



YOUR PARTNER FOR COMPLETE VIBRATION
TEST SYSTEMS, TRAINING AND SUPPORT

Vibration Test Systems

Complete vibration test systems from one partner

Hottinger Brüel & Kjær is one of the leading manufacturers and suppliers of advanced technology for testing and measuring the quality of sound and vibration. As a trusted partner of the most insightful industries, companies and test houses requiring vibration testing, we help our customers specify, install and maintain virtually any vibration test setup worldwide.

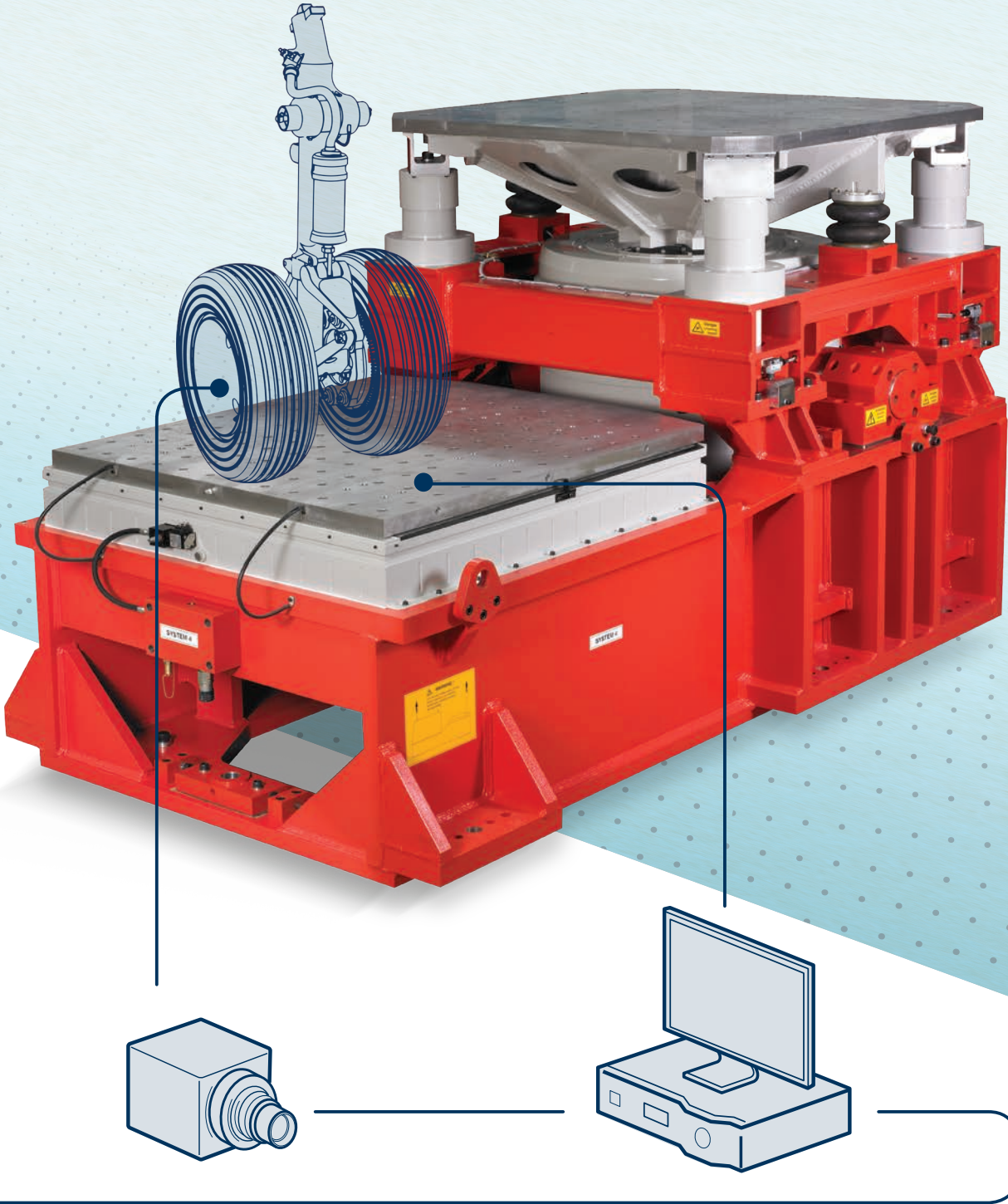
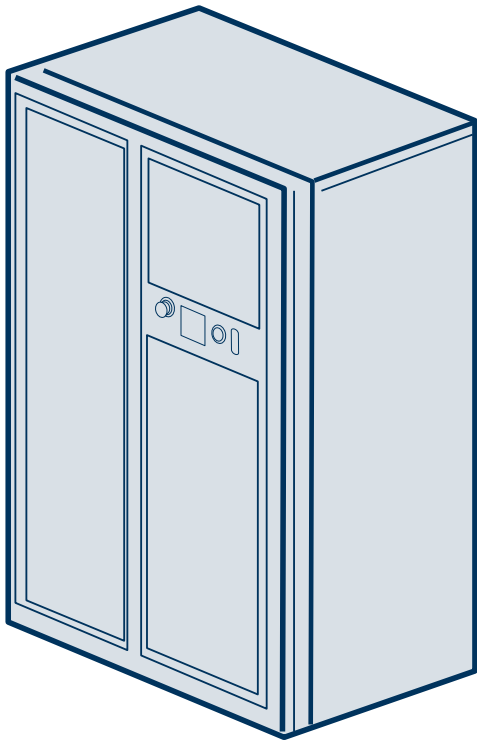
Hottinger Brüel & Kjær's heritage goes back to 1942 when Brüel & Kjær was founded. Sixty-six years later, Brüel & Kjær acquired LDS (Ling Dynamic Systems) Test and Measurement and started its journey to become a turnkey solution provider for vibration test systems. Today, the comprehensive range of LDS® shaker systems forms a core part of the turnkey solutions offered by HBK, covering accelerometers, data acquisition, sensors and much more.

