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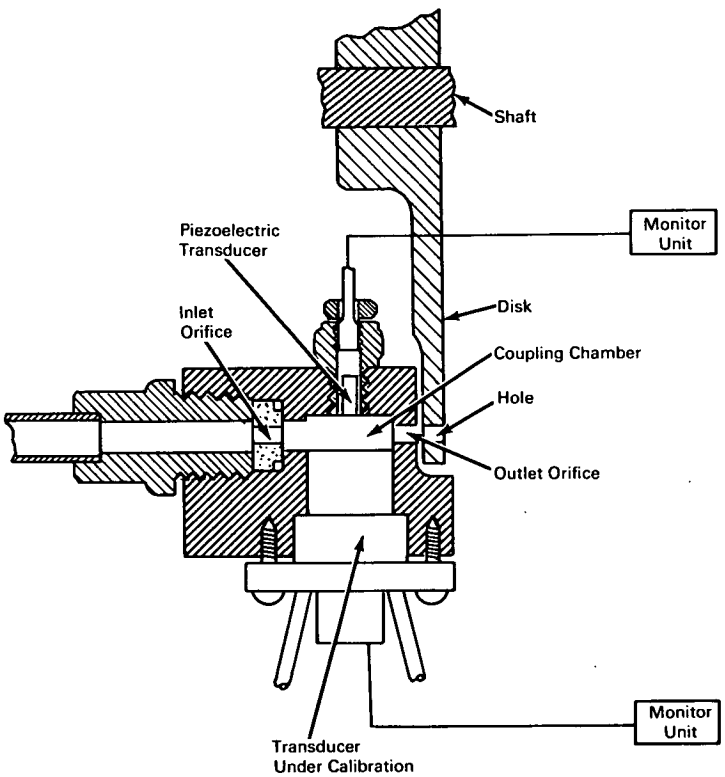
NASA TECH BRIEF

Pressure Transducers Dynamically Tested with Sinusoidal Pressure Generator



The problem:

In order to dynamically test and calibrate pressure transducers, there is a requirement for resonance free pressure signals that can be varied throughout the audiofrequency (20–20,000 cps) range. In previous devices, the driving medium modulating chamber was sufficiently resonant in the operating mode to reinforce oscillations reaching the instrument under test.

The solution:

A pressure generator assembly with a chamber having its lowest resonant mode above the audiofrequency range. Essentially true sinusoidal waveforms of useful amplitude above signal noise may then be applied to the transducer being tested.

How it's done:

The flush diaphragm transducer under test is installed so its diaphragm closes the coupling chamber.

(continued overleaf)

A second, piezoelectric type transducer is mounted in the opposite wall of the coupling chamber. The two transducer outputs are connected to electronic monitoring equipment. An exciting gas, such as helium, is forced through the inlet orifice into the coupling chamber and exits by the outlet orifice. A revolving disk, bored with a number of holes accurately spaced around its periphery and driven by a variable speed motor, alternately blocks and opens the outlet orifice causing sinusoidal pressure oscillations in the coupling chamber. The chamber is designed with a volume and configuration that places its lowest resonant frequency above the highest calibration frequency of interest.

Response of the transducer under test is obtained in the form of the ratio between the two electronic monitoring devices plotted against the pressure generator operating frequency.

Patent status:

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act (42 U.S.C. 2457 (f)) to Princeton University, P.O. Box 172, Princeton, New Jersey, 08540.

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