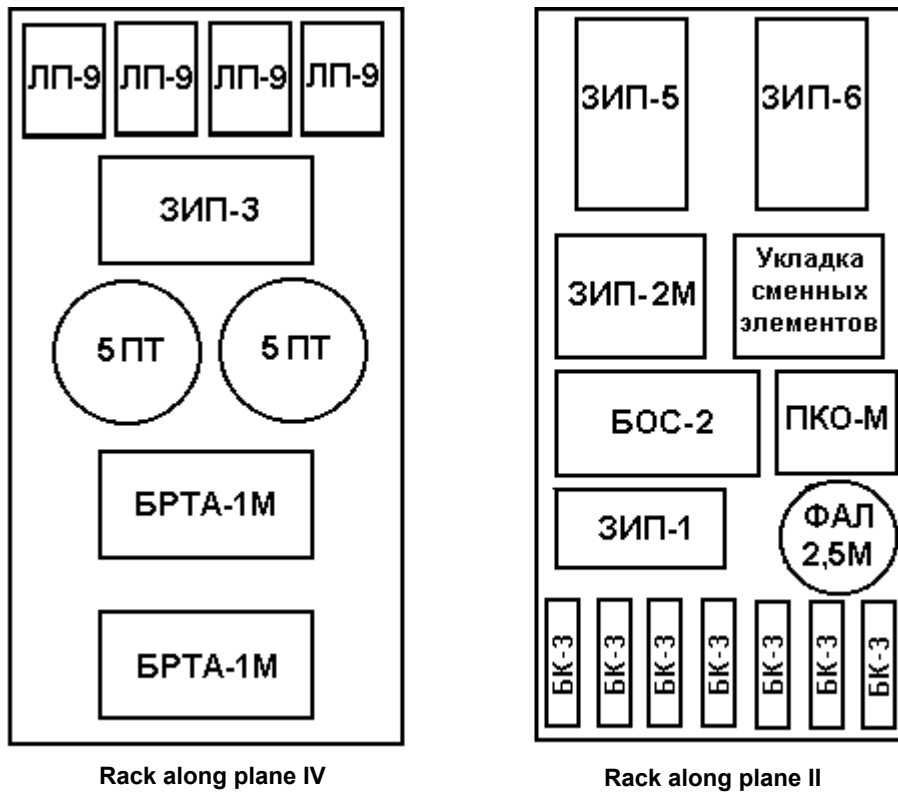
Port crew quarters

14. Remove cross brackets and stow them in Progress (twelve bolts, 10 mm Combo wrench, and fourteen screws)

Starboard crew quarters

15. Remove cross brackets and stow them in Progress (ten bolts, 10 mm Combo wrench, and four screws)
16. Remove side brackets (four) in crew quarters and stow them in Progress (forty-four bolts, 10 mm Combo wrench)

Report to MCC



Rack along plane IV

Rack along plane II

Figure 8.2. Orlan-M Hardware Components on [PO] racks

9. LAUNCH RESTRAINT BOLTS REMOVAL FROM INTERIOR PANELS

Required Tools and Hardware:

Flashlight

2A.2B Special Tools:

Power Driver

1/4" Hex Shank

7 mm Socket, 1/4" Drive

8 mm Socket, 1/4" Drive

M5 screws (8 mm socket) secure interior panel hinges

M4 screws (7 mm socket) secure interior panel locks

Remove blue color screws from interior panels 121, 126, 127, 130, 226, 227, 429, 430, 453, 454

Stow removed fasteners in Progress

Report to MCC

10. TELEOPERATOR CONTROL SYSTEM (TORU)

10.1. TORU EQUIPMENT REMOVAL

(03:00:00)

WARNING

Perform activities **on MCC Go** after TORU system has been powered down via command radio link.

REQUIRED TOOLS AND HARDWARE

Knife

Flashlight

Ziplock Bags

2A.2B Special Tools:

8 mm Combo wrench

10 mm Combo wrench

12 mm Combo wrench

14 mm Combo wrench

Connector Pliers

4" Standard Screwdriver

Gray tape, 2" width

Custom wrench (11Φ615.4426-OA16)

Extension tool (11Φ615.4428-OA15-05)

1. Photograph TORU containers #1 and #2.

DEMATING POWER BUS CHANNEL CONNECTORS ON TORU CONTAINER # 1 (77KM. 2380-0) ON PANEL 313 (Figure10.1-1)

WARNING

1. Connectors are powered.
2. Demate powered connectors using extreme care **on MCC Go** in AOS.
3. When demating powered connectors, quickly move cable end away as soon as captive nut comes off the threaded part of the connector shell.

2. Demate the following connectors (in the specified sequence) from TORU container #1:

≠2100 - X304,

≠2100 - X305,

≠2100 - X307,

≠2100 - X306,

≠2100 - X325

NOTE

Immediately cover both male and female halves (plug and receptacle) of demated connectors with protective caps from bag, tethered to the TORU container.

REMOVING TORU CONTAINER #2 (77KM. 2390-0) ON PANEL 312 (Figure10.1-3)

3. Demate the following connectors (in any sequence) from TORU container #2:
 - ≠2300 - X17,
 - ≠2300 - X1,
 - ≠2300 - X2,
 - ≠2300 - X11,
 - ≠2300 - X6,
 - ≠2300 - X14,
 - ≠2300 - X15,
 - ≠2300 - X18,
 - ≠2300 - X20
 - ≠2300 - X13
4. Tether inter-frame cables, disconnected from container #2, to container #1
5. Ground strap ↔ container #2, by unscrewing one bolt M5 with washer (10 mm wrench)
6. Remove container #2, by removing four black-painted custom bolts M8 (12 mm wrench).
Temp stow container #2.

REMOVING TORU CONTAINER #1 (77KM.2380-0) ON PANEL 313 (Figures 10.1-1, 10.1-2)

7. Demate the following connectors (in any sequence) from TORU container #1:
 - ≠2100-X321,
 - ≠2100-X322,
 - ≠2100-X323,
 - ≠2100-X309,
 - ≠2100-X340,
 - ≠2100-X303,
 - ≠2900-X2,
 - ≠2640=WZ1-XW13,
 - ≠2640=WV1-X18,
 - ≠2650-XW8,
 - ≠2650-WV1-X11,
 - ≠2900-X3,
 - ≠2300-X7,
 - ≠2300-X8,
 - ≠2300-X9,
 - ≠2300-X10,
 - ≠2300-X5,
 - ≠2710=A1 - Ш022/40,
 - ≠2900-X1,
 - ≠2900=A2-X1R,
 - ≠2710=A1 - Ш1066/10
8. Tether remaining TORU connector cables to frame
9. Ground strap ↔ container #1, by unscrewing one bolt M6 with washer (10 mm wrench)
10. Remove container #1 by removing four black-painted custom bolts M8 (12 mm wrench)
Temp stow container #1 (one custom bolt remains)

DEMATING CONNECTORS FROM ЛБ1 (≠2710=A1) UNIT OF TORU CONTAINER #1
(Figure10.1-1)

11. Demate the following connectors (in any sequence) from ЛБ1 unit:
 - ≠2710=A1-Ш460/10 (cable 77KM.2118-1160)
 - ≠2710=A1-Ш486/10 (cable 77KM.2118-1110)
 - ≠2710=A1-Ш1067/10 (cable 77KM.2318-10)
12. Tether demated connector cables to frame

DEMATING CONNECTORS FROM КЛ-108M (≠2900=A2) UNIT OF TORU CONTAINER #1

(Figure10.1-1)

13. Demate the following connectors (in any sequence) from КЛ-108M unit:

≠2900=A2-X4R (cable 77KCO.2918-10)

≠2900=A2-X2R (cable 77KCO.2918-20)

≠2900=A2-X6R (cable OCT3-186(≠2650=WV1-x WV10)-(≠2900=A2-x6R)-250 OCT92-8716-75)

≠2900=A2-X1R (cable 77KM.2118-1130)

14. Tether demated connector cables to frame

NOTE

Steps 15 through 22 are only performed when the container does not pass through the hatchway.