FOR DIVERSE APPLICATIONS OF ALL SIZES

HBK provides standardized and customized solutions for applications as diverse as laboratory testing, modal and structural analysis, squeak and rattle, package testing, and durability testing of objects of practically any size – ranging from small electrical components through to complete systems and large payloads.

ONE PARTNER FOR VIBRATION MEASUREMENT

HBK combines vibration test solutions together with data acquisition software, hardware, and sensors. Our vibration test systems are built with a unique blend of global experience, the latest advanced technologies, and a highly motivated team that prides itself on making the best vibration test systems in the world.



2002

LDS® launched the V9 shaker system for large payloads that need high-performance vibration or shock testing

2003

LDS® launched the V8 shaker system providing the versatility and capability demanded by research and development

2009

LDS® supplied the V994 to NASA JPL for testing of the Mars rovers (launched 2011)

2016

LDS® launched the world's first 80 kN air-cooled shaker (V8900)

2020

LDS® launched the non-optical inductive centring system for positioning the armature with a purely digital sensor

FIVE REASONS WHY TO CHOOSE HOTTINGER BRÜEL & KJÆR

- 1

Reliable company
 HBK is one of the leading manufacturers and suppliers of technology for testing and measuring the quality of sound and vibration worldwide. Over 10,000 LDS® shakers have been shipped around the world.
- 2

Specialized production
 HBK provides standardized and customized vibration solutions for a diverse range of applications by meeting the industry standards around the world.

- 3

Turnkey solution
 HBK combines LDS® shakers and vibration test systems together with analysis and engineering software, data acquisition software and hardware, and sensors.
- 4

Global support
 HBK's wide range of global support services will help you before, during and after your vibration test and measurement.
- 5

In-depth training
 HBK offers a full range of professional product training, supporting you with knowledge and updating you on the latest vibration test procedures, developments, and trends.

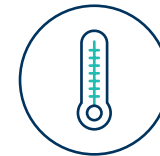
Vibration test systems: developed for your measurement tasks

Can this satellite withstand the excessive vibration of being launched into orbit?
Will this electric vehicle battery be able to endure 250,000 km on the road?
Will this type of packaging material ensure your flat-screen TV arrives safely?

Vibration testing covers it all: from the aerospace and defence industry, the automotive industry to the manufacturing industry, HBK has the right vibration test system for your testing requirements.

