Calibration Shaker System
Air Bearing Shaker

Air Bearing Shaker

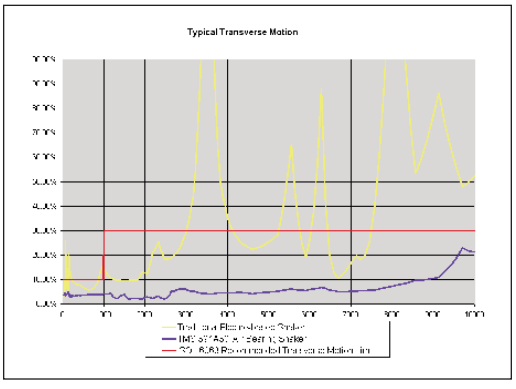
The Models K394B30 and K394B31 Calibration Shaker Systems represent a new level of performance in calibration grade shakers. As the centerpiece of these systems, the 396C10 and 396C11 air bearing shakers continue the award winning PCB Group tradition of providing superior performance characteristics and ease of use while offering exceptional value and simplicity. A graphite air bearing combined with an ultra-stiff lightweight armature essentially eliminates transverse motion that plagues traditional flexure based shaker armature suspension systems.

Unlike other air bearing shakers that use rubber bands to adjust and balance the armature, the 396C10 and 396C11 use a unique Lorentz force lifting mechanism making calibration of various accelerometer sizes quick and easy. An integral reference accelerometer mounted within a beryllium insert has a mounted resonance greater than 70 kHz permitting the shaker to be used for resonance searches to over 50 kHz while effectively eliminating the need for complicated mass loading corrections. In addition, this innovative two-part armature design provides electrical isolation of the sensors, improving accuracy by eliminating electrical noise in the calibration measurement. A SmartAmp power amplifier makes system operation over 92% efficient. The SmartAmp protects the shaker by sensing when there is no air flow to the shaker and automatically shuting down.

The shakers were specifically designed for use in the demanding environment of high volume, production comparison accelerometer calibration systems such as The Modal Shop's Model 9155 Accelerometer Calibration Workstation.

Benefits:

- Drastically reduces uncertainty to provide accurate calibration conforming to ISO 16063 Part 21 transverse recommendations by effectively eliminating transverse motion.
- High calibration throughput by simplifying mounting and setup.
- Fully test sensors using the shaker's extended frequency range for calibration and mounted resonance tests.
- Calibrate at low frequencies without distortion using the shaker's full 10 mm stroke length.
- Excellent signal integrity by electrically isolating the reference accelerometer and mounting surface from the armature.



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"Simplifying with Smart Sensing Solutions"

MECHANICAL		396C10	396C11
Stroke	in [mm] pk-pk	0.4 [10]	0.4 [10]
Frequency Range, frequency response testing	Hz nominal	2 to 15,000	2 to 20,000
Frequency Range, resonant search testing	Hz nominal	up to 50 kHz	up to 50 kHz
Acceleration Level (sinusoidal)			
Continuous (25 to 10,000 Hz)	g [m/s^2] pk	8.5 [83]	8.5 [83]
Intermittent (35 to 10,000 Hz)	g [m/s^2] pk	40 [392]	40 [392]
Maximum Load	oz [gm]	28.1 [800]	28.1 [800]
Lifting Spring	type	Lorentz - force coil	Lorentz - force coil
Air Bearing Specifications	type	Graphite	Graphite
Pressure	psi [bar]	30 to 60 [2 to 4]	30 to 60 [2 to 4]
Recommended Flow Supply to regulator	ft^3/min [L/s]	1.5 [0,7]	1.5 [0,7]
Air-bearing flow rate (typical)	ft^3/min [L/s]	0.15-0.20 [0,07-0,09]	0.15-0.20 [0,07-0,09]
ISO 8573.1 Quality Class		3	3
Dirt (Particle Size)	micron	5	5
Water Pressure Dewpoint (100psi gauge)	°F (ppm vol.)	-4 (128)	-4 (128)
Oil (including vapor)	mg/m^3	1	1
Armature	material	Aluminum	Beryllium
Insert	material	Beryllium	Beryllium
Total mass	oz [gm]	1.6 [45]	1.6 [45]
Sensor Mounting[1]	thread size	1/4-28 UNF	1/4-28 UNF
Transverse Motion (typical)			
<5000 Hz	%	5	5
<10,000 Hz	%	10	10
<15,000 Hz	%	30	10
<20,000 Hz	%	n/a	20
Shaker Dimensions (diameter x height)	inch [mm]	6.5 x 5.25 [165 x 133]	6.5 x 5.25 [165 x 133]
Shaker Weight	lbs [kg]	22.3 [10,1]	22.3 [10,1]

ELECTRICAL			
Drive-Coil Resistance	Ohm (nominal)	1.0	1.0
Lorentz-Coil Resistance	Ohm (nominal)	2.8	2.8

INTERNAL REFERENCE ACCELEROMETER			
Type	ICP®		
Sensitivity	mV/g [$m^V/m/s^2$]	10 (1.02)	10 (1.02)
Frequency Range (+/- 10%)	Hz	0.7 to 20,000	0.7 to 20,000
Resonant Frequency			

SMARTAMP POWER AMPLIFIER			
Efficiency	%	92	92
Output Voltage, max[1]	V rms	38	38
Current Limit [2]	A peak	18	18
Output Power [3]	W	400	400
Frequency Response, +0 / -3 dB, 4Ω load	Hz	0.4 to 40k	0.4 to 40k
Max. Voltage Gain	dB	26	26
DC Output Supply [4]	V	12 to 30	12 to 30
Protection Features	Interlock Switch / Air Pressure Switch / DC Fault Detection / Clip Detection / Over-current Detection / Safe Start in Mute Mode		
Front Panel Display	LCD	Two Row, four function keys	
Dimensions (W x H x D)	cm (inches)	44 x 9 x 37 (17.3 x 3.5 x 14.6)	
Weight	kg (lb)	3.8 (8.5)	

SYSTEM COMPONENTS: K394B30	
396C10 [5]	Air Bearing Shaker
080A200 [6]	Beryllium insert (1/4-28 mount) with internal reference accelerometer
482A21	ICP® Sensor Signal Conditioner
Sensor Mounting adaptor kit	Includes typical mounting adaptor studs and plates

[1] is at 4Ω load impedance, 1 kHz, THD 0.1%
[2] typical over-current protection limit
[3] at 4Ω load impedance, 1 kHz, THD 0.6%
[4] 4A max
[5] K394A31 includes 396C11 instead of 396C10
[6] 080A200 is standard armature core supplied. Other units available include 080A199

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