

PRODUCT DATA

LDS V9x Shaker Imperial

Performance Parameters*

Armature Diameter	17.3 in
Sine Force (peak)	23605 lbf
Random Force (rms)†	23605 lbf
Maximum ½-sine Shock Force‡	43419 lbf
Armature Resonance (f _n)	2.0 kHz
Usable Frequency Range	d.c. – 2.7 kHz
Mass of Moving Element (raised inserts)	109.8 lb
Velocity (sine peak) – full-field	118 in/s
Acceleration (sine peak)	150 g
Acceleration (random rms)	70 g
Displacement (pk–pk) – continuous	3.0 in
Useable Shock – 20 kg payload	>300 g
Useable Shock – 30 kg payload	>200 g
LDS Amplifier	SPA 176 K

Environmental Data

Working Ambient Temperature Range:	
Shaker and Cooling Unit	45 – 86° F
Amplifier and FPS	41 – 86° F
Acoustic Noise at 1 m Distance:**	
Shaker	112 dBA
Amplifier	85 dBA
Field Power Supply (FPS)	70 dBA
Cooling Unit	<80 dBA
Total Heat Dissipation:	
Shaker to air (from body)	6 kW
Amplifier	17 kW
Field Power Supply	≈ 4.3 kW

Characteristics

Suspension Axial Stiffness	Nil	Max. Required Input, Amplifier	170 kVA
Suspension Rotational Stiffness	416000 lbf ft/rad	Max. Required Input, Field Power Supply (FPS)	105 kVA
Suspension Cross-axial Stiffness	685000 lbf/in	Max. Required Input, Cooling Unit	8.3 kVA
Stray Magnetic Field††	<10.3 gauss	Compressed Air Supply	100 lbf/in ²
Lin-E-Air Body Resonance	<5 Hz	Cooling Air Flow – Amplifier	141 ft ³ /s
Internal Load Support Capacity	3970 lb	Cooling Air Flow – FPS	35 ft ³ /s
Shaker Body Mass (M _b)	4800 lb		

* Force and velocity ratings depend on the amplifier driving the shaker. The sine force, random force and velocity parameters detailed here are based on the shaker when driven by the SPA176K amplifier.

† V9x is the latest version of the V9 Shaker model. All accessories and spare parts are interchangeable with older models.

‡ Random and shock ratings assume a payload approximately twice the mass of the armature; shock pulse 2 ms. For advice on specific test requirements, contact Brüel & Kjær.

** Measured at a height of 63 in above floor level in enclosed cell.

†† Theoretical maximum, measured 6 in above table, full-field, at normal operating temperature.

V9x[†] Shakers offer maximum displacement, velocity and force at the same time, along with the highest achievable envelope of testing parameters. Multi-shaker systems for large payloads are used extensively within the aerospace industry

V9x Shakers are trunnion-mounted, either free-standing or as part of shaker/slip table combos.

Trunnion mounting allows the shaker to be used in either the horizontal or vertical axis. The trunnions are supported by LDS' Lin-E-Air suspension system, which enables low-frequency operation at full displacement.



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System Performance

	with SPA 176 K-105	with SPA 176 K-90
Sine Force (peak)	23605 lbf	20233 lbf
Max. Acceleration (sine peak)	150 g	150 g
Random Force (rms)	23605 lbf	23605 lbf
Max. Acceleration (random rms)	70 g	70 g
Velocity (sine peak)	118 in/s	118 in/s

Some of the features listed are available as standard, others as options. Please contact Brüel & Kjær for advice on the optimum specification to meet your system needs

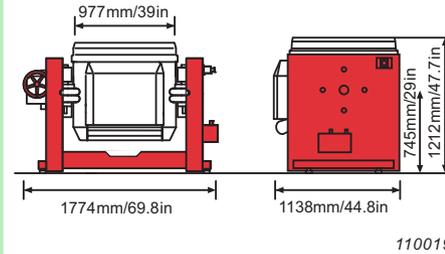
SPA-K Series Amplifier Characteristics

Power Range	152 – 176 kVA in 8 kVA increments
Signal-to-noise Ratio	>68 dB, with respect to 100 V rms output, 10 kΩ input termination and rated resistive load connected
Input Impedance	10 kΩ nominal
Total Harmonic Distortion	0.5 – 0.8% at rated output into resistive load
Input Sensitivity	1.0 V for 100 V rms output
Modulation Range	d.c. – 10 kHz
Switching Frequency	150 kHz
Efficiency	>90% (not including FPS)
Continuous Output Current	80 A rms (sine and random) per 8 kVA increment
Transient Output Current	240 A per 8 kVA increment for 100 ms
Full Power Bandwidth	20 Hz – 3 kHz
Rated Output Voltage	100 V rms (sine)
Module Efficiency	93%
Protection	Integral protection to prevent output devices from working outside their specified limits
Health and Safety	Complies with the following EU directives: Machinery :2006/42/EC Low Voltage: 2006/95/EC EMC: 2004/108/EC Designed in accordance with EN 61010 – 1:2001

V9x Shaker Options

Armature Insert Selection:	
M 8	◆
M 10	◆
3/8" UNC	◆
Mounting Selection:	
Trunnion mounted with Lin-E-Air isolation and body rotation gearbox	◆
Airglide mobility	●
Other Options:	
Thermal barrier	●
A standard range of head expanders is also available	
Key:	
◆ Standard – Available on shortest delivery	
● Option – Stocked item, available on short delivery	

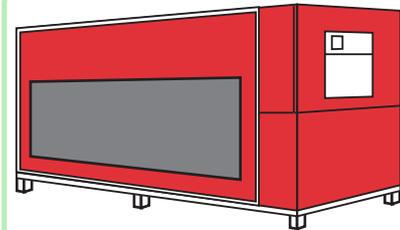
V9x Shaker



Shaker Mass (trunnion mounted): 6850 lb

Armature Insert Pattern:

PCD:	Centre	8 in	16 in
17.3 in			
Inserts	1	8	8

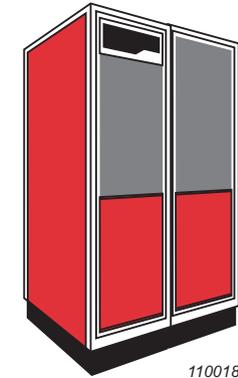


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Cooling Unit

Raw Water:	
Flow Rate	52.8 gal/min
Maximum Supply Pressure	70 lbf/in ²
Typical Pressure Drop	22 lbf/in ²
Maximum Inlet Temperature	90° F
Maximum Heat Rejected	153 kW
Height	62.2 in
Width	31.5 in
Depth	68.9 in
Mass	1320 lb

SPA-K Amplifier with Integral FPS



110018

	Amplifier	FPS
Mass (lb)	3307	1100
Height (in)	75	75
Width (in)	42.5/55.9*	42.5/55.9*
Depth (in)	32.5	32.5

* with casters

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From application engineering, installation and training through to maintenance, spares and repairs, Brüel & Kjær offers a total service approach to keep your system operating efficiently and reliably. All LDS systems (standards and specials) are designed and manufactured to ISO 9001 standard. Brüel & Kjær offers a comprehensive range of vibration, measurement and analysis equipment. Please consult our website for details.

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