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**EXPERIENCE**

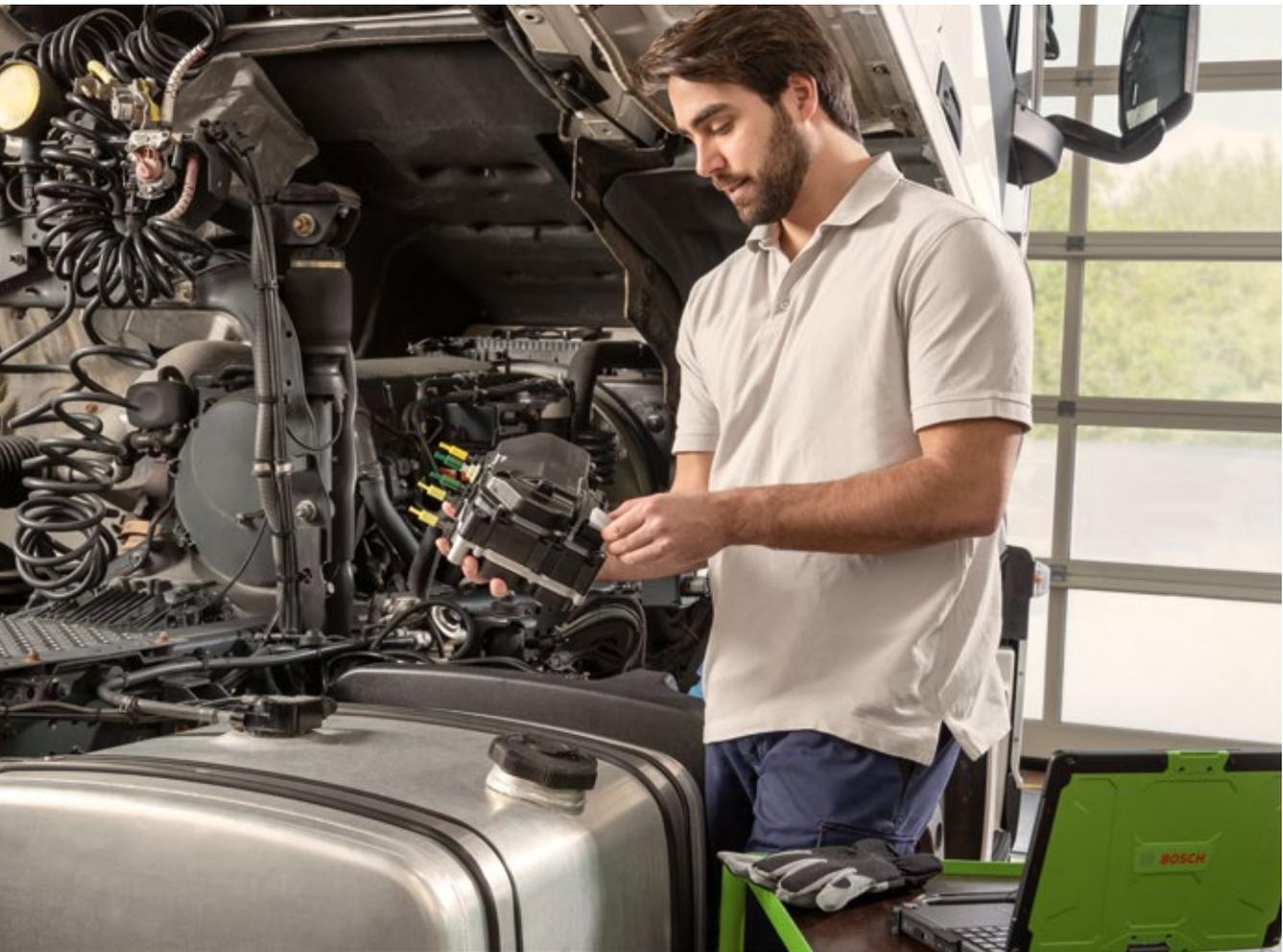


**BOSCH**

Invented for life

## Better performance for the workshop

Denoxtronic diagnosis, replacement and service for experts – The comprehensive range of services for exhaust-gas treatment



## Exhaust-gas treatment

Denoxtronic from Bosch

p. 04



## Denoxtronic operating principle

Technology

p. 06



## Technical training

Overview

p. 19



## Denoxtronic spare parts

Overview

p. 18



## Denoxtronic repairs

Program & product details

p. 16

# Professional testing and replacement

## Denoxtronic from Bosch

Bosch offers a wide range of services for the diagnosis and maintenance of the Denoxtronic exhaust-gas treatment system. The market for the exhaust-gas treatment of diesel vehicles is growing continuously – and this means huge **potential** for workshops. As a systems developer, Bosch draws upon its many years of experience and **expertise** in this area. We offer the most suitable solutions for the entire **process** – from diagnostics and parts to replacement and training.

