

Senior Design Project Description for FALL 2016

Project Title: High-Force Electromagnetic Actuation Device for Automotive Applications (SG_FIELD)

Supporter: Schaeffler Group USA

Supporter Technical Representative: ASSIGNED

Faculty Mentor: _____ ASSIGNED TBD (check one)

Single Team Dual Team _____ (check one)

Personnel (EN/ET): 1 E, _____ Cp, _____ Cv, 3 M, 1 SE

(Complete if the number of students required is known)

Expected person-hours: (250 per student)

Description of Project:

Schaeffler Group USA engineers, designs and fabricates bearings, linear motion, engine components, bearings, hydraulic and transmission systems for the automotive and aerospace industry.

Schaeffler Group is in need of a high force, long travel electromagnetic actuation device for shifting a clutch in transmission and differential applications. Common e-mag actuators are typically either capable of high force with very small travel (i.e. lifting magnets) or long travel with very low forces (i.e. solenoid valves).

Initial Project Requirements (e.g. weight, size, etc.):

The project entails:

- The design of a magnetic actuator - including the coil windings, armature shape, core shape, etc
- The controls for the magnet designed onto an integrated circuit, including distance sensor for position of the actuator, temperature compensation algorithms, overload/safety strategy. Software and controls should meet automotive electronic quality expectations.
- The mechanical hardware must create a pre-load force of 300N on the clutch when the actuator is fully engaged, and must travel 3mm, against the 300N force, into the disengage position.
- The actuator must hold position at either extreme, engaged or disengaged, with no electrical power draw.

More details will be provided at the Kick Off Breakfast.

Expected Deliverables/Results:

The deliverable is a completed and tested prototype.

List here any specific skills or knowledge needed or suggested (If none please state none):



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None