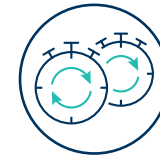
CUSTOMIZED TO MEET YOUR REQUIREMENTS

You haven't found the right vibration test system that fits your needs?
HBK provides vibration test solutions, tailored to your specific needs and testing requirements.



Environmental Stress Screening

Exposes new products to stresses such as thermal cycling and vibration in order to force latent defects to manifest themselves by permanent or catastrophic failure during the screening process.



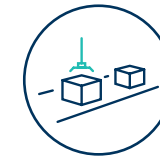
Durability and Fatigue Testing

Evaluates how well products and components hold up to typical use. Products are either tested to meet certain standards or they are shaken to destruction.



Modal and Structural Analysis

Identifies the modal parameters of structures under controlled boundary and environmental conditions.



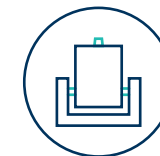
Package Testing and Transport Vibration Simulation

Ensures that the package will sufficiently protect the product while withstanding the stress of transportation.



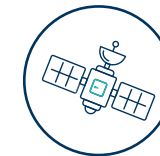
Buzz, Squeak and Rattle

Ensures that automotive components and interiors remain durable and free from noise, for greater passenger comfort.



Shock Testing

Tests if products and components survive a drop, an induced shock or even a pyro shock. Products and components are moved rapidly for a short time period.



Satellite Qualification Test

Guarantees that the equipment design meets the performance expectations required for a mission (from assembly and transportation to launch and operation).



Permanent magnet shakers

LDS® V101, V201, V406/8, V450 AND V455 SHAKERS

Ideal for modal analysis and high-frequency testing

The LDS® permanent magnet shakers are ideal solutions for vibration testing of components, small assemblies, or modal and structural analysis. The efficient armature design of these shakers enables them to deliver impressive peak forces and accelerations over a wide frequency range. Although external cooling is not required for the permanent magnet shakers, a fan unit can be added to force cool the larger shakers and to increase the max sine force level.

Shaker model	V100 Series	V200 Series	V400 Series		V450 Series	V455 Series
System sine force peak (N/lbf)	8.9/2	17.8/4	98/22	196/44	311/70	489/110
System max random force (N/lbf)	–	–	38/8.5	89/20	214/48	290/66
Max acceleration sine peak (m/s²/g _n)	1,373/140	892/91	490/50	980/100	730/74.4	1,147/177
System velocity sine peak (m/s – in/s)	1.31/51.6	1.49/58.7	1.52/59.8	1.78/70.1	1.78/70.1	2.5/98.4
Displacement pk-pk (mm/in)	2.5/0.1	5/0.2	14/0.6	17.6/0.7	19/0.8	
Moving element mass (kg/lb)	0.0065/0.01	0.02/0.04	0.2/0.4		0.426/0.9	
Usable frequency range (kHz)	DC – 12	DC – 13	DC – 9		DC – 7.5	
Amplifier Model	LPA100	LPA100	LPA100	LPA600	LPA600	LPA1000
Forced air cooling	No	No	No	Yes	Yes	Yes

CORE FEATURES:

- Low-mass, high-performance armature construction with two laminated-fibre flexures for axial support and to enhance lateral and rotational restraints
- Robust, lightweight suspension provides excellent torsional and transverse stiffness with minimal impact on system acceleration
- Base or trunnion mounted
- Compatible with COMET_{USB}™ and LASER_{USB}™ vibration controllers, enabling remote monitoring and control

Industry Applications

- Modal and structural analysis
- Electronic assembly testing
- Laboratory experiments

OPEN SYSTEM

Compatible with third party controllers and amplifiers



Low-force shakers

LDS® V555, V650, V721, AND V780 SHAKERS

Total system solutions

Combining a wide frequency range, high force and high acceleration, the low-force, air-cooled LDS® shakers deliver excellent all-round testing capabilities for modal, structural and component testing. The velocity and acceleration performances are enhanced by the armature fabrication, which incorporates a unique suspension mechanism to improve axial stiffness and lateral and rotational restraints. As standard, the low-force range is mounted on a solid cast-iron trunnion for measuring in three axes with built-in vibration isolation to prevent the transmission of low frequency vibration into the floor.

