



## Superior Torque Transmission – With Torsional Dampers and Clutches from ZF

- **Torsional dampers for all requirements**
- **Clutches for PTO applications**
- **Double clutches as drives for auxiliary devices**

**High demands are placed on the torque transmission between engine and transmission. In case of a clutch a fast and reliable disengagement and engagement of the power flow, smooth drive-offs, damping of the engine vibrations, as well as comfortable operability, long service lives with no loss in comfort, and low installation space requirements. Moreover, clutches have additional functions in special vehicles such as agricultural tractors and construction machinery. These include driving auxiliary devices that need to be activated and deactivated separately, or even driving a permanent power take-off. In state-of-the-art construction or agricultural machinery, using powershift transmissions or hydrostatic drives, high-performance torsional dampers are needed to reduce the loads on the powertrain caused by engine vibrations remarkably.**

### **Torsional dampers**

Torsional dampers are always installed behind the engine as vibrational dampers, when the powertrain does not have a shift and start-up clutch.

The purpose of torsional dampers is to prevent engine torque peaks as well as operational irregularities in the powertrain and/or auxiliary units. All commercial vehicles with powershift transmission or hydrostatic drive feature a torsional damper these days, which – to put it simply – ensures “peace and quietness” in the vehicle. If the operative forces in the powertrain vicinity are not countered, driving comfort is noticeably impaired and the powertrain components show considerably greater wear as well.



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A bolt-on torsional damper (fig. 21) is an economical yet effective solution for decoupling torsional vibrations. It is based on the steel spring damper technology used in clutch discs, which makes it resistant against any temperature induced aging processes.

For applications with greater demands, the DynaDamp (fig. 22) from ZF provides the answer. The DynaDamp uses the same technology as the established dual-mass flywheel in order to decouple torsional vibrations reliably and with a high degree of effectiveness.

ZF puts its experience in large-scale series technology into all its torsional dampers. This means that its products developed for special applications feature the same quality as those for large-scale series. Torsional dampers in different sizes are available to suit various power levels.

### **Clutches for PTOs**

If a permanent power take-off (PTO) is needed, it can be connected by a driven disc connected to the clutch assembly housing. The PTO then always runs at the engine speed. If desired, the driven disc can be equipped with a torsional damper (fig. 23).

### **Double clutches**

These are two clutches combined in one unit that do separate jobs. They are used in agricultural vehicles that have auxiliary devices which have to be activated and deactivated separately.

For the DuT-type double clutch (fig 24), the drive and PTO clutches are activated by separate releasers and release lever sets.

For the DoT-type double clutch, the two clutch systems are activated by a shared releaser and release lever set in two successive stages.

The clutch discs used in these clutches are designed in a particularly robust way to fulfil the challenging demands of agricultural use. The clutch disc can feature a torsional damper and, if necessary, also a



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predamper for idling mode. For applications that are subject to high thermal loads, the clutch disc can be equipped with cerametallic facings.

Captions:

- 21) Bolt-on torsional damper
- 22) Torsional damper DynaDamp
- 23) Clutch for PTOs
- 24) Clutch for agricultural applications

Images: ZF

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**ZF Friedrichshafen AG**

ZF is a global technology company and supplies systems for passenger cars, commercial vehicles and industrial technology, enabling the next generation of mobility. With its comprehensive technology portfolio, the company offers integrated solutions for established vehicle manufacturers, mobility providers and start-up companies in the fields of transportation and mobility. ZF continually enhances its systems in the areas of digital connectivity and automation in order to allow vehicles to see, think and act.

In 2018, ZF achieved sales of €36.9 billion. The company has a global workforce of 149,000 with approximately 230 locations in 40 countries. ZF invests over six percent of its sales in research and development annually.

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