

# UNHOLTZ-DICKIE CORP.



Industry Leading Test Solutions



VIBRATION TEST EQUIPMENT



[www.udco.com](http://www.udco.com)

## About Unholtz-Dickie

Unholtz-Dickie Corporation (UD) was founded in 1959, and has achieved a leadership position in the Vibration Test Industry, with over 8,000 installations in more than 45 countries. UD designs and manufactures complete systems for vibration and shock testing which include electrodynamic shakers, power amplifiers, PC-based controllers, slip table assemblies, long stroke thrusters, transducer calibrators, head expanders, accelerometers and charge amplifier instrumentation. UD systems combine strong performance specs with proven reliability - a combination that represents solid value to our customers.



**UD Factory and Corporate Headquarters  
Wallingford, CT**

Vibration and mechanical shock tests are key components of most engineering and manufacturing operations, used for initial design validation as well as for production screening. UD Systems are commonly used to establish compliance with a broad range of industry test standards, including the following representative list:

- ◆ MIL-STD: 167 / 202 / 331 / 726 / 750 / 781 / 810 / 883
- ◆ ASTM: D4728 / D3580
- ◆ SAE
- ◆ IEC 68
- ◆ JIS
- ◆ RTCA/DO-160
- ◆ ETSI
- ◆ GR-63 / GR-468 / GR-1221
- ◆ IEEE-344
- ◆ ESS Stress Screening

Currently, UD offers nine families of shaker systems (S-Series, H-Series, R-Series, K-Series, T2000, T4000, T5000, T5500 and LS Thrusters), with more than 87 different configurations and a force range of 100 to 55,000 lbf (.45 - 245 kN).

## Typical Vibration System Configuration

This diagram represents a typical vibration test system configuration. Vibration or shock motion is generated by the shaker in response to an amplified drive signal that originates at the controller. The generated vibration is measured by accelerometers which provide a conditioned feedback signal to the controller to establish closed loop control.

A wide variety of test conditions can be programmed using software modules, including: Sine, Random, Shock Pulse, Sine-on-Random, Random-on-Random and reproduction of actual time histories (g vs. time) taken from measured field data.



## S-Series - Small

100 - 1,000 lbf (.45 - 4.4 kN)



Models S062 / S092



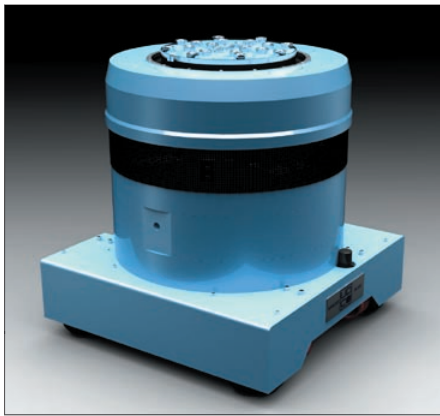
Model S032

**S-Series - Small** vibration systems are the popular choice when testing small size payloads. Three shaker models cover this output force range with armature sizes of 4.1" (105 mm) or 7.0" (178 mm) diameter. Typical test payloads include small circuit cards, small electronic modules, cell phones and computer disk drives. Automotive industry payloads include switches and engine sensors.

- ◆ 3 Shaker Models: S032 / S062 / S092
- ◆ 2 inch (51 mm) Stroke
- ◆ 100% Air Cooled
- ◆ High "g" Shock Pulse Output: up to 1,500 g pk (S092)
- ◆ Base Options: Pedestal

## S-Series - Medium

1,000 - 2,200 lbf (4.5 - 9.8 kN)



Model S202 w/ Low  
Profile Base

**S-Series - Medium** vibration systems are the choice for testing small to intermediate size payloads. The model S202 covers this output force range and includes the versatile 13.4" (340 mm) diameter armature. Typical test payloads include: larger circuit boards, electronic modules, laptops, printers, related PC hardware. Automotive industry payloads include instrument clusters, interior and exterior body mounted components.

- ◆ Shaker Model: S202
- ◆ 2 inch (51 mm) Stroke
- ◆ Versatile 13.4" (340mm) diameter armature
- ◆ 100% Air Cooled
- ◆ Automatic Load Support: 600 lbs (272 kg)
- ◆ Base Options: Low Profile / Pedestal / Slip Table
- ◆ Combined Vibration / Temperature Interface Capability

## S-Series - Large

4,500 - 6,000 lbf (20 - 26.7 kN)



Model S452-16 w/ Low Profile  
Base, Casters & Handle

**S-Series - Large** Vibration Systems are the choice for testing intermediate size payloads. Two shaker models covers this output force range, with two armature sizes: 13.3" (337 mm) or 17.5" (445 mm) diameter. Typical test payloads include a variety of electronic or mechanical assemblies. Automotive industry payloads include engine components.

