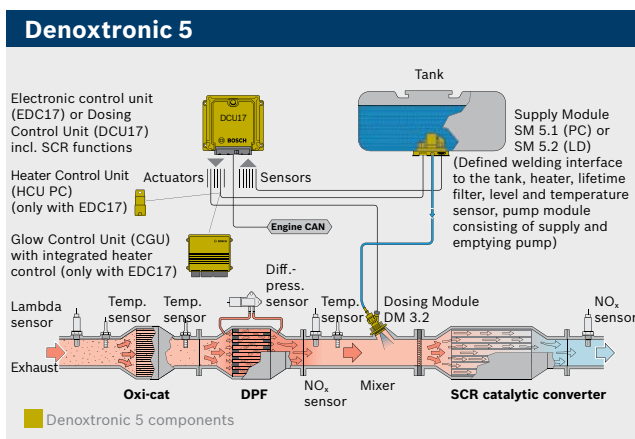


Diesel Systems

Denoxtronic 5 – Urea Dosing System for SCR systems



BOSCH
Invented for life



Customer benefits

- ▶ Engine operation can be optimized towards fuel efficiency (fuel savings up to 5%)
- ▶ Reduction of nitrogen-oxide (NO_x) emissions by up to 95%
- ▶ Contributes towards achieving Tier 2 Bin 5 and Euro 6 emission limits
- ▶ Business model adapted to established fuel business model
- ▶ Economical due to standardized Supply Module with integrated tank heater for different tank variants
- ▶ Small mounting space: Supply Module can be integrated into the AdBlue tank
- ▶ Robust design, e.g. ice-pressure resistant Supply Module and optional actively cooled Dosing Module

In order to restrict vehicle emissions, the emission limits are continuously being reduced worldwide. In the upcoming years new emission legislation (e.g. Euro 6, from September 2014) as well as new emission test cycles (WLTP: Worldwide Harmonized Light Duty Test Procedure or RDE: Real Driving Emission, scheduled for 2017) will further reduce these limits. To comply with the new emission legislation all vehicle classes will require active exhaust-gas treatment.

The Denoxtronic injects AdBlue/DEF, a solution of 32.5% urea in water, into the exhaust stream upstream of the SCR catalytic converter. The urea is then converted via thermolysis and hydrolysis into ammonia. Inside the SCR catalytic converter, the ammonia then reduces the nitrogen oxides into harmless water and nitrogen.

NO_x raw emissions of modern diesel engines are 96% lower than those of a typical diesel from 1990. The SCR system (Selective Catalytic Reduction) with the Denoxtronic Urea Dosing System from Bosch further reduces these raw emissions by up to 95%.

Instead of the multiple variants of the first generation (Denoxtronic 3.1), the second generation (Denoxtronic 5) has a standardized Supply Module which is fused with the AdBlue tank by the vehicle manufacturer. This enables robust and economical solutions. The Denoxtronic 5 scope of supply comprises Dosing Modules for mounting underfloor (with passive air cooling) or in the engine compartment (with active cooling by engine coolant).

Possible applications

The Denoxtronic 5 has been developed for passenger-car and light-duty-vehicle applications.

Technical features

Dosing quantity min./max.	200/2,000 g/h
Operating pressure	4.5–8.5 bar
Spray quality	100 µm SMD (Sauter Mean Diameter)
Spray angle	10°–23°
Filter retention capacity	PC: 8 g, LD: 26 g
Lifetime	8,000 h
Operating voltage	12 V
Bosch control unit	EDC17 or DCU17
Heater control	HCU-PC or integrated into DCU17
Fields of application	PC, LD
Emission targets	Euro 6, Tier 2 Bin 5

Operating principle

The Supply Module sucks the AdBlue/DEF out of the tank with a diaphragm pump and compresses it to the system pressure of 4.5 to 8.5 bar required for atomization. The Dosing Module meters and atomizes the required quantity of AdBlue/DEF into the exhaust stream upstream of the SCR catalytic converter.

Control of the dosing and heating strategy and of on-board diagnosis can be executed by an engine control unit or a Dosing Control Unit. By monitoring/processing of the ongoing engine operation data and all required sensor data, the AdBlue/DEF volume is precisely adapted to the engine operation point and catalytic-converter specific requirements to reach maximum nitrogen oxide conversion. The system is open-loop controlled.

When the engine control unit is used, the tank and pressure line heating is controlled by the Heater Control Unit for passenger-car SCR systems (HCU-PC). This configuration optimizes the diagnosis capability and increases robustness compared with the Denoxtronic 3.1 and requires fewer output stages in the engine control unit.

AdBlue/DEF freezes at -11 °C. Therefore the Supply Module integrated into the AdBlue/DEF tank is ice-pressure resistant. The Dosing Module is emptied at engine switch-off.

Outlook

There is a clear trend towards engine close coupled mounting, higher AdBlue/DEF injection quantities with a subsequently increased consumption volume over lifetime as well as AdBlue/DEF quality detection. Bosch engineers are already developing concepts to comply with these requirements.

Components of the Denoxtronic 5 and applications

- 1** AdBlue Supply Module SM 5 with pump module, maintenance-free AdBlue filter, tank heating, continuous level and temperature sensing, electrical and mechanical interfaces
- 2** AdBlue Dosing Module DM 3.2 (air cooled), DM 3.3 (air and engine coolant), DM 3.4 (coolant)
- 3** Dosing Control Unit DCU with SCR functions
- 4** Heater Control Unit HCU-PC (used when SCR function is integrated into the engine control unit)

Bosch: Automotive competence from a single source

- Comprehensive range of services and know-how
- System and network competence
- Innovator and technology leader
- Warrantor for quality and dependability
- Worldwide presence
- Universal partner

Robert Bosch GmbH
 Diesel Systems

 Postfach 30 02 20
 70442 Stuttgart
 Germany
 diesel@bosch.com

www.future-with-diesel.com

Printed in Germany
 292000P0WZ-C/CCA-201209-En