



DSX-Series Vibration



THE DRIVING FORCE IN ELECTRODYNAMIC VIBRATION TESTING

Vibration Experience That Counts

A global vibration manufacturer for more than 35 years, Thermotron specializes in high-performance vibration test system integration. Our electrodynamic shakers feature superior acceleration, velocity, force, and shock performance. With a rugged, lightweight magnesium armature, a powerful IGBT-based amplifier, and an intuitive Windows®-based vibration control system, Thermotron's DSX-Series electrodynamic shakers provide durability and versatility that meet a variety of vibration testing applications.

DSX-Series Vibration

Model Sizes

Thermotron is a turnkey manufacturer of Vibration Test Systems, including the shaker, amplifier, control system, sliptables, head expanders, and fixtures. From running random and sine-to-shock, sine-on-random, and random-on-random tests, Thermotron's versatile performance can meet your specific testing needs.

SMALL FORCE RANGE

DSX-2250

- 2,250 force pound (10 kN) sine and random capabilities
- 12" (30.5 cm) diameter armature
- 500 pound (227 kg) payload support
- 90 ips (2.28 mps) continuous velocity
- 100g bare table acceleration*



MEDIUM FORCE RANGE

DSX-4000

- 4,000 force pound (17.8 kN) sine and random capabilities
- 16" (40.6 cm) or 24" (61 cm) diameter armature
- 1,000 pound (454 kg) payload support (1,500 pound option)
- 70 ips (1.78 mps) continuous velocity
- 60g bare table acceleration (with 16" armature)*

DSX-6650

- 6,650 force pound (29.6 kN) sine and random capabilities
- 16" (40.6 cm) or 24" (61 cm) diameter armature
- 1,000 pound (454 kg) payload support (1,500 pound option)
- 90 ips (2.28 mps) continuous velocity
- 100g bare table acceleration (with 16" armature)*

DSX-8000

- 8,000 force pound (35.6 kN) sine and random capabilities
- 16" (40.6 cm) or 24" (61 cm) diameter armature
- 1,000 pound (454 kg) payload support (1,500 pound option)
- 100 ips (2.54 mps) continuous velocity
- 120g bare table acceleration (with 16" armature)*



LARGE FORCE RANGE

DSX-12000

- 12,000 force pound (53.4 kN) sine and random capabilities
- 16" (40.6 cm) or 24" (61 cm) diameter armature
- 1,000 pound (454 kg) payload support (1,500 pound option)
- 90 ips (2.28 mps) continuous velocity
- 120g bare table acceleration (with 16" armature)*



*Bare table does not include standoffs or thermal barrier.

DSX-Series Vibration

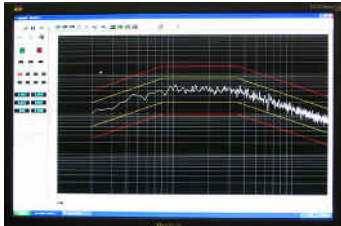
Features & Benefits

AMPLIFIER

The DSX-Series air-cooled power amplifier efficiently drives the shaker to full output over a specified frequency range. The amplifier uses state-of-the-art IGBT technology, combining the fast switching of a MOSFET with high current capability and low power dissipation of a bipolar transistor. Each IGBT is controlled by a driver IC that continually monitors every switching element for fault conditions and safely shuts down the system before components fail.



WinVCS-3200



Controlled by Thermotron's exclusive Windows®-based WinVCS-3200 Vibration Control System, the DSX-Series is designed for versatility and ease of use with a 24" (61 cm) widescreen color monitor. WinVCS-3200 software is available for accurate sine, random, shock, shock response spectrum, resonant search and dwell, real data acquisition and playback (RDAP), random-on-random, and sine-on-random capabilities. The WinVCS-3200 features over 85 dB of dynamic range, a selectable resolution up to 3,200 lines, and a user-selectable frequency range up to 3,000 Hz. Eight input channels are standard. Built-in Ethernet capabilities give the

WinVCS-3200 network-wide accessibility. The USB ports allow programs to be interchanged between instruments quickly and easily, which allows for the export and transfer of test data using a USB flash drive.

