



Automobile Related (energy saving, riding comfort, increased efficiency)

Motorized power-steering system

Motorized power steering is a steering system that employs a powered assistant motor instead of a hydraulic actuator to reduce the strength required for steering. The system controls the assisting force of the motor depending on the handling force of the driver and realizes optimal steering characteristics of being able to gain the necessary assisting force when such assistance is necessary. Ever since motorized power steering was introduced for the first time on light vehicles in 1988, there has been an increase in the utilization of the system with the better energy-saving effect due to rise in concern for the environment and is becoming more common in vehicles with larger engine displacement.



Shock absorber

Shock absorbers are installed on all 4 front/back and right/left suspensions of a vehicle. They support the operation performance of a vehicle and improve the steering stability and riding comfort. The absorber improves the riding comfort by controlling the front/back and right/left movements during the following conditions:

- Roll: right/left movement during cornering
- Pitch: relative forward/back movement
- Bounce: identical forward/back movement
- Nose dive: forward and down movement during braking
- Squat: backward and down movement during acceleration



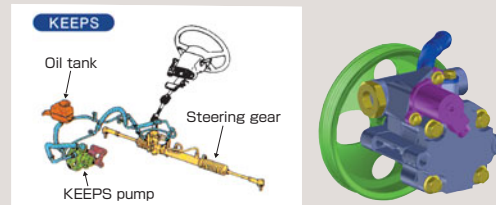
CVT vane pump

The CVT vane pump was developed as the ideal transmission for operating the engine at the optimal conditions. The vane pump is used as the hydraulics source for 2.0~2.5 liter class engines. Use of this vane pump has allowed 38% reduction of the drive torque loss of the pump. In addition, it also contributes to smaller and lighter CVT. The pump greatly contributes to the improvement of fuel consumption while improving the operability and noise of the vehicle.



Energy-saving power steering (KEEPS)

This is an electronically controlled hydraulic power-steering system. This energy saving system detects at all times the vehicle speed and handling of the steering wheel to minimize loss of energy by supplying just the right amount of flow and to realize optimal steering. Fuel consumption was improved by about 2.5% in the 10/15 mode tests using the actual vehicle. (55% improvement compared to our "normal PS")



KEEPS : Kayaba Electronic Controlled Energy Saving Power Steering

Motorized rear-wheel steering actuator

Rear-wheel steering heightens the turning performance of the vehicle and enables smoother lane changes by appropriately controlling the rear wheels according to the operation of the steering wheel and vehicle speed. Although hydraulic actuators were used at first, they were replaced with motorized actuators for lighter weight and better energy saving. In the future, application in active steering systems for avoiding danger can be expected by upgrading the control.



Technology that Support Safety

Improvement of riding comfort on the Shinkansen

Damper technology

Trains running at high-speeds such as the Shinkansen require various efforts other than the design to improve riding comfort. Our semi-active suspension system is one of them. The system improves the riding comfort by reducing vibrations and internal noise to realize a space for pleasant transportation.

N700 Shinkansen that made its debut on July 1



Semi-active suspension system

The device suppresses horizontal vibrations by calculating the vibration characteristics of the car using a computer and changing the damper performance in real time.