Master Thesis: Electrodynamic Model of a Pyrotechnical Switch for High Voltage Battery Systems

Introduction: Soon the electromotive market will rapidly grow up. One aspect for this growth is the increase of the energy density of high voltage battery systems. This systems are built up with Li-Ion cells with a module voltage up to 850V. To increase the performance of such systems, the inner resistance of the module has to be as small as possible. As a result, the short circuit current of such High Voltage Batteries reaches up to 20kA. To interrupt such a high short circuit current within 2ms the Pyrotechnical Battery Disconnector was developed by Joyson Safety Systems Aschaffenburg GmbH.

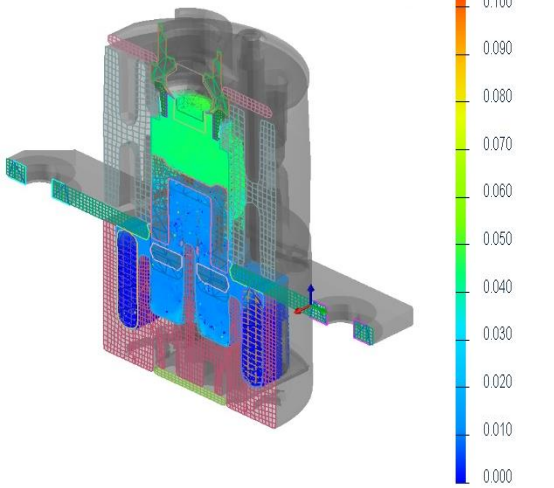
Task: Development of an electrodynamic model of a pyrotechnical battery disconnector. Transient nonlinear electrodynamic FE simulations to improve the design of the Pyrotechnical Battery Disconnector.

Work plan:

1. Modeling of the HV-Connector in the steady state / dynamic state.
2. Model extension in the dynamic state with Piston & Housing
3. Interpretation of the electrodynamic effects and derivation to constructive Changes.
4. Development of a electrodynamic optimized design of a pyrotechnical switch.

Requirements: Fundamentals of numerical field simulation, experiences with Matlab and CST EM Studio/Comsol/Ansys beneficial even CAD programs as CATIA or similar.

Pyrotechnial Battery Disconnector
Joyson Safety Systems



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