

Delphi Electronic Diesel Exhaust Gas Recirculation Valves

Delphi Electronic Diesel Exhaust Gas Recirculation (EGR) Valves re-circulate metered amounts of exhaust gas into the engine's intake system to help limit the formation of nitrogen oxide (NO_x) emissions. Delphi offers a family of diesel EGR valves based on a proven electronically actuated diesel exhaust gas recirculation valve technology.

Delphi Electronic Diesel Exhaust Gas Recirculation Valves are available with single poppet, dual poppet and butterfly valve designs to help meet all ranges of flow requirement for diesel engines. They are available with solenoid, torque motor, or direct current (DC) motor actuators to help meet individual customer requirements for force, response, cost and leak.

► Benefits

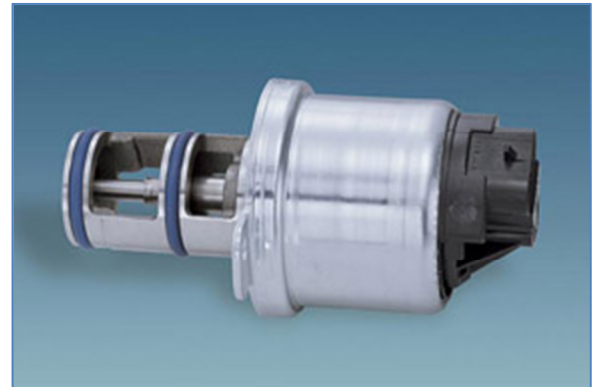
- Robust valve design provides carbon resistance, durability and long life, high quality and engine control module controllability.
- High opening and closing force actuators minimize impact of corrosion and help provide high quality, durability and long life. They have ECM-compatible drivers. Delphi offers a range of actuators to meet customer application requirements.
- Fast valve opening and closing response time enhances engine control module controllability and helps lower emissions as a result of the reduction in exhaust gas lag time.
- Low internal and external leak designs offer low cost.
- Stainless steel valves and components provide robust performance and resistance to corrosion, high temperatures and wear.
- Modular valves offer design flexibility to meet a full range of customer requirements.

► Typical Applications

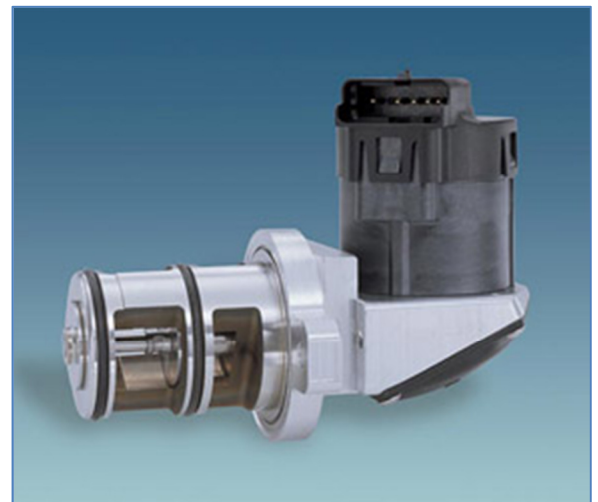
Delphi Electronic Diesel Exhaust Gas Recirculation Valves are designed for diesel engine programs targeted to meet future exhaust emissions requirements in Europe, North America and Asia. They are designed for both highway and off-highway applications.



Delphi Single Poppet Rotary EGR Valve with Torque Motor



Delphi Dual Poppet Linear EGR Valve with Solenoid Actuator



Delphi Dual Poppet Rotary EGR Valve with Torque Motor

▶ **Performance Advantages**

Delphi Electronic Diesel Exhaust Gas Recirculation Valves feature a robust design that helps inhibit carbon contamination (coking), which can adversely affect pintle operation. Their high opening and closing force also helps minimize the impact of carbon contamination. Fast opening and closing response time helps manufacturers meet controllability requirements, while low internal and external leak performance helps minimize exhaust emissions and enables precise engine calibration, all in an efficient and cost-effective package.

Delphi recognizes that one of the most effective ways to reduce NO_x output in a diesel engine is to lower in-cylinder temperatures. This can be accomplished very effectively by limiting the amount of oxygen in the combustion chamber. Thus, Delphi's EGR valves re-circulate controlled amounts of inert gasses into the intake system where they mix with incoming air. The result is to help lower the combustion temperature below the level at which NO_x is formed.

The amount of re-circulated gas in the combustion chamber is dependent on operating conditions, but Delphi's continuously variable EGR valves allow:

- High EGR flow for cruising and mid-range operation
- Low EGR flow for low-speed and light-load conditions
- No EGR flow during engine warm-up, idle, and wide-open throttle

Delphi can support a wide variety of diesel EGR program requirements globally through engineering facilities in Rochester, NY, USA; Bascharage, Luxembourg; and Daegu, Korea.

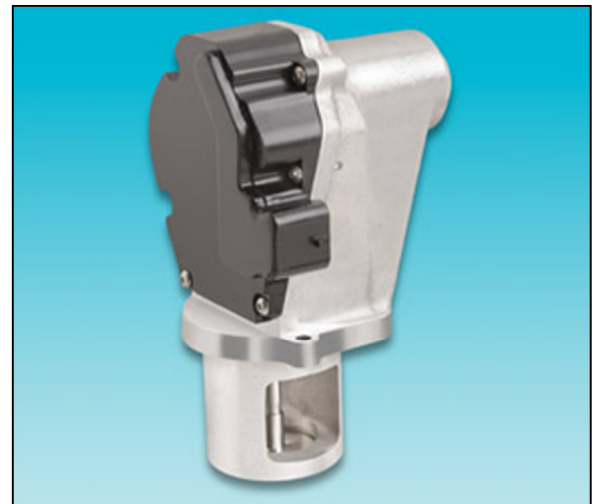
▶ **The Delphi Advantage**

Delphi has partnered with Korea Delphi Automotive Systems Corporation (KDAC) to strengthen its design and development capabilities for future diesel EGR valves and to increase its global engineering resources.

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 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.



Delphi High Power Light Duty Diesel EGR Valve with DC Brush Motor



Delphi High Power Medium Duty Diesel EGR Valve with DC Brush Motor



Delphi High Flow Butterfly EGR Valve with Torque Motor