

# Bachelor/Master Thesis



TECHNISCHE  
UNIVERSITÄT  
DARMSTADT

Setup, of coupled Low Voltage Drive Systems with Speed  
Control Implementation for a ETIT Demonstrator



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## Background:

Modern power grids feature an increasing number of volatile power generation (PV, Wind). Therefore, the capabilities to store electrical energy become ever more important. To give students the possibility to experience this challenge first hand, a demonstrator of a small, electrically fully functional, modular 12 V DC distribution grid, including generation, storage and consumption is developed at the institute.

## Goal (Bachelor Thesis):

The goal of this thesis is the setup of two coupled Hacker PMSM drives as a Motor-Generator Unit to simulate power generation for the demonstrator mini-grid. For speed variable drive operation, a control system needs to be implemented. In addition, an import function for manual load/speed profile needs to be implemented.

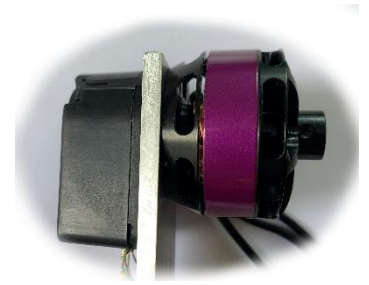
## Tasks (Bachelor Thesis):

1. Research of relevant topics, amongst others: Speed control, PMSM-Drives, Power Generation, Encoders, Controller Programming
2. Analysis of the given system regarding its capabilities in respect to the project goal
3. Setup of the coupled drive system with encoder
4. Implementation of a speed control for the drive unit
5. Implementation of an import function for load profiles
6. Verification of proper functionality
7. Documentation

## Enhancement for Master Thesis:

Additional tasks, as well as the scientific goals for a Master Thesis will be discussed individually based on the students personal interest, background of study and its applicability to the project.

**Working Language:** German, English



**Fig. 1:** Hacker Motor with Encoder



**Fig. 2:** Inverter with Controller