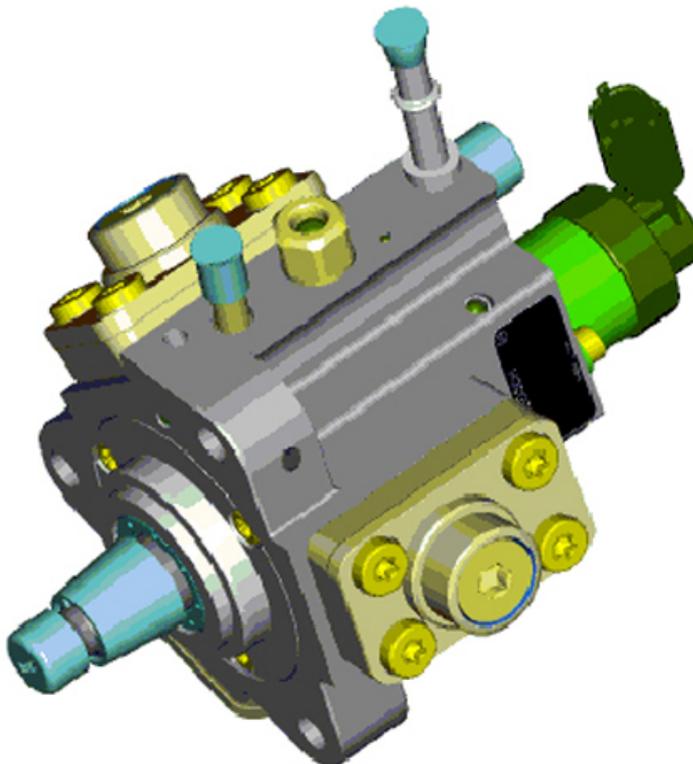


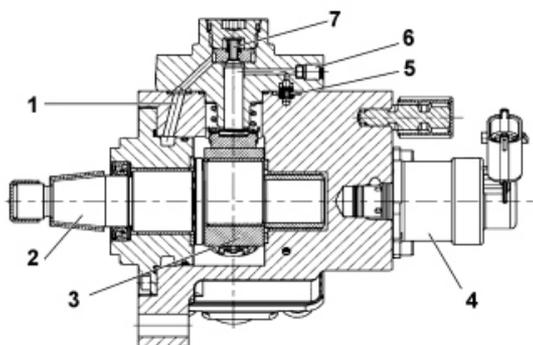
NUOVO DUCATO X250 2.3 JTD INTRODUCTION

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

The quantity of fuel sent to the pumping pistons is regulated by a flow rate regulator operated by the engine management control unit.



A section of the pump is illustrated below



- 1 - Low pressure supply line
- 2 - Shaft with cam
- 3 - 3 lobe element
- 4 - Pressure regulator
- 5 - High pressure line single-acting valve
- 6 - Supply line
- 7 - High/low pressure line single-acting valve

RADIALJET PUMP SPECIFICATIONS

The movement of the pistons is determined by the rotation of a triangular shaped cam on 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 an intake valve and a supply ball valve. All the three supplies for the pumping elements are joined inside the pump and send the fuel to the shared manifold by means of a single duct. One feature of this pump is that it is simultaneously lubricated and cooled by the same diesel fuel circulating inside it by means of suitable ports.

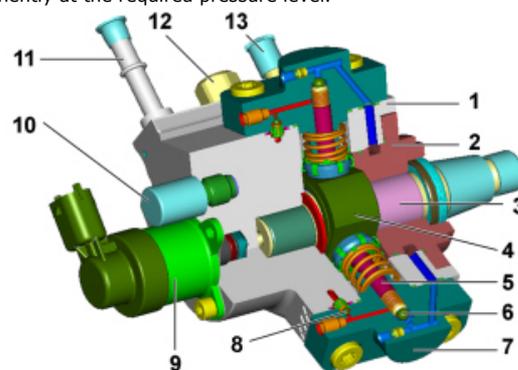
There is a low pressure regulator solenoid on the pump to adjust the supply pressure at the pump intake in order to compress only the amount of diesel fuel needed to reach the pressure mapped in the control unit

The main specifications of the Radialjet pump are described below:

- type: radialjet with radial pumping elements
- no. of pumping elements: 3
- total capacity: 0.695 cm³/rev
- maximum operating pressure: 1600 bar
- maximum pump shaft rotation speed at 1600 bar: 3300/3750 rpm
- power supply: diesel at a pressure of 3.5 - 5.0 bar
- lubrication: carried out by the same diesel fuel
- cooling: carried out by the same diesel fuel.

