

Multi-Criteria Optimization of High-Temperature Reversed Starter-Generator

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Abstract : The paper presents another structural scheme of high-temperature starter-generator with external rotor to be installed on High Pressure Shaft (HPS) of aircraft engines (AE) to implement More Electrical Engine concept. The basic materials to make this starter-generator (SG) were selected and justified. Multi-criteria optimization of the developed structural scheme was performed using a genetic algorithm and Pareto method. The optimum (in Pareto terms) active length and thickness of permanent magnets of SG were selected as a result of the optimization. Using the dimensions obtained, allowed to reduce the weight of the designed SG by 10 kg relative to a base option at constant thermal loads. Multidisciplinary computer simulation was performed on the basis of the optimum geometric dimensions, which proved performance efficiency of the design. We further plan to make a full-scale sample of SG of HPS and publish the results of its experimental research.

Keywords : high-temperature starter-generator, more electrical engine, multi-criteria optimization, permanent magnet

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