- ◆ 2 Shaker Models: S452 / S452-16
- ◆ 2 Armature Diameters: 13.3" / 17.5" (337 / 445 mm)
- ◆ 2 inch (51 mm) Stroke
- ◆ 100% Air Cooled
- ◆ Automatic Load Support: 800 lbs (364 kg)
- ◆ Base Options: Low Profile / Pedestal / Slip Table
- ◆ Combined Vibration / Temperature Interface Capability



## H-Series

6,000 - 8,000 lbf (26.7 - 35.6 kN)



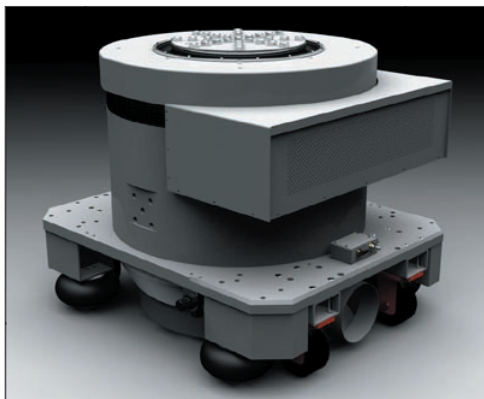
**Model H560B-24-3 Three Inch Stroke Shaker w/ Low Profile Base, Casters & Handle**

**H-Series** Vibration Systems provide increased force output to deliver test levels up to 160 g sine and 400 g shock. Three armature sizes are available: 13.3" dia (338 mm), 17.5" dia (445 mm) and 25.5" dia (647 mm). Model H560BAC/2 shaker with extended frequency range is optimized for testing to 5,000 Hz. All models include automatic load support and armature centering.

- ◆ 4 Shaker Models: H560B-12 / H560B-16 / H560B-24 / H560BAC/2
- ◆ 3 Armature Diameters: 13.3" / 17.5" / 25.5" (338 / 445 / 647 mm)
- ◆ 2 inch (51 mm) Stroke (H560-12, -16, -24) Standard
- ◆ 3 inch (76 mm) Stroke (H560-16, -24) Optional
- ◆ 100% Air Cooled
- ◆ Automatic Load Support:
  - H560B-12: 800 lbs (363 kg)
  - H560B-16: 1,360 lbs (618 kg)
  - H560B-24: 1,500 lbs (680 kg)
- ◆ Base Options: Low Profile / Pedestal / Slip Table
- ◆ Combined Temperature/Vibration Thermal Interface Options
- ◆ High Shock Configurations: 100g - 11 msec Half-Sine on 200 lbs (91 kg)

## R-Series

10,000 - 13,500 lbf (44.5 - 60 kN)



**Model R16C w/ Low Profile Base & Casters**

**R-Series** Vibration Systems provide higher force output and are 100% air cooled. Two armature sizes are offered: 17.5" (445 mm) and 25.75" (654 mm) diameter. Optional Head Expanders can accommodate large test articles such as wide screen televisions, flight equipment, telecom racks, shipboard hardware and major automotive components.

- ◆ 5 Shaker Models: R16A / R16C / R16CA / R24A / R24C
- ◆ 2 Armature Diameters: 17.5" / 25.75" (445 / 654 mm)
- ◆ 2 inch (51 mm) Stroke Standard
- ◆ 2.5" (63 mm) Stroke and 3" (76 mm) Stroke Option for R16C / R16CA
- ◆ 100% Air Cooled
- ◆ Automatic Load Support: 1,500 lbs (680 kg)
- ◆ Base Options: Low Profile / Pedestal / Slip Table
- ◆ Combined Vibration / Temperature Interface Capability

## K-Series

18,000 lbf (80.1 kN)



**Model K180-24C-3 w/ Pedestal Base**

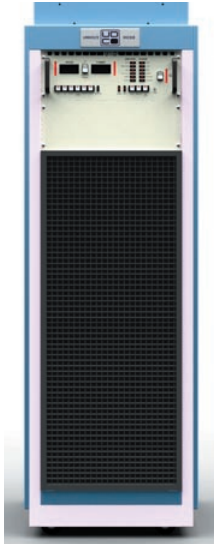
**K-Series** Vibration Systems provide the highest force output with 100% air cooling. Two armature sizes are offered: 17.5" (445 mm) and 25.75" (654 mm) diameter. Optional Head Expanders can accommodate very large test articles such as well drilling equipment or large hydraulic systems. Automotive payloads include large lithium ion batteries or fuel cell stacks for EV or alternate propulsion drive vehicles.

- ◆ 2 Shaker Models: K180-16CA-3 / K180-24C-3
- ◆ 2 Armature Diameters: 17.5" / 25.75" (445 / 654 mm)
- ◆ 3 inch (76 mm) Stroke Standard
- ◆ 100% Air Cooled
- ◆ Automatic Load Support: 2,500 lbs (1,136 kg)
- ◆ Base Options: Low Profile / Pedestal / Slip Table
- ◆ Combined Vibration / Temperature Interface Capability

## SALL / SAI Replacement Power Amplifiers

Older vibration test systems include low efficiency, water cooled Power Amplifiers housed in large multi-bay consoles. These old technology linear amplifiers consume large amounts of 3-phase electrical power, occupy excessive amounts of valuable floor space and require environmentally "unfriendly" water cooling systems.

UD offers SALL or SAI series replacement power amplifiers in SMALLER or LARGER sizes. The replacement amplifier type / size selection is made to best match the original shakers' impedance characteristics and output KVA requirements.