TORU CONTAINER #2 BRACKET 77KCO.2393-101 CONNECTORS REMOVAL (Figure10.1-4)

15. Remove the following connectors (in any sequence) from bracket 77KCO.2393-101, by removing screws with washers (four) from each connector:

≠2300=X16 (cable 77KM.2319-190)

≠2300=X11 (cable 77KM.2319-180)

≠2300=X17 (cable 77KM.2319-10)

≠2300=X1 (cable 77KM.2319-20)

≠2300=X2 (cable 77KM.2319-180)

16. Tether demated connector cables to frame

TORU CONTAINER # 2 BRACKET 77KCO.2393-101 REMOVAL (Figure10.1-3)17. Remove bracket 77KCO.2393-101, by removing screws (four) (screwdriver)
Temp stow removed bracketTORU CONTAINER # 2 BRACKET 77KCO.2393-102 CONNECTORS REMOVAL (Figure 10.1-4)

18. Remove the following connectors (in any sequence) from bracket 77KCO.2393-102, by removing screws with washers (four) from each connector:

≠2300=X15 (cable 77KM.2319-200)

≠2300=X14 (cable 77KM.2319-200)

≠2300=X6 (cable 77KM.2319-110)

≠2300=X13 (cable 77KM.2319-200)

≠2300=X20 (cable 77KM.2319-200)

≠2300=X18 (cable 77KM.2319-170)

19. Tether demated connector cables to frame

TORU CONTAINER #2 BRACKET 77KCO.2393-102 REMOVAL (Figure10.1-3)

20. Move БПС (≠2300=A1) unit away from frame of TORU container #2, by removing custom bolts (four) (12 mm wrench) (while leaving connectors and ground strap attached to ≠2300=A1 unit)

21. Remove bracket 77KCO.2393-102, by removing screws (four) (screwdriver)
Temp stow removed bracket

22. Reinstall БПС unit (≠2300=A1) into nominal place. Tighten custom bolts (four) (12 mm wrench)

REMOVING MOUNTING FRAMES OF TORU CONTAINERS ON PANELS 312, 313 (Figure10.1-5)23. Remove two beams (77KM-7723-660 and 77KM-7723-660-01), by removing M6 bolts (four) with washers (10 mm wrench), that fasten these two beams to crossbeams
Temp stow removed beams (two)

24. Remove beam 77KM-7723-652 together with brackets 77KM-7723-670 and 77KM-7723-670-01, by detaching ground strap bolt (one) and removing M6 bolts (four) with washers (10 mm wrench), that fasten brackets 77KM-7723-670 and 77KM-7723-670-01 to beams 77KM-7723-640 and 77KM-7723-640-01
Remove M6 bolts (five) with washers and gaskets (10 mm wrench)
Temp stow removed beam and brackets (two)

CAUTION

Do not remove beam 77KM-7723-651 labeled "НЕ СНИМАТЬ".

25. Remove frame 77KM-7723-630 by removing M8 bolts (four) (12 mm wrench)
Temp stow removed frame
26. Remove beams 77KM-7723-640 and 77KM-7723-640-01, by removing M6 bolts (six) with washers and gaskets (10 mm wrench)
27. Photograph panels 312, 313 after TORU mounting frames have been removed
28. **Report task completion to MCC**
29. Stow removed TORU containers #1, #2, beams 77KM-7723-660 and 77KM-7723-660-01, frame 77KM-7723-630, black-painted custom bolts (seven), brackets 77KCO.2393-101 and 77KCO.2393-102 in Shuttle.
Stow all other removed TORU fasteners and frames in Progress

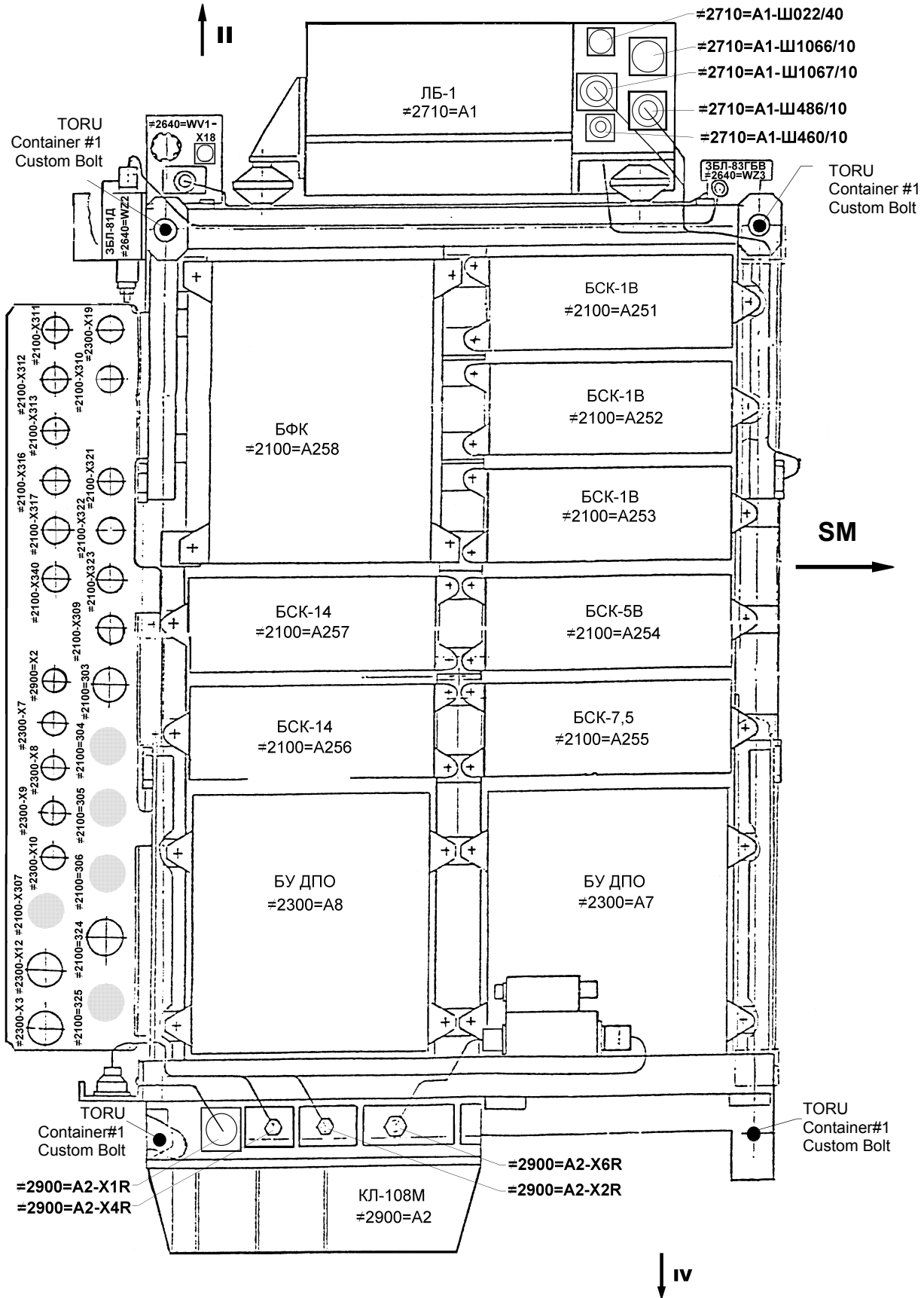


Figure 10.1-1. TORU Container #1 (77KM.2380-0)