### Denoxtronic diagnosis

Program & product details

p. 08



### Denoxtronic components

Program & product details

p. 10



### Exhaust-gas sensors

Program & product details

p. 15



### Departronic particulate-filter regeneration

Program & product details

p. 14



### Denoxtronic filter

Program & product details

p. 12



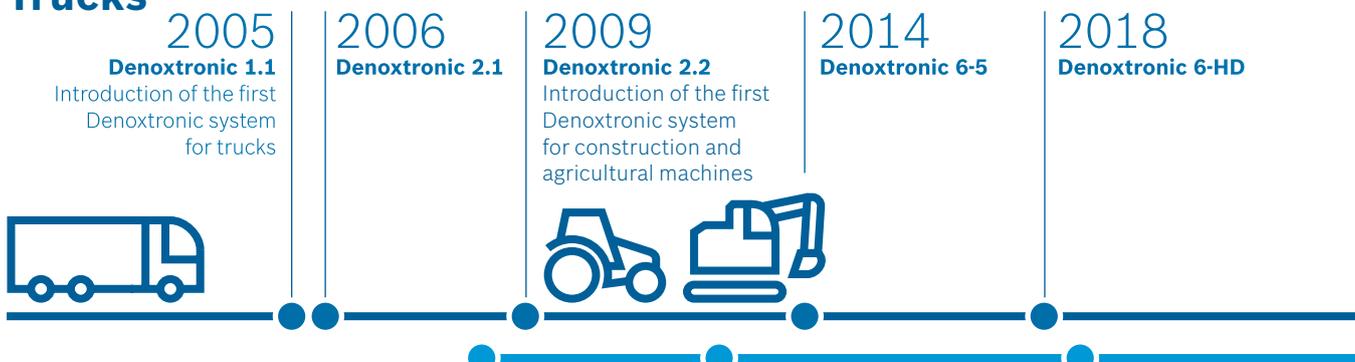
# Exhaust-gas treatment

## Denoxtronic from Bosch

Since the manufacture of the first diesel truck in 1924, and the first diesel car in 1936, Bosch has been one of the world's leading providers of diesel technology. Denoxtronic – the exhaust-gas treatment and dosing system that is being used in the majority of diesel vehicles, has great significance, and thus potential, for workshops. The system injects an aqueous urea solution (AdBlue) into the exhaust stream and, in combination with the SCR catalytic converter, converts harmful nitrogen oxides (NO<sub>x</sub>) into water and nitrogen.

Denoxtronic systems for

### Trucks



Denoxtronic systems for

### Cars and light Commercial vehicles



### Know-how since 2005

These days, Bosch Denoxtronic systems are built in to commercial vehicles around the world. In 2005, the first Denoxtronic System for trucks was introduced. Since then Denoxtronic has been continuously developed to help to fulfill the stringent emission standards. Since the introduction of the European exhaust-gas standards 4 and 5, the number of vehicles that are equipped with Denoxtronic has been increasing steadily. An increasing number of vehicle manufacturers are using the Bosch system to ensure that high diesel performance vehicles are in compliance with emission limits.

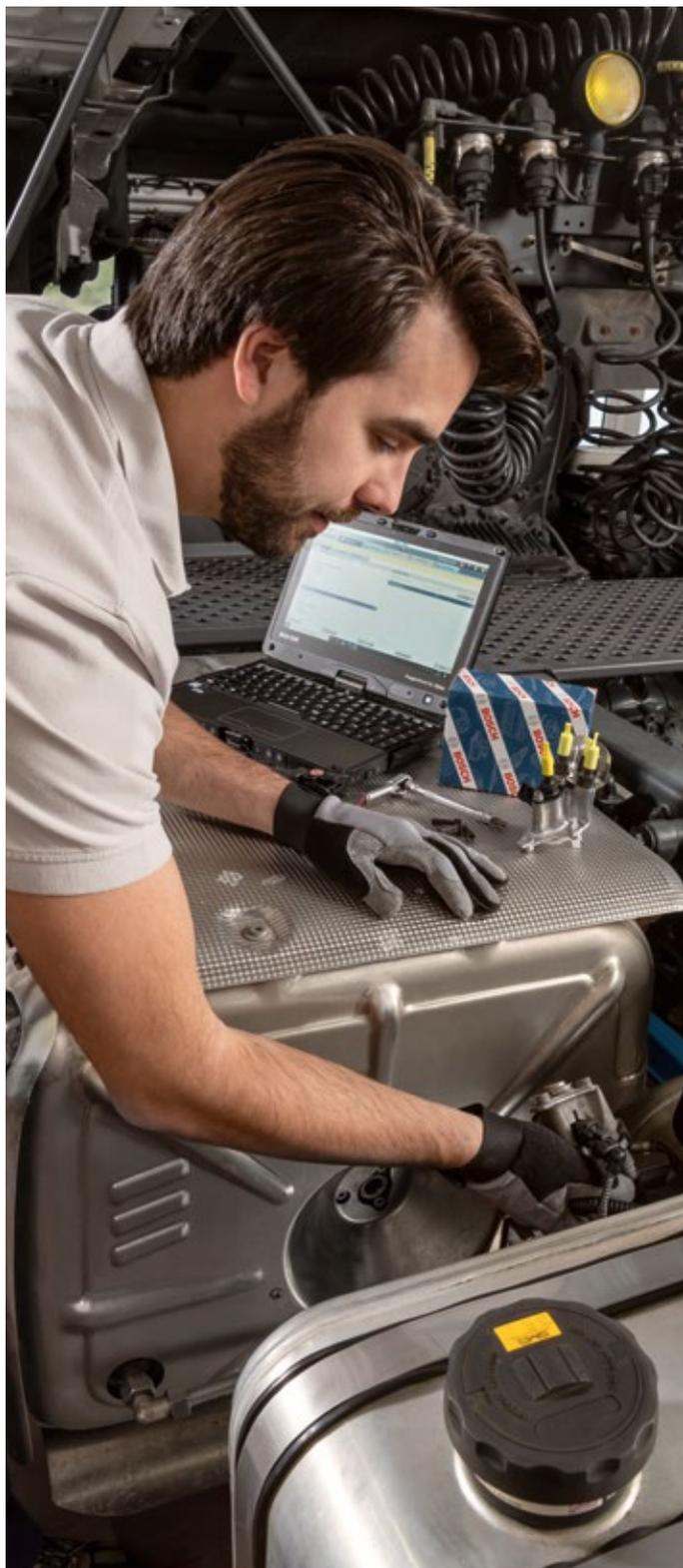
### Advantages at a glance

- ▶ **Reduction of NO<sub>x</sub> emissions**  
ensure that vehicles are in compliance with applicable emissions standards
- ▶ **Fuel-saving engine design**
- ▶ **Proven, robust technology**

# Exhaust-gas treatment

## Market trends and potential

The comprehensive service program from Bosch offers diesel experts a high degree of flexibility and the opportunity to serve this important market.



