

Batteries & Charging

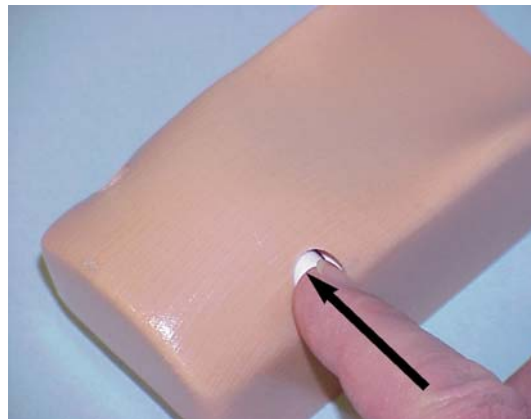
10 Battery & Battery Charging

10.1 Battery

The Boston Digital Arm System is supplied with two custom removable batteries. These are Ni-Cd batteries supplying 1100 mAHr at 12 volts. For most users, one battery is adequate to last an entire day depending on the prosthetic components, condition of the battery and the frequency of use.

10.2 On-Off Switch

The system on-off switch is located on the left side of the removable battery. To turn the system on, depress the switch – it should stay depressed. To turn the system off, depress the switch further – it will then extend back to the original position, flush with the battery cover. Turn the system off whenever you remove the prosthesis.



10.3 Battery Installation & Removal

Batteries can be removed for replacement as necessary, however we recommend recharging the battery in the prosthesis (see section 4.3). To remove a battery simply insert the recharge connector. This depresses a latch mechanism freeing the battery for removal. Using the recharge plug as a handle, lift the front edge of the battery. The battery will pivot on two hinge pins at its the rear. Grasping the front of the battery continue to lift until the battery clears the hinge pins.



Installing a battery is the reverse process. Place the rear of the battery into the elbow forearm first, positioning it so that the two slots on the battery align with the pins on the inside of the forearm frame. Once it is in position on these hinge pins, lower the forward edge of the battery until it engages the locking pin and latches in place.

10.4 Battery Charging

Boston Digital™ Arm Systems are supplied with two chargers; a Fast Charger (BE255) and a Slow Charger (BE256). The Fast Charger is recommended for daily use. This charger is more efficient and assures that the battery is fully charged. The Slow Charger is intended as a back-up to the Fast Charger. Users often prefer the Slow Charger when travelling because it is smaller and lighter than the Fast Charger.



Fast Charger (BE255)

An optional Charger-Evaluator (BC21) is also available for users who want to track their battery condition/capacity.

The battery should be recharged in the prosthesis, although it can also be recharged once removed. To recharge the battery in the prosthesis, turn the prosthesis off and remove it. Then insert the recharge plug into the receptacle located on the forward right side of the battery case. Plug the charger into the wall outlet and if using the Fast Charger, observe the lights on the charger. The green light should illuminate. The green light will remain on until the battery is fully charged and then will flash indicating that the charge cycle is complete. This process will take up to 75 minutes depending on the battery's state of charge. If the green light on the charger goes out after several minutes, this indicates that there is a problem with the battery and the spare battery should be installed. The faulty battery should be returned to your prosthetist for evaluation.

The Fast Charger starts off with a slow charge and it will not start the fast charge cycle until the battery voltage reaches 10V. If the charger does not detect 10V in 20 minutes, the green light will go out indicating a bad battery. Either a cell has been reversed and in this case the battery should be returned to your prosthetist or the battery has been sitting idle for a number of weeks and has self-discharged. In the latter case, it may be possible to salvage the battery. Try to charge the battery several more times before returning it to your prosthetist.

It is recommended that the battery be *discharged* periodically* to purge any battery "memory" that has occurred from previous use. The Fast Charger is designed to control the discharge cycle. The Charger will bring each cell down to 1 volt (or 10 volts for the entire battery) and then automatically recharge it. To initiate this *discharge*, follow the same procedure as for charging the battery. As soon as the green light illuminates, press the *Discharge* button on the front of the charger. The yellow light will illuminate indicating that the battery is discharging. Once the discharge is complete the charger will automatically switch back to the charge mode – the yellow light will flash and the green light will illuminate. When the charge cycle is completed, the green light will also flash indicating that the charger can be removed from the battery. This entire process may take several hours depending on the initial state of charge of the battery.

* Discharging the battery once a week will do no harm and this routine is easy to remember

Batteries must not be over-discharged as can occur when leaving the battery *on* when the prosthesis is not in use. This can cause permanent damage to the battery. Make sure that the on-off switch is in the *off* position when you remove the prosthesis!

Ni-Cd batteries also "self-discharge" over time, they lose charge while sitting idle. Although this self-discharge process is slow, a charged battery left unattended for weeks is likely to be discharged when needed. Therefore we recommend either swapping batteries periodically (i.e. weekly) or recharging the spare battery outside the prosthesis occasionally to keep it fresh.

The battery can be "topped off" with the Fast Charger to obtain a partial charge if there is not adequate time for a full charge. Follow the same procedure as recommended for a full charge and when it is time to stop the charge, simply remove the recharge plug from the battery.

Fast Chargers have a 115/220V switch which allows them to be used in foreign countries where 220-240 volt, 50 Hz mains power is provided. Slide the switch to the appropriate setting for the U.S (115V) or for a foreign country (220V). The Charger uses a standard "computer" power cord so when arriving in a foreign country simply purchase a suitable power cord at any business supply store.

The Slow Charger (BE256) is designed to charge the battery overnight. Just turn the prosthesis off and plug the charger into the recharge receptacle. Leave this charger plugged in for 8-10 hours and remove the plug. The battery should be fully charged. The Slow Charger is not intended as a long-term trickle charger and batteries should not be left connected to this charger for more than about 10-15 hours. Slow Chargers are available for use in Europe and the UK – contact your prosthetist if you plan to travel abroad.



Slow Charger (BE256)