

SCHAEFFLER

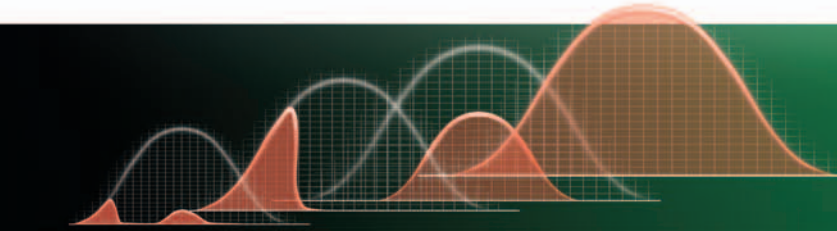


UniAir Fully-variable Valve Control System

Environmentally-friendly and powerful



Flexible intake control with UniAir ...



UniAir is the world's first electro-hydraulic system for fully-variable control of intake valves per cylinder and according to requirements in gasoline and diesel engines. This means the engine is always operated at optimal efficiency. UniAir reduces fuel consumption by up to 10%, increases power by 10% and torque by up to 15% in the lower speed range – and these improvements are achieved while complying with the requirements of emission standards Euro 5 and 6.

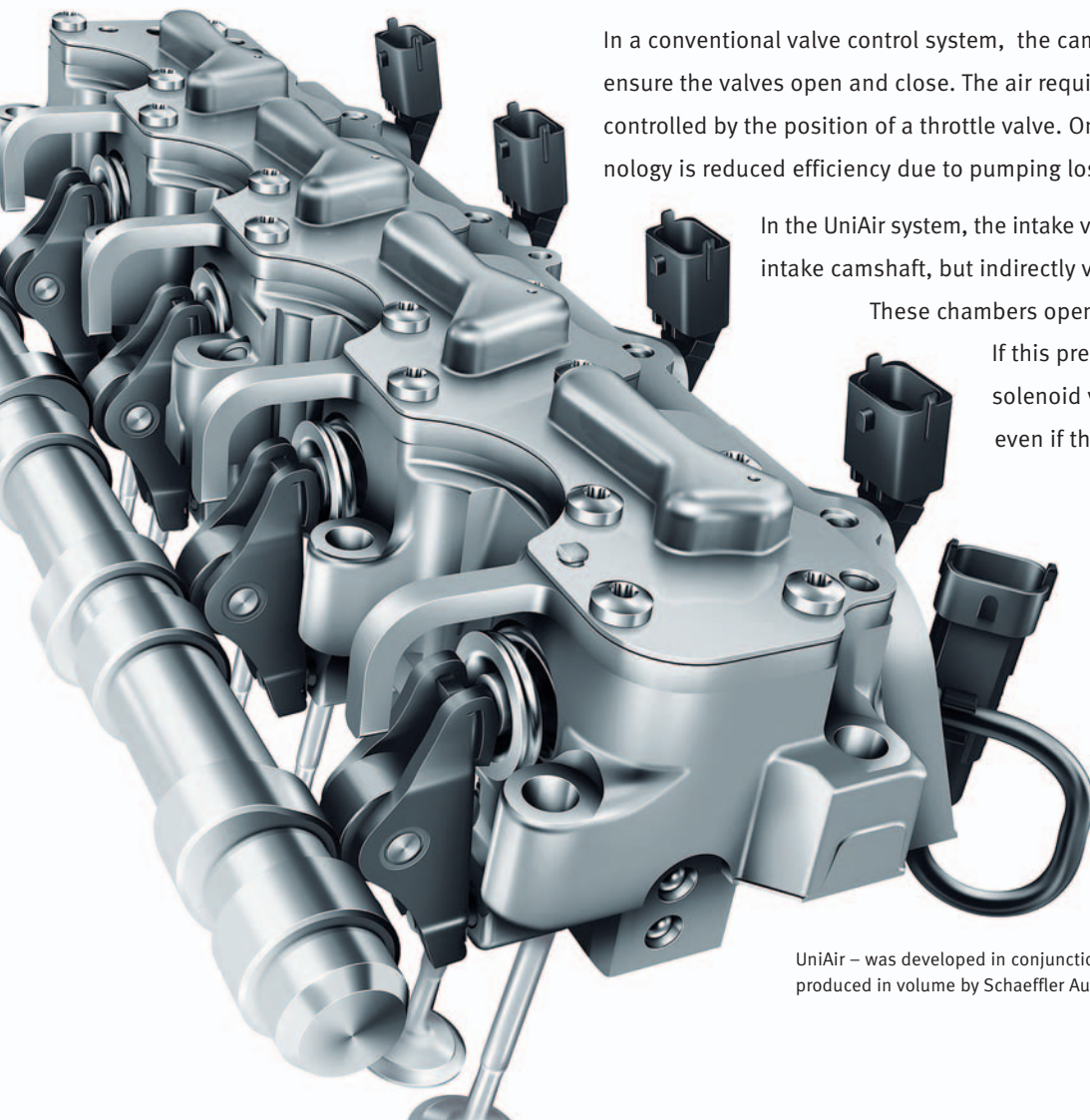
How does UniAir work?

