Tips & Technology

For Bosch business partners

Current topics for successful workshops No. 04

Trucks

BOSCH
Invented for life

Filters for commercial vehicles – Part 2

Rough conditions for truck filters

Commercial vehicles are on the road almost continuously. This means that all filter types are exposed to continuous stress.

Requirements for filters	Cars	Commercial vehicles
Service intervals	+	++(+)
Flow rate	+	++
Vibration resistance	+	++
Dirt collection capacity	+	++(+)
Pulsation resistance	+	++
Size	+	++(+)

In Tips & Technology No. 4 – "Filters for commercial vehicles – Part 1", we already introduced you to diesel, oil, cabin and air filters

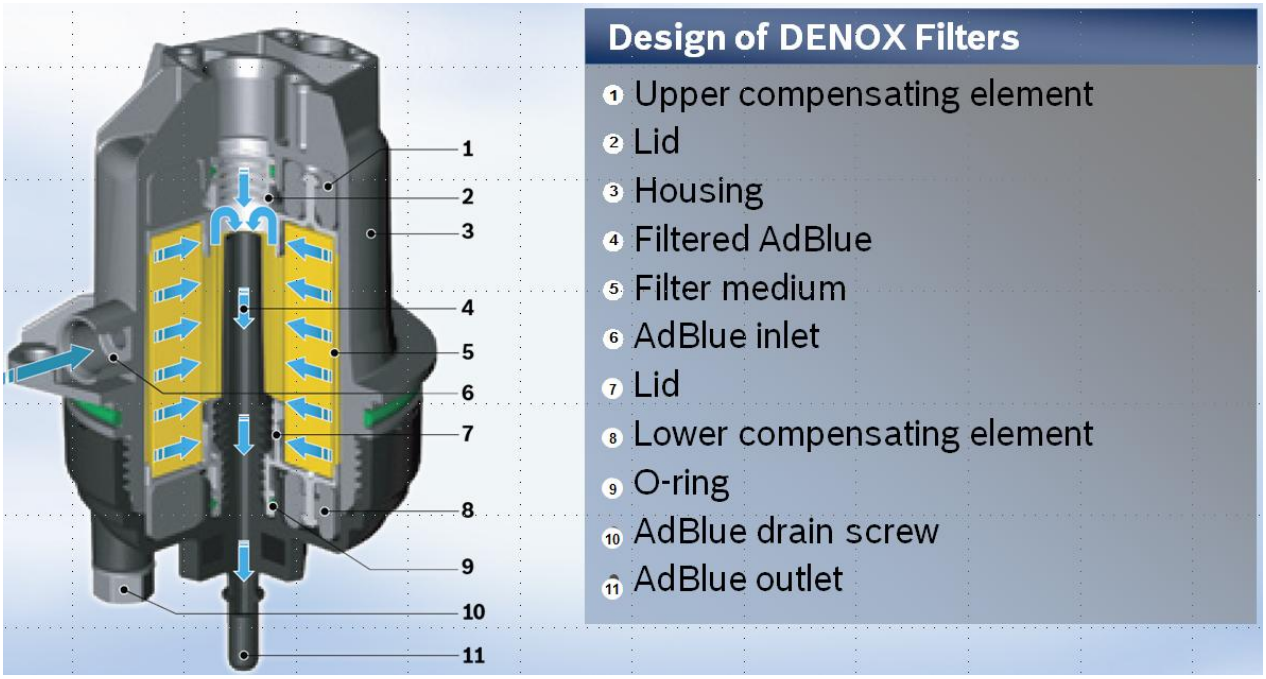
In Part 2 of this issue, we would like to provide you with information on the following products:

- DENOX filters
- Desiccant boxes
- Cooling water filters
- Oil separators
- Hydraulic oil filters

DENOX filters

The Denoxtronic AdBlue dosing system and the SCR catalytic converter reduce nitrogen oxide emissions and fuel consumption. The DENOX filter is integrated into the dosing module, protects the sensitive injection valve and thereby ensures correct dispensing of AdBlue.

Bosch DENOX filters have a high dirt separation rate thanks to the phenolic resin coating and the large area of the filter medium. Use of high-grade materials makes them resistant to the aggressive AdBlue. Because of the high water content, AdBlue freezes even at -11 °C and expands. Compensation elements prevent damage to the filter. An electric heater is incorporated to heat the frozen AdBlue quickly.



Changing the DENOX filter 2.1:

The filter is bolted to the cover on the housing of the Denoxtronic delivery module and is removed from the housing together with the cover. If it has come loose from the cover or is stuck in the housing, it can be removed with the aid of the extraction tool.

