

Electric Motor Control with Regenerative Braking

**Functional Description and Complete System Block
Diagram**

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Introduction

The Electric Motor Control with Regenerative Braking (EMCRB) project will develop a test system to investigate electric vehicular drive systems and regenerative braking. The test system will consist of a three phase permanent magnet synchronous motor, flywheel, and control electronics. Data collected from the test system will be used to develop a model that will establish the efficiency of regenerative braking. An on going Bradley University Mechanical Engineering project will utilize the efficiency data to design an ultra light electric vehicle. A future Bradley University Electrical Engineering project may expand upon the test bench system developed in the EMCRB project.

System Block Diagram

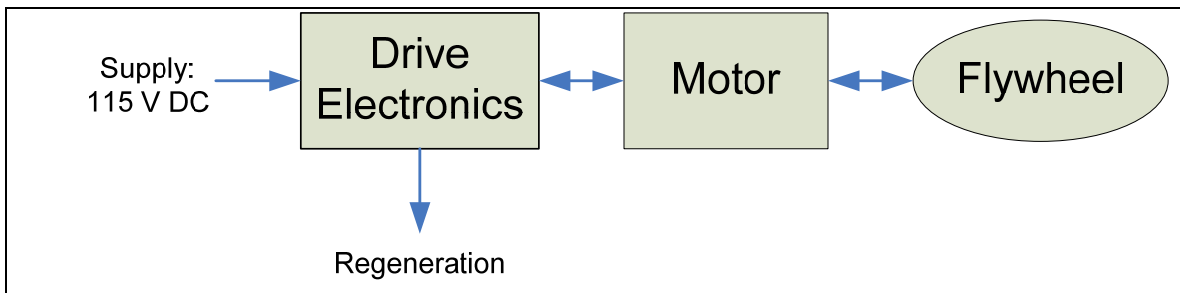


Figure 1: Test Bench Block Diagram

The system motor will initially be powered from a 115 V DC supply and will impart kinetic energy to a flywheel. Once kinetic energy is stored in the flywheel, the motor will be operated as a generator in order to recover electrical energy from the system. The rate and amount of the recovered energy will be used in order to determine the efficiency of the regenerative braking process.

Conclusion

The collected efficiency data will be used to develop regenerative braking simulations and models. These models will serve as the baseline to future regenerative braking projects.