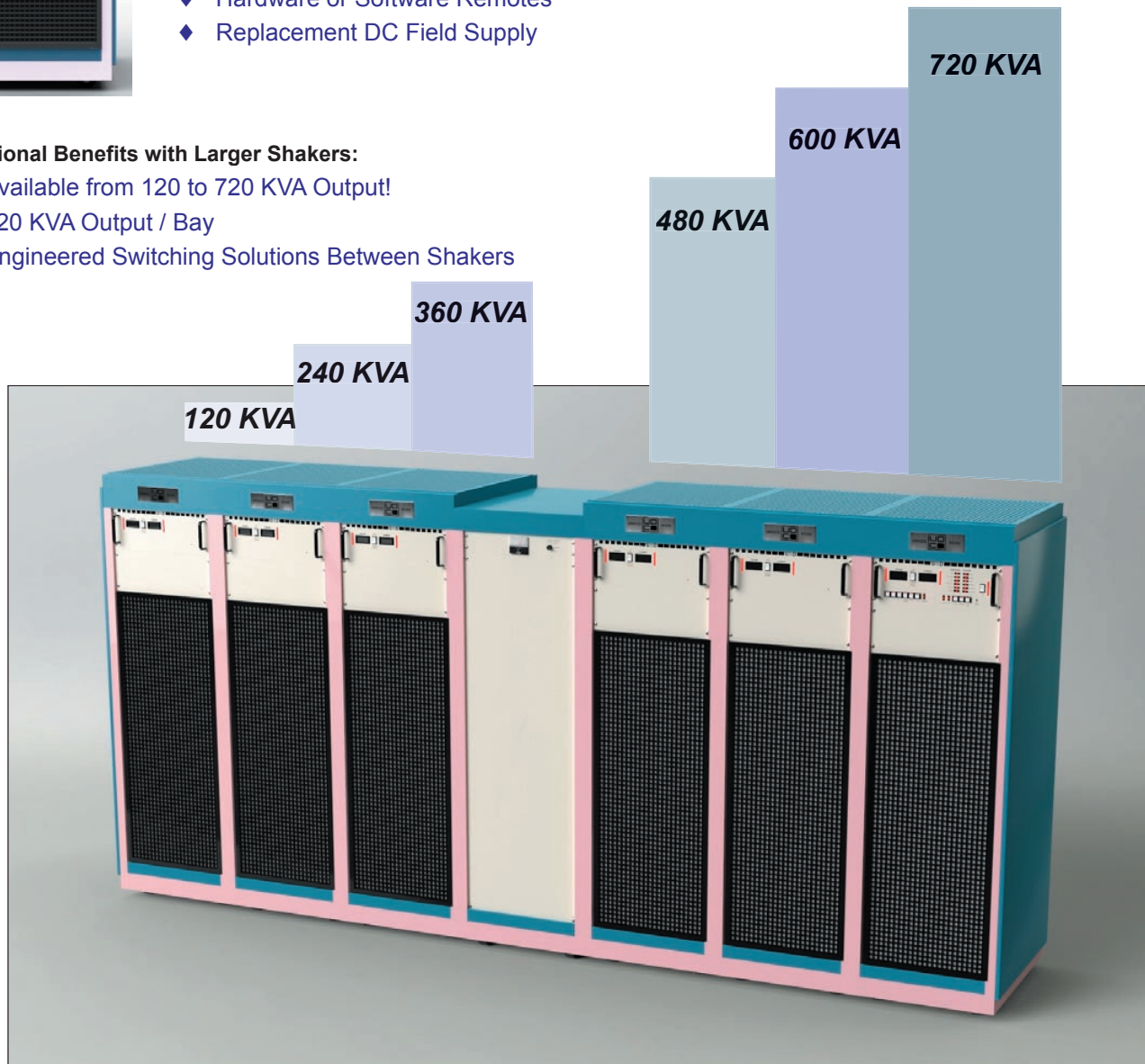


### Benefits with Smaller Shakers:

- ◆ 25 to 100 KVA Output (Single Bay)
- ◆ 2:1 Typical Floor Space Reduction
- ◆ 12 Interlock Protection Circuits for Safety
- ◆ Advanced IGBT Transistor Circuitry
- ◆ EMI Shielded Consoles and AC Line Filtering Standard
- ◆ Direct Coupling Between Amplifier & Shaker - NO Matching Transformer
- ◆ Increased Random and Shock Ratings
- ◆ Totally Air Cooled, Eliminates Water Cooling
- ◆ Reduced Power Consumption: >90% Efficient
- ◆ Comprehensive Command / Status Panel
- ◆ Hardware or Software Remotes
- ◆ Replacement DC Field Supply

### Additional Benefits with Larger Shakers:

- ◆ Available from 120 to 720 KVA Output!
- ◆ 120 KVA Output / Bay
- ◆ Engineered Switching Solutions Between Shakers



