

LDS V8 Shaker Systems

Medium-Force Electrodynamic Vibration Systems



*left: V8-440, trunnion-mounted with Lin-E-Air suspension;
centre: combo shaker with slip table and guided head expander; right: SPA-K amplifier*

Mounting Selection

- Base-mounted
- Lin-E-Air air isolated trunnions

Other Options

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

The LDS® V8 series shaker system is ideal for vibration and mechanical shock testing using sinusoidal, random, or transient excitation. V8 systems are available in armature sizes of 440 mm (17.32 in) and 640 mm (25.20 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

| | Sine Force (peak) | | Random Force (rms)* | | Half-sine Shock Force* | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|
| | V8-440 | V8-640 | V8-440 | V8-640 | V8-440 | V8-640 |
| with SPA40K Amplifier | 42.00 kN (9 442 lbf) | 42.00 kN (9 442 lbf) | 47.14 kN (10 598 lbf) | 39.72 kN (8 929 lbf) | 84.54 kN (19 005 lbf) | 84.70 kN (19 042 lbf) |
| with SPA48K Amplifier | 50.40 kN (11 330 lbf) | 50.40 kN (11 330 lbf) | 56.57 kN (12 718 lbf) | 47.66 kN (10 714 lbf) | 101.45 kN (22 806 lbf) | 101.64 kN (22 850 lbf) |
| with SPA56K Amplifier | 57.83 kN (13 000 lbf) | 55.60 kN (12 500 lbf) | 66.00 kN (14 837 lbf) | 55.60 kN (12 500 lbf) | 118.35 kN (26 607 lbf) | 118.59 kN (26 660 lbf) |

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

V8 Shaker Specification

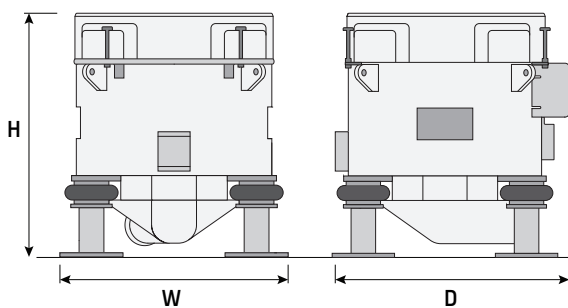
| LDS Shaker Model | V8-440 | V8-640 |
|---|--|-----------------------------------|
| Armature Diameter | 440 mm (17.32 in) | 640 mm (25.20 in) |
| Usable Frequency Range | dc to 2500 Hz | dc to 2300 Hz |
| Armature Resonance (fn) | 2000 Hz | 1900 Hz |
| Acceleration (sine peak)† | 1370 m/s ² (140.0 gn) | 392 m/s ² (40.0 gn) |
| Acceleration Random (rms)† | 980 m/s ² (100.0 gn) | 392 m/s ² (40.0 gn) |
| Effective Mass of Moving Elements (Armature with Raised Inserts) | 42.0 kg (92.6 lb) | 47.0 kg (103.6 lb) |
| Suspension Rotational Stiffness | 387 kN m/rad (286 000 lbf ft/rad) | 538 kN m/rad (397 000 lbf ft/rad) |
| Suspension Cross-axial Stiffness | 27.6 kN/mm (158 000 lbf/in) | 29.0 kN/mm (166 000 lbf/in) |
| Stray Magnetic Field§ | Base-mounted Shaker: < 1.6 mT (16 gauss) — Trunnion-mounted Shaker: < 1.0 mT (10 gauss) | |
| Suspension Axial Stiffness | 20 kN/m (114 lbf/in) | |
| Velocity (sine peak)† | 1.8 m/s (70.9 in/s) | |
| Displacement (peak-peak)‡ | 63.5 mm (2.5 in) | |
| Internal Load Support Capability | 700 kg (1540 lb) | |
| Body Mass | Base Mounted: 3050 kg (6724 lb) — Lin-E-Air Trunnions: 3250 kg (7165 lb) | |
| 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) | |
| Maximum Dimensions (H x W x D) | Trunnion-mounted Shaker: 1320 x 1693 x 1138 mm (52.0 x 66.6 x 44.8 in) Base-mounted Shaker: 1225 x 1103 x 1341 mm (48.2 x 43.4 x 52.8 in) | |

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

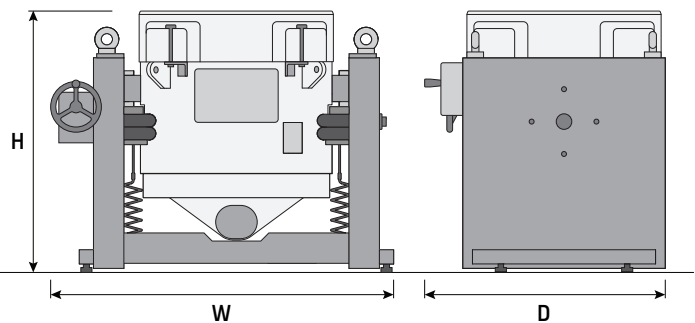
‡ Displacement can vary with payload and shaker orientation. Please contact Brüel & Kjær for advice on specific test requirements.

