**LFEV-Y5**

v0.1

**Lafayette College: Electrical and Computer Engineering**

08

**Fall**

Accumulator Test: ATP-02

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This document contains information about how to set up a test for the accumulator. This test connects all four packs to the motor to verify performance.

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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.

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

In this document 100% load means no load. This document only verifies the temperature of the packs since we do not have any cooling system that we will use on the actual car.

# Required Hardware

* 4 Packs in series
* Motor
* Dynamometer
* Basic GLV safety loop
* PPE per safety plan
* Danger zone per safety plan
* IR temperature probe

EITHER:

* Current sensor for the packs
* Voltmeter for the packs

OR:

* Populated packman attached to at least 1 pack

# Required Software

1. The remote software to get to the dyno

# Hardware Setup

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 packs in series from pack 1 to pack 4
4. Connect safety loop
5. Connect packs to the motor power supply
6. Place tape over room 401
7. Close all BRBs
8. Exit room 401

# Software Setup

1. How to start the connection?

# Test Procedure

## Basic test

1. Set the load to none (100%)
2. Set throttle to 0%
3. Check ATP02-01
4. Record cell temperature
   1. If there is a PacMan installed inspect screen to verify temp
   2. If there is no PacMan use the IR probe to measure the temp
5. Record motor controller temperature with probe
6. Record motor temperature
7. Set throttle to draw 50A of current
8. Run test for 1 min
9. Check ATP02-02
10. If this test passes run the same test again for 5 min

## Physics data acquisition

1. Set throttle to 20%
2. Recorded the values of power supply current (A), Controller RMS Current (A), Motor RPM, hydraulic torque (ft-lb), pack voltage (V), and motor controller and motor temperatures (deg C)
3. Increment the throttle by 2% and repeat previous two steps.
4. Stop when throttle at 35%
5. Repeat for loads from 100% down to 50% in 2% steps

## Stress test

1. Set the load to 100%
2. Set throttle to 0%
3. Ramp the throttle to 100%
4. Check ATP02-03
5. Set throttle to 0%

# Acceptance Test Summary

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test | Description | Criteria | Bounds +/- | Actual | Pass/Fail |
| ATP02-01 | Measure current draw from the packs when throttle at 0 | 0 A | 100 uA |  |  |
| ATP02-02 | Measure temperature of cells | 40 C + ambient | Do not exceed |  |  |
| ATP02-03 | Measure temperature of cells | 40 C + ambient | Do not exceed |  |  |
| ATP02-04 | Measure temperature of motor | 25 C | 5 C |  |  |
| 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