

# MRU – Mechanical release unit

## The task

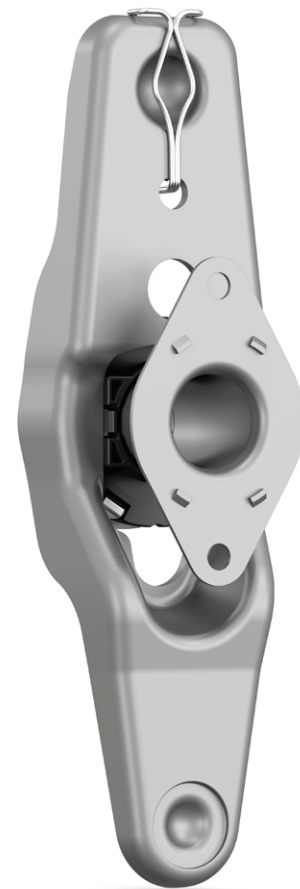
The mechanical release unit connects the hydraulic clutch actuation system with the diaphragm spring on the clutch cover assembly. The MRU must ensure absolute noiselessness and uncompromising reliability over its entire service life. In addition, optimized system rigidity is required to impart a subjectively “good feel” for the pressure point to the driver.

For this purpose, ZF offers its customers a unit that minimizes assembly work as only one module needs to be installed. In addition, this solution makes it possible for the customer to resort to a system on which all individual parts have been adapted to each other perfectly with regard to efficiency, robustness, and service life.

## The technology

The mechanical release unit consists of a ready-to-fit component assembly. The first component is the guide sleeve. It is bolted into the bell housing and ensures axial guidance of the clutch release bearing. High requirements regarding surface quality and roundness of this component ensure friction-optimized motion of the clutch release bearing on the guide sleeve. The release lever/release fork transmits the release stroke from the slave cylinder to the clutch release bearing. One side of the release lever is supported on the slave cylinder; the other side is supported on the bell housing via a pin that is pre-installed on the MRU.

The clutch release bearing is the transfer element between the rotating clutch and the stationary actuation system. Optimized synthetic materials for the sliding sleeve and a friction-optimized interface between the thrust ring and the diaphragm spring minimize the increase in hysteresis over the entire service life.



Mechanical release unit

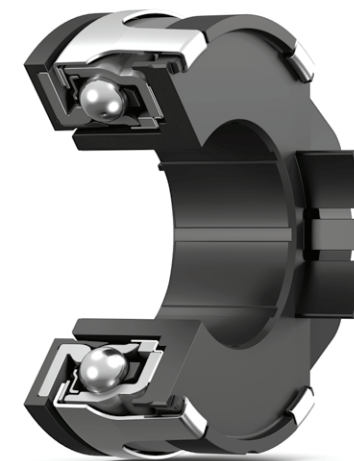
# Clutch release bearing

## The task

The clutch release bearing is the transfer element between the rotating clutch and the stationary actuation system. Absolute noiselessness and uncompromising reliability under any kind of operating condition must be ensured over its entire service life. With the clutch release bearing it is possible to compensate for a potential assembly- or tolerance-related off set.

## The technology

The clutch release bearing is part of a modular system in which all components are ideally matched. Special plastics which have been modified with regards to wear, friction, and form stability are used for the sliding sleeve. The inner and outer ring of the clutch release bearing are high-precision, high-strength steel parts. In order to guarantee reliable lubrication of the ball-bearing grooves over the entire service life, only special grease is used. To reduce friction between the diaphragm spring in the pressure plate and the inner ring of the clutch release bearing, a plastic thrust washer can be fitted.



Clutch release bearing

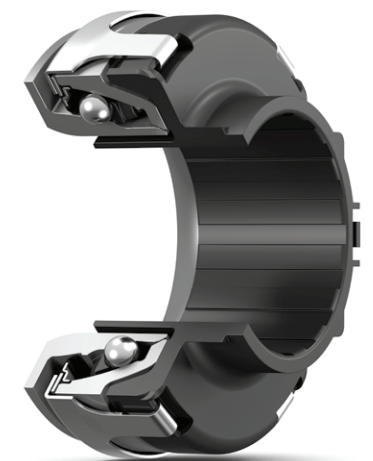
# Flexible clutch release bearing

## The task

The flexible clutch release bearing is the transfer element between the rotating clutch and the stationary actuation system. Absolute noiselessness, uncompromising reliability over the entire service life, and optimum elimination of rotational irregularities must be ensured by the precession-inhibitory clutch release bearing. The ever increasing efficiency optimization on modern drivelines results in an increasing susceptibility to vibration phenomena. The flexible clutch release bearing decouples vibrations that originate from the engine and are transmitted to the clutch system, thus reducing driveline vibrations.

## The technology

The flexible clutch release bearing is equipped with a special ball groove which makes it possible to tilt the inner ring relative to the outer ring. By using balls in the clutch release bearing, this system provides a low friction, dynamic compensation for any diaphragm spring precession. This precession of the clutch release bearing results in a significant reduction of pedal and driveline vibrations, thus increasing comfort for the driver.



Flexible clutch release bearing