10 Maintenance and checkout

This chapter specifies the checkout procedure and the maintenance activities to be performed to the patient monitor after corrective maintenance and during annual planned maintenance.

WARNING **Only perform maintenance procedures specifically described in the manual.**

WARNING **Planned maintenance should be carried out annually. Failure to implement the recommended maintenance schedule may cause equipment failure and possible health hazards.**

NOTE: The manufacturer does not, in any manner, assume the responsibility for performing the recommended maintenance schedule, unless an Equipment Maintenance Agreement exists. The sole responsibility rests with the individuals, hospitals, or institutions utilizing the device.

NOTE: Refer to Module Frames and Modules Technical Manual for corrective and planned maintenance checkout procedures of the parameter modules.

NOTE: Refer to the PDM section in the Module Frames and Modules Technical Manual for the battery maintenance procedure of the PDM battery.

Corrective maintenance

Service personnel shall perform the following checkout procedure steps after any corrective maintenance, before taking the monitor back into clinical use:

Performed service activity	Required checkout procedure		
	Visual inspections (section 10.1)	Electrical safety test (section 10.2)	Functional check (section 10.3)
After detaching or replacing: - Power supply - CPU PCB assembly - Lithium -ion battery (timekeeper)	Yes	Yes	- All steps
After detaching or replacing: - 3rd video card	Yes	Yes	- 10.3.1 Start-up - 10.3.2 Display - 10.3.3 PSM / PDM identification
After detaching or replacing: - Enclosure Kit - Hardware kit (or any part of this) - Speaker assembly	Yes	Yes	- 10.3.1 Start-up
After detaching or replacing: - Label kit	Yes	No	- 10.3.1 Start-up
After detaching or replacing: - uDOM	Yes	Yes	- All steps
After detaching or replacing: - M-Port keypad Kit - Remote Control Kit	Yes	No	- 10.3.1 Start-up - 10.3.5 Keypad and remote

Planned maintenance schedule

Service personnel shall perform the following checkout procedure every 12 months after installation:

1. Visual inspection (section 10.1)
2. Electrical safety tests (section 10.2)
3. Functional check (section 10.3, all steps)

Replace the CPU timekeeper battery every 5 years, or whenever the **Service Monitor Error Code 0xHOST1100** message is shown.

10.1 Visual inspection

Follow the procedure in section 8.1. Visual inspection.

10.2 Electrical safety checks

Electrical safety tests provide a method of determining if potential electrical health hazards to the patient or operator of the device exist.

Perform the following electrical safety tests described in detail in chapter 8. Installation checkout:

– 8.2.1. Test setup
– 8.2.2. Power outlet
– 8.2.3. Power cord and plug
– 8.2.4. Ground (earth) integrity
– 8.2.5. Earth leakage current test
– 8.2.6. Enclosure leakage current (touch current) test

Record the values of the tests on the Appendix B. Maintenance check form.

10.3 Functional check

10.3.1 Start-up

Follow the procedure in section 8.3.1. Start-up.

10.3.2 Display

Follow the procedure in section 8.3.2. Display.

10.3.3 PSM / PDM identification

1. Configure the ECG1 waveform field and the NIBP parameter window to the patient monitor screen with adequate priority. Connect a PSM or PDM module to the patient monitor.
2. Verify that the ECG waveform field, the NIBP parameter window and the related information appear on the patient monitor screen.

10.3.4 E-module identification

1. Log in to Webmin.

2.   Select *Information > Device Information*.

3.   Verify that the information about the connected module appears in the table named as *"Acquisition Information – E-Modules"*.

NOTE: For some parameter modules, the table does not show the actual module information, but the information of the individual subassemblies inside the module.

NOTE: You may need to refresh the Webmin screen if you have connected the module to the patient monitor after entering the *Device Information* Webmin screen.

10.3.5   Keypad and remote

Follow the procedure in section 8.3.5. Keypad and remote.

10.3.6   Mouse

Follow the procedure in section 8.3.6. Mouse.

10.3.7   Alphanumeric keyboard

Follow the procedure in section 8.3.7. Alphanumeric keyboard.

10.3.8   Barcode reader

Follow the procedure in section 8.3.8. Barcode reader.

10.3.9   MC Network and S/5 Network

Follow the procedure in section 8.3.9. MC Network and S/5 Network.

10.3.10   IX printers

Follow the procedure in section 8.3.10. IX printers.

10.3.11   Insite with Exc

Follow the procedure in section 8.3.12. Insite with EXC

10.3.12   Recorder

1.   Select *Monitor Setup > Printing > Devices > Setup* and configure:
Printout: Waveforms
Location: Local

2.   Select *Monitor Setup > Printing > Waveforms* and configure:
Waveform 1: II
Waveform 2: V1

3.   Select *Monitor Setup > Printing > Waveforms > Print Waveforms* or the related soft key in the main menu, or the *Print Waveforms* hard key in the keypad to start printing.

4.   Verify that the recorder starts printing. Let the recorder print for approximately 10 seconds and verify the following things from the printout:

- The header line contains the date, time and some other applicable status and configuration information.
- The grid is clear.
- The waveforms labels appear in the printout as configured.

Stop printing by selecting **Monitor Setup > Printing > Waveforms > Stop Printing**, or the related soft key in the main menu.

10.3.13 Test completion

Select **Discharge Patient** or **Reset Case** to discard any changes made to the patient monitor configuration during checkout.

- Complete the Appendix B. Maintenance check form.