Press Release

Vibracoustic active hydraulic motor mount systems reduce noise by up to 20dB and neutralize incoming vibrations

Darmstadt, 05. August 2020 | To reduce fuel consumption and CO_2 emissions, the industry relies on downsizing, cylinder deactivation and higher combustion pressures for combustions engines. However, this causes more engine vibrations. Active motor mount systems from Vibracoustic solve this conflict by applying electronically generated compensation movements to neutralize the incoming vibrations and reduce noise by up to 20dB. This enables vehicle manufacturers to implement fuel efficiency features without compromising on the driving comfort.

Vehicle manufacturers are constantly striving to increase the efficiency of their internal combustion engines to comply with the ever-stricter emission regulations and to reduce fuel consumption. Technological solutions like downsizing, cylinder deactivation and higher combustion pressures help to achieve this goal but at the same time engines with fewer cylinders generate more vibrations as the time intervals between the ignitions are longer. Since conventional and hydraulic mounts work passively, they are not always able to eliminate these types of disturbances.

Active motor mount systems use specially generated compensation movements to neutralize the incoming engine vibrations. The basic principle lies in neutralizing incoming sine wave vibrations by applying electrically generated compensation movements. These compensation movements are set at the same frequency. The appropriate setting of the phase position prevents the vibrations being transferred into the chassis and felt inside the cabin, which ultimately increases the driving comfort for the passengers.

Noise reduction of up to 20dB and same passive damping as conventional hydro mounts

When low frequency, high amplitude road excitations occur, the active hydro mount functions as a conventional mount and an oscillation of the engine is damped by the movement of the liquid. When high frequency, low amplitude engine excitations occur, from idle to full load operations, the conventional hydro mount can no longer follow the quick movement due to the inertia of the fluid. Here the active function of the hydro mount comes into play. It can operate the actuator up and down to control the inside pressure of the fluid and therewith adjust the dynamic stiffness of the mount, enhancing the vibration isolation performance while driving. The active hydraulic motor mounts can work in a frequency range of 20-200 Hz and the generated compensation movements can lead to a noise reduction of up to 20dB under partial load conditions and a reduction of up to 15dB under full load conditions, which is a clearly noticeable difference for the passengers.

Active motor mount systems consist of a hydraulic motor mount with an actuator, an acceleration sensor and an electronic control unit (ECU). Whereas the acceleration sensor measures the excitations transferred into the chassis, the ECU calculates in real-time the needed compensation movements and sends them to the actuator within the active hydro mount to cancel out the incoming vibrations.

As a leading NVH expert for the automotive industry, Vibracoustic is able to develop active hydro mounts including dedicated simulation tools and verification with component, subsystem and vehicle tests. Vibracoustic is also able to realize the software integration of the ECU into the vehicle software environment.

Active motor mount systems are most commonly used in three- and four-point longitudinal installation but are also applicable to pendulum or central mounting systems, depending on transfer path analysis and direction of highest excitation. The benefits from active vibration control can also be also applied to high frequency hybrid and electric motors.

About Vibracoustic

Vibracoustic is a leading global automotive NVH expert, providing customized solutions adding comfort and supporting efficiency, safety and durability. Its expertise along the entire product life cycle and all vehicle systems as well as its broad product range enable Vibracoustic to solve current and future NVH challenges across all automotive segments. With more than 10,000 employees at 43 production and engineering locations across 19 countries, Vibracoustic serves all major automotive manufacturers. In 2019 Vibracoustic recorded total sales of 2.1 billion €. For more information, see www.vibracoustic.com

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