SYSTEM DATA

LDS Small Electromagnetic Vibration Systems

V555 Series • V650 Series • V721 Series • V780 Series

V780 Series in trunnions

V650 Series in trunnions

V555 Series in trunnions

HPAK

FPS
LPA1000

Industry Applications

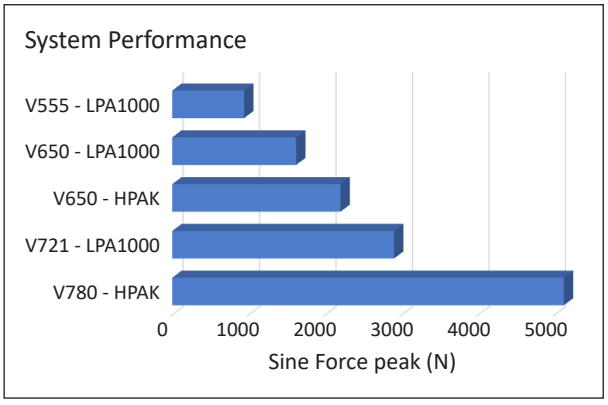
- Automotive component testing
- Modal and structural analysis
- Electronic assembly testing
- Fatigue and resonance testing
- Use as a velocity transducer or high-speed actuator
- In-house testing and calibration

The LDS® V555 Series, V650 Series, V721 Series, and V780 Series vibration systems are designed to produce a wide frequency range, high force, and acceleration. These systems deliver excellent all-round test capabilities while providing maximum flexibility for the test engineer.

The shakers can be driven by any suitable oscillator/amplifier/field power supply combination, but the LDS LPA1000 or HPAK amplifier is specifically recommended for this purpose. Note: When using the LPA1000 amplifier, the LDS FPS is also required.

Features

- Lightweight, high performance armature delivers excellent acceleration and velocity performance
- Powered by compact, quiet, and energy efficient amplifiers
- Robust, lightweight suspension provides excellent torsional and transverse stiffness with minimal impact on system acceleration
- Proven reliability maximises system availability
- Vertical and horizontal operations



Brüel & Kjær

Small Electromagnetic Shakers

We bought a V722 (same specs)

LDS Shaker Model	V555 Series	V650 Series		V721 Series	V780 Series
Recomended LDS Amplifier	LPA1000 + FPS	LPA1000 + FPS	HPAK	LPA1000 + FPS	HPAK
Sine Force (peak)	0.94 kN (211 lbf)	1.62 kN (364 lbf)	2.2 kN (495 lbf)	2.9 kN (651 lbf)	5.12 kN (1150 lbf)
Random Force (rms)	0.636 kN (143 lbf)	1.09 kN (245 lbf)	1.54 kN (346 lbf)	1.9 kN (427 lbf)	4.23 kN (950 lbf)
Half-sine Shock Force*	1.2 kN (281 lbf)	2.1 kN (475 lbf)	3.1 kN (691 lbf)	4.6 kN (1028 lbf)	9.5 kN (2145 lbf)
Velocity (sine peak)	1.50 m/s (59.1 in/s)	1.40 m/s (55.1 in/s)	1.50 m/s (59.1 in/s)	0.70 m/s (27.6 in/s)	1.90 m/s (74.8 in/s)
Acceleration (sine peak)	981 m/s² (100.0 g_n)	722 m/s² (73.7 g_n)	981 m/s² (100.0 g_n)	650 m/s² (66.3 g_n)	1088 m/s² (111.0 g_n)
Acceleration Random (rms)	677 m/s² (69 g_n)	486 m/s² (49.6 g_n)	686 m/s² (70.0 g_n)	440 m/s² (44.9 g_n)	490 m/s² (50.0 g_n)
Displacement (peak-peak)†	25.4 mm (1.0 in)	25.4 mm (1.0 in)		25.4 mm (1.0 in)	25.4 mm (1.0 in)
Mass of Moving Elements	0.94 kg (2.07 lb)	2.24 kg (4.94 lb)		4.46 kg (9.83 lb)	4.70 kg (10.36 lb)
Body Mass	97.5 kg (215 lb)	189 kg (417 lb)		381.0 kg (840.0 lb)	381.0 kg (840.0 lb)
Internal Payload Capacity	25 kg (55 lb)	50 kg (110 lb)		100 kg (220 lb)	100 kg (220 lb)
Armature Resonance (f_n)	4850 Hz	3800 Hz		3150 Hz	2950 Hz
Usable Frequency Range	dc to 6300 Hz	dc to 4000 Hz		dc to 4000 Hz	dc to 4000 Hz
Acoustic Noise‡	104 dBA	110 dBA		110 dBA	110 dBA
Total Heat Dissipation (from body)	1.52 kW	1.70 kW	2.30 kW	2.10 kW	3.20 kW
Total Heat Dissipation (from cooling fan)	1.35 kW	1.5 kW	2.1 kW	1.9 kW	4.8 kW
Ambient Working Temperature	0 – 30 °C (32 – 86 °F)				
Maximum Dimensions (trunnion-mounted shaker)	485 x 582 x 300 mm (19.1 x 22.9 x 11.8 in)	584 x 744 x x 380 mm (23.0 x 29.3 x 15.0 in)	584 x 744 x x 380 mm (23.0 x 29.3 x 15.0 in)	714 x 890 x x 490 mm (28.1 x 35.0 x 19.3 in)	714 x 890 x x 490 mm (28.1 x 35.0 x 19.3 in)