Shaker model	V555 Series	V650 Series		V721 Series	V780 Series
System sine force peak (kN/lbf)	0.94/211	1.62/364	2.2/495	2.9/651	5.12/1,150
System max random force (kN/lbf)	0.64/143	1.09/245	1.54/346	1.9/427	4.23/950
Half sine shock force (kN/lbf)	1.2/281	2.1/475	3.1/691	4.6/1,028	9.5/2,145
Max acceleration sine peak (m/s²/g _n)	981/100	722/73.7	981/100	650/66.3	1,088/111
System velocity sine peak (m/s – in/s)	1.5/59.1	1.4/55.1	1.5/59.1	0.7/27.6	1.9/74.8
Displacement pk-pk (mm/in)	25.4/1	25.4/1		25.4/1	25.4/1
Moving element mass (kg/lb)	0.94/2.1	2.24/4.9		4.46/9.8	4.7/10.4
Usable frequency range (kHz)	DC – 6.3	DC – 4		DC – 4	DC – 4
Amplifier Model	LPA1000+FPS	LPA1000+FPS	HPA-K range	LPA1000+FPS	HPA-K range

Force and velocity ratings depend on the amplifier driving the shaker. The parameters detailed here are based on the shaker when driven by the strongest amplifier of its range. Random force ratings are based on ISO5344.

CORE FEATURES

- Lightweight, high-performance armature delivers excellent acceleration and velocity performance
- Compatible with COMET_{USB}™ and LASER_{USB}™ vibration controllers, enabling remote monitoring and control
- Robust, lightweight suspension provides excellent torsional and transverse stiffness with minimal impact on system acceleration
- Ease of use and power saving features reduce operating costs
- Proven reliability maximizes system availability
- Several optional extras, such as slip tables and thermal barriers enable the system to be tailored to suit most applications

Industry applications

- Durability and fatigue testing of small components and assemblies
- Fatigue and resonance testing
- Modal and structural analysis
- Use as a velocity transducer or high-speed actuator
- In-house testing and calibration

Medium-force shakers

LDS® V8000–V8 SERIES OF SHAKERS

Industry standard for automotive, aerospace and defence, and electrical assembly testing

Providing the versatility and capability demanded by research and development, product qualification and stress screening, the **medium-force, air-cooled LDS® shakers** combine superior performance with low capital and running costs. The shakers can be fitted with different robust armature versions (from 185 to 640 mm) to economically adjust the mounting surface according to the size of the payload.

Shaker model	V830 Series	V850 Series	V875 Series	V875LS Series	V8750 Series	V8 Series
System sine force peak (kN/lbf)	9.8/2,205	22.2/5,000	35.6/8,000	35.6/8,000	35.6/8,000	57.8/13,000
System max random force (kN/lbf)	9.8/2,205	22.2/5,000	35.6/8,000	35.6/8,000	35.6/8,000	66/14,837
Half sine shock force (kN/lbf)	25.11/5,644	44.38/9,976	84.33/18,958	84.30/18,952	140/31,475	118.59/26,660
Max acceleration sine peak (m/s ² /g _r)	1,176/120	1,225/125	1,600/163	1,098/112	1,098/112	1,370/140
System velocity sine peak (m/s – in/s)	2/78.7	2/78.7	1.8/70.9	1.8/70.9	2.5/98.4	1.8/70.9
Displacement pk-pk (mm/in)	50.8/2	50.8/2	50.8/2	76.2/3	76.2/3	63.5/2.5
Moving element mass (kg/lb)	7.48/16.5	14.33/31.6	32.2/71	32.9/72.5	32.9/72.5	42.0/92.6
Usable frequency range (kHz)	DC – 3.5	DC – 3	DC – 3	DC – 3	DC – 3	DC – 2.5
Amplifier Model	SPA-K range			XPA-K		SPA-K range

Force and velocity ratings are dependent on the final configurations of the system with respect to the strength of the amplifier and diameter of the armature. Random force ratings are based on ISO5344. For full information, please refer to the associated product datasheets.