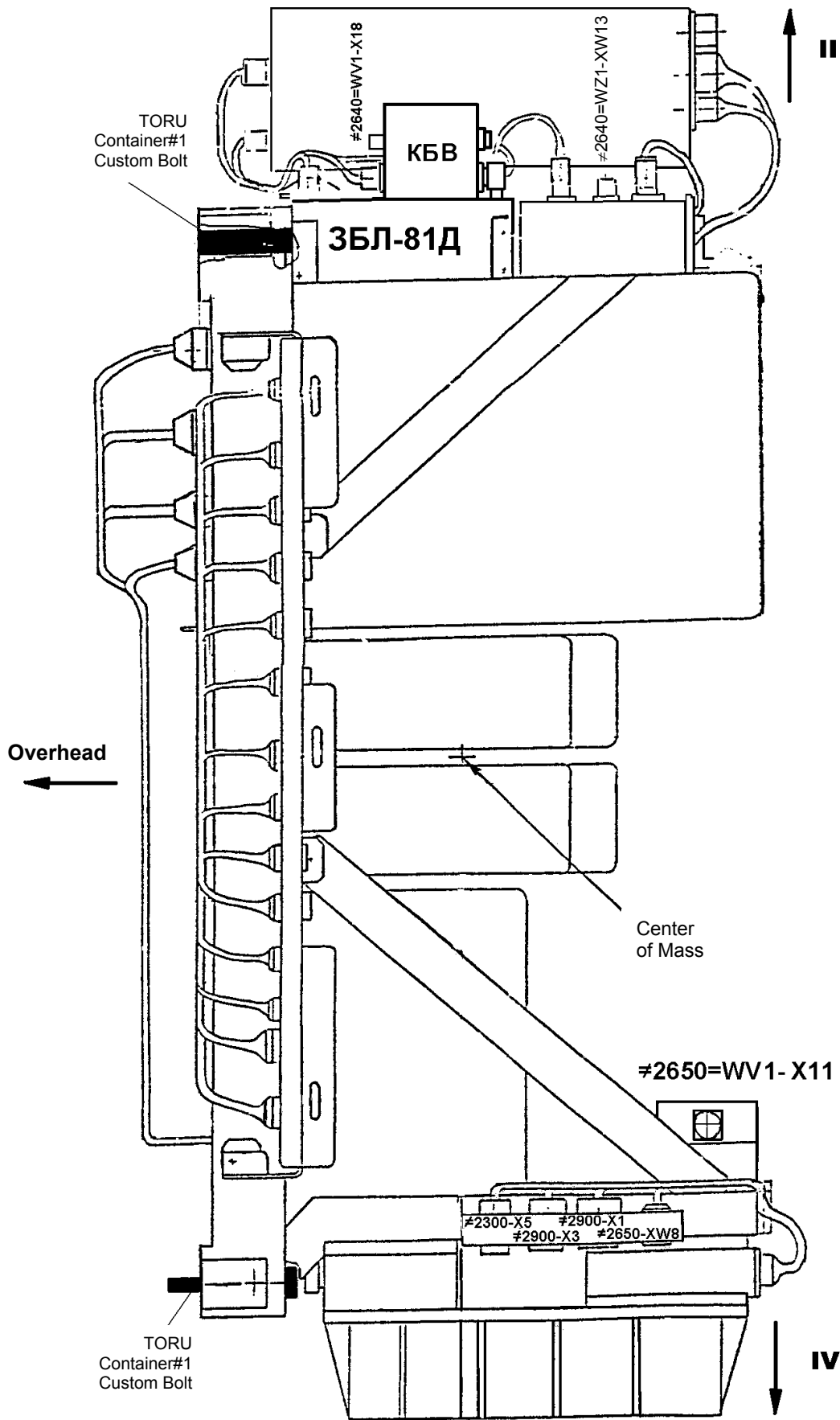


Figure 10.1-2. TORU Container #1 (77KM.2380-0)

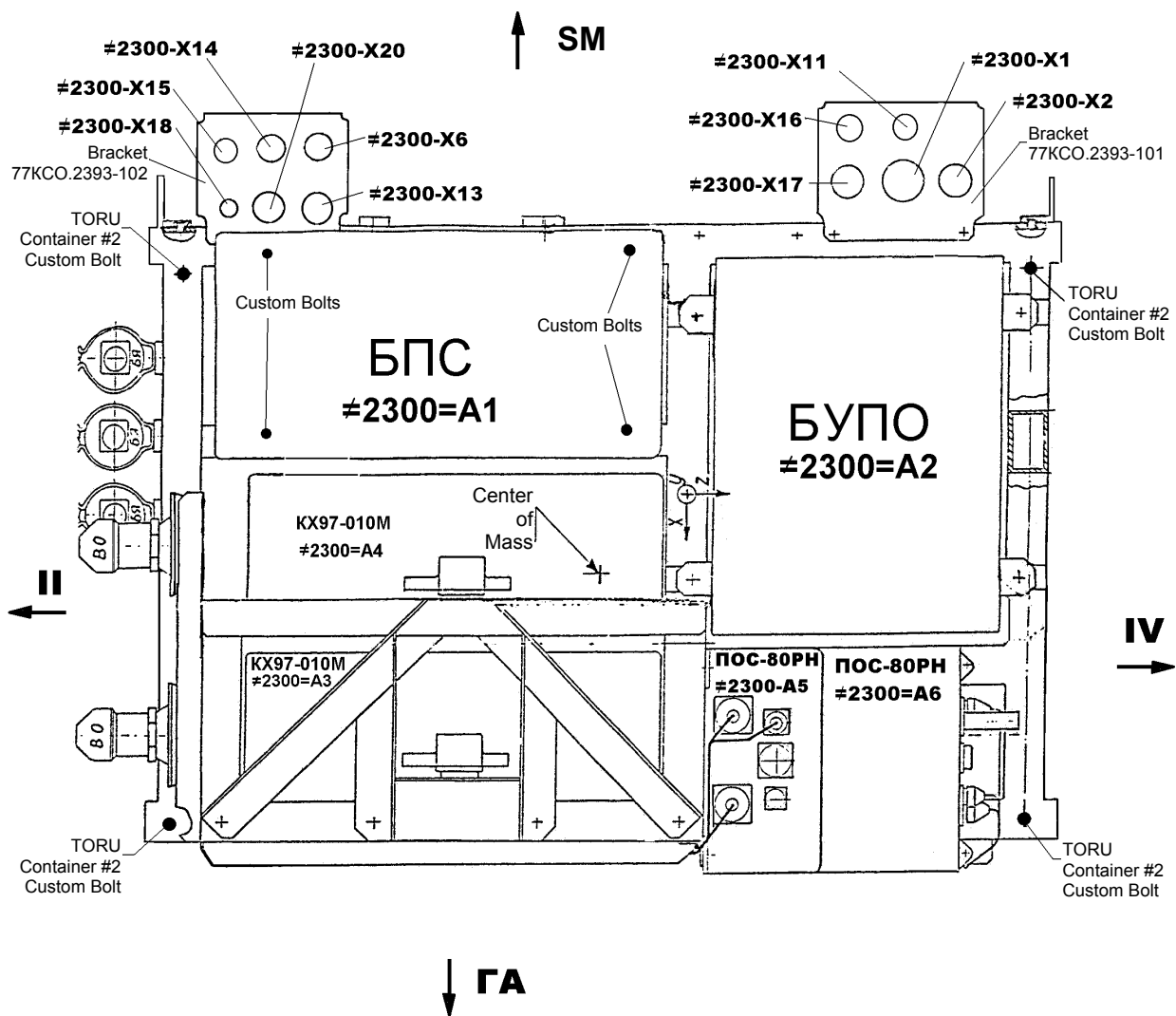


Figure 10.1-3. A Deck View of TORU Container #2 (77KM.2390-0)