* Half-sine shock force is calculated with the standard payload, 2 ms pulsewidth, 10% pre/post pulse.
† Displacement can vary with payload and shaker orientation. Please contact Brüel & Kjær for advice on specific test requirements.
‡ Measured at a distance of 1 m (3.3 ft) and at a height of 1.6 m (5.2 ft) above floor level in an enclosed cell.

HPAK Switching Power Amplifier

The HPAK amplifier is a dedicated 5 kVA unit optimised for use with the LDS V650 Series and V780 Series shakers to deliver greater force than if using the LPA1000 amplifier. This compact unit delivers the power for both the shaker and field coils, as well as power for the cooling fan.

LDS HPAK Amplifier

Classification	class D switching amplifier, air-cooled
Input Supply — three phase	50/60 Hz: 380, 400, 415, 440 V 60 Hz: 480, 500 V
Power Output	5 kVA
Rated Output Voltage	100 V rms (sine)
Continuous Output Current	50 A rms (sine and random)
Transient Output Current	150 A for 100 ms
Switching Frequency	150 kHz
Modulation Range	dc to 10 kHz
Total Harmonic Distortion	Typically 0.15%
Input Sensitivity — differential output	1.0 Vrms for 100Vrms output
Input Impedance	10 kΩ nominal
Amplifier Efficiency	> 90%
Module Efficiency	93%
Signal-to-Noise Ratio§	> 68 dB
Overall Dimensions	1000 x 825 x 557 mm (39.4 x 32.5 x 21.1 in)
Weight	210 kg (463 lb)

§ With respect to 100 V rms output, 10 kΩ input termination and rated resistive load connected.

LPA1000 Linear Power Amplifier

The LPA1000 has been designed to provide optimum, efficient, and reliable system power. Benefitting from low noise circuitry, advanced field proven Class B topology and a low distortion design.

LDS LPA1000 Amplifier

Classification	class B linear amplifier, air-cooled
Input Supply (±10%)	100, 120, 230 V, at 50 / 60 Hz
Input kVA	<2.7 kVA
Rated Power Output	961 VA in 4.0 Ω
Maximum Power Output Capacity	1296 VA in 4.0 Ω
Frequency Range at Maximum Power	40Hz to 10 kHz for 30 minutes at max. VA
Total Harmonic Distortion at Rated Output	<0.2% 40 Hz to 5 kHz <0.3% 5 kHz to 10 kHz
Maximum Output Voltage	72 Vrms, DC to 10 kHz (no load)
Output Current at Rated VA	15.5 A rms
Maximum Output Current	17.75 A rms, 40Hz to 10 kHz, for 30 minutes
Signal-to-Noise Ratio	> 95 dB
Amplifier Efficiency	64 %
Sound Power Level at 2m (6.6 ft)	49 dBA
Drive Input Connection	BNC
Weight	33 kg (73 lb)
Height	132 mm (5.2 in) excluding feet
Width	482.6 mm (19.0 in) with flanges for standard 19" rack mounting
Depth (case excluding 2 mm front plate)	550 mm (21.6 in)

