

LDS V830 and V850 Shaker Systems

Medium-Force Electrodynamic Vibration Systems



left: V830 Shaker, centre: SPA-K Amplifier, right: V850 Shaker

Mounting Selection

- Solid trunnions
- Lin-E-Air air isolated trunnions

Other Options

- Combo slip table
- V-groove castors
- Air glide
- Chamber floor support
- Silencer for shaker cooling fan
- Acoustic enclosure
- Thermal management
- Head expander

The LDS® V830 and V850 series shaker systems are ideal for vibration and mechanical shock testing using sinusoidal, random, or transient excitation. V830 systems are available in armature sizes of 185 mm (7.28 in) and 335 mm (13.19 in). V850 systems are available in armature sizes of 240 mm (9.45 in) and 440 mm (17.32 in).

Systems are available in various forms to meet customers' exact requirements, for example: Lin-E-Air trunnion-mounted with a body rotation gearbox; combined with a horizontal hydrostatic slip table; or for under-chamber operation.

Maximum Force Ratings for System Configurations

V830 Shaker Model	Sine Force (peak)		Random Force (rms)*		Half-sine Shock Force*	
	V830-185	V830-335	V830-185	V830-335	V830-185	V830-335
with SPA8K	6.8 kN (1524 lbf)	6.5 kN (1470 lbf)	5.8 kN (1298 lbf)	7.6 kN (1709 lbf)	14.2 kN (3194 lbf)	13.4 kN (3018 lbf)
with SPA16K	8.9 kN (2000 lbf)	9.8 kN (2205 lbf)	5.8 kN (1300 lbf)	9.8 kN (2205 lbf)	16.4 kN (3695 lbf)	25.1 kN (5644 lbf)
V850 Shaker Model	V850-240	V850-440	V850-240	V850-440	V850-240	V850-440
with SPA8K	7.1 kN (1600 lbf)	5.7 kN (1290 lbf)	7.2 kN (1622 lbf)	6.6 kN (1493 lbf)	15.0 kN (3376 lbf)	11.1 kN (2494 lbf)
with SPA16K	14.2 kN (3200 lbf)	11.5 kN (2580 lbf)	13.3 kN (3000 lbf)	13.3 kN (2985 lbf)	30.0 kN (6752 lbf)	22.2 kN (4987 lbf)
with SPA24K	17.8 kN (4000 lbf)	17.2 kN (3871 lbf)	13.3 kN (3000 lbf)	19.9 kN (4478 lbf)	38.0 kN (8549 lbf)	33.3 kN (7481 lbf)
with SPA32K	—	22.2 kN (5000 lbf)	—	22.2 kN (5000 lbf)	—	44.4 kN (9976 lbf)

* Random and shock ratings assume a payload approximately twice the mass of the armature. Half-sine shock force is calculated with a standard payload, 2 ms pulsewidth, 10% pre/post pulse.

