NTS SERVICE SPOTLIGHT

WAS-5000 ACOUSTIC TRANSDUCER

A FULL RANGE OF NOISE EVALUATION

Primarily used in acoustic test chambers, the WAS-5000 acoustic transducer is an electro-pneumatic noise source rated at 10 kW output over a frequency range of 25 to 5,000 Hz.

The WAS-5000 provides a full range of noise evaluation for large components used in spacecraft, missile, and advanced aircraft systems. It uses the principle of vibrating vanes to reproduce exact sine wave, random noise and sine-random combinations.

SIMULATION TESTING APPLICATIONS

Pre-flight qualification testing of structures and components provides added assurance of meeting the high reliability requirements of aerospace vehicles. Vibration during launch and flight operations is a major concern. Since pressure fluctuation over the external skin is the principal source of vibration in modern flight vehicles, acoustic energy offers a logical and effective simulation tool for reliability testing.

Acoustic test facilities which simulate these external pressure fluctuations can be used for structural and component testing. Qualification tests can be designed to evaluate designs, to gauge reliability and to provide total system checkout.

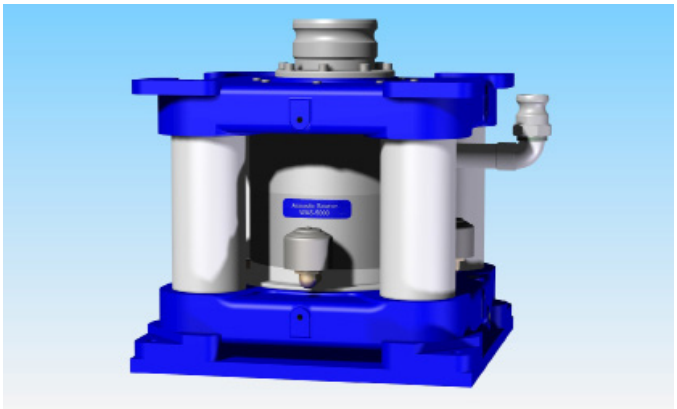
GENERAL CHARACTERISTICS

The WAS-5000 converts approximately 1500 scfm (42.5 m3/min.) at 30 psig (2 bars) of airflow into 10,000 acoustic watts, with a linear relationship of air flow to power output.

STABLE AND RELIABLE OPERATION

The WAS-5000 uses an inductive drive system acting on its reciprocating valve assembly.

The transducer consists of a magnetic structure which houses and supports two driver coils. It also includes a hollow conductor field coil that is water-cooled, while the driver coils are cooled by air, water droplets, and vapor



WAS-5000 Acoustic Transducer

through the use of an external cooling system. This high-efficiency cooling system permits use of the high currents required for high-frequency operation.

The driver coils in conjunction with the field coil are inductively coupled to the reciprocating valve's single shorted turn. The modulation valve incorporates two concentric cylinders, each having rows of modulation slots. With air pressure applied outside of the reciprocating valve cylinder, air is forced through these slots.

Motion in the reciprocating valve increases and decreases the opening size of the modulation slots, based upon the polarity of the electrical input signal. This process breaks the air stream into "puffs" which become pressure pulses at the discharge of the WAS-5000.

The advantages of this reciprocating vane modulator is that a true random noise input produces a true random noise output and any additional signal – such as discrete frequencies or sweeps – can be superimposed on the random noise.

This design allows the valve to obtain the extremely high acceleration levels necessary for operation at high frequencies.

WAS-5000 SPECIFICATIONS

Transducer

Acoustic power output	10kW
Airflow rate for 10 kW	1,500 scfm
Air pressure required (at exhaust plenum housing)	30 psig
Frequency response	20 to 5000 Hz (max power to 1250 Hz)

Drive Circuit

Maximum current	60 amp rms (sine) 40 amps rms (random)
Maximum voltage	50 V rms
DC resistance (w/out cable)	0.24 ohm

Field

Rated Current	300 amps DC
Rated dc voltage	4.6 VDC
Resistance at 20°C (w/out cable)	0.013 ohm (DC resistance)
Protection discharge rectifier	

Overall Dimensions and Weight

Length	18 in (457 mm)
Width	18 in (457 mm)
Height	17.75 in (551 mm)
Air and sound output port diameter	3.57 in (91 mm)
Air input	4 in (102 mm)
Port connecton	Kamlock quick coupler
Pressure Monitoring port connection	1/4 - 18 NPTI
Cable length	10 in (508 mm)
Weight	195 lb (87 kg)
Distilled water flow	0.25 gmp to each transducer, restricted to 0.36 gmp max. within the transducer.

Amplifier

Drive output for one WAS-5000	
Volt amps:	10 kVA
Current max:	100 amps rms

Amplifier Continued

Drive over current protection
Efficient “Class D” direct-coupled design
100% air-cooled, 480 V/240, 3 0 input

Compact package dimensions	Width 22 in (560 mm) Depth 20 in (762 mm) Height 48 in (1219 mm)

Field supply (300 amp DC) in cabinet

Cooling Unit

Cooling and field supply for one WAS-5000
Display of flow and pressure

FULL SERVICE SUPPORT

NTS can provide turn key acoustic facility development and engineering support. We are prepared to take single-source responsibility for design, engineering, construction management, instrumentation and control systems, operation maintenance, and personnel training.

NTS also operates several of its own reverberant and progressive wave acoustic test facilities in order to meet short term testing requirements. Since 1949, we have provided specialized testing and simulation services to aerospace, defense and commercial industries.

ABOUT NTS

Every hour of every day, NTS is fully invested in helping you build better, stronger, safer, more reliable products, and bring those products to market quickly and efficiently.

Since conducting our first rounds of tests in 1961, NTS has become one of the largest commercial test laboratory networks in North America. Our test, inspection and certification services cover environmental, dynamics, EMC, wireless, product safety, materials, ballistics and much more.

NTS engineers and technicians have exceptional knowledge of all test and conformity requirements in both domestic and international arenas. Our client partners in Aerospace, Defense, Telecom and Energy rely on NTS to make sure they’re putting their best products forward, and so can you.

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