CORE FEATURES:

- Ideal for sine, random and high-acceleration shock tests, and many more control profiles
- Lightweight yet robust interchangeable armatures give the highest performance with reduced capital cost
- Advanced switching power amplifiers offer high reliability, reduced space requirements, and simple installation and operation
- Inductive centering system for non-contact, non-optical armature centering
- Compatible with COMET_{USB}™ and LASER_{USB}™ vibration controllers, enabling remote monitoring and control
- Several optional extras enable the system to be tailored to suit most applications, such as trunnion mounting with rotation gearbox, horizontal hydrostatic slip tables. In special instances climatic chambers can be applied for environmental stress testing

Industry applications:

- Package testing
- Squeak & Rattle testing
- Environmental stress screening and hot shake testing
- Shock & Drop testing
- Durability and fatigue Testing



High-force shakers

LDS® V900–V9 SERIES AND V8900 SHAKER

The standard for high-force, long-duration vibration testing

Where large payloads require high performance vibration or shock testing, the **high-force water and air-cooled LDS® shakers** from HBK give engineers the confidence they need to develop highly reliable complex parts and large assemblies. With their large frequency range and advanced hydrostatic bearing technology with inductive or optical armature centering systems, they enable long or high shock tests without significant wear-and-tear.

Shaker model	V8900 Series	V964 Series	V9 Series	V984 Series	V994 Series
System sine force peak (kN/lbf)	80/17,984	89/20,000	105/23,605	160.1/36,000	289.1/65,000
System max random force (kN/lbf)	76.2/17,130	89/20,000	105/23,605	160.1/36,000	289.1/65,000
Half sine shock force (kN/lbf)	254.1/57,124	186.9/42,022	193.1/43,419	322.2/72,439	578.8/130,129
Max acceleration sine peak (m/s ² /g _r)	980.7/100	980.7/100	1,471/150	980.7/100	735.5/75
System velocity sine peak (m/s – in/s)	2.5/98.4	2/78.7	3/118.1	2/78.7	1.9/74.8
Displacement pk-pk (mm/in)	101.6/4	38.1/1.5	76.2/3	38.1/1.5	50.8/2
Moving element mass (kg/lb)	77.5/170.9	59/130	49.8/109.8	130.2/287	254.9/561.9
Usable frequency range (kHz)	DC – 3	DC – 2.5	DC – 2.7	DC – 1.7	DC – 2
Amplifier Model	XPA-K	DPA-K	SPA-K	DPA-K	DPA-K

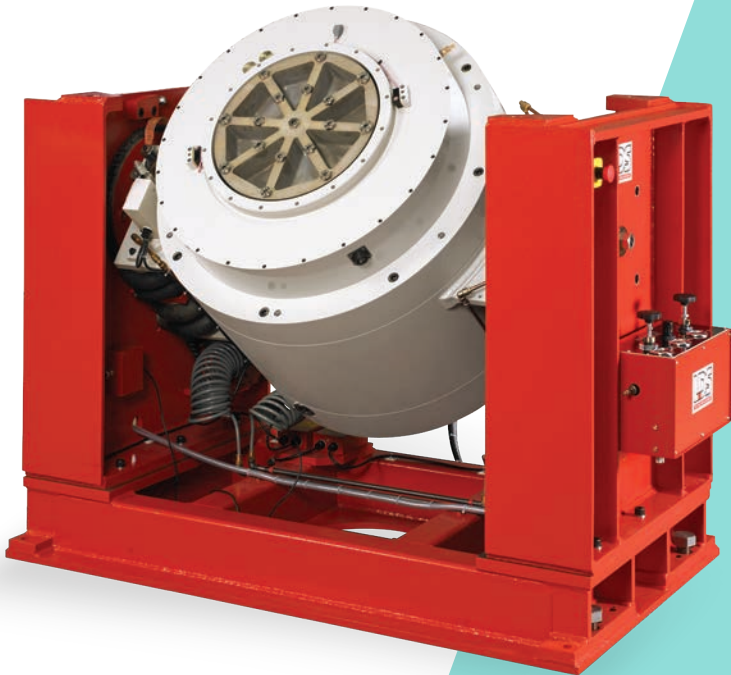
Force and velocity ratings depend on the amplifier driving the shaker. The parameters detailed here are based on the shaker when driven by the strongest amplifier of its range. Random force ratings are based on ISO5344.