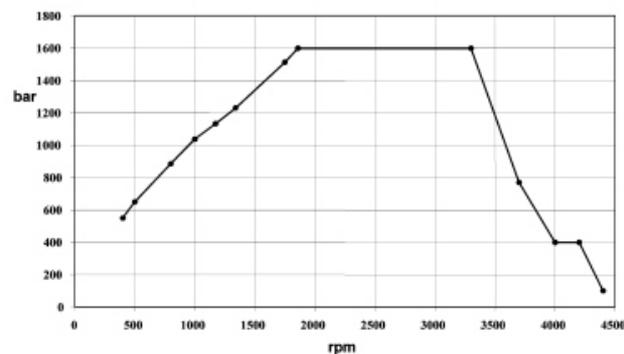
FUNCTION

The pump is driven by the motor at a rotation speed of 2/3 of the speed of the motor itself using a toothed belt transmission. The timing and the duration of the injection are, in this injection system, the task of the electronic control system; this pump only carries out the function of keeping the fuel in the manifold permanently at the required pressure level.

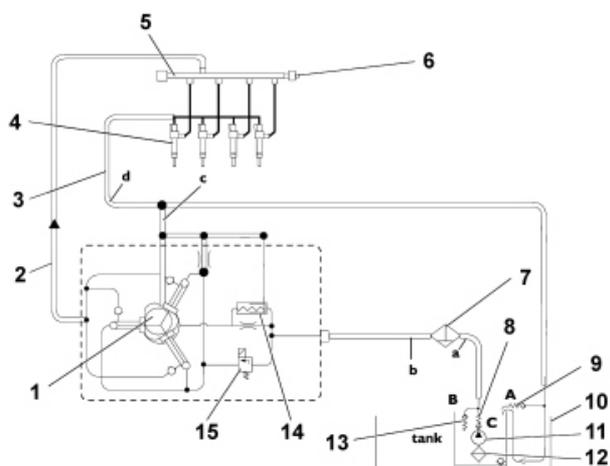


- 1 - Pump casing
- 2 - Pump casing cover
- 3 - Pump shaft
- 4 - Cam
- 5 - Piston
- 6 - Compression chamber inlet valve
- 7 - Pumping element cover
- 8 - High pressure regulation valve
- 9 - Flow regulator solenoid valve
- 10 - High pressure supply connector (to single fuel manifold)
- 11 - Fuel inlet pipe
- 12 - Safety valve
- 13 - Fuel outlet pipe (return to the tank)

The progress of the pressure produced by the pump depending on its rotation speed is illustrated in the graph below.



The pump supply circuit hydraulic system is illustrated in the diagram below.



- 1 - High pressure pump
 - 2 - High pressure supply pipe
 - 3 - Injector return pipe
 - 4 - Injectors
 - 5 - Common Rail
 - 6 - Fuel pressure sensor
 - 7 - Filter with water separator
 - 8 - Fuel pump single-acting valve
 - 9 - Injector return line pressure relief valve
 - 10 - Reservoir
 - 11 - Fuel pump
 - 12 - Fuel pump inlet filter
 - 13 - Fuel pump pressure relief valve
 - 14 - Pressure relief valve
 - 15 - Pressure regulator proportional valve
- Pressures in the circuit:

- (a) $4.15 \text{ bar} < p < 5.35 \text{ bar}$
- (b) $3.5 \text{ bar} < p < 5.0 \text{ bar}$
- (c) $p < 0.8 \text{ bar}$
- (d) $0.3 \text{ bar} < p < 0.8 \text{ bar}$