In a conventional valve control system, the cams of the rotating intake camshaft ensure the valves open and close. The air required for the combustion process is controlled by the position of a throttle valve. One of the disadvantages of this technology is reduced efficiency due to pumping losses incurred in the throttle valve.

In the UniAir system, the intake valves are not controlled directly by the intake camshaft, but indirectly via intermediate hydraulic chambers.

These chambers open the valves by means of oil pressure.

If this pressure is discharged by a controlled solenoid valve, the intake valve will not open even if the cam is in the lift phase.



... reduces fuel consumption and CO₂ emissions



Valve lash can be adjusted to meet changing performance requirements with the UniAir system. The supplied fuel mixture is controlled solely by the valves.

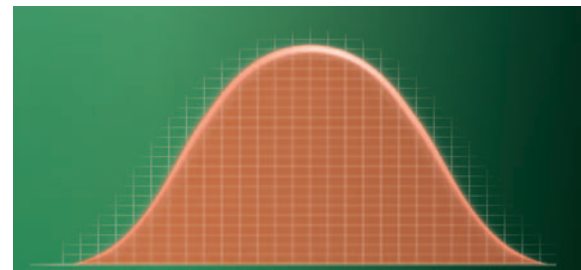
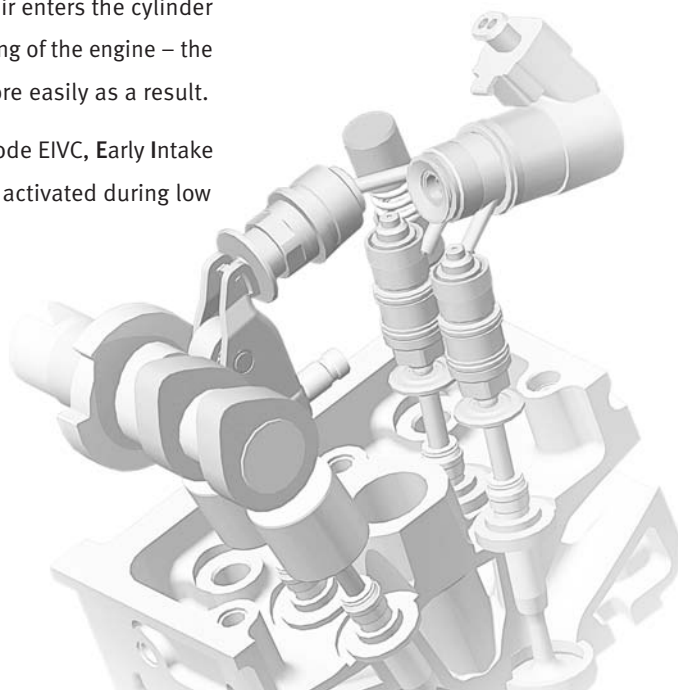
Four operating modes for increased environmental compatibility

- ① Full load describes an operating mode in which the valves are fully opened and closed as during normal control by the camshaft.
- ② The Late Intake Valve Opening mode (LIVO) is activated when starting the engine and during idling. This means the opening of the intake valves is delayed and they open for a shorter period and not so wide. Only a small amount of cold air enters the cylinder during cold starting of the engine – the engine starts more easily as a result.
- ③ The operating mode EIVC, Early Intake Valve Closing, is activated during low

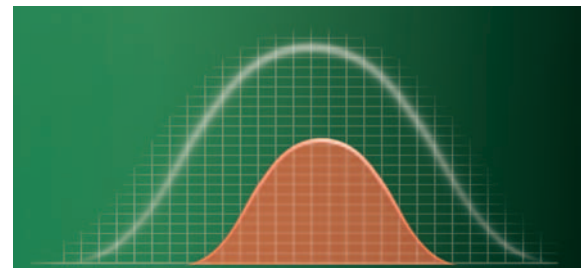
to medium engine speeds and lower levels of cylinder charging. This reduces pumping losses, increases the engine output per liter and prevents an undesirable backflow of the fuel mixture into the intake ports.

- ④ The only difference between the partial load mode and the EIVC mode is wider opening and later closing of the valves. Charge cycle losses and back flows of the fuel mixture are prevented, while power is increased.

In addition, the UniAir system is able to completely deactivate individual cylinders in the partial load range. This saves fuel and reduces CO₂ emissions.



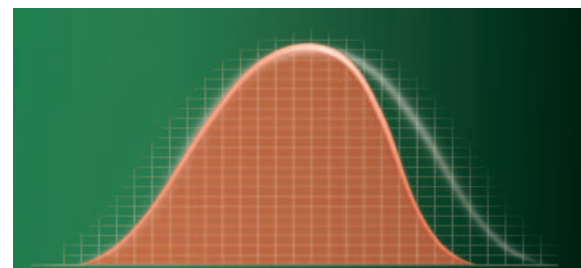
① Full load: if full power is required



② LIVO – for reliable cold starting and increased fuel economy during idling



③ EIVC – early closing of the intake valves for lower emissions



④ Economical driving during partial load operation

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