

3 SERVICE PROCEDURES

3.1 General service information

Field service of the M-BIS is limited to replacing faulty circuit boards or mechanical parts. Faulty circuit boards should be returned to Datex-Ohmeda for repair.

Datex-Ohmeda is always available for service advice. Please provide the unit serial number, full type designation, and a detailed description of the fault.

The Datex-Ohmeda BIS Simulator (order No. 900509) is recommended for functional checks.


CAUTION Only trained personnel with appropriate equipment should perform the tests and repairs outlined in this section. Unauthorized service may void the warranty of the unit.

3.2 Service check

These instructions include complete procedures for a service check. The service check should be performed after any service repair. However, the service check procedures can also be used for determining possible failures.

The procedures should be performed in ascending order.

The instructions include a check form, [Service check form](#), which should be filled in when performing the procedures.

The mark  in the instructions means that the check form should be signed after performing the procedure.

3.2.1 Recommended tools

Tool	Order No.	Notes
BIS Simulator or	900509	
BIS Sensor simulator	900508	
Screwdriver		

- Detach the module box by removing the two screws from the back of the module. Be careful with the loose latch and spring pin for locking.

1. Check internal parts:

- screws are tightened properly
- cables are connected properly
- there are no loose objects inside the module



2. Check external parts of the module:

- the front cover and the front panel sticker are intact
- connectors are intact and are attached properly
- the module box, latch and spring pin for locking are intact

Reattach the module box



3. Check the external parts of the Digital Signal Converter

- - the cover and the panel stickers are intact
- - cables and their connections are intact

Do not connect DSC to the module yet



Turn the monitor on and wait until the normal monitoring screen appears.

- Configure the monitor screen so that information regarding the BIS measurement is shown:

Monitor Setup - Screen 1 Setup - Waveform Fields - Field1 - BIS EEG

Others - BIS - Scale - 100uV

Others - BIS - Smoothing Rate 15s

4. Installation

Plug in the module. Check that it goes in smoothly and engages properly



5. Recognition of module

Check that the module is recognized, i.e. the BIS header with related information appears in the chosen waveform field and 'Cable off' message is shown on field.



6. Enter the service menu:

Monitor Setup - Install/Service (password 16-4-34) - **Service** (password 26-23-8)

Record the information regarding the module software of M-BIS by selecting SCROLL VERS and turning the ComWheel.

Note! DSC related data will appear only when the DSC is connected for the first time after start-up.



7. Recognition of DSC

Connect the PIC+ cable to the DSC.

Connect the DSC to the module.

- Check that the DSC is recognized (DSC related data appears to the page)
- Check that 'No sensor' appears to the selected waveform field.



8. Enter the BIS module service menu:

Parameters - More... - BIS

Check that the 'Mod Mon Timeouts', 'Mon Mod Bad checksums', 'Mod Mon Bad Checksums', 'Bad Checksums from BIS' values in the module view are not increasing faster than by 5 per second. Check that the memories of the module have passed the internal memory test, i.e. 'RAM', 'ROM' and 'EEPROM' all state OK.



9. Check the **BIS** and **Sensor Check** membrane keys of the module. Stay in the module view and press each key for at least one second and check that the key being pressed is identified, i.e. the corresponding PRESSED text appears in the service menu.



10. Check that 'Messages from BE' are increasing steadily.



11. Go to the Sensor page.

Check that

- no sensor is identified
- mains frequency is set correctly
- check that 'BE powerup test', 'DSC selftest Ch1' and 'DSC selftest Ch2' all show PASs (if not, go to BIS Setup page, perform DSC Test and check the results again)



12. Sensor check

Connect the BIS simulator to the PIC+ cable. See that 'Checking sensor' text and image appear. Wait for a while seconds and check that all sensors show PASS. Check that the 'Sensor type' shows Demo Sensor.



13. Check that the 'BIS', 'SQL' and 'SR' values are between 0..1000, and the 'EMG' value between 0..10000. Note! If Sensor simulator 900508 is used, the values can be out of the given range.



14. Go to the Module page

Check that no BIS Engine errors appear.



15. Perform sensor check by pressing 'Check Sensor' and verify sensor passes.



16. Perform an electrical safety check and a leakage current test.



17. Check that the module functions normally after performing the electrical safety check.



18. Clean the module with suitable detergent.



- Fill in all necessary documents.