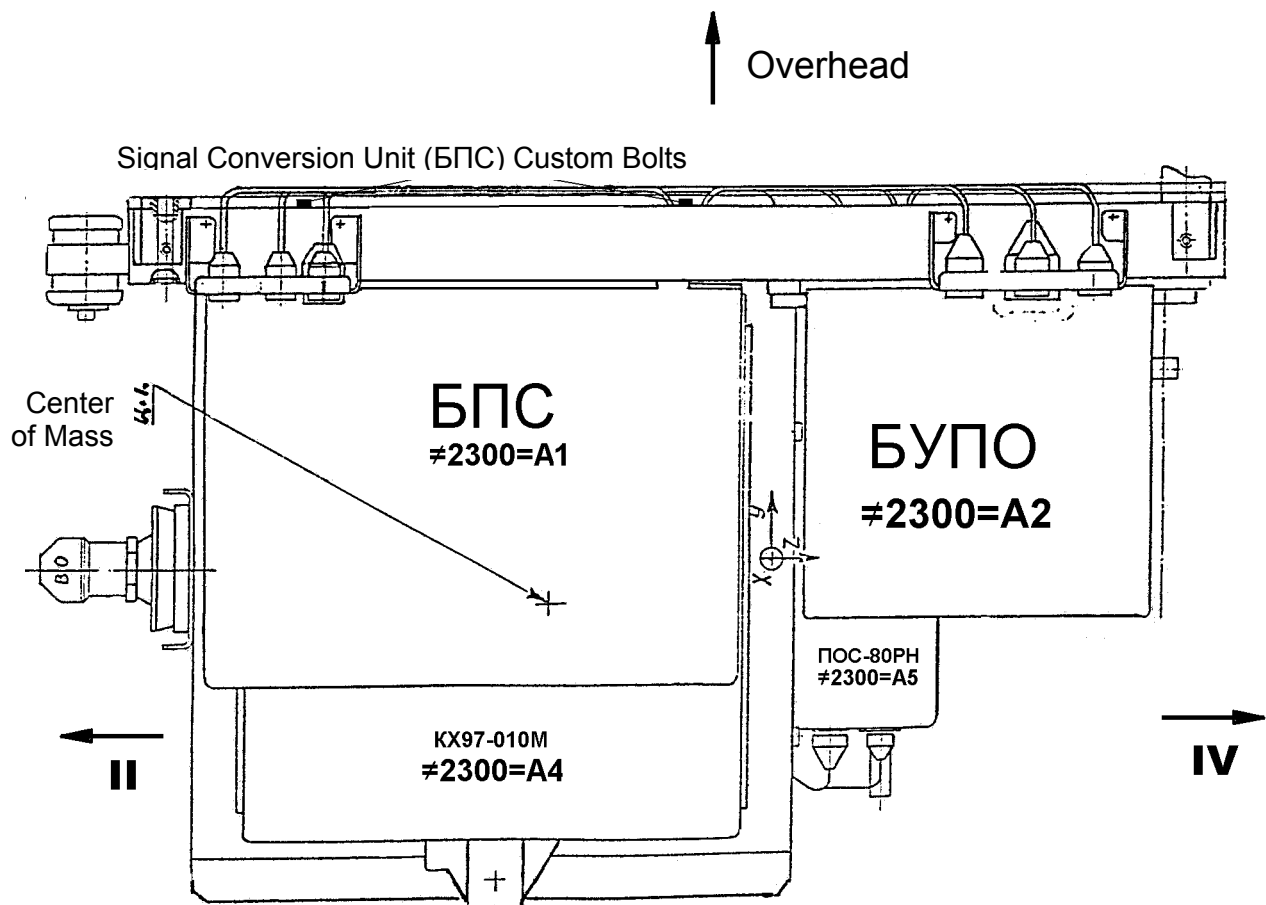


Figure 10.1-4. TORU Container #2 77KM.2390-0

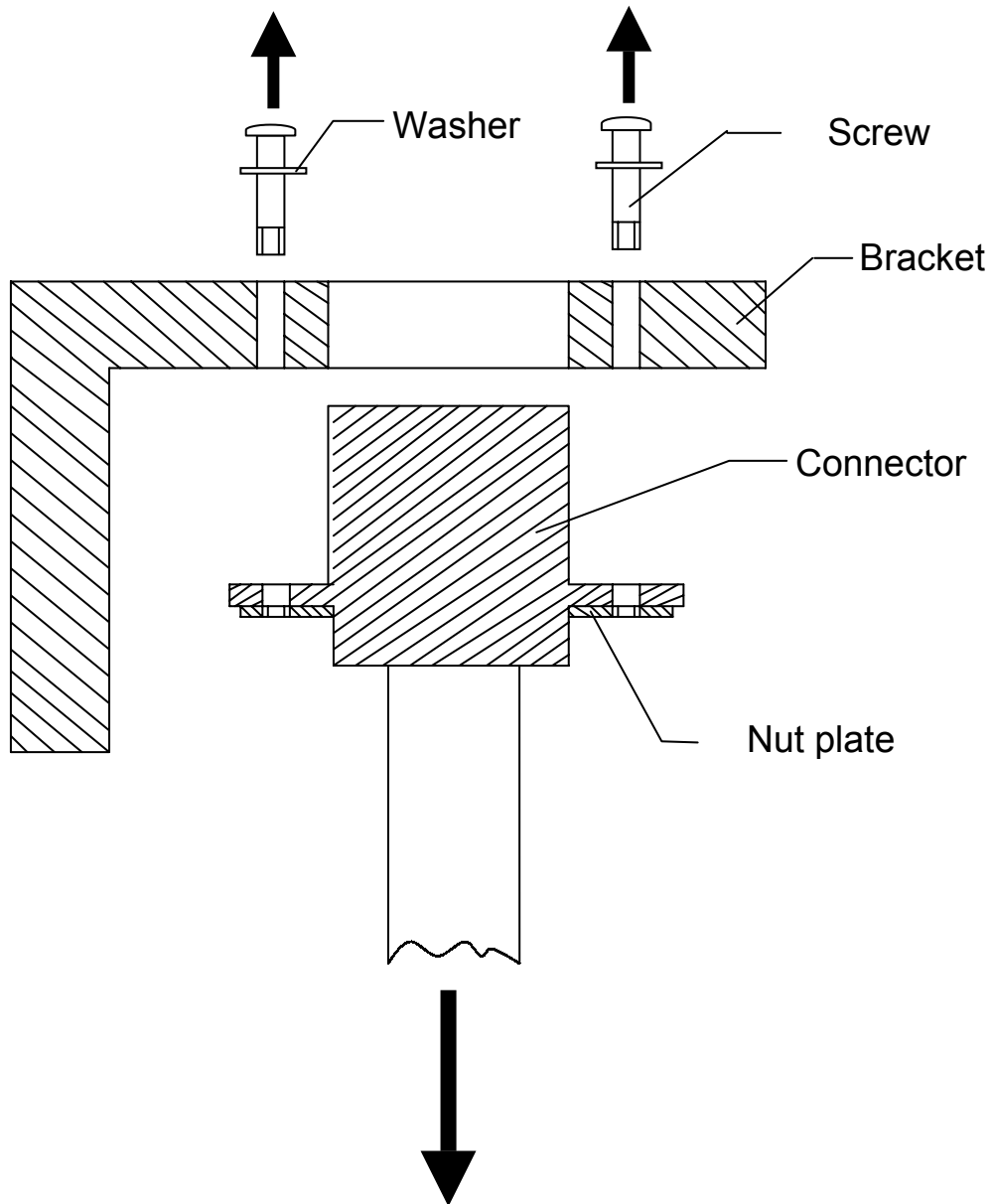


Figure 10.1-5. Connector Removal from Brackets 77KCO.2393-101 and 77KCO.2393-102

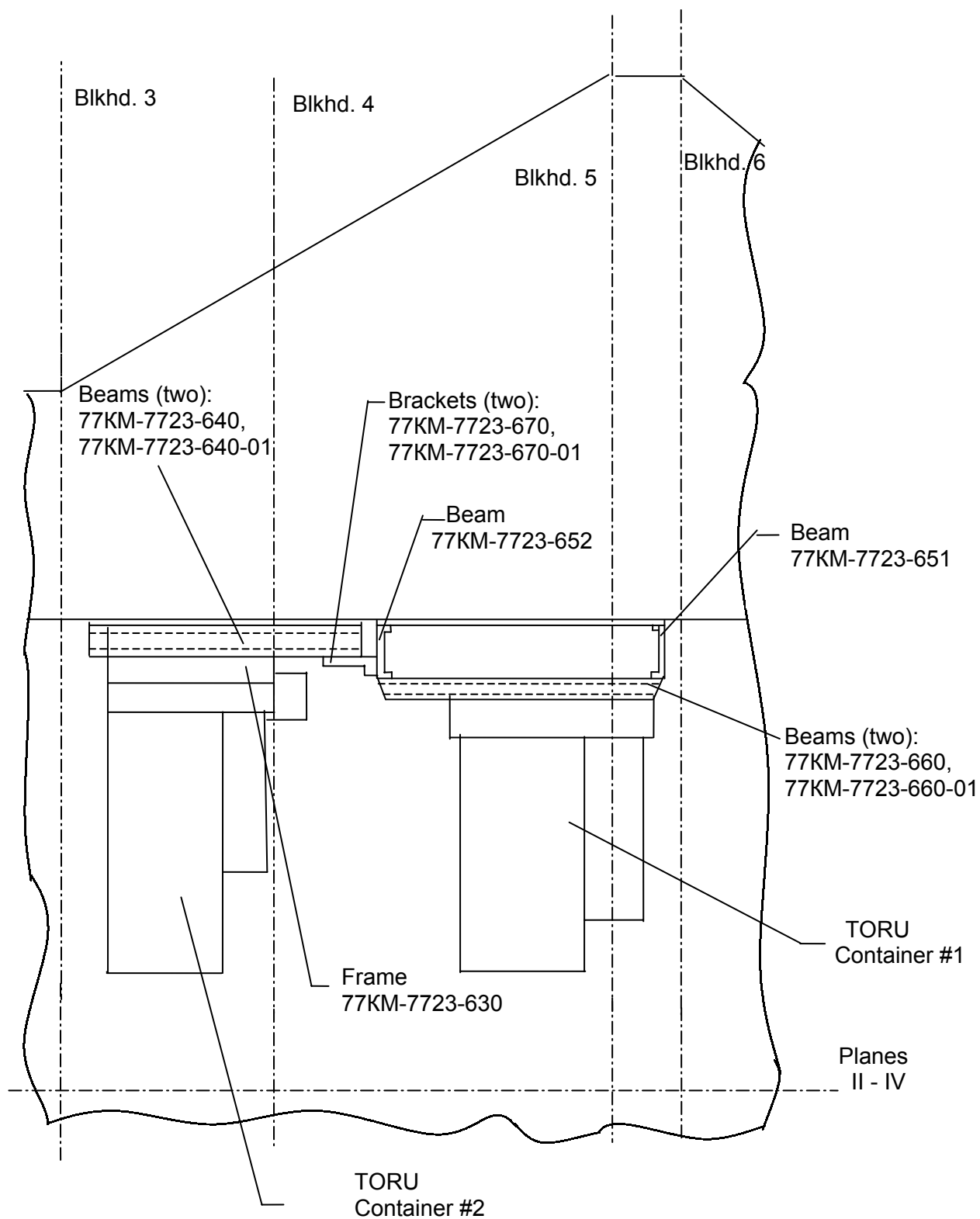


Figure 10.1-6. TORU Containers Fastening Hardware Location Diagram

11. REMOVAL OF 11Φ732.Γ1210-OA2 DOCKING MECHANISM FROM FGB ACA-Γ 11Φ732.Γ9000A1-0 COVER

(00:20:00)

REQUIRED TOOLS AND HARDWARE

Flashlight

2A.2B Special Tools:

Ratchet 1/4" Drive

4" Extension, 1/4" Drive

14 mm Socket, 1/4" Drive

12 mm Combo wrench

14 mm Combo wrench

Wire Cutters

Combo Pliers

Connector Pliers

4" Standard Screwdriver

Gray Tape, 2" Width

Delivered hardware:

Handles 11Φ732.Γ9000A1-40 (two) – Progress #251

NOTE

All activities are conducted **on MCC Go**

1. Photograph cover with docking mechanism still installed
2. Pull thermal blanket away from cover, by loosening docking mechanism mounting bolts, and secure thermal blanket in place with Gray tape
