

The MAHLE Range Extender Engine

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Abstract

Current focus on techniques to reduce the tailpipe carbon dioxide (CO₂) emissions of road vehicles is increasing the interest in hybrid and electric vehicle technologies. Pure electric vehicles require bulky, heavy, and expensive battery packs to enable an acceptable driving range. Range Extended Electric Vehicles (REEVs) partly overcome the limitations of current battery technology by having a range extender (REx) unit that allows a reduction of the traction battery storage capacity, whilst still maintaining an acceptable vehicle driving range.

MAHLE have developed a REx unit specifically for passenger car applications. Key attributes for the engine were identified as being minimum package volume, low weight, low cost, and good NVH. In order to showcase the resulting REx unit a current production gasoline fuelled compact-class car has been converted into a REEV. The integration of REx, along with considerations for the operating strategy, including a GPS based strategy, and results showing the measured fuel efficiency will be presented.

Finally, to broaden the scope of applicability of the REx unit, methods to increase the power output of the unit with high component commonality have been investigated.