

# CALIBRATION SHAKER SYSTEM

## AIR BEARING SHAKER



Air Bearing Shaker

The Models K394A30 and K394A31 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.

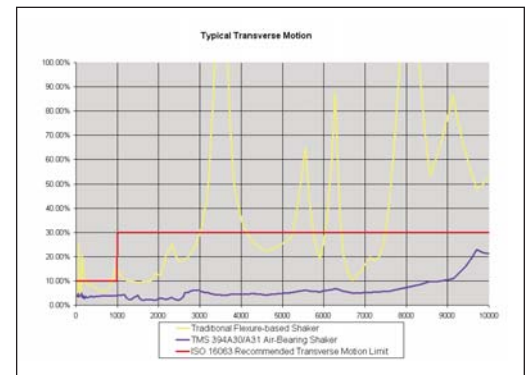
Unlike other air bearing shakers that use rubber bands to adjust and balance the armature, the 396C10 and 396C11 use a unique Lorentz force lifting mechanism making calibration of various accelerometer sizes quick and easy.

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.

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. The systems include a variety of accessory components, such as the reference accelerometer signal conditioner listed on the backside of this datasheet.

### 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.





# MODEL K394A30 / K394A31

## MECHANICAL

		<b>396C10</b>	<b>396C11</b>
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 <sup>2</sup> ] pk	8.5 [83]	8.5 [83]
Intermittent (35 to 10,000 Hz)	g [m/s <sup>2</sup> ] pk	40 [392]	40 [392]
Maximum Load	oz [gm]	9.6 [270]	9.6 [270]
Lifting Spring	type	Lorentz - force coil	Lorentz - force coil
Air Supply 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 <sup>3</sup> /min [L/s]	1.5 [0,7]	1.5 [0,7]
Air-bearing flow rate (typical)	ft <sup>3</sup> /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 <sup>3</sup>	1	1
Armature	material	Aluminum	Beryllium
Insert	material	Beryllium	Beryllium
Total mass	oz [gm]	1.6 [45]	1.6 [45]
Sensor Mounting <sup>1</sup>	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	30
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 <sup>®</sup>		
Sensitivity	mV/g	10	10
Frequency Range (+/- 10%)	Hz	0.7 to 20,000	0.7 to 20,000
Resonant Frequency	kHz	>70	>70

## SYSTEM COMPONENTS: K394A30<sup>2</sup>

396C10 <sup>2</sup>	Air Bearing Shaker
080A200 <sup>1</sup>	Beryllium insert (1/4-28 mount) with internal reference accelerometer
482A23	ICP <sup>®</sup> Sensor Signal Conditioner
482A75	Shaker System DC Power Supply / Air Regulator
003C10	Reference Accelerometer Sensor Cable
012A03	Signal Conditioner output cable
012A10 (Qty 2)	Shaker Cable
Air Filter Assembly	Includes filter and appropriate couplings
Sensor Mounting adaptor kit	Includes typical mounting adaptor studs and plates

## SUGGESTED ACCESSORIES

2050E05	Power Amplifier, 500 VA with continuous gain adjustment
KP394A30/KP394A31	Includes primary calibration of internal reference accelerometer via laser interferometer for ultra low uncertainty of 0.2% at 100Hz & 160Hz

<sup>1</sup> 080A200 is standard armature core supplied. Other units available include 080A199 (10-32 thread), 080A205 (M6 x 0.75 - 6H thread), and 080A206 (M8 x 1.0 - 6H thread).

<sup>2</sup> K394A31 includes 396C11 instead of 396C10

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