ARMATURE

Made from magnesium, Thermotron armatures are lightweight and durable for maximized acceleration levels. Radial-finned design directs uniform forces through a single structure to the specimen mounting surface. This mounting surface incorporates standoffs arranged on concentric bolt circles that minimize thermal transfer and support long-term reliability testing. Custom wound armatures are available for specific performance.

HEAD EXPANDERS

Head expanders and plates increase the mounting area for attaching fixtures and products. Our head expanders and plates are designed for proper stiffness (i.e. gusseted and welded) and are made of durable magnesium. Head expander weight is reduced where practical. It also features corrosion protection.

FIXTURING

Thermotron's fixture design combines experience, computer analysis, and knowledge of customer testing needs to optimize the critical issues of resonance and performance to provide the best fixture for each specific need. Acting as an interface between the shaker and the product under test, fixtures are built to be rigid and lightweight. Our fixtures mount easily to the armature and allow for quick changes, helping to improve productivity. Thermotron provides complete customization in fixture designs, product fit-up, and ongoing engineering support throughout the life of your fixture. Fixtures can accommodate multiple products, improve throughput, and save time and money.



SLIPTABLES



All shakers in the DSX-Series can be used with sliptables and a trunnion, allowing horizontal-axis vibration by rotating the shaker 90°. Our single piece table construction with a solid trunnion limits the relative body motion of the shaker, improving low frequency/high displacement performance of the overall system. This solid trunnion and base configuration reduces problems associated with misalignment. Our sliptables go beyond the standard oil film system with options of guideline and hydrostatic bearings in order to provide true and consistent horizontal vibration performance for product loading configurations with a high center of gravity.

Combined Environment Test Facilities

Thermotron's electrodynamic shakers are fully compatible with environmental test chambers for combined environment testing. Thermotron is the only manufacturer of combined environment testing. Interfacing features include a thermal isolation system, casters, and the necessary interconnects for remote control by chamber instrumentation.



Shaker and Chamber Control on One Screen

Thermotron is also the only manufacturer that has shaker and chamber functions on a single screen. The



WinVCS-3200 powers this controller on a 24" (61 cm) widescreen color monitor. Vibration control information is displayed on one half of the screen and chamber control information on the other for convenient viewing

of test progress and other information.

Options & Accessories

Thermotron is proud to offer Vibration Test System options to improve interface, wisely use utilities, meet certain space constraints, expand overall productivity, and enhance data collection, monitoring, or communication with products under test.

- Power Tow
- Airglide Mobility System
- Quiet Packages
- Accelerometer Packages
- Sound Enclosures
- Standoffs for Thermal Isolation
- Head Expanders
- Fixtures
- Sliptables



Custom Solutions Thermotron specializes in creating custom shakers to meet specific testing needs. Whether you have a special test specification or a unique product, we can help find a turnkey solution.

Comprehensive Vibration Service

When you work with Thermotron you are supported by the largest, best equipped, and most highly trained service force in the test equipment industry. A network of direct-sales representatives, field service engineers, and application engineers provide support before and after the sale. From preventive maintenance to our responsive parts department, our worldwide service centers and technical support staff provide expert assistance throughout the life of your equipment.

Our Vibration History

Innovative thinking and deep-rooted commitment to customer service have kept us in the shock and vibration industries for more than 35 years. We were the first to introduce a low profile electrodynamic shaker to interface with environmental chambers and the first to use switching (Class D) amplifiers, making our shakers more efficient and reliable than previous linear amplifiers.

Thermotron was the first to use microprocessor-based dynamic centering on vibration systems. We are also the only manufacturer in the industry that manufactures all components needed to create a combined environment test facility, including the chamber, shaker, amplifier, and all of the integrated control systems and software, as well as sliptables, head expanders, and fixturing.

