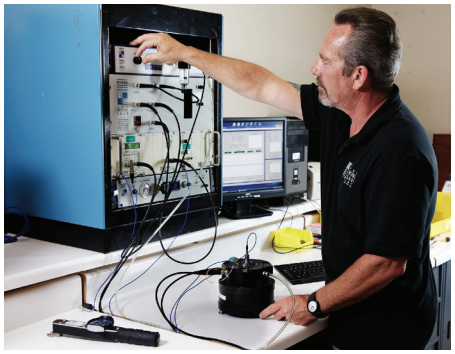
THE MODAL SHOP
AN AMPHENOL COMPANY



K394B SERIES

AIR BEARING CALIBRATION SHAKER

- 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
- Proven design used in over 100 000 calibrations annually performed by PCB Piezotronics

PRECISION VIBRATION CALIBRATION

The Models K394B30C and K394B31 Air Bearing Calibration Shakers represent a new level of performance in calibration grade shakers. Continuing the award-winning PCB Piezotronics tradition of providing superior performance characteristics, Air Bearing Shakers offer ease-of-use while coupled with exceptional value and simplicity. A graphite air bearing combined with an ultra-stiff light-weight 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 Air Bearing Shakers from The Modal Shop use a unique Lorentz force lifting mechanism making calibration of various accelerometer sizes quick and easy. An integral reference accelerometer mounted within a light-weight 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. The included SmartAmp™ power amplifier makes system operation over 92% efficient and protects the shaker by automatically shutting down when there is no air flow to the shaker.

These 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.

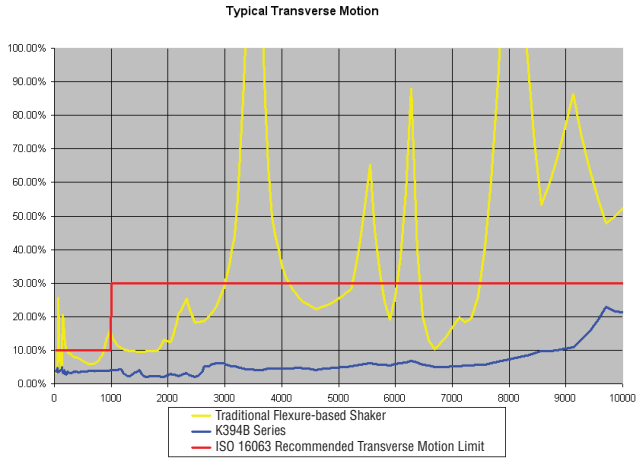
CE

SPECIFICATIONS

Mechanical		K394B30C	K394B31
Stroke	in [mm] pk-pk	0.4 [10]	0.4 [10]
Frequency Range, Frequency Response Testing	Hz (Nominal)	5 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) [1]	g [m/s²] pk	8.5 [83]	
Intermittent (35 to 10 000 Hz) [1]	g [m/s²] pk	40 [392]	
Maximum Load	oz [gm]	17.6 [500]	
Lifting Spring	Type	Lorentz - Force Coil	
Air Bearing Specifications	Type	Graphite	
Pressure	psi [bar]	30 to 60 [2 to 4]	
Recommended Flow Supply to Regulator	ft³/min [L/s]	1.5 [0.7]	
Air-bearing Flow Rate (typical)	ft³/min [L/s]	0.15–0.20 [0.07–0.09]	
ISO 8573.1 Quality Class		3	
Armature	Material	Aluminum	Beryllium
Insert	Material	Ceramic	Beryllium
Total Mass	oz [gm]	4.3 [121]	2.2 [62]
Sensor Mounting [2]	Thread Size	¼-28 UNF	
Transverse Motion [3]			
<921 Hz	%	5	5
<10 000 Hz	%	10	10
<15 000 Hz	%	30	10
<20 000 Hz	%	N/A	20
Shaker Dimensions (D x H)	inch [mm]	6.5 x 5.25 [165 x 133]	6.5 x 5.25 [165 x 133]
Shaker Weight	lb [kg]	22.5 [10.2]	22.3 [10.1]
Electrical			
Drive-Coil Resistance	Ohm (Nominal)	1.0	
Lorentz-Coil Resistance	Ohm (Nominal)	2.8	
Internal Reference Accelerometer			
Type	ICP®		
Sensitivity	mV/g [mV / m/s²]	10 [1.02]	
Frequency Range (+/- 3 dB)	Hz	0.35 to 30000 Hz	
Resonant Frequency	kHz	>70	
SmartAmp™ Power Amplifier			
Efficiency	%	92	
Output Voltage, Max [4]	V RMS	38	
Current Limit [5]	A peak	18	
Output Power [6]	W	400	

SPECIFICATIONS (continued)

Frequency Response, +0 / -3 dB, 4Ω load	Hz	0.4 to 40 000
Max. Voltage Gain	dB	26
DC Current Supply, Adjustable		0 to 1.75
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)	17.3 x 3.5 x 14.6 in [44 x 9 x 37 cm]	
Width with mounting ears installed	19 in (48 cm)	
Height with rubber feet installed	3.9 in (10 cm)	
Weight	lb [kg]	4.3 [9.5]
System Components: K394B30C		
396C10 [7]	Air Bearing Shaker	
080A200C [2]	Ceramic Insert (¼-28 Mount) with Internal Reference Accelerometer	
482A21	ICP® Sensor Signal Conditioner	
Sensor Mounting Adaptor Kit	Includes Typical Mounting Adaptor Studs and Plates	



[1] At 100 Hz with 135-gram payload.
[2] 080A200/080A200C is standard armature core supplied. Other units available include 080A199/080A199C.
[3] Typical, tested to ISO 16063-21:2003 recommendations.
[4] At 4Ω load impedance, 1 kHz, THD 0.1%.
[5] Typical over-current protection limit.
[6] At 4Ω load impedance, 1 kHz, THD 0.6%.
[7] K394B31 includes 396C11 instead of 396C10.

THE MODAL SHOP
AN AMPHENOL COMPANY

10310 Aerohub Boulevard, Cincinnati, OH 45215 USA

modalshop.com | info@modalshop.com | 800 860 4867 | +1 513 351 9919