P.A.Hilton Ltd

VIBRATION

P.A.Hilton Ltd is a market leader in the manufacture and provision of teaching equipment for Universities and Technical Colleges worldwide for both degree and vocational level.

It has been designing and manufacturing "hands-on" Engineering teaching equipment for almost 50 years and has a wealth of knowledge and experience within the educational and training industry. Its worldwide network of agents guarantees a fast and professional response to all enquiries.

The VIBRATIONS range of P.A.Hilton Ltd equipment enables clear and comprehensive learning of VIBRATIONS covering a variety of theories and topics. An understanding of the way in which materials and components react to excitation, is fundamental when studying the application of loads on a variety of fixed structures and rotating machinery. The VIBRATIONS range forms a comprehensive range of equipment, from simple pendulums, beam vibrations to complex structural vibrations. All are suitable for demonstration and experimental work.

All the VIBRATIONS hardware operates in a standalone mode, with some being supplied with **Data Acquisition** Interfaces and **Software.**

FREE

FORCED

TORSIONAL

SEISMIC

PENDULUMS

SPRING MASS

2 Two Year Warranty

Pendulums

HVT1 Simple Pendulum

A simple pendulum consisting of a cord with a ring at the top end and a sliding pendulum mass.

HVT2 Reversible Pendulum

The reversible pendulum consists of a rigid metal bar with two pivot points, one near each end of the bar. It can be suspended from either pivot and swung. The two pivots are adjustable on the rigid metal bar and this allows the periods of swing to be adjustable. In use, it is swung from one pivot, and the period timed, and then turned upside down and swung from the other pivot, and the period timed.

HVT3 Compound Pendulum

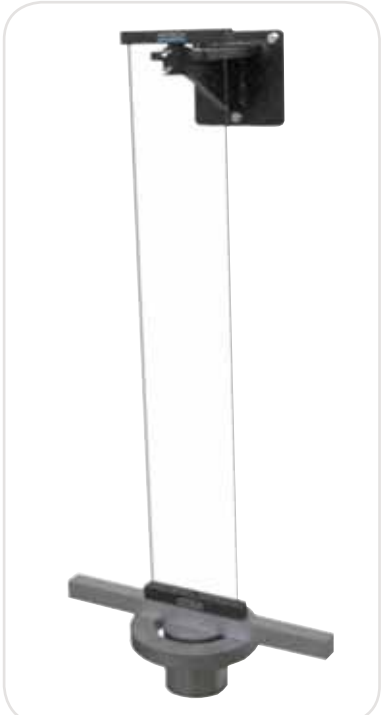
A wall mounted bracket has a metre long bar suspended from its knife-edge pivot point. Attached to the pendulum bar is a movable mass. The mass can be fixed along the pendulum bar in seven positions.

HVT5 Seismic Table

This apparatus is a uniaxial motion simulator (one-degree-of-freedom). With this and the accessories supplied topics such as resonance, dampening, torsion, material properties and end condition fixings can be investigated. The unit consists of a bench mounted main base with front panel controls and display. The amplitude of movement as well as the frequency can be controlled and set by the user.

HVT8 Bifilar/Trifilar Suspension

A suspended wall bracket supports wire cables for a two wire (Bifilar) or three wire (Trifilar) suspension system, to determine experimentally the moment of inertia and radius of gyration of a rectangular bar, ring and cylinder. No drill chucks or cumbersome fixing devices are used, so that calculations are straight forward, as is the changing over of the two wire or three wire arrangement.



HVT9 Torsional Vibration Apparatus

The equipment provides a basic range of torsional vibration experiments.

A wire rod clamped in a wall mounted bracket has a heavy disc attached to the lower end. A solid ring can be located over the disc to increase its inertia. Steel and brass rods of two different diameters are included. All brackets, clamps and adapters are supplied.

