

Delphi EPIC Diesel Fuel Injection System

Delphi is an industry leader in diesel common rail fuel injection technology and is actively involved in the development of advanced diesel technology to create fuel injection equipment that continues to help meet stringent emission requirements while enhancing fuel economy and performance. Extensive experience in high-pressure fuel injection technology has helped Delphi develop several innovative design and control strategies to meet customer needs for cost-competitive, high-value fuel injection systems that provide accurate injection over the life of the vehicle, helping minimize emissions while providing robust performance and low noise.

Description – To help meet the demands of current emission regulations, Delphi has developed the Delphi EPIC diesel fuel injection system, a purpose-designed full authority fuel injection system.

Designed for use with both direct and indirect injection engines, the Delphi EPIC diesel fuel injection system uses advanced electronic technology and is operated via an electronic control unit (ECU). The system offers a number of advantages, including enabling reduced engine emissions, improved vehicle idling, and better driving performance.

Product Design – The principle component of the Delphi EPIC diesel fuel injection system is the fuel injection pump, which uses Delphi's proven cam pumping mechanism. The brain that operates the system is the ECU. This receives signals from sensors positioned in various points in the vehicle, engine, and pump, and in turn sends signals to the pump actuator to operate at the chosen timing and fuel delivery. The ECU enables accurate control of the fuel quantity injected. The system is fully flexible and can adjust fueling to suit different engine and starting requirements.



Typical Applications – The Delphi EPIC diesel fuel injection system is currently available for indirect injection engines where injection pressures are up to 350 bar, and direct injection engines where injection pressures of up to 950 bar are necessary.

Product Features

- Internal cam pumping
- Closed loop control of fuel metering
- Dashboard interface
- Emissions reduction
- Improved driveability
- Smoother idling

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EPIC Advantages

- **Emissions Reduction**
The Delphi EPIC diesel fuel injection system enables accurate timing of fuel delivery and control of exhaust gas recirculation. This helps create a substantial reduction in emissions.
- **Improved Driveability**
The Delphi EPIC diesel fuel injection system minimizes engine speed oscillations during acceleration. This is achieved by using both the transient response characteristics of the pump and the sophisticated ECU.
- **Smoother Idling**
Engine idle speed is tightly controlled with the Delphi EPIC diesel fuel injection system by modulating shot to shot fuel delivery, thus helping reduce noise and vibration.
- **Integration with Other Vehicle Systems**
EPIC can be integrated into a modern vehicle database. This enables the system to communicate with other vehicle systems such as traction control, anti-lock brakes (ABS), and automatic transmission. Other vehicle systems can also be incorporated.
- **Self Diagnostic and Performance Check**
The system carries out an extensive range of self diagnostic and performance checks using two microprocessors: one carries out the data processing while the other acts as a back-up, checking correct operation of the first unit. The driver is alerted of any major faults by a light situated in the dashboard.
- **Optional Extra Features**
The ECU enables the system to be linked to an extensive range of optional extra equipment, including cruise control, anti-theft devices, and air conditioning.

Operating Principle

- Fuel enters the pumping chamber via a transfer pump.
- The ECU sends signals to the drain and feed solenoids in the pump to open or close. This enables precise control of the axial displacement of the rotor using a position sensor in a feedback loop, thereby providing accurate control of the fuel quantity injected.
- Timing is controlled by a solenoid actuator that regulates the position of the cam by varying hydraulic pressure.

Advanced Diesel Technology – The popularity of diesel vehicles is growing globally. In Europe, approximately one of every three new cars sold is powered by a diesel engine. There are many reasons for this surge in popularity. Consumers are discovering that diesel engines offer:

- **Better fuel efficiency:** Light-duty diesel engines typically use 30-40 percent less fuel than gasoline engines of similar power under similar circumstances
- **More torque:** Diesels produce more drive force at low engine speeds than gasoline engines under similar circumstances, making diesels more fun to drive
- **Lower greenhouse gas emissions:** Less fuel consumed translates to lower emissions of carbon dioxide

To continue to offer consumers these advantages, vehicle manufacturers are required to meet stringent diesel emission standards. These standards vary throughout the world and are one factor driving development of advanced diesel technology.

The Delphi Advantage – As a global leader in advanced diesel technology, Delphi integrates air and fuel management systems, exhaust aftertreatment, and the associated electronic controls and sensors, helping provide complete end-to-end diesel engine control systems that help meet emission requirements worldwide.

Delphi has two common rail development centers, five diesel applications facilities in Europe, Asia-Pacific, and the United States, and nearly 8,000 employees working to further advance diesel technologies. Delphi has 12 manufacturing facilities that produce diesel systems components in seven countries, enabling exceptional on-time delivery performance.