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Pierburg Pump Technology GmbH

The electrification of power braking

Hydraulic braking systems won universal acceptance in automotive production decades ago. The system is simply constructed, long-lastingly durable and has achieved an unmatched degree of pedal comfort and operating security through the use of pneumatic power brakes. Due to the increased efficiency of gasoline engines in modern vehicles a sufficient vacuum supply was more and more reduced which until that time fed the pneumatic system. Since then, modern vacuum pumps have been responsible for allowing these cost-efficient, robust, and comfortable braking system to be retained. Also with regard to alternative drive systems, Pierburg Pump Technology GmbH will offer an electric vacuum pump (E-VP) in the future: it is conceived as a dry running vane pump, serves as the sole low-pressure source and remains maintenance-free for the life of the vehicle.

If the mechanical pump is completely eliminated – i.e. in a design layout as a stand-alone solution – the new vacuum pump is able to fulfil all demands placed on the braking system. In hybrids it enables driving on pure electric power when the combustion engine is switched off, whereby full braking support is maintained. The E-VP furthermore allows the so-called “sailing” operating mode. This is a mode in which the drive mechanism is switched off while driving and is decoupled. Further energy savings are achieved due to reduced resistance in the power transmission.

Braking is vitally important when driving automobiles. Both manufacturers and customers therefore place a high value on safe operation of pneumatic braking systems. The low-pressure build-up of the electric pump variants corresponds to that of the million-fold tried and tested low-pressure mechanical pumps and guarantees that the pump optimally supplies the power brakes, even in very frequent braking manoeuvres and when operating in a large SUV.

Electrical pumps lower fuel consumption

Mechanical vacuum pumps that are directly coupled on the combustion engine are cost-effective, but have the disadvantage that they are continually running while the vehicle is in operation even when they are not needed and – depending on the working unit – may also operate at high rpms. By contrast, electric vacuum pumps are switched off when no braking manoeuvre is taking place. This saves fuel and reduces emissions. Moreover, eliminating the mechanical pump eases the burden on the engine

lubrication system because no additional oil is used to lubricate the vacuum pump. The size of the oil pump itself can therefore be scaled down, which in turn increases the efficiency of the drive

Because E-VPs can be installed independently of all other units, they solve installation space-related conflicts. As a rapid and uncomplicated application, they offer considerable advantages in a market that continually demands an ever greater variety of models. They can be employed within the context of an identical parts strategy and effectively minimize application times and costs.