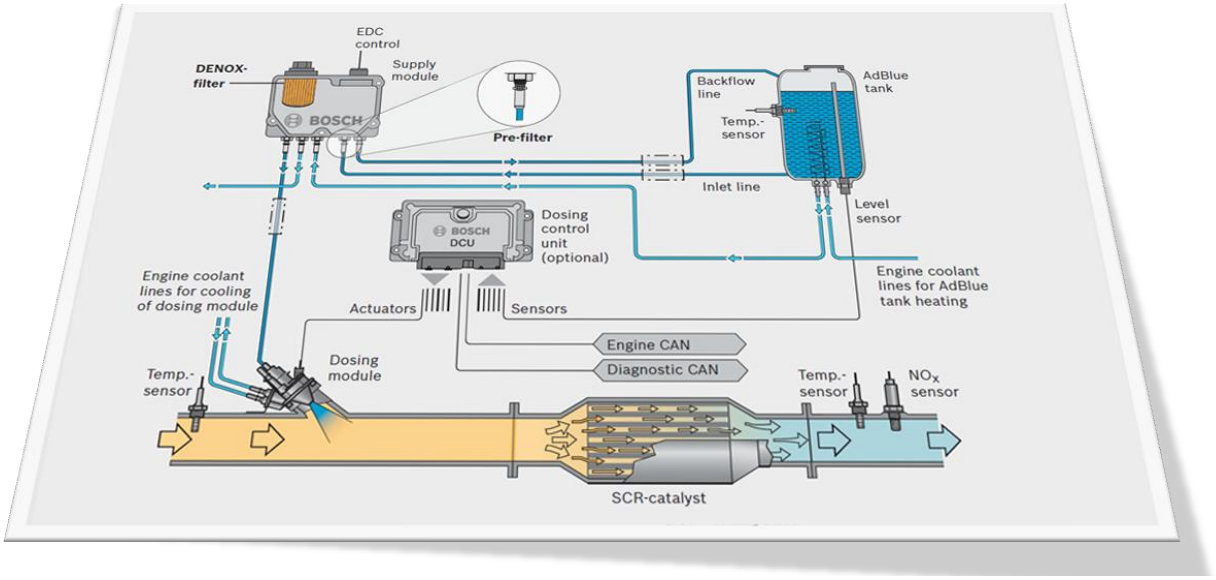
Changing the DENOX filter 2.2:

The filter is removed from the Denoxtronic delivery module with the aid of the extraction tool. The extraction tool is included in the service kit.

DENOX filter extraction tool for Denoxtronic 2.1:

The extraction tool is used only if the filter has come loose from the housing cover or is stuck. (Item number: 0 986 613 295)

Location of the DENOX filter in the Denoxtronic system:



Desiccant boxes

Compressed air is used for many functions on commercial vehicles:

- The service brake and parking brake systems
- The trailer's brake system
- Air suspension
- Door operation, e.g. on buses
- The traction control system

Consequences of poor moisture removal from the compressed air:

When compressed, air becomes warmer, absorbs more water vapor and then releases condensate when cooled to ambient temperature:

- Risk of valve malfunctions as the result of the water freezing when the weather turns cold
- Risk of corrosion in air tanks, valves and cylinders
- Washing away of the oil lubricating film in components of the brake system

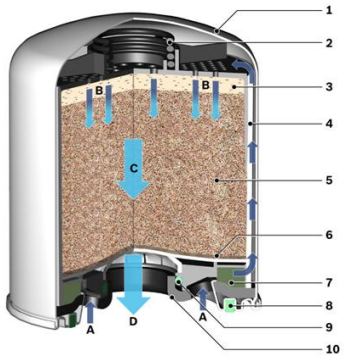
Consequences of poor oil separation in the compressed air:

The compressor and other oil-lubricated components continually loose small amounts of oil. This oil appears as an oil mist in the compressed air and in turn in the desiccant box:

- Risk of fouling the desiccant pellets, causing a loss of drying capacity
- Risk of seal and valve malfunctions in the pneumatic system, since oil mist attacks plastics
- Oil escaping from the pneumatic system poses the risk of violating Euro V and VI standards