### Huge demand for service

A large number of trucks, construction vehicles and agricultural vehicles, as well as stationary systems (generators) are equipped with Denoxtronic. Numerous vehicles already have high mileages. This also increases the demand for services and cost-effective system repairs. To cater to the needs of this diverse market, Bosch has developed a service program for its aftermarket. The Denoxtronic field maintenance process is simple and logical: testing of the components according to manufacturers' specifications, replacement of defective parts and final testing to verify functionality. Bosch provides everything from a single source: equipment, tools and the software that are required for efficient and time-saving service. Regardless of whether it is the replacement of defective modules or comprehensive repairs that are needed – every workshop can carry out comprehensive diagnostics and replacements of the Denoxtronic components. Due to the increasingly strict emissions standards, Denoxtronic systems will continue to be an important part of exhaust-gas treatment in the future.

 Did you know?

Approximately  
**12 Million**

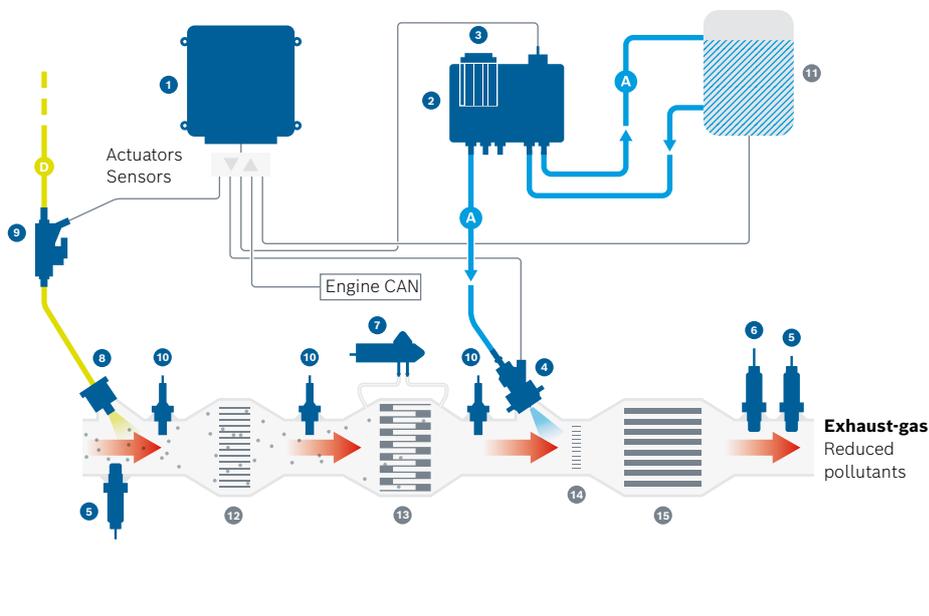
Denoxtronic systems are built in to commercial vehicles as well as construction and agricultural vehicles around the world.

# Denoxtronic operating principle

## Technology

Denoxtronic is a precise dosing system for the reducing agent AdBlue and is used in conjunction with a nitrogen oxide catalytic converter (SCR = Selective Catalytic Reduction). During combustion in the engine, nitrogen oxides are produced and, for the most part, converted into water and nitrogen through the reaction with AdBlue.

Denoxtronic exhaust-gas treatment and sensors (e.g. for Denoxtronic 2.2)



### Bosch components

Denoxtronic:

- 1 Dosing control unit / Electronic engine control unit
- 2 Supply module
- 3 Denoxtronic filter
- 4 Dosing module
- 5 NO<sub>x</sub> sensor
- 6 Particulate matter sensor
- 7 Differential pressure sensor
- 8 Diesel injection unit
- 9 Diesel metering unit with shut-off valve
- 10 Exhaust-gas temperature sensor

Other components

- 11 AdBlue tank
- 12 Oxidation catalyst
- 13 Coated diesel particulate filter
- 14 Mixer
- 15 SCR catalytic converter with ammonia slip catalyst

- A AdBlue
- B Diesel
- Electrical connection
- Hot

During the exhaust-gas treatment, a selective catalytic reduction of nitrogen oxides (NO<sub>x</sub>) takes place. The process is based on the fact that a reducing agent combined with oxygen reduces nitrogen oxides.

A urea-water solution is used as a reducing agent in vehicle applications. The urea-water solution is known under the name **AdBlue**. The AdBlue dosing system from Bosch, called Denoxtronic, is a modular system. It ensures the exact measurement and distribution of the reducing agent AdBlue.

