

METHOD AND APPARATUS FOR OPERATING A VIBRATION ISOLATION SYSTEM HAVING ELECTRONIC AND PNEUMATIC CONTROL SYSTEMS

ABSTRACT

A method and apparatus for implementing an active vibration isolation system (AVIS) is provided. The AVIS includes a pneumatic control system and an electronic control system. The pneumatic control system supports a mass sensitive to vibration and isolates the mass from high frequency external disturbances. The electronic control system isolates the mass from low frequency external disturbances. The pneumatic control system includes a compliance chamber filled with a fluid to pneumatically support the mass, pressure sensor to measure the pressure level in the compliance chamber, and pneumatic actuator to control the pressure level to minimize the effects of pressure variation in the compliance chamber. The electronic control system includes at least one motion sensor to measure the actual position of the mass as the mass moves due to vibration, at least one feedback system to generate a corresponding signal, an electronic controller to generate signal(s) representing the calculated electronic force needed to compensate for the vibration, and an electronic actuator to generate the electric force to isolate the mass from the external disturbances. The pneumatic and electronic control systems work together to provide high frequency response and eliminate heat dissipation from the electronic control system.

Fig. 1