AC150 Angular Vibration Table

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ACUTRONIC designed the Model AC150 Angular Vibration Table (AVT) to prov
while preserving high fidelity motion for both very large and very small amplitud

Model AC150 Angular Vibration Table shown with ACUTROL®3000 and Vibration Control Panel.

Description

The AVT achieves a unique and challenging set of performance specifications by bringing together a variety of precision components and proven technologies. An air bearing is used in place of conventional mechanical ball bearings to avoid the degrading effects of friction and continuous vibration, and a flex circuit service loop is used in place of a twist cable or slip ring to pass sensor signals. The torque actuation system provides for high acceleration (torque) and position displacements over the full frequency range of operation. The mechanical design of the structural components that transfer torque and accelerate the tabletop/payload is such that they are very stiff and tightly coupled to ensure that structural resonances are maintained well above the required frequency range of the system. This results in a very low overall AVT height. The AVT must be installed on a massive base such as a granite table to prevent base dynamics from compromising the overall system response. Some features of the AVT are highlighted in the photo above.

Architecture

The AC150 Angular Vibration Table is classified as a single-axis motion platform and is operated identically to other systems equipped with an ACUTROL®3000 digital motion controller and an AC brushless motor/drive. All of the standard features of the ACUTROL®3000 controller are available for this system. Two features that make this high performance motion platform unique are the selection of zero-friction electromechanical components and a motor/drive actuation system that permits acceleration to the unprecedented frequency of 2 kHz.

The primary components of this new product are:

- ACUTROL®3000 Digital Motion Controller
- Vibration Control Panel
- Three-Phase Brushless Drive

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ide angular vibration over a wide frequency range (<1 to 2000 Hz)
es of stimulation.

- Low profile
- Rigid four-point mounting
- Removable handles
- Shock-absorbed limits
- Air-cooled motor with fins
- Integrated table electronics

- Vibration Table (air bearing, brushless motor, motion sensors)
- Vibration Control and Monitor Instrumentation (optional)

The Unit Under Test (UUT) is mounted to the tabletop using customer fixtures that bolt to the standard mounting grid pattern of the tabletop. The table axis is limited in rotation to one revolution, so no slip rings are required for connections to the UUT. ACUTRONIC experts will work with the customer to help design the UUT cable service to ensure that it is sufficiently flexible and does not influence the response or fidelity of the table motion.

Specifications

System	Specification
Position Range	± 175°
End-of-Travel Stop	Over Center Shock Absorber
Positioning Accuracy	5 arcsec RSS
Positioning Repeatability	± 1 arcsec
Rate Range (peak of sinusoid)	± 1000°/s
Rate Resolution	< 0.00001°/s
Acceleration (with payload)	± 6000°/s²
Acceleration (without payload)	± 10000°/s²
Stimulation Response (ACUTROL®3000)	> 500 Hz
Torque Response (Acceleration)	> 2000 Hz
Dynamic Performance	**Specification**
Peak Sinusoidal Position Amplitude	170°
Peak Sinusoidal Rate Amplitude	1000°/s
Peak Sinusoidal Acceleration Amplitude	6000°/s²; 1–2000 Hz
Mechanical	**Specification**
Tabletop Diameter	± 14 inches
Tabletop Flatness	± 0.001 inch
Table Height	6.12 inches
Tabletop Bolt Pattern	Qty. 32, 1/4”-20 Heli-Coils inserts on a 2” grid
AVT Base Footprint (less handles)	16 inches square; 13 inch sq. bolt pattern
Axis Wobble	1 arcsec RMS
Axis Payload Weight	30 pounds rated (CG on center of axis)
Axis Torque Load (non dynamic)	20 ft-lb
Radial Run Out	± 0.001 inches
Axial Run Out	± 0.001 inches
Power	**Specification**
AC Input Voltage (console power)	440–480 VAC
AC Input Power	< 2.5 KVA

AVT Operation Using External Torque Stimulation

Customers can use the Vibration Control Panel to input a vibration command signal and operate the AVT up to 2kHz. In this mode of stimulation, the ACUTROL®3000 controller keeps the table centered around a defined operating position while allowing the external input to dominate the acceleration command motion.]