

## Troubleshooting & Repair

### 13 Maintenance

13.1 The Boston Digital™ Arm System requires little maintenance. Generally, once successfully fitted, there is no need to make adjustments to the System unless the socket fit changes (i.e. the user gains or loses weight), increases/decreases muscle strength or requires different components or different control set-up. If you are operating the elbow or any other component using myoelectric control and this is your first prosthesis, you will probably find that adjustments are needed as your muscles strengthen and coordination improves. Typically you will need to have the system “tuned-up” after about a week and then again about a month later. Expect to visit your prosthetist about every six months thereafter so that the system can be checked out and all straps and other components can be kept in good repair.

13.2 The exterior of the prosthetic system can be cleaned with a damp cloth if necessary. Water and other cleaning fluids should not be used because they may cause damage to the electrical components. The prosthetic system should never be immersed in water and if this should occur by accident, it should be returned to the prosthetic shop as soon as possible.

13.3 Lubricants should not be applied to the prosthetic system. All parts that require lubrication have permanent lubricants applied at the time of assembly.

13.4 Do not attempt to disassemble the prosthetic system (other than removing the battery for replacement). The system is fabricated and sealed to prevent dirt from entering critical areas. Any attempts to disassemble the prosthetic system will **void the warranty**.

13.5 What happens if I fall? There are times when you want a product to fail. If you fall on your prosthesis or a heavy object falls on it, you want it to fail in a safe way. The free-swing lock pin and the limit stop pins are designed to fail when subjected to a severe overload. If this should occur, consult your prosthetist. It may be necessary to send your prosthesis back to the manufacturer for evaluation and repair.

13.6 Sweat contains salt and is very corrosive. It will damage circuits and even mechanisms made of stainless steel and those protected with special coatings. If anything might permit sweat to enter the prosthetic system, it should be prevented. If sweat runs down the inside or outside of the socket, you should apply an absorptive cloth band immediately and then consult your prosthetist to determine how this can be prevented before it damages the mechanisms or circuits.

13.7 If water or sweat enters any part of the mechanism or the electrical components, flush out the affected areas with rubbing alcohol as soon as possible. This will displace the water and most contamination. Then call your prosthetist. Do not wait! Corrosion can be prevented, but not repaired after it occurs.

## 14. Troubleshooting the Boston Digital™ Arm System

### 14.1 The System does not operate:

- a) Check the on-off switch and make sure the switch is in the *on* position (depressed, see figure at right),
- b) Check the battery to make sure that it is installed correctly,
- c) Check to see that the battery is charged, recharge if necessary (observe the charger lights). Make sure that the Fast Charger switch is on the appropriate setting (115V-US or 220V-foreign),
- d) If the battery is suspected as the problem, install the spare battery,
- e) If the Fast Charger is suspected as the problem, try the Slow Charger



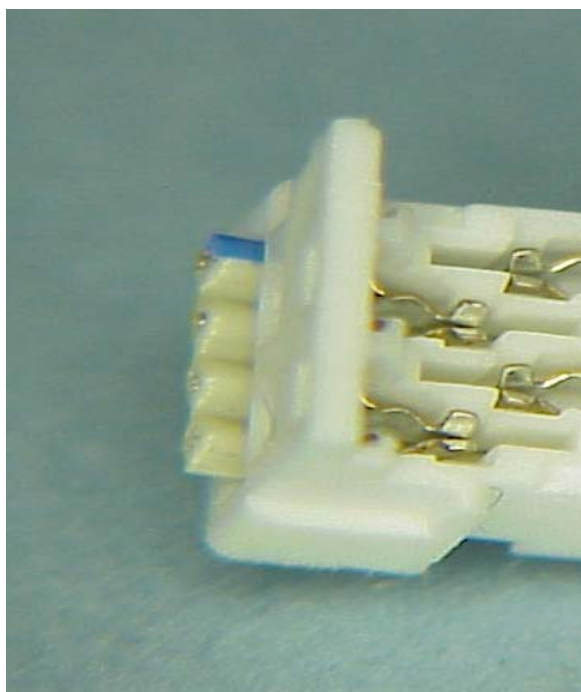
### 14.2 The System operates but is difficult to control;

- a) Make sure that the socket is properly aligned and the harness positioned properly.
- b) Check all cables and connectors, external cables often fail adjacent to a switch.
- c) Check to see that the free swing lever is engaged (locked).
- d) See whether the socket is loose. If you have lost weight, the electrodes may not be making adequate contact with the skin surface. These electrodes should leave a slight imprint in the skin.

### 14.3 One component in the system does not operate (i.e. hand or elbow)

- a) Check the wrist disconnect for the hand or gripper
- b) If you use a switch as part of the control system, check to see that the wires are not damaged.

**Connector repairs.** During the initial setup of a prosthesis, wires sometimes get pulled so hard that the connections are pulled out. Study Figure 14.1. The two connections on the left are most likely to be subject to hidden damage after a severe tug on the cable. You will need to cut the connector off and start over. First make a sketch that looks like the right hand connector in Figure xx. Be sure that you can read “L4” from left to right on the connector and that the wide notch is on the left. Then mark which wire enters the left hand side. It is now safe to cut off the connector. Your preferred method for repair is having LTI do it for you using proper installation tools; however, when that will take too long, you must push the prongs away from the wires so they can be pulled free. The best emergence tool is a jeweler’s screw driver measuring .072 x.012in. (1.8 x .33mm) at the tip. This tool will just fit the slot. After you put the undamaged but slightly shorter wire through the slot in the connector you need to push the bits of metal down to pierce the insulation. Study Figure mm. The screwdriver blade will just fit the slot for the back of the piece of metal. Push all four pieces down until they contact the insulation. Then go back and push harder on each to pierce the insulation. Cut off any excess wire and test the connections with an ohmmeter. The copper that shows in the center of each cut end should make a connection to the corresponding bit of metal. Note that some connectors are not installed in the standard way. Touch-Pad connectors need two connections to pin 1. We do this by removing pin 2 and running a wire through the connector where it is soldered to the pin 1 wire. Always study the damaged connector before replacing it.



**Figure 14.1. Connector from below.** The two arrows identify the slot that a jeweler’s screwdriver must fit if you are to reinstall one of these connectors in the field. The same blade will fit the slot on the other side when pushing the prongs away from the four wires to remove the damaged connection.