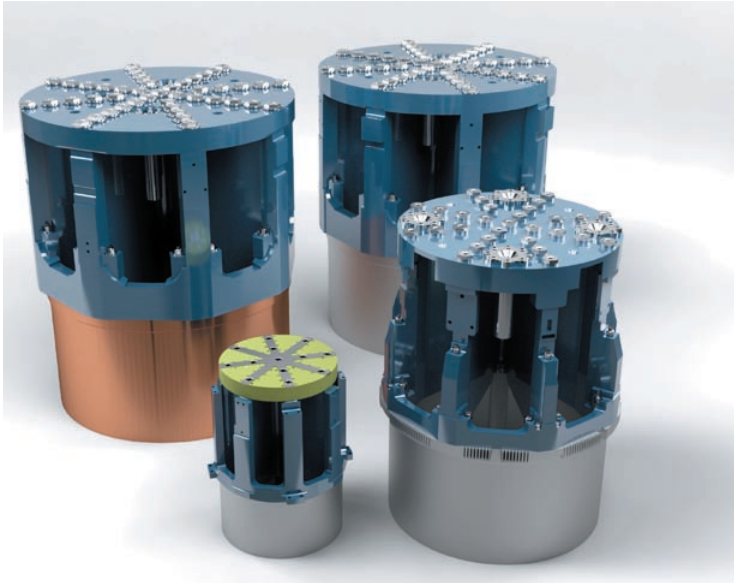
# Induct-A-Ring Technology

Unholtz-Dickie “**T-Series**” Shakers utilize the Induct-A-Ring armature, an advanced design available only from UD. The unique IAR armature is comprised of a solid metal, single turn ring into which AC currents are induced without electrical or cooling connections to the moving element. The solid metal ring is rigidly bolted to the ribbed upper table casting, resulting in a structurally superior, rugged armature capable of extremely high output force ratings without sacrificing reliability.

Most conventional armature designs include a complicated structure with electrical windings, high voltage potentials, many epoxy bonded mechanical joints between insulated wires, high current leads to bring AC current in and out and high pressure water hoses to bring cooling water in and out. All of these electromechanical structures are subjected to the same vibration and shock levels generated over

and over through normal shaker operation. High level testing with conventional armatures often results in current flex-lead fatigue failures, cracked epoxy bonds, failed cooling water fittings, voltage breakdown and burned driver coil windings.

By comparison, the Induct-A-Ring armature is a simple, two-piece metal structure. No electrical current leads or water cooling connections are required. There are no electrical windings, and all points on the armature are at ground potential at all times. No electrical insulation is used anywhere in the armature assembly because there is zero voltage potential between any two points on the ring, or between the ring and ground. Consider an armature consisting of two rigid metal members bolted together vs an assortment of clamped electrical windings, flexing leads and hoses. Which design would you trust to deliver up to 200 g sine vibration and 600 g shock pulses without sacrificing armature reliability? The answer: INDUCT-A-RING!



**Induct-A-Ring Armatures  
(T5500, T4000, T2000-3, T208IAR)**

## COMPARISON: INDUCT-A-RING vs Conventional Armature Design

|                                      | T2000 INDUCT-A-RING  | Conventional Armature Design  |
|--------------------------------------|--|---|
| <b><u>Armature Construction:</u></b> | Solid metal, forged aluminum ring <b>bolted</b> to upper casting.  | Insulated copper wire is held together with epoxy joints. Armature is epoxy bonded to upper casting.  |
| <b><u>Electrical Connection:</u></b> | Inductively Coupled - No electrical current leads required. All points on moving armature remain at ground potential.  | Fragile 1000 Amp current connection bridging shaker suspension required. Armature is at high voltage potential. Voltage breakdown and shorting (arcing) are possible. |
| <b><u>Armature Cooling:</u></b>      | Air Cooled - simple and effective  | Design requires fragile water connection to bridge the armature suspension to cool the coil. These hoses and fittings are subjected to high fatigue stress.           |
| <b><u>Armature Weight:</u></b>       | 100 lb (45 Kg) moving element. Solid metal construction and reduced weight provide superior strength to weight ratio, a key factor for high performance and reliability. | >125 lbs (57 Kg) typical moving element. Many individual components, potentially weak epoxy joints and non-rigid structures.  |
| <b><u>Rated Acceleration:</u></b>    | 200 g sine / 600 g shock   | 100 - 150 g max sine  |

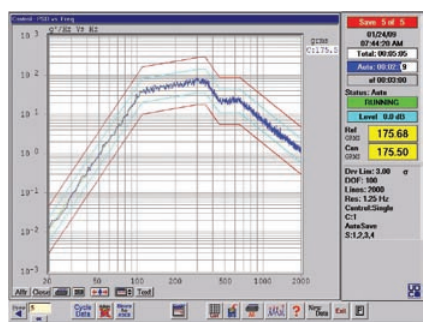


## T2000 Series

15,000 - 25,000 lbf (67 - 111 kN)

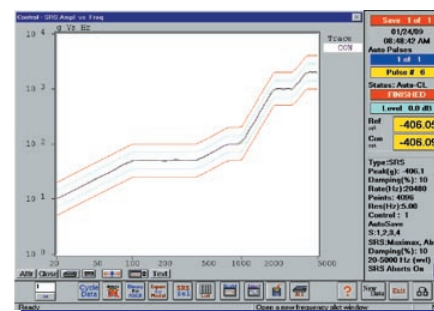


**T2000 Induct-A-Ring Shaker  
with Pedestal Base**



### **SRS Shock: 2000 g SRS @ 5,000 Hz**

High level Shock Response Spectrum (SRS) or Pyro Shock tests are common requirements in the military and aerospace industries. The rugged, solid metal construction of the T2000 Induct-A-Ring armature provides a reliable test platform for these demanding shock tests.



**T2000 Series** Systems lead the industry in high “g” performance applications including up to 200 g sine operation and 600 g shock pulse testing. A major ingredient in T2000 high end performance is the rugged Induct-A-Ring armature, which can deliver extreme vibration test levels with proven reliability. T2000 Systems are the preferred solution to meet the demanding requirements of many Aerospace, Military and Automotive test specifications. The T2000 armature can accommodate component size payloads for high g testing as well as payloads up to 1,900 lbs (863 kg) and remain within the range of the T2000’s automatic load centering system.

