

## Electric Beds

### 1. Preventive Maintenance Qualitative Tests

- a. **Chassis/Housing:** Examine the exterior of the unit for cleanliness and general physical condition. Be sure that plastic housings are intact, that all hardware is present and tight, and that there are no signs of spilled liquids or serious abuse.
- b. **Mount/Fasteners:** If the device is mounted on a stand or cart, examine the condition of the mount. If it attached to the wall, or rests on a shelf, check the security of the attachment.
- c. **Casters/Brakes:** If the device moves on casters, check their condition. Look for accumulations of lint and thread around the casters, and be sure that they turn and swivel, as appropriate. Check the operation of brakes and swivel locks, if the unit is so equipped.
- d. **AC Plug/Receptacles:** Examine the AC power plug for damage. Attempt to wiggle the blades to check that they are secure. Shake the plug and listen for rattles that could indicate loose screws. If any damage is suspected, open the plug and inspect it. Should the equipment be placed on a cart that has extra electrical receptacles for other equipment, insert AC plugs into each and verify they are firmly held. Verify that no damage is present in the cart receptacles.
- e. **Line Cord:** Inspect the cord for signs of damage. If damaged, replace the entire cord or if the damage is near one end, cut out the defective portion. Wire a new power cord or plug on the same polarity. Check the line cords of battery chargers.
- f. **Strain Reliefs:** Examine the strain reliefs at both ends of the line cord. Be sure that they hold the cord securely. If the line cord is detachable, we recommend that the cord be affixed to the unit so that it cannot be removed by the operator.
- g. **Circuit Breaker/Fuse:** If the device has a switch-type circuit breaker, check that it moves freely. If the device is protected by an external fuse, check its value and type against that marked on the chassis and ensure that a spare is provided.
- h. **Cables:** Inspect the cables of sensors, electrodes, remote control and their strain reliefs and general conditions. Carefully examine cables to detect breaks in the insulation and to ensure that they are gripped securely in the connectors at each end to prevent rotation or other strain.
- i. **Fittings / Connectors:** Examine all fittings and electrical cable connectors for general condition. Electrical contact pins or surfaces should be straight and clean. Fittings should be tight and should not leak. If keyed connectors are used, make sure that the keying is correct.

- j. Controls/ Switches:** Before changing any controls or alarm limits, check their position any settings appear inordinate (e.g., alarm limits at the ends of their range), consider the possibility of inappropriate clinical use or of incipient device failure. Record the settings of those controls that should be returned to their original positions following the inspection. Examine all controls and switches for physical condition, secure mounting, and correct motion. Check that control knobs have not slipped on their shafts. Where a control should operate against fixed-limit stops, check for proper alignment, as well as positive stopping. Check membrane switches for membrane damage (e.g., from fingernails, pens). During the course of the inspection, be sure to check that each control and switch performs its proper function.
- k. Motor/Fan/Pump:** Inspect fan blades for deterioration and damage. Ensure fan is securely attached to drive shaft and that the coupling is present and intact. Check that clearance between the fans and housing are adequate by looking for signs of rubbing. In some cases, an improperly inserted control module and heater assembly in the incubator base has bent and disabled fan. Verify whether if fan requires lubrication or not. Observe the fan in operation to determine if there are excessive vibrations or wobbling.
- l. Indicators/Displays:** During the course of the inspection, confirm the operation of all lights, indicators, and visual displays on the unit and charger, if so equipped. Be sure that all segments of a digital display function properly.
- m. User Calibration/Self-Test:** Verify operation of these features, if applicable.
- n. Labeling:** Check that all necessary labels, conversion charts, and instruction cards are present and legible.

## 2. Preventive Maintenance Electrical Safety Test

- a. Grounding Resistance:** Using an ohmmeter, electrical safety analyzer, or multimeter with good resolution of fractional ohms, measure and record the resistance between the grounding pin of the power cord and exposed (unpainted and not anodized) metal on the chassis. We recommend a maximum of 0.5 Ohms.
- b. Leakage Current:** Measure chassis leakage current to ground with the grounding conductor of plug-connected equipment temporarily opened. Operate the device in all normal modes, including on, standby, and off, and record the maximum leakage current. Chassis leakage current to ground should not exceed 300 $\mu$ A.

