

Brose reduces fuel consumption with optimized thermal management



Brushless cooling fan module: With its new generation of brushless cooling fan modules, which will go into series production at the beginning of 2012, Brose will demonstrate an effective solution for engine cooling at this year's IAA: The overall length has been reduced by approx. 15 millimeters and the weight by some 700 grams.

- Brushless drive for cooling fan modules: smaller, lighter, more efficient
- Shroud: material-saving production through physical foaming
- Active grill shutter control: CO₂ emissions reduced by 5g/km

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Brose, the global market leader in cooling fan modules is continually working to improve the components involved in air-intake management. A worldwide network of engineering teams from electrics, electronics and aerodynamics, specialists in the electromagnetic compatibility (EMC) of vehicle components and state-of-the-art internal simulation tools guarantee fast development of customer-specific designs and a holistic approach regarding thermal management in vehicles. Not for nothing does the supplier for almost all of its electro-mechanical components rank in first or second place on the market.

At the 2011 IAA, Brose showcases this expertise by presenting holistic solutions for optimized thermal management. A new generation of brushless cooling fan modules, ranging from 200 to 450 watt, combines minimal resource consumption with maximum performance in cooling capacity, acoustics, package space and weight. In combination with the new system to control the supply of cooling air, the mechatronic specialist achieves CO₂ savings of approx. 7 grams per kilometer. Brose is the first and to date the only supplier of an actuator with an integrated mechatronic safety function. Patented by Brose, the system will go into series production by August 2013.

Brushless cooling fan modules: compact, silent and efficient

With its new generation of brushless cooling fan modules, which will be launched on the market at the beginning of 2012, Brose demonstrates a cost-effective solution for engine cooling at this year's IAA. Compared with conventional systems, this solution is not only lighter and more efficient, it also requires less space in the already tight engine compartment: the overall length has been reduced by 15 millimeters, reducing the weight by some 700 grams. The electronic regulation of the variable speed control has been fully integrated into the motors. An intelligent circuit design optimizes the drives at their load point, thus achieving a load efficiency of more than 80%. As a result, energy consumption under full load operation is cut by some 40%, which translates into a fuel reduction of about 0.1 to 0.2 liters per 100 km.

The focus is on a holistic, sustainable approach, since energy consumption can already be reduced at the production stage: physical foaming of the shroud allows material-saving use of plastics, which cuts energy consumption during production by some 30% and the use of resources by some 5%. In addition, a solderless process is used to assemble wired components.

All the drives - from 200 watt to 1,000 watt output - can be installed in the shroud without any adaptation necessary, cutting tooling costs for the car manufacturers and simplifying the creation of variants.

Active grill shutter system with "failsafe" function

Air intake management is completed by active grill shutter control which ensures the engine is cooled as required. Drawing upon its competence in mechatronic adjuster systems - 150 million drives for doors and seats are sold by the supplier a year - Brose is launching onto the market an innovative system for closing the front air vents of the vehicle.

An electro-mechanical actuator with integrated electronics controls the grill shutters sequentially. After the engine control unit has given feedback on the temperature in the engine compartment, the shutters are closed, thus ensuring optimal vehicle airflow. This also reduces the drag coefficient (CW value). Thanks to improved aerodynamics, CO₂ emissions can be reduced by up to five grams per kilometer at a constant speed of 140 km/h.

Another positive effect is that fuel consumption goes down right from the very first kilometer since the engine warms up faster with closed shutters. For example, the warm-up phase is reduced by more than one minute at an outside temperature of -5°C.

To ensure functional safety, the actuator is equipped with a so-called "failsafe" function: if the power supply of the shutter control is interrupted in the event of a failure, the shutters are opened to ensure engine cooling.

Worldwide motors competence

With regard to virtually all essential areas of the automobile where electro-mechanical components are used, Brose today ranks first or second on the world market: the mechatronic specialist is world market leader in pump drives for electronic braking systems (EBS), drive train actuators and cooling fan modules; it is one of the leading suppliers in electric power steering and engine cooling.

The supplier, for example in the case of HVAC blowers, can look back on 30 years' experience in series production with more than 250 million motors supplied worldwide; the same can be said of its 25 years' experience in series production with more than 150 million drives for EBS supplied worldwide.

In the area of high-performance cooling fan modules with a power output ranging from 850 to 1,000 watt, Brose uses efficient drives with an 80% efficiency rate and whose weight could be reduced for example by 1 kilogram to 2,650 grams. Thus, in this higher performance category, the supplier is also contributing toward reducing fuel and emission consumption.