The primary purpose of the fuel-injection system is to provide the engine with an air/fuel mixture which is best suited to the prevailing operating state. Over the years, these systems have been continually improved, a significant feature of this improvement being the constant increase in the amount of electronic components used.

While the development objective in the 1970s lay primarily in increasing power and comfort, the emphasis switched from the 1980s onwards to reducing emissions. A further requirement, which began to be taken increasingly seriously, was the reduction of fuel consumption and with it also the reduction of CO₂ emissions.

### Development of gasoline injection systems

An important milestone in the development history of control systems for gasoline engines was the introduction of electronically controlled fuel-injection systems. Where previously mechanically controlled fuel-injection systems had been used, Bosch with D-Jetronic introduced in 1967 for the first time an electronic system in which fuel was injected via electromagnetically actuated fuel injectors intermittently onto the intake valve of each cylinder (multi-point injection).

However, wide-range use of fuel-injection systems was only possible with lower-cost designs. Mechanical K-Jetronic and Mono-Jetronic with only one single, centrally situated electromagnetic fuel injector (single-point injection) enabled fuel-injection technology to stretch also to mid-size and small cars.

The carburetor was rendered completely obsolete on account of the advantages of gasoline injection with regard to fuel consumption, power output, engine performance and emission behavior. In particular, the reduction of pollutant emissions could only be achieved thanks to the advances made in fuel-injection technology in conjunction with exhaust-gas treatment (three-way catalytic converter). The emission limits laid down by legislators for hydrocarbons (HC), carbon monoxide (CO) and nitrogen oxide (NOₓ) called for fuel-injection systems which were able to adjust the mixture composition within very narrow limits.

Table 1 shows the development of Bosch fuel-injection systems. Today, only the Motronic engine-management system with multi-point injection is still used. Only with this type of fuel injection in conjunction with complex engine management is it possible to comply with today's stringent emission limits.
The story of fuel injection extends back to cover a period of almost one hundred years. The Gasmotorenfabrik Deutz was manufacturing plunger pumps for injecting fuel in a limited production series as early as 1898.

A short time later the uses of the venturi-effect for carburetor design were discovered, and fuel-injection systems based on the technology of the time ceased to be competitive.

Bosch started research on gasoline-injection pumps in 1912. The first aircraft engine featuring Bosch fuel injection, a 1200-hp unit, entered series production in 1937; problems with carburetor icing and fire hazards had lent special impetus to fuel-injection development work for the aeronautics field. This development marks the beginning of the era of fuel injection at Bosch, but there was still a long path to travel on the way to fuel injection for passenger cars.

1952 saw a Bosch direct-injection unit being featured as standard equipment on a small car for the first time. A unit was then installed in the 300 SL, the legendary production sports car from Daimler-Benz. In the years that followed, development on mechanical injection pumps continued, and... 

In 1967 fuel injection took another giant step forward: The first electronic injection system: the intake-pressure-controlled D-Jetronic!

In 1973 the air-flow-controlled L-Jetronic appeared on the market, at the same time as the K-Jetronic, which featured mechanical-hydraulic control and was also an air-flow-controlled system.

In 1976, the K-Jetronic was the first automotive system to incorporate a Lambda closed-loop control.

1979 marked the introduction of a new system: Motronic, featuring digital processing for numerous engine functions. This system combined L-Jetronic with electronic program-map control for the ignition. The first automotive microprocessor!

In 1982, the K-Jetronic model became available in an expanded configuration, the KE-Jetronic, including an electronic closed-loop control circuit and a Lambda oxygen sensor.

These were joined by Bosch Mono-Jetronic in 1987: This particularly cost-efficient single-point injection unit made it feasible to equip small vehicles with Jetronic, and once and for all made the carburetor absolutely superfluous.