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

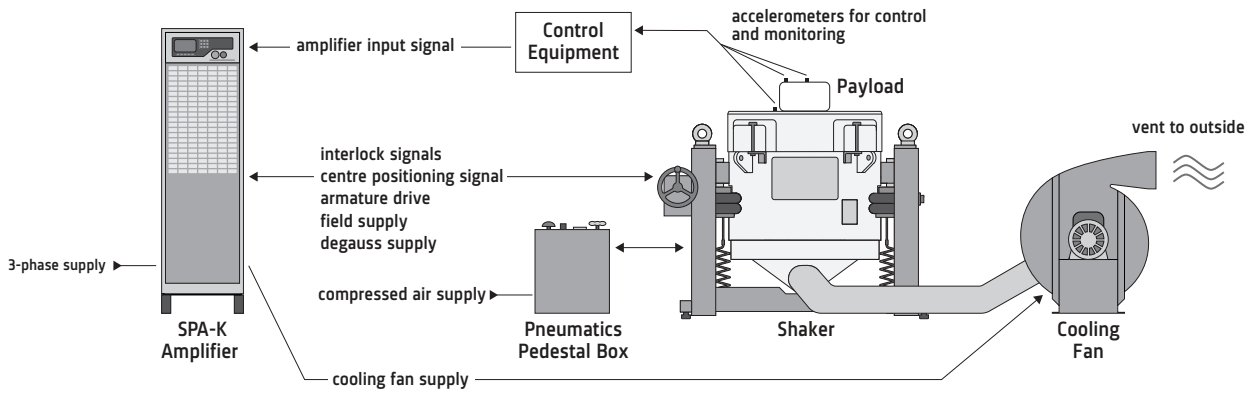
Base-Mounted V8



V8 on Lin-E-Air Trunnions



Typical Vibration Test System



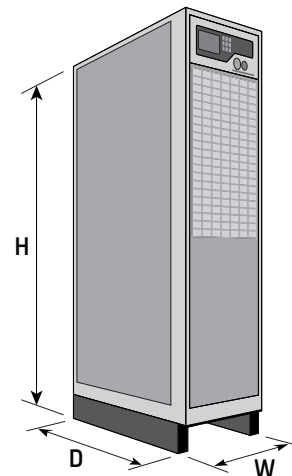
SPA-K Amplifier Specification

| | |
|-----------------------------|---|
| Power Range | 40 – 56 kVA in 8 kVA increments |
| Signal-to-Noise Ratio | > 68 dB wrt 100 V rms output** |
| Input Impedance | 10 kΩ nominal |
| Total Harmonic Distortion | 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) |

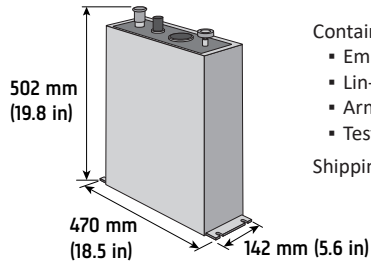
** 10 kΩ input termination and rated resistive load connected.

| | Heat Rejected to Air | Cooling Airflow | Max. Input Requirement# | Weight |
|--------|----------------------|------------------------|-------------------------|------------------|
| SPA40K | 5.1 kW | 0.65 m ³ /s | 72.3 kVA | 588 kg (1296 lb) |
| SPA48K | 5.7 kW | 0.72 m ³ /s | 79.6 kVA | 599 kg (1321 lb) |
| SPA56K | 6.4 kW | 0.80 m ³ /s | 80.5 kVA | 610 kg (1345 lb) |

Includes requirements from cooling fan and system ancillaries in steady state.



Standard Ancillaries

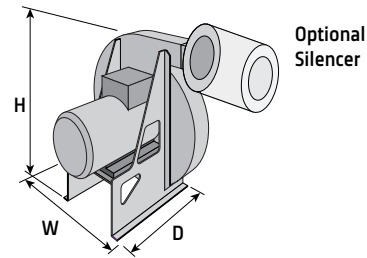


Pneumatics Pedestal Box

Contains:

- Emergency stop
- Lin-E-Air suspension air control valve
- Armature position indicator
- Test load control valve

Shipping Weight 20 kg (44 lb)



Shaker Cooling Fan

| | V8 Cooling Fan 50 Hz | V8 Cooling Fan 60 Hz |
|--|--|---|
| Cooling Fan without Silencer (H x W x D) | 1053 x 891 x 736 mm (41.5 x 35.1 x 30.0 in) | 876 x 762 x 737 mm (34.5 x 30.0 x 29.0 in) |
| Cooling Fan with Silencer (H x W x D) | 1112 x 1391 x 764 mm (43.8 x 54.8 x 30.1 in) | 955 x 1262 x 764 mm (37.6 x 49.7 x 30.1 in) |
| Cooling Fan Shipping Weight | 225 kg (496 lb) | 198 kg (437 lb) |

Environment, Supply, and Safety

Environmental Data

| | |
|--------------------------------|--|
| Max. Acoustic Noise* | |
| Shaker | 118 dBA |
| SPA-K Amplifier | 74 dBA |
| Cooling Fan | 102 dBA |
| Total Heat Dissipation: | |
| Shaker (from body) | 2.5 kW |
| SPA-K Amplifier | see page 3 |
| Cooling Fan | 62.0 kW |
| Cooling Airflow: | |
| Shaker via Cooling Fan | 0.92 m ³ /s (1950 ft ³ /min) |
| SPA-K Amplifier | see page 3 |

* Maximum acoustic noise levels do not take into account any noise that may be generated due to payloads attached to the vibration testing system.

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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