Rotas NVH Analysis Systems

State of the Art
Discom develops and distributes systems for acoustical quality analysis. The systems are in use world-wide in the automotive industry and their partners for the test of units in the production environment.

The measuring system consists of a latest generation industrial PC enhanced by the addition of a unique USB based data acquisition frontend, specially developed by DISCOM. The number of sensors used and the system’s processing power can be scaled by installing additional data acquisition modules into the frontend. Available sensors include contact detectors for structure-borne noise, torsional accelerometers, laser vibrometers, and microphones.

Applications
The test objects include transmissions of all variety including automatic, DDCT and manual designs as well as axles and transfer cases. Other assemblies tested include combustion engines, electric motors and tape roller bearings. The acoustical analysis is performed during end-of-line testing on test benches under driving conditions. To accomplish the correlation to the vehicle, Discom produces a mobile acoustical analysis system that is ideal for the use in vehicles.

Assured Quality
Acoustic quality analysis as an integral part of the manufacturing process enables rapid, reliable and thorough testing of all kinds of mechanical assemblies. The modular construction of the Discom noise analysis system enables it to be customized for all types of sensors and adapted to nearly any desired application. Among other implementations, the Discom system has been successfully used for testing automobile components (gearboxes, engines) and evaluating vehicles’ overall noise emissions inside the cabin.

At Your Service
A team of 16 employees in Göttingen, Germany, is responsible for your projects. With central competence software, hardware and applications are developed and systems are integrated. Via on-site and remote support commissioning and service of more than 800 systems is accomplished.
**TAS08 Frontend**

The TAS08 is a modular frontend with high precision yet low-power design. It houses up to 6 input modules for 10 analog inputs and 4 speed channels at simultaneous sampling rates of 100 kHz.

**TAD96 A/D Converter**

2 Channels, 24 bit resolution, 100 kHz sampling rate per channel, programmable configurations: AC-, DC- or ICP inputs, single-ended or differential coupling, programmable gain for full scale ranges from 100mV to 28V.

**TIS25 Speed Input**

4 channels, 10 MHz pulse rate, TTL-Differential (RS485) or TTL SE inputs, programmable divider, programmable deglitch circuit.

An USB module, the TUI07, interfaces the measurement modules to the PC. It provides a data rate of 28 MB/s and a buffer capacity of 1 s for Windows driver latencies. The power module, PWR12, can power the TAS08 from the USB with up to 5 ICP channels. For more channels, a 12 V power supply is used. The PWR12 can be directly connected to a vehicle power outlet.

**The Rotas Software Suite**

The Rotas software suite is a complete set of tools for the measurement and analysis of mechanical assemblies by acoustical means. In addition to a unique multi-channel measurement system, a parameter database and a set of data storage and programs form a complete application for high volume, end-of-line quality analysis tasks.

**The TasAlyzer**

The TasAlyzer is the data analysis part of the Rotas system. It controls the USB based TAS08 data acquisition frontend, processes the signals, extracts problem specific data and evaluates them against a set of limit values. The data analysis and evaluation parameters are extracted from a parameter database. The measurement results are stored in measurement archive files which are collected into a result database. In addition to these processed data, a wave file with the original sensor input is stored. This file also holds test cycle information like serial numbers and test steps. This allows for a complete replay of the test run and re-analysis of the data from the wave file.
WebPal Intranet Analysis

WebPal is a browser-based analysis tool, that features a set of easy-to-use production analysis modules without requiring a software installation on the user’s computer. WebPal operates on the result database and shows part and reject counts, test reports, TOP-N reject analysis and single value time history data. In combination with Marvis, selected measurements can be downloaded and fed into the curve analysis tool.

Parameter Database

To control the measurement program, a central parameter database holds kinematic data of the unit under test like number of teeth for a transmission. In addition, the measurement recipe is specified here, including a variety of parameters from order resolution details to specifications for time and spectral domain software instruments.

The parameter database gives an easy-to-use interface into this multitude of parameters that allows to control transmissions models and test stands with minimal effort.
TAS Mobile In Vehicle Tests

TAS Mobile is a universal measurement, analyzing and assessment system for acoustical measurements in vehicles or under portable conditions.

A special software configuration allows to measure the average power spectrum of four microphones and one accelerometer. It display order and fixed frequency spectra in real time so that the current status of a noise source can be monitored during the measurement. It operate from 12 V of the vehicles power outlet or will even work on the laptop’s power. The TAS08 frontend can be powered from the laptop. It will work with Windows 8 tablet PC’s. Vehicle speed signals can be acquired from the OBD connector with a CAN bus interface.

Sensor BKS03

The active sensor element of the BKS03 weighs only 1.7 g and responds to frequencies up to 16.5 kHz. The sensor is mounted on a silicon ball, the top of its casing contacting the unit under test. A small steel plate is attached to the device and electrically isolated to prevent malfunction. Because of the small weight, the relatively large contact area, and the absorption of vibration by the rubber ball, resonance remains at a minimum. The sensitivity is 25 mV/g using an ICP amplifier.

Sensor BKS10

The BKS10 sensor is designed to fit into narrow spaces. The cable is guided internally and the adapters are available for a BKS03 compatible mechanical layout.

Our Customers

Discom NVH analysis systems are used by major automotive companies and their suppliers around the world. Applications include:

- **American Axle** in the USA (Detroit) and in Mexico. Front and rear axles.
- **Borg Warner** in the USA and in China. Transfer Cases.
- **Daimler AG** in Germany, Manual and automatic transmissions, axles, heavy-duty commercial vehicle transmissions, engine hot test, mobile measurement systems.
- **Eaton Inc.** Acoustical analysis of manual transmissions for commercial applications.
- **First Automobile Autoworks** and VW in China. Analysis of manual transmissions and gear testers. Mobile vehicle NVH analysis.
- **Fiat Powertrain** in Italy, India and Brazil. Test of manual transmissions and DDCT transmissions.
- **General Motors** in Germany and Austria (Opel) and in the USA (Detroit and Toledo), Canada, Mexico (SLP, Ramos, Silao), China (SGM Yantai and Shanghai), Korea (GMDAT). Automatic, hybrid and manual transmissions, gear testers and mobile NVH analysis systems.
- **Magna** in Austria, Mexico and China. End-of-line test of transfer cases, axles and manual transmissions.
- **SAIC/SAGW** China. Acoustical analysis of manual and hybrid transmissions.
- **SKF** Acoustical test of tape roller bearings in Germany, China, Brazil, Mexico, India, Ukraine and USA.
- **Volkswagen AG** Germany and in China (FAW-VW, VWTS Shanghai), Spain (Gearbox), Argentina (Transax), Brazil, Slovakia (VW-Slovakia) und South Africa. Manual and automatic transmissions (DDCT and CVT), axles, transmissions for electric vehicles, gear testers and mobile vehicle NVH analysis.

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