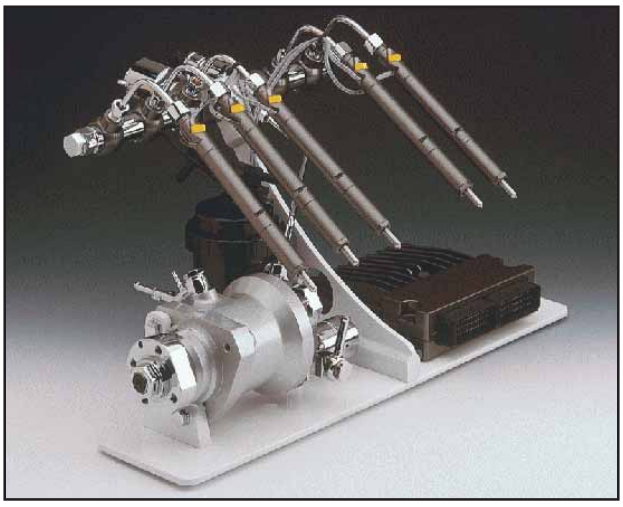
DELPHI

DELPHI-TVS

Diesel Common Rail (DCR) System



DESCRIPTION

To meet future stringent emissions requirements and to offer further improvements in fuel economy, Delphi, one of the world's largest producers of fuel injection equipment, developed a new, high-pressure fuel injection system-the Delphi Diesel Common Rail (DCR) system.

Fuel injection equipment with the capability of operating at very high pressures will be required to achieve the ultra-low emissions challenges and low noise demands of the coming years, and this latest addition to the Delphi diesel portfolio, the Delphi diesel common rail system, extends the Delphi fuel injection product range for future high speed direct injection (HSDI) engines.

PRODUCT DESIGN

The DCR product is a modular system, and can therefore be easily adapted for different engines.

The main components of the DCR system are:

- Common pressure accumulator (the 'rail')
- High pressure regulator (option)
- Inlet metered high-pressure supply pump with integrated lift pump
- Injectors
- Electronic Control Unit (ECU)
- Filter unit

The Delphi diesel common rail system consists of a common pressure accumulator, called the "rail", which is mounted along the engine block and fed by a high pressure pump.

The pressure level of the rail is electronically regulated by a combination of metering on the supply pump and fuel discharge by a high-pressure regulator (when fitted). The pressure accumulator operates independently of engine speed or load, so that high injection pressure can be produced at low speeds if required.

A series of injectors are connected to the rail, and each is opened and closed by a solenoid, driven by the ECU.

TYPICAL APPLICATIONS

The DCR system is designed for use on future HSDI engines for passenger cars that will be required to meet the EURO-3 and USS-98 emissions legislation and beyond. Because of its compact, modular design, the DCR system can be used on a wide range of vehicles, from three-to-six-cylinder engines.

Using the same basic principles, DDCR will also be fitted to medium range truck engines and is also planned to be used in off-highway applications.

PRODUCT FEATURES

- Injection pressure, independent of speed
- High-pressure injection
- Reduced NO_x emissions and engine noise
- Modular system, easily adapted to different engine types
- Compact design
- Full electronic control and interface with other vehicles functions

DELPHI

Diesel Common Rail (DCR) System

DCR ADVANTAGES

- **Compact Design**

  The compact design of the injector outline enables the DCR system to be used on two or four valve per cylinder engines.

- **Modular System**

  With one electronically driven injector per engine cylinder, the system is modular and can be used on three, four, five and six cylinder engines.

- **Low drive torque**

  As the pumping of the pressure rail is not phased with the injection, the common rail system requires a low drive torque from the engine.

- **Independent Injection Pressure**

  The injection pressure is independent of the engine spped and load, enabling high injection pressures at low speed if required.

- **Lower NO_x Emissions**

  Injection sequences, which include periods both pre and post the main injection, can be utilized to reduce emissions, particulaarly NO_x enabling the system to meet the stringent emissions levels required by EURO-3 and US-98 legislation and beyond.

- **Noise Reduction and NO_x Control**

  The inclusion of pilot injection results in a significant reduction in engine noise.

- **Full Electronic Control**

  Common rail offers all the benefits of full electronic control fuel metering and timing, as well as the option to interface with other vehicle functions.

OPERATING PRINCIPLE

- A feed pump delivers the fuel through a filter unit to the high pressure pump
- The high-pressure pump delivers fuel to the high-pressure accumulator (the rail)
- The injectors inject fuel into the combustion chamber when the solenoid valve is actuated.
- Because the injection pressure is independent of engine speed and load, the actual start of injection, the injection pressure and the duration of injection can be freely chosen from a wide range.
- The introduction of pilot injection, which is adjusted depending on enginesneeds, results in significant engine noise reduction, together with a reduction in NO_x emissions.
- The pressure in the system is controlled by the actuator.

DELPHI-TVS Diesel Systems Ltd.

- FACTORY:
  Mannur, Thodukadu Post, Sriperumbudur Taluk,
  Kancheepuram District - 602 105, Tamil Nadu, India
  Ph : 91-4116-258454 to 258460 Telefax (Mktg.): 91-4116-258657
  E-mail: ss.mktg@delphitvs.com

- CORPORATE OFFICE:
  "AALIM" Centre, 2nd Floor, 82, Dr. Radhakrishnan Salai,
  Mylapore, Chennai - 600 004. Tamil Nadu, India
  Ph : 91-44-2811 0063 / 2811 0074 Fax : 91-44-2811 5624
  E-Mail: ltvs.corp@lucastvs.co.in