



Brushless DC Motor Brings Amazing Performance to BorgWarner's New AWD Coupling

- *Technology leads to a new class of actuators for systems in combustion, hybrid and electric vehicles, including park lock and disconnect applications*
- *Optimized brushless DC motor with integrated electronics offers industry-leading dynamics and durability to latest generation of AWD coupling*
- *Lightweight design accounts for weight savings of approximately 15 percent*

Auburn Hills, Michigan, August 22, 2019 – The latest generation of BorgWarner's all-wheel drive (AWD) coupling has been optimized with a compact brushless direct current (BLDC) motor and highly integrated electronics. The resulting actuator unit has very high durability and weight savings of approximately 15 percent in comparison to a conventional AWD coupling. The lightweight, high performance design has best-in-class response times, torque density and accuracy. As a result, vehicle handling, stability and traction are enhanced. At the core of the coupling is a patented 6-piston centrifugally controlled piston pump that both creates and controls system hydraulic pressure. Now powered by BorgWarner's in-house design of BLDC motor, the latest generation coupling is a key enabler for Eco mode systems due to its high stop/start capability. Motor control algorithms, which enable system optimization, are expected to lead to the introduction of new actuator applications in hybrid and pure electric vehicles.

"BorgWarner continues to innovate, developing leading technologies that not only improve performance but support fuel-saving stop/start systems with outstanding durability," said Dr. Stefan Demmerle, President and General Manager, BorgWarner PowerDrive Systems. "Based on our tradition of providing customers with competitive and refined solutions, this latest generation offers great performance and very competitive packaging, weight and efficiency. It also creates a platform for the introduction of actuators for new systems in hybrid and electric vehicles."

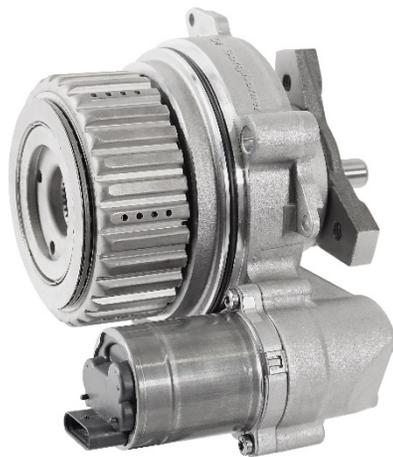
The pre-emptive AWD coupling operates independently of the differential speed between two axles, providing locking torque, depending on road conditions and vehicle load distribution. For drivers, this means well-balanced torque control at any speed and at all times.

The operational lifetime of a DC motor is usually limited by wear on the brush system and the commutator. This drawback is completely eliminated by a BLDC motor because there is no contact between rotor and stator. When a vehicle is in Eco mode in situations where no torque transfer is needed, the motor can be completely shut off, reducing the energy consumption of the whole system. It is also possible to actively manage the lubrication flow to the friction disc pack to minimize oil churning losses.

Other key advances in the new AWD coupling include an integrated electronic control unit (ECU) which reduces cost and improves packaging. In addition, the ECU and stator diameters are aligned, allowing an efficient assembly process.

About BorgWarner

BorgWarner Inc. (NYSE: BWA) is a global product leader in clean and efficient technology solutions for combustion, hybrid and electric vehicles. With manufacturing and technical facilities in 67 locations in 19 countries, the company employs approximately 30,000 worldwide. For more information, please visit borgwarner.com.



BorgWarner's latest all-wheel drive (AWD) coupling features a compact brushless direct current (BLDC) motor and highly integrated electronics.

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