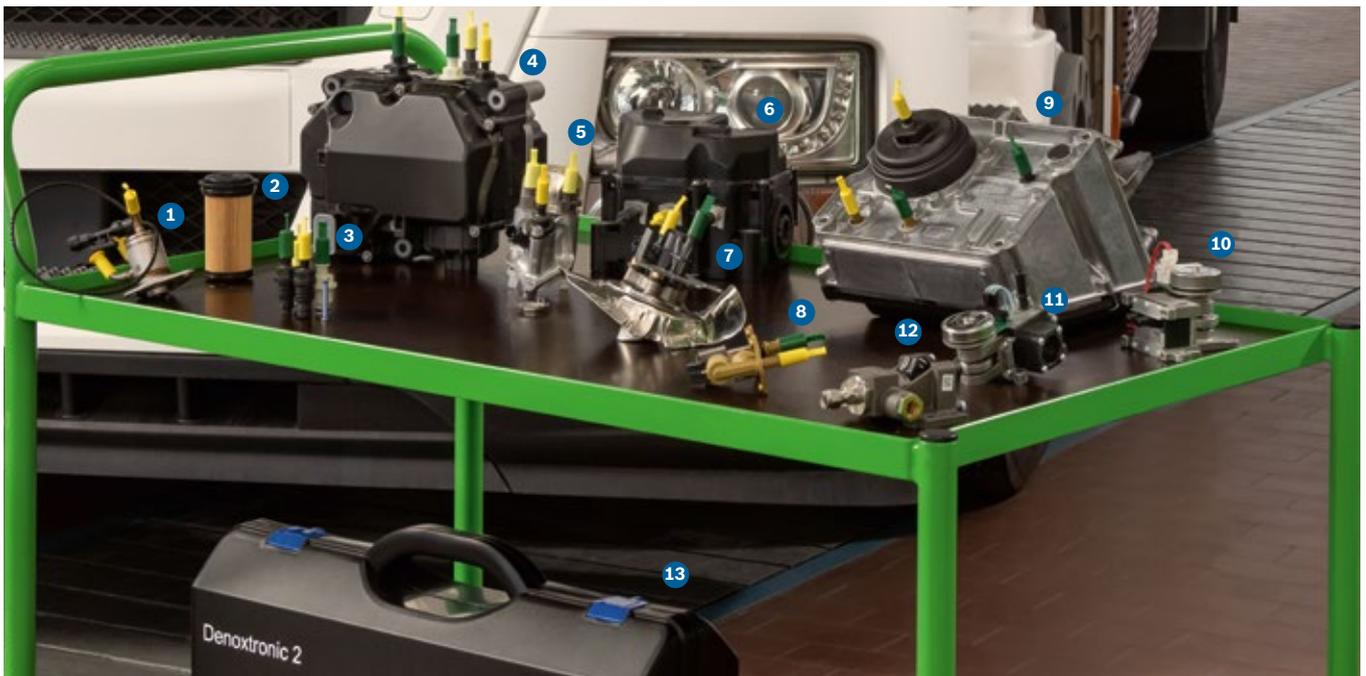
Denoxtronic consists of the **dosing control unit 1**, the **supply module 2** and the **dosing module 4**.

The supply module brings AdBlue to the required pressure and feeds it to the dosing module. The dosing module ensures the precise quantity of AdBlue is atomized and injected into the exhaust stream. The intermediate dosing control unit calculates the required amount.

# Denoxtronic service offer

## Overview

Thanks to many years of experience and expertise in original equipment, Bosch also offers the aftermarket a wide range of efficient diagnostics, replacement, and service solutions for exhaust-gas treatment. This enables the workshop to carry out service easily and efficiently through precise diagnosis and clear identification of defective components as well as the rapid replacement of Denoxtronic modules.



- |                                   |   |                                  |
|-----------------------------------|---|----------------------------------|
| 1 Dosing module 2.6               | 5 Dosing module 2.2                     | 9 Denoxtronic 2.1 supply module  |
| 2 Denoxtronic 2.2 filter kit      | 6 Denoxtronic 6-5 supply module         | 10 Denoxtronic 2.1 membrane pump |
| 3 Denoxtronic 2.2 hose connection | 7 Dosing module 2.1                     | 11 Denoxtronic 1.1 membrane pump |
| 4 Denoxtronic 2.2 supply module   | 8 Denoxtronic 2.1 cooling control valve | 12 Dosing module 1.1             |
|                                   |   | 13 Denoxtronic 2.2 test set      |



### Cleanliness is important!

Leaks can cause AdBlue to creep and crystallise in the air due to its low viscosity. A clean, separate work surface prevents the risk of leaks, e.g. via o-rings or seals.



### Did you know?

AdBlue is a watery urea solution composed of up to 32.5% urea and up to 67.5% demineralized water. Due to its high water content, AdBlue freezes and expands at just

**-11.5°**

Celsius. In this case, compressible compensation elements prevent damage to both the filter and the supply module.

# Denoxtronic diagnosis

## Program & product details

With the Denoxtronic test set and a KTS truck, the components of the Bosch Denoxtronic exhaust-gas treatment are tested directly on the truck while installed. Thanks to the clear identification of the defective component, a suitable solution can be found quickly.



**Denoxtronic 1.1 test set**

☎ 0 986 610 800

**Denoxtronic 2.1/2.2 test set**

☎ 0 986 610 450



### Advantages at a glance

- ▶ **Targeted and professional testing** of Denoxtronic components directly on the vehicle saves time and enables solutions to be found quickly
- ▶ **Extensive test options** are covered and the functional tests provided by the vehicle manufacturer are supported
- ▶ **Easy use and application** for every workshop, not only for diesel experts
- ▶ **Contribution to compliance of the legal emissions standards** through diagnosis and replacement of the defective component

### Did you know?

With the Denoxtronic test set and a diagnostics tester, different functional tests can be carried out on installed components (independently of vehicle manufacturer specifications), e.g.:

- ▶ Pressure test
- ▶ Dosing quantity test
- ▶ AdBlue quality test (composition and contamination)

# Denoxtronic diagnosis

## Program & product details

The test sets are designed to work on the Denoxtronic 1.1 exhaust-gas treatment system or the Denoxtronic 2.1 and 2.2 systems. The diagnosis take place directly on the components that are installed in the vehicle, thereby shortening the downtime of the truck.

The **Denoxtronic 1.1 test set** is used when carrying out the functional test via the system diagnostics and the field repairs. The tests encompass the checking of the air circuit, the measurement of the dosing amount and the testing of the pump performance.

The **Denoxtronic 2.1/2.2 test set** is used for the assessment of the hydraulic system leakproofness as well as the dosing and supply quantity test in the Denoxtronic diagnosis.

