

With the four-stroke engine, Nikolaus August Otto developed an internal-combustion engine which was also suitable for use in the first automobiles at the end of the 19th century. This engine soon took hold and encouraged the spread of the automobile. The gasoline engines installed in new vehicles still operate in accordance with the same principle and today still bear the name of their inventor in German (“Otto-Motor”).

Ignition posed a problem in the early stages of the automobile era. Only Robert Bosch was able to come up with a reliable solution to this problem. He developed the slow magneto-electric snap-release ignition used by Otto for his stationary engines for easier make-and-break magneto ignition, which helped the gasoline engine to achieve higher speeds. With this solution, it was initially possible to satisfy the requirements for use of the engine in an automobile. The high-tension magneto ignition also developed by Bosch in conjunction with the spark plug – which celebrated its centenary in 2002 – and finally battery ignition satisfied the ever-increasing requirements and provided for reliable ignition of the air-fuel mixture in the gasoline engine.

From the 1970s onwards, further developments in engine construction were required primarily on account of the increasingly stringent emission-control legislation. An important role in the endeavors to increase power and comfort and to reduce pollutant emissions was played by electronics. At Bosch, systems were developed which took into account these new requirements. An equally important role is now played by gasoline injection and ignition, which at Bosch are combined in the Motronic engine-management system. Motronic began to incorporate an increasing number of subsystems, such as for example cylinder-charge control with the electronically controlled throttle valve (Electronic Throttle Control, ETC). The task of expanding Motronic to manage a gasoline engine with direct injection into the combustion chamber posed another big challenge to Bosch engineers.

Reducing fuel consumption and thus cutting down CO₂ emissions are requirements which are increasingly taking center stage. Gasoline direct injection is one way of achieving this objective. The use of natural gas in the gasoline engine is another alternative for attaining this objective. Bifuel-Motronic manages a gasoline engine which can be run on both gasoline and natural gas.

The booklets of the “Expert Know-How on Automotive Technology” series are combined in this book. It describes both how the different engine-management systems are structured and how their components work. A retrospective section looks back on and explains the earlier engine-management systems and the different gasoline injection systems and ignition systems. After all, these systems are still featured in older vehicles.

Another topic discussed in this book is emission-control legislation, which has a crucial impact on the scope of the Motronic systems. This chapter provides an insight into the complexity of the statutory provisions.

An immense amount of time and money is spent on development before a Motronic system gets to work in a newly developed vehicle. Another chapter of this book therefore provides an overview of how these systems are readied for series production at Bosch.

A comprehensive table of contents and list of key words together with a list of abbreviations make this book an ideal reference work on the subject of “Gasoline Engine Management”.