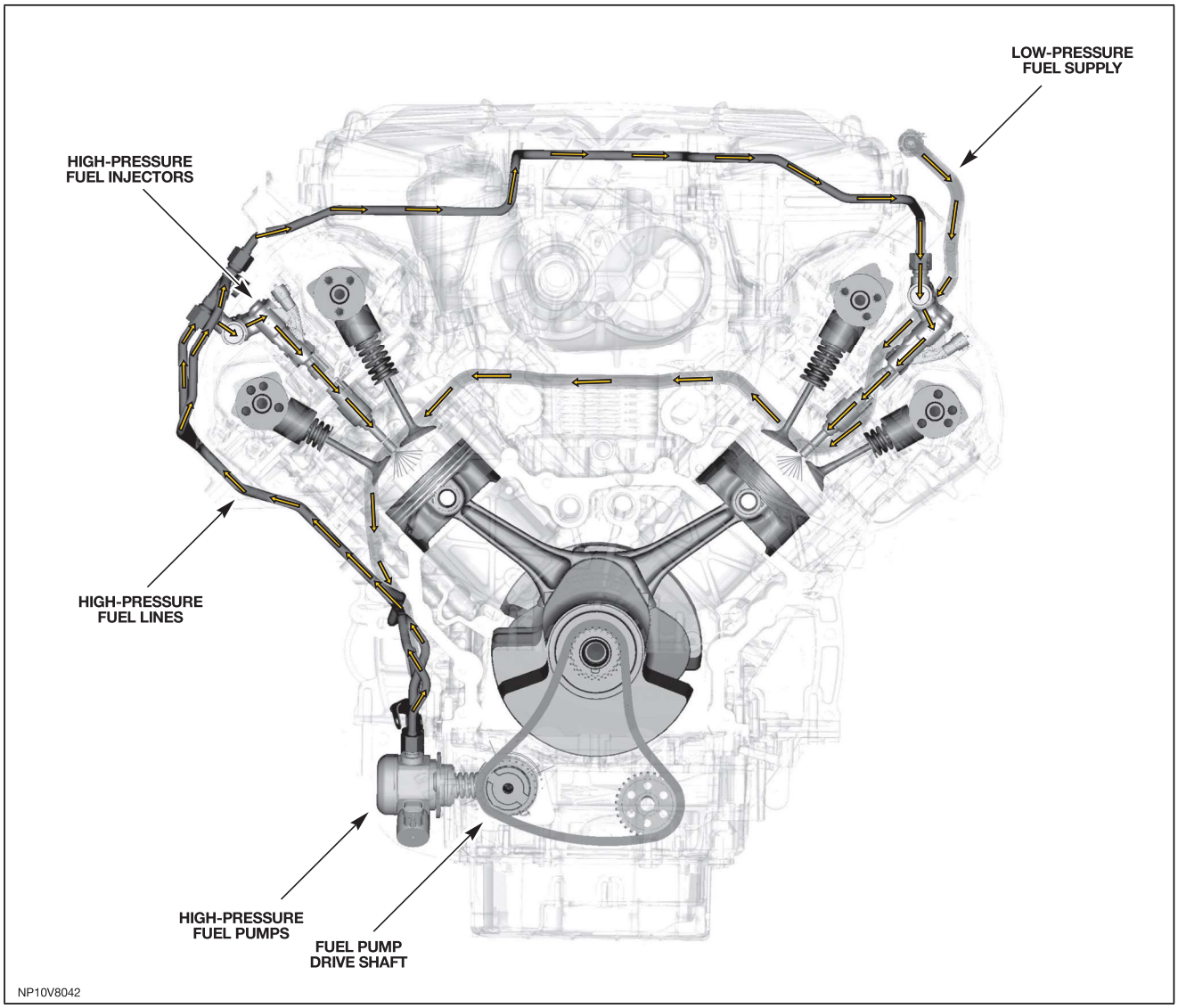
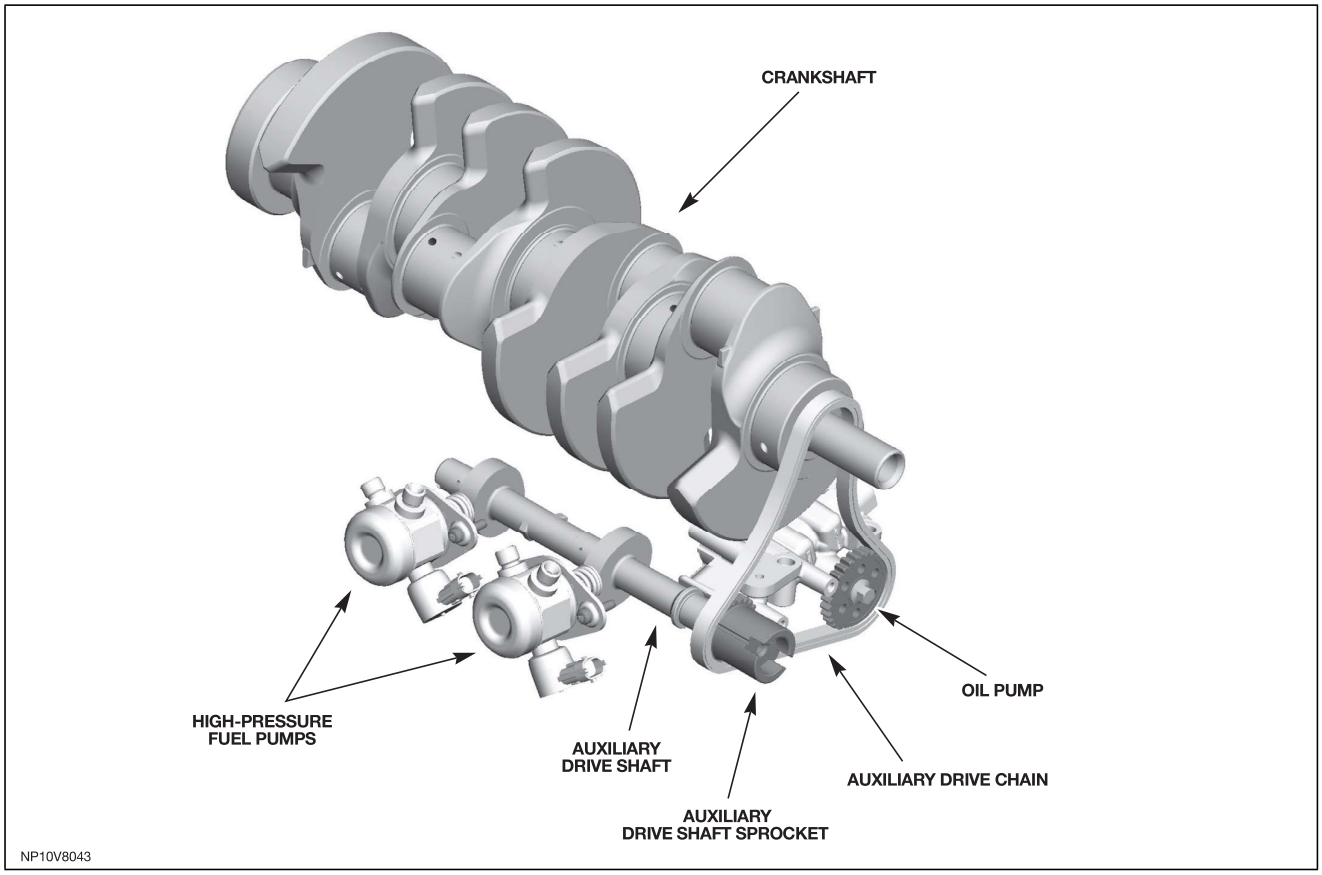
The new engine's Direct Fuel Injection (DFI) system has been specifically designed to achieve high standards of durability, combustion performance, and refinement.

