

Fourth-generation damping technology

With enhancements to its MagneRide damping technology and worldwide expansion of its production network, these are exciting times for **BWI Group**



» MagneRide has a special place in BWI Group's product portfolio.

Even though this active suspension technology was launched at the very beginning of the 21st century, it continues to evolve. Recently, a comprehensive reinvention was undertaken, resulting in MagneRide 4.0.

MagneRide is a well-known tuning tool for ride and handling development. Vehicle body and suspension motions are used as inputs into a control algorithm that determines optimum damping levels for each corner, 1,000 times per second. Each suspension damper in the MagneRide system employs a magnetic field within the piston to vary the damping force. Instead of mechanical valves within the damper, the strength of the magnetic field operating on the magnetorheological 'smart fluid' determines the optimal damping force every millisecond.

The benefits are numerous, but the very wide range of low-speed damping for primary motion control and tunability for special conditions stands out.

Of course, several enhancements have been implemented over the past decade, to the overall system, to the damper and controller hardware, and to the controller software, resulting in the 'Gen 3' system configuration. Fast-forward to today, and MagneRide 4.0 further increases driving comfort, while also touching upon several 'under the hood' mechanisms.

As for the fourth generation, Doug Carson, assistant president and global director of business and product development at BWI, notes, "The microprocessor that we have available to us now with this fourth generation was not even conceived in the automotive environment in 2002. So as the evolution of microprocessors continues, there are things we can do to make MagneRide even better."

On the input side, an inertial measurement unit has been integrated into the electronic control unit, and primary motion control has been enhanced. Wheel hub-mounted accelerometers are used to improve precision and phase, and virtually

eliminate mechanical hysteresis. At the same time, the electronic control unit packaging space is reduced, and the mass reduced by nearly 20%. On the controller output side, bidirectional current control capability and magnetic flux management strategies are in place to further fine-tune the damper output commands. When coupled with reduced-friction magnetorheological dampers, the resulting comfort setting is what some would describe as a 'magic carpet ride'.

For nearly two decades, MagneRide has been associated with everything from supercars to high-spec SUVs, to raucous muscle cars, to svelte sedans, but the future seems to be even brighter and more promising. As BWI Group constantly expands its global business, this technology will soon be manufactured in BWI's newly opened operations in Greenfield, Indiana, in the heartland of the USA.

This facility is the corporation's third new suspension production facility and its first in the USA, following the setting up of the Fangshan plant in China in 2009 and the Cheb plant in the Czech Republic in 2016. This dynamic adds to BWI's business abilities and is a perfect example of balanced growth where high technology development is followed by capacity increases and product accessibility.

Part of BWI's mission statement states, it is, "...to provide our customers with the right solution, at the right place, at the right time." It seems that BWI is living up to that goal. 

ABOVE: BWI Group's fourth-generation damping technology: MagneRide 4.0

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