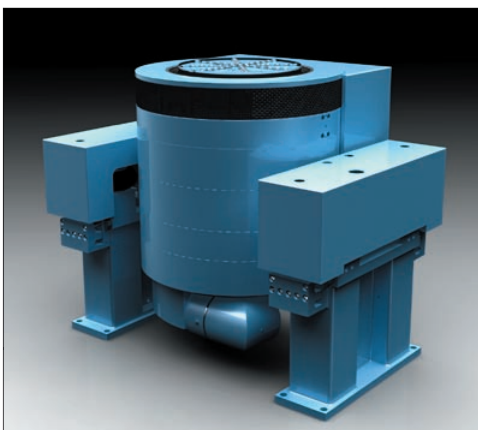
- ◆ Rugged Lightweight Armature: 100 lbs (45.4 kg)
- ◆ Automatic Load Support: 1,900 lbs (862 kg)
- ◆ 2 inch (51 mm) Stroke; 3 inch (76 mm) Stroke Optional
- ◆ 17.5 inch Diameter Armature (445 mm)
- ◆ Rated Sine Force to 3,000 Hz
- ◆ Reliable Operation for Extreme Random and Shock Tests

### **Launch Vibration: 176 g rms with 18 lbs (8.2 kg) payload**

High level random vibration tests can be “armature killers” for conventional wound coil armatures which tend to exhibit the well known SLINKY EFFECT as a failure mode. By comparison, the T2000 Induct-A-Ring armature delivers these extreme test levels and comes back for more.

## T4000 / T5000 / T5500 Series

28,000 - 55,000 lbf (125 - 245 kN)



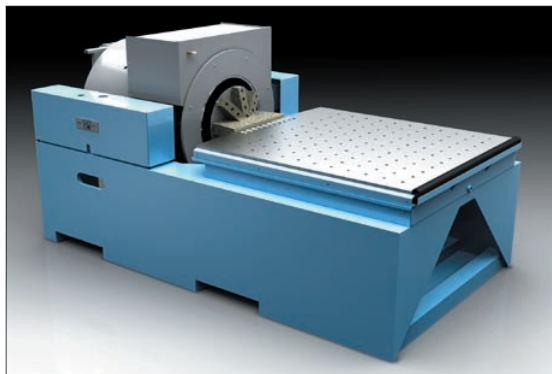
**T4000 Induct-A-Ring Shaker  
with Pedestal Base**

**T4000/T5000/T5500 Series** Systems extend the high performance ratings of Induct-A-Ring armature technology to 55,000 lbs force (245 kN). The T4000, T5000 and T5500 Shakers have 25.5” dia (648 mm) armatures with automatic load centering for payloads up to 4,000 lbs (1,818 kg). These high force, large payload systems are configured to meet the special demands of the automotive, military and aerospace industries. Typical test payloads include missile & launch hardware, satellites, radar systems, battery assemblies, transmissions and large avionics packages.

- ◆ Rugged Induct-A-Ring Armature
- ◆ 2 inch (51 mm) Stroke and 3 inch (76 mm) Stroke Models
- ◆ Automatic Load Support: 4,000 lbs (1,818 kg)
- ◆ Base Options: Pedestal / Concrete Slip Table Assembly (CSTA)
- ◆ Full Rated Sine and Random Force to 2,000 Hz.
- ◆ High Armature Resonant Frequency and Low Mass

T4000 - 2 inch stroke: 2,000 Hz, 250 lbs (113 kg)  
 T4000 - 3 inch stroke: 2,000 Hz, 285 lbs (129 kg)  
 T5000 - 3 inch stroke: 1,800 Hz, 385 lbs (175 kg)  
 T5500 - 3 inch stroke: 1,800 Hz, 385 lbs (175 kg)

## ST Series Slip Tables



Model ST/T2000-48-48

Shaker Models S202 to T2000 are available with the **ST Series** Slip Table option to provide sequential 3-Axis testing capability. Standard slip plate working areas are available from 20" square (508 mm) to 48" square (1219 mm) depending on shaker model (larger plate sizes optional). A unique body-guidance and trunnion isolation feature eliminates unwanted base resonance for both vertical and horizontal axis operation, and provides linear guidance of the shaker body in the horizontal mode. A linear guide bearing to restrain lateral axis (yaw) response is standard.

- ◆ Permanent Factory Alignment
- ◆ Multi-port, Constant Volume Oil Pumping System
- ◆ 10 Minute Conversion Between Vertical/Horizontal Modes
- ◆ Ambient & Combined Environment Support
- ◆ "Oilguard" System Minimizes Oil Contamination
- ◆ Integrated Body Guidance and Trunnion Isolation (IGIS)
- ◆ Lateral Restraint Bearing (LRB)

