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Title: 48 V High Power Battery for Mild-Hybrid Electric Powertrains

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Abstract

Mild-hybridisation, using a 48 V system architecture, is receiving interest, as it offers fuel consumption benefits approaching those achieved using high-voltage systems, at a much lower cost. To maximise the benefits from a 48 V mild hybrid system, it is desirable to recuperate during deceleration events at as high a power level as possible, whilst at the same time having a relatively compact and low cost unit. This paper examines the particular requirements of the battery pack for such a mild-hybrid application and discusses trade-offs between battery power capabilities and possible fuel consumption benefits. The technical challenges and solutions to design a 48 V mild-hybrid battery pack are presented with special attention to cell selection and the thermal management of the whole pack. The proposed solution features a continuous power capability of more than 10 kW and a peak power rating of up to 25 kW and ensures maximum recuperation levels and fuel economy benefits. In the target application fuel consumption can be reduced by up to 15.5 %.