KSPG AG

Low-noise range extender dispels battery runtime angst

Together with FEV GmbH, KSPG is currently and successfully testing a range extender developed for electric vehicles. The test vehicle, based on the FIAT 500, has already undergone comprehensive tests at KSPG. Customer response to tests conducted at various OEMs underscore the targets achieved in the development of this extender where emphasis was on barely perceptible noise and vibration from the 2-cylinder V-type engine fitted with FEVcom vibration compensation.

Thanks to its dedicated design features including active vibration compensation and convenient mounting location, the system on show performs excellently in the noise-vibration-harshness discipline. As a consequence, the impression of low-noise electric propulsion hardly suffers whenever the extender goes about its work.

The range extender allows vast flexibility in the configuration of its operating strategy. Depending on the timing and load conditions for when it starts up, the unit’s “operating philosophy” can be very closely adapted to any given conditions.

The extender’s advantages are to allow a reduction in battery size and cost and in the related weight. Also, the car can maintain its customary travel range without having to stop for lengthy recharging. It dispels “runtime angst,” a phenomenon not to be underestimated when introducing electric mobility.

Experts and legislators generally see range extenders as paving the way for widespread acceptance of electric vehicles and assume that an entirely new category of very small gasoline engines will arise to make them a reality. This presents attractive possibilities for suppliers, given that these extenders are largely unsuited for assembly on currently available production lines and initial unit quantities will possibly not be very high. KSPG has both a diversified product portfolio and the necessary development competencies. The largely universally mountable module furthermore allows for economies of scale and limits development and application costs.

The new KSPG power unit consists of a two-cylinder, V-type gasoline engine with a vertically positioned crankshaft and two generators with gear wheel drive. Except for the fuel tank and the radiator, all components are mounted on a ready-to-install support frame. The vertical crankshaft requires only a short construction height, such that the module can be integrated beneath the floor of a small passenger vehicle or, for example, be tucked neatly within a spare wheel recess. This installation option offers the easiest and least expensive modification procedure relative to conventional
vehicle construction and leaves room for attractive compact-vehicle packaging and styling options.

The power unit is conceived in such a way that the vehicle interfaces are reduced to a minimum. Vehicle integration thus proves comparatively unproblematic and installation or disassembly can be performed easily and efficiently. This enables the range extender to be reduced to an additional accessory equipment option. The automobile can thus be delivered with or without a range extender, thus allowing for a strategy of modularity.

**Bridge technology reduces costs**
The current market situation for electric vehicles looks as if many consumers are afraid that battery range will be insufficient ("range angst"). They also appear to shy away from the high added costs. A bridge technology like that employed in range extenders could expedite market entry for a generation of battery-powered vehicles and support legislators in their efforts to reduce CO₂ emissions.

The range extender is also an elegant solution to further constraints. At temperatures in which the battery tends to work inefficiently when re-/discharging, the range extender can generate extra heat or cold which in turn helps reduce CO₂. The range extender allows normal use of heating and air-conditioning functions without the fear of excessive battery discharge.

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