

# Formula SAE Accumulator

## By Team JuiceBox

Will Bowers, Graham Bruski, Maxwell Helton  
Jackson Meier, Jason Rico

## Project Overview

The FSAE is a student competition where schools attempt to create an Electric Vehicle to compete in a Formula 1 competition. A primary component of an electric vehicle is the Accumulator. It is responsible for storing and distributing the energy required by the vehicle.

Team JuiceBox is the first team tasked with handling the design of the accumulator and was expected to create an initial proof of concept for how the accumulator will work that would support future work.

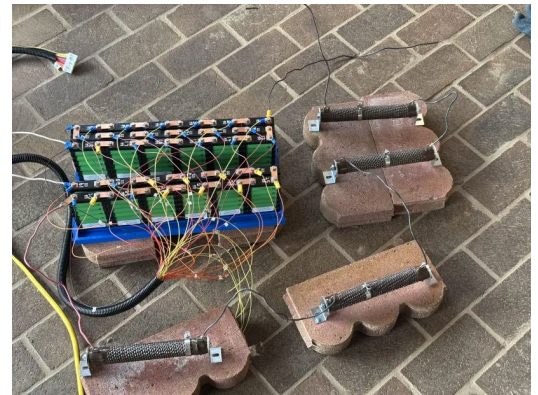


Figure: 30 Battery Module  
Testbench

## Technical Specifications

The Accumulator mainly consists of two components: the battery management system and the battery themselves. The battery management system (BMS) is responsible for overseeing the drainage, temperature, and overall health of the batteries in the system. In response to dangerous conditions, the BMS is capable of stopping all power in the system with the help of other FSAE required subsystems. The BMS used throughout testing was the Orion BMS 2. The batteries respective to this project were the Lithium-Ion VTC5A Battery Modules that hold cells configured in 1 series 6 parallel. A total of 90 battery modules are expected to be used in the final product.

Testing the performance of the Orion BMS 2 in tangent with our battery modules involved a testbench setup. The bms is hooked up to a choice of 5, 15, or 30 battery modules, depending on testing size, all in wired in series with provided bus bars. Within this configuration power resistors would be placed to simulate a load and cause the batteries to drain. While testing, the bms would track the voltage of each battery module and temperature from the device thermistors and report back to the user.