SERVICE MODULE

THERMAL MODE CONTROL SYSTEM
[COTP]

SM

© РКК «ЭНЕРГИЯ», 2000
## Revision Log

1 E  - 20 Sep 00  
2 E  - 20 Sep 00  
3 E  - 20 Sep 00  
4 E  - 20 Sep 00  
5 E  - 20 Sep 00  
6 E  - 20 Sep 00  
7 E  - 20 Sep 00  
8 E  - 20 Sep 00  

1—1 E  - 20 Sep 00  
1—2 E  - 20 Sep 00  
2—1 E  - 20 Sep 00  
2—2 E  - 20 Sep 00  
2—3 E  - 20 Sep 00  
2—4 E  - 20 Sep 00  
2—5 E  - 20 Sep 00  
2—6 E  - 20 Sep 00  
2—7 E  - 20 Sep 00  
2—8 E  - 20 Sep 00  
2—9 E  - 20 Sep 00  
2—10 E  - 20 Sep 00  
2—11 E  - 20 Sep 00  
2—12 E  - 20 Sep 00  
2—13 E  - 20 Sep 00  
2—14 E  - 20 Sep 00  
2—15 E  - 20 Sep 00  

3—1 E  - 20 Sep 00  
3—2 E  - 20 Sep 00  
3—3 E  - 20 Sep 00  
3—4 E  - 20 Sep 00  
3—5 E  - 20 Sep 00  

4—1 E  - 20 Sep 00  
4—2 E  - 20 Sep 00  
4—3 E  - 20 Sep 00  
4—4 E  - 20 Sep 00  
4—5 E  - 20 Sep 00  
4—6 E  - 20 Sep 00  
4—7 E  - 20 Sep 00  
4—8 E  - 20 Sep 00  
4—9 E  - 20 Sep 00  
4—10 E  - 20 Sep 00  
4—11 E  - 20 Sep 00  
4—12 E  - 20 Sep 00  
4—13 E  - 20 Sep 00  
4—14 E  - 20 Sep 00
# TABLE OF CONTENTS

1. **GENERAL INSTRUCTIONS** ................................................................. 1—1

   1.1. CREW RESPONSIBILITIES ................................................................. 1—1

   1.2. SAFETY PRECAUTIONS ................................................................. 1—2

2. **AIR CONDITIONER ([CKB1,CKB2]) AND CONDENSATE LINE ([MOK])** ........................................ 2—1

   2.1. [CKB] DISPLAY OPERATION .......................................................... 2—1

   2.2. [CKB] CONTROL ........................................................................... 2—2

   2.2.1. [CKB1] ([CKB2]) AND [HOK1] ([HOK2]) ACTIVATION/DEACTIVATION .... 2—2

   2.2.2. [CKB1] ([CKB2]) SETTING TEMPERATURE SELECTION .... 2—3

   2.2.3. [CKB1] ([CKB2]) OPERATING MODE SELECTION .... 2—3

   2.2.4. [CKB1] ([CKB2]) ACTIVATION/DEACTIVATION USING DIRECT COMMAND (ON MCC-M GO) .... 2—4

   2.2.5. [CKB1]([CKB2]) TEMPERATURE SENSOR FUNCTIONAL CHECK (ON MCC-M GO) ......................................................... 2—5

   2.2.6. POWER SUPPLY FUNCTIONAL CHECK (ON MCC-M GO) .......... 2—5

   2.3. [BT1], [BTK1] ([BT2], [BTK2]) OPERATION .................................. 2—6

   2.4. [MOK] DISPLAY OPERATION .......................................................... 2—8

   2.5. [CKB1] ([CKB2]) AND [MOK] MALFUNCTIONS ......................... 2—9

   2.5.1. 'SM SKV1 (2) AIR CONDITIONER OFF-NOMINAL SHUTDOWN-RS' ........ 2—9

   2.5.1.1. COOLANT TEMPERATURE IS ABNORMALLY LOW (ON MCC-M GO) ........... 2—10

   2.5.1.2. COOLANT PRESSURE IS ABNORMALLY HIGH (ON MCC-M GO) .......... 2—10

   2.5.1.3. POWER SUPPLY INLET CURRENT IS ABNORMALLY HIGH (ON MCC-M GO) ............ 2—10

   2.5.1.4. FAN REVOLUTIONS ARE ABNORMALLY LOW (ON MCC-M GO) .......... 2—11

   2.5.2. [BT1] ([BT2]) FAILURE ............................................................... 2—12

   2.5.3. [BTK1] ([BTK2]) ........................................................................ 2—13

   2.5.4. 'SM REPLACE CONDENSATE COLLECTION TANK IN SKV-RS' .......... 2—14

   2.5.5. [HOK1] ([HOK2]) FAILURE ......................................................... 2—15

   2.5.6. MOISTURE APPEARANCE IN [CKB1][([CKB2]) AREA .... 2—15

3. **ACTIVE THERMAL CONTROL SYSTEM [CTP]** ........................................ 3—1

   3.1. ACTIVE THERMAL COTROL SYSTEM MALFUNCTION ................. 3—1

   3.1.1. LOOP OUTSIDE LEAK ............................................................... 3—1

   3.1.2. KOB1 INTERNAL LEAK ............................................................... 3—3

   3.1.3. KOB2 INTERNAL LEAK ............................................................... 3—14

   3.1.4. 'OTKA3 КОЛУТПОК КОX' (KOX LOOPS FAILURE) ................. 3—14

   3.1.5. ‘OTKA3 КОЛУТПОК КОБ’ (KOБ LOOPS FAILURE) ................. 3—14

4. **VENTILATION SUBSYSTEM ([CB])** .................................................. 4—1

   4.1. [CB] DISPLAY OPERATION ............................................................ 4—1

   4.2. FAN CONTROL ............................................................................ 4—1

   4.2.1. FAN ACTIVATION/DEACTIVATION VIA SYSTEM POWER PANEL (ППС) .......... 4—1

   4.2.2. [BH1] ([BH2]) CONTROL ............................................................ 4—3

   4.2.3. CONTROL OF CREW QUARTERS FANS (BK01 (BK02)) .......... 4—4

   4.2.4. TOILET CABIN FAN (BCY) CONTROL ....................................... 4—5

   4.2.5. LIRA EQUIPMENT FAN (ВОЛ) OPERATION MONITORING (ON MCC-M GO) ................. 4—5

   4.2.6. [BK1] ([BK2], [BK3], [BK4]) OPERATION .................................... 4—5

   4.3. AIR FLOW CONTROL IN CREW QUARTERS (STARBOARD (PORT)) . 4—7

   4.4. DUST FILTER (Π Ф01 (Π Ф4, Π Ф3, Π Ф4)) INSPECTION .......... 4—7

   4.5. VENTILATION SUBSYSTEM [CB] PREVENTIVE MAINTENANCE ........ 4—8
4.5.1. Пф1 (Пф2, Пф3, Пф4) CARTRIDGE REPLACEMENT .............................................. 4—8
4.5.2. CLEANING OF [СКВ1] ([СКВ2]) GAS-LIQUID HEAT EXCHANGER (ГЖТ)
    GRILL ........................................................................................................ 4—9
4.5.3. GAS ANALYZER (ГА) VENTILATION CLEANING ............................................. 4—9
4.5.4. SCREEN FILTER CLEANING ........................................................................ 4—9
4.5.5. FLEXIBLE AIR DUCT CLEANING ............................................................... 4—10
4.5.6. FAN SCREEN CLEANING ............................................................................ 4—10

4.6. VENTILATION SUBSYSTEM [СВ] MALFUNCTION ........................................... 4—12
4.6.1. FAILURE OF FANS CONTROLLED VIA ППС AND OF TOILET CABIN FAN4—12
4.6.2. CABIN AIR HEATER ([ВН1] ([ВН2])) FAILURE ........................................... 4—13
4.6.3. CREW QUARTERS FAN ([ВКЮ1] ([ВКЮ2])) FAILURE ................................ 4—14
4.6.4. PERSONAL FAN ([ВК1] ([ВК2], [ВК3], [ВК4])) FAILURE ............................... 4—14

APPENDIX. [COTP] Backup Modes
INTRODUCTION

These COTP crew procedures contain information for the crew about procedures and rules for Active Thermal Control, Air Conditioning and Ventilation Systems operations. COTP (Backup Modes) book contains procedures about COTP, performed by the crew on MCC-M if it is not possible to perform them by MCC-M during:

- maintenance support
- test performance
- change of operating modes and configuration of thermal control system pumps

These crew procedures are intended for trained crew members who have completed the full training course and simulations, and also per results of full-scale tests.

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

These crew procedures are developed per БВС software release 4.30.14 and RS Laptop software dated 07.03.00.