3. Remove lockwire from 11Φ732.Γ9000A1-104 captive bolts (twelve) (Combo Pliers and Wire Cutters)
4. Completely loosen 11Φ732.Γ9000A1-104 captive bolts (twelve) (14 mm Combo wrench)
5. Pull docking mechanism out 100---120 mm (until cables are tight)
6. Release connectors by pulling at rubber O-ring tabs
7. Demate connectors XF9/201, XF10/201, XF11/201
8. Tether cables to frame and secure (Gray tape)
9. Tape connectors (three) on the hatch (Gray tape)
10. Remove docking mechanism and stow in Progress
11. Install handles 11Φ732.Γ9000A1-40 (two) onto hatch by inserting them into docking mechanism mounting bushings on the hatch rotation axis side (two captive bolts on each handle, 12 mm Combo wrench) (see Figure 11.1-1)
12. Photograph cover after docking mechanism has been removed
13. **Report** removal completion to **MCC**

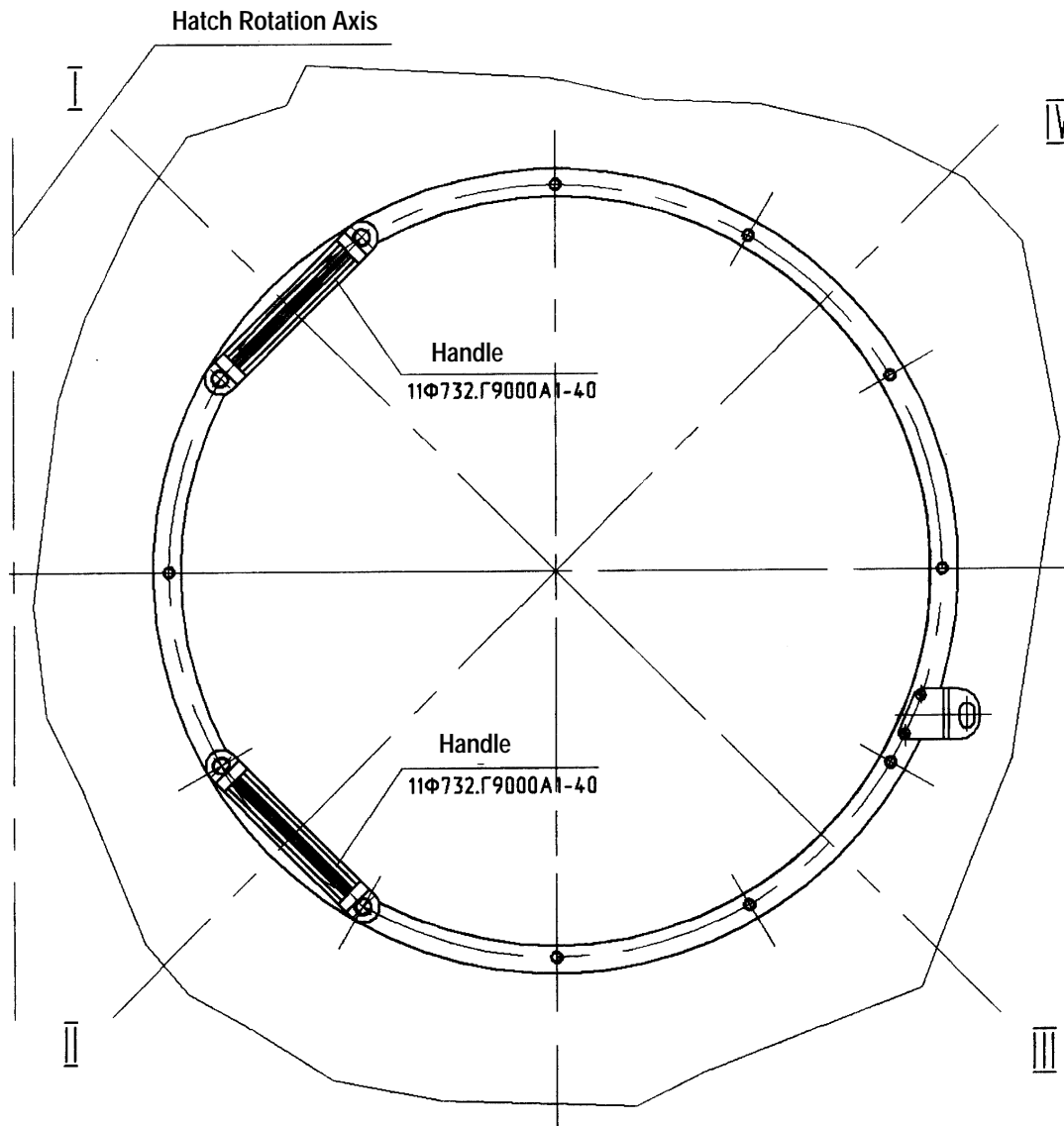


Figure 11.1-1. 11Φ732.Γ9000A1-40 Hatch Handles Installation on Hatch 11Φ732.9000A1-0 after Docking Mechanism Removal

