Service Information
Dual-Mass Flywheel (DMF)
Noises When Starting the Engine, When Traveling, or When Switching off the Engine

Unusual noises when starting the engine, when traveling or when switching off the engine are often associated with a possible dual-mass flywheel (DMF) defect.
However, the noises are actually caused by sources of error in the periphery of the DMF.
If a new DMF (lower inner friction) is installed, it can be that the noises from the periphery are more strongly noticed.

Noises when starting the engine

Possible complaints:
- Noises (e.g. rattling, chattering, etc.) from the DMF / clutch / transmission area when starting the engine.
- The starting process takes longer than usual.
- The engine does not run smoothly directly following the start.

A high voltage drop when starting the engine can cause the failure of electronic components and generate entries in the error memory.

Possible error causes:
- Battery insufficiently charged, damaged, or defective.
- High contact resistances on the electrical connections in the electric circuit belonging to the starter and the alternator.
- Starter damaged or defective. Collector smeared due to insufficient current consumption.

Fig. 1: Ground connection prior to cleaning: Poor connection

Fig. 2: Ground connection following cleaning: Good connection

The starting speed is below the value specified by the vehicle manufacturer (**~ 300 rpm**). The engine thus starts with insufficient starting speed and, consequently, causes excessive vibrations in the DMF area. Over an extended period, the vibrations lead to the failure of the component.

Checking the cranking speed
Note before checking the cranking speed:
- Driveline must be at operating temperature (carry out test drive).
- Use a suitable diagnostic device to determine the speed.
- Ensure that the engine does not start during the test (e.g. electronic compression test with suitable diagnostic unit). Observe the vehicle manufacturer specifications.
- Allow the starter to turn sufficiently long and read off the speed (rpm). If necessary, repeat two to three times and calculate the mean.

Possible remedy:
- Check the condition of the battery. Where necessary, charge or replace the battery.
- Check the electrical connections between the battery, starter, alternator and body. If necessary, clean the electrical connections (ZF special tool 4200 080 590) or replace them.
- Tighten the electrical connections with the tightening torque stipulated by the vehicle manufacturer and protect against corrosion.
- Check the condition of the starter. If necessary, repair or replace the starter.

Cleaning the electrical connections in the electric circuit belonging to the starter and alternator minimizes voltage loss and improves the current consumption of the starter. The smeared collector belonging to the starter will burn itself free once again after a few starting procedures. The speed for starting the engine again reaches the value specified by the vehicle manufacturer (**~ 300 rpm**).

Noises when traveling

Possible complaints:
- Rattling or bucking during acceleration when under high engine load.
- Engine not running smoothly.
- Noises from the area of the transmission.

Misfires may also occur when dealing with gasoline engines.
When dealing with diesel engines, noticeable problems can occur in terms of the setting of idling noise.

Possible error causes:
- Gasoline engines: Errors in the mixture preparation, in the ignition system, etc.
- Diesel engines: Coked injection elements, errors in the injection system, etc.
- Driving at extremely low engine speeds.

Fig. 3: Unit-injector element coked

Possible remedy:
- Repair the injection system.
- Repair the ignition system.
- Check the software status and, where necessary, update it. (Engine control unit).
- Drive the vehicle according to the operating instructions of the vehicle manufacturer.

Test drive together with the customer in order to diagnose the problem (customer drives).

Noises when switching off the engine

Possible complaints:
- Noises (e.g., rattling) or reverberation when switching off the engine.
- Short, hard impacts from the DMF/clutch/transmission area when switching off the engine.
- Rattling or chattering from the transmission area.

Possible error causes:
- Shutoff flap vacuum pressure supply insufficient.
- Shutoff flap mechanically blocked.
- Exhaust-gas recirculation valve (EGR valve) is stuck or coked.

Fig. 4: Flap belonging to the exhaust-gas recirculation valve (EGR valve) coked

Due to the design, insufficient stopping of the air supply when switching off the engine leads to further compression of the springs in the DMF. This causes vibrations when switching off the engine and, as a consequence, noises in the driveline.

Possible remedy:
- Check the vacuum system and, where necessary, repair it.
- Check mechanical components for free travel and function and, where necessary, replace them.

Check the electrical shutoff flaps and the EGR valves using a suitable diagnostic unit.

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