ACRONYMS AND ABBREVIATIONS

алг - algorithm
б/и - crew procedures
БВ - switch panel
БВК - command output unit
БИТС - onboard measurement telemetry subsystem
БКС - onboard cable network
БРУС - fan speed control unit
ВАП - equipment fan
ВВПрК - transfer tunnel air duct fan
ВВПхО - transfer compartment duct fan
ВГЖТ - gas-liquid heat exchanger fan
ВД - air duct
ВК - personal fan
ВКЮ - crew quarters fan
ВН - cabin air heater
ВОЛ - Lira equipment fan
ВПО - instrument area fan
ВПрК - transfer chamber fan
ВПхО - transfer compartment fan
ВСУ - toilet cabin fan
ВСЭП - СЭП equipment fan
ВТ - heat exchanger fan
ВТК - heat exchanger-condenser fan
ГЖТ - gas-liquid heat exchanger
Дна3-М - report to MCC-M
ДпоУ3-М - √МСС-M
ДТ - temperature sensor
загл - cap, plug
ЗИП - spares kit
ИнПУ - integrated control panel
кбл - cable
кл - valve
клав - pushbutton
кн - pb
КОБ - SM internal thermal loop
<table>
<thead>
<tr>
<th>Буква</th>
<th>Обозначение</th>
<th>Описание</th>
</tr>
</thead>
<tbody>
<tr>
<td>КОК</td>
<td>- SM external thermal loop</td>
<td></td>
</tr>
<tr>
<td>КРЛ</td>
<td>- command radio link</td>
<td></td>
</tr>
<tr>
<td>КУ</td>
<td>- compressor [СКВ]</td>
<td></td>
</tr>
<tr>
<td>МЗ</td>
<td>- air conditioner fan</td>
<td></td>
</tr>
<tr>
<td>МОК</td>
<td>- condensate line</td>
<td></td>
</tr>
<tr>
<td>Н/С</td>
<td>- off-nominal situation</td>
<td></td>
</tr>
<tr>
<td>НОК</td>
<td>- condensate pump</td>
<td></td>
</tr>
<tr>
<td>НЭП</td>
<td>- Science Power Platform</td>
<td></td>
</tr>
<tr>
<td>Откл</td>
<td>- deactivate, deactivated (if there is no label)</td>
<td></td>
</tr>
<tr>
<td>п</td>
<td>- procedure</td>
<td></td>
</tr>
<tr>
<td>перекл</td>
<td>- switch</td>
<td></td>
</tr>
<tr>
<td>ПДНК</td>
<td>- external loop refill panel</td>
<td></td>
</tr>
<tr>
<td>ПК</td>
<td>- valve panel</td>
<td></td>
</tr>
<tr>
<td>ПКР</td>
<td>- accumulator panel</td>
<td></td>
</tr>
<tr>
<td>ПоУЗ-М</td>
<td>- on MCC-M GO</td>
<td></td>
</tr>
<tr>
<td>ППС</td>
<td>- system power panel</td>
<td></td>
</tr>
<tr>
<td>ПрК</td>
<td>- transfer chamber</td>
<td></td>
</tr>
<tr>
<td>ПСС</td>
<td>- caution and warning panel</td>
<td></td>
</tr>
<tr>
<td>ПУВН</td>
<td>- cabin air heaters control panel</td>
<td></td>
</tr>
<tr>
<td>ПФ</td>
<td>- dust filter</td>
<td></td>
</tr>
<tr>
<td>ПхО</td>
<td>- transfer compartment</td>
<td></td>
</tr>
<tr>
<td>РБС</td>
<td>- power outlet</td>
<td></td>
</tr>
<tr>
<td>РВ</td>
<td>- ventilation grill</td>
<td></td>
</tr>
<tr>
<td>РРЖ</td>
<td>- flow control valve</td>
<td></td>
</tr>
<tr>
<td>рзм</td>
<td>- cnctr, connector</td>
<td></td>
</tr>
<tr>
<td>рис</td>
<td>- Figure</td>
<td></td>
</tr>
<tr>
<td>РН</td>
<td>- manual pump</td>
<td></td>
</tr>
<tr>
<td>РО</td>
<td>- working compartment</td>
<td></td>
</tr>
<tr>
<td>РП</td>
<td>- flow regulator</td>
<td></td>
</tr>
<tr>
<td>РПК</td>
<td>- cabin flow rate indicator</td>
<td></td>
</tr>
<tr>
<td>РРЖ</td>
<td>- flow control valve</td>
<td></td>
</tr>
<tr>
<td>с/с</td>
<td>- ground pass, comm pass</td>
<td></td>
</tr>
<tr>
<td>СбК</td>
<td>- condensate container</td>
<td></td>
</tr>
<tr>
<td>СВ</td>
<td>- ventilation subsystem</td>
<td></td>
</tr>
<tr>
<td>СвД</td>
<td>- light emitting diode, LED</td>
<td></td>
</tr>
<tr>
<td>СД</td>
<td>- pressure alarm, pressure indicator</td>
<td></td>
</tr>
<tr>
<td>СКВ</td>
<td>- air conditioner</td>
<td></td>
</tr>
<tr>
<td>СМ</td>
<td>- Service Module</td>
<td></td>
</tr>
<tr>
<td>см</td>
<td>- reference, see</td>
<td></td>
</tr>
<tr>
<td>СО</td>
<td>- Docking Compartment</td>
<td></td>
</tr>
<tr>
<td>СОС</td>
<td>- atmosphere revitalization subsystem</td>
<td></td>
</tr>
<tr>
<td>СОТР</td>
<td>- thermal mode control system</td>
<td></td>
</tr>
<tr>
<td>СПН</td>
<td>- replaceable pump panel</td>
<td></td>
</tr>
<tr>
<td>СРВ-К2М</td>
<td>- condensate water processor</td>
<td></td>
</tr>
<tr>
<td>СТР</td>
<td>- active thermal control system</td>
<td></td>
</tr>
<tr>
<td>СУ</td>
<td>- docking assembly</td>
<td></td>
</tr>
<tr>
<td>т/н</td>
<td>- coolant</td>
<td></td>
</tr>
<tr>
<td>ТК</td>
<td>- Soyuz transport vehicle</td>
<td></td>
</tr>
<tr>
<td>ТКГ</td>
<td>- Progress cargo vehicle</td>
<td></td>
</tr>
<tr>
<td>ТМИ</td>
<td>- Telemetry</td>
<td></td>
</tr>
<tr>
<td>ФГБ</td>
<td>- Functional Cargo Block (FGB)</td>
<td></td>
</tr>
<tr>
<td>ФС</td>
<td>- screen filter</td>
<td></td>
</tr>
<tr>
<td>ЦУП-М</td>
<td>- Mission Control Center-Moscow, МСС-М</td>
<td></td>
</tr>
<tr>
<td>ЦУП-Х</td>
<td>- Mission Control Center-Houston, МСС-Н</td>
<td></td>
</tr>
<tr>
<td>ЭК</td>
<td>- solenoid valve</td>
<td></td>
</tr>
<tr>
<td>ЭН</td>
<td>- КОБ electrical heater</td>
<td></td>
</tr>
</tbody>
</table>
SYMBOLS

- illuminated
- blinking
- not illuminated
- sw BT1 → On (i.e. up relative to label on panel)
- sw BT1 → Off (i.e. down relative to label on panel)
- i.e. right relative to label on panel
- i.e. left relative to label on panel
- mouse left click
- rotate clockwise
- rotate counterclockwise
- rotate counterclockwise to stop
- rotate clockwise to stop
- adjust by rotating
- place physical device in designated state
- control panel status
- disconnect
- connect
- press pushbutton
- press pushbutton to lock
- check (in case of discrepancy, attempt a corrective action one time only)
- verify
- continuously monitor
- verify aurally
- tactile verification

3ВУК
- acknowledge audio alarm
15:46:28
- 15 hours 46 minutes 28 seconds
- repeat steps

♀ BT1 is running ********************
Use the other [BK] or ON MCC-M GO Replace fan ********************

♀ СКВ1 работает ******* Report to MCC-M

ПУВН ↓ ПУЛЬТ ВКЛ □ СвД Д1

НОК1 (НОК2) — ★

- an anticipated off-nominal situation, if the condition left of the asterisks on the same line is not met, perform action(s) enclosed by asterisk lines
- off-nominal situation, if the condition left of the asterisks on the same line is not met, perform 2.5.2
- an anticipated off-nominal situation, if the condition left of the asterisks on the same line is not met, stop performing procedure and \(\text{MCC-M}\)

- press pb PANEL PWR, in this case □ LED Д1
- advisory annunciation (not mandatory for monitoring)
COMMAND ISSUE VIA RS LAPTOP

RS Laptop

CM: COTP: Commands

 Execute

- Open the specified display
- Select the command by its unique ID
- Issue the command with execution confirmation

PROCEDURE RUN VIA RS LAPTOP

RS Laptop

CM: COTP: CTP_proc

 Execute

- Open the specified display
- Select the command by its unique ID
- Type parameter #1 value in the parameter input field

param 1 __

param n __

('n' stands for total number of procedure parameters)

- Type parameter #n value in the parameter input field
- Run the procedure with execution confirmation

COMMAND ISSUE VIA INTEGRATED CONTROL PANEL (ИнПУ)

ИнПУ

SM COTP CONTROL

FAN MASTER PWR OFF □ FANS PWR OFF

- Open the specified display
- Place cursor on softkey (FAN MASTER PWR)
- Press key COMMAND / OFF (OFF)
- Verify indicator (FANS PWR OFF) becomes highlighted (in bright green)

INDICATOR MONITORING VIA ИнПУ

ИнПУ

SM COTP CONTROL

□ FAN1 ПрК PWR ON

- Open the specified display
- Verify indicator (FAN1 ПрК PWR ON) becomes highlighted (in bright green)
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-M instructions, in accordance with the crew functional responsibilities and current status of the onboard systems

2. Report to MCC-M completed operations

3. Monitor systems operation per these crew procedures and MCC instructions

4. 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)
   - report to MCC-M at the earliest available comm pass

5. In the event of an off-nominal situation, take corrective action by executing the malfunction procedure

6. Perform indicator panel lamp test

7. Output commands via control panels by pressing pushbuttons (without lock) and holding for 1-2 sec.

8. Record actual time spent performing operations

9. When working with hardware (control panels, hoses, cables etc.) equipped with protective caps and covers:
   - remove caps and covers before operations
   - re-install caps and covers after operations
1.2. SAFETY PRECAUTIONS

To ensure nominal systems operation and crew safety, the crew is responsible for the following actions:

1. When working with the system, use only hardware, tools, and protective devices designated by these crew procedures or by MCC-M.

2. 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
   - report to MCC-M at the earliest available comm pass

3. Replace fuses only when system or instrument is unpowered. Replace fuse per amperage, labeled on the fuse.
   \(\text{MCC-M}\) before repeating fuse replacement.
2. AIR CONDITIONER ([CKB1, CKB2]) AND CONDENSATE LINE ([MOK])

2.1. [CKB] DISPLAY OPERATION

Figure 2.1-1 Display of activated [CKB1] (similar for [CKB2])
Mode “Drying” is selected. Coolant condenser operates on КОБ2.
Tlm values correspond to setting mode of [CKB] operation.