12. FGB POWER SUPPLY SYSTEM (СЭС) BLOCKS CHANGEOUT

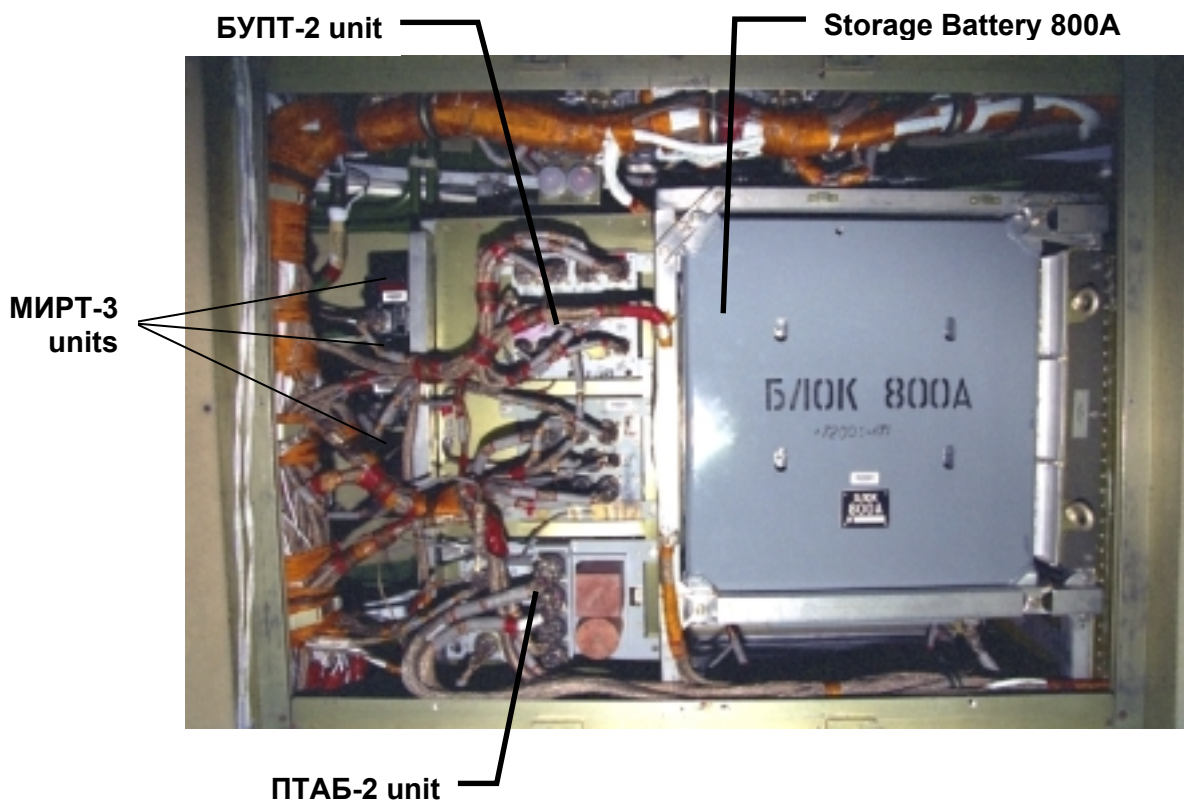


Figure 12-1. СЭС Units Location behind panel 103.

12.1. STORAGE BATTERY 800A ≠7200-01=A71 (A72, A73, A74, A75, A76) CHANGEOUT

(01:15:00)

WARNING

Changeout must be performed **on MCC-M Go** after storage battery charge/discharge unit has been powered down via command radio link.

REQUIRED TOOLS AND HARDWARE:

Flashlight,
Knife,
Ziplock Bag
Marker Pen

2A.2B Special Tools:

Ratchet, ¼" Drive,
4" Extension, ¼" Drive,
10 mm socket, ¼" Drive,

10 mm Combo wrenches
12 mm Combo wrenches
17 mm Combo wrenches

Connector pliers,
Screwdriver
Gray tape

Delivered hardware:

Storage Battery 800A

NOTE

If necessary, remove stowage bags from work area (see Transfer Cue Cards, IFM).

1. Open required panel (see Figure 12-1, Table 12.1-1)

Table 12.1-1

Unit ID Number	Panel Location	3PY Unit
≠7200.1=A71	103	3PY1
≠7200.1=A72	104,105	3PY2
≠7200.1=A73	105,106	3PY3
≠7200.1=A74	108,109	3PY4
≠7200.1=A75	110	3PY5
≠7200.1=A76	110,111	3PY6

2. For A73, remove transverse tee bracket by removing bolts (two) and nuts (two) (see Figures 12.1-1, 12.1-2).
For A72, A73, remove tee bracket by removing M5 bolts (two) (8 mm Socket) and screw (one) (screwdriver) on either of its ends and temp stow
3. Photograph the storage battery 800A area before changeout

FAILED STORAGE BATTERY 800A REMOVAL (see Figures 12.1-1, 12.1-2)

4. Remove the lockline from connectors
5. Cable connectors X94, X90, X93, X1325, X92 ←→ storage battery (see Figure 12.1-2)
6. Temp cover up the contact pad of each cable connector (Gray tape)
7. Remove restraints 77KM-7721-11 (two) in the bottom part of storage battery by loosening nuts (two) (17 mm Combo wrench) and removing M12 bolts (two) (12 mm Combo wrench)
8. For A71, A74, move away hold-down 7721-110, by completely removing one of the M6 bolts (two) (10 mm Combo wrench) and loosening the other
9. For A71, A74, remove hold-down 7721-120 by removing M6 bolts (three) (10 mm Combo wrench) and discard all
10. For A71, A74, remove hold-down 7721-130 by removing M6 bolts (four) (10 mm Combo wrench)
11. For A72, A73, A75, A76, remove two hold-down brackets on each by removing M6 bolts (eight) (10 mm Combo wrench)
12. Remove hold-down bracket 77KM-7721-12 by removing M6 bolts (three) (10 mm Combo wrench)
13. Remove hold-down bracket 77KM-7721-13 (holding it by eye-bolts)
14. Move air duct outlet frame away from storage battery
15. Pull out storage battery
16. Close down ventilation grilles on both sides of removed storage battery (Gray tape) (see Figure 11.1-5)
17. Label removed storage battery
18. Install protective caps (removed from connectors of new storage battery) onto connectors of the removed storage battery

NEW STORAGE BATTERY 800A INSTALLATION

19. Install new storage battery 800A (without warping rubber gasket on air duct outlet frame)
20. Re-install restraints 77KM-7721-11 (two) (two bolts and two nuts on each) (12 mm and 17 mm Combo wrenches)
21. Move air duct outlet frame towards storage battery
22. Re-install hold-down bracket 77KM-7721-13 (holding it by eye-bolts)
23. Re-install hold-down bracket 77KM-7721-12 in place by tightening M6 bolts (three) (10 mm Combo wrench)
24. For A71, A74, re-install hold-down 7721-130 by tightening M6 bolts (four) (10 mm Combo wrench)
25. For A72, A73, A75, A76, re-install hold-down brackets (two) on each by tightening M6 bolts (eight) (10 mm Combo wrench)

NOTE

When installing hold-down brackets 7721-130, pusher screws should abut against corners of storage battery 800A.