V830 and V850 Shaker Specification

Shaker Model	V830-185	V830-335	V850-240	V850-440
Armature Diameter	185 mm (7.28 in)	335 mm (13.19 in)	240 mm (9.45 in)	440 mm (17.32 in)
Usable Frequency Range *	dc to 3500 Hz	dc to 3000 Hz	dc to 2600 Hz	dc to 3000 Hz
Armature Resonance (fn)	3100 Hz	2250 Hz	2400 Hz	2200 Hz
Acceleration (sine peak)†•	1176 m/s ² (120 gn)	810 m/s ² (83 gn)	1225 m/s ² (125 gn)	932 m/s ² (95 gn)
Acceleration Random (rms)†	735 m/s ² (75 gn)	588 m/s ² (60 gn)	588 m/s ² (60 gn)	490 m/s ² (50 gn)
Effective Mass of Moving Elements				
Armature fitted with Flush Inserts	7.0 kg (15.4 lb)	12.0 kg (26.6 lb)	14.0 kg (30.9 lb)	23.8 kg (52.6 lb)
Armature fitted with Raised Inserts	7.5 kg (16.5 lb)	12.8 kg (28.3 lb)	14.3 kg (31.6 lb)	24.5 kg (54.1 lb)
Suspension Rotational Stiffness	41.8 kN m/rad (30 800 lbf ft/rad)	67.8 kN m/rad (50 000 lbf ft/rad)	57.4 kN m/rad (42 300 lbf ft/rad)	90.0 kN m/rad (66 700 lbf ft/rad)
Suspension Axial Stiffness	Nil		Nil	
Suspension Cross-axial Stiffness	5.25 kN/mm (30 000 lbf/in)		6.65 kN/mm (38 000 lbf/in)	
Internal Load Support Capability	160 kg (350 lb)		350 kg (770 lb)	
Stray Magnetic Field§	< 0.5 mT (5 gauss)		< 1.8 mT (18 gauss)	
Velocity (sine peak)†	2.0 m/s (78.7 in/s)			
Displacement (peak-peak)‡	50.8 mm (2.0 in)			
Body Suspension Resonance	Lin-E-Air Suspension: < 5 Hz — Air Isolaton Mounts: < 10 Hz			
Ambient Working Temperature	+7 to 30 °C (+45 to 86 °F)			
Body Mass	Solid Trunnions: 616 kg (1358 lb) Lin-E-Air Trunnions: 454 kg (1000 lb)		Solid Trunnions: 1288 kg (2840 lb) Lin-E-Air Trunnions: 1125 kg (2480 lb)	
Maximum Dimensions (H x W x D)	Solid Trunnions: 838 x 1005 x 772 mm (33.0 x 39.6 x 30.4 in) Lin-E-Air Trunnions: 837 x 942 x 600 mm (33.0 x 37.1 x 23.6 in)		Solid Trunnions: 838 x 1246 x 1094 mm (33.0 x 49.1 x 43.1 in) Lin-E-Air Trunnions: 838 x 1165 x 849 mm (33.0 x 44.0 x 29.7 in)	

* Displacement will be limited below body suspension resonance due to body movement. Recommended min Freq base mount 8 Hz. Lin-E-Air 5Hz.

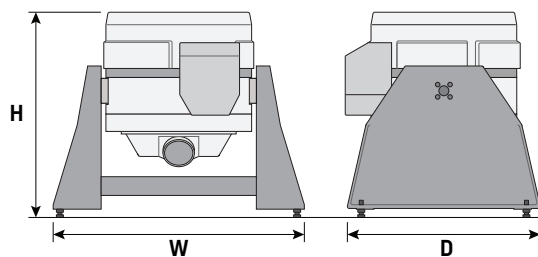
† Velocity and acceleration ratings depend on the amplifier driving the shaker.

• With flush inserts. 335mm/440mm armature with multi point control.

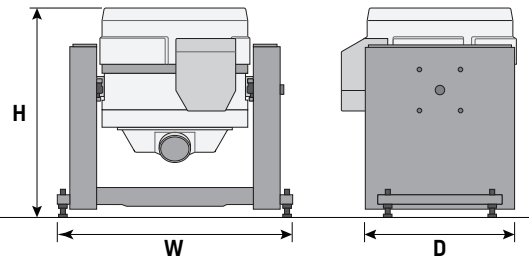
‡ Displacement can vary with payload and shaker orientation. Please contact Brüel & Kjær for advice on specific test requirements.

§ Theoretical maximum, measured 150mm (6 in) above table, full-field, at normal operation temperature.