Figure 2.1-2 Display of deactivated [CKB1] (similar for [CKB2])
2.2. [CKB] CONTROL

2.2.1. [CKB1] ([CKB2]) AND [HOK1] ([HOK2]) ACTIVATION/DEACTIVATION

1. [CKB1] ([CKB2]) AND [MOK] PREPARATION FOR ACTIVATION

201(401) √ 7Kn1 (7Kn2) --- ОТКРЫТ (Open)
When evacuating condensate to condensate container (C6K):
401 7Kn3 → ЗАКРЫТ (Closed)
201 7Kn4 → В СБОРНИК КОНДЕНСАТА (to C6K)
behind 131 √ pb ВКЛ (On) (on 7СД)
√ Condensate container valve-indicator — ОТКР (Open) (c−)
When pumping condensate to CPB-K2M (condensate water processor):
401 7Kn3 → В CPB-K (to [CPB-K])
201 7Kn4 → ЗАКРЫТ (Closed)
behind 204(404) √ Mode is selected On MCC-M GO (COOLING or DRYING) (see 2.2.3)
RS Laptop CM:COTP:CB
√ BT1 (BT2), BTK1 (BTK2) — (see 2.3)
CM:COTP:CTP:MOK
∠ HOK1 (HOK2) — (when [CKB2] ([CKB1]) is operating )
if [HOK1][HOK2]) — Wait — ( ) (for ≤ 30 min)

2. [CKB1] ([CKB2]) AND [HOK1] ([HOK2]) ACTIVATION

RS Laptop CM:COTP:CTP_proc
proc FT_207 (CKB1 and HOK1 Activation)
proc FT_208 (CKB2 and HOK2 Activation)
00:00:00 Execute
00:01:00 CM:COTP:CTP:CKB1(CKB2)
∠
∠ Power ON
∠ BP —

When activating [CKB1] ([CKB2]) after C6K replacement or [CPB-K2M] failure:
≤ 00:05:00 — — 2---5 V (for 30 sec)

3. [CKB1] ([CKB2]) AND [HOK1] ([HOK2]) DEACTIVATION

RS Laptop CM:COTP:CTP_proc
proc FT_209 (CKB1 and HOK1 Deactivation)
proc FT_210 (CKB2 and HOK2 Deactivation)
Execute
ПСС □ OTHER (yellow) ALARM
RS Laptop CM:COTP:CTP:CKB1(CKB2)
∠ System Status Off-nominal halt
∠ Power OFF
∠ BP —

NOTE
After [CKB1] ([CKB2]) deactivation, [HOK1] ([HOK2]) continues operating for 30 min
2.2.2. [CKB1] ([CKB2]) SETTING TEMPERATURE SELECTION

RS Laptop: Activate [CKB1][[CKB2]] (see 2.2.1 step 2)

<table>
<thead>
<tr>
<th>#</th>
<th>CKB1 (CKB2) T setting selection</th>
<th>Cmd</th>
<th>CM:COTP: Commands</th>
<th>CM:COTP:CTP:CKB1(CKB2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CKB1: minus 0.5 °C</td>
<td>T_PRVKV1M05D (CKB1 Setpoint –0.5 C)</td>
<td>Adjustment -0.5 °C</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CKB1: minus 1.5 °C</td>
<td>T_PRVKV1M15D (CKB1 Setpoint –1.5 C)</td>
<td>Adjustment -1.5 °C</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CKB2: minus 0.5 °C</td>
<td>T_PRVKV2M05D (CKB2 Setpoint –0.5 C)</td>
<td>Adjustment -0.5 °C</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CKB2: minus 1.5 °C</td>
<td>T_PRVKV2M15D (CKB2 Setpoint –1.5 C)</td>
<td>Adjustment -1.5 °C</td>
<td></td>
</tr>
</tbody>
</table>

2.2.3. [CKB1] ([CKB2]) OPERATING MODE SELECTION
(On MCC-M GO)

CAUTION
When operating, observe integrity of hydraulic manifolds and check for leaks

1. COOLING MODE SELECTION

behind 204 (404) Valve BH1 → 2 (upward)
Valve BH2 → 1 (upward)
RS Laptop: CM:COTP:CTP:CKB1(CKB2)

Report to MCC-M

2. DRYING MODE SELECTION

behind 204 (404) Valve BH1 → 3 (downward)
Valve BH2 → 0 (downward)
RS Laptop: CM:COTP:CTP:CKB1(CKB2)

Report to MCC-M
2.2.4. [CKB1] ([CKB2]) ACTIVATION/DEACTIVATION USING DIRECT COMMAND (ON MCC-M GO)

CAUTION

Perform only during comm pass when operating per Ошибка! Источник ссылки не найден., Ошибка! Источник ссылки не найден.

(OFF-NOMINAL DEACTIVATION) when the [CKB1] ([CKB2]) parameters \( T_{\text{coolant}} < N \) or \( T_{\text{converter}} > N \)

1. [CKB1] ([CKB2]) ACTIVATION

RS Laptop

**CM:TBM:Procedures**

<table>
<thead>
<tr>
<th>proc</th>
<th>F18_3</th>
<th>(Cntl cmd (KY) output for БС 1, Enable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>param</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

**CM:COTP:Commands**

<table>
<thead>
<tr>
<th>cmd</th>
<th>T_ONPSKV1</th>
<th>(CKB-1 power ON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>cmd</td>
<td>T_ONPSKV2</td>
<td>(CKB-2 power ON)</td>
</tr>
</tbody>
</table>

**Execute**

**CM:COTP:CTP:CKB1(CKB2)**

Without indication

2. [CKB1] ([CKB2]) DEACTIVATION

RS Laptop

**CM:COTP:Commands**

<table>
<thead>
<tr>
<th>cmd</th>
<th>T_OFPSKV1</th>
<th>(CKB-1 power OFF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>cmd</td>
<td>T_OFPSKV2</td>
<td>(CKB-2 power OFF)</td>
</tr>
</tbody>
</table>

**Execute**

**CM:TBM:Procedures**

<table>
<thead>
<tr>
<th>proc</th>
<th>F18_4</th>
<th>(Cntl cmd (KY) output for БС 1 (Initial), Inhibit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>param</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

**Execute**

**CM:COTP:CTP:CKB1(CKB2)**

Without indication
2.2.5. [CKB1]([CKB2]) TEMPERATURE SENSOR FUNCTIONAL CHECK (ON MCC-M GO)

on [CKB1(2)] housing
behind 204(404) cnctr X027/52 ←→ [CKB] cbl

00:00:00 Activate [CKB1] ([CKB2]) by command in comm pass (see 2.2.4 step 1)
00:01:00 ←→ [CKB1] ([CKB2]) activation

******************************************************************************
Deactivate [CKB1] ([CKB2]) by command in comm pass
(see 2.2.4 step 2)
Operate [CKB2] ([CKB1]) (see 2.2.1.)
On MCC-M GO Replace БУ (see RODF: IFM IVA SM)
******************************************************************************

Deactivate [CKB1] ([CKB2]) by command in comm pass (see 2.2.4 step 2)
behind 204(404) cnctr X027/52 ←→ onboard cable network
Report to MCC-M

2.2.6. POWER SUPPLY FUNCTIONAL CHECK (ON MCC-M GO)

To the left of compressor
behind 204(404) cnctr X005/52 ←→ БКС

00:00:00 Activate [CKB1] ([CKB2]) by command in comm pass (see 2.2.4 step1)
00:01:00 ←→ [CKB1] ([CKB2]) activation

******************************************************************************
Deactivate [CKB1] ([CKB2]) by command in comm pass
(see 2.2.4 step 2)
Operate [CKB2] ([CKB1]) (see 2.2.1.)
On MCC-M GO Replace БП (see RODF: IFM IVA SM)
******************************************************************************

Deactivate [CKB1] ([CKB2]) by command in comm pass (see 2.2.4 step 2)
behind 204(404) cnctr X005/52 ←→ БКС
Report to MCC-M
2.3. [BT1], [BTK1] ([BT2], [BTK2]) OPERATION

**NOTE**

[BT1], [BTK1] ([BT2], [BTK2]) are operating continuously
Deactivate only when perform assembly operations or maintenance activities

<table>
<thead>
<tr>
<th>Fan</th>
<th>Part-No.</th>
<th>Fan-location</th>
<th>Control panel and its location</th>
</tr>
</thead>
<tbody>
<tr>
<td>[BT1]</td>
<td>MO-2-5008p</td>
<td>behind 205</td>
<td>306 ППС-21, 204 БРУС А15</td>
</tr>
<tr>
<td>[BT2]</td>
<td>MO-2-5008p</td>
<td>behind 405</td>
<td>308 ППС-22, 404 БРУС А18</td>
</tr>
<tr>
<td>[BTK1]</td>
<td>MO-1-5006</td>
<td>behind 205</td>
<td>306 ППС-21, 204 БРУС А16</td>
</tr>
<tr>
<td>[BTK2]</td>
<td>MO-1-5006</td>
<td>behind 405</td>
<td>308 ППС-22, 404 БРУС А19</td>
</tr>
</tbody>
</table>

1. [BT1] ([BTK1], [BT2], [BTK2]) ACTIVATION WHEN OPERATING WITHOUT FAN SPEED CONTROL UNIT (БРУС)

ППС-21(22) @ BT1 (BTK1, BT2, BTK2)
RS Laptop CM:COTP:CB or CM:COTP:CTP:CKB1 (CKB2)

2. With LED 8 (mode 8) (one) – fan nominal revolutions
From mode 1 to mode 7 – decrease of rpm
3. After each press of pb MODE, fan noise should decrease
4. Mode switchover time is 5 sec

**NOTE**

1. [BT1] ([BTK1], [BT2], [BTK2]) rpm control is possible only after installation of [CKB1] ([CKB2]) with БРУС delivered instruments
2. With LED 8 (mode 8) (one) – fan nominal revolutions
From mode 1 to mode 7 – decrease of rpm
3. After each press of pb MODE, fan noise should decrease
4. Mode switchover time is 5 sec

БРУС А15(16,18,19) \(\ominus\) POWER (opposite of arrow direction)

ППС-21(22) @ BT1 (BTK1, BT2, BTK2)
РС Laptop CM:COTP:CB or CM:COTP:CTP:CKB1 (CKB2)

БРУС А15(16,18,19) \(\ominus\) POWER (in arrow direction) \(\square\) LED 8
On MCC-M GO:

<table>
<thead>
<tr>
<th>#</th>
<th>Mode selection</th>
<th>БРУС A15(16,18,19) (mode switchover time is 5 sec)</th>
<th>LEDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 MODE (once after БРУС powerup)</td>
<td></td>
<td>1, 8</td>
</tr>
<tr>
<td>2</td>
<td>2 MODE (twice after БРУС powerup)</td>
<td></td>
<td>2, 8</td>
</tr>
<tr>
<td>3</td>
<td>3 MODE (three times after БРУС powerup)</td>
<td></td>
<td>3, 8</td>
</tr>
<tr>
<td>4</td>
<td>4 MODE (four times after БРУС powerup)</td>
<td></td>
<td>4, 8</td>
</tr>
<tr>
<td>5</td>
<td>5 MODE (five times after БРУС powerup)</td>
<td></td>
<td>5, 8</td>
</tr>
<tr>
<td>6</td>
<td>6 MODE (six times after БРУС powerup)</td>
<td></td>
<td>6, 8</td>
</tr>
<tr>
<td>7</td>
<td>7 MODE (seven times after БРУС powerup)</td>
<td></td>
<td>7, 8</td>
</tr>
</tbody>
</table>

