



PRODUCT INFORMATION

High-Pressure Fuel Pumps and Mechanical Fuel Pumps

- Built-in pressure limiting valve
- Compact, lightweight construction
- Integrated pressure dampening feature with adjustable feed pressure
- Meets or exceeds OEM Specifications

PRODUCT FEATURES

Since the introduction of common rail systems in diesel engines, high-pressure fuel pumps have become an indispensable part of the fuel processing system. With the introduction of direct petrol injection, high-pressure pumps are also used in petrol engines.

The fuel system of a modern direct petrol injection engine is made up of a low-pressure system with a high-pressure circuit. In the low-pressure circuit, the fuel is sucked from the tank by an electrical fuel pump and then conveyed to the high-pressure pump.

The system pressure in the low-pressure circuit is regulated by the engine control unit as required and can be up to 6.0 bar, depending on the system. In the high-pressure circuit, the fuel is pumped by the high-pressure pump via high-pressure fuel lines into the fuel distribution pipe (rail), where it reaches the relevant cylinders via the connected electrical high-pressure injection valves. The fuel pressure in the high-pressure circuit is monitored by the engine control unit and regulated from 50 to 350 bar in accordance with the appropriate system configuration.

Design and function of the high-pressure fuel pump:

Depending on the vehicle manufacturer and engine concept, different types of high-pressure pumps can be installed. A distinction is made here between radial piston pumps, axial piston pumps or in-line pumps, which can be run with one or several pump elements. As a result of the different drive concepts, the pump can be lubricated either by the fuel or by the engine oil.

Regardless of the design, the high-pressure fuel pump has the task of compressing the fuel provided by the pre-feed pump to the fuel pressure required for the injection valves and of then making it available in the fuel distribution pipe (rail). Since the high-pressure pump is driven mechanically via the camshafts, the pump's delivery rate is proportional to the engine speed.

The fuel pressure is monitored by the engine control unit via a pressure sensor and regulated via a flow control valve installed in the pump. This fuel pressure regulator is attached directly to the high-pressure pump. It measures out the supply to the high-pressure pump and thus regulates its performance.

This demand-based control means that only the high pressure that is actually needed for the current operating situation is generated in the pump.

Single-cylinder, high-pressure pump with roller tappet: (1) Low pressure connection, (2) High pressure connection, (3) Pressure spring, (4) Roller tappet, (5) Pressure control valve, (6) Pump housing



HELLA HIGH-PRESSURE FUEL PUMPS & MECHANICAL FUEL PUMPS

HIGH-PRESSURE FUEL PUMPS

Simply put, a high pressure fuel pump is a device that supplies fuel to the engine at much higher pressures than standard fuel pumps. Its main function is to guarantee that the engine gets the appropriate amount of fuel at the pressure needed for effective combustion.

Fuel delivery is a vital component of any vehicle's system, and high pressure fuel pumps are essential for ensuring efficient and dependable fuel injection. These specialized pumps are engineered to provide fuel at elevated pressures, promoting optimal combustion and enhancing engine performance. By recognizing the significance of high pressure fuel pumps, both drivers and automotive enthusiasts can better understand how to optimize fuel delivery and improve their vehicles' overall performance.



Failure Symptoms

Severe mechanical strain, high fuel pressures, lack of lubricant and temperature differences promote wear and can lead to a defect in the high-pressure pump over time. The following effects may indicate a defective high-pressure pump:

- Erratic engine running
- No power in the upper speed range
- Poor starting behavior
- Engine stops – engine warning light comes on
- Oil dilution

MECHANICAL FUEL PUMPS

Mechanical fuel pumps utilize moving components to draw fuel from the tank to the engine, while electric fuel pumps depend on electricity and computer systems to deliver fuel to the engine. Additionally, mechanical fuel pumps are typically located on the side of the engine, whereas electric fuel pumps are installed at the fuel tank. There are also distinct operational differences between the two, which are outlined below.

Causes of failure

The following causes can be responsible for the failure of the high-pressure pumps:

- External mechanical damage
- Internal mechanical damage to the drive, roller tappet or pump element
- Leaks - fuel loss
- Inspection service intervals/maintenance intervals not observed
- Poor lubrication - oil dilution or poor oil quality
- Contamination in the low-pressure system

Product life expectancy

A high-pressure fuel pump typically lasts at least 100,000 miles, but can last more than 200,000 miles

Product features, specifications and availability are subject to change without notice.

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