



## **Cabin dampers from ZF Sachs – The right solution for every application**

- **Customized designs meet all customer requirements**
- **ZF Sachs products increase driving safety and comfort**

**The vibration damper is a crucial component in cabin damping. ZF Sachs, the Powertrain and Suspension Components Division of ZF Friedrichshafen AG, provides the right solutions for all requirements – in the form of steel-spring modules, air-spring modules, Cabin Air Leveling Module (CALM) (fig. 17) with integrated ride-height control, or now as the CDC electronic damping system (Continuous Damping Control) (fig. 18).**

The steel-spring module (fig. 19) is the standard solution for cabins in construction machines, delivery vehicles, tractors, and special-purpose vehicles. The advantages of steel springs in cabin dampers include simple installation by vehicle manufacturers, compact dimensions, and operations that do not require pressurized air.

### **Air springs for higher demands**

The air-spring module (fig. 20) provides considerably greater comfort. It is especially suited for installation in vehicles that carry a wide range of different loads – including in the cabin itself. It compensates for different cabin furnishings, and ensures very comfortable damping and suspension performance.

### **CALM: Cabin Air Leveling Module**

A further development of the air-spring module is the Cabin Air Leveling Module (CALM), which ZF Sachs developed together with Wabco. This module contains an integrated ride-height control system for the cabin. Depending on cabin height, a valve regulates the pressure in the air spring. CALM offers all the advantages of air springs, and in addition, its integrated height-control valve reduces



the dimensions and simplifies installation. This additionally increases the reliability of the ride-height control system and prevents a dirt-related failure of the control valve.

**Greater safety and comfort as well as health protection with CDC**

Vehicle damping must meet complex demands. On the one hand, it is supposed to enhance comfort and to protect the driver and the vehicle. On the other hand, it has to ensure sufficient driving stability. The optimum adjustment for shock absorbers is therefore always a compromise: Less damping enhances driving comfort, whereas a very high level of damping serves the stability of the cabin.

This is where CDC, the electronically adjustable damping system from ZF Sachs, comes into play. The technology is already successfully used in passenger cars and commercial vehicles and has now been implemented for cabin damping for the first time. The control system permanently monitors all influences such as driver actions and vehicle movements, and controls the CDC dampers accordingly. The combination of a proportional valve on the damper and an electronic control unit enables damping forces to be adjusted in fractions of a second as required by any given driving situation.

The benefits of CDC are obvious. For one thing, it considerably enhances ride comfort, such as when drivers face changing conditions (off-road, on-road, etc). Moreover, it reduces strain on vehicle components and thus lowers maintenance costs. Dynamic adjustment of the damping forces decreases driver fatigue, thus keeping their performance levels high for longer periods of time and protecting their health.

A positive driving experience in the tractor is no luxury, but the precondition that the driver can work with his vehicle safely, relaxed and attentively. As a system supplier ZF develops and manufactures cabin suspensions (fig. 21) for all tractor applications – including springs, vibration dampers and rubber metal components. In this context the solution offered by ZF is optimally



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adapted to the specific requirement. The drivers are profiting from a comfortable working place with reduced jerking, rocking and rolling motions.

Fig.:

- 17.) ZF Sachs: CALM<sup>®</sup> - Cabin Air Leveling Module
- 18.) ZF Sachs: CDC<sup>®</sup> - Continuous Damping Control
- 19.) ZF Sachs: Steel-spring module
- 20.) ZF Sachs: Air-spring module
- 21.) Continuously variable S-Matic transaxle with cabin support for tractors.

Pictures: ZF

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ZF Sachs AG, the Powertrain and Suspension Components division, develops and produces vibration dampers and other components for chassis regulation as well as car and CV converters and clutches.

ZF is one of the world's leading automotive industry suppliers specializing in driveline and chassis technologies. With a workforce of 60,000 employees, the company operates 125 plants in 26 countries. ZF Group revenues in 2008 totaled €12.5 billion. ZF ranks as one of the top-10 automotive industry suppliers worldwide.

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