

Delphi DPG Medium Duty Diesel Rotary Fuel Injection Pump

The Delphi DPG Medium Duty Diesel Rotary Fuel Injection Pump is based on the Delphi DPA series of diesel fuel pumps and includes mechanical governor enhancements, providing durable governor performance to ISO 8528-5 Class G2 standards. The pump is easily adjusted to suit either 50 or 60 Hz operation, and offers easy in-service conversion to electronic operation using an integrated governor controller and actuator. The main components of the DPG pump include:

- Fuel inlet
- Transfer pump with pressure regulator
- Distributor pumping system with two or four plungers
- Internal cam ring
- Driveshaft
- Metering valve with droop control
- Mechanical governor with low friction and wear features
- Governor transient stabilizer
- Electric shut-off

Options include:

- Advance control (start retard or light load advance)
- Clockwise or anti-clockwise drive
- Engine transient overspeed limiting
- Component package for low lubricity fuel

► Benefits

- Enhancements to the design of the governor improve wear performance of the governor components, and advanced knife edge pivots and governor weight design improve hysteresis performance between governor pull-off and pull-on.
- Droop control sets droop (rate of governor pull-off) to a desired value and allows easy conversion from 50 Hz to 60 Hz generator operation within ISO 8528-5 Class G2 standards. This feature can also be used for adjustments in service if required.
- Hydraulic damper fitted to the governor helps keep the alternator stable and within ISO specified requirements.
- A simple conversion to electronic governing with integrated governor controller and actuator allows in-service upgrades. No separate controller is needed, helping minimize wiring harness complexity. Digital control helps provide precise governing with multiple governing strategies such as isochronous load sharing, 50/60 Hz switching, auxiliary load sharing, etc. The actuator can be specified as original equipment by the engine manufacturer.

► Typical Applications

The Delphi DPG Medium Duty Diesel Rotary Fuel Injection Pump is suitable for generator set and fixed speed applications within the following parameters:

- Engine speeds up to 3000 rpm
- Engine ratings up to 24 kW per cylinder
- Peak pumping pressures up to 550 bar (injection pressures up to 650 bar)
- Three, four, or six cylinder engines



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- ISO 6519 standard 20 mm diameter drive taper
- Gear or hub drive
- 12 V or 24 V electrical supply
- Up to 8° advance travel

▶ **Performance Advantages**

Performance The basic operation of the Delphi DPG Medium Duty Diesel Rotary Fuel Injection Pump is the same as highly successful Delphi DPA series of rotary fuel pumps. Fuel enters the pump and is raised to a pressure of about 6 to 7 bar for proper control of fuel quantity and timing.

Between injections, fuel is fed through a control (metering) valve into the distributor rotor center. At full fuel, the valve is held open and delivers maximum fuel quantity. It is regulated by the maximum displacement of the pumping plungers and controlled by adjustable plates. At lower engine loads, the flyweight governor controls the fuel by closing the control valve, which throttles the filling of the pump.

During the pumping phase, the roller shoe assemblies, which run inside the internal cam ring, are pushed inward. They bear on the pumping plungers in the rotor, causing an injection pulse to travel from the pump to the injector in the engine cylinder head via a pressurizing valve and high-pressure pipe. Timing of the injection is controlled or altered by rotation of the cam relative to the pumping plungers and drive shaft.

Adjusting the trunnion throttle (which sets the load in the governor spring) sets the speed at which the governor reaches engine no-load delivery. Adjusting the height of the control metering valve sets the droop or governor speed range over which the governor reduces the fuel from maximum to minimum quantity. This changes the degree of overlap between the metering valve filling slot and the filling port in the hydraulic head, thus adjusting the angular rate of change of port area.

▶ **The Delphi Advantage**

Delphi is actively involved in the development of advanced diesel technology. 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 injection systems that provide accurate injection over the life of the engine and low noise. Delphi has 15 diesel design and engineering centers located in Europe, Asia, North America and South America, and 21 diesel manufacturing facilities in 13 countries enabling exceptional on-time delivery.

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