



V9_{MKII} SHAKER



INDUSTRY APPLICATIONS

- ✓ High force, long duration automotive testing
- ✓ Low frequency and shock pulse testing – ideal for 100 g_n, 11 ms, and SRS tests
- ✓ Avionics and military hardware testing
- ✓ Product and package testing

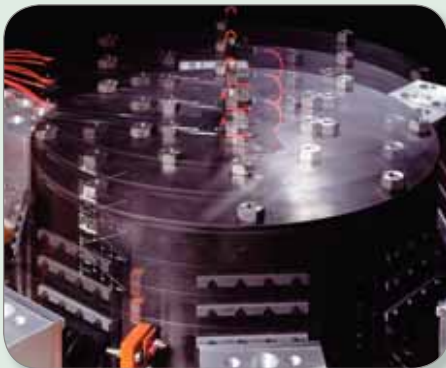
THE NEW STANDARD FOR HIGH FORCE, LONG DURATION VIBRATION TESTING

Providing the versatility and capability demanded for both research and development and production testing, the V9_{mkII} shaker system offers exceptional performance combined with low capital and running costs. The V9_{mkII} shaker offers the highest achievable envelope of testing parameters.

Shaker Model	V9 _{mkII}
System Sine Force Peak (kN)	105
System Max Random Force rms (kN)	105
Max Acceleration Sine Peak (g _n)	150
System Velocity Sine Peak (m/s)	3.0
Displacement Continuous pk-pk (mm)	76.2
Moving Element Mass (kg)	49.8
Usable Frequency Range (Hz)	DC - 2,700

High-Force Long-Duration Electrodynamic Shaker

- Full water cooling, including body cooling, enables prolonged testing at maximum force levels
- Long 76.2 mm stroke allows greater acceleration at low frequencies, combined with higher maximum velocity
- Advanced switching power amplifier offers high reliability, simple installation and operation
- Powerful LDS-Dactron vibration control system enables remote monitoring and control
- Payloads up to 1,800 kg
- Scalable solution
- Systems can be tailored for special applications such as load bearing platforms
- Vertical or horizontal operation with optional slip table



Whether you are looking for the failure point of a missile guidance system, assessing hazardous materials or safety testing components such as automotive airbags and side impact sensors – you will go on testing until your products meet your expectations and standards. Testing with electro-dynamic shakers is now the preferred method of accurately simulating the vibration stress that a product will experience in real life.

In-house design expertise, first class project engineering skills and advanced manufacturing facilities mean LDS can help with the most complex and unusual vibration testing applications.

The V9_{mkII} shaker delivers excellent performance for long duration testing at high velocity. This is achieved by using innovative designs, driven by an in-depth understanding of our clients test applications.

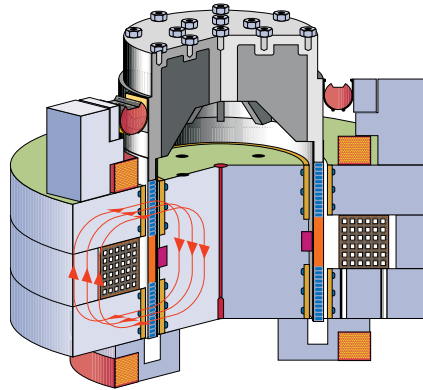
LDS offers complete vibration test solutions, comprising shakers, amplifiers and controllers.

Our *LASER_{USB}TM* and *COMET_{USB}TM* controllers, as well as our amplifiers can also be used with 3rd-party shakers.



DUAL-COIL ARMATURE DESIGN

- Dual-coil armature results in reduced rotational force
- Delivers higher velocity than an equivalent single-coil design



