



Seismic Table HVT5



HVT5 Unit Shown with Full Set of Experiment Parts, Sensor Box and Accessories

- **Self-contained setup with all accessories supplied for large range of experiments detailed in manual.**
- **Variable frequency range available for testing, test setups can be taken through resonance.**
- **Amplitude of vibration adjustable.**
- **Frequency can be set and locked as well as pulse function.**
- **Digital display for showing cycles per second.**
- **Sensor Box with digital oscilloscope functions provided with two single axis accelerometer sensors.**
- **Data acquisition software USB linked to sensor box to record and store frequency data.**
- **Accessory for measuring displacement of models provided.**
- **Negligible Operating and Maintenance Costs.**
- **Two year Warranty.**



Introduction

Almost all structures (buildings, bridges, trains, trees, cranes, cars, power cables, etc) will vibrate if they are struck. This is not obvious in many cases either because the resulting vibrational movements are too small to see or the vibration is rapidly damped out by friction.

When struck, almost all structures will vibrate at a number of *discrete* 'natural frequencies' (NFs). The lowest NF of any structure is called the 'fundamental NF' (FNF). Large, long structures like ships, aircraft wings, skyscrapers and tall trees exhibit low FNFs in the range between 0.1 and 10 Hz (cycles per second). Smaller, stiff structures exhibit higher FNFs in the range 80 to 200 Hz.

The importance of NFs is that if any form of dynamic (unsteady) forced excitation such as gusts of wind, internal combustion, uneven rail or road surface or air turbulence contains frequencies that closely match any one NF of an exposed structure, a phenomenon termed '*resonance*' occurs and the vibrational response of the structure will be much larger than if a static (steady) force of the same magnitude were applied to the structure. This is known as 'dynamic magnification'. The seismic waves generated in dry land by an earthquake, for example, in most cases produce mainly *horizontal* to-and-fro motion at the surface of the ground.

Description

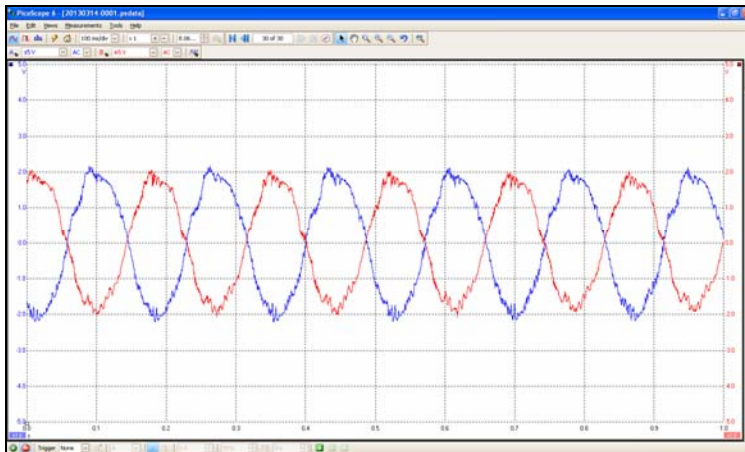
Seismic tables are used to simulate earthquake ground motions, and the motions of structures excited by earthquakes. By placing equipment or model structures on these shake tables engineers can determine if they can survive particular earthquakes or if computer models accurately predict the earthquake response of the test objects.

The **HVT5 Seismic Table** comes with a wide range of model structures and variations to test many different concepts of ground movement activity and structure reaction. With this equipment students can learn some of the fundamental concepts of structure design and designing principles as well as gain a much fuller understanding of the back ground theory of many related topics and how they are applied in industry.



This apparatus is a uniaxial motion simulator (one-degree-of-freedom) but 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 as well as the frequency of movement can be controlled and set by the user.

Two single axis accelerometer sensors are provided with magnetic bases; these can be fixed to the structure models and linked via sensor box, with digital oscilloscope capabilities, to a PC or laptop where data can be captured (via the software provided) and recorded for future analysis.



Comparison of a wide variety of models and setup variations can be achieved with the mounting boards provided. It is possible for students to construct their own models to fix to the platform for testing although only experiments with the equipment provided is outlined in the manual.





Specification

HVT5 Seismic Table

General

An instrumented bench top vibration unit with sensors and accessories that provides a wide range of experiments, background learning and real life simulation of responses to vibration of different structure setups. To see the effects and applications of how to change the parameters of models for structural as well as specific theory applications, incorporating a variety of practical solutions to minimise the amplitude of frequency responses.

Detailed

- Frequency Range: 1 to 14Hz, 60 to 840 RPM (+/- 10%) dependant on setup and accessories used.
- Amplitude of 0- 10mm
- Digital Display
- Displacement of structures can be measured.
- Dampening accessories
- Vibration isolator accessories
- Vibration neutraliser accessories
- Additional masses provided
- Models of different heights, support, CSA, balance and materials.
- Models with different fixings, stiffeners provided.
- Two story structures.
- 2 x single axis accelerometers
- Sensor box with digital oscilloscope capabilities, USB linked for PC use, complete with software.
- 2 x Power supplies provided (for main unit and sensor box).

Supplied with a detailed experimental operating and maintenance manual, showing example results as well as theoretical calculations. Accessories and spares for at least two years normal operation together with a full two-year warranty.

Experimental Capabilities

- Uniaxial vibration, single degree of freedom.
- Dampening types and effectiveness on reducing vibration and magnitude of displacement.
- Anti-seismic protection.
- Experiments looking at cross sectional area, density, bending moments, centre of gravity and weight distribution.
- Calculating natural frequency, damping ratio, spring stiffness and frequency response.
- Fixing conditions
- Torsional twist of 3D models.
- Local vibration.
- Free location of sensor pick-up points and orientation.
- Different material reaction to amplitude and frequency of movement.
- Investigation of resonance speeds and modes. Changing setup variables to manipulate resonance.

Dimensions

Height:	340mm	Depth:	480mm
Width:	670mm	Weight:	10kg

Services Required

Electrical:

Any mains single phase outlet. Unit supplied with two power transformers for 110-240V input to 9V and 12V output respectively.

Ordering Information

Order as: HVT5 Seismic Table

Electrical Specification

Either: A: 220-240 Volts, Single Phase, 50Hz (With earth/ground).

or

B: 110-120 Volts, Single Phase, 60Hz (With earth/ground).

Language

English

Shipping Specification

Service Unit Net Weight:	12.5 kg
Packing Case Volume:	0.125m ³

Accessories and Spares

Unit supplied with:

- One experimental operating and maintenance manual in English.
- Accessories and spares for 2 years normal operation. List available on request.

Also Available On Request

Further detailed/ technical specifications.
Additional copies of instruction manual.
Recommended list of spares for 5 years operation.

P.A.HILTON Ltd.

Horsebridge Mill, King's Somborne,
Stockbridge, Hampshire, SO20 6PX, England

Telephone: National (01794) 388382
International +44 1794 388382

Fax: National (01794) 388129
International +44 1794 388129

E-mail: sales@p-a-hilton.co.uk
Website: www.p-a-hilton.co.uk

