Diesel Engines

Differences in Operation

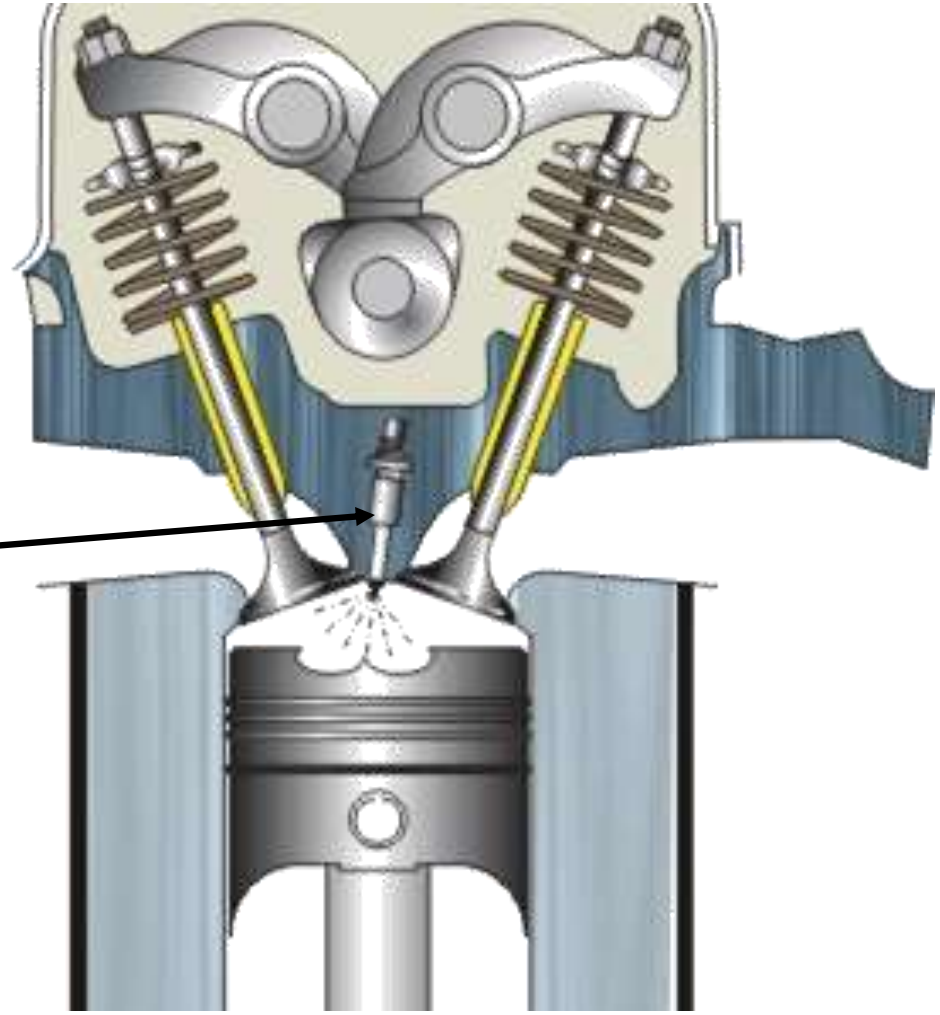
Based on the injection there are two main types of diesel engines today