FPS Field Power Supply

The FPS field power supply is designed to provide the dc power requirements of the field and degauss coil for the following LDS shakers: V555 Series, V650 Series, and V721 Series, and to operate with the LPA1000 amplifier.

LDS FPS Field Power Supply

Input Supply (±10%)	100, 120, 230 V, at 50 / 60 Hz
Input kVA (including 0.75 kVA supply for shaker cooling fan)	< 2.45 kVA
Field Voltage at Nominal Supply	70 V DC @ 5.5 Ω
Low-field Voltage	44 V DC 5.5 Ω
Field Current - full field	12.7 A
Field Current - low field	8 A
Degauss Full-field Voltage	66 V DC / 1.4 A DC @ 47 Ω
Degauss Low-field Voltage	40 V DC / 0.85 A DC @ 47 Ω
Degauss Current Range	0 to 1.5 A / 0 to 70 V adjustable
Cooling Fan Output	Switchable, Pmax = 0.75 kVA
Sound Power Level at 2m (6.6 ft)	45 dBA
Weight	27 kg (60 lb)
Height	132 mm (5.2 in) excluding feet
Width	483 mm (19.0 in) with flanges for standard 19" rack mounting
Depth (case excluding 2 mm front plate)	450 mm (21.6 in)

Armature Interface

LDS Shaker Model	V555 Series	V650 Series	V721 Series	V780 Series
Armature Diameter	110 mm (4.33 in)	156 mm (6.14 in)	180 mm (7.09 in)	180 mm (7.09 in)
Armature Inserts				
Insert Options	M6, 1/4 UNF	M8, 5/16 UNF	M8, 3/8 UNF	M8, 3/8 UNF
Insert Pattern	1 insert at centre, 8 inserts equispaced on 90 mm (3.5 in) PCD*	1 insert at centre, 8 inserts equispaced on 125 mm (4.9 in) PCD*	1 insert at centre, 8 inserts equispaced on 150 mm (5.9 in) PCD*	1 insert at centre, 8 inserts equispaced on 150 mm (5.9 in) PCD*

* PCD = Pitch Circle Diameter

Cooling Fans

LDS Shaker Model	V555 Series with LPA	V650 Series / V721 Series with LPA	650 Series / V780 Series with HPAK
Electrical Requirement	single-phase 230V, 50 Hz single phase 120V / 230V, 60Hz	single-phase 230V, 50 Hz single phase 120V / 230V, 60Hz	three-phase 380V - 440V, 50 Hz three phase 380V - 500V, 60 Hz
Cooling Fan Dimensions			
50 Hz Cooling Fan	476 x 383 x 455 mm (18.7 x 15.1 x 17.9 in)	481 x 363 x 455 mm (18.9 x 14.3 x 17.9 in)	575 x 546 x 408 mm (22.6 x 21.5 x 16.1 in)
60 Hz Cooling Fan	476 x 383 x 442 mm (18.7 x 15.1 x 17.4 in)	476 x 383 x 442 mm (17.4 x 15.1 x 18.7 in)	580 x 542 x 408 mm (22.8 x 21.3 x 16.1 in)
Cooling Fan Weight	30 kg (66 lb)	30 kg (66 lb)	30 kg (66 lb)

Further Information

For further details on LDS products and systems, including outline drawings, please contact your local Brüel & Kjær representative.

Safety

Complies with the following EU directives:
- Machinery: 2006/42/EC
- Low Voltage: 2014/35/EU
- EMC: 2014/30/EU
- Designed in accordance with EN 61010-1:2010

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