RS Laptop

CM:COTP:CB or CM:COTP:CTP:CKB1 (CKB2)

< BT1 (BTK1, BT2, BTK2) — (3 --- 5 V) ******* Perform 2.5.2 (2.5.3)

Report to MCC-M

4. [BT1] ([BTK1], [BT2], [BTK2]) DEACTIVATION WHEN OPERATING WITH БРУС

БРУС A15(16,18,19) =$\bowtie$ POWER (opposite of arrow direction) ■ LEDs (all)

ППС-21(22) @$\bowtie$ BT1 (BTK1, BT2, BTK2)

RS Laptop

CM:COTP:CB or CM:COTP:CTP:CKB1 (CKB2)

< BT1 (BTK1, BT2, BTK2) —
2.4. [MOK] DISPLAY OPERATION

Valve of condensate supply to CPB-K2M
Valve of condensate supply to CbK

Tlm: [HOK1] rpm
(2---5 V – [HOK1] is operating)

Tlm: CbK activation
(1 – CbK is empty,
0 – CbK is full)

Tlm: [HOK2] rpm
(0---0.5 V – [HOK2] is not operating)

Valve of condensate supply to CbK

Figure 2.4. [MOK] display
(Configuration: [HOK1] is operating, [HOK2] is not operating)

[HOK1] operation timeline when [CKB1] is operating

<table>
<thead>
<tr>
<th>Time (s)</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:00:00</td>
<td>HOK1 5</td>
</tr>
<tr>
<td>00:00:30</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:05:00</td>
<td>HOK1 5</td>
</tr>
<tr>
<td>00:05:30</td>
<td>HOK1 0.5</td>
</tr>
</tbody>
</table>

[HOK2] operation timeline when [CKB2] is operating

<table>
<thead>
<tr>
<th>Time (s)</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:00:00</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:02:30</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:03:00</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:07:30</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:08:00</td>
<td>HOK1 0.5</td>
</tr>
</tbody>
</table>

[HOK] operation timeline when [CKB1] and [CKB2] are operating simultaneously

<table>
<thead>
<tr>
<th>Time (s)</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:00:00</td>
<td>HOK1 5</td>
</tr>
<tr>
<td>00:00:30</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:02:30</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:03:00</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:05:00</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:05:30</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:07:30</td>
<td>HOK1 0.5</td>
</tr>
<tr>
<td>00:08:00</td>
<td>HOK1 0.5</td>
</tr>
</tbody>
</table>

When CKB1 and CKB2 are deactivated (in 30 min after deactivation):
HOK1, HOK2
2.5. [CKB1] ([CKB2]) AND [MOK] MALFUNCTIONS

**CAUTION**

1. In case of freon leak (hissing noise and/or white cloud in the area of compressor) deactivate [CKB], instruments and units with heating cells — report to MCC-M
   On MCC-M GO perform atmosphere scrubbing
2. Do not tighten connectors or do other work on active [CKB] system
3. In the event of any knocking sounds coming from compressor or fans, immediately deactivate [CKB] — report to MCC-M

2.5.1. ‘SM SKV1 (2) AIR CONDITIONER OFF-NOMINAL SHUTDOWN-RS’

**NOTE**

In mode of condensate pump operation when condensate container is full or when there is a signal from [CPB-K2M], [CKB1], [CKB2] are not deactivated automatically

- **ПЛС**
  - OTHER (yellow)
  - ALARM

- **RS Laptop**
  - Caution events

  × ‘SM SKV1 (2) Air Conditioner Off-Nominal Shutdown-RS’

  (with act. [CKB1] ([CKB2]))

- × ‘SM Replace Condensate Collection Tank in SKV-RS’
  - Yes
  - No

- × ‘SM Heating Loops Failure-RS’
  - Yes
  - No

- ПУРВ-К
  - LOW QUAL?
    - POT FULL ?

- CM:COTP:CTP:MOK
  - HOK1, HOK2 —

- ИНПУ

  - CM: COTP CONTROL
    - COND EVAC PUMP 1(2) INOP ?

  - • Report to MCC-M
    - • ÌMCC-M (after MCC-M Tlm info analysis)

  - • If there is no [CKB1(2)] deactivation:
    - Deactivate [CKB1(2)] (see 2.2.1, step 3)
    - Perform 2.5.4.

  - • If there is no [CKB1(2)] deactivation:
    - Deactivate [CKB1(2)] (see 2.2.1, step 3)
    - Perform per RODF: SM COЖ 2.1.13 step 2(3)

  - • Perform 2.5.5
2.5.1.1. COOLANT TEMPERATURE IS ABNORMALLY LOW (ON MCC-M GO)

Deactivate КОБ parallel operation (per Table of 2.2.1, step 3)

- Is H₂O level compartment < 7 mm Hg? 
  - Yes → On MCC-M GO Change [CKB1] ([CKB2]) operating mode
  - No → Are [BT1] ([BT2]) and [BTK1] ([BTK2]) operating?
    - No → Activate [BT1] ([BT2]) and [BTK1] ([BTK2]) (see 2.3.)
    - Yes → On MCC-M GO Check temperature sensor (see 2.2.5)

08:00:00 → Activate [CKB1] ([CKB2]) (see 2.2.1 step 2)

Is [CKB1] ([CKB2]) deactivated per Tcoolant < N?
  - No → On MCC-M GO Change [CKB1] ([CKB2]) operating mode
  - Yes → On MCC-M GO Power supply functional check

2.5.1.2. COOLANT PRESSURE IS ABNORMALLY HIGH (ON MCC-M GO)

- Is there a failure during [CKB1] ([CKB2]) activation?
  - No → √ MCC-M
  - Yes → Is there [CKB1] ([CKB2]) activation?
    - Yes → Continue operation
    - No → √ MCC-M

2.5.1.3. POWER SUPPLY INLET CURRENT IS ABNORMALLY HIGH (ON MCC-M GO)

- Is there a failure during [CKB1] ([CKB2]) activation?
  - No → (After ≥ 15 min)
  - Yes → Is there [CKB1] ([CKB2]) activation?
    - Yes → Continue operation
    - No → On MCC-M GO Power supply functional check
2.5.1.4. FAN REVOLUTIONS ARE ABNORMALLY LOW (ON MCC-M GO)

- Activating [CKB1] ([CKB2]) (see 2.2.1 step 2)

  Is [CKB1] ([CKB2]) deactivated?

  - Yes: Continue operation
  - No: Report to MCC-M

- bhd 204(404)
  - Remove FAN M3
    (see RODF: IFM IVA SM)
  - Inspect FAN M3
  - Remove moisture, dry (if necessary)
  - Rotate propeller

  Is there FAN M3 jam?

  - Yes: Reinstall FAN M3
    (see RODF: IFM IVA SM)
  - No: Replace FAN M3
    (see RODF: IFM IVA SM)
    • Report to MCC-M
2.5.2. [BT1] ([BT2]) FAILURE

RS Laptop
• CM:COTP:CB
• BT1 (BT2) __
• LED (with mode number), LED8

Activate BT1(BT2) with max rpm:
• Choose mode number
ППС-21(22) • BT1 (BT2)
БРУС А15(18) • POWER (opposite of arrow direction) LED 8
ППС-21(22) • BT1 (BT2)
БРУС А15(18) • POWER (in arrow direction) LED 8
Is [BT1] ([BT2]) operating?

No

Activate BT1(BT2) without БРУС:
ППС-21(22) • BT1 (BT2)
БРУС А15(18) • POWER (opposite of arrow direction) LED 8
ППС-21(22) • BT1 (BT2)
Is [BT1] ([BT2]) operating?

No

BT1 (BT2) failure
ППС-21(22) • BT1 (BT2)
• Deactivate [CKB1] ([CKB2])
(see 2.2.1 step 2)
• On MCC-M GO Replace [BT]
(see RODF: IFM IVA SM)
• Activate [BT1] ([BT2]) (see 2.3 step 3)
Is [BT1] ([BT2]) operating?

No

AP5 BT1 (BT2) failure
ППС-21(22) • BT1 (BT2)
• On MCC-M GO Replace AP5
(see RODF: IFM IVA SM)
ППС-21(22) • BT1 (BT2)
Is [BT1] ([BT2]) operating?

No

ППС-21(22) • BT1 (BT2)
• MCC-M

• Select a higher rpm mode using БРУС
(see 2.3. step 3)
• Report to MCC-M

Yes

• БРУС failure
• Operate [BT1] ([BT2]) without БРУС
• On MCC-M GO Replace БРУС
(see RODF: IFM IVA SM)
• Report to MCC-M

Yes

• On MCC-M GO Activate [CKB1] ([CKB2])
(see 2.2.1, step 2)
• Continue nominal operation
• Report to MCC-M

Yes
2.5.3. [BTK1] ([BTK2])

RS Laptop
- CM:COTP:CB
- BTK1 (BTK2)
- LED (with mode number), LED 8

Activate BTK1 (BTK2) with max rpm:
- Choose mode number
- ППС-21(22)
- БРУС A16(19)
- BTK1 (BTK2)
- POWER (opposite of arrow direction)
- LED 8

Is [BTK1] ([BTK2]) operating?

Yes
- Select a higher rpm mode using БРУС
  (see 2.3. step 3)
- Report to MCC-M

No

Start BTK1(BTK2) without БРУС:
- ППС-21(22)
- БРУС A16(19)
- BTK1 (BTK2)
- POWER (opposite of arrow direction)
- LED 8

Is [BTK1] ([BTK2]) operating?

Yes
- БРУС failure
  - Operate BTK1 (BTK2) without БРУС
  - On MCC-M GO Replace БРУС
    (see RODF: IFM IVA SM)
  - Report to MCC-M

No

BTK1 (BTK2) failure
- ППС-21(22)
- BTK1 (BTK2)
- Deactivate CKB1 (CKB2) (see 2.2.1 step 3)
- On MCC-M GO Replace BTK
  (see RODF: IFM IVA SM)
- Activate BTK1 (BTK2) (see 2.3. step 3)

Is [BTK1] ([BTK2]) operating?

Yes
- On MCC-M GO Activate CKB1 (CKB2)
  (see 2.2.1 step 2)
- Continue nominal operation
- Report to MCC-M

No

AP6 BTK1 (BTK2) failure
- ППС-21(22)
- BTK1 (BTK2)
- On MCC-M GO Replace AP6
  (see RODF: IFM IVA SM)
- BTK1 (BTK2)

Is [BTK1] ([BTK2]) operating?

