AIM :- To study about CRDI four stroke multi cylinder diesel engine

APPARATUS:- CRDI Model Type

INTRODUCTION:- The Common-Rail system prototype was developed by Robert Huber and Dr.Marco Ganser at the Swiss Federal Institute of Technology in the late 1960s. But the first successful usage of this technology accomplished by Japan in the 1990s. For the first time, this technology was used on heavy vehicles and later adapted to automobiles and passed mass production. In CRDI (Common Rail Direct Injection), there is a common line which is called Common-Rail, and each injector is connected to this line. Through this line, fuel sent into the cylinders.

Components of CRDI Engine

Following are the components of CRDI engine which are discussed below

1. High Pressure Fuel Pump (HPP)

The high-pressure fuel pump is located between the low pressure and high-pressure pipes. The basic function is to transmit the fuel to the system at the required pressure The high-pressure fuel pump is supplied by electric. This pump produces the fuel pressure required for the high-pressure injector to provide ideal mixing of the fuel and air directly into the combustion chamber.

2. Fuel Metering Control Valve

- It is located back side of the HPP.
- Controls amount of fuel
- Controlled by ECU.

When there is no energy on solenoid, valve is open and low volume of fuel charging tothe HPP. When there is energy on solenoid, valve is closed and high volume of fuelcharging to the HPP.

3. High Pressure Regulator Valve

- Controls high pressure fuel which is delivered to common rail.
- Sends excess fuel into the fuel tank.

- Cool downs the fuel before sends it to the tank

4. High Pressure Accumulator (Common-Rail)

The fuel is sent to the common rail at high pressure. The fuel is stored here and distributed by injection. In addition, common-rail eliminates vibration caused by the high-pressure pump.

5. Fuel Pressure Sensor

Fuel pressure sensor is located on the fuel rail. It measures the fuel pressure on the Common Rail and communicates with the engine computer.

Working of CRDI Engine

A high-pressure pump supplies pressurized fuel. The pump compresses the fuel at the pressures of about 1,000 bar or 15,000 psi. It then supplies the pressurized fuel via a high-pressure pipe to the inlet of the fuel rail. The fuel-rail distributes the fuel to individual injectors which then inject it into the combustion chamber.

Moreover, most modern CRDI engines use the Unit-Injector system with a Turbocharger, which increases power output and meets stringent emission norms. Additionally, it improves engine power, throttle response, fuel efficiency and controls emissions.

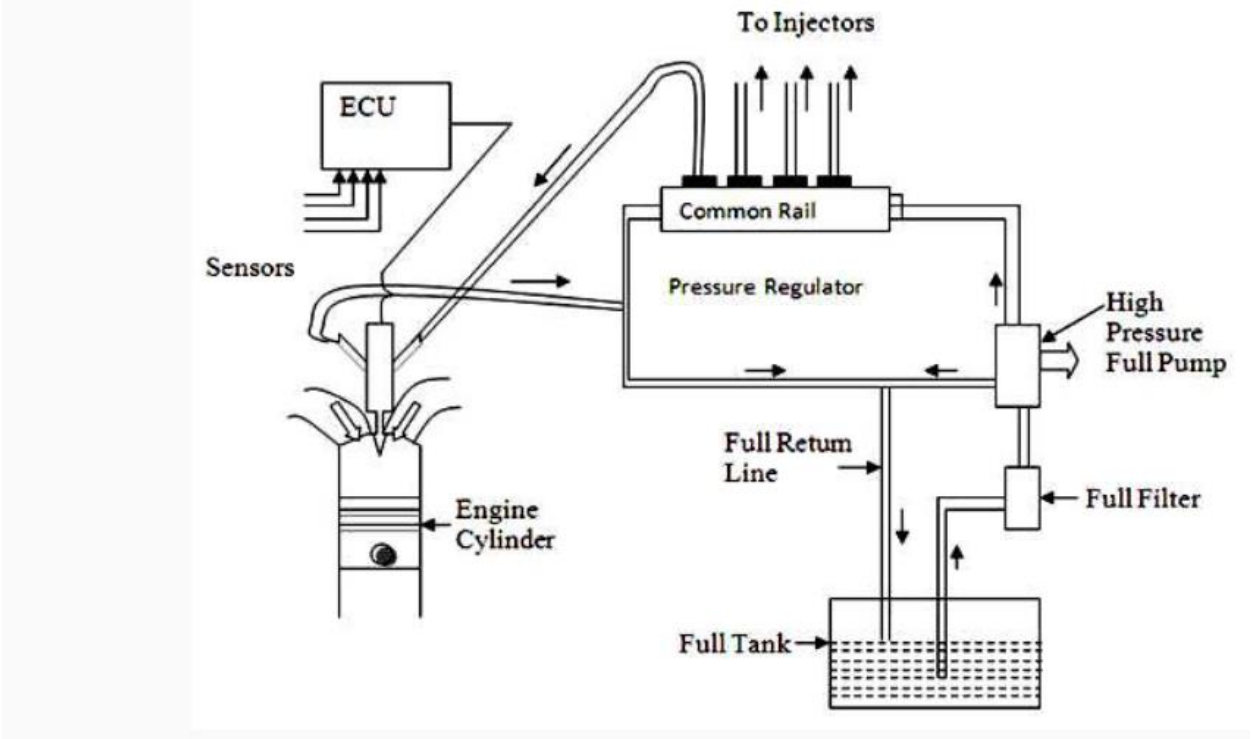

Fig. Common rail diesel injection system

Advantages

1) Lower Emissions.

2) More Power.

3) Less Noise.

4) Fewer Vibrations.

5) Better Mileage.

Disadvantages

1) Higher Vehicle Cost.

2) Expensive Parts.

3) More Maintenance.