Our Vibration Experience

Thermotron develops and refines vibration test systems that set industry standards. Our equipment meets many of the most widely used vibration test specifications, including those from SAE, MIL-STD, IEC, ISTA, JIG, EIA, ISO, NAVMAT, JIS, Telcordia, and ASTM. Our equipment is able to perform transportation testing, stress screening, dynamic simulation, accelerated stress testing, and seismic vibration.

We proudly meet international certification requirements such as UL, CE, CSA, and VDE including provisions for shock and vibration resistance.



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Thermotron DSX-Series Electrodynamic Vibration GENERAL SPECIFICATIONS

Shaker Model	DSX-2250		DSX-4000		DSX-6650		DSX-8000		DSX-12000			
Armature Size Inches / Centimeters	12 / 30.5		16 / 40.6	24 / 61	16 / 40.6	24 / 61	16 / 40.6	24 / 61	16 / 40.6		16 / 40.6	24 / 61
Amplifier Model	915/1		915/1		930/2		945/3		960/4	960/5	960/5	
Force Rating Sine Peak lbf / kN Random ¹ RMS lbf / kN	2,250 / 10.0 2,250 / 10.0		4,000 / 17.8 4,000 / 17.8		6,650 / 29.6 6,650 / 29.6		8,000 / 35.6 8,000 / 35.6		12,000 / 53.4 12,000 / 53.4			
Shock vs. Load Rating ² Lbs / Kg	30g: 280 / 127 50g: 120 / 54 100g: 15 / 6.8	30g: 375 / 170 50g: 200 / 91 75g: 19 / 8.6	30g: 357 / 162 50g: 182 / 82 75g: 1 / 0.45	30g: 750 / 340 50g: 280 / 127 85g: 45 / 20	30g: 732 / 332 50g: 262 / 119 85g: 26 / 12	30g: 840 / 381 50g: 425 / 192.8 100g: 100 / 45.3	30g: 822 / 373 50g: 407 / 185 100g: 82 / 37	30g: 1,000 / 454 50g: 575 / 261 100g: 120 / 54	30g: 1,000 / 454* 50g: 575 / 261* 100g: 200 / 91*	30g: 1,500 / 681 50g: 650 / 295 100g: 95 / 43.2	30g: 1,485 / 675 50g: 635 / 289 100g: 80 / 36.4	
Maximum Velocity ³ —Sine Sweep ips/mps	90 / 2.28		70 / 1.78		90 / 2.28		100 / 2.54		90 / 2.29			
Displacement Rated	2.5" (63mm) pk-pk continuous 3" (75mm) between stops		2.5" (63mm) pk-pk continuous sine 3" (75mm) shock						2.5" (63mm) pk-pk continuous sine 3" (75mm) shock			
Frequency Range ⁴	5-3,000 Hz		5-3,000 Hz	5-2,500 Hz	5-3,000 Hz	5-2,500 Hz	5-3,000 Hz	5-2,500 Hz	5-3,000 Hz		5-2,750 Hz	
Mass—Lbs / Kg	22.5 / 10.2		66.5 / 30.2	85 / 38.6	66.5 / 30.2	85 / 38.6	66.5 / 30.2	85 / 38.6	66.5 / 30.2		100 / 45.5	115 / 52.3
Axial Resonance	2,900 Hz		2,200 Hz	1,800 Hz	2,200 Hz	1,800 Hz	2,200 Hz	1,800 Hz	2,200 Hz		1,925 Hz	
Mounting Points	16*		17*	25*	17*	25*	17**	25**	17**		17**	25**
Payload Support ⁵ —Lbs / Kg	500 / 227		1,000 / 454						1,000 / 454			
Stray Magnetic Field (gauss)	Less than 5 [^]		Less than 8 ^{^^}	Less than 12 ^{^^}	Less than 8 ^{^^}	Less than 12 ^{^^}	Less than 8 ^{^^}	Less than 12 ^{^^}	Less than 8 ^{^^}		Less than 20 ^{^^}	
Shaker Weight—Lbs / Kg	1,980 / 898		6,000 / 2,722						9,000 / 4,083			
Shaker Dimensions—WxDxH Inches Centimeters	26x40x34 66x102x86		38x53x33 97x134x84						48x51x38 122x130x96			
Cooling Blower Duct Diameter Inches / Centimeters	6 / 15.2		8 / 20						8 / 20			
Blower Motor	5 Hp (3.8 kW)		5 Hp (3.8 kW)		10 Hp (7.5 kW)		15 Hp (11.3 kW)		20 Hp (15.1 kW)			
Airflow	450 CFM (0.22m ³ /s)		550 CFM (0.26m ³ /s)		800 CFM (0.38m ³ /s)		960 CFM (0.43m ³ /s)		1100 CFM (0.49m ³ /s)			
Blower Dimensions ⁶ —WxDxH Inches Centimeters	25x23x26 64x58x66		25x23x26 64x58x66		43x30x44 109x76x112		46x34x46 117x87x117		51x36x48 130x92x122			
Blower Weight—Lbs / Kg	145 / 66		145 / 66		385 / 175		500 / 227		530 / 241			
Console Dimensions—WxDxH Inches Centimeters	34x32x78.5 86x81x199		34x32x78.5 86x81x199						34x32x78.5 86x81x199			
Heat Rejected (Maximum)	39,000 BTUH		59,000 BTUH		81,200 BTUH		132,000 BTUH		176,000 BTUH		176,000 BTUH	
Recommended Minimum Service ⁷ 460 / 3 / 60 400 / 3 / 50	30 Amp 35 Amp		40 Amp 45 Amp		60 Amp 70 Amp		80 Amp 90 Amp		115 Amp 135 Amp		130 Amp 150 Amp	
Environmental Characteristics Room Ambient Combined	5°C to 40°C / 40°F to 104°F -54°C to 85°C / -65°F to 185°F		5°C to 40°C / 40°F to 104°F -73°C to 138°C / -100°F to 250°F						5°C to 40°C / 40°F to 104°F -73°C to 138°C / -100°F to 250°F			