a) Direct Injection

b) Indirect Injection

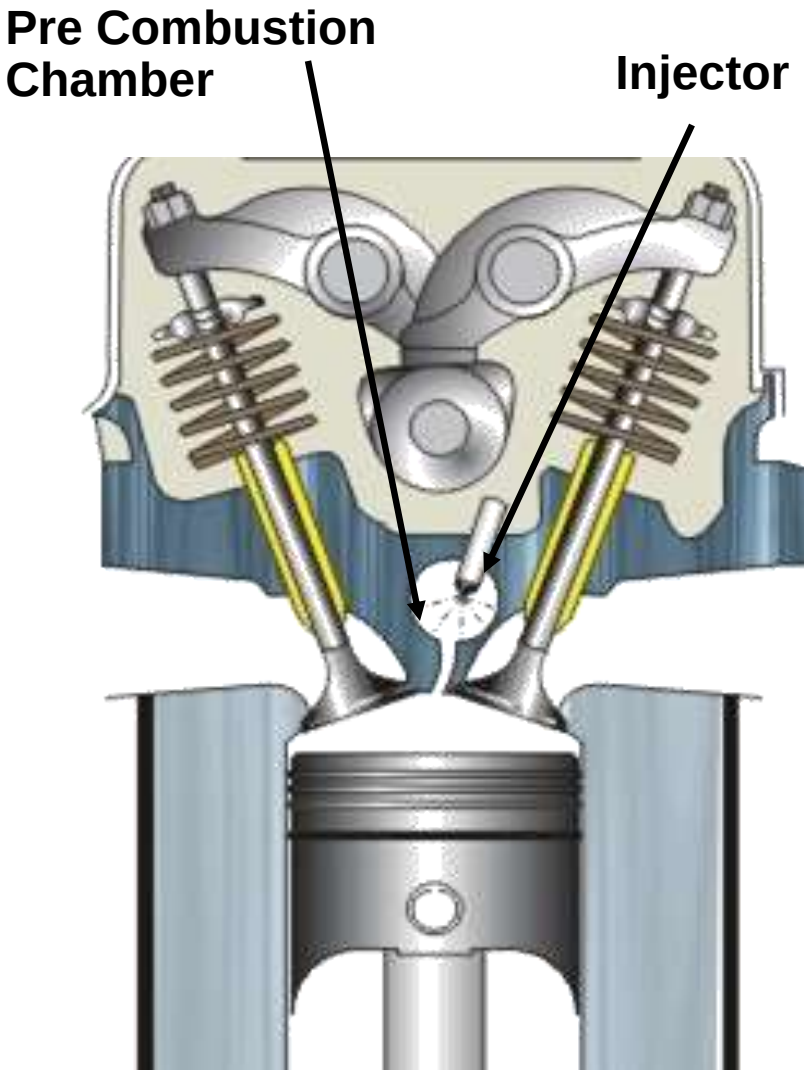
Direct Injection

In a direct injection diesel engine, fuel is injected directly into the cylinder.

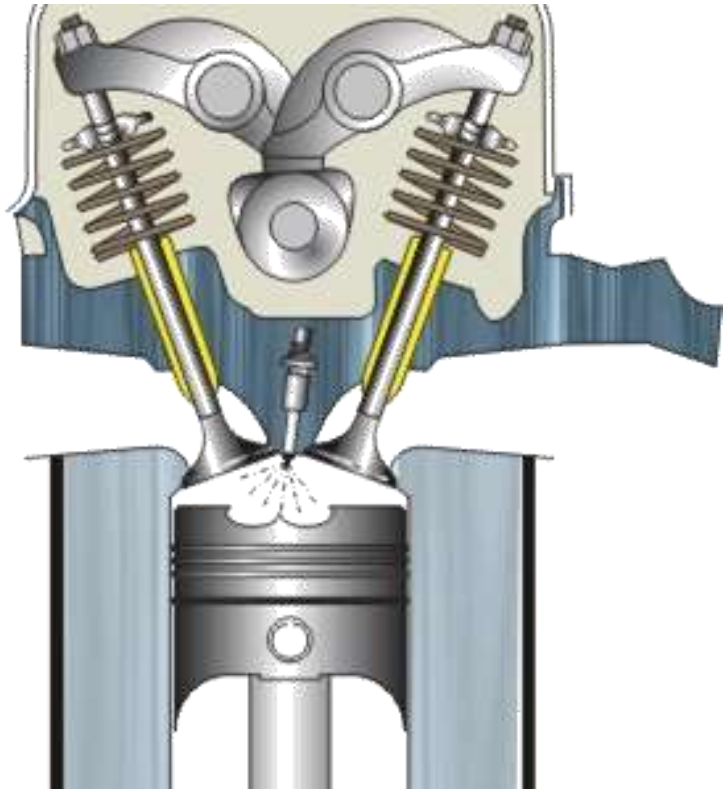


Indirect Injection

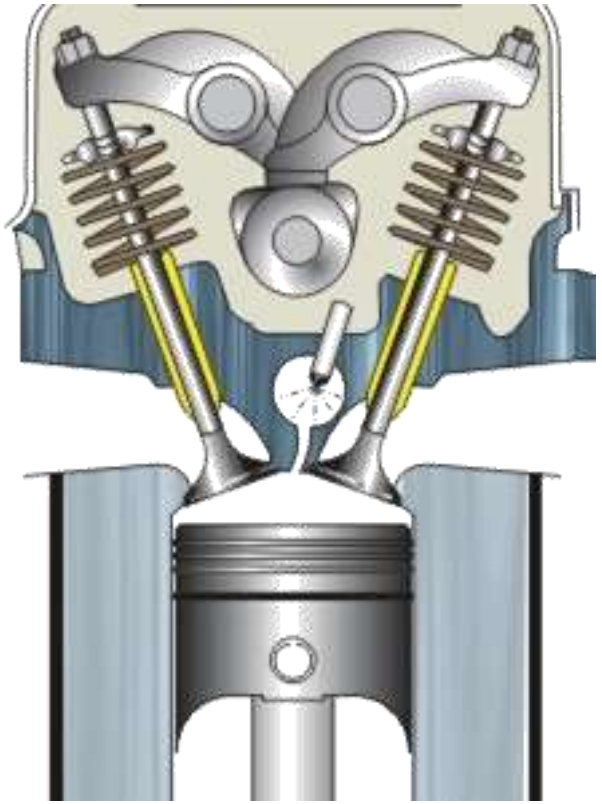
- Here diesel engine fuel is injected into a small pre-chamber which is connected to the cylinder by a narrow opening.
- The initial combustion takes place in this pre-chamber slowing the rate of combustion.