CORE FEATURES:

- Peak force ratings from 80 kN to 289 kN
- Available with an amplifier remote control for lab setups
- Inductive centering system for non-contact, non-optical armature centering
- Compatible with COMET_{USB}™ and LASER_{USB}™ vibration controllers, enabling remote monitoring and control
- High performance hydrostatic armature bearing for improved robustness and high overturning moment restraint
- Several optional extras enable the system to be tailored to suit most applications, such as Lin-E-Air shaker suspension, head expanders, slip table and thermal barriers

Industry applications

- Package testing
- Squeak & Rattle testing
- Shock & Drop testing
- Battery testing
- Environmental stress screening and hot shake testing
- Durability and fatigue testing for components and complete assemblies
- Satellite qualification testing
- Testing in clean rooms and controlled environments



Vibration amplifiers

LDS® LINEAR AND DIGITAL SWITCHING POWER AMPLIFIERS

An amplifier for each shaker

The LDS® line of linear and digital switching amplifiers offers energy-efficient and robust operation for power requirements up to 280 kVA. Our different amplifier modules can be used for driving LDS® shakers and third-party shakers with the corresponding force ratings.

Amplifier model	LPA	HPA-K	SPA-K	XPA-K	DPA-K
Amplifier Type	Linear Power	Linear Power	Switch-Mode	Switch-Mode	Switch-Mode
Power range (kVA)	0.154 – 1.296	5	8 – 176	88 – 128	80 – 280
Modulation range (kHz)	DC – 15	DC – 5	DC – 10	DC – 10	DC – 10
Shaker Range	Permanent Magnet + Low Force Range	Low Force Range	Medium Force Range	LDS® V8900	High Force Range

Force and velocity ratings of different shaker systems depend on the amplifier driving the shaker. HBK's wide range of amplifiers offer diverse force and velocity parameters ideal for your application.

CORE FEATURES:

- Remote control capability and remote diagnostics
- Connected services
- Variable field power/power balancing reducing ongoing running costs
- LDS® linear power amplifiers offer low noise and low distortion
- From the LDS® HPA-K range onwards, all amplifiers offer maximum power, minimum waste, and lower running costs
- LDS® XPA-K and LDS® DPA-K amplifiers are modular and scalable to easily increase a systems power capacity to meet future needs

COOL AND QUIET MODE

The intuitive user interface of the LDS® XPA-K amplifier enables a QUIET mode for low acoustic noise to detect sources of noise during durability or buzz, squeak and rattle testing. The COOL mode of the LDS® XPA-K amplifier offers an optimized energy usage profile that lowers the cost of ownership.



Vibration controllers

LDS® COMET_{USB}™

Economical for production testing

Offering high performance at a very affordable price, the LDS® COMET_{USB}™ Vibration Controller is an ideal solution to the everyday demands of your shock and vibration testing. COMET_{USB}™ provides the flexibility to perform random, swept sine and shock testing on electrodynamic shakers using a switching power amplifier. Easy-to-use software together with extensive automation features make it a perfect fit for vibration stress screening and production testing applications, fully compatible with TEDS - Transducer Electronic Data Sheets.

CORE FEATURES:

- Very economical and suitable for random, sine and shock tests
- Simplified or advanced user interfaces are suitable for different operators and tests
- Setup wizard for error-free test setup

LDS® LASER_{USB}™

Convenience, performance, flexibility and safety

Offering 24-bit precision with wide control dynamic range, and fast loop times, the LDS® LASER_{USB}™ Vibration Controller offers superb control for your most challenging tests ranging from random, swept sine, resonance dwell, classical shock to random on random, sine on random, shock SRS, and field data replication. Advanced technologies reduce test time and increase the reliability of your product. One-click reporting makes it quick and easy to create comprehensive reports for your design group or customer.

CORE FEATURES:

- Full capability for vibration control and data analysis
- Kurtosis control and fatigue monitoring reduces test time and improves product reliability
- Multi-channel with 2 to 16 channels for multi-point control, limiting and analysis
- Processing independent of the host PC with fast loop times for the ultimate in performance and safety

LAB INTEGRATION

LASER_{USB}™ can integrate and coordinate all your test equipment. The Amplifier Controller software option allows control of an LDS® SPA-K amplifier from the same PC used to run the vibration control software. A seamless connection with the control software of many popular chamber makers is provided by the Chamber Interface option.

NET-Integrator provides ActiveX commands that interface vibration control applications with user programs. This capability makes it possible to develop simple user interfaces and automate complex test procedures.