26. For A71, A74, re-install hold-down 7721-110 by installing/tightening one of M6 bolts (two) and tightening the other (10 mm Combo wrench)
27. Remove Gray tape from the contact pad of each cable connector
28. Cable connectors: X92, X1325, X93, X90, X94 →← storage battery (see Figure 12.1-2)
29. Label storage battery 800A «≠7200.1=A71 (A72, A73, A75) replaced by (flight crew ...) on ... (date)»
30. For A72, A73, install tee bracket back into nominal location by tightening M5 bolts (two) (8 mm Socket) and screw (one) (screwdriver)
31. For A73, re-install transverse tee bracket by tightening bolts (two) and nuts (two)

32. Photograph storage battery 800A area after changeout
33. Close required panel — 103 (104, 105, 106, 108, 109, 110, 111)
34. **Report to MCC**
35. **MCC-M** performs functional check via command radio link
36. Stow removed storage battery 800A and fasteners in Orbiter

For A73, remove
transverse tee bracket
by removing bolts (two)
and nuts (two)

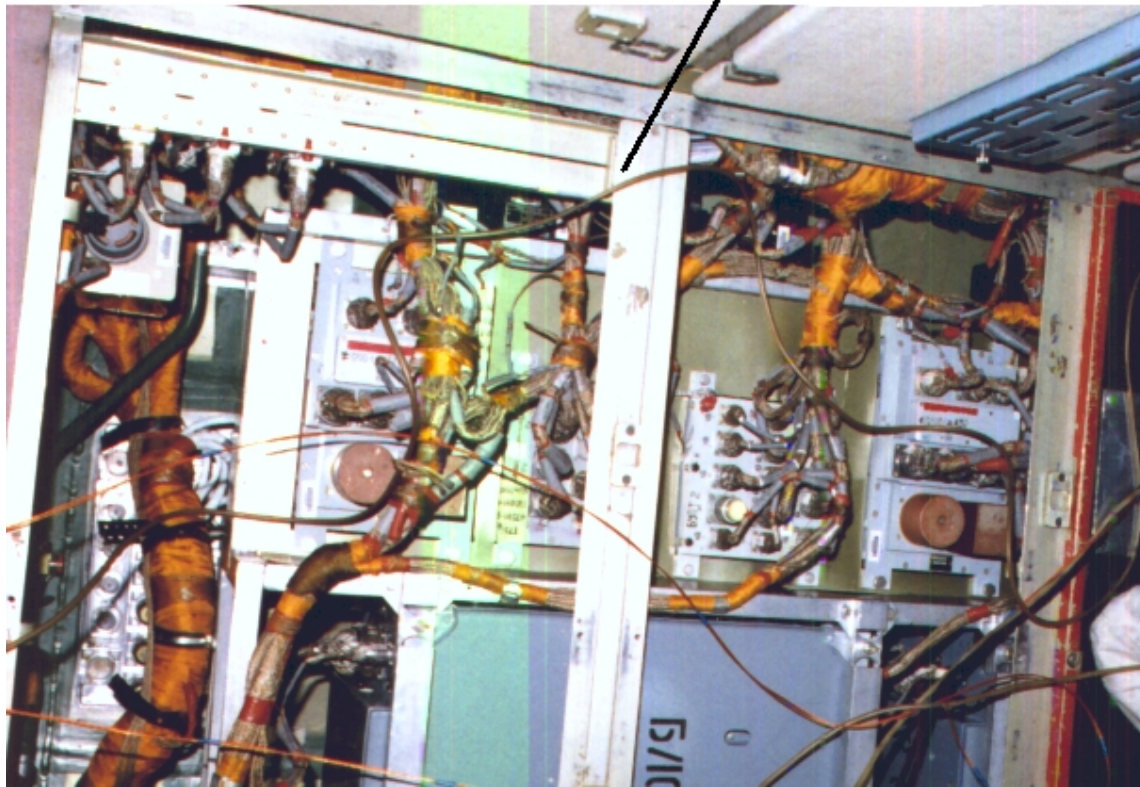


Figure 12.1-1. Transverse Tee Bracket to be removed during Storage Battery A73 Changeout



Non-captive
bolts

Figure 12.1-2. Transverse Tee Bracket to be removed during Storage Battery A73 Changeout
(a close view with both nuts already removed)