Difference



Direct



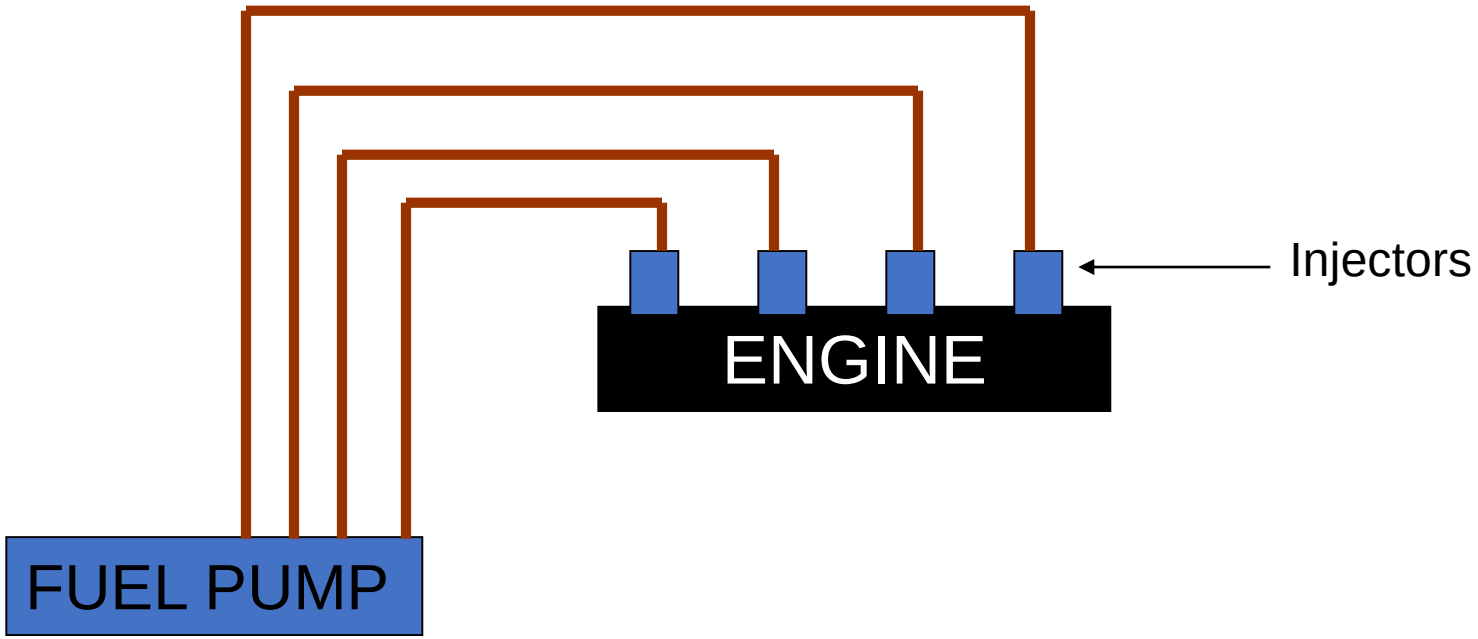
In Direct

Direct V/S Indirect Injection

Feature	***Direct Injection***	***Indirect Injection***
Sound & Vibration	More	Less
Efficiency / Economy	More	Less
Power	More	Less
Emissions	Less	More

Regular Direct Injection

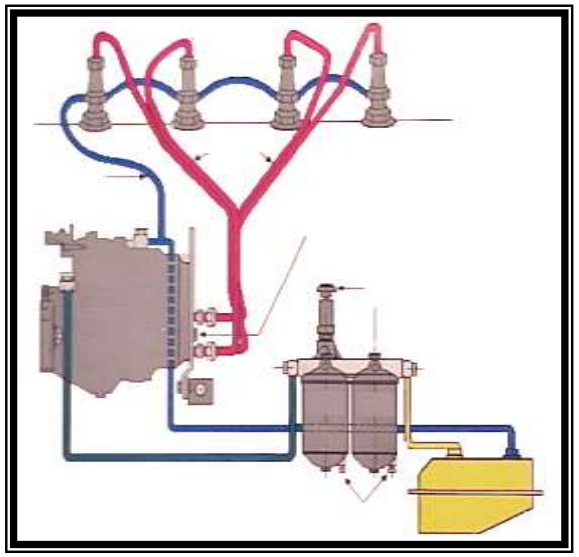
- In this system a fuel pump, pumps fuel and also distributes it to each injector.
- This system is mechanically controlled or can be computer controlled.

