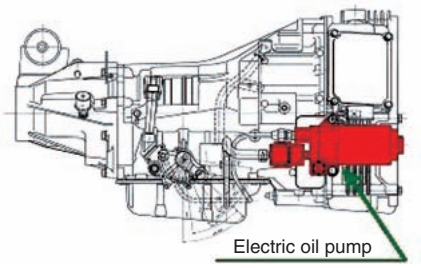
Electric Oil Pump for Vehicle Idle Reduction System

The growing trend of energy conservation and environmental regulation reinforcement of recent years has influenced automotive manufacturers to actively adopt new technologies effective for better fuel efficiency of vehicles. As a technology which improves the fuel efficiency of gasoline-driven vehicles by 5 to 10%, an idle reduction system which stops the engine when a vehicle is stationary has been commercialized and vehicles which adopt this system are becoming more and more popular. This paper introduces a new electric oil pump for vehicle idle reduction systems developed and mass produced by JTEKT. The newly developed electric oil pump is smaller, lower cost and more energy efficient than our conventional electric oil pump.

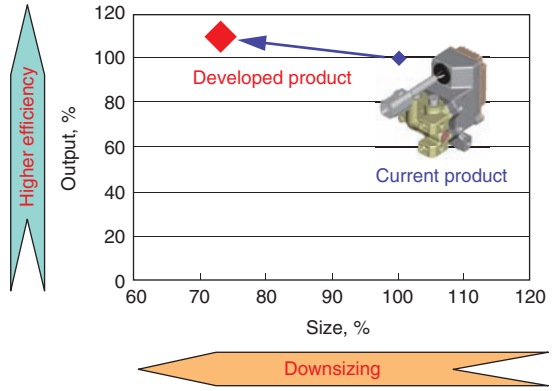
Intended Use of Electric Oil Pump

In a vehicle equipped with an idle reduction system, hydraulic pressure decreases when the engine is stopped. As such, when the vehicle starts to move again, the hydraulic pressure response is delayed, impeding the vehicle's motion. The role of the electric oil pump is to secure the minimal necessary hydraulic pressure and avoid impeding vehicle motion.



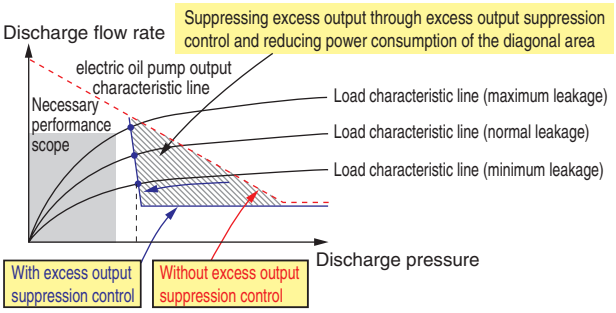
Performance

Compared with JTEKT's conventional electric oil pump, the newly developed electric oil pump is smaller yet achieves higher output per volume.

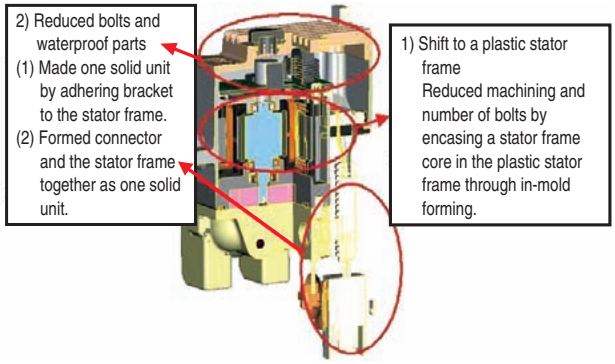


Features

1. In the control circuit of the electric oil pump, discharge pressure is estimated from oil temperature, motor speed and current. Power consumption has been reduced by up to 47% as a result of lowering the motor speed and suppressing excess hydraulic pressure when the discharge pressure exceeds the necessary level.



2. Suppression of motor heat generation made it possible to adopt a plastic stator frame. Also, by reviewing each individual part, the size of the electric oil pump was reduced 30% compared with the conventional products.



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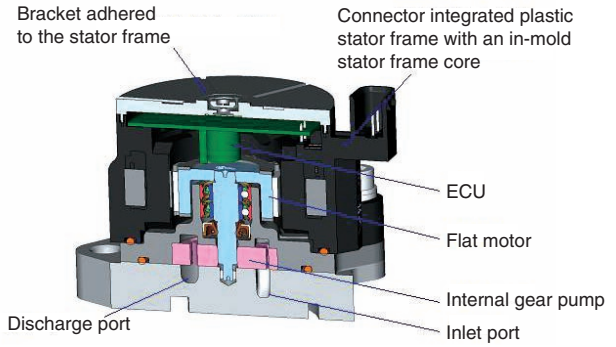
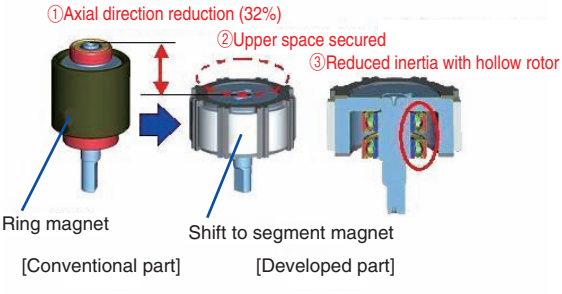


Structure

1. By making a rotor hollow, bearings are allowed to be positioned inside the rotor, and reduce resulting in shortening the axial directional length of the rotor by 32%.
2. A magnetic cage is adopted, which has reduced cost by completely eliminating bonding process. Also, by changing from ring magnet to segment magnet shape, usage of neodymium magnet has been reduced by 30%.



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