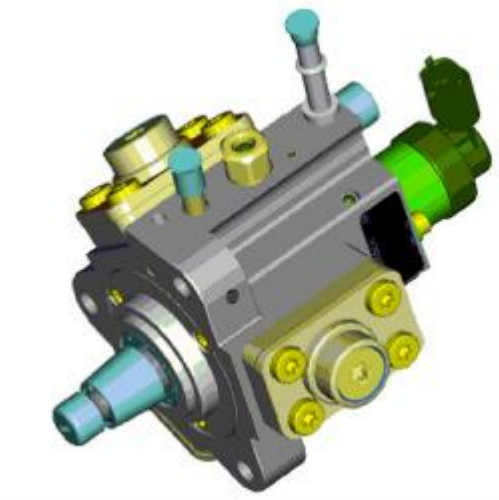
DESCRIPTION OF COMPONENTS

HIGH PRESSURE PUMP

General information

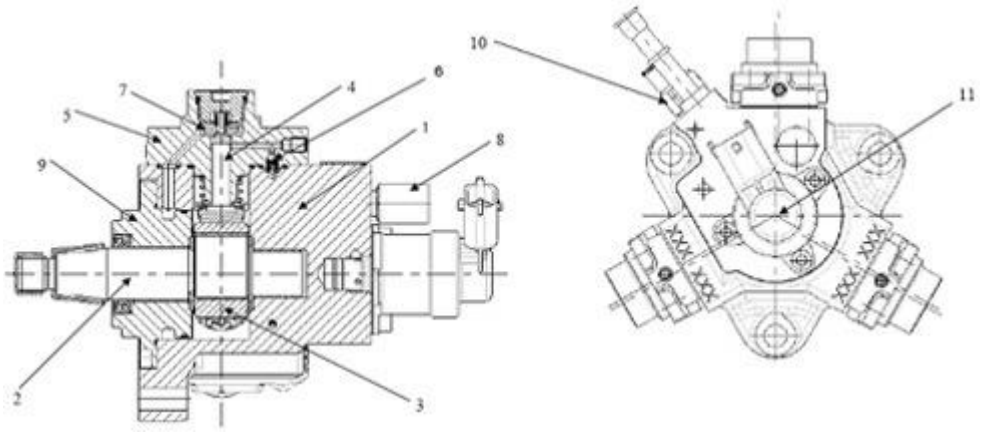
The supply pump for the Common Rail system is known as a Radial jet pump because the pumping effect is achieved using three pumping elements (pistons) arranged in a radial direction in relation to the pump shaft rotation axis. The angle between one pumping element and the other is 120°.

On this version the pressure pump is timed therefore the timing belt has yellow references for correct fitting as described in the procedures.



Function

The pump is driven by the engine at a rotation speed equal to 2/3 (4v) and 25/43 (2v) of that of the actual engine, by means of a toothed belt transmission. The timing and injection duration are, in this injection system, tasks of the electronic control system; this pump only carries out the task of permanently maintaining the fuel contained in the manifold at the requested pressure level.



- 1 - Pump casing
- 2 - Pump shaft
- 3 - Cam
- 4 - Piston
- 5 - Cover
- 6 - High pressure regulation valve
- 7 - Inlet valve
- 8 - Supply - high pressure (to single fuel manifold)
- 9 - Pump casing cover
- 10 - Safety valve
- 11 - Low pressure regulator solenoid

Requirements

The pump is supplied at low pressure with a minimum pressure of 3.5 bar and a minimum flow rate of 160 litres/hour for the supply to ensure correct operation. This supply is achieved by means of a low pressure electric pump.

Radial jet pump specifications

The movement of the pistons is determined by the rotation of a triangular-shaped cam integrated with the pump shaft. This cam causes the movement of the three pistons in succession, through the movement of a mechanical interface (tappet) between the cam and the foot of the piston. The contact between the cam and each individual tappet is ensured by means of a spring.
Each pumping unit is equipped with a plate type intake valve and a ball type supply valve. All three delivery valves of the pumping elements are united inside the pump and send the fuel to the common manifold via a single duct. A feature of this pump is that it is lubricated and cooled at the same time

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by the diesel fuel circulating inside it, via special ports.
There is a low pressure regulator solenoid on the pump to adjust the supply pressure at the pump intake, in order to compress only the amount of diesel fuel needed to reach the pressure mapped in the control unit.

The main specifications of the Radial jet pump are described below:

- type: radialjet with radial pumping elements
  number of pumping elements: 3
  Total capacity: 0.697 cm3/rev
  Volumetric output: less than 80% at 16000 bar at 2000 pump rpm with diesel fuel at 40°C
  Maximum operating pressure: 1600 bar
  Power absorbed: 1.6kW at 1600 bar, 3450 engine rpm
  Supply: diesel fuel at a pressure of 3.5 bar with a minimum flow rate of 160litres/hour
  Lubrication: carried out by the same diesel fuel supply
  Cooling: carried out by the same diesel fuel supply

The maximum speed depending on the pressure is indicated below:

Speed (rpm)	Pressure (bar)
400	550
500	650
800	885
1000	1038
1173	1134
1340	1231
1750	1514
1860	1600
3200	1600
3700	770
4000	400
4200	400
4400	100

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