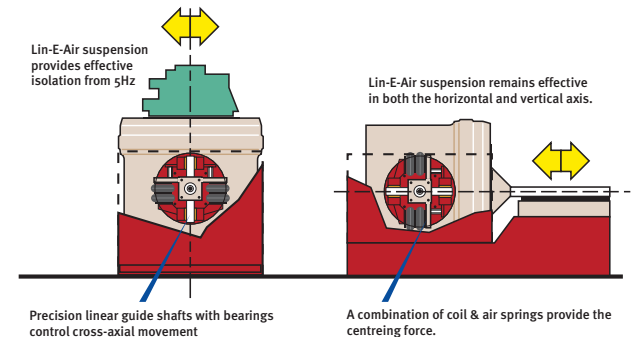
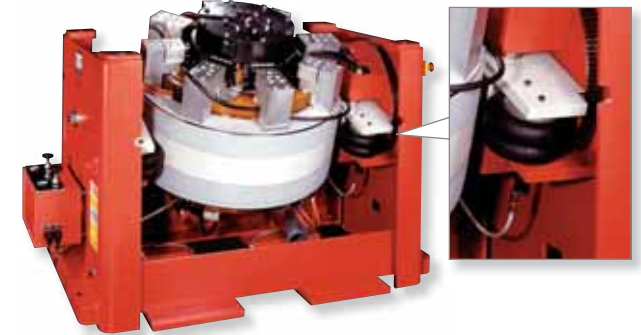
The V9_{mkII} uses a unique design of dual-wound coil which greatly reduces the rotational force on the armature and also results in an increase in the velocity delivered to the payload when compared with more conventional single-coil designs.

Combined with the water-cooled field coils results in quieter operation and a cooler body temperature, minimising the temperature effects on the equipment under test and increasing the test duration. This makes it ideal for automotive and other transport tests involving small to medium payloads and long test periods.

Typical applications include Sine on Random tests in automotive and other transport applications, and also SRS tests.

LIN-E-AIR™ BODY ISOLATION

Lin-E-Air body isolation is standard on V9_{mkII} shakers, and ensures excellent stability at low frequencies. Combined with the long 76.2 mm stroke, this delivers greater acceleration and velocity at frequencies as low as 5 Hz.



V9_{mkII} shakers have low installation and running costs combined with the highest levels of safety in accordance with the stringent requirements of CE approval.

V9_{mkII} Shaker

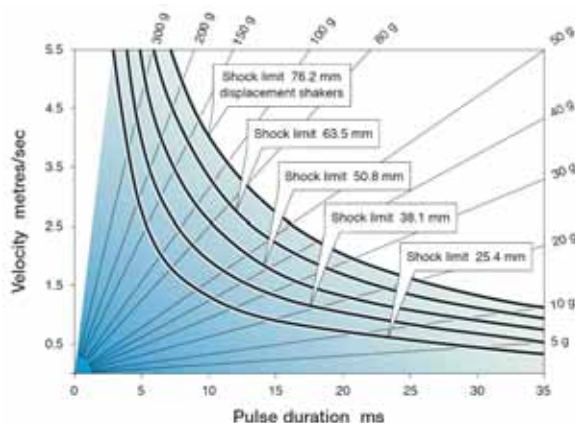
TRANSIENT SHOCK TESTING

The V9_{mkII} shaker delivers excellent shock performance of up to 300 g_n with payloads of 20 kg, and is an ideal choice for use in industry standard 100 g_n 11 ms shock tests where it can carry payloads of up to 60 kg.

This is due in part to its lightweight composite carbon fibre armature, which combines high strength with low mass, and also its long displacement of 76.2 mm which enables it to deliver a velocity of up to 3 m/s.

The V9_{mkII} shaker allows SRS (Shock Response Spectrum) tests to be conducted at levels higher than most other shakers, due primarily to its robust armature design. The system comprising shaker, amplifier and controller thus allows high forces and accelerations to be achieved at frequencies as low as DC.

The V9_{mkII} is well positioned to accommodate the increasingly demanding test specifications of the future.



SLIP TABLES AND COMBOS

The wide range of LDS slip tables and combos meets the growing demand for rigorous 3-axis testing. Most 3-axis testing requirements can be met by a combo system with trunnion-mounted shaker and slip table mounted on a common air-isolated base. This ensures alignment between slip table and shaker while offering easy installation and mobility of the entire system.

Where the payload to be tested is heavy or dynamically complex, LDS can supply a stand-alone trunnion-mounted shaker with a separate slip table on a seismic base.

All V9_{mkII} combo systems have Lin-E-Air body isolation and guidance. This ensures the shaker body is kept constantly aligned to the thrust axis, minimising cross-axial movement and maximising low frequency performance.