Yes

No

ППС-21(22)
- BTK1 (BTK2)
- MCC
2.5.4. ‘SM REPLACE CONDENSATE COLLECTION TANK IN SKV-RS’

□ OTHER (yellow) ALARM

\n\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{ПСС RS Laptop} & \textbf{Caution events} \\
\hline
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{CM:COTP:CTP:MOK} & \textbf{(condensate container is full)} \\
\hline
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{behind 131} & \textbf{Presence of drops on condensate container indicator valve} \\
\hline
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{CM:COTP:Commands} & \textbf{cmd \ T_OFSNOK (HOK alarm Cancel)} \\
\hline
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{Execute} & \\
\hline
\end{tabular}
\end{center}

Prior to condensate container replacement [СКВ1] ([СКВ2]) and [MOK] are operating on MCC-M GO

1. FILLED CONDENSATE CONTAINER REMOVAL

behind 201
- 7Кп4 → ЗАКРЫТ (Closed)

behind 131
- С6К indicator valve → ЗАКР (Closed) (√)
- Flexible hose ← OK-32 (С6К inlet fitting) (24 mm wrench)
- Cap ← OK-32 (cap is tethered within С6К area)
- Disengage securing clamps (two) and remove condensate container
- Record number and discard

2. NEW CONDENSATE CONTAINER INSTALLATION

131
- Unstow new С6К from ЗИП, record number, install
- Engage securing clamps (two)
- cap ← OK-32 (С6К inlet fitting) (24 mm wrench),
- tether cap within С6К area
- Flexible hose ← OK-32
- Tighten coupling nut (24 mm wrench)

3. NEW С6К CONFIGURATION FOR CONDENSATE COLLECTION

131
- New С6К indicator valve → ОТКР (Open) (√)
- ВКП (On) (on 7СД) into bracket

\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{CM:COTP:CTP:MOK} & \textbf{(С6К is not filled)} \\
\hline
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{201} & 7Кп4 → В СБОРИНКИ КОНДЕНСАТА (to condensate container) \\
\hline
\end{tabular}
\end{center}
**2.5.5. [HOK1] ([HOK2]) FAILURE**

- **ПСС**
  - OTHER (yellow) ALARM

- **ИнПУ**
  - SM, STATUS:COTP
  - 'COTP-SIG'

- **COND EVAC PUMP 1 (COND EVAC PUMP 2) INOP**

- **On MCC-M GO**
  - Replace [HOK] (see RODF: IFM IVA SM)
  - Activate [CKB1] ([CKB2]) (see 2.2.1, step 2)

- **RS Laptop**
  - CM:COTP: Commands:
  - cmd T_OFNSOK (HOK alarm Cancel)
  - Execute

- **ИнПУ**
  - SM, STATUS:COTP
  - 'COTP-SIG'

- **COND EVAC PUMP 1 (COND EVAC PUMP 2) INOP**

- **RS Laptop**
  - CM:COTP:CTP:MOK

- **HOK1 (HOK2) — (is operating per timeline)**

- If no spare [HOK], evacuate condensate using manual pump (PH) per RODF: SM COTP (Backup Modes), 2.1.

**2.5.6. MOISTURE APPEARANCE IN [CKB1][[CKB2]] AREA**

- **behind 202(402)**
  - Appearance of moisture drops

- When [HOK1] ([HOK2]) is operating:
  - No condensate motion in translucent hose on [HOK1] ([HOK2]) outlet
  - HOK1 (HOK2) is operating ([HOK] are locked)

- **00:00:00**
  - Deactivate [CKB1] ([CKB2]) (see 2.2.1 step 3)

- **00:30:00**
  - On MCC-M GO
    - Replace HOK valves 6485.130 КЛ.ВХОД and 6485.140 КЛ.ВЫХОД (see RODF: IFM IVA SM)

- **On MCC-M GO**
  - Prior to replacement, evacuate condensate from [CKB1][[CKB2]] using manual pump [PH] per RODF: SM COTP (Backup Modes), 2.1

- **00:00:00**
  - Activate [CKB1][[CKB2]] (see 2.2.1 step 2)

- **00:30:00**
  - Condensate motion in translucent hose on [HOK1][[HOK2]] outlet

- **On MCC-M GO**
  - Replace inlet fitting 6485.200 with new one from spares

- **00:00:00**
  - Activate [CKB1][[CKB2]] (see 2.2.1 step 2)

- **00:30:00**
  - Condensate motion

**Report to MCC-M**
3. ACTIVE THERMAL CONTROL SYSTEM [CTP]

3.1. ACTIVE THERMAL CONTROL SYSTEM MALFUNCTION

3.1.1. LOOP OUTSIDE LEAK

1. KOX1 LEAK

RS Laptop

<table>
<thead>
<tr>
<th>CM:COTP:СТР:ПКР1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1ДД1, 1ДД2 ≤ 400 mm Hg</td>
</tr>
<tr>
<td>CM:COTP:СТР</td>
</tr>
<tr>
<td>All KOX1 pumps — О</td>
</tr>
<tr>
<td>2Н1 pump — О</td>
</tr>
<tr>
<td>CM:COTP:СТР:Statuses</td>
</tr>
</tbody>
</table>

**Normal Pressure in KOX1**

**Normal Pressure in KOX2**

During KOX1 pri operation (prior to leak):

<table>
<thead>
<tr>
<th>CM:COTP:СТР:KOX1_proc FT_27</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Loop 1РРЖ Deactivation)</td>
</tr>
<tr>
<td>CM:COTP:СТР:KOX1 ↪ 1РРЖ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRESSURE ≤ 400 mm Hg</th>
</tr>
</thead>
</table>

![Diagram of KOX1](image1)

**Figure 3.1.1-1. Pressure in KOX1 in the event of leak into vacuum**

![Diagram of KOX2](image2)

**Figure 3.1.1-2. Pressure in KOX2 in the event of leak into vacuum**

2. KOX2 LEAK

RS Laptop

<table>
<thead>
<tr>
<th>CM:COTP:СТР:ПКР2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2ДД1, 2ДД2 ≤ 400 mm Hg</td>
</tr>
<tr>
<td>CM:COTP:СТР</td>
</tr>
<tr>
<td>All KOX2 pumps — О</td>
</tr>
<tr>
<td>1Н5, 1Н6 pumps — О</td>
</tr>
<tr>
<td>CM:COTP:СТР:Statuses</td>
</tr>
</tbody>
</table>

**Normal Pressure in KOX1**

**Normal Pressure in KOX2**
3. КОБ1 LEAK

RS Laptop

СИ:СОТР:СТР:ПКР3
3ДД1, 3ДД2 ≤ 400 mm Hg
СИ:СОТР:СТР
All pumps КОБ1
H1,H2 4СПН1 pumps
СИ:СОТР:СТР:ЭН
3ЭН1----3ЭН6
СИ:СОТР:СТР:_statuses
Normal Pressure in КОБ1
Normal Pressure in КОБ2

![Figure 3.1.1-3. Pressure in КОБ1 in the event of leak into vacuum](image1)

Figure 3.1.1-3. Pressure in КОБ1 in the event of leak into vacuum

4. КОБ2 LEAK

RS Laptop

СИ:СОТР:СТР:ПКР4
4ДД1, 4ДД2 ≤ 400 mm Hg
СИ:СОТР:СТР
All pumps КОБ2
H1,H2 3СПН1 pumps
СИ:СОТР:СТР:ЭН
4ЭН1----4ЭН6
СИ:СОТР:СТР:statuses
Normal Pressure in КОБ2
Normal Pressure in КОБ1

![Figure 3.1.1-4. Pressure in КОБ2 in the event of leak into vacuum](image2)

Figure 3.1.1-4. Pressure in КОБ2 in the event of leak into vacuum
3.1.2. **КОБ1 INTERNAL LEAK**

(Determined per МСС-М Tlm)

**On МСС-М GO:**

1. **TRANSFER TO 4СПН1(4СПН2) КОБ2**

<table>
<thead>
<tr>
<th>Transfer</th>
<th>Procedure</th>
<th>param</th>
<th>СM:СОРТ::СТР::проц</th>
<th>СM:СОРТ::СТР</th>
</tr>
</thead>
<tbody>
<tr>
<td>КОБ1 → 4СПН1 КОБ2</td>
<td>FT_106 (Transition during КОБ1 operation)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>КОБ1 → 4СПН2 КОБ2</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>(КОБ1 + КОБ2) → deact. КОБ1</td>
<td>FT_108 (Halt КОБ units simo operation)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

2. **КОБ1 AND COMPARTMENT PRESSURE EQUALIZATION**

behind 249 ПК1 cap ↔ filling device (ПЗ)
Secure caps within ПЗ area
Кл В9 → ОТКРЫТ (Open)
00:00:00 Кл В6 → ОТКРЫТ (Open)

RS Laptop СM:СОРТ::СТР::ПКР3 and СM:СОРТ::СТР::ПК1
00:01:00 ≈ 3ДД1=3ДД2=8ДДЗ= P(МВ) ±10 mm Hg

3. **LEAK SOURCE PINPOINTING AND ISOLATION**
Report to MC-M area location with $P_H = 8$
Collect and remove traces of coolant, using paper towels
Discard used paper towels
Cover source of leak with waterproof material

✓ MCC-M
Figure 3.1.2-1 Pressure in КОБ1 in the event of internal leak

Figure 3.1.2-2 Pressure in КОБ2 in the event of internal leak

Figure 3.1.2-3 Valve panel (ПК1) operation in the event of КОБ1 (КОБ2) internal leak

1. Remove cap
2. Open
3a. Open while operating КОБ1
3b. Open while operating КОБ2
### 3.1.3. KOB2 INTERNAL LEAK
(Determined per MCC-M Tlm)

**On MCC-M GO:**
1. TRANSFER TO 3СПН1(3СПН2) KOB1

<table>
<thead>
<tr>
<th>Transfer</th>
<th>Procedure</th>
<th>param</th>
</tr>
</thead>
<tbody>
<tr>
<td>KOB2 → 3СПН1 KOB1</td>
<td>FT_107 (Transition during KOB2 operation)</td>
<td>1 0 Pre. act. KOB2 pump—H1,H2 3СПН1—4ЭН1---4ЭН6</td>
</tr>
<tr>
<td>KOB2 → 3СПН2 KOB1</td>
<td></td>
<td>1 1 Pre. act. KOB2 pump—H1,H2 3СПН2—4ЭН1---4ЭН6</td>
</tr>
<tr>
<td>(КОБ1 + KOB2) → deact. KOB2</td>
<td>FT_108 (Halt KOB units simo operation)</td>
<td>1 All KOB2 pumps—4ЭН1---4ЭН6</td>
</tr>
</tbody>
</table>

