



## SONCEBOZ Motion systems

Our core competencies consist of design, development and production of **mechatronic drive systems** and **electric motors** that operate in **harsh environments**. We are committed to improving safety, decreasing energy consumption and minimizing the impact on the environment. Our focus on **innovation, best in class quality** and **exceptional service** is our key to success for worldwide OEM customers and their suppliers.

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## Motion systems

for challenging **Active Grille Shutter** applications

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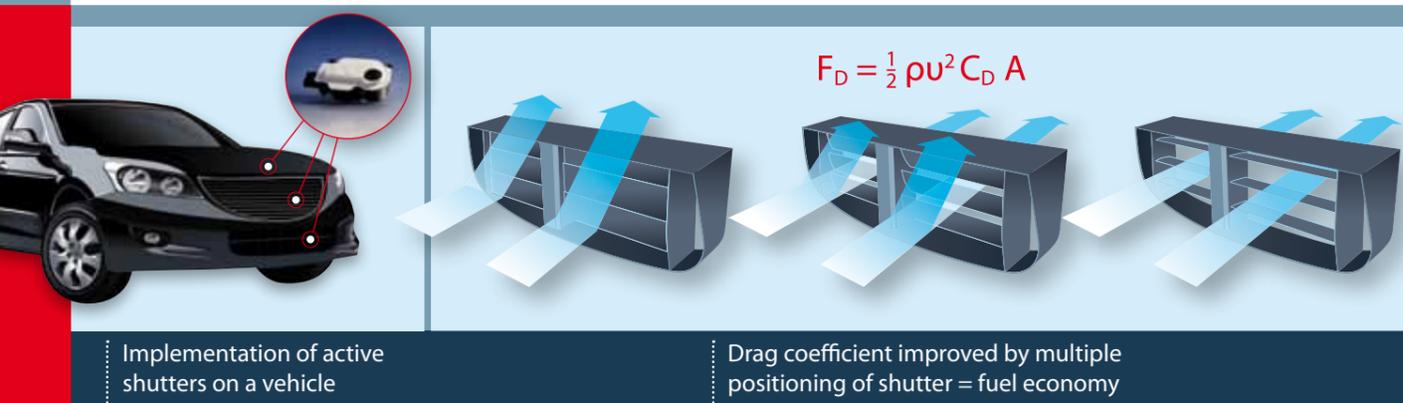
# Challenges in Active Grille Shutter

Movable shutters behind a vehicle's radiator grille enhance vehicle aerodynamics and speed engine warm-up. For the idea to work right, you need Sonceboz actuators to accurately, dependably, and efficiently modulate the position of the shutters.

Without shutters, air entering the engine compartment from the front creates about 10% of the total aerodynamic drag of a passenger car, and much more than that in heavy-duty vehicles. With active shutters, a smooth airflow over the front of the vehicle means lower drag coefficient, less fuel consumption and significantly less CO<sub>2</sub> emitted - as much as 3 g/km less!

Moreover, actively modulating airflow into the engine compartment reduces exhaust emissions by hastening engine warm-up and closely regulating engine temperature while driving. And active grille shutters make a vehicle quieter on account of the improved aerodynamics. Low-noise vehicles are less disturbing for the car's occupants and nearby residents and pedestrians.

All these benefits can be achieved with reliable, compact and waterproof Sonceboz smart stepper motors.



Implementation of active shutters on a vehicle

Drag coefficient improved by multiple positioning of shutter = fuel economy

# Our solutions

Sonceboz has long been recognized not only for our expertise in mechatronic drive systems, but also for generating competitive advantages for our client partners. Our vigilant anticipation of market needs anchors our relentless drive for innovative, high quality solutions to minimize total cost of ownership. Our application-specific actuator, with millions of units in service, stands as the premier, most reliable solution for air grille shutter actuation:

- Fully programmable electronics
- Lightweight: just 65 gr
- Watertight
- Low noise operation
- Low current consumption
- RoHS compliant

This patented slim shape stepper motor integrates a gear train and embedded electronics. It gives silent, fine positional accuracy and unparalleled smooth motion without additional sensors. The electronics, developed and tested in house by Sonceboz experts, are based on an application-specific integrated circuit (ASIC) with fully programmable positions and adaptable speed. Multiple positions and stall detection over 360° facilitate OBD integration. By any and every measure, this versatile, standardized all-in-one actuator provides an unrivaled flexibility for OEM global platform strategy.



...Sonceboz expertise is at work in vehicles of all types around the world:



# Your benefits

- Flexible interface for OEM platform strategy
- Internal diagnostic mode
- Validated application-specific actuator for fast time-to-market
- Technical support and product robustness for trouble-free service
- Outstanding light weight and compactness for easy integration

## • Passenger Cars & Light-Duty

Space is at a high premium in today's passenger cars, and design considerations are paramount. These stringent constraints on active grille shutter systems call for high-performance actuators with low weight and small size. Variable positioning is needed to optimize airflow according to driving conditions and to strike the precise balance between engine temperature and aerodynamic drag. Naturally, with today's global OEM production platform strategy, the actuators' drive electronics must be versatile and readily adaptable to the automaker's control system architecture.

## • Trucks & Heavy-Duty

Heavy-duty vehicles have service life measured in decades and in millions of miles or kilometers. High torque is needed to cope with a commercial vehicle's large shutters subjected to high wind resistance. The actuators or your active grille shutters must be sturdy and dependably robust at high and low temperatures and in harsh environments. Sonceboz actuators are the ones you need.