The following models can be tested with the **Denoxtronic 1.1** tool set:  
DAF, Heuliez, Iveco, MAN, Mitsubishi – Fuso, Scania, TEMSA, UD Trucks

The following models can be tested with the **Denoxtronic 2.1** tool set:  
Case IH, Iveco, New Holand, Renault, Volvo Trucks

The following models can be tested with the **Denoxtronic 2.2** tool set:  
CAT, CNH, Cummins, DAF, Deutz, FAW, Hino, Isuzu, Iveco, John Deere, Nissan, Renault, Temsa, UD Trucks, Volvo Trucks, Volkswagen



### ESI[tronic] 2.0 Online + KTS Truck – an unbeatable team



ESI[tronic] 2.0 Online with the info type Truck, info type OHW 1 and info type OHW 2 as well as the KTS Truck, a modular entry-level device in commercial vehicle diagnostics, make it possible to carry out extensive vehicle diagnostics on commercial vehicles, trailers, buses as well as on agricultural vehicles, construction vehicles and engines.

A Denoxtronic service begins with the vehicle diagnostics by means of a KTS Truck and the ESI[tronic] 2.0 Online Truck or OHW. In many cases, the faulty component can already be clearly identified at this stage.

# Denoxtronic components

## Program & product details

	Denoxtronic 1.1	Denoxtronic 2.1
System pressure	3.8 bar	5.0 bar
Operating voltage	24V	24V
Maximum dosage amount	9 kg/h	9 kg/h
Applications		



	Supply module 1.1	Supply module 2.1
Description	The supply module brings the AdBlue to the required pressure and feeds it to the dosing module.	
DCU	integrated	integrated
Heating	electric	electric



	Dosing module 1.1	Dosing module 2.1
Description	The dosing module ensures the precise quantity of AdBlue is atomized and injected into the exhaust stream.	
Water chiller	No water chiller required (separate spray head provided)	through AdBlue circuit

### Advantages at a glance

- ▶ **Support for compliance with the emission standards** through reduction of the NO<sub>x</sub> emissions
- ▶ **Long service life** thanks to proven, robust technology
- ▶ **Efficient solutions** for fast and easy replacement of the modules in the service



### Did you know?

#### Bosch eXchange

offers an attractive option for fast and efficient vehicle repairs with its comprehensive replacement program. It comes with the same warranty as the Bosch new product range. The Denoxtronic 1.1, 2.1 and 2.2 supply modules are also available as Bosch eXchange products.

# Denoxtronic components

## Program & product details

Denoxtronic 2.2	Denoxtronic 6-5	Denoxtronic 6-HD
9.0 bar	5.0 bar	9.0 bar
12V or 24V	12V or 24V	12V or 24V
12 kg/h	5.4 kg/h	15 kg/h
		



Supply module 2.2	Supply module 6-5	Supply module 6-HD
The supply module brings the AdBlue to the required pressure and feeds it to the dosing module.		
not integrated	not integrated	not integrated
electric or through cooling water circuit	electric	electric or through cooling water circuit



Dosing module 2.2/2.5	Dosing module 2.2/2.5	Dosing module 2.6
The dosing module ensures the precise quantity of AdBlue is atomized and injected into the exhaust stream.		
through cooling water circuit	through cooling water circuit	through cooling water circuit

### Advantages at a glance

- ▶ **Support for compliance with the emission standards** through reduction of the NO<sub>x</sub> emissions
- ▶ **Long service life** thanks to proven, robust technology
- ▶ **Efficient solutions** for fast and easy replacement of the modules in the service



### Did you know?



#### Regular filter replacement

The replacement of the Denoxtronic filter is a maintenance measure that should be carried out regularly. In this way, compliance with the legally required emissions standards is ensured. The replacement interval is determined by the vehicle manufacturer and can be found in the ESI[tronic] maintenance schedule.

# Denoxtronic filter

## Program & product details

Bosch Denoxtronic filters protect the Denoxtronic injection system in commercial vehicles and off-highway vehicles. They reliably remove particles from AdBlue thus contributing to optimum dosing.



### Advantages at a glance

- ▶ **High particle separation** rate due to microporous filter medium with special impregnation
- ▶ **High particle holding capacity** due to large filter surface
- ▶ **Chemical resistance to aggressive AdBlue** due to usage of high-quality materials
- ▶ **Frost resistance** through compressible compensation elements

### Clean AdBlue for an optimal dosage

This video shows how the exhaust-gas treatment system in commercial vehicles works and what role the Denoxtronic filter plays in keeping it working.



# Denoxtronic filter

## Program & product details

### Filter spare-part sets for repair and servicing

Typ/KIT										
Denoxtronic 1 Service	1 457 436 042		•	•		•	•	•		DAF, MAN, IVECO, Scania, Volvo
Denoxtronic 1 Repair	F 00B H40 025					•	•		•	DAF, MAN, IVECO, Scania, Volvo
Denoxtronic 2.1 Service	1 457 436 006		•			•	•			Case, IVECO, KHD, Renault, Volvo
Denoxtronic 2.1 Repair	1 457 030 020							•		Case, IVECO, KHD, Renault, Volvo
Denoxtronic 2.2 Service	1 457 436 088		•			•			•	Cummins, IVECO, Mack, Nissan, Renault, Volvo
Denoxtronic 6.5 Service	1 457 436 039		•			•			•	Perkins, IVECO, CNH, JCB, Daimler India, CAMC (China)
Denoxtronic 6HD Service	1 457 436 057		•			•			•	MAN, John Deere, IVECO, CNH



Filter with compensation element



Compensation element with sealing function



Pre-filter



Filter element



Set of seals



Filter cover



Compensation element



Drain plug



Extraction tool



#### Replacement of Denoxtronic 2.1 filters

The filter is screwed onto the housing cover of the Denoxtronic supply module and is extracted from the housing along with the cover. In case the filter detaches from the cover or gets stuck at the housing, it can be extracted using the extraction tool.



