

High voltages are no problem

EC fans for cooling air in a state-of-the-art articulated bus

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To reduce CO2 emissions and the production of fine particles, downtown areas in particular are being advised to switch over to public means of transportation since the fine particle pollution falls with the lower number of vehicles traveling. This effect is reinforced when the means of public transportation also use state-of-the-art environmentally friendly technology. To protect the environment, Mercedes-Benz developed the Citaro bus with a diesel-electric hybrid drive (Figure 1).

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The new bus relies on a serial hybrid drive in which the combustion engine is not mechanically coupled with the drive gears. Instead it drives a generator that supplies energy to the electrical travel drive and a battery located in the electrical DC-link. The voltage in this DC-link lies between 450 and 750 V. Since a normal vehicle electrical system usually works with 24 V, these high voltages pose great challenges to the suppliers of the electrical units used in the bus. Stepping down the voltage necessarily leads to losses and additional components are required, which results in added costs for acquisition and service as well as more weight.

The motor and fan specialist ebm-papst Mulfingen, however, was able to gain points in the overhead cooling system with EC fans that connect directly to the existing intermediate voltage. To do so, ebm-papst fell back on an EC-fan from its wide range of products that was originally intended for AC voltage from 350 to 400 V. It was modified accordingly and now works reliably at DC voltages up to 750 V. A total of six of these EC fans now contribute to supplying the various cooling circuits, such as for the diesel engine or the electronic components, reliably with cooling air. ebm-papst has thereby succeeded as a development partner in being able to offer innovative components for very demanding customer applications.

Figure 1: The Mercedes-Benz Citaro bus (image: EvoBus GmbH)