Slip tables are available in sizes ranging from 900 mm x 900 mm up to 1220 mm x 1220 mm as standard. Other sizes will be considered on request.



TEST FIXTURES

LDS can supply a wide range of standard and special-purpose head expanders, fixtures and load bearing platforms, designed and manufactured to the standards on which LDS has built its world-wide reputation.

The V9_{mkII} has previously been supplied with a magnesium guided head expander of 1.8 m x 1.8 m, designed for transport shock tests of electronics equipment with the payload weighing up to 1,500 kg. The system performed shock tests on packaged equipment, with acceleration up to 75 g_n at frequencies up to 3 kHz. It was used in conjunction with a thermal chamber and was installed on a seismic base below floor level. Control was provided by a *LASER_{USB}* controller.

SERVICE AND SUPPORT

Despite being a global company, LDS prides itself on its ability to provide support to our customers with the speed and care of a local company.

Our service to our customers extends well beyond the supply of vibration test and measurement equipment. We provide training and technical support at the customers site delivered by dedicated industry specialists. Combined with excellent system reliability and maintenance, we ensure you get the best possible return for your investment and trust in LDS.

SPOTLIGHT: V9_{mkII} extends test houses capabilities to meet more stringent test standards



V9_{mkII} shaker with slip-table being set up for testing automotive components.

As vibration testing evolves, customers are demanding higher testing parameters which are reflected in new industry standards. When a test house needed to offer its clients improved vibration testing capabilities, they turned to the V9_{mkII} vibration test system from LDS.

This allows them to perform the high acceleration Sine on Random (SoR) and Random tests required by the latest **ISO 16750** and **EN61373** standards. **ISO 16750** requires

vibration testing combined under various environmental conditions for road vehicles. The V9_{mkII} shakers compatibility with all AGREE/CERT standard thermal chambers makes this possible.



ISO 9001
Cert. No. FM 26616

The addition of a standard slip table allows testing in the horizontal axis as well as in the vertical axis. This gives a more representative test of the vibrations experienced by the equipment when in real life.



All LDS equipment complies with current European and USA safety and EMC regulations

The V9_{mkII} is able to test heavy loads typical of the railways industry and also multiple smaller loads in electronics and automotive industries, which reduces test time and gives greater returns from the testing budget.

SWITCHING POWER AMPLIFIER

Providing the controlled power required for vibration testing, SPA-K amplifiers enable the V9_{mkII} to deliver maximum performance, and can also be used as replacement amplifiers in other systems. Their advanced design offers high reliability with robust construction and they are easy to install and operate. Microprocessor control and LCD function display ensure simple set-up and fast troubleshooting.

Incorporating self-contained power modules operating in parallel, SPA-K amplifiers feature electronically controlled equal current sharing to minimise overloading and deliver maximum efficiency in random and shock conditions. Reliability and performance benefit further from the high 150 kHz switching frequency, economy field setting and low 0.15% full field harmonic distortion.



Advanced design switching power amplifier and field power supply.

LDS Test and Measurement Ltd
Jarman Way, Royston
Herts, SG8 5BQ

Phone: +44 (0) 1763 255 255
E-Mail: info-uk@lds.spx.com

www.lds-group.com

LDS Test and Measurement LLC
8551 Research Way, M/S 140
Middleton, WI 53562 USA

Phone : +1 (608) 821-6600
E-Mail: info-us@lds.spx.com

www.bksv.com

LDS Test and Measurement GmbH
Carl-Zeiss-Ring 11-13
D-85737 Ismaning

Phone: +49 (0) 89 92 33 33 0
E-Mail: info-de@lds.spx.com

LDS Test and Measurement SARL
9 Avenue du Canada – BP 221
F-91942 Courtaboeuf CEDEX

Phone: +33 (0)164864545
E-Mail: info-fr@lds.spx.com

LDS Test and Measurement
Room 2912, Jing Guang Centre
Beijing, China 100020

Phone: +86 10 6597 4006
E-Mail: info-cn@lds.spx.com

**Brüel & Kjær Sound & Vibration
Measurement A/S**
Skodsborgvej 307,
DK-2850 Nærum, Denmark

Phone: +45 4580 0500
Fax: +45 4580 1405



Brüel & Kjær 