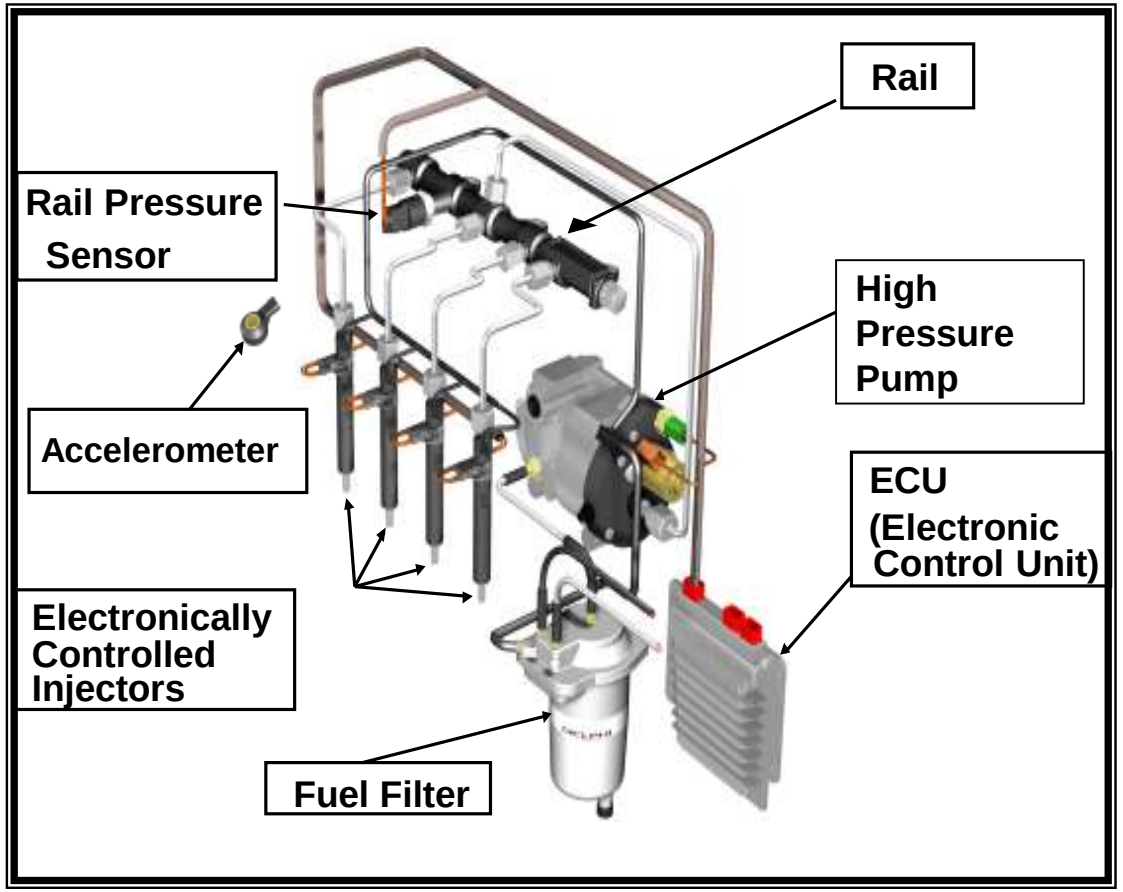


Common Rail Direct Injection

- Fuel pump pumps fuel into a rail at very high pressure.
- Injection is computer controlled as the pump is not metering fuel.
- As the injectors are controlled by computer the injection can be done in small steps to reduce the noise drastically.
- This CRDe technology helps to reduce the noise level in diesel engine while keeping all the benefits of direct injection.

Common Rail Direct Injection





Diesel engines are infamous for unwanted noise, black emissions, and low performance & responsiveness

CRDe takes care of all these issues.

Common Rail Direct Injection

Engine Type	Operation
Conventional Diesel Engine (IDI) Indirect Injection	# Fuel Injection Pump mechanically meters the fuel quantity to be injected in the cylinder # Timing of fuel injection (& hence the quantity) is controlled mechanically by the FIP as per the engine RPM
Diesel Engine with Electronic Fuel Injection Control Unit / Module	# The ECU (like a MPFI Petrol engine) operates the solenoid valve injector # Fuel quantity and injection timing is controlled electronically, as such is independent of engine RPM
Common Rail Direct Injection.	# The CRDI operates with electronically controlled injection timing and quantity and at high pressure throughout the injection process (the high pressure common rail helps maintain the high pressure)

Advantage CRDe

- Higher Fuel Economy
- Low Emissions
- Low Engine Noise
- High Power
- High Torque