ARM (Actuation via Real-Time Myoelectric Signals) ProsthEEsis

User Manual

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1.1 How to install your product

The first step for using the prosthesis is placing the electrodes. Two electrodes should be placed near the muscle belly, in line with the muscle fibers. The third electrode acts as a ground, and it should be placed near a bone or electrically unrelated tissue. An example of electrode placement is shown in **Figure 1**.

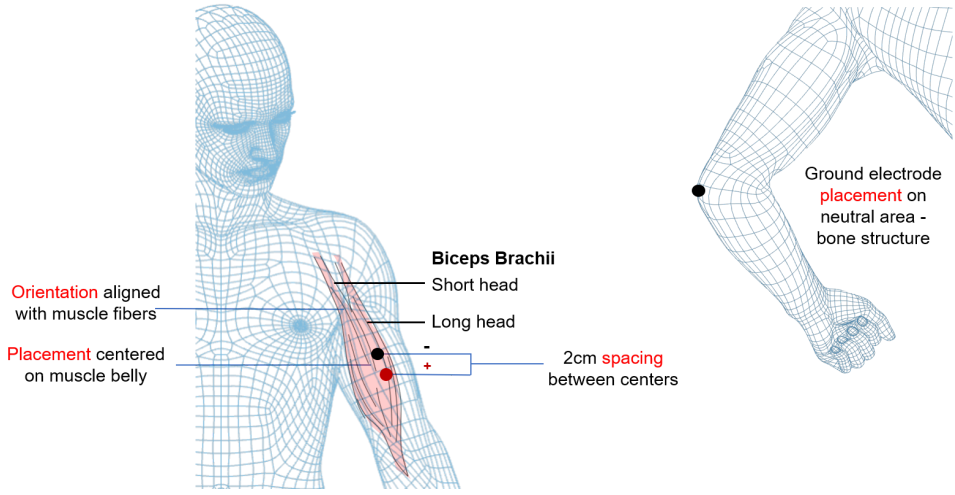

Figure 1. Electrode Placement Guide (source)

Next, the cables need to be snapped onto the electrodes. The green connector should snap onto the ground electrode. The yellow and red connectors should snap onto the muscle belly electrodes.

Then, the arm & socket should be fitted onto the residual limb. Now, the device is ready for setup and subsequent use.

1.2 How to setup your product

Before setting up the device, two 18650 lithium ion batteries with built-in protection should be placed between the snaps in the battery box in the orientation corresponding to the markings.

To turn on the device, move the switch on the battery board to the “ON” position.

Once the power is on, a blue LED should light up on the main board within the arm. If you see this light, you can proceed with calibration.

To begin the calibration process, press the “USER” button on the circuit board. The OLED display will then provide instructions for the calibration process:

- First, the calibration process will load. After loading, you will be prompted to press the “USER” button.
- Then, you will be prompted to relax the target muscle. The device will take measurements during this time. After, you will be prompted to press the “USER” button.

- Next, you will be prompted to flex the target muscle as the screen flashes. There will be a countdown before the flashing starts. When the screen is fully white, flex the target muscle as you will to change the hand position.
    - Note: The screen will flash three times, for varying amounts of time. Continue to flex the muscle until the screen goes dark again.
    - After, you will be prompted to press the “USER” button.
- Two things may happen in the next stage:
    - If the calibration was successful, the display will let you know. Then, it will calculate and set the threshold value. You are now finished with calibration – hold the button to start the calibration process again.
    - If the calibration was not successful, you will get an error message. If this happens, hold the button to start the calibration process again. You will be prompted to do so.

After successful calibration, setup is complete.

1.3 How the user can tell if the product is working

You can tell the device is operating properly when:

- The blue power LED is on.
- The OLED display provides a prompt after holding the “USER” button.
- The calibration process ends in success.
- The movement of the hand corresponds with the input from the target muscle.

1.4 How the user can troubleshoot the product

- What if the blue power LED does not come after I flip the power switch?
    - This is likely due to an issue with the batteries. First, charge them and try again, ensuring proper orientation.
    - If this does not work, try another set of batteries.
- What if the OLED display does not provide a prompt after holding the “USER” button.
    - First, ensure you are pressing the “USER” button: there are two other buttons present on the board.
    - Next, make sure you are holding the button when the hand is not moving. The button will not work during other processes, so if the hand is opening or closing, hold the button for at least 5 seconds. The prompt should appear when the motion stops.
- What if the calibration process has an error?
    - First, try the calibration process one more time. There may have been temporary signal interruptions that interfered with the signals detected in calibration.
    - If this process fails again, check the metal cage on the inside of the device. This cage helps minimize the noise due to nearby electronic devices. If it is broken, wireless signals will variably interfere with signal processing: it needs to be repaired.
- What if the hand does not move when I flex my muscle (or vice versa)?

    - This is likely due to a calibration issue. The calibration process may need to be repeated throughout the day if the muscle weakens quickly with use. Try repeating the calibration process.
    - Next, check the metal cage on the inside of the device. This cage helps minimize the noise due to nearby electronic devices. If it is broken, wireless signals will interfere with signal processing: it needs to be repaired.
- If there is another issue or these solutions do not work, please contact eNABLE. They can further troubleshoot the hardware and software to resolve the problem.