## HST Series Slip Tables

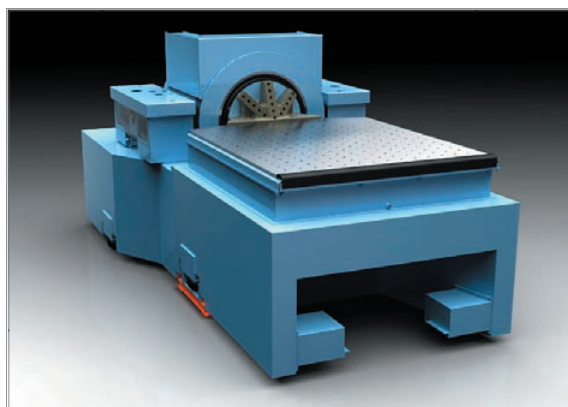


Model HST/T2000-48-48-8LB

UD's latest horizontal slip table design offers a hybrid between a full concrete base (CSTA) and standard Slip Table (ST) configurations. Available for R, K and T2000 Series shakers, the **HST Series** Slip Table assembly offers similar design features included with the CSTA Series, with the addition of shaker body isolation and guidance (IGIS) for vertical and horizontal axis testing. These added features provide increased test flexibility for both general purpose or high CG payload testing. Additional HST benefits include:

- ◆ Concrete Filled Base for Supporting Extra Heavy Loads
- ◆ IGIS Isolation at Trunnions
- ◆ Eliminates Need for Expensive Floor Seismic Mass
- ◆ Floor Isolation Airbags Automatically Inflate for Slip Axis Tests
- ◆ Linear Guidance Bearings Provide Increased Pitch and Yaw Moment Restraint

## CSTA Series Slip Tables



Model CSTA/T5000-60-60-4LB

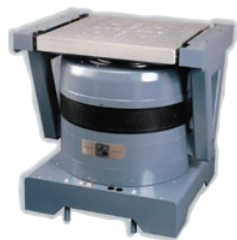
For R, K and T2000 Series shakers, the **CSTA Series** Slip Table assembly is available as an alternate to the above ST-series. For T4000/5000/5500 shakers the CSTA series is used. The CSTA base design utilizes a structural steel base with cross-bracing and stiffeners which provide a rigid platform for positive alignment between the shaker and slip table. Reinforced concrete is added to the base's shell cavity, creating a robust and highly damped reaction mass. This substantial reaction mass is a key feature for obtaining full shaker stroke at low frequencies by minimizing shaker body motion with locked out trunnions. Additional benefits include:

- ◆ Concrete Filled Base for Supporting Extra Heavy Loads
- ◆ May Eliminate Need for Expensive Floor Seismic Mass
- ◆ Rigid Connection to a Seismic Mass with Optional Brackets
- ◆ Linear Guidance Bearings Provide Increased Pitch and Yaw Moment



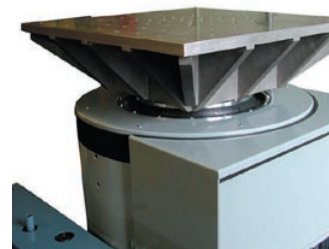
## Head Plates / Expanders

Unholtz-Dickie offers a wide range of Head Expanders and Head Plates to maximize the versatility of any electrodynamic shaker. Head plates and head expanders are manufactured from lightweight magnesium or aluminum alloys, providing high stiffness-to-weight ratio. By increasing the mounting area of the shaker, multiple items can be tested at the same time, decreasing total test cycle time.



**24 x 24 inch (609 x 609 mm)  
Head Plate with External Support  
Structure**

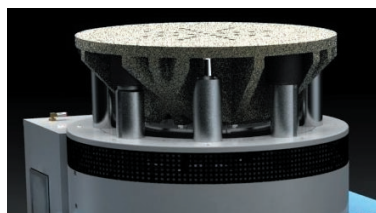
- ◆ Square Standard (round & others optional)
- ◆ Moderate Mass, Maximum Stiffness
- ◆ 2,000 Hz Usable Frequency Range (expanders only)
- ◆ G-10 Interface for Use with Thermal Chambers
- ◆ Custom Insert Mounting Hole Patterns Available
- ◆ Extensive use of FEA Analysis Tools, Modeled with Armature



**36 x 36 inch (914 x 914 mm) Head Expander**

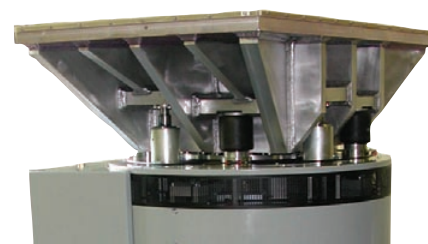
## Guided Head Expanders

Using Guided Head Expanders, payloads with large foot prints or uneven mass distribution can be safely mounted and tested on the shaker.



**32 inch (813 mm) ROUND Head  
Expander with Guidance Bearings and  
Load Support**

- ◆ Square Standard (round & others optional)
- ◆ Guidance Bearings, with extra Load Support
- ◆ 2,000 Hz Usable Frequency Range
- ◆ Simple Interface for Use with Thermal Chambers
- ◆ Custom Insert Mounting Hole Patterns Available
- ◆ Extensive use of FEA Analysis Tools, Modeled with Armature



**30 x 50 inch (762 x 1270 mm) Head Expander  
with Guidance Bearings, Load Support and  
Thermal Isolation**

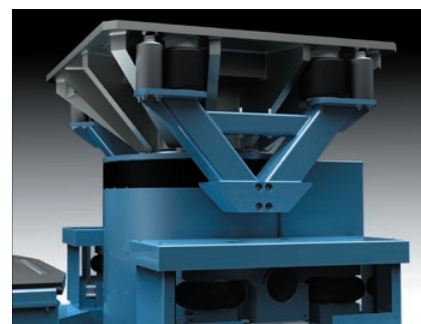
## Structure Guided Head Expanders

For even larger payloads, UD offers Super Structure, externally supported, guided head expanders. These configurations include a massive support structure connected to the shaker or slip table assembly base, and (4) linear bearings located at widely spaced corner positions to optimize in-axis guidance and provide effective lateral restraint.



