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NVH SOUND CORRELATION TO DRIVESHAFT TORQUE

STRAIN GAGE MONITORING OF AUTOMOTIVE DRIVESHAFTS FOR USE WITH NVH CORRELATION

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Application: NVH Sound Correlation to Driveshaft Torque

Wireless strain gage monitoring of automotive driveshafts for use with NVH correlation

Industry: Automotive

Product: AT-5000 EasyApp

Parameters measured: Torque

When a major Detroit automotive manufacturer wanted a convenient, accurate, and dependable way of studying the correlation of passenger compartment audible ("moan") noise to driveshaft torque, the AT-5000 EasyApp was chosen. The AT-5000 monitored torque with 12 bit data collected continuously at 11718 samples per second. The AT-5000's anti-alias filtering was altered from its normal DC to 1.2 kHz value to a 5 kHz value for this application. The torque data was recorded along with sound recordings from a passenger compartment microphone during vehicle operation on a test track. Data analysis software (not included with the AT-5000 EasyApp) provided correlation results immediately after the run, while still in the vehicle.

Test data was easily recorded, and the long battery life and ease of mounting of the AT-5000 EasyApp allowed the same studies to be quickly replicated in different vehicles.

Benefits:

- Easy installation
- Good bandwidth / sampling rates
- No data dropout
- Long battery life
- High data integrity and noise immunity

AT-5000 EasyApp
(Mounted on automotive Driveshaft)

Installation of AT-5000
2/3 Length AA Battery

AT-5000 End View
(showing gain resistor, shunt cal connector, and gage connections)

The picture above left shows the rotating AT-5000 EasyApp Transmitter; the low profile transmitter is held on to the driveshaft with an aramid fiber strap. A simple flex loop is mounted concentrically around the transmitter for signal pickup. Simple body tape, and plastic ties were used to fasten the pickup loop to convenient structures under the vehicles. It is easily mounted to the driveshaft using an Allen wrench. On the right is a close up of the input side of the transmitter. The gain resistor is on the front of board as shown; the resistor (or the entire input board) can be easily changed to adjust the sensitivity of the system.

Note: The battery of an AT-5000 EasyApp allows up to 150 hours of continuous use with a 1000 ohm strain gage; 50 hours with a 350 ohm strain gage.

The AT-5000 single channel telemetry system can also be configured to measure voltage and temperature (RTD or type k thermocouple).

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