

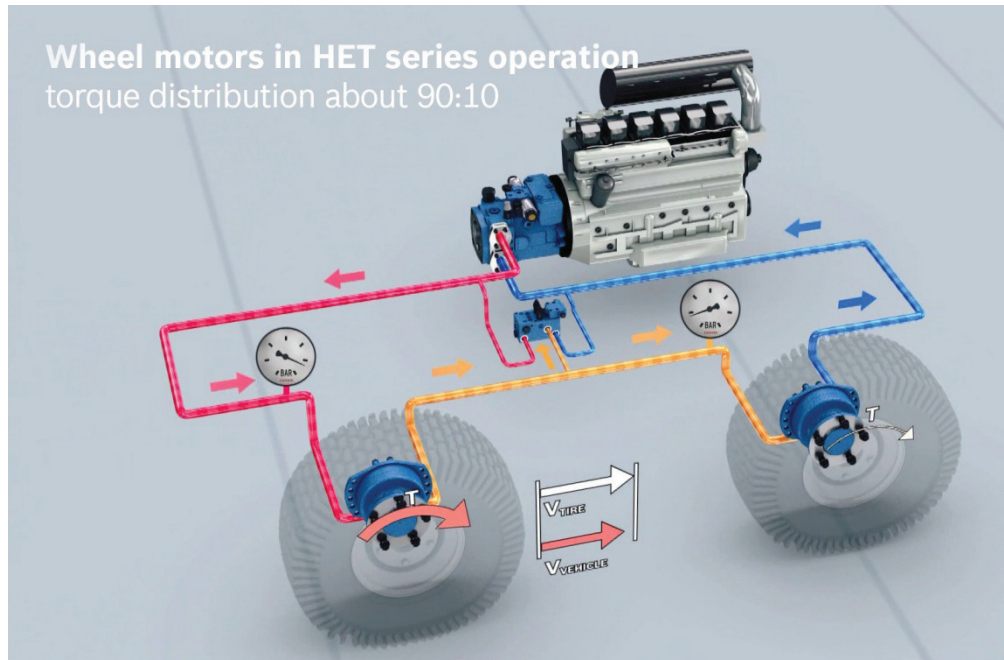
## Press Release

### All-wheel drive on demand

High-efficiency traction control (HET) automatically switches between two-wheel and all-wheel drive

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- ▶ All-wheel drive only when needed – automatically actuated
- ▶ High energy efficiency thanks to the HET valve block
- ▶ Compact plug-and-play solution for simple vehicle integration



Thanks to an optimal distribution of drive torque, high-efficiency traction control significantly improves the efficiency of conventional series circuits.

**Simple, compact, and flexible: these are the main characteristics of the new single-wheel drive solution for compact vehicles that Bosch Rexroth is presenting at BAUMA 2013. The innovative high-efficiency traction control (HET) enables a fully automatic switch from two-wheel to all-wheel drive. In its own unique way, the technology combines high energy efficiency with a high level of driving comfort.**

High-efficiency traction control (HET) makes it possible for compact vehicles such as municipal vehicles, loaders or mini-dumpers to operate efficiently with two-wheel drive on normal roads, and provides optimal all-wheel drive characteristics for difficult terrain. It was designed with a particular focus on driver comfort. This has been achieved with the fully automatic all-wheel drive actuation feature that kicks in immediately when needed. HET has a very compact design and is easy to install without any electronics. This makes it an attractive plug-and-play solution for vehicle manufacturers. With conventional series circuits, oil flows through the radial hydraulic motors

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successively. This means that pressure drops in an even manner, and that torque distribution to the vehicle's wheels is about 50:50. This state of operation is inefficient. By adding an HET valve block, efficiency can be significantly improved. In normal operations, drive power is provided by the radial motors on the rear axle, through which the oil flows first. In such a situation, the wheels on the front axle turn without the need to build up pressure.

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If the main drive axle's torque is reduced as a result of slippage, the HET unit balances distribution by automatically actuating the front wheels' motors. This, in turn, activates the ancillary drive as needed. Moreover, this solution prevents oil from becoming hydraulically clamped between wheels with varying levels of grip. This is important, as slippage does not occur only when a wheel is spinning. Due to deformation of rubber tires, slippage is actually always present to a certain degree. The specially developed HET valve block ensures that excess hydraulic oil caused by natural slip is directed to the low-pressure side of the circuit. As a result, it significantly improves the drive's efficiency.

In addition, the HET valve block is not located in the main oil flow, which further minimizes losses. With pressure relief and supply as well as an integrated purge function, the HET block has a very compact design. What is more, this simple system does not require any additional electronics or control systems. This, in turn, reduces the effort and cost in terms of installation and piping.

The drive concept for municipal vehicles, small loaders, or mini-dumpers is based on the compact MCR radial piston motor with constant or selectable displacement volumes. The robust MCR motor was designed specifically for compact vehicles, and is characterized by its particularly quiet operation and reduced noise development at both low and high speeds. Additional features such as a speed sensor, parking brake, or dynamic service brake make it possible to adapt a vehicle's equipment to a broad range of requirements.

HET also benefits from other successful Rexroth components. These include the A4VG and A10VG variable displacement pumps. The reversible A4VG is suitable for applications at high pressures of up to 450 bar. All components are integrated into the closed circuit. It is possible to mount additional pumps up to the same nominal size onto the through drive. An auxiliary pump for boost and control oil supply is also integrated, as is a boost pressure relief valve. The A10VG variable displacement pump, which is designed for pressures up to 350 bar, is equipped with similar components.

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