#### Replacement of Denoxtronic 2.2 filters

Using the extraction tool, the filter is extracted from the Denoxtronic supply module. The matching extraction tool is included within the service kit.

# Departronic particulate-filter regeneration

## Program & product details



### Metering unit

The metering unit of the Departronic system determines the required dosing quantity and forwards it to the injection unit.



### Injection unit

The injection unit of the Departronic system ensures a precise fuel injection and handles its atomization and distribution within the exhaust pipe.



### Advantages at a glance

- ▶ **Fuel savings** through the high efficiency of the particulate-filter regeneration
- ▶ **Maintenance-free, long service life** thanks to robust design
- ▶ **High performance quality** through proven Bosch know-how
- ▶ **Efficient solutions** for fast and easy replacement of the modules in the service



### Did you know?

## Departronic

Unlike pure engine-internal measures of particulate-filter regeneration such as post-injection, Departronic doses and injects the fuel upstream of the oxidation catalytic converter and the diesel particulate-filter. Efficient regeneration of particulate-filters is achieved by optimum adjustment of injection timing and quantity.

# Exhaust-gas sensors

## Program & product details



### Lambda sensor

Lambda sensors measure the oxygen content in the exhaust-gas and provide the necessary information for the optimal air-fuel mixture to the engine control unit. They support a clean combustion to ensure that emissions standards are complied with.



### Exhaust-gas temperature sensor

Exhaust-gas temperature sensors monitor the optimum temperature range and protect high-quality components such as turbochargers, catalytic converters and diesel particulate filters in the hot exhaust-gas system. They ensure ideal regulation behaviour of the exhaust-gas cleaning components.



### Differential-pressure sensor

Differential-pressure sensors monitor the pressure difference of the particulate filter and thereby provide information about their loading condition. This provides a demand-based particulate-filter regeneration.



## Advantages at a glance

- ▶ **High performance and reliability over a long service life** through functional and quality tests according to the same standards as original equipment
- ▶ **Outstanding corrosion resistance** in the high-stress area around the exhaust-gas system thanks to high-quality materials and robust design
- ▶ **Reduced stay of the vehicle in the workshop and time savings** thanks to trouble-free installation of the sensors



### Program extension planned for particulate and NO<sub>x</sub> sensors

An increasing number of light and heavy commercial vehicles are being equipped with particulate and NO<sub>x</sub> sensors. As a result, sensors are becoming increasingly important for aftermarket business. The Bosch workshop program already offers particulate and NO<sub>x</sub> sensors for many vehicles in the market and will also be extended for commercial vehicles in the near future.

# Denoxtronic repairs

## Program & product details

In cases when it is necessary to remove the Denoxtronic component from a commercial vehicle, reliable and quick diagnosis and repairs can be carried out using repair solutions from Bosch. With the recommended testing and repair tools, technical instructions and spare parts with original equipment quality, Denoxtronic repairs can be carried out successfully.



**Denoxtronic 2.2  
Tool set**

0 986 610 561



### Advantages at a glance

- ▶ **Carry out all the functional tests, as recommended by Bosch**, on the removed component
- ▶ **High-quality component repairs** thanks to repair instructions in ESI[tronic] and parts in original equipment quality
- ▶ **The repairing of components** – an affordable solution for the customer
- ▶ **Contribution to compliance of the legal emissions standards** through repair of the defective components

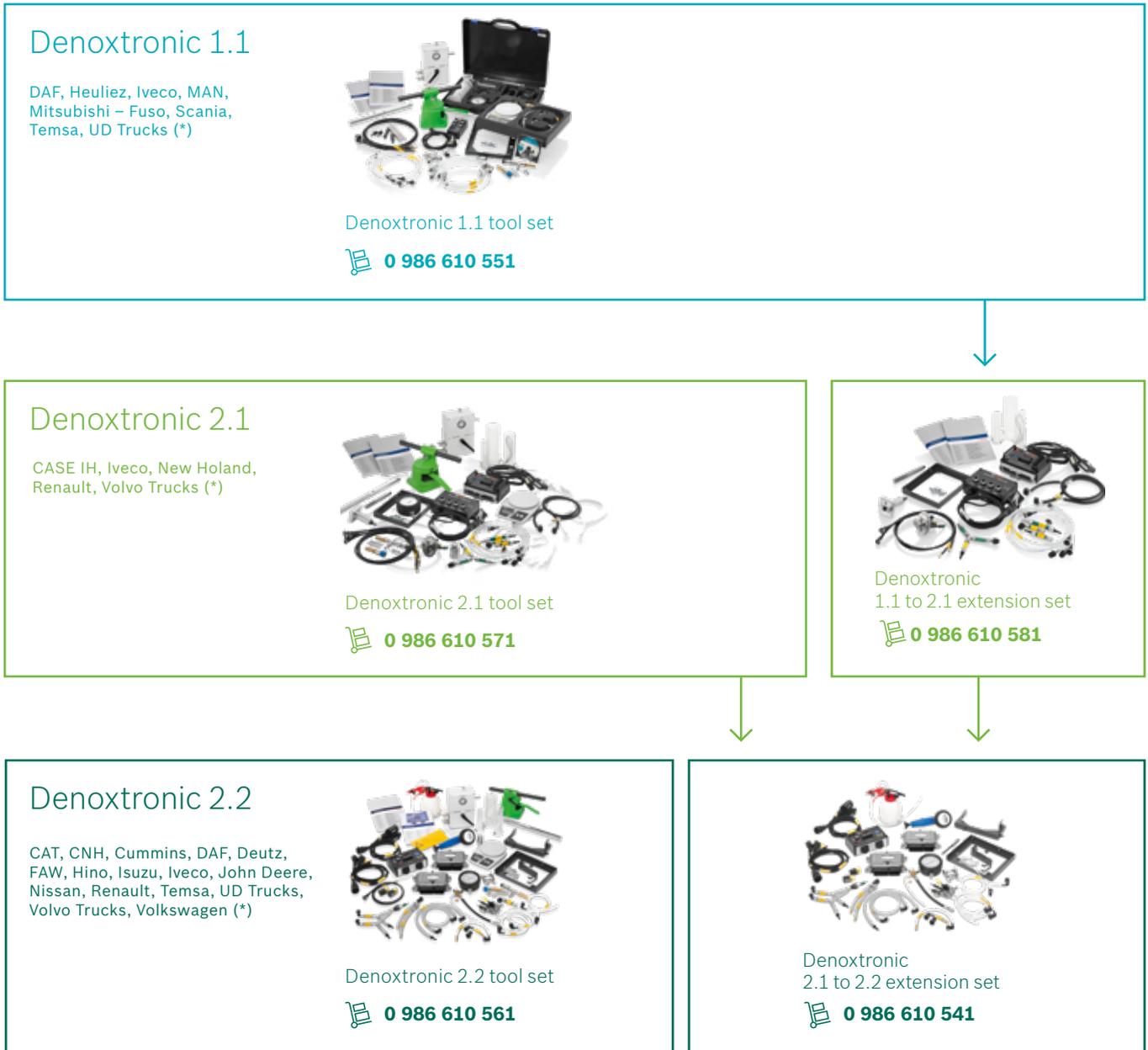
### ? Did you know?