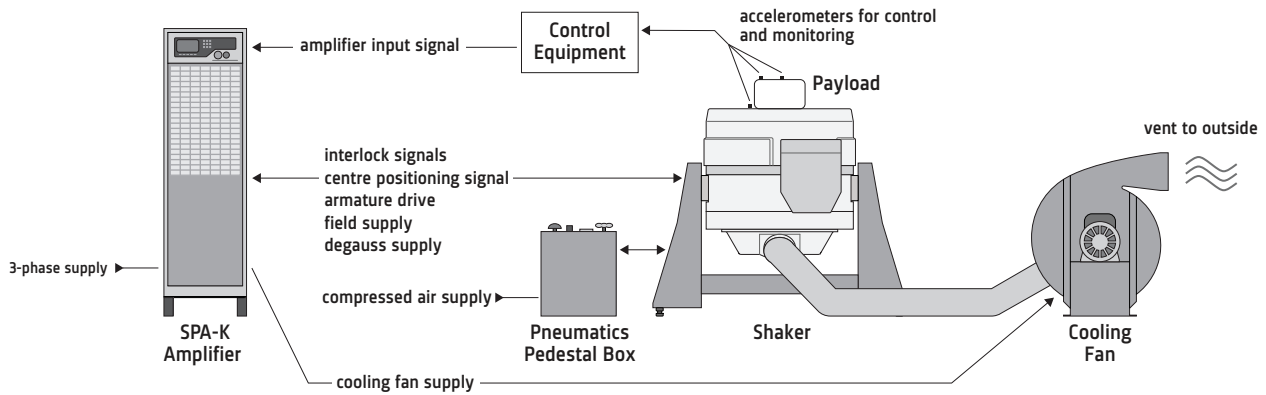
V830/V850 Shaker on Solid Trunnions



V830/V850 Shaker on Lin-E-Air Trunnions



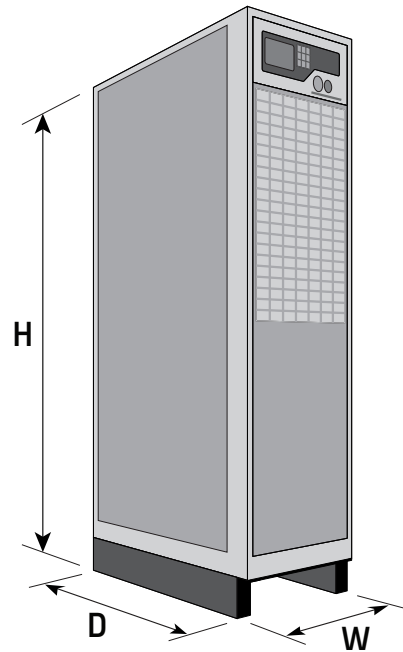
Typical Vibration Test System



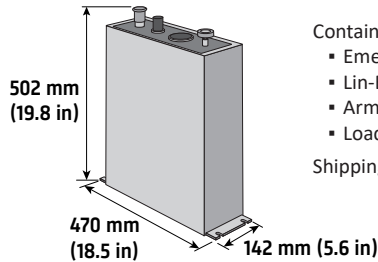
SPA-K Amplifier Specification

Power Range	8 – 32 kVA in 8 kVA increments
Signal-to-Noise Ratio	> 68 dB wrt 100 V rms output**
Input Impedance	10 kΩ nominal
Total Harmonic Distortion	Typically 0.5 to 0.8 % at rated output into rated resistive load
Input Sensitivity	1.0 V for 100 V rms output
Switching Frequency	150 kHz
Efficiency	> 90 % (not including field power supply)
Rated Output Voltage	100 V rms (sine)
Continuous Output Current	80 A rms (sine and random) per 8 kVA increment
Full Power Bandwidth	20 Hz to 3 kHz
Transient Output Current	240 A per 8 kVA increment for 100 ms
Module Efficiency	93 %
Modulation Range	dc to 10 kHz
Protection	Integral protection to prevent output devices from working outside their specification limit.
Ambient Working Temperature	+5 to 30 °C (+41 to 86 °F)
Max. Dimensions (H x W x D)	1870 x 537 x 825 mm (74 x 21 x 33 in)

