
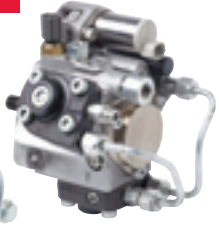






In this issue:

In this first news bulletin we give an overview of the DENSO Diesel Common Rail System with an accompanying film on YouTube: [click here](#).

Following the feature on the new DENSO-C diagnostic tool in the December newsletter, we will be issuing five additional technical news bulletins over the next three months to provide further technical insight into DENSO Diesel systems and the need and use of diagnostics.

	1996	1998	2000	2002	2004	2006
Common Rail System	1st Generation Common Rail System			2nd Generation Common Rail System		
Large Trucks	HP0 120MPa  Pre-stroke Quality Adjustment					
Medium-size Trucks				HP4 180MPa 		
Compact Trucks Passenger Vehicles			HP2 135MPa 	HP3 180MPa 		

> Types of High Pressure pumps and their range of applications. The most common pump at this moment is HP 3.

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Outline of a Common Rail System

1) Fuel is stored in the fuel tank

2) Fuel passes the fuel filter to filter the polluted fuel

3) The fuel is pressurised by the supply pump

The supply pump has a feed pump side and a high pressure pump side.

- The feed pump draws the fuel from the tank
- The high pressure pump pushes the fuel to the rail

The supply pump works independent of the engine speed, so it creates a working space bounded by four characteristics:

- Minimal engine speed for the supply pump
- Maximum engine speed
- Minimal pressure for lifting the needle
- Maximum pump pressure

4) The fuel is stored in the common rail

The rail works like an accumulator (buffer for decreasing fluctuations).

5) The injection of the fuel takes place by the injector

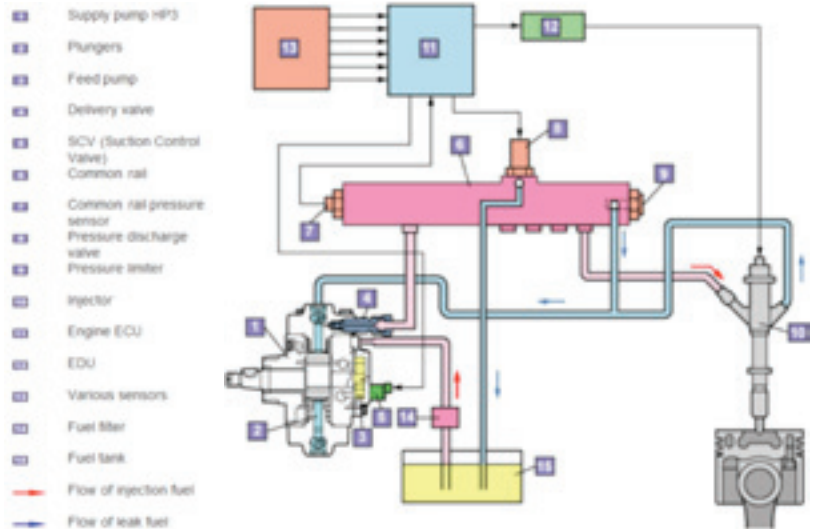
6) High-pressure fuel pipes

Function: Transport the high-pressure fuel to the rail and from the rail to the injectors.

Location: Between the supply pump and rail and between the rail and injectors.

Common Rail System Characteristics

The common rail system uses a type of accumulation chamber called a rail to store pressurised fuel, and injectors that contain electronically controlled solenoid valves (or piëzo) to inject the pressurised fuel into the cylinders. Because the engine ECU controls the injection system (injection pressure, injection rate, and injection timing), the injection system is independent, and thus unaffected by the engine speed or load. This ensures a stable injection pressure at all times, particularly in the low engine speed range, and dramatically decreases the



amount of black smoke ordinarily emitted by a diesel engine during start-up and acceleration. As a result, exhaust gas emissions are cleaner and reduced, and higher power output is achieved.

Features of Injection Control

(1) Injection Pressure Control

- Enables high-pressure injection even at low engine speeds.
- Optimises control to minimise particulate matter and NOx emissions.

(2) Injection Timing Control

- Enables finely tuned optimised control in accordance with driving conditions.

(3) Injection Amount Control

- Pilot injection control injects a small amount of fuel before the main injection.

In the next issue:

In the next news bulletin we will highlight DENSO specific system items to be acknowledged while working on and diagnosing a DENSO Diesel common rail system. Items that will be reviewed include:

- Injector Compensation programming (QR coding)
- Fuel pump learning
- Small injection quantity learning
- Cold start problems
- And more....

Go online!

Over the coming weeks we will upload new videos on the DENSO Diagnostic YouTube channel to support the news bulletins. Why not take a look? To check out our films and subscribe to our YouTube channel, click [here](#).

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