## 3. Preventive Maintenance

- a. Clean the exterior and interior*
- b. Lubricate and clean fan assembly if required*
- c. Calibrate if needed*
- d. Replace filter and battery if needed based on Scheduled Parts Replacement Policies.*



## ***Hospital Electrical Beds: Additional FDA Safety Tips to Prevent Fires Caused by Hospital Beds***

The following safety tips should be routinely used by the staff to reduce the risk of fire caused by hospital beds.

It is assumed that normal behavioral policies such as prohibitions against smoking, lighting candles, etc., are already in place. The fire risks posed by oxygen administration to a patient in bed are not addressed in this list of safety tips.

1. Connect the bed's power cord directly into a wall-mounted outlet. Make sure that the wall-mounted outlet will accommodate a heavy duty or hospital-grade plug and that the outlet is in good working order. The plug of the power cord should have two blades and ground pin that fit tightly into the wall outlet. Power cord plugs that have the ground pin removed should never be used. The plug body, the wall outlet, and the wall plate should not be cracked or chipped. The plug blades should be secure and the cord's insulation should be properly constrained by the strain relief of the plug.
2. Do not connect the bed's power cord to an extension cord or to a multiple outlet strip. Whenever possible, avoid the use of extension cords or multiple outlet strips in patient rooms for any medical electrical equipment since they are highly vulnerable to physical damage that can cause fires. If the use of extension cords or multiple outlet strips cannot be avoided, use only heavy duty or hospital-grade connectors that are approved by the facility's engineering department. Extension cords and multiple outlet strips should only be installed by properly-trained electrical maintenance personnel. Multiple outlet strips should be mounted on a fixed object (e.g., equipment cart or night stand) to reduce the risk of liquid spills and physical damage. In addition, if multiple-receptacle outlet boxes are used, they also should be protected from the risk of liquids spills and physical damage. All extension cords and multiple outlet strips should be tagged and inspected routinely.
3. Visually inspect the bed's power cord for damage. The bed's power cord, as well as power cords from other medical electrical equipment, can sustain damage from crushing, pinching, shearing, cutting, or from being worn through from cleaning solutions. They also can be damaged by bed movement, deterioration from use of aging, or human or equipment traffic. Furniture placement (e.g., a rocking chair positioned too close to a power cord) can also be hazardous.
4. Do not cover the bed's power cord or any power cord with a rug or carpet. Rugs or carpets can prevent normal air flow, which can lead to greater heat build-up. Covered power cords also are more prone to being walked on or having furniture places directly on them. The bed maintenance staff should place the cord in a low or no traffic area.
5. Ensure that appropriate staffs inspect all parts of the bed frame, motor hardware, mattress, and the floor beneath and near the bed for build-up of dust and lint.



6. Test the bed to assure that it moves freely to its full limit in both directions. In many facilities, wall mounted outlets are located directly behind the hospital bed. Check to be sure that the vertical motion of the bed does not interfere with the bed's power cord or plug. In addition, the bed's hand control cable and all other power cords should not be threaded through mechanical parts of the bed or bed rails where normal bed movement may damage or cut the cable.
7. Test the bed's hand and panel control, including the patient lockout features, to assure that the bed is working properly.
8. Inspect the covering of the bed's control panel and the patient control panel to assure that the covering is not cracked or damaged. Cracked or damaged covers can allow liquids or other conductive material to penetrate to the switches
9. Check patient bed occupancy monitors and other equipment in the patient's room with plug-in power supplies for indications of overheating or physical damage. Make sure that the power supplies are plugged into a wall socket where they cannot be contacted by bed clothes, bedding, etc.
10. Report to the bed maintenance personnel, any unusual sounds, burning odors, or movement deviations observed in the controls, motors, or the limits switch functions.
11. Assure that all manufacturer's recall, urgent safety notices, etc., have been followed.