The Denoxtronic test sets are used in conjunction with a diagnostics tester, e.g. a Bosch KTS 560/590 – for a targeted diagnosis.

# Denoxtronic repairs

## Program & product details



### Special accessories

- |   |  |   |   |  |
|---|--|---|---|--|
|  <p>Denoxtronic workbench</p> <p>🛒 0 986 613 880</p> |  <p>Voltage stabiliser</p> <p>🛒 1 687 022 873</p> |  <p>Adapter module (Scania)</p> <p>🛒 0 986 610 173</p> |  <p>Test adapter</p> <p>🛒 0 986 610 174</p> |  <p>KTS 5xx and ESI[tronic]<br/>Please speak to your wholesaler</p> |
|---|--|---|---|--|

(\*) Depending on the equipment level in the workshop and the vehicle manufacturer and/or vehicle type, further optional accessories may be required. Contact your specialist wholesaler to discuss your specific needs.

# Denoxtronic spare parts

## Overview

Bosch offers an extensive range of original equipment quality spare parts for affordable vehicle repairs. Further spare parts can be found in ESI[tronic] 2.0 Online.

### Spare parts example

#### Supply module 2.1



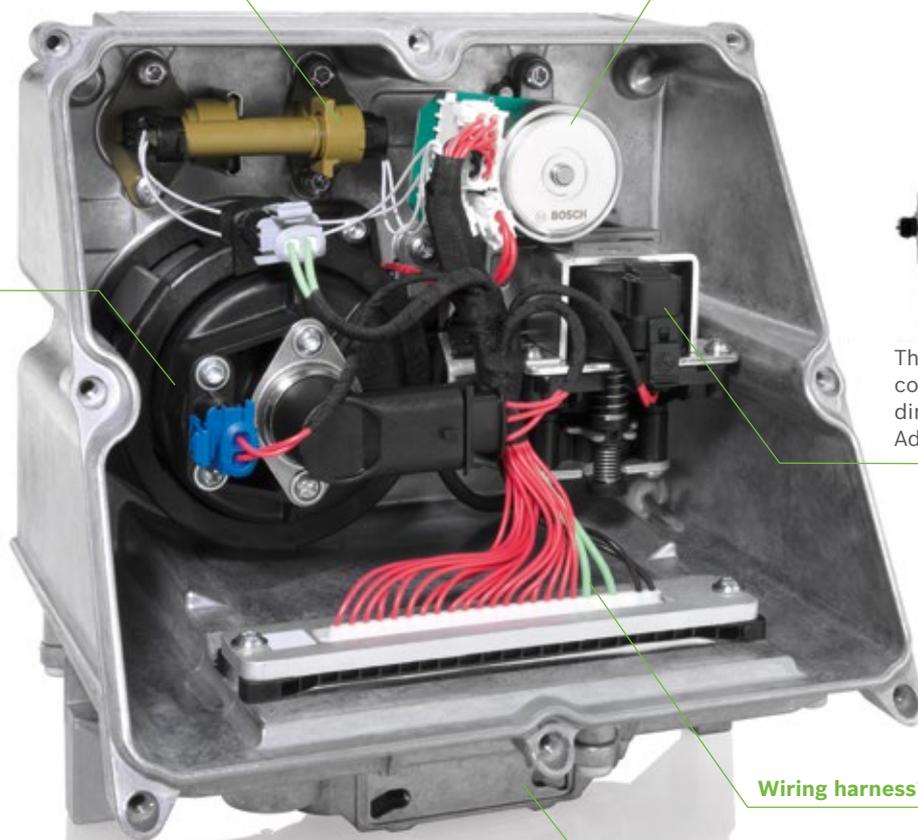
The **control unit** in the supply module is used to regulate the cooling of the dosing module.



The **membrane pump** in the supply module generates the required system pressure and delivers the AdBlue reducing medium from the tank to the dosing module via the supply module.



The filter reliably cleans the AdBlue from particles and thus supports optimal dosing.



The **4/2-way valve** controls the flow direction of the AdBlue.