**72 x 72 inch (1829 x 1829 mm) Externally  
Guided Head Expander and 72 x 72 inch (1829  
x 1829 mm) slip plate with 8 Linear Guidance  
Bearings.**

- ◆ Massive External Support Structure
- ◆ Heavy duty guidance Bearings
- ◆ Load Support to 12,000 lbs
- ◆ 2,000 Hz Usable Frequency Range
- ◆ Custom Insert Mounting Hole Patterns Available
- ◆ Extensive use of FEA Analysis Tools, Modeled with Armature



**60 x 60 inch (1524 x 1524 mm) Head Expander  
with External Guidance Bearings and Load  
Support to 12,000 lbs (5,455 kg)**

# APEX SL Vibration Control / Analysis Workstation



**APEX SL Control Chassis**

The **APEX SL** is a powerful Vibration & Shock Controller that can be configured to satisfy the basic needs of production test users, or meet the more advanced control & analysis requirements for engineering development work. The **APEX SL** hardware set includes a standard Core i5 workstation and a SlimLine Controller Chassis connected via high speed USB interface. Advanced architecture incorporates three high speed Digital Signal Processor's, parallel 24 bit ADC's for each input channel, and two 24 bit high fidelity output channel DAC's.

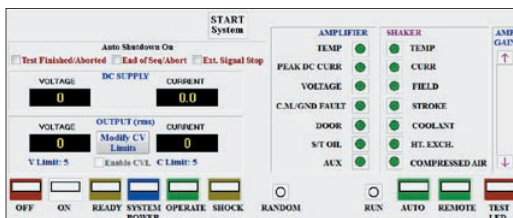


**APEX SL-16 Control Chassis (rear view)  
(16 Channels in 1U Rack Spacing!)**

- ◆ Powerful Core i5 Workstation
- ◆ SlimLine Controller Chassis with High Speed USB Interface
- ◆ Advanced Multiple Digital Signal Processing Architecture
- ◆ Windows 10 64-bit Operating System
- ◆ Input Channels: 4, 8, 12 or 16
- ◆ Integrated Constant Current Source for IEPE Sensors
- ◆ Amplifier-Shaker Remote Command Link (optional)
- ◆ Extensive Safety & Security Features
- ◆ Calibration Kit
- ◆ Auto Report Generator
- ◆ Extensive Test Library:
  - Sine, Random, Shock
  - Resonance Dwell
  - Sine on Random, Gunfire
  - Random on Random
  - PSD Analyzer / Transient Capture
  - SMART Tool
  - Time Replication of Field Data
  - Import, Export Data Utility
  - Transducer Calibration
  - Remote Interface
  - SRS / Burst-Chirp Shock
  - Multi-Tone Sine

## Command Link

### Software Command / Status Panel

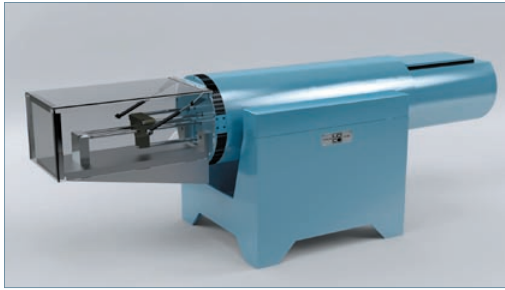


**APEX SL  
Controller**

The **APEX SL** Controller includes an optional interface that displays an Interactive Command/Status Panel icon to provide control and monitoring of all SA Power Amplifier functions from the **APEX SL** Workstation. Using point & click commands, the **APEX SL** operator can start and stop the Vibration System, monitor output current & voltage meters and check system interlocks. A "power save" mode may be selected which automatically powers down the complete Vibration System upon completion of the **APEX SL** controlled test. Long duration, unattended tests can be powered down automatically and safely, eliminating wasted energy and the risk factor of leaving the Vibration System at full power for long periods after test completion.

- ◆ Complete System Operation from APEX SL Workstation
- ◆ Shaker/Amplifier Status and Fault Indicators
- ◆ Automated Start-up from External Input (e.g. temp. chamber)
- ◆ Amplifier Output Voltage and Current Meter Display
- ◆ Power Save Mode Shuts Vibration System Off at End of Test
- ◆ Selectable Soft Shutdown Limits

## LS - Series Long Stroke Thrusters



**LS20 Long Stroke Thruster w/ Slider and Clear Safety Shield**

Unholtz-Dickie offers a family of Long Stroke Thrusters optimized for reproducing transient waveforms (crash, drop, impact) often required to test air bag sensors, ABS, active Suspension components and other automotive hardware items. These LS Systems include guided horizontal "sled" platforms (6 x 7 inch, 152 x 178 mm) driven by large Power Amplifiers for ultrahigh velocity operation.

