

Delphi Multec[®] Light Duty Diesel Common Rail System

The Delphi Multec[®] Light Duty Diesel Common Rail System is a robust, modular fuel injection system. This highly popular system offers automotive manufacturers the best value light duty fuel injection system in the industry.

The system features balanced valve, extremely fast actuating servo-solenoid injectors, which deliver precise metering and performance similar to competitive servo-piezo technologies, but at lower cost. Delphi's next generation DFP6 high pressure fuel pump may be included in the system. The DFP6 offers best-in-class volumetric efficiency, well above 90 percent at very high pump speed. The small size of Delphi's injectors and the pump allow packaging flexibility with reduced weight. And, the system also includes Delphi's patented Accelerometer Pilot Control (APC) and Individual Injection Characterization (I3C) control strategies, which help provide optimal control of multiple injections over the life of the engine to help maintain low noise and reduced emissions.

The key elements of the Delphi Multec Light Duty Diesel Common Rail System include:

- Compact, state-of-the-art fuel injectors for best possible packaging (17 mm, or 19 mm pencil diameter)
- High pressure, modular pump range (0.3 to 1.2 cm³/rev) with a new generation DFP6 single plunger that enables operation up to 2,000 bar, with the inherent capability of 2,200 bar
- DFP6 roller cam shoe mechanism optimized for reduced torque, dynamic mass and noise via the patented Delphi static shoe guide
- Proven, tubular-shaped common rail
- Reliable electronic control unit (ECU) with 32-bit processor
- Filter customized to application requirements to ensure performance over the life of the engine

► Benefits

- Simple, modular, robust and precise diesel fuel injection system with a high level of injection performance
- Stable emissions and excellent acoustic performance throughout the life of the vehicle
- Low backflow injectors do not require backflow cooler mechanism
- Robust, durable and modular pump family designed for high pressure bar capability and can support a variety of packaging and drive requirements
- Tubular common rail is hydraulically optimized to dampen waves, enabling precise and multiple fuel injections
- Simple, reliable and cost effective electronic controller design works with 12 V battery voltage, thus boost voltage is not required
- The system's fuel filter is specifically designed to withstand the life expectancy objectives of the engine

► Typical Applications

The Delphi Multec Light Duty Diesel Common Rail System is suitable for the entire range of light duty vehicle applications, including future generations of downsized engines in a range of vehicle classes. Current and future (Euro 5 and Euro 6) European emissions legislation can be met without the need for nitrogen oxide (NO_x) aftertreatment. To meet an engine manufacturer's requirements, the system can also integrate diesel particulate filter strategies and, potentially, NO_x exhaust aftertreatment strategies.



Delphi Multec[®] Light Duty Diesel Common Rail System (4-Cylinder Engines)

▶ **Performance Advantages**

The Delphi Multec Light Duty Diesel Common Rail System offers significant simplification of the engine system design. The injectors operate at battery voltage and with the lowest energy requirements (compared with competitive technologies) to provide a less complex and more cost-effective electronic design. In addition, the injectors perform the pressure relief function in conjunction with the inlet metering system. This permits the elimination of a high pressure discharge valve to further simplify packaging and help reduce the overall cost of the system.

In this system, very small moving masses and short hydraulic circuits optimize inertia resulting in fast injector response. The balanced valve system requires only small forces to be applied and permits low spring loading. This helps eliminate the space and cost necessary for larger solenoid valves or retention springs.

The combination of Delphi's state-of-the-art injectors and the DFP6 common rail pump provides improved fuel delivery control, extended multiple injection capability, enhanced spray atomization and superior air mixing. Up to six injections per cycle are possible, providing a smoother combustion event with exceptional refinement.

The Delphi Multec Light Duty Diesel Common Rail System features Accelerometer Pilot Control which enables the injectors to deliver a precise amount of fuel over the life of the engine. In this closed-loop system, an accelerometer attached to the engine block "listens" to the combustion enabling the engine management system to automatically optimize calibrations as conditions change. The result is a consistently clean, quiet, and smooth-running engine offering greater durability.

The system also features Individual Injector Characterization which helps the engine run with optimum efficiency and enables the electronic control unit to be calibrated with the injection system. The precise characteristics of each injector are read and programmed into the control unit via a bar code label when the engine is installed. This provides superb "first time" accuracy of injector performance.

▶ **The Delphi Advantage**

Delphi is a world leader in innovation, design and manufacture of diesel engine management systems and components. Our revolutionary direct acting light duty diesel common rail system and best-value conventional solenoid light duty diesel common rail systems are examples of our ingenuity. Delphi offers a wide portfolio of diesel engine technologies for light duty, medium duty and heavy duty applications.

As a global leader in engine management systems technology, Delphi can help manufacturers meet emissions requirements, improve fuel economy and enhance performance. Delphi is a source for high value solutions and our systems approach is built into every product. Delphi's flexible engineering approach encourages collaboration. And Delphi has a thorough understanding of markets around the world and a global network of resources.



Delphi Multec® Light Duty Diesel Common Rail System (3-Cylinder Engines)