2. KOB2 AND COMPARTMENT PRESSURE EQUALIZATION

behind 249 ПК1 cap —— filling device (П3)
Secure caps within П3 area
Кл В9 → ОТКРЫТ (Open)
00:00:00 Кл В7 → ОТКРЫТ (Open)

RS Laptop | СМ: СОТР: СТР: ПКР4 and СМ: СОТР: СТР: ПК1 |
RS Laptop | ОТКРЫТ (Open) |
00:01:00 4ДД1=4ДД2=8ДДЗ= Р(МВ) ±10 mm Hg

Pinpoint leak (see 3.1.2 step 3)

### 3.1.4. 'ОТКАЗ КОНТУРОВ KOX' (KOX LOOPS FAILURE)

ПСС | OTHER (yellow) ALARM |
RS Laptop | Caution events |
RS Laptop | 'SM Cooling Loops Failure-RS' (All KOX1 and KOX2 pumps failure) |
RS Laptop | Station transfers to survival mode |
RS Laptop | MCC-M |

### 3.1.5. 'ОТКАЗ КОНТУРОВ KOB' (KOB LOOPS FAILURE)

ПСС | OTHER (yellow) ALARM |
RS Laptop | Caution events |
RS Laptop | 'SM Heating Loops Failure-RS' (All KOB1 and KOB2 pumps failure) |
RS Laptop | Station transfers to survival mode |
RS Laptop | MCC-M |
4. VENTILATION SUBSYSTEM ([СВ])

4.1. [СВ] DISPLAY OPERATION

ВПФ1, ВПФ2 are not indicated in the display

4.2. FAN CONTROL

4.2.1. FAN ACTIVATION/DEACTIVATION VIA SYSTEM POWER PANEL (ППС)

NOTE
1. ВАП1, ВАП2, ВВ1РО, ВВ2РО, ВВПрК, ВВПрК, ВВПхО, ВВГЖТ1-ВВГЖТ4, ВПО1-ВПО11, ВСЭП-1, ВПФ1, ВПФ2 are running continuously. Deactivation only on MCC-M GO
2. ВПО12 is activated only when the treadmill is running

Activation (deactivation):

ППС    Ø(®) corresponding sw (see Table 4.2.1.)
RS Laptop CM:COTP:СВ
                       ◀ All activated fans
                       ◀ All deactivated fans
<table>
<thead>
<tr>
<th>Fan</th>
<th>Item</th>
<th>Onboard location</th>
<th>Panel</th>
<th>sw</th>
</tr>
</thead>
<tbody>
<tr>
<td>ВАП1</td>
<td>17КС.53Ю 5005-0</td>
<td>behind 104</td>
<td>ППС-22 (308)</td>
<td>ВАП1</td>
</tr>
<tr>
<td>ВАП2</td>
<td>17КС.53Ю 5005-0</td>
<td>behind 102</td>
<td>ППС-21 (306)</td>
<td>ВАП2</td>
</tr>
<tr>
<td>ВВ1РО</td>
<td>МО-1-5006</td>
<td>behind 336, behind cover 17КСМ-7661-360 on rigid air duct</td>
<td>ППС-23 (338)</td>
<td>ВВ1РО</td>
</tr>
<tr>
<td>ВВ2РО</td>
<td>МО-1-5006</td>
<td>behind 333, behind cover 17КСМ-7661-360 on rigid air duct</td>
<td>ППС-24 (338)</td>
<td>ВВ2РО</td>
</tr>
<tr>
<td>ВВПрК</td>
<td>МО-2-5008</td>
<td>behind 129</td>
<td>ППС-24 (338)</td>
<td>ВВПрК</td>
</tr>
<tr>
<td>ВВПхО</td>
<td>МО-2-5008</td>
<td>ПхО, cone, plane 1</td>
<td>ППС-22 (308)</td>
<td>ВВПхО</td>
</tr>
<tr>
<td>ВГЖТ1</td>
<td>МО-2-5006</td>
<td>behind 126</td>
<td>ППС-24 (338)</td>
<td>ВГЖТ1</td>
</tr>
<tr>
<td>ВГЖТ2</td>
<td>МО-2-5008</td>
<td>behind 328</td>
<td>ППС-24 (338)</td>
<td>ВГЖТ2</td>
</tr>
<tr>
<td>ВГЖТ3</td>
<td>МО-2-5008</td>
<td>behind 128</td>
<td>ППС-23 (338)</td>
<td>ВГЖТ3</td>
</tr>
<tr>
<td>ВГЖТ4</td>
<td>МО-1-5006</td>
<td>behind 126</td>
<td>ППС-24 (338)</td>
<td>ВГЖТ4</td>
</tr>
<tr>
<td>ВПО1</td>
<td>17КС.53Ю 5011-0</td>
<td>behind 408</td>
<td>ППС-22 (308)</td>
<td>ВПО1</td>
</tr>
<tr>
<td>ВПО10</td>
<td>МО-2-5008</td>
<td>behind 129</td>
<td>ППС-24 (338)</td>
<td>ВПО10</td>
</tr>
<tr>
<td>ВПО11</td>
<td>МО-2-5008</td>
<td>behind 131</td>
<td>ППС-23 (338)</td>
<td>ВПО11</td>
</tr>
<tr>
<td>ВПО12</td>
<td>МО-2-5008</td>
<td>behind 130</td>
<td>ППС-24 (338)</td>
<td>ВПО12</td>
</tr>
<tr>
<td>ВПО2</td>
<td>17КС.53Ю 5011-0</td>
<td>behind 208</td>
<td>ППС-21 (306)</td>
<td>ВПО2</td>
</tr>
<tr>
<td>ВПО3</td>
<td>17КС.53Ю 5011-0</td>
<td>behind 416</td>
<td>ППС-22 (308)</td>
<td>ВПО3</td>
</tr>
<tr>
<td>ВПО4</td>
<td>17КС.53Ю 5011-0</td>
<td>behind 216</td>
<td>ППС-21 (306)</td>
<td>ВПО4</td>
</tr>
<tr>
<td>ВПО5</td>
<td>МО-2-5008</td>
<td>behind 307</td>
<td>ППС-22 (308)</td>
<td>ВПО5</td>
</tr>
<tr>
<td>ВПО6</td>
<td>МО-2-5008</td>
<td>behind 307</td>
<td>ППС-21 (306)</td>
<td>ВПО6</td>
</tr>
<tr>
<td>ВПО7</td>
<td>МО-2-5008</td>
<td>behind 328</td>
<td>ППС-23 (338)</td>
<td>ВПО7</td>
</tr>
<tr>
<td>ВПО8</td>
<td>МО-2-5008</td>
<td>behind 338</td>
<td>ППС-24 (338)</td>
<td>ВПО8</td>
</tr>
<tr>
<td>ВПО9</td>
<td>МО-2-5008</td>
<td>behind 338</td>
<td>ППС-23 (338)</td>
<td>ВПО9</td>
</tr>
<tr>
<td>ВПрК</td>
<td>МО-2-5008</td>
<td>ПрК, plane 1</td>
<td>ППС-23 (338)</td>
<td>ВПрК</td>
</tr>
<tr>
<td>ВПхО</td>
<td>МО-2-5008</td>
<td>ПхО, cone, plane 4</td>
<td>ППС-21 (306)</td>
<td>ВПхО</td>
</tr>
<tr>
<td>ВПФ1</td>
<td>17КС.53Ю 5011-0</td>
<td>behind 449 (behind ПФ1)</td>
<td>ППС-24 (338)</td>
<td>ВПФ1,2</td>
</tr>
<tr>
<td>ВПФ2</td>
<td>17КС.53Ю 5011-0</td>
<td>behind 246 (behind ПФ2)</td>
<td>ППС-24 (338)</td>
<td>ВПФ1,2</td>
</tr>
<tr>
<td>ВСЭП-1</td>
<td>МО-2-5008</td>
<td>behind 126</td>
<td>ППС-24 (338)</td>
<td>ВСЭП1</td>
</tr>
</tbody>
</table>
### 4.2.2. [BH1] ([BH2]) CONTROL

<table>
<thead>
<tr>
<th>Fan</th>
<th>Item</th>
<th>Onboard location</th>
<th>Panel</th>
<th>Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH1</td>
<td>17КС.53Ю 5007-0</td>
<td>on 219 ПУВН, 237, crew quarters, Port</td>
<td>ПУВН, 237, crew quarters, Port</td>
<td>pb FAN</td>
</tr>
<tr>
<td>BH2</td>
<td>17КС.53Ю 5007-0</td>
<td>on 305 ПУВН, 440, crew quarters, Starboard</td>
<td>ПУВН, 440, crew quarters, Starboard</td>
<td>pb ZONE HEATERS</td>
</tr>
</tbody>
</table>

#### CAUTION

1. Activate [BH1] ([BH2]) only if:
   - RS Laptop
   - TP_CFVN1 BH1 control & monitoring
   - (TP_CFVN2 BH2 control & monitoring)

2. For a time of БИТС maintenance, [BH1] ([BH2]) heater section activation is forbidden
   - Operation is allowed only in fan mode

#### NOTE

1. Cabin air heater has three sections, each section power is 200 W
2. Amount and numbers of activated sections – arbitrary (per crew discretion)

#### 1. PANEL ACTIVATION (only during [BH1] ([BH2]) first activation)

- 237(440) ПУВН
  - ↓ PANEL PWR ON
  - ↓ LAMP TEST (hold)

#### NOTE

When the crew is onboard ПУВН may remain on

#### 2. FAN ACTIVATION

- 237(440) ПУВН
  - ▲ □ LED Д1

  - If ▼ LED Д1
    - Perform step 1

  - ↓ FAN ON

- BH1(BH2)
  - ● BH1(BH2) is running
  - ◀ air flow direction (if necessary)