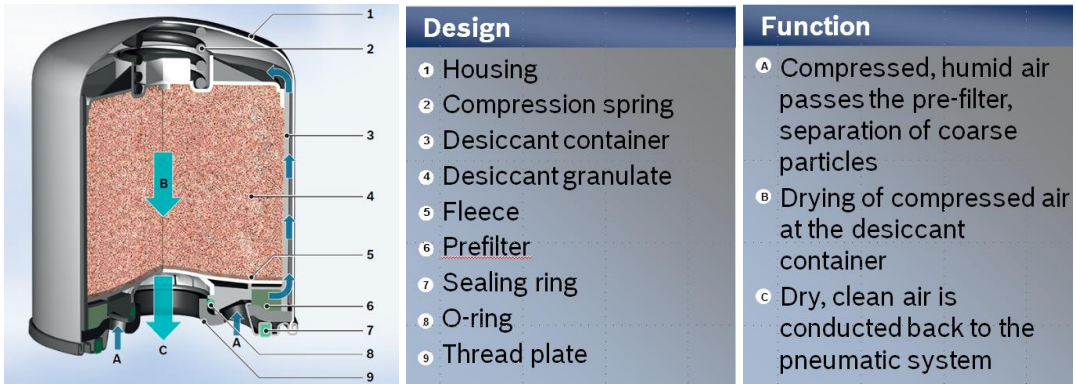
The desiccant box performs the function of cleaning the compressed air by removing moisture, particles and oil mist.

Desiccant box with integrated oil separator:

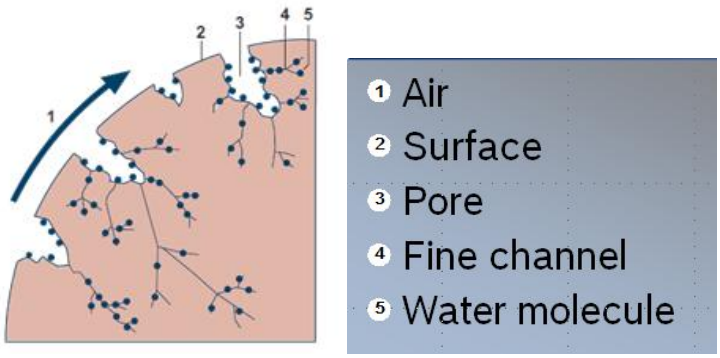


Design	Function
1 Housing	A Compressed, humid air passes the pre-filter, separation of coarse particles
2 Compression spring	B Separation of oil mist
3 Oil separator	C Drying of compressed air at the desiccant container
4 Desiccant container	D Dry, clean air is conducted back to the pneumatic system
5 Desiccant granulate	
6 Fleece	
7 Prefilter	
8 Sealing ring	
9 O-ring	
10 Thread plate	

Desiccant box without oil separator:



Microstructure of the desiccant pellet:



The desiccant consists of pellets measuring 1-3 mm in size. The pores and tiny channels in the pallet create a large internal surface area for absorbing water molecules. The quantity of pellets in a desiccant box – about 1 kg – has an internal surface area of 1 million m², the area of about 20 football fields.

The regeneration cycle:

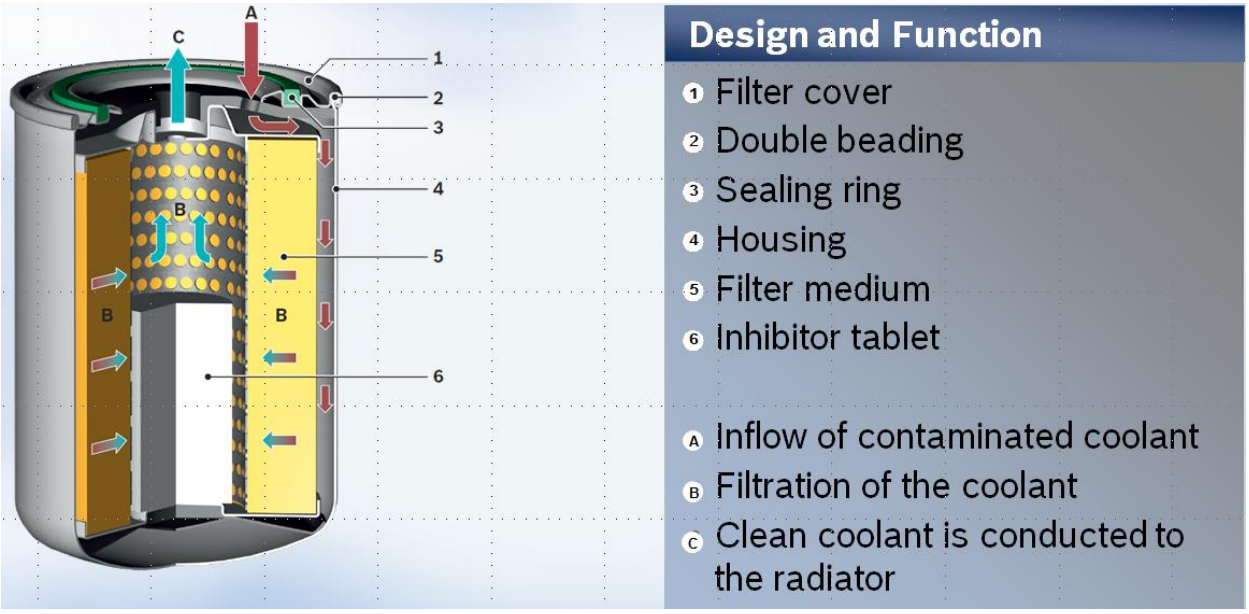
The water droplets contained in the compressed air collect in the pellets. During the regeneration cycle, an air release valve opens, reducing the pressure in the drying container. Dry air from the regeneration air tank flows through the pellets in the opposite direction. The moisture is carried to the outside.

