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ECE 492

02/27/2017

Accumulator Memo 1

Between Tuesday, February 14th and Monday, February 20th, significant strides were made in completing the Accumulator for the LFEV. All 4 packs were assembled and verified (without the AMS). Emilie, Greg, and Meridith performed the following experiments and tests:

- 1) Connectivity Test on each Pack
- 2) An electrical stress experiment on each Pack
- 3) An experiment in which 4 Packs were in series and hooked to the test load.
- 4) An experiment in which 4 Packs were in series and powering the motor.

Connectivity Test on each Pack

This was to ensure there was as little resistance as possible between the aluminum bus bars and a cell's terminals. The results for this test can be found on the 2017 website.

A stress experiment on each Pack

For each individual Pack, we used the test load in room 400 to draw the following currents for 60 second spans: 20A, 50A, 100A, 200A. We observed that the Packs still worked afterwards by testing the Safety Loop and measuring the Voltage across the cells.

An experiment in which 4 Packs were in series and hooked to the test load.

We connected all 4 Packs in series, with the Basic Safety Loop connected through all 4 packs.

The following Measurements were produced. Note: Through the load current measurements

were used with current probe. Voltage @ the load is defined as being measured with a multimeter, on the load is defined as what the load was displaying.

V @ load (V)	V on load (V)	Pack 1 Voltage (V)	I @ Load (A)	I through Load (A)	I on Pack 1 Display (A)
93.28	93.4	23.3	0.1	2.7	.666
92.15	93.1	23.0	14.2	10.3	9.33
90.9	91.8	22.8	24.8	20.1	18.91
89.98	90.9	22.6	36.3	30.2	29.24
89.04	89.9	22.4	47	40.0	38.93
89.553	90.5	22.5	37.7	30.8	29.87
89.49*	90.5	22.5	38.5	30.8	29.87
91.45*	92.6	22.9	0	0	0
89.75*	90.6	22.6	38.9	30.8	29.8

Table 1. *Observing the response of the system when stimulated with a step from 30A to 0 A back to 30 A.

An experiment in which 4 Packs were in series and powering the motor.

This experiment was performed in room 401 with the dynamometer. Voltage was measured with a multimeter, and current was measured with a current probe hooked into a multimeter. The data was read by Meridith over a walkie talkie to Greg who was in room 400 controlling the SCADA system and recorded by Richard Diego. The data can be seen under “Accumulator with Dyno Results 02/20” on the website.

Conclusion

This was the first time 4 Packs have been hooked together in series, as well as the first time Packs have powered the motor in room 401. It was a major accomplishment that involved TSV, Dyno, and Systems teams.