- ◆ Six Shaker Models: 6XS / LS08 / LS12 / LS16 / LS20 / LS24
- ◆ Extreme Velocity Change Specifications ( $\Delta V$ )
  - 300 - 800 in/sec (7.6 - 20 m/sec) pk-pk
  - 17 - 45 mph (27 - 72 kph) pk-pk
- ◆ Shock Force Ratings: 2,500 - 8,500 lbf pk (11- 38 kN)
- ◆ Stroke: 6, 8, 12, 16, 20, 24 inch pk-pk (152, 203, 305, 406, 508, 609 mm)
- ◆ Up to 400 g / 8 msec Halfsine with 2 lb (0.9 kg) Payload (LS08 System)
- ◆ Bearing Guided Slider and IGIS Isolation System

## LS-Series Seismic Thrusters



- ◆ Seismic Configuration for Telcordia Zones 1-4 Earthquake Waveforms
  - 12 inch stroke (305 mm) w/ large table & 48 x 48 inch (1219 x 1219 mm) slip plate

**LS12H configured to meet Zone 4 earthquake test on 2 bay rack - Horizontal axis**

**LS12V w/ guided table platform to meet Zone 4 earthquake test on 2 bay rack - Vertical Axis**



## Transducer Calibration Systems



**Model 680C System  
(w/ oscilloscope option)**

Unholtz-Dickie Transducer Calibration Systems have been an established tool in vibration metrology labs for decades. The Model 680C System is UD's latest generation calibrator, utilizing an enhanced version of the APEX SL Controller (see page 10) and the rugged Model S032-C Shaker which accommodates a broad range of sensors from small accelerometers to large velocity transducers. The calibration control software is user-friendly and generates a detailed Calibration Certificate upon test completion.

- ◆ Fast, PC-Controlled Calibration of Accelerometers and Velocity Transducers
- ◆ Back-to-Back Calibration Using NIST Reference Accelerometer
- ◆ Critical for ISO9000 Test Compliance
- ◆ Precision Sinusoidal Comparison Technique
- ◆ Swept or Stepped-Frequency Sine
- ◆ Wide Frequency Range: 2 - 10,000 Hz
- ◆ High Acceleration (75g) and Velocity (50 in/s, 1.3 m/s)
- ◆ Automatic Calibration Certificate



## Instrumentation & Accelerometers

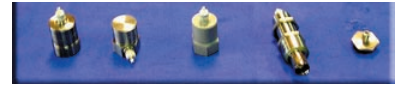


(6) Model D33 w/ Rack Adapter

- ◆ Single or Multi-Channel Signal Conditioners
- ◆ Normalized Outputs: 10 / 100 mV/g
- ◆ Digital Meter, Selectable HP/LP filters (D33 Series)
- ◆ Low-Pass Filtering (plug-in module)
- ◆ Dial-A-Gain Input Sensitivity Feature



Models CVA-4 (top) & CVA-8



Models: 8B6, 10B10-X, 10B10T-X, RCA-2TR, Iso Stud

- ◆ Normalized Charge Sensitivity: 10 pC/g
- ◆ Low Base-Strain and Case-Strain Sensitivity
- ◆ Flat Charge Sensitivity vs Frequency
- ◆ Flat Charge Sensitivity vs Temperature
- ◆ Mounted Resonant Frequency: 30 kHz
- ◆ Remote Charge Preamp (RCA-2TR)

## Spare Parts

The ability to obtain spare parts in a efficient and timely manner, extends equipment life and minimizes equipment downtime. UD offers an extensive supply of replacement parts with most common parts typically available for prompt shipment directly from our Wallingford, Connecticut factory. Parts can be purchased by credit card. Please contact [spares@udco.com](mailto:spares@udco.com)

## Calibration

UD provides complete calibration services from our corporate headquarters in Wallingford, Connecticut. All calibration procedures meet quality standards and are NIST traceable. Calibration available for Vwin II and Apex SL Controllers, CVA, D33 and 122P Series Signal Conditioners, TSC-3 Instrumentation, and UD (and other) Accelerometers. Please contact [info@udco.com](mailto:info@udco.com)

## Service / Training / Startup / Instruction

**SERVICE:** UD is a company committed to prompt service and strong technical support for every customer. Service and technical support are provided TWO different ways: 1. Direct technical support from our factory by telephone, FAX or E-Mail. 2. Field service dispatched from our Connecticut factory, our west coast division in California, our European Representative Division in Germany or from our regional service support centers in other countries. For more information contact [service@udco.com](mailto:service@udco.com)



**TRAINING:** UD offers instructional training throughout the year for its domestic and international customers. This instruction includes vibration controller, power amplifier, electrodynamic shaker, slip table assembly, and support instrumentation. Instruction is provided by qualified company engineers who use the equipment every day. For more information contact [info@udco.com](mailto:info@udco.com)

**NEW SYSTEM STARTUP & ON-SITE TRAINING:** UD offers startup assistance including System Installation Inspection, Initial System Startup and Operational Verification, and Training on System Operation and Maintenance.

**INSTRUCTION:** Controller operational training courses are held in a classroom setting at our World Headquarters in Wallingford, CT. Access to control systems and shakers are available where instructors demonstrate specific operational and performance features. Training is normally held twice a year and is scheduled through the planning coordinator at the Unholtz-Dickie factory. Please contact [info@udco.com](mailto:info@udco.com) for further information and enrollment.



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