#### 3. SECTION ACTIVATION

<table>
<thead>
<tr>
<th>(per crew discretion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH1(BH2)</td>
</tr>
<tr>
<td>00:00:00</td>
</tr>
<tr>
<td>237(440) ПУВН</td>
</tr>
<tr>
<td>↓ STATUS CHECK</td>
</tr>
<tr>
<td>In any combination:</td>
</tr>
<tr>
<td>↓ ZONE HEATERS 1</td>
</tr>
<tr>
<td>↓ ZONE HEATERS 2</td>
</tr>
<tr>
<td>↓ ZONE HEATERS 3</td>
</tr>
<tr>
<td>□ ZONE 1</td>
</tr>
<tr>
<td>□ ZONE 2</td>
</tr>
<tr>
<td>□ ZONE 3</td>
</tr>
<tr>
<td>00:01:00</td>
</tr>
<tr>
<td>□ ZONE 1,2,3</td>
</tr>
<tr>
<td>BH1(BH2)</td>
</tr>
<tr>
<td>● Air is being heated</td>
</tr>
<tr>
<td>Report to MCC-M</td>
</tr>
</tbody>
</table>
4. SECTION AND [BH1][BH2] DEACTIVATION

CAUTION

When ↓ ZONE HEATERS OFF
[BH1] ([BH2]) and [BH1] monitoring algorithm are deactivated

237(440) ПУВН ↓ FAN OFF
↓ STATUS CHECK ■ ZONE 1,2,3
BH1 (BH2) ☹ ☹ BH1(BH2) is not operating
If necessary, perform step 2 to activate [BH1] ([BH2])

5. PANEL DEACTIVATION (in the event of partial deactivation)

237(440) ПУВН ↓ PANEL_PWR OFF ■ LED Д1

4.2.3. CONTROL OF CREW QUARTERS FANS (BKЮ1 (BKЮ2))

CAUTION

1. When the crew is in the crew quarters, BKЮ1 (BKЮ2) should be activated
2. Activate BKЮ1 (BKЮ2) only if:
   RS Laptop CM:COTP:CTP: Algorithms
   TP_CVK01 BKЮ1 monitoring
   (TP_CVK02 BKЮ2 monitoring)
3. For a period of БИТС maintenance, BKЮ1 (BKЮ2) operation without algorithm is allowed

<table>
<thead>
<tr>
<th>Fan</th>
<th>Item</th>
<th>Onboard location</th>
<th>Panel</th>
<th>Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>BKЮ1</td>
<td>MO-2-5008</td>
<td>behind 322</td>
<td>BBK-2, 440, crew quarters, Starboard</td>
<td>pb ON/OFF</td>
</tr>
<tr>
<td>BKЮ2</td>
<td>MO-2-5008</td>
<td>behind 320</td>
<td>BBK-2, 237, crew quarters, Port</td>
<td>pb ON/OFF</td>
</tr>
</tbody>
</table>

1. BKЮ1 (BKЮ2) ACTIVATION

440 (237) BBK-2 ↓ ON ■ LED
337(332) ☹ ☹ BKЮ1(BKЮ2) is running (through crew quarters overhead)

ИнПУ SM COTP CONTROL
   ‘COTP-SIG’
   □ FAN 1 (FAN 2) ПрК PWR ON

2. BKЮ1 (BKЮ2) DEACTIVATION

440 (237) BBK-2 ↓ OFF ■ LED
337(332) ☹ ☹ BKЮ1(BKЮ2) is not running (through crew quarters overhead)

ИнПУ SM COTP CONTROL
   ‘COTP-SIG’
   ■ FAN 1 (FAN 2) ПрК PWR ON
4.2.4. TOILET CABIN FAN (ВСУ) CONTROL

<table>
<thead>
<tr>
<th>Fan</th>
<th>Item</th>
<th>Onboard location</th>
<th>Panel</th>
<th>Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>ВСУ</td>
<td>17КС.53Ю 5005-0</td>
<td>on 455, toilet cabin</td>
<td>БВ-1, 455, toilet cabin</td>
<td>sw</td>
</tr>
</tbody>
</table>

NOTE.
Operates if necessary for toilet cabin ventilation

Activation (deactivation):
БВ-1
Ø (Ø)
455
Ø, ВСУ is running (is not running)

4.2.5. LIRA EQUIPMENT FAN (ВОЛ) OPERATION MONITORING (ON MCC-M GO)

<table>
<thead>
<tr>
<th>Fan</th>
<th>Item</th>
<th>Onboard location</th>
<th>Panel</th>
<th>Controller</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>ВОЛ</td>
<td>МО-3-5010</td>
<td>behind 338</td>
<td>-</td>
<td>-</td>
<td>Operates with LIRA</td>
</tr>
</tbody>
</table>

In case of LIRA activation (deactivation):
RS Laptop
CM:COTP:СВ
< ВОЛ — ( )

4.2.6. [BK1] ([BK2], [BK3], [BK4]) OPERATION

<table>
<thead>
<tr>
<th>Fan</th>
<th>Item</th>
<th>Onboard location</th>
<th>Panel</th>
<th>Controller</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK1—BK4</td>
<td>17КС.53Ю 5004-0</td>
<td>Portable</td>
<td>-</td>
<td>sw on housing, РВС10/3</td>
<td>Delivered</td>
</tr>
</tbody>
</table>

NOTE
1. BK1 — BK4 are used to provide additional ventilation
2. Connect in SM to any РВС 10/3 (in case of fire or leak outlet is powered down automatically)

1. HARDWARE SETUP

Unstow:
BK1 (BK2, BK3, BK4) 17КС.53Ю 5004-0,
adapter 17КС.29Ю 2001-30,
cbl 17КС.59Ю 8259А-390 (17КС.59Ю 8259А-400, 17КС.59Ю 8259А-410,
17КС.59Ю 8259А-420)
bracket LIV/20

BK1 (BK2, BK3, BK4)
Depress latch-rods flush (two)
Into bracket grooves of BK1 (BK2, BK3, BK4)
Align bracket pulley of BK1 (BK2, BK3, BK4)
with adapter opening
BK1 (BK2, BK3, BK4) bracket  \rightarrow \leftarrow \text{ adapter (to stop)}
BK1 (BK2, BK3, BK4) with adapter  \rightarrow \leftarrow \text{ LIV/20 bracket}
Screw on adapter  \rightarrow \leftarrow \text{ (manually)}
LIV/20 bracket with BK1 (BK2, BK3, BK4)  \rightarrow \leftarrow \text{ working area}
cbl BK1 (BK2, BK3, BK4)  \rightarrow \leftarrow \text{ cnctr on BK1 (BK2, BK3, BK4) housing}
cbl BK1 (BK2, BK3, BK4)  \rightarrow \leftarrow \text{ cnctr 2 РБС 10/3}

3. **[BK1] ([BK2], [BK3], [BK4]) ACTIVATION**

РБС 10/3  
BK1 (BK2, BK3, BK4)  

\[ \times \] BK1(BK2, BK3, BK4) is running  
**Report to MCC-M**

4. **[BK1] ([BK2], [BK3], [BK4]) DEACTIVATION**

BK1 (BK2, BK3, BK4)  

\[ \times \] BK1(BK2, BK3, BK4) is not running

5. **[BK1] ([BK2], [BK3], [BK4]) REMOVAL (see Figure 4.2.6)**

cbl BK1(BK2, BK3, BK4)  \rightarrow \leftarrow \text{ cnctr 2 РБС 10/3}
LIV/20 bracket with BK1 (BK2, BK3, BK4)  \rightarrow \leftarrow \text{ working area}
Screw on adapter  \rightarrow \leftarrow \text{ (manually)}
BK1 (BK2, BK3, BK4) with adapter  \rightarrow \leftarrow \text{ LIV/20 bracket}
Stow:  
BK1 (BK2, BK3, BK4) with cable,  
adapter,  
(УПК) LIV/20 bracket  
**Report to MCC-M**

![Connection Diagram](attachment://connection_diagram.png)

**Figure 4.2.6 [BK1], [BK2], [BK3], [BK4] Connection Diagram**
4.3. AIR FLOW CONTROL IN CREW QUARTERS (STARBOARD (PORT))
(per crew discretion)

1. AIR FLOW DIRECTION CHANGE
337(332) Turn rod to move louvers in desired direction

2. AIR FLOW VOLUME CHANGE
337(332) Pull handle (in the center of the crew quarters overhead)
Increase volume
Decrease volume
Report to MCC-M

4.4. DUST FILTER (ПФ1 (ПФ2, ПФ3, ПФ4)) INSPECTION
(Once or twice a day)
449(246,448,245) Visually inspect ПФ1 (ПФ2, ПФ3, ПФ4)
Remove foreign objects (if necessary)
Report to MCC-M
4.5. VENTILATION SUBSYSTEM [CB] PREVENTIVE MAINTENANCE

**CAUTION**

1. During preventive maintenance not more than two panels may be open at the same time for not more than 2 hrs. following After 2 hours, panels must be closed to 30 minutes
2. Clean panels using vacuum cleaner and/or wet wipes
3. Manually remove any large pieces of debris from [CB] hardware

4.5.1. ПФ1 (ПФ2, ПФ3, ПФ4) CARTRIDGE REPLACEMENT

(00:15:00 x four, every 20 days)

**NOTE**
During replacement of all dust filters, perform the operation to completion on one side prior to deactivation and filter replacement on the other side

<table>
<thead>
<tr>
<th>ППС-24</th>
<th>ВПФ1,2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ППС-23</td>
<td>ВВ1РО (prior to ПФ1, ПФ3 replacement)</td>
</tr>
<tr>
<td>ППС-24</td>
<td>ВВ2РО (prior to ПФ2, ПФ4 replacement)</td>
</tr>
</tbody>
</table>

1. **ПФ USED CARTRIDGE REMOVAL**

449(246,448,245) Loosen bolts (four) on frame (7 mm wrench or screwdriver M5)
Remove frame
Slide out drum with cartridge into [РРО]
Remove cartridge from drum flange and fold cartridge corrugations carefully
Discard

2. **ПФ NEW CARTRIDGE INSTALLATION**

Unstow new cartridge from spares
449(246,448,245) Install it on drum flange
Unfold corrugation of filter gasket
Reinstall drum with cartridge
Reinstall frame
Tighten bolts (four) on frame (7 mm wrench or screwdriver M5)

<table>
<thead>
<tr>
<th>ППС-23</th>
<th>ВВ1РО (after ПФ1, ПФ3 replacement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ППС-24</td>
<td>ВВ2РО (after ПФ2, ПФ4 replacement)</td>
</tr>
<tr>
<td></td>
<td>ВПФ1,2</td>
</tr>
</tbody>
</table>