HVT10 Comprehensive Torsional Vibration

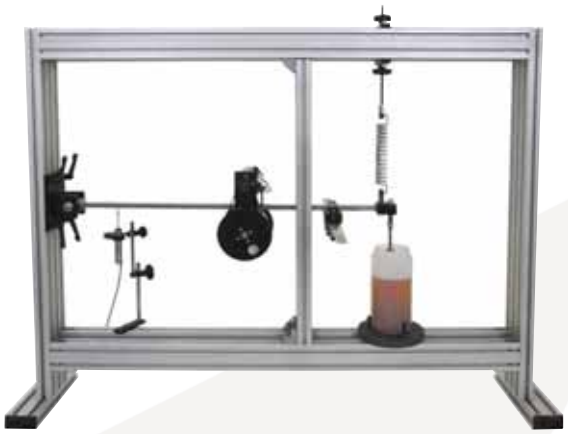
A wall mounted apparatus to verify the dependence of the periodic time of oscillation of a 'shaft' mounted flywheel on the moment of inertia, length of shaft and shaft diameter; fixed and free end conditions and damping.

HVT11 Vibration of a Spiral String

This self-contained wall mounted unit easily allows students to easily calculate the theoretical simple harmonic motion of the spring, and compare the value with simple experimental results.

HVT12 Universal Vibrations Apparatus

The HVT12 is designed to illustrate the vibrational characteristics and controlling properties of a simple mechanical system. It illustrates how it is possible to suppress the vibration of a primary system by attaching to it a smaller secondary system.



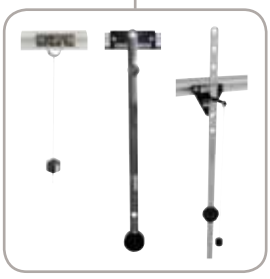
The Standard HVT12 Universal Vibrations Apparatus comprises the following equipment:

- HVT12f - Vibrations Frame
- HVT12g - Free and Forced Vibrations experiment
- HVT12d - Vibration Absorber
- HVT12k - Data Acquisition System (Two Channel Digital oscilloscope)
- HAC90 - Tachometer
- HAC110 - Speed Controller
- HAC120 - Motor Exciter

Experimentation on the following four phenomena is possible with the standard unit:

Free Vibrations, **Resonant Frequency, Forced Vibrations**, **Damping**

The modular nature of the standard unit allows optional extras **HVT12a, b, c,** and **h** to be added as and when budgets permit.



HVT12a - Pendulum Module

HVT12b - Torsional Oscillation (Free and Damped) Module

HVT12c - Beam Bending (Transverse) Vibrations Module

HVT12h - Mass Spring System Module

HVT13 Torsional Vibration

This bench top mounted unit is used to study torsional stiffness and torsional vibration. Angular movement sensors on the chuck pillars provide the amplitude of vibration as an electrical signal. The control unit conditions these signals and makes them available to view on the **HVT13 Data Acquisition System (Optional Extra)**. Static twist of the specimen is achievable using the attachable protractor, pointer, hanger and calibrated weights supplied.

HVT14 Spring Mass Vibration System

The floor standing unit is used to analyse the free or damped oscillations of a spring mass system. The sturdy base secures two vertical guides. A top horizontal bracket keeps the bars at a near constant width which aids the running of a cradle up and down the bars. The cradle attaches to one end of a helical tension spring of known wire diameter, free length and spring rate. At the other end of the spring an adjustable screw mechanism adjusts the length of the spring and hence it's starting position. The cradle has its own self weight, but additionally a number of calibrated weights can be added to the cradle in order to vary the oscillating mass. The cradle vertical motion is transferred to a rotating drum recorder mounted with paper which can be removed after testing to undertake further analysis.

HVT20 Stability of Structures

A model strut consisting of two rigid links connected by a pinned joint is mounted in a test frame with a fixed pin at one end and a pin free to move axially at the other. The rigidity of the strut is achieved by attaching various linear coil springs or a torsion spring to the centre pin or the free end. The free end is constrained by a loading yoke that is guided by linear bearings running on parallel rails. The central joint is fitted with a trunnion to which loading cables are connected. One cable includes a strain gauged load cell to measure the net force being applied. The signal from the strain gauge load cell is fed into the Data Acquisition Interface supplied.

OTHER EXPERIMENTS AVAILABLE *(Refer to our Website for details)*

HVT15 Free Vibration of Horizontal Cantilevers
HVT16 Vibration of Vertical Cantilevers
HVT17 Forced Vibration of a Cantilever
HVT18 Transient Force at Base of a Cantilever
HVT19 Structural Dynamics Kit
HVT22 Vibrations of a String
HVT23 Free Vibration of Bars
HVT24 G Pendulum

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