Locating the fuel injectors into the cylinder head and spraying directly into the combustion chamber requires fuel pressures much higher than the 3 to 4 bar (44 to 58 psi) of conventional engines. This, in turn, demands a high-pressure fuel pump. The new direct-injection engine, which incorporates two auxiliary shaft-driven fuel pumps regulated by the engine management system, is capable of generating fuel delivery pressures as high as 150 bar (2176 psi).



A single-plunger design is used in the high-pressure injection pumps to provide high volumetric efficiency at low drive torque and at low cost. The pumps have a built-in electromagnetic control valve, and the control function varies the fuel delivery amount by adjusting the timing of the drive pulses sent to the valve. The drive torque and pulsation inside the high-pressure lines are minimal, since the pumps supply only as much fuel as the engine actually requires.



Ultra-precise machining of the high-pressure injectors helps ensure a fine, high-quality spray to achieve optimum combustion conditions both at cruising speeds and during acceleration.

The new engine uses stainless steel high-pressure fuel rails. The fuel pressure in the rail is detected by a high-pressure sensor, which controls flow into the rail by adjusting the electromagnetic fuel metering valve in the high-pressure fuel pump's outlet.

The pressure relief valve (located in the high-pressure pump) protects the high-pressure side of the system from excessive pressure if there is a failure of the fuel metering valve. If the pump delivery pressure increases to 195 – 204 bar (2828 – 2959 psi), the pressure relief valve opens and returns fuel to the inlet side of the plunger.

NOTE: The high-pressure fuel system can only be diagnosed using Jaguar Land Rover approved diagnostic equipment.

Like other fuel injection components, the fuel rails are used well below their design pressure limit of 350 bar (5076 psi).