** 10 kΩ input termination and rated resistive load connected.

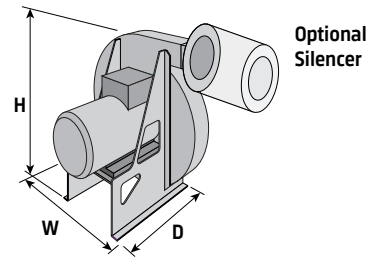


Standard Ancillaries



Pneumatics Pedestal Box

- Contains:
- Emergency stop
 - Lin-E-Air suspension air control valve
 - Armature position indicator
 - Load support control valve
- Shipping Weight 20 kg (44 lb)



Shaker Cooling Fan

	V830 Cooling Fan 50 Hz	V830 Cooling Fan 60 Hz	V850 Cooling Fan 50 Hz	V850 Cooling Fan 60 Hz
Cooling Fan without Silencer (H x W x D)	750 x 683 x 551 mm (29.5 x 28.9 x 21.7 in)	750 x 645 x 551 mm (29.5 x 25.4 x 21.7 in)	914 x 783 x 644 mm (36.0 x 30.8 x 25.4 in)	782 x 705 x 627 mm (30.8 x 27.8 x 24.7 in)
Cooling Fan with Silencer (H x W x D)	824 x 1083 x 551 mm (32.4 x 42.6 x 21.7 in)	824 x 1045 x 551 mm (32.4 x 41.4 x 21.7 in)	991 x 1283 x 648 mm (39.0 x 50.5 x 25.5 in)	873 x 1205 x 639 mm (34.4 x 47.4 x 25.2 in)
Shipping Weight	84 kg (185 lb)	84 kg (165 lb)	130 kg (287 lb)	130 kg (287 lb)

Environment, Supply, and Safety

Environmental Data

	V830 Systems		V850 Systems	
	V830-185	V830-335	V850-240	V850-440
Max. Acoustic Noise*				
Shaker	110 dBA		118 dBA	
SPA-K Amplifier	69 dBA		70 dBA	
Cooling Fan	91 dBA		99 dBA	
Total Heat Dissipation:				
Shaker (from body)	1.00 kW		1.60 kW	
SPA-K Amplifier	see Table below			
Cooling Fan	19.9 kW	20.9 kW	31.4 kW	38.9 kW
Cooling Airflow:				
Shaker via Cooling Fan	0.47 m ³ /s (1000 ft ³ /min)		0.79 m ³ /s (1674 ft ³ /min)	
SPA-K Amplifier	see Table below			

*Maximum acoustic noise levels do not take into account any noise that may be generated due to payloads attached to the vibration testing system. Measured at 1 m distance and a height of 1.60 m above floor level in enclosed cell.

	Heat Rejected to Air	Cooling Airflow	Max. Input Requirement#	Amplifier Weight
V830				
SPA8K	1.3 kW	0.42 m ³ /s	21.9 kVA	483 kg (1065 lb)
SPA16K	1.5 kW	0.42 m ³ /s	29.1 kVA	494 kg (1089 lb)
V850				
SPA8K	1.7 kW	0.42 m ³ /s	26.0 kVA	544 kg (1199 lb)
SPA16K	2.3 kW	0.42 m ³ /s	33.2 kVA	555 kg (1224 lb)
SPA24K	3.0 kW	0.50 m ³ /s	40.4 kVA	566 kg (1248 lb)
SPA32K	3.6 kW	0.57 m ³ /s	47.6 kVA	577 kg (1272 lb)

Includes requirements from amplifier, cooling fan and pneumatic pedestal box in steady state.

Electrical and Compressed Air Supply

Voltage 3-Phase	Standard: 380 to 500 V, 50/60 Hz Low Voltage Option: 200 to 220 V, 50/60 Hz
Compressed Air Supply	6.9 bar (100 lbf/in ²)

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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