**Wiring harness\***

**Dosing control unit**

\*depending on the Denoxtronic system

# Technical training

## Overview

For commercial vehicle workshops, trained employees are a great asset because vehicles today are increasingly complex and new technologies present new challenges. Only with the necessary expertise, is it possible for workshop employees to carry out diagnosis, maintenance, and service work on current vehicle models effectively and cost-effectively.

### Training content and goals

In the special diesel technology and the exhaust-gas treatment system training courses, technicians are taught the professional testing of components and systems using KTS and ESI[tronic] in conjunction with the Denoxtronic test kit. It is also possible to learn how to repair Denoxtronic modules 1 and 2. Since construction and agricultural machinery are increasingly being equipped with Denoxtronic, the training offer has been developed accordingly. For example, independent troubleshooting and fault resolutions on SCR systems or the exhaust-gas treatment of construction and agricultural machinery can be taught.



**28 Training center** around the world



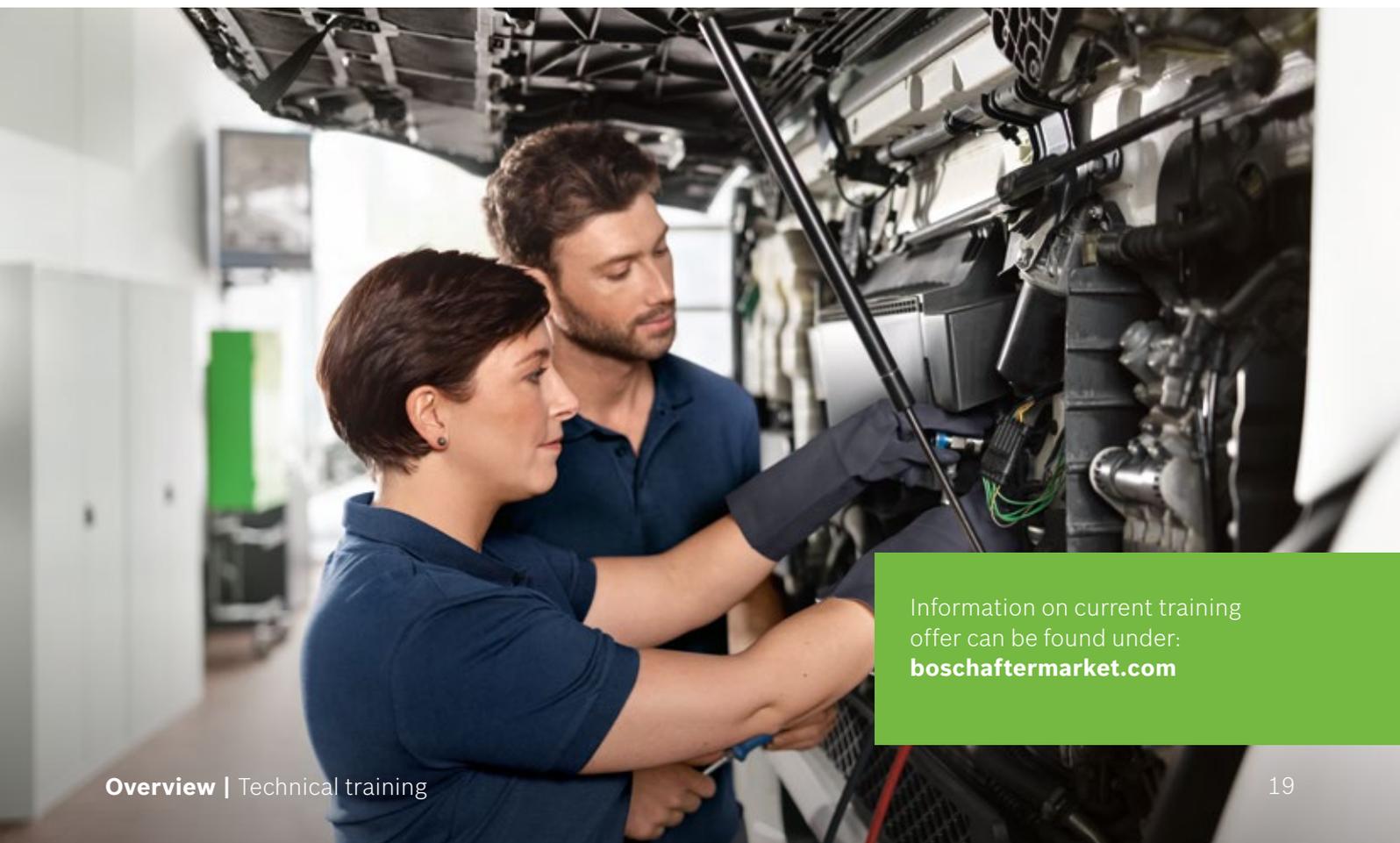
**5259 training courses** with 265 314 training participants worldwide in 2019



**521 practical training courses** on various disciplines in the offer



**107 courses** relating to diesel and exhaust-gas treatment



Information on current training offer can be found under:  
**[boschaftermarket.com](https://boschaftermarket.com)**

# What drives you, drives us

Bosch technologies are used worldwide in almost all vehicles. People, and assuring their mobility, is what we are focused on.

To them, we dedicate 130 years of pioneering spirit and expertise in research and manufacturing.

And it is for them that we continue to work constantly to develop unique combinations of spare parts, diagnostics solutions and services:

- ▶ Solutions for efficient and effective vehicle repairs
- ▶ innovative workshop equipment and software
- ▶ one of the largest spare parts offerings for new and replacement parts worldwide
- ▶ large dealership network for quick and reliable parts supply
- ▶ competent technical support
- ▶ comprehensive educational and training offerings
- ▶ targeted sales and marketing support

Learn more now:  
[boschaftermarket.com](https://boschaftermarket.com)

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