

PRODUCT DATA



V994 Shaker

Metric

Performance Parameters*

Armature Diameter	760 mm
Sine Force (peak)	289.1 kN
Random Force (rms) [†]	266.9 kN
Maximum ½-sine Shock Force [‡]	578.8 kN
Armature Resonance (f _n)	1325 Hz
Usable Frequency Range	d.c – 1.7 kHz
Mass of Moving Element (flush inserts)	254.9 kg
Velocity (sine peak) – full-field	1.9 m/s
Acceleration (sine peak)	75 g
Acceleration (random rms)	60 g
Displacement (pk–pk) – continuous	50.8 mm
LDS Amplifier	DPA-K range

Characteristics

Suspension Axial Stiffness	91 N/mm
Suspension Rotational Stiffness	10 700 kN m/rad
Suspension Cross-axial Stiffness	71.8 kN/mm
Internal Load Support Capacity	5000 kg
Shaker Body Mass (M _b)	12 970 kg
Stray Magnetic Field [‡]	2.0 mT
Low Gauss Option	0.3 mT
Compressed Air Supply	6.88 bar
Max. Required Input, Amplifier	244.59 kVA
Max. Required Input, FPS and CU	169.63 kVA

Used where large payloads need high performance vibration or shock testing, the V900 series gives engineers the confidence they need to develop highly reliable products. These systems have been used in single and multi-shaker configurations, and have been used to test products such as satellites and missiles.

Features

- Combination of high performance armature design and water-cooled coils deliver excellent acceleration and velocity performance
- Automatic armature and body position load compensation system ensures larger loads can be comfortably accommodated
- Trunnions feature Lin-E-Air suspension system as standard. Solid trunnions available upon request



System Performance

	with DPA 90/140K -DC	with DPA 120/140K -DC	with DPA140K -TC	with DPA140K -DC	with DPA140K -TC	with DPA 165/210K -DC	with DPA210K -DC	with DPA210K -TC	with DPA280K -TC
Sine Force (peak)	133.9 kN	176.1 kN	155.7 kN	213.5 kN	186.8 kN	231.3 kN	204.2 kN	253.5 kN	289.1 kN
Max. Acceleration (sine peak)	53.6 g	70 g	62.3 g	75 g	74.7 g	75 g	75 g	75 g	75 g
Random Force (rms)	176.1 kN	176.1 kN	231.3 kN	176.1 kN	231.3 kN	176.1 kN	266.9 kN	266.9 kN	266.9 kN
Max. Acceleration (random rms)	60 g	60 g	60 g	60 g	60 g	60 g	60 g	60 g	60 g
Velocity (sine peak)	1.3 m/s	1.3 m/s	1.8 m/s	1.3 m/s	1.5 m/s	1.3 m/s	1.3 m/s	1.6 m/s	1.9 m/s
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								

Industry Applications

- 3-axis testing of complete satellite systems
- Avionics and military hardware testing
- Structural dynamics testing
- Clean room environments
- Multi-shaker, multi-axis applications

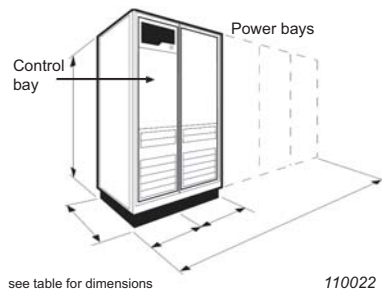
* Force and velocity ratings depend on the amplifier driving the shaker. The sine force, random force and velocity parameters detailed here are based on the shaker when driven by the DPA280K amplifier.

[†] 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.

[‡] Theoretical maximum, measured 150 mm above table, full-field, at normal operating temperature.

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

DPA-K Series Amplifier Characteristics



Power Range	90 – 280 kVA in 8 kVA increments
Signal-to-noise Ratio	>65 dB, relative to 100 V rms output, 10 kΩ input termination and rated resistive load connected (100 kHz BW)
Input Impedance	10 kΩ nominal
Total Harmonic Distortion	0.5 – 0.8% at rated output into resistive load
Input Sensitivity	1.1 V (±0.1 V rms input) for (400 Hz, Master Gain fully CW)
Switching Frequency	150 kHz
Module Efficiency	90.9%
Nominal Sine Output Voltage	100 V rms at rated power output
Frequency Range	10 Hz – 1 kHz
Frequency Response	20 Hz – 3 kHz: ±1.5 dB
Common Mode Rejection	100 dB (d.c. – 5 kHz)
Protection	Integral protection to prevent output devices from working outside their specification limits

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Environmental Data*

	V994 Shaker	DPA-K Amplifier					FPS and Cooling Unit
		90/140K	140K	165/210K	210K	280K	
Working Ambient Temp. (°C)	4.5 to 66	5 to 40					5 to 40
Heat Dissipation (Rejected to Air)	12 kW	9.41 kW	14.91 kW	17.20 kW	22.29 kW	29.69 kW	4.79 kW
Acoustic Noise at 2 m	105 dBA	85 dBA				90 dBA	75 dBA
Cooling Air Flow	–	3.30 m³/s		4.95 m³/s		6.60 m³/s	0.66 m³/s
Raw Water Flow Rate	–	177 l/min†		184 l/min†		191 l/min†	209 l/min‡
Raw Water Pressure Drop	–	0.57 bar†		0.62 bar†		0.66 bar†	0.77 bar‡
Raw Water Max. Inlet Temp. (°C)	–	32†					32‡
Raw Water Max. Outlet Temp. (°C)	–	44†		45†			47‡
Height (mm)	1980	1905		1905		1905	1905
Width (mm)	2714	1559		2070		2581	1500
Depth (mm)	1642	825		825		825	825
Mass (kg)	18320	1405	1500	2084	2169	2838	1222

* Values for air trunnion mounted shaker and an amplifier configuration of one control bay and one power bay

† Actual values when used with V994 shaker

‡ Values for cooling unit alone when running at maximum capacity

Make Our Experience Your Advantage

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.

V 994 Shaker Options

Armature Insert Selection:

- M 12 ♦
- 1/2" UNC ♦

Mounting Selection:

- Trunnion mounted with Lin-E-Air isolation and body rotation gearbox ♦

- Solid trunnion ●

Other Options:

- Combination shaker/slip table base ●
- Chamber support kit ●
- Thermal barrier ●

Key:

- ♦ Standard – Available on shortest delivery
- Option – Stocked item, available on short delivery

Brüel & Kjær reserves the right to change specifications and accessories without notice.

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