Going the extra mile: Vibration testing turnkey solution

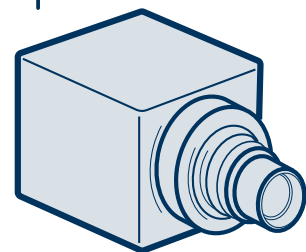
HBK accomplishes the vibration test systems with the right vibration control software and accessories such as head expanders, slip tables and thermal barriers to offer a turnkey solution for your vibration measurement. But that's not all: HBK analysis and engineering software as well as data acquisition hardware and software enable durability and reliability testing – simultaneously or stand-alone.

EXTEND YOUR TESTING CAPABILITIES

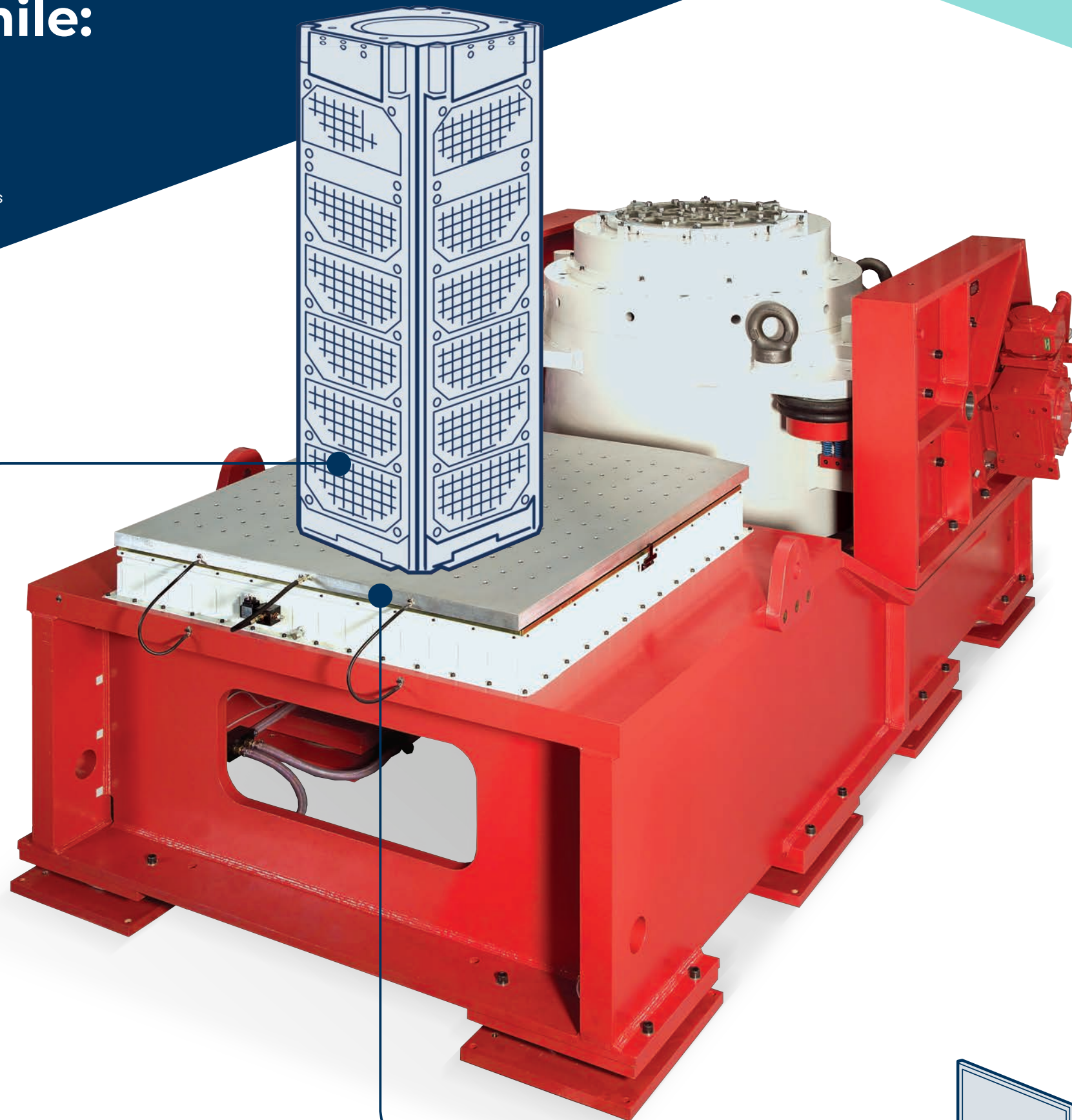
1. **LDS® Head Expanders** (guided and unguided) consist of a large high-strength, aerospace-grade magnesium alloy platform that is bolted to the shaker's load table. It increases the effective mounting surface to accommodate larger or numerous payloads.

