Fuel Pump

The fuel pump is located at the fuel tank and is designed to convey the required quantity of fuel from the tank to the engine at the necessary pressure.

Function

The purpose of a car fuel pump is to convey the required quantity of fuel from the tank to the engine at the necessary pressure.

Mechanical fuel pump

Older cars with a carburettor are usually fitted with a mechanical fuel pump (diaphragm pump). This type of fuel supply pump is driven by the camshaft or distributor shaft. It also draws the fuel from the tank and conveys it into the float chamber of the carburettor. The supply pressure is roughly 0.2 to 0.3 bar.

Design of electric fuel pump

The electric fuel pump comprises the following components:

Cover

This contains electrical connections, a check valve (to prevent escape from the fuel system) and a hydraulic outlet. The cover usually also contains the carbon brushes for operation of the commutator drive motor and interference suppression elements (inductors and, if applicable, capacitors).

Electric motor

The electric motor contains an armature and permanent magnets. A copper commutator is standard. Carbon commutators are used for special applications and diesel systems.

Pump section

The pump section is either a positive displacement pump or a flow-type pump.

A broad distinction can be made between electric fuel pumps of the flow and positive displacement type.

Strömungspumpen

Strömungspumpen sind geräuscharm, da der Druckaufbau kontinuierlich und nahezu pulsationsfrei erfolgt. Bezüglich ihres Wirkungsgrades und ihres maximalen Druckaufbaus sind sie verglichen mit Verdrängerpumpen allerdings im Nachteil und werden häufig als Vorstufe in Kombination mit diesen eingesetzt.

Verdrängerpumpen

Bei hoch viskosen Medien, wie kaltem Diesel-Kraftstoff, sind Verdrängerpumpen vorteilhaft. Je nach Detailausführung und Einbausituation können die unvermeidlichen Druckpulsationen Geräusche verursachen. Für die klassische Funktion der Elektrokraftstoffpumpen in elektronischen Benzineinspritzsystemen wurde die Verdrängerpumpe von der Strömungspumpe weitgehend abgelöst. Für die Verdrängerpumpe ergibt sich mit ihrem wesentlich erweiterten Druckbedarf und Viskositätsbereich ein neues Anwendungsfeld bei der Vorförderung für Diesel-Common-Systeme. Mit Verdrängerpumpen sind Systemdrücke bis 6,5 bar erreichbar.

In den Anfängen der elektronischen Benzineinspritzung waren Elektrokraftstoffpumpen ausschließlich außerhalb des Tanks (Inline) angeordnet. Heute hingegen überwiegt der Tankeinbau. Dabei ist die Elektrokraftstoffpumpe Teil eines Kraftstofffördermoduls, das weitere Elemente umfassen kann. Zu diesen Elementen gehören unter anderem der Tankfüllstandsensor oder ein Saugfilter zum Schutz der Pumpe.

Electric fuel pump

The introduction of fuel injection systems in modern engines made it necessary to use electric fuel pumps. An electric fuel pump supplies the fuel to the injectors at a defined pressure. The injectors spray the fuel into the intake manifold (manifold injection) or directly into the combustion chamber (petrol direct injection).

With manifold injection, the electric fuel pump conveys the fuel out of the tank to the injectors. With petrol direct injection, the fuel is likewise conveyed out of the tank by an electric fuel pump and then compressed to a higher pressure by a high-pressure pump before being supplied to the high-pressure injectors.

Regardless of whether the engine is cold or warm, the electric fuel pump (EFP) has the following task: To supply the engine with sufficient fuel at the pressure required for injection.

Safety

If an electric fuel pump is not functioning properly, this can have a detrimental effect on safety and comfort. If an inadequate amount of fuel is supplied, this can lead to poor engine performance, misfiring and bucking for example.

Depreciation

Expensive repairs are usually required if an electric fuel pump fails or is not working optimally. A fully functional electric fuel pump thus helps to retain the value of the vehicle as a whole.

Environmental protection

One major advantage of an electric fuel pump is lower fuel consumption, as it has neither a mechanical drive nor the resistance associated with this. Decoupling the fuel pump from the engine mechanical system also makes it possible to control the fuel supply far more efficiently. Pre-delivery can be implemented for rapid engine starting for example. This is particularly important with stop-start systems.

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Source: https://www.my-cardictionary.com/dictionary/drive-system/fuel-pump