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Perspective

Mechanism of Valvetronic Engine Technology

Ivan Miller*

Department of Applied Sciences, University of Milan, Milan, Italy

DESCRIPTION

Individual mobility has been provided by automobiles for more than a century. This mobility is made possible, first and foremost, by combustion engines that derive their power from fossil energy carriers, which are still used to provide mechanical drive power in automobiles. The key goals of designing drive systems are to reduce CO_2 emissions and fuel consumption. The car industry is developing new engines to solve this problem. The European Automobile Manufacturers Association (ACEA) has made a voluntary commitment to lower the average fleet emission of all newly introduced cars to 140 g of CO_2 per kilometer by 2008. The quantity of energy required to drive a vehicle decreases as driving resistance decreases, as a result of, for example, a reduction in roll and air resistance. To make more efficient use of energy in fuel, the actual process of using energy must be more efficient.

MECHANISM

Valvetronic uses an additional eccentric shaft, an electric motor, and multiple intermediary rocker arms to activate valve opening and shutting. The intake valves will have more lifted if the rocker arms are pushed deeper, and vice versa. Depending on the demands imposed on the engine, valvetronic can achieve deep, long ventilation (big valve lift) or flat, short ventilation (short valve lift). Valvetronic cylinder heads have an additional pair of rocker arms called intermediate arms that are located between the valve stem and the camshaft. These intermediate arms can pivot on a central axis thanks to an additional, electro analytically driven camshaft. This action, without any movement of the intake camshaft, has the ability to open or close the intake valves. The valvetronic system is based on BMW's well-known double VANOS technology, which stainless adjusts the timing of the inlet and exhaust cams.

The valvetronic system, on the other hand, adds variable valve lift to the inlet through a lever located between the camshaft and the inlet valves. The intake valves' timing and lift are varied *via* valvetronic. The Valvetronic system incorporates a traditional intake cam as well as a secondary eccentric shaft with a set of levers and roller followers controlled by a stepper motor. The stepper motor alters the phase of the eccentric cam, altering the action of the intake valves, based on signals previously acquired mechanically from the accelerator pedal. The second shaft adjusts the lever's distance from the camshaft, with the eccentric's position set by an electric motor. The location of the lever turns the cam motion into a lower or bigger valve lift, depending on the engine management system's requirement. Because the intake valves can now travel from fully closed to fully open positions and everywhere in between, the primary means of engine load control has shifted from the throttle plate to the intake valve train. Pumping losses are decreased, fuel efficiency and responsiveness are increased, and pumping losses are eliminated by removing the throttle plate's "bottleneck" in the intake track.

ADVANTAGES

- Zero-maintenance valve drive with hydraulic valve play correction.
- A two-mass flywheel for enhanced smoothness of operation Valve drive has roller bearings throughout for low friction and fuel efficiency.
- Advanced catalysts near the engine in a specially designed manifold for low emissions.
- In Valvetronic engines, coolant flows through the head, resulting in a 60% drop in temperature.

CONCLUSION

The significantly enhanced fuel/air mixture of engines with valvetronic load management ensures minimum fuel economy, maximum spontaneity, and optimum refinement. Overall, widespread usage of the most recent direct-injection technology has some substantial downsides, including price, the necessity to make the combustion process particularly robust, and the potential for exhaust emissions treatment. Valvetronic combines significant fuel consumption reduction with great engine responsiveness and control, allowing for optimal valve timing under all operating situations.

Correspondence to: Ivan Miller, Department of Applied Sciences, University of Milan, Milan, Italy, E-mail: ivan.miller3@efg.it

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