Report to MCC-M
4.5.2. CLEANING OF [СКВ1] ([СКВ2]) GAS-LIQUID HEAT EXCHANGER (ГЖТ) GRILL
(01:00:00 x two, every 6 months)

Deactivate СКВ1(СКВ2) (see 2.2.1 step 3)
Deactivate BT1, BTK1 (BT2, BTK2) (see 2.3)
Loosen bolts (twenty) on rigid air duct removable panel at ГЖТ inlet
(8 mm wrench)
Removable panel ↔ rigid air duct
behind 204(404) Clean ГЖТ with vacuum cleaner
Removable panel ↔ rigid air duct
Tighten fastening bolts (twenty) on rigid air duct removable panel
at ГЖТ inlet (8 mm wrench)
Activate BT1, BTK1 (BT2, BTK2) (see 2.3)
Activate СКВ1 (СКВ2)(see 2.2.1 step 2) (if necessary)
Report to MCC-M

4.5.3. GAS ANALYZER (ГА) VENTILATION CLEANING
(00:15:00)

ППС-24 @ ВПФ1,2
ППС-23 @ BB1RO
450 Clean screen on panel
behind 449 Clean grill on air duct housing between ПФ1 and ПФ3
ППС-23 @ BB1RO
ППС-24 @ ВПФ1,2
Report to MCC-M

4.5.4. SCREEN FILTER CLEANING

1. ФС9 ВДПрK SCREEN FILTER CLEANING
(00:10:00, every 2 months)

129 Clean screen filter (at ВДПрK inlet)
Report to MCC-M

2. ФС14 SCREEN FILTER CLEANING ON ГЖТ2
(00:20:00, every 6 months)

NOTE
1. СЭП equipment ('Molibden' hardware and units 800) may continue to operate
2. ФС14 is allowed not to be retrieved from guides if access is good

ППС-23 @ ВПО7
ППС-24 @ ВГЖТ2
behind 327 Loosen fastening bolt ФС14 (8 mm wrench)
Pull ФС14 out of guides (using loop) into [РО]
Clean with vacuum cleaner
Reinstall ФС14
Tighten fastening bolt
ППС-23 @ ВПО7
ППС-24 @ ВГЖТ2
Report to MCC-M
3. **ΦС16 SCREEN FILTER CLEANING ON ГЖТ3**
(00:30:00, every 6 months)

**NOTE**
СЭП equipment ('Molibden' hardware and units 800) may continue to operate

ППС-23  ➔ ГЖТ3
behind 124,128
Lift flexible air duct (using strip)
Loosen fastening bolt ΦС16 (8 mm wrench, during the first cleaning)
Pull ΦС16 out of guides (using loop) into [PO]
Clean with vacuum cleaner
Reinstall ΦС16
Cover with flexible air duct (using strip)

ППС-23  ➔ ГЖТ3
Report to MCC-M

4.5.5. **FLEXIBLE AIR DUCT CLEANING**
(00:20:00, every 2 months)
ПхО
Clean flexible air duct (outside surface) with vacuum cleaner

4.5.6. **FAN SCREEN CLEANING**
(every 2 months)
Perform operations, see Table 4.5.6.
### CLEANING OF FAN SCREENS

<table>
<thead>
<tr>
<th>#</th>
<th>Screen</th>
<th>Fan location</th>
<th>Fan control</th>
<th>Operation</th>
<th>Note</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ВПхО</td>
<td>ПхО, pl 4</td>
<td>ППС-21 @/ @ ВПхО</td>
<td>Deactivate fan</td>
<td></td>
<td>00:10:00</td>
</tr>
<tr>
<td></td>
<td>ВПрK</td>
<td>ПрK, pl 1-4</td>
<td>ППС-23 @/ @ ВПрK</td>
<td>Clean screen</td>
<td></td>
<td>00:10:00</td>
</tr>
<tr>
<td>2</td>
<td>ВСУ</td>
<td>455</td>
<td>БВ-1 @/ @</td>
<td>Activate fan</td>
<td></td>
<td>00:10:00</td>
</tr>
<tr>
<td>3</td>
<td>ВПО1</td>
<td>behind 408</td>
<td>ППС-22 @/ @ ВПО1</td>
<td>Deactivate treadmill</td>
<td>Do not open more than two panels at a time</td>
<td>00:20:00</td>
</tr>
<tr>
<td></td>
<td>ВПО3</td>
<td>behind 416</td>
<td>@/ @ ВПО3</td>
<td>(during ВПО10, ВПО11, ВПО12 cleaning)</td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td></td>
<td>ВПО5</td>
<td>behind 307</td>
<td>@/ @ ВПО5</td>
<td>Deactivate fan</td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td>4</td>
<td>ВПО2</td>
<td>behind 208</td>
<td>ППС-21 @/ @ ВПО2</td>
<td>Clean screen</td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td></td>
<td>ВПО4</td>
<td>behind 216</td>
<td>@/ @ ВПО4</td>
<td>Activate fan</td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td></td>
<td>ВПО6</td>
<td>behind 307</td>
<td>@/ @ ВПО6</td>
<td></td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td>5</td>
<td>ВПО8</td>
<td>behind 338</td>
<td>ППС-24 @/ @ ВПО8</td>
<td></td>
<td>PT-50-1 (two) may continue to operate</td>
<td>00:20:00</td>
</tr>
<tr>
<td></td>
<td>ВПО9</td>
<td>behind 338</td>
<td>ППС-23 @/ @ ВПО9</td>
<td></td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td>6</td>
<td>ВСЭП1</td>
<td>behind 126</td>
<td>ППС-24 @/ @ ВСЭП1</td>
<td></td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td>7</td>
<td>ВАЛ1</td>
<td>behind 104</td>
<td>ППС-22 @/ @ ВАП1</td>
<td>Instruements in ВАП1 (ВАП2) area may continue to operate</td>
<td>00:20:00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ВАП2</td>
<td>behind 102</td>
<td>ППС-21 @/ @ ВАП2</td>
<td></td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td>8</td>
<td>ВПО10</td>
<td>behind 129</td>
<td>ППС-24 @/ @ ВПО10</td>
<td>Do not open more than two panels at a time. ВПО12 operates with treadmill</td>
<td>00:20:00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ВПО11</td>
<td>behind 131</td>
<td>ППС-23 @/ @ ВПО11</td>
<td></td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td></td>
<td>ВПО12</td>
<td>behind 130</td>
<td>ППС-24 @/ @ ВПО12</td>
<td></td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td>9</td>
<td>ВН1</td>
<td>219, 305</td>
<td>ПУВН ↓ FAN OFF (ON)</td>
<td>Deactivate fan and sections via ПУВН</td>
<td>00:10:00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ВН2</td>
<td></td>
<td></td>
<td>Clean screen (if necessary) via ПУВН</td>
<td></td>
<td>00:10:00</td>
</tr>
<tr>
<td>10</td>
<td>ВОЛ</td>
<td>behind 339</td>
<td>-</td>
<td>Deactivate LIRA</td>
<td>00:20:00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Clean screen</td>
<td></td>
<td>00:20:00</td>
</tr>
<tr>
<td>11</td>
<td>ВКЮ1</td>
<td>322</td>
<td>БВК-2 ↓ OFF (ON)</td>
<td>Deactivate fan via БВК-2</td>
<td>00:10:00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ВКЮ2</td>
<td>320</td>
<td></td>
<td>Clean screen (if necessary) via БВК-2</td>
<td></td>
<td>00:10:00</td>
</tr>
<tr>
<td>12</td>
<td>ВГКТ1</td>
<td>behind 126</td>
<td>ППС-24 @/ @ ВГКТ1</td>
<td>Deactivate fan</td>
<td>00:20:00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ВГКТ4</td>
<td>behind 126</td>
<td>ППС-24 @/ @ ВГКТ4</td>
<td>Clean screen</td>
<td></td>
<td>00:20:00</td>
</tr>
</tbody>
</table>

Table 4.5.6.
4.6. VENTILATION SUBSYSTEM [CB] MALFUNCTION

4.6.1. FAILURE OF FANS CONTROLLED VIA ППС AND OF TOILET CABIN FAN

**CAUTION**

In case of BBПхO failure, ventilation between SM and NODE1 may be disrupted

---

RS Laptop
- CM:COTP:CB
- Corresponding fan 

Panel
- √ fan
- Is fan operating?

For all fans except BB1PO, BB2PO, BBГЖТ1—BBГЖТ4, ВП07, BBПхO, BBПрK:
Panel
- ‹ fan
- Rotate propeller
- ‹ fan
- Is fan operating?

Yes
- Continue nominal operation
- Report to MCC-M

No

Panel
- ‹ fan
- Report to MCC-M
- On MCC-M GO Replace fan
  (see RODF: IFM IVA SM)
- ‹ fan
- Is fan operating?

Yes
- Propeller jam
  - Continue nominal operation
  - Report to MCC-M

No

Panel
- ‹ fan
  - MCC-M
- Is fan operating?

Yes
- Fan failure
  - Continue nominal operation
  - Report to MCC-M

No
4.6.2. CABIN AIR HEATER ([BH1] ([BH2])) FAILURE

1. [BH1] ([BH2]) FAN STOP

2. BURNING SMELL FROM [BH1] ([BH2])
4.6.3. CREW QUARTERS FAN (BKЮ1 (BKЮ2)) FAILURE

**CAUTION**
Crew stay in Starboard (Port) crew quarters is forbidden

RS Laptop
• CM:COTP.CE
• BKЮ1 (BKЮ2) —

00:00:00
ПСС
 OTHER (yellow) ALARM
ИнПУ
SM: COTP CONTROL 'COTP-SIG'
FAN1 ПрК PWR ON (FAN2 ПрК PWR ON)
RS Laptop
Caution events

X 'Автоматическое выключение BKЮ1'?
X 'Автоматическое выключение BKЮ2'?

Yes

00:10:00
BKЮ-2
ON
Other (yellow)

Yes

Switch off indicator light FAN1 ПрК PWR ON (FAN2 ПрК PWR ON)
(see RODF: MANUAL CONTROLS 2.5.2.)
Report to MCC-M

4.6.4. PERSONAL FAN ([BK1] ([BK2], [BK3], [BK4])) FAILURE

BK1(BK2,BK3,BK4) Ø
РБС 10/3
√ All connectors mating
BK1(BK2,BK3,BK4) Ø
BK1(BK2, BK3, BK4) is running

Use the other [BK] or
ON MCC-M GO Replace fan
(see RODF: IFM IVA SM)

Report to MCC-M