

Battery System

In addition to batteries, the battery system contains converters to provide a low-voltage supply to other buoy equipment, a low voltage disconnect circuit to turn off the low-voltage supply if the batteries become discharged, and switches to turn the system on and off for connection.

A preliminary design for housing 24 14A-Hr lead acid batteries has been developed. The design of this housing uses a stainless box we've used successfully on the buoy in past deployments, and includes features to keep access to hazardous voltages to a minimum during assembly. The intention is that a plastic guard will fit down over the batteries and have covers over each terminal such that only one terminal can be exposed at a time for connection.

We have performed testing on these lead-acid batteries to determine the effect of pulse charging. We found that charging continuously at $C/4$, and charging at C with a 25% duty cycle (10 second period) is not equivalent. The pulse charged battery decayed in capacity considerably faster than the constantly charged battery. Nevertheless, the current design still allows battery charging at pulses of C or greater, but it is estimated that these events occur rarely enough that we won't significantly degrade the batteries. It is possible to have the control system limit battery charging to a certain current and to direct the rest to the load-dump resistor during peak events, this is under investigation.

We are also concerned about hydrogen build-up in the housing and are planning a test to quantify this effect at both continuous $C/4$ charging, and during pulse charging.

Documentation Included:

- Schematic
- Lab Battery Test Results
- Concept SolidModel of housing