Feasibility Testing Report – Battery Capacity Test

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Related System: Recharge or Replace Battery (ADB)

The test is being completed to determine how long the battery can last on a typical days use before having to be recharged. It also helps determine how much maximum current will be drawn to prevent any short circuits from occurring. Both these outcomes are based on a typical days use whether a test subject is using this device in active or idle mode.

Supplies:

1.) AFO control device
2.) 1 ohm high power resistor
3.) Data logger
4.) Oscilloscope software
5.) 9v battery

Setup:

1) Connect the output of the power source to the 1 ohm resistor
2) Connect each end of the resistor to the Data logger so that voltage drop across the resistor can be recorded
2) Connect the data logger to a laptop where the outcome and run the oscilloscope software

Procedure(s):

Test:

1. Turn on the AFO and run the device in active mode and compress the heelstrike compression sensor to represent a typical gait cycle.
2. Save the data obtained
3. Repeat the procedure in idol mode, no compression is necessary
4. Save the data obtained

Data Analysis:

1. Using ohms law across the 1 ohm resistor can determine current drawn

2. Using the power rating on the 9v battery as well as an expected amount of time someone could use in either mode, total usage of this device is recorded.

Results:

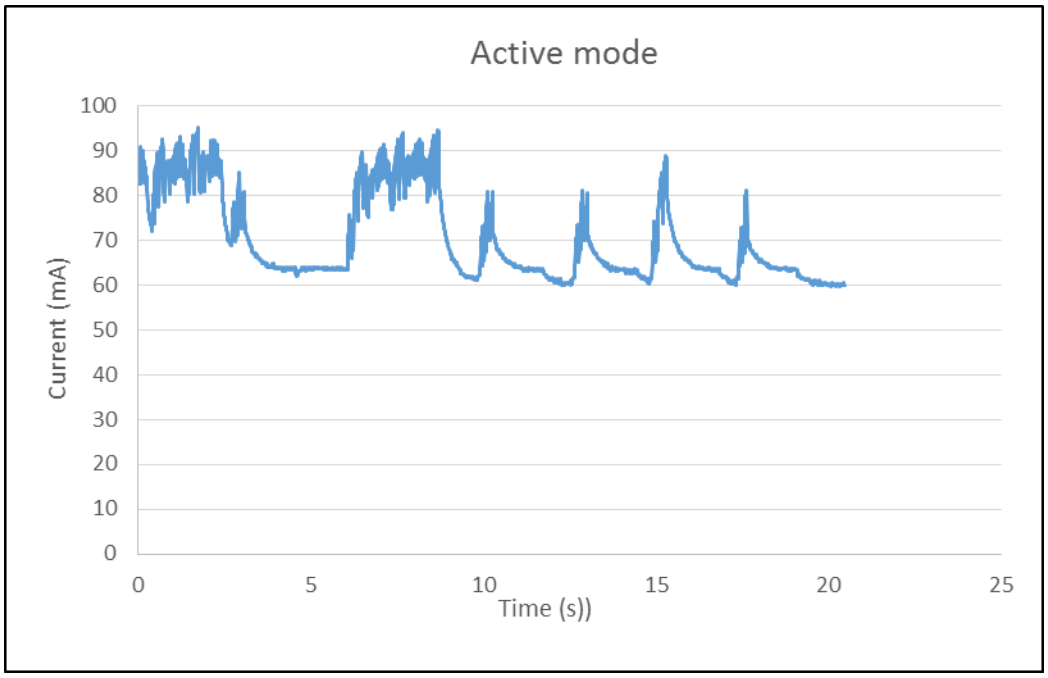

Figure 1: The following plot displays the raw data which represents amount of current that is drawn when the dive is being used in active mode. Each spike represents heel strike

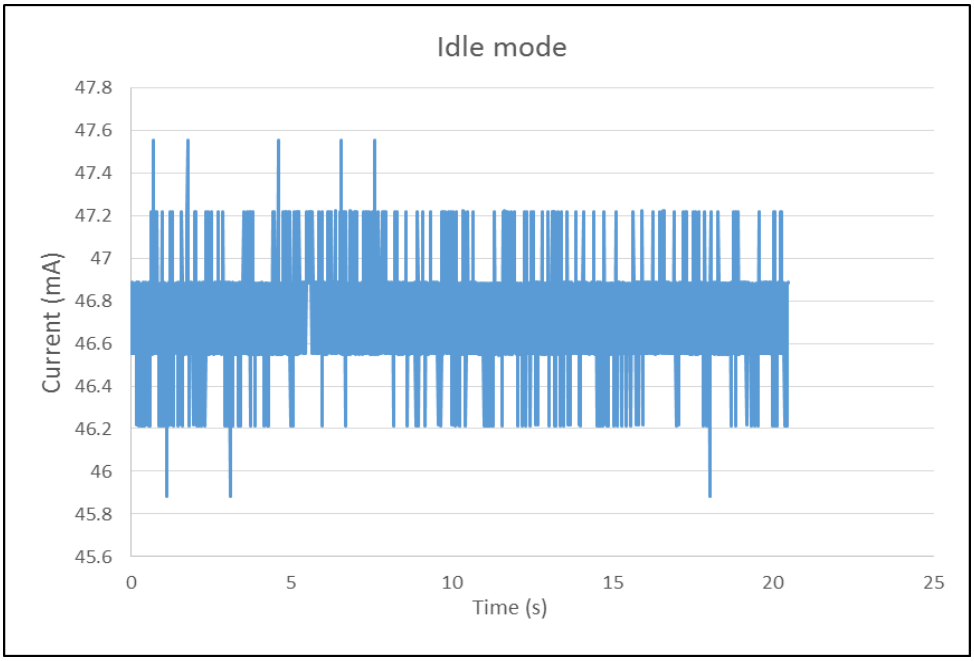

Figure 2: The following plot displays the raw data of current drawn when the device is in idle mode. No steps taken

Time calculations	
Battery active (hrs)	4.46
Battery idle (hrs)	8.9
Geni sec/step	1.35
Expected sec/step	2.7
Total expected steps	1500
Expected active time (sec)	4050
Expected active time (hr)	1.125
Expected total use (hr)	8
Percent use in idle	25%
Expected idle time (hr)	6.655
Total use (hrs)	7.780

Figure 3: The following table displays steps for determining the total usage on a particular day

ER9: Max current (mA)	
Ideal Value:	100
Marginal Value:	200
Obtained value	95
ER10 Time between charges (hours)	
Ideal Value:	8
Marginal Value:	6
Obtained value:	7.78

Figure 4: The following table compares results obtained from the test to the engineering requirements

Conclusion:

From testing the battery, maximum current does not go above ideal value and the time between charges is above marginal value. As a result, this device can last for a full days use before a charge is necessary.