The regeneration cycle always occurs when the pneumatic system has enough compressed air in the storage tanks, regardless of the moisture content of the pellets.

Desiccant box installation locations:

Cooling water filters

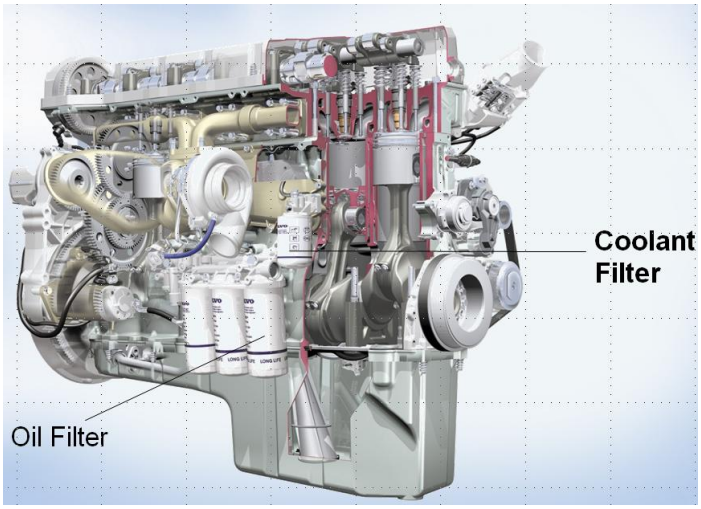
The function of the cooling water is to remove the heat generated by operation of the engine. The cooling water filter protects the small channels of the cooling system against deposits through a combination of mechanical filtration and chemical additives.



Consequences of inadequate cooling water filtration:

- Corrosion in the cooling system
- Foaming at low cooling temperatures
- Calcium and magnesium deposits
- Over-acidification and bacteria build-up
- Cavitation and pitting on metal surfaces

Installation location:

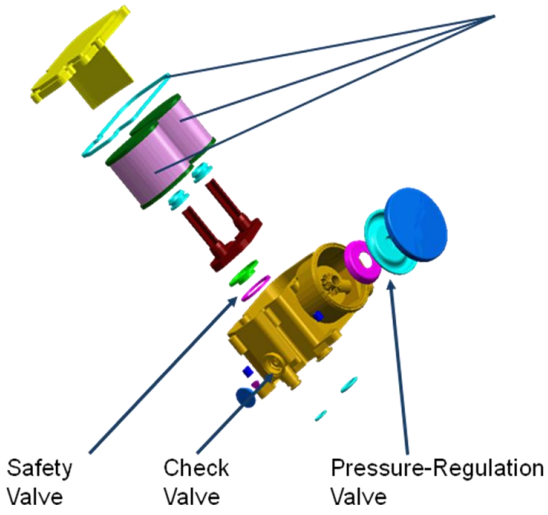


Oil separators

The oil separator performs the function of removing the oil mist from blow-by gases.

When the engine is operating, gases flow out of the combustion chamber into the crankcase through the gaps between the piston and cylinder wall. Even with optimal sealing, these so-called blow-by gases amount to about 0.5% to 2% of the total gas volume in the cylinders. Blow-by gases contain fuel residue, soot particles and oil mist.

Example: Bosch filter F026404008 - IVECO 2992447 (Set)



Hydraulic oil filters

Hydraulic oil transmits very high pressures in the hydraulic system, e.g. before moving excavator arms and wheel loader buckets. The hydraulic oil filter protects the hydraulic system against contaminants such as dust, metal detritus and water.

Hydraulic oil is a fluid that is used to transmit pressure and hydraulic systems. These pressures can be as much as 400 bar and higher. The hydraulic oil must satisfy tough requirements:

- Low temperature sensitivity of the viscosity (flowing ability)
- Low compressibility
- Low tendency to foam
- High shear stability, i.e. no disruption of the lubricating film even under high mechanical loads