2. **LDS® Thermal Barriers/Extenders** protect the shaker from high and low temperatures, to enable the use of climatic chambers during environmental testing. HBK works closely together with manufacturers of climatic chambers.

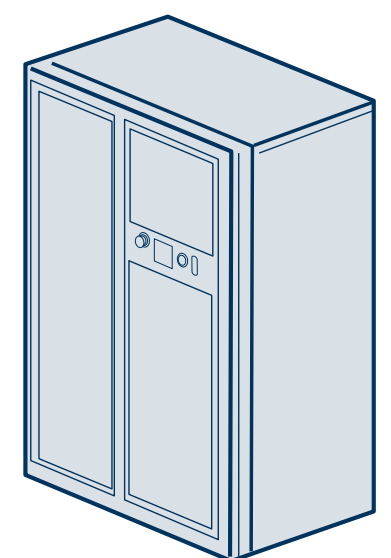
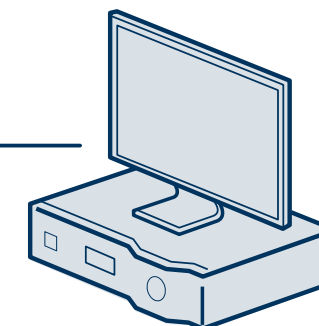
3. **LDS® Slip Tables** are ideal when testing applications in three individual axes. A slip table typically consists of a magnesium plate sitting atop a smooth granite block through the connection between either linear or hydrostatic bearings, with a lubricating film in between. Both are housed in a frame that connects to the shaker's armature, enabling it to excite payloads in the horizontal position.



HBK vibration transducers are used to monitor and control the vibration imparted into the test object based on defined profiles but also acquire data for immediate or post process analysis.



HBK measurement hardware and software, LAN-XI data acquisition hardware and BK Connect® software can be used to analyze the durability and reliability of the payload – simultaneously or stand-alone.





Rapid response

The prime goal of our global support service is to ensure that your system is always fine-tuned to your needs, and that any problems are resolved quickly.



Preventative maintenance with unplanned downtime

Reliability and efficiency demand professional servicing at regular intervals. We understand the cost implications of downtime and strive with our [shaker system service contracts](#) to both minimize it and plan it well in advance.



In-depth training

From introduction courses to [on-site help](#), we can help you meet your testing goals. Our world-renowned experts offer many different opportunities for [comprehensive staff training](#): online, in person or at your site.

Global service for vibration test systems

Your choice of a service partner is as critical as your choice of system. Effective maintenance and adequate staff training are essential to get the most out of your investment and safeguard its future. Thanks to the worldwide service team, HBM will continue to help you minimize downtime and maximize test performance long after we have installed your system. It's part of being an all-round partner.

ALL-ROUND PARTNER FOR VIBRATION TEST SYSTEMS

- Site surveys, installation, commissioning and decommissioning plans
- Staff training, development and support
- System modifications and upgrades
- Service contracts and preventative maintenance with genuine spare parts for vibration test systems
- Our troubleshooting expertise and product development services, deliver specialist knowledge and state-of-the-art equipment and facilities to help with any challenges.





www.bksv.com/lds

Hottinger Brüel & Kjær UK Ltd

SG 5BQ Royston · United Kingdom

Telephone: +44 1223 389800 · Fax: +44 1763 249715

www.bksv.com · ukinfo@bksv.com

Hottinger Brüel & Kjær A/S

DK-2850 Nærum · Denmark

Telephone: +45 77 41 20 00 · Fax: +45 45 80 14 05

www.bksv.com · info@bksv.com

Local representatives and service organizations worldwide