**Lafayette College: Electrical and Computer Engineering**

08

**Fall**

Accumulator Simulation Test: ATP-01

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This document contains information about how to set up a test for the accumulator. This test verifies that the packs are able to power the motor. A simulated load is used for this test.

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# Desired objectives

This test should verify that the packs perform safely. To achieve this the packs will discharge into a simulated load. This will be done in two steps. The first test will verify that an individual pack can deliver the expected current. The second test will ensure that all of the packs can work together to ensure that the correct current can be driven into the load at the right voltage.

The nominal voltage of 4 packs in series is 89.6VDC. For one pack it is 22.4V. The maximum current that the packs will be asked to draw is 200A. The maximum anticipated voltage is 106.4VDC. The tests are designed to ensure that no more than 200 A will be drawn in any circumstance.

To run these test a safety plan must have already been agreed and accepted by the ECE Director of Laboratories.

# Required Hardware

* 4 Packs in series
* Simulated load
* Basic GLV safety loop
* PPE per safety plan
* Danger zone per safety plan

# Required Software

None

# Hardware Setup

Before any test is completed it is recommended that the packs are fully charged. This test is relatively quick so a half charged pack should not lead to failure.

## Single pack

1. Ensure safety loop is disconnected and the AIR(s) are open
2. Check BRBs are open
3. Connect safety loop
4. Connect pack to simulated load
5. Set load to 0.5 ohms (43A test)3

## Series packs

This setup requires a professor present since there is a high voltage present.

1. Ensure safety loop is disconnected and all AIRs are open
2. Check BRBs are open
3. Connect safety loop
4. Connect packs in series from pack 1 to pack 4
5. Connect packs to the simulated load
6. Set load to 2.0 ohms (43A test)

# Software Setup

N/A

# Test Procedure

## Single pack

1. Close the BRB
2. Verify current draw per ATP01-01
3. Set simulated load to 0.14 ohms (154A test)
4. Verify current draw per ATP01-02
5. Open BRB
6. Verify current draw per ATP01-03

## Series packs

1. Close the BRB
2. Verify current draw per ATP01-04
3. Set simulated load to 0.56 ohms (154A test)
4. Verify current draw per ATP01-05
5. Open BRB
6. Verify current draw per ATP01-06

# Acceptance Test Summary

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test | Description | Criteria | Bounds +/- | Actual | Pass/Fail |
| ATP01-01 | Measure current through the simulated load at a low draw | 43 A | 10 A |  |  |
| ATP01-02 | Measure current through the simulated load at a high draw | 154 A | 45 A |  |  |
| ATP01-03 | Measure current through the simulated load with the safety loop open | 0A | 100uA |  |  |
| ATP01-04 | Measure current through the simulated load at a low draw with all of the packs | 43 A | 10 A |  |  |
| ATP01-05 | Measure current through the simulated load at a high load with all of the packs | 154 A | 45 A |  |  |
| ATP01-06 | Measure current through the simulated load | 0A | 100uA |  |  |

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Witness/examiner signature Date Pass/Fail