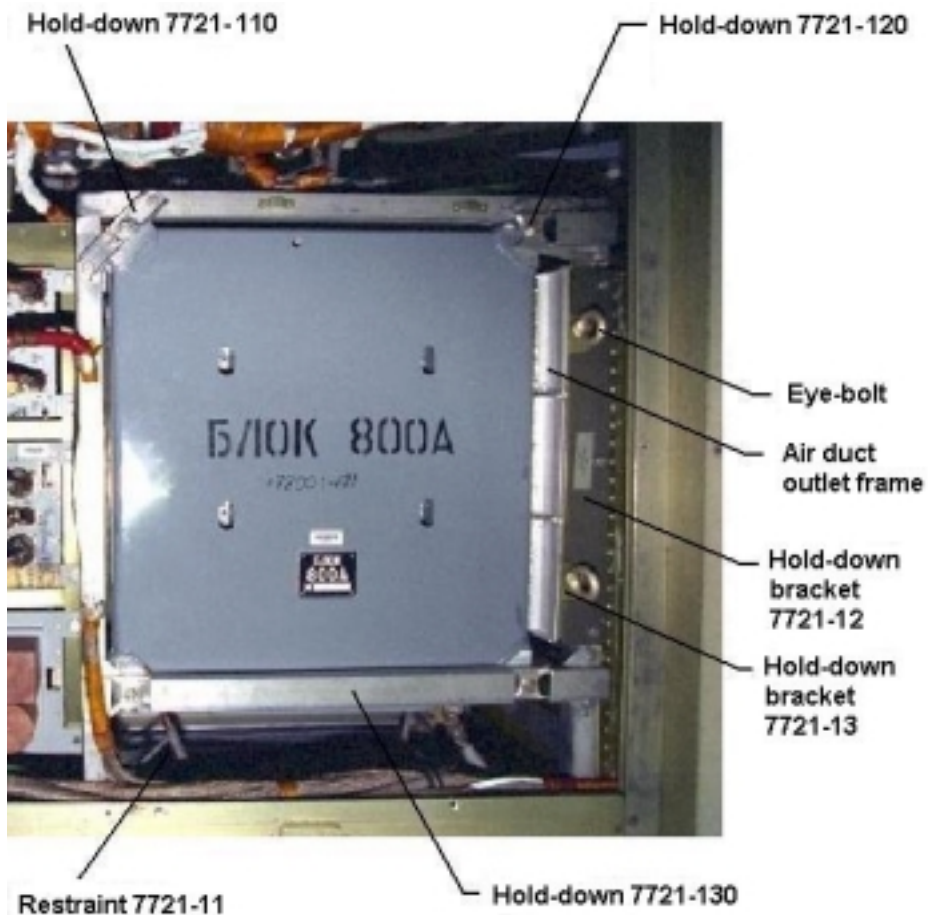


Figure 12.1-3. Storage Battery 800A Fasteners

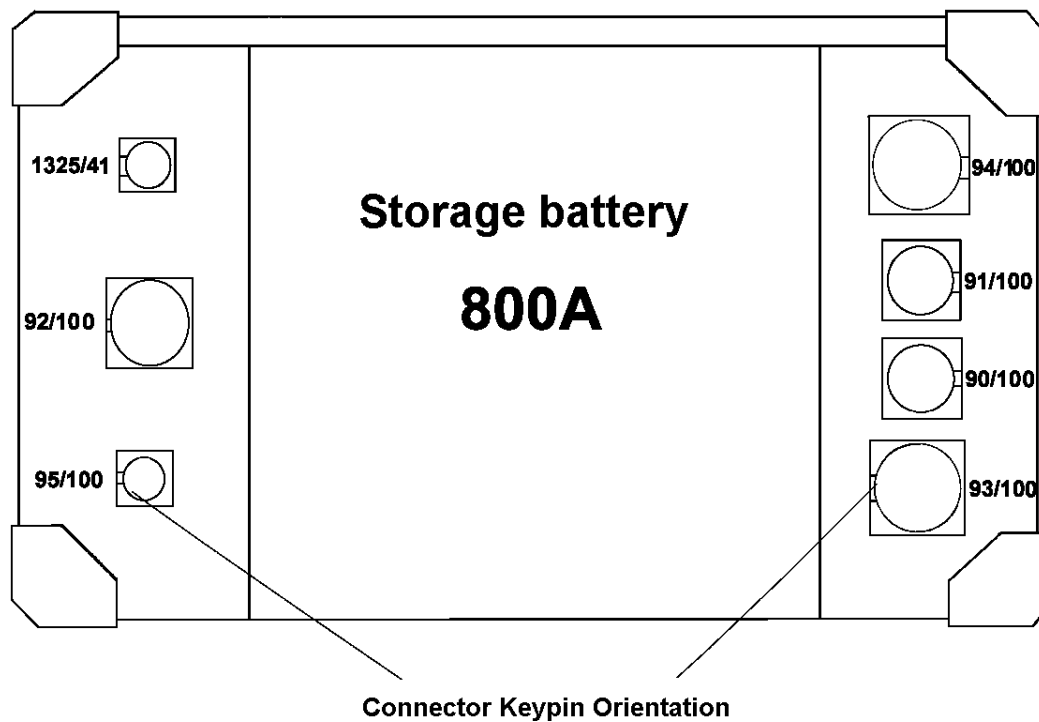


Figure 12.1-4. Connector Positions on Storage Battery 800A

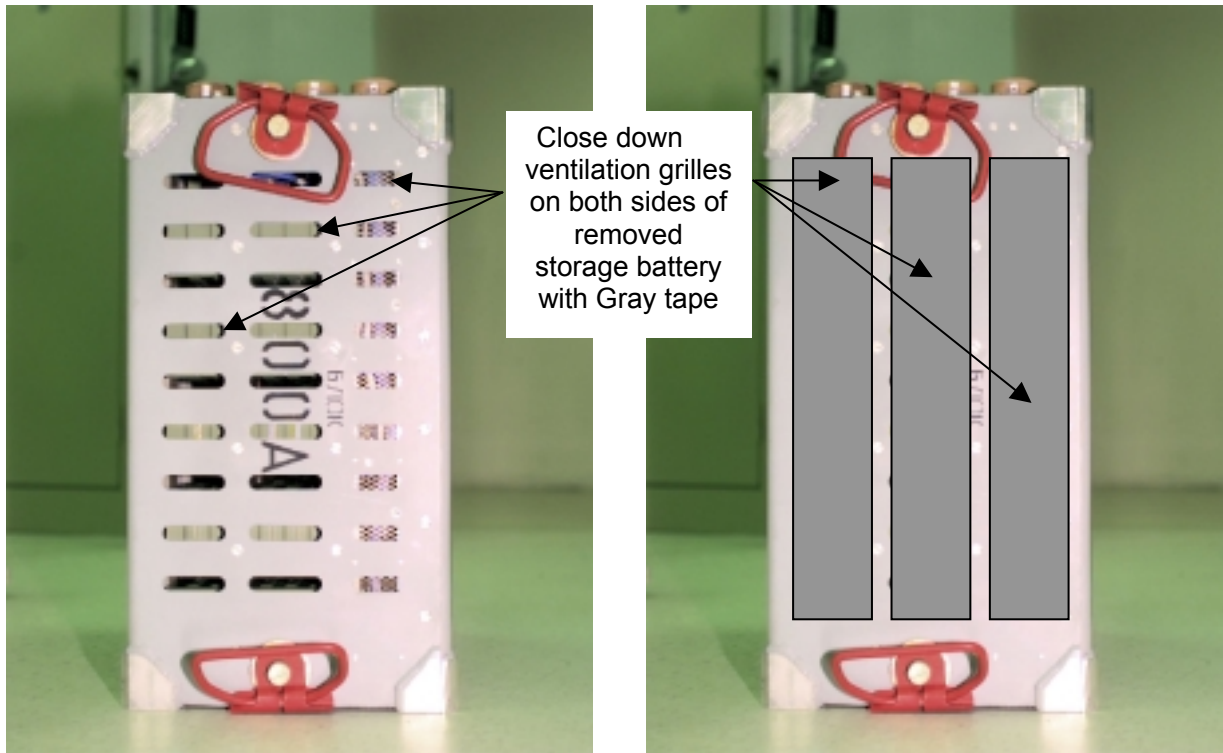


Figure 12.1-5. Battery Vent Grille Taping Diagram

12.2. CHARGE/DISCHARGE CURRENT INTEGRATOR (MIPT-3) UNITS ≠ 77KM-7200.1=A1 – A18 CHANGEOUT

(01:00:00)

REQUIRED TOOLS AND HARDWARE:

Knife,
Flashlight,
Ziplock Bag
2A.2B Special Tools:
Connector Pliers
Wire Cutters
4" Standard Screwdriver
Scissors, 2" Cut, 8-1/4" Long
Grey Tape, 2" width

Delivered Hardware:

New MIPT-3 units — A16, A17, A18 (three)

WARNING

Proceed on **MCC Go** after 3PY is powered off via КРЛ

OLD UNIT REMOVAL (see Table 12.2-1)

1. Remove required panel
2. Photograph MIPT-3 unit installation area before changeout
3. If necessary, cut open metal bands (roll sharp ends inside and safe with Gray tape), then bend them towards cables

NOTE

Units may be removed in any order, after that, re-install them in the reverse order of removal.

4. Remove custom screws (two)
5. Onboard cable ←+→ connector X1 of unit
6. Remove the old unit and temp stow

NEW UNIT INSTALLATION (see Table 12.2-1)

7. Install new unit
8. Onboard cable →|← connector X1 of unit
9. Install custom screws (two) with knurled head in convenient threaded holes
10. Photograph MIPT-3 unit installation area after changeout
11. Close panel
12. **Report** task completion to **MCC**
13. **MCC** performs functional check via КРЛ
14. Stow removed units (√ **MCC** for storage location)

Table 12.2-1

Unit ID Number	Panel Location	3PY Unit	Cable Connector	Unit Connector
≠7200.1=A18 ≠7200.1=A17 ≠7200.1=A16	111	3PY6	≠7200.1=A18-1 ≠7200.1=A17-1 ≠7200.1=A16-1	X1
≠7200.1=A1 ≠7200.1=A2 ≠7200.1=A3	103	3PY1	≠7200.1=A1-1 ≠7200.1=A2-1 ≠7200.1=A3-1	X1
≠7200.1=A4 ≠7200.1=A5 ≠7200.1=A6	104	3PY2	≠7200.1=A4-1 ≠7200.1=A5-1 ≠7200.1=A6-1	X1
≠7200.1=A7 ≠7200.1=A8 ≠7200.1=A9	105,106	3PY3	≠7200.1=A7-1 ≠7200.1=A8-1 ≠7200.1=A9-1	X1
≠7200.1=A10 ≠7200.1=A11 ≠7200.1=A12	109,108	3PY4	≠7200.1=A10-1 ≠7200.1=A11-1 ≠7200.1=A12-1	X1
≠7200.1=A15 ≠7200.1=A14 ≠7200.1=A13	110	3PY 5	≠7200.1=A15-1 ≠7200.1=A14-1 ≠7200.1=A13-1	X1

FOR NOTES