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## Gas Turbine Combustor Monitoring with Dynamic Pressure Sensors

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Dry low-NOx gas emission is one of the 21st century's challenges. Turbine manufacturers are working on combustors to operate with NOx levels approaching a few ppm. Although a lot of progress has been made, a failure of combustion control can lead to hardware failure caused by flashback or oscillating dynamics. A good way to control the combustion is to measure the dynamic pressure at different locations on the combustor. When combustion is stable, the fluctuating pressure shows a low

RMS (root-mean-square) value, whereas when the combustion oscillates, the RMS value increases. In this way, the manufacturer controls the combustion parameters, such as fuel injection, in a closed loop to achieve stable combustion.

Vibro-Meter has developed a unique solution for the special requirements of this stringent application, for both R&D and permanent use:

- Dynamic piezoelectric pressure transducers which withstand the very high temperatures inside the combustion chambers (up to 700°C or 1,292°F);
- Low-noise charge amplifiers in industrial housings;
- Low-noise, high-temperature cable assemblies;
- A complete protection and condition monitoring system, the new VM 600 suite of products.

Vibro-Meter dynamic pressure systems have been proven in use by many of the leading gas turbine manufacturers. Special features of the sensors that help to ensure reliable and accurate operation in this extremely hostile environment include:

- Use of natural crystal materials (artificial piezo-ceramics are limited to about 520°C, Vibro-Meter's VC2 natural material can withstand up to 760°C and remain stable);
- Compensation for vibration sensitivity (a separate internal accelerometer cancels the effect of vibration on the pressure sensing elements);
- Carefully designed cable termination with effective strain relief.

The high temperature capability of these sensors allows them to be flush mounted, removing the sensitivity and frequency response errors associated with tube mounting. Avoiding mounting tubes and water cooling keeps the system simple and therefore reliable, saving time and money for R&D teams, manufacturers and operators.

An application paper providing more details is available on request, reference no. 461.008, this can also be downloaded from [www.vibro-meter.com](http://www.vibro-meter.com).

**PRESS RELEASE**