- For a uniform power spectral density from 20 to 2,000 Hz, payload mass equal to or greater than twice the armature mass.
 - Half sine shock pulse, 40% symmetric pre and post pulse, field reduced per engineering specifications.
 - Rated sine performance is "full field". Increased velocities may be obtained with reduced field, especially in shock testing.
 - Dependent on controller resolution, slew rate, and loading.
 - 1000 lbm (454 kg) payload support systems have 1500 lbm (680 kg) load support option available.
 - Nominal for a 460/3/60 system.
 - Valid for vertical systems only. Horizontal systems will vary based on slidable requirements. Other voltages available.
- + Shock specifications are valid for IEC60068-2-27 & 29 (GMW3172 requirement) pre and post pulses and 40% pre-post.

* Aluminum inserts 3/8-16 UNC standard for DSX-2250, DSX-4000, and DSX-6650. Stainless and other threads available.

** Stainless inserts 3/8-16 UNC standard for DSX-8000 and DSX-12000. Other thread sizes available.

[^] At full field with degauss coil, 85 gauss without degauss coil, at 6" (150 mm) above mounting surface. Vertical system only.

^{^^} At 6" (150 mm) above mounting surface. Degauss kit optional for reduction to less than 5 gauss at full field for DSX-4000, DSX-6650, and DSX-8000; reduction to less than 8 gauss at full field for DSX-12000. Vertical systems only.

Air supply: 2SCFM at 90 psi (1 L/sec. @ 6.2 BAR).

Automatic centering with indicators and optical electronic overtravel protection.

Specifications subject to change without notice.