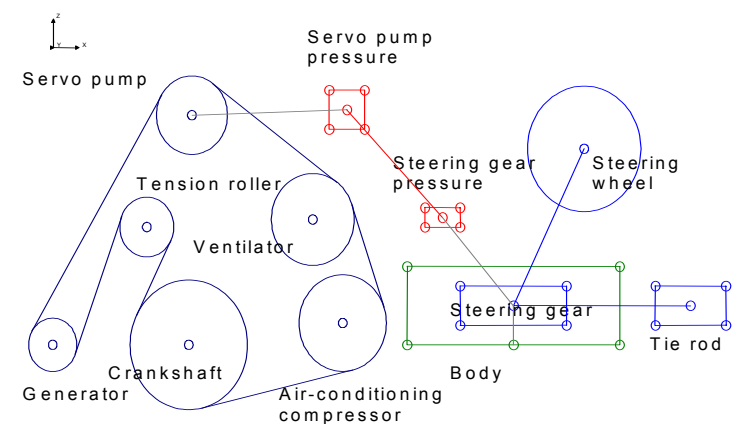
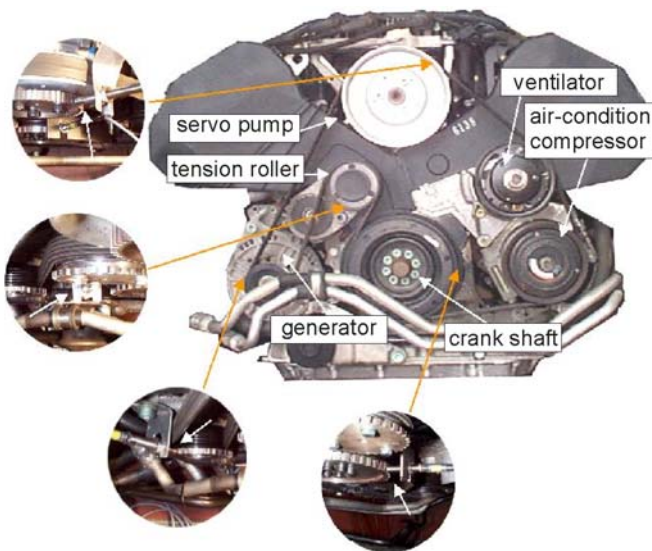


# Analysis of Torsional Vibration

Vehicle acoustics consists of numerous measuring and analysis tasks, with the problems becoming increasingly complex. For an improvement of noise and vibration behaviour of vehicles, extensive investigations of single components, subsystems as well as of the complete vehicle are executed at ika/fka. Apart from the questions concerning air-borne and structure-borne noise, torsional vibration of rotating systems are investigated.

Thus, torsional vibrations in the combustion engine's belt system cause a comfort loss of the steering behaviour in idle engine speed. Vibrations in the drivetrain can reduce driving comfort and, as a result from this, product quality.

The measuring and analysis software includes the analysis in time and frequency range related to the acquisition configuration. The impact of speed and structure on special frequency ranges comes up clearly in order analyses of all signals. With the data measured for torsional vibrations, angle speed, speed variations or angle acceleration is evaluated.



Essential on the way to solve such torsional vibration problems are highly accurate measuring and analysis of the torsional vibration simultaneously to air-borne and structure-borne noise analyses. For this task, we use a multi-channel data acquisition and analysis device of ROTEC Ltd.

Up to 6 digital and 24 analogue signals can be measured simultaneously. The resolution of the digital inputs amounts to 32 bit, analogue input signals can be acquired with a maximum sample rate of 50 kHz. Based on this, torsional vibration are analyzed in detail.

The used analysis software is completed by an animation and simulation program. Measuring or simulation results can be animated in a grid model illustrating the phasing of different channels. The simulation allows an investigation of systems behaviour by parameter variation. Here, the object is treated as a multiplicity of single masses, springs and damping. Input data are measured values or synthetic excitation.

We investigate complex problems by applying measurement and analysis of torsional vibrations to acoustic questions.