4-circuit protection valves

suitable for: DAF, Iveco, Mercedes-Benz, Renault, Volvo etc.



Effectively ensuring safety in the compressed air system

4-circuit protection valves fulfil an important safety function in the compressed air system of commercial vehicles. They distribute the compressed air across several supply circuits and ensure that the entire system does not fail in the event of a pressure loss. This means that the vehicle's braking capability is maintained even if problems occur in individual circuits.

In the latest PS Tips video, Parts Specialist Niklas explains how 4-circuit protection valves work in commercial vehicles. He uses a truck as an example to show how compressed air is distributed across the individual circuits and what to look out for in particular when troubleshooting. Various versions of the 4-circuit safety valves are available on the Diesel Technic Partner Portal. The range also includes various pressure connections and multi-circuit safety valves

for systems with functions that go beyond the traditional four circuits. Variants with a sensor function are also available under the DT Spare Parts brand. The range includes, in particular, solutions for the following applications: DAF, Iveco, Mercedes-Benz, Renault and Volvo.

The compressed air generated by the compressor and treated by the air dryer is distributed to several circuits via the valve. The individual valves are numbered and assigned to their respective operating circuits. Each circuit has its own shut-off function. If, for example, a pipe bursts and the compressor is unable to compensate for the loss of pressure, the remaining circuits shut off automatically at a defined limit pressure.

Furthermore, in most versions, the 4-circuit safety valve ensures that, when the system is pressurised, the brake circuits are supplied with compressed air first. This means that the necessary braking power is available before it is even possible to release the parking brake or supply the auxiliary consumers. "Some versions also feature a so-called 'bleed-back' function. If, for example, the pressure in a circuit drops completely, this function enables controlled deceleration by allowing the parking brake to bring the vehicle to a standstill with increasing braking force," says Niklas.

A good understanding of how the system works is crucial for a successful diagnosis. "When troubleshooting, it is important to know exactly how the 4-circuit protection valve works and is constructed," explains the Parts Specialist. In addition, reference numbers, pressure diagrams and connection designations should always be checked carefully.

As part of the Diesel Technic Quality System (DTQS), 4-circuit protection valves are tested on specialised test benches. Various operating conditions and pressure profiles are simulated in order to assess the behaviour of the valves under different conditions. This enables any discrepancies to be identified at an early stage and ensures reliable operation.

A typical indicator of a defect is the uncontrolled release of air despite the system being under operating pressure. This can be caused by a valve that has become stuck, which is often due to contaminants in the system. Whilst investigating such a defect, Niklas identified some residues at the pressure inlet. These can arise, for example, from compressor wear or contaminants from the intake tract. "That is why you should always check whether the compressor is introducing oil or dirt into the system and whether the maintenance intervals for the injection tract have been adhered to," emphasises Niklas.

To get a precise diagnosis, it is worth first checking the pressure display in the vehicle. If the minimum pressure is maintained either upstream or downstream of the 4-circuit safety valve despite a detected leak, this initially suggests that the valve is functioning correctly. If, on the other hand, the displayed pressure drops completely to zero, this may indicate a fault with the 4-circuit protection valve. "It is important always to interpret the pressure readings correctly and systematically identify the cause," explains Parts Specialist Niklas.

Not every 4-circuit protection valve needs to be completely replaced in the event of a defect. DT Spare Parts offers suitable repair kits for numerous applications. Special care is required here, though: the individual valves are preset to defined opening and cut-off pressures via adjusting screws. When carrying out repairs, the manufacturer's specifications therefore need to be followed precisely. In addition, you should check whether the pressure sensors, which display the pressure readings on the dashboard, are working correctly. This is the only way to ensure that the

entire compressed air system functions reliably.

If you have any technical questions about Diesel Technic products and services, our Parts Specialists are happy to help via their HelpDesk and offer the right support: helpdesk.parts-specialists.com.

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More info: www.dtqs.de