

Delphi Selective Catalytic Reduction Dosing System

The Delphi Selective Catalytic Reduction (SCR) Dosing System, with its high performance dosing injector, is designed to help reduce the amount of nitrogen oxide (NOx) emissions in the exhaust from light duty diesel vehicles. It offers an innovative design with the ability to maximize emissions reduction potential, including CO₂, at minimum system cost across a wide range of applications.

The system features a unique doser, which integrates a high pressure pump and nozzle providing injection pressure of greater than 20 bar, superior spray characteristics with particle size of SMD <50 μm, and stable lifetime injection performance. The modular Delphi SCR Dosing System also includes a urea delivery module (UDM) that integrates urea level sensing, filter and heater into a single component, which fits into the bottom of the manufacturer's tank. Delphi provides support for electronics (hardware and/or software) to control and diagnose the dosing system components. Delphi also offers an optional ammonia sensor and a sensor controller as an addition to the system.

The Delphi SCR Dosing System provides precise and highly atomized dosing of liquid urea, minimizing the mixing length (between doser and catalyst). This enables the SCR catalyst to be placed closer to the engine for better thermally-aided NOx conversion to help manufacturers meet new and more stringent European emissions standards for diesel vehicles. This thermal advantage minimizes the need for catalyst heating strategies, which further contributes to reduced CO₂ emissions.



Delphi's Selective Catalytic Reduction (SCR) Dosing System includes: (clockwise from lower left) a Dosing Injector, Engine Control Module, SCR Urea Delivery Module, and optional Ammonia Sensor and Ammonia Sensor Controller/SCR Driver Module.

► Benefits

- System is designed specifically for aqueous urea solution dosing applications.
- The high pressure injection of greater than 20 bar produces a highly diffused spray with minute droplets to provide high performance dosing.
- Thermally robust product permits the nozzle to be placed directly into the exhaust stream allowing better targeting, mixing and opportunities to maintain a high quality spray over the life of the product as the exhaust temperature ensures a deposit free nozzle tip.
- Compact, modular design with integrated dosing pump injector and a simplified architecture enables easy packaging in the vehicle.
- System is designed for repeated freezing and thawing of the urea solution. It withstands temperatures below -11 °C, when urea solution is frozen.
- Urea solution purge is not required at shutdown; the doser and UDM have been designed to withstand freezing.
- Dosing pump injector allows a wide range of mounting angles on the exhaust (axially and radically) for packaging flexibility.
- The dosing injector is cooled by water. This allows the dosing injector to be mounted in engine compartment environments where ambient temperatures can exceed 200 °C.
- System helps manufacturers meet Euro 6, Tier 4 and other stringent European and U.S. emissions standards for diesel vehicles.
- Target lifetime for reliability of the system is 350,000 km (215,000 mi.), or 15 years.
- Delphi's industry-leading ammonia sensor is available as an option to help the system achieve more accurate dosing control if required.

withstand freezing of the aqueous urea solution, thus purging of the solution is not required at engine shutdown. This simplifies the system architecture while keeping the aqueous urea solution free from exhaust deposits that can lead to detrimental contamination. These advantages help reduce the overall cost of the SCR exhaust aftertreatment system (exhaust and dosing system). The Delphi SCR Dosing System provides manufacturers with a robust solution for meeting new NOx emissions regulations. The high performance system is designed specifically for aqueous urea solution dosing.

The urea delivery module is a bottom mounted unit, which includes an electric heater capable of meeting defrosting requirements. The module also includes a bottom referenced tank level sensor which has no moving parts and an integrated lifetime filter. The module includes a rod heater and dissipaters to enable dosing even under freezing conditions.

With Delphi's flexible service approach, a manufacturer can select an SCR Driver Module (to drive both the doser and the heaters), or a simple heater control module, or just software and electrical interface specifications to control the dosing subsystem from the engine control module. In addition, Delphi can provide system services to specify and calibrate the dosing subsystem.

► **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 exception 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 approach 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.