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Energy Management

— Technology for higher environmental performance of vehicles —

Improving fuel economy goes beyond focusing on powertrain efficiency. Despite the many advances in technology, only about 20 percent of fuel energy is actually used to power the vehicle, while the remaining fuel energy is simply wasted. To better manage energy, DENSO is committed to Energy Management, an approach to a more efficient use of fuel energy.

DENSO's Energy Management Approach is Based on the following Principles:

1. Reducing the burden on an engine:

DENSO is working to improve the efficiency of alternators so they produce more electricity. The company also strives to reduce the amount of energy consumed by air conditioning systems and other devices. I n addition, DENSO is developing a system to control the air conditioning system and alternator in response to the continuously changing engine load, which will use the energy generated by the engine more efficiently.

Also, DENSO is developing a cold storage system that will help maintain a vehicle's air conditioning temperature when a vehicle equipped with a start/stop system is stopped and the air conditioning system no longer operates. The company's new system stores cooled refrigerant and uses it while the engine is stopped to ensure the air conditioning remains comfortable.

Looking forward, DENSO is conducting research on a "car-navigation cooperative control system," that will better manage fuel energy. Basically, this system will allow the air conditioning system, alternator and other devices to work together based upon information provided by the in-vehicle navigation system to ensure fuel energy is used effectively. For example, when the car navigation-cooperative system detects a downhill slope ahead after the current climb, the system will limit the generation of electricity when the vehicle is using energy to go up hill. Then, when the vehicle starts to go downhill, the system will produce electricity at the maximum rate. Together and in cooperation, this saves fuel.

2. Recovering lost energy through regeneration

Primarily, there are two types of wasted vehicle energy: 1) The thermal energy emitted from the engine and other devices, and 2) The kinetic energy dissipated while braking.

Thermal: DENSO is developing a new heat recovery system that uses the engine exhaust heat to improve heating performance during the winter. This also will quickly warm the engine and transmission to the optimum temperature for driving, which helps to improve fuel economy.

Kinetic Energy: DENSO is improving the performance of products that convert deceleration energy into electricity. Electricity is produced by the generator using engine power and excess electricity is stored in the battery. It then becomes increasingly important to generate electricity effectively without adversely affecting fuel efficiency, and to control the use of electricity for the entire vehicle. DENSO's regeneration system during deceleration generates and stores electricity by using the kinetic energy that is conventionally dissipated during braking. The system uses stored electricity when additional power is required for acceleration, limiting the generation of electricity and helping to improve fuel efficiency.

By integrating a wide range of technologies used in powertrain, thermal, electric, electronic and information and safety systems, DENSO is developing more fuel efficient and environmentally friendly technologies. These efforts help contribute to the improvement of a vehicle's environmental impact without influencing the vehicle's safety, comfort, or convenience.

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